```
0001                    ASMB,A,B,L
**  NO ERRORS*
```

```
0001                    ASMB,A,B,L
0002  04001                   ORG 4001B
0003                          SUP
0004*
0005*      LINKAGE INFORMATION USED BY THE TSB LOADER
0006*
0007  04001 037300        DEF LIBRA      SYSTEM LIBRARY PROGRAM ORIGIN
0008  04002 036051        DEF COM6       => SYSTEM LIBRARY DISC ADDRESSES
0009  04003 000035        ABS TTY01-TTY00    LENGTH OF A TTY TABLE
0010  04004 033304        DEF TTY00+?DISC    ADDRESS OF USER DISC ADDRES
0011  04005 033303        DEF TTY00+?MASK    ADDRESS OF USER MASK     X]
0012  04006 033270        DEF TTY00+?BHED    =>START OF LOGICAL BUFFER
0013  04007 033267        DEF TTY00+?BSTR    =>END OF LOGICAL BUFFER
0014  04010 033271        DEF TTY00+?BGIN    =>START OF PHYSICAL BUFFER
0015  04011 033272        DEF TTY00+?BEND    =>END OF PHYSICAL BUFFER
0016  04012 033306        DEF TTY00+?ID      ADDRESS OF ID-NAME
0017  04013 001626        DEF LMSK       ADDRESS OF USER-DEPENDENT ITEMS
0018  04014 177322        ABS USER-PROGB-1   LENGTH OF SWAP AREA
0019  04015 001325        DEF USER       CORE ADDRESS OF SWAP AREA
0020  04016 000041        DEF DATIM      ADDRESS OF HOUR OF YEAR
0021  04017 000042        DEF DATIM+1    ADDRESS OF TENTHS OF HOUR
0022  04020 000040        DEF YEAR       ADDRESS OF YEAR
0023  04021 036131        DEF TSBLB      DISC ADDRESS FOR START UP
0024  04022 000641        DEF MGSLE      MAG SLEEP LOC.
0025  04023 000445        DEF UTLTY      STARTING ADDR. OF UTILITY
0026  04024 114312        JSB POWIN,I    SET IN LOC 4 BY LOADER        [X]
```

```
0028  00002                ORG 2
0029  00002 102002         HLT 2          FOR SYSTEM
0030  00003 024002         JMP *-1          PROTECTION
0031  00004 103004         HLT 4,C        CHANGED BY LOADER.
0032  00005 102005         HLT 5          PARITY ERROR.
0033  00006 114315  DMA    JSB ?ADIN,I
0034  00000         A      EQU 0          A REGISTER ADDRESS
0035  00001         B      EQU 1          B REGISTER ADDRESS

0037  00007 107707         CLC *,C
0038  00010 114313  ?SC    JSB T35DR,I    SYSTEM CONSOLE
0039  00011 103111  DC     CLF *        DISC DATA CHANNEL                  [X]
0040  00012 114315  CC     JSB ?ADIN,I  DISC COMMAND CHANNEL               [X]
0041  00013 106713         CLC *          PHOTOREADER
0042  00014         MPX    EQU 14B
0043  00014                ORG MPX
0044  00014 114354         JSB MPXO,I     MUX(DATA)
0045  00015 000000         NOP            MUX(STATUS)
0046  00016         DSCB   EQU 16B
0047  00016                ORG DSCB
0048  00016 114316         JSB DSCBA,I    PHONES
0049  00017 114314  CLOCK  JSB CLKDR,I    TBG
0050  00020 000000  LTEMP  BSS 16                                           [X]
0051  00040 000000  YEAR   BSS 1          A NUMBER FROM 0 TO 99
0052  00041 000000  DATIM  BSS 2          REPRESENTS TIME OF YEAR. FIRST
0053*                             WORD CONTAINS HOUR OF YEAR. SECOND
0054*                              IS # OF 100MS UNITS IN HR -
0055*                              36000.
0056  00043 000000  MOVES  BSS 1            SOURCE AND DESTINATION
0057  00044 000000  MOVED  BSS 1              FOR MOVEW ROUTINE.
0058  00045 000000  ID     BSS 1            USED FOR RESULTS OF GETID ROUTIN
0059  00046 000000  MID    BSS 1
0060  00047 000000  T35CP  BSS 1            T35 BUFFER PNTR FOR LIBR.PROGS.
0061  00050 000000  T35LC  BSS 1            RESULT OF T35CH ROUTINE.
0062  00051 000000  PBPTR  BSS 1            POINTER TO END OF CURRENT PROGRA
0063  00052 000000  TERR   BSS 1           BIT FLAG INDICATING TAPE ERROR X
0064  00053 000000  CFLAG  BSS 1           BIT FLAG INDICATING COMPILE MODE

0066* THE FOLLOWING ARE USED BY THE SCHEDULER *

0068  00054 000000  TIMER  BSS 1            POINTS TO CLOCK OF ACTIVE USER.
0069  00055 000000  SBHED  BSS 1
0070  00056 000000  SCHL   BSS 1
0071  00057 000000  TTQ    BSS 1
0072  00060 000000  SCHID  BSS 1
0073  00061 000000  SCHP   BSS 1
0074  00062 000000  SCNT   BSS 1
0075  00063 000000  SCHPR  BSS 1
0076  00064 000000  CTEMP  BSS 1
0077  00065 000000  WORD   BSS 1            WORD COUNT TO DISC ROUTINE.
0078  00066 000000  TOG    BSS 1
0079  00067 000000  TADR   BSS 1
0080  00070 000000  TCNT   BSS 1
0081  00071 000000  IDTRA  BSS 1
0082  00072 000000  IDTLA  BSS 1
0083  00073 000000  IDCNT  BSS 1
```

```
0084  00074 000000  IDCAD BSS 1
0085  00075 150040  IDMAX DEC -12256
0086*
0087  00076 000000  MSQCT NOP
0088  00077 012270  MSQP1 DEF MSQHD     BEGINNING OF MESSAGE BUFFER
0089*
```

```
0091* THE NEXT SET OF CARDS CONSTITUTE THE RESIDENT INFO ABOUT
0092* DISC RESIDENT TABLES. THESE CARDS MUST BE ORIGINED AT 100B.
0093* THEY ARE INITIALIZED BY THE VARIOUS LOADERS, AND THEIR
0094* CONTENTS ARE WRITTEN ON DISC BY THE SLEEP ROUTINE.
0095  00100                 ORG 100B
0096  00100 000000  DIREC BSS 56        POINTERS TO THE DISC DIRECTORIES
0097*                                    THESE CONSIST OF 4 7-WORD
0098*                                    ENTRIES, ONE FOR EACH DISC
0099*                                    DIRECTORY. THE 7 WORDS ARE
0100*                                    1)-#OF WDS. IN DIRECTORY;
0101*                                    2)1ST 5 WDS OF DIRECTORY;
0102*                                    3)DISC ADDRESS.
0103  00170 000000  IDLEN BSS 1       TOTAL LENGTH OF ID TABLE
0104  00171 000172  IDTTA DEF *+1
0105  00172 000000       BSS 4       DISC ADDRESSES FOR ID TRAKCS
0106  00176 000177  IDTRL DEF *+1
0107  00177 000000       BSS 4       TRACK LENGTHS FOR ID TRAKCS
0108  00203 000000  ADLOC BSS 1          DISC ADDRESS OF ADTABLE.
0109  00204 000000  ADLEN BSS 1          -#OF WORDS IN ADT.
0110  00205 000000  ?TBL  BSS 1
0111  00206 000000  NPORT BSS 1          - NUMBER OF SWAP TRACKS RESERVED
0112  00207 177610  PHR   DEC -120       TWO MINUTES DEFAULT CASE
0113  00210 000000  SLEPT BSS 1          0=SELPT  1=NOT SLEPT
0114  00211 000000  T35BF BSS 36         BUFFER FOR INPUT AND REPLIES.
0115  00255 006412  CRLF  OCT 6412       MUST FOLLOW T35BF
0116*
0117* THE FOLLOWING VARIABLES ARE SYSTEM STATUS VARIABLES
0118*
0119  00256 000000  TCNTR BSS 1
0120  00257 000000  TPNTR BSS 1
0121  00250 000000  SROMS ARR 1
0122  00261 000000  MAIN  NOP            INDICATES USER IN CORE,0 IF NONE
0123  00262 000000  LIB   NOP            INDICATES LIBRARY PROG. IN CORE
0124  00263 000000  ENDSK NOP            =1 IF DISC BUSY, 0 IF NOT.
0125  00264 000000  TIMEF NOP            =1 WHEN CURRENT PROG IS TIMED.
0126  00265 000000  MPCOM NOP          BIT = 1 FOR MPX MSG TO SCHED  X]
0127  00266 000000  TAPEF NOP          BIT = 1 FOR USER IN TAPE MODE X]
0128  00267 000000  CHNFG NOP          BIT = 1 FOR CHAIN RUNNING     X]
0129  00270 000000  HFLAG NOP          BIT = 1 FOR $HELLO RUNNING    X]
0130*
0131***   DISC DRIVER TEMPORARIES AND STORAGE
0132*
0133  00271 000000  CORE  NOP
0134  00272 000000  DADDR NOP
0135  00273 000000  DRIVE NOP
0136  00274 000000  HDSCT NOP
0137  00275 000000  CYL#  NOP
0138  00276 000000  DSAVE BSS 2
0139  00300 177766  FAIL  DEC -10
0140  00301 010000  WRIT  OCT 10000
0141  00302 020000  READ  OCT 20000
0142  00303 030000  SEEK  OCT 30000
0143  00304 077600  CYLMK OCT 77600
0144  00305 120011  CMDMA ABS 120000B+DC
0145  00306 000000  SYSID NOP
0146*
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0147  00307 000000  TTA    BSS 1
0148  00310 000000  TTB    BSS 1
0149  00311 000000  TTE    BSS 1
0150  00312 031512  POWIN  DEF POW
0151  00313 032350  T35DR  DEF ?TT2
0152  00314 034204  CLKDR  DEF CLKIN
0153  00315 031436  ?ADIN  DEF DINT
0154  00316 032222  DSCBA  DEF DSCBL
0155  37300         LIBRA  EQU 373008     256 WORDS FROM THE LOADER.
0156  00317 137300  #LIBI  DEF LIBRA,I
0157  00320 037300  #LIB#  DEF LIBRA
0158  00321 035502  SCHEN  DEF SCHEQ
0159  00322 035442  SCHIN  DEF SCHIQ      LINKAGE FOR INPUT REQUEST.
0160  00323 000020  DLTEM  DEF LTEMP
0161  00324 032330  TTY35  DEF ?TT35
0162  00325 000000  DID    NOP
0163  00326 012267  USEND  DEF MSQHD-1
0164  00327 036751  SCHLB  DEF SCHLQ
0165  00330 001531  L128   DEF LIBUS+128
0166  00331 036052  FUSS   DEF COM6+1     POINTER TO DISC ADDRESS OF FUSS.
0167  00332 006000  P3072  DEC 3072                                      XJ
0168  00333 033264  DTTY0  DEF TTY00
0169  00334 000100  DIRD0  DEF DIREC
0170  00335 000107  DIRD1  DEF DIREC+7
0171  00336 000161  DIRD3  DEF DIREC+49                                  XJ
0172*
0173  00337 000000  LCHCR  NOP
0174  00340 020040  ASCBB  ASC 1,
0175  00341 036330  T35CH  DEF T35CQ
0176  00342 000343  READY  DEF *+1
0177  00343 005122         OCT 5122       LF-R
0178  00344 042501         ASC 2,EADY
0179  00346 030060  ASC00  ASC 1,00
0180  00347 035562  SCHOU  DEF SCHOQ
0181  00350 031334  DISC   DEF LDISC
0182  00351 000352  MLINK  DEF *+1        POINTS TO BASIC QUEUE ENTRY.
0183  00352 000352         DEF *          LINK TO HEAD OF QUEUE.
0184  00353 077777         OCT 77777      MAX. PRIORITY USED FOR Q INSERTS
0185  00353         INF    EQU MLINK+2
0186  00354 032602  MPX0   DEF MPXIO
0187  00355 032541  MUXR   DEF MUXOR
0188  00356 035604  POCR   DEF POC
0189  00357 017575  TTYTP  DEF TTPT
0190  00360 077577  SYNCC  OCT 77577      SYNCHRONIZING CHARACTER
0191  00361 026127  MLP2A  DEF MLOP2
0192  00362 001777  B1777  OCT 1777
0193  00363 000137  BKSPC  OCT 137
0194  00062         BUFLN  EQU 50                                        XJ
0195  00364 177634  MBLEN  ABS -BUFLN-BUFLN
0196  00365 000144  BLEN   ABS BUFLN+BUFLN
0197  00366 177636  MAXBL  ABS -BUFLN-BUFLN+2
0198  00367 036051  DCOM6  DEF COM6
0199  00370 000000  LOGCT  NOP            NUMBER OF ELEMENTS IN LOGGR
0200  00371 036201  LOGP1  DEF LOGGR+31   POINTERS TO FIRST
0201  00372 036201  LOGP2  DEF LOGGR+31     AND LAST ENTRIES IN LOGGR
0202  00373 036142  LOGBG  DEF LOGGR      POINTS TO BEGINNING OF LOGGR
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0203  00374 036202  LOGND DEF LOGGR+32   POINTS TO END OF LOGGR
0204  00375 047040  ASCIN ASC 1,N
0205  00376 043106  ASCFF ASC 1,FF
0206  00377 020100  ASCBA ASC 1, @
0207  00400 030040  ASC0B ASC 1,0
0208  00401 034216  DCLC1 DEF CLC1
0209  00402 034222  DCLC2 DEF CLC2
0210* TTY ENTRY FOR TTY35
0211  00403 000000  T35CL NOP            PSEUDO CLOCK.
0212  00404 000000  T35RS NOP            RESTART ADDRESS
0213  00405 000000  T35ST NOP            STATUS
0214  00406 000000  T35LK NOP            LINK
0215  00407 000000  T35PR NOP            PRIORITY
0216  00410 000406  T35LN DEF T35LK
0217  00411 000422  T35B2 ABS T35BF+T35BF  CHAR POINTER TO TTY35 BUFFER
0218  00412 000532  T35ND ABS T35BF+T35BF+72   POINTS TO BUFFER END
0219  00413 000211  T35B1 DEF T35BF     POINTS TO WORD ADDRESS OF BUFFER
0220*
0221***  CONSTANTS AND TEMPORARIES IN ASR-7 DRIVER.
0222*
0223  00414 000000  T35F1 NOP            SYSTEM
0224  00415 000000  T35F2 NOP             CONSOLE
0225  00416 000000  T35F3 NOP                FLAGS
0226  00417 160000  TBITS OCT 160000
0227  00420 120000  B120K OCT 120000
0228  00421 130000  B130K OCT 130000
0229  00422 160000  B160K OCT 160000                                    XJ
0230  00423 000255  ?ABP2 DEF CRLF
0231*
0232  00424 001331  LIBD  DEF LIBUS
0233  00425 101331  LIBDI DEF LIBUS,I
0234  00426 001741  ERS32 DEF ERSEC+32
0235  00427 012120  U4475 DEF USER+4475
0236  00430 100001  ONEI  DEF 1,I
0237  00431 035034  DEH   DEF EH
0238  00432 176447  MLIBD ABS -LIBUS
0239  00433 002003  PBUFF DEF PROGB+1
0240  00434 071540  M36K  ABS -30000-6000
0241  00435 106240  D36K  ABS 30000+6000
0242  00436 142027  MCOM2 ABS -COM2
0243  00437 020134  RVRSL ASC 1, \
0244  00440 035746  SCOM1 DEF COM1
0245  00441 036040  SCOM5 DEF COM5-1
0246  00442 000000  MFLAG NOP            USED BY "SUPERSAVE"
0247  00443 024005  DISCP DEF CHECK
0248  00444 000000  NUSE3 BSS 1          NOT USED
0249  00445 000000  UTLTY BSS 1          FILLED BY UTILITY
0250*
0251**  GENERAL USE CONSTANTS
0252*
0253  00446 172000  M3072 DEC -3072                                    XJ
0254  00447 176000  M2000 OCT 176000
0255  00450 176030  M1000 DEC -1000
0256  00451 177400  M256  DEC -256
0257  00452 177404  M252  DEC -252
0258  00453 177600  M128  DEC -128
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0259   00454 177640   M96    OCT -140
0260   00455 177666   M74    DEC -74
0261   00456 177667   M73    DEC -73
0262   00457 177670   M72    DEC -72
0263   00460 177700   D100   OCT -100
0264   00461 177712   D66    OCT -66
0265   00462 177706   D72    OCT -72
0266   00462          M72B   EQU D72
0267   00463 177713   D65    OCT -65
0268   00464 177716   D62    OCT -62
0269   00465 177720   M60B   OCT -60
0270   00466 177725   D53    OCT -53
0271   00467 177737   M41B   OCT -41
0272   00470 177740   M32    DEC -32
0273   00471 177743          DEC -29,-28,-27,-26
0274   00475 177747          DEC -25,-24,-23,-22,-21,-20,-19,-18,-17,-16
0275   00507 177761          DEC -15,-14,-13,-12,-11,-10,-9,-8,-7,-6,-5,-4
0276   00523 177775          DEC -3,-2,-1
0277   00526 000000   .      DEC 0,1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16
0278   00547 000021          DEC 17,18,19,20,21,22,23,24,25,26,27,28,29,30
0279   00565 000037          DEC 31,32,33,34,35,36,37,38,39,40,41,42,43,44
0280   00603 000055          DEC 45,46,47,48,49
0281   00610 000063   B63    OCT 63
0282   00611 000072   .58    DEC 58
0283   00612 000073   B73    OCT 73
0284   00613 000074   D60    DEC 60
0285   00614 000077   B77    OCT 77
0286   00615 000100   B100   OCT 100
0287   00616 000110   .72    DEC 72
0288   00616          ?72    EQU .72
0289   00617 000112   .74    DEC 74
0290   00620 000113   .75    DEC 75
0291   00621 000133   B133   OCT 133
0292   00622 000313   D203   DEC 203
0293   00623 000300   B300   OCT 300
0294   00624 000151   .105   DEC 105
0295   00625 000160   .112   DEC 112
0296   00626 000177   B177   OCT 177
0297   00627 000200   B200   OCT 200
0298   00630 000377   B377   OCT 377
0299   00631 000400   B400   OCT 400
0300   00632 000776   B776   OCT 776
0301   00633 000777   B777   OCT 777
0302   00634 071000   CHNOP  OCT 71000
0303   00527          %ABOR  EQU .+1
0304   00530          %INPT  EQU .+2
0305   00531          %OUTW  EQU .+3
0306   00532          %SYNT  EQU .+4
0307   00635 000000   NUSE4  BSS 3          NOT USED
```

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0309*
0310**  LANGUAGE PROCESSOR CONSTANTS AND ADDRESSES
0311*
0312  00640 000000  DMID  NOP
0313  00641 000000  MGSLE BSS 1          FILLED BY UTILITY
0314  00642 017534  ABCK  DEF ABCHK
0315  00643 016100  DELSA DEF DELST
0316  00644 024350  TAPEA DEF TAPER
0317  00645 014777  SBJTB DEF #FSC
0318  00646 014000  SYNTA DEF SYNTX
0319  00647 015435        DEF #SBCK
0320  00650 001130  D600  DEC 600
0321  00651 015254        DEF #FRCR
0322  00652 014013  SYN2A DEF SYNT2
0323  00653 015305        DEF #FPOP
0324  00654 012252  LWAUS DEF FILBF-1
0325  00655 015641        DEF #VROP
0326  00656 166036  LW200 ABS 200-FILBF+1
0327  00657 015555        DEF #ARID
0328  00660 115672  STBAS DEF SYNTB-458,I
0329  00661 016304        DEF #PGIN
0330  00662 031760  MCBOP DEF MCBOS
0331  00663 016401        DEF #TBSR
0332  00664 031773  MCREL DEF MRELS
0333  00665 016271        DEF #GTPF
0334  00666 032001  ANOT  DEF NOT
0335  00667 020575        DEF #LPCK
0336  00670 032004  STTYP DEF STYPS
0337  00671 015765        DEF #RPCK
0338  00672 032046  AEND  DEF EOFOP
0339  00673 016501        DEF #LTR
0340  00674 032057  MATIO DEF IOSTS
0341  00675 016513        DEF #STOP
0342  00676 032116  ATHEN DEF THEN
0343  00677 016007        DEF #CRST
0344  00700 032123  ASTEP DEF STEP
0345  00701 016037        DEF #DGCK
0346  00702 032126  ATAB  DEF TAB
0347  00703 015777        DEF #LTCK
0348  00704 032131  PDFNS DEF PRDFS
0349  00705 020566        DEF #SBPU
0350  00706 032203  MATFN DEF MATFS
0351  00707 016523        DEF #SYCK
0352  00710 047506  OF    ASC 1,OF
0353  00711 023546        DEF #FINC
0354  00712 052117  TO    ASC 1,TO
0355  00713 030734        DEF #NMCK
0356  00714 047106  FN    ASC 1,NF
0357  00715 031134        DEF #MB10
0358  00716 016111  ACCSA DEF ACCST
0359  00717 031302        DEF #DB10
0360  00720 016202  ACC5A DEF ACCS5
0361  00721 031164        DEF #NRML
0362  00722 021726  DONEA DEF EXIT3
0363  00723 031217        DEF #PACK
0364  00724 024750  SER7A DEF SERR7
```

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0365  00725 030705        DEF #OVFL
0366  00726 036134 DSERR  DEF DSERA
0367  00727 016063        DEF #DLPR
0368  00730 176605 SERRA  ABS -SERRS
0369  00731 016227        DEF #FDPS
0370  00732 177737 RERRA  ABS SERRS-RERRS
0371  00733 017407        DEF #SSYM
0372  00734 177724 WERRA  ABS RERRS-WERRS
0373  00735 017457        DEF #ASYM
0374  00736 001701 ERSCA  DEF ERSEC
0375  00737 017162        DEF #DCMP
0376  00740 017473 APTR1  DEF SYMT6
0377  00741 017277        DEF #PNST
0378  00742 017502 APTR2  DEF SYMT7
0379  00743 016051        DEF #CUSP
0380  00744 000540 A.10   DEF .+10
0381  00745 015561        DEF #STRI
0382  00746 021707 EXITA  DEF EXIT
0383  00747 015607        DEF #RSTO
0384  00750 020724 XEC1A  DEF XEC1
0385  00751 015621        DEF #GTST
0386  00752 022560 FRET   DEF FOR10
0387  00753 022335        DEF #FORM
0388  00754 121741 XECBR  DEF XECTB-45B,I
0389  00755 023507        DEF #STST
0390  00756 015330 FOPBS  DEF QUOTE-2
0391  00757 023771        DEF #SBFX
0392  00760 122630 ARBAS  DEF FOJT-12B,I
0393  00761 023366        DEF #PSTR
0394  00762 021254 MINP1  DEF EINP1
0395  00763 025415        DEF #TRST
0396  00764 021327 MINP2  DEF EINP0+3
0397  00765 023306        DEF #CMPR
0398  00766 021371 ENDIN  DEF EIN12
0399  00767 023267        DEF #PCHK
0400  00770 001463 FSCHA  DEF FSCH
0401  00771 021702        DEF #FTCH
0402  00772 001375 FINCA  DEF FINCH
0403  00773 022034        DEF #STDP
0404  00774 001652 NMBFA  DEF NUMBF
0405  00775 022125        DEF #FDAT
0406  00776 025255 LCALL  DEF LIS10-1
0407  00777 023531        DEF #FSCH
0408  01000 001000 B1000  OCT 1000
0409  01001 023760        DEF #PSHS
0410  01002 002000 B2000  OCT 2000
0411  01003 024332        DEF #ARIN
0412  01004 003000 B3000  OCT 3000
0413  01005 023562        DEF #BNOP
0414  01006 010000 RPOP   OCT 10000
0415  01007 023555        DEF #STTP
0416  01010 011000 RBOP   OCT 11000
0417  01011 023571        DEF #OPCK
0418  01012 012000 LBOP   OCT 12000
0419  01013 023623        DEF #RSCK
0420  01014 013000 LPOP   OCT 13000
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0421  01015 024246         DEF #FAD
0422  01016 014000  UNPLC  OCT 14000
0423  01017 024260         DEF #FSB
0424  01020 015000  UNMNC  OCT 15000
0425  01021 024272         DEF #FMP
0426  01022 022000  MULOP  OCT 22000
0427  01023 024304         DEF #FDV
0428  01024 024000  EXPOP  OCT 24000
0429  01025 024316         DEF #OUCK
0430  01026 047000  DIMOP  OCT 47000
0431  01027 024341         DEF #FLUN
0432  01030 050000  DEFOP  OCT 50000
0433  01031 023661         DEF #IFIX
0434  01032 051000  REMOP  OCT 51000
0435  01033 027153         DEF #ENOT
0436  01034 054000  FOROP  OCT 54000
0437  01035 027171         DEF #NMOT
0438  01036 055000  NXTOP  OCT 55000
0439  01037 017703         DEF #GTDG
0440  01040 060000  ENDOP  OCT 60000
0441  01041 025562         DEF #OTLN
0442  01042 062000  DATOP  OCT 62000
0443  01043 025542         DEF #EDLM
0444  01044 063000  INPOP  OCT 63000
0445  01045 022310         DEF #STPT
0446  01046 065000  PRTOP  OCT 65000
0447  01047 030400         DEF #EXP
0448  01050 070000  FILOP  OCT 70000
0449  01051 030524         DEF #LOG
0450  01052 076000  TOOP   OCT 76000
0451  01053 027720         DEF #CHEB
0452  01054 077000  OPMSK  OCT 77000
0453  01055 030023         DEF #IENT
0454  01056 077600  SMSK   OCT 77600
0455  01057 030041         DEF #PWR2
0456  01060 100003  INTFL  OCT 100003
0457  01061 022250         DEF #INCL
0458  01062 100017  PDFFL  OCT 100017
0459  01063 017726         DEF #GTCR
0460  01064 100037  TABCN  OCT 100037
0461  01065 017675         DEF #BKSP
0462  01066 100337  LENCN  OCT 100337
0463  01067 025574         DEF #OTCR
0464  01070 100777  OPDMK  OCT 100777
0465  01071 025514         DEF #OTIN
0466  01072 100100  DHMSK  OCT 100100
0467  01073 025440         DEF #MCOT
0468  01074 174000  HMASK  OCT 174000
0469  01075 025475         DEF #OTST
0470  01076 174003  OFOP   OCT 174003
0471  01077 022326         DEF #SINI
0472  01100 004704  .2500  DEC 2500
0473  01101 016314         DEF #BLDI
0474  01102 063146  TENTH  OCT 63146
0475  01103 027107         DEF #RDIM
0476  01104 176667  D1111  OCT -1111
```

```
0477  01105 027056         DEF #VCHK
0478  01106 154360  MAXSN  DEC -10000
0479  01107 024525         DEF #SERR
0480  01110 000105  E      OCT 105
0481  01111 030714         DEF #CHOU
0482  01112 000106  F      OCT 106
0483  01113 024514         DEF #MOVE
0484  01114 000116  N      OCT 116
0485  01115 016346         DEF #RECR
0486  01116 072000  LETOP  OCT 72000                                        [X
0487  01117 016367         DEF #FILR
0488  01120 000140  .140   OCT 140
0489  01121 022057         DEF #VLFI
0490  01122 177645  D133   OCT -133
0491  01123 024014         DEF #RQST
0492  01124 177201  D577   OCT -577
0493  01125 024144         DEF #FILS
0494  01126 004000  B4000  OCT 4000
0495  01127 023721         DEF #GTTY
0496  01130 125137  PDFBS  JMP PDFTB-1,I
0497  01131 025371         DEF #WRBU
0498  01132 045000  COMOP  OCT 45000
0499  01133 020436         DEF #ALCO
0500  01134 016000  SCOMM  OCT 16000
0501  01135 000000  STATS  NOP              USED BY "DISC-UP" COMMAND
0502  01136 022213  FDT4A  DEF FDAT4
0503  01137 025761  MIOEN  DEF MIO7
0001*
0002**  FUNCTION EXECUTION ENTRY ADDRESSES
0003*
0004  01140 027773  PDFTB  DEF ETAB
0005  01141 030061         DEF ESIN
0006  01142 030057         DEF ECOS
0007  01143 030150         DEF ETAN
0008  01144 030266         DEF EATN
0009  01145 030376         DEF EEXP
0010  01146 030522         DEF ELOG
0011  01147 030020         DEF EABS
0012  01150 030617         DEF ESQR
0013  01151 027510         DEF EINT
0014  01152 027570         DEF ERND
0015  01153 027643         DEF ESGN
0016  01154 001157  LDVSR  DEF DVSRS      'LEN' IS DONE IN A SPECIAL WAY
0017  01155 027654         DEF ETYP
0018  01156 027524         DEF ETIM


0020  01157 023420  DVSRS  DEC 10000
0021  01160 001750         DEC 1000
0022  01161 000144         DEC 100
0023  01162 000012         DEC 10
0024  01163 100000  MNEG   OCT 100000
0025  01164 000376         OCT 376
0026  01165 040000  HALF   DEC 0.5
0027  00460          M64    EQU D100
0028  00451          HIMSK  EQU M256
```

```
0029  00525           EOF   EQU .-1
0030  00524           EOR   EQU .-2
0031  00545           B17   EQU .+17B
0032  00556           CANCL EQU .+30B
0033  01161           .100  EQU DVSRS+2
0034  01050           TPMSK EQU FILOP
0035  01122           M133B EQU D133
0036*
0037**   BIT FLAGS
0038*
0039  00527           BIT0  EQU .+1
0040  00530           BIT1  EQU .+2
0041  00532           BIT2  EQU .+4
0042  00536           BIT3  EQU .+10B
0043  00546           BIT4  EQU .+20B
0044  00566           BIT5  EQU .+40B
0045  00615           BIT6  EQU B100
0046  01167 000200    BIT7  OCT 000200
0047  00631           BIT8  EQU B400
0048  01000           BIT9  EQU B1000
0049  01002           BIT10 EQU B2000
0050  01126           BIT11 EQU B4000
0051  00301           BIT12 EQU WRIT
0052  00302           BIT13 EQU READ
0053  01165           BIT14 EQU HALF
0054  01163           BIT15 EQU MNEG
0055  00524           NBT0  EQU .-2
0056  00523           NBT1  EQU .-3
0057  00521           NBT2  EQU .-5
0058  00515           NBT3  EQU .-9
0059  00467           NBT5  EQU M41B
0060  01170 177677    NBT6  OCT 177677
0061  01171 177577    NBT7  OCT 177577
0062  01172 167777    NBT12 OCT 167777
0063  01172           NECHO EQU NBT12
0064  01002           A000  EQU B2000
0065*
0066**  ERROR JUMP TABLE
0067*
0068  01173 001573    SERRS DEF SERR
0069                        REP 32
0070  01174 001573          DEF SERR
0070  01175 001573          DEF SERR
0070  01176 001573          DEF SERR
0070  01177 001573          DEF SERR
0070  01200 001573          DEF SERR
0070  01201 001573          DEF SERR
0070  01202 001573          DEF SERR
0070  01203 001573          DEF SERR
0070  01204 001573          DEF SERR
0070  01205 001573          DEF SERR
0070  01206 001573          DEF SERR
0070  01207 001573          DEF SERR
0070  01210 001573          DEF SERR
0070  01211 001573          DEF SERR
0070  01212 001573          DEF SERR
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```
0070  01213 001573          DEF SERR
0070  01214 001573          DEF SERR
0070  01215 001573          DEF SERR
0070  01216 001573          DEF SERR
0070  01217 001573          DEF SERR
0070  01220 001573          DEF SERR
0070  01221 001573          DEF SERR
0070  01222 001573          DEF SERR
0070  01223 001573          DEF SERR
0070  01224 001573          DEF SERR
0070  01225 001573          DEF SERR
0070  01226 001573          DEF SERR
0070  01227 001573          DEF SERR
0070  01230 001573          DEF SERR
0070  01231 001573          DEF SERR
0070  01232 001573          DEF SERR
0070  01233 001573          DEF SERR
0071  01234 001573  RERRS   DEF SERR
0072                        REP 43
0073  01235 001573          DEF SERR
0073  01236 001573          DEF SERR
0073  01237 001573          DEF SERR
0073  01240 001573          DEF SERR
0073  01241 001573          DEF SERR
0073  01242 001573          DEF SERR
0073  01243 001573          DEF SERR
0073  01244 001573          DEF SERR
0073  01245 001573          DEF SERR
0073  01246 001573          DEF SERR
0073  01247 001573          DEF SERR
0073  01250 001573          DEF SERR
0073  01251 001573          DEF SERR
0073  01252 001573          DEF SERR
0073  01253 001573          DEF SERR
0073  01254 001573          DEF SERR
0073  01255 001573          DEF SERR
0073  01256 001573          DEF SERR
0073  01257 001573          DEF SERR
0073  01260 001573          DEF SERR
0073  01261 001573          DEF SERR
0073  01262 001573          DEF SERR
0073  01263 001573          DEF SERR
0073  01264 001573          DEF SERR
0073  01265 001573          DEF SERR
0073  01266 001573          DEF SERR
0073  01267 001573          DEF SERR
0073  01270 001573          DEF SERR
0073  01271 001573          DEF SERR
0073  01272 001573          DEF SERR
0073  01273 001573          DEF SERR
0073  01274 001573          DEF SERR
0073  01275 001573          DEF SERR
0073  01276 001573          DEF SERR
0073  01277 001573          DEF SERR
0073  01300 001573          DEF SERR
0073  01301 001573          DEF SERR
```

```
0073   01302 001573          DEF  SERR
0073   01303 001573          DEF  SERR
0073   01304 001573          DEF  SERR
0073   01305 001573          DEF  SERR
0073   01306 001573          DEF  SERR
0073   01307 001573          DEF  SERR
0074   01310 001573  WERRS    DEF  SERR
0075                         REP  8
0076   01311 001573          DEF  SERR
0076   01312 001573          DEF  SERR
0076   01313 001573          DEF  SERR
0076   01314 001573          DEF  SERR
0076   01315 001573          DEF  SERR
0076   01316 001573          DEF  SERR
0076   01317 001573          DEF  SERR
0076   01320 001573          DEF  SERR
```

```
0078  01321 001325  USE    DEF USER
0079  01322 101325  USEI   DEF USER,I
0080  01325                ORG 13258
0081  01325          USER   EQU *
0082  01325 000000   AREG   NOP
0083  01326 000000   BREG   NOP
0084  01327 000000   EREG   NOP
0085  01330 000000   PREG   NOP
0086  01331          LIBUS  EQU *
0087*
0088**   SUBROUTINE RETURN ADDRESSES
0089*
0090  01331 000000   FSC    NOP
0091  01332 124645          JMP *-JTD,I
0092  01333 000000   SBSCK  NOP
0093  01334 124647          JMP *-JTD,I
0094  01335 000000   FRCUR  NOP
0095  01336 124651          JMP *-JTD,I
0096  01337 000000   FPOP   NOP
0097  01340 124653          JMP *-JTD,I
0098  01341 000000   VAROP  NOP
0099  01342 124655          JMP *-JTD,I
0100  01343 000000   ARRID  NOP
0101  01344 124657          JMP *-JTD,I
0102  01345 000000   PRGIN  NOP
0103  01346 124661          JMP *-JTD,I
0104  01347 000000   TBSRH  NOP
0105  01350 124663          JMP *-JTD,I
0106  01351 000000   GETPF  NOP
0107  01352 124665          JMP *-JTD,I
0108  01353 000000   LPCK   NOP
0109  01354 124667          JMP *-JTD,I
0110  01355 000000   RPCK   NOP
0111  01356 124671          JMP *-JTD,I
0112  01357 000000   LTR    NOP
0113  01360 124673          JMP *-JTD,I
0114  01361 000000   STROP  NOP
0115  01362 124675          JMP *-JTD,I
0116  01363 000000   CHRST  NOP
0117  01364 124677          JMP *-JTD,I
0118  01365 000000   DIGCK  NOP
0119  01366 124701          JMP *-JTD,I
0120  01367 000000   LETCK  NOP
0121  01370 124703          JMP *-JTD,I
0122  01371 000000   SBPUD  NOP
0123  01372 124705          JMP *-JTD,I
0124  01373 000000   SYMCK  NOP
0125  01374 124707          JMP *-JTD,I
0126  01375 000000   FINCH  NOP
0127  01376 124711          JMP *-JTD,I
0128  01377 000000   NUMCK  NOP
0129  01400 124713          JMP *-JTD,I
0130  01401 000000   MBY10  NOP
0131  01402 124715          JMP *-JTD,I
0132  01403 000000   DBY10  NOP
0133  01404 124717          JMP *-JTD,I
```

```
0134  01405 000000  NORML NOP
0135  01406 124721        JMP *-JTD,I
0136  01407 000000  .PACK NOP
0137  01410 124723        JMP *-JTD,I
0138  01411 000000  OVFLW NOP
0139  01412 124725        JMP *-JTD,I
0140  01413 000000  DELPR NOP
0141  01414 124727        JMP *-JTD,I
0142  01415 000000  FNDPS NOP
0143  01416 124731        JMP *-JTD,I
0144  01417 000000  SSYMT NOP
0145  01420 124733        JMP *-JTD,I
0146  01421 000000  ASYMT NOP
0147  01422 124735        JMP *-JTD,I
0148  01423 000000  DCMPL NOP
0149  01424 124737        JMP *-JTD,I
0150  01425 000000  PRNST NOP
0151  01426 124741        JMP *-JTD,I
0152  01427 000000  CUSP  NOP
0153  01430 124743        JMP *-JTD,I
0154  01431 000000  STRID NOP
0155  01432 124745        JMP *-JTD,I
0156  01433 000000  RSTOP NOP
0157  01434 124747        JMP *-JTD,I
0158  01435 000000  GETST NOP
0159  01436 124751        JMP *-JTD,I
0160  01437 000000  FORMX NOP
0161  01440 124753        JMP *-JTD,I
0162  01441 000000  STSTR NOP
0163  01442 124755        JMP *-JTD,I
0164  01443 000000  SBFIX NOP
0165  01444 124757        JMP *-JTD,I
0166  01445 000000  PSTR  NOP
0167  01446 124761        JMP *-JTD,I
0168  01447 000000  TRSTR NOP
0169  01450 124763        JMP *-JTD,I
0170  01451 000000  COMPR NOP
0171  01452 124765        JMP *-JTD,I
0172  01453 000000  PCHK  NOP
0173  01454 124767        JMP *-JTD,I
0174  01455 000000  FETCH NOP
0175  01456 124771        JMP *-JTD,I
0176  01457 000000  SETDP NOP
0177  01460 124773        JMP *-JTD,I
0178  01461 000000  FDATA NOP
0179  01462 124775        JMP *-JTD,I
0180  01463 000000  FSCH  NOP
0181  01464 124777        JMP *-JTD,I
0182  01465 000000  PSHST NOP
0183  01466 125001        JMP *-JTD,I
0184  01467 000000  ARINV NOP
0185  01470 125003        JMP *-JTD,I
0186  01471 000000  BINOP NOP
0187  01472 125005        JMP *-JTD,I
0188  01473 000000  STTOP NOP
0189  01474 125007        JMP *-JTD,I
```

```
0190   01475 000000  OPCHK NOP
0191   01476 125011        JMP *-JTD,I
0192   01477 000000  RSCHK NOP
0193   01500 125013        JMP *-JTD,I
0194   01501 000000  .FAD  NOP
0195   01502 125015        JMP *-JTD,I
0196   01503 000000  .FSB  NOP
0197   01504 125017        JMP *-JTD,I
0198   01505 000000  .FMP  NOP
0199   01506 125021        JMP *-JTD,I
0200   01507 000000  .FDV  NOP
0201   01510 125023        JMP *-JTD,I
0202   01511 000000  OUCHK NOP
0203   01512 125025        JMP *-JTD,I
0204   01513 000000  .FLUN NOP
0205   01514 125027        JMP *-JTD,I
0105   00404 000000  HEHW  MNO
0207   01516 125031        JMP *-JTD,I
0208   01517 000000  ENOUT NOP
0209   01520 125033        JMP *-JTD,I
0210   01521 000000  NUMOT NOP
0211   01522 125035        JMP *-JTD,I
0212   01523 000000  GETDG NOP
0213   01524 125037        JMP *-JTD,I
0214   01525 000000  OUTLN NOP
0215   01526 125041        JMP *-JTD,I
0216   01527 000000  EDELM NOP
0217   01530 125043        JMP *-JTD,I
0218   01531 000000  SETPT NOP
0219   01532 125045        JMP *-JTD,I
0220   01533 000000  .EXP  NOP
0221   01534 125047        JMP *-JTD,I
0222   01535 000000  .LOG  NOP
0223   01536 125051        JMP *-JTD,I
0224   01537 000000  .CHEB NOP
0225   01540 125053        JMP *-JTD,I
0226   01541 000000  .IENT NOP
0227   01542 125055        JMP *-JTD,I
0228   01543 000000  .PWR2 NOP
0229   01544 125057        JMP *-JTD,I
0230   01545 000000  INCAL NOP
0231   01546 125061        JMP *-JTD,I
0232   01547 000000  GETCR NOP
0233   01550 125063        JMP *-JTD,I
0234   01551 000000  BCKSP NOP
0235   01552 125065        JMP *-JTD,I
0236   01553 000000  OUTCR NOP
0237   01554 125067        JMP *-JTD,I
0238   01555 000000  OUTIN NOP
0239   01556 125071        JMP *-JTD,I
0240   01557 000000  MCOUT NOP
0241   01560 125073        JMP *-JTD,I
0242   01561 000000  OUTST NOP
0243   01562 125075        JMP *-JTD,I
0244   01563 000000  SINIT NOP
0245   01564 125077        JMP *-JTD,I
```

```
0246  01565 000000  BLDIN NOP
0247  01566 125101        JMP *-JTD,I
0248  01567 000000  REDIM NOP
0249  01570 125103        JMP *-JTD,I
0250  01571 000000  VCHK  NOP
0251  01572 125105        JMP *-JTD,I
0252  01573 000000  SERR  NOP
0253  01574 125107        JMP *-JTD,I
0254  01575 000000  CHOUF NOP
0255  01576 125111        JMP *-JTD,I
0256  01577 000000  MOVER NOP
0257  01600 125113        JMP *-JTD,I
0258  01601 000000  RECRF NOP
0259  01602 125115        JMP *-JTD,I
0260  01603 000000  FILRF NOP
0261  01604 125117        JMP *-JTD,I
0262  01605 000000  VLFIL NOP
0263  01606 125121        JMP *-JTD,I
0264  01607 000000  RQSTR NOP
0265  01610 125123        JMP *-JTD,I
0266  01611 000000  FILST NOP
0267  01612 125125        JMP *-JTD,I
0268  01613 000000  GTTYP NOP
0269  01614 125127        JMP *-JTD,I
0270  01615 000000  WRBUF NOP
0271  01616 125131        JMP *-JTD,I
0272  01617 000000  ALCOM NOP
0273  01620 125133        JMP *-JTD,I
0274  01621 000000  RSTPT NOP
0275  01622 000000  NUSE  BSS 1          NOT USED
0276  00465         JTD   EQU FSC-SBJTB+1
0277*
0278**  GENERAL USAGE INFORMATION
0279*
0280  01623 000000  RNDX1 BSS 1          30-BIT RANDOM
0281  01624 000000  RNDX2 BSS 1           INTEGER.
0282  01625 000000  .LNUM BSS 1
0283  01626 000000  LMSK  BSS 1                                          X]
0284  01627 000000  CMSK  BSS 1                                          X]
0285  01630 000000  LBUFA BSS 1                                          X]
0286  01631 000000  LBUFE BSS 1                                          X]
0287  01632 000000  PRBFA BSS 1                                          X]
0288  01633 000000  PRBFE BSS 1                                          X]
0289  01634 000000  LNAME BSS 1                                    [X]
0290  01635 000000  BADDR BSS 1                                    [X]
0291  01636 000000  CHRCT BSS 1
0292  01637 000040  BLANK OCT 40
0293  01640 000000  SBPTR BSS 1
0294  01641 000000  SYMTB BSS 1
0295  01642 000000  VALTB BSS 1
0296  01643 002003  SPROG DEF PROGB+1
0297  01644 000000  VLFLG BSS 1
0298  01645 000000  NUMPT BSS 1
0299  01646 000000  ENOUF NOP
0300  01647 000000  TEMP  BSS 9
0301  01660 000000  XTEMP BSS 2
```

```
0302  01662 000000  YTEMP BSS 2
0303  01664 000000  UTEMP BSS 2
0304  01666 000000  X2TMP BSS 2
0305  01670 000000  ATMP  BSS 2
0306  01672 000000  BTMP  BSS 2
0307  01674 000000  DTMP  BSS 2
0308  01676 000000  BIN01 BSS 1
0309  01677 000000  BIN02 BSS 1
0310  01700 125471        JMP BINOP,I
0311  01701 000000  ERSEC BSS 64
0312  02001               BSS 0          END OF USER AREA BASE PAGE
0313*
0314  02003               ORG USER+456B
0315  02002         PROGB EQU *-1
0316  01163         FLGBT EQU MNEG
0317  01521         GFLAG EQU NUMOT
0318  01701         PINTG EQU ERSEC
0319  01367         SIGN  EQU LETCK
0320  01417         MANT1 EQU SSYMT
0321  01421         MANT2 EQU ASYMT
0322  01423         EXP   EQU DCMPL
0323  01425         EXPON EQU PRNST
0324  01407         DPFLG EQU .PACK
0325  01437         FFLAG EQU FORMX
0326  01457         NMTMP EQU SETDP
0327  01461         NMPTR EQU FDATA
0328  01652         NUMBF EQU TEMP+3
0329  01455         DIGCT EQU FETCH
0330  01401         NT0   EQU MBY10
0331  01411         OCTMP EQU OVFLW
0332  01477         LT0   EQU RSCHK
0333  01527         LT1   EQU EDELM
0334  01375         LT2   EQU FINCH
0335  01531         LT3   EQU SETPT
0336  01537         LT4   EQU .CHEB
0337  01541         LT5   EQU .IENT
0338  01543         LT6   EQU .PWR2
0339  01533         LT7   EQU .EXP
0340  01545         OT1   EQU INCAL
0341  01551         OT3   EQU BCKSP
0342  01567         OT4   EQU REDIM
0343  01473         DGCNT EQU STTOP
0344  01611         SOURC EQU FILST
0345  01613         DEST  EQU GTTYP
0346  01577         TAP0  EQU MOVER
0347  01573         TAP1  EQU SERR
0348  01575         CU1   EQU CHOUF
0349*
0350**  SYNTAX INFORMATION TEMPORARIES
0351*
0352  01642         ERRCT EQU VALTB
0353  01654         SBUFA EQU TEMP+5
0354  01571         SYNTQ EQU VCHK
0355  01653         SSTAK EQU TEMP+4
0356  01501         MAXCR EQU .FAD
0357  01503         TABLE EQU .FSB
```

```
0358  01505          LNGTH EQU .FMP
0359  01507          SMBGN EQU .FDV
0360  01533          SLENG EQU .EXP
0361  01537          COUNT EQU .CHEB
0362  01541          TBLPT EQU .IENT
0363  01543          TSPTR EQU .PWR2
0364  01407          SBT0  EQU .PACK
0365  01513          CDFLG EQU .FLUN
0366*
0367**  COMPILE INFORMATION TEMPORARIES
0368*
0369  01335          FLINK EQU FRCUR
0370  01603          FILTB EQU FILRF
0371  01343          STEND EQU ARRID
0372  01331          SPTR  EQU FSC
0373  01337          NSPTR EQU FPOP
0374  01341          STYPE EQU VAROP
0375  01647          STMP1 EQU TEMP
0376  01650          STMP2 EQU TEMP+1
0377  01647          VTMP1 EQU TEMP
0378  01650          VTMP2 EQU TEMP+1
0379  01651          VTMP3 EQU TEMP+2
0380  01652          VTMP4 EQU TEMP+3
0381  01653          VTMP5 EQU TEMP+4
0382  01653          COMSN EQU TEMP+4
0383  01654          STPTR EQU TEMP+5
0384  01654          COMPT EQU TEMP+5
0385  01655          STCT1 EQU TEMP+6
0386  01651          STCT2 EQU TEMP+2
0387  01652          STCT3 EQU TEMP+3
0388  01655          DCFLG EQU TEMP+6
0389*
0390**  EXECUTION INFORMATION TEMPORARIES
0391*
0392  01333          FCORE EQU SBSCK
0393  01601          FCNTR EQU RECRF
0394  01341          RTRNQ EQU VAROP
0395  01343          RTNST EQU ARRID
0396  01347          FORQ  EQU TBSRH
0397  01351          FORST EQU GETPF
0398  01431          TMPST EQU STRID
0399  01433          OPDST EQU RSTOP
0400  01565          OPTRQ EQU BLDIN
0401  01435          PRGCT EQU GETST
0402  01363          DCCNT EQU CHRST
0403  01345          NXTDT EQU PRGIN
0404  01647          TEMP1 EQU TEMP
0405  01353          TEMP2 EQU LPCK
0406  01355          TEMP3 EQU RPCK
0407  01357          TEMP4 EQU LTR
0408  01373          TEMP5 EQU SYMCK
0409  01361          TEMP6 EQU STROP
0410  01577          GTMP  EQU MOVER
0411  01527          FVT   EQU EDELM
0412  01521          EFN0  EQU NUMOT
0413  01523          EFN1  EQU GETDG
```

```
0414  01525          EFN2   EQU OUTLN
0415  01465          EFN3   EQU PSHST
0416  01557          INITF  EQU MCOUT
0417  01521          IFCNT  EQU NUMOT
0418  01617          MCNT   EQU ALCOM
0419  01453          INTMP  EQU PCHK
0420  01571          EOL    EQU VCHK
0421  01557          EOPF   EQU MCOUT
0422  01640          BS1    EQU SBPTR
0423  01447          BS2    EQU TRSTR
0424  01451          BS3    EQU COMPR
0425  01413          MT0    EQU DELPR
0426  01415          MT1    EQU FNDPS
0427  01660          MT2    EQU XTEMP
0428  01661          MT3    EQU XTEMP+1
0429  01441          MOP    EQU STSTR
0430  01463          MEXIT  EQU FSCH
0431  01670          MMT0   EQU ATMP
0432  01671          MMT1   EQU ATMP+1
0433  01672          MMT2   EQU BTMP
0434  01673          MMT3   EQU BTMP+1
0435  01674          MMT4   EQU DTMP
0436  01675          MMT5   EQU DTMP+1
0437  01666          MMT6   EQU X2TMP
0438  01667          MMT7   EQU X2TMP+1
0439  01475          MMT8   EQU OPCHK
0440  01615          ID0    EQU WRBUF
0441  01461          ID1    EQU FDATA
0442  01571          RD0    EQU VCHK
0443  01477          VT0    EQU RSCHK
0444  01660          SCALR  EQU XTEMP
0445  01662          MAXE   EQU YTEMP
0446  01664          TOL    EQU UTEMP
0447  01445          PIVEL  EQU PSTR
0448  01537          EST1   EQU .CHEB
0449  01541          EST2   EQU .IENT
0450  01543          EST3   EQU .PWR2
0451  01654          A1     EQU TEMP+5
0452  01656          A2     EQU TEMP+7
0453  01501          FD0    EQU .FAD
0454  01365          TT1    EQU DIGCK
0455  01367          TT2    EQU LETCK
0456  01652          TT3    EQU TEMP+3
0457  01653          TT4    EQU TEMP+4
0458  01702          RQ1    EQU ERSEC+1
0459  01703          RQ2    EQU ERSEC+2
0460  01704          RQ3    EQU ERSEC+3
0461  01337          FBASE  EQU FPOP
0462  01705          EORFL  EQU ERSEC+4
0463  01335          FILE#  EQU FRCUR
0464  01621          RCRD#  EQU RSTPT
0465  01615          VL0    EQU WRBUF
0466  01706          DADRR  EQU ERSEC+5
0467  01707          FILT   EQU ERSEC+6
0468  01477          MPT    EQU RSCHK
0469  01475          NQT    EQU OPCHK
```

```
0470   01505          TNULL EQU .FMP
0471   01507          TPRME EQU .FDV
0472   01567          PS0   EQU REDIM
0473   01563          PS1   EQU SINIT
0474   01533          CP0   EQU .EXP
0475   01445          CP1   EQU PSTR
0476   01501          TRFCH EQU .FAD
0477   01503          TRS0  EQU .FSB
0478   01537          RT0   EQU .CHEB
0479   01541          RT1   EQU .IENT
0480   01535          LBTMP EQU .LOG
0481   01475          CTMP  EQU OPCHK
```

```
0483   12253                  ORG 14000B-853
0484   12253 000000  FILBF BSS 13
0485*      MESSAGE BUFFER
0486*
0487   12270 000000  MSQHD BSS 39
0488*
0489*
0490*
0491**     USER BUFFERS
0492*
0493   12337 000000  BUF00 BSS BUFLN
0494   12421 000000  BUF01 BSS BUFLN
0495   12503 000000  BUF02 BSS BUFLN
0496   12565 000000  BUF03 BSS BUFLN
0497   12647 000000  BUF04 BSS BUFLN
0498   12731 000000  BUF05 BSS BUFLN
0499   13013 000000  BUF06 BSS BUFLN
0500   13075 000000  BUF07 BSS BUFLN
0501   13157 000000  BUF10 BSS BUFLN
0502   13241 000000  BUF11 BSS BUFLN
0503   13323 000000  BUF12 BSS BUFLN
0504   13405 000000  BUF13 BSS BUFLN
0505   13467 000000  BUF14 BSS BUFLN
0506   13551 000000  BUF15 BSS BUFLN
0507   13633 000000  BUF16 BSS BUFLN
0508   13715 000000  BUF17 BSS BUFLN
0509   13777                BSS 0          WHERE ARE WE?
```

```
0002  14000                ORG 14000B
0003*
0004* ********************************
0005****                              ***
0006***  CHECK SYNTAX OF STATEMENT   ***
0007****                             ***
0008* ********************************
0009*
0010*  PBPTR POINTS TO THE LAST WORD +1 OF THE PREVIOUS PROGRAM AND
0011*  THUS ALSO POINTS TO THE FIRST WORD OF AVAILABLE USER SPACE,
0012*  WHERE THE NEW STATEMENT WILL BE TRANSLATED.  WHEN AN ERROR
0013*  OCCURS UNDER 'TAPE' MODE, THE USER'S TERR BIT IN THE FIRST WORD
0014*  OF HIS TTY TABLE IS SET AND HIS COPY OF ERRCT IS BUMPED. IF AN
0015*  OUT-OF-STORAGE ERROR OCCURS IN 'TAPE' MODE, SYMTB IS SET TO 1
0016*  AND ALL SUBSEQUENT PROGRAM MATERIAL IS REJECTED.  IF UPON ENTRY
0017*  THE PRIOR PROGRAM IS NULL, ALL FLAGS ARE SET TO NULL; IF THE
0018*  PRIOR PROGRAM IS NOT NULL, IT IS PLACED IN 'SOURCE' MODE. SYNTAX
0019*  WILL REJECT ADDITIONAL STATEMENTS IF FEWER THAN 200 WORDS OF
0020*  USER SPACE ARE AVAILABLE BUT WILL ACCEPT STATEMENT DELETIONS IF
0021*  IN 'KEY' MODE.
0022*
0023  14000 064051  SYNTX LDB PBPTR     NULL
0024  14001 054433        CPB PBUFF       PROGRAM?
0025  14002 127412        JMP DCLNU,I   YES
0026  14003 060052        LDA TERR      ANY TAPE ERRORS                  X]
0027  14004 031627        IOR CMSK      FOR THIS USER                    X]
0028  14005 002006        INA,SZA                                        X]
0029  14006 026011        JMP SYNT1     NO                               X]
0030  14007 051642        CPA ERRCT        IMBEDDED IN CODE?
0031  14010 124644        JMP TAPEA,I   NO,FINISH ABORTED ERROR CLEANUP
0032  14011 015563  SYNT1 JSB SINIT     YES, PREPARE PROGRAM
0033  14012 015423        JSB DCMPL       FOR SYNTAX
0034  14013 006400  SYNT2 CLB           SET LINE NUMBER
0035  14014 174051        STB PBPTR,I     TO ZERO
0036  14015 060051        LDA PBPTR     SET SYNTAX POINTER TO FIRST
0037  14016 071640        STA SBPTR       AVAILABLE WORD OF USER SPACE
0038  14017 071654        STA SBUFA     SAVE POINTER TO SYNTAX BUFFER
0039  14020 040624        ADA .105        AND TO
0040  14021 071653        STA SSTAK         SYNTAX STACK
0041  14022 071571        STA SYNTQ
0042  14023 006004        INB           DOES 'OUT OF STORAGE'
0043  14024 055641        CPB SYMTB       ERROR EXIST?
0044  14025 124724        JMP SER7A,I   YES
0045  14026 015547        JSB GETCR     NO, EMPTY RECORD?
0046  14027 124720        JMP ACC5A,I   YES
0047  14030 015551        JSB BCKSP     NO
0048*                              *
0049**  DETERMINE SEQUENCE NUMBER  **
0050*                              *
0051*
0052*  A RECORD CONSISTING ONLY OF A SEQUENCE NUMBER WILL CAUSE THE
0053*  DELETION OF A PREVIOUSLY ACCEPTED STATEMENT REFERENCED BY THAT
0054*  SEQUENCE NUMBER.
0055*
0056  14031 015565        JSB BLDIN     RECORD
0057  14032 175640        STB SBPTR,I     SEQUENCE
```

```
0058  14033 035640        ISZ SBPTR         NUMBER
0059  14034 050543        CPA .+15B       NULL STATEMENT?
0060  14035 124643        JMP DELSA,I     YES
0061  14036 035640        ISZ SBPTR       NO, SKIP STATEMENT LENGTH WORD
0062  14037 171640        STA SBPTR,I     SAVE FIRST CHARACTER
0063  14040 060051        LDA PBPTR       ACCEPTABLE AMOUNT
0064  14041 040656        ADA LW200         OF USER SPACE
0065  14042 002021        SSA,RSS             REMAINING?
0066  14043 115173        JSB SERRS,I     NO
0067*                                *
0068**  DETERMINE STATEMENT TYPE  **
0069*                                *
0070  14044 060535        LDA .+7         SET MAXIMUM
0071  14045 071501        STA MAXCR         SYMBOL LENGTH
0072  14046 060670        LDA STTYP       STATEMENT-TYPE NAMES
0073  14047 064501        LDB .-21       -(NUMBER OF STATEMENT TYPES)  X]
0074  14050 015347        JSB TBSRH       FIND STATEMENT TYPE
0075  14051 061116        LDA LETOP       NO, ASSUME 'IMPLIED' LET
0076  14052 064515        LDB .-9         DISALLOW
0077  14053 077421        STB MSFLG         MULTIPLE STORE
0078  14054 064531        LDB .+3         SET MAXCR TO MOST
0079  14055 075501        STB MAXCR         COMMON VALUE
0080  14056 006400        CLB             TURN OFF
0081  14057 077423        STB PFLAG         'PARAMETER' MODE
0082  14060 101051        LSR 9           RIGHT JUSTIFY OPERATOR CODE
0083  14061 073425        STA SFLAG       TURN OFF STRING AND STORE MODES
0084  14062 073417        STA DFLAG       TURN ON 'SUBSCRIPT' MODE
0085  14063 040660        ADA STBAS       BRANCH TO
0086  14064 124000        JMP 0,I           SYNTAX ROUTINE
0087*
0088***                             **
0089**  <LET STATEMENT> SYNTAX   **
0090***                            **
0091*
0092  14065 061116  LET0  LDA LETOP       FAKE
0093  14066 171640        STA SBPTR,I       A
0094  14067 015551        JSB BCKSP           'LET'
0095  14070 065640  LETS  LDB SBPTR       ENABLE A
0096  14071 077425        STB SFLAG         STRING VARIABLE
0097  14072 037421        ISZ MSFLG       TURN ON 'MULTIPLE STORE' MODE
0098  14073 015331        JSB FSC         ANALYZE FORMULA
0099  14074 037425        ISZ SFLAG       STRING VARIABLE FOUND?
0100  14075 026103        JMP LET1        NO
0101  14076 015373        JSB SYMCK       YES, (B) IS LEFT AT -1
0102  14077 015365        DEF ASSOP-1     DEMAND ASSIGNMENT OPERATOR
0103  14100 115176        JSB SERRS+3,I   NOT FOUND
0104  14101 015433        JSB RSTOP       RECORD A STRING OPERAND
0105  14102 026105        JMP EOST        DEMAND END OF STATEMENT
0106  14103 037425  LET1  ISZ SFLAG       DID A STORE OCCUR?
0107  14104 115176        JSB SERRS+3,I   NO
0108**                                  **
0109***  CHECK FOR END OF STATEMENT  ***
0110**                                  **
0111  14105 050543  EOST  CPA .+15B       END OF STATEMENT?
0112  14106 124716        JMP ACCSA,I     YES
0113  14107 115177        JSB SERRS+4,I   NO
```

```
0114*
0115***                              **
0116**  <DIM STATEMENT> SYNTAX  **
0117***                              **
0118*
0119  14110 002400  DIMS  CLA              FLAG AS DIM STATEMENT
0120*
0121***                              **
0122**  <COM STATEMENT> SYNTAX  **
0123***                              **
0124*
0125  14111 071513  COMS  STA CDFLG       FLAG AS COM STATEMENT
0126  14112 077417        STB DFLAG       TURN ON 'DIM' MODE ( (B)=0 )
0127  14113 061640        LDA SBPTR       ENABLE STRING
0128  14114 073425        STA SFLAG         VARIABLE
0129  14115 015341        JSB VAROP       SEEK VARIABLE OPERAND
0130  14116 115200        JSB SERRS+5,I   IMPROPER SUBSCRIPT
0131  14117 026123  COMS0 JMP COMS1       ARRAY OR STRING FOUND
0132  14120 006400        CLB             SIMPLE VARIABLE
0133  14121 055513        CPB CDFLG       'DIM'?
0134  14122 115200        JSB SERRS+5,I    YES--ERROR
0135  14123 050543  COMS1 CPA .+15B       NO, CARRIAGE RETURN FOLLOWS?
0136  14124 124716        JMP ACCSA,I     YES
0137  14125 007400        CCB             NO
0138  14126 015373        JSB SYMCK       COMMA?
0139  14127 015333        DEF COMMA-1
0140  14130 115201        JSB SERRS+6,I   NO
0141  14131 026113        JMP COMS+2      YES
0142*
0143***                              **
0144**  <DEF STATEMENT> SYNTAX  **
0145***                              **
0146*
0147  14132 015357  DEFS  JSB LTR         FIRST TWO
0148  14133 115202        JSB SERRS+7,I
0149  14134 001727        ALF,ALF           CHARACTERS
0150  14135 031650        IOR TEMP+1
0151  14136 050714        CPA FN              'FN' ?
0152  14137 002001        RSS             YES
0153  14140 115202        JSB SERRS+7,I   NO
0154  14141 015357        JSB LTR         FOLLOWED BY A LETTER?
0155  14142 115202        JSB SERRS+7,I   NO
0156  14143 061650        LDA TEMP+1      YES,
0157  14144 064611        LDB .58           RECORD
0158  14145 015361        JSB STROP           FUNCTION
0159  14146 061651        LDA TEMP+2      RETRIEVE FOLLOWING CHARACTER
0160  14147 015353        JSB LPCK        DEMAND LEFT PARENTHESIS
0161  14150 031163        IOR FLGBT       SET FLAG FOR
0162  14151 171640        STA SBPTR,I       FORMAL PARAMETER
0163  14152 015341        JSB VAROP       DEMAND A SIMPLE VARIABLE
0164  14153 000000        NOP             NONE
0165  14154 115203        JSB SERRS+8,I     FOUND
0166  14155 015355        JSB RPCK        DEMAND A RIGHT PARENTHESIS
0167  14156 007400        CCB             ASSIGNMENT
0168  14157 015373        JSB SYMCK         OPERATOR
0169  14160 015365        DEF ASSOP-1         NEXT?
```

```
0170  14161 115176          JSB SERRS+3,I NO
0171  14162 060524          LDA .-2       YES,
0172  14163 041640          ADA SBPTR       ISOLATE
0173  14164 160000          LDA 0,I           AND SAVE
0174  14165 010633          AND B777            FORMAL
0175  14166 073423          STA PFLAG             PARAMETER
0176  14167 015331          JSB FSC       FETCH DEFINING FORMULA
0177  14170 015371          JSB SBPUD     RECORD END-OF-FORMULA OPERATOR
0178  14171 026105          JMP EOST      DEMAND END OF STATEMENT
0179*
0180*
0181***                              **
0182**  <FILES STATEMENT> SYNTAX  **
0183***                             **
0184*
0185  14172 002401  FILES CLA,RSS       SUPPRESS BLANKS
0186*
0187**                                  **
0188***  <CHAIN STATEMENT> SYNTAX  ***
0189**                                  **
0190*
0191  14172         CHANS EQU FILES
0192*
0193***                            **
0194**  <REM STATEMENT> SYNTAX  **
0195***                           **
0196*
0197  14173 060543  REMS  LDA .+15B     DUMMY STATEMENT TERMINATOR
0198  14174 006404        CLB,INB       SET CHARACTER FLAG TO 'LOW HALF'
0199  14175 015363        JSB CHRST     RECORD REMAINDER OF STATEMENT
0200  14176 124716        JMP ACCSA,I     AS A STRING
0201*
0202***                                                  **
0203**  <GOTO STATEMENT> & <GOSUB STATEMENT> SYNTAX  **
0204***                                                 **
0205*
0206  14177 061635  GOTOS LDA BADDR    SAVE THE BUFFER                  X]
0207  14200 071650        STA TEMP+1          POINTER                   X]
0208  14201 003400        CCA           SET INTCK MODE TO
0209  14202 071521        STA GFLAG       'EXIT ON ERROR'
0210  14203 015345        JSB PRGIN     SEEK SEQUENCE NUMBER
0211  14204 026241        JMP GOTO3     FOUND
0212  14205 007400        CCB           NOT FOUND
0213  14206 045640  GOTO1 ADB SBPTR     BACK UP
0214  14207 075640        STB SBPTR       SYNTAX POINTER
0215  14210 161640        LDA SBPTR,I   ERASE
0216  14211 011054        AND OPMSK       'INTEGER FOLLOWS'
0217  14212 171640        STA SBPTR,I       FLAG
0218  14213 061650        LDA TEMP+1   RESTORE BUFFER                  X]
0219  14214 071635        STA BADDR     POINTER                        X]
0220  14215 015331        JSB FSC       SEEK FORMULA
0221  14216 050543        CPA .+15B     END-OF-RECORD?
0222  14217 115204        JSB SERRS+9,I YES
0223  14220 001727        ALF,ALF       NO, DO
0224  14221 071650        STA TEMP+1      NEXT
0225  14222 015547        JSB GETCR         TWO
```

```
0226  14223 115204         JSB SERRS+9,I       CHARACTERS
0227  14224 031650         IOR TEMP+1            FORM
0228  14225 050710         CPA OF                  'OF' ?
0229  14226 002001         RSS              YES
0230  14227 115204         JSB SERRS+9,I    NO
0231  14230 061076         LDA OFOP         RECORD
0232  14231 171640         STA SBPTR,I        'OF' AND
0233  14232 015371         JSB SBPUD            ADVANCE POINTER
0234  14233 015565  GOT02   JSB BLDIN       DEMAND A SEQUENCE NUMBER
0235  14234 175640         STB SBPTR,I      RECORD IT
0236  14235 015371         JSB SBPUD
0237  14236 050602         CPA .+44         COMMA NEXT?
0238  14237 026233         JMP GOT02        YES
0239  14240 026105         JMP EOST         NO, DEMAND END OF STATEMENT
0240  14241 050543  GOT03   CPA .+15B      END-OF-STATEMENT                  X]
0241  14242 124716         JMP ACCSA,I      ACCEPT IT                         X]
0242  14243 071521         STA GFLAG        NO, RE-ENABL BAD INTEGER ERROR
0243  14244 064524         LDB .-2
0244  14245 026206         JMP GOT01
0245*
0246***                    **
0247**  <IF STATEMENT> SYNTAX  **
0248***                    **
0249*
0250  14246 035640  IFS     ISZ SBPTR        FETCH NEXT
0251  14247 015547         JSB GETCR          CHARACTER
0252  14250 115232         JSB SERRS+31,I   NONE FOUND
0253  14251 171640         STA SBPTR,I      FOUND, SAVE IT
0254  14252 060672         LDA AEND         LOOK
0255  14253 007400         CCB                FOR
0256  14254 015347         JSB TBSRH            'END'
0257  14255 026261         JMP IF0          NOT FOUND
0258  14256 015603         JSB FILRF        FOUND, GET FILE REFERENCE
0259  14257 115233         JSB SERRS+32,I   NONE FOUND
0260  14260 026306         JMP IF1+1        FOUND
0261  14261 015551  IF0     JSB BCKSP        RESTORE
0262  14262 007400         CCB                TO
0263  14263 045640         ADB SBPTR            ENTRY
0264  14264 075640         STB SBPTR              STATUS
0265  14265 077425         STB SFLAG        ENABLE STRING VARIABLE
0266  14266 015331         JSB FSC          SEEK DECISION FORMULA
0267  14267 037425         ISZ SFLAG        STRING VARIABLE FOUND?
0268  14270 026306         JMP IF1+1        NO
0269  14271 071650         STA TEMP+1       YES, SAVE NEXT CHARACTER
0270  14272 064523         LDB .-3          MAXCR = 3 FROM FSC
0271  14273 171640         STA SBPTR,I      MULTICHARACTER
0272  14274 060664         LDA MCREL          RELATIONAL
0273  14275 015347         JSB TBSRH            OPERATOR?
0274  14276 002001         RSS              NO
0275  14277 026305         JMP IF1          YES
0276  14300 061650         LDA TEMP+1       RETRIEVE CHARACTER
0277  14301 064522         LDB .-4          SINGLE CHARACTER
0278  14302 015373         JSB SYMCK          RELATIONAL
0279  14303 015401         DEF RELOS-1          OPERATOR?
0280  14304 115213         JSB SERRS+16,I   NO
0281  14305 015433  IF1     JSB RSTOP        YES, RECORD A STRING OPERAND
```

```
0282  14306 171640         STA SBPTR,I   SAVE NEXT CHARACTER
0283  14307 035501         ISZ MAXCR     BUMP LIMIT TO FOUR CHARACTERS
0284  14310 060676         LDA ATHEN     LOOK
0285  14311 007400         CCB             FOR
0286  14312 015347         JSB TBSRH         'THEN'
0287  14313 115205         JSB SERRS+10,I  NOT FOUND
0288  14314 015345         JSB PRGIN     DEMAND A SEQUENCE NUMBER
0289  14315 026105         JMP EOST      DEMAND END OF STATEMENT
0290*
0291***                              **
0292**  <FOR STATEMENT> SYNTAX   **
0293***                              **
0294*
0295  14316 015341  FORS   JSB VAROP     SEEK A SIMPLE VARIABLE
0296  14317 000000         NOP           NONE
0297  14320 115203         JSB SERRS+8,I   FOUND
0298  14321 007400         CCB           DEMAND AN
0299  14322 015373         JSB SYMCK       ASSIGNMENT
0300  14323 015365         DEF ASSOP-1       OPERATOR
0301  14324 115176         JSB SERRS+3,I NOT FOUND
0302  14325 015331         JSB FSC       RECORD INITIALIZATION FORMULA
0303  14326 050543         CPA .+15B    ARE WE AT STATEMENT END?
0304  14327 115206         JSB SERRS+11,I   YES ERROR
0305  14330 001727         ALF,ALF       DO
0306  14331 071650         STA TEMP+1      NEXT
0307  14332 015547         JSB GETCR         TWO
0308  14333 115206         JSB SERRS+11,I      CHARACTERS
0309  14334 031650         IOR TEMP+1            FORM
0310  14335 050712         CPA TO                  'TO' ?
0311  14336 002001         RSS           YES
0312  14337 115206         JSB SERRS+11,I  NO
0313  14340 061052         LDA TOOP      RECORD
0314  14341 171640         STA SBPTR,I     'TO'
0315  14342 015331         JSB FSC       RECORD LIMIT FORMULA
0316  14343 050543         CPA .+15B     END OF STATEMENT?
0317  14344 124716         JMP ACCSA,I   YES
0318  14345 171640         STA SBPTR,I   NO, IS NEXT
0319  14346 035501         ISZ MAXCR
0320  14347 060700         LDA ASTEP       SYMBOL
0321  14350 007400         CCB
0322  14351 015347         JSB TBSRH         'STEP' ?
0323  14352 115207         JSB SERRS+12,I  NO
0324  14353 015331         JSB FSC       YES, RECORD STEP SIZE
0325  14354 026105         JMP EOST      DEMAND END OF STATEMENT
0326*
0327***                              **
0328**  <NEXT STATEMENT> SYNTAX   **
0329***                              **
0330*
0331  14355 015341  NEXTS  JSB VAROP     SEEK SIMPLE VARIABLE
0332  14356 000000         NOP           NOT
0333  14357 115203         JSB SERRS+8,I   FOUND
0334  14360 026105         JMP EOST      DEMAND END OF STATEMENT
0335*
0336***                                        **
0337**  <RETURN STATEMENT>, <END STATEMENT>,  **
```

```
0338**    AND <STOP STATEMENT> SYNTAX          **
0339***                                       **
0340*
0341   14361 035640   ENDS   ISZ SBPTR      RECORD NULL OPERAND
0342   14362 015547          JSB GETCR      END OF STATEMENT?
0343   14363 124716          JMP ACCSA,I    YES
0344   14364 115177          JSB SERRS+4,I  NO
0345*
```

```
0347***                              **
0348**  <DATA STATEMENT> SYNTAX   **
0349***                              **
0350*
0351   14365 015371  DATAS JSB SBPUD
0352   14366 002400        CLA             INITIALIZE
0353   14367 071367        STA SIGN          SIGN
0354   14370 015547        JSB GETCR       REQUEST A CHARACTER
0355   14371 115210        JSB SERRS+13,I  END-OF-INPUT CONDITION
0356   14372 006404        CLB,INB
0357   14373 050601        CPA .+43        '+' ?
0358   14374 026423        JMP DATA4       YES
0359   14375 007400        CCB             NO
0360   14376 050603        CPA .+45        '-' ?
0361   14377 026423        JMP DATA4       YES
0362   14400 015377  DATA1 JSB NUMCK       NO, NUMBER?
0363   14401 026416        JMP DATA3       NO
0364   14402 115211        JSB SERRS+14,I  BAD EXPONENT
0365   14403 064523        LDB .-3         NUMBER,
0366   14404 045640        ADB SBPTR         MARK
0367   14405 160001        LDA 1,I             PREVIOUS
0368   14406 031163        IOR FLGBT             OPERATOR AS
0369   14407 170001        STA 1,I                 'NUMBER FOLLOWS'
0370   14410 061650        LDA TEMP+1      RETRIEVE FOLLOWING CHARACTER
0371   14411 007400  DATA2 CCB             COMMA
0372   14412 015373        JSB SYMCK
0373   14413 015333        DEF COMMA-1       NEXT?
0374   14414 026105        JMP EOST        NO, DEMAND END OF STATEMENT
0375   14415 026365        JMP DATAS       YES
0376   14416 055367  DATA3 CPB SIGN        SIGN FOUND? ( (B) = 0 )
0377   14417 002001        RSS             NO
0378   14420 115212        JSB SERRS+15,I  YES
0379   14421 015435        JSB GETST       DEMAND A STRING CONSTANT
0380   14422 026411        JMP DATA2
0381   14423 075367  DATA4 STB SIGN        RECORD SIGN
0382   14424 015547        JSB GETCR
0383   14425 115212        JSB SERRS+15,I  END-OF-INPUT CONDITION
0384   14426 026400        JMP DATA1
0385*
0386***                              **
0387**  <READ STATEMENT> SYNTAX   **
0388***                              **
0389*
0390   14427 015601  READS JSB RECRF       READ FROM FILE?
0391   14430 026436        JMP READ1       NO
0392   14431 050543        CPA .+15B       YES, PSUEDO-RESTORE?
0393   14432 124716        JMP ACCSA,I     YES
0394   14433 050612        CPA B73         NO, ';' ?
0395   14434 026437        JMP INPTS       YES
0396   14435 115201        JSB SERRS+6,I   NO
0397   14436 015551  READ1 JSB BCKSP
0398*
0399***                              **
0400**  <INPUT STATEMENT> SYNTAX   **
0401***                              **
0402*
```

```
0403   14437 065640  INPTS LDB SBPTR      ENABLE STRING
0404   14440 077425        STB SFLAG       VARIABLE
0405   14441 015341        JSB VAROP      SEEK VARIABLE OPERAND
0406   14442 115214        JSB SERRS+17,I  NONE FOUND
0407   14443 000000        NOP
0408   14444 007400        CCB
0409   14445 015373        JSB SYMCK      COMMA?
0410   14446 015333        DEF COMMA-1
0411   14447 026105        JMP EOST       NO, DEMAND END OF STATEMENT
0412   14450 026437        JMP INPTS      YES
0413*
0414***                          **
0415**  <PRINT STATEMENT> SYNTAX  **
0416***                          **
0417*
0418   14451 015601  PRINS JSB RECRF      WRITE ONTO FILE?
0419   14452 026462        JMP PRIN0-1    NO
0420   14453 007400        CCB            YES, SET
0421   14454 075603        STB FILRF        'FILE' FLAG
0422   14455 050543        CPA .+15B      NULL WRITE?
0423   14456 124716        JMP ACCSA,I    YES
0424   14457 050612        CPA B73        NO, ';' ?
0425   14460 026463        JMP PRIN0      YES
0426   14461 115201        JSB SERRS+6,I  NO
0427   14462 015551        JSB BCKSP
0428   14463 015371  PRIN0 JSB SBPUD      ADVANCE SYNTAX BUFFER POINTER
0429   14464 015547        JSB GETCR      MORE STATEMENT?
0430   14465 026553        JMP PRIN7      NO
0431   14466 007400        CCB            YES, ENABLE
0432   14467 077423        STB PFLAG        FORMULA AND TAB
0433   14470 050570        CPA .+42B      " ?
0434   14471 002001        RSS            YES
0435   14472 026511        JMP PRIN3      NO
0436   14473 015435  PRIN1 JSB GETST      RECORD A STRING CONSTANT
0437   14474 050543        CPA .+15B      END OF STATEMENT?
0438   14475 124716        JMP ACCSA,I    YES
0439   14476 007400        CCB            NO
0440   14477 077423        STB PFLAG
0441   14500 050570  PRIN2 CPA .+42B      " ?
0442   14501 026473        JMP PRIN1      YES
0443   14502 064524        LDB .-2        NO
0444   14503 015373        JSB SYMCK      COMMA OR
0445   14504 015333        DEF COMMA-1      SEMICOLON?
0446   14505 006401        CLB,RSS        NO
0447   14506 026463        JMP PRIN0      YES
0448   14507 175640        STB SBPTR,I    ZERO NEXT WORD
0449   14510 015371        JSB SBPUD
0450   14511 037423  PRIN3 ISZ PFLAG      FORMULA OR TAB PERMITTED?
0451   14512 115201        JSB SERRS+6,I  NO
0452   14513 171640        STA SBPTR,I    YES
0453   14514 007400        CCB            'FILE'
0454   14515 035603        ISZ FILRF        MODE?
0455   14516 026527        JMP PRIN4      NO
0456   14517 075603        STB FILRF      YES, SET FLAG AGAIN
0457   14520 060672        LDA AEND
0458   14521 015347        JSB TBSRH      'END' ?
```

```
0459  14522 026542         JMP PRIN5      NO
0460  14523 015371         JSB SBPUD      YES
0461  14524 015547         JSB GETCR      FETCH NEXT
0462  14525 000000         NOP              CHARACTER
0463  14526 026550         JMP PRIN6
0464  14527 060702  PRIN4   LDA ATAB
0465  14530 015347         JSB TBSRH      'TAB' ?
0466  14531 026542         JMP PRIN5      NO
0467  14532 007400         CCB            YES
0468  14533 045640         ADB SBPTR      RECORD
0469  14534 075640         STB SBPTR        'TAB'
0470  14535 061064         LDA TABCN          WITH
0471  14536 130001         IOR 1,I              PREVIOUS
0472  14537 170001         STA 1,I                OPERATOR
0473  14540 015351         JSB GETPF      RECORD PARENTHESIZED FORMULA
0474  14541 026550         JMP PRIN6
0475  14542 015551  PRIN5  JSB BCKSP      BACKUP
0476  14543 007400         CCB              TO POINT
0477  14544 045640         ADB SBPTR          FOLLOWING
0478  14545 075640         STB SBPTR            LAST OPERATOR
0479  14546 077425         STB SFLAG      ENABLE STRING VARIABLE
0480  14547 015331         JSB FSC        RECORD FORMULA
0481  14550 050543  PRIN6  CPA .+15B      END OF STATEMENT?
0482  14551 124716         JMP ACCSA,I    YES
0483  14552 026500         JMP PRIN2      NO
0484  14553 035603  PRIN7  ISZ FILRF      'FILE' MODE?
0485  14554 124716         JMP ACCSA,I    NO
0486  14555 115175         JSB SERRS+2,I    YES
0487*
0488***                      **
0489**  <MAT STATEMENT> SYNTAX  **
0490***                      **
0491*
0492  14556 015357  MATS   JSB LTR        FIRST TWO
0493  14557 115215         JSB SERRS+18,I  CHARACTERS
0494  14560 015367         JSB LETCK          LETTERS?
0495  14561 026647         JMP MATS3      NO
0496  14562 035640         ISZ SBPTR      YES,
0497  14563 001727         ALF,ALF          RETRIEVE
0498  14564 031650         IOR TEMP+1         FIRST CHARACTER
0499  14565 171640         STA SBPTR,I    LOOK
0500  14566 060533         LDA .+5          FOR
0501  14567 071501         STA MAXCR          'INPUT',
0502  14570 060674         LDA MATIO            'READ',
0503  14571 064523         LDB .-3                OR
0504  14572 015347         JSB TBSRH                'PRINT'
0505  14573 115215         JSB SERRS+18,I  NONE FOUND
0506  14574 051046         CPA PRTOP      IS IT 'PRINT'?
0507  14575 026622         JMP MATS2      YES
0508  14576 051044         CPA INPOP      NO, 'INPUT' ?
0509  14577 026606         JMP MATS1-2    YES
0510  14600 015601         JSB RECRF      NO, READ FROM FILE?
0511  14601 026605         JMP MATS1-3    NO
0512  14602 050612         CPA B73        YES, ';' ?
0513  14603 026606         JMP MATS1-2    YES
0514  14604 115201         JSB SERRS+6,I  NO
```

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0515  14605 015551          JSB BCKSP
0516  14606 002404          CLA,INA         TURN ON
0517  14607 073417          STA DFLAG         'MATRIX SUBSCRIPT' MODE
0518  14610 015343  MATS1   JSB ARRID       RECORD AN ARRAY
0519  14611 015333          JSB SBSCK       RECORD SUBSCRIPT
0520  14612 000000          NOP               IF PRESENT
0521  14613 050543          CPA .+15B       END OF STATEMENT?
0522  14614 124716          JMP ACCSA,I     YES
0523  14615 007400          CCB             NO, DEMAND
0524  14616 015373          JSB SYMCK         COMMA
0525  14617 015333          DEF COMMA-1
0526  14620 115201          JSB SERRS+6,I   NOT FOUND
0527  14621 026610          JMP MATS1
0528  14622 015601  MATS2   JSB RECRF       WRITE ON FILE?
0529  14623 026641          JMP MAT11       NO
0530  14624 050612          CPA B73         YES, ';' ?
0531  14625 007401          CCB,RSS         YES
0532  14626 115201          JSB SERRS+6,I   NO
0533  14627 075603          STB FILRF       NOTE 'FILE' MODE
0534  14630 015343  MAT10   JSB ARRID       RECORD AN ARRAY
0535  14631 050543          CPA .+15B       END OF STATEMENT?
0536  14632 124716          JMP ACCSA,I     YES
0537  14633 064524          LDB .-2         NO, DEMAND
0538  14634 015373          JSB SYMCK         COMMA OR
0539  14635 015333          DEF COMMA-1         SEMICOLON
0540  14636 115201          JSB SERRS+6,I   NOT FOUND
0541  14637 015547          JSB GETCR       END OF STATEMENT?
0542  14640 026643          JMP *+3         YES
0543  14641 015551  MAT11   JSB BCKSP       NO
0544  14642 026630          JMP MAT10
0545  14643 015371          JSB SBPUD       UPDATE POINTER
0546  14644 035603          ISZ FILRF       'FILE' MODE?
0547  14645 124716          JMP ACCSA,I     NO
0548  14646 115175          JSB SERRS+2,I     YES
0549  14647 065640  MATS3   LDB SBPTR       SAVE ADDRESS
0550  14650 077431          STB ARYAD         OF ARRAY OPERAND
0551  14651 061650          LDA TEMP+1      RECORD
0552  14652 171653          STA SSTAK,I       AND SAVE
0553  14653 064604          LDB .+46            THE ARRAY
0554  14654 015361          JSB STROP             IDENTIFIER
0555  14655 061651          LDA TEMP+2      RETRIEVE
0556  14656 007400          CCB               NEXT CHARACTER
0557  14657 015373          JSB SYMCK           AND TEST FOR
0558  14660 015365          DEF ASSOP-1           ASSIGNMENT OPERATOR
0559  14661 115176          JSB SERRS+3,I   NOT FOUND
0560  14662 015357          JSB LTR         LETTER NEXT?
0561  14663 026733          JMP MATS5       NO
0562  14664 015367          JSB LETCK       YES, ANOTHER LETTER?
0563  14665 026743          JMP MATS6       NO
0564  14666 035640          ISZ SBPTR       YES,
0565  14667 001727          ALF,ALF           CONCATENATE
0566  14670 031650          IOR TEMP+1          LETTERS
0567  14671 171640          STA SBPTR,I           AND
0568  14672 060706          LDA MATFN               SEARCH FOR
0569  14673 064521          LDB .-5                   AN ARRAY
0570  14674 015347          JSB TBSRH                   FUNCTION
```

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0571  14675 115202          JSB SERRS+7,I NONE FOUND
0572  14676 001727          ALF,ALF       FOUND,
0573  14677 001723          ALF,RAR         CONVERT
0574  14700 031062          IOR PDFFL         TO OPERAND
0575  14701 007400          CCB           COMBINE
0576  14702 045640          ADB SBPTR       WITH
0577  14703 130001          IOR 1,I           OPERATOR
0578  14704 170001          STA 1,I             AND RECORD
0579  14705 010633          AND B777      'INV'
0580  14706 041124          ADA D577        OR
0581  14707 002021          SSA,RSS           'TRN' ?
0582  14710 026720          JMP MATS4     YES
0583  14711 015547          JSB GETCR     NO, END OF STATEMENT?
0584  14712 124716          JMP ACCSA,I   YES
0585  14713 006404          CLB,INB       NO, TURN ON
0586  14714 077417          STB DFLAG       'MATRIX SUBSCRIPT' MODE
0587  14715 015333          JSB SBSCK     DEMAND SUBSCRIPT
0588  14716 115200          JSB SERRS+5,I NONE FOUND
0589  14717 026105          JMP EOST      DEMAND END OF STATEMENT
0590  14720 002003  MATS4    SZA,RSS       ALLOW INVERSION
0591  14721 171653          STA SSTAK,I     INTO SELF
0592  14722 015547          JSB GETCR     DEMAND
0593  14723 115221          JSB SERRS+22,I  LEFT
0594  14724 015353          JSB LPCK          PARENTHESIS
0595  14725 015343          JSB ARRID     DEMAND ARRAY
0596  14726 015355          JSB RPCK      DEMAND RIGHT PARENTHESIS
0597  14727 065650          LDB TEMP+1    SAME SOURCE AND
0598  14730 155653          CPB SSTAK,I     DESTINATION ARRAYS?
0599  14731 115216          JSB SERRS+19,I  YES
0600  14732 026105          JMP EOST      NO, DEMAND END OF STATMENT
0601  14733 015551  MATS5   JSB BCKSP     BACK UP AND
0602  14734 015351          JSB GETPF       DEMAND PARENTHESIZED FORMULA
0603  14735 007400          CCB           SEEK
0604  14736 015373          JSB SYMCK
0605  14737 015373          DEF TIMES-1       '*'
0606  14740 115217          JSB SERRS+20,I  NOT FOUND
0607  14741 015343          JSB ARRID     DEMAND ARRAY
0608  14742 026105          JMP EOST      DEMAND END OF STATEMENT
0609  14743 061650  MATS6   LDA TEMP+1    RECORD
0610  14744 064604          LDB .+46        ARRAY
0611  14745 015361          JSB STROP         OPERAND
0612  14746 061651          LDA TEMP+2    END OF
0613  14747 050543          CPA .+15B       STATEMENT?
0614  14750 124716          JMP ACCSA,I   YES
0615  14751 064523          LDB .-3       NO, SEEK
0616  14752 015373          JSB SYMCK         '+', '-',
0617  14753 015367          DEF PLUS-1          OR '*'
0618  14754 115220          JSB SERRS+21,I  NOT FOUND
0619  14755 006400          CLB           SET '*' FLAG TO FALSE
0620  14756 051022          CPA MULOP     '*' ?
0621  14757 026772          JMP MATS9     YES
0622  14760 077423  MATS7   STB PFLAG      NO
0623  14761 015343          JSB ARRID     DEMAND ARRAY
0624  14762 071651          STA TEMP+2    SAVE CHARACTER
0625  14763 037423          ISZ PFLAG     '*' ?
0626  14764 026770          JMP MATS8     NO
```

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0627   14765 061650         LDA TEMP+1     YES, DOES ARRAY
0628   14766 151653         CPA SSTAK,I      MATCH LEFT-HAND SIDE?
0629   14767 115216         JSB SERRS+19,I  YES
0630   14770 061651  MATS8   LDA TEMP+2     NO, RETRIEVE CHARACTER
0631   14771 026105         JMP EOST       DEMAND END OF STATEMENT
0632   14772 007400  MATS9   CCB            SET '*' FLAG TO TRUE
0633   14773 061650         LDA TEMP+1     DOES ARRAY
0634   14774 151653         CPA SSTAK,I      MATCH LEFT-HAND SIDE?
0635   14775 115216         JSB SERRS+19,I
0636   14776 026760         JMP MATS7      NO
```

```
0002*
0003***                              **
0004**  <FORMULA> SYNTAX CHECKER     **
0005***                              **
0006*
0007*
0008*  FSC ANALYZES THE INPUT STRING UNDER THE ASSUMPTION
0009*  THAT A LEGITIMATE FORMULA IS THERE.  EXIT TO ERROR ON
0010*  UNRECOGNIZABLE OR OBVIOUSLY INCORRECT INPUT.  EXIT TO
0011*  (P+1) WHEN CONTINUED INPUT CANNOT BE A PART OF THE
0012*  FORMULA AND THE INPUT SCANNED SO FAR FORMS A COMPLETE
0013*  FORMULA IN ITSELF (I.E., ... A+B TO ... EXITS AFTER
0014*  THE 'B').  ON EXIT (A) HOLDS THE FIRST CHARACTER NOT
0015*  PARSED INTO THE FORMULA, (B) = 0, AND SBPTR,I = 0
0016*  (END-OF-FORMULA OPERATOR).  DURING THE FORMULA PARSE,
0017*  SSTAK,I HOLDS THE COUNT OF UNMATCHED LEFT PARENTHESES.
0018*  IF THE FIRST SYMBOL ENCOUNTERED IS A STRING VARIABLE,
0019*  EXIT TO ERROR IF IT IS NOT ENABLED ELSE RECORD THE
0020*  VARIABLE AND ANY FOLLOWING SUBSCRIPT AND EXIT TO (P+1)
0021*  WITH THE NEXT CHARACTER IN (A), (B) = -1, AND SFLAG = -1.
0022*
0023  14777 002400  #FSC  CLA            SET LEFT PARENTHESIS
0024  15000 171653       STA SSTAK,I      COUNT TO ZERO
0025  15001 060531       LDA .+3          SET MULTICHARACTER SEARCH
0026  15002 071501       STA MAXCR          TO MAXIMUM OF 3 CHARACTERS
0027  15003 003400  FSC1 CCA              ENABLE
0028  15004 073427       STA UFLAG          UNARY OPERATORS
0029*                      *
0030**  LOOK FOR AN OPERAND  **
0031*                      *
0032  15005 015341  FSC2 JSB VAROP        SEEK VARIABLE OPERAND
0033  15006 027112       JMP FSC7         FIRST CHARACTER NOT A LETTER
0034  15007 027212       JMP FSC13-3      SUBSCRIPTED OR STRING VARIABLE
0035  15010 015367       JSB LETCK        SIMPLE VARIABLE.  LETTER NEXT?
0036  15011 027215       JMP FSC13        NO
0037*                                                  *
0038**  DOES 'AND', 'OR', 'MAX', OR 'MIN' FOLLOW      **
0039**    A SIMPLE VARIABLE?                          **
0040*                                                  *
0041  15012 064522       LDB .-4
0042  15013 171640       STA SBPTR,I      SEARCH FOR
0043  15014 060662       LDA MCBOP          'AND', 'OR',
0044  15015 015347       JSB TBSRH            'MAX', AND 'MIN'
0045  15016 002001       RSS              NONE FOUND
0046  15017 027107       JMP FSC6         FOUND
0047*                                      *
0048**  SEE IF OPERAND IS A FUNCTION RATHER  **
0049**    THAN A SIMPLE VARIABLE.            **
0050*                                        *
0051  15020 061651       LDA TEMP+2
0052  15021 001727       ALF,ALF          WERE
0053  15022 031650       IOR TEMP+1         TWO LETTERS
0054  15023 050714       CPA FN               'FN' ?
0055  15024 027054       JMP FSC4         YES
0056  15025 171640       STA SBPTR,I      NO,
0057  15026 060704       LDA PDFNS          PREDEFINED
```

```
0058  15027 064510        LDB .-14
0059  15030 015347        JSB TBSRH
0060  15031 027152        JMP FSC11      NO
0061  15032 001727        ALF,ALF        YES,
0062  15033 001723        ALF,RAR          BUILD
0063  15034 031062        IOR PDFFL          NAME
0064  15035 071650  FSC3  STA TEMP+1      SAVE FUNCTION
0065  15036 007400        CCB            RETRIEVE
0066  15037 045640        ADB SBPTR        PREVIOUS
0067  15040 075640        STB SBPTR          OPERATOR-
0068  15041 160001        LDA 1,I              OPERAND
0069  15042 011054        AND OPMSK      REPLACE
0070  15043 031650        IOR TEMP+1       OPERAND
0071  15044 171640        STA SBPTR,I        WITH FUNCTION
0072  15045 061650        LDA TEMP+1
0073  15046 051066        CPA LENCN      'LEN' ?
0074  15047 027064        JMP FSC0       YES
0075  15050 064515        LDB .-9        NO, TURN OFF
0076  15051 077421        STB MSFLG        'MULTIPLE STORE' MODE
0077  15052 015351        JSB GETPF      DEMAND PARENTHSIZED
0078  15053 027215        JMP FSC13        FORMULA
0079  15054 015547  FSC4  JSB GETCR      DOES
0080  15055 115202        JSB SERRS+7,I    LETTER
0081  15056 015367        JSB LETCK          FOLLOW?
0082  15057 115202        JSB SERRS+7,I  NO
0083  15060 040460        ADA D100       YES,
0084  15061 001700        ALF              BUILD
0085  15062 040545        ADA .+17B          FUNCTION
0086  15063 027035        JMP FSC3             NAME
0087  15064 035640  FSC0  ISZ SBPTR       MOVE TO CORRECT PROGRAM WORD
0088  15065 015547        JSB GETCR      RECORD
0089  15066 115221        JSB SERRS+22,I   LEFT
0090  15067 015353        JSB LPCK           PARENTHESIS
0091  15070 015357        JSB LTR        LETTER NEXT?
0092  15071 115223        JSB SERRS+24,I   NO
0093  15072 050572        CPA .+44B      YES, FOLLOWED BY '$' ?
0094  15073 002001        RSS            YES
0095  15074 115223        JSB SERRS+24,I   NO
0096  15075 061650        LDA TEMP+1     RECORD
0097  15076 064601        LDB .+53B        STRING
0098  15077 015361        JSB STROP          VARIABLE
0099  15100 015547        JSB GETCR      RECORD
0100  15101 115222        JSB SERRS+23,I   RIGHT
0101  15102 015355        JSB RPCK           PARENTHESIS
0102  15103 027132        JMP FSC8
0103*                                 *
0104**  CHECK FOR LEFT PARENTHESIS   **
0105*                                 *
0106  15104 061014  FSC5  LDA LPOP       RECORD
0107  15105 171640        STA SBPTR,I      A '('
0108  15106 135653        ISZ SSTAK,I    COUNT IT
0109  15107 064515  FSC6  LDB .-9        TURN OFF
0110  15110 077421        STB MSFLG        'MULTIPLE STORE'
0111  15111 027003        JMP FSC1           MODE
0112  15112 015371  FSC7  JSB SBPUD      UPDATE POINTER
0113  15113 050576        CPA .+40       '(' ?
```

```
0114  15114 027104          JMP FSC5       YES
0115  15115 050621          CPA B133       NO, '' ?
0116  15116 027104          JMP FSC5       YES
```

```
0118*                          *
0119**  CHECK FOR A NUMBER     **
0120*                          *
0121  15117 006400         CLB            SET '+'
0122  15120 075367         STB SIGN         AS SIGN
0123  15121 015377         JSB NUMCK      SEEK A NUMBER
0124  15122 027135         JMP FSC9       NOT FOUND
0125  15123 115211         JSB SERRS+14,I   BAD EXPONENT
0126  15124 065640         LDB SBPTR      RETRIEVE
0127  15125 044523         ADB .-3          PRECEDING
0128  15126 160001         LDA 1,I            OPERATOR
0129  15127 031163         IOR FLGBT      SET FLAG TO SAY
0130  15130 170001         STA 1,I          NUMBER FOLLOWS
0131  15131 061650         LDA TEMP+1     RETRIEVE CHARACTER
0132  15132 064515  FSC8   LDB .-9        TURN OFF
0133  15133 077421         STB MSFLG        'MULTIPLE STORE'
0134  15134 027215         JMP FSC13          MODE
0135*                                 *
0136**  CHECK FOR A UNARY OPERATOR   **
0137*                                 *
0138  15135 037427  FSC9   ISZ UFLAG      UNARY OPERATORS PERMITTED?
0139  15136 115224         JSB SERRS+25,I   NO
0140  15137 065020         LDB UNMNC      YES LOAD UNARY MINUS OPCODE
0141  15140 050601         CPA .+43       '+' ?
0142  15141 027145         JMP *+4        YES
0143  15142 050603         CPA .+45       NO, '-' ?
0144  15143 027146         JMP *+3        YES
0145  15144 115224         JSB SERRS+25,I   NO
0146  15145 065016         LDB UNPLC      CONVERT (B) TO UNARY '+' OPCODE
0147  15146 175640         STB SBPTR,I    RECORD UNARY OPERATOR
0148  15147 064515  FSC10  LDB .-9        TURN OFF
0149  15150 077421         STB MSFLG        'MULTIPLE STORE'
0150  15151 027005         JMP FSC2           MODE
0151*                                          *
0152**  CHECK POSSIBILITY OF 'NOT' RATHER THAN  **
0153**    A SIMPLE VARIABLE                     **
0154*                                           *
0155  15152 037427  FSC11  ISZ UFLAG      'NOT' PERMITTED?
0156  15153 027246         JMP FSC14-1    NO
0157  15154 161640         LDA SBPTR,I    YES
0158  15155 001727         ALF,ALF
0159  15156 171640         STA SBPTR,I
0160  15157 060666         LDA ANOT       SEEK
0161  15160 007400         CCB
0162  15161 015347         JSB TBSRH        'NOT'
0163  15162 027246         JMP FSC14-1    'NOT' NOT FOUND
0164  15163 171640         STA SBPTR,I    FOUND
0165  15164 007400         CCB            ERASE
0166  15165 045640         ADB SBPTR
0167  15166 160001         LDA 1,I          SPURIOUS
0168  15167 011054         AND OPMSK
0169  15170 170001         STA 1,I            OPERAND
0170  15171 027147         JMP FSC10
0171*                                  *
0172**  CHECK FOR RIGHT PARENTHESIS   **
0173*                                  *
```

```
0174  15172 064524  FSC12 LDB .-2          ')'
0175  15173 015373        JSB SYMCK          OR
0176  15174 015347        DEF RPARN-1          ']' ?
0177  15175 027247        JMP FSC14          NO
0178  15176 061006        LDA RPOP           YES,
0179  15177 171640        STA SBPTR,I          RECORD ')'
0180  15200 060577        LDA .+41           RETRIEVE ')'
0181  15201 007400        CCB                MATCHING
0182  15202 145653        ADB SSTAK,I          LEFT
0183  15203 006020        SSB                  PARENTHESIS?
0184  15204 027247        JMP FSC14          NO
0185  15205 175653        STB SSTAK,I        YES
0186  15206 015371        JSB SBPUD          UPDATE POINTER
0187  15207 015547        JSB GETCR          FETCH NEXT
0188  15210 027247        JMP FSC14            CHARACTER
0189  15211 027215        JMP FSC13
0190*                                  *
0191**  CHECK FOR A BINARY OPERATOR  **
0192*                                  *
0193  15212 007400        CCB                STRING VARIABLE
0194  15213 057425        CPB SFLAG            JUST FOUND?
0195  15214 125331        JMP FSC,I          YES
0196  15215 050543  FSC13 CPA .+15B         NO, END OF STATEMENT?
0197  15216 027247        JMP FSC14          YES
0198  15217 073427        STA UFLAG          NO, DISABLE UNARY OPERATORS
0199  15220 071650        STA TEMP+1         SAVE CHARACTER
0200  15221 064517        LDB .-7            SEARCH
0201  15222 171640        STA SBPTR,I          FOR A
0202  15223 060662        LDA MCBOP              MULTICHARACTER
0203  15224 015347        JSB TBSRH                BINARY OPERATOR
0204  15225 002001        RSS                NONE FOUND
0205  15226 027107        JMP FSC6           FOUND
0206  15227 061650        LDA TEMP+1         NO, RECOVER A CHARACTER
0207  15230 067421        LDB MSFLG          SINGLE
0208  15231 015373        JSB SYMCK            CHARACTER
0209  15232 015367        DEF PLUS-1             BINARY OPERATOR?
0210  15233 027237        JMP *+4            NO
0211  15234 051024        CPA EXPOP          YES, '^' ?
0212  15235 027147        JMP FSC10          YES
0213  15236 027107        JMP FSC6           NO
0214  15237 007400        CCB                ASSIGNMENT
0215  15240 015373        JSB SYMCK
0216  15241 015365        DEF ASSOP-1          OPERATOR?
0217  15242 027172        JMP FSC12          NO
0218  15243 060524        LDA .-2            YES, SET FLAG
0219  15244 073425        STA SFLAG            TO SAY
0220  15245 027003        JMP FSC1               STORE OCCURRED
0221*                     *
0222**  END OF FORMULA   **
0223*                     *
0224  15246 061651          LDA TEMP+2       RETRIEVE CHARACTER
0225  15247 006400  FSC14 CLB                RECORD
0226  15250 175640        STB SBPTR,I          END-OF-FORMULA
0227  15251 155653        CPB SSTAK,I        ALL LEFT PARENTHESES MATCHED?
0228  15252 125331        JMP FSC,I          YES
0229  15253 115222        JSB SERRS+23,I     NO
```

```
0231**                                          **
0232***  SAVE LOCAL VARIABLES OF FSC            ***
0233**                                          **
0234*
0235*  SAVING MSFLG, UFLAG, VAROP, GETPF, AND FSC MAKES FSC A
0236*  RE-ENTRANT SUBROUTINE.  THEY ARE SAVED ON THE SYNTAX
0237*  STACK BELOW THE ACTIVE SYNTAX BUFFER.  ON ENTRY (B)
0238*  CONTAINS THE NUMBER OF WORDS TO BE SAVED.
0239*
0240  15254 035653  #FRCR ISZ SSTAK      SAVE PREVIOUS '(' COUNT
0241  15255 045653         ADB SSTAK      SUFFICIENT
0242  15256 007000         CMB              USER
0243  15257 044654         ADB LWAUS          SPACE
0244  15260 006020         SSB                  LEFT?
0245  15261 115173         JSB SERRS,I    NO
0246  15262 067421         LDB MSFLG      YES, SAVE
0247  15263 175653         STB SSTAK,I      'MULTIPLE STORE'
0248  15264 035653         ISZ SSTAK          FLAG
0249  15265 067427         LDB UFLAG      SAVE
0250  15266 175653         STB SSTAK,I      'UNARY OPERATOR'
0251  15267 035653         ISZ SSTAK          FLAG
0252  15270 065341         LDB VAROP      SAVE
0253  15271 175653         STB SSTAK,I      VAROP
0254  15272 035653         ISZ SSTAK          RETURN ADDRESS
0255  15273 065351         LDB GETPF      SAVE
0256  15274 175653         STB SSTAK,I      GETPF
0257  15275 035653         ISZ SSTAK          RETURN ADDRESS
0258  15276 065331         LDB FSC        SAVE
0259  15277 175653         STB SSTAK,I      FSC
0260  15300 035653         ISZ SSTAK          RETURN ADDRESS
0261  15301 003400         CCA            DISABLE
0262  15302 043425         ADA SFLAG        SFLAG
0263  15303 073425         STA SFLAG          VALUE
0264  15304 125335         JMP FRCUR,I
0265**                                          **
0266***  RESTORE FSC LOCAL VARIABLES             ***
0267**                                          **
0268*
0269*  INVERSE OF FRCUR.  (A) IS SAVED BUT (B) IS NOT.
0270*
0271  15305 071650  #FPOP STA TEMP+1     SAVE (A)
0272  15306 065653         LDB SSTAK      RESET
0273  15307 044520         ADB .-6          SYNTAX STACK
0274  15310 075653         STB SSTAK          POINTER
0275  15311 006004         INB            RESTORE
0276  15312 160001         LDA 1,I          'MULTIPLE STORE'
0277  15313 073421         STA MSFLG          FLAG
0278  15314 006004         INB            RESTORE
0279  15315 160001         LDA 1,I          'UNARY OPERATOR'
0280  15316 073427         STA UFLAG          FLAG
0281  15317 006004         INB            RESTORE
0282  15320 160001         LDA 1,I          VAROP
0283  15321 071341         STA VAROP          RETURN ADDRESS
0284  15322 006004         INB
0285  15323 104200         DLD 1,I        RESTORE GETPF
0286  15325 071351         STA GETPF        RETURN ADDRESS AND
```

```
0331  15374 022010  TIMES OCT 22010       MULTIPLICATION
```

```
0287  15326 075331          STB FSC          FSC RETURN ADDRESS
0288  15327 037425          ISZ SFLAG     RESTORE SFLAG VALUE
0289  15330 061650          LDA TEMP+1    RESTORE (A)
0290  15331 125337          JMP FPOP,I


0292**                                                      **
0293***  SINGLE CHARACTER AND/OR FORMULA OPERATORS        ***
0294**                                                      **
0295*
0296*  BITS 15-9 OF THE OCTAL WORD ARE THE OPERATOR CODE.
0297*  BITS 3-0 ARE THE PRECEDENCE FOR FORMULA OPERATORS.
0298*  THE ASCII WORD IS USED TO RECOGNIZE THE OPERATOR ON
0299*  INPUT AND TO PROVIDE THE PRINT NAME ON OUTPUT.  THE
0300*  ORDERING OF THE TABLE FACILITATES SEARCHING.
0301*
0302  15332 001000  QUOTE OCT 1000       STRING DELIMITER
0303  15333 021040        ASC 1,"
0304  15334 002000  COMMA OCT 2000       COMMA
0305  15335 026040        ASC 1,,
0306  15336 003000        OCT 3000       SEMICOLON
0307  15337 035440        ASC 1,;
0308  15340 004000  HATCH OCT 4000       HATCH SIGN
0309  15341 021440        ASC 1,#
0310  15342 000000        BSS 6          UNUSED
0311  15350 010001  RPARN OCT 10001      RIGHT PARENTHESIS
0312  15351 024440        ASC 1,)
0313  15352 011001        OCT 11001      RIGHT BRACKET
0314  15353 056440        OCT 56440          ]
0315  15354 012013  LBRAC OCT 12013      LEFT BRACKET
0316  15355 055440        OCT 55440          [
0317  15356 013013        OCT 13013      LEFT PARENTHESIS
0318  15357 024040        ASC 1,(
0319  15360 014011        OCT 14011      UNARY PLUS
0320  15361 025440        ASC 1,+
0321  15362 015011        OCT 15011      UNARY MINUS
0322  15363 026440        ASC 1,-
0323  15364 016002  SCMMA OCT 16002      SUBSCRIPT SEPARATOR
0324  15365 026040        ASC 1,,
0325  15366 017002  ASSOP OCT 17002      ASSIGNMENT OPERATOR
0326  15367 036440        ASC 1,=
0327  15370 020007  PLUS  OCT 20007      ADDITION
0328  15371 025440        ASC 1,+
0329  15372 021007        OCT 21007      SUBTRACTION
0330  15373 026440        ASC 1,-
0331  15374 022010  TIMES OCT 22010      MULTIPLICATION
0332  15375 025040        ASC 1,*
0333  15376 023010        OCT 23010      DIVISION
0334  15377 027440        ASC 1,/
0335  15400 024012        OCT 24012      EXPONENTIATION
0336  15401 057040        ASC 1,^
0337  15402 025005  RELOS OCT 25005      GREATER THAN
0338  15403 037040        ASC 1,>
0339  15404 026005        OCT 26005      LESS THAN
0340  15405 036040        ASC 1,<
0341  15406 027005        OCT 27005      UNEQUAL
```

```
0342   15407 021440          ASC 1,#
0343   15410 030005          OCT 30005      EQUAL
0344   15411 036440          ASC 1,=
0345   15412 015720  DCLNU    DEF CLNUP
0346   15413 014117  DCOM0    DEF COMS0
0347   15414 000000          BSS 2          UNUSED
0348   15416 033004          OCT 33004      AND
0349   15417 000000  DFLAG    NOP
0350   15420 034003          OCT 34003      OR
0351   15421 000000  MSFLG    NOP
0352   15422 035006          OCT 35006      MINIMUM
0353   15423 000000  PFLAG    NOP
0354   15424 036006          OCT 36006      MAXIMUM
0355   15425 000000  SFLAG    NOP
0356   15426 037005          OCT 37005      UNEQUAL
0357   15427 000000  UFLAG    NOP
0358   15430 040005          OCT 40005      GREATER THAN OR EQUAL
0359   15431 000000  ARYAD    NOP
0360   15432 041005          OCT 41005      LESS THAN OR EQUAL
0361   15433 000000          NOP
0362   15434 042011          OCT 42011      NOT
```

```
0365**                          **
0366***  SUBSCRIPT SYNTAX      ***
0367**                          **
0368*
0369*  SBSCK ASSUMES A PRIOR ARRAY OPERAND REFERENCED THROUGH
0370*  THE POINTER ARYAD.  ENTRY IS MADE WITH A CHARACTER IN
0371*  (A); EXIT TO (P+1) IF THIS CHARACTER IS NOT '(' OR '',
0372*  OTHERWISE ANALYZE THE SUBSCRIPT WHICH MUST FOLLOW,
0373*  EXITING TO (P+2).  SBSCK HANDLES BOTH SINGLE AND DOUBLE
0374*  SUBSCRIPTS.  IF DFLAG=0 THE SUBSCRIPT IS FROM A
0375*  <DIM STATEMENT> AND THE BOUNDS MUST BE POSITIVE
0376*  INTEGERS.  IF DFLAG=1 THE SUBSCRIPT RE-DIMENSIONS A
0377*  MATRIX AND A COMMA SEPARATES THE TWO BOUNDS OF A
0378*  DOUBLE SUBSCRIPT AND AN END-OF-FORMULA OPERATOR
0379*  FOLLOWS THE LAST BOUND.  OTHERWISE A 'SUBSCRIPT'
0380*  COMMA SEPARATES THE TWO PARTS OF A DOUBLE SUBSCRIPT
0381*  AND NO END-OF-FORMULA OPERATOR APPEARS.  IN ALL CASES,
0382*  THE ARRAY OPERAND IS MARKED AS ONE- OR TWO-DIMENSIONAL.
0383*  IF THE SUBSCRIPT BELONGS TO A STRING VARIABLE IN A
0384*  <DIM STATEMENT>, IT MUST HAVE ONE AND ONLY ONE BOUND
0385*  CONSISTING OF A POSITIVE INTEGER NOT LARGER THAN 72.
0386*  IN THIS CASE ARYAD HOLDS A DUMMY POINTER SINCE STRING
0387*  VARIABLES ARE NOT MARKED WITH DIMENSIONALITY.
0388*
0389  15435 064524  #SBCK LDB .-2        '('
0390  15436 015373        JSB SYMCK       OR
0391  15437 015353        DEF LBRAC-1       '' ?
0392  15440 125333        JMP SBSCK,I   NO, RETURN TO (P+1)
0393  15441 035333        ISZ SBSCK     YES, SET RETURN TO (P+2)
0394  15442 163431        LDA ARYAD,I   SET
0395  15443 040524        ADA .-2         ARRAY TO
0396  15444 173431        STA ARYAD,I       SINGLE DIMENSION
0397  15445 061012        LDA LBOP      RECORD
0398  15446 171640        STA SBPTR,I     ''
0399  15447 037417        ISZ DFLAG     BUMP MAGIC FLAG
0400  15450 006404        CLB,INB       DIM
0401  15451 057417        CPB DFLAG       STATEMENT?
0402  15452 027546        JMP SBSC5     YES
0403  15453 064535        LDB .+7       NO, SAVE FSC
0404  15454 015335        JSB FRCUR       LOCAL VARIABLES
0405  15455 065333        LDB SBSCK     SAVE
0406  15456 175653        STB SSTAK,I     RETURN
0407  15457 035653        ISZ SSTAK         ADDRESS
0408  15460 067431        LDB ARYAD     SAVE ARRAY
0409  15461 175653        STB SSTAK,I     REFERENCE
0410  15462 035653        ISZ SSTAK     RESERVE SPACE FOR '(' COUNT
0411  15463 060515        LDA .-9       TURN OFF 'STORE
0412  15464 073421        STA MSFLG       ALLOWED' MODE
0413  15465 015331        JSB FSC       DEMAND SUBSCRIPT
0414  15466 007400        CCB           RESTORE
0415  15467 045653        ADB SSTAK
0416  15470 075653        STB SSTAK       ARRAY
0417  15471 164001        LDB 1,I
0418  15472 077431        STB ARYAD         REFERENCE
0419  15473 067417        LDB DFLAG     'MATRIX SUBSCRIPT'
0420  15474 054530        CPB .+2         MODE?
```

```
0421  15475 027541         JMP SBSC4      YES
0422  15476 007400  SBSC1  CCB            NO, SEEK
0423  15477 015373         JSB SYMCK        'SUBSCRIPT'
0424  15500 015363         DEF SCMMA-1        COMMA
0425  15501 027511         JMP SBSC3+1    NONE FOUND
0426  15502 137431         ISZ ARYAD,I    SET ARRAY AS DOUBLY-SUBSCRIPTED
0427  15503 006404         CLB,INB        DIM
0428  15504 057417         CPB DFLAG        STATEMENT?
0429  15505 027510         JMP SBSC3      YES
0430  15506 015331         JSB FSC        NO, DEMAND SECOND SUBSCRIPT
0431  15507 002001         RSS
0432  15510 015345  SBSC3  JSB PRGIN      DEMAND SECOND BOUND
0433  15511 007400         CCB            RESTORE
0434  15512 047417         ADB DFLAG        ORIGINAL
0435  15513 077417         STB DFLAG          DFLAG VALUE
0436  15514 054527         CPB .+1        'MATRIX SUBSCRIPT' MODE?
0437  15515 015371         JSB SBPUD      YES
0438  15516 064524         LDB .-2        DEMAND
0439  15517 015373         JSB SYMCK        ')' OR
0440  15520 015347         DEF RPARN-1        ']'
0441  15521 115222         JSB SERRS+23,I   NOT FOUND
0442  15522 061010         LDA RBOP       RECORD
0443  15523 171640         STA SBPTR,I      ']'
0444  15524 015371         JSB SBPUD      UPDATE POINTER
0445  15525 015547         JSB GETCR      FETCH NEXT
0446  15526 000000         NOP              CHARACTER
0447  15527 006400         CLB            DIM
0448  15530 057417         CPB DFLAG        STATEMENT?
0449  15531 125333         JMP SBSCK,I    YES
0450  15532 007400         CCB            NO,
0451  15533 045653         ADB SSTAK        RESTORE
0452  15534 075653         STB SSTAK          THE
0453  15535 165653         LDB SSTAK,I          RETURN
0454  15536 075333         STB SBSCK              ADDRESS
0455  15537 015337         JSB FPOP       RESTORE FSC
0456  15540 125333         JMP SBSCK,I      LOCAL VARIABLES
0457  15541 007400  SBSC4  CCB
0458  15542 015373         JSB SYMCK      COMMA?
0459  15543 015333         DEF COMMA-1
0460  15544 027511         JMP SBSC3+1    NO
0461  15545 027502         JMP SBSC1+4    YES
0462  15546 015345  SBSC5  JSB PRGIN      DEMAND DECLARED BOUND
0463  15547 037425         ISZ SFLAG      STRING VARIABLE?
0464  15550 027476         JMP SBSC1      NO
0465  15551 044456         ADB M73        YES, DOES BOUND
0466  15552 006021         SSB,RSS          EXCEED 72?
0467  15553 115231         JSB SERRS+30,I   YES
0468  15554 027511         JMP SBSC3+1    NO
```

```
0470**                                  **
0471***  RECORD ARRAY IDENTIFIER  ***
0472**                                  **
0473*
0474*  ARRAY IDENTIFIER LEFT IN TEMP+1, ARRAY OPERAND ADDRESS
0475*  PUT IN ARYAD.  EXIT WITH FOLLOWING CHARACTER IN TEMP+2
0476*  AND IN (A).
0477*
0478  15555 015357  #ARID JSB LTR       FETCH IDENTIFIER
0479  15556 115225        JSB SERRS+26,I  NONE FOUND
0480  15557 065343        LDB ARRID     SET
0481  15560 075431        STB STRID       EXIT
0482**                                  **
0483***  RECORD STRING IDENTIFIER  ***
0484**                                  **
0485*
0486*  STRING IDENTIFIER LEFT IN TEMP+1, SFLAG SET TO -1.
0487*  EXIT WITH FOLLOWING CHARACTER IN (A).  EXIT TO ERROR
0488*  IF A STRING VARIABLE IS NOT PERMITTED IN THIS CONTEXT.
0489*
0490  15561 050572  #STRI CPA .+44B     '$' ?
0491  15562 027572        JMP STRI1     YES
0492  15563 061640        LDA SBPTR     NO, SET POINTER TO
0493  15564 073431        STA ARYAD       VARIABLE LOCATION
0494  15565 061650        LDA TEMP+1    RECORD
0495  15566 064604        LDB .+56B       ARRAY
0496  15567 015361        JSB STROP         VARIABLE
0497  15570 061651        LDA TEMP+2    RETRIEVE FOLLOWING
0498  15571 125431        JMP STRID,I     CHARACTER
0499  15572 063425  STRI1 LDA SFLAG     STRING VARIABLE
0500  15573 051640        CPA SBPTR       PERMITTED?
0501  15574 003401        CCA,RSS       YES
0502  15575 115226        JSB SERRS+27,I  NO
0503  15576 073425        STA SFLAG     SET FLAG TO 'STRING OCCURRED'
0504  15577 061650        LDA TEMP+1    RECORD
0505  15600 064601        LDB .+53B       STRING
0506  15601 015361        JSB STROP         VARIABLE
0507  15602 061653        LDA SSTAK     SET POINTER TO DUMMY
0508  15603 073431        STA ARYAD       VARIABLE LOCATION
0509  15604 015547        JSB GETCR     FETCH
0510  15605 000000        NOP             NEXT
0511  15606 125431        JMP STRID,I       CHARACTER
0512**                                  **
0513***  RECORD A STRING OPERAND  ***
0514**                                  **
0515*
0516*  DEMAND A STRING VARIABLE OR A STRING COSTANT.  EXIT
0517*  TO ERROR IF NEITHER IS FOUND, ELSE EXIT WITH THE NEXT
0518*  CHARACTER IN (A).
0519*
0520  15607 061640  #RSTO LDA SBPTR     SEEK
0521  15610 073425        STA SFLAG       STRING
0522  15611 015341        JSB VAROP         OPERAND
0523  15612 027616        JMP RSTO1     1ST CHARACTER NOT A LETTER
0524  15613 037425        ISZ SFLAG     STRING VARIABLE?
0525  15614 115227        JSB SERRS+28,I  NO
```

```
0526  15615 125433         JMP RSTOP,I   YES
0527  15616 015371  RST01  JSB SBPUD     DEMAND A
0528  15617 015435         JSB GETST       STRING
0529  15620 125433         JMP RSTOP,I       CONSTANT
0530**                                 **
0531***  FETCH A STRING CONSTANT   ***
0532**                                 **
0533*
0534*  EXIT TO ERROR IF (A) # " UPON ENTRY.  ELSE SAVE CURRENT
0535*  BUFFER POINTER AND PACK THE INPUT STRING INTO THE BUFFER
0536*  FOLLOWING THE INITIAL BUFFER WORD.  EXIT TO ERROR IF NO
0537*  CLOSING " IS FOUND.  RECORD THE OPENING " ALONG WITH A
0538*  COUNT OF THE STRING CHARACTERS AND EXIT WITH THE NEXT
0539*  CHARACTER IN (A).  EXIT TO ERROR IF STRING EXCEEDS
0540*  72 CHARACTERS.
0541*
0542  15621 065640  #GTST LDB SBPTR     SAVE SYNTAX
0543  15622 077431         STB ARYAD       BUFFER POINTER
0544  15623 050570         CPA .+42B     " ?
0545  15624 006401         CLB,RSS       YES, SET (B) = 0
0546  15625 115227         JSB SERRS+28,I  NO
0547  15626 015363         JSB CHRST     RECORD STRING CONSTANT
0548  15627 115230         JSB SERRS+29,I  NO CLOSING QUOTE
0549  15630 063332         LDA QUOTE     RECORD CHARACTER COUNT
0550  15631 041650         ADA TEMP+1      ALONG WITH
0551  15632 173431         STA ARYAD,I       OPENING QUOTE
0552  15633 041104         ADA D1111     MORE THAN 72
0553  15634 002021         SSA,RSS         CHARACTERS?
0554  15635 115231         JSB SERRS+30,I  YES
0555  15636 015547         JSB GETCR     NO, FETCH
0556  15637 000000         NOP             NEXT
0557  15640 125435         JMP GETST,I       CHARACTER
0558**                                 **
0559***  SEEK A VARIABLE OPERAND   ***
0560**                                 **
0561*
0562*  VAROP SCANS FOR AND RECORDS A VARIABLE OPERAND.  IF
0563*  THE FIRST CHARACTER IS NOT A LETTER, EXIT IS TO (P+1)
0564*  WITH THE CHARACTER IN (A).  OTHERWISE A VARIABLE
0565*  OPERAND IS RECORDED AND UPON EXIT (A) CONTAINS THE
0566*  FOLLOWING CHARACTER.  EXIT IS TO (P+2) AFTER FINDING
0567*  AN ARRAY OR STRING VARIABLE ALONG WITH ANY FOLLOWING
0568*  SUBSCRIPT.  IF A STRING VARIABLE IS FOUND AND SFLAG =
0569*  SBPTR, SET SFLAG = -1; IF SFLAG # SBPTR, NO STRING
0570*  VARIABLE IS PERMITTED AT THIS POINT: EXIT TO ERROR.
0571*  AFTER FINDING A SIMPLE VARIABLE EXIT TO (P+3) WITH
0572*  TEMP+2 = (A) AND THE LAST CHARACTER OF THE SIMPLE
0573*  VARIABLE IN TEMP+1.  IF INSIDE A <DEF STATEMENT>,
0574*  SIMPLE VARIABLES ARE COMPARED WITH THE PARAMETER AND
0575*  MATCHES ARE MARKED.
0576*
0577  15641 015357  #VROP JSB LTR       LETTER?
0578  15642 125341         JMP VAROP,I   NO, EXIT VIA (P+1)
0579  15643 035341         ISZ VAROP     YES
0580  15644 050576         CPA .+50B     "(" ?
0581  15645 027665         JMP VAR04     YES
```

```
0582  15646 050621          CPA B133      NO, '' ?
0583  15647 027665          JMP VAR04     YES
0584  15650 050572          CPA .+44B     NO, '$' ?
0585  15651 027665          JMP VAR04     YES
0586  15652 035341          ISZ VAROP     NO
0587  15653 015365          JSB DIGCK     DIGIT NEXT?
0588  15654 027675          JMP VAR01     NO
0589  15655 061650          LDA TEMP+1    YES, LOAD LETTER,
0590  15656 044606          ADB .+48        RESTORE DIGIT,
0591  15657 075650          STB TEMP+1        AND RECORD
0592  15660 015361          JSB STROP           SIMPLE VARIABLE
0593  15661 015547          JSB GETCR     FETCH
0594  15662 000000          NOP             AND SAVE
0595  15663 071651          STA TEMP+2        NEXT
0596  15664 027701          JMP VAR02           CHARACTER
0597  15665 015431  VAR04    JSB STRID     RECORD ARRAY OR STRING VARIABLE
0598  15666 015333          JSB SBSCK     FETCH THE SUBSCRIPT
0599  15667 002001          RSS           NO SUBSCRIPT
0600  15670 125341          JMP VAROP,I   EXIT VIA (P+2)
0601  15671 065341          LDB VAROP     WAS VAROP CALLED FOR
0602  15672 057413          CPB DCOM0       DIM OR COM SYNTAX?
0603  15673 115200          JSB SERRS+5,I YES--ERROR
0604  15674 125341          JMP VAROP,I   NO--EXIT
0605  15675 061650  VAR01    LDA TEMP+1    RETRIEVE LETTER,
0606  15676 064605          LDB .+57B       SET 'NO DIGIT',
0607  15677 015361          JSB STROP         AND RECORD
0608  15700 061651          LDA TEMP+2          SIMPLE VARIABLE
0609  15701 006400  VAR02    CLB           INSIDE A
0610  15702 057423          CPB PFLAG       'DEF' STATEMENT?
0611  15703 125341          JMP VAROP,I   NO, EXIT VIA (P+3)
0612  15704 007400          CCB           YES,
0613  15705 045640          ADB SBPTR       ISOLATE
0614  15706 160001          LDA 1,I           LATEST
0615  15707 010633          AND B777            OPERAND
0616  15710 053423          CPA PFLAG     IS IT THE PARAMETER?
0617  15711 027714          JMP *+3       YES
0618  15712 061651  VAR03    LDA TEMP+2    NO, RETRIEVE CHARACTER
0619  15713 125341          JMP VAROP,I     AND EXIT VIA (P+3)
0620  15714 160001          LDA 1,I       FLAG
0621  15715 031163          IOR FLGBT       OPERAND
0622  15716 170001          STA 1,I           AS
0623  15717 027712          JMP VAR03           PARAMETER
0624*                                 *
0625**  CLEAN UP FOR NEW PROGRAM  **
0626*                                 *
0627  15720 061627  CLNUP    LDA CMSK      SET PROGRAM MODE                X]
0628  15721 010053          AND CFLAG     TO 'UNCOMPILED'                 X]
0629  15722 070053          STA CFLAG                                     X]
0630  15723 064433          LDB PBUFF       INSURE CORRECT
0631  15724 075643          STB SPROG         START-OF--PROGRAM SETTING
0632  15725 006400          CLB             INITIALIZE
0633  15726 075641          STB SYMTB         ERROR FLAG
0634  15727 026011          JMP SYNT1
0001*
0002***                               **
0003**  <RESTORE STATEMENT> SYNTAX  **
```

```
0004***                              **
0005*
0006   15730 015547  RSTRS JSB GETCR      END OF STATEMENT?
0007   15731 027735        JMP RSTR1      YES
0008   15732 015551        JSB BCKSP      NO, DEMAND
0009   15733 015345        JSB PRGIN        SEQUENCE NUMBER
0010   15734 026105        JMP EOST       DEMAND END OF STATEMENT
0011   15735 035640  RSTR1 ISZ SBPTR      RECORD DUMMY OPERAND
0012   15736 124716        JMP ACCSA,I
0013*
0014***    STATEMENT SYNTAX ENTRY POINTS    ***
0015*
0016   15737 014111  SYNTB DEF COMS       COM
0017   15740 014070        DEF LETS       LET
0018   15741 014110        DEF DIMS       DIM
0019   15742 014132        DEF DEFS       DEF
0020   15743 014173        DEF REMS       REM
0021   15744 014177        DEF GOTOS      GOTO
0022   15745 014246        DEF IFS        IF
0023   15746 014316        DEF FORS       FOR
0024   15747 014355        DEF NEXTS      NEXT
0025   15750 014177        DEF GOTOS      GOSUB
0026   15751 014361        DEF ENDS       RETURN
0027   15752 014361        DEF ENDS       END
0028   15753 014361        DEF ENDS       STOP
0029   15754 014365        DEF DATAS      DATA
0030   15755 014437        DEF INPTS      INPUT
0031   15756 014427        DEF READS      READ
0032   15757 014451        DEF PRINS      PRINT
0033   15760 015730        DEF RSTRS      RESTORE
0034   15761 014556        DEF MATS       MAT
0035   15762 014172        DEF FILES      FILES
0036   15763 014172        DEF CHANS       CHAIN                          [X]
0037   15764 014065        DEF LET0       'IMPLIED' LET
0038*
0039***    DEMAND A RIGHT PARENTHESIS
0040*
0041*
0042*      IF (A) HOLDS ')' OR ']' RECORD A ')' AND EXIT
0043*      WITH THE FOLLOWING CHARACTER IN (A), ELSE ERROR.
0044*
0045   15765 064524  #RPCK LDB .-2         ')'
0046   15766 015373        JSB SYMCK       OR
0047   15767 015347        DEF RPARN-1      ']'?
0048   15770 115222        JSB SERRS+23,I  NO
0049   15771 061006        LDA RPOP       YES, RECORD
0050   15772 171640        STA SBPTR,I     A ')'
0051   15773 015371        JSB SBPUD      RECORD A NULL OPERAND
0052   15774 015547        JSB GETCR      FETCH
0053   15775 000000        NOP             NEXT
0054   15776 125355        JMP RPCK,I       CHARACTER
0055*
0056***    CHECK FOR A LETTER
0057*
0058*      ENTER WITH CHARACTER IN (A). EXIT TO (P+2) IF A
0059*      LETTER, ELSE EXIT TO (P+1). (A) IS NOT CHANGED.
```

```
0060*
0061  15777 064000  #LTCK LDB 0          ASCII
0062  16000 045122        ADB D133       133B OR
0063  16001 006021        SSB,RSS          GREATER?
0064  16002 125367        JMP LETCK,I    YES
0065  16003 044560        ADB .+32B      NO, ASCII 101B
0066  16004 006021        SSB,RSS         OR GREATER?
0067  16005 035367        ISZ LETCK      YES
0068  16006 125367        JMP LETCK,I    NO
0069**                                  **
0070***  PROCESS CHARACTER STRING   ***
0071**                                  **
0072*
0073*  UPON ENTRY (A) CONTAINS THE STRING DELIMITER AND (B)
0074*  INDICATES WHETHER THE FIRST CHARACTER IS TO BE STORED
0075*  IN THE LOWER HALF OF THE CURRENT BUFFER WORD ( (B) = 1)
0076*  OR THE UPPER HALF OF THE NEXT BUFFER WORD ( (B) = 0).
0077*  EXIT TO (P+1) ON EMPTYING THE INPUT STRING. EXIT TO
0078*  (P+2) ON FINDING THE STRING DELIMITER.  BLANKS ARE NOT
0079*  STRIPPED OUT OF THE INPUT STRING IF (A) # 0 UPON ENTRY.  UPON
0080*  EXIT SBPTR POINTS TO THE FIRST BUFFER WORD NOT CONTAINING PART OF
0081*  THE STRING WHILE TEMP+1 CONTAINS A COUNT OF THE STRING
0082*  CHARACTERS BIASED BY THE VALUE OF (B) UPON ENTRY.
0083*
0084  16007 075650  #CRST STB TEMP+1    SET CHARACTER FLAG AND COUNTER
0085  16010 071651        STA TEMP+2    NOTE TERMINATOR CHARACTER
0086  16011 064540        LDB .+10      IF (A) # 0
0087  16012 002002        SZA             STOP BLANK
0088  16013 075637        STB BLANK         SUPPRESSION
0089  16014 015547  CHRS1 JSB GETCR     FETCH CHARACTER
0090  16015 026033        JMP CHRS3+1   NONE FOUND
0091  16016 060001        LDA 1         ALLOW LOWER CASE                B1
0092  16017 051651        CPA TEMP+2    TERMINATOR?
0093  16020 026032        JMP CHRS3     YES
0094  16021 065650        LDB TEMP+1    NO, COUNT CHARACTER
0095  16022 006014        SLB,INB         AND SELECT WORD HALF
0096  16023 026026        JMP CHRS2     LOW HALF
0097  16024 015371        JSB SBPUD     HIGH HALF, MOVE TO NEXT WORD
0098  16025 001737        ALF,SLA,ALF   POSITION CHARACTER AND SKIP
0099  16026 131640  CHRS2 IOR SBPTR,I   COMBINE WITH PREVIOUS CHARACTER
0100  16027 171640        STA SBPTR,I
0101  16030 075650        STB TEMP+1    SAVE FLAG/COUNTER
0102  16031 026014        JMP CHRS1
0103  16032 035363  CHRS3 ISZ CHRST     SET EXIT TO (P+2)
0104  16033 015371        JSB SBPUD     ADVANCE POINTER
0105  16034 064566        LDB .+40B     RESTORE BLANK
0106  16035 075637        STB BLANK       SUPPRESSION
0107  16036 125363        JMP CHRST,I
0108*
0109***    CHECK FOR A DIGIT
0110*
0111*
0112*      ENTER WITH CHARACTER IN (A). IF NOT A DIGIT, EXIT
0113*      TO (P+1) WITH CHARACTER IN (A). EXIT TO (P+2)
0114*      WITH DIGIT (BINARY) IN (A) AND (B) IF FOUND.
0115*
```

```
0116   16037 064000  #DGCK LDB 0          ASCII
0117   16040 044462        ADB D72        72 OR
0118   16041 006021        SSB,RSS          GRAETER?
0119   16042 125365        JMP DIGCK,I    YES
0120   16043 044540        ADB .+12B      NO, ASCII 57B
0121   16044 006020        SSB             OR LESS
0122   16045 125365        JMP DIGCK,I    YES
0123   16046 060001        LDA 1          NO, LOAD
0124   16047 035365        ISZ DIGCK       DIGIT
0125   16050 125365        JMP DIGCK,I      INTO (A)
0126*
0127***    INSURE SPACE FOR NEW ENTRY
0128*
0129*
0130*      A CHECK IS MADE THAT THE UNUSED USER SPACE IS AT
0131*      LEAST AS LARGE AS THE NUMBER OF WORDS SPECIFIED BY
0132*      (A). EXIT TO ERROR IF NOT SE. (B) IS NOT CHANGED.
0133*      ON NORMAL EXIT (A) CONTAINS ITS ENTRY VALUE + (PBPTR).
0134*
0135   16051 040051  #CUSP ADA PBPTR     AT LEAST
0136   16052 071575        STA CU1        (A) WORDS
0137   16053 003000        CMA             OF AVAILABLE
0138   16054 040654        ADA LWAUS        USER
0139   16055 002021        SSA,RSS            SPACE?
0140   16056 026061        JMP *+3        YES
0141   16057 015423  CUSP1 JSB DCMPL      NO, DECOMPILE
0142   16060 115246        JSB RERRS+10,I  OUT OF STORAGE SPACE
0143   16061 061575        LDA CU1        RETURN WITH NEW
0144   16062 125427        JMP CUSP,I      VALUE OF PBPTR
```

```
0146**                              **
0147***  DELETE SOME PROGRAM       ***
0148**                              **
0149*
0150*  THAT PART OF THE PROGRAM REFERENCED BY CORE LOCATIONS
0151*  (TEMP+1)+(A) THROUGH (TEMP+1)+(B)-1 INCLUSIVE IS
0152*  DELETED BY SLIDING UP ALL OF THE PROGRAM FROM
0153*  (TEMP+1)+(B) TO (PBPTR)-1 (I.E., THE REST OF THE
0154*  PROGRAM FOLLOWING THE 'GAP').  PBPTR IS THEN
0155*  UPDATED TO POINT TO LAST WORD +1 OF THE PROGRAM.
0156*
0157  16063 041650  #DLPR ADA TEMP+1     COMPUTE INITIAL
0158  16064 071651        STA TEMP+2       DESTINATION ADDRESS
0159  16065 045650        ADB TEMP+1     COMPUTE INITIAL SOURCE ADDRESS
0160  16066 054051  DELP1 CPB PBPTR      DONE?
0161  16067 026075        JMP DELP2      YES
0162  16070 160001        LDA 1,I        NO, TRANSFER
0163  16071 171651        STA TEMP+2,I     A WORD
0164  16072 035651        ISZ TEMP+2     BUMP
0165  16073 006004        INB              POINTERS
0166  16074 026066        JMP DELP1
0167  16075 061651  DELP2 LDA TEMP+2     UPDATE
0168  16076 070051        STA PBPTR        END-OF-PROGRAM
0169  16077 125413        JMP DELPR,I        POINTER
0170**                                  **
0171***  DELETE A PROGRAM STATEMENT    ***
0172**                                  **
0173*
0174*  THE STATEMENT REFERENCED BY THE SEQUENCE NUMBER IN
0175*  (B) IS DELETED.  EXIT TO EXECUTIVE.
0176*
0177  16100 060051  DELST LDA PBPTR      LOAD SEARCH TERMINATION POINTER
0178  16101 015415        JSB FNDPS      SEARCH FOR STATEMENT
0179  16102 124720        JMP ACC5A,I    NOT
0180  16103 124720        JMP ACC5A,I      FOUND
0181  16104 002400        CLA
0182  16105 006004        INB            (B),I = STATEMENT LENGTH
0183  16106 164001        LDB 1,I        LOAD LENGTH OF OLD STATEMENT
0184  16107 015413        JSB DELPR      DELETE
0185  16110 124720        JMP ACC5A,I      STATEMENT
```

```
0187**                          **
0188***  ACCEPT A STATEMENT  ***
0189**                          **
0190*
0191*  A CORRECT STATEMENT IS ADDED TO THE PROGRAM BUFFER.
0192*  IF ITS SEQUENCE NUMBER IS THE HIGHEST SO FAR, ONLY
0193*  THE END-OF-PROGRAM POINTER REQUIRES CHANGE, SINCE THE
0194*  STATEMENT IS TRANSLATED IMMEDIATELY BELOW THE PREVIOUS
0195*  PROGRAM.  OTHERWISE THE NEW STATEMENT IS INSERTED INTO
0196*  THE PROGRAM IN PROPER SEQUENTIAL POSITION.  IF ITS
0197*  SEQUENCE NUMBER COINCIDES WITH THAT OF A PREVIOUS
0198*  PROGRAM STATEMENT, IT REPLACES IT, WITH SPACE MADE OR
0199*  DELETED IN THE PROGRAM AS NECESSARY.  EXIT TO EXEC.
0200*  IF STATEMENT LENGTH = 0 THE STATEMENT WAS REJECTED DUE TO
0201*  A STORAGE OVERFLOW IN TAPE MODE.  IF IN KEYBOARD MODE AND
0202*  SYMTB = 4 AT LEAST ONE OVER/UNDERFLOW OCCURRED WHILE ANALYZING
0203*  THE STATEMENT SO EMIT THE ERROR; OTHERWISE ECHO A LINE FEED.
0204*  IF IN TAPE MODE MOVE THE START-OF-RECORD POINTER TO THE START
0205*  OF THE NEXT BUFFER AND IF IT IS COMPLETED SYNTAX IT NOW, ELSE
0206*  EXIT TO EXEC.
0207*
0208  16111 065654  ACCST LDB SBUFA
0209  16112 006004        INB
0210  16113 061654        LDA SBUFA      COMPUTE
0211  16114 003004        CMA,INA          STATEMENT
0212  16115 041640        ADA SBPTR          LENGTH
0213  16116 002003        SZA,RSS        UNPROCESSED STATEMENT?
0214  16117 026215        JMP ACCS6      YES
0215  16120 170001        STA 1,I        NO, STORE LENGTH IN STATEMENT
0216  16121 071651        STA TEMP+2     SAVE IT
0217  16122 060051        LDA PBPTR      FIND STATEMENT'S
0218  16123 165654        LDB SBUFA,I      SEQUENTIAL
0219  16124 015415        JSB FNDPS          POSITION
0220  16125 026200        JMP ACCS4      APPEND STATEMENT TO PROGRAM
0221  16126 026152        JMP ACCS2      INSERT STATEMENT INTO PROGRAM
0222  16127 006004        INB            REPLACE PRIOR STATEMENT
0223  16130 160001        LDA 1,I        COMPARE LENGTH
0224  16131 003004        CMA,INA          OF NEW STATEMENT
0225  16132 041651        ADA TEMP+2         WITH THAT OF OLD
0226  16133 002003        SZA,RSS        EQUAL?
0227  16134 026142        JMP ACCS1      YES
0228  16135 002021        SSA,RSS        NO, LONGER?
0229  16136 026153        JMP ACCS2+1    YES
0230  16137 061651        LDA TEMP+2     NO, SHORTER
0231  16140 164001        LDB 1,I        LOAD LENGTH OF OLD STATEMENT
0232  16141 015413        JSB DELPR      DELETE EXTRA LENGTH
0233  16142 065654  ACCS1 LDB SBUFA      LOAD FIRST SOURCE ADDRESS
0234  16143 160001        LDA 1,I        TRANSFER
0235  16144 171650        STA TEMP+1,I     A WORD
0236  16145 035650        ISZ TEMP+1     ADVANCE DESTINATION
0237  16146 006004        INB              AND SOURCE ADDRESSES
0238  16147 055640        CPB SBPTR      DONE?
0239  16150 026202        JMP ACCS5      YES
0240  16151 026143        JMP ACCS1+1    NO
0241  16152 061651  ACCS2 LDA TEMP+2     LOAD SPACE REQUIREMENT
0242  16153 041654        ADA SBUFA      UPDATE POINTER
```

```
0243  16154 071654         STA SBUFA       TO NEW STATEMENT
0244  16155 041651         ADA TEMP+2    RESET
0245  16156 065640         LDB SBPTR       END OF STATEMENT
0246  16157 071640         STA SBPTR         POINTER
0247  16160 071651         STA TEMP+2    INITIALIZE DESTINATION ADDRESS
0248  16161 003000         CMA           USER
0249  16162 040654         ADA LWAUS       SPACE
0250  16163 002020         SSA               OVERFLOW?
0251  16164 115173         JSB SERRS,I   YES
0252  16165 061654         LDA SBUFA     NO, UPDATE POINTER
0253  16166 070051         STA PBPTR       TO END-OF-PROGRAM
0254  16167 055650 ACCS3   CPB TEMP+1    EVERYTHING MOVED?
0255  16170 026142         JMP ACCS1     YES
0256  16171 003400         CCA           NO, BACK UP
0257  16172 041651         ADA TEMP+2      SOURCE AND
0258  16173 071651         STA TEMP+2        DESTINATION
0259  16174 044525         ADB .-1             ADDRESSES
0260  16175 160001         LDA 1,I       TRANSFER
0261  16176 171651         STA TEMP+2,I    A WORD
0262  16177 026167         JMP ACCS3
0263  16200 061640 ACCS4   LDA SBPTR     RESET POINTER TO
0264  16201 070051         STA PBPTR       LAST WORD+1 OF PROGRAM
0265  16202 060266 ACCS5   LDA TAPEF     TAPE
0266  16203 011626         AND LMSK                                        X]
0267  16204 002002         SZA            MODE?
0268  16205 026215         JMP ACCS6     YES
0269  16206 065641         LDB SYMTB     NO
0270  16207 071641         STA SYMTB     RESET UNDER/OVERFLOW FLAG
0271  16210 054532         CPB .+4       UNDER/OVERFLOW ERROR(S)?
0272  16211 115274         JSB RERRS+32,I  YES
0273  16212 060540         LDA .+12B     NO,
0274  16213 015553         JSB OUTCR       OUTPUT A
0275  16214 124321         JMP SCHEN,I       LINE FEED
0276  16215 065635 ACCS6   LDB BADDR    ALLOW MORE INPUT                   X]
0277  16216 006004         INB           THESE CHANGES ARE FROM 2000A]X]
0278  16217 155633         CPB PRBFE,I                                     X]
0279  16220 165632         LDB PRBFA,I                                     X]
0280  16221 103100         CLF 0                                           X]
0281  16222 175630         STB LBUFA,I                                     X]
0282  16223 155631         CPB LBUFE,I                                     X]
0283  16224 124321         JMP SCHEN,I                                     X]
0284  16225 102100         STF 0                                           X]
0285  16226 124652         JMP SYN2A,I                                     X]
0286**                                          **
0287***  FIND A STATEMENT'S SEQUENTIAL POSITION  ***
0288**                                          **
0289*
0290*  UPON ENTRY (A) POINTS TO THE LAST WORD+1 OF THE PROGRAM
0291*  AND (B) HOLDS A SEQUENCE NUMBER.  IF (B) IS LARGER THAN
0292*  ANY SEQUENCE NUMBER IN THE PROGRAM, EXIT TO (P+1) WITH
0293*  (B) POINTING TO THE LAST WORD+1 OF THE PROGRAM.  IF (B)
0294*  FALLS BETWEEN TWO SEQUENCE NUMBERS, EXIT TO (P+2) WITH
0295*  (B) POINTING TO THE STATEMENT WITH A LARGER SEQUENCE
0296*  NUMBER.  IF A STATEMENT IN THE PROGRAM HAS THE SEQUENCE
0297*  NUMBER IN (B), EXIT TO (P+3) WITH (B) POINTING TO THIS
0298*  STATEMENT (IF IT IS AN EMBEDDED ERROR MESSAGE, STATEMENT
```

```
0299*  TYPE = 0, DECREMENT THE ERROR COUNT). IN ALL CASES TEMP+1
0300*  = (B) UPON EXIT.
0301*
0302  16227 075650  #FDPS STB TEMP+1     SAVE TEST SEQUENCE NUMBER
0303  16230 071652        STA TEMP+3     SAVE TERMINATION POINTER
0304  16231 065643        LDB SPROG      START WITH FIRST WORD OF PROGRAM
0305  16232 055652  FNDP1 CPB TEMP+3     PROGRAM EXHAUSTED?
0306  16233 026267        JMP FNDP3+2    YES, EXIT TO (P+1)
0307  16234 160001        LDA 1,I        NO, IS
0308  16235 003004        CMA,INA          PROGRAM
0309  16236 041650        ADA TEMP+1         SEQUENCE NUMBER
0310  16237 002003        SZA,RSS              THE SAME?
0311  16240 026247        JMP FNDP2      YES, EXIT TO (P+3)
0312  16241 002020        SSA            NO, GREATER?
0313  16242 026266        JMP FNDP3+1    YES, EXIT TO (P+2)
0314  16243 060001        LDA 1          NO,
0315  16244 002004        INA              SET (B)
0316  16245 144000        ADB 0,I            TO NEXT
0317  16246 026232        JMP FNDP1            PROGRAM STATEMENT
0318  16247 060001  FNDP2 LDA 1          LOAD
0319  16250 040530        ADA .+2          STATEMENT
0320  16251 160000        LDA 0,I        ERROR
0321  16252 011054        AND OPMSK
0322  16253 002002        SZA              STATEMENT?
0323  16254 026265        JMP FNDP3      NO
0324  16255 003400        CCA            YES,
0325  16256 041642        ADA ERRCT        DECREMENT
0326  16257 071642        STA ERRCT          ERROR COUNT
0327  16260 002002        SZA            ONLY ERROR?
0328  16261 026265        JMP FNDP3
0329  16262 061627        LDA CMSK     YES--                              X]
0330  16263 010052        AND TERR     SET FLAG TO SAY                    X]
0331  16264 070052        STA TERR     'NO EMBEDDED ERRORS'               X]
0332  16265 035415  FNDP3 ISZ FNDPS
0333  16266 035415        ISZ FNDPS
0334  16267 075650        STB TEMP+1     SAVE POINTER TO
0335  16270 125415        JMP FNDPS,I      FINAL STATEMENT SEEN
0336**                                   **
0337***  FETCH PARENTHESIZED FORMULA   ***
0338**                                   **
0339*
0340*  AN END-OF-FORMULA OPERATOR FOLLOWS THE FORMULA
0341*
0342  16271 064533  #GTPF LDB .+5         SAVE FSC
0343  16272 015335        JSB FRCUR        LOCAL VARIABLES
0344  16273 015371        JSB SBPUD      UPDATE POINTER
0345  16274 015547        JSB GETCR      RECORD
0346  16275 115221        JSB SERRS+22,I  LEFT
0347  16276 015353        JSB LPCK          PARENTHESIS
0348  16277 015331        JSB FSC        DEMAND FORMULA
0349  16300 015371        JSB SBPUD      RECORD END-OF-FORMULA OPERATOR
0350  16301 015355        JSB RPCK       RECORD RIGHT PARENTHESIS
0351  16302 015337        JSB FPOP       RESTORE FSC
0352  16303 125351        JMP GETPF,I      LOCAL VARIABLES
0353**                      **
0354***  RECORD AN INTEGER  ***
```

```
0355**                          **
0356*
0357*  PRGIN FLAGS THE PREVIOUS OPERATOR TO SAY 'INTEGER FOLLOWS'.
0358*  STORE THE INTEGER AND EXIT WITH IT IN (B) AND THE FOLLOWING
0359*  CHARACTER IN (A).
0360*
0361  16304 161640  #PGIN LDA SBPTR,I    SET
0362  16305 031060       IOR INTFL        'INTEGER FOLLOWS'
0363  16306 171640       STA SBPTR,I        FLAG
0364  16307 015371       JSB SBPUD      ADVANCE POINTER
0365  16310 015565       JSB BLDIN      BUILD INTEGER
0366  16311 175640       STB SBPTR,I    RECORD INTEGER
0367  16312 015371       JSB SBPUD      ADVANCE POINTER
0368  16313 125345       JMP PRGIN,I
0369**                      **
0370***  BUILD AN INTEGER  ***
0371**                      **
0372*
0373*  MISSING OR ILLEGAL INTEGER EXITS TO (P+2) OF PRGIN IF PFLAG = -1,
0374*  ELSE TO ERROR.  A LEGAL INTEGER IS NON-ZERO AND LESS THAN 10000.
0375*
0376  16314 002400  #BLDI CLA            INITIALIZE TO
0377  16315 071701       STA PINTG        ZERO INTEGER.
0378  16316 015547       JSB GETCR
0379  16317 026336       JMP BLDI2
0380  16320 015365       JSB DIGCK      DIGIT?
0381  16321 026336       JMP BLDI2      NO
0382  16322 071702       STA PINTG+1    YES, SAVE IT
0383  16323 061701       LDA PINTG      MULTIPLY PREVIOUS
0384  16324 100200       MPY .+10         INTEGER BY 10
0385  16326 000040       CLE            ADD IN
0386  16327 041702       ADA PINTG+1      NEW DIGIT
0387  16330 006043       SEZ,SZB,RSS    OVERFLOW?
0388  16331 026315       JMP #BLDI+1    NO
0389  16332 035521  BLDI1 ISZ GFLAG     YES, RETURN ON ERROR?
0390  16333 115174       JSB SERRS+1,I  NO
0391  16334 035345       ISZ PRGIN      YES, EXIT TO
0392  16335 125345       JMP PRGIN,I      (P+2) OF PRGIN
0393  16336 065701  BLDI2 LDB PINTG     ZERO
0394  16337 006103       CLE,SZB,RSS      INTEGER?
0395  16340 026332       JMP BLDI1      YES
0396  16341 045106       ADB MAXSN      NO, INTEGER
0397  16342 002040       SEZ              TOO LARGE?
0398  16343 026332       JMP BLDI1      YES
0399  16344 065701       LDB PINTG      NO
0400  16345 125565       JMP BLDIN,I
0401**                        **
0402***  SEEK RECORD REFERENCE  ***
0403**                        **
0404*
0405*  IF THE NEXT CHARACTER IS NOT '#', RESTORE SBPTR AS UPON ENTRY
0406*  AND EXIT TO (P+1) WITH THE CHARACTER IN (A).  OTHERWISE CHECK
0407*  CHARACTER RETURNED IN (A) FROM FILRF.  IF IT IS A COMMA OR A
0408*  SEMICOLON RECORD IT.  EXIT TO (P+2) WITH THE CHARACTER IN (A)
0409*  IF IT IS A SEMICOLON.  IF A COMMA, PROCESS THE FOLLOWING RECORD
0410*  REFERENCE AND EXIT TO (P+2) WITH CHARACTER FOLLOWING IT IN (A)
```

```
0411*  (IF A SEMICOLON, RECORD IT BEFORE EXITING).
0412*
0413   16346 015603  #RECR JSB FILRF      SEEK FILE REFERENCE
0414   16347 026363        JMP RECR1      NONE FOUND
0415   16350 035601        ISZ RECRF      FOUND
0416   16351 050602        CPA .+54B      COMMA?
0417   16352 002001        RSS            YES
0418   16353 026357        JMP RECR0      NO
0419   16354 065002        LDB B2000      RECORD
0420   16355 175640        STB SBPTR,I      COMMA
0421   16356 015331        JSB FSC        PROCESS RECORD REFERENCE
0422   16357 065004  RECR0 LDB B3000
0423   16360 050612        CPA B73        SEMICOLON?
0424   16361 175640        STB SBPTR,I    YES
0425   16362 125601        JMP RECRF,I
0426   16363 007400  RECR1 CCB            RESTORE
0427   16364 045640        ADB SBPTR
0428   16365 075640        STB SBPTR        SBPTR
0429   16366 125601        JMP RECRF,I
0430**                       **
0431***  SEEK FILE REFERENCE  ***
0432**                       **
0433*
0434*  IF THE NEXT CHARACTER IS NOT A '#' RETURN TO (P+1) WITH IT IN
0435*  (A).  OTHERWISE RECORD THE FILE REFERENCE AND RETURN TO (P+2)
0436*  WITH THE FOLLOWING CHARACTER IN (A).
0437*
0438   16367 035640  #FILR ISZ SBPTR
0439   16370 015547        JSB GETCR      NEXT
0440   16371 125603        JMP FILRF,I
0441   16372 007400        CCB              CHARACTER
0442   16373 015373        JSB SYMCK
0443   16374 015337        DEF HATCH-1        A '#' ?
0444   16375 125603        JMP FILRF,I    NO
0445   16376 015331        JSB FSC        YES, PROCESS FILE REFERENCE
0446   16377 035603        ISZ FILRF
0447   16400 125603        JMP FILRF,I
```

```
0449**                                                  **
0450***  SEARCH TABLE FOR MULTICHARACTER SYMBOL   ***
0451**                                                  **
0452*
0453*  UPON ENTRY (A) POINTS TO THE TABLE OF ACCEPTABLE
0454*  SYMBOLS, (B) CONTAINS THE NUMBER OF ENTRIES IN THE
0455*  TABLE (IN 2'S COMPLEMENT), MAXCR CONTAINS THE MAXIMUM
0456*  ACCEPTABLE NUMBER OF CHARACTERS IN THE SYMBOL, AND
0457*  SBPTR,I CONTAINS THE FIRST CHARACTER OF THE PROSPECTIVE
0458*  SYMBOL IN BITS 7-0 AND EITHER 0 OR THE SECOND CHARACTER
0459*  IN BITS 15-8.  IF NO ACCEPTABLE SYMBOL IS FOUND, EXIT TO
0460*  (P+1) WITH THE HALVES OF SBPTR,I SWAPPED AND THE INPUT
0461*  STRING AS UPON ENTRY.  ON SUCCESS EXIT TO (P+2) WITH
0462*  THE OPERATOR CODE IN BOTH (A) AND SBPTR,I; THE NEW INPUT
0463*  STRING BEGINS WITH THE CHARACTER FOLLOWING THE SYMBOL.
0464*
0465  16401 071503  #TBSR STA TABLE     SAVE TABLE ADDRESS
0466  16402 075505        STB LNGTH     SAVE -(NUMBER OF ENTRIES)
0467  16403 061635        LDA BADDR    SAV E BUFFER                    X\
0468  16404 071652        STA TEMP+3   POINTER                         X]
0469  16405 061640        LDA SBPTR     SAVE CURRENT
0470  16406 071507        STA SMBGN       SYNTAX BUFFER POINTER
0471  16407 002404        CLA,INA       COUNT FIRST CHARACTER
0472  16410 071533        STA SLENG       OF SYMBOL
0473  16411 161640        LDA SBPTR,I   LEFT JUSTIFY
0474  16412 001727        ALF,ALF         FIRST
0475  16413 171640        STA SBPTR,I       CHARACTER
0476  16414 010626        AND B177      TWO
0477  16415 002003        SZA,RSS         CHARACTERS?
0478  16416 026435        JMP TSRC4     NO
0479  16417 035533  TSRC1 ISZ SLENG     COUNT NEW CHARACTER
0480  16420 065505        LDB LNGTH     SET COUNTER
0481  16421 075537        STB COUNT       FOR TABLE ENTRIES
0482  16422 061503        LDA TABLE     SET POINTER
0483  16423 071541  TSRC2 STA TBLPT       TO NEXT ENTRY
0484  16424 161541        LDA TBLPT,I   TABLE ENTRY AND
0485  16425 010535        AND .+7         CURRENT SYMBOL
0486  16426 051533        CPA SLENG         OF SAME LENGTH?
0487  16427 026452        JMP TSRC6     YES
0488  16430 040531  TSRC3 ADA .+3       NO, UPDATE
0489  16431 001100        ARS             TABLE
0490  16432 041541        ADA TBLPT         POINTER
0491  16433 035537        ISZ COUNT     MORE ENTRIES?
0492  16434 026423        JMP TSRC2     YES
0493  16435 015547  TSRC4 JSB GETCR     NO, FETCH NEXT CHARACTER
0494  16436 026476        JMP TSR10     NONE FOUND
0495  16437 065533        LDB SLENG     SYMBOL ALREADY
0496  16440 055501        CPB MAXCR       OF MAXIMUM LENGTH?
0497  16441 026476        JMP TSR10     YES
0498  16442 006011        SLB,RSS       NO, EVEN-NUMBERED CHARACTER?
0499  16443 026447        JMP TSRC5     NO
0500  16444 131640        IOR SBPTR,I   YES, FILL LOWER HALF
0501  16445 171640        STA SBPTR,I     OF LAST WORD OF SYMBOL
0502  16446 026417        JMP TSRC1
0503  16447 015371  TSRC5 JSB SBPUD     ADVANCE SYMBOL POINTER
0504  16450 001727        ALF,ALF       STORE CHARACTER IN
```

```
0505  16451 026445        JMP *-4          UPPER HALF OF WORD
0506  16452 065541 TSRC6  LDB TBLPT      SET POINTER TO
0507  16453 075543        STB TSPTR        SYMBOL IN TABLE
0508  16454 065507        LDB SMBGN      SET (B) TO
0509  16455 026461        JMP *+4          INPUT SYMBOL
0510  16456 055640 TSRC7  CPB SBPTR      ALL OF SYMBOL MATCHED?
0511  16457 026467        JMP TSRC8      YES
0512  16460 006004        INB            NO, ADVANCE
0513  16461 035543        ISZ TSPTR        POINTERS
0514  16462 161543        LDA TSPTR,I    COMPARE NEXT
0515  16463 150001        CPA 1,I          WORD OF SYMBOLS
0516  16464 026456        JMP TSRC7      EQUAL
0517  16465 061533        LDA SLENG      UNEQUAL, TRY
0518  16466 026430        JMP TSRC3        NEXT TABLE SYMBOL
0519  16467 161541 TSRC8  LDA TBLPT,I  LOAD ISOLATE                    X
0520  16470 011054        AND OPMSK        AND STORE
0521  16471 171507        STA SMBGN,I        OPERATOR CODE
0522  16472 035347        ISZ TBSRH      SET EXIT TO (P+2)
0523  16473 065507 TSRC9  LDB SMBGN      CORRECT SYNTAX
0524  16474 075640        STB SBPTR        BUFFER POINTER
0525  16475 125347        JMP TBSRH,I
0526  16476 061652 TSR10  LDA TEMP+3   RESTORE BUFFER                  X]
0527  16477 071635        STA BADDR    POINTER                         X]
0528  16500 026473        JMP TSRC9
0529**                    **
0530***  FETCH A LETTER  ***
0531**                    **
0532*
0533*  EXITS TO (P+1) IF NEXT CHARACTER NOT A LETTER.
0534*  OTHERWISE STORES IT IN TEMP+1, STORES FOLLOWING
0535*  CHARACTER IN TEMP+2, AND EXITS TO (P+2) WITH
0536*  SECOND CHARACTER IN (B).
0537*
0538  16501 015547 #LTR   JSB GETCR      FIRST
0539  16502 000000        NOP              CHARACTER
0540  16503 015367        JSB LETCK          A LETTER?
0541  16504 125357        JMP LTR,I      NO, EXIT WITH CHARACTER IN (A)
0542  16505 035357        ISZ LTR        YES, SET RETURN ADDRESS TO (P+2)
0543  16506 071650        STA TEMP+1     SAVE CHARACTER
0544  16507 015547        JSB GETCR      SAVE
0545  16510 000000        NOP              SECOND
0546  16511 071651        STA TEMP+2         CHARACTER
0547  16512 125357        JMP LTR,I
```

```
0549**                                  **
0550***  STORE AN OPERAND NAME          ***
0551**                                  **
0552*
0553*  OPERANDS ARE STORED AS 9-BIT QUANTITIES.  BITS 8-4
0554*  HOLD A LETTER (1-32 OCTAL FOR A-Z).  BITS 3-0 INDICATE
0555*  THE TYPE OF OPERAND:  0 FOR A STRING, 1 AND 2 FOR
0556*  SINGLY AND DOUBLY SUBSCRIPTED VARIABLES, 3 FOR A
0557*  SUBSCRIPTED VARIABLE WITH DIMENSIONALITY NOT DEFINED
0558*  LOCALLY, 4 FOR A SINGLE-LETTER SIMPLE VARIABLE, 5-16
0559*  OCTAL FOR A LETTER-DIGIT SINGLE VARIABLE, AND 17 OCTAL
0560*  FOR A PROGRAMMER-DEFINED FUNCTION.
0561*
0562  16513 040460  #STOP ADA D100      LETTER = ASCII CODE - 100 OCTAL
0563  16514 044466       ADB D53       DIGIT = ASCII CODE - 53 OCTAL
0564  16515 001700       ALF           COMPLETE
0565  16516 030001       IOR 1           OPERAND
0566  16517 131640       IOR SBPTR,I   MERGE OPERATOR
0567  16520 171640       STA SBPTR,I     AND OPERAND
0568  16521 015371       JSB SBPUD     SET POINTER TO
0569  16522 125361       JMP STROP,I     FRESH WORD
0570**                                          **
0571***  CHECK FOR SINGLE-CHARACTER OPERATORS  ***
0572**                                          **
0573*
0574*  ENTER WITH CHARACTER IN (A) AND NUMBER OF ACCEPTABLE
0575*  OPERATORS IN (B) IN 2'S COMPLEMENT.  (P+1)+2 POINTS
0576*  TO THE LIST OF ACCEPTABLE OPERATORS.  ON A MATCH
0577*  EXIT TO (P+3) AFTER RECORDING THE OPERATOR CODE,
0578*  WHICH REMAINS IN (A).  ON NO MATCH EXIT TO (P+2)
0579*  WITH THE CHARACTER IN (A).
0580*
0581  16523 075537  #SYCK STB COUNT     SAVE COUNT OF POSSIBLE MATCHES
0582  16524 001727       ALF,ALF       POSITION
0583  16525 030566       IOR .+32        CHARACTER
0584  16526 165373       LDB SYMCK,I   LOAD
0585  16527 035373       ISZ SYMCK       STARTING
0586  16530 044530  SYMC1 ADB .+2           TABLE ENTRY
0587  16531 150001       CPA 1,I       MATCH?
0588  16532 026540       JMP SYMC2     YES
0589  16533 035537       ISZ COUNT     NO, POSSIBILITIES LEFT?
0590  16534 026530       JMP SYMC1     YES
0591  16535 001727       ALF,ALF       NO,
0592  16536 010626       AND B177        RESTORE
0593  16537 125373       JMP SYMCK,I       CHARACTER
0594  16540 044525  SYMC2 ADB .-1       FETCH
0595  16541 160001       LDA 1,I         AND
0596  16542 011054       AND OPMSK         STORE
0597  16543 171640       STA SBPTR,I         OPERATOR
0598  16544 035373       ISZ SYMCK             CODE
0599  16545 125373       JMP SYMCK,I
```

```
0002*
0003* ***************************
0004****                         **
0005***  'COMPILE' THE PROGRAM   **
0006****                         **
0007* ***************************
0008*
0009*
0010*  SYMTB=0 IMPLIES THE PROGRAM IS IN 'SOURCE': ALL OPERANDS ARE IN
0011*  SYMBOLIC FORM.  SYMTB#0 AND SPTR=0 IMPLIES THE PROGRAM IS 'SEMI-
0012*  COMPILED': VARIABLE OPERANDS ARE POINTERS TO A SYMBOL TABLE AND
0013*  STATEMENT REFERENCES ARE REPLACED BY ABSOLUTE POINTERS.
0014*  SYMTB = SPTR IMPLIES THE PROGRAM IS 'COMPILED': THE SYMBOL TABLE
0015*  ENTRIES CONTAIN POINTERS TO A VALUE TABLE OR IN THE CASE OF
0016*  FUNCTIONS TO THE DEFINING FORMULA, AND A TABLE IS BUILT
0017*  CONTAINING INFORMATION FOR EACH FILE IN THE PROGRAM.  BEFORE
0018*  BUILDING THE SYMBOL TABLE, THE INTERPRETER'S PROGRAM COUNTER
0019*  IS SET TO THE STATEMENT REFERENCED BY THE 'RUN' COMMAND (THE
0020*  LOWEST NUMBERED STATEMENT IS THE DEFAULT CHOICE).
0021*
0022  16546 064433  CMPLE LDB PBUFF      NULL
0023  16547 054051        CPB PBPTR       PROGRAM?
0024  16550 124722        JMP DONEA,I     YES
0025  16551 006404        CLB,INB         INITIALIZE
0026  16552 075435        STB PRGCT       PROGRAM COUNTER
0027  16553 015563        JSB SINIT       SIMPLE
0028  16554 015547        JSB GETCR       'RUN' ?
0029  16555 026564        JMP CMP15       YES
0030  16556 015551        JSB BCKSP       NO
0031  16557 015565        JSB BLDIN       DEMAND AN INTEGER
0032  16560 075435        STB PRGCT       SAVE STARTING STATEMENT NUMBER
0033  16561 050543        CPA .+15B       END OF RECORD?
0034  16562 002001        RSS             YES
0035  16563 115250        JSB RERRS+12,I  NO
0036  16564         CMP15 EQU *                                   [X]
0037  16564 103100        CLF 0
0038  16565 064261        LDB MAIN      DON'T
0039  16566 044535        ADB .+?TSTA
0040  16567 160001        LDA 1,I        ALLOW
0041  16570 031002        IOR UNABT
0042  16571 170001        STA 1,I          ABORTS
0043  16572 102100        STF 0
0044  16573 064433        LDB PBUFF
0045  16574 055643        CPB SPROG       NO, COM STORAGE ALLOCATED?
0046  16575 015617        JSB ALCOM       NO--DO IT
0047  16576 061641        LDA SYMTB       GET SYMBOL TABLE POINTER
0048  16577 002003        SZA,RSS         IS PROGRAM COMPILED ?
0049  16600 060051        LDA PBPTR       NO, USE PBPTR
0050  16601 065435        LDB PRGCT       GET STARTING STATEMENT NUMBER
0051  16602 015415        JSB FNDPS       SEEK REFERENCED STATEMENT
0052  16603 124722        JMP DONEA,I     NOT WITHIN PROGRAM
0053  16604 000000        NOP             SET
0054  16605 075435        STB PRGCT       PROGRAM COUNTER
0055  16606         CMP14 EQU *
0056  16606 064261        LDB MAIN        SET USER'S
0057  16607 044535        ADB .+?TSTA       I/O STATUS
```

```
0058  16610 160001          LDA B,I          TO 'USER IS
0059  16611 030536          IOR RNBT           RUNNING'
0060  16612 170001          STA B,I
0061  16613 061641  CMPL0 LDA SYMTB     CHECK IF COMPILED?              X]
0062  16614 002002          SZA          0=UNCOMPILED                    X]
0063  16615 027772          JMP VALUE     COMPILED
0064  16616 071603          STA FILTB    SET FOR FILES                   X]
0065  16617 103100          CLF 0        SET MODE                        X]
0066  16620 061626          LDA LMSK     TO                              X]
0067  16621 030053          IOR CFLAG    COMPILED                        X]
0068  16622 070053          STA CFLAG                                      [
0069  16623 102100          STF 0                                        X]
0070**                              **
0071***  BUILD THE SYMBOL TABLE  ***
0072**                              **
0073*
0074*  THE PROGRAM IS EXAMINED STATEMENT BY STATEMENT.  ALL
0075*  VARIABLE OPERANDS ARE REPLACED BY POINTERS (RELATIVE
0076*  TO THE START OF THE SYMBOL TABLE) TO TWO WORD ENTRIES.
0077*  SYMBOL TABLE ENTRIES KEEP THE SYMBOL IN THE FIRST WORD
0078*  AND INFORMATION IN THE SECOND.  FOR FUNCTIONS THE
0079*  SECOND WORD CONTAINS A POINTER TO THE DEFINING FORMULA
0080*  (0 BEFORE FINDING THE <DEF STATEMENT>).  FOR SIMPLE
0081*  VARIABLES THE SECOND WORD IS USED TO FORM A LINKED LIST
0082*  OF UNMATCHED FOR-VARIABLES (OTHERWISE IT IS 0) WITH
0083*  FLINK POINTING TO THE INNERMOST NESTED FOR-VARIABLE.
0084*  IF THE SIMPLE VARIABLE APPEARS IN A <COM STATEMENT>
0085*  THE SECOND WORD IS SET TO -1. FOR ARRAY AND STRING
0086*  VARIABLES THE SECOND WORD IS 0 UNLESS THE VARIABLE
0087*  APPEARS IN A <DIM STATEMENT>, IN WHICH CASE IT
0088*  POINTS TO THE DIMENSIONS IN THE CODE, OR IT APPEARS
0089*  IN A <COM STATEMENT>, IN WHICH CASE IT IS THE
0090*  NEGATION OF A POINTER TO THE DIMENSIONS.
0091*  PROGRAM INTEGERS ARE REPLACED BY A POINTER TO THE
0092*  STATEMENT THEY REFERENCE.  ON EXIT TO VALUE OR DCMPL,
0093*  SPTR POINTS TO THE FIRST WORD NOT PROCESSED.
0094*
0095  16624 064051          LDB PBPTR    CREATE POINTER
0096  16625 075641          STB SYMTB      TO SYMBOL TABLE
0097*
0098* COUNT NUMBER OF STATEMENTS IN PROGRAM
0099*
0100  16626 002404          CLA,INA      INITIALIZE STATEMENT COUNTER
0101  16627 065643          LDB SPROG
0102  16630 006004  CMP01 INB          MOVE TO
0103  16631 144001          ADB 1,I        NEXT
0104  16632 044525          ADB .-1          STATEMENT
0105  16633 054051          CPB PBPTR    DONE?
0106  16634 026637          JMP CMP02    YES
0107  16635 002004          INA          NO--BUMP COUNTER
0108  16636 026630          JMP CMP01
0109  16637 006400  CMP02 CLB          DIVIDE # OF STATEMENTS
0110  16640 100400          DIV .+32       INTO 32 PARTS
0111  16642 007000          CMB          SET B=-1-# OF OVERSIZE GROUPS,
0112  16643 002003          SZA,RSS        BUT IF <32 STATEMENTS USE -#
0113  16644 006004          INB
```

```
0114   16645 002004          INA             SET A TO SIZE OF LARGER GROUP
0115   16646 071655          STA STCT1       SET COUNTER
0116   16647 075651          STB STCT2
0117   16650 064736          LDB ERSCA       SET POINTER TO TABLE
0118   16651 075645          STB NUMPT
0119*
0120* BUILD A TABLE OF 64 WORDS. THE FIRST 32 CONTAIN THE SEQUENCE
0121* NUMBERS OF STATEMNTS WHICH DIVIDE THE PROGRAM INTO 32 ALMOST
0122* EQUAL PARTS. THE SECOND 32 WORDS ARE THE ABSOLUTE ADDRESSES
0123* OF THESE STATEMENTS
0124*
0125   16652 061643          LDA SPROG
0126   16653 044566  CMP03   ADB .+32
0127   16654 170001          STA 1,I         SET ABSOLUTE ADDRESS INTO TABLE
0128   16655 164000          LDB 0,I         SET SEQUENCE # INTO TABLE
0129   16656 175645          STB NUMPT,I
0130   16657 035645          ISZ NUMPT       BUMP POINTERS
0131   16660 035651          ISZ STCT2       TEST FOR ANY MORE
0132   16661 006401          CLB,RSS           OVERSIZE WUPS
0133   16662 007400          CCB             COMPUTE SIZE OF NEXT GROUP
0134   16663 045655          ADB STCT1
0135   16664 075655          STB STCT1
0136   16665 007000          CMB
0137   16666 075652          STB STCT3
0138   16667 065645          LDB NUMPT       TEST FOR DONE
0139   16670 054426          CPB ERS32
0140   16671 026700          JMP CMP04
0141   16672 035652          ISZ STCT3       COMPUTE FIRST STATEMENT
0142   16673 002005          INA,RSS           IN NEXT GROUP
0143   16674 026653          JMP CMP03
0144   16675 140000          ADA 0,I
0145   16676 040525          ADA .-1
0146   16677 026672          JMP *-5
0147*
0148   16700 002404  CMP04   CLA,INA
0149   16701 071335          STA FLINK       SET FOR-QUEUE TO EMPTY
0150   16702 015425          JSB PRNST       INITIALIZE
0151   16703 017126          DEF CMP11         COMPILATION
0152   16704 002041          SEZ,RSS         WAS FLAG BIT SET?
0153   16705 026761          JMP CMPL3       NO
0154*                                       *
0155**  PROCESS NON-VARIABLE OPERAND        **
0156*                                       *
0157   16706 040522          ADA .-4           PROGRAM
0158   16707 002021          SSA,RSS             INTEGER?
0159   16710 027360          JMP PRNS2       NO, MUST BE A PARAMETER
0160   16711 035331  CMPL1   ISZ SPTR        YES, MOVE
0161   16712 065331          LDB SPTR          TO NEXT WORD
0162   16713 055337          CPB NSPTR       STATEMENT FINISHED?
0163   16714 027126          JMP CMP11       YES
0164   16715 064736          LDB ERSCA       BEGIN SEARCH FOR REFERNECED STMT
0165   16716 160001  CMP05   LDA 1,I         FIRST STATEMENT =>SOUGHT STATE.?
0166   16717 003000          CMA
0167   16720 141331          ADA SPTR,I
0168   16721 002024          SSA,INA
0169   16722 026732          JMP CMP06       FOUND ONE
```

```
0170  16723 006004          INB
0171  16724 054426          CPB ERS32      TEST FOR DONE
0172  16725 002001          RSS
0173  16726 026716          JMP CMP05
0174  16727 044565          ADB .+31
0175  16730 061641          LDA SYMTB      STATEMENT IS IN LAST GROUP
0176  16731 026741          JMP CMP07
0177  16732 044566  CMP06 ADB .+32        B=> FIRST STATEMNT IN GROUP
0178  16733 002003          SZA,RSS        TEST FOR FOUND
0179  16734 026754          JMP CMP09
0180  16735 054426          CPB ERS32      TEST FOR NOT THERE
0181  16736 026757          JMP CMPL2      ERROR
0182  16737 160001          LDA 1,I        SET A=> FIRST WORD BEYOND GROUP
0183  16740 044525          ADB .-1
0184  16741 164001  CMP07 LDB 1,I
0185  16742 071655          STA STCT1      SAVE END TEST
0186  16743 161331          LDA SPTR,I     GET SEQUENCE NUMBER
0187  16744 006004  CMP08 INB             BUMP STATEMENT POINTER
0188  16745 144001          ADB 1,I
0189  16746 044525          ADB .-1
0190  16747 055655          CPB STCT1      TEST FOR DONE
0191  16750 026757          JMP CMPL2      LABEL NOT FOUND--ERROR
0192  16751 150001          CPA 1,I        TEST FOR FOUND
0193  16752 026755          JMP CMP09+1
0194  16753 026744          JMP CMP08
0195  16754 164001  CMP09 LDB 1,I
0196  16755 175331          STB SPTR,I     FOUND--REPLACE INTEFER
0197  16756 026711          JMP CMPL1        WITH ABSOLUTE ADDRESS
0198  16757 015423  CMPL2 JSB DCMPL      DECOMPILE
0199  16760 115234          JSB RERRS,I    NON-EXISTENT STATEMENT NUMBER
0200*                                 *
0201**  PROCESS VARIABLE OPERAND  **
0202*                                 *
0203  16761 071647  CMPL3 STA STMP1      SAVE SYMBOL
0204  16762 010545          AND .+17B
0205  16763 050545          CPA .+17B      FUNCTION?
0206  16764 027050          JMP CMPL6      YES
0207  16765 002003          SZA,RSS        NO, STRING VARIABLE?
0208  16766 027071          JMP CMPL9-3    YES
0209  16767 040522          ADA .-4        NO,
0210  16770 002020          SSA              ARRAY?
0211  16771 027074          JMP CMPL9      YES
0212  16772 015417          JSB SSYMT      NO, COMPILE
0213  16773 035331          ISZ SPTR         SIMPLE VARIABLE
0214  16774 055132          CPB COMOP      'COM'?
0215  16775 027041          JMP CMP41      YES
0216  16776 055034          CPB FOROP      NO, FOR-VARIABLE OF 'FOR'?
0217  16777 027022          JMP CMPL4      YES
0218  17000 055036          CPB NXTOP      NO, FOR-VARIABLE OF 'NEXT' ?
0219  17001 002001          RSS            YES
0220  17002 027361          JMP PRNS2+1    NO
0221  17003 065335          LDB FLINK
0222  17004 006020          SSB            MAKE
0223  17005 007004          CMB,INB          POSITIVE
0224  17006 055650          CPB STMP2      MATCH LATEST <FOR STATEMENT> ?
0225  17007 027012          JMP *+3        YES


0271  17064 174000          STB 0,I        SAVE
```

```
0226  17010 015423         JSB DCMPL      NO, DECOMPILE
0227  17011 115235         JSB RERRS+1,I  NEXT NOT PRECEDED BY PROPER FOR
0228  17012 065335         LDB FLINK
0229  17013 161650         LDA STMP2,I    REMOVE
0230  17014 071335         STA FLINK        VARIABLE
0231  17015 006020         SSB            WAS VARIABLE IN COMMON?
0232  17016 007401         CCB,RSS        NO
0233  17017 006400         CLB            NO
0234  17020 175650         STB STMP2,I    RESET AS SIMPLE VARIABLE
0235  17021 027361         JMP PRNS2+1
0236  17022 161650 CMPL4   LDA STMP2,I    LOAD SECOND WORD OF TABLE ENTRY
0237  17023 002002         SZA            ALREADY IN FOR-QUEUE?
0238  17024 002007         INA,SZA,RSS    MAYBE
0239  17025 027030         JMP CMPL5      NO
0240  17026 015423         JSB DCMPL      YES, DECOMPILE
0241  17027 115236         JSB RERRS+2,I  NESTED "FOR'S" WITH SAME VARIABL
0242  17030 065650 CMPL5   LDB STMP2
0243  17031 161650         LDA STMP2,I    WAS VARIABLE
0244  17032 002020         SSA              IN COMMON?
0245  17033 007004         CMB,INB        YES
0246  17034 061335         LDA FLINK      ADD
0247  17035 171650         STA STMP2,I      TO
0248  17036 075335         STB FLINK          FOR-QUEUE
0249  17037 035341         ISZ STYPE      DESTROY STATEMENT TYPE
0250  17040 027361         JMP PRNS2+1
0251  17041        CMP41    EQU *                                          BJ
0252  17041 061650         LDA STMP2                                      BJ
0253  17042 164000         LDB 0,I                                        BJ
0254  17043 006002         SZB            VARIABLE ALREADY IN COMMON?     BJ
0255  17044 027124         JMP CMP10+1    YES                             BJ
0256  17045 007400         CCB            NO, FLAG VARIABLE               BJ
0257  17046 174000         STB 0,I          IN COMMON                     BJ
0258  17047 027361         JMP PRNS2+1
0259  17050 015417 CMPL6   JSB SSYMT      COMPILE FUNCTION NAME
0260  17051 055030         CPB DEFOP      FUNCTION DEFINITION?
0261  17052 002001         RSS            YES
0262  17053 027360         JMP PRNS2      NO
0263  17054 165650         LDB STMP2,I    PREVIOUSLY
0264  17055 006002         SZB              DEFINED?
0265  17056 027066         JMP CMPL8      YES
0266  17057 061650         LDA STMP2      NO
0267  17060 035341         ISZ STYPE      DESTROY STATEMENT TYPE
0268  17061 065331 CMPL7   LDB SPTR       ADVANCE
0269  17062 044531         ADB .+3          PROGRAM
0270  17063 075331         STB SPTR           POINTER
0271  17064 174000         STB 0,I        SAVE
0272  17065 027361         JMP PRNS2+1      POINTER
0273  17066 035331 CMPL8   ISZ SPTR
0274  17067 015423         JSB DCMPL      DECOMPILE
0275  17070 115237         JSB RERRS+3,I  FUNCTION DEFINED TWICE
0276  17071 015417         JSB SSYMT      COMPILE STRING VARIABLE
0277  17072 035647         ISZ STMP1      SET TO 'SINGLY SUBSCRIPTED'
0278  17073 002001         RSS            PROCESS POSSIBLE DECLARATION
0279  17074 015421 CMPL9   JSB ASYMT      COMPILE ARRAY VARIABLE
0280  17075 002300         CCE            SET 'COM' FLAG
0281  17076 055132         CPB COMOP      'COM'?
```

```
0282  17077 027103         JMP CMP91      YES
0283  17100 055026         CPB DIMOP      NO, 'DIM'?
0284  17101 002101         CLE,RSS        YES--SET 'DIM' FLAG
0285  17102 027360         JMP PRNS2
0286  17103 165650  CMP91   LDB STMP2,I    WAS VARIABLE
0287  17104 006002         SZB              PREVIOUSLY DIMENSIONED?
0288  17105 027123         JMP CMP10      YES
0289  17106 065331         LDB SPTR       NO, SAVE POINTER
0290  17107 044530         ADB .+2          TO DIMENSIONS
0291  17110 002040         SEZ            DIMENSIONED IN 'COM' ?
0292  17111 007004         CMB,INB        YES--FLAG IT
0293  17112 175650         STB STMP2,I    NO
0294  17113 065331         LDB SPTR       RESTORE
0295  17114 044530         ADB .+2          POINTER
0296  17115 061647         LDA STMP1      RETRIEVE SYMBOL
0297  17116 002011         SLA,RSS        ADVANCE
0298  17117 044530         ADB .+2          POINTER
0299  17120 044530         ADB .+2            PAST
0300  17121 075331         STB SPTR             ONE OR TWO
0301  17122 027362         JMP PRNS2+2
0302  17123 035331  CMP10   ISZ SPTR
0303  17124 015423         JSB DCMPL      DECOMPILE
0304  17125 115240         JSB RERRS+4,I  VARIABLE DEFINED TWICE
0305*                                *
0306**  PROCESS END OF STATEMENT  **
0307*                                *
0308  17126 055641  CMP11   CPB SYMTB      END OF PROGRAM?
0309  17127 002001         RSS            YES
0310  17130 027307         JMP PRNS1      NO
0311  17131 075331         STB SPTR       INSURE CORRECT SETTING FOR SPTR
0312  17132 061341         LDA STYPE      LAST STATEMENT
0313  17133 051040         CPA ENDOP        AN 'END' ?
0314  17134 027137         JMP CMP12      YES
0315  17135 015423         JSB DCMPL      NO, DECOMPILE
0316  17136 115241         JSB RERRS+5,I  MISSING 'END'
0317  17137 002404  CMP12   CLA,INA
0318  17140 051335         CPA FLINK      ALL FORS MATCHED?
0319  17141 027144         JMP *+3        YES
0320  17142 015423         JSB DCMPL      DECOMPILE
0321  17143 115242         JSB RERRS+6,I  'FOR' WITHOUT 'NEXT'
0322  17144 002400         CLA
0323  17145 071644         STA VLFLG      MUST RUN VALUE.
0324  17146 064051         LDB PBPTR      SET POINTER TO
0325  17147 075603         STB FILTB        END OF SYMBOL TABLE.
0326*
0327*  FILCT = -5 AT THIS POINT UNLESS THE PROGRAM CONTAINS A
0328*  <FILES STATEMENT>.  THE CALL TO SCHLB,I LEAVES VALTB =
0329*  FILTB+7*(NUMBER OF FILES REQUESTED).  IF NO <FILES STATEMENT>
0330*  APPEARS, VALTB = FILTB.
0331*
0332  17150 035642         ISZ VALTB    2000A VERSION OF FILES          X]
0333  17151 027154         JMP CMP13                                    X]
0334  17152 075642         STB VALTB                                    X]
0335  17153 027774         JMP VALU0
0336  17154 114327  CMP13   JSB SCHLB,I                                 X]
0337  17155 036053         DEF FILIB
```

```
0338   17156 115251          JSB RERRS+13,I  BAD FORMAT OR ILLEGAL NAME
0339   17157 115252          JSB RERRS+14,I  MISSING OR PROTECTED FILE
0340   17160 115246          JSB RERRS+10,I  OUT OF STORAGE
0341   17161 027774          JMP VALU0      SUCCESSFUL REQUEST
```

```
0343**                                                **
0344***  DECOMPILE ALL OR PART OF PROGRAM             ***
0345**                                                **
0346*
0347*  IF CFLAG[1] = 0 PROGRAM IS IN SOURCE, EXIT IMMEDIATELY;
0348*  ELSE SET CFLAG[1] = 0 AND DECOMPILE PROGRAM.  SPTR POINTS
0349*  INITIALLY TO LAST WORD+1 OF COMPILED PROGRAM.  ABSOLUTE
0350*  ADDRESSES ARE REPLACED BY THE SEQUENCE NUMBERS TO WHICH
0351*  THEY POINT.  VARIABLE OPERAND POINTERS ARE REPLACED BY
0352*  THEIR SYMBOL.  PBPTR IS SET TO LAST WORD+1 OF PROGRAM.
0353*
0354  17162 061626  #DCMP LDA LMSK     IS PROGRAM COMPILED?          X]
0355  17163 010053        AND CFLAG                                  X]
0356  17164 002003        SZA,RSS                                    X]
0357  17165 027256        JMP DCMP4     NO
0358  17166 103100        CLF 0         YES                          X]
0359  17167 020053        XOR CFLAG     SET MODE TO 'UNCOMPILED'     X]
0360  17170 070053        STA CFLAG
0361  17171 102100        STF 0                                      X]
0362  17172 060051        LDA PBPTR     NULL
0363  17173 050433        CPA PBUFF       PROGRAM?
0364  17174 027254        JMP DCMP3+2   YES
0365  17175 061331        LDA SPTR      SPTR=0 TO FLAG
0366  17176 071603        STA FILTB       ADDRESS
0367  17177 015425        JSB PRNST     INITIALIZE
0368  17200 017307        DEF PRNS1       DECOMPILATION
0369  17201 006441        CLB,SEZ,RSS   WAS FLAG BIT SET?
0370  17202 027220        JMP DCMP2     NO
0371*                                  *
0372**  PROCESS NON-VARIABLE OPERAND   **
0373*                                  *
0374  17203 040522        ADA .-4         PROGRAM
0375  17204 002021        SSA,RSS           INTEGER?
0376  17205 027360        JMP PRNS2     NO
0377  17206 035331  DCMP1 ISZ SPTR      YES, MOVE TO
0378  17207 065331        LDB SPTR        NEXT WORD
0379  17210 055603        CPB FILTB     DONE?
0380  17211 027252        JMP DCMP3     YES
0381  17212 055337        CPB NSPTR     NO, STATEMENT DONE?
0382  17213 027310        JMP PRNS1+1   YES
0383  17214 161331        LDA SPTR,I    NO, REPLACE
0384  17215 160000        LDA 0,I         ABSOLUTE ADDRESS
0385  17216 171331        STA SPTR,I        WITH SEQUENCE
0386  17217 027206        JMP DCMP1           NUMBER
0387*                                  *
0388**  PROCESS VARIABLE OPERAND   **
0389*                                  *
0390  17220 040525  DCMP2 ADA .-1       COMPUTE
0391  17221 101117        RRR 15          SYMBOL TABLE
0392  17222 045641        ADB SYMTB         ADDRESS
0393  17223 161331        LDA SPTR,I    EXTRACT
0394  17224 011054        AND OPMSK       OPERATOR
0395  17225 130001        IOR 1,I       REPLACE OPERATOR-
0396  17226 171331        STA SPTR,I      OPERAND PAIR IN CODE
0397  17227 065341        LDB STYPE
0398  17230 055026        CPB DIMOP     'DIM' ?
```

```
0399  17231 027235         JMP DCMP6     YES
0400  17232 055132         CPB COMOP     NO, 'COM'?
0401  17233 002001         RSS           YES
0402  17234 027360         JMP PRNS2     NO
0403  17235 065331 DCMP6   LDB SPTR
0404  17236 006004         INB
0405  17237 055603         CPB FILTB     DONE?
0406  17240 027252         JMP DCMP3     YES
0407  17241 006004         INB           NO
0408  17242 010545         AND .+17B     STRING
0409  17243 040522         ADA .-4       SIMPLE
0410  17244 002021         SSA,RSS         VARIABLE?
0411  17245 027360         JMP PRNS2     YES
0412  17246 040532         ADA .+4       NO, STRING
0413  17247 002003         SZA,RSS         VARIABLE?
0414  17250 002004         INA           YES, SET TO SINGLE SUBSCRIPT MOD
0415  17251 027116         JMP CMP10-5
0416  17252 061641 DCMP3   LDA SYMTB     SET ACTIVE USER AREA POINTER
0417  17253 070051         STA PBPTR       TO LAST WORD+1 OF PROGRAM
0418  17254 002400         CLA           ZERO
0419  17255 071641         STA SYMTB       POINTER
0420  17256 170401 DCMP4   STA DCLC1,I   BLOCK CLOCK
0421  17257 064433         LDB PBUFF
0422  17260 055643         CPB SPROG     COMMON ALLOCATED?
0423  17261 027273         JMP DCMP5     NO
0424  17262 054051         CPB PBPTR     YES, NULL PROGRAM?
0425  17263 027273         JMP DCMP5     YES
0426  17264 075613         STB DEST      NO
0427  17265 061643       LDA SPROG     SET UP
0428  17266 075643         STB SPROG       POINTERS
0429  17267 064051         LDB PBPTR         FOR MOVE
0430  17270 015577         JSB MOVER     REMOVE COMMON AREA
0431  17271 065613         LDB DEST      RESET END-OF-
0432  17272 074051         STB PBPTR       PROGRAM POINTER
0433  17273       DCMP5    EQU *
0434  17273 017534         JSB ABCHK     ABORT?
0435  17274 160402         LDA DCLC2,I   NO--UNBLOCK
0436  17275 170401         STA DCLC1,I     CLOCK
0437  17276 125423         JMP DCMPL,I
```

```
**                                                  **
*                                                                X]
*     STILL HAVE TO CHANGE PRNST                                 X]
*                                                                X]
***  PROCESS NEXT STATEMENT OF PROGRAM  ***
**                                                  **
*
*  USED BY CMPLE AND DCMPL TO SCAN THROUGH THE PROGRAM.
*  A 'JSB PRNST' INITIALIZES THE SCAN: (P+1) IS A POINTER
*  TO THE CODE FOR HANDLING THE END-OF-STATEMENT CONDITION;
*  .LNUM HOLDS THE SEQUENCE NUMBER OF THE STATEMENT BEING
*  PROCESSED; SPTR POINTS TO THE WORD OF THE PROGRAM BEING
*  PROCESSED.  PRNST HANDLES <REM STATEMENT>, <DATA STATEMENT>,
*  STRING CONSTANTS, NULL OPERANDS, NUMERICAL CONSTANTS, AND
*  <FILES STATEMENT>.  OTHER CASES EXIT TO (P+2).  PRNST IS
*  RE-ENTERED DIRECTLY, LEAVING THE INITIALIZED EXIT ADDRESSES
*  UNCHANGED THROUGHOUT PROCESSING OF THE PROGRAM.
*
17277 161425  #PNST LDA PRNST,I   SET POINTER TO
17300 071343        STA STEND       END-OF-STATEMENT
17301 035425        ISZ PRNST         PROCESSING ROUTINE
17302 003400        CCA    SET VALTB TO INDICATE NO FILES
17303 071642        STA VALTB
17304 002400        CLA            INITIALIZE
17305 071653        STA COMSN       COM FLAG
17306 065643        LDB SPROG      INITIAL PROGRAM POINTER
17307 075331  PRNS1 STB SPTR       SET PROGRAM POINTER TO STATEMENT
17310 161331        LDA SPTR,I     SAVE STATEMENT
17311 071625        STA .LNUM       SEQUENCE NUMBER
17312 035331        ISZ SPTR       COMPUTE
17313 145331        ADB SPTR,I      LENGTH
17314 075337        STB NSPTR      SAVE POINTER TO NEXT STATEMENT
17315 035331        ISZ SPTR       EXTRACT
17316 161331        LDA SPTR,I      STATEMENT
17317 011054        AND OPMSK         TYPE
17320 071341        STA STYPE      SAVE IT
17321 051132        CPA COMOP      'COM' ?
17322 027325        JMP *+3        YES
17323 075653        STB COMSN      NO--CLEAR COM FLAG.
17324 027335        JMP PRNS4
17325 065653        LDB COMSN      NON-COM
17326 006003        SZB,RSS         STATEMENT SEEN?
17327 027361        JMP PRNS2+1    NO
17330 065331        LDB SPTR       YES, RESET
17331 044524        ADB .-2         STATEMENT
17332 075331        STB SPTR         POINTER
17333 015423        JSB DCMPL      ERROR
17334 115306        JSB RERRS+42,I  'COM' OUT OF ORDER
17335 051032  PRNS4 CPA REMOP      'REM' ?
17336 027362        JMP PRNS2+2    YES
17337 051042        CPA DATOP      NO, DATA?
17340 027362        JMP PRNS2+2    YES
17341 050634        CPA CHNOP      NO, CHAIN?
17342 027362        JMP PRNS2+2    YES
17343 051050        CPA FILOP      NO, <FILES STATEMENT> ?
17344 002001        RSS            YES
```

```
0495  17345 027361          JMP PRNS2+1   NO
0496  17346 065331          LDB SPTR
0497  17347 044524          ADB .-2
0498  17350 035642          ISZ VALTB    SECOND <FILES> STATEMENT?
0499  17351 027355          JMP *+4      YES
0500  17352 075642          STB VALTB    NO, SAVE POINTER
0501  17353 065337          LDB NSPTR  SKIP OVER THE REST
0502  17354 027362          JMP PRNS2+2
0503  17355 075331          STB SPTR     TWO FILES SATEMENTS
0504  17356 015423          JSB DCMPL      DECOMPILE
0505  17357 115276          JSB RERRS+34,I     EXTRA <FILES> STATEMENT
0506*                                        *
0507**  PROCESS NEXT WORD OF STATEMENT      **
0508*                                        *
0509  17360 035331  PRNS2 ISZ SPTR        MOVE TO
0510  17361 065331         LDB SPTR          NEXT WORD
0511  17362 055603         CPB FILTB       DECOMPILE FINISHED?
0512  17363 027252         JMP DCMP3       YES
0513  17364 055337         CPB NSPTR       NO, STATEMENT FINISHED?
0514  17365 125343         JMP STEND,I     YES
0515  17366 161331         LDA SPTR,I      NO, ISOLATE
0516  17367 011054         AND OPMSK         OPERATOR
0517  17370 051000         CPA B1000       " ?
0518  17371 027401         JMP PRNS3       YES
0519  17372 121331         XOR SPTR,I      NO, GET OPERAND
0520  17373 002003         SZA,RSS         NULL OPERAND?
0521  17374 027360         JMP PRNS2       YES
0522  17375 001265         RAL,CLE,ERA     NO, PUT FLAG BIT IN (E)
0523  17376 002003         SZA,RSS         NUMBER?
0524  17377 027061         JMP CMPL7       YES
0525  17400 125425         JMP PRNST,I     NO
0526  17401 121331  PRNS3  XOR SPTR,I      EXTRACT LENGTH
0527  17402 040531         ADA .+3         COMPUTE
0528  17403 001100         ARS               POINTER
0529  17404 041331         ADA SPTR            TO CLOSING
0530  17405 071331         STA SPTR              QUOTE
0531  17406 027361         JMP PRNS2+1
0532**                                       **
0533***  'COMPILE' A SYMBOL                 ***
0534**                                       **
0535*
0536*  ENTER WITH A SYMBOLIC NAME IN STMP1 AND SEARCH THE
0537*  SYMBOL TABLE FOR A MATCHING ENTRY.  IF NO ENTRY IS
0538*  FOUND, APPEND A NEW TWO WORD ENTRY WITH THE SYMBOL
0539*  IN THE FIRST WORD AND 0 IN THE SECOND.  THE SYMBOL IN
0540*  THE PROGRAM IS REPLACED WITH THE ORDINAL NUMBER OF
0541*  ITS SYMBOL TABLE ENTRY.  EXIT WITH THE NEW PROGRAM
0542*  WORD IN (A), A POINTER TO THE SECOND WORD OF THE
0543*  TABLE ENTRY IN STMP2, AND THE STATEMENT TYPE IN (B).
0544*
0545  17407 060532  #SSYM LDA .+4         INSURE SPACE
0546  17410 015427         JSB CUSP         FOR NEW ENTRY
0547  17411 061647         LDA STMP1      RETRIEVE SYMBOL
0548  17412 065641         LDB SYMTB
0549  17413 054051  SYMT1  CPB PBPTR      SYMBOL TABLE EXHAUSTED?
0550  17414 027433         JMP SYMT3      YES
```

```
0551  17415 150001         CPA 1,I       NO, IS NEXT SYMBOL A MATCH?
0552  17416 027443         JMP SYMT5     YES
0553  17417 044530         ADB .+2       NO, MOVE
0554  17420 027413         JMP SYMT1       TO NEXT ENTRY
0555*                                     *
0556**  HANDLE UNMATCHED ARRAY SYMBOL   **
0557*                                     *
0558  17421 051647  SYMT2 CPA STMP1     "DON'T KNOW" SYMBOL?
0559  17422 002001         RSS           YES
0560  17423 027433         JMP SYMT3     NO, MAKE NORMAL TABLE ENTRY
0561  17424 034051         ISZ PBPTR     ALLOCATE SPACE
0562  17425 034051         ISZ PBPTR       FOR NEW ENTRY
0563  17426 061650         LDA STMP2     WAS A SINGLE OR DOUBLE
0564  17427 002006         INA,SZA         SUBSCRIPTED ENTRY FOUND?
0565  17430 027436         JMP SYMT4     YES, INCLUDE POINTER IN ENTRY
0566  17431 170001         STA 1,I       NO, SAVE SPACE FOR LATER ENTRY
0567  17432 044530         ADB .+2         WITH NUMBER OF DIMENSIONS
0568*                                   *
0569**  CREATE A NEW TABLE ENTRY  **
0570*                                   *
0571  17433 034051  SYMT3 ISZ PBPTR     ALLOCATE SPACE
0572  17434 034051         ISZ PBPTR       FOR NEW ENTRY
0573  17435 002400         CLA           INITIALIZE
0574  17436 006004  SYMT4 INB             SECOND
0575  17437 170001         STA 1,I            WORD
0576  17440 044525         ADB .-1       PUT SYMBOL
0577  17441 061647         LDA STMP1       IN FIRST
0578  17442 170001         STA 1,I            WORD
0579*                                    *
0580**  'COMPILE' PROGRAM WORD  **
0581*                                    *
0582  17443 006004  SYMT5 INB           COMPUTE
0583  17444 075650         STB STMP2
0584  17445 007000         CMB             RELATIVE
0585  17446 045641         ADB SYMTB
0586  17447 007004         CMB,INB            ADDRESS
0587  17450 005100         BRS
0588  17451 161331         LDA SPTR,I    REPLACE SYMBOL
0589  17452 011054         AND OPMSK       IN PROGRAM
0590  17453 030001         IOR 1              WITH RELATIVE
0591  17454 171331         STA SPTR,I           ADDRESS
0592  17455 065341         LDB STYPE     LOAD STATEMENT TYPE
0593  17456 125417         JMP SSYMT,I
```

```
0002**                              **
0003***  PROCESS ARRAY SYMBOL       ***
0004**                              **
0005*
0006*  ENTER WITH AN ARRAY NAME IN STMP1.  IF A MATCHING
0007*  SYMBOL TABLE ENTRY EXISTS, PROCEED AS IN SSYMT.  ELSE IF
0008*  THE ARRAY IS SINGLY OR DOUBLY SUBSCRIPTED (LAST FOUR
0009*  BITS OF NAME ARE 0001 OR 0010): EXIT IS TO ERROR ON
0010*  FINDING A CONFLICTING ENTRY; ON FINDING ONLY A "DON'T
0011*  KNOW" ENTRY (LAST FOUR BITS 0011), PROCEED AS IN SSYMT,
0012*  PLACING THE APPROPRIATE ENTRY IN THE TWO WORDS ABOVE
0013*  THE "DON'T KNOW" ENTRY AND SETTING A POINTER TO ITS
0014*  SECOND WORD INTO THE SECOND WORD OF THE "DON'T KNOW"
0015*  ENTRY.  IF THE SYMBOL IS AN UNMATCHED "DON'T KNOW"
0016*  ARRAY NAME, APPEND A SYMBOL TABLE ENTRY: IF A SINGLY
0017*  OR DOUBLY SUBSCRIPTED VERSION OF THE ARRAY HAS BEEN
0018*  PREVIOUSLY FOUND, PLACE A POINTER TO THE SECOND WORD
0019*  OF THE PREVIOUS ENTRY INTO THE SECOND WORD OF THE NEW
0020*  "DON'T KNOW" ENTRY; OTHERWISE LEAVE TWO WORDS ABOVE
0021*  THE NEW ENTRY.
0022*
0023  17457 061421  #ASYM LDA ASYMT      SET RETURN
0024  17460 071417        STA SSYMT       ADDRESS
0025  17461 003400        CCA            SET MATCH
0026  17462 071650        STA STMP2       FLAG FALSE
0027  17463 060740        LDA APTR1      INTIALIZE
0028  17464 071421        STA ASYMT       SEARCH LOOP
0029  17465 060532        LDA .+4        INSURE SPACE
0030  17466 015427        JSB CUSP        FOR NEW ENTRY
0031  17467 065641        LDB SYMTB
0032  17470 061647        LDA STMP1      RETRIEVE SYMBOL
0033  17471 030531        IOR .+3        SET ARRAY SYMBOL
0034  17472 027505        JMP SYMT7+3     TO "DON'T KNOW"
0035  17473 040524  SYMT6 ADA .-2        MATCH AS
0036  17474 150001        CPA 1,I         'SINGLE SUBSCRIPT'?
0037  17475 027510        JMP SYMT8      YES
0038  17476 002004        INA            NO, MATCH AS
0039  17477 150001        CPA 1,I         'DOUBLE SUBSCRIPT'?
0040  17500 027510        JMP SYMT8      YES
0041  17501 002004        INA            NO, MATCH AS
0042  17502 150001  SYMT7 CPA 1,I         "DON'T KNOW"?
0043  17503 027524        JMP SYMT9      YES
0044  17504 044530        ADB .+2        NO, MORE SYMBOL
0045  17505 054051        CPB PBPTR       TABLE ENTRIES?
0046  17506 027421        JMP SYMT2      NO
0047  17507 125421        JMP ASYMT,I    YES
0048  17510 051647  SYMT8 CPA STMP1      DOES ENTRY MATCH SYMBOL?
0049  17511 027443        JMP SYMT5      YES
0050  17512 030531        IOR .+3        NO, IS SYMBOL OF
0051  17513 051647        CPA STMP1       TYPE "DON'T KNOW"?
0052  17514 027517        JMP *+3        YES
0053  17515 015423        JSB DCMPL      NO, DECOMPILE
0054  17516 115247        JSB RERRS+11,I  SUBSCRIPT CONFLICT
0055  17517 075650        STB STMP2      SAVE POINTER TO ENTRY
0056  17520 064742        LDB APTR2      CONTINUE SEARCH
0057  17521 075421        STB ASYMT       FOR POSSIBLE
```

```
0058  17522 065650        LDB STMP2          "DON'T KNOW"
0059  17523 027504        JMP SYMT7+2          ENTRY
0060  17524 051647  SYMT9 CPA STMP1      DOES ENTRY MATCH SYMBOL?
0061  17525 027443        JMP SYMT5      YES
0062  17526 006004        INB            NO, NEW ENTRY TO BE MADE
0063  17527 060001        LDA 1          SET POINTER TO
0064  17530 044524        ADB .-2          NEW ENTRY INTO
0065  17531 174000        STB 0,I            "DON'T KNOW" ENTRY
0066  17532 002400        CLA            MAKE NEW
0067  17533 027437        JMP SYMT4+1      ENTRY
```

```
0069*
0070**     CHECK FOR ABORT ATTEMPT
0071*
0072   17534 000000  ABCHK NOP
0073   17535 064352        LDB MLINK+1    LOAD TTY STATUS WORD.
0074   17536 044502        ADB .-?LINK+?TSTA
0075   17537 061002        LDA UNABT      CLEAR UNABORT
0076   17540 003000        CMA              CONDITION
0077   17541 103100        CLF 0          I.E.
0078   17542 110001        AND 1,I        ALLOW
0079   17543 170001        STA 1,I          ABORTS
0080   17544 102100        STF 0              AGAIN.
0081   17545 011126        AND ABTRY      DID THIS GUY TRY
0082   17546 002003        SZA,RSS          TO ABORT?
0083   17547 127534        JMP ABCHK,I    NOPE.
0084   17550 103100        CLF 0          YES.
0085   17551 160001        LDA B,I        RELOAD TTY STATUS.
0086   17552 013574        AND ABSCL      REMOVE OLD STATUS.
0087   17553 030527        IOR IOBT       ADD NEW STATUS.
0088   17554 170001        STA B,I
0089   17555 044536        ADB .-?TSTA+?MASK
0090   17556 060265        LDA MPCOM      SET COMMUNICATIONS
0091   17557 130001        IOR B,I          FLAG FOR
0092   17560 070265        STA MPCOM          THIS USER.
0093   17561 061627        LDA CMSK       CLEAR
0094   17562 010267        AND CHNFG        CHAIN
0095   17563 070267        STA CHNFG          FLAG.
0096   17564 002400        CLA            BLOCK CLOCK.
0097   17565 170401        STA DCLC1,I
0098   17566 044541        ADB .+?STAT-?MASK
0099   17567 003400        CCA
0100   17570 170001        STA B,I        SET STATUS TO ABORTING.
0101   17571 102100        STF 0
0102   17572 127573        JMP *+1,I
0103   17573 034256        DEF SCH1
0104*
0105   17574 070002  ABSCL OCT 70002
0106*
```

```
0108*
0109**   TELETYPE POINTER TABLE
0110*
0111   17575           TTPT  EQU *
0112   17575 033264          DEF TTY00
0113   17576 033321          DEF TTY01
0114   17577 033356          DEF TTY02
0115   17600 033413          DEF TTY03
0116   17601 033450          DEF TTY04
0117   17602 033505          DEF TTY05
0118   17603 033542          DEF TTY06
0119   17604 033577          DEF TTY07
0120   17605 033634          DEF TTY10
0121   17606 033671          DEF TTY11
0122   17607 033726          DEF TTY12
0123   17610 033763          DEF TTY13
0124   17611 034020          DEF TTY14
0125   17612 034055          DEF TTY15
0126   17613 034112          DEF TTY16
0127   17614 034147          DEF TTY17
0128*
0129*
0130   17615 000000  NUSE9 BSS 1     FREE SPACE TO NEXT "ORG" STATEMENT
```

```
0132  17675                 ORG 17675B
0133**                        **
0134***  BACKSPACE IN BUFFER  **
0135**                        **
0136*
0137  17675 065635  #BKSP LDB BADDR       SET THE BUFFER
0138  17676 155632        CPB PRBFA,I          POINTER
0139  17677 165633        LDB PRBFE,I              BACK
0140  17700 044525        ADB .-1
0141  17701 075635        STB BADDR
0142  17702 125551        JMP BCKSP,I
0143**                       **
0144***  GET DIGIT TO OUTPUT  ***
0145**                       **
0146*
0147*  COMPUTE NEXT DECIMAL DIGIT AND RETURN WITH IT IN (A).
0148*  SUBTRACT IT OUT OF THE NUMBER.
0149*
0150  17703 015401  #GTDG JSB MBY10     MULTIPLY BY 10
0151  17704 065423        LDB EXP      GET EXPONENT IN (B)
0152  17705 007004        CMB,INB        AS NEGATIVE
0153  17706 011074        AND HMASK    RETAIN HIGH 5 BITS
0154  17707 001200        RAL          NORMALIZE TO BIT 15
0155  17710 006024        SSB,INB      ROTATE INTEGER
0156  17711 027707        JMP *-2        INTO (A)
0157  17712 010630        AND B377     EXTRACT
0158  17713 071501        STA FD0        DIGIT
0159  17714 065423        LDB EXP      ROTATE
0160  17715 007004        CMB,INB
0161  17716 001300        RAR              BACK
0162  17717 006024        SSB,INB
0163  17720 027716        JMP *-2
0164  17721 021417        XOR MANT1    REMOVE
0165  17722 065421        LDB MANT2      DIGIT
0166  17723 015405        JSB NORML    NORMALIZE REMAINDER
0167  17724 061501        LDA FD0      LOAD (A) WITH DIGIT
0168  17725 125523        JMP GETDG,I
0169**                                  **
0170***  FETCH NEXT BUFFER CHARACTER     ***
0171**                                  **
0172*
0173*  THE NEXT CHARACTER FROM THE INPUT BUFFER IS FETCHED. NORMAL
0174*  EXIT IS TO (P+2) WITH THE CHARACTER IN (A). BLANKS ARE SKIPPED
0175* IF 'BLANK' = 40 OCTAL. A 'CARRIAGE RETURN' EXITS TO (P+1)
0176*
0177  17726 065635  #GTCR LDB BADDR    INCREMENT                          X]
0178  17727 006004        INB            CHARACTER ADDRESS                X]
0179  17730 155633        CPB PRBFE,I  OUT OF PHYSICAL BUFFR?             X]
0180  17731 165632        LDB PRBFA,I  YES, WRAP AROUND                   X]
0181  17732 075635        STB BADDR    NO                                 X]
0182  17733 004065        CLE,ERB      LOAD CORRECT                       X]
0183  17734 160001        LDA 1,I        BUFFER WORD                      X]
0184  17735 002041        SEZ,RSS      EXTRACT                            X]
0185  17736 001727        ALF,ALF        DESSIRED                          X]
0186  17737 010630        AND B377         CHARACTER                      X]
0187  17740 051637        CPA BLANK    BLANK?                             X]
```

```
0188  17741 027726         JMP #GTCR         YES, IGNORE IT    [X]
0189  17742 050543         CPA .+15B    NO, CARRIAGE REUTRN?          X]
0190  17743 125547         JMP GETCR,I  YES                           X]
0191  17744 064000         LDB 0      COPY CHAR TO B
0192  17745 040454         ADA M96
0193  17746 002021         SSA,RSS    NO SKIP IF LOWER CASE
0194  17747 040470         ADA M32    MAKE INTO UPPER CASE
0195  17750 041120         ADA .140   RESTORE CHARACTER
0196  17751 035547         ISZ GETCR     NO, EXIT                    X]
0197  17752 125547         JMP GETCR,I     TO P+2
0198  17753 005116  UPMA1 OCT 5116
0199  17754 047524         ASC 6,OT USER DISC
0200  17762 051531  SYSAA ASC 3,SYSTEM
0201*
0202  17765 000000  NUSE1 BSS 5          NOT USED
```

```
0204**                          **
0205***  BUILD THE VALUE TABLE  ***
0206**                          **
0207*
0208*  IF NO VALUE TABLE EXISTS, ONE IS BUILT FROM THE SYMBOL
0209*  TABLE AND INITIALIZED; IF IT ALREADY EXISTS, IT IS
0210*  INITIALIZED.  IN BUILDING THE VALUE TABLE, EACH ENTRY
0211*  IN THE SYMBOL TABLE IS CHECKED: FOR FUNCTIONS THE
0212*  EXISTENCE OF A DEFINING FORMULA IS CHECKED; FOR SIMPLE
0213*  VARIABLES TWO WORDS ARE ALLOCATED AND SET TO 'UNDEFINED'
0214*  AND A POINTER TO THEM IS PLACED IN THE SECOND WORD OF
0215*  THE SYMBOL TABLE ENTRY; FOR ARRAYS FOUR WORDS ARE
0216*  ALLOCATED FOR THE DECLARED AND DYNAMIC DIMENSIONS,
0217*  THE DIMENSIONS ARE INITIALIZED EITHER FROM A
0218*  <DIM STATEMENT> IN THE PROGRAM OR THE DEFAULT
0219*  DIMENSIONS, ARRAY SPACE IS ALLOCATED AT TWO WORDS PER
0220*  ARRAY ELEMENT CONTIGUOUS WITH THE DIMENSIONS,  THE
0221*  ELEMENTS ARE INITIALIZED TO 'UNDEFINED,' AND A
0222*  POINTER TO THE FIRST ELEMENT IS PLACED IN THE SECOND
0223*  WORD OF THE SYMBOL TABLE ENTRY; FOR STRINGS FOLLOW THE
0224*  PATTERN FOR ARRAYS WITH ONE WORD HOLDING THE PHYSICAL
0225*  DIMENSION IN BITS 15-8 AND THE DYNAMIC DIMENSION IN
0226*  BITS 7-0 (DIMENSION HERE MEANS LENGTH AS NUMBER OF
0227*  CHARACTERS), STRING SPACE IS ALLOCATED ONE WORD PER
0228*  TWO CHARACTERS, AND THE DYNAMIC LENGTH IS INITIALIZED
0229*  TO ZERO.  FOR "DON'T KNOW" ARRAY ENTRIES, THE SECOND
0230*  WORD OF THE SYMBOL TABLE ENTRY IS COPIED FROM THE
0231*  ASSOCIATED SINGLY OR DOUBLY SUBSCRIPTED ENTRY (OR
0232*  EXIT TO ERROR IF NONE EXISTS).
0233*  FOR VARIABLES WHICH HAVE BEEN DECLARED IN A <COM
0234*  STATEMENT>, STORAGE IS ALLOCATED IN THE COMMON AREA
0235*  WHICH RESIDES AHEAD OF THE PROGRAM. FOR ARRAYS AND
0236*  STRINGS, THIS AREA IS LEFT UNDISTURBED IF THE DIMENSIONS
0237*  DECLARED IN THE <COM STATEMENT> MATCH THOSE FOUND IN
0238*  THE COMMON AREA, AND THE DYNAMIC DIMENSIONS ARE CONSISTENT
0239*  IF A VALUE TABLE ALREADY EXISTS, VARIABLES IN COMMON ARE
0240*  LEFT UNTOWHED, VALUES OF SIMPLE VARIABLES AND ARRAY
0241*  ELEMENTS ARE SET TO 'UNDEFINED' AND DYNAMIC ARRAY
0242*  DIMENSIONS ARE SET TO DECLARED DIMENSIONS; THE DYNAMIC
0243*  LENGTHS OF STRINGS ARE SET TO ZERO.  EXIT TO XEC IF
0244*  PROCESSING IS SATISFACTORILY COMPLETED.
0245*
0246  17772 065333  VALUE LDB FCORE     INSURE CORRECT
0247  17773 074051        STB PBPTR       SETTING FOR PBPTR
0248  17774 064433  VALU0 LDB PBUFF     INITIALIZE
0249  17775 075654        STB COMPT       COMMON POINTER
0250  17776 065641        LDB SYMTB     SET (B) TO
0251  17777 002001        RSS             SYMBOL TABLE
0252  20000 006004  VALU1 INB           SYMBOL TABLE
0253  20001 055603        CPB FILTB       EXHAUSTED?
0254  20002 026433        JMP VAL99     YES
0255  20003 160001        LDA 1,I       NO, LOAD SYMBOL
0256  20004 006004        INB           POINT (B) TO VALUE TABLE POINTER
0257  20005 002003        SZA,RSS       NULL SYMBOL?
0258  20006 026326        JMP VAL14     YES
0259  20007 010545        AND .+17B     NO
```

```
0260  20010 050545          CPA .+17B      FUNCTION?
0261  20011 026052          JMP VALU4      YES
0262  20012 002003          SZA,RSS        NO, STRING VARIABLE?
0263  20013 026330          JMP VAL15      YES
0264  20014 040522          ADA .-4        NO,
0265  20015 002020          SSA              ARRAY?
0266  20016 026057          JMP VALU5      YES
0267*                                  *
0268**  INITIALIZE SIMPLE VARIABLE  **
0269*                                  *
0270  20017 061644          LDA VLFLG      SIMPLE VARIABLE
0271  20020 002003          SZA,RSS        STORAGE ALLOCATED?
0272  20021 026034          JMP VALU3      NO
0273  20022 160001          LDA 1,I        YES
0274  20023 003004          CMA,INA        VARIABLE
0275  20024 040001          ADA 1            IN
0276  20025 002021          SSA,RSS            COMMON?
0277  20026 026000          JMP VALU1      YES
0278  20027 160001          LDA 1,I        NO
0279  20030 071647  VALU2    STA VTMP1      SAVE POINTER TO VALUE
0280  20031 003400          CCA            SET
0281  20032 171647          STA VTMP1,I      VALUE TO
0282  20033 026000          JMP VALU1          UNDEFINED
0283  20034 160001  VALU3    LDA 1,I        VARIABLE
0284  20035 002020          SSA              IN COMMON?
0285  20036 026045          JMP VAL31      YES
0286  20037 060530          LDA .+2        NO--ALLOCATE
0287  20040 015427          JSB CUSP         STORAGE
0288  20041 070051          STA PBPTR          FOR VALUE
0289  20042 040524          ADA .-2        PUT VALUE POINTER
0290  20043 170001          STA 1,I          INTO SYMBOL TABLE
0291  20044 026030          JMP VALU2
0292  20045 061654  VAL31    LDA COMPT      ALLOCATE STORAGE
0293  20046 170001          STA 1,I          IN COMMON
0294  20047 040530          ADA .+2        UPDATE COMMON
0295  20050 071654          STA COMPT        POINTER
0296  20051 026000          JMP VALU1
0297*                      *
0298**  CHECK FUNCTION  **
0299*                      *
0300  20052 160001  VALU4    LDA 1,I        WAS FUNCTION
0301  20053 002002          SZA              DEFINED?
0302  20054 026000          JMP VALU1      YES
0303  20055 015423          JSB DCMPL      NO, DECOMPILE
0304  20056 115243          JSB RERRS+7,I  UNDEFINED FUNCTION
0305*                       *
0306**  INITIALIZE ARRAY  **
0307*                       *
0308  20057 050525  VALU5    CPA .-1        IS ARRAY TYPE "DON'T KNOW" ?
0309  20060 026317          JMP VAL13      YES
0310  20061 075647          STB VTMP1      NO, SAVE POINTER TO SYMBOL TABLE
0311  20062 002004          INA            SAVE INFORMATION ON
0312  20063 071650          STA VTMP2        NUMBER OF DIMENSIONS
0313  20064 061644          LDA VLFLG      STORAGE
0314  20065 002002          SZA              ALLOCATED?
0315  20066 026157          JMP VAL12      YES
```

```
0316  20067 160001         LDA 1,I         NO
0317  20070 002020         SSA             IN COMMON?
0318  20071 026173         JMP VAL51       YES
0319  20072 165647         LDB VTMP1,I     NO, LOAD POINTER TO DIMENSIONS
0320  20073 060051         LDA PBPTR       SET POINTER TO
0321  20074 071651         STA VTMP3         DIMENSION ENTRY
0322  20075 060532         LDA .+4         ALLOCATE
0323  20076 015427         JSB CUSP          SPACE
0324  20077 070051         STA PBPTR           FOR ENTRY
0325  20100 171647         STA VTMP1,I     SYMBOL TABLE POINTER TO ARRAY
0326  20101 006003         SZB,RSS         DEFAULT DIMENSIONS?
0327  20102 026154         JMP VAL11       YES
0328  20103 160001         LDA 1,I         NO, LOAD ROW DIMENSION
0329  20104 044530         ADB .+2         BUMP POINTER
0330  20105 035650  VALU6   ISZ VTMP2      TWO DIMENSIONAL?
0331  20106 006405         CLB,INB,RSS     NO, SET COLUMN DIMENSION TO 1
0332  20107 164001         LDB 1,I         YES, LOAD COLUMN DIMENSION
0333  20110 171651         STA VTMP3,I     PUT
0334  20111 035651         ISZ VTMP3         DECLARED DIMENSIONS
0335  20112 175651         STB VTMP3,I         IN VALUE TABLE
0336  20113 035651  VALU7   ISZ VTMP3      PUT
0337  20114 171651         STA VTMP3,I       DYNAMIC DIMENSIONS
0338  20115 035651         ISZ VTMP3           IN
0339  20116 175651         STB VTMP3,I           VALUE TABLE
0340  20117 100200         MPY VTMP3,I     COMPUTE NUMBER OF ARRAY ELEMENTS
0341  20121 006003         SZB,RSS         TOO
0342  20122 002020         SSA               LARGE?
0343  20123 026152         JMP VAL10       YES
0344  20124 071652         STA VTMP4       SAVE POSITIVE
0345  20125 003004         CMA,INA           AND NEGATIVE
0346  20126 071650         STA VTMP2           COUNT
0347  20127 065651         LDB VTMP3       HAS
0348  20130 006004         INB               ARRAY BEEN
0349  20131 054051         CPB PBPTR           ALLOCATED?
0350  20132 026142         JMP VALU9       NO
0351  20133 003400  VALU8   CCA             INITIALIZE
0352  20134 170001         STA 1,I           ARRAY ELEMENT
0353  20135 044530         ADB .+2             TO 'UNDEFINED'
0354  20136 035650         ISZ VTMP2       DONE?
0355  20137 026133         JMP VALU8       NO
0356  20140 065647         LDB VTMP1       YES
0357  20141 026000         JMP VALU1
0358  20142 041100  VALU9   ADA .2500       ARRAY
0359  20143 002020         SSA               TOO LARGE?
0360  20144 026152         JMP VAL10       YES
0361  20145 061652         LDA VTMP4       NO
0362  20146 001000         ALS             ALLOCATE
0363  20147 015427         JSB CUSP          SPACE
0364  20150 070051         STA PBPTR           FOR ARRAY
0365  20151 026133         JMP VALU8
0366  20152 015423  VAL10   JSB DCMPL       DECOMPILE
0367  20153 115244         JSB RERRS+8,I   ARRAY TOO LARGE
0368  20154 060540  VAL11   LDA .+10        LOAD (A) WITH 10
0369  20155 064744         LDB A.10        LOAD (B) WITH
0370  20156 026105         JMP VALU6         ADDRESS OF 10
0371  20157 160001  VAL12   LDA 1,I         IS ARRAY
```

```
0372  20160 003004         CMA,INA
0373  20161 040001         ADA 1             IN COMMON?
0374  20162 002021         SSA,RSS
0375  20163 026000         JMP VALU1         YES
0376  20164 161647         LDA VTMP1,I       NO--LOAD
0377  20165 040522         ADA .-4
0378  20166 071651         STA VTMP3           DECLARED
0379  20167 161651         LDA VTMP3,I
0380  20170 035651         ISZ VTMP3             DIMENSIONS
0381  20171 165651         LDB VTMP3,I
0382  20172 026113         JMP VALU7
0383  20173 165647 VAL51   LDB VTMP1,I       SET
0384  20174 007004         CMB,INB             DIMENSION
0385  20175 075653         STB VTMP5             POINTER
0386  20176 175647         STB VTMP1,I             POSITIVE
0387  20177 061654         LDA COMPT         SET
0388  20200 071651         STA VTMP3           POINTER
0389  20201 040532         ADA .+4               IN SYMBOL
0390  20202 171647         STA VTMP1,I             TABLE
0391  20203 160001         LDA 1,I           PHYSICAL ROW DIMENSION
0392  20204 151651         CPA VTMP3,I         SAME AS DECLARED DIMENSION?
0393  20205 002001         RSS               YES
0394  20206 026255         JMP VAL52         NO
0395  20207 044530         ADB .+2           B=> SECOND DIMENSION
0396  20210 061650         LDA VTMP2         TWO
0397  20211 050524         CPA .-2             DIMENSIONAL?
0398  20212 006405         CLB,INB,RSS       NO--SET COLUMN DIMENSION TO 1
0399  20213 164001         LDB 1,I           YES--LOAD COLUMN DIMENSION
0400  20214 035651         ISZ VTMP3         PHYSICAL COLUMN DIMENSION
0401  20215 155651         CPB VTMP3,I         SAME AS DECLARED DIMENSION
0402  20216 002001         RSS               YES
0403  20217 026255         JMP VAL52         NO
0404  20220 161654         LDA COMPT,I       COMPUTE SIZE OF
0405  20221 100200         MPY VTMP3,I         ARRAY AS DECLARED
0406  20223 006003         SZB,RSS           TOO
0407  20224 002020         SSA                 LARGE?
0408  20225 026255         JMP VAL52         YES
0409  20226 071652         STA VTMP4         NO--SAVE SIZE
0410  20227 041100         ADA .2500         TOO
0411  20230 002020         SSA                 LARGE?
0412  20231 026255         JMP VAL52         YES
0413  20232 035651         ISZ VTMP3         NO
0414  20233 161651         LDA VTMP3,I       COMPUTE SIZE
0415  20234 035651         ISZ VTMP3           AS SPECIFIED BY
0416  20235 100200         MPY VTMP3,I           DYNAMIC DIMENSIONS
0417  20237 006003         SZB,RSS           TOO
0418  20240 002020         SSA                 LARGE?
0419  20241 026255         JMP VAL52         YES
0420  20242 003007         CMA,INA,SZA,RSS
0421  20243 026255         JMP VAL52         CHEESE IT! DYNAMIC DIMENSION = 0
0422  20244 041652         ADA VTMP4         DYNAMIC SIZE
0423  20245 002020         SSA                 > DECLARED SIZE
0424  20246 026255         JMP VAL52         YES
0425  20247 161647         LDA VTMP1,I       = COMPT+4
0426  20250 041652         ADA VTMP4
0427  20251 041652         ADA VTMP4         UPDATE
```

```
0428  20252 071654         STA COMPT       COMMON POINTER
0429  20253 065647         LDB VTMP1      RESTORE (B)
0430  20254 026000         JMP VALU1
0431  20255 065653  VAL52   LDB VTMP5      => ROW DIMENSION
0432  20256 160001         LDA 1,I
0433  20257 044530         ADB .+2        => COLUMN DIMENSION
0434  20260 035650         ISZ VTMP2      TWO-DIMENSIONAL?
0435  20261 006405         CLB,INB,RSS    NO--LOAD DEFAULT DIMENSION
0436  20262 164001         LDB 1,I        PUT
0437  20263 171654         STA COMPT,I      DECLARED
0438  20264 035654         ISZ COMPT          DIMENSIONS IN
0439  20265 175654         STB COMPT,I          COMMON AREA
0440  20266 035654         ISZ COMPT      PUT
0441  20267 171654         STA COMPT,I      DYNAMIC
0442  20270 035654         ISZ COMPT          DIMENSIONS IN
0443  20271 175654         STB COMPT,I          COMMON AREA
0444  20272 100200         MPY COMPT,I    COMPUTE NUMBER OF ARRAY ELEMENTS
0445  20274 006003         SZB,RSS        TOO
0446  20275 002020         SSA              LARGE?
0447  20276 026152         JMP VAL10      YES
0448  20277 003004         CMA,INA        NO--SAVE COMPLEMENT
0449  20300 071650         STA VTMP2        OF NUMBER OF ELEMENTS
0450  20301 003004         CMA,INA        ARRAY
0451  20302 041100         ADA .2500        TOO
0452  20303 002020         SSA                LARGE?
0453  20304 026152         JMP VAL10      YES
0454  20305 035654         ISZ COMPT      NO
0455  20306 065654         LDB COMPT      INITIALIZE
0456  20307 003400         CCA              ALL
0457  20310 170001  VAL53   STA 1,I             ELEMENTS
0458  20311 044530         ADB .+2                TO
0459  20312 035650         ISZ VTMP2                UNDEFINED
0460  20313 026310         JMP VAL53
0461  20314 075654         STB COMPT      UPDATE COMMON POINTER
0462  20315 065647         LDB VTMP1      RESTORE (B)
0463  20316 026000         JMP VALU1
0464  20317 061644  VAL13   LDA VLFLG      STORAGE
0465  20320 002002         SZA              ALLOCATED?
0466  20321 026000         JMP VALU1      YES
0467  20322 160001         LDA 1,I        NO, GET
0468  20323 160000         LDA 0,I          AND STORE
0469  20324 170001         STA 1,I            POINTER TO
0470  20325 026000         JMP VALU1            VALUE TABLE
0471  20326 015423  VAL14   JSB DCMPL      DECOMPILE
0472  20327 115245         JSB RERRS+9,I  NUMBER OF DIMENSIONS NOT KNOWN
0473*                                    *
0474**  INITIALIZE STRING VARIABLE  **
0475*                                    *
0476  20330 075647  VAL15   STB VTMP1      SAVE (B)
0477  20331 061644         LDA VLFLG      STORAGE
0478  20332 002002         SZA              ALLOCATED?
0479  20333 026363         JMP VAL17      YES
0480  20334 160001         LDA 1,I        NO
0481  20335 002020         SSA            IN COMMON?
0482  20336 026376         JMP VAL18      YES
0483  20337 165647         LDB VTMP1,I    NO, SAVE LENGTH POINTER
```

```
0484  20340 060051         LDA PBPTR      SET POINTER TO
0485  20341 071651         STA VTMP3        LENGTH ENTRY
0486  20342 002004         INA            MORE
0487  20343 050654         CPA LWAUS        USER SPACE?
0488  20344 115246         JSB RERRS+10,I   NO
0489  20345 070051         STA PBPTR      YES, SET POINTER TO STRING
0490  20346 171647         STA VTMP1,I      INTO SYMBOL TABLE ENTRY
0491  20347 006003         SZB,RSS        DEFAULT LENGTH?
0492  20350 002405         CLA,INA,RSS    YES, SET (A) = 1
0493  20351 160001         LDA 1,I        NO, LOAD DECLARED LENGTH
0494  20352 001727         ALF,ALF        STORE PHYSICAL LENGTH
0495  20353 171651         STA VTMP3,I      ALONG WITH ZERO
0496  20354 001727         ALF,ALF            LOGICAL LENGTH
0497  20355 002004         INA            ALLOCATE
0498  20356 001100         ARS              SPACE
0499  20357 015427         JSB CUSP           FOR
0500  20360 070051         STA PBPTR            STRING
0501  20361 065647  VAL16  LDB VTMP1      RESTORE
0502  20362 026000         JMP VALU1        (B)
0503  20363 160001  VAL17  LDA 1,I
0504  20364 003004         CMA,INA        STRING
0505  20365 040001         ADA 1            IN
0506  20366 002021         SSA,RSS            COMMON?
0507  20367 026000         JMP VALU1      YES
0508  20370 007400         CCB            NO--RESET
0509  20371 145647         ADB VTMP1,I
0510  20372 160001         LDA 1,I          LOGICAL LENGTH
0511  20373 010451         AND M256
0512  20374 170001         STA 1,I            TO ZERO
0513  20375 026361         JMP VAL16
0514  20376 003004  VAL18  CMA,INA        SET POINTER POSITIVE
0515  20377 071651         STA VTMP3      => DIMENSION INFORMATION
0516  20400 061654         LDA COMPT      SET VALUE
0517  20401 002004         INA              POINTER IN
0518  20402 170001         STA 1,I            SYMBOL TABLE
0519  20403 161654         LDA COMPT,I    EXTRACT PHYSICAL
0520  20404 001727         ALF,ALF          LENGTH FROM
0521  20405 010630         AND B377           COMMON AREA
0522  20406 151651         CPA VTMP3,I    SAME AS DECLARED LENGTH?
0523  20407 002001         RSS            YES
0524  20410 026421         JMP VAL20      NO
0525  20411 161654         LDA COMPT,I    LOGICAL
0526  20412 010630         AND B377
0527  20413 003004         CMA,INA          LENGTH <=
0528  20414 141651         ADA VTMP3,I
0529  20415 002020         SSA                PHYSICAL LENGTH?
0530  20416 026421         JMP VAL20      NO
0531  20417 161651         LDA VTMP3,I    LOAD PHYSICAL LENGTH
0532  20420 026425         JMP VAL19
0533  20421 161651  VAL20  LDA VTMP3,I    RESET PHYSICAL LENGTH TO
0534  20422 001727         ALF,ALF          DECLARED LENGTH AND
0535  20423 171654         STA COMPT,I        LOGICAL LENGTH TO ZERO
0536  20424 001727         ALF,ALF
0537  20425 002004  VAL19  INA            UPDATE
0538  20426 001100         ARS
0539  20427 002004         INA              COMMON
```

```
0540   20430 041654          ADA COMPT
0541   20431 071654          STA COMPT          POINTER
0542   20432 026000          JMP VALU1
0543   20433 002404   VAL99  CLA,INA        SAY STORAGE HAS
0544   20434 071644          STA VLFLG        BEEN ALLOCATED
0545   20435 026604          JMP XEC
```

```
0547**                          **
0548***  ALLOCATE COM STORAGE  ***
0549**                          **
0550*
0551* THE BEGINNING OF THE PROGRAM IS SCANNED FOR <COM STATEMENTS>. THE
0552* AMOUNT OF COM STORAGE NEEDED IS COMPUTED. A POINTER (SPROG) TO
0553* THE START OF THE PROGRAM IS CREATED AND THE PROGRAM IS SHIFTED TO
0554* HIGHER CORE TO ALLOW FOR THE COM STORAGE.
0555*
0556  20436 006400  #ALCO CLB             SAY NO COMMON
0557  20437 075613        STB DEST          ALLOCATED YET.
0558  20440 064433        LDB PBUFF
0559  20441 075654        STB STPTR       POINTER TO FIRST STATEMENT
0560  20442 161654  ALCO1 LDA STPTR,I     SAVE STATEMENT
0561  20443 071625        STA .LNUM         NUMBER
0562  20444 035654        ISZ STPTR
0563  20445 145654        ADB STPTR,I
0564  20446 075337        STB NSPTR       POINTER TO NEXT STATEMENT
0565  20447 035654        ISZ STPTR
0566  20450 161654        LDA STPTR,I     EXTRACT
0567  20451 011054        AND OPMSK         OPERATOR
0568  20452 051132        CPA COMOP       COM STATEMENT?
0569  20453 026501        JMP ALCO2       YES
0570  20454 061613  ALCO6 LDA DEST        GET TOTAL COMMON ALLOCATED
0571  20455 002003        SZA,RSS         EXIT IF THERE WERE
0572  20456 125617        JMP ALCOM,I       NO COM STATEMENTS
0573  20457 040433        ADA PBUFF       PROGRAM BEGINNING MOVES BY
0574  20460 071643        STA SPROG         AMOUNT OF COMMON ALLOCATED.
0575  20461 007400        CCB             POINTER TO FIRST
0576  20462 044051        ADB PBPTR         WORD TO BE MOVED
0577  20463 060001        LDA 1           POINTER TO
0578  20464 041613        ADA DEST          FIRST DESTINATION
0579  20465 071613        STA DEST            LOCATION
0580  20466 002004        INA             RESET END OF
0581  20467 070051        STA PBPTR         PROGRAM POINTER
0582  20470 160001  ALCO0 LDA 1,I         MOVE A
0583  20471 171613        STA DEST,I        WORD
0584  20472 054433        CPB PBUFF       DONE?
0585  20473 125617        JMP ALCOM,I     EXIT
0586  20474 044525        ADB .-1         NO--BUMP
0587  20475 003400        CCA
0588  20476 041613        ADA DEST          POINTERS
0589  20477 071613        STA DEST
0590  20500 026470        JMP ALCO0           AND LOOP
0591  20501 161654  ALCO2 LDA STPTR,I     EXTRACT
0592  20502 010545        AND .+17B         OPERAND
0593  20503 002002        SZA             STRING?
0594  20504 026515        JMP ALCO3       NO
0595  20505 035654        ISZ STPTR       YES--
0596  20506 035654        ISZ STPTR         EXTRACT
0597  20507 161654        LDA STPTR,I         LENGTH
0598  20510 002004        INA             COMPUTE
0599  20511 001100        ARS               STORAGE
0600  20512 002004        INA                 REQUIRED
0601  20513 035654        ISZ STPTR       BUMP PAST RIGHT BRACKET
0602  20514 026551        JMP ALCO7+1
```

```
0603  20515 040522  ALC03 ADA .-4
0604  20516 002020        SSA             SIMPLE VARIABLE?
0605  20517 026522        JMP ALC04       NO
0606  20520 002404        CLA,INA         YES-- ALLOW TWO WORDS
0607  20521 026550        JMP ALC07
0608  20522 035654  ALC04 ISZ STPTR       MUST BE ARRAY
0609  20523 035654        ISZ STPTR
0610  20524 165654        LDB STPTR,I     EXTRACT LENGTH
0611  20525 035654        ISZ STPTR
0612  20526 161654        LDA STPTR,I     GET NEXT
0613  20527 011054        AND OPMSK         OPERATOR
0614  20530 051134        CPA SCOMM       SUBSCRIPT COMMA?
0615  20531 026534        JMP *+3         YES
0616  20532 060001        LDA 1           NO
0617  20533 026543        JMP ALC05+1
0618  20534 060001        LDA 1           COMPUTE
0619  20535 035654        ISZ STPTR         ARRAY
0620  20536 100200        MPY STPTR,I         SIZE
0621  20540 006002        SZB             TOO BIG?
0622  20541 126565        JMP CUS1A,I     YES
0623  20542 035654  ALC05 ISZ STPTR       BUMP PAST
0624  20543 000066        CLE,ELA
0625  20544 002061        SEZ,SSA,RSS     TOO BIG?
0626  20545 000035        SLA,ERA         NO
0627  20546 126565        JMP CUS1A,I     YES
0628  20547 040530        ADA .+2         ALLOW 4 WORDS FOR DIMENSIONS
0629  20550 001000  ALC07 ALS            DOUBLE EVERYTHING
0630  20551 041613        ADA DEST        UPDATE
0631  20552 071613        STA DEST          POINTER
0632  20553 041161        ADA .100
0633  20554 015427        JSB CUSP        CHECK FOR ENOUGH ROOM
0634  20555 035654        ISZ STPTR
0635  20556 065654        LDB STPTR
0636  20557 055337        CPB NSPTR       END OF STATEMENT
0637  20560 002001        RSS             YES
0638  20561 026501        JMP ALC02       NO
0639  20562 054051        CPB PBPTR       END OF PROGRAM?
0640  20563 026454        JMP ALC06       YES
0641  20564 026442        JMP ALC01       NO
0642*
0643  20565 016057  CUS1A DEF CUSP1
0644**                                      **
0645***  ADVANCE SYNTAX BUFFER POINTER      ***
0646**                                      **
0647*
0648*  (A) AND (B) REMAIN AS UPON E^RY
0649*
0650  20566 071407  #SBPU STA SBT0         SAVE (A)
0651  20567 035640        ISZ SBPTR       ADVANCE POINTER
0652  20570 061640        LDA SBPTR       BUFFER
0653  20571 051571        CPA SYNTQ         OVERFLOW?
0654  20572 115232        JSB SERRS+31,I  YES
0655  20573 061407        LDA SBT0        NO, RETRIEVE (A)
0656  20574 125371        JMP SBPUD,I
0657**                                  **
0658***  DEMAND A LEFT PARENTHESIS  ***
```

```
0659**                                  **
0660*
0661*  INSIST CHARACTER IN (A) BE '(' OR ')'.  RECORD IT
0662*  AS A '('.
0663*
0664   20575 064524  #LPCK LDB .-2          '('
0665   20576 015373         JSB SYMCK         OR
0666   20577 015353         DEF LBRAC-1         ')' ?
0667   20600 115221         JSB SERRS+22,I   NO
0668   20601 061014         LDA LPOP        YES, RECORD
0669   20602 171640         STA SBPTR,I       A '('
0670   20603 125353         JMP LPCK,I
```

```
0002*
0003* ***************************
0004****                         ***
0005***  EXECUTE THE PROGRAM   ***
0006****                         ***
0007* ***************************
0008*
0009*
0010*  THE CORE-RESIDENT FILE BUFFERS FOLLOW THE VALUE TABLE:  ONE
0011*  64-WORD BLOCK OF CORE IS ALLOCATED FOR EACH FILE REQUESTED
0012*  IN THE <FILES STATEMENT>.  FIVE STACKS EXIST DURING EXECUTION:
0013*  SINCE STACK POINTERS ARE ASSUMED TO REFERENCE THE TOPMOST
0014*  ENTRY IN THEIR STACK THEY ARE INITIALLY SET ONE ENTRY BELOW
0015*  THE PHYSICAL START OF THE STACK; THUS THE FIRST ENTRY ADVANCES
0016*  A STACK POINTER TO THE FIRST WORD OF ITS STACK SPACE.  GOSUBS
0017*  QUEUE THEIR RETURN ADDRESSES IN THE RETURN STACK, WHICH HAS A
0018*  FIXED LENGTH OF NINE WORDS ALLOCATED IMMEDIATELY FOLLOWING
0019*  THE FILE BUFFERS.  THE FOR-STACK (SIX-WORD ENTRIES) CONTAINS
0020*  ALL INFORMATION PERTAINING TO ACTIVE FOR-NEXT LOOPS; INITIALLY
0021*  EMPTY, ITS CORE SPACE IS ALLOCATED DYNAMICALLY AS NEEDED.  THE
0022*  TEMPORARY STACK HOLDS INTERMEDIATE RESULTS DURING FORMULA
0023*  EVALUATION; IT IS INITIALIZED TO HOLD TEN TEMPORARIES AND
0024*  EXPANDS DYNAMICALLY AS NECESSARY.  THE OPERAND AND OPERATOR
0025*  STACKS FOLLOW WITH THEIR ONE-WORD ENTRIES OCCUPYING ALTERNATE
0026*  LOCATIONS, EXPANDING INTO FREE USER SPACE ON A DEMAND BASIS.
0027*  THE TOP OF THE OPERATOR STACK, ALWAYS AT LEAST ONE WORD AHEAD
0028*  OF THE OPERAND STACK, IS PBPTR SO THAT ALL ACTIVE USER SPACE
0029*  IS KEPT WITHIN THE SWAP REGION.  SINCE ALL STACKS EXCEPT THE
0030*  RETURN STACK EXPAND DYNAMICALLY, STATIC AND DYNAMIC NESTING
0031*  OF FORMULAS AND FOR-NEXT LOOPS IS FREELY PERMITTED UP TO
0032*  THE EXHAUSTION OF USER SPACE.
0033*
0034**                           **
0035***  INITIALIZE EXECUTION  ***
0036**                           **
0037*
0038*  PRINT THE PROGRAM NAME.  INITIALIZE FILE STATUS INFORMATION
0039*  IN THE FILE TABLE AND NOTIFY USER OF ANY REQUESTED FILES
0040*  WHICH ARE READ-ONLY.  ALLOCATE A 64 WORD BUFFER FOR EACH FILE.
0041*  ALLOCATE RUN-TIME STACKS, INITIALIZE POINTERS TO THE DATA BLOCK,
0042*  AND MOVE TO A FRESH TELETYPE LINE.
0043*
0044  20604 002400  XEC   CLA            BLOCK
0045  20605 170401        STA DCLC1,I      CLOCK
0046  20606 114642        JSB ABCK,I     ANY ABORTS?
0047  20607 160402        LDA DCLC2,I     NO--UNBLOCK
0048  20610 170401        STA DCLC1,I      CLOCK
0049  20611 060051        LDA PBPTR       SET POINTER TO LAST WORD +1
0050  20612 071333        STA FCORE         OF FIXED TABLES
0051  20613 061626        LDA LMSK       SAVE THE CHAIN                  XJ
0052  20614 010267        AND CHNFG        FLAG                          XJ
0053  20615 071353        STA TEMP2                                      XJ
0054  20616 002003        SZA,RSS        WAS THIS PROGRAM                XJ
0055  20617 026626        JMP XEC01      CHAINED TO?                     XJ
0056  20620 103100        CLF 0          YES                             XJ
0057  20621 061627        LDA CMSK       CLEAR CHAIN FLAG                XJ
```

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O@FD //81 #/7  L@HM DWDBTSHNM KNNO

0058  20622 010267          AND CHNFG                                        X]
0059  20623 070267          STA CHNFG                                          [
0060  20624 102100          STF 0                                            X]
0061  20625 026643          JMP XEC0
0062*
0063  20626 060540  XEC01 LDA .+12B      ECHO
0064  20627 015553          JSB OUTCR       LINE FEED
0065  20630 061634          LDA LNAME
0066  20631 071527          STA LT1
0067  20632 040527          ADA .+?NAME-?ID
0068  20633 160000          LDA 0,I
0069  20634 010353          AND INF
0070  20635 002003          SZA,RSS           NAME?
0071  20636 026643          JMP XEC0        YES
0072  20637 006400          CLB             NO
0073  20640 075375          STB LT2         OUTPUT
0074  20641 060523          LDA .-3           PROGRAM
0075  20642 015561          JSB OUTST           NAME
0076  20643 002400  XEC0  CLA               ZERO
0077  20644 071601          STA FCNTR         FILE COUNTER
0078  20645 071343          STA RTNST           AND MESSAGE FLAG
0079  20646 071646          STA ENOUF       TURN OFF OVER/UNDERFLOW
0080  20647 065603          LDB FILTB       LOAD ADDRESS OF FILE TABLE
0081  20650 055642  XEC2  CPB VALTB       DONE?
0082  20651 026702          JMP XEC4        YES
0083  20652 035601          ISZ FCNTR       NO, COUNT FILE
0084  20653 060270          LDA HFLAG     IF HELLO PROGRAM                   [
0085  20654 011626          AND LMSK        IS RUNNING                       [
0086  20655 031353          IOR TEMP2         OR PROGRAM WAS CHAINED TO
0087  20656 002002          SZA              THEN DO NOT PRINT READ ONLY MES
0088  20657 026663          JMP XEC3        YES
0089  20660 160001          LDA 1,I         READ
0090  20661 002020          SSA               ONLY?
0091  20662 026744          JMP XEC5        YES
0092  20663 003400  XEC3  CCA               NO
0093  20664 044530          ADB .+2         SET NULL
0094  20665 170001          STA 1,I           RECORD ADDRESS
0095  20666 044530          ADB .+2         ALLOCATE
0096  20667 060627          LDA B200          128 WORD
0097  20670 015427          JSB CUSP            BUFFER FOR
0098  20671 070051          STA PBPTR             THE FILE
0099  20672 170001          STA 1,I         SET
0100  20673 006004          INB               'RECORD FULL'
0101  20674 170001          STA 1,I             CONDITION
0102  20675 006004          INB             SET
0103  20676 002400          CLA               'NO EOF EXIT'
0104  20677 170001          STA 1,I             CONDITION
0105  20700 006004          INB
0106  20701 026650          JMP XEC2
0107  20702 061353  XEC4  LDA TEMP2
0108  20703 002002          SZA             WAS THIS PROGRAM CHAINED TO?
0109  20704 026713          JMP XEC8        YES
0110  20705 060543          LDA .+15B       NO, OUTPUT A
0111  20706 015553          JSB OUTCR         CARRIAGE RETURN
0112  20707 060540          LDA .+12B           AND
0113  20710 015553          JSB OUTCR             TWO
```

```
0114  20711 060540         LDA .+12B             LINE FEEDS
0115  20712 015553         JSB OUTCR
0116  20713 064051  XEC8   LDB PBPTR
0117  20714 044525         ADB .-1          SET POINTERS TO
0118  20715 075341         STB RTRNQ          TOP AND BOTTOM
0119  20716 075343         STB RTNST            OF RETURN STACK
0120  20717 044532         ADB .+4          SET
0121  20720 075347         STB FORQ           EXECUTION
0122  20721 015531         JSB SETPT            POINTERS
0123  20722 065643         LDB SPROG        SET POINTERS TO
0124  20723 015457         JSB SETDP          FIRST <DATA STATEMENT>
0125*                       *
0126**  EXECUTE STATEMENT  **
0127*                       *
0128*
0129*  SAVE SEQUENCE NUMBER FOR POSSIBLE USE BY ERROR ROUTINE.
0130*  ADVANCE PROGRAM COUNTER TO NEXT STATEMENT AND BRANCH TO
0131*  CODE FOR EXECUTION OF CURRENT STATEMENT.
0132*
0133  20724 065435  XEC1   LDB PRGCT         SAVE CURRENT
0134  20725 160001         LDA 1,I            SEQUENCE
0135  20726 071625         STA .LNUM            NUMBER
0136  20727 060001         LDA 1            COMPUTE
0137  20730 002004         INA                ADDRESS
0138  20731 144000         ADB 0,I              OF NEXT
0139  20732 075435         STB PRGCT              STATEMENT
0140  20733 002004         INA              SET INTRA-
0141  20734 071647         STA TEMP1          STATEMENT POINTER
0142  20735 161647         LDA TEMP1,I      COMPUTE
0143  20736 011054         AND OPMSK          BRANCH
0144  20737 001727         ALF,ALF              ADDRESS
0145  20740 001300         RAR                    FOR CURRENT
0146  20741 040754         ADA XECBR                STATEMENT TYPE
0147  20742 071335         STA FILE#        SET 'NO FILE' FLAG
0148  20743 124000         JMP 0,I          BRANCH TO APPROPRIATE ROUTINE
0149*                           *
0150**  OUTPUT READ-ONLY WARNING  **
0151*                           *
0152  20744 075341  XEC5   STB RTRNQ        SAVE (B)
0153  20745 064352         LDB MLINK+1
0154  20746 044515         ADB .+?ID-?LINK
0155  20747 160001         LDA 1,I          GET ID
0156  20750 010447         AND M2000        IS IT
0157  20751 051002         CPA A000           AN 'A'?
0158  20752 026766         JMP XEC7         YES
0159  20753 035343         ISZ RTNST        NO, FIRST TIME THROUGH?
0160  20754 115320         JSB WERRS+8,I    YES, EMIT MESSAGE
0161  20755 003400         CCA              SET FLAG FOR
0162  20756 071343         STA RTNST          MESSAGE SUPPRESSION
0163  20757 060571         LDA .+43B        OUTPUT
0164  20760 015553         JSB OUTCR          A '#'
0165  20761 061601         LDA FCNTR        OUTPUT
0166  20762 040606         ADA .+60B        OUTPUT DIGIT
0167  20763 015553         JSB OUTCR
0168  20764 060566         LDA .+40B        OUTPUT
0169  20765 015553         JSB OUTCR          BLANK
```

```
0170  20766 065341  XEC7  LDB RTRNQ      RETRIEVE (B)
0171  20767 026663        JMP XEC3
```

```
0173*
0174***                              **
0175**  EXECUTE <LET STATEMENT>   **
0176***                             **
0177*
0178  20770 002404  ELET   CLA,INA        ALLOW STRING CONSTANT
0179  20771 071571         STA EOL          IN FORMULA
0180  20772 015437         JSB FORMX      EVALUATE
0181  20773 026724         JMP XEC1         FORMULA
0182*
0183***                              **
0184**  EXECUTE <IF STATEMENT>   **
0185***                             **
0186*
0187  20774 035647  EIF1   ISZ TEMP1      EVALUATE
0188  20775 015605         JSB VLFIL        FILE REQUEST
0189  20776 035337         ISZ FBASE      TRANSFER
0190  20777 035647         ISZ TEMP1        EOF LABEL
0191  21000 165647         LDB TEMP1,I        TO
0192  21001 175337         STB FBASE,I          FILE TABLE
0193  21002 026724         JMP XEC1
0194  21003 104200  EIF    DLD TEMP1,I    EOF
0195  21005 055040         CPB ENDOP
0196  21006 002020         SSA              OPERATOR?
0197  21007 002405         CLA,INA,RSS    NO
0198  21010 026774         JMP EIF1       YES
0199  21011 071571         STA EOL        ALLOW STRING CONSTANT
0200  21012 015455         JSB FETCH      EVALUATE DECISION FORMULA
0201  21013 002003         SZA,RSS        RESULTANT 'TRUE' ?
0202  21014 026724         JMP XEC1       NO
0203*
0204***                               **
0205**  EXECUTE <GO TO STATEMENT>   **
0206***                              **
0207*
0208  21015 006401  EGOTO CLB,RSS          SET FLAG TO 'GOTO' MODE
0209*
0210***                               **
0211**  EXECUTE <GOSUB STATEMENT>   **
0212***                              **
0213*
0214  21016 007400  EGOSB CCB              SET FLAG TO
0215  21017 075577         STB GTMP         'GOSUB' MODE
0216  21020 065647         LDB TEMP1      COMPUTE SIMPLE BRANCH
0217  21021 006004         INB              'ADDRESS' ADDRESS
0218  21022 161647         LDA TEMP1,I    SIMPLE
0219  21023 011070         AND OPDMK        BRANCH
0220  21024 051060         CPA INTFL          STATEMENT?
0221  21025 027040         JMP EGOS1      YES
0222  21026 015455         JSB FETCH      NO, COMPUTE
0223  21027 015443         JSB SBFIX        BRANCH INDEX
0224  21030 026724         JMP XEC1       UNSUITABLE RESULT
0225  21031 045647         ADB TEMP1      COMPUTE
0226  21032 006004         INB              'ADDRESS'
0227  21033 060001         LDA 1              ADDRESS
0228  21034 003000         CMA            WITHIN
```

```
0229  21035 041435         ADA PRGCT       STATEMENT
0230  21036 002020         SSA               RANGE?
0231  21037 026724         JMP XEC1        NO
0232  21040 164001  EGOS1   LDB 1,I         YES, LOAD BRANCH ADDRESS
0233  21041 035577         ISZ GTMP        <GOTO STATEMENT> ?
0234  21042 026725         JMP XEC1+1      YES
0235  21043 061435         LDA PRGCT       NO, STACK
0236  21044 035343         ISZ RTNST         RETURN
0237  21045 171343         STA RTNST,I         ADDRESS
0238  21046 061343         LDA RTNST       NESTING
0239  21047 040514         ADA .-10          10
0240  21050 051341         CPA RTRNQ           DEEP?
0241  21051 115253         JSB RERRS+15,I  YES
0242  21052 026725         JMP XEC1+1      NO
0243*
0244***                      **
0245**  EXECUTE <FOR STATEMENT>  **
0246***                      **
0247*
0248  21053 055351  EFOR0   CPB FORST      TOP ENTRY?
0249  21054 027110         JMP EFOR5+1     YES
0250  21055 071521         STA EFN0        NO, SAVE (A)
0251  21056 075613         STB DEST        SET DESTINATION ADDRESS
0252  21057 065351         LDB FORST       COMPUTE MOVE
0253  21060 044534         ADB .+6           TERMINATION ADDRESS
0254  21061 061613         LDA DEST        COMPUTE
0255  21062 040534         ADA .+6           SOURCE ADDRESS
0256  21063 015577         JSB MOVER       DELETE FOR-TABLE ENTRY
0257  21064 061521         LDA EFN0        RETRIEVE (A)
0258  21065 027107         JMP EFOR5
0259  21066 161647  EFOR    LDA TEMP1,I     EXTRACT
0260  21067 010633         AND B777          AND SAVE THE
0261  21070 071527         STA FVT             FOR-VARIABLE
0262  21071 001000         ALS             COMPUTE
0263  21072 041641         ADA SYMTB         ADDRESS
0264  21073 040525         ADA .-1             OF ITS
0265  21074 160000         LDA 0,I               VALUE
0266  21075 065351         LDB FORST       LOAD POINTER TO FOR-STACK
0267  21076 055347  EFOR1   CPB FORQ        AT BOTTOM OF FOR-STACK?
0268  21077 027104         JMP EFOR2       YES
0269  21100 150001         CPA 1,I         NO, ENTRY FOR THIS FOR-VARIABLE?
0270  21101 027053         JMP EFOR0       YES
0271  21102 044520         ADB .-6         NO, CHECK
0272  21103 027076         JMP EFOR1         LOWER ENTRY
0273  21104 065351  EFOR2   LDB FORST       MOVE TO SPACE
0274  21105 044534         ADB .+6           FOR ENTRY
0275  21106 015531         JSB SETPT       RESET EXECUTION POINTERS
0276  21107 171351  EFOR5   STA FORST,I     SAVE ADDRESS OF VALUE IN ENTRY
0277  21110 015437         JSB FORMX       INITIALIZE FOR-VARIABLE
0278  21111 061351         LDA FORST       SAVE POINTERS TO
0279  21112 002004         INA               ENTRY FOR
0280  21113 071521         STA EFN0            LIMIT VALUE
0281  21114 040530         ADA .+2               AND
0282  21115 071523         STA EFN1                STEP SIZE
0283  21116 040530         ADA .+2         SAVE ADDRESS OF
0284  21117 065435         LDB PRGCT         FOLLOWING STATEMENT
```

```
0285  21120 174000         STB 0,I          IN ENTRY
0286  21121 015455         JSB FETCH      COMPUTE AND SAVE
0287  21122 104400         DST EFN0,I       LIMIT VALUE
0288  21124 061647         LDA TEMP1      IMPLICIT
0289  21125 051435         CPA PRGCT        STEP SIZE?
0290  21126 027163         JMP EFOR6      YES
0291  21127 015455         JSB FETCH      NO, COMPUTE STEP SIZE
0292  21130 104400 EFOR3   DST EFN1,I       AND SAVE VALUE
0293  21132 006400         CLB            SET SIGN FLAG
0294  21133 002020         SSA              TO -1 FOR
0295  21134 007400         CCB                NEGATIVE STEP SIZE,
0296  21135 075525         STB EFN2             0 FOR POSITIVE STEP SIZE
0297  21136 035435         ISZ PRGCT      LOAD
0298  21137 065435         LDB PRGCT        TYPE WORD OF
0299  21140 006004 EFOR4   INB                STATEMENT FOLLOWING
0300  21141 160001         LDA 1,I              THE <FOR STATEMENT>
0301  21142 071465         STA EFN3       SAVE IT
0302  21143 044525         ADB .-1        COMPUTE POINTER
0303  21144 144001         ADB 1,I          TO ITS SUCCESSOR
0304  21145 011054         AND OPMSK      <NEXT
0305  21146 051036         CPA NXTOP        STATEMENT> ?
0306  21147 002001         RSS            YES
0307  21150 027140         JMP EFOR4      NO
0308  21151 021465         XOR EFN3       SAME
0309  21152 051527         CPA FVT          FOR-VARIABLE?
0310  21153 002001         RSS            YES
0311  21154 027140         JMP EFOR4      NO
0312  21155 044525         ADB .-1        SET PROGRAM COUNTER
0313  21156 075435         STB PRGCT        PAST <NEXT STATEMENT>
0314  21157 165351         LDB FORST,I    LOAD
0315  21160 104200         DLD 1,I          INITIAL VALUE OF
0316  21162 027225         JMP ENEX3          FOR-VARIABLE
0317  21163 061165 EFOR6   LDA HALF       LOAD
0318  21164 064530         LDB .+2          DEFAULT
0319  21165 027130         JMP EFOR3          OF 1.0
0320*
0321***                      **
0322**  EXECUTE <NEXT STATEMENT>  **
0323***                      **
0324*
0325  21166 161647 ENEXT   LDA TEMP1,I    EXTRACT
0326  21167 010633         AND B777         FOR-VARIABLE
0327  21170 001000         ALS            COMPUTE
0328  21171 041641         ADA SYMTB        ADDRESS
0329  21172 040525         ADA .-1            OF ITS
0330  21173 160000         LDA 0,I              VALUE
0331  21174 065351         LDB FORST      LOAD POINTER TO FOR-STACK
0332  21175 055347 ENEX1   CPB FORQ       BOTTOM OF STACK?
0333  21176 026724         JMP XEC1       YES, IGNORE STATEMENT
0334  21177 150001         CPA 1,I        NO, MATCHING ENTRY?
0335  21200 027203         JMP ENEX2      YES
0336  21201 044520         ADB .-6        NO,CHECK
0337  21202 027175         JMP ENEX1        LOWER ENTRY
0338  21203 071523 ENEX2   STA EFN1       SAVE FOR-VARIABLE VALUE ADDRESS
0339  21204 055351         CPB FORST      TOP ENTRY OF FOR-STACK?
0340  21205 027210         JMP *+3        YES
```

```
0341  21206 015531         JSB SETPT      NO, RESET
0342  21207 065351         LDB FORST        EXECUTION POINTERS
0343  21210 006004         INB            SAVE ADDRESS
0344  21211 075521         STB EFN0         OF LIMIT VALUE
0345  21212 044530         ADB .+2
0346  21213 060524         LDA .-2        SET SIGN FLAG TO SAY
0347  21214 071525         STA EFN2         POSITIVE STEP SIZE
0348  21215 104200         DLD 1,I        LOAD STEP SIZE
0349  21217 002020         SSA            POSITIVE?
0350  21220 035525         ISZ EFN2       NO, RESET SIGN FLAG
0351  21221 015501         JSB .FAD       ADD STEP SIZE
0352  21222 101523         DEF EFN1,I       TO VALUE OF FOR-VARIABLE
0353  21223 104400         DST EFN1,I     SAVE NEW VALUE
0354  21225 015503  ENEX3  JSB .FSB       SUBTRACT
0355  21226 101521         DEF EFN0,I       LIMIT VALUE
0356  21227 035525         ISZ EFN2       IF STEP SIZE POSITIVE,
0357  21230 001600         ELA              INVERT SIGN OF RESULT
0358  21231 002020         SSA            LIMIT VALUE EXCEEDED?
0359  21232 027237         JMP ENEX4      YES
0360  21233 061351         LDA FORST      NO, LOAD ADDRESS
0361  21234 040533         ADA .+5          OF STATEMENT
0362  21235 164000         LDB 0,I            FOLLOWING THE
0363  21236 026725         JMP XEC1+1           <FOR STATEMENT>
0364  21237 065351  ENEX4  LDB FORST      REMOVE
0365  21240 044520         ADB .-6          ENTRY FROM
0366  21241 015531         JSB SETPT          FOR-STACK
0367  21242 026724         JMP XEC1       SKIP PAST <NEXT STATEMENT>
0368*
0369***                                **
0370**  EXECUTE <RETURN STATEMENT>   **
0371***                               **
0372*
0373  21243 061343  ERTRN  LDA RTNST      RETURN STACK
0374  21244 051341         CPA RTRNQ        EMPTY?
0375  21245 115254         JSB RERRS+16,I   YES
0376  21246 164000         LDB 0,I        NO, POP
0377  21247 040525         ADA .-1          RETURN ADDRESS
0378  21250 071343         STA RTNST          FROM STACK
0379  21251 026725         JMP XEC1+1
0380*
0381***                              **
0382**  EXECUTE <INPUT STATEMENT>   **
0383***                             **
0384*
0385  21252 002400  EINPT  CLA            TURN OFF
0386  21253 071617         STA MCNT         MATRIX INPUT COUNTER
0387  21254 071557  EINP1  STA INITF      SAVE ADDRESS FLAG
0388  21255 002400         CLA            REQUEST
0389  21256 071571         STA SYNTQ        FIRST
0390  21257 015545         JSB INCAL          INPUT RECORD
0391  21260 035521  EINP2  ISZ IFCNT      COUNT INPUT QUANTITY
0392  21261 003400         CCA            MATRIX
0393  21262 051557         CPA INITF        INPUT?
0394  21263 027274         JMP EINP3      YES
0395  21264 015437         JSB FORMX      NO, EVALUATE NEXT ADDRESS
0396  21265 165433         LDB OPDST,I    IS IT A
```

```
0397  21266 006020         SSB              STRING VARIABLE?
0398  21267 027400         JMP EIN13        YES
0399  21270 061433         LDA OPDST        NO,
0400  21271 040524         ADA .-2            UNSTACK
0401  21272 071433         STA OPDST            ADDRESS
0402  21273 075640         STB SBPTR        SAVE DESTINATION ADDRESS
0403  21274 002400 EINP3   CLA              SET SIGN
0404  21275 071367         STA SIGN           TO POSITIVE
0405  21276 071453         STA INTMP        FLAG REQUEST FOR NUMBER
0406  21277 027303         JMP EINP4
0407  21300 075367         STB SIGN         RESET SIGN TO POSITIVE
0408  21301 015545         JSB INCAL
0409  21302 035521         ISZ IFCNT        FETCH
0410  21303 015547 EINP4   JSB GETCR          FIRST
0411  21304 027301         JMP *-3              CHARACTER
0412  21305 007400         CCB              TURN OFF
0413  21306 075573         STB SERR           OVER/UNDERFLOW FLAG
0414  21307 050603         CPA .+45         '-' ?
0415  21310 027365         JMP EIN11        YES
0416  21311 006404         CLB,INB          NO
0417  21312 050601         CPA .+43         '+' ?
0418  21313 027365         JMP EIN11        YES
0419  21314 015377 EINP5   JSB NUMCK        NO, NUMBER?
0420  21315 027350         JMP EINP7        NO
0421  21316 027354         JMP EINP8        BAD EXPONENT
0422  21317 064566 EINP6   LDB .+40B        TURN ON
0423  21320 075637         STB BLANK          BLANK SUPPRESSION
0424  21321 035617         ISZ MCNT         MATRIX COMPLETED?
0425  21322 002001         RSS              NO
0426  21323 125137         JMP MIOEN,I      YES
0427  21324 065647 EINP0   LDB TEMP1        <INPUT STATEMENT>
0428  21325 055435         CPB PRGCT          SATISFIED?
0429  21326 027371         JMP EIN12        YES
0430  21327 035573         ISZ SERR         DID OVER/UNDERFLOW OCCUR?
0431  21330 027335         JMP EINP9        YES
0432  21331 050543         CPA .+15B        NO, END OF INPUT RECORD?
0433  21332 027257         JMP EINP2-1      YES
0434  21333 050602         CPA .+54B        NO, COMMA NEXT?
0435  21334 027344         JMP EIN10        YES
0436  21335 115310 EINP9   JSB WERRS,I      NO
0437  21336 065521         LDB IFCNT        OUTPUT NEXT
0438  21337 006004         INB                ITEM
0439  21340 015555         JSB OUTIN            NUMBER
0440  21341 060543         LDA .+15B        OUTPUT
0441  21342 015553         JSB OUTCR          CARRIAGE RETURN
0442  21343 027257         JMP EINP2-1
0443  21344 015547 EIN10   JSB GETCR        END OF INPUT RECORD?
0444  21345 027335         JMP EINP9        YES
0445  21346 015551         JSB BCKSP        NO
0446  21347 027260         JMP EINP2
0447  21350 050570 EINP7   CPA .+42B        " ?
0448  21351 027354         JMP EINP8        YES
0449  21352 055367         CPB SIGN         NO, SIGN FOUND?
0450  21353 027303         JMP EINP4        NO, IGNORE CHARACTER
0451  21354 115310 EINP8   JSB WERRS,I      YES
0452  21355 065521         LDB IFCNT        OUTPUT
```

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0453  21356 015555          JSB OUTIN       ITEM NUMBER
0454  21357 060543          LDA .+15B      OUTPUT
0455  21360 015553          JSB OUTCR        CARRIAGE RETURN
0456  21361 006400          CLB            NUMBER
0457  21362 055453          CPB INTMP        REQUESTED?
0458  21363 027300          JMP EINP4-3    YES
0459  21364 027414          JMP EIN14      NO
0460  21365 075367  EIN11    STB SIGN       SAVE SIGN
0461  21366 015547          JSB GETCR
0462  21367 027354          JMP EINP8      OUT-OF-DATA ERROR
0463  21370 027314          JMP EINP5
0464  21371 050543  EIN12    CPA .+15B      END OF RECORD?
0465  21372 002401          CLA,RSS        YES
0466  21373 115317          JSB WERRS+7,I  NO
0467  21374 071636          STA CHRCT      ZERO CHARACTER COUNT
0468  21375 060540          LDA .+12B      OUTPUT A
0469  21376 015553          JSB OUTCR        LINE FEED
0470  21377 026724          JMP XEC1
0471  21400 007000  EIN13    CMB            EXTRACT
0472  21401 160001          LDA 1,I          PHYSICAL
0473  21402 001727          ALF,ALF            LENGTH OF
0474  21403 010630          AND B377             DESTINATION STRING
0475  21404 003000          CMA            SET IT AS END
0476  21405 141431          ADA TMPST,I      OF UNSPECIFIED
0477  21406 071507          STA TPRME          DESTINATION STRING
0478  21407 003400          CCA            PREPARE
0479  21410 015445          JSB PSTR         DESTINATION STRING
0480  21411 065505          LDB TNULL      SAVE LENGTH
0481  21412 075453          STB INTMP        ALLOWANCE
0482  21413 027416          JMP *+3
0483  21414 015545  EIN14    JSB INCAL
0484  21415 035521          ISZ IFCNT      FETCH
0485  21416 015547          JSB GETCR        FIRST
0486  21417 027414          JMP *-3            CHARACTER
0487  21420 007400          CCB            TURN OFF
0488  21421 075573          STB SERR         OVER/UNDERFLOW FLAG
0489  21422 050570          CPA .+42B      " ?
0490  21423 002001          RSS            YES
0491  21424 015551          JSB BCKSP      NO, STRING BEGINS HERE
0492  21425 006400  EIN17    CLB            TURN OFF
0493  21426 075637          STB BLANK        BLANK SUPPRESSION
0494  21427 060772          LDA FINCA      POINT TO INPUT BUFFER
0495  21430 015447          JSB TRSTR      TRANSFER STRING
0496  21431 006400          CLB            ALL REQUESTED
0497  21432 055505          CPB TNULL        CHARACTERS TRANSFERRED?
0498  21433 027457          JMP EIN21      YES
0499  21434 055563          CPB PS1        NO, TRANSFER LENGTH SPECIFIED?
0500  21435 027453          JMP EIN20      NO
0501  21436 071453          STA INTMP      YES, SAVE (A)
0502  21437 003400          CCA            FINISH
0503  21440 071507          STA TPRME
0504  21441 041505          ADA TNULL        TRANSFER
0505  21442 071505          STA TNULL
0506  21443 060770          LDA FSCHA          WITH BLANKS
0507  21444 015447          JSB TRSTR
0508  21445 061453          LDA INTMP      RESTORE (A)
```

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0509  21446 050543  EIN18 CPA .+158      TRANSFER ENDED BY END-OF-INPUT?
0510  21447 027317        JMP EINP6      YES
0511  21450 015547  EIN19 JSB GETCR      NO, WAS A "
0512  21451 000000        NOP            EXIT WITH
0513  21452 027317        JMP EINP6        NEXT CHARACTER
0514  21453 165361  EIN20 LDB TEMP6,I    SET LOGICAL
0515  21454 045505        ADB TNULL        TO ACTUAL
0516  21455 175361        STB TEMP6,I        STRING LENGTH
0517  21456 027446        JMP EIN18
0518  21457 055563  EIN21 CPB PS1        LENGTH OF TRANSFER SPECIFIED?
0519  21460 027466        JMP EIN15      NO
0520  21461 015547  EIN16 JSB GETCR      YES
0521  21462 027317        JMP EINP6      IMPLIED CLOSING QUOTE
0522  21463 050570        CPA .+42B      " ?
0523  21464 027450        JMP EIN19      YES
0524  21465 027461        JMP EIN16      NO, LOOK FOR " OR END-OF-INPUT
0525  21466 015547  EIN15 JSB GETCR      END-OF-INPUT NEXT?
0526  21467 027317        JMP EINP6      YES
0527  21470 050570        CPA .+42B      NO, CLOSING " ?
0528  21471 027450        JMP EIN19      YES
0529  21472 061453        LDA INTMP      NO, DESTINATION STRING EXCEEDED
0530  21473 071505        STA TNULL      RESTORE
0531  21474 061640        LDA SBPTR        DESTINATION STRING
0532  21475 071373        STA TEMP5          PARAMETERS
0533  21476 060566        LDA .+40B
0534  21477 071637        STA BLANK      RESET DEBLANKING
0535  21500 027354        JMP EINP8
0536*
0537***                              **
0538**  EXECUTE <READ STATEMENT>   **
0539***                              **
0540*
0541  21501 015605  EREAD JSB VLFIL      LOOK FOR FILE REQUEST
0542  21502 027517        JMP EREA1      FILE REQUEST FOUND
0543  21503 015437        JSB FORMX      EVALUATE DESTINATION ADDRESS
0544  21504 161433        LDA OPDST,I    STRING
0545  21505 002020        SSA              VARIABLE?
0546  21506 027523        JMP EREA2      YES
0547  21507 071640        STA SBPTR      NO, SAVE AND
0548  21510 061433        LDA OPDST        UNSTACK
0549  21511 040524        ADA .-2            DESTINATION
0550  21512 071433        STA OPDST            ADDRESS
0551  21513 006404        CLB,INB        FETCH
0552  21514 015461        JSB FDATA        NUMBER
0553  21515 104400        DST SBPTR,I    STORE NUMBER
0554  21517 061647  EREA1 LDA TEMP1      END OF
0555  21520 051435        CPA PRGCT        STATEMENT?
0556  21521 026724        JMP XEC1       YES
0557  21522 027503        JMP EREAD+2    NO
0558  21523 064530  EREA2 LDB .+2        PREPARE
0559  21524 015461        JSB FDATA        SOURCE STRING
0560  21525 003400        CCA            PREPARE
0561  21526 015445        JSB PSTR         DESTINATION STRING
0562  21527 060770        LDA FSCHA
0563  21530 015447        JSB TRSTR      TRANSFER STRING
0564  21531 027517        JMP EREA1
```

```
0565*
0566***                              **
0567**  EXECUTE <PRINT STATEMENT>    **
0568***                              **
0569*
0570  21532 015605  EPRIN JSB VLFIL     VALIDATE FILE REQUEST
0571  21533 027672        JMP EPRI3
0572  21534 027544        JMP EPRI2+1   NO FILE REQUEST FOUND
0573  21535 061335  EPRI1 LDA FILE#     FILE
0574  21536 002021        SSA,RSS         MODE?
0575  21537 027543        JMP EPRI2     YES
0576  21540 002400        CLA           NO, EXECUTE COMMA
0577  21541 051571        CPA EOL         UNLESS PRECEDED BY
0578  21542 015527        JSB EDELM         A 'TAB' (EOL = 1)
0579  21543 003401  EPRI2 CCA,RSS       TURN OFF 'END-OF-LINE' FLAG
0580  21544 002400        CLA           TURN ON
0581  21545 071571        STA EOL         'END-OF-LINE' FLAG
0582  21546 161647  EPRI3 LDA TEMP1,I   EXTRACT
0583  21547 011070        AND OPDMK       NEXT OPERAND
0584  21550 002002        SZA           NULL?
0585  21551 027575        JMP EPRI5     NO, BEGINS FORMULA
0586  21552 035647        ISZ TEMP1     YES
0587  21553 065647  EPRI4 LDB TEMP1     STATEMENT
0588  21554 055435        CPB PRGCT       FINISHED?
0589  21555 027667        JMP EPRI2     YES
0590  21556 161647        LDA TEMP1,I   NO, EXTRACT
0591  21557 011054        AND OPMSK       NEXT OPERATOR
0592  21560 051002        CPA B2000     COMMA?
0593  21561 027535        JMP EPRI1     YES
0594  21562 051004        CPA B3000     NO, SEMICOLON?
0595  21563 027543        JMP EPRI2     YES
0596  21564 051000        CPA B1000     NO, " ?
0597  21565 027621        JMP EPRI8     YES
0598  21566 051040        CPA ENDOP     NO, 'END' ?
0599  21567 027661        JMP EPRI1     YES
0600  21570 002003        SZA,RSS       NO, NULL?
0601  21571 027546        JMP EPRI3     YES
0602  21572 003400        CCA           NO, MUST BE FORMULA
0603  21573 041647        ADA TEMP1     RESET TO PRIOR
0604  21574 071647        STA TEMP1       NULL OPERAND
0605  21575 003400  EPRI5 CCA           TURN OFF
0606  21576 071571        STA EOL         'TAB' FLAG
0607  21577 015437        JSB FORMX     EVALUATE FORMULA
0608  21600 165433        LDB OPDST,I   IS IT A
0609  21601 006020        SSB             STRING VARIABLE?
0610  21602 027622        JMP EPRI8+1   YES
0611  21603 015475        JSB OPCHK     NO, UNSTACK VALUE ADDRESS
0612  21604 061335        LDA FILE#     TO BE WRITTEN
0613  21605 002021        SSA,RSS         ON A FILE?
0614  21606 027615        JMP EPRI7     YES
0615  21607 035571        ISZ EOL       NO, A 'TAB' ?
0616  21610 027553        JMP EPRI4     YES (EOL = 1 NOW)
0617  21611 104200        DLD 1,I       NO, OUTPUT
0618  21613 015517        JSB ENOUT       A NUMBER
0619  21614 027553        JMP EPRI4
0620  21615 075640  EPRI7 STB SBPTR     SAVE VALUE ADDRESS
```

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0621  21616 064524          LDB .-2         WRITE NUMBER
0622  21617 015611          JSB FILST         ON FILE
0623  21620 027553          JMP EPRI4
0624  21621 015441  EPRI8    JSB STSTR       STACK STRING CONSTANT
0625  21622 060524          LDA .-2         PREPARE
0626  21623 015445          JSB PSTR          PRINT
0627  21624 071357          STA TEMP4           STRING
0628  21625 075507          STB TPRME
0629  21626 064523          LDB .-3         PRESET TO WRITE ON FILE
0630  21627 061335          LDA FILE#       TO BE WRITTEN
0631  21630 002021          SSA,RSS           ON A FILE?
0632  21631 027617          JMP EPRI7+2     YES
0633  21632 002400          CLA             NO, TURN ON
0634  21633 071571          STA EOL           'END-OF-LINE' FLAG
0635  21634 061505          LDA TNULL       ENOUGH
0636  21635 003004          CMA,INA           SPACE
0637  21636 041636          ADA CHRCT           ON
0638  21637 040455          ADA M74               CURRENT
0639  21640 002021          SSA,RSS                 LINE?
0640  21641 015525          JSB OUTLN       NO
0641  21642 027656          JMP EPRI0       YES
0642  21643 015463  EPRI9    JSB FSCH        FETCH
0643  21644 060566          LDA .+40B         CHARACTER
0644  21645 050544          CPA .+16B       PSUEDO LINE FEED?
0645  21646 060540          LDA .+12B       YES
0646  21647 050545          CPA .+17B       PSUEDO CARRIAGE RETURN?
0647  21650 002001          RSS             YES
0648  21651 027655          JMP EPRI0-1     NO
0649  21652 060543          LDA .+15B       OUTPUT
0650  21653 015553          JSB OUTCR         CARRIAGE RETURN
0651  21654 060630          LDA B377            AND RUBOUT
0652  21655 015553          JSB OUTCR       OUTPUT CHARACTER
0653  21656 035505  EPRI0    ISZ TNULL       MORE STRING?
0654  21657 027643          JMP EPRI9       YES
0655  21660 027553          JMP EPRI4       NO
0656  21661 071705  EPRI1    STA EORFL       FILE
0657  21662 015613          JSB GTTYP
0658  21663 050531          CPA .+3           FULL?
0659  21664 027552          JMP EPRI4-1     YES
0660  21665 007400          CCB             NO, WRITE
0661  21666 027617          JMP EPRI7+2       END-OF-FILE
0662  21667 035571  EPRI2    ISZ EOL         'END-OF-LINE' FLAG SET?
0663  21670 015525          JSB OUTLN       YES
0664  21671 026724          JMP XEC1        NO
0665  21672 044521  EPRI3    ADB .-5
0666  21673 160001          LDA 1,I         SET
0667  21674 031165          IOR BIT14         DIRTY
0668  21675 170001          STA 1,I             BIT.
0669  21676 065647          LDB TEMP1       NULL
0670  21677 055435          CPB PRGCT         PRINT?
0671  21700 026724          JMP XEC1        YES
0672  21701 027543          JMP EPRI2       NO
0001*
0002**                          **
0003***  FETCH FORMULA VALUE  ***
0004**                          **
```

```
0005*
0006*     RETURN WITH RTHE RESULT IN (A) AND (B)
0007*
0008  21702 015437  #FTCH JSB FORMX     EVALUATE FORMULA
0009  21703 015475       JSB OPCHK     UNSTACK ADDRESS
0010  21704 104200       DLD 1,I       LOAD RESULT
0011  21706 125455       JMP FETCH,I
0012***                   **
0013**  COMPLETE EXECUTION  **
0014***                   **
0015*
0016  21707          EXIT EQU *
0017  21707 103100       CLF 0
0018  21710 064261       LDB MAIN      INHIBIT
0019  21711 044535       ADB .+?TSTA
0020  21712 160001       LDA 1,I         ABORTS
0021  21713 031002       IOR UNABT
0022  21714 170001       STA 1,I
0023  21715 102100       STF 0
0024  21716 061601       LDA FCNTR     SET COUNTER TO
0025  21717 003000       CMA             1'S COMPLEMENT OF
0026  21720 071601       STA FCNTR         NUMBER OF FILES
0027  21721 061333       LDA FCORE      LOAD FIRST BUFFER ADDRESS
0028  21722 065603       LDB FILTB      LOAD POINTER TO
0029  21723 044530       ADB .+2          FIRST DISC ADDRESS
0030  21724 035601  EXIT0 ISZ FCNTR     MORE FILES?
0031  21725 027761       JMP EXIT2      YES
0032  21726 006400  EXIT3 CLB            NO, OUTPUT
0033  21727 075375       STB LT2
0034  21730 174401       STB DCLC1,I
0035  21731 114642       JSB ABCK,I    ANY ABORTS?
0036  21732 160402       LDA DCLC2,I
0037  21733 170401       STA DCLC1,I
0038  21734 063754       LDA EXIT1
0039  21735 071527       STA LT1         COMPLETION
0040  21736 060270       LDA HFLAG     CHECK E  HELLO FLAG                 XJ
0041  21737 011626       AND LMSK                                          XJ
0042  21740 006400       CLB
0043  21741 002002       SZA                MESSAGE UNLESS
0044  21742 003401       CCA,RSS
0045  21743 060522       LDA .-4
0046  21744 015561       JSB OUTST            $HELLO PROGRAM
0047  21745 064261       LDB MAIN       REMOVE 'USER
0048  21746 044535       ADB .+?TSTA      IS RUNNING'
0049  21747 160001       LDA B,I            AND 'X-OFF'
0050  21750 010515       AND RNNBT            BITS FROM HIS
0051  21751 010467       AND XONBT              I/O STATUS
0052  21752 170001       STA B,I
0053  21753 124321       JMP SCHEN,I
0054  21754 021754  EXIT1 DEF *
0055  21755 006412       OCT 6412
0056  21756 042117       ASC 2,DONE
0057  21760 006412       OCT 6412
0058  21761 075337  EXIT2 STB FBASE      WRITE
0059  21762 071704       STA RQ3          OUT
0060  21763 015615       JSB WRBUF          RECORD
```

```
0061  21764 061704          LDA RQ3       MOVE
0062  21765 040627          ADA B200       POINTERS                          XJ
0063  21766 065337          LDB FBASE         FOR NEXT
0064  21767 044535          ADB .+7             FILE
0065  21770 027724          JMP EXIT0
0066*
0067***                                  **
0068**  EXECUTE <RESTORE STATEMENT>      **
0069***                                  **
0070*
0071  21771 161647  ERSTR LDA TEMP1,I    LOAD FLAG WORD
0072  21772 035647          ISZ TEMP1     ADVANCE STATEMENT POINTER
0073  21773 065643          LDB SPROG     SET (B) TO START OF PROGRAM
0074  21774 002020          SSA           'LABELLED RESTORE'
0075  21775 165647          LDB TEMP1,I   YES, RESET (B) TO STATEMENT
0076  21776 015457          JSB SETDP     SET DATA POINTERS
0077  21777 026724          JMP XEC1
0078*
0079**                                    **
0080***  EXECUTE <CHAIN STATEMENT>       ***
0081**                                    **
0082*
0083  22000 114327  ECHAN JSB SCHLB,I    CALL SYSTEM TO EXECUTE DISC ROUT
0084  22001 036054          DEF CHLIB
0085  22002 115302          JSB RERRS+38,I
0086  22003 115303          JSB RERRS+39,I
0087  22004 115304          JSB RERRS+40,I
0088  22005 115305          JSB RERRS+41,I
```

```
0090*
0091*
0092***  EXECUTION BRANCH TABLE  ***
0093*
0094   22006 020724  XECTB DEF XEC1      COMM
0095   22007 020770        DEF ELET      LET
0096   22010 020724        DEF XEC1      DIM
0097   22011 020724        DEF XEC1      DEF
0098   22012 020724        DEF XEC1      REM
0099   22013 021015        DEF EGOTO     GOTO
0100   22014 021003        DEF EIF       IF
0101   22015 021066        DEF EFOR      FOR
0102   22016 021166        DEF ENEXT     NEXT
0103   22017 021016        DEF EGOSB     GOSUB
0104   22020 021243        DEF ERTRN     RETURN
0105   22021 021707        DEF EXIT      END
0106   22022 021707        DEF EXIT      STOP
0107   22023 020724        DEF XEC1      DATA
0108   22024 021252        DEF EINPT     INPUT
0109   22025 021501        DEF EREAD     READ
0110   22026 021532        DEF EPRIN     PRINT
0111   22027 021771        DEF ERSTR     RESTORE
0112   22030 025613        DEF EMAT      MAT
0113   22031 020724        DEF XEC1      FILES
0114   22032 022000        DEF ECHAN     CHAIN
0115   22033 020770        DEF ELET      'IMPLIED' LET
```

```
0117**                                          **
0118***  SET POINTERS TO DATA STATEMENT         ***
0119**                                          **
0120*
0121*  STARTING WITH THE STATEMENT REFERENCED BY (B) UPON
0122*  ENTRY, FIND THE NEXT <DATA STATEMENT> AND SET THE DATA
0123*  BLOCK POINTERS APPROPRIATELY.  IF NO <DATA STATEMENT>
0124*  IS FOUND, SET THE POINTERS TO THE 'OUT OF DATA'
0125*  CONFIGURATION AND EXIT WITH (A) = -1.
0126*
0127  22034 055641  #STDP CPB SYMTB     PROGRAM EXHAUSTED?
0128  22035 026053        JMP SETD2     YES, SET 'OUT OF DATA' CONDITION
0129  22036 044530        ADB .+2       NO,
0130  22037 160001        LDA 1,I         STATEMENT
0131  22040 044525        ADB .-1           OF
0132  22041 011054        AND OPMSK           TYPE
0133  22042 051042        CPA DATOP             'DATA'?
0134  22043 026047        JMP SETD1     YES
0135  22044 144001        ADB 1,I       NO, COMPUTE
0136  22045 044525        ADB .-1         ADDRESS OF
0137  22046 026034        JMP #STDP         NEXT STATEMENT
0138  22047 160001  SETD1 LDA 1,I       LOAD STATEMENT LENGTH
0139  22050 006004        INB           SET
0140  22051 003004        CMA,INA         DATA
0141  22052 002005        INA,RSS           COUNTER
0142  22053 003400  SETD2 CCA                 TO
0143  22054 071363        STA DCCNT             1-STATEMENT LENGTH
0144  22055 075345        STB NXTDT     SET POINTER ONE WORD
0145  22056 125457        JMP SETDP,I     ABOVE FIRST DATA CONSTANT
0146**                                  **
0147***  VALIDATE A FILE REQUEST        ***
0148**                                  **
0149*
0150*  EXIT TO (P+2) IF (TEMP1)+1 DOES NOT BEGIN A FILE REFERENCE;
0151*  ELSE EVALUATE THE FILE REFERENCE AND VERIFY ITS CORRESPONDENCE
0152*  WITH A REQUESTED FILE.  IF A RECORD REFERENCE IS ALSO PRESENT,
0153*  EVALUATE IT AND CALL FOR ITS SWAPPING INTO THE CORE BUFFER.
0154*
0155  22057 065647  #VLFI LDB TEMP1     IS
0156  22060 006004        INB
0157  22061 055435        CPB PRGCT       NEXT
0158  22062 026067        JMP VLFI0
0159  22063 160001        LDA 1,I           OPERATOR
0160  22064 011054        AND OPMSK
0161  22065 051126        CPA B4000           A '#' ?
0162  22066 026071        JMP VLFI1     YES
0163  22067 035605  VLFI0 ISZ VLFIL     NO, EXIT
0164  22070 125605        JMP VLFIL,I     TO (P+2)
0165  22071 007400  VLFI1 CCB           SET
0166  22072 161647        LDA TEMP1,I     VL0 = 0
0167  22073 011054        AND OPMSK         FOR
0168  22074 051046        CPA PRTOP           'PRINT',
0169  22075 006400        CLB                   ELSE
0170  22076 075615        STB VL0                 VL0 = -1
0171  22077 035647        ISZ TEMP1     EVALUATE
0172  22100 015455        JSB FETCH       FILE REFERENCE
```

```
0173  22101 015443          JSB SBFIX      15-BIT INTEGER?
0174  22102 115277          JSB RERRS+35,I  NO
0175  22103 075335          STB FILE#      YES, SAVE IT
0176  22104 161647          LDA TEMP1,I    NEXT
0177  22105 011054          AND OPMSK        OPERATOR
0178  22106 051002          CPA B2000          A COMMA?
0179  22107 026121          JMP VLFI3      YES
0180  22110 007400          CCB            NO, USE NULL RECORD
0181  22111 075621  VLFI2   STB RCRD#
0182  22112 006020          SSB            NULL RECORD?
0183  22113 064524          LDB .-2        YES, DO NOT ADJUST FILE POINTER
0184  22114 061335          LDA FILE#
0185  22115 035615          ISZ VL0        WRITE REQUEST?
0186  22116 003000          CMA            YES
0187  22117 015607          JSB RQSTR      VALIDATE FILE/RECORD REQUEST
0188  22120 125605          JMP VLFIL,I
0189  22121 015455  VLFI3   JSB FETCH      EVALUATE RECORD REFERENCE
0190  22122 015443          JSB SBFIX      15-BIT INTEGER?
0191  22123 065000          LDB B1000      NO, LOAD IMPOSSIBLE RECORD
0192  22124 026111          JMP VLFI2      YES
0193**                       **
0194***  FETCH DATA ITEM    ***
0195**                       **
0196*
0197*  UPON ENTRY (B) = 1 IF A NUMBER IS REQUESTED OR (B) = 2 IF A
0198*  STRING IS REQUESTED.  FDATA FILLS THE REQUEST FROM A FILE IF
0199*  ONE IS REFERENCED BY THE CALLER, ELSE FROM THE DATA BLOCK.
0200*  TYPE MATCH IS CHECKED.  NUMBERS RETURN IN (A) AND (B); STRINGS
0201*  ARE PREPARED AS SOURCE STRINGS.  FDATA MOVES TO NEW FILE
0202*  RECORDS OR <DATA STATEMENT>S AS NECESSARY.
0203*
0204  22125 061335  #FDAT LDA FILE#      READ FROM
0205  22126 002021          SSA,RSS        FILE?
0206  22127 026200          JMP FDAT3      YES
0207  22130 035363          ISZ DCCNT      NO, DATA IN CURRENT STATEMENT?
0208  22131 026141          JMP FDAT1      YES
0209  22132 075373          STB TEMP5      NO, SAVE (B)
0210  22133 065345          LDB NXTDT      MOVE TO NEXT
0211  22134 015457          JSB SETDP        <DATA STATEMENT>
0212  22135 065373          LDB TEMP5      RETRIEVE (B)
0213  22136 035363          ISZ DCCNT      DATA FOUND?
0214  22137 002001          RSS            YES
0215  22140 115261          JSB RERRS+21,I  NO, OUT OF DATA
0216  22141 035363  FDAT1   ISZ DCCNT      INCREMENT COUNTER
0217  22142 161345          LDA NXTDT,I    CORRECT
0218  22143 035345          ISZ NXTDT
0219  22144 005300          RBR              TYPE OF
0220  22145 020001          XOR 1
0221  22146 002020          SSA                DATA?
0222  22147 115262          JSB RERRS+22,I  NO
0223  22150 006021          SSB,RSS        YES, STRING?
0224  22151 026160          JMP FDAT2      YES
0225  22152 104200          DLD NXTDT,I    NO, LOAD NUMBER
0226  22154 035345          ISZ NXTDT      UPDATE
0227  22155 035345          ISZ NXTDT        POINTER
0228  22156 035363          ISZ DCCNT
```

```
0229  22157 125461         JMP FDATA,I
0230  22160 161345  FDAT2  LDA NXTDT,I    LOAD STRING LENGTH
0231  22161 035345         ISZ NXTDT      SET
0232  22162 065345         LDB NXTDT        START-OF-STRING
0233  22163 005000         BLS                CHARACTER
0234  22164 075357         STB TEMP4            ADDRESS
0235  22165 010630         AND B377       SET
0236  22166 003000         CMA              TRANSFER STRING
0237  22167 071507         STA TPRME          LENGTH
0238  22170 003004         CMA,INA        UPDATE
0239  22171 001100         ARS
0240  22172 064000         LDB 0
0241  22173 041345         ADA NXTDT        DATA
0242  22174 071345         STA NXTDT
0243  22175 045363         ADB DCCNT
0244  22176 075363         STB DCCNT          POINTERS
0245  22177 125461         JMP FDATA,I
0246  22200 075373  FDAT3  STB TEMP5       SAVE DATA REQUEST TYPE
0247  22201 065621         LDB RCRD#      GET TYPE
0248  22202 075705         STB EORFL        OF NEXT ITEM
0249  22203 015613         JSB GTTYP          IN FILE
0250  22204 051373         CPA TEMP5      MATCHING TYPES?
0251  22205 026223         JMP FDAT5      YES
0252  22206 050532         CPA .+4        NO, END-OF-RECORD?
0253  22207 026213         JMP FDAT4      YES
0254  22210 050531         CPA .+3        NO, END-OF-FILE?
0255  22211 002001         RSS            YES
0256  22212 115262         JSB RERRS+22,I   NO, TYPE MISMATCH
0257  22213 035337  FDAT4  ISZ FBASE       LOAD
0258  22214 165337         LDB FBASE,I      EOF/EOR ADDRESS
0259  22215 006003         SZB,RSS        NULL?
0260  22216 115301         JSB RERRS+37,I   YES, UNPROTECTED EOF/EOR
0261  22217 075435         STB PRGCT      NO
0262  22220 065351         LDB FORST      CLEAN UP
0263  22221 015531         JSB SETPT        EXECUTION STACKS
0264  22222 124750         JMP XEC1A,I
0265  22223 165337  FDAT5  LDB FBASE,I    LOAD DATA ADDRESS
0266  22224 002011         SLA,RSS        STRING?
0267  22225 026233         JMP FDAT6      YES
0268  22226 104200         DLD 1,I        NO, LOAD NUMBER
0269  22230 135337         ISZ FBASE,I    ADJUST RECORD POINTER
0270  22231 135337         ISZ FBASE,I      PAST DATA
0271  22232 125461         JMP FDATA,I
0272  22233 160001  FDAT6  LDA 1,I        LOAD STRING HEADER
0273  22234 006004         INB            SET
0274  22235 005000         BLS              SOURCE
0275  22236 075357         STB TEMP4          ADDRESS
0276  22237 005100         BRS
0277  22240 010630         AND B377       SET
0278  22241 003000         CMA              TRANSFER
0279  22242 071507         STA TPRME          LENGTH
0280  22243 003004         CMA,INA        ADJUST
0281  22244 001100         ARS              RECORD POINTER
0282  22245 044000         ADB 0              PAST
0283  22246 175337         STB FBASE,I          STRING
0284  22247 125461         JMP FDATA,I
```

```
0286**                                  **
0287***  REQUEST AN INPUT RECORD  ***
0288**                                  **
0289*
0290*  SERVICES REQUESTS FOR TELETYPE INPUT.  IF (A) = 0 EMIT A '?'
0291*  AND 'X-ON' ELSE EMIT A LINE FEED, TWO '?', AND AN 'X-ON'.
0292*
0293  22250 002002  #INCL SZA             INITIAL REQUEST?
0294  22251 026303        JMP INCL2       NO
0295  22252 061636        LDA CHRCT       YES
0296  22253 040457        ADA M72         LINE
0297  22254 002020        SSA               FULL?
0298  22255 026262        JMP INCL1       NO
0299  22256 060543        LDA .+15B       YES, OUTPUT
0300  22257 015553        JSB OUTCR         CARRIAGE RETURN
0301  22260 060540        LDA .+12B           AND
0302  22261 015553        JSB OUTCR             LINE FEED
0303  22262 060614  INCL1 LDA B77         OUTPUT
0304  22263 015553        JSB OUTCR         '?'
0305  22264 060547        LDA .+21B       OUTPUT
0306  22265 015553        JSB OUTCR         AN X-ON
0307  22266 002400        CLA             RESET
0308  22267 071636        STA CHRCT         OUTPUT CHARACTER COUNTER
0309  22270 071521        STA IFCNT           AND INPUT ITEM COUNTER
0310  22271 114322        JSB SCHIN,I   REQUEST INPUT RECORD                X]
0311  22272 003400        CCA           SET LOCA                            X]
0312  22273 141630        ADA LBUFA,I   BUFFAR                              X]
0313  22274 071635        STA BADDR     POINTER                             X]
0314  22275 015547        JSB GETCR      FIRST
0315  22276 026303        JMP INCL2        CHARACTER A
0316  22277 050531        CPA .+3            'CONTROL C' ?
0317  22300 124746        JMP EXITA,I    YES, TERMINATE EXECUTION
0318  22301 015551        JSB BCKSP      NO, RETURN
0319  22302 125545        JMP INCAL,I      TO CALLER
0320  22303 060540  INCL2 LDA .+12B      OUTPUT A
0321  22304 015553        JSB OUTCR        LINE FEED
0322  22305 060614        LDA B77            AND
0323  22306 015553        JSB OUTCR            A '?'
0324  22307 026262        JMP INCL1
0325**                                  **
0326***  SET EXECUTION POINTERS  ***
0327**                                  **
0328*
0329*  SETS POINTERS TO THOSE STACKS WHOSE LOCATION MAY CHANGE
0330*  DURING EXECUTION, USUALLY DUE TO INITIATION OR COMPLETION
0331*  OF FOR-LOOPS.
0332*
0333  22310 075351  #STPT STB FORST      SET TOP OF FOR-STACK
0334  22311 044532        ADB .+4       SET POINTER TO TOP
0335  22312 075431        STB TMPST       OF TEMPORARY STACK
0336  22313 044552        ADB .+20      SET POINTER TO TOP
0337  22314 075433        STB OPDST       OF OPERAND STACK
0338  22315 044531        ADB .+3       SET POINTER TO BOTTOM
0339  22316 075565        STB OPTRQ       OF OPERATOR STACK
0340  22317 007000        CMB           OUT
0341  22320 044654        ADB LWAUS       OF
```

```
0342  22321 006020          SSB                 STORAGE?
0343  22322 115246          JSB RERRS+10,I  YES
0344  22323 065565          LDB OPTRQ      NO, SET POINTER TO TOP
0345  22324 074051          STB PBPTR        OF OPERATOR STACK
0346  22325 125531          JMP SETPT,I
0347**                                          **
0348***  INITIALIZE FOR PROGRAM MODIFICATION  ***
0349**                                          **
0350  22326 003400  #SINI CCA           SET LOCAL                          X]
0351  22327 141630        ADA LBUFA,I  CHARACTER                          X]
0352  22330 071635        STA BADDR    POINTER                            X]
0353  22331 060566        LDA .+40B    TURN ON
0354  22332 071637        STA BLANK      BLANK SUPPRESSION
0355  22333 071521        STA GFLAG     TURN OFF INTEGER ERROR-SUPPRESS
0356  22334 125563        JMP SINIT,I
```

```
0358**                                **
0359***  EVALUATE A FORMULA  ***
0360**                                **
0361*
0362*  ENTER WITH TEMP1 POINTING TO THE FIRST OPERAND OF THE
0363*  FORMULA.  OPERATORS AND THE ADDRESSES OF OPERANDS ARE
0364*  STACKED SEPARATELY.  OPERAND ADDRESSES ARE STACKED AS
0365*  SOON AS THE OPERAND IS SCANNED.  AN OPERATOR IS NOT
0366*  STACKED WHILE THE OPERATOR ON TOP OF THE STACK HAS EQUAL
0367*  OR HIGHER PRECEDENCE, INSTEAD THE LATTER IS UNSTACKED
0368*  AND EXECUTED; THUS AN OPERATOR FORCES EXECUTION OF THOSE
0369*  PREVIOUSLY STACKED, DOWN TO THE LATEST ONE STACKED WHICH
0370*  HAS A LOWER PRECEDENCE.  THE OPERATOR STACK IS INITIALIZED
0371*  WITH AN END-OF-FORMULA (LOWEST PRECEDENCE) OPERATOR.  THE
0372*  ACTION OF OPERATORS IS IN GENERAL TO COMBINE THE TOP TWO
0373*  OPERANDS STACKED .  THE ADDRESS OF THE PARTIAL RESULT THUS
0374*  OBTAINED REPLACES THE ADDRESSES OF ITS CONSTITUENT OPERANDS
0375*  ON THE STACK (VALUES OF PARTIAL RESULTS ARE KEPT ON THE
0376*  TEMPORARY STACK).  UPON EXIT TEMP1 POINTS TO THE FIRST PROGRAM
0377*  WORD WHOSE OPERATOR DOES NOT MANIPULATE THE STACK (THIS
0378*  MAY BE AN END-OF-FORMULA, 'THEN', 'OF', ETC.).
0379*
0380  22335 015465  #FORM JSB PSHST     STACK
0381  22336 006400        CLB           BEGINNING-OF-FORMULA
0382  22337 174051        STB PBPTR,I     OPERATOR
0383*                       *
0384**  PROCESS NEXT OPERAND  **
0385*                       *
0386  22340 161647  FORM1 LDA TEMP1,I   EXTRACT
0387  22341 035647        ISZ TEMP1       NEXT
0388  22342 011070        AND OPDMK         OPERAND
0389  22343 002003        SZA,RSS       NULL OPERAND?
0390  22344 026405        JMP FORM2     YES
0391  22345 035433        ISZ OPDST     NO, BUMP POINTER
0392  22346 035433        ISZ OPDST       TO OPERAND STACK
0393  22347 002020        SSA           VARIABLE OPERAND?
0394  22350 026463        JMP FORM6     NO
0395*                                                 *
0396**  STACK NON-FUNCTION VARIABLE OPERAND ADDRESS  **
0397*                                                 *
0398*
0399*  THE ADDRESSES STACKED ARE AS FOLLOWS:  FOR SIMPLE VARIABLES,
0400*  A POINTER TO THE VALUE; FOR ARRAYS, THE BASE ADDRESS; FOR
0401*  STRING VARIABLES, THE NEGATION OF THE BASE ADDRESS.
0402*
0403  22351 040525        ADA .-1       COMPUTE
0404  22352 001000        ALS             POINTERS
0405  22353 041641        ADA SYMTB         TO SYMBOL
0406  22354 064000        LDB 0               TABLE
0407  22355 006004        INB                   ENTRY
0408  22356 160000        LDA 0,I       PROGRAMMER-
0409  22357 010545        AND .+17B       DEFINED
0410  22360 050545        CPA .+17B         FUNCTION?
0411  22361 026515        JMP FORM8     YES
0412  22362 164001        LDB 1,I       NO, LOAD VALUE POINTER
0413  22363 002002        SZA           STRING VARIABLE?
```

```
0414   22364 026404          JMP FORM2-1    NO
0415   22365 061647          LDA TEMP1      YES, END
0416   22366 051435          CPA PRGCT        OF FORMULA?
0417   22367 026374          JMP FORM0      YES
0418   22370 161647          LDA TEMP1,I    NO,
0419   22371 011054          AND OPMSK        FOLLOWED BY
0420   22372 051012          CPA LBOP           SUBSCRIPT?
0421   22373 026403          JMP FORM2-2    YES
0422   22374 075357  FORM0   STB TEMP4      NO
0423   22375 015477          JSB RSCHK      CREATE TEMPORARY
0424   22376 002400          CLA            RECORD
0425   22377 007400          CCB
0426   22400 104400          DST TMPST,I      (0,-1)
0427   22402 065357          LDB TEMP4      RETRIEVE AND
0428   22403 007004          CMB,INB          NEGATE STRING ADDRESS
0429   22404 175433          STB OPDST,I    STACK ADDRESS
0430*                          *
0431**  PROCESS NEXT OPERATOR  **
0432*                          *
0433   22405 061647  FORM2   LDA TEMP1      FORMULA
0434   22406 051435          CPA PRGCT        EXHAUSTED?
0435   22407 026423          JMP FORM3      YES
0436   22410 161647          LDA TEMP1,I    NO,
0437   22411 011054          AND OPMSK        EXTRACT
0438   22412 001727          ALF,ALF            NEXT
0439   22413 064000          LDB 0                OPERATOR
0440   22414 050530          CPA .+2        STRING CONSTANT?
0441   22415 026615          JMP FOR13      YES
0442   22416 040506          ADA .-20B      NO, NON-FORMULA
0443   22417 002020          SSA              OPERATOR?
0444   22420 006400          CLB            YES
0445   22421 040461          ADA D66        NO, NON-FORMULA
0446   22422 002021          SSA,RSS          OPERATOR?
0447   22423 006400  FORM3   CLB            YES
0448   22424 002400          CLA            NO
0449   22425 006003          SZB,RSS        END-OF-FORMULA?
0450   22426 026432          JMP *+4        YES
0451   22427 044756          ADB FOPBS      NO, LOAD OPERATOR
0452   22430 160001          LDA 1,I          INFORMATION WORD
0453   22431 010630          AND B377       SAVE
0454   22432 071353          STA TEMP2        PRIORITY
0455   22433 120001          XOR 1,I        SAVE
0456   22434 001100          ARS              INTERNAL
0457   22435 071355          STA TEMP3          NAME
0458*                                                  *
0459**  STACK PRESENT OR EXECUTE PREVIOUS OPERATOR  **
0460*                                                  *
0461   22436 160051  FORM4   LDA PBPTR,I    DOES OPERATOR
0462   22437 010630          AND B377         ON TOP
0463   22440 003000          CMA                OF STACK
0464   22441 041353          ADA TEMP2            HAVE HIGHER
0465   22442 002020          SSA                    PRIORITY?
0466   22443 026453          JMP FORM5      YES
0467   22444 061353          LDA TEMP2      NO
0468   22445 050541          CPA .+13B      CORRECT
0469   22446 002404          CLA,INA          STACK PRIORITY
```

```
0470  22447 031355         IOR TEMP3     ADD NAME
0471  22450 015465         JSB PSHST     STACK
0472  22451 170051         STA PBPTR,I     OPERATOR
0473  22452 026340         JMP FORM1
0474  22453 160051  FORM5   LDA PBPTR,I   POP
0475  22454 064524         LDB .-2         OPERATOR
0476  22455 044051         ADB PBPTR         FROM TOP
0477  22456 074051         STB PBPTR           OF STACK
0478  22457 001727         ALF,ALF       BRANCH
0479  22460 010630         AND B377        TO
0480  22461 040760         ADA ARBAS         APPROPRIATE
0481  22462 124000         JMP 0,I             ROUTINE
0482*                                          *
0483**  STACK CONSTANT OR PARAMETER ADDRESS   **
0484*                                          *
0485*
0486*  FOR NUMERICAL CONSTANTS STACK A POINTER TO THE VALUE
0487*  EMBEDDED IN THE PROGRAM, FOR PARAMETERS STACK THE
0488*  PARAMETER ADDRESS.
0489*
0490  22463 001665  FORM6   ELA,CLE,ERA   ERASE FLAG BIT
0491  22464 002002         SZA           CONSTANT?
0492  22465 026472         JMP FORM7     NO
0493  22466 065647         LDB TEMP1     YES,
0494  22467 035647         ISZ TEMP1       STACK
0495  22470 035647         ISZ TEMP1         ADDRESS
0496  22471 026404         JMP FORM2-1
0497  22472 071353  FORM7   STA TEMP2     PRE-
0498  22473 010545         AND .+17B       DEFINED
0499  22474 050545         CPA .+17B         FUNCTION?
0500  22475 026500         JMP *+3       YES
0501  22476 165565         LDB OPTRQ,I   NO, STACK
0502  22477 026404         JMP FORM2-1     PARAMETER ADDRESS
0503*
0504*  FOR FUNCTIONS RECURSION ON FORMX EVALUATES THE PARAMETER
0505*  AND, FOR PROGRAMMER DEFINED FUNCTIONS, THE VALUE.
0506*  FUNCTION VALUES ARE LEFT ON THE TEMPORARY STACK AND A
0507*  POINTER THERETO IS PLACED ON THE OPERAND STACK.
0508*  'LEN' IS HANDLED IN A SPECIAL WAY.
0509*
0510*                                        *
0511**  EVALUATE PRE-DEFINED FUNCTION       **
0512*                                        *
0513  22500 021353         XOR TEMP2     IDENTIFY
0514  22501 001727         ALF,ALF
0515  22502 001700         ALF             FUNCTION
0516  22503 050543         CPA .+15B     'LEN' ?
0517  22504 026574         JMP FOR12     YES
0518  22505 041130         ADA PDFBS     NO, STACK
0519  22506 015465         JSB PSHST       JUMP TO
0520  22507 170051         STA PBPTR,I       ENTRY POINT
0521  22510 061437         LDA FORMX     SAVE FORMX
0522  22511 171433         STA OPDST,I     RETURN ADDRESS
0523  22512 015437         JSB FORMX     EVALUATE ARGUMENT
0524  22513 015473         JSB STTOP     BRANCH TO
0525  22514 124051         JMP PBPTR,I     SUBROUTINE
```

```
0527*                                                *
0528**  EVALUATE PROGRAMMER-DEFINED FUNCTION  **
0529*                                                *
0530  22515 160001  FORM8 LDA 1,I        LOAD ADDRESS OF FORMULA
0531  22516 015465        JSB PSHST      SAVE VALUE OF
0532  22517 065431        LDB TMPST        CURRENT POINTER TO
0533  22520 174051        STB PBPTR,I        TEMPORARY STACK
0534  22521 015465        JSB PSHST      SAVE ADDRESS OF
0535  22522 170051        STA PBPTR,I      DEFINING FORMULA
0536  22523 061437        LDA FORMX      SAVE FORMX
0537  22524 171433        STA OPDST,I @    RETURN ADDRESS
0538  22525 015437        JSB FORMX      EVALUATE ARGUMENT
0539  22526 161433        LDA OPDST,I    SWAP
0540  22527 165565        LDB OPTRQ,I      OLD AND NEW
0541  22530 175433        STB OPDST,I        ARGUMENT
0542  22531 171565        STA OPTRQ,I          ADDRESSES
0543  22532 051431        CPA TMPST      PROTECT PARAMETER
0544  22533 015477        JSB RSCHK        ON TEMPORARY STACK
0545  22534 061647        LDA TEMP1      SWAP ADDRESSES
0546  22535 164051        LDB PBPTR,I      OF CURRENT
0547  22536 075647        STB TEMP1          AND FUNCTION
0548  22537 170051        STA PBPTR,I          FORMULAS
0549  22540 015437        JSB FORMX      EVALUATE FUNCTION
0550  22541 165433        LDB OPDST,I    POP
0551  22542 060524        LDA .-2          OPERAND
0552  22543 041433        ADA OPDST          STACK,
0553  22544 071433        STA OPDST            SAVING
0554  22545 161433        LDA OPDST,I            RESULT ADDRESS
0555  22546 171565        STA OPTRQ,I              AND ADDRESS OF
0556  22547 175433        STB OPDST,I                OLD PARAMETER
0557  22550 160051        LDA PBPTR,I    RESTORE
0558  22551 071647        STA TEMP1        FORMULA POINTER
0559  22552 060051        LDA PBPTR      POP
0560  22553 040524        ADA .-2          OPERATOR
0561  22554 070051        STA PBPTR          STACK
0562  22555 160051        LDA PBPTR,I    RESTORE ORIGINAL
0563  22556 071431        STA TMPST        TEMPORARY STACK POINTER
0564  22557 015473        JSB STTOP      LOAD FUNCTION RESULT
0565*                                  *
0566**  RECORD RESULT OF FUNCTION  **
0567*                                  *
0568*
0569*  PRE-DEFINED FUNCTIONS RETURN TO THIS POINT WITH THEIR
0570*  RESULT IN (A) AND (B).
0571*
0572  22560 104400  FOR10 DST TMPST,I    SAVE RESULT
0573  22562 161433        LDA OPDST,I    RESTORE FORMX
0574  22563 071437        STA FORMX        RETURN ADDRESS
0575  22564 061431        LDA TMPST      RECORD LOCATION
0576  22565 171433        STA OPDST,I      OF RESULT
0577  22566 064051        LDB PBPTR      POP
0578  22567 044524        ADB .-2          FUNCTION
0579  22570 074051        STB PBPTR          ADDRESS
0580  22571 035647        ISZ TEMP1        OF RESULT
0581  22572 035647        ISZ TEMP1          ON TOP OF
0582  22573 026405        JMP FORM2            OPERAND STACK
```

```
0583*                          *
0584**  EVALUATE 'LEN'   **
0585*                          *
0586  22574 015477  FOR12 JSB RSCHK      CREATE SPACE ON TEMPORARY STACK
0587  22575 161647         LDA TEMP1,I   FIND
0588  22576 011070         AND OPDMK       STRING'S
0589  22577 040525         ADA .-1           SYMBOL
0590  22600 001000         ALS                 TABLE
0591  22601 041641         ADA SYMTB             ENTRY
0592  22602 002004         INA               LOAD ADDRESS
0593  22603 160000         LDA 0,I             OF STRING
0594  22604 040525         ADA .-1           EXTRACT
0595  22605 160000         LDA 0,I             STRING
0596  22606 010630         AND B377              LENGTH
0597  22607 105120         OCT 105120    FLT - STACK
0598  22610 104400         DST TMPST,I       STRING LENGTH
0599  22612 061431         LDA TMPST       STACK ADDRESS
0600  22613 171433         STA OPDST,I       OF RESULT
0601  22614 026571         JMP FOR12-3
0602*                                *
0603**  PROCESS STRING CONSTANT  **
0604*                                *
0605*
0606*  WHEN STRING CONSTANTS ARE STACKED, AN APPROPRIATE
0607*  ENTRY IS PLACED ON THE TEMPORARY STACK SO THAT ALL
0608*  STRING OPERANDS HAVE THE SAME FORM:  A NEGATED BASE
0609*  ADDRESS ON THE OPERAND STACK AND A TWO WORD ENTRY ON
0610*  THE TEMPORARY STACK CONTAINING THE START-OF-STRING
0611*  AND END-OF-STRING DESIGNATORS BIASED BY -1 (DEFAULT
0612*  START-OF-STRING DESIGNATORS HAVE A STACK VALUE OF 0,
0613*  DEFAULT END-OF-STRING DESIGNATORS HAVE A STACK VALUE
0614*  OF -1).  IN THE CASE OF SUBSCRIPTED STRING VARIABLES,
0615*  THE TEMPORARY IS CREATED WHEN THE ')' IS SCANNED; THE
0616*  ENTRY FOR NON-SUBSCRIPTED STRING OPERANDS IS CREATED
0617*  WHEN THEY ARE SCANNED.
0618*
0619  22615 002404  FOR13 CLA,INA       PRINT STATEMENT
0620  22616 051571         CPA EOL        STRING CONSTANT?
0621  22617 015441         JSB STSTR     NO, STACK STRING CONSTANT
0622  22620 026423         JMP FORM3     EXECUTE END-OF-FORMULA
```

```
0624*                                  *
0625**  RECORD RESULT OF OPERATION   **
0626*                                  *
0627*
0628*  OPERATORS CREATING INTERMEDIATE RESULTS RETURN TO HERE.
0629*
0630  22621 035433  FOR14 ISZ OPDST      STACK
0631  22622 035433         ISZ OPDST        TEMPORARY
0632  22623 104400         DST TMPST,I        RESULT
0633  22625 061431         LDA TMPST      SAVE
0634  22626 171433         STA OPDST,I      ADDRESS ON
0635  22627 026436         JMP FORM4          OPERAND STACK
0636*                                 *
0637**  EXIT FORMULA EVALUATOR   **
0638*                                  *
0639*
0640*  THIS WORD IS ACTUALLY PART OF THE FORMULA OPERATOR JUMP
0641*  TABLE.  THE WORDS BETWEEN IT AND FOJT CORRESPOND TO
0642*  OPERATORS WHICH ARE NOT EXECUTED, SO CODE IS INSERTED HERE
0643*  TO UTILIZE THIS SPACE.
0644*
0645  22630 101437         DEF FORMX,I
0646**                                 **
0647***  SET LOGICAL VALUES   ***
0648**                                 **
0649  22631 002400  FALSE CLA            LOAD
0650  22632 006400        CLB              ZERO
0651  22633 026621        JMP FOR14
0652  22634 061165  TRUE  LDA HALF       LOAD
0653  22635 064530        LDB .+2          1.0
0654  22636 026621        JMP FOR14
0655**                                 **
0656***  EXECUTE UNARY -   ***
0657**                                 **
0658  22637 015473  EUMIN JSB STTOP      UNSTACK AND LOAD TOP OF STACK
0659  22640 015467        JSB ARINV      NEGATE IT
0660  22641 026621        JMP FOR14      STORE IT
0661**                                 **
0662***  FORMULA OPERATOR JUMP TABLE   ***
0663**                                 **
0664  22642 022673  FOJT  DEF ELBRC
0665  22643 022340        DEF FORM1      (
0666  22644 022436        DEF FORM4      UNARY +
0667  22645 022637        DEF EUMIN      UNARY -
0668  22646 022702        DEF ESCMA      SUBSCRIPT COMMA
0669  22647 022756        DEF ESTR       ASSIGNMENT OPERATOR
0670  22650 023065        DEF EFAD       +
0671  22651 023070        DEF EFSB       -
0672  22652 023073        DEF EFMP       *
0673  22653 023076        DEF EFDV       /
0674  22654 023101        DEF EPWR       ^
0675  22655 023202        DEF EGTRT      >
0676  22656 023206        DEF ELST       <
0677  22657 023224        DEF ENEQL      #
0678  22660 023214        DEF EEQL       =
0679  22661 000000        NOP            UNUSED
```

```
0680  22662 000000          NOP             CODES
0681  22663 023251          DEF EAND        AND
0682  22664 023257          DEF EIOR        OR
0683  22665 023237          DEF EMIN        MIN
0684  22666 023230          DEF EMAX        MAX
0685  22667 023224          DEF ENEQL       <>
0686  22670 023210          DEF EGORE       >=
0687  22671 023220          DEF ELORE       <=
0688  22672 023265          DEF ENOT        NOT
0001**                        **
0002***  EXECUTE LEFT BRACKET  ***
0003**                        **
0004*
0005*  LOAD A DEFAULT SECOND SUBSCRIPT AND ENTER THE CODE FOR
0006*  A SUBSCRIPT COMMA.
0007*
0008  22673 061433  ELBRC LDA OPDST      LOAD
0009  22674 040524        ADA .-2         -1
0010  22675 160000        LDA 0,I           FOR A
0011  22676 007400        CCB                 STRING,
0012  22677 002021        SSA,RSS               0
0013  22700 006400        CLB                     FOR
0014  22701 026712        JMP ESCM1                 AN ARRAY
0015**                        **
0016***  EXECUTE SUBSCRIPT COMMA  ***
0017**                        **
0018*
0019*  BOTH SUBSCRIPTS ARE ROUNDED TO INTEGERS AND TESTED TO BE
0020*  POSITIVE.  FOR STRINGS, THE TWO INTEGERS ARE SAVED ON THE
0021*  TEMPORARY STACK AS A PSUEDO-ENTRY LATER USED BY PSTR.  FOR
0022*  ARRAYS, THE SUBSCRIPTS ARE CHECKED AND IF WITHIN THE CURRENT
0023*  BOUNDS THEY ARE COMBINED WITH THE BASE ADDRESS OF THE ARRAY.
0024*  THE ARRAY ELEMENT ADDRESS THEN REPLACES THE BASE ADDRESS ON
0025*  THE OPERAND STACK.  UNSUITABLE SUBSCRIPTS EXIT TO THE ERROR
0026*  ROUTINE.
0027*
0028  22702 015475  ESCMA JSB OPCHK      UNSTACK
0029  22703 104200        DLD 1,I         SECOND SUBSCRIPT
0030  22705 015443        JSB SBFIX       ROUND TO INTEGER
0031  22706 115255        JSB RERRS+17,I  UNSUITABLE RESULT
0032  22707 060051        LDA PBPTR       UNSTACK
0033  22710 040524        ADA .-2         THE
0034  22711 070051        STA PBPTR         ''
0035  22712 075357  ESCM1 STB TEMP4      SAVE RESULT
0036  22713 015473        JSB STTOP       POP FIRST SUBSCRIPT
0037  22714 015443        JSB SBFIX       ROUND TO INTEGER
0038  22715 115255        JSB RERRS+17,I  UNSUITABLE RESULT
0039  22716 175431        STB TMPST,I     STORE IN TEMPORARY STACK
0040  22717 161433        LDA OPDST,I     STRING
0041  22720 002021        SSA,RSS           VARIABLE?
0042  22721 026727        JMP ESCM2       NO, ARRAY VARIABLE
0043  22722 061431        LDA TMPST       YES,
0044  22723 002004        INA               SAVE
0045  22724 065357        LDB TEMP4           SECOND SUBSCRIPT IN
0046  22725 174000        STB 0,I               TEMPORARY STACK
0047  22726 026340        JMP FORM1
```

```
0048  22727 040524  ESCM2 ADA .-2        LOAD COLUMN
0049  22730 104200        DLD 0,I          AND ROW BOUNDS
0050  22732 003004        CMA,INA        IS SPECIFIED
0051  22733 141431        ADA TMPST,I      ROW
0052  22734 002021        SSA,RSS            LEGAL?
0053  22735 115255        JSB RERRS+17,I   NO
0054  22736 075373        STB TEMP5      YES
0055  22737 007004        CMB,INB        IS SPECIFIED
0056  22740 045357        ADB TEMP4        COLUMN
0057  22741 006021        SSB,RSS            LEGAL?
0058  22742 115255        JSB RERRS+17,I   NO
0059  22743 161431        LDA TMPST,I    YES, COMPUTE ROW
0060  22744 100200        MPY TEMP5        DISPLACEMENT
0061  22746 041357        ADA TEMP4      ADD COLUMN DISPLACEMENT
0062  22747 001000        ALS            DOUBLE FOR CORE WORDS
0063  22750 141433        ADA OPDST,I    STORE ACTUAL
0064  22751 171433        STA OPDST,I      ELEMENT ADDRESS
0065  22752 061431        LDA TMPST      POP UNUSED
0066  22753 040524        ADA .-2          TEMPORARY
0067  22754 071431        STA TMPST          STACK
0068  22755 026340        JMP FORM1            ENTRY
0069**                    **
0070***  EXECUTE STORE   ***
0071**                    **
0072*
0073*  IN ORDER TO ALLOW MULTIPLE ASSIGNMENT STATEMENTS, NO
0074*  ASSIGNMENT CAN TAKE PLACE UNTIL THE RIGHT-HAND FORMULA
0075*  IS EVALUATED; I.E. ONLY AN END-OF-FORMULA OPERATOR CAN
0076*  FORCE AN ASSIGNMENT OPERATOR OFF OF THE STACK.  ASSIGNMENTS
0077*  MAY BE NUMERICAL TO NUMERICAL TYPE OPERAND, IN WHICH CASE
0078*  THE ASSIGNED QUANTITY IS SAVED FOR POSSIBLE ADDITIONAL
0079*  ASSIGNMENTS; OR STRING TO STRING OPERAND.  IN THE LATTER
0080*  CASE AN INTERMEDIATE STRING IS NECESSARY IF THE HEAD OF
0081*  THE DESTINATION STRING LIES IN THE TAIL OF THE ACTUAL
0082*  SOURCE STRING.
0083*
0084  22756 065353  ESTR  LDB TEMP2      NEXT OPERATOR AN
0085  22757 006002        SZB              END-OF-FORMULA?
0086  22760 027057        JMP ESTR5      NO
0087  22761 055355        CPB TEMP3      YES, FIRST STORE OF FORMULA?
0088  22762 026775        JMP ESTR2      YES
0089  22763 161433  ESTR1 LDA OPDST,I    NO, SET
0090  22764 071361        STA TEMP6        DESTINATION ADDRESS
0091  22765 104200        DLD TEMP3,I    TRANSFER
0092  22767 104400        DST TEMP6,I      THE NUMBER
0093  22771 061433        LDA OPDST      UNSTACK
0094  22772 040524        ADA .-2          DESTINATION
0095  22773 071433        STA OPDST          OPERAND
0096  22774 026436        JMP FORM4
0097  22775 161433  ESTR2 LDA OPDST,I    STRING
0098  22776 002020        SSA              OPERANDS?
0099  22777 027003        JMP ESTR3      YES
0100  23000 015475        JSB OPCHK      NO, UNSTACK SOURCE
0101  23001 075355        STB TEMP3        AND SAVE VALUE ADDRESS
0102  23002 026763        JMP ESTR1
0103  23003 060524  ESTR3 LDA .-2        PREPARE
```

```
0104   23004 015445          JSB PSTR        SOURCE
0105   23005 071357          STA TEMP4         STRING
0106   23006 075507          STB TPRME
0107   23007 003400          CCA           PREPARE
0108   23010 015445          JSB PSTR        DESTINATION STRING
0109   23011 064051          LDB PBPTR     SAVE CORE
0110   23012 075537          STB EST1        POINTER
0111   23013 061357          LDA TEMP4     TRANSFER
0112   23014 003000          CMA             TO
0113   23015 041373          ADA TEMP5         HIGHER
0114   23016 002020          SSA                 CORE?
0115   23017 027052          JMP ESTR4     NO
0116   23020 041507          ADA TPRME     YES,
0117   23021 040530          ADA .+2         OVERLAPPING
0118   23022 002021          SSA,RSS           TRANSFER?
0119   23023 027052          JMP ESTR4     NO
0120   23024 061373          LDA TEMP5     YES, SAVE
0121   23025 071541          STA EST2        DESTINATION ADDRESS
0122   23026 006004          INB           SET DESTINATION
0123   23027 005000          BLS             ADDRESS TO START
0124   23030 075373          STB TEMP5         OF FREE CORE
0125   23031 061505          LDA TNULL     SAVE TRANSFER
0126   23032 071543          STA EST3        LENGTH
0127   23033 003004          CMA,INA       ALLOCATE
0128   23034 001100          ARS             SPACE FOR
0129   23035 015427          JSB CUSP          INTERMEDIATE
0130   23036 070051          STA PBPTR           STRING
0131   23037 060770          LDA FSCHA
0132   23040 015447          JSB TRSTR     TRANSFER STRING TO FREE CORE
0133   23041 061543          LDA EST3      RESTORE TRANSFER
0134   23042 071505          STA TNULL       LENGTH
0135   23043 071507          STA TPRME     RESET ACTUAL SOURCE LENGTH
0136   23044 061537          LDA EST1      SET SOURCE
0137   23045 002004          INA             ADDRESS TO
0138   23046 001000          ALS               INTERMEDIATE
0139   23047 071357          STA TEMP4           STRING
0140   23050 061541          LDA EST2      RESTORE ORIGINAL
0141   23051 071373          STA TEMP5       DESTINATION STRING
0142   23052 060770  ESTR4   LDA FSCHA
0143   23053 015447          JSB TRSTR     COMPLETE TRANSFER
0144   23054 061537          LDA EST1      RESTORE FREE
0145   23055 070051          STA PBPTR       CORE POINTER
0146   23056 026453          JMP FORM5     EXECUTE END-OF-FORMULA
0147   23057 034051  ESTR5   ISZ PBPTR     DEFER
0148   23060 034051          ISZ PBPTR       EXECUTION
0149   23061 063064          LDA BASSO
0150   23062 170051          STA PBPTR,I
0151   23063 026444          JMP FORM4+6
0152*
0153   23064 007402  BASSO   OCT 7402
0154**                        **
0155***  EXECUTE +          ***
0156**                        **
0157   23065 015471  EFAD    JSB BINOP
0158   23066 015501          JSB .FAD
0159   23067 026621          JMP FOR14
```

```
0161**                  **
0162***  EXECUTE -     ***
0163**                  **
0164  23070 015471  EFSB  JSB BINOP
0165  23071 015503       JSB .FSB
0166  23072 026621       JMP FOR14
0167**                  **
0168***  EXECUTE *     ***
0169**                  **
0170  23073 015471  EFMP  JSB BINOP
0171  23074 015505       JSB .FMP
0172  23075 026621       JMP FOR14
0173**                  **
0174***  EXECUTE /     ***
0175**                  **
0176  23076 015471  EFDV  JSB BINOP
0177  23077 015507       JSB .FDV
0178  23100 026621       JMP FOR14
0179**                  **
0180***  EXECUTE ^     ***
0181**                  **
0182*                   *
0183**  REAL POWER     **
0184*                   *
0185*
0186*  EXIT TO ERROR IF BASE IS NEGATIVE.  ELSE COMPUTE
0187*  RESULT AS E^(POWER*LN(BASE)).
0188*
0189  23101 165433  EPWR  LDB OPDST,I    LOAD
0190  23102 104200       DLD 1,I          POWER
0191  23104 015515       JSB IFIX        INTEGER?
0192  23105 027110       JMP *+3         NO
0193  23106 102301       SOS             YES, 16-BIT?
0194  23107 027123       JMP IPWR        YES
0195  23110 015471       JSB BINOP       NO, UNSTACK
0196  23111 002001       RSS               ARGUMENTS
0197  23112 015453       JSB PCHK        CHECK ARGUMENTS
0198  23113 002020       SSA             NEGATIVE BASE?
0199  23114 115272       JSB RERRS+30,I    YES
0200  23115 065676       LDB BIN01       NO, LOAD BASE ADDRESS
0201  23116 015535       JSB .LOG        TAKE NATUAL LOG
0202  23117 015505       JSB .FMP        MULTIPLY
0203  23120 101677       DEF BIN02,I       BY POWER
0204  23121 015533       JSB .EXP        EXPONENTIATE
0205  23122 026621       JMP FOR14
0206*                    *
0207**  INTEGER POWER    **
0208*                    *
0209*
0210*  MULTIPLY BASE REPEATEDLY, USING POWERS-OF-TWO METHOD
0211*  TO SPEED PROCESS.  IF POWER IS NEGATIVE, TAKE RECIPROCAL
0212*  FOR FINAL RESULT.
0213*
0214  23123 075365  IPWR  STB TT1         SAVE SIGN
0215  23124 006020       SSB             FORM ABSOLUTE
0216  23125 007004       CMB,INB           VALUE OF POWER
```

```
0217  23126 075367         STB TT2       SAVE IT
0218  23127 015471         JSB BINOP     UNSTACK
0219  23130 002001         RSS             ARGUMENTS
0220  23131 015453         JSB PCHK      CHECK ARGUMENTS
0221  23132 065676         LDB BINO1     STORE
0222  23133 071676         STA BINO1
0223  23134 075677         STB BINO2       BASE
0224  23135 061165         LDA HALF      INITIALIZE
0225  23136 071652         STA TT3         RESULT
0226  23137 060530         LDA .+2           TO
0227  23140 071653         STA TT4             1.0
0228  23141 065367 IPWR1   LDB TT2       DIVIDE POWER
0229  23142 004031         SLB,BRS         BY 2
0230  23143 027162         JMP IPWR4     ODD POWER
0231  23144 075367         STB TT2       EVEN POWER
0232  23145 006002 IPWR2   SZB           ZERO?
0233  23146 027173         JMP IPWR5     NO
0234  23147 061365         LDA TT1       YES
0235  23150 002020         SSA           POSITIVE POWER?
0236  23151 027155         JMP IPWR3     NO
0237  23152 061652         LDA TT3       YES, RETURN
0238  23153 065653         LDB TT4         WITH
0239  23154 026621         JMP FOR14         RESULT
0240  23155 061165 IPWR3   LDA HALF      TAKE
0241  23156 064530         LDB .+2         RECIPROCAL
0242  23157 015507         JSB .FDV          FOR
0243  23160 001652         DEF TT3             FINAL
0244  23161 026621         JMP FOR14             RESULT
0245  23162 075367 IPWR4   STB TT2       SAVE POWER
0246  23163 061676         LDA BINO1     LOAD
0247  23164 065677         LDB BINO2       BASE
0248  23165 015505         JSB .FMP      MULTIPLY BY
0249  23166 001652         DEF TT3         RESULT SO FAR
0250  23167 071652         STA TT3       SAVE NEW
0251  23170 075653         STB TT4         PARTIAL
0252  23171 065367         LDB TT2           RESULT
0253  23172 027145         JMP IPWR2
0254  23173 061676 IPWR5   LDA BINO1     SQUARE
0255  23174 065677         LDB BINO2
0256  23175 015505         JSB .FMP        BASE
0257  23176 001676         DEF BINO1
0258  23177 071676         STA BINO1     RECORD
0259  23200 075677         STB BINO2       NEW
0260  23201 027141         JMP IPWR1         BASE
```

```
0262**                  **
0263***  EXECUTE >     ***
0264**                  **
0265  23202 015451  EGTRT JSB COMPR      COMPARE OPERANDS
0266  23203 002020       SSA            < ?
0267  23204 026631       JMP FALSE      YES
0268  23205 027225       JMP ENEQL+1    NO
0269**                  **
0270***  EXECUTE <     ***
0271**                  **
0272  23206 015451  ELST  JSB COMPR      COMPARE OPERANDS
0273  23207 003001       CMA,RSS        REVERSE COMPARISON SENSE
0274**                  **
0275***  EXECUTE >=    ***
0276**                  **
0277  23210 015451  EGORE JSB COMPR      COMPARE OPERANDS
0278  23211 002020       SSA            < ?
0279  23212 026631       JMP FALSE      YES
0280  23213 026634       JMP TRUE       NO
0281**                  **
0282***  EXECUTE =     ***
0283**                  **
0284  23214 015451  EEQL  JSB COMPR      COMPARE OPERANDS
0285  23215 002002       SZA            = ?
0286  23216 026631       JMP FALSE      NO
0287  23217 026634       JMP TRUE       YES
0288**                  **
0289***  EXECUTE <=    ***
0290**                  **
0291  23220 015451  ELORE JSB COMPR      COMPARE OPERANDS
0292  23221 002020       SSA            >= ?
0293  23222 026634       JMP TRUE       NO
0294  23223 027215       JMP EEQL+1     YES
0295**                  **
0296***  EXECUTE # OR <>  ***
0297**                  **
0298  23224 015451  ENEQL JSB COMPR      COMPARE OPERANDS
0299  23225 002002       SZA            # ?
0300  23226 026634       JMP TRUE       NO
0301  23227 026631       JMP FALSE      YES
0302**                  **
0303***  EXECUTE 'MAX'  ***
0304**                  **
0305  23230 015471  EMAX  JSB BINOP      SUBTRACT THE
0306  23231 015503       JSB .FSB         TOP TWO OPERANDS
0307  23232 002021       SSA,RSS        TOP OPERAND LARGER?
0308  23233 027243       JMP ARG1       NO
0309  23234 104200  ARG2  DLD BINO2,I    YES, RETRIEVE
0310  23236 026621       JMP FOR14        ITS VALUE
0311**                  **
0312***  EXECUTE 'MIN'  ***
0313**                  **
0314  23237 015471  EMIN  JSB BINOP      SUBTRACT THE
0315  23240 015503       JSB .FSB         TOP TWO OPERANDS
0316  23241 002021       SSA,RSS        TOP OPERAND LARGER?
0317  23242 027234       JMP ARG2       NO
```

```
0318  23243 035433  ARG1  ISZ OPDST      YES,
0319  23244 035433        ISZ OPDST        RETRIEVE
0320  23245 165433        LDB OPDST,I        VALUE OF
0321  23246 104200        DLD 1,I              NEXT-TO-TOP
0322  23250 026623        JMP FOR14+2            OPERAND
0323**                    **
0324***  EXECUTE 'AND'  ***
0325**                    **
0326  23251 015471  EAND  JSB BINOP      UNSTACK
0327  23252 002001        RSS              OPERANDS
0328  23253 002003        SZA,RSS        TOP OPERAND ZERO?
0329  23254 026631        JMP FALSE      YES
0330  23255 161677        LDA BIN02,I    NO, CHECK
0331  23256 027225        JMP ENEQL+1      NEXT-TO-TOP OPERAND
0332**                    **
0333***  EXECUTE 'OR'  ***
0334**                    **
0335  23257 015471  EIOR  JSB BINOP      UNSTACK
0336  23260 002001        RSS              OPERANDS
0337  23261 002002        SZA            TOP OPERAND NON-ZERO?
0338  23262 026634        JMP TRUE       YES
0339  23263 161677        LDA BIN02,I    NO, CHECK
0340  23264 027225        JMP ENEQL+1      NEXT-TO-TOP OPERAND
0341**                    **
0342***  EXECUTE 'NOT'  ***
0343**                    **
0344  23265 015473  ENOT  JSB STTOP      LOAD TOP OPERAND
0345  23266 027215        JMP EEQL+1     GO TO CHECK
0346**                      **
0347***  INSURE VALID POWERING  ***
0348**                      **
0349*
0350*  INSURES THAT A^B HAS ACCEPTABLE ARGUMENTS.  A=B=0 IS A NON-
0351*  RECOVERABLE ERROR.  A=0 AND B<0 PRINTS A WARNING MESSAGE AND
0352*  RETURNS THE MAXIMUM POSITIVE NUMBER AS THE RESULT.
0353*
0354  23267 075676  #PCHK STB BIN01      LOAD HIGH PART
0355  23270 165677        LDB BIN02,I      OF POWER
0356  23271 002002        SZA            BASE ZERO?
0357  23272 027303        JMP PCHK1      NO
0358  23273 006003        SZB,RSS        YES, POWER ZERO?
0359  23274 115271        JSB RERRS+29,I   YES
0360  23275 006021        SSB,RSS        NO, POWER POSITIVE?
0361  23276 026631        JMP FALSE      YES
0362  23277 115312        JSB WERRS+2,I  NO
0363  23300 060353        LDA INF        USE POSITIVE
0364  23301 064524        LDB .-2          INFINITY
0365  23302 026621        JMP FOR14          FOR RESULT
0366  23303 006003  PCHK1 SZB,RSS        POWER ZERO?
0367  23304 026634        JMP TRUE       YES, TAKE RESULT AS 1.0
0368  23305 125453        JMP PCHK,I     NO
```

```
0370**                                          **
0371***  COMPARE TOP OPERANDS OF STACK          ***
0372**                                          **
0373*
0374*  ON EXIT (A) IS NEGATIVE IF THE TOP OPERAND OF THE
0375*  STACK IS GREATER THAN THE NEXT-TO-TOP OPERAND,
0376*  POSITIVE IF IT IS LESS, AND ZERO IF THEY ARE EQUAL.
0377*
0378  23306 161433  #CMPR LDA OPDST,I   STRING
0379  23307 002020        SSA             ARGUMENTS?
0380  23310 027314        JMP COMP1       YES
0381  23311 015471        JSB BINOP       NO, COMPARE
0382  23312 015503        JSB .FSB          NUMERICAL
0383  23313 125451        JMP COMPR,I         OPERANDS
0384  23314 060524  COMP1 LDA .-2         PREPARE
0385  23315 015445        JSB PSTR          COMPARISON
0386  23316 071357        STA TEMP4           STRING
0387  23317 075507        STB TPRME
0388  23320 061505        LDA TNULL       SAVE SPECIFIED
0389  23321 071533        STA CP0           LENGTH
0390  23322 060524        LDA .-2         PREPARE
0391  23323 015445        JSB PSTR          TEST STRING
0392  23324 075445        STB CP1         SAVE ACTUAL LENGTH
0393  23325 035431        ISZ TMPST       RESERVE SPACE
0394  23326 035431        ISZ TMPST         FOR RESULT
0395  23327 035533  COMP2 ISZ CP0         MORE SPECIFIED STRING?
0396  23330 027333        JMP COMP3       YES
0397  23331 006400        CLB             NO, LOAD A
0398  23332 027336        JMP COMP4         NULL CHARACTER
0399  23333 015463  COMP3 JSB FSCH        LOAD NEXT
0400  23334 060566        LDA .+40B         COMPARISON
0401  23335 064000        LDB 0               CHARACTER
0402  23336 035505  COMP4 ISZ TNULL       MORE SPECIFIED TEST STRING?
0403  23337 027347        JMP COMP6       YES
0404  23340 002400        CLA             NO, LOAD NULL CHARACTER
0405  23341 007004  COMP5 CMB,INB         COMPARE
0406  23342 040001        ADA 1             CHARACTERS
0407  23343 002003        SZA,RSS         EXIT ON NOT EQUAL
0408  23344 006003        SZB,RSS           OR BOTH NULL
0409  23345 125451        JMP COMPR,I         CHARACTERS
0410  23346 027327        JMP COMP2
0411  23347 061445  COMP6 LDA CP1         MORE ACTUAL
0412  23350 002006        INA,SZA           TEST STRING?
0413  23351 027354        JMP COMP7       YES
0414  23352 060566        LDA .+40B       NO, LOAD A BLANK
0415  23353 027341        JMP COMP5
0416  23354 071445  COMP7 STA CP1
0417  23355 061373        LDA TEMP5       EXTRACT
0418  23356 000065        CLE,ERA
0419  23357 160000        LDA 0,I           NEXT
0420  23360 002041        SEZ,RSS
0421  23361 001727        ALF,ALF             TEST
0422  23362 010630        AND B377
0423  23363 035373        ISZ TEMP5             CHARACTER
0424  23364 027341        JMP COMP5
```

```
0426**                                **
0427***  PREPARE STRING OPERAND       **
0428**                                **
0429*
0430*  THE STRING ADDRESS ON TOP OF THE OPERAND STACK IS COMBINED
0431*  WITH THE SUBSCRIPTS IN A PSUEDO-ENTRY ON THE TEMPORARY STACK
0432*  TO FORM A STRING OPERAND.  (A) = 0 UPON ENTRY FOR A SOURCE
0433*  STRING; (A) = -1 FOR A DESTINATION STRING.  THE ADDRESS OF
0434*  THE FIRST CHARACTER OF THE STRING OPERAND IS LEFT IN TEMP5;
0435*  FOR SOURCE STRINGS (A) = TEMP5 UPON EXIT.  THE REQUESTED
0436*  STRING LENGTH (IN CHARACTERS) IS LEFT IN TNULL; FOR SOURCE
0437*  STRINGS THE ACTUAL STRING LENGTH (WHICH MAY BE LESS THAN THE
0438*  REQUESTED LENGTH) IS IN (B) UPON EXIT.  THE FOLLOWING
0439*  CONDITIONS EXIT TO ERROR:  NEGATIVE STRING LENGTH, REQUESTED
0440*  DESTINATION STRING WOULD EXCEED PHYSICAL STRING BOUNDARY, OR
0441*  REQUESTED DESTINATION STRING WOULD PRODUCE A STRING QUANTITY
0442*  WITH TWO UNCONNECTED PARTS.  THE LOGICAL LENGTH OF A
0443*  DESTINATION STRING IS ADJUSTED AS NEEDED.
0444*
0445  23365 000111  .73    DEC 73                                    BJ
0446*                                                               BJ
0447  23366 071567  #PSTR  STA PS0        SAVE MODE FLAG
0448  23367 015475         JSB OPCHK      UNSTACK OPERAND
0449  23370 075563         STB PS1        SET FLAG POSITIVE
0450  23371 005000         BLS            SAVE ADDRESS OF FIRST
0451  23372 075373         STB TEMP5        CHARACTER OF STRING
0452  23373 005100         BRS            SAVE
0453  23374 044525         ADB .-1          POINTER TO
0454  23375 075361         STB TEMP6          STRING LENGTH
0455  23376 065431         LDB TMPST      LOAD
0456  23377 044530         ADB .+2          START-OF-STRING
0457  23400 160001         LDA 1,I            DESIGNATOR
0458  23401 071477         STA MPT        SAVE IT
0459  23402 041373         ADA TEMP5      RECORD CHARACTER ADDRESS
0460  23403 071373         STA TEMP5        OF START-OF-STRING
0461  23404 071640         STA SBPTR      SAVE ADDRESS
0462  23405 006004         INB            LOAD
0463  23406 160001         LDA 1,I          END-OF-STRING DESIGNATOR
0464  23407 002006         INA,SZA        SPECIFIED?
0465  23410 027423         JMP PSTR2      YES
0466  23411 003400         CCA            NO
0467  23412 051567         CPA PS0        'SOURCE' MODE?
0468  23413 027417         JMP PSTR1      NO
0469  23414 161361         LDA TEMP6,I    YES, LOAD STRING'S
0470  23415 010630         AND B377         LOGICAL LENGTH
0471  23416 027423         JMP PSTR2
0472  23417 071563  PSTR1  STA PS1        SET FLAG TO -1
0473  23420 061507         LDA TPRME      COMPUTE
0474  23421 003000         CMA              END-OF-STRING
0475  23422 041477         ADA MPT            DESIGNATOR
0476  23423 071475  PSTR2  STA NQT        SAVE IT
0477  23424 003000         CMA            IS LENGTH
0478  23425 041477         ADA MPT          OF SPECIFIED STRING
0479  23426 002021         SSA,RSS            NEGATIVE?
0480  23427 115256         JSB RERRS+18,I   YES
0481  23430 071505         STA TNULL      SAVE LENGTH                 BJ
```

```
23431 043365          ADA .73                                          B]
23432 002020          SSA              TOO LONG?                       B]
23433 115260          JSB RERRS+20,I   YES                             B]
23434 161361          LDA TEMP6,I     DOES
23435 010630          AND B377          START-OF-STRING
23436 003000          CMA                 CHARACTER
23437 035567          ISZ PS0               RELATE TO
23440 002004          INA                     PREVIOUS
23441 041477          ADA MPT                   VALUE
23442 002021          SSA,RSS                     OF STRING?
23443 027462          JMP PSTR3       NO
23444 161361          LDA TEMP6,I     YES, EXTRACT
23445 035567          ISZ PS0           END-OF-
23446 001727          ALF,ALF             PERMITTED-STRING
23447 010630          AND B377              DESIGNATOR
23450 003000          CMA             COMPUTE DIFFERENCE FROM
23451 041475          ADA NQT           END OF SPECIFIED STRING -1
23452 006404          CLB,INB         'SOURCE'
23453 055567          CPB PS0           MODE?
23454 027467          JMP PSTR5       NO
23455 065505          LDB TNULL       YES, SPECIFIED SOURCE STRING
23456 002004          INA               CONTAINED WITHIN
23457 002021          SSA,RSS             DEFINED SOURCE STRING?
23460 044000          ADB 0           NO, CORRECT LENGTH
23461 027465          JMP PSTR4         OF ACTUAL SOURCE STRING
23462 035567   PSTR3  ISZ PS0         'SOURCE' MODE?
23463 115257          JSB RERRS+19,I   NO
23464 007400          CCB             YES, SET ACTUAL LENGTH TO 0
23465 061373   PSTR4  LDA TEMP5       LOAD START-OF-STRING
23466 125445          JMP PSTR,I        CHARACTER ADDRESS
23467 002021   PSTR5  SSA,RSS         PHYSICAL STORAGE OVERFLOW?
23470 115260          JSB RERRS+20,I   YES
23471 035563          ISZ PS1         END-OF-STRING SPECIFIED?
23472 027500          JMP PSTR7       YES
23473 161361   PSTR6  LDA TEMP6,I     NO,
23474 010451          AND M256          RESET
23475 031475          IOR NQT             LOGICAL LENGTH
23476 171361          STA TEMP6,I           OF STRING
23477 125445          JMP PSTR,I
23500 161361   PSTR7  LDA TEMP6,I     IS NEW
23501 010630          AND B377          DESTINATION
23502 003000          CMA                 STRING
23503 041475          ADA NQT               LONGER
23504 002021          SSA,RSS                 THAN OLD?
23505 027473          JMP PSTR6       YES
23506 125445          JMP PSTR,I      NO
**                                  **
***  STACK STRING CONSTANT  ***
**                                  **
*
*  SEE NOTE AT FOR13 OF ROUTINE FORMX
*
23507 035433   #STST  ISZ OPDST       STACK
23510 035433          ISZ OPDST         NEGATIVE
23511 061647          LDA TEMP1           OF
23512 003000          CMA                   STRING
```

```
0538  23513 171433          STA OPDST,I          ADDRESS
0539  23514 161647          LDA TEMP1,I    COMPUTE
0540  23515 010630          AND B377         STRING
0541  23516 007400          CCB                LENGTH
0542  23517 044000          ADB 0               -1
0543  23520 040531          ADA .+3        UPDATE
0544  23521 001100          ARS              INTRA-STATEMENT
0545  23522 041647          ADA TEMP1           POINTER
0546  23523 071647          STA TEMP1            PAST STRING
0547  23524 015477          JSB RSCHK      CREATE TEMPORARY
0548  23525 002400          CLA            RECORD
0549  23526 104400          DST TMPST,I      (0,(B) )
0550  23530 125441          JMP STSTR,I
0551**                              **
0552***  FETCH SOURCE CHARACTER  ***
0553**                              **
0554*
0555*  CHARACTER ADDRESS IN TEMP4, SOURCE CHARACTER COUNT
0556*  IN TPRME (IN 1'S COMPLEMENT).  EXIT TO (P+1) ON NO
0557*  MORE CHARACTERS (TPRME = -1) ELSE EXIT TO (P+2) WITH
0558*  NEXT CHARACTER IN (A).
0559*
0560  23531 061507  #FSCH LDA TPRME      MORE
0561  23532 002007        INA,SZA,RSS      CHARACTERS?
0562  23533 125463        JMP FSCH,I     NO
0563  23534 071507        STA TPRME      YES, UPDATE CHARACTER COUNT
0564  23535 061357        LDA TEMP4      LOAD CHARACTER
0565  23536 000065        CLE,ERA          ADDRESS
0566  23537 160000        LDA 0,I        EXTRACT
0567  23540 002041        SEZ,RSS          NEXT
0568  23541 001727        ALF,ALF            CHARACTER
0569  23542 010630        AND B377
0570  23543 035357        ISZ TEMP4      UPDATE CHARACTER ADDRESS
0571  23544 035463        ISZ FSCH
0572  23545 125463        JMP FSCH,I
0573**                              **
0574***  FETCH INPUT CHARACTER  ***
0575**                              **
0576*
0577*  EXITS NORMALLY TO (P+2) WITH NEXT INPUT CHARACTER IN (A).
0578*  IF THE CHARACTER IS A " OR THE INPUT RECORD IS EMPTY,
0579*  EXIT TO TRSTR,I (THE ONLY CALLER WHO CAN ENCOUNTER THIS
0580*  CONDITION).
0581*
0582  23546 035375  #FINC ISZ FINCH
0583  23547 015547        JSB GETCR      FETCH NEXT CHARACTER
0584  23550 125447        JMP TRSTR,I    NONE IN BUFFER
0585  23551 060001        LDA 1          ALLOW LOWER CASE                B1
0586  23552 050570        CPA .+42B      " ?
0587  23553 125447        JMP TRSTR,I    YES, TERMINAL EXIT
0588  23554 125375        JMP FINCH,I    NO
```

```
0590**                          **
0591***  FETCH TOP OF STACK    ***
0592**                          **
0593*
0594*  EXIT WITH TOP OPERAND IN (A) AND (B) AFTER UNSTACKING
0595*  IT.  CREATE EMPTY SPACE ON TEMPORARY STACK FOR FUTURE
0596*  INTERMEDIATE RESULT.
0597*
0598  23555 015475  #STTP JSB OPCHK      UNSTACK OPERAND
0599  23556 015477       JSB RSCHK      CREATE SPACE FOR TEMPORARY
0600  23557 104200       DLD 1,I        LOAD TOP OPERAND
0601  23561 125473       JMP STTOP,I
0602**                                 **
0603***  EXECUTE A BINARY OPERATOR    ***
0604**                                 **
0605*
0606*  ON ENTRY (P+1) CONTAINS A SUBROUTINE CALL FOR A BINARY
0607*  OPERATION.  THE TOP TWO OPERANDS ON THE STACK ARE
0608*  UNSTACKED AND VERIFIED AS NOT BEING 'UNDEFINED.'  THE
0609*  APPROPRIATE SUBROUTINE IS CALLED WITH THE TOP ARGUMENT'S
0610*  ADDRESS IN BIN02 AND THE NEXT-TO-TOP ARGUMENT'S VALUE IN
0611*  (A) AND (B).  EXIT IS TO (P+2) WITH THE RESULT IN (A)
0612*  AND (B).
0613*
0614  23562 161471  #BNOP LDA BINOP,I   SAVE
0615  23563 071676       STA BIN01        SUBROUTINE
0616  23564 035471       ISZ BINOP          CALL
0617  23565 015475       JSB OPCHK      SAVE ADDRESS OF
0618  23566 075677       STB BIN02        TOP OPERAND
0619  23567 015473       JSB STTOP      FETCH NEXT OPERAND
0620  23570 025676       JMP BIN01      EXECUTE SUBROUTINE
0621**                                  **
0622***  VERIFY LEGITIMACY OF OPERAND   ***
0623**                                  **
0624*
0625*  THE VALUE REFERENCED BY THE TOP OF THE OPERAND STACK
0626*  IS CHECKED.  EXIT TO ERROR IF VALUE IS 'UNDEFINED.'
0627*  ELSE REMOVE OPERAND ADDRESS FROM STACK AND REMOVE VALUE
0628*  FROM TOP OF TEMPORARY STACK, IF IT IS THERE.  EXIT
0629*  WITH OPERAND ADDRESS IN (B).
0630*
0631  23571 165433  #OPCK LDB OPDST,I   STRING
0632  23572 006020       SSB              OPERAND?
0633  23573 027616       JMP OPCH3-1    YES
0634  23574 160001       LDA 1,I        NO, HIGH PART OF
0635  23575 001222       RAL,RAL        IS
0636  23576 002004       INA              OPERAND
0637  23577 001310       RAR,SLA            NORMALIZED?
0638  23600 027610       JMP OPCH1      YES
0639  23601 051163       CPA BIT15      WAS FIRST WORD ZERO
0640  23602 006005       INB,RSS        YES
0641  23603 115263       JSB RERRS+23,I NO--ERROR
0642  23604 160001       LDA 1,I        SECOND
0643  23605 002002       SZA              WORD ZERO?
0644  23606 115263       JSB RERRS+23,I NO--ERROR
0645  23607 044525       ADB .-1        YES--RESTORE OPERAND ADDRESS
```

```
0646  23610 055431  OPCH1 CPB TMPST     TEMPORARY?
0647  23611 027617        JMP OPCH3     YES
0648  23612 061433  OPCH2 LDA OPDST     NO,
0649  23613 040524        ADA .-2         UNSTACK
0650  23614 071433        STA OPDST         OPERAND
0651  23615 125475        JMP OPCHK,I         ADDRESS
0652  23616 007004        CMB,INB       SET ADDRESS TRUE
0653  23617 061431  OPCH3 LDA TMPST     UNSTACK
0654  23620 040524        ADA .-2         TEMPORARY
0655  23621 071431        STA TMPST         OPERAND
0656  23622 027612        JMP OPCH2
0657**                                                  **
0658***  ALLOCATE AN ENTRY ON THE TEMPORARY STACK   ***
0659**                                                  **
0660*
0661*  (B) IS UNCHANGED UPON EXIT.  ON STACK OVERFLOW,
0662*  THE OPERATOR AND OPERAND STACKS ARE MOVED TO HIGHER
0663*  CORE TO MAKE ROOM FOR FIVE MORE TEMPORARY ENTRIES.
0664*
0665  23623 061431  #RSCK LDA TMPST     ADVANCE
0666  23624 040530        ADA .+2         POINTER TO
0667  23625 071431        STA TMPST         NEXT ENTRY
0668  23626 002004        INA           STACK
0669  23627 051565        CPA OPTRQ       OVERFLOW?
0670  23630 002001        RSS           YES
0671  23631 125477        JMP RSCHK,I   NO
0672  23632 075537        STB RT0       SAVE (B)
0673  23633 064051        LDB PBPTR     LOAD SOURCE ADDRESS
0674  23634 060540        LDA .+10      ALLOCATE SPACE FOR
0675  23635 015427        JSB CUSP        FIVE MORE
0676  23636 070051        STA PBPTR         TEMPORARIES
0677  23637 071541        STA RT1       SAVE DESTINATION ADDRESS
0678  23640 160001  RSCH1 LDA 1,I       TRANSFER
0679  23641 171541        STA RT1,I       A WORD
0680  23642 055431        CPB TMPST     DONE?
0681  23643 027651        JMP RSCH2     YES
0682  23644 003400        CCA           NO, DECREMENT
0683  23645 041541        ADA RT1         DESTINATION
0684  23646 071541        STA RT1           AND SOURCE
0685  23647 044525        ADB .-1             ADDRESSES
0686  23650 027640        JMP RSCH1
0687  23651 061433  RSCH2 LDA OPDST     CORRECT
0688  23652 040540        ADA .+10
0689  23653 071433        STA OPDST       STACK
0690  23654 061565        LDA OPTRQ
0691  23655 040540        ADA .+10          POINTERS
0692  23656 071565        STA OPTRQ
0693  23657 065537        LDB RT0       RESTORE (B)
0694  23660 125477        JMP RSCHK,I
```

```
0002**                          **
0003***  INTEGERIZE A NUMBER   ***
0004**                          **
0005*
0006*  ENTER WITH A FLOATING POINT NUMBER IN (A) AND (B).
0007*  IF EXPONENT EXCEEDS 23, NUMBER HAS INTEGER SIGNIFICANCE;
0008*  EXIT TO (P+1).  ALL OTHER CASES EXIT TO (P+2) WITH 32-BIT
0009*  INTEGER RIGHT JUSTIFIED IN (A) AND (B).  ON EXIT (0) = 0
0010*  IF NUMBER IS EXACTLY REPRESENTABLE AS A 16-BIT INTEGER.
0011*  IF EXPONENT IS NEGATIVE, TRUNCATE TO 0 OR -1 APPROPRIATELY
0012*  AND LET (0) = 1.  OTHERWISE RIGHT JUSTIFY INTEGER AND EXIT
0013*  WITH LAST BIT LOST IN (E).
0014*
0015  23661 071361  #IFIX STA TEMP6      SAVE (A)
0016  23662 102101        STO            SET 'NOT ONE-WORD INTEGER' MODE
0017  23663 015513        JSB .FLUN      UNPACK (B)
0018  23664 002020        SSA            NEGATIVE EXPONENT?
0019  23665 027710        JMP IFIX3      YES
0020  23666 040506        ADA .-16       NO, EXPONENET
0021  23667 002020        SSA              <= 15?
0022  23670 103101        CLO            YES
0023  23671 040516        ADA .-8        NO, EXPONENT
0024  23672 002021        SSA,RSS          <= 23?
0025  23673 125515        JMP IFIX,I     NO, ALL SIGNIFICANCE IS INTEGER
0026  23674 040516        ADA .-8        YES, MOVE BINARY POINT TO END OF
0027  23675 071423        STA EXP          (B) AND SAVE SHIFT COUNT
0028  23676 061361        LDA TEMP6      RETRIEVE (A)
0029  23677 027704        JMP IFIX2
0030  23700 000071  IFIX1 CLE,SLA,ARS    SHIFT (A) RIGHT
0031  23701 002200        CME            SHIFT
0032  23702 004035        SLB,ERB          (B) RIGHT
0033  23703 102101        STO            LOST A 1
0034  23704 035423  IFIX2 ISZ EXP        ALL SHIFTS DONE?
0035  23705 027700        JMP IFIX1      NO
0036  23706 035515        ISZ IFIX       YES
0037  23707 125515        JMP IFIX,I
0038  23710 061361  IFIX3 LDA TEMP6      RETRIEVE (A)
0039  23711 002120        CLE,SSA        TRUNCATE
0040  23712 003401        CCA,RSS          TO
0041  23713 002401        CLA,RSS            -1
0042  23714 007401        CCB,RSS             OR
0043  23715 006400        CLB                    0
0044  23716 027706        JMP IFIX3-2
```

```
0046**                                  **
0047***  GET NEXT FILE ITEM TYPE   ***
0048**                                  **
0049*
0050*  THE NEXT ITEM IN THE FILE, NUMBER, STRING, END-OF-FILE, OR
0051*  END-OF-RECORD, IS IDENTIFIED AND UPON EXIT (B) =1,2,3, OR 4
0052*  RESPECTIVELY.  EORFL = -1 WILL IGNORE END-OF-RECORD'S AND
0053*  RETURN WITH THE FIRST OF THE OTHER ITEMS ENCOUNTERED.
0054*
0055  23717 061335  GTTY1 LDA FILE#     REQUEST
0056  23720 015607        JSB RQSTR       NEXT RECORD
0057  23721 007400  #GTTY CCB            LOAD ACTIVE
0058  23722 045337        ADB FBASE       AND LIMIT
0059  23723 104200        DLD 1,I           RECORD POINTERS
0060  23725 050001        CPA 1           PHYSICAL END OF RECORD?
0061  23726 027742        JMP GTTY3       YES
0062  23727 160001        LDA 1,I         NO, LOAD WORD
0063  23730 006404        CLB,INB           OF RECORD
0064  23731 050524        CPA EOR         END-OF-RECORD?
0065  23732 027742        JMP GTTY3       YES
0066  23733 050525        CPA EOF         NO, END-OF-FILE?
0067  23734 027754        JMP GTTY4       YES
0068  23735 010451        AND M256        NO
0069  23736 051000        CPA B1000       STRING?
0070  23737 006004        INB             YES, (B) = 2
0071  23740 060001  GTTY2 LDA 1           SET (A) = (B)
0072  23741 125613        JMP GTTYP,I
0073  23742 065337  GTTY3 LDB FBASE      PHYSICAL
0074  23743 044522        ADB .-4         END
0075  23744 104200        DLD 1,I           OF
0076  23746 050001        CPA 1               FILE?
0077  23747 027756        JMP GTTY5       YES
0078  23750 007400        CCB             NO
0079  23751 055705        CPB EORFL       EOR'S WANTED?
0080  23752 027717        JMP GTTY1       NO
0081  23753 064530        LDB .+2         YES, SET (B) = 4
0082  23754 044530  GTTY4 ADB .+2         (B) = 3
0083  23755 027740        JMP GTTY2
0084  23756 060531  GTTY5 LDA .+3         (B) = 3
0085  23757 125613        JMP GTTYP,I
```

```
0087**
0088***   PUSH DOWN OPERATOR STACK
0089**
0090*
0091*  ALLOCATE AN ENTRY ON THE OPERATOR STACK.
0092*  (A) IS NOT CHANGED
0093*
0094  23760 064051  #PSHS LDB PBPTR      ADVANCE
0095  23761 044530        ADB .+2        STACK POINTER
0096  23762 007000        CMB            USER
0097  23763 044654        ADB LWAUS        SPACE
0098  23764 006020        SSB                OVERFLOW?
0099  23765 115246        JSB RERRS+10,I
0100  23766 034051        ISZ PBPTR      NO, ALLOCATE
0101  23767 034051        ISZ PBPTR        STORAGE
0102  23770 125465        JMP PSHST,I
0103**                                **
0104***  ROUND NUMBER TO INTEGER  ***
0105**                                **
0106*
0107*  ENTER WITH NUMBER IN (A) AND (B).  EXIT TO (P+2) IF
0108*  INTEGER FORM (ROUNDED AS NEEDED) IS POSITIVE AND NOT
0109*  LARGER THAN 15 BITS, ELSE EXIT TO (P+1).  ON EXIT TO
0110*  (P+2), (B) HOLDS THE INTEGER BIASED BY -1.
0111*
0112  23771 015515  #SBFX JSB IFIX       TRUNCATE NUMBER
0113  23772 125443        JMP SBFIX,I    NUMBER TOO LARGE
0114  23773 002002        SZA            INTEGER OVERFLOW?
0115  23774 125443        JMP SBFIX,I    YES
0116  23775 002041        SEZ,RSS        NO, ROUNDING BIT?
0117  23776 044525        ADB .-1        NO, BIAS INTEGER BY -1
0118  23777 006021        SSB,RSS        YES, POSITIVE RESULT?
0119  24000 035443        ISZ SBFIX      YES
0120  24001 125443        JMP SBFIX,I    NO
0121*
0122  24002 000000  NUSE2 BSS 3           NOT USED.
0123*
0124*
0125*  ROUTINE USED BY POWERFAIL/AUTO RESTART
0126*  TO DO A DISC TRANSFER.
0127*
0128  24005 000000  CHECK NOP
0129  24006 114350        JSB DISC,I     START TRANSFER.
0130  24007 060263        LDA ENDSK      WAIT FOR COMPLETION.
0131  24010 002002        SZA
0132  24011 026007        JMP *-2
0133  24012 103100        CLF 0          TURN OFF INTERRUPT.
0134  24013 126005        JMP CHECK,I
0135*
0136*
```

```
0138**                          **
0139***  REQUEST A RECORD       ***
0140**                          **
0141*
0142*  UPON ENTRY (A) HOLDS A FILE NUMBER (POSITIVE FOR A READ
0143*  REQUEST, NEGATIVE FOR A WRITE REQUEST) AND (B) SPECIFIES
0144*  VALIDATION OF THE FILE'S EXISTENCE ( (B) = -2) OR THE FILE
0145*  RECORD TO BE PUT IN THE FILE BUFFER ( (B) = -1 REQUESTS
0146*  THE RECORD WHICH FOLLOWS THE ONE CURRENTLY IN THE BUFFER,
0147*  (B) >= 0 REQUESTS RECORD (B)+1 ).  EXIT TO ERROR IF THE
0148*  FILE DOES NOT EXIST OR A WRITE REQUEST IS GIVEN FOR A
0149*  READ-ONLY FILE.  EXIT TO THE END-OF-FILE CODE IF THE
0150*  REQUESTED RECORD DOES NOT EXIST.  OTHERWISE, THE DIRTY
0151*  BIT IS EXAMINED TO DETERMINE IF THE FILE BUFFER SHOULD
0152*  BE WRITTEN BACK TO DISC.
0153*  A READ REQUEST READS THE REQUESTED RECORD INTO THE BUFFER;
0154*  A WRITE REQUEST MERELY INITIALIZES THE BUFFER TO 'EMPTY'.
0155*  THE FILE TABLE IS UPDATED TO REFLECT THE CHANGES.
0156*
0157  24014 075703  #RQST STB RQ2        SAVE RECORD REFERENCE
0158  24015 007400        CCB           GET 1'S COMPLEMENT
0159  24016 002020        SSA             OF FILE NUMBER AND
0160  24017 006401        CLB,RSS           SET RQ1 = -1 FOR A
0161  24020 003000        CMA                 READ REQUEST OR 0
0162  24021 075702        STB RQ1               FOR A WRITE REQUEST
0163  24022 041601        ADA FCNTR     DOES REQUESTED
0164  24023 003021        CMA,SSA,RSS     FILE EXIST?
0165  24024 115277        JSB RERRS+35,I  NO
0166  24025 041601        ADA FCNTR     YES
0167  24026 100200        MPY .+7       SET POINTER
0168  24030 041603        ADA FILTB       TO FILE TABLE
0169  24031 071337        STA FBASE         ENTRY
0170  24032 161337        LDA FBASE,I   LOAD NUMBER OF RECORDS
0171  24033 035337        ISZ FBASE     BIT 15 =1
0172  24034 035337        ISZ FBASE
0173  24035 007500        CCB,CLE
0174  24036 002020        SSA           READ-ONLY FILE?
0175  24037 055702        CPB RQ1       YES, READ REQUEST?
0176  24040 001675        ELA,CLE,SLA,ERA    YES, CLEAR BIT 15 AND SKIP
0177  24041 115300        JSB RERRS+36,I  NO
0178  24042 010362        AND B1777
0179  24043 065703        LDB RQ2       FILE VALIDATION
0180  24044 054524        CPB .-2         ONLY?
0181  24045 026140        JMP RQST5+2   YES
0182  24046 035703        ISZ RQ2       NO, RECORD SPECIFIED?
0183  24047 026061        JMP RQST2     YES
0184  24050 165337        LDB FBASE,I   NO, LOAD OLD RECORD ADDRESS
0185  24051 007003        CMB,SZB,RSS   NULL RECORD?
0186  24052 026061        JMP RQST2     YES
0187  24053 035337        ISZ FBASE     NO, COMPUTE
0188  24054 145337        ADB FBASE,I
0189  24055 007010        CMB,SLB         NEW
0190  24056 044000        ADB 0
0191  24057 005100         BRS              RECORD
0192  24060 006005        INB,RSS             NUMBER
0193  24061 035337  RQST2 ISZ FBASE
```

```
0194  24062 003004          CMA,INA       DOES
0195  24063 040001          ADA 1           RECORD
0196  24064 002020          SSA               EXIST?
0197  24065 026071          JMP *+4       YES
0198  24066 035337          ISZ FBASE     NO, CORRECT FBASE
0199  24067 035337          ISZ FBASE
0200  24070 125136          JMP FDT4A,I     FOR EOF EXIT CHECK
0201  24071 040001          ADA 1
0202  24072 030527          IOR .+1       COMPUTE
0203  24073 005000          BLS             DISC
0204  24074 002020          SSA               ADDRESS
0205  24075 060001          LDA 1               OF NEW
0206  24076 141337          ADA FBASE,I           RECORD
0207  24077 071703          STA RQ2       SAVE IT
0208  24100 035337          ISZ FBASE     SET POINTER
0209  24101 165337          LDB FBASE,I
0210  24102 044453          ADB M128    TO BEGINNING                        X]
0211  24103 035337          ISZ FBASE
0212  24104 175337          STB FBASE,I       OF RECORD BUFFER
0213  24105 075704          STB RQ3       SAVE ADDRESS OF BUFFER
0214  24106 065337          LDB FBASE     MOVE TO
0215  24107 044523          ADB .-3         DISC
0216  24110 075337          STB FBASE         ADDRESSES
0217  24111 151337          CPA FBASE,I   OLD AND NEW RECORDS THE SAME?
0218  24112 026131          JMP RQST3     YES
0219  24113 015615          JSB WRBUF     NO, WRITE OLD RECORD TO DISC
0220  24114 035702          ISZ RQ1      READ REQUEST?
0221  24115 026134          JMP RQST4     NO
0222  24116 061703          LDA RQ2       YES
0223  24117 064453          LDB M128      READ IN
0224  24120 103100          CLF 0
0225  24121 074065          STB WORD
0226  24122 065704          LDB RQ3         REQUESTED
0227  24123 045163          ADB FLGBT
0228  24124 114350          JSB DISC,I
0229  24125 060263          LDA ENDSK           RECORD
0230  24126 002002          SZA
0231  24127 026125          JMP *-2
0232  24130 026136          JMP RQST5
0233  24131 035702  RQST3   ISZ RQ1       WRITE REQUEST?
0234  24132 002001          RSS           YES
0235  24133 026136          JMP RQST5     NO
0236  24134 064524  RQST4   LDB EOR       SCRATCH RECORD
0237  24135 175704          STB RQ3,I       WITH END-OF-RECORD MARK
0238  24136 061703  RQST5   LDA RQ2       SET DISC ADDRESS OF
0239  24137 171337          STA FBASE,I     NEW RECORD INTO FILE TABLE
0240  24140 065337          LDB FBASE     MOVE POINTER
0241  24141 044531          ADB .+3         TO REFERENCE
0242  24142 075337          STB FBASE         RECORD POINTER
0243  24143 125607          JMP RQSTR,I
```

```
0245**                          **
0246*** STORE ITEM IN FILE  ***
0247**                          **
0248*
0249*  UPON ENTRY (B) INDICATES WHAT IS TO BE WRITTEN ON THE FILE:
0250*  (B) = -1 WRITES AN END-OF-FILE MARK, (B) = -2 WRITES A TWO-
0251*  WORD FLOATING POINT NUMBER, (B) = -3 WRITES A STRING.  IF
0252*  THE RECORD CANNOT ACCOMMODATE THE QUANTITY, A SERIAL WRITE
0253*  WILL PLACE IT IN THE FOLLOWING RECORD WHILE A RECORD WRITE
0254*  WILL EXIT TO THE END-OF-FILE CODE.
0255*
0256  24144 075707  #FILS STB FILT      SAVE REQUEST TYPE
0257  24145 007400        CCB           LOAD
0258  24146 045337        ADB FBASE       ACTIVE AND LIMIT
0259  24147 104200        DLD 1,I           RECORD POINTERS
0260  24151 050001        CPA 1         RECORD FULL?
0261  24152 026236        JMP FILS1     YES
0262  24153 075706        STB DADRR     NO, SAVE ACTIVE POINTER
0263  24154 035707        ISZ FILT      EOF REQUEST?
0264  24155 026166        JMP FILS2     NO
0265  24156 003400        CCA           YES,OVERLAY PREVIOUS
0266  24157 170001        STA 1,I         EOR OR EOF WITH EOF MARK
0267  24160 065337  FILS7 LDB FBASE     MAKE POINTER TO FIRST WORD OF
0268  24161 044521        ADB .-5         FILE TABLE ENTRY.
0269  24162 160001        LDA 1,I       SET
0270  24163 031165        IOR BIT14       DIRTY
0271  24164 170001        STA 1,I           BIT.
0272  24165 125611        JMP FILST,I
0273  24166 035707  FILS2 ISZ FILT      STRING?
0274  24167 026221        JMP FILS6     YES
0275  24170 044530        ADB .+2       NO
0276  24171 003004  FILS3 CMA,INA       COMPARE PROSPECTIVE
0277  24172 040001        ADA 1           ACTIVE POINTER WITH
0278  24173 003004        CMA,INA           END-OF-RECORD POINTER
0279  24174 002020        SSA           OVERFLOW?
0280  24175 026231        JMP FILS0     YES
0281  24176 175337        STB FBASE,I   NO, SAVE NEW ACTIVE POINTER
0282  24177 002003        SZA,RSS       RECORD EXACTLY FULL?
0283  24200 026203        JMP FILS4     YES
0284  24201 060524        LDA EOR       NO, FOLLOW ENTRY SPACE
0285  24202 170001        STA 1,I         WITH EOR MARK
0286  24203 035707  FILS4 ISZ FILT     STRING?
0287  24204 026214        JMP FILS5      NO
0288  24205 061505        LDA TNULL      YES
0289  24206 003000        CMA            COMPUTE AND
0290  24207 031000        IOR B1000        STORE STRING
0291  24210 171706        STA DADRR,I        HEADER WORD
0292  24211 060770        LDA FSCHA      TRANSFER
0293  24212 015447        JSB TRSTR        STRING
0294  24213 026160        JMP FILS7
0295  24214 104200  FILS5 DLD SBPTR,I    TRANSFER
0296  24216 104400        DST DADRR,I      NUMBER
0297  24220 026160        JMP FILS7
0298  24221 006004  FILS6 INB            COMPUTE
0299  24222 005000        BLS              DESTINATION
0300  24223 075373        STB TEMP5          ADDRESS
```

```
0301   24224 007004          CMB,INB         COMPUTE
0302   24225 045505          ADB TNULL         RECORD
0303   24226 007004          CMB,INB             SPACE
0304   24227 005100          BRS                   REQUIRED
0305   24230 026171          JMP FILS3
0306   24231 060524  FILS0    LDA EOR         INSURE EOR MARK
0307   24232 171706          STA DADRR,I       ENDS PRESENT RECORD
0308   24233 060524          LDA .-2         RESTORE
0309   24234 041707          ADA FILT         REQUEST
0310   24235 071707          STA FILT           TYPE
0311   24236 007400  FILS1    CCB
0312   24237 055621          CPB RCRD#       SERIAL WRITE?
0313   24240 002001          RSS             YES
0314   24241 125136          JMP FDT4A,I     NO
0315   24242 061335          LDA FILE#       REQUEST
0316   24243 003000          CMA               RECORD
0317   24244 015607          JSB RQSTR           TO WRITE
0318   24245 026145          JMP #FILS+1
```

```
0320**                                                  **
0321***  ADD TWO FLOATING POINT NUMBERS                ***
0322**                                                  **
0323   24246 071654  #FAD   STA A1        SET POINTER TO 2ND ARG
0324   24247 161501         LDA .FAD,I
0325   24250 071656         STA A2
0326   24251 061654         LDA A1
0327   24252 105000         OCT 105000    FAD A2,I
0328   24253 101656         DEF A2,I
0329   24254 035501         ISZ .FAD
0330   24255 102201         SOC
0331   24256 015511         JSB OUCHK     OVERFLOW OR UNDERFLOW
0332   24257 125501         JMP .FAD,I
0333**                                                  **
0334***  SUBTRACT TWO FLOATING POINT NUMBERS           ***
0335**                                                  **
0336   24260 071654  #FSB   STA A1        SE4POINTER TO 2ND ARG
0337   24261 161503         LDA .FSB,I
0338   24262 071656         STA A2
0339   24263 061654         LDA A1
0340   24264 105020         OCT 105020    FSB A2,I
0341   24265 101656         DEF A2,I
0342   24266 035503         ISZ .FSB
0343   24267 102201         SOC
0344   24270 015511         JSB OUCHK
0345   24271 125503         JMP .FSB,I
0346**                                                  **
0347***  MULTIPLY TWO FLOATING POINT NUMBERS           ***
0348**                                                  **
0349   24272 071654  #FMP   STA A1        SET POINTER TO 2ND ARG
0350   24273 161505         LDA .FMP,I
0351   24274 071656         STA A2
0352   24275 061654         LDA A1
0353   24276 105040         OCT 105040    FMP A2,I
0354   24277 101656         DEF A2,I
0355   24300 035505         ISZ .FMP
0356   24301 102201         SOC
0357   24302 015511         JSB OUCHK
0358   24303 125505         JMP .FMP,I
0359**                                                  **
0360***  DIVIDE TWO FLOATING POINT NUMBERS             ***
0361**                                                  **
0362   24304 071654  #FDV   STA A1
0363   24305 161507         LDA .FDV,I
0364   24306 071656         STA A2
0365   24307 061654         LDA A1
0366   24310 105060         OCT 105060    FDV A2,I
0367   24311 101656         DEF A2,I
0368   24312 035507         ISZ .FDV
0369   24313 102201         SOC
0370   24314 015511         JSB OUCHK
0371   24315 125507         JMP .FDV,I
0372*
0373*     CHECK OVERFLOW OR UNDERFLOW CONDITION
0374*
0375   24316 071654  #OUCK  STA A1        SAVE REGISTERS
```

```
0376  24317 075656          STB A2
0377  24320 002002          SZA
0378  24321 026327          JMP OUCK2     UNDERFLOW
0379  24322 015575          JSB CHOUF
0380  24323 115316          JSB WERRS+6,I
0381  24324 061654  OUCK1 LDA A1
0382  24325 065656          LDB A2
0383  24326 125511          JMP OUCHK,I
0384  24327 015575  OUCK2 JSB CHOUF
0385  24330 115315          JSB WERRS+5,I   OVERFLOW
0386  24331 026324          JMP OUCK1
0387**                                **
0388***  TAKE ARITHMETIC INVERSE  ***
0389**                                **
0390*
0391*  ENTER WITH A FLOATING POINT NUMBER IN (A) ABD (B).
0392*  EXIT WITH ITS ARITHMETIC INVERSE IN (A) AND (B).
0393*
0394  24332 104400  #ARIN DST A1          SAVE NUMBER
0395  24334 002400          CLA             SUBTRACT
0396  24335 006400          CLB               IT
0397  24336 105020          OCT 105020          FROM
0398  24337 001654          DEF A1                ZERO
0399  24340 125467          JMP ARINV,I
0400**                                   **
0401***  UNPACK LOW WORD OF NUMBER   ***
0402**                                   **
0403*
0404*  ENTER WITH LOW WORD OF FLOATING POINT NUMBER IN (B).
0405*  EXIT WITH EXPONENT IN (A) AND MANTISSA IN (B).
0406*
0407  24341 002400  #FLUN CLA             EXTRACT
0408  24342 101050          LSR 8           EXPONENT
0409  24343 001727          ALF,ALF           IN (A) AND
0410  24344 005727          BLF,BLF             MANTISSA IN (B)
0411  24345 000033          SLA,RAR         NEGATIVE EXPONENT?
0412  24346 031056          IOR SMSK        YES, FILL IN LEADING BITS
0413  24347 125513          JMP .FLUN,I     NO
```

```
0415*
0416*  WHILE READING A PROGRAM IN 'TAPE' MODE, ERRONEOUS STATEMENTS
0417*  ARE REPLACED WITH ERROR PSUEDO-STATEMENTS.  THESE ARE THREE
0418*  WORD 'STATEMENTS':  THE STATEMENT NUMBER, THE LENGTH (ALWAYS
0419*  3), AND THE ERROR NUMBER.  SINCE BITS 15-9 ARE CLEAR IN WORD
0420*  THREE, ERRORS HAVE A STATEMENT TYPE OF 0.  ERRCT HOLDS A
0421*  COUNT OF THE EMBEDDED ERRORS AND THE USER'S BIT OF TERR IS
0422*  SET IF ANY EMBEDDED ERRORS EXIST.  ADDITIONALLY, THE 'OUT-OF-
0423*  STORAGE' ERROR SETS SYMTB = 1 TO ASSIST SYNTAX.  ALL STATEMENTS
0424*  WITH A SEQUENCE NUMBER OF ZERO WILL BE COLLAPSED INTO A SINGLE
0425*  ERROR AND UNDER/OVERFLOWS IN NUMERICAL CONSTANTS ARE NOT
0426*  REPORTED.
0427*
0428**                                  **
0429***  OUTPUT TAPE MODE ERRORS        ***
0430**                                  **
0431*
0432*  UPON ENTRY ALL EMBEDDED ERRORS ARE STRIPPED FROM THE PROGRAM
0433*  AND STORED BELOW IT AS TWO-WORD QUANTITIES (THE LENGTH WORD
0434*  IS DROPPED).  FOLLOWING THIS THE ERRORS ARE PRINTED ONE BY
0435*  ONE WITH LINE NUMBERS.  AFTER PRINTING ALL ERRORS (OR, IF THE
0436*  USER ABORTS THE ERROR PRINTING, AFTER THE USER TYPES THE NEXT
0437*  LINE) EVERYTHING IS CLEANED UP AND A MESSAGE PRINTED TO SAY
0438*  THE LAST RECEIVED INPUT HAS BEEN IGNORED.
0439*
0440  24350 002400  TAPER CLA             FIRST
0441  24351 051642        CPA ERRCT         ENTRY?
0442  24352 026457        JMP TAPE5       NO
0443  24353 071641        STA SYMTB       YES, RESET 'OUT OF STORAGE' FLAG
0444  24354 060051        LDA PBPTR       INITIALIZE
0445  24355 071331        STA SPTR
0446  24356 064433        LDB PBUFF         PROGRAM
0447  24357 075613        STB DEST
0448  24360 075611        STB SOURC           POINTERS
0449*                                  *
0450**  STRIP OUT EMBEDDED ERRORS     **
0451*                                  *
0452  24361 006004  TAPE1 INB             SET (B)
0453  24362 060001        LDA 1             TO FIRST WORD
0454  24363 144001        ADB 1,I             OF NEXT
0455  24364 044525        ADB .-1               PROGRAM STATEMENT
0456  24365 002004        INA             IS THE
0457  24366 160000        LDA 0,I           CURRENT STATEMENT
0458  24367 011054        AND OPMSK           OF TYPE
0459  24370 002002        SZA                   'ERROR' ?
0460  24371 026361        JMP TAPE1       NO
0461  24372 061611        LDA SOURC       YES, LOAD SOURCE ADDRESS
0462  24373 075611        STB SOURC       SET SOURCE TO NEW VALUE
0463  24374 044523        ADB .-3         JUXTAPOSED
0464  24375 050001        CPA 1             ERRORS?
0465  24376 026402        JMP TAPE2       YES, NO MOVE NEEDED
0466  24377 051613        CPA DEST        NO, FIRST ERROR ENCOUNTERED?
0467  24400 026467        JMP TAPE6       YES
0468  24401 015577        JSB MOVER       NO, DELETE PRIOR ERROR(S)
0469  24402 064051  TAPE2 LDB PBPTR       ENOUGH
0470  24403 075577        STB TAP0
```

```
0471  24404 006004         INB              USER SPACE
0472  24405 054654         CPB LWAUS
0473  24406 026472         JMP TAPE7          TO TRANSFER
0474  24407 006004         INB
0475  24410 054654         CPB LWAUS            ERROR?
0476  24411 026472         JMP TAPE7      NO
0477  24412 074051         STB PBPTR      YES, APPEND TWO WORDS
0478  24413 164000         LDB 0,I        TRANSFER
0479  24414 175577         STB TAP0,I       LINE NUMBER
0480  24415 035577         ISZ TAP0
0481  24416 040530         ADA .+2        TRANSFER
0482  24417 164000         LDB 0,I          ERROR
0483  24420 175577         STB TAP0,I         NUMBER
0484  24421 065611         LDB SOURC      RETRIEVE POINTER TO STATEMENT
0485  24422 003400         CCA            DECREMENT
0486  24423 041642         ADA ERRCT        ERROR
0487  24424 071642         STA ERRCT          COUNTER
0488  24425 002002         SZA            ALL ERRORS DELETED?
0489  24426 026361         JMP TAPE1      NO
0490  24427 055331         CPB SPTR       YES, PROGRAM REMAINING?
0491  24430 026434         JMP TAPE3      NO
0492  24431 061611         LDA SOURC      YES, SLIDE UP
0493  24432 065331         LDB SPTR         OVER LAST
0494  24433 015577         JSB MOVER          ERROR(S)
0495*                        *
0496**  OUTPUT ERROR MESSAGES  **
0497*                        *
0498  24434 062451  TAPE3 LDA RETAD      SET
0499  24435 071573         STA SERR         RETURN ADDRESS
0500  24436 060734         LDA WERRA      FAKE
0501  24437 003004         CMA,INA          'WARNING ONLY'
0502  24440 071541         STA LT5            ERROR MODE
0503  24441 007400  TAPE4 CCB            FORCE
0504  24442 075543         STB LT6          LINE NUMBER
0505  24443 165331         LDB SPTR,I     MAKE LINE NUMBER OF
0506  24444 075625         STB .LNUM        CURRENT ERROR ACCESSIBLE
0507  24445 035331         ISZ SPTR       LOAD
0508  24446 161331         LDA SPTR,I       ERROR NUMBER
0509  24447 006400         CLB            EXIT TO
0510  24450 026562         JMP SERR1+3        ERROR PRINTER
0511  24451 024452  RETAD DEF *+1
0512  24452 035331         ISZ SPTR       MORE
0513  24453 061331         LDA SPTR
0514  24454 050051         CPA PBPTR        ERRORS?
0515  24455 002001         RSS            NO
0516  24456 026441         JMP TAPE4      YES
0517  24457 061613  TAPE5 LDA DEST       CORRECT POINTER TO
0518  24460 070051         STA PBPTR        LAST WORD +1 OF PROGRAM
0519  24461 103100         CLF 0
0520  24462 060052         LDA TERR       TURN
0521  24463 011627         AND CMSK  ERROR FLAG                          XJ
0522  24464 070052         STA TERR          OFF                         XJ
0523  24465 102100         STF 0
0524  24466 115275         JSB RERRS+33,I  EMIT PARTING SHOT
0525*
0526  24467 075613  TAPE6 STB DEST       SET DESTINATION POINTER
```

```
0527  24470 060001         LDA 1           TO FIRST ERROR ENCOUNTERED
0528  24471 026402         JMP TAPE2
0529  24472 071573  TAPE7  STA TAP1        SAVE SOURCE ADDRESS
0530  24473 003004         CMA,INA         COMPUTE SIZE OF AREA
0531  24474 041613         ADA DEST          TO BE RECLAIMED
0532  24475 071577         STA TAP0            AND SAVE IT
0533  24476 041331         ADA SPTR        RESET POINTER TO
0534  24477 071331         STA SPTR          LAST WORD +1 OF PROGRAM
0535  24500 065611         LDB SOURC       SET POINTER TO
0536  24501 045577         ADB TAP0          NEXT STATEMENT
0537  24502 075611         STB SOURC           TO NEW VALUE
0538  24503 061573         LDA TAP1        RETRIEVE SOURCE ADDRESS
0539  24504 064051         LDB PBPTR       RECLAIM
0540  24505 015577         JSB MOVER         SPACE
0541  24506 065613         LDB DEST        SET NEW POINTER TO
0542  24507 074051         STB PBPTR         PROTECTED AREA
0543  24510 061611         LDA SOURC       COMPUTE POINTER TO
0544  24511 040523         ADA .-3           CURRENT ERROR STATEMENT
0545  24512 071613         STA DEST        SET NEW DESTINATION POINTER
0546  24513 026403         JMP TAPE2+1
0547**                                    **
0548***  MOVE BLOCK TO LOWER CORE  ***
0549**                                    **
0550*
0551*  UPON ENTRY (B) POINTS TO THE LAST WORD +1 TO BE MOVED AND
0552*  (A) POINTS TO THE FIRST WORD TO BE MOVED.  DEST POINTS TO THE
0553*  FIRST WORD OF THE DESTINATION SPACE.
0554*
0555  24514 076524  #MOVE STB MVEND      SAVE POINTER TO LAST WORD +1
0556  24515 164000         LDB 0,I       TRANSFER
0557  24516 175613         STB DEST,I      WORD
0558  24517 035613         ISZ DEST      BUMP
0559  24520 002004         INA             POINTERS
0560  24521 052524         CPA MVEND     DONE?
0561  24522 125577         JMP MOVER,I   YES
0562  24523 026515         JMP #MOVE+1   NO
0563  24524 000000  MVEND  NOP
0564*
0565***   OUTPUT AN ERROR MESSAGE
0566*
0567  24525 003400  #SERR CCA             COMPUTE                          X]
0568  24526 041573         ADA SERR                                        X]
0569  24527 160000         LDA 0,I       AND SAVE                         X]
0570  24530 040730         ADA SERRA                                       X]
0571  24531 010633         AND B777      ERROR NUMBER.                    X]
0572  24532 071531         STA LT3                                         X]
0573  24533 040732         ADA RERRA                                       X]
0574  24534 071541         STA LT5       SYNTAX                           X]
0575  24535 002021         SSA,RSS       ERROR?                           X]
0576  24536 026557         JMP SERR1     NO                               X]
0577  24537 060266         LDA TAPEF     YES,                             X]
0578  24540 011626         AND LMSK       TAPE                            X]
0579  24541 002002         SZA              MODE?                         X]
0580  24542 026725         JMP SERR6     YES                              X]
0581  24543 006400         CLB           NO                               X]
0582  24544 075375         STB LT2       OUTPUT                           X]
```

```
0583  24545 062754         LDA ASCER     'ERROR'                          X]
0584  24546 071527         STA LT1        AND                             X]
0585  24547 060523         LDA .-3         WAIT                           X]
0586  24550 015561         JSB OUTST        FOR                           X]
0587  24551 114322         JSB SCHIN,I        INPUT                       X]
0588  24552 003400         CCA           SET                              X]
0589  24553 141630         ADA LBUFA,I    BUFFER                          X]
0590  24554 071635         STA BADDR       POINTER                        X]
0591  24555 015547         JSB GETCR     CARRIAGE RETURN ONLY?            X]
0592  24556 026666         JMP SERR4     YES                              X]
0593*
0594***   PRINT ERROR MESSAGE
0595*
0596  24557 061531  SERR1 LDA LT3                          [X]
0597*                                                    X]
0598  24560 006400         CLB           LOAD                             X]
0599  24561 075543         STB LT6                                        X]
0600  24562 101104         RRR 4          BIDRANT                         X]
0601  24563 075531         STB LT3                                        X]
0602  24564 040726         ADA DSERR       ADDRESS                        X]
0603  24565 164000         LDB 0,I                                        X]
0604  24566 061531         LDA LT3       COMPUTE                          X]
0605  24567 001200         RAL                                            X]
0606  24570 010527         AND .+1       SECTOR                           X]
0607  24571 040001         ADA 1                                          X]
0608  24572 064453         LDB M128                                       X]
0609  24573 103100         CLF 0                                          X]
0610  24574 074065         STB WORD      READ                             X]
0611  24575 064317         LDB #LIBI                                      X]
0612  24576 114350         JSB DISC,I    SECTOR                           X]
0613  24577 060263         LDA ENDSK     WAIT FOR                         X]
0614  24600 002002         SZA           DISC TRANSFER                    X]
0615  24601 026577         JMP *-2       TO COMPLETE                      X]
0616  24602 103100         CLF 0         TURN OFF INTERRUPT SO WE'RE [X]
0617  24603 070262         STA LIB          SAFE AS FROGS TOES [X]
0618  24604 061541         LDA LT5                                        X]
0619  24605 002021         SSA,RSS       EXECUTION ERROR?                 X]
0620  24606 026676         JMP SERR5     YES                              X]
0621  24607 060630         LDA B377      NO - OUTPUT                      X]
0622  24610 015553         JSB OUTCR      A RUBOUT                        X]
0623  24611 060517         LDA .-7                                        X]
0624  24612 071527         STA LT1       OUTPUT                           X]
0625  24613 060566         LDA .+40B                                      X]
0626  24614 015553         JSB OUTCR      7                               X]
0627  24615 035527         ISZ LT1                                        X]
0628  24616 026613         JMP *-3         BLANKS.                        X]
0629  24617 061531  SERR2 LDA LT3                                        X]
0630  24620 001727         ALF,ALF       COMPUTE                          X]
0631  24621 010625         AND .112      MESSAGE     (0XXX0000)           X]
0632  24622 040320         ADA #LIB#     ADDRESS                          X]
0633  24623 065613         LDB DEST          SAVE 'DEST'
0634  24624 076753         STB MVNDT
0635  24625 064736         LDB ERSCA     * TRANSFER          [X]
0636  24626 075527         STB LT1       * ERROR             [X]
0637  24627 075613         STB DEST      * STATEMENT         [X]
0638  24630 064547         LDB .+17      * TO                [X]
```

```
0639   24631 044000          ADB 0          * ERSEC              [X]
0640   24632 015577          JSB MOVER      * BUFFER             [X]
0641   24633 066753          LDB MVNDT        RESTORE DEST
0642   24634 075613          STB DEST
0643   24635 007400          CCB                                      X]
0644   24636 161527          LDA LT1,I       PRINT               [X]
0645   24637 002020          SSA            LINE NUMBER?              X]
0646   24640 026643          JMP *+3        NO                        X]
0647   24641 075543          STB LT6        YES - SET FLAG            X]
0648   24642 003004          CMA,INA                                  X]
0649   24643 006400          CLB            OUTPUT                    X]
0650   24644 075375          STB LT2         ERROR                    X]
0651   24645 015561          JSB OUTST        MESSAGE                 X]
0652   24646 035543          ISZ LT6        LINE NUMBER FLAG SET?     X]
0653   24647 026657          JMP SERR3      NO                        X]
0654   24650 062760          LDA LINEA      YES                       X]
0655   24651 071527          STA LT1        PRINT                     X]
0656   24652 006400          CLB                                      X]
0657   24653 060521          LDA .-5         'IN LINE'                X]
0658   24654 015561          JSB OUTST                                X]
0659   24655 065625          LDB .LNUM      OUTPUT                    X]
0660   24656 015555          JSB OUTIN      LINE NUMBER               X]
0661   24657 061541  SERR3    LDA LT5      'BAD                      X]
0662   24660 040734          ADA WERRA       INPUT'                   X]
0663   24661 002003          SZA,RSS          ERROR                  X]
0664   24662 026674          JMP SERR8      YES                       X]
0665   24663 071541          STA LT5        NO - SAVE FOR RETURN CHECK X]
0666   24664 060543          LDA .+15B      OUTPUT                    X]
0667   24665 015553          JSB OUTCR       CARRIAGE RETURN          X]
0668   24666 060540  SERR4    LDA .+12B    OUTPUT                    X]
0669   24667 015553          JSB OUTCR       LINE-FEED                X]
0670   24670 061541          LDA LT5        WARNING                   X]
0671   24671 002020          SSA            ONLY?                     X]
0672   24672 124321          JMP SCHEN,I    NO                        X]
0673   24673 002400          CLA            YES                       X]
0674   24674 071636  SERR8    STA CHRCT                                X]
0675   24675 125573          JMP SERR,I                               X]
0676*                                                  X]
0677   24676 060543  SERR5    LDA .+15B    OUTPUT                    X]
0678   24677 015553          JSB OUTCR       CARRIAGE RETURN          X]
0679   24700 060540          LDA .+12B        AND                    X]
0680   24701 015553          JSB OUTCR         LINE-FEED              X]
0681   24702 002400          CLA            BLOCK
0682   24703 170401          STA DCLC1,I      CLOCK
0683   24704 114642          JSB ABCK,I     ANY ABORTS?
0684   24705 160402          LDA DCLC2,I    UNBLOCK
0685   24706 170401          STA DCLC1,I      CLOCK
0686   24707 061541          LDA LT5        WARNING                   X]
0687   24710 040734          ADA WERRA      ERROR?                    X]
0688   24711 002021          SSA,RSS                                  X]
0689   24712 026617          JMP SERR2      YES                       X]
0690   24713 060267          LDA CHNFG      NO                        X]
0691   24714 011627          AND CMSK        CLEAR                    [X]
0692   24715 070267          STA CHNFG      CHAIN FLAG                X]
0693   24716 064261          LDB MAIN
0694   24717 044535          ADB .+?TSTA     REMOVE 'USER
```

```
24720 160001          LDA B,I          IS RUNNING'
24721 010515          AND RNNBT          AND 'X-OFF'
24722 010467          AND XONBT            BITS FROM HIS
24723 170001          STA B,I                I/O STATUS
24724 026617          JMP SERR2                                    X]
24725 064051   SERR6  LDB PBPTR                                    X]
24726 044530          ADB .+2       STORE                          X]
24727 061531          LDA LT3       ERROR                          X]
24730 170001          STA 1,I       NUMBER                         X]
24731 006004          INB           SET POINTER TO                 X]
13621 /6453/          STB SBPTR     L@ST WORD*0 OF ERROR           X]
24733 002003          SYA,RSS       'OUT OF STORAGE' ERROR?        W\
24734 035641          ISZ SYMTB     YES                            X]
24735 103100          CLF 0         NO                             X]
24736 060052          LDA TERR      FIRST                          X]
24737 031626          IOR LMSK                                     X]
24740 050052          CPA TERR      ERROR?                         X]
24741 026745          JMP *+4       NO                             X]
24742 070052          STA TERR      YES - SET FLAG                 X]
24743 002400          CLA           CLEAR                          X]
24744 071642          STA ERRCT     ERROR COUNTER                  X]
24745 102100          STF 0                                        X]
24746 035642          ISZ ERRCT     COUNT ERROR                    X]
24747 015551          JSB BCKSP     SEEK                           X]
24750 015547   SERR7  JSB GETCR     CARRIAGE RETURN                X]
24751 124716          JMP ACCSA,I                                  X]
24752 026750          JMP *-2                                      X]
24753 000000   MVNDT  NOP
*                                                  X]
24754 024754   ASCER  DEF ERR-1                                    X]
24755 005105   ERR    OCT 5105                                     X]
24756 051122          ASC 2,RROR                                   X]
24760 024760   LINEA  DEF *                                        X]
24761 020111          ASC 4, IN LINE                               X]
24765 020000          OCT 20000                                    X]
```

```
0002* **********************
0003****                    ***
0004***  LIST THE PROGRAM   ***
0005****                    ***
0006* **********************
0007*
0008*
0009*
0010*  'LIST' CONVERTS THE CURRENT USER PROGRAM TO A STANDARD ASCII
0011*  FORMAT AND PRINTS IT ON THE TELETYPE ONE LINE PER PROGRAM
0012*  STATEMENT.  'PUNCH' ADDS A LEADER AND TRAILER TO THE ASCII
0013*  PROGRAM DUMP.  LISTING BEGINS WITH THE FIRST PROGRAM STATEMENT
0014*  UNLESS DIRECTED OTHERWISE BY THE 'LIST' OR 'PUNCH' COMMAND.
0015*  LT1 IS THE PROGRAM POSITION POINTER.  LT2 IS THE STATEMENT
0016*  LENGTH COUNTER.
0017*
0018  24766 002404  XPNCH CLA,INA       SET FLAG TO XPUNCH
0019  24767 026772        JMP LIST+1
0020  24770 003401  PUNCH CCA,RSS       SET TO 'PUNCH' MODE
0021  24771 002400  LIST  CLA           SET TO 'LIST' MODE
0022  24772 071477        STA LT0       SAVE MODE
0023  24773 064433        LDB PBUFF     NULL
0024  24774 054051        CPB PBPTR       PROGRAM?
0025  24775 027352        JMP LIS16     YES
0026  24776 065643        LDB SPROG     NO
0027  24777 075531        STB LT3
0028  25000 015563        JSB SINIT     PREPARE PROGRAM FOR LISTING
0029  25001 064051        LDB PBPTR
0030  25002 060053        LDA CFLAG     SAVE
0031  25003 011626        AND LMSK        PROGRAM                          [
0032  25004 071541        STA LT5           MODE
0033*                                          *
0034**  DETERMINE FIRST STATEMENT TO BE LISTED  **
0035*                                          *
0036  25005 002002        SZA           SAVE POINTER TO
0037  25006 065641        LDB SYMTB       LAST WORD +1
0038  25007 075543        STB LT6           OF PROGRAM
0039  25010 065163        LDB BIT15   GET LARGE SEQUENCE NUMBER
0040  25011 075533        STB LT7      SET ENDING SEQUENCE NUMBER
0041  25012 015547        JSB GETCR     STARTING LINE NUMBER?
0042  25013 027042        JMP LIST1     NO
0043  25014 006400        CLB
0044  25015 050602        CPA .+54B     CHECK FOR COMMA
0045  25016 027026        JMP LISCM    FIRST STATEMENT NUMBER OMITTED.
0046  25017 015551        JSB BCKSP     BACK UP FOR FIRST STATEMENT NUMB
0047  25020 015565        JSB BLDIN     FETCH INTEGER
0048  25021 050543        CPA .+15B    CHECK FOR CARRIAGE RETURN
0049  25022 027035        JMP LISCR    YES, END OF COMMAND
0050  25023 050602        CPA .+54B      COMMA?
0051  25024 027026        JMP LISCM     YES
0052  25025 115250        JSB RERRS+12,I    NOPE
0053  25026         LISCM EQU *
0054  25026 075531        STB LT3      SAVE STARTING SEQUENCE NUMBER
0055  25027 015565        JSB BLDIN    GET INTEGER
0056  25030 050543        CPA .+15B     END OF RECORD?
0057  25031 007001        CMB,RSS       YES
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0058  25032 115250          JSB RERRS+12,I  NO
0059  25033 075533          STB LT7       SAVE ENDING SEQUENCE NUMBER
0060  25034 065531          LDB LT3       GET BACK STARTING SEQUENCE NUMBER
0061  25035           LISCR EQU *
0062  25035 061543          LDA LT6        SEEK
0063  25036 015415          JSB FNDPS        STATEMENT
0064  25037 027352          JMP LIS16     ALL LINE NUMBERS < GIVEN INTEGER
0065  25040 000000          NOP           SAVE DESIRED
0066  25041 075531          STB LT3         STARTING POINT
0067  25042 060540    LIST1 LDA .+12B     OUTPUT A
0068  25043 015553          JSB OUTCR       LINE FEED
0069*                       *
0070**  OUTPUT PROGRAM NAME  **
0071*                       *
0072  25044 061634          LDA LNAME
0073  25045 071527          STA LT1
0074  25046 040527          ADA .+?NAME-?ID
0075  25047 160000          LDA 0,I
0076  25050 010353          AND INF
0077  25051 002003          SZA,RSS         NAME?
0078  25052 027061          JMP *+7       YES
0079  25053 006400          CLB           NO
0080  25054 075375          STB LT2       OUTPUT
0081  25055 060523          LDA .-3         PROGRAM
0082  25056 015561          JSB OUTST         NAME
0083  25057 060543          LDA .+15B     OUTPUT
0084  25060 015553          JSB OUTCR       CARRIAGE RETURN
0085  25061 060540          LDA .+12B         AND
0086  25062 015553          JSB OUTCR           DOUBLE
0087  25063 060540          LDA .+12B             LINE
0088  25064 015553          JSB OUTCR               FEED
0089*                           *
0090**  OUTPUT LEADER IF 'PUNCH'  **
0091*                           *
0092  25065 002400          CLA           'LIST'
0093  25066 051477          CPA LT0         MODE?
0094  25067 027076          JMP LIST2-2   YES
0095  25070 060462          LDA M72B      NO,
0096  25071 071455          STA DIGCT       OUTPUT
0097  25072 002400          CLA               FEED
0098  25073 015553          JSB OUTCR           FRAMES
0099  25074 035455          ISZ DIGCT             FOR
0100  25075 027072          JMP *-3                 LEADER
0101  25076 065531          LDB LT3       SET POINTER TO
0102  25077 075527          STB LT1         STARTING POINT
0103*                     *
0104**  MAIN LIST LOOP  **
0105*                     *
0106  25100 065527  LIST2 LDB LT1         PROGRAM
0107  25101 055543          CPB LT6         EXHAUSTED?
0108  25102 027340          JMP LIS15     YES
0109  25103 165527          LDB LT1,I     GET LINE NUMBER
0110  25104 045533          ADB LT7       CHECK FOR END OF LISTING
0111  25105 006021          SSB,RSS       SKIP IF NOT DONE YET
0112  25106 027340          JMP LIS15     STOP LISTING HERE
0113  25107 165527          LDB LT1,I      NO, OUTPUT
```

```
0114  25110 015555          JSB OUTIN       LINE NUMBER
0115  25111 060566          LDA .+40B      OUTPUT
0116  25112 015553          JSB OUTCR        BLANK
0117  25113 035527          ISZ LT1        SET
0118  25114 161527          LDA LT1,I        LENGTH
0119  25115 003004          CMA,INA            COUNTER
0120  25116 002004          INA                  FOR
0121  25117 071375          STA LT2                STATEMENT
0122  25120 027123          JMP LIST3
0123  25121 165527          LDB LT1,I    OUTPUT
0124  25122 015555          JSB OUTIN      BOUND
0125  25123 035527  LIST3    ISZ LT1       MORE OF
0126  25124 035375          ISZ LT2         STATEMENT?
0127  25125 027141          JMP LIST4     YES
0128  25126 002404          CLA,INA    IS IT XPUNCH?
0129  25127 051477          CPA LT0
0130  25130 002001          RSS          YES
0131  25131 027134          JMP *+3
0132  25132 060551          LDA .+23B   OUPUT X-OFF CHARACTER
0133  25133 015553          JSB OUTCR
0134  25134 060543          LDA .+15B     NO,
0135  25135 015553          JSB OUTCR       OUTPUT A
0136  25136 060540          LDA .+12B         CARRIAGE RETURN
0137  25137 015553          JSB OUTCR           AND LINE FEED
0138  25140 027100          JMP LIST2
0139*                        *
0140**  IDENTIFY OPERATOR   **
0141*                        *
0142  25141 161527  LIST4    LDA LT1,I     EXTRACT
0143  25142 011054          AND OPMSK       OPERATOR
0144  25143 002003          SZA,RSS       NULL OPERATOR?
0145  25144 027165          JMP LIST5     YES
0146  25145 051116          CPA LETOP     NO, 'IMPLIED' LET?
0147  25146 027163          JMP LIST5-2   YES, OUTPUT A BLANK
0148  25147 001727          ALF,ALF       NO,
0149  25150 040464          ADA D62         SINGLE-CHARACTER
0150  25151 002021          SSA,RSS           OPERATOR?
0151  25152 027314          JMP LIS12     NO
0152  25153 040610          ADA B63       YES,
0153  25154 040756          ADA FOPBS       EXTRACT
0154  25155 160000          LDA 0,I           ASCII
0155  25156 001727          ALF,ALF             CODE
0156  25157 010626          AND B177
0157  25160 050570          CPA .+42B     " ?
0158  25161 027355          JMP LIS14     YES
0159  25162 002001          RSS           NO
0160  25163 060566          LDA .+40B     LOAD A BLANK
0161  25164 015553          JSB OUTCR
0162*                        *
0163**  IDENTIFY OPERAND    **
0164*                        *
0165  25165 161527  LIST5    LDA LT1,I     EXTRACT
0166  25166 011070          AND OPDMK       OPERAND
0167  25167 071531          STA LT3
0168  25170 002020          SSA           FLAG BIT SET?
0169  25171 027237          JMP LIST9     YES
```

```
0170  25172 006400          CLB              NO, NULL
0171  25173 055531          CPB LT3            OPERAND?
0172  25174 027123          JMP LIST3        YES
0173  25175 055541          CPB LT5          NO, 'COMPILED' ?
0174  25176 027204          JMP LIST0        NO
0175  25177 040525          ADA .-1          YES
0176  25200 001000          ALS              LOAD
0177  25201 041641          ADA SYMTB          ACTUAL
0178  25202 160000          LDA 0,I              SYMBOL
0179  25203 071531          STA LT3          SAVE SYMBOL
0180*                                 *
0181**  LIST SYMBOLIC OPERAND  **
0182*                                 *
0183  25204 011062  LIST0 AND PDFFL       ISOLATE TYPE PART
0184  25205 050545         CPA .+17B       FUNCTION?
0185  25206 027232         JMP LIST8       YES
0186  25207 061531  LIST6 LDA LT3         NO,
0187  25210 101104         RRR 4             COMPUTE
0188  25211 010565         AND .+37B           ASCII FOR
0189  25212 040615         ADA B100              LETTER
0190  25213 015553         JSB OUTCR       OUTPUT LETTER
0191  25214 061531         LDA LT3
0192  25215 010545         AND .+17B
0193  25216 050545         CPA .+17B       FUNCTION?
0194  25217 027123         JMP LIST3       YES
0195  25220 002003         SZA,RSS         NO, STRING VARIABLE?
0196  25221 027230         JMP LIST7       YES
0197  25222 040521         ADA .-5         NO
0198  25223 002020         SSA             DIGIT?
0199  25224 027123         JMP LIST3       NO
0200  25225 040606         ADA .+60B       YES,
0201  25226 015553         JSB OUTCR         OUTPUT IT
0202  25227 027123         JMP LIST3
0203  25230 060572  LIST7 LDA .+44B       LOAD ASCII '$'
0204  25231 027226         JMP *-3
0205  25232 061112  LIST8 LDA F           OUTPUT
0206  25233 015553         JSB OUTCR
0207  25234 061114         LDA N             'FN'
0208  25235 015553         JSB OUTCR
0209  25236 027207         JMP LIST6
0210*                                       *
0211**  LIST CONSTANT OPERAND OR PARAMETER  **
0212*                                       *
0213  25237 001665  LIST9 ELA,CLE,ERA   CLEAR FLAG BIT
0214  25240 002002         SZA           CONSTANT?
0215  25241 027256         JMP LIS10     NO
0216  25242 071636         STA CHRCT     YES, SET
0217  25243 071367         STA SIGN        FOR NO SIGN
0218  25244 035527         ISZ LT1       LOAD
0219  25245 035375         ISZ LT2
0220  25246 104200         DLD LT1,I       CONSTANT
0221  25250 035527         ISZ LT1
0222  25251 035375         ISZ LT2
0223  25252 002120         CLE,SSA       NEGATIVE NUMBER?
0224  25253 002300         CCE           YES, ENABLE SIGN
0225  25254 015521         JSB NUMOT     OUTPUT THE CONSTANT
```

```
0226  25255 027123         JMP LIST3
0227  25256 010545  LIS10  AND .+17B      ISOLATE TYPE PART
0228  25257 050531         CPA .+3       PROGRAM INTEGER?
0229  25260 027271         JMP LIS11     YES
0230  25261 050545         CPA .+17B     NO, PRE-DEFINED FUNCTION?
0231  25262 002001         RSS           YES
0232  25263 027207         JMP LIST6     NO, MUST BE A PARAMETER SYMBOL
0233  25264 061531         LDA LT3       OUTPUT
0234  25265 001722         ALF,RAL
0235  25266 064702         LDB ATAB        FUNCTION
0236  25267 015557         JSB MCOUT
0237  25270 027123         JMP LIST3         SYMBOL
0238  25271 035527  LIS11  ISZ LT1
0239  25272 035375         ISZ LT2
0240  25273 061537         LDA LT4       LISTING A
0241  25274 051026         CPA DIMOP       <DIM STATEMENT> ?
0242  25275 027121         JMP LIST3-2   YES
0243  25276 051132         CPA COMOP     NO, 'COM'?
0244  25277 027121         JMP LIST3-2   YES
0245  25300         LIS18  EQU *                                        B]
0246  25300 061541         LDA LT5       NO
0247  25301 165527         LDB LT1,I     LOAD PROSPECTIVE INTEGER
0248  25302 002002         SZA           PROGRAM 'COMPILED' ?
0249  25303 164001         LDB 1,I       YES
0250  25304 015555         JSB OUTIN     OUTPUT INTEGER
0251  25305 035527         ISZ LT1       MORE
0252  25306 035375         ISZ LT2         STATEMENT?
0253  25307 002001         RSS           YES
0254  25310 027126         JMP LIST3+3   NO
0255  25311 060602         LDA .+54B     EMIT
0256  25312 015553         JSB OUTCR       A COMMA
0257  25313 027300         JMP LIS18                                   B]
0258*                                   *
0259**  LIST MULTICHARACTER OPERATOR   **
0260*                                   *
0261  25314 060566  LIS12  LDA .+40B      OUTPUT
0262  25315 015553         JSB OUTCR       A BLANK
0263  25316 161527         LDA LT1,I     OUTPUT
0264  25317 064662         LDB MCBOP       MULTICHARACTER
0265  25320 015557         JSB MCOUT         OPERATOR
0266  25321 060566         LDA .+40B
0267  25322 065537         LDB LT4       WAS IT
0268  25323 055032         CPB REMOP       A 'REM' ?
0269  25324 027334         JMP LIS13     YES
0270  25325 055050         CPB FILOP     NO, 'FILES' ?
0271  25326 027333         JMP LIS13-1   YES
0272  25327 054634         CPB CHNOP     NO, 'CHAIN'?
0273  25330 027333         JMP LIS13-1   YES
0274  25331 015553         JSB OUTCR     NO, OUTPUT A BLANK
0275  25332 027165         JMP LIST5
0276  25333 015553         JSB OUTCR     OUTPUT A BLANK
0277  25334 061375  LIS13  LDA LT2       OUTPUT
0278  25335 007400         CCB             THE
0279  25336 015561         JSB OUTST         REMARK
0280  25337 027123         JMP LIST3
0281*                                 *
```

```
0282**  OUTPUT TRAILER IF 'PUNCH'  **
0283*                               *
0284   25340 002400  LIS15 CLA        LIST
0285   25341 051477        CPA LT0      MODE?
0286   25342 124321        JMP SCHEN,I   YES
0287   25343 060462        LDA M72B      NO,
0288   25344 071455        STA DIGCT       OUTPUT
0289   25345 002400        CLA               FEED
0290   25346 015553        JSB OUTCR           FRAMES
0291   25347 035455        ISZ DIGCT             FOR
0292   25350 027345        JMP *-3                 TRAILER
0293   25351 124321        JMP SCHEN,I
0294*
0295   25352 060540  LIS16 LDA .+12B     ECHO
0296   25353 015553        JSB OUTCR       LINE
0297   25354 124321        JMP SCHEN,I       FEED
0298*                                *
0299**  LIST A STRING CONSTANT  **
0300*                               *
0301   25355 015553  LIS14 JSB OUTCR     OUTPUT "
0302   25356 161527        LDA LT1,I     COMPUTE
0303   25357 010630        AND B377        WORDS
0304   25360 002003        SZA,RSS
0305   25361 027366        JMP LIS17
0306   25362 003004        CMA,INA           OF
0307   25363 001100        ARS                 STRING
0308   25364 006400        CLB           OUTPUT
0309   25365 015561        JSB OUTST       STRING
0310   25366 060570  LIS17 LDA .+42B     OUTPUT
0311   25367 015553        JSB OUTCR       CLOSING "
0312   25370 027123        JMP LIST3
0313**                               **
0314***  WRITE BUFFER TO DISC  ***
0315**                               **
0316*
0317*  THE BUFFER OF THAT FILE CURRENTLY REFERENCED BY FBASE IS
0318*  WRITTEN TO ITS PLACE ON THE DISC, UNLESS NOTHING HAS BEEN
0319*  WRITTEN INTO THE BUFFER.
0320*
0321   25371 065337  #WRBU LDB FBASE     LOAD FIRST
0322   25372 044524        ADB .-2         WORD FROM
0323   25373 160001        LDA 1,I           FILE TABLE
0324   25374 001226        RAL,ELA             ENTRY
0325   25375 002141        SEZ,CLE,RSS   HAS BIT14 BEEN SET?
0326   25376 125615        JMP WRBUF,I   NO
0327   25377 001523        ERA,RAR       YES--CLEAR IT
0328   25400 170001        STA 1,I
0329   25401 161337        LDA FBASE,I   LOAD ACTIVE RECORD ADDRESS
0330   25402 050525        CPA .-1       NULL RECORD?
0331   25403 125615        JMP WRBUF,I   YES
0332   25404 064453        LDB M128    NO                                  XJ
0333   25405 103100        CLF 0         WRITE
0334   25406 074065        STB WORD
0335   25407 065704        LDB RQ3
0336   25410 114350        JSB DISC,I      RECORD
0337   25411 060263        LDA ENDSK
```

```
0338  25412 002002          SZA
0339  25413 027411          JMP *-2              TO DISK
0340  25414 125615          JMP WRBUF,I
0341**                         **
0342***  TRANSFER A STRING   ***
0343**                         **
0344*
0345*  THE NUMBER OF CHARACTERS SPECIFIED BY TNULL (IN 1'S
0346*  COMPLEMENT) IS TRANSFERRED FROM THE SOURCE STRING TO
0347*  A DESTINATION STRING BEGINNING WITH THE CHARACTER
0348*  ADDRESSED BY TEMP5.
0349*
0350  25415 071501  #TRST STA TRFCH      SAVE SUBROUTINE CALL
0351  25416 035505        ISZ TNULL      MORE TRANSFER STRING?
0352  25417 002001        RSS            YES
0353  25420 125447        JMP TRSTR,I    NO
0354  25421 115501        JSB TRFCH,I    FETCH A SOURCE CHARACTER
0355  25422 060566        LDA .+40B      NONE LEFT, LOAD A BLANK
0356  25423 071503        STA TRS0       SAVE IT
0357  25424 065373        LDB TEMP5      LOAD
0358  25425 004065        CLE,ERB          DESTINATION
0359  25426 160001        LDA 1,I            WORD
0360  25427 002041        SEZ,RSS        SAVE
0361  25430 001727        ALF,ALF          OTHER
0362  25431 010451        AND M256           CHARACTER
0363  25432 031503        IOR TRS0       COMBINE WITH
0364  25433 002041        SEZ,RSS          NEW CHARACTER
0365  25434 001727        ALF,ALF            AND STORE
0366  25435 170001        STA 1,I              WORD
0367  25436 035373        ISZ TEMP5      INCREMENT DESTINATION ADDRESS
0368  25437 027416        JMP #TRST+1
0369**                                     **
0370***  LIST A MULTICHARACTER SYMBOL    ***
0371**                                     **
0372*
0373*  UPON ENTRY (A) HOLDS A WORD CONTAINING A SYMBOL CODE AND (B)
0374*  HOLDS A POINTER TO THE PRINT NAME TABLE.  THE SYMBOL IS FOUND
0375*  IN THE TABLE AND ITS ASCII FORM OUTPUT.
0376*
0377  25440 011054  #MCOT AND OPMSK      SAVE
0378  25441 071537        STA LT4          SYMBOL
0379  25442 160001  MCOT1 LDA 1,I        DESIRED
0380  25443 011054        AND OPMSK        TABLE
0381  25444 051537        CPA LT4            ENTRY?
0382  25445 027454        JMP MCOT2      YES
0383  25446 160001        LDA 1,I        NO,
0384  25447 010535        AND .+7          COMPUTE
0385  25450 040531        ADA .+3            ADDRESS
0386  25451 001100        ARS                  OF NEXT
0387  25452 044000        ADB 0                  ENTRY
0388  25453 027442        JMP MCOT1
0389  25454 160001  MCOT2 LDA 1,I        COMPUTE
0390  25455 010535        AND .+7          COUNT
0391  25456 003004        CMA,INA            OF
0392  25457 001100        ARS                  ASCII
0393  25460 071531        STA LT3                WORDS
```

```
0394  25461 075561         STB OUTST     SAVE ASCII SYMBOL ADDRESS
0395  25462 035561  MCOT3  ISZ OUTST     MOVE TO NEXT WORD OF SYMBOL
0396  25463 161561         LDA OUTST,I   OUTPUT
0397  25464 001727         ALF,ALF         HIGH
0398  25465 015553         JSB OUTCR
0399  25466 161561         LDA OUTST,I   OUTPUT
0400  25467 010630         AND B377        LOW CHARACTER
0401  25470 002002         SZA               IF NOT
0402  25471 015553         JSB OUTCR           NULL
0403  25472 035531         ISZ LT3       MORE SYMBOL?
0404  25473 027462         JMP MCOT3     YES
0405  25474 125557         JMP MCOUT,I   NO
0406**                     **
0407***  LIST A STRING   ***
0408**                     **
0409*
0410*  UPON ENTRY (A) HOLDS A NEGATIVE WORD COUNT OF THE STRING.  IF
0411*  (B) # 0 THE STRING BEGINS WITH THE LOW HALF OF (LT1),I ; IF
0412*  (B) = 0 IT BEGINS WITH THE HIGH HALF OF THE WORD FOLLOWING
0413*  (LT1),I .  A TRAILING NULL CHARACTER WILL NOT BE PRINTED.
0414*
0415  25475 071537  #OTST STA LT4         SAVE STRING WORD COUNT
0416  25476 006002         SZB           'REM' ?
0417  25477 027505         JMP OTST2     YES
0418  25500 035527  OTST1  ISZ LT1       NO, MOVE TO
0419  25501 035375         ISZ LT2         NEXT PROGRAM WORD
0420  25502 161527         LDA LT1,I     OUTPUT
0421  25503 001727         ALF,ALF         HIGH
0422  25504 015553         JSB OUTCR
0423  25505 161527  OTST2  LDA LT1,I     OUTPUT
0424  25506 010630         AND B377        LOW CHARACTER
0425  25507 002002         SZA               IF NOT
0426  25510 015553         JSB OUTCR           NULL
0427  25511 035537         ISZ LT4       MORE STRING?
0428  25512 027500         JMP OTST1     YES
0429  25513 125561         JMP OUTST,I   NO
```

```
0431**                          **
0432***  OUTPUT AN INTEGER      ***
0433**                          **
0434*
0435*  ENTER WITH A POSITIVE INTEGER IN (B).  OUTPUT IT WITHOUT
0436*  LEADING ZEROS.
0437*
0438   25514 060522  #OTIN LDA .-4        SET DIGIT
0439   25515 071473        STA DGCNT       COUNTER
0440   25516 061154        LDA LDVSR     SET DIVISOR
0441   25517 071545        STA OT1         ADDRESS
0442   25520 002400        CLA           SUPPRESS
0443   25521 071553        STA OUTCR       ZEROS
0444   25522 101040  OUTI1 LSR 16         DIVIDE INTEGER BY
0445   25523 100400        DIV OT1,I       CURRENT DIVISOR
0446   25525 075551        STB OT3       SAVE THE REMAINDER
0447   25526 051553        CPA OUTCR     LEADING ZERO?
0448   25527 027532        JMP OUTI2     YES
0449   25530 040606        ADA .+60B     NO.
0450   25531 015553        JSB OUTCR     OUTPUT DIGIT
0451   25532 065551  OUTI2 LDB OT3       RETRIEVE REMAINDER
0452   25533 035545        ISZ OT1       SET FOR NEXT DIVISOR
0453   25534 035473        ISZ DGCNT     ALL DIVISORS USED?
0454   25535 027522        JMP OUTI1     NO
0455   25536 060001        LDA 1         YES
0456   25537 040606        ADA .+60B     OUTPUT
0457   25540 015553        JSB OUTCR       LAST DIGIT
0458   25541 125555        JMP OUTIN,I
```

```
0460**                          **
0461***  SPACE FOR A COMMA   ***
0462**                          **
0463*
0464*  MOVE TO THE NEXT FIELD OF 15 ON THE PRINT LINE OR TO THE
0465*  NEXT LINE IF THE CURRENT ONE IS EXHAUSTED.
0466*
0467  25542 065636  #EDLM LDB CHRCT     LOAD CURRENT CHARACTER COUNT
0468  25543 006003        SZB,RSS       ZERO?
0469  25544 125527        JMP EDELM,I   YES, AT START OF ZONE
0470  25545 044507        ADB .-15      NO, SUBTRACT ZONE WIDTH
0471  25546 006021        SSB,RSS       NON-NEGATIVE RESULT?
0472  25547 027543        JMP #EDLM+1   YES
0473  25550 075571        STB EOL       NO, SAVE COUNT
0474  25551 060566        LDA .+40B     OUTPUT
0475  25552 015553        JSB OUTCR       A BLANK
0476  25553 035571        ISZ EOL       ZONE FULL?
0477  25554 027551        JMP *-3       NO
0478  25555 065636        LDB CHRCT     YES,
0479  25556 044455        ADB M74         PAST THE
0480  25557 006021        SSB,RSS           END OF LINE?
0481  25560 015525        JSB OUTLN     YES
0482  25561 125527        JMP EDELM,I   NO
0483**                          **
0484***  OUTPUT AN END-OF-LINE  ***
0485**                          **
0486  25562 065557  #OTLN LDB EOPF      RESET
0487  25563 045636        ADB CHRCT       END-OF-FIELD
0488  25564 075557        STB EOPF          MARKER
0489  25565 060551        LDA .+23B     OUTPUT
0490  25566 015553        JSB OUTCR       AN X-OFF
0491  25567 060543        LDA .+15B     OUTPUT A
0492  25570 015553        JSB OUTCR       CARRIAGE RETURN
0493  25571 060540        LDA .+12B         AND A
0494  25572 015553        JSB OUTCR           LINE FEED
0495  25573 125525        JMP OUTLN,I
0496**                          **
0497***  OUTPUT A CHARACTER  ***
0498**                          **
0499*
0500*  OUTPUT THE CHARACTER IN (A).  NON-PRINTING CHARACTERS DO NOT
0501*  COUNT AGAINST THE 72 CHARACTERS PER LINE.  A CARRIAGE RETURN
0502*  ('CONTROL 0' IN A STRING OR AN END-OF-LINE, FOR EXAMPLE)
0503*  RESETS THE PRINT POSITION TO 0.
0504*
0505  25574 071411  #OTCR STA OCTMP     SAVE CHARACTER
0506  25575 011120        AND .140      NON-
0507  25576 002002        SZA             PRINTING
0508  25577 051120        CPA .140          CHARACTER?
0509  25600 002001        RSS           YES
0510  25601 035636        ISZ CHRCT     NO, COUNT IT
0511  25602 006400        CLB
0512  25603 061411        LDA OCTMP     RETRIEVE CHARACTER
0513  25604 050543        CPA .+15B     CARRIAGE RETURN?
0514  25605 075636        STB CHRCT     YES, ZERO CHARACTER COUNT
0515  25606 064352        LDB MLINK+1
```

```
0516  25607 044473          ADB .-?LINK
0517  25610 114356          JSB POCR,I
0518  25611 125553          JMP OUTCR,I
```

```
0002*
0003***                          **
0004**  EXECUTE <MAT STATEMENT>  **
0005***                          **
0006*
0007*
0008  25612 025773  EMT1  DEF EMAT1
0009*
0010  25613 161647  EMAT  LDA TEMP1,I   FIRST
0011  25614 011070        AND OPDMK       OPERAND
0012  25615 002002        SZA               NULL?
0013  25616 127612        JMP EMT1,I    NO
0014*                     *
0015**  IDENTIFY MATRIX I/O  **
0016*                     *
0017  25617 035647        ISZ TEMP1
0018  25620 161647        LDA TEMP1,I   COMPUTE AND SAVE
0019  25621 101111        RRR 9           I/O TYPE:
0020  25622 010614        AND B77           INPUT = -2
0021  25623 040463        ADA D65           READ  = -1
0022  25624 071415        STA MT1           PRINT =  0
0023  25625 002026        SSA,INA,SZA   SAVE FLAG
0024  25626 071413        STA MT0         IF 'INPUT'
0025  25627 015605        JSB VLFIL     PROCESS ANY
0026  25630 000000        NOP             FILE REQUEST
0027  25631 161647  MI01  LDA TEMP1,I   LOAD NEXT
0028  25632 011070        AND OPDMK       IDENTIFIER
0029  25633 002003        SZA,RSS       ZERO?
0030  25634 124750        JMP XEC1A,I   YES
0031*                           *
0032**  PREPARE A MATRIX FOR I/O  **
0033*                           *
0034  25635 001000        ALS           LOAD
0035  25636 041641        ADA SYMTB       BASE ADDRESS
0036  25637 040525        ADA .-1           OF ARRAY
0037  25640 164000        LDB 0,I
0038  25641 044524        ADB .-2       SAVE POINTER TO
0039  25642 075640        STB SBPTR       DYNAMIC DIMENSIONS
0040  25643 061647        LDA TEMP1     LAST
0041  25644 002004        INA             WORD OF
0042  25645 051435        CPA PRGCT         STATEMENT?
0043  25646 002400        CLA           YES
0044  25647 160000        LDA 0,I       NO, LOAD (A) WITH
0045  25650 011054        AND OPMSK       FOLLOWING OPERATOR
0046  25651 065415        LDB MT1       MAT
0047  25652 006003        SZB,RSS         PRINT?
0048  25653 027706        JMP MI02      YES
0049  25654 051012        CPA LBOP      NO, '' NEXT OPERATOR?
0050  25655 015567        JSB REDIM     YES, REDIMENSION ARRAY
0051  25656 161640        LDA SBPTR,I   SET POINTER
0052  25657 035640        ISZ SBPTR       TO FIRST ELEMENT
0053  25660 100200        MPY SBPTR,I       OF ARRAY
0054  25662 035640        ISZ SBPTR           WHILE COMPUTING
0055  25663 003004        CMA,INA               NUMBER OF
0056  25664 071617        STA MCNT                ELEMENTS
0057  25665 003400        CCA           MAT
```

```
0058  25666 051415         CPA MT1         READ?
0059  25667 027675         JMP MI09        YES
0060*                              *
0061**  INPUT VALUES FOR MATRIX  **
0062*                              *
0063  25670 035413         ISZ MT0         FIRST MATRIX TO BE INPUT?
0064  25671 002001         RSS             NO
0065  25672 124762         JMP MINP1,I     YES
0066  25673 041413         ADA MT0         RETRIEVE
0067  25674 124764         JMP MINP2,I       SAVED CHARACTER
0068*                              *
0069**  READ VALUES FOR MATRIX  **
0070*                              *
0071  25675 006404  MI09     CLB,INB       FETCH
0072  25676 015461           JSB FDATA       CONSTANT
0073  25677 104400           DST SBPTR,I   STORE
0074  25701 035640           ISZ SBPTR
0075  25702 035640           ISZ SBPTR       IT
0076  25703 035617           ISZ MCNT      DONE?
0077  25704 027675           JMP MI09      NO
0078  25705 027761           JMP MI07      YES
0079*
0080  25706 051004  MI02     CPA B3000     ';' FOLLOWING ARRAY?
0081  25707 007400           CCB           YES
0082  25710 075617           STB MCNT      NO, TREAT AS COMMA
0083  25711 065640           LDB SBPTR     VALIDATE
0084  25712 015571           JSB VCHK        ARRAY ELEMENTS
0085  25713 161640           LDA SBPTR,I   SAVE
0086  25714 035640           ISZ SBPTR       COUNT
0087  25715 003004           CMA,INA           OF
0088  25716 071413           STA MT0             ROWS
0089  25717 161640           LDA SBPTR,I
0090  25720 035640           ISZ SBPTR
0091  25721 065335           LDB FILE#     WRITE ON
0092  25722 006020           SSB             A FILE?
0093  25723 027736           JMP MI03      NO
0094*                              *
0095**  WRITE MATRIX ON FILE  **
0096*                              *
0097  25724 100200           MPY MT0       SET
0098  25726 071617           STA MCNT        ELEMENT COUNTER
0099  25727 064524  MI04     LDB .-2       WRITE ELEMENT
0100  25730 015611           JSB FILST       TO FILE
0101  25731 035640           ISZ SBPTR     MOVE TO
0102  25732 035640           ISZ SBPTR       NEXT ELEMENT
0103  25733 035617           ISZ MCNT      MATRIX DONE?
0104  25734 027727           JMP MI04      NO
0105  25735 027761           JMP MI07      YES
```

```
0107*                                  *
0108**  WRITE MATRIX ON TELETYPE      **
0109*                                  *
0110  25736 003004  MIO3  CMA,INA       SAVE
0111  25737 071661        STA MT3         COLUMN COUNT
0112  25740 071660  MIO8  STA MT2       SET COLUMN COUNT
0113  25741 027745        JMP MIO6
0114  25742 002400  MIO5  CLA
0115  25743 051617        CPA MCNT
0116  25744 015527        JSB EDELM
0117  25745 104200  MIO6  DLD SBPTR,I   PRINT
0118  25747 015517        JSB ENOUT       ELEMENT
0119  25750 035640        ISZ SBPTR     MOVE TO
0120  25751 035640        ISZ SBPTR       NEXT ELEMENT
0121  25752 035660        ISZ MT2       ROW DONE?
0122  25753 027742        JMP MIO5      NO
0123  25754 015525        JSB OUTLN     YES, DOUBLE
0124  25755 015525        JSB OUTLN       SPACE
0125  25756 061661        LDA MT3
0126  25757 035413        ISZ MT0       MATRIX DONE?
0127  25760 027740        JMP MIO8      NO
0128*                                 *
0129**  CHECK FOR MORE MATRICES      **
0130*                                 *
0131  25761 035647  MIO7  ISZ TEMP1
0132  25762 065647        LDB TEMP1     STATEMENT
0133  25763 055435        CPB PRGCT       FINISHED?
0134  25764 027767        JMP *+3       YES
0135  25765 071413        STA MT0       NO, SAVE (A)
0136  25766 027631        JMP MIO1
0137  25767 064524        LDB .-2       MATRIX
0138  25770 055415        CPB MT1         INPUT?
0139  25771 124766        JMP ENDIN,I   YES
0140  25772 124750        JMP XEC1A,I   NO
0141*                                  *
0142**  PREPARE MATRIX ASSIGNMENT     **
0143*                                  *
0144  25773 064750  EMAT1 LDB XEC1A     SET MAIN LOOP TO
0145  25774 075463        STB MEXIT       STATEMENT EXIT MODE
0146  25775 001000        ALS
0147  25776 041641        ADA SYMTB     COMPUTE
0148  25777 040525        ADA .-1         POINTER
0149  26000 164000        LDB 0,I           TO
0150  26001 044524        ADB .-2             DESTINATION
0151  26002 075640        STB BS1               MATRIX
0152  26003 035647        ISZ TEMP1
0153  26004 161647        LDA TEMP1,I   MATRIX
0154  26005 002020        SSA             FUNCTION?
0155  26006 026261        JMP EMAT6     YES
0156  26007 064361        LDB MLP2A     NO, SET OPERATION
0157  26010 075441  EMAT2 STB MOP         JUMP TO 'REPLACE' MODE
0158  26011 035647        ISZ TEMP1
0159  26012 011070        AND OPDMK     SCALAR
0160  26013 002003        SZA,RSS         MULTIPLICATION?
0161  26014 026251        JMP EMAT5     YES
0162  26015 001000        ALS           NO
```

```
0163  26016 041641          ADA SYMTB      COMPUTE
0164  26017 040525          ADA .-1          POINTER
0165  26020 164000          LDB 0,I             TO FIRST
0166  26021 044524          ADB .-2               SOURCE
0167  26022 075447          STB BS2                 MATRIX
0168  26023 015571          JSB VCHK       VALIDATE ITS ELEMENTS
0169  26024 061647          LDA TEMP1      END OF
0170  26025 051435          CPA PRGCT        STATEMENT?
0171  26026 026103          JMP EMAT3      YES
0172  26027 161647          LDA TEMP1,I    NO
0173  26030 011070          AND OPDMK      COMPUTE
0174  26031 001000          ALS
0175  26032 041641          ADA SYMTB        POINTER TO
0176  26033 040525          ADA .-1
0177  26034 164000          LDB 0,I             SECOND
0178  26035 044524          ADB .-2
0179  26036 075451          STB BS3                 SOURCE MATRIX
0180  26037 015571          JSB VCHK       VALIDATE ITS ELEMENTS
0181  26040 161647          LDA TEMP1,I
0182  26041 011054          AND OPMSK      MATRIX
0183  26042 051022          CPA MULOP        MULTIPLICATION?
0184  26043 026140          JMP EMAT4      YES
0185  26044 100106          RRL 6          NO
0186  26045 026064          JMP EMT3

0188*
0189**  POINTERS AND CONSTANTS
0190*
0191  26046 026131  MLP3A DEF MLOP3
0192  26047 027016  MADDA DEF MADD
0193  26050 027021  MSUBA DEF MSUB
0194  26051 027033  SMULA DEF SMULT
0195  26052 027024  IDNA  DEF IDN
0196  26053 027036  MCPYA DEF MCPY
0197  26054 041433  TOLC  DEC +1E-6
0198  26056 026057  F0.0A DEF F0.0
0199  26057 000000  F0.0  DEC 0.0
0200  26061 026062  F1.0A DEF F1.0
0201  26062 040000  F1.0  DEC 1.0
```

```
0203*                                                       *
0204**  SET UP MATRIX ADD, SUBTRACT, OR REPLACE  **
0205*                                                       *
0206  26064          EMT3  EQU *
0207  26064 066047         LDB MADDA      RECORD
0208  26065 002020         SSA              'MATRIX ADD'
0209  26066 066050         LDB MSUBA          OR 'MATRIX SUBTRACT'
0210  26067 075441         STB MOP              OPERATION JUMP
0211  26070 065640         LDB BS1
0212  26071 160001         LDA 1,I        ROW
0213  26072 151451         CPA BS3,I        COMPATIBILITY?
0214  26073 006005         INB,RSS        YES
0215  26074 115247         JSB RERRS+11,I   NO
0216  26075 035451         ISZ BS3
0217  26076 164001         LDB 1,I        COLUMN
0218  26077 155451         CPB BS3,I        COMPATIBILITY?
0219  26100 002001         RSS            YES
0220  26101 115247         JSB RERRS+11,I   NO
0221  26102 035451         ISZ BS3
0222  26103 161447  EMAT3  LDA BS2,I      ROW
0223  26104 151640         CPA BS1,I        COMPATIBILITY?
0224  26105 002001         RSS            YES
0225  26106 115247         JSB RERRS+11,I   NO
0226  26107 035447         ISZ BS2
0227  26110 035640         ISZ BS1        COMPUTE NUMBER
0228  26111 100200         MPY BS2,I        OF MATRIX ELEMENTS
0229  26113 165447         LDB BS2,I      COLUMN
0230  26114 155640         CPB BS1,I        COMPATIBILITY?
0231  26115 003005         CMA,INA,RSS    YES
0232  26116 115247         JSB RERRS+11,I   NO
0233  26117 071617         STA MCNT       SAVE 2'S COMPLEMENT OF SIZE
0234  26120 035447         ISZ BS2
0235  26121 035640         ISZ BS1
```

```
0237*                              *
0238**  ASSIGN MATRIX VALUE       **
0239*                              *
0240*
0241*  MOP HOLDS A POINTER TO CODE WHICH COMPUTES ONE ELEMENT OF THE
0242*  DESTINATION MATRIX AND RETURNS IT IN (A) AND (B).  MEXIT
0243*  HOLDS THE EXIT ADDRESS SET BY THE CALLER.
0244*
0245  26122 104200  MLOOP DLD BS2,I      LOAD ELEMENT OF SOURCE MATRIX
0246  26124 125441        JMP MOP,I      JUMP TO OPERATION
0247  26125 035451  MLOP1 ISZ BS3        MOVE TO NEXT ELEMENT
0248  26126 035451        ISZ BS3          OF SECOND SOURCE MATRIX
0249  26127 035447  MLOP2 ISZ BS2        MOVE TO NEXT ELEMENT
0250  26130 035447        ISZ BS2          OF FIRST SOURCE MATRIX
0251  26131 104400  MLOP3 DST BS1,I      RECORD ELEMENT
0252  26133 035640        ISZ BS1          OF DESTINATION MATRIX
0253  26134 035640        ISZ BS1            AND MOVE TO NEXT ELEMENT
0254  26135 035617        ISZ MCNT       DONE?
0255  26136 026122        JMP MLOOP      NO
0256  26137 125463        JMP MEXIT,I    YES
0257*                              *
0258**  COMPUTE MATRIX PRODUCT    **
0259*                              *
0260  26140 161640  EMAT4 LDA BS1,I      DESTINATION MATRIX
0261  26141 151447        CPA BS2,I        ROW COMPATIBILITY?
0262  26142 003005        CMA,INA,RSS    YES
0263  26143 115247        JSB RERRS+11,I   NO
0264  26144 071670        STA MMT0       SAVE ROW COUNTER
0265  26145 035640        ISZ BS1
0266  26146 035447        ISZ BS2
0267  26147 161447        LDA BS2,I      INNER PRODUCT
0268  26150 151451        CPA BS3,I        COMPATIBILITY?
0269  26151 003005        CMA,INA,RSS    YES
0270  26152 115247        JSB RERRS+11,I   NO
0271  26153 071671        STA MMT1       SAVE INNER PRODUCT
0272  26154 071672        STA MMT2         COUNTERS
0273  26155 001000        ALS            SAVE ROW
0274  26156 071666        STA MMT6         BACK UP AMOUNT
0275  26157 100200        MPY BS1,I      SAVE COLUMN
0276  26161 040530        ADA .+2          BACK UP
0277  26162 071667        STA MMT7           AMOUNT
0278  26163 035451        ISZ BS3
0279  26164 161640        LDA BS1,I      DESTINATION MATRIX
0280  26165 151451        CPA BS3,I        COLUMN COMPATIBILITY?
0281  26166 003005        CMA,INA,RSS    YES
0282  26167 115247        JSB RERRS+11,I   NO
0283  26170 071673        STA MMT3       SAVE COLUMN
0284  26171 071674        STA MMT4         COUNTERS
0285  26172 003004        CMA,INA        SAVE COLUMN
0286  26173 001000        ALS              ADVANCE
0287  26174 071675        STA MMT5           AMOUNT
0288  26175 035640        ISZ BS1        MOVE TO
0289  26176 035447        ISZ BS2          FIRST ELEMENT
0290  26177 035451        ISZ BS3            OF MATRICES
0291  26200 065451        LDB BS3        SAVE FIRST-ELEMENT ADDRESS
0292  26201 075475        STB MMT8         OF SECOND SOURCE MATRIX
```

```
0293  26202 104200  MPR1  DLD F0,0      INITIALIZE DESTINATION
0294  26204 104400        DST BS1,I       ELEMENT TO ZERO
0295  26206 104200  MPR2  DLD BS2,I     COMPUTE
0296  26210 035447        ISZ BS2         TERM
0297  26211 035447        ISZ BS2           OF
0298  26212 015505        JSB .FMP            INNER
0299  26213 101451        DEF BS3,I             PRODUCT
0300  26214 015501        JSB .FAD       ADD IN PREVIOUS
0301  26215 101640        DEF BS1,I       RUNNING SUM
0302  26216 104400        DST BS1,I      SAVE RUNNING SUM
0303  26220 065451        LDB BS3        ADVANCE TO
0304  26221 045675        ADB MMT5        NEXT ROW OF
0305  26222 075451        STB BS3           SECOND SOURCE MATRIX
0306  26223 035672        ISZ MMT2       INNER PRODUCT COMPLETE?
0307  26224 026206        JMP MPR2       NO
0308  26225 035640        ISZ BS1        YES, MOVE TO NEXT
0309  26226 035640        ISZ BS1         DESTINATION ELEMENT
0310  26227 065671        LDB MMT1       RESET INNER PRODUCT
0311  26230 075672        STB MMT2        TERM COUNTER
0312  26231 035674        ISZ MMT4       ROW COMPLETE?
0313  26232 026240        JMP MPR3       NO
0314  26233 065673        LDB MMT3       YES, RESET
0315  26234 075674        STB MMT4        COLUMN COUNTER
0316  26235 035670        ISZ MMT0      DONE?
0317  26236 026246        JMP MPR4       NO
0318  26237 124750        JMP XEC1A,I    YES
0319  26240 065447  MPR3  LDB BS2        BACK UP
0320  26241 045666        ADB MMT6        TO BEGINNING OF ROW OF
0321  26242 075447        STB BS2           FIRST SOURCE MATRIX
0322  26243 065451        LDB BS3        BACK UP TO BEGINNING
0323  26244 045667        ADB MMT7        OF NEXT COLUMN
0324  26245 002001        RSS               OF SECOND SOURCE MATRIX
0325  26246 065475  MPR4  LDB MMT8       BACK UP TO FIRST ELEMENT
0326  26247 075451        STB BS3
0327  26250 026202        JMP MPR1
0328*                                     *
0329**  SET UP SCALAR MULTIPLICATION     **
0330*                                     *
0331  26251 015455  EMAT5 JSB FETCH      COMPUTE AND
0332  26252 104400        DST SCALR       SAVE SCALAR
0333  26254 035647        ISZ TEMP1      LOAD OPERATION JUMP
0334  26255 035647        ISZ TEMP1      PROCESS
0335  26256 161647        LDA TEMP1,I     FOLLOWING
0336  26257 066051        LDB SMULA         MATRIX
0337  26260 026010        JMP EMAT2
0338*
0339  26261 101104  EMAT6 RRR 4          COMPUTE
0340  26262 010565        AND .+37B       MATRIX
0341  26263 040477        ADA .-27B         FUNCTION
0342  26264 071615        STA ID0             TYPE
0343  26265 002021        SSA,RSS        MATRIX INITIALIZATION?
0344  26266 026325        JMP EMAT8      NO
0345*                                     *
0346**  SET UP MATRIX INITIALIZATION     **
0347*                                     *
0348  26267 065647        LDB TEMP1
```

```
0349  26270 006004          INB
0350  26271 055435          CPB PRGCT      REDIMENSIONING?
0351  26272 002001          RSS            NO
0352  26273 015567          JSB REDIM      YES
0353  26274 161640  INVL    LDA BS1,I      COMPUTE
0354  26275 071461          STA ID1          NUMBER
0355  26276 035640          ISZ BS1            OF ELEMENTS
0356  26277 100200          MPY BS1,I            IN 2'S
0357  26301 003004          CMA,INA                COMPLEMENT
0358  26302 071617          STA MCNT       SAVE IT
0359  26303 035615          ISZ ID0        'IDN' ?
0360  26304 026316          JMP EMAT7      NO
0361  26305 161640          LDA BS1,I      YES
0362  26306 051461          CPA ID1        SQUARE MATRIX?
0363  26307 003001          CMA,RSS        YES
0364  26310 115264          JSB RERRS+24,I   NO
0365  26311 071615          STA ID0        SET
0366  26312 003400          CCA              DIAGONAL
0367  26313 071461          STA ID1            COUNTER
0368  26314 062052          LDA IDNA       LOAD OPERATION JUMP
0369  26315 026321          JMP *+4
0370  26316 062046  EMAT7   LDA MLP3A      RECORD
0371  26317 066061          LDB F1.0A        CORRECT CONSTANT:
0372  26320 035615          ISZ ID0            0.0 FOR 'ZER'
0373  26321 066056          LDB F0.0A          1.0 FOR 'CON'
0374  26322 075447          STB BS2            0.0 FOR 'IDN'
0375  26323 071441          STA MOP        RECORD OPERATION JUMP
0376  26324 026121          JMP MLOOP-1
0377*
0378  26325 035647  EMAT8   ISZ TEMP1      COMPUTE
0379  26326 161647          LDA TEMP1,I
0380  26327 011070          AND OPDMK        POINTER
0381  26330 001000          ALS
0382  26331 041641          ADA SYMTB          TO
0383  26332 040525          ADA .-1
0384  26333 164000          LDB 0,I              SOURCE
0385  26334 044524          ADB .-2
0386  26335 075447          STB BS2                MATRIX
0387  26336 015571          JSB VCHK       VALIDATE IT
0388  26337 165640          LDB BS1,I      LOAD DESTINATION ROW DIMENSION
0389  26340 005000          BLS            SAVE COLUMN
0390  26341 075673          STB MMT3         ADVANCE AMOUNT
0391  26342 005100          BRS
0392  26343 035640          ISZ BS1
0393  26344 161640          LDA BS1,I      ARE COLUMNS OF DESTINATION
0394  26345 151447          CPA BS2,I        AND ROWS OF SOURCE EQUAL?
0395  26346 003005          CMA,INA,RSS    YES
0396  26347 115247          JSB RERRS+11,I   NO
0397  26350 071671          STA MMT1       SAVE DESTINATION MATRIX
0398  26351 071672          STA MMT2         COLUMN COUNTERS
0399  26352 035447          ISZ BS2        ARE ROWS OF DESTINATION AND
0400  26353 155447          CPB BS2,I        COLUMNS OF SOURCE EQUAL?
0401  26354 007005          CMB,INB,RSS    YES
0402  26355 115247          JSB RERRS+11,I   NO
0403  26356 075670          STB MMT0       SAVE ROW COUNTER
0404  26357 100200          MPY MMT3       SAVE COLUMN BACK UP
```

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0405  26361 035447          ISZ BS2
0406  26362 065615          LDB ID0
0407  26363 006003          SZB,RSS        'TRN' ?
0408  26364 026414          JMP INV        NO
0409  26365 040530          ADA .+2        YES, SAVE COLUMN
0410  26366 071674          STA MMT4         BACK UP AMOUNT
0411  26367 035640          ISZ BS1            FOR SOURCE MATRIX
0412  26370 026376          JMP TRN
0413  26371 065671  TRN1    LDB MMT1       RESET
0414  26372 075672          STB MMT2         COUNTER
0415  26373 065447          LDB BS2        BACK UP TO
0416  26374 045674          ADB MMT4         FIRST ELEMENT
0417  26375 075447          STB BS2            OF NEXT COLUMN
0418*                         *
0419**  TRANSPOSE A MATRIX  **
0420*                         *
0421  26376 104200  TRN     DLD BS2,I      TRANSFER
0422  26400 104400          DST BS1,I        ELEMENT
0423  26402 035640          ISZ BS1
0424  26403 035640          ISZ BS1
0425  26404 065447          LDB BS2        ADVANCE TO
0426  26405 045673          ADB MMT3         NEXT ELEMENT
0427  26406 075447          STB BS2            OF COLUMN
0428  26407 035672          ISZ MMT2       COLUMN TRANSFERRED?
0429  26410 026376          JMP TRN        NO
0430  26411 035670          ISZ MMT0       YES, DONE?
0431  26412 026371          JMP TRN1       NO
0432  26413 124750          JMP XEC1A,I    YES
0433*                         *
0434**  INVERT A MATRIX   **
0435*                         *
0436  26414 064000  INV     LDB 0          SAVE 2'S COMPLEMENT
0437  26415 001100          ARS              OF NUMBER OF
0438  26416 071617          STA MCNT           ELEMENTS IN MATRIX
0439  26417 061640          LDA BS1        SAVE ADDRESS OF
0440  26420 071451          STA BS3          DESTINATION MATRIX
0441  26421 061431          LDA TMPST      SET ADDRESS
0442  26422 040530          ADA .+2          OF FREE CORE
0443  26423 071640          STA BS1            AS BASE ADDRESS
0444  26424 003004          CMA,INA        SUFFICIENT
0445  26425 040654          ADA LWAUS        FREE CORE
0446  26426 040001          ADA 1              TO COPY
0447  26427 003021          CMA,SSA,RSS          SOURCE MATRIX?
0448  26430 115246          JSB RERRS+10,I   NO
0449  26431 040654          ADA LWAUS      YES, INCLUDE IT
0450  26432 070051          STA PBPTR        IN SWAP AREA
0451  26433 006400          CLB            SET 'MAXIMUM ELEMENT'
0452  26434 075662          STB MAXE         VALUE TO
0453  26435 075663          STB MAXE+1         ZERO
0454  26436 062053          LDA MCPYA      SET UP TO
0455  26437 071441          STA MOP          COPY MATRIX,
0456  26440 062443          LDA INV1           FIND MAXIMUM (ABSOLUTE
0457  26441 071463          STA MEXIT            VALUE) ELEMENT,
0458  26442 026122          JMP MLOOP              AND RETURN
0459  26443 026444  INV1    DEF *+1
0460  26444 104200          DLD MAXE       COMPUTE
```

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0461  26446 015505         JSB .FMP        RELATIVE
0462  26447 026054         DEF TOLC          TOLERANCE
0463  26450 104400         DST TOL
0464  26452 003400         CCA
0465  26453 071615         STA ID0         RESTORE
0466  26454 041451         ADA BS3           DESTINATION
0467  26455 071640         STA BS1             BASE ADDRESS
0468  26456 003004         CMA,INA         COMPUTE DIFFERENCE
0469  26457 041431         ADA TMPST         BETWEEN BASE ADDRESSES
0470  26460 003004         CMA,INA             OF SOURCE (COPIED)
0471  26461 071451         STA BS3               AND DESTINATION
0472  26462 062465         LDA INV2                MATRICES
0473  26463 071463         STA MEXIT       SET DESTINATION MATRIX
0474  26464 026274         JMP INVL          TO IDENTITY AND RETURN
0475  26465 026466  INV2   DEF *+1
0476  26466 065431         LDB TMPST       SAVE
0477  26467 044530         ADB .+2           BASE ADDRESS
0478  26470 060001         LDA 1               OF SOURCE
0479  26471 075447         STB BS2               MATRIX
0480  26472 045451         ADB BS3         SAVE BASE ADDRESS OF
0481  26473 075640         STB BS1           DESTINATION MATRIX
0482  26474 006400         CLB             SET PIVOT ELEMENT
0483  26475 075615         STB ID0           BIAS TO ZERO
0484  26476 026507         JMP INV4
0485  26477 061615  INV3   LDA ID0         SET BIAS
0486  26500 040524         ADA .-2           FOR NEXT
0487  26501 071615         STA ID0             PIVOT ELEMENT
0488  26502 061670         LDA MMT0        INITIALIZE COUNTER TO
0489  26503 071672         STA MMT2          2'S COMPLEMENT OF COLUMNS
0490  26504 061445         LDA PIVEL       UPDATE PIVOT
0491  26505 041673         ADA MMT3          ADDRESS
0492  26506 040530         ADA .+2             TO NEXT
0493  26507 071445  INV4   STA PIVEL               DIAGONAL ELEMENT
0494  26510 071674         STA MMT4        INITIALIZE
0495  26511 006400         CLB               PIVOT ELEMENT
0496  26512 075662         STB MAXE            AS MAXIMUM
0497  26513 075663         STB MAXE+1            IN COLUMN
0498  26514 065671         LDB MMT1        SET COUNTER TO SEARCH
0499  26515 075675         STB MMT5          REMAINDER OF COLUMN
0500  26516 071666  INV5   STA MMT6        LOAD
0501  26517 104200         DLD MMT6,I        ELEMENT
0502  26521 002020         SSA             GET
0503  26522 015467         JSB ARINV         ABSOLUTE
0504  26523 104400         DST SCALR           VALUE
0505  26525 015503         JSB .FSB        SUBTRACT
0506  26526 001662         DEF MAXE          PREVIOUS MAXIMUM
0507  26527 002002         SZA             RESULT
0508  26530 002020         SSA               POSITIVE?
0509  26531 026540         JMP INV6        NO
0510  26532 104200         DLD SCALR       YES, RECORD
0511  26534 104400         DST MAXE          NEW MAXIMUM
0512  26536 061666         LDA MMT6            AND ITS
0513  26537 071674         STA MMT4              LOCATION
0514  26540 061666  INV6   LDA MMT6        MOVE TO NEXT
0515  26541 041673         ADA MMT3          ELEMENT OF COLUMN
0516  26542 035675         ISZ MMT5        COLUMN DONE?
```

```
0517  26543 026516         JMP INV5        NO
0518  26544 065445         LDB PIVEL       YES
0519  26545 045615         ADB ID0         SET POINTERS
0520  26546 075667         STB MMT7          TO OLD
0521  26547 045451         ADB BS3             PIVOT ROWS OF
0522  26550 075675         STB MMT5              BOTH MATRICES
0523  26551 075461         STB ID1
0524  26552 061674         LDA MMT4        NEED TO
0525  26553 051445         CPA PIVEL         SWAP ROWS?
0526  26554 026623         JMP INV8        NO
0527  26555 041615         ADA ID0       YES, SET POINTERS
0528  26556 071475         STA MMT8          TO NEW
0529  26557 041451         ADA BS3             PIVOT ROWS OF
0530  26560 071666         STA MMT6              BOTH MATRICES
0531  26561 104200  INV7   DLD MMT5,I     SWAP
0532  26563 104400         DST SCALR
0533  26565 104200         DLD MMT6,I        ROW
0534  26567 104400         DST MMT5,I
0535  26571 104200         DLD SCALR           ELEMENT
0536  26573 104400         DST MMT6,I
0537  26575 104200         DLD MMT7,I            OF
0538  26577 104400         DST SCALR
0539  26601 104200         DLD MMT8,I              EACH
0540  26603 104400         DST MMT7,I
0541  26605 104200         DLD SCALR                 MATRIX
0542  26607 104400         DST MMT8,I
0543  26611 035675         ISZ MMT5        BUMP
0544  26612 035675         ISZ MMT5
0545  26613 035666         ISZ MMT6          ALL
0546  26614 035666         ISZ MMT6
0547  26615 035667         ISZ MMT7            FOUR
0548  26616 035667         ISZ MMT7
0549  26617 035475         ISZ MMT8              POINTERS
0550  26620 035475         ISZ MMT8
0551  26621 035672         ISZ MMT2        ROW SWAPPED?
0552  26622 026561         JMP INV7        NO
0553  26623 104200  INV8   DLD MAXE        YES
0554  26625 015503         JSB .FSB        PIVOT ELEMENT
0555  26626 001664         DEF TOL           SMALLER THAN
0556  26627 002020         SSA                 TOLERANCE?
0557  26630 115266         JSB RERRS+26,I    YES
0558  26631 104200         DLD F1.0        NO
0559  26633 015507         JSB .FDV        COMPUTE
0560  26634 101445         DEF PIVEL,I       INVERSE OF
0561  26635 104400         DST MAXE            PIVOT ELEMENT
0562  26637 061671         LDA MMT1        LAST
0563  26640 002007         INA,SZA,RSS       PIVOT?
0564  26641 026657         JMP INV10       YES
0565  26642 071675         STA MMT5        NO, PREPARE
0566  26643 061445         LDA PIVEL         TO SCALE
0567  26644 071666         STA MMT6            PIVOT ROW
0568  26645 035666  INV9   ISZ MMT6        MOVE TO NEXT
0569  26646 035666         ISZ MMT6          ELEMENT OF ROW
0570  26647 104200         DLD MMT6,I      MULTIPLY
0571  26651 015505         JSB .FMP          BY 1/PIVOT
0572  26652 001662         DEF MAXE            AND STORE
```

```
0573  26653 104400         DST MMT6,I          NEW VALUE
0574  26655 035675         ISZ MMT5        ROW DONE?
0575  26656 026645         JMP INV9        NO
0576  26657 061461  INV10   LDA ID1         YES
0577  26660 071666         STA MMT6
0578  26661 061670         LDA MMT0        SET
0579  26662 071672         STA MMT2
0580  26663 071675         STA MMT5          COUNTERS
0581  26664 104200  INV11   DLD MMT6,I     SCALE ELEMENTS OF
0582  26666 002003         SZA,RSS
0583  26667 026674         JMP INV12         PIVOT ROW
0584  26670 015505         JSB .FMP
0585  26671 001662         DEF MAXE            OF DESTINATION
0586  26672 104400         DST MMT6,I
0587  26674 035666  INV12   ISZ MMT6             MATRIX
0588  26675 035666         ISZ MMT6
0589  26676 035675         ISZ MMT5        ROW DONE?
0590  26677 026664         JMP INV11       NO
0591  26700 065640         LDB BS1         YES, SET POINTER TO
0592  26701 075477         STB VT0           DESTINATION ARRAY
0593  26702 061447         LDA BS2         SET POINTER
0594  26703 003004         CMA,INA           TO PIVOT COLUMN
0595  26704 041615         ADA ID0             IN FIRST ROW
0596  26705 003004         CMA,INA               OF SOURCE
0597  26706 071475  INV13   STA MMT8                MATRIX
0598  26707 051445         CPA PIVEL       PIVOT ROW?
0599  26710 027012         JMP INV19       YES
0600  26711 071667         STA MMT7        NO
0601  26712 104200         DLD MMT7,I      LOAD MULTIPLIER FOR PIVOT ROW
0602  26714 002003         SZA,RSS         ZERO?
0603  26715 027012         JMP INV19       YES
0604  26716 104400         DST SCALR       NO, SAVE MULTIPLIER
0605  26720 061671         LDA MMT1        LAST
0606  26721 002007         INA,SZA,RSS       ROW?
0607  26722 026750         JMP INV15       YES
0608  26723 071675         STA MMT5        NO, SET POINTER TO
0609  26724 061445         LDA PIVEL         PIVOT ELEMENT IN
0610  26725 071666         STA MMT6            SOURCE MATRIX
0611  26726 035666  INV14   ISZ MMT6        MOVE
0612  26727 035666         ISZ MMT6          TO
0613  26730 035667         ISZ MMT7            NEXT
0614  26731 035667         ISZ MMT7              COLUMN
0615  26732 104200         DLD SCALR       COMPUTE
0616  26734 015505         JSB .FMP
0617  26735 101666         DEF MMT6,I
0618  26736 104400         DST MAXE          TRANSFORMED
0619  26740 104200         DLD MMT7,I
0620  26742 015503         JSB .FSB
0621  26743 001662         DEF MAXE            ELEMENT
0622  26744 104400         DST MMT7,I
0623  26746 035675         ISZ MMT5        ROW DONE?
0624  26747 026726         JMP INV14       NO
0625  26750 061461  INV15   LDA ID1         YES, SET POINTER TO PIVOT
0626  26751 071666         STA MMT6          ROW OF DESTINATION MATRIX
0627  26752 061670         LDA MMT0        SET
0628  26753 071674         STA MMT4          COUNTER
```

```
0629  26754 104200  INV16 DLD MMT6,I     COMPUTE
0630  26756 002003        SZA,RSS
0631  26757 026772        JMP INV17
0632  26760 015505        JSB .FMP
0633  26761 001660        DEF SCALR         TRANSFORMED
0634  26762 104400        DST MAXE
0635  26764 104200        DLD VT0,I
0636  26766 015503        JSB .FSB
0637  26767 001662        DEF MAXE            ELEMENT
0638  26770 104400        DST VT0,I
0639  26772 035477  INV17 ISZ VT0          MOVE
0640  26773 035477        ISZ VT0           TO
0641  26774 035666        ISZ MMT6            NEXT
0642  26775 035666        ISZ MMT6              COLUMN
0643  26776 035674        ISZ MMT4        ROW DONE?
0644  26777 026754        JMP INV16       NO
0645  27000 061475  INV18 LDA MMT8        YES, MOVE TO NEXT
0646  27001 041673        ADA MMT3          ROW IN SOURCE MATRIX
0647  27002 035672        ISZ MMT2        ALL ROWS TRANSFORMED?
0648  27003 026706        JMP INV13       NO
0649  27004 035671        ISZ MMT1        YES, MATRIX INVERTED?
0650  27005 026477        JMP INV3        NO
0651  27006 061431        LDA TMPST       YES
0652  27007 040555        ADA .+23        RELEASE EXTRA
0653  27010 070051        STA PBPTR         CORE
0654  27011 124750        JMP XEC1A,I
0655  27012 061477  INV19 LDA VT0          ADVANCE TO
0656  27013 041673        ADA MMT3          NEXT ROW OF
0657  27014 071477        STA VT0             DESTINATION
0658  27015 027000        JMP INV18             MATRIX
0001*                                  *
0002**  CODE TO COMPUTE AN ELEMENT  **
0003*                                  *
0004  27016 015501  MADD  JSB .FAD        ADD
0005  27017 101451        DEF BS3,I         SOURCE
0006  27020 026125        JMP MLOP1           ELEMENTS
0007*
0008  27021 015503  MSUB  JSB .FSB        SUBTRACT
0009  27022 101451        DEF BS3,I         SOURCE
0010  27023 026125        JMP MLOP1           ELEMENTS
0011*
0012  27024 035461  IDN   ISZ ID1         DIAGONAL ELEMENT?
0013  27025 026131        JMP MLOP3       NO
0014  27026 061615        LDA ID0         YES, RESET
0015  27027 071461        STA ID1           DIAGONAL COUNTER
0016  27030 104200        DLD F1.0        LOAD
0017  27032 026131        JMP MLOP3         1.0
0018*
0019  27033 015505  SMULT JSB .FMP        MULTIPLY
0020  27034 001660        DEF SCALR         SOURCE ELEMENT
0021  27035 026127        JMP MLOP2           BY SCALAR
0022*
0023  27036 002020  MCPY  SSA             GET
0024  27037 015467        JSB ARINV         ABSOLUTE
0025  27040 104400        DST SCALR           VALUE
0026  27042 015503        JSB .FSB        SUBTRACT
```

```
0027  27043 001662          DEF MAXE          PREVIOUS
0028  27044 002002          SZA                 MAXIMUM
0029  27045 002020          SSA             POSITIVE RESULT?
0030  27046 027053          JMP MCPY1       NO
0031  27047 104200          DLD SCALR       YES, RECORD
0032  27051 104400          DST MAXE          NEW MAXIMUM
0033  27053 104200  MCPY1   DLD BS2,I       RELOAD VALUE
0034  27055 124361          JMP MLP2A,I
0035**                                  **
0036***  CHECK VALIDITY OF MATRIX   ***
0037**                                  **
0038*
0039*  ENTER WITH (B) POINTING TO THE DYNAMIC ARRAY DIMENSIONS.
0040*  COMPUTE THE NUMBER OF ELEMENTS AND CHECK EACH ONE.  EXIT
0041*  TO ERROR IF ANY ELEMENT HAS VALUE 'UNDEFINED'.
0042*
0043  27056 160001  #VCHK LDA 1,I         LOAD ROW DIMENSION
0044  27057 006004        INB
0045  27060 075477        STB VT0
0046  27061 100200        MPY VT0,I       MULTIPLY BY
0047  27063 065477        LDB VT0           COLUMN DIMENSION
0048  27064 003000        CMA             SAVE 1'S COMPLEMENT
0049  27065 071477        STA VT0           OF MATRIX SIZE
0050  27066 035477  VCHK1 ISZ VT0         DONE?
0051  27067 006005        INB,RSS         NO, MOVE TO NEXT ELEMENT
0052  27070 125571        JMP VCHK,I      YES
0053  27071 160001        LDA 1,I
0054  27072 001222        RAL,RAL         IS
0055  27073 002004        INA               OPERAND
0056  27074 001310        RAR,SLA             NORMALIZED?
0057  27075 027105        JMP VCHK2       YES
0058  27076 051163        CPA BIT15       MAYBE, WAS FIRST WORD ZERO?
0059  27077 006005        INB,RSS         YES
0060  27100 115263        JSB RERRS+23,I  NO--ERROR
0061  27101 160001        LDA 1,I         SECOND
0062  27102 002002        SZA               WORD ZERO?
0063  27103 115263        JSB RERRS+23,I  NO--ERROR
0064  27104 027066        JMP VCHK1
0065  27105 006004  VCHK2 INB
0066  27106 027066        JMP VCHK1
0067*                                                                  BJ
0068**                                  **
0069***  REDIMENSION A MATRIX   ***
0070**                                  **
0071*
0072*  UPON ENTRY (TEMP1)+1 POINTS TO THE REDIMENSION SUBSCRIPT IN
0073*  THE PROGRAM AND SBPTR POINTS TO THE CURRENT DYNAMIC DIMENSIONS
0074*  OF THE ARRAY.  THE SUBSCRIPT BOUNDS ARE EVALUATED, ROUNDED,
0075*  AND RECORDED.  IF THE NUMBER OF ELEMENTS IS WITHIN THE
0076*  PHYSICAL ARRAY ALLOWANCE, EXIT WITH TEMP1 POINTING TO THE
0077*  WORD FOLLOWING THE SUBSCRIPT AND SBPTR AS UPON ENTRY, ELSE
0078*  EXIT TO ERROR.
0079*
0080  27107 035647  #RDIM ISZ TEMP1       COMPUTE NEW
0081  27110 015455        JSB FETCH         ROW DIMENSION
0082  27111 015443        JSB SBFIX       15 BIT INTEGER > 0?
```

```
0083  27112 115255          JSB RERRS+17,I  NO
0084  27113 006004          INB             YES, SAVE
0085  27114 175640          STB SBPTR,I       TRUE VALUE
0086  27115 075571          STB RD0             IN ARRAY
0087  27116 035640          ISZ SBPTR             ENTRY
0088  27117 165647          LDB TEMP1,I   EXPLICIT NEW
0089  27120 006003          SZB,RSS         COLUMN DIMENSION?
0090  27121 027125          JMP RDIM1     NO
0091  27122 015455          JSB FETCH     YES,
0092  27123 015443          JSB SBFIX       COMPUTE
0093  27124 115255          JSB RERRS+17,I    IT
0094  27125 006004  RDIM1   INB             SAVE TRUE VALUE
0095  27126 175640          STB SBPTR,I       IN ARRAY ENTRY
0096  27127 061571          LDA RD0         COMPUTE
0097  27130 100200          MPY SBPTR,I       NUMBER OF
0098  27132 006003          SZB,RSS             ELEMENTS
0099  27133 003025          CMA,SSA,INA,RSS       SPECIFIED
0100  27134 115265          JSB RERRS+25,I  TOO MANY
0101  27135 071571          STA RD0
0102  27136 065640          LDB SBPTR       RESET
0103  27137 044523          ADB .-3           ARRAY POINTER
0104  27140 160001          LDA 1,I             AND COMPUTE
0105  27141 006004          INB                   NUMBER OF
0106  27142 075640          STB SBPTR               ELEMENTS
0107  27143 100200          MPY SBPTR,I               AVAILABLE
0108  27145 035640          ISZ SBPTR                   FOR ARRAY
0109  27146 041571          ADA RD0         SUFFICIENT
0110  27147 002020          SSA              PHYSICAL SPACE?
0111  27150 115265          JSB RERRS+25,I  NO
0112  27151 035647          ISZ TEMP1       YES
0113  27152 125567          JMP REDIM,I
```

```
0115**                          **
0116***  PRINT A NUMBER        ***
0117**                          **
0118*
0119*  ENTER WITH A FLOATING POINT NUMBER IN (A) AND (B).  PRINT THE
0120*  NUMBER AND APPEND BLANKS TO REACH THE PRINT POSITION SPECIFIED
0121*  BY -EOPF ON RETURN FROM NUMOT.
0122*
0123  27153 002300  #ENOT CCE             ENABLE SIGN
0124  27154 015521        JSB NUMOT       OUTPUT NUMBER
0125  27155 027160        JMP *+3
0126  27156 060566        LDA .+40B       OUTPUT
0127  27157 015553        JSB OUTCR         A BLANK
0128  27160 065557        LDB EOPF        FIELD
0129  27161 045636        ADB CHRCT
0130  27162 006002        SZB               FULL?
0131  27163 027156        JMP *-5         NO
0132  27164 125517        JMP ENOUT,I     YES
0133*
0134  27165 114631  MINFX DEC -0.099999959
0135  27167 102756  MAXFX DEC -999999.5
0136**                          **
0137***  OUTPUT A NUMBER        ***
0138**                          **
0139*
0140*  ENTER WITH A FLOATING POINT NUMBER IN (A) AND (B) AND (E) = 1
0141*  IF A SIGN IS WANTED.  DETERMINE THE FORM OF THE NUMBER AND
0142*  SET EOPF ACCORDINGLY.  NON-INTEGERS ARE ROUNDED AFTER CONVERSION
0143*  TO DECIMAL.  TRAILING ZEROS ARE SUPPRESSED ON NUMBERS WITHOUT
0144*  EXPONENTS (AND ON NUMBERS WITH EXPONENTS IF CALLED FROM 'LIST').
0145*
0146  27171 071652  #NMOT STA NUMBF      SAVE HIGH MANTISSA
0147  27172 002041        SEZ,RSS         SIGN?
0148  27173 027205        JMP NUM01       NO
0149  27174 002021        SSA,RSS         YES, NEGATIVE NUMBER?
0150  27175 027202        JMP *+5         NO
0151  27176 015467        JSB ARINV       YES, NEGATE NUMBER
0152  27177 071652        STA NUMBF       SAVE HIGH MANTISSA
0153  27200 060603        LDA .+55B       LOAD '-'
0154  27201 002001        RSS
0155  27202 060566        LDA .+40B       LOAD '+'
0156  27203 071367        STA SIGN        SAVE SIGN
0157  27204 061652        LDA NUMBF       RETRIEVE HIGH MANTISSA
0158  27205 075653  NUM01 STB NUMBF+1     SAVE LOW MANTISSA
0159  27206 015515        JSB IFIX        INTEGER?
0160  27207 027233        JMP NUM02       NO
0161  27210 102201        SOC             YES, 16-BIT INTEGER?
0162  27211 027233        JMP NUM02       NO
0163*                        *
0164**  OUTPUT AN INTEGER    **
0165*                        *
0166  27212 075652        STB NUMBF       SAVE INTEGER
0167  27213 044450        ADB M1000
0168  27214 060534        LDA .+6
0169  27215 006021        SSB,RSS         3 DIGIT INTEGER?
0170  27216 040531        ADA .+3         NO
```

```
0171  27217 041636          ADA CHRCT      COMPUTE END-OF-FIELD
0172  27220 003004          CMA,INA        SAVE
0173  27221 071557          STA EOPF         IT
0174  27222 040617          ADA .74        ENOUGH
0175  27223 002020          SSA              ROOM?
0176  27224 015525          JSB OUTLN      NO
0177  27225 061367          LDA SIGN       YES
0178  27226 002002          SZA            SIGN?
0179  27227 015553          JSB OUTCR      YES, OUTPUT IT
0180  27230 065652          LDB NUMBF      NO
0181  27231 015555          JSB OUTIN      OUTPUT THE INTEGER
0182  27232 125521          JMP NUMOT,I
0183*                                       *
0184**  OUTPUT A FLOATING POINT NUMBER      **
0185*                                       *
0186  27233 060524  NUMO2   LDA .-2        SET 'FIXED'
0187  27234 071437          STA FFLAG        FLAG FALSE
0188  27235 104200          DLD NUMBF      LOAD NUMBER
0189  27237 015501          JSB .FAD       IS NUMBER
0190  27240 027167          DEF MAXFX        LESS THAN
0191  27241 002021          SSA,RSS            999999.5 ?
0192  27242 027251          JMP NUMO3      NO
0193  27243 104200          DLD NUMBF      YES, IS
0194  27245 015501          JSB .FAD         NUMBER
0195  27246 027165          DEF MINFX          LESS THAN
0196  27247 002021          SSA,RSS              0.09999995 ?
0197  27250 035437          ISZ FFLAG      NO, SET 'FIXED' FLAG TRUE
0198  27251 104200  NUMO3   DLD NUMBF      LOAD NUMBER
0199  27253 071417          STA MANT1      UNPACK
0200  27254 015513          JSB .FLUN
0201  27255 075421          STB MANT2        NUMBER
0202  27256 071423          STA EXP
0203  27257 002400          CLA            INITIALIZE
0204  27260 071425          STA EXPON        DECIMAL EXPONENT
0205  27261 051423          CPA EXP        ZERO EXPONENT?
0206  27262 027304          JMP NUMO5      YES
0207  27263 015401  NUMOO   JSB MBY10      NO
0208  27264 061423          LDA EXP        MULTIPLY
0209  27265 003026          CMA,SSA,INA,SZA   NUMBER BY 10
0210  27266 027271          JMP *+3             UNTIL IT IS
0211  27267 035425          ISZ EXPON             GREATER
0212  27270 027263          JMP NUMOO               THAN 1
0213  27271 015403          JSB DBY10      DIVIDE BY 10
0214  27272 061425          LDA EXPON
0215  27273 065423  NUMO4   LDB EXP        DIVIDE
0216  27274 007004          CMB,INB          NUMBER
0217  27275 006021          SSB,RSS            BY 10
0218  27276 027304          JMP NUMO5            UNTIL
0219  27277 071425          STA EXPON              IT IS
0220  27300 015403          JSB DBY10                LESS
0221  27301 003400          CCA                        THAN
0222  27302 041425          ADA EXPON                    1
0223  27303 027273          JMP NUMO4
0224  27304 003000  NUMO5   CMA            SET EXPONENT
0225  27305 071425          STA EXPON        TO TRUE VALUE-1
0226  27306 064520          LDB .-6        SET DIGIT
```

```
0227  27307 075455          STB DIGCT       COUNTER
0228  27310 064774          LDB NMBFA     SET BUFFER
0229  27311 075461          STB NMPTR       POINTER
```

```
0231*                                  *
0232**  CONVERT MANTISSA TO ASCII   **
0233*                                  *
0234   27312 015523  NUM06 JSB GETDG      STORE A
0235   27313 040606        ADA .+60B        DECIMAL
0236   27314 171461        STA NMPTR,I        DIGIT
0237   27315 035461        ISZ NMPTR
0238   27316 035455        ISZ DIGCT      SIXTH DIGIT?
0239   27317 027312        JMP NUM06      NO
0240   27320 015523        JSB GETDG      YES,
0241   27321 040521        ADA .-5          NEXT DIGIT
0242   27322 002020        SSA                >= 5 ?
0243   27323 027344        JMP NUM09+1    NO
0244*                                  *
0245**  ROUND ASCII MANTISSA   **
0246*                                  *
0247   27324 065461        LDB NMPTR
0248   27325 044525  NUM07 ADB .-1        LOAD LAST
0249   27326 160001        LDA 1,I          DIGIT
0250   27327 002004        INA            INCREMENT IT
0251   27330 050611        CPA .58        WAS IT A 9?
0252   27331 002001        RSS            YES
0253   27332 027343        JMP NUM09      NO
0254   27333 054774        CPB NMBFA      LEADING DIGIT?
0255   27334 027340        JMP NUM08      YES
0256   27335 060606        LDA .+60B      NO, OVERLAY
0257   27336 170001        STA 1,I          A 0
0258   27337 027325        JMP NUM07
0259   27340 035425  NUM08 ISZ EXPON      BUMP DECIMAL
0260   27341 000000        NOP              EXPONENT AND
0261   27342 060607        LDA .+61B          OVERLAY A 1
0262   27343 170001  NUM09 STA 1,I
0263   27344 061425        LDA EXPON      IS NUMBER
0264   27345 002021        SSA,RSS          LESS THAN 1 ?
0265   27346 027364        JMP NM011      NO
0266   27347 071457        STA NMTMP      YES
0267   27350 060606        LDA .+60B
0268   27351 065461        LDB NMPTR
0269   27352 035457  NM010 ISZ NMTMP      COUNT ZEROS
0270   27353 000000        NOP              PLUS 1
0271   27354 044525        ADB .-1        LAST
0272   27355 150001        CPA 1,I          DIGIT 0?
0273   27356 027352        JMP NM010      YES
0274   27357 061457        LDA NMTMP      NO, ALL SIGNIFICANCE
0275   27360 002020        SSA              IN SIX DIGITS?
0276   27361 027364        JMP NM011      NO
0277   27362 003400        CCA            YES, SET
0278   27363 071437        STA FFLAG        'FIXED' FLAG TRUE
0279   27364 064542  NM011 LDB .+12       COMPUTE
0280   27365 035437        ISZ FFLAG        FIELD
0281   27366 044531        ADB .+3            WIDTH
0282   27367 045636        ADB CHRCT      SAVE
0283   27370 007004        CMB,INB          END-OF-FIELD
0284   27371 075557        STB EOPF           MARKER
0285   27372 044620        ADB .75        ENOUGH
0286   27373 006020        SSB              ROOM?
```

```
0287  27374 015525          JSB OUTLN     NO
0288  27375 061367          LDA SIGN      YES
0289  27376 002002          SZA           SIGN?
0290  27377 015553          JSB OUTCR     YES, OUTPUT IT
0291  27400 064517          LDB .-7       SET OUTPUT
0292  27401 075455          STB DIGCT       DIGIT COUNTER
0293  27402 065461          LDB NMPTR
0294  27403 003400          CCA           FIXED
0295  27404 051437          CPA FFLAG       FORMAT?
0296  27405 027412          JMP *+5       NO
0297  27406 061425          LDA EXPON     YES, SET
0298  27407 003000          CMA             INDICATOR TO
0299  27410 071457          STA NMTMP         DECIMAL POINT
0300  27411 027424          JMP NM016
0301  27412 071457          STA NMTMP     SET INDICATOR FOR DECIMAL POINT
0302  27413 060776          LDA LCALL     CALLED
0303  27414 051521          CPA NUMOT       FROM 'LIST' ?
0304  27415 027424          JMP NM016     YES
0305  27416 027446          JMP NM014     NO
0306*                         *
0307**  DELETE TRAILING ZEROS  **
0308*                         *
0309  27417 061455  NM012 LDA DIGCT     AT RIGHT OF
0310  27420 002004          INA             DECIMAL
0311  27421 051457          CPA NMTMP         POINT?
0312  27422 027430          JMP *+6       NO
0313  27423 071455          STA DIGCT     YES, DELETE ZERO
0314  27424 044525  NM016 ADB .-1       LAST
0315  27425 160001          LDA 1,I         DIGIT
0316  27426 050606          CPA .+60B         0?
0317  27427 027417          JMP NM012     YES
0318  27430 003400          CCA           NO, FIXED
0319  27431 051437          CPA FFLAG       FORMAT?
0320  27432 027446          JMP NM014     NO
0321  27433 061425          LDA EXPON     YES, LEADING
0322  27434 002021          SSA,RSS         DECIMAL POINT?
0323  27435 027446          JMP NM014     NO
0324  27436 071457          STA NMTMP     YES, SET LEADING ZEROS COUNTER
0325*                         *
0326**  OUTPUT MANTISSA  **
0327*                         *
0328  27437 060604          LDA .+56B     OUTPUT A
0329  27440 002001          RSS             DECIMAL POINT
0330  27441 060606  NM013 LDA .+60B     OUTPUT
0331  27442 015553          JSB OUTCR       A ZERO
0332  27443 035457          ISZ NMTMP     MORE LEADING ZEROS?
0333  27444 027441          JMP NM013     YES
0334  27445 035455          ISZ DIGCT     NO, COUNT DECIMAL POINT
0335  27446 064774  NM014 LDB NMBFA     SET
0336  27447 075461          STB NMPTR       DIGIT POINTER
0337  27450 027455          JMP *+5
0338  27451 035457  NM015 ISZ NMTMP     DECIMAL POINT NEXT?
0339  27452 027455          JMP *+3       NO
0340  27453 060604          LDA .+56B     YES, LOAD IT
0341  27454 027457          JMP *+3
0342  27455 161461          LDA NMPTR,I   LOAD NEXT
```

```
0343  27456 035461          ISZ NMPTR       DIGIT
0344  27457 015553          JSB OUTCR       OUTPUT CHARACTER
0345  27460 035455          ISZ DIGCT       MORE DIGITS?
0346  27461 027451          JMP NM015       YES
0347  27462 035437          ISZ FFLAG       NO, EXPONENT?
0348  27463 125521          JMP NUMOT,I     NO
0349*                          *
0350**  OUTPUT THE EXPONENT  **
0351*                          *
0352  27464 061110          LDA E
0353  27465 015553          JSB OUTCR       OUTPUT AN 'E'
0354  27466 060603          LDA .+55B       OUTPUT
0355  27467 065425          LDB EXPON
0356  27470 006020          SSB               AN
0357  27471 007005          CMB,INB,RSS
0358  27472 060601          LDA .+53B           EXPONENT
0359  27473 075425          STB EXPON
0360  27474 015553          JSB OUTCR             SIGN
0361  27475 061425          LDA EXPON
0362  27476 006400          CLB             COMPUTE
0363  27477 100400          DIV .+10
0364  27501 040606          ADA .+60B         EXPONENT'S
0365  27502 044606          ADB .+60B
0366  27503 075425          STB EXPON           10'S DIGIT
0367  27504 015553          JSB OUTCR       OUTPUT IT
0368  27505 061425          LDA EXPON       OUTPUT
0369  27506 015553          JSB OUTCR         1'S DIGIT
0370  27507 125521          JMP NUMOT,I
```

```
0372* *                    *
0373**  COMPUTE INT(X)   *
0374*
0375*  ENTER WITH NUMBER IN (A) AND (B).  EXIT WITH FLOATING
0376*  POINT FORM OF ENTIER IN (A) AND (B).
0377*
0378  27510 075535  EINT  STB LBTMP      SAVE (B)
0379  27511 015515        JSB IFIX       TAKE ENTIER
0380  27512 027521        JMP EINT1      ALL SIGNIFICANCE IN MANTISSA
0381  27513 075535        STB LBTMP      SAVE (B)
0382  27514 064565        LDB .+31       CORRECT FOR
0383  27515 075423        STB EXP          BINARY POINT BIAS
0384  27516 065535        LDB LBTMP      RETRIEVE (B)
0385  27517 015407        JSB .PACK      NORMALIZE AND PACK
0386  27520 124752        JMP FRET,I
0387  27521 061361  EINT1 LDA TEMP6      RETRIEVE
0388  27522 065535        LDB LBTMP        NUMBER
0389  27523 124752        JMP FRET,I
0390* *                    *
0391**  EXECUTE TIM(X)    *
0392* *                    *
0393  27524 015515  ETIM  JSB IFIX       INTEGERIZE ARGUMENT
0394  27525 115307        JSB RERRS+43,I ILLEGAL ARGUMENT
0395  27526 002002        SZA
0396  27527 115307        JSB RERRS+43,I ILLEGAL ARGUMENT
0397  27530 060001        LDA 1          IS ARGUMENT
0398  27531 010531        AND .+3          <=3 AND
0399  27532 050001        CPA 1              >=0 ?
0400  27533 002001        RSS            YES
0401  27534 115307        JSB RERRS+43,I NO--ILLEGAL ARGUMENT
0402  27535 043563        ADA DTMTB      BRANCH TO
0403  27536 124000        JMP 0,I          APPROPRIATE ROUTINE
0404  27537 060042  ETIM0 LDA DATIM+1    # OF 100 MS
0405  27540 040435        ADA D36K         UNITS
0406  27541 006400        CLB            CONVERT
0407  27542 100400        DIV D600         TO MINUTES
0408  27544 027561        JMP ETIM3+1
0409  27545 060041  ETIM1 LDA DATIM      HOURS OF YEAR
0410  27546 006400        CLB            CONVERT
0411  27547 100400        DIV .+24         TO DAYS
0412  27551 060001        LDA 1          REMAINDER IS HOUR OF DAY
0413  27552 027561        JMP ETIM3+1
0414  27553 060041  ETIM2 LDA DATIM      HOURS OF YEAR
0415  27554 006400        CLB            CONVERT
0416  27555 100400        DIV .+24         TO DAYS
0417  27557 002001        RSS
0418  27560 060040  ETIM3 LDA YEAR       GET YEAR
0419  27561 105120        OCT 105120   CONVERT TO POATING POINT
0420  27562 124752        JMP FRET,I    EXIT WITH RESULT IN (A) AND (B)
0421  27563 127564  DTMTB DEF *+1,I
0422  27564 027537        DEF ETIM0
0423  27565 027545        DEF ETIM1
0424  27566 027553        DEF ETIM2
0425  27567 027560        DEF ETIM3
0426* *                    *
0427**  COMPUTE RND(X)    *
```

```
0428* *                    *
0429*
0430* THE RANDOM NUMBER FUNCTION COMPUTES A RANDOM NUMBER FROM THE
0431* FORMULAS:
0432*
0433*     X(N)=A*X(N-1)+C(MOD 2^30)     (A=5^11,C=2^30*(1/2-1/SQR(12)))
0434*     RND =X/2^30 MIN (1-2^-23)
0435*
0436  27570 002021  ERND  SSA,RSS       IS ARGUMENT POSITIVE?
0437  27571 027576        JMP *+5       YES
0438  27572 005265        RBL,CLE,ERB         NO,INITIALIZE RANDOM
0439  27573 001600        ELA             VALUE
0440  27574 071623        STA RNDX1
0441  27575 075624        STB RNDX2
0442*
0443  27576 061623        LDA RNDX1     COMPUTE FIRST
0444  27577 100200        MPY RNDA2       CROSS PRODUCT.
0445  27601 071623        STA RNDX1     SAVE (ONLY NEED LOW ORDER PART)
0446  27602 061624        LDA RNDX2     COMPUTE 2ND
0447  27603 100200        MPY RNDA1       CROSS PRODUCT.
0448  27605 041623        ADA RNDX1     ADD IN FIRST.
0449  27606 043641        ADA RNDC1     ADD IN HIGH PART OF C.
0450  27607 071623        STA RNDX1     SAVE TOTAL. (THIS IS HIGH PART).
0451  27610 002500        CLA,CLE       SET EXP=0.
0452  27611 071423        STA EXP
0453  27612 061624        LDA RNDX2     COMPUTE LOW ORDER PRODUCT.
0454  27613 100200        MPY RNDA2
0455  27615 043642        ADA RNDC2     ADD IN LOW PART OF C.
0456  27616 002040        SEZ           ADD ANY CARRY INTO
0457  27617 006004        INB             B.
0458  27620 001265        RAL,CLE,ERA   E_A(15),A(15)_0.
0459  27621 071624        STA RNDX2     SAVE LOW ORDER RESULT.
0460  27622 005600        ELB           SHIFT HIGH ORDER PART & ADD IN
0461  27623 045623        ADB RNDX1       PREVIOUS TOTAL.
0462  27624 005665        ELB,CLE,ERB   CLEAR BIT 15 AND STORE.
0463  27625 075623        STB RNDX1
0464  27626 001200        RAL           SHIFT A ADJACENT TO B.
0465  27627 101100        SWP           EXCHANGE REGISTERS AND
0466  27630 015407        JSB .PACK       PACK.
0467  27631 054530        CPB .+2       TEST FOR RESULT=1.0
0468  27632 002001        RSS
0469  27633 124752        JMP FRET,I    EXIT IF NOT.
0470  27634 060353        LDA INF       SET RESULT TO 1-2^-23
0471  27635 064451        LDB M256
0472  27636 124752        JMP FRET,I
0473*
0474*
0475  27637 002722  RNDA1 DEC 1490       A DIV 2^15
0476  27640 007335  RNDA2 DEC 3805       A MOD 2^15
0477  27641 016441  RNDC1 OCT 16441      C DIV 2^15
0478  27642 007701  RNDC2 OCT 7701       C MOD 2^15
0479* *                    *
0480**  COMPUTE SGN(X)   *
0481* *                    *
0482*
0483*  ENTER WITH ARGUMENT IN (A) AND (B).  IF ARGUMENT IS
```

```
0484*  NEGATIVE RETURN -1.0, IF ZERO RETURN 0, IF POSITIVE
0485*  RETURN 1.0 .
0486*
0487  27643 006400  ESGN  CLB             CLEAR LOW PART OF NUMBER
0488  27644 002003        SZA,RSS         ZERO?
0489  27645 124752        JMP FRET,I      YES, RETURN 0
0490  27646 002021        SSA,RSS         POSITIVE?
0491  27647 064530        LDB .+2         YES, LOAD EXPONENT FOR +1
0492  27650 061163        LDA FLGBT       NO, LOAD HIGH PART OF -1
0493  27651 006002        SZB             WAS ARGUMENT POSITIVE?
0494  27652 001300        RAR             YES, SET RESULT TO +1
0495  27653 124752        JMP FRET,I      NO
0496* *                  *
0497**  COMPUTE TYP(X)   *
0498* *                  *
0499*
0500*  UPON ENTRY (A) AND (B) HOLD A FILE NUMBER IN FLOATING POINT
0501*  FORM.  FILE 0 REFERS TO THE <DATA STATEMENT>S.  IF THE FILE
0502*  NUMBER IS NEGATIVE RETURN 1.0, 2.0, 3.0, OR 4.0 IF THE NEXT
0503*  ITEM IN THE FILE IS A NUMBER, STRING, EMD-OF-FILE, OR END-
0504*  OF-RECORD RESPECTIVELY.  IF THE FILE NUMBER IS POSITIVE RETURN
0505*  WITH THE VALUE CORRESPONDING TO THE FIRST ITEM FOUND OF ONE
0506*  OF THE FIRST THREE TYPES.
0507*
0508  27654 075535  ETYP  STB LBTMP     SAVE (B)
0509  27655 065335        LDB FILE#     SAVE VALUE
0510  27656 075701        STB PINTG       OF FILE#
0511  27657 002003        SZA,RSS       'DATA' FILE?
0512  27660 027710        JMP ETYP3     YES
0513  27661 007400        CCB           NO, IGNORE
0514  27662 002020        SSA             END-OF-RECORDS
0515  27663 006400        CLB               UNLESS ARGUMENT
0516  27664 075705        STB EORFL           IS NEGATIVE
0517  27665 065535        LDB LBTMP     RETRIEVE (B)
0518  27666 002020        SSA           TAKE ABSOLUTE VALUE
0519  27667 015467        JSB ARINV       OF ARGUMENT
0520  27670 015443        JSB SBFIX     15-BIT INTEGER?
0521  27671 115277        JSB RERRS+35,I  NO
0522  27672 075335        STB FILE#     YES
0523  27673 061335        LDA FILE#     VALIDATE
0524  27674 064524        LDB .-2
0525  27675 015607        JSB RQSTR       FILE
0526  27676 015613        JSB GTTYP     GET TYPE
0527  27677 065701  ETYP1 LDB PINTG     RESTORE
0528  27700 075335        STB FILE#       FILE#
0529  27701 105120        OCT 105120
0530  27702 124752        JMP FRET,I      FLOATING POINT FORM
0531  27703 060531  ETYP2 LDA .+3
0532  27704 065345        LDB NXTDT     OUT-OF-DATA
0533  27705 055641        CPB SYMTB       CONDITION?
0534  27706 027677        JMP ETYP1     YES, (A) = 3
0535  27707 015457        JSB SETDP     NO, SEEK NEXT <DATA STATEMENT>
0536  27710 003400  ETYP3 CCA           MORE DATA IN
0537  27711 051363        CPA DCCNT       CURRENT STATEMENT?
0538  27712 027703        JMP ETYP2     NO
0539  27713 165345        LDB NXTDT,I   YES, LOAD TYPE WORD
```

```
0540  27714 002404          CLA,INA         SET NUMBER
0541  27715 006021          SSB,RSS         NUMBER?
0542  27716 060530          LDA .+2         NO, SET FOR STRING
0543  27717 027677          JMP ETYP1
```

```
0002**                              **
0003***  COMPUTE CHEBYSHEV(X)      ***
0004**                              **
0005  27720 015505  #CHEB JSB .FMP
0006  27721 030243        DEF K2
0007  27722 104400        DST X2TMP      X2TMP = X*2
0008  27724 165537        LDB .CHEB,I
0009  27725 075475        STB CTMP       POINTER TO COEFFICIENT TABLE
0010  27726 104200        DLD 1,I
0011  27730 104400        DST DTMP       DTMP = COEFF(N)
0012  27732 002400        CLA
0013  27733 071672        STA BTMP
0014  27734 071673        STA BTMP+1     B = 0
0015  27735 035475  CHEB1 ISZ CTMP
0016  27736 035475        ISZ CTMP       N = N-1
0017  27737 161475        LDA CTMP,I
0018  27740 002003        SZA,RSS        C(N) = 0?
0019  27741 027763        JMP CHEB2      YES
0020  27742 104200        DLD BTMP       NO
0021  27744 104400        DST ATMP       A = B
0022  27746 104200        DLD DTMP
0023  27750 104400        DST BTMP       B = D
0024  27752 015505        JSB .FMP
0025  27753 001666        DEF X2TMP
0026  27754 015503        JSB .FSB
0027  27755 001670        DEF ATMP
0028  27756 015501        JSB .FAD
0029  27757 101475        DEF CTMP,I
0030  27760 104400        DST DTMP       D = COEFF(N)-A+B*X2
0031  27762 027735        JMP CHEB1
0032  27763 104200  CHEB2 DLD DTMP
0033  27765 015503        JSB .FSB
0034  27766 001670        DEF ATMP
0035  27767 015505        JSB .FMP
0036  27770 001165        DEF HALF
0037  27771 035537        ISZ .CHEB      ANS = (D-A)/2
0038  27772 125537        JMP .CHEB,I

0040* *                   *
0041**  EXECUTE TAB(X)    *
0042* *                   *
0043  27773 015541  ETAB  JSB .IENT      INTEGERIZE ARGUMENT
0044  27774 060616        LDA .72        ARG > 32767
0045  27775 006400        CLB            SET FLAG TO
0046  27776 075571        STB EOL          'TAB OCCURRED'
0047  27777 040457        ADA M72        IS ARGUMENT
0048  30000 002021        SSA,RSS          > 71 ?
0049  30001 026015        JMP ETAB2
0050  30002 040616        ADA .72        NO
0051  30003 003004        CMA,INA        ANY
0052  30004 041636        ADA CHRCT        BLANKS
0053  30005 002021        SSA,RSS            REQUIRED?
0054  30006 026016        JMP ETAB2+1    NO
0055  30007 071535        STA LBTMP      YES
0056  30010 060566  ETAB1 LDA .+40B      OUTPUT
0057  30011 015553        JSB OUTCR        A BLANK
```

```
0058  30012 035535          ISZ LBTMP      DONE?
0059  30013 026010          JMP ETAB1      NO
0060  30014 002001          RSS            YES
0061  30015 015525  ETAB2   JSB OUTLN      MOVE TO NEXT LINE
0062  30016 061163          LDA BIT15      INSURE THAT OPCHK DOESN'T BARF
0063  30017 124752          JMP FRET,I
0064* *                    *
0065**  COMPUTE ABS(X)    *
0066* *                    *
0067  30020 002020  EABS    SSA            ARGUMENT NEGATIVE?
0068  30021 015467          JSB ARINV      YES, NEGATE IT
0069  30022 124752          JMP FRET,I     NO

0071**                      **
0072***  LIBRARY ENTIER    ***
0073**                      **
0074*
0075*  ENTER WITH NUMBER IN (A) AND (B).  IF EXPONENT > 14
0076*  THEN EXIT TO (P+1), ELSE EXIT TO (P+2) WITH THE
0077*  ENTIER OF THE ARGUMENT IN (A).
0078*
0079  30023 071535  #IENT   STA LBTMP      SAVE (A)
0080  30024 060001          LDA 1          EXTRACT
0081  30025 010630          AND B377         EXPONENT
0082  30026 000033          SLA,RAR        NEGATIVE?
0083  30027 026033          JMP IENT1      YES
0084  30030 040507          ADA .-15       NO, LESS THAN
0085  30031 002021          SSA,RSS          OR EQUAL TO 14?
0086  30032 125541          JMP .IENT,I    NO
0087  30033 035541  IENT1   ISZ .IENT      YES
0088  30034 061535          LDA LBTMP      RESTORE (A)
0089  30035 015515          JSB IFIX       TAKE ENTIER
0090  30036 000000          NOP
0091  30037 060001          LDA 1          LOAD INTEGER
0092  30040 125541          JMP .IENT,I      INTO (A)


0094**                                  **
0095***  MULTIPLY BY A POWER OF 2       ***
0096**                                  **
0097*
0098*  ENTER WITH NUMBER IN (A) AND (B).  AUGMENT EXPONENT
0099*  BY THE VALUE POINTED TO BY (P+1) AND EXIT TO (P+2).
0100*  NO CHECK ON EXPONENT UNDERFLOW OR OVERFLOW.
0101*
0102  30041 002003  #PWR2   SZA,RSS        ARGUMENT ZERO?
0103  30042 026055          JMP PWR2A      YES, RETURN 0
0104  30043 071666          STA X2TMP      NO, SAVE HIGH PART OF MANTISSA
0105  30044 015513          JSB .FLUN      UNPACK LOW PART OF NUMBER
0106  30045 075667          STB X2TMP+1    SAVE LOW MANTISSA
0107  30046 165543          LDB .PWR2,I    COMPUTE NEW
0108  30047 140001          ADA 1,I          EXPONENT
0109  30050 001200          RAL            POSITION
0110  30051 010630          AND B377         AND MASK IT
0111  30052 070001          STA 1          COMPUTE NEW LOW
0112  30053 045667          ADB X2TMP+1      PART OF NUMBER
```

```
0113  30054 061666          LDA X2TMP     RETRIEVE HIGH MANTISSA
0114  30055 035543  PWR2A   ISZ .PWR2
0115  30056 125543          JMP .PWR2,I
0116* *                  *
0117**  COMPUTE COS(X)   *
0118* *                  *
0119  30057 015501  ECOS    JSB .FAD      COMPUTE
0120  30060 030345          DEF PIBY2       SIN(X+PI/2)
0121* *                  *
0122**  COMPUTE SIN(X)   *
0123* *                  *
0124  30061 015505  ESIN    JSB .FMP
0125  30062 030131          DEF TOPI
0126  30063 104400          DST XTEMP     X = 2*X/PI
0127  30065 015501          JSB .FAD
0128  30066 030241          DEF K1
0129  30067 015543          JSB .PWR2
0130  30070 000524          DEF .-2
0131  30071 015541          JSB .IENT
0132  30072 115273          JSB RERRS+31,I  EXPONENT EXCEEDS 14
0133  30073 105120          OCT 105120    FLT
0134  30074 015505          JSB .FMP
0135  30075 030133          DEF MM4
0136  30076 015501          JSB .FAD
0137  30077 001660          DEF XTEMP
0138  30100 104400          DST XTEMP     X = X-4*ENTIER((X+1)/4)
0139  30102 015503          JSB .FSB
0140  30103 030241          DEF K1
0141  30104 002020          SSA           X<1?
0142  30105 026114          JMP ESIN1     YES
0143  30106 104200          DLD K2        NO
0144  30110 015503          JSB .FSB
0145  30111 001660          DEF XTEMP
0146  30112 104400          DST XTEMP     X = 2-X
0147  30114 104200  ESIN1   DLD XTEMP
0148  30116 015505          JSB .FMP
0149  30117 001660          DEF XTEMP
0150  30120 015543          JSB .PWR2
0151  30121 000527          DEF .+1
0152  30122 015503          JSB .FSB
0153  30123 030241          DEF K1
0154  30124 015537          JSB .CHEB
0155  30125 030135          DEF COEF2
0156  30126 015505          JSB .FMP
0157  30127 001660          DEF XTEMP
0158  30130 124752          JMP FRET,I    ANS = X*CHEBY(2*X^2 -1)
0159*
0160  30131 050574  TOPI    DEC .636619772     2/PI
0161  30133 100000  MM4     DEC -4.
0162  30135 047605  COEF2   DEC 1.18496E-6
0163  30137 134143          DEC -1.365875E-4
0164  30141 045261          DEC 9.118016E-3
0165  30143 133371          DEC -.2852615692
0166  30145 050656          DEC 2.5525579248
0167  30147 000000          OCT 0
0168* *                  *
```

```
0169**  COMPUTE TAN(X)  *
0170* *                  *
0171   30150 015505  ETAN   JSB .FMP
0172   30151 030237         DEF FOPI        4/PI
0173   30152 104400         DST XTEMP
0174   30154 015501         JSB .FAD
0175   30155 030241         DEF K1
0176   30156 015543         JSB .PWR2
0177   30157 000524         DEF .-2
0178   30160 015541         JSB .IENT
0179   30161 115273         JSB RERRS+31,I
0180   30162 105120         OCT 105120      FLT
0181   30163 015467         JSB ARINV
0182   30164 015543         JSB .PWR2
0183   30165 000530         DEF .+2
0184   30166 015501         JSB .FAD
0185   30167 001660         DEF XTEMP
0186   30170 104400         DST XTEMP       X = X-4*ENTIER((X+1)/4)
0187   30172 015503         JSB .FSB
0188   30173 030241         DEF K1
0189   30174 071535         STA LBTMP
0190   30175 002020         SSA             X<1?
0191   30176 026231         JMP ETAN2       YES
0192   30177 104200         DLD K2          NO
0193   30201 015503         JSB .FSB
0194   30202 001660         DEF XTEMP
0195   30203 104400  ETAN1  DST YTEMP       Y = 2-X
0196   30205 015505         JSB .FMP
0197   30206 001662         DEF YTEMP
0198   30207 015505         JSB .FMP
0199   30210 030243         DEF K2
0200   30211 015503         JSB .FSB
0201   30212 030241         DEF K1
0202   30213 015537         JSB .CHEB
0203   30214 030245         DEF COEF0
0204   30215 015505         JSB .FMP
0205   30216 001662         DEF YTEMP
0206   30217 104400         DST YTEMP       Y = Y*CHEBY(2*Y^2 -1)
0207   30221 061535         LDA LBTMP
0208   30222 002020         SSA             X<1?
0209   30223 026234         JMP ETAN3       YES
0210   30224 104200         DLD K1          NO
0211   30226 015507         JSB .FDV
0212   30227 001662         DEF YTEMP
0213   30230 124752         JMP FRET,I      ANS = 1/Y
0214   30231 104200  ETAN2  DLD XTEMP
0215   30233 026203         JMP ETAN1       Y = X
0216   30234 104200  ETAN3  DLD YTEMP
0217   30236 124752         JMP FRET,I      ANS = Y
0218*
0219   30237 050574  FOPI   DEC 1.273239545
0220   30241 040000  K1     DEC 1.
0221   30243 040000  K2     DEC 2.
0222   30245 076061  COEF0  DEC 1.4458E-8
0223   30247 066034         DEC 2.013766E-7
0224   30251 057035         DEC 2.804816E-6
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0225  30253 050755          DEC 3.906637E-5
0226  30255 043523          DEC 5.4417038E-4
0227  30257 076112          DEC 7.586101578E-3
0228  30261 066520          DEC .10675392857
0229  30263 070512          DEC 1.7701474227
0230  30265 000000          OCT 0
0231* *                   *
0232**  COMPUTE ATN(X)   *
0233* *                   *
0234  30266 104400  EATN    DST XTEMP
0235  30270 060001          LDA 1
0236  30271 010630          AND B377
0237  30272 071535          STA LBTMP
0238  30273 002002          SZA
0239  30274 000010          SLA               ABS(X) > 1?
0240  30275 026332          JMP EATN2         NO
0241  30276 104200          DLD K1            YES
0242  30300 015507          JSB .FDV
0243  30301 001660          DEF XTEMP         U = 1/X
0244  30302 104400  EATN1   DST UTEMP
0245  30304 015505          JSB .FMP
0246  30305 001664          DEF UTEMP
0247  30306 015505          JSB .FMP
0248  30307 030243          DEF K2
0249  30310 015503          JSB .FSB
0250  30311 030241          DEF K1
0251  30312 015537          JSB .CHEB
0252  30313 030351          DEF COEF1
0253  30314 015505          JSB .FMP
0254  30315 001664          DEF UTEMP
0255  30316 104400          DST YTEMP         Y = U*CHEBY(2*U^2 -1)
0256  30320 061535          LDA LBTMP
0257  30321 002002          SZA
0258  30322 000010          SLA               ABS(X) > 1?
0259  30323 026335          JMP EATN3         NO
0260  30324 061660          LDA XTEMP         YES
0261  30325 002020          SSA               X<0?
0262  30326 026340          JMP EATN4         YES
0263  30327 104200          DLD PIBY2         NO
0264  30331 026342          JMP EATN4+2
0265  30332 104200  EATN2   DLD XTEMP
0266  30334 026302          JMP EATN1         U = X
0267  30335 104200  EATN3   DLD YTEMP
0268  30337 124752          JMP FRET,I        ANS = Y
0269  30340 104200  EATN4   DLD MP2
0270  30342 015503          JSB .FSB
0271  30343 001662          DEF YTEMP
0272  30344 124752          JMP FRET,I        ANS = -PI/2-Y
0273*
0274  30345 062207  PIBY2   DEC 1.5707963268    PI/2
0275  30347 115570  MP2     DEC -1.5707963268   -PI/2
0276  30351 106671  COEF1   DEC -1.33034E-8
0277  30353 056335          DEC 8.64888E-8
0278  30355 131601          DEC -56.99186E-8
0279  30357 040033          DEC 3.821037E-6
0280  30361 111013          DEC -2.6215196E-5
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0281  30363 060542          DEC 1.8574297E-4
0282  30365 122573          DEC -1.381195004E-3
0283  30367 055471          DEC .01113584206
0284  30371 111620          DEC -.1058929245
0285  30373 070320          DEC 1.762747174
0286  30375 000000          OCT 0
0287* *                    *
0288**  COMPUTE EXP(X)   *
0289* *                    *
0290  30376 015533  EEXP    JSB .EXP
0291  30377 124752          JMP FRET,I
0292  30400 015505  #EXP    JSB .FMP
0293  30401 030520          DEF L2E
0294  30402 104400          DST XTEMP       X = ARG*LOG2(E)
0295  30404 015541          JSB .IENT
0296  30405 026477          JMP .EXP2
0297  30406 071535          STA LBTMP
0298  30407 105120          OCT 105120    FLT
0299  30410 104400          DST YTEMP       Y = ENTIER(X)
0300  30412 061535          LDA LBTMP
0301  30413 042506          ADA M124
0302  30414 002021          SSA,RSS         X >= 124?
0303  30415 026477          JMP .EXP2       YES
0304  30416 042507          ADA .244        NO
0305  30417 002020          SSA             X < -120?
0306  30420 026474          JMP .EXP1       YES
0307  30421 104200          DLD XTEMP       NO
0308  30423 015503          JSB .FSB
0309  30424 001662          DEF YTEMP
0310  30425 104400          DST XTEMP       X = X-ENTIER(X)
0311  30427 015505          JSB .FMP
0312  30430 001660          DEF XTEMP
0313  30431 104400          DST UTEMP       U = X^2
0314  30433 015501          JSB .FAD
0315  30434 030510          DEF AAAA
0316  30435 104400          DST YTEMP       Y = X^2+AAAA
0317  30437 104200          DLD BBBB
0318  30441 015507          JSB .FDV
0319  30442 001662          DEF YTEMP
0320  30443 104400          DST YTEMP       Y = BBBB/Y
0321  30445 104200          DLD CCCC
0322  30447 015505          JSB .FMP
0323  30450 001664          DEF UTEMP
0324  30451 015501          JSB .FAD
0325  30452 030516          DEF DDDD
0326  30453 015503          JSB .FSB
0327  30454 001660          DEF XTEMP
0328  30455 015503          JSB .FSB
0329  30456 001662          DEF YTEMP
0330  30457 104400          DST YTEMP       Y = -X+DDDD+CCCC*X^2-Y
0331  30461 104200          DLD XTEMP
0332  30463 015507          JSB .FDV
0333  30464 001662          DEF YTEMP
0334  30465 015501          JSB .FAD
0335  30466 001165          DEF HALF
0336  30467 035535          ISZ LBTMP
```

```
0337  30470 000000         NOP
0338  30471 015543         JSB .PWR2
0339  30472 001535         DEF LBTMP
0340  30473 125533         JMP .EXP,I      ANS = (0.5+X/Y)*2^ENTIER(ARG*LE)
0341  30474 002400 .EXP1    CLA
0342  30475 006400         CLB
0343  30476 125533         JMP .EXP,I      ANS = 0
0344  30477 061535 .EXP2    LDA LBTMP       LARGE ARGUMENT
0345  30500 002020         SSA             NEGATIVE?
0346  30501 026474         JMP .EXP1       YES
0347  30502 115314         JSB WERRS+4,I   NO
0348  30503 060353         LDA INF
0349  30504 064524         LDB .-2         ANS = POSITIVE INFINITY
0350  30505 125533         JMP .EXP,I
0351*
0352  30506 177604 M124     DEC -124
0353  30507 000364 .244     DEC 244
0354  30510 053552 AAAA     DEC 87.417497202
0355  30512 046477 BBBB     DEC 617.9722695
0356  30514 043372 CCCC     DEC .03465735903
0357  30516 047643 DDDD     DEC 9.9545957821
0358  30520 056125 L2E      DEC 1.4426950409
```

```
0360* *                    *
0361**  COMPUTE LOG(X)     *
0362* *                    *
0363   30522 015535  ELOG   JSB .LOG
0364   30523 124752         JMP FRET,I
0365   30524 002003  #LOG   SZA,RSS        NON-ZERO ARGUMENT?
0366   30525 026601         JMP .LOG1      NO
0367   30526 002020         SSA            YES, POSITIVE ARGUMENT?
0368   30527 115267         JSB RERRS+27,I  NO
0369   30530 071660         STA XTEMP      YES,
0370   30531 015513         JSB .FLUN        SAVE MANTISSA
0371   30532 075661         STB XTEMP+1        AND FLOATED
0372   30533 105120         OCT 105120            EXPONENT
0373   30534 104400         DST YTEMP              SEPARATELY
0374   30536 104200         DLD XTEMP
0375   30540 015501         JSB .FAD
0376   30541 030605         DEF R22
0377   30542 104400         DST UTEMP      U = X+SQR(0.5)
0378   30544 104200         DLD XTEMP
0379   30546 015503         JSB .FSB
0380   30547 030605         DEF R22
0381   30550 015507         JSB .FDV
0382   30551 001664         DEF UTEMP
0383   30552 104400         DST UTEMP      U = (X-SQR(0.5))/U
0384   30554 015505         JSB .FMP
0385   30555 001664         DEF UTEMP
0386   30556 015503         JSB .FSB
0387   30557 030615         DEF CCC
0388   30560 104400         DST XTEMP
0389   30562 104200         DLD MB
0390   30564 015507         JSB .FDV
0391   30565 001660         DEF XTEMP
0392   30566 015501         JSB .FAD
0393   30567 030611         DEF AAA
0394   30570 015505         JSB .FMP
0395   30571 001664         DEF UTEMP
0396   30572 015503         JSB .FSB
0397   30573 001165         DEF HALF
0398   30574 015501         JSB .FAD
0399   30575 001662         DEF YTEMP
0400   30576 015505         JSB .FMP
0401   30577 030607         DEF LE2        ANS = LOG(2)*
0402   30600 125535         JMP .LOG,I       (MANTISSA-0.5+U*(AAA+MB/X))
0403   30601 115311  .LOG1  JSB WERRS+1,I
0404   30602 061163         LDA MNEG
0405   30603 064632         LDB B776       ANS = NEGATIVE INFINITY
0406   30604 125535         JMP .LOG,I
0407*
0408   30605 055202  R22    DEC .707106781      SQR(0.5)
0409   30607 054271  LE2    DEC .6931471806     LOG BASE E (2)
0410   30611 051260  AAA    DEC 1.2920070987
0411   30613 125606  MB     DEC -2.6398577035
0412   30615 065010  CCC    DEC 1.6567626301
```

```
0414* *                    *
0415**  COMPUTE SQR(X)     *
0416* *                    *
0417  30617 002003  ESQR   SZA,RSS        X= 0?
0418  30620 124752         JMP FRET,I     YES, ANS = 0
0419  30621 002020         SSA            NO, X < 0?
0420  30622 115270         JSB RERRS+28,I  YES
0421  30623 071660         STA XTEMP      NO
0422  30624 015513         JSB .FLUN
0423  30625 000031         SLA,ARS        EXPONENT ODD?
0424  30626 026664         JMP ESQR2      YES
0425  30627 040525         ADA .-1        NO
0426  30630 071535         STA LBTMP      EXPONENT/2 -1
0427  30631 075661         STB XTEMP+1    MANTISSA SAVED
0428  30632 061660         LDA XTEMP
0429  30633 015505         JSB .FMP
0430  30634 030677         DEF SA2
0431  30635 015501         JSB .FAD
0432  30636 030703         DEF SB2        Y = SB2+SA2*X
0433  30637 104400  ESQR1  DST YTEMP
0434  30641 104200         DLD XTEMP
0435  30643 015507         JSB .FDV
0436  30644 001662         DEF YTEMP
0437  30645 015501         JSB .FAD
0438  30646 001662         DEF YTEMP
0439  30647 015543         JSB .PWR2
0440  30650 000525         DEF .-1
0441  30651 104400         DST YTEMP      Y = (Y+X/Y)/2
0442  30653 104200         DLD XTEMP
0443  30655 015507         JSB .FDV
0444  30656 001662         DEF YTEMP
0445  30657 015501         JSB .FAD
0446  30660 001662         DEF YTEMP
0447  30661 015543         JSB .PWR2
0448  30662 001535         DEF LBTMP
0449  30663 124752         JMP FRET,I     ANS = (P+F/P)*2^ESQ0
0450  30664 071535  ESQR2  STA LBTMP      EXPONENT/2
0451  30665 044630         ADB B377
0452  30666 075661         STB XTEMP+1    MANTISSA/2 SAVED
0453  30667 061660         LDA XTEMP
0454  30670 015505         JSB .FMP
0455  30671 030675         DEF SA1
0456  30672 015501         JSB .FAD
0457  30673 030701         DEF SB1
0458  30674 026637         JMP ESQR1      Y = SB1+SA1*X
0459*
0460  30675 070000  SA1    DEC .875
0461  30677 045000  SA2    DEC .578125
0462  30701 043524  SB1    DEC .27863
0463  30703 066000  SB2    DEC .421875
```

```
0465**                          **
0466***  HANDLE OVERFLOW       ***
0467**                          **
0468*
0469*  (A) CONTAINS THE HIGH MANTISSA UPON ENTRY.  (A) AND
0470*  (B) CONTAIN THE LARGEST REPRESENTABLE NUMBER OF
0471*  APPROPRIATE SIGN, PACKED, UPON EXIT.
0472*
0473  30705 064524  #OVFL LDB .-2
0474  30706 002020        SSA
0475  30707 064632        LDB B776
0476  30710 030353        IOR INF
0477  30711 002020        SSA
0478  30712 061163        LDA MNEG
0479  30713 125411        JMP OVFLW,I
0480**                          **
0481***  CHECK OVER/UNDERFLOWS  ***
0482**                          **
0483*
0484*  EXIT TO (P+1) IF STATUS IS NOT SYNTAX.  ELSE EXIT TO (P+2),
0485*  SETTING SYMTB = 4 IF IN KEYBOARD MODE.  THESE ERRORS ARE NOT
0486*  REPORTED IF IN TAPE MODE.
0487*
0488  30714 061634  #CHOU LDA LNAME     COMPUTE
0489  30715 040536        ADA .+?STAT-?ID
0490  30716 164000        LDB 0,I         STATUS
0491  30717 054532        CPB .+4       SYNTAX?
0492  30720 002001        RSS           YES
0493  30721 026730        JMP CHOU1     NO
0494  30722 060266        LDA TAPEF                                       X]
0495  30723 011626        AND LMSK                                        X]
0496  30724 002003        SZA,RSS                                         X]
0497  30725 075641        STB SYMTB     NO
0498  30726 035575        ISZ CHOUF
0499  30727 125575        JMP CHOUF,I
0500  30730 035646  CHOU1 ISZ ENOUF     ARE WE EXECUTING ENTER STATE?
0501  30731 002001        RSS           NO
0502  30732 035575        ISZ CHOUF     YES--SUPPRESS ERROR
0503  30733 125575        JMP CHOUF,I
0504**                          **
0505***  LOOK FOR A NUMBER     ***
0506**                          **
0507*
0508*  NUMCK LOOKS FOR AN UNSIGNED NUMBER, SIGN MUST BE SET
0509*  BY THE CALLER (SIGN = -1 FOR NEGATIVE, ELSE POSITIVE).
0510*  (A) CONTAINS A CHARACTER UPON ENTRY; IF IT IS NEITHER
0511*  A DIGIT NOR A DECIMAL POINT, EXIT IS TO (P+1) WITH
0512*  (A) UNCHANGED AND (B) = 0.  EXIT IS TO ERROR ON FINDING
0513*  AN EXPONENT PART OF INCORRECT FORMAT.  ZERO REPLACES AN
0514*  UNDERFLOW; THE LARGEST REPRESENTABLE NUMBER OF THE
0515*  APPROPRIATE SIGN REPLACES AN OVERFLOW.  AFTER STORING A
0516*  FLOATING POINT NUMBER IN M AND M+1 (WHERE SBPTR,I = M)
0517*  EXIT IS TO (P+2) WITH THE NEXT INPUT STRING CHARACTER
0518*  IN (A) AND TEMP+1.
0519*
0520  30734 006400  #NMCK CLB           ZERO
```

```
0521  30735 075423          STB EXP          ALL
0522  30736 075417          STB MANT1          COMPONENTS
0523  30737 075421          STB MANT2            OF THE
0524  30740 075425          STB EXPON              NUMBER
0525  30741 075650          STB TEMP+1     SET 'NUMBER FLAG' FALSE
0526  30742 007400          CCB            SET 'DECIMAL POINT'
0527  30743 075407          STB DPFLG             FLAG FALSE
0528  30744 050604  NUMC1    CPA .+56B      DECIMAL POINT?
0529  30745 035407          ISZ DPFLG      YES
0530  30746 026752          JMP NUMC2      NO
0531  30747 002400          CLA            ZERO POST-DECIMAL
0532  30750 071425          STA EXPON        DIGIT
0533  30751 027007          JMP NUMC4+1        COUNTER
0534  30752 015365  NUMC2    JSB DIGCK      DIGIT?
0535  30753 027023          JMP NUMC7      NO
0536  30754 035425          ISZ EXPON      YES, COUNT DIGIT
0537  30755 100033          ASL 11         LEFT-JUSTIFY DIGIT
0538  30756 071651          STA TEMP+2       AND SAVE IT
0539  30757 015401          JSB MBY10      MULTIPLY PREVIOUS NUMBER BY 10
0540  30760 065423          LDB EXP        ZERO
0541  30761 006003          SZB,RSS          EXPONENT?
0542  30762 027016          JMP NUMC6      YES
0543  30763 044522          ADB .-4        NO,
0544  30764 007000          CMB              SAVE
0545  30765 061651          LDA TEMP+2         SHIFT
0546  30766 075651          STB TEMP+2           COUNT
0547  30767 006400          CLB            CLEAR LOWER MANTISSA
0548  30770 035651  NUMC3    ISZ TEMP+2     ALL SHIFTS DONE?
0549  30771 027013          JMP NUMC5      NO
0550  30772 000040          CLE            YES, ADD IN
0551  30773 045421          ADB MANT2        LOW PART
0552  30774 103101          CLO                OF NUMBER
0553  30775 002040          SEZ            OVERFLOW FROM (B)?
0554  30776 002004          INA            YES
0555  30777 041417          ADA MANT1      ADD IN HIGH PART OF MANTISSA
0556  31000 102301          SOS            OVERFLOW?
0557  31001 027006          JMP NUMC4      NO
0558  31002 000065          CLE,ERA        YES, CORRECT
0559  31003 005500          ERB              MANTISSA
0560  31004 035423          ISZ EXP            AND BUMP
0561  31005 000000          NOP                  EXPONENT
0562  31006 015405  NUMC4    JSB NORML      NORMALIZE THE NUMBER
0563  31007 035650          ISZ TEMP+1     SET 'NUMBER FLAG' TRUE
0564  31010 015547          JSB GETCR      FETCH CHARACTER
0565  31011 027072          JMP NUM12-1    NONE FOUND
0566  31012 026744          JMP NUMC1
0567  31013 000065  NUMC5    CLE,ERA        SHIFT
0568  31014 005500          ERB              DIGIT
0569  31015 026770          JMP NUMC3          RIGHT
0570  31016 060532  NUMC6    LDA .+4        SET
0571  31017 071423          STA EXP          EXPONENT
0572  31020 061651          LDA TEMP+2     LOAD
0573  31021 006400          CLB              NUMBER
0574  31022 027006          JMP NUMC4
0575  31023 006400  NUMC7    CLB            SET EXPONENT
0576  31024 075651          STB TEMP+2       SIGN TO '+'
```

```
0577  31025 055650          CPB TEMP+1     DIGIT OR DECIMAL POINT FOUND?
0578  31026 125377          JMP NUMCK,I    NO
0579  31027 051110          CPA E          'E' ?
0580  31030 002001          RSS            YES
0581  31031 027073          JMP NUM12      NO
0582  31032 015547          JSB GETCR      FETCH CHARACTER
0583  31033 027132          JMP NUM16      NONE FOUND
0584  31034 050601          CPA .+53B      '+' ?
0585  31035 027042          JMP NUMC8      YES
0586  31036 050603          CPA .+55B      NO, '-' ?
0587  31037 003401          CCA,RSS        YES
0588  31040 027044          JMP NUMC9      NO
0589  31041 071651          STA TEMP+2     SET EXPONENT SIGN TO '-'
0590  31042 015547  NUMC8    JSB GETCR      FETCH CHARACTER
0591  31043 027132          JMP NUM16      NONE FOUND
0592  31044 015365  NUMC9    JSB DIGCK      DIGIT?
0593  31045 027132          JMP NUM16      NO
0594  31046 071650          STA TEMP+1     YES, SAVE IT
0595  31047 015547          JSB GETCR
0596  31050 027066          JMP NUM11
0597  31051 015365          JSB DIGCK      DIGIT?
0598  31052 027066          JMP NUM11      NO
0599  31053 061650          LDA TEMP+1     YES, MULTIPLY
0600  31054 075650          STB TEMP+1       PREVIOUS DIGIT
0601  31055 100200          MPY .+10           BY 10
0602  31057 041650          ADA TEMP+1     ADD IN NEW DIGIT
0603  31060 071650          STA TEMP+1     SAVE EXPONENT
0604  31061 015547          JSB GETCR
0605  31062 027066          JMP NUM11
0606  31063 015365          JSB DIGCK      THIRD DIGIT?
0607  31064 002001          RSS            NO
0608  31065 027132          JMP NUM16      YES
0609  31066 065650  NUM11    LDB TEMP+1     LOAD EXPONENT
0610  31067 035651          ISZ TEMP+2     POSITIVE?
0611  31070 007004          CMB,INB        YES, COMPLEMENT IT
0612  31071 002001          RSS            NO
0613  31072 006400          CLB
0614  31073 071650  NUM12    STA TEMP+1     SAVE CHARACTER
0615  31074 035407          ISZ DPFLG      DECIMAL POINT FOUND?
0616  31075 045425          ADB EXPON      YES, CORRECT EXPONENT
0617  31076 006003          SZB,RSS        NO, ZERO EXPONENT?
0618  31077 027114          JMP NUM14      YES
0619  31100 006020          SSB            NO, POSITIVE EXPONENT?
0620  31101 027110          JMP NUM13      YES
0621  31102 007004          CMB,INB        NO, SET
0622  31103 075425          STB EXPON        COUNTER
0623  31104 015403          JSB DBY10      DIVIDE NUMBER BY 10
0624  31105 035425          ISZ EXPON      DONE?
0625  31106 027104          JMP *-2        NO
0626  31107 027114          JMP NUM14      YES
0627  31110 075425  NUM13    STB EXPON      SET COUNTER
0628  31111 015401          JSB MBY10      MULTIPLY NUMBER BY 10
0629  31112 035425          ISZ EXPON      DONE?
0630  31113 027111          JMP *-2        NO
0631  31114 061417  NUM14    LDA MANT1      LOAD
0632  31115 065421          LDB MANT2        MANTISSA
```

```
0633  31116 035367          ISZ SIGN       POSITIVE?
0634  31117 027123          JMP NUM15      YES
0635  31120 003000          CMA            NO, COMPLEMENT
0636  31121 007007          CMB,INB,SZB,RSS  THE
0637  31122 002004          INA                NUMBER
0638  31123 015407  NUM15   JSB .PACK      NORMALIZE AND PACK
0639  31124 171640          STA SBPTR,I    STORE
0640  31125 015371          JSB SBPUD        NUMBER IN
0641  31126 175640          STB SBPTR,I        DESTINATION
0642  31127 015371          JSB SBPUD            ADDRESS
0643  31130 061650          LDA TEMP+1     RETRIEVE CHARACTER
0644  31131 035377          ISZ NUMCK
0645  31132 035377  NUM16   ISZ NUMCK
0646  31133 125377          JMP NUMCK,I
0001**                                        **
0002***  MULTIPLY UNPACKED NUMBER BY 10       ***
0003**                                        **
0004*
0005*  THE FLOATING POINT NUMBER IN MANT1, MANT2, AND EXP
0006*  IS MULTIPLIED BY 10.
0007*
0008  31134 061417  #MB10   LDA MANT1      LOAD HIGH MANTISSA
0009  31135 002003          SZA,RSS        ZERO NUMBER?
0010  31136 125401          JMP MBY10,I    YES
0011  31137 065423          LDB EXP        NO,
0012  31140 044531          ADB .+3          MULTIPLY
0013  31141 075423          STB EXP            BY 8
0014  31142 065421          LDB MANT2      LOAD LOW MANTISSA
0015  31143 000065          CLE,ERA        DIVIDE
0016  31144 005500          ERB              BY
0017  31145 000065          CLE,ERA            4
0018  31146 005540          ERB,CLE
0019  31147 045421          ADB MANT2      ADD INTO
0020  31150 002040          SEZ              BOTH REGISTERS
0021  31151 002004          INA                PRODUCING
0022  31152 041417          ADA MANT1            1.25 * MANTISSA
0023  31153 002021          SSA,RSS        CORRECT
0024  31154 027161          JMP MBY01
0025  31155 000065          CLE,ERA          ON
0026  31156 005500          ERB
0027  31157 035423          ISZ EXP            OVERFLOW
0028  31160 000000          NOP
0029  31161 071417  MBY01   STA MANT1      STORE
0030  31162 075421          STB MANT2        MANTISSA
0031  31163 125401          JMP MBY10,I
0032**                                        **
0033***  NORMALIZE UNPACKED NUMBER            ***
0034**                                        **
0035*
0036*  ENTER WITH NUMBER IN (A), (B), AND EXP.  EXIT WITH
0037*  NORMALIZED NUMBER IN MANT1, MANT2, AND EXP (MANTISSA
0038*  IS LEFT IN (A) AND (B) AS WELL).
0039*
0040  31164 071401  #NRML   STA NT0        SET
0041  31165 002400          CLA              LEFT-SHIFT
0042  31166 071651          STA TEMP+2         COUNTER
```

```
0043  31167 061401         LDA NT0          TO ZERO
0044  31170 002003         SZA,RSS        IF NUMBER
0045  31171 006002         SZB              IS ZERO,
0046  31172 027200         JMP NORM2+1        CLEAR
0047  31173 071423         STA EXP              EVERYTHING
0048  31174 071417         STA MANT1      STORE
0049  31175 075421  NORM1  STB MANT2        MANTISSA
0050  31176 125405         JMP NORML,I
0051  31177 035651  NORM2  ISZ TEMP+2     COUNT A LEFT SHIFT
0052  31200 004066         CLE,ELB        ROTATE (A)
0053  31201 001600         ELA              AND (B) LEFT
0054  31202 002061         SEZ,SSA,RSS    TWO HIGHEST BITS 0?
0055  31203 027177         JMP NORM2      YES, POSITIVE UNNORMALIZED
0056  31204 002060         SEZ,SSA        NO, TWO HIGHEST BITS 1?
0057  31205 027177         JMP NORM2      YES, NEGATIVE UNNORMALIZED
0058  31206 001500         ERA            NO, NORMALIZE
0059  31207 005540         ERB,CLE          MANTISSA
0060  31210 071417         STA MANT1      COMPUTE
0061  31211 061651         LDA TEMP+2
0062  31212 003004         CMA,INA          CORRECTED
0063  31213 041423         ADA EXP
0064  31214 071423         STA EXP            EXPONENT
0065  31215 061417         LDA MANT1
0066  31216 027175         JMP NORM1
```

```
0068**                                  **
0069***  NORMALIZE AND PACK NUMBER     ***
0070**                                  **
0071*
0072*  NUMBER IN (A), (B), AND EXP ON ENTRY.  ON EXIT (A)
0073*  AND (B) CONTAIN THE NORMALIZED, ROUNDED, AND PACKED
0074*  NUMBER.  UNDERFLOW BECOMES A ZERO, OVERFLOW BECOMES
0075*  THE LARGEST REPRESNTABLE NUMBER OF APPROPRIATE SIGN.
0076*
0077  31217 015405  #PACK JSB NORML      NORMALIZE NUMBER
0078  31220 002103        CLE,SZA,RSS   ZERO?
0079  31221 125407        JMP .PACK,I   YES
0080  31222 044626        ADB B177      NO, ROUND
0081  31223 002021        SSA,RSS       POSITIVE?
0082  31224 006004        INB           YES, FINISH ROUND
0083  31225 103101        CLO
0084  31226 002040        SEZ           ON OVERFLOW FROM (B)
0085  31227 002104        CLE,INA         CORRECT (A)
0086  31230 102301        SOS           OVERFLOW? ( (A)=100000, (B)=0 )
0087  31231 001200        RAL           TWO HIGH BITS
0088  31232 002031        SSA,SLA,RSS     BOTH 1? ( IF (A) WAS 140000 )
0089  31233 027236        JMP PACK1     NO
0090  31234 002300        CCE           YES
0091  31235 001130        ARS,SLA,ALS   SET (A) = 100000 AND SKIP
0092  31236 001300  PACK1 RAR           UNDOES RAL ABOVE
0093  31237 071651        STA TEMP+2    SAVE (A)
0094  31240 101050        LSR 8         DELETE 8 LOW BITS
0095  31241 005727        BLF,BLF         OF MANTISSA
0096  31242 061423        LDA EXP       DECREMENT
0097  31243 002040        SEZ             EXPONENT
0098  31244 040525        ADA .-1           ON (E) # 0
0099  31245 102201        SOC           INCREMENT
0100  31246 002004        INA             EXPONENT ON OVERFLOW
0101  31247 040627        ADA B200      EXPONENT
0102  31250 002020        SSA             UNDERFLOW?
0103  31251 027270        JMP PACK3     YES
0104  31252 040451        ADA M256      NO, EXPONENT
0105  31253 002021        SSA,RSS         OVERFLOW?
0106  31254 027275        JMP PACK4     YES
0107  31255 040627        ADA B200      NO, RESTORE EXPONENT
0108  31256 001200        RAL           POSITION
0109  31257 010630        AND B377        EXPONENT AND
0110  31260 044000        ADB 0             ADD LOW MANTISSA
0111  31261 061651        LDA TEMP+2    RETRIEVE HIGH MANTISSA
0112  31262 051163        CPA MNEG
0113  31263 002001        RSS           NEGATIVE
0114  31264 125407        JMP .PACK,I
0115  31265 055164        CPB MNEG+1      OVERFLOW?
0116  31266 027275        JMP PACK4     YES
0117  31267 125407        JMP .PACK,I   NO
0118  31270 015575  PACK3 JSB CHOUF     CHECK STATUS
0119  31271 115316        JSB WERRS+6,I
0120  31272 002400        CLA           ZERO RESULT
0121  31273 006400        CLB             ON UNDERFLOW
0122  31274 125407        JMP .PACK,I
0123  31275 015575  PACK4 JSB CHOUF     CHECK STATUS
```

```
0124  31276 115315          JSB WERRS+5,I
0125  31277 061651          LDA TEMP+2     RETRIEVE HIGH MANTISSA
0126  31300 015411          JSB OVFLW
0127  31301 125407          JMP .PACK,I
0128**                                     **
0129***  DIVIDE UNPACKED NUMBER BY 10      ***
0130**                                     **
0131*
0132*  INVERSE OF MBY10
0133*
0134  31302 061417  #DB10 LDA MANT1       RETURN
0135  31303 002003          SZA,RSS          ON
0136  31304 125403          JMP DBY10,I        ZERO
0137  31305 064524          LDB .-2        ADD EXPONENT
0138  31306 045423          ADB EXP          OF 1/10 TO
0139  31307 075423          STB EXP            THAT OF NUMBER
0140  31310 061421          LDA MANT2      JUSTIFY
0141  31311 000065          CLE,ERA          LOWER MANTISSA
0142  31312 100200          MPY TENTH          MULTIPLY BY 1/10
0143  31314 000066          CLE,ELA        SHIFT
0144  31315 005640          ELB,CLE          BACK
0145  31316 040001          ADA 1          ADD IN EQUIVALENT OF
0146  31317 002040          SEZ              LOWER MANTISSA*
0147  31320 006104          CLE,INB            TENTH*2^(-16)
0148  31321 075421          STB MANT2            AND ROUND TO 16 BITS
0149  31322 061417          LDA MANT1      DO
0150  31323 100200          MPY TENTH        SAME TO
0151  31325 040001          ADA 1              HIGH MANTISSA
0152  31326 041421          ADA MANT2      PERFORM EFFECTIVE
0153  31327 002040          SEZ              SUM OF DOUBLE-LENGTH
0154  31330 006004          INB                PRODUCTS
0155  31331 101100          SWP            SWAP (A) AND (B)
0156  31332 015405          JSB NORML      NORMALIZE
0157  31333 125403          JMP DBY10,I      RESULT
```

```
0159*
0160*  A-REG = DISC ADDRESS
0161*        A(15)  =DISC DRIVE
0162*        A(14:7)=CYLINDER NUMBER
0163*        A(6)   =1 IF FIXED DISC/0 IF CARTRIGE
0164*        A(5:0) =SECTOR NUMBER
0165*
0166*  B-REG = CORE ADDRESS AND DIRECTION
0167*        B(15)  =1 FOR DISC READ/0 FOR DISC WRITE
0168*        B(14:0)=CORE ADDRESS
0169*
0170*  WORD  = - NUMBER OF WRODS TO BE TRANSFERRED
0171*
0172*  ENDSK = DRIVER FLAG, SET WHEN A TRANSFER IS INITIATED
0173*          AND CLEARED UPON SUCCESSFUL COMPLETION
0174*
0175*  WHEN AN ATTEMPTED TRANSFER FAILS, IT IS REPEATED NINE
0176*  ADDITIONAL TIMES.  IF IT CONTINUES TO FAIL, THE COMPUTER
0177*  HALTS DISPLAYING THE DISC STATUS IN THE A-REGISTER.
0178*


0180  31334 000000  LDISC NOP
0181  31335 103100        CLF 0
0182  31336 070272        STA DADDR     SAVE DISC AND
0183  31337 074271        STB CORE        CORE ADDRESSES
0184  31340 067334        LDB LDISC     STORE RETURN
0185  31341 077436        STB DINT        ADDRESS
0186  31342 034263        ISZ ENDSK     SET BUSY FLAG
0187  31343 064065  LDOR  LDB WORD      IS WORD
0188  31344 006003        SZB,RSS         COUNT=0?
0189  31345 027463        JMP LDEND     YES-NO TRANSFER
0190*
0191  31346        LDORP EQU *
0192  31346 001200        RAL
0193  31347 010527        AND .+1       ISOLATE
0194  31350 070273        STA DRIVE       DRIVE NUMBER
0195*
0196  31351 060272        LDA DADDR     ISOLATE
0197  31352 010615        AND B100        HEAD NUMBER
0198  31353 070001        STA B
0199  31354 060272        LDA DADDR     ISOLATE SECTOR
0200  31355 010614        AND B77         ADDRESS
0201  31356 040476        ADA .-24      IF SECTOR NUMBER
0202  31357 002021        SSA,RSS         GREATER THAN 23, THEN
0203  31360 044566        ADB .+40B         ADJUST HEAD NUMBER
0204  31361 002020        SSA           IF SECTOR NUMBER LESS
0205  31362 040556        ADA .+24        THAN 12, RESET IT
0206  31363 005723        BLF,RBR       POSITION AND ADD
0207  31364 030001        IOR B           DISC NUMBER
0208  31365 070274        STA HDSCT     SAVE
0209*
0210  31366 060272        LDA DADDR
0211  31367 010304        AND CYLMK     ISOLATE
0212  31370 001727        ALF,ALF         CYLINDER
0213  31371 001200        RAL               NUMBER
```

```
0214  31372 070275          STA CYL#
0215*
0216**     INITIATE SEEK OPERATION
0217*
0218  31373 102611          OTA DC          OUTPUT CYLINDER #
0219  31374 103711          STC DC,C          TO DATA CHANNEL
0220  31375 060303          LDA SEEK        LOAD SEEK COMMAND AND
0221  31376 030273          IOR DRIVE         ADD ON DRIVE NUMBER
0222  31377 106712          CLC CC          CLEAR PREVIOUS COMMAND
0223  31400 102612          OTA CC          OUTPUT SEEK TO
0224  31401 103712          STC CC,C          COMMAND CHANNEL
0225  31402 102311          SFS DC          WAIT FOR CYLINDER #
0226  31403 027402          JMP *-1           TO BE ACCEPTED
0227  31404 060274          LDA HDSCT       OUTPUT
0228  31405 102611          OTA DC            HEAD/SECTOR
0229  31406 103711          STC DC,C            ADDRESS
0230  31407 102311          SFS DC          WAIT FOR
0231  31410 027407          JMP *-1           ACCEPTANCE
0232*
0233**     INITIATE DISC TRANSFER
0234*
0235  31411 060271          LDA CORE
0236  31412 064305          LDB CMDMA       SET UP
0237  31413 106606          OTB 6             DMA
0238  31414 106702          CLC 2
0239  31415 102602          OTA 2           OUTPUT CORE
0240  31416 102702          STC 2             ADDRESS
0241  31417 064065          LDB WORD        OUTPUT WORD
0242  31420 106602          OTB 2             COUNT
0243  31421 064302          LDB READ        LOAD
0244  31422 002021          SSA,RSS           DISC
0245  31423 064301          LDB WRIT            COMMAND
0246  31424 044273          ADB DRIVE       ADD ON DRIVE #
0247  31425 106712          CLC CC
0248  31426 106612          OTB CC          OUTPUT COMMAND
0249  31427 002021          SSA,RSS         IF OUTPUT, PRESET
0250  31430 102111          STF DC            DATA CHANNEL FLAG
0251  31431 002020          SSA             IF INPUT, CLEAR THE
0252  31432 103711          STC DC,C          FLAG AND SET CONTROL
0253  31433 103706          STC 6,C         START DMA
0254  31434 103712          STC CC,C        START DISC
0255  31435 027471          JMP LDE2        RETURN


0257*
0258**     PROCESS COMMAND CHANNEL INTERRUPT
0259*
0260  31436 000000  DINT    NOP
0261  31437 103100          CLF 0
0262  31440 104400          DST DSAVE       SAVE REGISTERS
0263  31442 102106          STF 6           TURN OFF DMA
0264  31443 102504          LIA 4           WAS INTERRUPT
0265  31444 050540          CPA .+CC          FROM DISC?
0266  31445 002001          RSS
0267  31446 027470          JMP LDE1        NO
0268*
```

```
0269**     CHECK STATUS
0270*
0271   31447 102512          LIA CC          GET ATTENSION BITS AND
0272   31450 040525          ADA .-1           CONVERT TO DRIVE NUMBER
0273   31451 103711          STC DC,C        SET UP DATA CHANNEL
0274   31452 102612          OTA CC          OUTPUT
0275   31453 106712          CLC CC            STATUS
0276   31454 103712          STC CC,C            COMMAND
0277   31455 102311          SFS DC          WAIT FOR
0278   31456 027455          JMP *-1           STATUS
0279   31457 102511          LIA DC          RETRIEVE STATUS
0280   31460 106711          CLC DC          TURN OFF DATA CHANNEL
0281   31461 000010          SLA             ANY ERRORS?
0282   31462 027475          JMP LDERR       YES
0283*
0284**     TRANSFER COMPLETED - NO ERRORS
0285*
0286   31463 106712  LDEND   CLC CC
0287   31464 060514          LDA .-10        RESET FAIL
0288   31465 070300          STA FAIL          COUNTER
0289   31466 002400          CLA             CLEAR DRIVER
0290   31467 070263          STA ENDSK         BUSY FLAG
0291   31470 107706  LDE1    CLC 6,C         TURN OFF DMA
0292   31471 104200  LDE2    DLD DSAVE       RESTORE REGISTERS
0293   31473 102100          STF 0
0294   31474 127436          JMP DINT,I      RETURN


0296*
0297**     ERROR HAS BEEN DETECTED
0298*
0299   31475 034300  LDERR   ISZ FAIL        INCREMENT FAIL COUNTER
0300   31476 027502          JMP LDER1       INITIATE RESTART
0301   31477 103010  LDER2   HLT 10B,C       HALT WITH STATUS
0302   31500 060514          LDA .-10          IN A-REGISTER
0303   31501 070300          STA FAIL
0304*
0305   31502 060272  LDER1   LDA DADDR       INITIATE
0306   31503 027343          JMP LDOR          RESTART
0307*
0308*  THE FOLLOWING INSTRUCTIONS ARE USED BY "DISC-UP" COMMAND
0309*  TO PREVENT A SYSTEM HALT WHEN OPERATOR ERRONEOUSLY UPS
0310*  A NON-EXISTENT OR NOT READY DISC.
0311*  IT WILL BE ENTERED BY INSERTING THE INSTR. AT LABEL "LDER5" INTO
0312*  LOCATION "LDER2"
0313*
0314   31504 071135  LDER3   STA STATS       STORE STATUS
0315   31505 063510          LDA LDER4       RESTORE "HALT" INSTRUCTION
0316   31506 073477          STA LDER2
0317   31507 027463          JMP LDEND       EXIT
0318*
0319   31510 103010  LDER4   HLT 10B,C
0320   31511 027504  LDER5   JMP LDER3
0321*
0322   31512         LDSND   EQU *
```

```
0325*
0326**     POWER FAIL/RESTART
0327*
0328  31512 000000  POW   NOP
0329  31513 102204        SFC 4          FAIL OR RESTART?
0330  31514 027615        JMP POW1       RESTART.
0331*
0332**     POWER FAIL SECTION
0333*
0334  31515 104400        DST POWIT      SAVE REGISTERS TEMP.
0335  31517 005520        ERB,BLS
0336  31520 102201        SOC
0337  31521 006004        INB
0338*
0339  31522 063734        LDA FLAG
0340  31523 002002        SZA            CHECK FLAG.
0341  31524 027613        JMP POW2       FLAG=1 OR FLAG=2,
0342*
0343*
0344*
0345  31525 063512        LDA POW        FLAG=0. FAILED IN RESTART?
0346  31526 043735        ADA POWD1
0347  31527 002020        SSA
0348  31530 027544        JMP POW81      NO. NORMAL FAIL.
0349  31531 043736        ADA POWD2
0350  31532 002020        SSA
0351  31533 027613        JMP POW2       YES. FAILED IN RESTART.
0352  31534 043737        ADA POWD3      MAY BE.
0353  31535 002021        SSA,RSS
0354  31536 027544        JMP POW81      NO. NORMAL FAIL.
0355  31537 063477        LDA LDER2      YES. FAILED IN RESTART.
0356  31540 073740        STA SVHLT      SAVE CONTENTS OF "LDER2" AND
0357  31541 063510        LDA LDER4      REPLACE WITH "HALT" INSTRUC-
0358  31542 073477        STA LDER2      TION.
0359  31543 027613        JMP POW2
0360*
0361* NORMAL POWER FAILURE.
0362*
0363  31544 077745  POW81 STB POWEO      SAVE REGISTERS
0364  31545 104200        DLD POWIT        PERMANENTLY.
0365  31547 104400        DST POWAB
0366  31551 063512        LDA POW        SAVE RETURN ADDRESS.
0367  31552 073753        STA POWP
0368  31553 102501        LIA 01         FETCH AND
0369  31554 073746        STA POWSW        SAVE SWITCH REGISTER.
0370*
0371  31555 002400        CLA            GET ALL DEVICE FLAGS.
0372  31556 102206        SFC DMA        CHECK DMA FLAG.
0373  31557 002004        INA            SET BIT 0, IF SET.
0374  31560 102210        SFC ?SC        CHECK CONSOLE FLAG.
0375  31561 030532        IOR .+4        SET BIT 2,IF SET.
0376*                                    * DISC
0377*                                        * CHANNELS.
0378*                                   * PHOTOREADER CHANNEL.
0379  31562 102214        SFC MPX          CHECK MUX(DATA) FLAG.
0380  31563 030615        IOR B100         SET BIT 6, IF SET.
```

```
0381*                                          * MUX(STATUS) CHANNEL.
0382  31564 102216          SFC DSCB          CHECK PHONES FLAG.
0383  31565 030631          IOR B400          SET BIT 8, IF SET.
0384  31566 102217          SFC CLOCK         CHECK TBG FLAG.
0385  31567 031000          IOR B1000         SET BIT 9,IF SET.
0386  31570 073733          STA POWFL         SET FLAG WORD.
0387  31571 060272          LDA DADDR         SAVE DISC ADDRESS.
0388  31572 073747          STA PDADR
0389  31573 060271          LDA CORE          SAVE CORE ADDRESS
0390  31574 073750          STA PCORE
0391  31575 060065          LDA WORD          SAVE WORD COUNT.
0392  31576 073751          STA PWORD
0393  31577 060263          LDA ENDSK         SAVE DISC FLAG.
0394  31600 073752          STA PNDSK
0395  31601 063436          LDA DINT          SAVE INTERRUPT RET.ADDR.
0396  31602 073742          STA PDINT           OF DISC DRIVER.
0397  31603 063477          LDA LDER2         SAVE CONTENTS OF "LDER2" AND
0398  31604 073740          STA SVHLT         REPLACE WITH "HALT" INSTR.
0399  31605 063510          LDA LDER4
0400  31606 073477          STA LDER2
0401*
0402  31607 006400          CLB               IF CENTRAL INTERRUPT
0403  31610 102200          SFC 0               FLAG IS SET, STORE "STF 0"
0404  31611 067754          LDB SETF0             IN "POWND"; ELSE "NOP".
0405  31612 077727          STB POWND
0406*
0407  31613          POW2   EQU *
0408  31613 106704          CLC 4
0409  31614 102004          HLT 4
0410*
0411*
0412*
0413*****************************************************************
0414***** END OF POWER FAIL SECTION *****
0415*****************************************************************
0416*
0417*
0418*
0419*
0420*
0421*****************************************************************
0422**    CORE RESIDENT RESTART SECTION
0423*****************************************************************
0424*
0425*
0426  31615 103704  POW1    STC 4,C           SET FOR POWER FAIL.
0427  31616 060451          LDA M256          SET WORD LENGTH FOR ROLL IN AND
0428  31617 070065          STA WORD            ROLL OUT.
0429*
0430*  WAIT FOR DISC TO GET UP TO SPEED.
0431*
0432  31620 063755          LDA LOOPS         DELAY.
0433  31621          POW30  EQU *
0434  31621 006400          CLB
0435  31622 034001          ISZ B
0436  31623 027622          JMP *-1
```

```
0437  31624 034000          ISZ A
0438  31625 027621          JMP POW30
0439  31626           POW3  EQU *
0440  31626 103711          STC DC,C        SET UP DATA CHANNEL.
0441  31627 106612          OTB CC          OUTPUT
0442  31630 106712          CLC CC          STATUS.
0443  31631 103712          STC CC,C            COMMAND.
0444  31632 102311          SFS DC          WAIT FOR ACCEPTANCE.
0445  31633 027632          JMP *-1
0446  31634 102511          LIA DC          GET STATUS.
0447  31635 106711          CLC DC
0448  31636 006002          SZB             DRIVE #1?
0449  31637 027644          JMP POW31       YES. CONTINUE.
0450  31640 010615          AND B100        NO. CHECK READY BIT.
0451  31641 002003          SZA,RSS         SET?
0452  31642 006004          INB             NO. NOW DO DRIVE #1.
0453  31643 027626          JMP POW3        YES. RECHECK.
0454*
0455  31644           POW31 EQU *
0456  31644 106712          CLC CC
0457  31645 063734          LDA FLAG        CHECK FLAG.
0458  31646 000010          SLA
0459  31647 027653          JMP POW56       FLAG=1.
0460  31650 002002          SZA
0461  31651 027657          JMP POW51       FLAG=2.
0462*
0463  31652 037734  POW55    ISZ FLAG        SET FLAG=1.
0464  31653           POW56 EQU *
0465  31653 163757          LDA SWLBA,I     ROLL OUT SYSTEM LIBRARY.
0466  31654 064320          LDB #LIB#
0467  31655 114443          JSB DISCP,I
0468*
0469  31656 037734          ISZ FLAG        SET FLAG=2.
0470  31657           POW51 EQU *
0471  31657 163756          LDA RSLBA,I     ROLL IN RESTART.
0472  31660 064317          LDB #LIBI
0473  31661 114443          JSB DISCP,I
0474*
0475  31662 124320          JMP #LIB#,I     EXECUTE RESTART.
0476*
0477*
0478*
0479*****************************************************************
0480*  CONTINUATION OF CORE RESIDENT RESTART LOGIC.
0481*****************************************************************
0482*
0483*  OVERLAY RESTART LOGIC MUST HAVE BEEN EXECUTED
0484*  BEFORE ENTERING THIS SECTION.
0485*
0486*
0487  31663           POW57 EQU *
0488  31663 163757          LDA SWLBA,I      ROLL IN SYSTEM LIBRARY.
0489  31664 064317          LDB #LIBI
0490  31665 114443          JSB DISCP,I
0491*
0492*
```

```
0493*  TURN ON ALL DEVICES.
0494*
0495  31666 102717          STC CLOCK      START TBG.
0496  31667 102710          STC ?SC        START CONSOLE.
0497  31670 060417          LDA TBITS      RE-ESTABLISH PREVIOUS
0498  31671 102610          OTA ?SC          STATE OF CONSOLE.
0499  31672 102714          STC MPX        START MUX.
0500  31673 102716          STC DSCB       START PHONES.
0501*
0502*
0503  31674 063752          LDA PNDSK      RESTORE DISC BUSY FLAG.
0504  31675 070263          STA ENDSK
0505  31676 063751          LDA PWORD
0506  31677 070065          STA WORD
0507  31700 067750          LDB PCORE
0508  31701 063741          LDA CKFLG      CHECK FLAG.
0509  31702 002003          SZA,RSS
0510  31703 027721          JMP POW58      =0. DRIVER NOT BUSY.
0511  31704 000010          SLA
0512  31705 027716          JMP POW59      =1.DRIVER BUSY,NOT FAILED IN DR.
0513  31706 063742          LDA PDINT      =2.DRIVER BUSY.FAILED IN DRIVER.
0514  31707 073436          STA DINT
0515  31710 063740          LDA SVHLT      RE-INSTATE CONTENTS OF
0516  31711 073477          STA LDER2        LOCATION "LDER2".
0517  31712 002400          CLA            ST FLAG=0.
0518  31713 073734          STA FLAG
0519  31714 063747          LDA PDADR
0520  31715 027346          JMP LDORP
0521*
0522  31716          POW59  EQU *
0523  31716 063747          LDA PDADR      RECALL DISC DRIVER.
0524  31717 114443          JSB DISCP,I
0525  31720 103100          CLF 0
0526  31721          POW58  EQU *
0527  31721 002400          CLA
0528  31722 067740          LDB SVHLT      RE-INSTATE LOCATION "LDER2".
0529  31723 077477          STB LDER2
0530  31724 073734          STA FLAG       SET FLAG=0.
0531*
0532  31725 104200          DLD POWAB      RESTORE A AND B REGISTERS.
0533*
0534*  RESET INTERRUPT TO SAME
0535*     AS BEFORE POWER FAILURE.
0536*
0537  31727 000000  POWND NOP
0538  31730 127753          JMP POWP,I     EXIT.
0539  31731          PEXIT  EQU *
0540*
0541*
0542*
0543  31731 000000  POWIT BSS 2
0544  31733 000000  POWFL BSS 1
0545  31734 000000  FLAG  NOP
0546  31735 146163  POWD1 ABS -POW1
0547  31736 177743  POWD2 ABS -POW55+POW1
0548  31737 177721  POWD3 ABS -PEXIT+POW55
```

```
0549  31740 103010  SVHLT HLT 10B,C
0550  31741 000000  CKFLG BSS 1
0551  31742 000000  PDINT BSS 1
0552  31743 000000  POWAB BSS 2
0553  31745 000000  POWEO BSS 1
0554  31746 000000  POWSW BSS 1
0555  31747 000000  PDADR BSS 1
0556  31750 000000  PCORE BSS 1
0557  31751 000000  PWORD BSS 1
0558  31752 000000  PNDSK BSS 1
0559  31753 000000  POWP  BSS 1          TO SAVE RETURN ADDRESS.
0560  31754 102100  SETF0 STF 0
0561  31755 177502  LOOPS DEC -190
0562  31756 036132  RSLBA DEF RSLIB      POINTERS
0563  31757 036133  SWLBA DEF SWLIB      TO DISC ADDRESSES.
0564*
0565*
0566*
```

```
0568**                                                          **
0569***  PRINT NAME TABLE FOR MULTICHARACTER SYMBOLS            ***
0570**                                                          **
0571*
0572*  BITS 15-9 OF THE 'OCT' WORD ARE THE BASIC OPERATOR
0573*  CODES OF THE SYMBOLS.  BITS 2-0 ARE THE LENGTH IN
0574*  CHARACTERS OF THE SYMBOLS.  THE ASCII VERSION (PRINT
0575*  NAME) FOLLOWS.
0576*
0577*                                                          *
0578**  MULTICHARACTER BINARY OPERATORS                        **
0579*                                                          *
0580  31760 033003  MCBOS OCT 33003      AND
0581  31761 040516        ASC 1,AN
0582  31762 042000        OCT 42000
0583  31763 034002        OCT 34002      OR
0584  31764 047522        ASC 1,OR
0585  31765 035003        OCT 35003      MIN
0586  31766 046511        ASC 1,MI
0587  31767 047000        OCT 47000
0588  31770 036003        OCT 36003      MAX
0589  31771 046501        ASC 1,MA
0590  31772 054000        OCT 54000
0591  31773 037002  MRELS OCT 37002      UNEQUAL
0592  31774 036076        ASC 1,<>
0593  31775 040002        OCT 40002      GREATER THAN OR EQUAL
0594  31776 037075        ASC 1,>=
0595  31777 041002        OCT 41002      LESS THAN OR EQUAL
0596  32000 036075        ASC 1,<=
0597*                                                         *
0598**  MULTICHARACTER UNARY OPERATOR                        **
0599*                                                         *
0600  32001 042003  NOT   OCT 42003
0601  32002 047117        ASC 1,NO
0602  32003 052000        OCT 52000
0603*                     *
0604**  STATEMENT TYPES  **
0605*                     *
0606  32004 045003  STYPS OCT 45003      COM
0607  32005 041517        ASC 1,CO
0608  32006 046400        OCT 46400
0609  32007 046003        OCT 46003      LET
0610  32010 046105        ASC 1,LE
0611  32011 052000        OCT 52000
0612  32012 047003        OCT 47003      DIM
0613  32013 042111        ASC 1,DI
0614  32014 046400        OCT 46400
0615  32015 050003        OCT 50003      DEF
0616  32016 042105        ASC 1,DE
0617  32017 043000        OCT 43000
0618  32020 051003        OCT 51003      REM
0619  32021 051105        ASC 1,RE
0620  32022 046400        OCT 46400
0621  32023 052004        OCT 52004      GOTO
0622  32024 043517        ASC 2,GOTO
0623  32026 053002        OCT 53002      IF
```

```
0624  32027 044506         ASC 1,IF
0625  32030 054003         OCT 54003      FOR
0626  32031 043117         ASC 1,FO
0627  32032 051000         OCT 51000
0628  32033 055004         OCT 55004      NEXT
0629  32034 047105         ASC 2,NEXT
0630  32036 056005         OCT 56005      GOSUB
0631  32037 043517         ASC 2,GOSU
0632  32041 041000         OCT 41000
0633  32042 057006         OCT 57006      RETURN
0634  32043 051105         ASC 3,RETURN
0635  32046 060003  EOFOP   OCT 60003      END
0636  32047 042516         ASC 1,EN
0637  32050 042000         OCT 42000
0638  32051 061004         OCT 61004      STOP
0639  32052 051524         ASC 2,STOP
0640  32054 062004         OCT 62004      DATA
0641  32055 042101         ASC 2,DATA
0642  32057 063005  IOSTS   OCT 63005      INPUT
0643  32060 044516         ASC 2,INPU
0644  32062 052000         OCT 52000
0645  32063 064004         OCT 64004      READ
0646  32064 051105         ASC 2,READ
0647  32066 065005         OCT 65005      PRINT
0648  32067 050122         ASC 2,PRIN
0649  32071 052000         OCT 52000
0650  32072 066007         OCT 66007      RESTORE
0651  32073 051105         ASC 3,RESTOR
0652  32076 042400         OCT 42400
0653  32077 067003         OCT 67003      MAT
0654  32100 046501         ASC 1,MA
0655  32101 052000         OCT 52000
0656  32102 070005         OCT 70005      FILES
0657  32103 043111         ASC 2,FILE
0658  32105 051400         OCT 51400
0659  32106 071005         OCT 71005      CHAIN
0660  32107 041510         ASC 2,CHAI
0661  32111 047000         OCT 47000
0662  32112 072001         OCT 72001    'IMPLIED' LET                    XJ
0663  32113 000000         OCT 0
0664*                              *
0665**  MISCELLANEOUS OPERATORS  **
0666*                              *
0667  32114 074002         OCT 74002      OF
0668  32115 047506         ASC 1,OF
0669  32116 075004  THEN     OCT 75004
0670  32117 052110         ASC 2,THEN
0671  32121 076002         OCT 76002      TO
0672  32122 052117         ASC 1,TO
0673  32123 077004  STEP     OCT 77004
0674  32124 051524         ASC 2,STEP
0675*                                                  *
0676**  PREDEFINED FUNCTIONS.  BITS 13-9 ARE USED      **
0677**    FOR INTERNAL IDENTIFICATION                  **
0678*                                                  *
0679  32126 001003  TAB    OCT 1003       TAB
```

```
0680  32127 052101         ASC 1,TA
0681  32130 041000         OCT 41000
0682  32131 002003  PRDFS  OCT 2003       SIN
0683  32132 051511         ASC 1,SI
0684  32133 047000         OCT 47000
0685  32134 003003         OCT 3003       COS
0686  32135 041517         ASC 1,CO
0687  32136 051400         OCT 51400
0688  32137 004003         OCT 4003       TAN
0689  32140 052101         ASC 1,TA
0690  32141 047000         OCT 47000
0691  32142 005003         OCT 5003       ATN
0692  32143 040524         ASC 1,AT
0693  32144 047000         OCT 47000
0694  32145 006003         OCT 6003       EXP
0695  32146 042530         ASC 1,EX
0696  32147 050000         OCT 50000
0697  32150 007003         OCT 7003       LOG
0698  32151 046117         ASC 1,LO
0699  32152 043400         OCT 43400
0700  32153 010003         OCT 10003      ABS
0701  32154 040502         ASC 1,AB
0702  32155 051400         OCT 51400
0703  32156 011003         OCT 11003      SQR
0704  32157 051521         ASC 1,SQ
0705  32160 051000         OCT 51000
0706  32161 012003         OCT 12003      INT
0707  32162 044516         ASC 1,IN
0708  32163 052000         OCT 52000
0709  32164 013003         OCT 13003      RND
0710  32165 051116         ASC 1,RN
0711  32166 042000         OCT 42000
0712  32167 014003         OCT 14003      SGN
0713  32170 051507         ASC 1,SG
0714  32171 047000         OCT 47000
0715  32172 015003         OCT 15003      LEN
0716  32173 046105         ASC 1,LE
0717  32174 047000         OCT 47000
0718  32175 016003         OCT 16003      TYP
0719  32176 052131         ASC 1,TY
0720  32177 050000         OCT 50000
0721  32200 017003         OCT 17003      TIM
0722  32201 052111         ASC 1,TI
0723  32202 046400         OCT 46400
0724*                       *
0725**  MATRIX FUNCTIONS   **
0726*                       *
0727  32203 024003  MATFS  OCT 24003      ZER
0728  32204 055105         ASC 1,ZE
0729  32205 051000         OCT 51000
0730  32206 025003         OCT 25003      CON
0731  32207 041517         ASC 1,CO
0732  32210 047000         OCT 47000
0733  32211 026003         OCT 26003      IDN
0734  32212 044504         ASC 1,ID
0735  32213 047000         OCT 47000
```

```
0736  32214 027003          OCT 27003       INV
0737  32215 044516          ASC 1,IN
0738  32216 053000          OCT 53000
0739  32217 030003          OCT 30003       TRN
0740  32220 052122          ASC 1,TR
0741  32221 047000          OCT 47000
```

```
0743*
0744**
0745***    DATA SET CONTROL BOARD LOGIC
0746**
0747*
0748  32222 000000  DSCBL NOP
0749  32223 103100        CLF 0
0750  32224 072325        STA PHNA       SAVE
0751  32225 076326        STB PHNB
0752  32226 001500        ERA              REGISTERS
0753  32227 072327        STA PHNE
0754  32230 102516        LIA DSCB       LOAD AND SAVE
0755  32231 072324        STA NSTAT        PHONES STATUS
0756  32232 001722        ALF,RAL
0757  32233 001200        RAL
0758  32234 010545        AND .+15       A = PORT#
0759  32235 040357        ADA TTYTP
0760  32236 164000        LDB A,I        B => TTY TABLE
0761  32237 044544        ADB .+?PPRM
0762  32240 160001        LDA B,I        A = PHONES PARAM
0763  32241 010531        AND .+3        ISOLATE AND SAVE
0764  32242 072323        STA OSTAT      PHONES STATUS BITS
0765  32243 062324        LDA NSTAT      STORE NEW
0766  32244 170001        STA B,I          PHONES STATUS
0767  32245 102616        OTA DSCB       OUTPUT TO PHONES BOARD
0768  32246 044517        ADB .+?TSTA-?PPRM  B => I/O STATUS
0769  32247 010531        AND .+3        ISOLATE NEW STATUS BITS
0770  32250 022323        XOR OSTAT      TAKE CARE
0771  32251 002003        SZA,RSS          OF NOISE
0772  32252 026314        JMP DEXIT
0773  32253 000010        SLA      DID DSR CHANGE?
0774  32254 026277        JMP DSC2 YES

0776*
0777**     CARRIER STATUS CHANGED
0778*
0779  32255 012323        AND OSTAT
0780  32256 001310        RAR,SLA
0781  32257 026264        JMP DSC1
0782*
0783*  CONNECTION MADE OR CONNECTION RESTORED WITHIN
0784*  LINE DROP-OUT TIMING.
0785*         DSR(OLD)=1      CARRIER(OLD)=0
0786*         DSR(NEW)=1      CARRIER (NEW)=1
0787*
0788  32260 160001        LDA B,I        REMOVE LINE
0789  32261 011171        AND LDNBT        DROP-OUT BIT
0790  32262 170001        STA B,I            FROM STATUS
0791  32263 026314        JMP DEXIT
0792*
0793*  LINE DROP-OUT OR HANG UP.
0794*         DSR(OLD)=1      CARRIER(OLD)=1
0795*         DSR(NEW)=1      CARRIER(NEW)=0
0796*
0797  32264 160001  DSC1  LDA B,I        LOG TIMING OR
0798  32265 010623        AND LTLDB        LINE DROP-OUT
```

```
0799  32266 002002          SZA                 BIT SET?
0800  32267 026314          JMP DEXIT      YES, EXIT
0801  32270 160001          LDA B,I        NO, SET LINE
0802  32271 031167          IOR LDBT         DROP-OUT BIT
0803  32272 170001          STA B,I
0804  32273 044532          ADB .+?PHON-?TSTA
0805  32274 060524          LDA .-2        SET FOR TWO
0806  32275 170001          STA B,I          SECONDS TIMING
0807  32276 026314          JMP DEXIT

0809*
0810**    DATA SET READY CHANGED
0811*
0812  32277 012323  DSC2    AND OSTAT
0813  32300 000010          SLA
0814*
0815*  HERE'S JOE COOL ANSWERING THE PHONE -
0816*  RATS, WRONG NUMBER!
0817*
0818*     DSR(OLD)=1      CARRIER(OLD)=0 OR =1
0819*     DSR(NEW)=0      CARRIER(NEW)=0    =0
0820*
0821  32301 026264          JMP DSC1
0822*
0823*  PHONE JUST ANSWERED OR HARDWIRED TERMINAL CONNECTED
0824*     DSR(OLD)=0      CARRIER(OLD)=0 OR =0
0825*     DSR(NEW)=1      CARRIER(NEW)=0    =1
0826*
0827  32302 160001          LDA B,I        LOG TIMING OR
0828  32303 010623          AND LTLDB        LINE DROP-OUT
0829  32304 002002          SZA                BIT SET?
0830  32305 026314          JMP DEXIT      YES,EXIT
0831  32306 160001          LDA B,I        NO, SET LOG
0832  32307 030615          IOR LTBT         TIMING BIT
0833  32310 170001          STA B,I
0834  32311 044532          ADB .+?PHON-?TSTA
0835  32312 060207          LDA PHR        STORE LOG-ON TIME
0836  32313 170001          STA B,I          IN PHONES WORD

0838*
0839**   EXIT
0840*
0841  32314 062327  DEXIT   LDA PHNE       RESTORE
0842  32315 001600          ELA
0843  32316 062325          LDA PHNA         REGISTERS
0844  32317 066326          LDB PHNB
0845  32320 103116          CLF DSCB
0846  32321 102100          STF 0
0847  32322 126222          JMP DSCBL,I
0848  32323          DSCED  EQU *


0850*
0851  00623          LTLDB  EQU B300
0852  32323 000000   OSTAT  BSS 1
0853  32324 000000   NSTAT  BSS 1
```

```
0854   32325 000000   PHNA   BSS 1
0855   32326 000000   PHNB   BSS 1
0856   32327 000000   PHNE   BSS 1
```

```
0002* THE SYSTEM CONSOLE DRIVER CONTROLS ALL TRANSMISSION OF DATA BE-
0003* TWEEN THE SYSTEM CONSOLE (ASR-35) AND THE SYSTEM. IT HANDLES ALL
0004* * IO FOR THE DEVICE AND PROVIDES FOR COMMUNICATION OF MESSAGES TO
0005* THE SYSTEM, THE FOLLOWING VARIABLES ARE SIGNIFICANT:
0006*
0007* T35F1: =0 DURING INPUT, -1 DURING OUTPUT.
0008* T35F2: NORMALLY 0, IT IS SET TO -1 WHEN A COMPLETE MESSAGE HAS
0009*        BEEN RECEIVED. UNTIL IT IS CLEARED BY THE SYSTEM, ALL FUR-
0010*        THER INPUT IS INHIBITED.
0011* T35F3: NORMALLY 0, IT IS SET TO -1 WHEN A COMPLETE MESSAGE HAS
0012*        BEEN RECEIVED.  UNTIL IT IS CLEARED BY THE OUTPUT
0013*        INITIALIZATION SECTION OF THE DRIVER, LOG AND MESSAGE
0014*        ENTLRIES ARE HELD OFF.
0015* TOG:   NOT USED DURING INPUT. DURING OUTPUT, BIT 0 = 0 IF NEXT
0016*        CHARACTER IS ON LEFT, 1 IF ON RIGHT.
0017* TADR:  NOT USED DURING INPUT. DURING OUTPUT, TADR(14:0) POINTS TO
0018*        THE WORD FROM WHICH THE NEXT CHARACTER WILL BE TAKEN.
0019*        BIT 15=1 FOR PUNCH & PRINT, 0 FOR PRINT ONLY.
0020* TCNT:  DURING INPUT, TCNT=# OF CHARS IN SO FAR. DURING OUTPUT,
0021*        TCNT(14:0)=# OF CHARS REMAINING TO BE OUTPUT, BIT 15=0
0022*        IF A CRLF IS TO BE APPENDED, 1 IF NOT.
0023* TBITS: CONTAINS CURRENT CONTROL BITS.
0024*         120000 => PRINT
0025*         130000 => PUNCH AND PRINT
0026*         160000 => INPUT
0027* TTA,TTB,TTE: USED TO SAVE THE VALUES OF A,B,E REGISTERS DURING
0028*        INTERRUPTS.
0029*
0030* CALLING SEQUENCE:
0031*     JSB TTY35,I  A=# OF CHARS (BIT 15=0 FOR CRLF, 1 FOR NONE)
0032*                  B=BUFFER ADDRESS (BIT 15=1 FOR PUNCHING)
0033*
0034* INPUT MESSAGES ARE STORED IN THE 72 CHARACTER BUFFER T35BF.
0035*


0037  32330 000000  ?TT35 NOP            ENTRY POINT FOR OUTPUT.
0038  32331 103100        CLF 0          INHIBIT INTERRUPT.
0039  32332 070070        STA TCNT       SET UP INITIAL PARAMETERS.
0040  32333 074067        STB TADR
0041  32334 003400        CCA            SET FLAG TO SAY
0042  32335 070414        STA T35F1       OUTPUT.
0043  32336 062330        LDA ?TT35      COPY RETURN ADDRESS INTO THAT OF
0044  32337 072350        STA ?TT2        INTERRUPT SECTION.
0045  32340 002400        CLA            SET TOG TO SAY LEFT HAND CHAR.
0046  32341 070066        STA TOG
0047  32342 070416        STA T35F3
0048*
0049* TEST FOR PENDING INPUT. IF THERE IS ANY, EXIT IMMEDIATELY AND LET
0050* THE INTERRUPT TRIGGER THE FIRST OUTPUT CHARACTER.
0051*
0052  32343 102510        LIA ?SC
0053  32344 002021        SSA,RSS
0054  32345 026374        JMP TT18       NONE PENDING--GO OUTPUT 1ST CHAR
0055  32346 102100        STF 0
0056  32347 126330        JMP ?TT35,I
```

```
0057*
0058* INTERRUPT SECTION
0059*
0060  32350 000000  ?TT2  NOP
0061  32351 070307        STA TTA        SAVE REGISTERS.
0062  32352 074310        STB TTB
0063  32353 001500        ERA
0064  32354 070311        STA TTE
0065  32355 060414        LDA T35F1      TEST FLAG TO DETERMINE IF
0066  32356 002003        SZA,RSS         INPUT OR OUTPUT.
0067  32357 026452        JMP TT17       INPUT
0068  32360 102510        LIA ?SC        LOAD BACK LINE STATUS DURING OUT
0069  32361 064405        LDB T35ST      GET CONSOLE STATUS              BJ
0070  32362 054531        CPB %OUTW      IF STATUS IS OUTPUT             BJ
0071  32363 064407        LDB T35PR        WAIT, USE PRIORITY            BJ
0072  32364 007004        CMB,INB                                        BJ
0073  32365 044574        ADB .+%SYNT-.+1+ROS-COM2                       BJ
0074  32366 006021        SSB,RSS        ABORTABLE LIBRARY ROUTINE?      BJ
0075  32367 050630        CPA B377       YES, CHECK FOR A KEY STRUCK     BJ
0076  32370 026374        JMP TT18       NO INPUT, CONTINUE ON
0077  32371 002400        CLA
0078  32372 070415        STA T35F2      CLEAR CONTINUEING OUTPUT FLAG
0079  32373 070405        STA T35ST      SET CONSOLE STATUS TO IDLE
0080*
0081  32374 060070  TT18  LDA TCNT        GET # OF CHARS LEFT.
0082  32375 001265        RAL,CLE,ERA    COPY CRLF BIT INTO E.
0083  32376 002002        SZA            ANY CHARS LEFT?
0084  32377 026427        JMP TT5        YES--GO OUTPUT NEXT ONE.
0085  32400 002040        SEZ            NO--WANT CRLF?
0086  32401 026413        JMP TT6        NO--GO RESET FOR INPUT.
0087  32402 070066        STA TOG        SET UP OUTPUT OF CRLF.
0088  32403 060531        LDA .+3        3 CHARS WITH
0089  32404 031163        IOR BIT15       NO CRLF FOLLOWING.
0090  32405 070070        STA TCNT
0091  32406 060067        LDA TADR       KEEP PRINT/PUNCH BIT.
0092  32407 011163        AND BIT15
0093  32410 032536        IOR TTXCP
0094  32411 070067        STA TADR
0095  32412 026374        JMP TT18
0096*
0097* END OF OUTPUT--RESET FOR INPUT.
0098*
0099  32413 070070  TT6   STA TCNT        SET COUNTER TO SAY NO CHARS IN.
0100  32414 070414        STA T35F1      SET FLAG TO SAY INPUT.
0101  32415 060422        LDA B160K      GET CONTROL BITS FOR INPUT.
0102  32416 070417        STA TBITS      SAVE.
0103  32417 102610  TT8   OTA ?SC        OUTPUT TO CONSOLE.
0104  32420 060311  TT10  LDA TTE        RESTORE REGISTERS.
0105  32421 001600        ELA
0106  32422 060307        LDA TTA
0107  32423 064310        LDB TTB
0108  32424 103710        STC ?SC,C      ENABLE DEVICE.
0109  32425 102100        STF 0          ENABLE INTERRUPT.
0110  32426 126350        JMP ?TT2,I     EXIT.
0111*
0112* OUTPUT NEXT CHARACTER
```

```
0113*
0114  32427 003400  TT5   CCA             DECREMENT
0115  32430 040070        ADA TCNT         COUNTER.
0116  32431 070070        STA TCNT
0117  32432 064067        LDB TADR         GET POINTER TO OUTPUT BUFFER.
0118  32433 060420        LDA B120K        GET BITS FOR PRINT ONLY.
0119  32434 005275        RBL,CLE,SLB,ERB    TEST & CLEAR BIT 15 OF B.
0120  32435 060421        LDA B130K        GET PRINT/PUNCH BITS.
0121  32436 070417        STA TBITS        SAVE CONTROL BITS.
0122  32437 102610        OTA ?SC          OUTPUT TO DEVICE.
0123  32440 160001        LDA 1,I          GET WORD CONTAINING CHARACTER.
0124  32441 064066        LDB TOG          GET LEFT/RIGHT TOGGLE.
0125  32442 004010        SLB              IF RIGHT CHARACTER,
0126  32443 034067        ISZ TADR          BUMP POINTER.
0127  32444 006011        SLB,RSS          IF LEFT CHARACTER,
0128  32445 001727        ALF,ALF           POSITION ON RIGHT.
0129  32446 034066        ISZ TOG          REVERSE TOGGLE SENSE.
0130  32447 010626  TT15  AND B177        KEEP BITS 6-0 AND
0131  32450 030627        IOR B200         SET BIT 7.
0132  32451 026417        JMP TT8          GO OUTPUT CHARACTER.
0133*
0134* CHARACTER HAS BEEN INPUT.
0135*
0136  32452 060415  TT17  LDA T35F2        IGNORE CHARACTER IF T35F2 IS SET
0137  32453 102401        MIA 1             OR SWITCH 0 IS SET.
0138  32454 000010        SLA
0139  32455 026420        JMP TT10
0140  32456 102510        LIA ?SC          GET CHARACTER IN A.
0141  32457 010626        AND B177
0142  32460 007400        CCB              PREPARE -1 IN B.
0143  32461 050540        CPA .+12B        IGNORE LF, RUBOUT, NULL, XOFF.
0144  32462 026420        JMP TT10
0145  32463 050626        CPA B177
0146  32464 026420        JMP TT10
0147  32465 002002        SZA
0148  32466 050551        CPA .+23B
0149  32467 026420        JMP TT10
0150*
0151**   TEST FOR 'CONTROL X'
0152*
0153  32470 050556        CPA .+30B
0154  32471 026525        JMP TT11
0155*
0156  32472 050363        CPA BKSPC        TEST FOR "_"
0157  32473 026513        JMP TT12
0158  32474 050543        CPA .+15B        TEST FOR CR.
0159  32475 074415        STB T35F2        SET COMMUNICATION FLAG.
0160  32476 050543        CPA .+15B
0161  32477 074416        STB T35F3
0162*
0163* NOW INSERT CHARACTER IN BUFFER.
0164*
0165  32500 064070        LDB TCNT         GET COUNT IN B.
0166  32501 054616        CPB ?72          DON'T IF BUFFER IS FULL.
0167  32502 026420        JMP TT10
0168  32503 004065        CLE,ERB          MOVE LEFT/RIGHT BIT TO E, AND
```

```
0169  32504 044413          ADB T35B1      COMPUTE ADDRESS OF DESTINATION.
0170  32505 002041          SEZ,RSS        LEFT/RIGHT TEST.
0171  32506 001737          ALF,SLA,ALF    LEFT.
0172  32507 130001          IOR 1,I        RIGHT.
0173  32510 034070          ISZ TCNT       BUMP COUNTER.
0174  32511 170001  TT16    STA 1,I         STORE IN BUFFER.
0175  32512 026420          JMP TT10       GO EXIT.
0176*
0177* HANDLE BACKSPACE.
0178*
0179  32513 064070  TT12    LDB TCNT       GET CHARACTER COUNT
0180  32514 006003          SZB,RSS        IGNORE IF NO CHARS YET.
0181  32515 026420          JMP TT10
0182  32516 044525          ADB .-1        GET NEW TCNT.
0183  32517 074070          STB TCNT
0184  32520 004065          CLE,ERB        CLEAR RIGHT HALF OF NEW DESTIN-
0185  32521 044413          ADB T35B1      ATION.
0186  32522 160001          LDA 1,I
0187  32523 010451          AND HIMSK
0188  32524 026511          JMP TT16
0189*
0190**    HANDLE 'CONTOL X'
0191*
0192  32525 074414  TT11    STB T35F1      SET OUTPUT FLAG.
0193  32526 002400          CLA            SET TCNT FOR CRLF AFTER "\".
0194  32527 070070          STA TCNT
0195  32530 070067          STA TADR       SET FOR NO PUNCHING
0196  32531 060420          LDA B120K      SET FOR PRINT ONLY.
0197  32532 070417          STA TBITS
0198  32533 102610          OTA ?SC
0199  32534 060437          LDA RVRSL      GO OUTPUT "\"
0200  32535 026447          JMP TT15
0201  32536        TTYED    EQU *
0202  32536 032537 TTXCP    DEF *+1
0203  32537 011415          OCT 11415
0204  32540 005000          OCT 5000
```

```
0206*
0207**
0208***     MULTIPLEXER OUTPUT ROUTINE
0209**
0210*
0211*    THIS ROUTINE HANDLES ALL OUTPUT TO BOTH MULTIPLEXER BOARDS.
0212*    THE FORMAT IS AS FOLLOWS:
0213*                 A REGISTER = DATA
0214*                 B REGISTER = UNIT NUMBER
0215*
0216   32541 000000  MUXOR NOP
0217   32542 103100        CLF 0           STOP INTERRUPTS
0218   32543 072601        STA ATEMP       SAVE A
0219   32544 005222        RBL,RBL         POSITION UNIT NUMBER
0220   32545 102515        LIA MPX+1       WAIT FOR
0221   32546 002020        SSA               SEEKING BIT
0222   32547 026545        JMP *-2             TO CLEAR
0223   32550 062601        LDA ATEMP       RESTORE A
0224   32551 102614        OTA MPX         OUTPUT DATA
0225   32552 106615        OTB MPX+1         AND UNIT NUMBER
0226   32553 102714        STC MPX
0227   32554 126541        JMP MUXOR,I     RETURN
0228   32555         MUXND EQU *

0230*
0231**          MULTIPLEXER CONSTANTS AND TEMPORARIES
0232*
0233   32555 000000  XTNUM BSS 1           =>  PORT NUMBER
0234   32556 000000  XCCNT BSS 1           =>  CHARACTER COUNT
0235   32557 000000  XBPNT BSS 1           =>  RUNNING BUFFER POINTER
0236   32560 000000  XBSTR BSS 1           =>  START OF BUFFER
0237   32561 000000  XBHED BSS 1           =>  START OF FIRST BUFFER
0238   32562 000000  XBGIN BSS 1           =>  START OF PHYSICAL BUFFER
0239   32563 000000  XBEND BSS 1           =>  END OF PHYSICAL BUFFER
0240   32564 000000  XSTAT BSS 1           =>  STATUS
0241   32565 000000  XDCNT BSS 1           =>  CR AND LF DELAY COUNT
0242   32566 000000  XRPRM BSS 1           =>  RECEIVE PARAMETER
0243   32567 000000  XMASK BSS 1           => MASK WORD
0244   32570 000000  XCHAR BSS 1           TEMPORARY CHARACTER STORAGE
0245   32571 000000  XTPNT BSS 1           BUFFER POINTER TEMPORARY
0246   32572 000000  MPXA  BSS 1           MULTIPLEXER
0247   32573 000000  MPXB  BSS 1             REGISTER
0248   32574 000000  MPXE  BSS 1               STORAGE
0249   32575 000000  MPXLC BSS 1           LOWER MPX SC STORAGE
0250   32576 000000  MPXUC BSS 1           UPPER MPX SC STORAGE

0252*
0253**     GENERAL USAGE CONSTANTS
0254*
0255   32577 043400  DMASK OCT 43400
0256   32600 070002  SCLER OCT 70002
0257   32601 000000  ATEMP BSS 1
```

```
0259*
0260**     DRIVER INITIALIZATION
0261*
0262  32602 000000  MPXIO NOP
0263  32603 072572        STA MPXA       S   A,
0264  32604 076573        STB MPXB        A   B,
0265  32605 005500        ERB               V   AND
0266  32606 076574        STB MPXE            E   E
0267  32607 102514        LIA MPX        GET MPX
0268  32610 072575        STA MPXLC        STATUS
0269  32611 102515        LIA MPX+1          AND
0270  32612 072576        STA MPXUC            SAVE IT
0271  32613 001700        ALF            MOVE TTY# TO
0272  32614 001222        RAL,RAL          RIGHT END AND
0273  32615 010545        AND B17            MASK TO 4 BITS
0274  32616 040357        ADA TTYTP      ADD ON TTY TABLE POINTER
0275  32617 164000        LDB A,I        B => TTY#
0276  32620 076555        STB XTNUM      SAVE
0277  32621 006004        INB            B => CHARACTER COUNT
0278  32622 076556        STB XCCNT
0279  32623 006004        INB            B => RUNNING BUFFER POINTER
0280  32624 076557        STB XBPNT
0281  32625 006004        INB            B => START OF BUFFER
0282  32626 076560        STB XBSTR
0283  32627 006004        INB            B => START OF FIRST BUFFER
0284  32630 076561        STB XBHED
0285  32631 006004        INB            B => START OF PHYSICAL BUFFER
0286  32632 076562        STB XBGIN
0287  32633 006004        INB            B => END OF PHYSICAL BUFFER
0288  32634 076563        STB XBEND
0289  32635 006004        INB            B => STATUS
0290  32636 076564        STB XSTAT
0291  32637 006004        INB            B => DELAY COUNTER
0292  32640 076565        STB XDCNT
0293  32641 044532        ADB .+?RPRM-?DCNT  B=> RECEIVE PARAMETER
0294  32642 076566        STB XRPRM
0295  32643 044531        ADB .+?MASK-?RPRM  B => MASK
0296  32644 076567        STB XMASK
0297  32645 062575        LDA MPXLC      GET CHARACTER,
0298  32646 010362        AND B1777      IS IT A BREAK?
0299  32647 002003        SZA,RSS
0300  32650 027050        JMP ABORT      YES - GO TO ABORT LOGIC
0301  32651 062576        LDA MPXUC      NO - GET STATUS AND
0302  32652 000010        SLA              TEST FOR INPUT
0303  32653 027124        JMP MPXOP      NO GO TO OUTPUT LOGIC
0304  32654 162564        LDA XSTAT,I    GET USER'S STATUS
0305  32655 010530        AND NIBT       IS INPUT ALLOWED?
0306  32656 002002        SZA            YES
0307  32657 027255        JMP MPXEP      NO - IGNORE IT
```

```
0309*
0310**
0311***    RECEIVE CHANNEL PROCESSING
0312**
0313*
0314   32660 062575          LDA MPXLC       GET DATA WORD
0315   32661 010626          AND B177        MASK DATA BITS
0316   32662 072570          STA XCHAR
0317   32663 064000          LDB A           B = CHARACTER
0318   32664 162564          LDA XSTAT,I     A = STATUS
0319   32665 010566          AND XOBT        CHECK FOR X-OFF BIT
0320   32666 002002          SZA
0321   32667 026674          JMP INPX        YES
0322   32670 162564          LDA XSTAT,I     A = STATUS
0323   32671 010546          AND CXBT        CHECK FOR CANCEL BIT
0324   32672 002003          SZA,RSS
0325   32673 026700          JMP INPX0       NONE
0326*
0327*      TAPE MODE - IGNORE CHARACTERS UNTIL 'CR'
0328*
0329   32674 122564  INPX    XOR XSTAT,I     REMOVE CANCEL OR X-OFF
0330   32675 054543          CPB .+15B         BIT IF CHARACTER IS A
0331   32676 172564          STA XSTAT,I         CARRIAGE RETURN
0332   32677 027255          JMP MPXEP
0333*
0334**     TEST THE CHARACTER
0335*
0336   32700 054556  INPX0   CPB CANCL        TEST FOR 'CONTROL X'
0337   32701 026752          JMP INPX2
0338   32702 054363          CPB BKSPC       TEST FOR BACKSPACE
0339   32703 027026          JMP INPX7
0340   32704 006002          SZB             IGNORE FEED FRAMES
0341   32705 054626          CPB B177          AND RUBOUTS
0342   32706 027255          JMP MPXEP
0343   32707 054540          CPB .+12B       IGNORE LINEFEEDS
0344   32710 027255          JMP MPXEP
0345   32711 054551          CPB .+23B       TEST FOR X-OFF
0346   32712 002001          RSS
0347   32713 026725          JMP INPX1       NO
0348   32714 162564          LDA XSTAT,I     YES
0349   32715 010302          AND BIT13       TEST FOR
0350   32716 002003          SZA,RSS           SUBTYPES 3 AND 4
0351   32717 027255          JMP MPXEP       NO - IGNORE CHARACTER
0352   32720 162564          LDA XSTAT,I     YES
0353   32721 030566          IOR XOBT        SET X-OFF BIT
0354   32722 172564          STA XSTAT,I       AND REPLACE THE
0355   32723 060543          LDA .+15B           X-OFF WITH A CR
0356   32724 072570          STA XCHAR
0357*
0358**     APPEND CHARACTER TO BUFFER
0359*
0360   32725 162557  INPX1   LDA XBPNT,I     A => POSITION FOR THIS CHARACTER
0361   32726 002004          INA             A => POSITION FOR NEXT CHARACTER
0362   32727 152563          CPA XBEND,I     IF A => BEYOND END OF BUFFER,
0363   32730 040364          ADA MBLEN         MAKE IT POINT TO START
0364   32731 152561          CPA XBHED,I     IF BUFFER FULL, TRANSFER
```

```
0365  32732 026752          JMP INPX2       FOR SPECIAL HANDLING
0366  32733 166557          LDB XBPNT,I   B => ADDRESS FOR THIS CHARACTER
0367  32734 172557          STA XBPNT,I   SAVE THE INCREMENTED POINTER
0368  32735 004065          CLE,ERB       B = WORD ADDRESS
0369  32736 160001          LDA B,I       A = DESTINATION WORD
0370  32737 002041          SEZ,RSS       IF HIGH CHARACTER
0371  32740 001727          ALF,ALF         ROTATE TO BOTTOM
0372  32741 010451          AND HIMSK     CLEAR LOWER 8 BITS
0373  32742 032570          IOR XCHAR     MERGE WITH NEW CHARACTER
0374  32743 002041          SEZ,RSS       IF HIGH CHARACTER,
0375  32744 001727          ALF,ALF         ROTATE BACK
0376  32745 170001          STA B,I       STORE BACK IN BUFFER
0377  32746 062570          LDA XCHAR     IF CHARACTER
0378  32747 050543          CPA .+15B       WAS A 'CR'
0379  32750 027007          JMP INPX4         GO PROCESS IT
0380  32751 027255          JMP MPXEP
0381*
0382**    PROCESS 'CONTROL X'  (CANCEL)
0383*
0384  32752 162560  INPX2 LDA XBSTR,I   RESET BUFFER POINTER
0385  32753 172557          STA XBPNT,I     TO BEGINNING
0386  32754 162567          LDA XMASK,I   IS USER IN
0387  32755 010266          AND TAPEF       TAPE MODE?
0388  32756 002002          SZA
0389  32757 027003          JMP INPX3     YES
0390  32760 166560          LDB XBSTR,I   NO, MOVE
0391  32761 004065          CLE,ERB         REVERSE
0392  32762 060437          LDA RVRSL         SLASH AND
0393  32763 170001          STA B,I             CR LF TO
0394  32764 006004          INB                   USER'S
0395  32765 060255          LDA CRLF                BUFFER
0396  32766 170001          STA B,I
0397  32767 060523          LDA .-3       SET CHARACTER
0398  32770 172556          STA XCCNT,I     COUNT TO -3
0399  32771 162564          LDA XSTAT,I   CHANGE
0400  32772 010524          AND IONBT       STATUS
0401  32773 172564          STA XSTAT,I       TO OUTPUT
0402  32774 010536          AND RNBT      IF USER NOT
0403  32775 002003          SZA,RSS         RUNNING
0404  32776 017036          JSB OTPUT     STOP INPUT
0405  32777 060360          LDA SYNCC
0406  33000 166555          LDB XTNUM,I
0407  33001 114355          JSB MUXR,I     OUTPUT
0408  33002 027255          JMP MPXEP
0409*
0410  33003 162564  INPX3 LDA XSTAT,I   SET THE
0411  33004 030546          IOR CXBT        CANCEL BIT
0412  33005 172564          STA XSTAT,I       IN STATUS
0413  33006 027255          JMP MPXEP
0414*
0415**    PROCESS CARRIAGE RETURN
0416*
0417  33007 162567  INPX4 LDA XMASK,I   IS USER IN
0418  33010 010266          AND TAPEF       TAPE MODE?
0419  33011 002002          SZA             TAPE MODE?
0420  33012 027020          JMP INPX6     YES
```

```
0421  33013 017036          JSB OTPUT      NO, CHANGE STATUS AND MPX PARAMS
0422*
0423**     INFORM SYSTEM OF COMPLETE LINE
0424*
0425  33014 162567  INPX5 LDA XMASK,I    SET THE
0426  33015 030265        IOR MPCOM        COMMUNICATION
0427  33016 070265        STA MPCOM          FLAG
0428  33017 027255        JMP MPXEP
0429*
0430  33020 162560  INPX6 LDA XBSTR,I    GET POINTER TO BEGINNING
0431  33021 166557        LDB XBPNT,I      OF CURRENT BUFFER AND RESET
0432  33022 176560        STB XBSTR,I        TO CURRENT CHARACTER
0433  33023 152561        CPA XBHED,I    IF BUFFER JUST COMPLETED WAS
0434  33024 027014        JMP INPX5        FIRST, TELL OTHER MACHINE
0435  33025 027255        JMP MPXEP
0436*
0437**     PROCESS BACKSPACE
0438*
0439  33026 162557  INPX7 LDA XBPNT,I    GET BUFFER POINTER
0440  33027 152560        CPA XBSTR,I    IF NO CHARACTERS
0441  33030 027255        JMP MPXEP        RETURN IMMEDIATELY
0442  33031 152562        CPA XBGIN,I    IF AT BEGINNING OF PHYSICAL
0443  33032 040365        ADA BLEN         BUFFER, MOVE TO END
0444  33033 040525        ADA .-1        BACK-UP ONE SPACE
0445  33034 172557        STA XBPNT,I
0446  33035 027255        JMP MPXEP
0447*
0448**     STOP INPUT - CONFIGURE SEND CHANNEL
0449*
0450  33036 000000  OTPUT NOP
0451  33037 162564        LDA XSTAT,I    A = STATUS
0452  33040 030530        IOR NIBT         'NO INPUT ALLOWED'
0453  33041 172564        STA XSTAT,I      BIT
0454  33042 162566        LDA XRPRM,I    A = RECEIVE PARAMETER
0455  33043 011172        AND NECHO          ECHO
0456  33044 166555        LDB XTNUM,I    GET UNIT NUMBER
0457  33045 114355        JSB MUXR,I      OUPUT TO MUX
0458  33046 102100        STF 0
0459  33047 127036        JMP OTPUT,I
```

```
0461*
0462**
0463***  ABORT PROCESSING
0464**
0465*
0466  33050 103100  ABORT CLF 0
0467  33051 062576        LDA MPXUC      GET MUX STATUS AND TEST
0468  33052 000010        SLA              FOR RECEIVE INTERRUPT
0469  33053 027124        JMP MPXOP      NO - OUTPUT NEXT CHARACTER
0470  33054 162564        LDA XSTAT,I    A = STATUS
0471  33055 010530        AND NIBT       CHECK FOR
0472  33056 002003        SZA,RSS          OUTPUT MODE
0473  33057 027255        JMP MPXEP      INPUT MODE - IGNORE
0474  33060 162564        LDA XSTAT,I
0475  33061 011002        AND UNABT      UNABLE TO
0476  33062 002003        SZA,RSS          ABORT?
0477  33063 027070        JMP ABT1       NO
0478  33064 162564        LDA XSTAT,I    YES, SET
0479  33065 031126        IOR ABTRY        'ABORT TRY'
0480  33066 172564        STA XSTAT,I        BIT IN STATUS
0481  33067 027255        JMP MPXEP
0482*
0483  33070 066555  ABT1  LDB XTNUM
0484  33071 044560        ADB .+?STAT
0485  33072 160001        LDA B,I        A = SYSTEM STATUS
0486  33073 050532        CPA %SYNT      CHECK FOR SYNTAX
0487  33074 027255        JMP MPXEP      CANN'T ABORT OUT OF SYNTAX
0488  33075 040514        ADA .+.-%SYNT-1-COM3+COM2
0489  33076 002020        SSA            SKIP IF LIBRARY PROGRAM,
0490  33077 027112        JMP ABT2         OTHERWISE ABORT ALWAYS ALLOWED
0491  33100 060556        LDA .+%SYNT-.+1+CAT-COM2
0492  33101 003004        CMA,INA        ABORTABLE
0493  33102 140001        ADA B,I          LIBRARY
0494  33103 002020        SSA                PROGRAM?
0495  33104 027255        JMP MPXEP      NO
0496  33105 160001        LDA B,I        MAYBE
0497  33106 003004        CMA,INA
0498  33107 040557        ADA .+%SYNT-.+1+LIBRY-COM2
0499  33110 002020        SSA
0500  33111 027255        JMP MPXEP      NO
0501*
0502  33112 162564  ABT2  LDA XSTAT,I
0503  33113 012600        AND SCLER      CLEAR STATUS BITS
0504  33114 030527        IOR IOBT       SET 'INPUT MODE' BIT
0505  33115 172564        STA XSTAT,I    STORE NEW I/O STATUS
0506  33116 003400        CCA            CHANGE USER'S SYSTEM
0507  33117 170001        STA B,I          STATUS TO -1
0508  33120 162567        LDA XMASK,I    SET THE
0509  33121 030265        IOR MPCOM        COMMUNICATION
0510  33122 070265        STA MPCOM          FLAG
0511  33123 027255        JMP MPXEP
```

```
0513**
0514*
0515***    SEND CHANNEL PROCESSING
0516**
0517*
0518   33124 166556  MPXOP LDB XCCNT,I    IF NO CHARACTERS
0519   33125 006003        SZB,RSS          LEFT, GO TO END OF
0520   33126 027207        JMP MPXEO          OUTPUT PROCESSING
0521   33127 166557        LDB XBPNT,I    B => BUFFER POINTER
0522   33130 006004        INB            B => NEXT CHARACTER
0523   33131 156563        CPB XBEND,I    IF END OF BUFFER,
0524   33132 044364        ADB MBLEN        CHANGE TO BEGINNING
0525   33133 076571        STB XTPNT      SAVE POINTER
0526   33134 162565        LDA XDCNT,I    CHECK DELAY COUNTER FOR CR
0527   33135 002002        SZA              OR LF DELAY IN PROGRESS
0528   33136 027201        JMP DELAY      GO TO DELAY PROCESSING
0529   33137 004065        CLE,ERB        POSITION AS WORD POINTER
0530   33140 160001        LDA B,I        A = WORD CONTAINING CHARACTER
0531   33141 002041        SEZ,RSS        POSITION CHARACTER
0532   33142 001727        ALF,ALF          IN BITS 7-0
0533   33143 010626        AND B177       MASK OUT CHARACTER
0534   33144 072570        STA XCHAR        AND SAVE IT
0535   33145 032577        IOR DMASK      ADD STOP AND PARITY BITS
0536   33146 166555        LDB XTNUM,I    B = UNIT NUMBER
0537   33147 114355        JSB MUXR,I      OUTPUT CHARACTER
0538   33150 102100        STF 0
0539   33151 062570        LDA XCHAR      A = CHARACTER
0540   33152 050543        CPA .+15B      IF CHARACTER IS
0541   33153 017235        JSB CRDLY        CR, SET UP DELAY
0542   33154 050540        CPA .+12B      IF CHARACTER IS
0543   33155 017245        JSB LFDLY        LF, SET UP DELAY
0544*
0545**     ADJUST BUFFER POINTERS
0546*
0547   33156 103100  BUFAD CLF 0
0548   33157 062571        LDA XTPNT      GET BUFFER POINTER TEMPORARY
0549   33160 172557        STA XBPNT,I    RESET BUFFER POINTER
0550   33161 136556        ISZ XCCNT,I    INCREMENT CHARACTER COUNT
0551   33162 002001        RSS            IF COUNT IS ZERO, GO
0552   33163 027255        JMP MPXEP        TO MUX END OF PROCESSING
0553   33164 162556        LDA XCCNT,I    GET CHARACTER COUNT
0554   33165 102100        STF 0
0555   33166 050514        CPA .-10       ARE EXACTLY 10
0556   33167 002001        RSS              CHARACTERS LEFT?
0557   33170 027255        JMP MPXEP      NO - CONTINUE
0558*
0559**     NOTIFY SYSTEM - BUFFER CAN TAKE CHARACTERS AGAIN
0560*
0561   33171 060265        LDA MPCOM      A = COMMUNICATION FLAG
0562   33172 066555        LDB XTNUM
0563   33173 044560        ADB .+?STAT
0564   33174 164001        LDB B,I        B = USER'S SYSTEM STATUS
0565   33175 054531        CPB .+3        IF STATUS IS OUTPUT WAIT,
0566   33176 132567        IOR XMASK,I      SET COMMUNICATION FLAG
0567   33177 070265        STA MPCOM
0568   33200 027255        JMP MPXEP
```

```
0569*
0570**     OUTPUT DELAY CHARACTER
0571*
0572  33201 060360  DELAY LDA SYNCC      GET DELAY CHARACTER
0573  33202 166555        LDB XTNUM,I    B = UNIT NUMBER
0574  33203 114355        JSB MUXR,I      OUTPUT DELAY CHARACTER
0575  33204 136565        ISZ XDCNT,I    CHECK FOR FURTHER DELAY TIME
0576  33205 027255        JMP MPXEP      YES
0577  33206 027156        JMP BUFAD      NO - ADJUST BUFFER POINTERS
0578*
0579**     END OF OUTPUT PROCESSING
0580*
0581  33207 103100  MPXEO CLF 0
0582  33210 162562        LDA XBGIN,I    RESET ALL
0583  33211 172557        STA XBPNT,I      BUFFER POINTERS
0584  33212 172560        STA XBSTR,I        TO THE BEGINNING
0585  33213 172561        STA XBHED,I          OF THE USER'S BUFFER
0586  33214 162564        LDA XSTAT,I    CHANGE
0587  33215 030527        IOR IOBT         STATUS
0588  33216 172564        STA XSTAT,I        TO INPUT
0589  33217 010521        AND ICNBT      REMOVE 'INPUT CONFIGURATION' BIT
0590  33220 152564        CPA XSTAT,I    BRANCH
0591  33221 002001        RSS              IF IT
0592  33222 027227        JMP MPXIC          WAS SET
0593  33223 010536        AND RNBT         CHECK FOR USER RUNNING
0594  33224 002002        SZA
0595  33225 027255        JMP MPXEP      YES
0596  33226 162564        LDA XSTAT,I    NO, REMOVE
0597  33227 010523  MPXIC AND NINBT         'NO INPUT ALLOWED'
0598  33230 172564        STA XSTAT,I        BIT
0599  33231 162566        LDA XRPRM,I    GET USER'S RECEIVE PARAMETER
0600  33232 166555        LDB XTNUM,I    B = UNIT NUMBER
0601  33233 114355        JSB MUXR,I
0602  33234 027255        JMP MPXEP
```

```
0604*
0605*  SUBROUTINE TO SET CR-DELAY.
0606*
0607   33235 000000  CRDLY NOP
0608   33236 066555        LDB XTNUM
0609   33237 044537        ADB .+?CDLY
0610   33240 160001        LDA B,I         STORE CR DELAY
0611   33241 172565        STA XDCNT,I       IN THE COUNTER
0612   33242 002002        SZA             ANY DELAY?
0613   33243 027255        JMP MPXEP       YES
0614   33244 127235        JMP CRDLY,I     NO


0616*
0617*  SUBROUTINE TO SET LF-DELAY.
0618*
0619   33245 000000  LFDLY NOP
0620   33246 066555        LDB XTNUM
0621   33247 044540        ADB .+?LDLY
0622   33250 160001        LDA B,I         STORE LF DELAY
0623   33251 172565        STA XDCNT,I       IN THE COUNTER
0624   33252 002002        SZA             ANY DELAY?
0625   33253 027255        JMP MPXEP       YES
0626   33254 127245        JMP LFDLY,I     NO


0628*
0629**
0630***   MULTIPLEXER END OF PROCESSING
0631**
0632*
0633   33255 062574  MPXEP LDA MPXE        RESTORE
0634   33256 001600        ELA               E,
0635   33257 062572        LDA MPXA          A,
0636   33260 066573        LDB MPXB          AND B
0637   33261 103114        CLF MPX         ENABLE MUX.
0638   33262 102100        STF 0
0639   33263 126602        JMP MPXIO,I
0640   33264         MPXED EQU *
```

```
0002*
0003**
0004***              TELETYPE TABLES
0005**
0006*

0008  00000          ?TNUM EQU 0
0009*                    PORT NUMBER IN BITS 12-8

0011  00001          ?CCNT EQU ?TNUM+1
0012*                    USED BY MPX FOR COUNTING OUTPUT CHARACTERS.  IT
0013*                    EQUALS -# OF CHARACTERS, INCLUDING CURRENT ONE.

0015  00002          ?BPNT EQU ?CCNT+1
0016*                    ON INPUT - POINTS TO THE CHARACTER LOCATION INTO
0017*                               WHICH THE NEXT CHARCTER WILL BE
0018*                               DEPOSITED.
0019*                    ON OUTPUT- POINTS TO THE LAST CHAR. TRANSMITTED.

0021  00003          ?BSTR EQU ?BPNT+1
0022*                    ON INPUT - POINTS TO THE FIRST CHARACTER OF THE
0023*                               MOST RECENT BUFFER.
0024*                    ON OUTPUT- POINTS TO THE LOCATION INTO WHICH THE
0025*                               NEXT CHARACTER WILL BE PLACED BY THE
0026*                               OUTCR ROUTINE.

0028  00004          ?BHED EQU ?BSTR+1
0029*                    ON INPUT - POINTS TO THE NEXT CHARACTER TO BE
0030*                               FETCHED.

0032  00005          ?BGIN EQU ?BHED+1
0033*                    POINTS TO BEGINNING OF PHYSICAL BUFFER

0035  00006          ?BEND EQU ?BGIN+1
0036*                    POINTS TO FIRST CHARACTER FOLLOWING PHYSICAL
0037*                BUFFER.
```

```
0039  00007          ?TSTA EQU ?BEND+1

0041  00527          IOBT  EQU BIT0      USER IS IN INPUT MODE
0042  00524          IONBT EQU NBT0
0043  00530          NIBT  EQU BIT1      NO INPUT ALLOWED
0044  00523          NINBT EQU NBT1
0045  00532          ICBT  EQU BIT2      INPUT CONFIGURATION NEEDED
0046  00521          ICNBT EQU NBT2
0047  00536          RNBT  EQU BIT3      USER IS RUNNING
0048  00515          RNNBT EQU NBT3
0049  00546          CXBT  EQU BIT4      'CONTROL X' WASIT
0050  00566          XOBT  EQU BIT5      X-OFF WAS READ FROM
0051  00467          XONBT EQU NBT5        TERMINET OR ASR-37
0052  00615          LTBT  EQU BIT6      WAIT FOR LOG TIMING
0053  01170          LTNBT EQU NBT6
0054  01167          LDBT  EQU BIT7      LINE DROPOUT OCCURRED
0055  01171          LDNBT EQU NBT7
0056  00631          HUBT  EQU BIT8      HANG USER UP
0057  01000          PDBT  EQU BIT9      PHONE DISCONNECTED
0058  01002          UNABT EQU BIT10     USER NOT ABLE TO ABORT
0059  01126          ABTRY EQU BIT11     USER TRIED TO ABORT
0060*                STYP2 EQU BIT12     *
0061*                STYP3 EQU BIT13      *
0062*                STYP4 EQU B1213      **  TELETYPE SUBTYPES
0063  01165          STYP5 EQU BIT14      *
0064*                STYP6 EQU B1214     *

0066  00010          ?DCNT EQU ?TSTA+1
0067*                    CR AND LF DELAY COUNTER.

0069  00011          ?CDLY EQU ?DCNT+1
0070*                    CARRIAGE RETURN DELAY (NEGATIVE).

0072  00012          ?LDLY EQU ?CDLY+1
0073*                    LINE FEED DELAY (NEGATIVE).

0075  00013          ?PHON EQU ?LDLY+1
0076*                    USED AS TIME COUNTER FOR PHONES LOGIC.

0078  00014          ?RPRM EQU ?PHON+1
0079*                    RECEIVE CHANNEL PARAMETERS.

0081  00015          ?SPRM EQU ?RPRM+1
0082*                    SEND CHANNEL PARAMETERS.

0084  00016          ?PPRM EQU ?SPRM+1
0085*                    PHONE PARAMETER.

0087  00017          ?MASK EQU ?PPRM+1
0088*                    =2^N FOR USER N.
```

```
0090  00020          ?DISC EQU ?MASK+1
0091*                    DISC ADDRESS.

0093  00021          ?PROG EQU ?DISC+1
0094*                    POINTS TO LAST USED WORD OF CORE PROGRAM.

0096  00022          ?ID   EQU ?PROG+1
0097*                    USER ID.

0099  00023          ?NAME EQU ?ID+1
0100*                    8 CHAR PROGRAM NAME

0102  00026          ?TIME EQU ?NAME+3
0103*                    STARTING TIME

0105  00030          ?CLOC EQU ?TIME+2
0106*                    USER'S TIMEOUT CLOCK.

0108  00031          ?RSTR EQU ?CLOC+1
0109*                    RESTART ADDRESS FOR SUSPENDED PROGRAMS.

0111  00032          ?STAT EQU ?RSTR+1
0112*                    USER STATUS--WHEN ON Q INDICATED PROGRAM TYPE;
0113*                    WHEN NOT ON Q INDICATED REASON WHY.

0115  00033          ?LINK EQU ?STAT+1
0116*                    POINTS TO LINK POSITION OF NEXT ENTRY ON QUEUE.

0118  00034          ?PLEV EQU ?LINK+1
0119*                    FOR PROGRAMS ON Q, CONTAINS PRIORITY LEVEL. FOR
0120*                    SUSPENDED PROGRAMS CONTAINS PROGRAM TYPE.
```

```
0122  33264 000000  TTY00 OCT 0,0
0123                      REP 4
0124  33266 024676        DEF BUF00+BUF00
0124  33267 024676        DEF BUF00+BUF00
0124  33270 024676        DEF BUF00+BUF00
0124  33271 024676        DEF BUF00+BUF00
0125  33272 025042        DEF BUF00+BUF00+BUFLN+BUFLN
0126  33273 000000        OCT 0,0,0,0,0
0127  33300 131202        OCT 131202,171202,140374
0128  33303 000001        DEC 1,0
0129  33305 002003        DEF PROGB+1
0130  33306 000000        OCT 0,0,0,0,0,0,0,0,0,0,0
0131*
0132  33321 000400  TTY01 OCT 400,0
0133                      REP 4
0134  33323 025042        DEF BUF01+BUF01
0134  33324 025042        DEF BUF01+BUF01
0134  33325 025042        DEF BUF01+BUF01
0134  33326 025042        DEF BUF01+BUF01
0135  33327 025206        DEF BUF01+BUF01+BUFLN+BUFLN
0136  33330 000000        OCT 0,0,0,0,0
0137  33335 131202        OCT 131202,171202,142374
0138  33340 000002        DEC 2,0
0139  33342 002003        DEF PROGB+1
0140  33343 000000        OCT 0,0,0,0,0,0,0,0,0,0,0
0141*
0142  33356 001000  TTY02 OCT 1000,0
0143                      REP 4
0144  33360 025206        DEF BUF02+BUF02
0144  33361 025206        DEF BUF02+BUF02
0144  33362 025206        DEF BUF02+BUF02
0144  33363 025206        DEF BUF02+BUF02
0145  33364 025352        DEF BUF02+BUF02+BUFLN+BUFLN
0146  33365 000000        OCT 0,0,0,0,0
0147  33372 131202        OCT 131202,171202,144374
0148  33375 000004        DEC 4,0
0149  33377 002003        DEF PROGB+1
0150  33400 000000        OCT 0,0,0,0,0,0,0,0,0,0,0
0151*
0152  33413 001400  TTY03 OCT 1400,0
0153                      REP 4
0154  33415 025352        DEF BUF03+BUF03
0154  33416 025352        DEF BUF03+BUF03
0154  33417 025352        DEF BUF03+BUF03
0154  33420 025352        DEF BUF03+BUF03
0155  33421 025516        DEF BUF03+BUF03+BUFLN+BUFLN
0156  33422 000000        OCT 0,0,0,0,0
0157  33427 131202        OCT 131202,171202,146374
0158  33432 000010        DEC 8,0
0159  33434 002003        DEF PROGB+1
0160  33435 000000        OCT 0,0,0,0,0,0,0,0,0,0,0
```

```
0162  33450 002000  TTY04 OCT 2000,0
0163                      REP 4
0164  33452 025516        DEF BUF04+BUF04
0164  33453 025516        DEF BUF04+BUF04
0164  33454 025516        DEF BUF04+BUF04
0164  33455 025516        DEF BUF04+BUF04
0165  33456 025662        DEF BUF04+BUF04+BUFLN+BUFLN
0166  33457 000000        OCT 0,0,0,0,0
0167  33464 131202        OCT 131202,171202,150374
0168  33467 000020        DEC 16,0
0169  33471 002003        DEF PROGB+1
0170  33472 000000        OCT 0,0,0,0,0,0,0,0,0,0,0
0171*
0172  33505 002400  TTY05 OCT 2400,0
0173                      REP 4
0174  33507 025662        DEF BUF05+BUF05
0174  33510 025662        DEF BUF05+BUF05
0174  33511 025662        DEF BUF05+BUF05
0174  33512 025662        DEF BUF05+BUF05
0175  33513 026026        DEF BUF05+BUF05+BUFLN+BUFLN
0176  33514 000000        OCT 0,0,0,0,0
0177  33521 131202        OCT 131202,171202,152374
0178  33524 000040        DEC 32,0
0179  33526 002003        DEF PROGB+1
0180  33527 000000        OCT 0,0,0,0,0,0,0,0,0,0,0
0181*
0182  33542 003000  TTY06 OCT 3000,0
0183                      REP 4
0184  33544 026026        DEF BUF06+BUF06
0184  33545 026026        DEF BUF06+BUF06
0184  33546 026026        DEF BUF06+BUF06
0184  33547 026026        DEF BUF06+BUF06
0185  33550 026172        DEF BUF06+BUF06+BUFLN+BUFLN
0186  33551 000000        OCT 0,0,0,0,0
0187  33556 131202        OCT 131202,171202,154374
0188  33561 000100        DEC 64,0
0189  33563 002003        DEF PROGB+1
0190  33564 000000        OCT 0,0,0,0,0,0,0,0,0,0,0
0191*
0192  33577 003400  TTY07 OCT 3400,0
0193                      REP 4
0194  33601 026172        DEF BUF07+BUF07
0194  33602 026172        DEF BUF07+BUF07
0194  33603 026172        DEF BUF07+BUF07
0194  33604 026172        DEF BUF07+BUF07
0195  33605 026336        DEF BUF07+BUF07+BUFLN+BUFLN
0196  33606 000000        OCT 0,0,0,0,0
0197  33613 131202        OCT 131202,171202,156374
0198  33616 000200        DEC 128,0
0199  33620 002003        DEF PROGB+1
0200  33621 000000        OCT 0,0,0,0,0,0,0,0,0,0,0
```

```
0202  33634 004000  TTY10 OCT 4000,0
0203                      REP 4
0204  33636 026336        DEF BUF10+BUF10
0204  33637 026336        DEF BUF10+BUF10
0204  33640 026336        DEF BUF10+BUF10
0204  33641 026336        DEF BUF10+BUF10
0205  33642 026502        DEF BUF10+BUF10+BUFLN+BUFLN
0206  33643 000000        OCT 0,0,0,0,0
0207  33650 131202        OCT 131202,171202,160374
0208  33653 000400        DEC 256,0
0209  33655 002003        DEF PROGB+1
0210  33656 000000        OCT 0,0,0,0,0,0,0,0,0,0,0
0211*
0212  33671 004400  TTY11 OCT 4400,0
0213                      REP 4
0214  33673 026502        DEF BUF11+BUF11
0214  33674 026502        DEF BUF11+BUF11
0214  33675 026502        DEF BUF11+BUF11
0214  33676 026502        DEF BUF11+BUF11
0215  33677 026646        DEF BUF11+BUF11+BUFLN+BUFLN
0216  33700 000000        OCT 0,0,0,0,0
0217  33705 131202        OCT 131202,171202,162374
0218  33710 001000        DEC 512,0
0219  33712 002003        DEF PROGB+1
0220  33713 000000        OCT 0,0,0,0,0,0,0,0,0,0,0
0221*
0222  33726 005000  TTY12 OCT 5000,0
0223                      REP 4
0224  33730 026646        DEF BUF12+BUF12
0224  33731 026646        DEF BUF12+BUF12
0224  33732 026646        DEF BUF12+BUF12
0224  33733 026646        DEF BUF12+BUF12
0225  33734 027012        DEF BUF12+BUF12+BUFLN+BUFLN
0226  33735 000000        OCT 0,0,0,0,0
0227  33742 131202        OCT 131202,171202,164374
0228  33745 002000        DEC 1024,0
0229  33747 002003        DEF PROGB+1
0230  33750 000000        OCT 0,0,0,0,0,0,0,0,0,0,0
0231*
0232  33763 005400  TTY13 OCT 5400,0
0233                      REP 4
0234  33765 027012        DEF BUF13+BUF13
0234  33766 027012        DEF BUF13+BUF13
0234  33767 027012        DEF BUF13+BUF13
0234  33770 027012        DEF BUF13+BUF13
0235  33771 027156        DEF BUF13+BUF13+BUFLN+BUFLN
0236  33772 000000        OCT 0,0,0,0,0
0237  33777 131202        OCT 131202,171202,166374
0238  34002 004000        DEC 2048,0
0239  34004 002003        DEF PROGB+1
0240  34005 000000        OCT 0,0,0,0,0,0,0,0,0,0,0
```

```
0242  34020 006000  TTY14 OCT 6000,0
0243                      REP 4
0244  34022 027156        DEF BUF14+BUF14
0244  34023 027156        DEF BUF14+BUF14
0244  34024 027156        DEF BUF14+BUF14
0244  34025 027156        DEF BUF14+BUF14
0245  34026 027322        DEF BUF14+BUF14+BUFLN+BUFLN
0246  34027 000000        OCT 0,0,0,0,0
0247  34034 131202        OCT 131202,171202,170374
0248  34037 010000        DEC 4096,0
0249  34041 002003        DEF PROGB+1
0250  34042 000000        OCT 0,0,0,0,0,0,0,0,0,0,0
0251*
0252  34055 006400  TTY15 OCT 6400,0
0253                      REP 4
0254  34057 027322        DEF BUF15+BUF15
0254  34060 027322        DEF BUF15+BUF15
0254  34061 027322        DEF BUF15+BUF15
0254  34062 027322        DEF BUF15+BUF15
0255  34063 027466        DEF BUF15+BUF15+BUFLN+BUFLN
0256  34064 000000        OCT 0,0,0,0,0
0257  34071 131202        OCT 131202,171202,172374
0258  34074 020000        DEC 8192,0
0259  34076 002003        DEF PROGB+1
0260  34077 000000        OCT 0,0,0,0,0,0,0,0,0,0,0
0261*
0262  34112 007000  TTY16 OCT 7000,0
0263                      REP 4
0264  34114 027466        DEF BUF16+BUF16
0264  34115 027466        DEF BUF16+BUF16
0264  34116 027466        DEF BUF16+BUF16
0264  34117 027466        DEF BUF16+BUF16
0265  34120 027632        DEF BUF16+BUF16+BUFLN+BUFLN
0266  34121 000000        OCT 0,0,0,0,0
0267  34126 131202        OCT 131202,171202,174374
0268  34131 040000        DEC 16384,0
0269  34133 002003        DEF PROGB+1
0270  34134 000000        OCT 0,0,0,0,0,0,0,0,0,0,0
0271*
0272  34147 007400  TTY17 OCT 7400,0
0273                      REP 4
0274  34151 027632        DEF BUF17+BUF17
0274  34152 027632        DEF BUF17+BUF17
0274  34153 027632        DEF BUF17+BUF17
0274  34154 027632        DEF BUF17+BUF17
0275  34155 027776        DEF BUF17+BUF17+BUFLN+BUFLN
0276  34156 000000        OCT 0,0,0,0,0
0277  34163 131202        OCT 131202,171202,176374
0278  34166 100000        DEC 32768,0
0279  34170 002003        DEF PROGB+1
0280  34171 000000        OCT 0,0,0,0,0,0,0,0,0,0,0
0281*
0282  34204               BSS 0                END OF TELETYPE TABLES
```

```
0284* THE QUEUE ALWAYS CONTAINS AT LEAST ONE ENTRY, A DUMMY ENTRY. IT
0285* IS POINTED TO BY THE LAST ACTUAL ELEMENT, AND POINTS TO THE FIRST.
0286* WHEN THE QUEUE IS OTHERWISE EMPTY, THE DUMMY LINK POINTS TO
0287* ITSELF.
0288*  THE CLOCK DRIVER IS THE CENTRAL POINT THROUGH WHICH CONTROL IS
0289*  PASSED TO THE SCHEDULER. ENTRY COMES TO THE DRIVER WHENEVER THE
0290*  CLOCK (REAL TIME SCALAR) INTERRUPTS.  THIS EVENT OCCURS EVERY
0291*  100 MS.  BESIDES GIVING CONTROL TO THE SCHEDULER, THE CLOCK
0292*  DRIVER ALSO HAS THE TASK OF UPDATING THE TIME OF DAY CLOCK.
0293* THIS CLOCK IS A TWO WORD ENTRY WHOSE VALUE IS AS FOLLOWS:
0294*     DATIM=24*DAY+HOUR
0295*     DATIM+1=600*MIN+10*SEC-36000

0297  34204 000000  CLKIN NOP             ENTRY POINT.
0298  34205 103100        CLF 0
0299  34206 034042        ISZ DATIM+1     BUMP 100MS COUNTER
0300  34207 026216        JMP CLC1        NO PROBLEM IF NO SKIP
0301  34210 070064        STA CTEMP       SAVE A.
0302  34211 060434        LDA M36K        RESET 100MS COUNTER.
0303  34212 070042        STA DATIM+1
0304  34213 060064        LDA CTEMP       RESET A.
0305  34214 034041        ISZ DATIM       BUMP HR COUNTER.
0306  34215 000000        NOP             JUST IN CASE.

0308* THE NEXT INSTRUCTION IS NORMALLY A JMP. WHEN THE
0309* SCHEDULER IS RUNNING, HOWEVER, IT PREVENTS ITSELF
0310* FROM BEING REENTERED BY INSERTING A NOP.

0312  34216 000000  CLC1  NOP

0314  34217 103117        CLF CLOCK       ALLOW ANOTHER CLOCK INTERRUPT.
0315  34220 102100        STF 0
0316  34221 126204        JMP CLKIN,I     RETURN.
0317  34222 026223  CLC2  JMP SCHED       USED TO INSERT IN CLC1.


0319*  THE SCHEDULER SECTION OF TSB DETERMINES WHICH
0320*  PROGRAM IS TO RUN NEXT. FIRST IT CLEARS CLC1,
0321*  ALLOWING THE CLOCK TO CONTINUE INTERRUPTING.

0323  34223 071325  SCHED STA AREG        SAVE A-REGISTER.
0324  34224 002400        CLA             INSERT NOP IN CLC1 TO PREVENT
0325  34225 072216        STA CLC1         REENTERING SCHED.
0326  34226 062204        LDA CLKIN       SAVE THE PROGRAM COUNTER
0327  34227 071330        STA PREG         ALSO.
0328  34230 103117        CLF CLOCK       NOW LET THE CLOCK IN AGAIN
0329  34231         CLKED EQU *
0330  34231 102100        STF 0
0331  34232 075326        STB BREG        SAVE B REGISTER,
0332  34233 001520        ERA,ALS         E-REGISTER,
0333  34234 102201        SOC             AND OVERFLOW REGISTER.
0334  34235 002004        INA
0335  34236 071327        STA EREG
```

```
0337  34237 060264          LDA TIMEF      GET TIMER FLAG.
0338  34240 002002          SZA            IF 0, THIS IS NOT A TIMED PROG.
0339  34241 134054          ISZ TIMER,I    IF NOT 0, BUMP TIMER.
0340  34242 026256          JMP SCH1       IF NOT OUT OF TIME, SKIP ROTAT-
0341*                                      ING RUN QUEUE.
0342*
0343*     AT THIS POINT WE HAVE DISCOVERED THAT THE PROGRAM THAT HAS
0344*     BEEN RUNNING HAS EXHAUSTED ITS TIME LIMIT. THE NEXT STEP IS
0345*     TO ADJUST THE QUEUE SO THAT THIS PROGRAM IS MOVED TO THE
0346*     BOTTOM.  THIS IS ACCOMPLISHED BY DELETING THE PROGRAM
0347*     FROM THE QUEUE AND THEN REINSERTING IT WITH ITS NEW PRIORITY.
0348*
0349  34243 064352          LDB MLINK+1    GET THE ADDRESS OF PRIORITY
0350  34244 006004          INB             FOR THE CURRENT PROGRAM.
0351  34245 060532          LDA .+4        SET IT TO LOW PRIORITY.
0352  34246 170001          STA 1,I
0353  34247 044525          ADB .-1
0354  34250 160001          LDA 1,I        GET THE LINK FROM THE CURRENT
0355  34251 070352          STA MLINK+1     PROGRAM AND STORE IT IN MLINK+1
0356*
0357*  THE NEXT SECTION INSERTS A USER INTO THE QUEUE IN ORDER OF HIS
0358*  PRIORITY. WHEN WE ARRIVE HERE, THE B REGISTER POINTS TO THE LINK
0359*  WORD FOR THE USER.
0360*
0361  34252 116255  SCH3    JSB INSQA,I     INSERT USER INTO QUEUE      [X]
0362  34253 017325          JSB SWAPR                                   [X]
0363  34254 026256          JMP SCH1                                    [X]
0364  34255 037051  INSQA   DEF INSEQ                                  [X]
0365*
0366*     THIS SECTION IS THE BEGINNING OF THE MAIN PART OF THE SCHEDU-
0367*     LER. CONTROL ALWAYS COMES HERE TO EXAMINE THE TTQ UNTIL IT'S
0368*     EXHAUSTED, OR WHEN THERE IS NOTHING TO DO. SWAPR ALWAYS COMES
0369*     TO THIS POINT WHEN THE QUEUE IS EMPTY OR THE FIRST PROGRAM ON
0370*     THE QUEUE IS ABSENT.
0371*
0372* THE FOLLOWING SECTION OF CODE TAKES CARE OF THE TELEPHONE LOGIC.
0373* IT IS RESPONSIBLE FOR MAKING 3 DECISIONS:
0374*     1) A USER HAS CALLED UP;
0375*     2) A USER HAS HUNG UP;
0376*     3) A USER HAS BEEN ON TOO LONG WITHOUT SUCCESSFULLY LOGGING IN
0377* THE FOLLOWING BIT FLAGS IN THE USER'S I/O STATUS ARE USED:
0378*     LTBT - LOG TIMING
0379*     LDBT - LINE DROP-OUT
0380*     PDBT - PHONE DISCONNECTED
0381*     HUBT - HANG USER UP
0382* TAINS THE TIMEOUT VALUE AS NEGATIVE TENTHS OF A SECOND.
0383* TAINS THE VALUE OF DATIM+1 NECESSARY FOR TIMEOUT TO BE ACHIEVED.

0385  34256          SCH1    EQU *
0386  34256 060042          LDA DATIM+1    GO THROUGH
0387  34257 003000          CMA              PHONES LOGIC
0388  34260 042421          ADA SPT1            ONCE A
0389  34261 064041          LDB DATIM              SECOND
0390  34262 007000          CMB
0391  34263 046422          ADB SPT2
0392  34264 030001          IOR 1
```

move

```
0393  34265 002021          SSA,RSS
0394  34266 026423          JMP SCH54
0395  34267 060042          LDA DATIM+1    SET
0396  34270 040540          ADA .+10         FOR
0397  34271 072421          STA SPT1            NEXT
0398  34272 060041          LDA DATIM              TRIP
0399  34273 002004          INA
0400  34274 072422          STA SPT2
0401  34275 060206          LDA NPORT      SET COUNTER TO
0402  34276 070256          STA TCNTR        NUMBER OF PORTS
0403  34277 164357          LDB TTYTP,I
0404  34300           SPL   EQU *
0405  34300 074257          STB TPNTR      => START OF TTY TABLE
0406  34301 044535          ADB .+?TSTA
0407  34302 074260          STB TSPNT      => USER I/O STATUS
0408  34303 160001          LDA B,I
0409  34304 012417          AND HLDTP      ANY PHONES
0410  34305 002003          SZA,RSS          BITS SET?
0411  34306 026412          JMP SPLN       NO
0412  34307 011000          AND PDBT       YES, PHONE
0413  34310 002002          SZA              DISCONNECTED BIT?
0414  34311 026377          JMP SPL4       YES
0415  34312 160001          LDA B,I        NO, HANG
0416  34313 010631          AND HUBT         USER UP
0417  34314 002002          SZA                BIT SET?
0418  34315 026332          JMP SPL1       YES
0419  34316 044532          ADB .+?PHON-?TSTA  NO, BUMP PHONES TIME
0420  34317 134001          ISZ B,I        COUNTER - IS TIME UP?
0421  34320 026412          JMP SPLN       NO
0422  34321 160260          LDA TSPNT,I    YES, A = STATUS
0423  34322 010615          AND LTBT       LOG TIMING
0424  34323 002002          SZA              BIT SET?
0425  34324 026363          JMP SPL3       YES
0426*
0427**    LINE DROP-OUT
0428*
0429  34325 160260          LDA TSPNT,I    NO, MUST BE LINE DROP-OUT
0430  34326 011171          AND LDNBT      REMOVE LINE DROP-OUT AND
0431  34327 010521          AND ICNBT        INPUT CONFIGURATION BITS
0432  34330 030527          IOR IOBT       SET INPUT MODE BIT
0433  34331 002001          RSS
0434*
0435**    HANG USER UP
0436*
0437  34332 120001    SPL1  XOR B,I        REMOVE HANG USER UP BIT
0438  34333 170260          STA TSPNT,I    STORE NEW STATUS
0439  34334 064257          LDB TPNTR
0440  34335 044560          ADB .+?STAT
0441  34336 160001          LDA B,I        A = USER'S SYSTEM STATUS
0442  34337 050532          CPA %SYNT      SYNTAX IN USE?
0443  34340 026344          JMP SPL5       YES. CAN NOT DISCONNECT.
0444  34341 040514          ADA .+.-%SYNT-1-COM3+COM2
0445  34342 002020          SSA            LIBRARY PROGRAM IN USE?
0446  34343 026350          JMP SPL2       NO
0447  34344 160260    SPL5  LDA TSPNT,I    YES. SET
0448  34345 030631          IOR HUBT         HANG USER
```

```
0449  34346 170260          STA TSPNT,I       UP BIT
0450  34347 026412          JMP SPLN
0451  34350 060524  SPL2    LDA .-2  %disc SET STATUS TO
0452  34351 170001          STA B,I            FORCED DISCONNECT
0453  34352 103100          CLF 0
0454  34353 044513          ADB .+?MASK-?STAT
0455  34354 160001          LDA B,I          SET MPCOM BIT
0456  34355 030265          IOR MPCOM
0457  34356 070265          STA MPCOM
0458  34357 102100          STF 0
0459  34360 044542          ADB .+?LINK-?MASK
0460  34361 017542          JSB DEQUE        REMOVE USER FROM QUEUE
0461  34362 026412          JMP SPLN
0462*
0463**     LOG-ON TIMED OUT
0464*
0465  34363 120260  SPL3    XOR TSPNT,I      REMOVE LOG TIMING
0466  34364 011171          AND LDNBT          AND LINE DROP-OUT BITS
0467  34365 031000          IOR PDBT         SET PHONE DISCONNECTED
0468  34366 030527          IOR IOBT           AND INPUT MODE BITS
0469  34367 170260          STA TSPNT,I      STORE NEW STATUS
0470  34370 160257          LDA TPNTR,I
0471  34371 001222          RAL,RAL          GET THE
0472  34372 102616          OTA DSCB           PHONES
0473  34373 102516          LIA DSCB             STATUS
0474  34374 030623          IOR B300         SET DTR OFF
0475  34375 102616          OTA DSCB         OUTPUT TO PHONES BOARD
0476  34376 026412          JMP SPLN
0477*
0478**     PHONE DISCONNECTED
0479*
0480  34377 003000  SPL4    CMA              REMOVE PHONE
0481  34400 110001          AND B,I            DISCONNECTED BIT
0482  34401 170001          STA B,I
0483  34402 160257          LDA TPNTR,I      GET THE
0484  34403 001222          RAL,RAL             PHONES
0485  34404 102616          OTA DSCB              STATUS
0486  34405 102516          LIA DSCB
0487  34406 032420          IOR B360         SET DTR ON
0488  34407 102616          OTA DSCB         OUTPUT TO PHONES BOARD
0489  34410 044535          ADB .+?PPRM-?TSTA
0490  34411 170001          STA B,I          STORE IN PHONES PARAMETER
0491*
0492**     UPDATE POINTERS TO NEXT USER
0493*
0494  34412 064257  SPLN    LDB TPNTR        ADJUST POINTER TO
0495  34413 044563          ADB .+TTY01-TTY00  NEXT USER'S TABLE
0496  34414 034256          ISZ TCNTR        ALL DONE?
0497  34415 026300          JMP SPL          NO
0498  34416 026423          JMP SCH54
0499*
0500  34417 001700  HLDTP   OCT 1700
0501  34420 000360  B360    OCT 360        DATA TERMINAL READY ON
0502  34421 000000  SPT1    OCT 0
0503  34422 000000  SPT2    OCT 0
0504*
```

NOT NEEDED

MAKE

```
0505  34423 102100  SCH54 STF 0
0506  34424 060265        LDA MPCOM      TEST FOR ANY COMMUNICATION
0507  34425 002002        SZA             FROM MULTIPLEXOR.
0508  34426 026652        JMP SCH5
0509*
0510* TEST FOR ANY TTY35 BUSINESS
0511*
0512  34427 003400        CCA            TEST FOR DRIVER BUSY.
0513  34430 050414        CPA T35F1
0514  34431 026613        JMP SCH15      DRIVER IS BUSY.
0515  34432 050416        CPA T35F3
0516  34433 026544        JMP SCH16      COMMAND ENTERED BUT NOT STARTED
0517*
0518* WHEN T35F1=0, THE CONSOLE IS QUIET SO WE CAN DO LOGGING.
0519*
0520*
0521  34434 040076        ADA MSQCT      ANY MESSAGES
0522  34435 050525        CPA .-1
0523  34436 026450        JMP SCH55      NO
0524*
0525  34437 070076 WHAT?  STA MSQCT
0526  34440 002003        SZA,RSS
0527  34441 026447        JMP SCH55-1
0528  34442 064077        LDB MSQP1      LOAD MESSAGE LENGTH
0529  34443 160001        LDA 1,I
0530  34444 006004        INB            COMPUTE MESSAGE BUFFER
0531  34445 114324        JSB TTY35,I     OUTPUT MESSAGE
0532  34446 026613        JMP SCH15      JMP SCH21
0533*
0534  34447 003400        CCA
0535  34450         SCH55 EQU *          NO MESSAGES - LOGGING?
0536  34450 040370        ADA LOGCT      TEST FOR ANY ENTRIES IN LOGTABLE
0537  34451 050525        CPA .-1
0538  34452 026544        JMP SCH16      LOG TABLE IS EMPTY.
0539*
0540* SET UP LOG BUFFER
0541*
0542  34453 070370        STA LOGCT      DECREMENT LOG COUNTER.
0543  34454 060371        LDA LOGP1      BUMP LOG POINTER
0544  34455 002004        INA
0545  34456 050374        CPA LOGND      IF AT END,
0546  34457 060373        LDA LOGBG        WRAP AROUND.
0547  34460 070371        STA LOGP1
0548  34461 160371        LDA LOGP1,I    TEST FOR LOGON
0549  34462 064375        LDB ASCIN        OR LOGOUT.
0550  34463 002020        SSA
0551  34464 064376        LDB ASCFF
0552  34465 076534        STB LOGBF+3
0553  34466 101052        LSR 10         SHIFT LOG CHAR TO LEAST 5 BITS.
0554  34467 010565        AND .+37B      MASK OFF OTHER STUFF.
0555  34470 040377        ADA ASCBA      CONVERT TO ASCII.
0556  34471 072535        STA LOGBF+4
0557  34472 160371        LDA LOGP1,I    GET ACCOUNT NUMBER AGAIN.
0558  34473 010362        AND B1777      KEEP ONLY # PART.
0559  34474 006400        CLB
0560  34475 100400        DIV .+10       GET 1ST 2 DIGITS IN A, LAST IN B
```

```
0561  34477 005727          BLF,BLF       SET UP LAST DIGIT AS
0562  34500 044400          ADB ASC0B      ASCII LEFT HALF.
0563  34501 076537          STB LOGBF+6
0564  34502 017221          JSB #LTEN     CONVERT FIRST 2 TO ASCCII ALSO.
0565  34503 072536          STA LOGBF+5
0566  34504 034371          ISZ LOGP1
0567  34505 160371          LDA LOGP1,I   NOW GET THE TIME.
0568  34506 010545          AND .+17B     GET TERMINAL NUMBER.
0569  34507 017221          JSB #LTEN     CONVERT AND STORE IN BUFFER.
0570  34510 072543          STA LOGBF+10
0571  34511 160371          LDA LOGP1,I
0572  34512 006400          CLB
0573  34513 101024          ASR 4
0574  34514 100400          DIV D60
0575  34516 174371          STB LOGP1,I   SAVE SECOND HALF
0576  34517 017221          JSB #LTEN     CONVERT FIRST HALF TO ASCII.
0577  34520 072540          STA LOGBF+7
0578  34521 160371          LDA LOGP1,I
0579  34522 017221          JSB #LTEN     CONVERT 2ND HALF TO ASCII.
0580  34523 072541          STA LOGBF+8
0581  34524 060554          LDA .+22
0582  34525 066530          LDB LOGR2      TO PPRINT THE
0583  34526 114324  SCH21    JSB TTY35,I    STUFF.
0584  34527 026613          JMP SCH15
0585  34530 134531  LOGR2    DEF *+1,I     BUFFER ADDRESS (I=>PUNCH)
0586  34531 025052  LOGBF    ASC 11,**LOGOFF A123 0930 #01
0587*
0588*  TTY35 IO COMPLETE
0589*
0590  34544 050415  SCH16    CPA T35F2     TEST DRIVER COMMUNICATE FLAG.
0591  34545 002001          RSS
0592  34546 026613          JMP SCH15
0593  34547 060405          LDA T35ST     GET CONSOLE STATUS.
0594  34550 064407          LDB T35PR
0595  34551 050531          CPA %OUTW     IF OUTPUT WAIT,
0596  34552 026576          JMP SCH23     GO SET HIM UP.
0597  34553 002002          SZA           IF NOT IDLE WEVE ALREADY
0598  34554 026613          JMP SCH15       QUEUED HIM.
0599* TTY35 INPUT COMMAND
0600*
0601  34555 060411          LDA T35B2     POINTER TO FIRST CHARACTER
0602  34556 070055          STA SBHED      OF CONSOLE BUFFER.
0603  34557 060412          LDA T35ND     POINTER TO END OF
0604  34560 070056          STA SCHL       CONSOLE BUFFER.
0605  34561 060566          LDA .+40B     INITIALIZE COMMAND
0606  34562 070061          STA SCHP       HOLDER.
0607  34563 017247          JSB SCOM      GET COMMAND.
0608  34564 026604          JMP SCH17     BLANK LINE
0609  34565 026606          JMP SCH18     ERROR
0610  34566 026606          JMP SCH18     ERROR
0611*
0612* SET UP QUEUE ENTRY FOR CONSOLE.
0613*
0614  34567 060055          LDA SBHED     SET POINTER FOR
0615  34570 070047          STA T35CP      T35CR.
0616  34571 060566          LDA .+40B     SET UP LA2T CHAR
```

```
0617  34572 070050          STA T35LC       AS BLANK
0618*
0619  34573 060320          LDA #LIB#       SET RESTART ADDRESS.
0620  34574 070404          STA T35RS
0621  34575 046603          ADB SCH19       SET PROGRAM STATUS
0622  34576 074405  SCH23    STB T35ST        TYPE.
0623  34577 060530          LDA .+2         SET PRIORITY.
0624  34600 070407          STA T35PR
0625  34601 064410          LDB T35LN       GO INSERT IN QUEUE
0626  34602 026252          JMP SCH3        %RUN
0627  34603 142034  SCH19   ABS -COM2+%SYNT-.+1
0628  34604 060430  SCH17   LDA ONEI        OUTPUT LINE FEED
0629  34605 002001          RSS
0630  34606 060532  SCH18   LDA .+4         OUTPUT ERROR MESSAGR
0631  34607 006400          CLB
0632  34610 074415          STB T35F2
0633  34611 064431          LDB DEH
0634  34612 026526          JMP SCH21


0001*
0002*
0003  34613 017325  SCH15   JSB SWAPR       CHECK FOR ANYTHING TO DO. IF NOT
0004*                                       SWAPR WILL GO TO SCH1 AGAIN.
0005*                                       IT WILL RETURN HERE IF THERE IS
0006*                                       AN EXECUTABLE PROGRAM IN CORE.


0008*      THE PROGRAM TO RUN IS AT THE HEAD OF THE QUEUE, AND SWAPR HAS
0009*      GUARANTEED THAT IT IS IN CORE. THE FOLLOWING SECTION OF CODE
0010*      SETS IT UP TO RUN, AND ALSO SETS UP THE CLOCK DRIVER SO THAT
0011*      FUTURE INTERRUPTS WILL GO BACK INTO THE SCHEDULER.

0013  34614 103100          CLF 0           INHIBIT INTERRUPT.
0014  34615 062222          LDA CLC2        RESTORE A <JMP SCHED> IN THE
0015  34616 072216          STA CLC1          CLOCK INTERRUPT ROUTINE.
0016  34617 060352          LDA MLINK+1
0017  34620 002004          INA             GET PRIORITY OF PROGRAM.
0018  34621 164000          LDB 0,I
0019  34622 054530          CPB .+2         IF PRIORITY IS 2, CHANGE IT TO
0020  34623 006400          CLB             ZERO SO IT DOESNT GET INTERRUPTE
0021  34624 174000          STB 0,I
0022  34625 040523          ADA .+?RSTR-?PLEV   GET RESTART ADDRESS
0023  34626 164000          LDB 0,I           IF NOT 0, PUT IT IN PREG
0024  34627 006002          SZB              TO START UP PROPERLY.
0025  34630 075330          STB PREG
0026  34631 006400          CLB             PUT 0 INTO TABLE IN ANY CASE
0027  34632 174000          STB 0,I
0028  34633 074264          STB TIMEF       SET TO SAY NO TIMING.
0029  34634 002004          INA             GET PROGRAM STATUS.
0030  34635 164000          LDB 0,I
0031  34636 040524          ADA .+?CLOC-?STAT   SET TIMER POINTER.
0032  34637 070054          STA TIMER       %RUN
0033  34640 054533          CPB %SYNT+1     IF STATUS IS RUN, SET
0034  34641 034264          ISZ TIMEF        TIMEFLAG FOR CLOCKING.
```

MOVE

```
0035  34642 061327          LDA EREG       RESTORE E
0036  34643 103101          CLO             AND OVERFLOW
0037  34644 000036          SLA,ELA          REGISTERS.
0038  34645 102101          STO
0039  34646 061325          LDA AREG       RESTORE A AND
0040  34647 065326          LDB BREG         B REG.
0041  34650 102100          STF 0          ENABLE INTERRUPT AND
0042  34651 125330          JMP PREG,I      TRANSFER TO PROGRAM.
0043*
0044*  THIS SECTION ACTUALLY PROCESSES A TTQ ENTRY. THERE ARE SEVERAL
0045*  KINDS OF ENTRIES WHICH MAY BE CLASSIFIED AS FOLLOWS:
0046*
0047*     1) ABORT - THIS IS INDICATED BY THE TELETYPE STATUS BEING
0048*        -1. THE ACTION TAKEN IS TO STOP THE PROGRAM (IF IT IS
0049*        IN THE QUEUE), AND TO INITIATE THE ABORT MESSAGE.
0050*
0051*     2) OUTPUT TERMINATE - THIS IS INDICATED BY THE STATUS BEING
0052*        %OUTW.  THE TTQ ENTRY REALLY MEANS THAT THE OUTPUT BUFFER
0053*        IS ALMOST EMPTY. THE PROGRAM IS PLACED BACK ON THE QUEUE
0054*        ACCORDING TO ITS PRIORITY.
0055*
0056*     3) INPUT - THIS IS INDICATED BY STATUS BEING %INPT. IT INDI-
0057*        CATES THAT A USER PROGRAM OR SYSTEM PROGRAM THAT HAS
0058*        REQUESTED INPUT HAS GOTTEN IT. THE PROGRAM IS PLACED IN
0059*        THE QUEUE.
0060*
0061*     4) COMMAND - WHEN STATUS IS %IDLE, EITHER A COMMAND OR
0062*        A SYNTAX STATEMENT HAS BEEN ENTERED. THESE CAN BE DISTIN-
0063*        GUISHED BY THE FIRST NON BLANK INPUT CHARACTER, WHICH IS
0064*        A DIGIT ONLY IF SYNTAX HAS BEEN ENTERED.
0065*
0066  34652 064333  SCH5  LDB DTTY0       COMPUTE ADDRESS OF TABLE
0067  34653 000033         SLA,RAR        ENTRY FOR SIGNALLING TELETYPE.
0068  34654 026657         JMP *+3        FOUND.
0069  34655 044563         ADB .+TTY01-TTY00
0070  34656 026653         JMP *-3
0071  34657 074057         STB TTQ        SAVE ADDRESS IN TTQ
0072  34660 044550         ADB .+?ID      STORE ID ADDRESS IN
0073  34661 074060         STB SCHID       SCHID.
0074  34662 103100         CLF 0          INHIBIT MULTIPLEXOR.
0075  34663 044523         ADB .+?MASK-?ID
0076  34664 160001         LDA 1,I        CLEAR MPCOM BIT.
0077  34665 020265         XOR MPCOM
0078  34666 070265         STA MPCOM
0079  34667 044541         ADB .+?STAT-?MASK  B=>STATUS.
0080  34670 160001         LDA 1,I        GET STATUS IN A.
0081  34671 040522         ADA .-4        MAKE SURE STATUS
0082  34672 002021         SSA,RSS          IS < 4.
0083  34673 026423         JMP SCH54      IGNORE OTHERWISE.
0084  34674 042676         ADA *+2        BRANCH TO SECTION TO HANDLE REQU
0085  34675 124000         JMP 0,I
0086  34676 034705         DEF *+7
0087  34677 026743         JMP SCH8       SPECIAL DISCONNECT.
0088  34700 026716         JMP SCH7       ABORT
0089  34701 026747         JMP SCH6       COMMAND
0090  34702 026423         JMP SCH54      ABORTING.
```

```
0091  34703 000000          NOP             INPUT
0092*
0093*  CODE TO HANDLE INPUT OR OUTPUT.
0094*
0095  34704 044530          ADB .+2         B=>PLEV
0096  34705 160001          LDA 1,I         GET ACTUAL STATUS
0097  34706 044524          ADB .-2         B=>STATUS.
0098  34707 170001          STA 1,I         SET ACTUAL STATUS
0099  34710 102100          STF 0
0100  34711 044530          ADB .+2         B=>PLEV
0101  34712 002400          CLA             SET PRIORITY TO 0
0102  34713 170001          STA 1,I
0103  34714 044525          ADB .-1         GO INSERT USER IN
0104  34715 026252          JMP SCH3         QUEUE.
0105*
0106*  CODE TO HANDLE ABORT
0107*
0108  34716 102100  SCH7    STF 0
0109  34717 006004          INB             B=>LINK
0110  34720 017542          JSB DEQUE       REMOVE USER FROM QUEUE.
0111  34721 064057          LDB TTQ         CHANGE STATUS
0112  34722 044560          ADB .+?STAT
0113  34723 002400          CLA
0114  34724 170001          STA 1,I
0115  34725 064057          LDB TTQ         PRINT ABORT
0116  34726 060514          LDA .-10          MESSAGE
0117  34727 017231          JSB TYPE
0118  34730 177615          OCT 177615,5123   CR-LF-S
0119  34732 052117          ASC 1,TO
0120  34733 050015          OCT 50015,5177    P-CR-LF-RUBOUT
0121  34735 064057          LDB TTQ         SCRATCH IF $HELLO IS RUNNING.
0122  34736 044527          ADB .+?CCNT      DECREMENT COUNT
0123  34737 134001          ISZ 1,I                                  WHY?
0124  34740 044525          ADB .-?CCNT      TEST FOR HELLO
0125  34741 017571          JSB HTEST
0126  34742 026423          JMP SCH54
0127*
0128* CODE TO SET UP FORCED DISCONNECT.
0129*
0130  34743 044525  SCH8    ADB .+?RSTR-?STAT
0131  34744 060001          LDA 1           SET A TO POINT TO RESTART        [
0132  34745 102100          STF 0                                             F]
0133  34746 027160          JMP SCH61       GO SET UP STARTING INFO.
0134*
0135*
0136*  CODE TO HANDLE COMMANDS.
0137*
0138  34747 102100  SCH6    STF 0
0139  34750 044500          ADB .+?BHED-?STAT  B=>BUFFER HEAD.
0140  34751 160001          LDA 1,I         GET BUFFER HEAD.
0141  34752 070055          STA SBHED       INITIALIZE BUFFER POINTER.
0142  34753 044530          ADB .+?BEND-?BHED
0143  34754 074056          STB SCHL
0144  34755 002400  SCH24   CLA             INITIALIZE SCHP TO HOLD
0145  34756 070061          STA SCHP         CHARACTERS.
0146  34757 017247          JSB SCOM        INTERPRET COMMAND
```

```
0147  34760 027002          JMP SCH30      EMPTY LINE.
0148  34761 026764          JMP SCH9       FIRST CARACTER A DIGIT
0149  34762 027032          JMP EHERR      INVALID COMMAND.
0150  34763 027040          JMP SCH11      COMMAND IS OK.
0151*
0152* THE FIRST CHARACTER IS A DIGIT. THIS MEANS THE LINE IS SYNTAX AND
0153* WE HAVE TO QUEUE IT AS SUCH.
0154*
0155  34764 064056  SCH9    LDB SCHL       GET TABLE POINTER AGAIN.
0156  34765 044554          ADB .+?PLEV-?BEND  B=>PRIORITY
0157  34766 002400          CLA            SET PRIORITY TO 0
0158  34767 150060          CPA SCHID,I    IF NO ID, GO LOG IN.
0159  34770 027044          JMP SCH25
0160  34771 170001          STA 1,I
0161  34772 044523          ADB .+?RSTR-?PLEV  SET UP STARTING ADDRESS
0162  34773 060646          LDA SYNTA          FOR SYNTAX
0163  34774 170001          STA 1,I
0164  34775 044527          ADB .+?STAT-?RSTR
0165  34776 060532          LDA %SYNT      SET STATUS TO
0166  34777 170001          STA 1,I         SYNTAX.
0167  35000 006004          INB            GO INSERT IN QUEUE.
0168  35001 026252          JMP SCH3
0169*
0170  35002 064057  SCH30   LDB TTQ        TEST FOR TAPE MODE IF NULL LINE.
0171  35003 044545          ADB .+?MASK
0172  35004 060266          LDA TAPEF
0173  35005 110001          AND 1,I
0174  35006 002003          SZA,RSS
0175  35007 027026          JMP SCH20    NO TAPE--GO EMIT LINE FEED.
0176  35010 103100          CLF 0          INHIBIT INTERRUPT.
0177  35011 064055          LDB SBHED      SET SBHED TO POINT AT 1ST CHAR
0178  35012 006004          INB             OF NEXT BUFFER.
0179  35013 154056          CPB SCHL,I
0180  35014 044364          ADB MBLEN
0181  35015 074055          STB SBHED
0182  35016 060056          LDA SCHL     SET BHED ALSO.
0183  35017 040524          ADA .+?BHED-?BEND
0184  35020 174000          STB 0,I
0185  35021 040525          ADA .-1        TEST FOR CONTINUATION.
0186  35022 154000          CPB 0,I
0187  35023 026423          JMP SCH54      NO CONTINUATION.
0188  35024 102100          STF 0          INTERRUPT BACK ON.
0189  35025 026755          JMP SCH24      GO SCAN NEXT BUFFER.
0190*
0191  35026 060540  SCH20   LDA .+12B      OUTPUT A LINE FEED.
0192  35027 064057          LDB TTQ
0193  35030 114356          JSB POCR,I
0194  35031 026423          JMP SCH54
0195*
0196* COME HERE WHEN ANY ILLEGAL INPUT IS FOUND.
0197*
0198  35032 060520  EHERR   LDA .-6
0199  35033 017231          JSB TYPE
0200  35034 005077  EH      OCT 5077,37477,6412    (???)
0201  35037 026423          JMP SCH54
0202*
```

```
0203* COME HERE WHEN A LEGITIMATE COMMAND IS FOUND
0204*
0205  35040 160060  SCH11 LDA SCHID,I   PROCESS COMMAND ONLY IF
0206  35041 002003        SZA,RSS        ID#0 OR
0207  35042 057057        CPB HI          HELLO COMMAND.
0208  35043 027061        JMP SCH22
0209  35044 060506  SCH25 LDA .-16       PRINT LOG IN MESSAGE
0210  35045 017231        JSB TYPE
0211  35046 005120        OCT 5120       LF-P
0212  35047 046105        ASC 6,LEASE LOG IN
0213  35055 006412        OCT 6412
0214  35056 026423        JMP SCH54
0215  35057 035766  HI    DEF HELLO
0216  35060 035755  DTAPR DEF CTAPR
0217  35061 064057  SCH22 LDB TTQ        IF COMMAND, CLEAR TAPE FLAG.
0218  35062 044545        ADB .+?MASK
0219  35063 160001        LDA 1,I
0220  35064 003000        CMA
0221  35065 010266        AND TAPEF
0222  35066 070266        STA TAPEF
0223  35067 160061        LDA SCHP,I     TEST FOR HELLO,BYE,OR SCRATCH.
0224  35070 053766        CPA HELLO      OK TO PROCEDE IF ANY
0225  35071 027105        JMP SCH27      OF THESE.
0226  35072 053746        CPA SCR
0227  35073 027105        JMP SCH27
0228  35074 053770        CPA BYE
0229  35075 027105        JMP SCH27
0230  35076 160001        LDA 1,I        TEST FOR ANY TAPE ERRORS.
0231  35077 010052        AND TERR
0232  35100 002003        SZA,RSS
0233  35101 027111        JMP SCH26      NO TAPE ERRORS--CONTINUE.
0234*
0235  35102 063060        LDA DTAPR      OTHERWISE, SET UP FOR EXECU-
0236  35103 070061        STA SCHP        TION OF TAPE ERROR
0237  35104 027111        JMP SCH26        PRINTOUT ROUTINE.
0238*
0239  35105 160001  SCH27 LDA 1,I        IF HELLO, BYE OR SCRATCH,
0240  35106 003000        CMA             CLEAR TAPE ERROR BIT.
0241  35107 010052        AND TERR
0242  35110 070052        STA TERR          AND PROCEDE.
0243  35111 044532  SCH26 ADB .+?NAME-?MASK
0244  35112 160001        LDA 1,I        TEST FOR
0245  35113 002021        SSA,RSS        RUN-ONLY PROGRAM.
0246  35114 027126        JMP SCH28      NOT RUN-ONLY.
0247  35115 160061        LDA SCHP,I     IF RUN-ONLY, DON'T
0248  35116 053762        CPA SAVE        ALLOW THESE
0249  35117 027140        JMP SCH29         COMMANDS.
0250  35120 053752        CPA LIS
0251  35121 027140        JMP SCH29
0252  35122 053753        CPA PUN
0253  35123 027140        JMP SCH29
0254  35124 053754        CPA XPUN
0255  35125 027140        JMP SCH29
0256*
0257  35126 044507  SCH28 ADB .+?BHED-?NAME
0258  35127 060055        LDA SBHED      SET BUFFER POINTER.
```

```
0259  35130 170001          STA 1,I
0260  35131 064061          LDB SCHP
0261  35132 044436          ADB MCOM2       TEST FOR TYPE I COMMAND.
0262  35133 006021          SSB,RSS
0263  35134 027150          JMP SCH12       NOT TYPE I.
0264  35135 047137          ADB *+2         GET STARTING ADDRESS FOR COMMAND
0265  35136 124001          JMP 1,I          PROCESSOR AND GO THERE.
0266  35137 136044          DEF COM5-COM1+COM2,I
0267  35140 060514  SCH29   LDA .-10
0268  35141 017231          JSB TYPE
0269  35142 005122          OCT 5122        LF-R
0270  35143 052516          ASC 3,UN ONL
0271  35146 054415          OCT 54415       Y-CR
0272  35147 027026          JMP SCH20
0273*
0274* TYPE II AND III COMMANDS
0275*
0276  35150 044533  SCH12   ADB %SYNT+1     DETERMINE PROGRAM STATUS.
0277  35151 060057          LDA TTQ
0278  35152 040560          ADA .+?STAT
0279  35153 174000          STB 0,I
0280  35154 040525          ADA .+?RSTR-?STAT  A=>RESTART ADDRESS
0281  35155 044514          ADB .+.-%SYNT+COM2-COM3-1    TYPE II OR III ??
0282  35156 006020          SSB
0283  35157 027171          JMP SCH13       TYPE II COMMAND
0284  35160 064320  SCH61   LDB #LIB#       TYPE III COMMANDS HAVE A STAN-
0285  35161 174000          STB 0,I          DARD STARTING ADDRESS AND
0286  35162 064530          LDB .+2           PRIORITY 2.
0287  35163 040531  SCH14   ADA .+?PLEV-?RSTR
0288  35164 174000          STB 0,I
0289  35165 007400          CCB   -1        GET LINK POINTER IN B AND GO
0290  35166 044000          ADB 0            TO INSERT INTO QUEUE.
0291  35167 026252          JMP SCH3
0292  35170 036051          DEF COM3+COM5-COM1
0293  35171 047170  SCH13   ADB *-1         GET STARTING ADDRESS FOR TYPE
0294  35172 164001          LDB 1,I          II COMMANDS.
0295  35173 174000          STB 0,I
0296  35174 006404          CLB,INB         GO SET PRIORITY TO 1
0297  35175 027163          JMP SCH14
0298*
0299* "SCRATCH" COMMAND
0300*
0301  35176 064057  #SCR    LDB TTQ         B=>TTY TABLE.
0302  35177 017201          JSB SCRAT       PERFORM SCRATCH FUNCTION.
0303  35200 027026          JMP SCH20       TERMINATE.
0304*
0305  35201 000000  SCRAT   NOP             SCRATCH A PROGRAM (B=>USERS TTY)
0306  35202 060433          LDA PBUFF       IF MAIN=B, SET PBPTR.
0307  35203 054261          CPB MAIN
0308  35204 070051          STA PBPTR
0309  35205 044547          ADB .+?PROG     B=>PROGEND
0310  35206 170001          STA 1,I         RESET TABLE(PROG)
0311  35207 044530          ADB .+?NAME-?PROG   CLEAR
0312  35210 002400          CLA
0313  35211 170001          STA 1,I
0314  35212 127201          JMP SCRAT,I
```

```
0315*
0316* "TAPE" COMMAND
0317*
0318  35213 064057  #TAP  LDB TTQ        B=>TTY TABLE.
0319  35214 044545        ADB .+?MASK    B=>MASK
0320  35215 060266        LDA TAPEF      SET TAPE BIT.
0321  35216 130001        IOR 1,I
0322  35217 070266        STA TAPEF
0323  35220 027026        JMP SCH20      TERMINATE.
0324*
0325*
0326  35221 000000  #LTEN NOP            CONVERT A # FROM 0-99 TO ASCII.
0327  35222 006400        CLB            GET FIRST DIGIT IN A,
0328  35223 100400        DIV .+10        SECOND IN B.
0329  35225 001727        ALF,ALF        POSITION FIRST ON LEFT,
0330  35226 040001        ADA 1          ADD IN SECOND,
0331  35227 040346        ADA ASC00        ADD IN ASCII BITS.
0332  35230 127221        JMP #LTEN,I      RETURN.
0333*
0334* TYPE SENDS AN ENTIRE STRING TO A TELETYPE. IT IS CALLED AS FOLLOWS
0335*     A=-#OF CHARS--MUST END ON RIGHT HALF OF WORD
0336*     JSB TYPE
0337*     <CHAR STRING>
0338*     RETURN


0340  35231 000000  TYPE  NOP
0341  35232 073246        STA TYPET      SAVE COUNTER
0342  35233 163231  TYPEL LDA TYPE,I     GET WORD CONTAINING CHAR.
0343  35234 067246        LDB TYPET      GET COUNT IN B.
0344  35235 006011        SLB,RSS        IF COUNT IS EVEN, TAKE HIGH
0345  35236 001727        ALF,ALF         CHAR;
0346  35237 004010        SLB            IF COUNT IS ODD,
0347  35240 037231        ISZ TYPE        BUMP TYPE.
0348  35241 064057        LDB TTQ        OUTPUT CHAR TO TELETYPE.
0349  35242 114356        JSB POCR,I
0350  35243 037246        ISZ TYPET      ANY MORE?
0351  35244 027233        JMP TYPEL      YES.
0352  35245 127231        JMP TYPE,I     NO.
0353  35246 000000  TYPET NOP
0354* SCOM SCANS A COMMAND INPUT BUFFER TO DETERMINE WHAT
0355* THE COMMAND IS. THE CALLING SEQUENCE TO SCOM IS:
0356*
0357*     JSB SCOM
0358*     <RETURN IF BLANK LINE>
0359*     <RETURN IF FIRST CHARACTER A DIGIT>
0360*     <RETURN IF NO LEGAL COMMAND>
0361*     <RETURN IF COMMAND FOUNE--B=COMMAND ADDRESS>
0362*
0363* SCOM ASSUMES THAT BEFORE IT IS CALLED, SBHED AND
0364* SCHL ARE INITIALIZED AS REQUIRED BY SCHAR,, AND
0365* SCHP=0 FOR NORMAL USERS AND OCT40 FOR CONSOLE.

0367  35247 000000  SCOM  NOP            ENTRY POINT.
0368  35250 064523        LDB .-3        INITIALIZE CHAR. COUNT TO -3
0369  35251 074062        STB SCNT
```

```
0370  35252 017520          JSB SCHAR      GET A CHARACTER.
0371  35253 127247          JMP SCOM,I     NOT THERE-BLANK LINE.
0372  35254 037247          ISZ SCOM       BUMP SCOM TO POINT AT DIGIT RET.
0373  35255 040465          ADA M60B       TEST FOR FIRST CHAR A DIGIT.
0374  35256 002020          SSA            AUTOMATIC FAILURE IF
0375  35257 037247          ISZ SCOM        < ASC0
0376  35260 040514          ADA .-10
0377  35261 002020          SSA            IF <=ASC9,RETURN TO P+2 IF A
0378  35262 127247          JMP SCOM,I      DIGIT, P+3 IF NOT.
0379  35263 037247          ISZ SCOM
0380  35264 040467          ADA M41B       TEST FOR LETTER.
0381  35265 002021  SCOMB    SSA,RSS
0382  35266 127247          JMP SCOM,I     NOT ALETTER.
0383  35267 040560          ADA .+32B
0384  35270 002020          SSA
0385  35271 127247          JMP SCOM,I     NOT A LETTER.
0386  35272 030061          IOR SCHP
0387  35273 034062          ISZ SCNT       TEST FOR 3 LETTERS IN.
0388  35274 001732          ALF,SLA,RAL    NO--ROTATE FOR NEXT ONE.
0389  35275 027303          JMP SCOMA      YES--GO TO SEARCH TABLE.
0390  35276 070061          STA SCHP
0391  35277 017520          JSB SCHAR      GET NEXT CHARACTER
0392  35300 127247          JMP SCOM,I     FAIL.
0393  35301 041122          ADA M133B
0394  35302 027265          JMP SCOMB
0395* SEARCH COMMAND TABLE *
0396  35303 064440  SCOMA    LDB SCOM1      B=>TABLE
0397  35304 002020          SSA
0398  35305 044570          ADB .+COM4-COM1
0399  35306 150001  SCOMD    CPA 1,I
0400  35307 027314          JMP SCOMC      COMMAND FOUND
0401  35310 054441          CPB SCOM5
0402  35311 127247          JMP SCOM,I     ILLEGAL COMMAND
0403  35312 006004          INB
0404  35313 027306          JMP SCOMD
0405  35314 037247  SCOMC    ISZ SCOM       RETURN O.K.
0406  35315 074061          STB SCHP       SAVE ADDRESS OF COMMAND.
0407  35316 017520          JSB SCHAR      SCAN
0408  35317 027323          JMP *+4         FOR CR
0409  35320 050603          CPA .+55B      OR DASH.
0410  35321 002001          RSS
0411  35322 027316          JMP *-4
0412  35323 064061          LDB SCHP
0413  35324 127247          JMP SCOM,I
0414*
0415* THE SWAPR ROUTINE IS CALLED FROM VARIOUS POINTS IN THE SCHEDULER
0416* IN ORDER TO DETERMINE IF A PROGRAM IS READY TO RUN. IT IS ALSO
0417* CALLED WHENEVER THE QUEUE IS UPDATED. THE FUNCTION OF SWAPR IS TO
0418* DETERMINE IF THERE IS A PROGRAM ON THE QUEUE, AND IF SO, IS THE
0419* PROGRAM AT THE HEAD OF THE QUEUE READY TO RUN. IF SAID PROGRAM IS
0420* NOT READY, SWAPR INITIATES THE NECESSARY DISC TRANSFERS. SWAPR IN-
0421* DICATES WHETHER A PROGRAM CAN BE RUN OR NOT AS FOLLOWS:
0422*
0423*      READY     : NORMAL RETURN
0424*      NOT READY: TRANSFER TO SCH1
```

```
0426  35325 000000  SWAPR NOP
0427  35326 060263        LDA ENDSK      TEST FOR DISC BUSY.
0428  35327 002002        SZA
0429  35330 026256        JMP SCH1       DISC BUSY--THEREFORE, NOT READY.
0430  35331 064352        LDB MLINK+1    GET FIRST QUEUE ENTRY.
0431  35332 054351        CPB MLINK      TEST FOR QUEUE EMPTY.
0432  35333 026256        JMP SCH1       EMPTY--NOTHING TO DO.
0433  35334 060416        LDA T35F3      HAS A COMMAND BEEN ENTERED, BUT
0434  35335 050525        CPA .-1          NOT STARTED?
0435  35336 027352        JMP SWAP4      YES. GO START IT.
0436  35337 060370        LDA LOGCT      IF CONSOLE AND THERE
0437  35340 030414        IOR T35F1      IS CURRENT OR
0438  35341 054410        CPB T35LN       IMMINENT OUTPUT TO
0439  35342 002003        SZA,RSS           ASR,
0440  35343 027352        JMP SWAP4
0441  35344 017542        JSB DEQUE       SUSPEND UNTIL ITS DONE.
0442  35345 060405        LDA T35ST
0443  35346 070407        STA T35PR
0444  35347 060531        LDA %OUTW
0445  35350 070405        STA T35ST
0446  35351 027326        JMP SWAPR+1
0447  35352         SWAP4 EQU *
0448  35352 044525        ADB .-1        B=>STATUS OF FIRST ENTRY.
0449  35353 160001        LDA 1,I        A=STATUS
0450  35354 050524        CPA .-2        TEST FOR SPECIAL DISCONNECT.
0451  35355 060552        LDA %SYNT+1+BYE-COM2
0452  35356 040514        ADA .-5+COM2-COM3  TEST FOR TYPE II OR III.
0453  35357 002021        SSA,RSS
0454  35360 027421        JMP SWAP3      PROGRAM IS OF TYPE III.
0455  35361 044474        ADB .-?STAT    TEST FOR PROGRAM IN CORE.
0456  35362 054261        CPB MAIN
0457  35363 127325        JMP SWAPR,I    PROGRAM PRESENT.
0458  35364 060261        LDA MAIN       FIND OUT WHAT PROGRAM IS.
0459  35365 002002        SZA            IS ANY PROGRAM PRESENT?
0460  35366 027403        JMP SWAP1      YES.
0461  35367 074261        STB MAIN       SET MAIN TO NEW PROGRAM.
0462*
0463* INITIATE DISC TO CORE TRANSFER
0464*
0465  35370 044547        ADB .+?PROG    B=>PROGRAM END LOCATION.
0466  35371 160001        LDA 1,I        COMPUTE NUMBER OF
0467  35372 070051        STA PBPTR
0468  35373 003000        CMA             WORDS IN PROGRAM.
0469  35374 041321        ADA USE
0470  35375 070065        STA WORD       STORE -LENGTH INTO WORD.
0471  35376 044525        ADB .+?DISC-?PROG
0472  35377 160001        LDA 1,I        A=DISC ADDRESS
0473  35400 065322        LDB USEI       B=CORE ADDRESS
0474  35401 114350        JSB DISC,I     INITIATE DISC TRANSFER.
0475  35402 026256        JMP SCH1       RETURN BUSY.

0477*
0478* INITIATE CORE TO DISC TRANSFER
0479*

0481  35403 070001  SWAP1 STA 1          B=>TABLE OF USER TO BE WRITTEN.
```

```
0482  35404 002400  SWAP2 CLA             SET MAIN TO SAY NO USER IN
0483  35405 070261        STA MAIN          CORE.
0484  35406 044547        ADB .+?PROG     B=>PROG.END LOCATION.
0485  35407 060051        LDA PBPTR
0486  35410 170001        STA 1,I
0487  35411 003000        CMA
0488  35412 041321        ADA USE
0489  35413 070065        STA WORD        STORE -LENGTH INTO WORD.
0490  35414 044525        ADB .+?DISC-?PROG  B=>DISC ADDRESS.
0491  35415 160001        LDA 1,I         GET USER DISC ADDRESS.
0492  35416 065321        LDB USE         B=CORE ADDRESS.
0493  35417 114350        JSB DISC,I      INITIATE DISC TRANSFER
0494  35420 026256        JMP SCH1          AND RETURN BUSY.

0496*
0497*  TYPE III PROGRAMS
0498*

0500  35421 044525  SWAP3 ADB .+?RSTR-?STAT
0501  35422 164001        LDB 1,I
0502  35423 054320        CPB #LIB#
0503  35424 074337        STB LCHCR
0504  35425 064261        LDB MAIN
0505  35426 006002        SZB
0506  35427 027404        JMP SWAP2       GO TO WRITE OUT MAIN PROGRAM.
0507  35430 040367        ADA DCOM6       A=>DISC ADDRESS FOR LIB.PROG.
0508  35431 050262        CPA LIB         IS IT IN CORE?
0509  35432 127325        JMP SWAPR,I     YES--RETURN PRESENT.
0510  35433 070262        STA LIB         IF NOT, INITIATE READ IN.
0511  35434 064451        LDB M256        LENGTH OF PROGRAM =256
0512  35435 074065        STB WORD
0513  35436 064317        LDB #LIBI
0514  35437 160000        LDA 0,I
0515  35440 114350        JSB DISC,I
0516  35441 026256        JMP SCH1
0517*
0518* ENTRY POINT FOR INPUT REQUEST
0519*
0520  35442 000000  SCHIQ NOP
0521  35443 103100        CLF 0           INTERRUPT INHIBIT.
0522  35444 064352        LDB MLINK+1     SET RESTART ADDRESS
0523  35445 044524        ADB .+?RSTR-?LINK  INTO TABLE.
0524  35446 063442        LDA SCHIQ
0525  35447 170001        STA 1,I
0526  35450 006004        INB             GET PROGRAM TYPE
0527  35451 160001        LDA 1,I
0528  35452 002020        SSA             QUIT IF ABORT REQUEST.
0529  35453 027555        JMP SUSP
0530  35454 044530        ADB .+?PLEV-?STAT
0531  35455 170001        STA 1,I         SET INTO PLEV.
0532  35456 044524        ADB .+?STAT-?PLEV
0533  35457 060530        LDA %INPT       CHANGE STATUS TO
0534  35460 170001        STA 1,I           INPUT WAIT.
0535  35461 044503        ADB .+?TSTA-?STAT
0536  35462 160001        LDA B,I         A = USER'S I/O STATUS
0537  35463 030527        IOR IOBT        SET 'INPUT MODE' BIT
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0538  35464 150001          CPA B,I        BRANCH IF USER IS
0539  35465 027472          JMP SCHIW        NOT IN OUTPUT MODE
0540  35466 160001          LDA B,I        A = STATUS
0541  35467 030532          IOR ICBT       SET 'INPUT CONFIGURATION' BIT
0542  35470 170001          STA B,I        STORE NEW STATUS
0543  35471 027555          JMP SUSP
0544*
0545  35472 010523  SCHIW    AND NINBT      REMOVE 'NO INPUT ALLOWED' BIT
0546  35473 170001          STA B,I        STORE NEW STATUS
0547  35474 044533          ADB .+?RPRM-?TSTA
0548  35475 160001          LDA B,I        A = RECEIVE PARAMETER
0549  35476 044512          ADB .+?TNUM-?RPRM
0550  35477 164001          LDB B,I        B = UNIT NUMBER
0551  35500 114355          JSB MUXR,I     OUTPUT TO MULTIPLEXER
0552  35501 027555          JMP SUSP        GO REMOVE FROM QUEUE.
0553*
0554**  ENTRY POINT FOR TERMINATION
0555*
0556  35502 103100  SCHEQ    CLF 0
0557  35503 064352          LDB MLINK+1    SCRATCH IF
0558  35504 054410          CPB T35LN
0559  35505 027511          JMP *+4
0560  35506 044473          ADB .-?LINK     THIS IS
0561  35507 017571          JSB HTEST        $HELLO.
0562  35510 064352          LDB MLINK+1         CHANGE
0563  35511 044525          ADB .+?STAT-?LINK  STATUS
0564  35512 160001          LDA 1,I          % ABRT
0565  35513 050525          CPA .-1 <-       QUIT IF ABORT REQUEST.
0566  35514 027555          JMP SUSP
0567  35515 002400          CLA                 TO IDLE
0568  35516 170001          STA 1,I
0569  35517 027555          JMP SUSP
0570* SCHAR FETCHES THE NEXT CHARACTER FROM A BUFFER. BUFFER
0571* POINTERS FOR SCHAR ARE INITIALIZED AS FOLLOWS:
0572*     SBHED=>FIRST CHARACTER IN BUFFER
0573*     SCHL,I=>BUFFER END
0574*
0575* SCHAR CALLING SEQUENCE:
0576*
0577*     JSB SCHAR
0578*     RETURN HERE IF CR
0579*     RETURN HERE IF ANY OTHER CHARACTER

0581  35520 000000  SCHAR   NOP
0582  35521 064055          LDB SBHED      GET POINTER.
0583  35522 004065          CLE,ERB        POSITION AS WORD POINTER.
0584  35523 160001          LDA 1,I        GET WORD CONTAINING CHARACTER.
0585  35524 005610          ELB,SLB        REPOSITION POINTER AND TEST
0586  35525 002001          RSS                 FOR UPPER OR LOWER.
0587  35526 001727          ALF,ALF
0588  35527 010630          AND B377       MASK OUT CHARACTER.
0589  35530 050543          CPA .+15B      RETURN IMMEDIATELY IF CR
0590  35531 127520          JMP SCHAR,I
0591  35532 006004          INB            BUMP CHARACTER POINTER.
0592  35533 154056          CPB SCHL,I     TEST FOR END OF BUFFER.
0593  35534 044364          ADB MBLEN      IF END, CHANGE TO BEGINNING.
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0594   35535 074055          STB SBHED
0595   35536 050566          CPA .+40B      SKIP BLANKS
0596   35537 027522          JMP SCHAR+2
0597   35540 037520          ISZ SCHAR
0598   35541 127520          JMP SCHAR,I
0599*
0600* DEQUE REMOVES A USER FROM THE QUEUE. IT IS CALLED WITH THE USER'S
0601* LINK ADDRESS IN B.
0602*
0603   35542 000000  DEQUE NOP
0604   35543 060351          LDA MLINK      GET POINTER TO FIRST ENTRY.
0605   35544 154000  DEQ1    CPB 0,I        TEST FOR ENTRY FOUND.
0606   35545 027552          JMP DEQ2
0607   35546 160000          LDA 0,I        LINK TO NEXT ENTRY.
0608   35547 050351          CPA MLINK      TEST FOR END OF QUEUE.
0609   35550 127542          JMP DEQUE,I    NOT ON QUEUE--RETURN.
0610   35551 027544          JMP DEQ1       LOOP.
0611   35552 164001  DEQ2    LDB 1,I        LINK AROUND THIS USER.
0612   35553 174000          STB 0,I
0613   35554 127542          JMP DEQUE,I
0614*
0615**   SUSPEND USER
0616*
0617   35555 160352  SUSP    LDA MLINK+1,I
0618   35556 070352          STA MLINK+1
0619   35557 002400          CLA            BLOCK
0620   35560 072216          STA CLC1         CLOCK
0621   35561 026256          JMP SCH1

0623*
0624**   OUTPUT SUSPEND REQUEST ENTRY
0625*
0626*                                                    X1
0627   35562 000000  SCHOQ NOP              OUTPUT SUSPEND REQUEST ENTRY.
0628   35563 103100          CLF 0          TURN OFF INTERRUPT.
0629   35564 063562          LDA SCHOQ      SET UP RETURN ADDRESS.
0630   35565 073604          STA POC        FOOL POC INTO
0631   35566 064352          LDB MLINK+1      DOING THE WORK
0632   35567 044525          ADB .+?STAT-?LINK
0633   35570 027653          JMP OBF+1

0635* HTEST SCRATCHES A PROGRAM IF THE ASSOCIATED HFLAG BIT IS SET.
0636* B POINTS TO THE USER'S TTY ADDRESS.
0637*
0638   35571 000000  HTEST NOP
0639   35572 044545          ADB .+?MASK    GET USER'S MASK.
0640   35573 160001          LDA 1,I
0641   35574 010270          AND HFLAG      GET HFLAG BIT.
0642   35575 002003          SZA,RSS
0643   35576 127571          JMP HTEST,I    RETURN IF HFLAG BIT =0.
0644   35577 020270          XOR HFLAG      CLEAR HFLAG BIT.
0645   35600 070270          STA HFLAG
0646   35601 044507          ADB .-?MASK    SCRATCH IT.
0647   35602 017201          JSB SCRAT
0648   35603 127571          JMP HTEST,I    RETURN.
```

```
0002*
0003**
0004***     PROCESS OUTPUT CHARACTER
0005**
0006*
0007*    THE OUTCR ROUTINE SENDS CHARACTERS TO POC WHICH IN TURN
0008*    PLACES THEM IN THE USER'S BUFFER.  THE CALLING SEQUENCE
0009*    FOR OUTCR IS:
0010*
0011*              JSB OUTCR,I       A = CHARACTER TO BE OUTPUT
0012*
0013*    THE CALLING SEQUENCE FOR POC IS:
0014*
0015*              JSB POCR,I        A = CHARACTER TO BE OUTPUT
0016*                                B = TTY TABLE ADDRESS
0017*
0018*    POC HANDLES THE FOLLOWING TWO SPECIAL CASES:
0019*         1) STATUS IS INPUT - THE USER'S STATUS IS CHANGED TO
0020*            OUTPUT AND A SYNCHRONIZING SIGNAL IS SENT TO THE
0021*            USER'S TELETYPE.
0022*
0023*         2) BUFFER IS FULL - THE USER IS PLACED IN OUTPUT WAIT
0024*            STATUS AND A TRANSFER IS MADE INTO THE SCHEDULER IN
0025*            ORDER TO DELETE THE USER FROM THE QUEUE.
0026*

0028  35604 000000  POC   NOP
0029  35605 103100        CLF 0           TURN OFF INTERRUPT SYSTEM
0030  35606 010626        AND B177        MASK CHARACTER TO
0031  35607 073745        STA OCHAR         7 BITS AND SAVE
0032  35610 077744        STB OTNUM       SAVE TTY TABLE POINTER
0033  35611 044535        ADB .+?TSTA
0034  35612 160001        LDA B,I         IS USER IN
0035  35613 010527        AND IOBT          OUTPUT MODE?
0036  35614 002002        SZA
0037  35615 017667        JSB OINIT       NO - GO INITIALIZE FOR OUTPUT
0038  35616 067744        LDB OTNUM
0039  35617 044531        ADB .+?BSTR     B => BUFFER TAIL
0040  35620 160001        LDA B,I
0041  35621 002004        INA             A = LOCATION FOR THIS CHARACTER
0042  35622 044531        ADB .+?BEND-?BSTR
0043  35623 150001        CPA B,I         IF A => BEYOND END OF BUFFER,
0044  35624 040364        ADA MBLEN
0045  35625 044523        ADB .+?BSTR-?BEND
0046  35626 170001        STA B,I         SET NEW POINTER VALUE
0047  35627 064000        LDB A           B = CHARACTER ADDRESS
0048  35630 004065        CLE,ERB         B = WORD ADDRESS
0049  35631 160001        LDA B,I         A = DESTINATION WORD
0050  35632 002041        SEZ,RSS         IF HIGH CHARACTER,
0051  35633 001727        ALF,ALF           ROTATE TO BOTTOM
0052  35634 010451        AND HIMSK       CLEAR LOWER 8 BITS
0053  35635 033745        IOR OCHAR       MERGE WITH NEW CHARACTER
0054  35636 002041        SEZ,RSS         IF HIGH CHARACTER,
0055  35637 001727        ALF,ALF           ROTATE BACK
0056  35640 170001        STA B,I         STORE BACK IN BUFFER
0057  35641 067744        LDB OTNUM
```

```
0058  35642 006004          INB
0059  35643 003400          CCA             INCREMENT
0060  35644 140001          ADA B,I           CHARACTER
0061  35645 170001          STA B,I             COUNT
0062  35646 050366          CPA MAXBL       IS BUFFER FULL?
0063  35647 027652          JMP OBF         YES
0064  35650 102100          STF 0           NO - TURN ON INTERRUPT SYSTEM
0065  35651 127604          JMP POC,I       RETURN
0066*
0067*     OUTPUT BUFFER FULL
0068*
0069  35652 044557  OBF     ADB .+?STAT-?CCNT
0070  35653 160001          LDA B,I         A = USER'S SYSTEM STATUS
0071  35654 002020          SSA             IF USER ABORTED, GO
0072  35655 027555          JMP SUSP          DIRECTLY TO SUSPEND
0073  35656 044530          ADB .+?PLEV-?STAT  MOVE STATUS
0074  35657 170001          STA B,I              TO PLEV AND
0075  35660 044524          ADB .+?STAT-?PLEV      SET STATUS TO
0076  35661 060531          LDA %OUTW                OUTPUT WAIT
0077  35662 170001          STA B,I
0078  35663 063604          LDA POC           SET
0079  35664 044525          ADB .+?RSTR-?STAT  RETURN
0080  35665 170001          STA B,I              ADDRESS
0081  35666 027555          JMP SUSP

0083*
0084**    OUTPUT INITIALIZATION ROUTINE
0085*
0086  35667 000000  OINIT   NOP
0087  35670 120001          XOR B,I         REMOVE 'INPUT MODE' BIT
0088  35671 170001          STA B,I
0089  35672 044520          ADB .+?CCNT-?TSTA
0090  35673 002400          CLA             SET CHARACTER
0091  35674 170001          STA B,I           COUNT TO ZERO
0092  35675 044532          ADB .+?BGIN-?CCNT
0093  35676 160001          LDA B,I         A = POINTER TO BUFFER HEAD
0094  35677 044523          ADB .+?BPNT-?BGIN
0095  35700 170001          STA B,I         RESET ALL BUFFER
0096  35701 006004          INB
0097  35702 170001          STA B,I           POINTERS TO BEGINNING
0098  35703 006004          INB
0099  35704 170001          STA B,I             OF USER'S BUFFER
0100  35705 044531          ADB .+?TSTA-?BHED
0101  35706 160001          LDA B,I         A = USER'S I/O STATUS
0102  35707 030530          IOR NIBT        IS PORT SETUP
0103  35710 150001          CPA B,I           FOR OUTPUT?
0104  35711 027720          JMP OINT1       YES
0105  35712 170001          STA B,I         NO - SET 'NO INPUT ALLOWED' BIT
0106  35713 044533          ADB .+?RPRM-?TSTA
0107  35714 160001          LDA B,I
0108  35715 011172          AND NECHO       MAKE SURE
0109  35716 167744          LDB OTNUM,I       USER'S ECHO
0110  35717 114355          JSB MUXR,I          IS TURNED OFF
0111  35720 067744  OINT1   LDB OTNUM
0112  35721 044537          ADB .+?CDLY     GET CARRIAGE
0113  35722 160001          LDA B,I           RETURN DELAY
```

```
0114  35723 002004          INA                 IF ANY
0115  35724 002021          SSA,RSS
0116  35725 027740          JMP OINT2       NO DELAY
0117  35726 044525          ADB .+?DCNT-?CDLY
0118  35727 170001          STA B,I         STORE DELAY
0119  35730 003400          CCA               AND INCREMENT
0120  35731 044517          ADB .+?CCNT-?DCNT  CHARACTER
0121  35732 170001          STA B,I             COUNT
0122  35733 006004          INB
0123  35734 160001          LDA B,I         A = CHARACTER POINTER
0124  35735 002004          INA             INCREMENT
0125  35736 006004          INB               CHARACTER
0126  35737 170001          STA B,I             POINTER
0127  35740 060360  OINT2 LDA SYNCC       GET SYNC CHARACTER
0128  35741 167744          LDB OTNUM,I       AND PORT#
0129  35742 114355          JSB MUXR,I      OUTPUT THEM
0130  35743 127667          JMP OINIT,I


0132  35744 000000  OTNUM BSS 1
0133  35745 000000  OCHAR BSS 1
```

```
0135*  COMMAND TABLE -- THIS TABLE CONSISTS OF 2 PARTS. PART 1 CONTAINS
0136*  THE ENCODED SYMBOLIC COMMANDS. THESE ARE CODED AS 3 BYTES, EACH
0137*  BYTE BEING OF LENGTH 5 BITS AND OF VALUE 101(OCTAL) LESS THAN THE
0138* OCTAL VALUE OF THE CHARACTER. THE THREE BYTES ARE IN BIT POSI-
0139*  TIONS 14-10,9-5, AND 4-0, RESPECTIVELY. BIT 15 IS SET TO 1 FOR
0140*  COMMANDS THAT ARE LEGAL FOR THE SYSTEM CONSOLE.
0141*
0142*  PART 1 IS ITSELF DIVIDED INTO 3 SECTIONS. COMMANDS IN SECTION 1
0143*  ARE THOSE COMMANDS WHICH ARE HANDLED IMMEDIATELY BY THE EXECUTIVE
0144*  WITHOUT ANY DISC ACCESS. THOSE IN SECTION 2 ARE COMPILER COMMANDS
0145*  WHICH ARE RESIDENT BUT WHICH REQUIRE THE PROGRAM TO BE LOADED
0146*  FROM DISC. COMMANDS IN SECTION 3 ARE SYSTEM COMMANDS WHICH ARE
0147*  DISC RESIDENT. ALL SYSTEM COMMANDS ARE OF THIS TYPE AND
0148* MUST BE LOCATED AFTER COM4.
0149*
0150*  PART 2 OF THE COMMAND TABLE CONTAINS THE CORE STARTING ADDRESSES
0151* FOR THOSE COMMANDS IN SECTIONS 1 AND 2, AND THE DISC ADDRESSES OF
0152*  THOSE IN SECTION 3.
0153*
0154*  PART I
0155*
0156*  SECTION I
0157*
0158  35746 044121  COM1   OCT 44121      SCRATCH
0159  35746         SCR    EQU COM1
0160  35747 046017         OCT 46017      TAPE
0161  35750 024230         OCT 24230      KEY
0162*
0163*  SECTION II
0164*
0165  35751 043215  COM2   OCT 43215      RUN
0166  35752 026422  LIS    OCT 26422      LIST
0167  35753 037215  PUN    OCT 37215      PUNCH
0168  35754 056764  XPUN   OCT 56764      XPUNCH
0169  35755 177777  CTAPR  OCT -1         USED FOR TAPE ERROR PRINTOUT.
0170*
0171*  SECTION III
0172*
0173  35756 177777  COM3   OCT -1         FOR LENGTH SECTION
0174  35757 177777         OCT -1         FOR FUSS TABLE.
0175  35760 177777         OCT -1         FOR FILES.
0176  35761 177777  COMCH  OCT -1         FOR CHAIN
0177  35762 044025  SAVE   OCT 44025
0178  35763 177777  SAVO   OCT -1         SAVE OVERLAY
0179  35764 014223         OCT 14223      GET
0180  35765 000757         OCT 757        APPEND
0181  35766 016213  HELLO  OCT 16213      HELLO
0182  35767 177777         OCT -1         HELLO OVERLAY
0183  35770 003404  BYE    OCT 3404       BYE
0184  35771 024413         OCT 24413      KILL
0185  35772 042215         OCT 42215      RENUMBER
0186  35773 032014         OCT 32014      NAME
0187  35774 004023  CAT    OCT 4023       CATALOG
0188  35775 026401  LIBRY  OCT 26401
0189  35776 006213         OCT  6213      DELETE
0190  35777 046414         OCT 46414      TIME
```

```
0191  36000 006422         OCT 6422       DISC (USER DISC SPACE)
0192  36001 030222         OCT 30222      MESSAGE
0193  36002 037056         OCT 37056      PROTECT
0194  36003 050657         OCT 50657      UNPROTECT
0195  36004 034744         OCT 34744      OPEN
0196  36005 177777         OCT -1         OPEN OVERLAY
0197  36006 026215         OCT 26215      LENGTH
0198  36007 010107         OCT 10107      ECHO
0199  36010 142217  COM4   OCT 142217     REPORT
0200  36011 106421         OCT 106421     DIRECTORY
0201  36012 142722  ROS    OCT 142722     ROSTER
0202  36013 142222         OCT 142222     RESET
0203  36014 144744         OCT 144744     SPEED
0204  36015 136721         OCT 136721     PORT
0205  36016 104340         OCT 104340     CHANGE
0206  36017 100655         OCT 100655     ANNOUNCE
0207  36020 144544         OCT 144544     SLEEP
0208  36021 177777         OCT -1           PLUS
0209  36022 177777         OCT -1              OVERLAYS
0210  36023 132226         OCT 132226     NEWID
0211  36024 124413         OCT 124413,-1  KILLID
0212  36026 130725         OCT 130725     MOVE
0213  36027 177777         OCT -1         MOVE OVERLAY
0214  36030 177777         OCT -1       2ND MOVE OVERLAY
0215  36031 137221         OCT 137221,-1  PURGE
0216  36033 136356         OCT 136356     PHONES
0217  36034 106422  DISCC  OCT 106422,-1  DISC
0218*
0219  36036 177777  START  OCT -1         SYSTEM START UP
0220  36037 177777         OCT -1         AUTO RESTART
0221  36040 177777         OCT -1         TO SAVE LIBR. ROUTINE CODE
0222*
0223*
0224*
0225*  PART II -- STARTING ADDRESSES
0226*
0227  36041 035176  COM5   DEF #SCR
0228  36042 035213         DEF #TAP
0229  36043 035026         DEF SCH20      KEY
0230*
0231  36044 016546         DEF CMPLE
0232  36045 024771         DEF LIST
0233  36046 024770         DEF PUNCH
0234  36047 024766         DEF XPNCH
0235  36050 024350         DEF TAPER
0236*
0237*  DISC ADDRESSES -- TO BE FILLED BY THE LOADER.
0238*
0239  36051 000000  COM6   BSS COM5-COM3
0240  36053         FILIB  EQU COM6+2     FILES DISC ADDRESS.
0241  36054         CHLIB  EQU COM6-COM3+COMCH    CHAIN DISC ADDRESS
0242  36131         TSBLB  EQU COM6-COM3+START   START UP ADDR.
0243*
0244  36132         RSLIB  EQU COM6-COM3+START+1   AUTO RESTART ADDR.
0245*
0246  36133         SWLIB  EQU COM6-COM3+START+2   SAVE LIBRARY ADDR.
```

```
0247*
0248  36134 000000  DSERA BSS 6          DISC ADDRESSES FOR ERROR MESS. X
0249  36142 000000  LOGGR BSS 32
```

```
0251* DLOOK SEARCHES THE DISC DIRECTORY FOR A PARTICULAR ENTRY. THE
0252* DESIRED ENTRY IS DEFINED BY LTEMP(0:3).
0253*
0254* IF THE ENTRY IS FOUND, DLOOK RETURNS TO P+1. THE FOLLOWING VARIA-
0255* BLES ARE SET:
0256*     (LTEMP+4)=POINTER TO DIREC ENTRY.
0257*     (LTEMP+5)=MEMORY ADDRESS OF ENTRY.
0258* THE APPROPRIATE DIRECTORY TRACK IS IN CORE.
0259*
0260* IF THE ENTRY IS NOT FOUND, DLOOK RETURNS TO P+2. THE POINTERS
0261* ARE SET TO POINT AT THE LAST ENTRY LESS THAN THE GIVEN ENTRY.

0263  36202 000000  DLOOK NOP             ENTRY POINT.
0264  36203 064024        LDB LTEMP+4     LOAD DIRECTORY POINTER
0265  36204 060424        LDA LIBD        INITIALIZE
0266  36205 040516        ADA .-8           MEMORY
0267  36206 070025        STA LTEMP+5         ADDRESS
0268  36207 060020        LDA LTEMP     CHECK IF SEARCH                  X]
0269  36210 002021        SSA,RSS       A GIVEN TRACKCH                  X]
0270  36211 064336        LDB DIRD3                                      X]
0271  36212 074024  DLOK3 STB LTEMP+4     DIRECTORY TRACK.
0272  36213 160024        LDA LTEMP+4,I   TEST FOR EMPTY TRACK.
0273  36214 002002        SZA
0274  36215 026221        JMP DLOK1       NOT EMPTY.
0275  36216 064024  DLOK2 LDB LTEMP+4     BUMP BACK TO
0276  36217 044517        ADB .-7         NEXT TRACK.
0277  36220 026212        JMP DLOK3
0278  36221 006004  DLOK1 INB             COMPARE FIRST TRACK ENTRY
0279  36222 060323        LDA DLTEM       TO DESIRED ENTRY.
0280  36223 016471        JSB DIRCM
0281  36224 026266        JMP DL.2      NOT ON THIS TRACK                X]
0282  36225 000000         NOP          FOUND THE RIGHT TRACK.
0283  36226 160024        LDA LTEMP+4,I
0284*                                                                    B]
0285  36227 003004        CMA,INA         SET UP INITIAL POINTER FOR
0286  36230 040424        ADA LIBD        TRACK SCAN.
0287  36231 040516        ADA .-8
0288  36232 070025        STA LTEMP+5
0289  36233 060024        LDA LTEMP+4   GET DIRECTORY
0290  36234 040534        ADA .+6       DISK ADDRESS.
0291  36235 160000        LDA 0,I
0292  36236 052327        CPA DIRWD       CHECK FOR THIS TRACK IN CORE.
0293  36237 026256        JMP DLOK4     TRACK ALREADY IN CORE.
0294  36240 062327        LDA DIRWD       CHECK FOR DIR. TRACK IN CORE.
0295  36241 002003        SZA,RSS       SKIP IF SO.
0296  36242 026245        JMP DLOKB     OTHERWISE, JUST READ IN NEW TRACK
0297  36243 064424        LDB LIBD      OUTGOING CORE ADDRESS.
0298  36244 016625        JSB DISCL     WRITE PREVIOUS TRACK OUT
0299  36245         DLOKB EQU *
0300  36245 002400        CLA             CLEAR TRACK
0301  36246 072327        STA DIRWD         INDICATOR
0302  36247 160024        LDA LTEMP+4,I SET UP DISC                      B]
0303  36250 070065        STA WORD          TRANSFER LENGTH              B]
0304  36251 060024        LDA LTEMP+4     GET DIRECTORY
0305  36252 040534        ADA .+6          DISC ADDRESS.
0306  36253 160000        LDA 0,I
```

```
0307  36254 064425          LDB LIBDI
0308  36255 016625          JSB DISCL      READ DIRECTORY.
0309* NOW SEARCH DIRECTORY FOR DESIRED ENTRY. A BINARY SEARCH IS USED.
0310* WITH LTEMP(14:15) USED AS POINTERS TO THE FIRST AND LAST OF ALL
0311* UNTESTED ENTRIES.
0312*
0313  36256 060424  DLOK4 LDA LIBD       SET POINTER TO BEGINNING OF
0314  36257 070036        STA LTEMP+14    DIRECTORY.
0315  36260 060323        LDA DLTEM      TEST LAST ENTRY IN TRACK.
0316  36261 064025        LDB LTEMP+5
0317  36262 016471        JSB DIRCM
0318  36263 026277        JMP DLOK5      LAST ENTRY TOO BIG--START CHOP.
0319  36264 002001        RSS            NO FOUND, TOO SMALL              X]
0320  36265 126202        JMP DLOOK,I    FOUND IT          L              X]
0321  36266 060020  DL.2  LDA LTEMP     CHECK IF 1 TRACK SEARCH            X]
0322  36267 002020        SSA                                             X]
0323  36270 026275        JMP DL.1       YES, FAIL EXIT                   X]
0324  36271 064024        LDB LTEMP+4    FULL CHECK                       X]
0325  36272 054334        CPB DIRD0      ARE WE DONE?                     X]
0326  36273 002001        RSS            YES                              X]
0327  36274 026216        JMP DLOK2      NO, NEXT RACK                    X]
0328  36275 036202  DL.1  ISZ DLOOK     FAILURE EXIT                     X]
0329  36276 126202        JMP DLOOK,I                                     X]
0330*
0331  36277 060025  DLOK5 LDA LTEMP+5    SET END POINTER.
0332  36300 070037        STA LTEMP+15
0333  36301 060036        LDA LTEMP+14   COMPUTE DIFFERENCE BETWEEN FIRST
0334  36302 003004  DLOK6 CMA,INA          AND LAST ENTRIES.
0335  36303 040037        ADA LTEMP+15
0336  36304 001100        ARS            DIVIDE BY TWO.
0337  36305 010516        AND .-8        ROUND TO A VALID MULTIPLE OF 8.
0338  36306 040036        ADA LTEMP+14   GET ADDRESS OF MIDDLE ENTRY.
0339  36307 070025        STA LTEMP+5    SET INTO RESULT LOCATION.
0340  36310 064323        LDB DLTEM      SETUP FOR JSB DIRCM.
0341  36311 050036        CPA LTEMP+14   TEST FOR ONLY 2 ENTRIES LEFT.
0342  36312 026322        JMP DLOK8      THERE ARE--WE'VE GOT THE RESULT.
0343*
0344  36313 016471        JSB DIRCM      TEST MIDWAY ENTRY.
0345  36314 026317        JMP DLOK7      TOO SMALL--GO RESET LTEMP(14).
0346  36315 026277        JMP DLOK5      TOO BIG--GO RESET LTEMP(15).
0347  36316 126202        JMP DLOOK,I    EQUAL--RETURN.
0348*
0349  36317 060025  DLOK7 LDA LTEMP+5    RESET LTEMP(14).
0350  36320 070036        STA LTEMP+14
0351  36321 026302        JMP DLOK6
0352*
0353  36322 050424  DLOK8 CPA LIBD       IF LTEMP(14)<>LTEMP, WE KNOW
0354  36323 016471        JSB DIRCM       IT'S LESS, SO WE SKIP TEST.
0355  36324 026266        JMP DL.2       NO ON THIS TRACK
0356  36325 000000        NOP
0357  36326 126202        JMP DLOOK,I    EQUAL TO ENTRY.
0358  36327 000000  DIRWD OCT 0          TELLS WHAT DIRECTORY TRACK
0359* T35CQ IS USED BY LIBRARY PROGRAMS TO SCAN THE TTY35 INPUT BUFFER.
0360* EACH TIME IT IS CALLED, IT FETCHES THE NEXT CHARACTER, BUT SKIPS
0361* BLANKS. THE CHARACTER IS LEFT IN T35LC, AND IN A. WHEN A RETURN IS
0362* ENCOUNTERED, T35CQ RETURNS TO P+1; OTHERWISE TO P+2. IT IS INITI-
```

```
0363* ALIZED BY THE MONITOR BEFORE THE LIBRARY ROUTINE IS CALLED.
0364*
0365  36330 000000  T35CQ NOP             ENTRY POINT.
0366  36331 060050        LDA T35LC       GET LAST CHARACTER.
0367  36332 050543        CPA .+15B       IF CR,
0368  36333 126330        JMP T35CQ,I      RETURN IMMEDIATELY.
0369  36334         T35C0 EQU *
0370  36334 064047        LDB T35CP       GET CHARACTER POINTER IN B+
0371  36335 004065        CLE,ERB          ADJUST.
0372  36336 160001        LDA 1,I         FETCH
0373  36337 002041        SEZ,RSS          CHAR.
0374  36340 001727        ALF,ALF
0375  36341 010626        AND B177
0376  36342 070050        STA T35LC       SAVE IT.
0377  36343 034047        ISZ T35CP       BUMP POINTER.
0378  36344 050543        CPA .+15B       IF CR.
0379  36345 126330        JMP T35CQ,I      RETURN IMMEDIATELY.
0380  36346 050566        CPA .+40B       IF BLANK,
0381  36347         T35C1 EQU *
0382  36347 026334        JMP T35C0       IGNORE
0383  36350 036330        ISZ T35CQ       OTHERWISE
0384  36351 126330        JMP T35CQ,I      RETURN NORMAL.
0385  36352 000000  MOVEW NOP             MOVES -B WORDS FROM MOVES,I TO
0386  36353 006025        SSB,INB,RSS      MOVED,I
0387  36354 126352        JMP MOVEW,I
0388  36355 160043        LDA MOVES,I     GET A WORD
0389  36356 170044        STA MOVED,I     STORE IT.
0390  36357 034043        ISZ MOVES       BUMP
0391  36360 034044        ISZ MOVED        POINTERS.
0392  36361 026353        JMP MOVEW+1     NO.
0393*
0394* RDPRG READS THE CURRENT USER INTO CORE.
0395*
0396  36362 000000  RDPRG NOP
0397  36363 064352        LDB MLINK+1     GET PROGRAM BOUND POINTER.
0398  36364 044514        ADB .+?PROG-?LINK
0399  36365 160001        LDA 1,I         GET PROGRAM BOUND
0400  36366 070051        STA PBPTR
0401  36367 003000        CMA             COMPUTE LENGTH.
0402  36370 041321        ADA USE
0403  36371 070065        STA WORD
0404  36372 044525        ADB .+?DISC-?PROG
0405  36373 160001        LDA 1,I         GET DISC ADDRESS.
0406  36374 006400        CLB             BLOCK
0407  36375 174401        STB DCLC1,I      SCHEDULER.
0408  36376 065322        LDB USEI        PERFORM
0409  36377 016625        JSB DISCL        TRANSFER.
0410  36400 160402        LDA DCLC2,I     UNBLOCK SCHEDULER.
0411  36401 170401        STA DCLC1,I
0412  36402 126362        JMP RDPRG,I     RETURN
0413*
0414* DATE COMPUTES A WORD CONTAINING THE YEAR IN ITS 7 HIGH ORDER BITS
0415* AND THE DAY IN ITS 9 LOW ORDER BITS.
0416*
0417  36403 000000  DATE  NOP
0418  36404 060041        LDA DATIM       GET HOUR OF YEAR.
```

```
0419  36405 006400          CLB             DIVIDE BY 24 TO
0420  36406 100400          DIV .+24         GET THE DAY.
0421  36410 100047          LSL 7           POSITION ON LEFT.
0422  36411 064040          LDB YEAR        POSITION THE YEAR
0423  36412 101047          LSR 7
0424  36413 126403          JMP DATE,I
0425*
0426*      FIND ID ENTRY IN ID TABLE
0427*        <P+1>: SUCCESS RETURN
0428*        <P+2>: FAIL RETURN
0429*        A: CORE ADDRESS OF ENTRY (SUCCESS)
0430*           OR FIRST ENTRY PAST THE REQUESTED ENTRY (FAIL)
0431*        IDTRA: POINTER TO TRACK ADDRESS
0432*        IDTLA: POINTER TO TRACK LENGTH
0433*
0434  36414 000000  FIDT    NOP
0435  36415 064424          LDB LIBD        SET POINTER
0436  36416 002400          CLA               AND COUNTER
0437  36417 070073          STA IDCNT           IN CASE NO ID'S
0438  36420 060171          LDA IDTTA       INITIALIZE
0439  36421 070071          STA IDTRA         TRACK ADDRESS
0440  36422 060176          LDA IDTRL         AND
0441  36423 070072          STA IDTLA         TRACK LENGTH
0442  36424         FIDT4   EQU *
0443  36424 160072          LDA IDTLA,I     LOAD TRACK LENGTH
0444  36425 002002          SZA             IF ZERO, GO BACK TO NEXT TRACK
0445  36426 026436          JMP FIDT1       #0. CHECK IT
0446  36427         FIDT2   EQU *
0447  36427 060171          LDA IDTTA       ALL
0448  36430 040531          ADA .+3           ID TRACKS
0449  36431 050071          CPA IDTRA           EMPTY?
0450  36432 026466          JMP FIDT3       YES
0451  36433 034071          ISZ IDTRA
0452  36434 034072          ISZ IDTLA
0453  36435 026424          JMP FIDT4
0454*
0455  36436 070065  FIDT1   STA WORD        READ ID TRACK
0456  36437 001121          ARS,ARS         DIVIDE LENGTH BY 8
0457  36440 001100          ARS               TO GET NUMBER OF ENTRIES
0458  36441 070073          STA IDCNT
0459  36442 160071          LDA IDTRA,I       FROM DISC
0460  36443 064425          LDB LIBDI
0461  36444 016625          JSB DISCL
0462  36445 064424          LDB LIBD
0463  36446 160424          LDA LIBD,I      LOAD 1ST ID
0464  36447 003004          CMA,INA           IS REQUESTED ID ON THIS
0465  36450 040045          ADA ID              TRACK?
0466  36451 002020          SSA
0467  36452 026427          JMP FIDT2       NO - TRY NEXT TRACK
0468  36453 064424          LDB LIBD        SET UP TO SCAN
0469  36454 060045          LDA ID            ID TABLE FOR ENTRY
0470  36455 003004          CMA,INA
0471  36456 070046          STA MID
0472  36457 160001  FIDT5   LDA B,I         LOAD ENTRY
0473  36460 040046          ADA MID           IS IT THE ONE WE'RE
0474  36461 002021          SSA,RSS           LOO KING FOR
```

```
0475   36462 026466          JMP FIDT3      FOUND THE SPOT
0476   36463 044536          ADB .+8        NOT THIS ONE - TRY NEXT ONE
0477   36464 034073          ISZ IDCNT      IF TABLE ALL DONE THEN ENTRY
0478*                                         BELONGS AT END
0479   36465 026457          JMP FIDT5
0480   36466 002002  FIDT3 SZA              DID WE FIND ENTRY?
0481   36467 036414          ISZ FIDT         NO - FAIL RETURN
0482   36470 126414          JMP FIDT,I
```

```
0484*
0485* DIRCM COMPARES THE 4 WORD ENTRIES POINTED TO BY A AND B.
0486* BIT 15 IS NOT USED. IT RETURNS AS FOLLOWS:
0487*     P+1: A<B
0488*     P+2: A>B
0489*     P+3 A=B
0490  36471 000000  DIRCM NOP
0491  36472 072403        STA DIRC2
0492  36473 060522        LDA .-4         SET COUNTER.
0493  36474 072414        STA DIRC1
0494  36475 076330        STB DIRC5
0495  36476 162330  DIRC3 LDA DIRC5,I     SUBTRACT WORD FROM B
0496  36477 001665        ELA,CLE,ERA
0497  36500 003004        CMA,INA         FROM WORD FROM A
0498  36501 166403        LDB DIRC2,I
0499  36502 005665        ELB,CLE,ERB
0500  36503 040001        ADA 1
0501  36504 002002        SZA             TEST FOR EQUAL.
0502  36505 026513        JMP DIRC4       NOT EQUAL-GO RETURN.
0503  36506 036330        ISZ DIRC5       BUMP
0504  36507 036403        ISZ DIRC2        POINTERS.
0505  36510 036414        ISZ DIRC1       TEST FOR FINISHED.
0506  36511 026476        JMP DIRC3
0507  36512 036471        ISZ DIRCM       DOUBLE ISZ FOR EQUAL.
0508  36513 002021  DIRC4 SSA,RSS
0509  36514 036471        ISZ DIRCM       ONE ISZ IF A>B
0510  36515 126471        JMP DIRCM,I      NONE IF A<B.
0511  36330         DIRC5 EQU T35CQ
0512  36414         DIRC1 EQU FIDT
0513  36403         DIRC2 EQU DATE
0514  36516 000000  LOUT  NOP       OUTPUT CHAR. IN A TO USERS TELETYPE.
0515  36517 064352        LDB MLINK+1
0516  36520 044473        ADB .-?LINK
0517  36521 114356        JSB POCR,I
0518  36522 126516        JMP LOUT,I
0519*
0520  36523 000000  LTYPR NOP             OUTPUT -A CHARS TO USER'S TTY;
0521  36524 072471        STA LTYP1   B POINTS TO BUFFER.
0522  36525 076414        STB LTYP2
0523  36526 162414  LTYP3 LDA LTYP2,I     GET FIRST
0524  36527 001727        ALF,ALF          CHARACTER OF WORD
0525  36530 016516        JSB LOUT          OUT.
0526  36531 036471        ISZ LTYP1       ANY MORE?
0527  36532 002001        RSS              YES
0528  36533 126523        JMP LTYPR,I     NO.
0529  36534 162414        LDA LTYP2,I     SEND 2ND
0530  36535 016516        JSB LOUT         CHAR.
0531  36536 036414        ISZ LTYP2       BUMP POINTER.
0532  36537 036471        ISZ LTYP1       ANY MORE?
0533  36540 026526        JMP LTYP3       YES
0534  36541 126523        JMP LTYPR,I
0535  36542 000000  LTYPE NOP             SAME AS LTYPR BUT WITH CRLF.
0536  36543 016523        JSB LTYPR
0537  36544 060524        LDA .-2
0538  36545 064423        LDB ?ABP2
0539  36546 016523        JSB LTYPR
```

```
0540   36547 126542          JMP LTYPE,I
0541   36471          LTYP1  EQU DIRCM
0542   36414          LTYP2  EQU FIDT
0543*
0544   36550 000000   LCHAR  NOP       GET NEXT INPUT CHAR.--SKIP RETURN
0545   36551 060337          LDA LCHCR    CHECK IF WE ARE AT CR CHARACTER
0546   36552 050543          CPA .+15B
0547   36553 126550          JMP LCHAR,I
0548   36554 064352          LDB MLINK+1   UNLESS CR, SKIP BLANKS.
0549   36555 044477          ADB .+?BHED-?LINK
0550   36556 076471          STB LTYP1
0551   36557 044530          ADB .+?BEND-?BHED  SET UP ENDOFBUFFER POINTER
0552   36560 076414          STB LTYP2
0553   36561 166471   LCHR1  LDB LTYP1,I   GET BUFFER POINTER
0554   36562 004065          CLE,ERB
0555   36563 160001          LDA 1,I       GET WORD.
0556   36564 002041          SEZ,RSS       ROTATE IF
0557   36565 001727          ALF,ALF        NECESSARY
0558   36566 010626          AND B177      MASK IT.
0559   36567 050543          CPA .+15B     RETURN IF
0560   36570 126550          JMP LCHAR,I    CR
0561   36571 166471          LDB LTYP1,I   GET BUFFER POINTER
0562   36572 006004          INB           BUMP TO NEXT CHAR.
0563   36573 156414          CPB LTYP2,I   IF END OF BUFFER,
0564   36574 044364          ADB MBLEN       MOVE TO START.
0565   36575 176471          STB LTYP1,I
0566   36576 070337          STA LCHCR    SET LAST CHARACTER FLAG
0567   36577 050566          CPA .+40B     SKIP
0568   36600          LCHR2  EQU *
0569   36600 026561          JMP LCHR1
0570   36601 036550          ISZ LCHAR
0571   36602 040454          ADA M96       TAPE
0572   36603 002021          SSA,RSS         CARE OF
0573   36604 040470          ADA M32           LOWER
0574   36605 041120          ADA .140              CASE
0575   36606 126550          JMP LCHAR,I
0576   36607 000000   T35SP  NOP           OUTPUT TO TT35 AND WAIT.
0577   36610 114324          JSB TTY35,I   FIRST OUTPUT.
0578   36611 103100          CLF 0
0579   36612 062607          LDA T35SP     MOVE RETURN ADDRESS
0580   36613 070404          STA T35RS     INTO TABLE.
0581   36614 060405          LDA T35ST     MOVE STATUS INTO PRIORITY
0582   36615 070407          STA T35PR
0583   36616 060531          LDA %OUTW     SET STATUS TO OUTWAIT.
0584   36617 070405          STA T35ST
0585   36620 126621          JMP *+1,I     GO HANG
0586   36621 035555          DEF SUSP
0587   36622 060540   LLEND  LDA .+12B
0588   36623 016516          JSB LOUT
0589   36624 124321          JMP SCHEN,I
0590   36625 000000   DISCL  NOP
0591   36626 114350          JSB DISC,I
0592   36627 060263          LDA ENDSK
0593   36630 002002          SZA
0594   36631 026627          JMP *-2
0595   36632 126625          JMP DISCL,I
```

```
0596  36633 000000  MOVEB NOP             MOVE BACKWARD -B WORDS FROM
0597  36634 006025        SSB,INB,RSS      MOVES TO MOVED.
0598  36635 126633        JMP MOVEB,I
0599  36636 160043        LDA MOVES,I
0600  36637 170044        STA MOVED,I
0601  36640 003400        CCA              UPDATE POINTERS.
0602  36641 040044        ADA MOVED
0603  36642 070044        STA MOVED
0604  36643 003400        CCA
0605  36644 040043        ADA MOVES
0606  36645 070043        STA MOVES
0607  36646 026634        JMP MOVEB+1
0608* LEND OUTPUTS A LINE FEED ON THE SYSTEM TELETYPE
0609* AND THEN TERMINATES THE PROGRAM.
0610  36647 060430  LEND  LDA ONEI         OUTPUT THE
0611  36650 064431        LDB DEH          LINE FEED.
0612  36651 114324  LEND2 JSB TTY35,I
0613  36652 103100  LENDR CLF 0
0614  36653 002400        CLA
0615  36654 070415        STA T35F2
0616  36655 124321        JMP SCHEN,I
0617*
0618* LFRER PRINTS AN ILLEGAL FORMAT MESSAGE ON THE SYSTEM
0619* TELETYPE AND THEN TERMINATES THE PROGRAM.
0620  36656 060537  LFRER LDA .+9
0621  36657 066661        LDB *+2
0622  36660 026651        JMP LEND2
0623  36661 036662  LFRDF DEF *+1
0624  36662 005111        OCT 5111
0625  36663 046114        ASC 4,LL FRMT
0001*
0002* GETID SCANS THE INPUT BUFFER FOR AN ID NUMBER. IF NOT FOUND, IT
0003* OUTPUTS A MESSAGE AND TERMINATES.
0004* IF FOUND, THE RESULT IS PLACED IN ID, -RESULT
0005* IN MID. IF THE FOLLOWING CHARACTER IS A CR, GETID SKIPS ON THE
0006* WAY BACK. IN ANY CASE, THE NEXT CHARACTER IS IN A.
0007* GETID USES LTEMP+12,13,14,15.
0008*
0009  00034         GETCH EQU LTEMP+12
0010  00035         GETI1 EQU LTEMP+13
0011  00036         GETI2 EQU LTEMP+14
0012  00037         GETI3 EQU LTEMP+15
0013  36667 000000  GETID NOP
0014  36670 060352        LDA MLINK+1      DETERMINE WHICH SCANNER TO USE
0015  36671 066750        LDB DLCHR        USE LCHAR IF USER TELETYPE,
0016  36672 050410        CPA T35LN          T35CH IF SYSTEM.
0017  36673 064341        LDB T35CH
0018  36674 074034        STB GETCH
0019  36675 114034        JSB GETCH,I      SCAN INPUT BUFFER FOR FIRST
0020  36676 026741        JMP GTFER         CHARACTER.
0021  36677 041122        ADA M133B        TEST FOR LETTER.
0022  36700 002021        SSA,RSS
0023  36701 026741        JMP GTFER
0024  36702 040560        ADA .+32B
0025  36703 002024        SSA,INA
0026  36704 026741        JMP GTFER
```

```
0027  36705 100032          ASL 10
0028  36706 070035          STA GETI1      SAVE FOR LATER.
0029  36707 060523          LDA .-3        SET DIGIT
0030  36710 070036          STA GETI2       COUNTER.
0031  36711 006400          CLB            SET NUMBER
0032  36712 074037  GETI4 STB GETI3        TO 0.
0033  36713 114034          JSB GETCH,I    GET NEXT CHAR.
0034  36714 026741          JMP GTFER      FAIL.
0035  36715 040462          ADA M72B       TEST FOR DIGIT
0036  36716 002021          SSA,RSS
0037  36717 026741          JMP GTFER      FAIL.
0038  36720 040540          ADA .+10
0039  36721 002020          SSA
0040  36722 026741          JMP GTFER      FAIL.
0041  36723 064037          LDB GETI3      GET PARTIAL VALUE.
0042  36724 005222          RBL,RBL        MULTIPLY BY 10.
0043  36725 044037          ADB GETI3
0044  36726 005200          RBL
0045  36727 044000          ADB 0          ADD IN NEW DIGIT.
0046  36730 034036          ISZ GETI2      TEST FOR DONE.
0047  36731 026712          JMP GETI4
0048  36732 044035          ADB GETI1      MERGE IN LETTER.
0049  36733 074045          STB ID
0050  36734 007004          CMB,INB
0051  36735 074046          STB MID
0052  36736 114034          JSB GETCH,I    GET NEXT CHARACTER.
0053  36737 036667          ISZ GETID      SKIP RETURN IF CR.
0054  36740 126667          JMP GETID,I
0055*
0056  36741 060034  GTFER LDA GETCH       IF SYSTEM TELETYPE, PRINT
0057  36742 050341          CPA T35CH      ERROR MESSAGE THERE.
0058  36743 026656          JMP LFRER
0059  36744 060515  ILFER LDA .-9         OTHERWISE PRINT IT ON
0060  36745 066661          LDB LFRDF      USER TELETYPE.
0061  36746 016542  LIBER JSB LTYPE
0062  36747 124321          JMP SCHEN,I    TERMINATE.
0063  36750 036550  DLCHR DEF LCHAR
0064* THIS ROUTINE IS CALLED BY THE COMPILER WHEN IT WANTS TO EXECUTE
0065* A DISC ROUTINE. THE DISC TOUTINE IS ALWAYS EXECUTED WITH A PRIOTI-
0066* TY OF 0, AS ALL DISC ROUTINES ARE. THE CALLING SEQUENCE IS
0067*     JSB SCHLB,I
0068*     DEF <DISC ADDRESS OF ROUTINE>
0069*     <PARAMETERS IF DESIRED>
0070*     <RETURN>
0071*
0072  36751 000000  SCHLQ NOP
0073  36752 103100          CLF 0
0074  36753 064352          LDB MLINK+1
0075  36754 044512          ADB .-?LINK+?MASK
0076  36755 060265          LDA MPCOM      SUSPEND
0077  36756 110001          AND 1,I          IF HE TRIED
0078  36757 002002          SZA     TO ABORT
0079  36760 126621          JMP LLEND-1,I
0080  36761 044516          ADB .-?MASK+?TSTA
0081  36762 160001          LDA 1,I        SET UNABLE
0082  36763 031002          IOR UNABT        TO ABORT
```

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0083  36764 170001          STA 1,I          BIT
0084  36765 044553          ADB .-?TSTA+?PLEV
0085  36766 002400          CLA
0086  36767 070264          STA TIMEF      NO TIMING.
0087  36770 170001          STA 1,I        SET PRIORITY TO 0
0088  36771 044524          ADB .+?STAT-?PLEV SET STATUS TO SYNTAX
0089  36772 060532          LDA %SYNT       SO SCHEDULER DOESN'T KNOW
0090  36773 170001          STA 1,I         WHAT WE'RE DOING.
0091  36774 044515          ADB .+?PROG-?STAT
0092  36775 060051          LDA PBPTR      SET PBPTR IN TABLE.
0093  36776 170001          STA 1,I
0094  36777 003000          CMA            SET UP DISC
0095  37000 041321          ADA USE         PARAMETERS.
0096  37001 070065          STA WORD
0097  37002 044525          ADB .+?DISC-?PROG
0098  37003 160001          LDA 1,I
0099  37004 065321          LDB USE        OUTPUT USER TO
0100  37005 016625          JSB DISCL       DISC.
0101  37006 162751          LDA SCHLQ,I    GET DISC ADDRESS.
0102  37007 036751          ISZ SCHLQ
0103  37010 050262          CPA LIB        IF IN CORE, TRANSFER DIRECT.
0104  37011 027300          JMP LIBRA
0105  37012 070262          STA LIB        SET LIB.
0106  37013 160000          LDA 0,I
0107  37014 064451          LDB M256       SET UP DISC TRANSFER.
0108  37015 074065          STB WORD
0109  37016 064317          LDB #LIBI
0110  37017 016625          JSB DISCL
0111  37020 027300          JMP LIBRA
0112*
0113* PROGRAM ALWAYS RETURNS HERE.
0114*
0115  37021 103100  SCHBL CLF 0
0116  37022 064352          LDB MLINK+1    SET PRIORITY AND STATUS
0117  37023 006004          INB            AGAIN.
0118  37024 134001          ISZ 1,I        PRIORITY=1.
0119  37025 034264          ISZ TIMEF      SET FLAG FOR TIMING.
0120  37026 044524          ADB .-2
0121  37027 134001          ISZ 1,I        TRUE STATUS IS RUN.
0122  37030 102100          STF 0
0123  37031 126751          JMP SCHLQ,I
0124  37032 037033  HELK   DEF *+1
0125  37033 005111          OCT 5111
0126  37034 046114          ASC 5,LL ACCESS
0127  37041 037042  HELH   DEF *+1
0128  37042 005116          OCT 5116
0129  37043 047440          ASC 6,0 TIME LEFT
0130*
0131*     THIS SUBROUTINE INSERTS A USER INTO THE QUEUE IN ORDER OF HIS
0132*     PRIORITY. WHEN WE ARRIVE HERE, THE B REGISTER POINTS TO THE LI
0133*     WORD FOR THE USER.
0134*
0135  37051 000000  INSEQ NOP
0136  37052 074056          STB SCHL       SAVE LINK ADDRESS IN SCHL
0137  37053 006004          INB            B=> USERS PRIORITY
0138  37054 160001          LDA 1,I        A=PRIORITY
```

```
0139  37055 003000          CMA           STORE -1-PRIORITY
0140  37056 070063          STA SCHPR       IN SCHPR.
0141  37057 064351          LDB MLINK     B=> PHONY USER.
0142  37060 074061  SCH2    STB SCHP      SAVE SCHP.
0143  37061 164001          LDB 1,I       B POINTS TO NEXT USER.
0144  37062 060001          LDA 1         GET PRIORITY
0145  37063 002004          INA            THAT USER IN
0146  37064 160000          LDA 0,I       A.
0147  37065 040063           ADA SCHPR    COPMPARE WITH PRIORITY
0148  37066 002020          SSA           OF USER BEING INSERTED.
0149  37067 027060          JMP SCH2      IF >= GO TO LINK TO NEXT ENTRY.
0150  37070 174056          STB SCHL,I    SET NEW ENTRY TO POINT TO HIM.
0151  37071 060056          LDA SCHL
0152  37072 170061          STA SCHP,I    SET PREVIOUS ENTRY => NEW ENTRY
0153  37073 040523          ADA .+?CLOC-?LINK     SET NEW USERS CLOCK TO -1
0154  37074 064514          LDB .-10
0155  37075 174000          STB 0,I
0156  37076 127051          JMP INSEQ,I
0157*
0158*  CHECK IF THE PROGRAM WHICH HAS JUST BEEN LOADED FROM THE USER
0159*  LIBRARY IS SEMI-COMPILED, AND SET THE NECESSARY COMPILER
0160*  VARIABLES.  LIBSC, LIBSP, AND LIBPB ARE PASSED TO THIS ROUTINE
0161*  FROM THE LIBRARY ROUTINE WHICH CALLS IT (CHAIN, GET, OR HELLO)
0162*
0163  37077 000000  SEMIC NOP
0164  37100 103100          CLF 0
0165  37101 002400          CLA           NO--CLEAR OUT-OF-
0166  37102 071641          STA SYMTB       STORAGE FLAG
0167  37103 060035          LDA LIBPB     SET LENGTH
0168  37104 070051          STA PBPTR       POINTER
0169  37105 064352          LDB MLINK+1   SET
0170  37106 044512          ADB .-?LINK+?MASK  SET TO              X]
0171  37107 160001          LDA 1,I              UNCOMPILED MODE   X]
0172  37110 003000          CMA                                    X]
0173  37111 010053          AND CFLAG                              X]
0174  37112 070053          STA CFLAG                              X]
0175  37113 044507          ADB .-?MASK                                  [X]
0176  37114 074261          STB MAIN        MAIN
0177  37115 064031          LDB LIBSP     SET START-OF-
0178  37116 075643          STB SPROG       PROGRAM POINTER
0179  37117 102100          STF 0
0180  37120 127077          JMP SEMIC,I
0181  00035         LIBPB EQU LTEMP+13  END OF PROGRAM POINTER (PBPTR) .
0182  00031         LIBSP EQU LTEMP+9   START OF PROGRAM POINTER
0183*
0184*
0185*     FIND SPACE ON DISC
0186*
0187*     THE ID IS IN LTEMP
0188*     ADT EL LENGTH IS IN LTEMP+9
0189*     THE NUMBER OF SECOTRS REQUIRED IS IN LTEMP+13
0190*     THE DISC ADDRES S POINTER IS IN LTEMP+8
0191*     THE DISC ADDRESS IS IN LTEMP+6
0192*     THE DISC SPACE LEFT IS IN LTEMP+12
0193*
0194*
```

```
0195  37121 000000  FDISC NOP
0196  37122 060204        LDA ADLEN     READ ADT TABLE INTO CORE
0197  37123 070065        STA WORD
0198  37124 060203        LDA ADLOC
0199  37125 064425        LDB LIBDI
0200  37126 016625        JSB DISCL
0201  37127 060204        LDA ADLEN     GET ADT LENGTH
0202  37130 001100        ARS           DETERMINE ENTRY COUNT
0203  37131 070031        STA LTEMP+9   SAVE SOUNT
0204  37132 064424        LDB LIBD      LOAD ADT ADDRESS
0205  37133 006004        INB           POINT TO FIRST LENGTH
0206  37134 160001  FD.1  LDA 1,I       LOAD LENGTH
0207  37135 040035        ADA LTEMP+13  ADD - REQUIRED LENGTH
0208  37136 002021        SSA,RSS       BIG ENOUGH?
0209  37137 027154        JMP FD.2      YES
0210  37140 044530        ADB .+2       NO - NEXT ENTRY
0211  37141 034031  FD.4   ISZ LTEMP+9   DONE?
0212  37142 027134        JMP FD.1      NO
0213*     NO ROOM LEFT
0214  37143 067146  FD.5  LDB *+3        LOAD ERROR MESSAGE
0215  37144 060514        LDA .-10
0216  37145 026746        JMP LIBER     OUTPUT ERROR MESSAGE
0217  37146 037147        DEF *+1
0218  37147 005117        OCT 5117
0219  37150 053105        ASC 4,VERLOAD
0220*
0221  37154 044525  FD.2   ADB .-1       GET DISC ADDRESS
0222  37155 074030        STB LTEMP+8   SAVE DISC ADDRESS POINTER
0223  37156 070034        STA LTEMP+12  SAVE DISC SPACE LEFT
0224  37157 160001        LDA 1,I       LOAD DISC ADDRESS
0225  37160 070026        STA LTEMP+6     & SAVE IT
0226  37161 060020        LDA LTEMP     IF ID=A000
0227  37162 051002        CPA A000      THEN IT IS OK
0228  37163 027170        JMP FD.3
0229  37164 060026        LDA LTEMP+6   LOAD DISC ADR.
0230  37165 011072        AND DHMSK     GET HEAD AND DISC DRIVE BITS
0231  37166 050615        CPA B100      JUST BIT 6?
0232  37167 002001        RSS           YES, SYSTEM DISC MAY NOT BE USED
0233  37170 127121  FD.3  JMP FDISC,I   OK - RETURN
0234  37171 044531        ADB .+3       GET NEXT ENTRY
0235  37172 027141        JMP FD.4
0236*
0237*
0238*
0239*     ROUTINE TO COMPUTE THE ADDRESS OF THE
0240*     BASE PAGE DIRECTORY ENTRY
0241*     FOR A GIVEN DISC
0242*
0243*     THE DISC ADDRESS IS IN LTEMP+6
0244*
0245*
0246  37173 000000  FDIRC NOP
0247  37174 006400        CLB
0248  37175 060026        LDA LTEMP+6   LOAD DISC ADDRESS
0249  37176 001200        RAL           GET DISC DRIVE
0250  37177 010527        AND .+1
```

```
0251   37200 100200          MPY .+28      MULTIPLY BY 28
0252   37202 070024          STA LTEMP+4   SAVE IT
0253   37203 060026          LDA LTEMP+6   GET HEAD BIT
0254   37204 010615          AND B100
0255   37205 101100          SWP           IN THE B REGISTER
0256   37206 006003          SZB,RSS       CARTRIDGE?
0257   37207 060544          LDA .+14      YES
0258   37210 040024          ADA LTEMP+4
0259   37211 040334          ADA DIRD0     ADD BASE ADDRESS
0260   37212 040535          ADA .+7       SECOND TRACK
0261   37213 070024          STA LTEMP+4   SAVE IT FOR DLLOK
0262   37214 070036          STA LTEMP+14  SAVE IT FOR SUPERSAVE
0263   37215 127173          JMP FDIRC,I   RETURN
0264*
0265*
0266*
0267   37216 037217  DIRHD   DEF *+1
0268   37217 005012          OCT 5012
0269   37220 020111          ASC 20, ID     NAME     DATE  SUB  TR/SEC    LEN
0270   37244 020106          ASC 2, FP
0271   37246 017400  DIRMS    OCT 17400
0272   37247 040060  DIRFS    ASC 1,@0
0273   37250 137672  DTABI    DEF DCNT,I
0274   37251 030057  DIR0S    ASC 1,0/
0275   37252 030040  DIR0B    ASC 1,0
0276   37253 017753  UPMS1    DEF UPMA1
0277   37254 037576  UPMS2    DEF UPAMS
0278   37255 037256  ILL      DEF *+1
0279   37256 005111           OCT 5111       LF-I
0280   37257 046114           ASC 4,LL. DISC
0281   37263 031477  PLDR2    DEF LDER2
0282   37264 031511  PLDR5    DEF LDER5
```

REMOVE

```
0284* THIS TABLE IS USED BY THE TSB PAPER TAPE LOADER, THE SLEEP
0285* ROUTINE, AND THE MAG TAPE LOADER. IT CONTAINS THE LENGTHS OF
0286* ALL THE REMAINING LIBRARY ROUTINES, AND ENABLES THE LOADER TO
0287* ALLOCATE THE MINIMUM NUMBER OF DISC SECTORS FOR EACH OF THEM.
0288* THE TABLE IS WRITTEN ON THE DISC AS THE FIRST LIBRARY ROUTINE.

0290  37300             ORG LIBRA
0291  37300 177707      ABS LIBRA-$SLPL
0292  37301 177600      DEC -128
0293  37302 177406      ABS LIBRA-$FLB
0294  37303 177441      ABS LIBRA-$CHN
0295  37304 177401      ABS LIBRA-$SAV
0296  37305 177406      ABS LIBRA-$$SAV     SAVE OVERLAY.
0297  37306 177562      ABS LIBRA-$GET
0298  37307 177453      ABS LIBRA-$APP
0299  37310 177404      ABS LIBRA-$HEL
0300  37311 177640      ABS LIBRA-$$HEL
0301  37312 177554      ABS LIBRA-$BYE
0302  37313 177412      ABS LIBRA-$KIL
0303  37314 177402      ABS LIBRA-$REN
0304  37315 177652      ABS LIBRA-$NAM
0305  37316 177535      ABS LIBRA-$CAT
0306  37317 177535      ABS LIBRA-$CAT
0307  37320 177650      ABS LIBRA-$DEL
0308  37321 177640      ABS LIBRA-$TIM
0309  37322 177662      ABS LIBRA-$UDIS
0310  37323 177666      ABS LIBRA-$MESS
0311  37324 177663      ABS LIBRA-$PRO
0312  37325 177663      ABS LIBRA-$PRO
0313  37326 177400      ABS LIBRA-$OPE
0314  37327 177670      ABS LIBRA-$$OPE
0315  37330 177716      ABS LIBRA-$LEN
0316  37331 177745      ABS LIBRA-$ECH
0317  37332 177523      ABS LIBRA-$REP
0318  37333 177400      ABS LIBRA-$DIR
0319  37334 177675      ABS LIBRA-$ROS                                  B]
0320  37335 177613      ABS LIBRA-$RES
0321  37336 177567      ABS LIBRA-$SPE
0322  37337 177676      ABS LIBRA-$POR
0323  37340 177626      ABS LIBRA-$CHA
0324*                                                                 B]
0325  37341 177605      ABS LIBRA-$ANN      ANNOUNCE              [X]
0326  37342 177400      ABS LIBRA-$SLE
0327  37343 177422      ABS LIBRA-$$SLE                  [X]
0328  37344 177466      ABS LIBRA-$$$SL                  [X]
0329  37345 177516      ABS LIBRA-$NEW
0330  37346 177400      ABS LIBRA-$KID
0331  37347 177421      ABS LIBRA-$$KID
0332  37350 177402      ABS LIBRA-$MOV
0333  37351 177401      ABS LIBRA-$$MOV     MOVE OVERLAY              [X
0334  37352 177641      ABS LIBRA-$$$MV
0335  37353 177400      ABS LIBRA-$PUR
0336  37354 177525      ABS LIBRA-$$PUR
0337*                                                                 B]
0338  37355 177746      ABS LIBRA-$PHO
0339  37356 177400      ABS LIBRA-$DN       DISC DOWN COMMAND          X]
```

```
0340   37357 177443          ABS LIBRA-$UP       DISC UP COMMAND          X1
0341   37360 177675          ABS LIBRA-$TSB
0342   37361 177517          ABS LIBRA-$PFRS
0343   37362 177400          ABS LIBRA-$PFSW
0344                         REP 6
0345   37363 177400          DEC -256
0345   37364 177400          DEC -256
0345   37365 177400          DEC -256
0345   37366 177400          DEC -256
0345   37367 177400          DEC -256
0345   37370 177400          DEC -256
0346   37371           $SLPL EQU *
```

```
0348* THE FUSS TABLE CONTAINS AN 8 WORD ENTRY FOR EACH PORT.
0349* THERE ARE 4 ENTRIES FOR EACH 8 WORDS.  EACH FILE ENTRY
0350* REQUIRES 2 WORDS:
0351*      1. DISC ADDRESS OF THE FILE
0352*      2. LENGTH OF THE FILE IN SECTORS (BIT 15=1 IF READ ONLY)
0353*
0354   37300                ORG LIBRA
0355                        REP 16
0356   37300 000000         OCT 0,0,0,0,0,0,0,0
0356   37310 000000         OCT 0,0,0,0,0,0,0,0
0356   37320 000000         OCT 0,0,0,0,0,0,0,0
0356   37330 000000         OCT 0,0,0,0,0,0,0,0
0356   37340 000000         OCT 0,0,0,0,0,0,0,0
0356   37350 000000         OCT 0,0,0,0,0,0,0,0
0356   37360 000000         OCT 0,0,0,0,0,0,0,0
0356   37370 000000         OCT 0,0,0,0,0,0,0,0
0356   37400 000000         OCT 0,0,0,0,0,0,0,0
0356   37410 000000         OCT 0,0,0,0,0,0,0,0
0356   37420 000000         OCT 0,0,0,0,0,0,0,0
0356   37430 000000         OCT 0,0,0,0,0,0,0,0
0356   37440 000000         OCT 0,0,0,0,0,0,0,0
0356   37450 000000         OCT 0,0,0,0,0,0,0,0
0356   37460 000000         OCT 0,0,0,0,0,0,0,0
0356   37470 000000         OCT 0,0,0,0,0,0,0,0
```

```
0358* THE FILES ROUTINE IS USED BY THE BASIC COMPILER TO PROCESS A FILES
0359* STATEMENT DURING PHASE II.  THE PURPOSE OF THE ROUTINE IS TO PRO-
0360* VIDE THE COMPILER WITH INFORMATION ABOUT THE REQUESTED FILES. THIS
0361* INFORMATION CONSISTS OF THE FILE DISC ADDRESS AND THE FILE LENGTH.
0362* THE COMPILER PASSES PARAMETERS TO THE FILES ROUTINE AS FOLLOWS:
0363*
0364*     VALTB=>LENGTH WORD OF FILES STATEMENT.
0365*     FILTB=>BEGINNING OF TABLE AREA FOR FILE INFO.
0366*     SCHLB,I=>FIRST POSSIBLE RETURN ADDRESS.
0367*
0368* THE CALLING SEQUENCE TO THE FILES ROUTINE IS AS FOLLOWS:
0369*
0370*     JSB SCHLB,I
0371*     DEF FILIB
0372*     <ERROR EXIT FOR BAD FORMAT IN FILES STATEMENT>
0373*     <ERROR EXIT IF A FILE IS UNACCESSIBLE>
0374*     <ERROR EXIT IF PROGRAM OVERFLOW>
0375*     <NORMAL EXIT>


0377  37300                ORG LIBRA
0378*
0379  37300 063671         LDA FILBP
0380  37301 070026         STA FLBUF      SAVE BUFFER POINTER.
0381  37302 070027         STA FLBFP
0382  37303 060521         LDA .-5        SET COUNTER FOR MAX NUMBER     X]
0383  37304 070030         STA FLBC1       OF FILES ALLOWED.
0384  37305 003400         CCA            SET POINTER TO
0385  37306 141642         ADA VALTB,I     LAST CHAR +1 OF
0386  37307 041642         ADA VALTB        FILES STATEMENT.
0387  37310 001200         RAL
0388  37311 070032         STA FLBP
0389  37312 061642         LDA VALTB      INITIALIZE POINTER TO
0390  37313 002004         INA
0391  37314 001000         ALS
0392  37315 070033         STA FLBCP       FILES STATEMENT.
0393*
0394  37316 060523  FLB1   LDA .-3        SET FILC2 TO SAY 3 WORDS
0395  37317 070031         STA FLBC2       ALLOWED.
0396  37320 002400         CLA
0397  37321 070021         STA FLBCM      CLEAR COMMA FLAG.
0398  37322 070020         STA FLB$
0399  37323 017634         JSB FLBCH      GET FIRST CHAR.
0400  37324 050572         CPA .+44B      TEST FOR DOLLAR SIGN.
0401  37325 027345         JMP FLB2
0402  37326 050566  FLB5   CPA .+40B      BETTER NOT BE A BLANK.
0403  37327 027411         JMP FLB81      FAIL IF IT IS
0404  37330 040020         ADA FLB$       PLACE $ FLAG ON FIRST CHAR.
0405  37331 001727  FLB3   ALF,ALF        POSITION ON LEFT
0406  37332 170026         STA FLBUF,I     AND STORE IN BUFFER.
0407  37333 017634         JSB FLBCH      GET RIGHT CHARACTER
0408  37334 130026         IOR FLBUF,I     AND PACK IN.
0409  37335 170026         STA FLBUF,I
0410  37336 034026         ISZ FLBUF      BUMP BUFFER POINTER.
0411  37337 017634         JSB FLBCH      GET NEXT CHARACTER.
0412  37340 034031         ISZ FLBC2      TEST FOR END OF FILE NAME.
```

```
0413  37341 027331         JMP FLB3
0414*
0415  37342 050566         CPA .+40B      IF END OF FILE NAME, CHAR MUST
0416  37343 027351         JMP FLB4        BE A BLANK.
0417  37344 027411         JMP FLB81      FAIL IF NOT
0418*
0419  37345 060627  FLB2     LDA B200      IF 1ST CHAR IS $, SET FIL$ TO
0420  37346 070020         STA FLB$      INDICATE LIBRARY FILE
0421  37347 017634         JSB FLBCH      GET NEXT CHAR.
0422  37350 027326         JMP FLB5
0423*
0424  37351 034030  FLB4     ISZ FLBC1     TEST FOR TOO MANY FILES.
0425  37352 002001         RSS
0426  37353 027411         JMP FLB81
0427  37354 060021         LDA FLBCM     TEST FOR ANY MORE REQUESTED.
0428  37355 002002         SZA
0429  37356 027316         JMP FLB1      YES IF COMMA WAS SEEN.
0430*
0431  37357 060030         LDA FLBC1     SET FILC1 TO EQUAL
0432  37360 040533         ADA .+5       -# OF FILES REQUESTED
0433  37361 003004         CMA,INA
0434  37362 070030         STA FLBC1
0435  37363 070031         STA FLBC2
0436*
0437  37364 036751         ISZ SCHLQ     BUMP RETURN ADDRESS SINCE WE'VE
0438  37365 060027         LDA FLBFP      NOW CHECKED FOR TYPE I ERRORS.
0439  37366 070026         STA FLBUF     SET POINTER TO BUFFER AGAIN.
0440*
0441  37367 060352         LDA MLINK+1   GET USER ID AND SAVE IT.
0442  37370 040515         ADA .+?ID-?LINK
0443  37371 160000         LDA 0,I
0444  37372 070034         STA FLBID
0445*
0446  37373 164026  FLB6     LDB FLBUF,I   GET FIRST WORD OF FILE NAME.
0447  37374 060034         LDA FLBID
0448  37375 006020         SSB           IF BIT 15 OF FIRST WORD IS SET,
0449  37376 061002         LDA A000       PERFORM SEARCH USING A000.
0450  37377 104400         DST LTEMP
0451  37401 034026         ISZ FLBUF     GET NEXT 2 WORDS ALSO.
0452  37402 104200         DLD FLBUF,I
0453  37404 104400         DST LTEMP+2
0454*
0455  37406 016202         JSB DLOOK     SEARCH FOR FILE.
0456  37407 027415         JMP FLB7      FOUND IT.
0457*
0458  37410 016362  FLB8     JSB RDPRG     IF FILE
0459  37411 002400  FLB81    CLA             NOT FOUND,
0460  37412 072327         STA DIRWD         RETURN TO
0461  37413 015423         JSB DCMPL           PROGRAM
0462  37414 027021         JMP SCHBL
0463*
0464  37415 060024  FLB7     LDA LTEMP+4   SET DIRWD
0465  37416 040534         ADA .+6
0466  37417 160000         LDA A,I         FOR DLOOK
0467  37420 072327         STA DIRWD
0468  37421 064025         LDB LTEMP+5   TEST TO SEE
```

```
0469  37422 044530          ADB .+2         IF THIS IS
0470  37423 160001          LDA 1,I          REALLY A
0471  37424 002021          SSA,RSS           FILE.
0472  37425 027410          JMP FLB8       FAIL IF NOT.
0473  37426 044525          ADB .-1        TEST FOR PROTECTED.
0474  37427 160001          LDA 1,I
0475  37430 002021          SSA,RSS
0476  37431 027436          JMP FLB9       NOT PROTECTED.
0477  37432 061002          LDA A000       IF PROTECTED, TEST FOR A000.
0478  37433 050034          CPA FLBID
0479  37434 002001          RSS
0480  37435 027410          JMP FLB8       PROTECTED FILE ACCESS--FAIL.
0481*
0482  37436 044533  FLB9    ADB .+5        NOW GET DISC ADDRESS AND LENGTH.
0483  37437 104200          DLD 1,I        STORE DISC ADDRESS
0484  37441 170026          STA FLBUF,I     IN BUFFER.
0485  37442 101027          ASR 7         CONVERT LENGTH TO              X]
0486  37443 007004          CMB,INB         POSITIVE SECTORS.
0487  37444 060034          LDA FLBID      TEST FOR USER REFERENCE TO
0488  37445 050020          CPA LTEMP       PUBLIC FILE.
0489  37446 002001          RSS
0490  37447 045163          ADB BIT15      SET BIT15 OF LENGTH IF IT IS.
0491  37450 034026          ISZ FLBUF      STORE IN
0492  37451 174026          STB FLBUF,I     BUFFER.
0493  37452 034026          ISZ FLBUF      BUMP BUFFER POINTER TO NEXT ENTR
0494  37453 016403          JSB DATE       GET DATE AND SET IN
0495  37454 064025          LDB LTEMP+5     PURGE LOCATION.
0496  37455 044533          ADB .+5
0497  37456 170001          STA 1,I
0498*
0499  37457 034030          ISZ FLBC1      TEST FOR ANY MORE FILES.
0500  37460 027373          JMP FLB6
0501*
0502* WE HAVE FOUND ALL THE FILES. WE NOW HAVE TO UPDATE THE FUSS TABLE.
0503* FIRST CHECK TO SEE IF THE PROGRAM HAS ROOM ENOUGH FOR THE TABLE.
0504*
0505  37461 062327          LDA DIRWD      WRITE
0506  37462 064424          LDB LIBD         DIRECTORY
0507  37463 016625          JSB DISCL           TO DISC
0508  37464 002400          CLA
0509  37465 072327          STA DIRWD
0510  37466 036751          ISZ SCHLQ      BUMP TO NEXT ERROR EXIT.
0511  37467 060031          LDA FLBC2      GET # OF FILES.
0512  37470 070030          STA FLBC1
0513  37471 003004          CMA,INA
0514  37472 100200          MPY .+7        COMPUTE NEW VALUE OF PBPTR.
0515  37474 040051          ADA PBPTR
0516  37475 003000          CMA
0517  37476 040654          ADA LWAUS      TEST FOR OVERFLOW.
0518  37477 002020          SSA
0519  37500 027410          JMP FLB8       FAIL--PROGRAM TOO LARGE.
0520*
0521  37501 036751          ISZ SCHLQ      BUMP TO NORMAL RETURN ADDRESS.
0522  37502 063667          LDA FL128         INPUT FUSS TABLE
0523  37503 070065          STA WORD
0524  37504 160331          LDA FUSS,I
```

```
0525  37505 064425          LDB LIBDI
0526  37506 016625          JSB DISCL
0527*
0528  37507 060352          LDA MLINK+1    DETERMINE USER #.
0529  37510 043666          ADA FLBSP
0530  37511 006400          CLB
0531  37512 100400          DIV .+TTY01-TTY00
0532  37514 001723          ALF,RAR        MULTIPLY USER# BY 8 AND
0533  37515 040424          ADA LIBD        ADD LIBD TO POINT AT USER'S
0534  37516 070035          STA FLBFS        SECTION OF FUSS.
0535  37517 070020          STA LTEMP
0536  37520 064516          LDB .-8        ZERO OUT USER'S SECTION.
0537  37521 002400          CLA
0538  37522 170020          STA LTEMP,I
0539  37523 034020          ISZ LTEMP
0540  37524 006006          INB,SZB
0541  37525 027522          JMP *-3
0542*
0543* NOW CHECK TO SEE IF ANY OF THE REQUESTED FILES ARE BEING USED BY
0544* ANOTHER USER. IF THEY ARE, WE ALLOW ONLY FILE READS BUT NO WRITES.
0545* IF THE USER IS A000, WE SKIP THE TEST.
0546*
0547  37526 034027          ISZ FLBFP
0548  37527 060034          LDA FLBID
0549  37530 013670          AND AMASK       IF USER IS A GROUP DON7T TEST
0550  37531 051002          CPA A000
0551  37532 027555          JMP FLB10
0552*
0553  37533 060027          LDA FLBFP      SET BUFFER POINTER.
0554  37534 070026          STA FLBUF
0555*
0556  37535 160026  FLB11 LDA FLBUF,I    GET DISC ADDRESS.
0557  37536 034026          ISZ FLBUF
0558  37537 064424          LDB LIBD       SET INITIAL POINTER TO FUSS.
0559  37540 150001  FLB14 CPA 1,I         TEST FOR THERE.
0560  37541 027546          JMP FLB12      IT IS.
0561  37542 044530          ADB .+2       BUMP POINTER                    XJ
0562  37543 054330          CPB L128         AND TEST FOR DONE
0563  37544 027551          JMP FLB13      NOT THERE.
0564  37545 027540          JMP FLB14
0565*
0566  37546 160026  FLB12 LDA FLBUF,I    SET DISC LENGTH TO SAY
0567  37547 031163          IOR BIT15       READ ONLY.
0568  37550 170026          STA FLBUF,I
0569*
0570  37551 034026  FLB13 ISZ FLBUF       BUMP BUFFER POINTER FOR
0571  37552 034026          ISZ FLBUF       NEXT FILE.
0572  37553 034030          ISZ FLBC1      TEST FOR ANY MORE
0573  37554 027535          JMP FLB11
0574*
0575* NOW UPDATE FUSS BY PLACING THE DISC ADDRESSES JUST REQUESTED
0576* INTO THE USER'S FUSS AREA.
0577*
0578  37555 060031  FLB10 LDA FLBC2     SET COUNTER
0579  37556 070030          STA FLBC1
0580  37557 060027          LDA FLBFP     GET POINTER TO FIRST ONE
```

```
0581  37560 070026         STA FLBUF                                    X]
0582  37561 104200  FLB15  DLD FLBUF,I  SET DISC ADDRESS               X]
0583  37563 104400         DST FLBFS,I  AND LENGTH INTO                 X]
0584  37565 034026         ISZ FLBUF    THE FUSS AREA                   X]
0585  37566 034026         ISZ FLBUF    THE FUSS AREA                   X]
0586  37567 034026         ISZ FLBUF
0587  37570 034035         ISZ FLBFS                                    X]
0588  37571 034035         ISZ FLBFS                                    X]
0589  37572 034030         ISZ FLBC1    ANY MORE?
0590  37573 027561         JMP FLB15    YES
0591*
0592  37574 160331         LDA FUSS,I    WRITE FUSS TABLE BACK TO
0593  37575 064424         LDB LIBD       DISC.
0594  37576 016625         JSB DISCL
0595*
0596  37577 016362         JSB RDPRG     READ IN USER'S PROGRAM AGAIN.
0597  37600 061603         LDA FILTB
0598  37601 071642         STA VALTB
0599  37602 104200  FLB16  DLD FLBFP,I   GET DISC INFO FOR ONE FILE.
0600  37604 175642         STB VALTB,I   STORE PHYSICAL LENGTH.
0601  37605 035642         ISZ VALTB
0602  37606 101100         SWP           GET PHYSICAL LENGTH IN A.
0603  37607 001665         ELA,CLE,ERA   REMOVE BIT 15.
0604  37610 040524         ADA .-2       COMPUTE RELATIVE LAST
0605  37611 002016         SLA,INA,SZA    LOGICAL SECTOR ADDRESS.
0606  37612 040525         ADA .-1
0607  37613 040001         ADA 1         COMPUTE ABSOLUTE ADDRESS
0608  37614 171642         STA VALTB,I   STORE IN TABLE.
0609  37615 035642         ISZ VALTB
0610  37616 035642         ISZ VALTB
0611  37617 175642         STB VALTB,I   STORE DISC ADDRESS
0612  37620 061642         LDA VALTB     BUMP POINTERS.
0613  37621 040532         ADA .+4
0614  37622 071642         STA VALTB
0615  37623 070051         STA PBPTR
0616  37624 060027         LDA FLBFP
0617  37625 040531         ADA .+3
0618  37626 070027         STA FLBFP
0619  37627 034031         ISZ FLBC2     TEST FOR ANY MORE.
0620  37630 027602         JMP FLB16
0621  37631 002400         CLA           NO DIRECTORY
0622  37632 072327         STA DIRWD       IN CORE
0623*
0624  37633 027021         JMP SCHBL     NOW WE'RE ALL DONE.
0625*
0626* FLBCH GETS THE NEXT CHARACTER OUT OF THE FILES
0627* STATEMENT. IF FLBCM=1, IT ASSUMES A COMMA HAS BEEN
0628* SEEN AND RETURNS A BLANK. OTHERWISE IF THE CHARAC-
0629* TER IS A COMMA, IT SETS FLBCM AND RETURNS A BLANK.
0630* IT ALSO RETURNS BLANKS AT THE END OF THE CODE.
0631*
0632  37634 000000  FLBCH NOP
0633  37635 060566         LDA .+40B     RETURN BLANK IF
0634  37636 064021         LDB FLBCM     FLBCM IS SET.
0635  37637 006002         SZB
0636  37640 127634         JMP FLBCH,I
```

```
0637  37641 064033          LDB FLBCP      GET CHAR. POINTER.
0638  37642 006004          INB            OTHERWISE BUMP
0639  37643 054032          CPB FLBP        IF END OF STATEMENT,
0640  37644 127634          JMP FLBCH,I    RETURN A BLANK.
0641  37645 074033          STB FLBCP       POINTER.
0642  37646 004065          CLE,ERB        GET NEXT CHAR.
0643  37647 160001          LDA 1,I
0644  37650 002041          SEZ,RSS
0645  37651 001727          ALF,ALF        ROTATE IF NECESSARY.
0646  37652 010626          AND B177       MASK.
0647  37653 002003          SZA,RSS        SKIP 0'S.
0648  37654 027635          JMP FLBCH+1
0649  37655 040454          ADA M96       MAKE INTO
0650  37656 002021          SSA,RSS           UPPER
0651  37657 040470          ADA M32                CASE
0652  37660 041120          ADA .140
0653  37661 050602          CPA .+54B      TEST FOR COMMA.
0654  37662 002001          RSS
0655  37663 127634          JMP FLBCH,I    NOT A COMMA.
0656  37664 034021          ISZ FLBCM      IF COMMA, SET FLAG AND GO
0657  37665 027635          JMP FLBCH+1     RETURN A BLANK.
0658*
0659  00020           FLB$  EQU LTEMP
0660  00021           FLBCM EQU LTEMP+1
0661  00026           FLBUF EQU LTEMP+6
0662  00027           FLBFP EQU LTEMP+7
0663  00030           FLBC1 EQU LTEMP+8
0664  00031           FLBC2 EQU LTEMP+9
0665  00032           FLBP  EQU LTEMP+10
0666  00033           FLBCP EQU LTEMP+11
0667  00034           FLBID EQU LTEMP+12
0668  00035           FLBFS EQU LTEMP+13
0669  37666 144461    FLBSP ABS -TTY00-?LINK
0670  37667 177600    FL128 DEC -128
0671  37670 076000    AMASK OCT 76000
0672  37671 012253    FILBP DEF FILBF
0673  37672           $FLB  EQU *
```

```
0002* DHE CHAIN ROUTINE IS USED BY THE BASIC COMPILER TO PROCESS A CHAIN
0003* STATEMENT DURING PHASE III. THE PURPOSE OF THIS ROUTINE IS TO
0004* CHECK FOR THE REQUESTED PROGRAM ON THE USER'S PRIVATE LIBRARY OR
0005* ON THE PUBLIC LIBRARY (IF THE NAME IS PRECEDED BY A DOLLAR SIGN)
0006* IF THE PROGRAM IS FOUND IT IS LOADED AND COMPILATION IS BEGUN.
0007  37300                 ORG LIBRA
0008  37300 061601          LDA FCNTR     SET COUNTER TO
0009  37301 003000          CMA             1'S COMPLEMENT OF
0010  37302 071601          STA FCNTR         NUMBER OF FILES
0011  37303 061333          LDA FCORE     LOAD FIRST BUFFER ADDRESS
0012  37304 065603          LDB FILTB     LOAD POINTER TO
0013  37305 044530          ADB .+2         FIRST DISC ADDRESS
0014  37306 035601  CHN01   ISZ FCNTR     MORE FILES?
0015  37307 002001          RSS           YES
0016  37310 027321          JMP CHAN0     NO--FINISHED DUMPING BUFFERS
0017  37311 075337          STB FBASE     WRITE
0018  37312 071704          STA RQ3         OUT
0019  37313 015615          JSB WRBUF         RECORD
0020  37314 061704          LDA RQ3       MOVE
0021  37315 040627          ADA B200        POINTERS
0022  37316 065337          LDB FBASE         FOR NEXT
0023  37317 044535          ADB .+7             FILE
0024  37320 027306          JMP CHN01
0025  37321 064352  CHAN0   LDB MLINK+1
0026  37322 044515          ADB .+?ID-?LINK
0027  37323 074026          STB CHNI        => USER ID
0028  37324 160001          LDA 1,I
0029  37325 070020          STA LTEMP     STORE IN LTEMP
0030  37326 060323          LDA DLTEM     SET UP
0031  37327 002004          INA             POINTER
0032  37330 070024          STA CHNP          FOR NAME
0033  37331 061647          LDA TEMP1     LOAD POINTER TO FIRST WORD
0034  37332 001000          ALS           DOUBLE FOR CHARACTER POINTER
0035  37333 002004          INA           TO RIGHT CHARACTER
0036  37334 070027          STA CHNC      STORE PICKUP POINTER
0037  37335 060517          LDA .-7
0038  37336 073625          STA INCHR     SET STORE COUNTER
0039  37337 063626          LDA OUTWR
0040  37340 073627          STA OUTWD     SET STORE POINTER
0041  37341 003400          CCA           A = -1
0042  37342 041647          ADA TEMP1     A => LENGTH WORD
0043  37343 160000          LDA 0,I       LOAD LENGTH
0044  37344 040523          ADA .-3
0045  37345 001000          ALS
0046  37346 003000          CMA
0047  37347 073624          STA INWRD     SET PICKUP COUNTER
0048  37350 017605          JSB CHNCH     GET A CHARACTER                    B]
0049  37351 050570          CPA .+42B     QUOTE?
0050  37352 002001          RSS           YES  GET NEXT CHAR
0051  37353 027601          JMP CHAN7+1   NO ERROR
0052  37354 017605          JSB CHNCH
0053  37355 002003          SZA,RSS     IS CHARACTER OK?
0054  37356 027601          JMP CHAN7+1   NO
0055  37357 050572          CPA .+44B     CHECK FOR DOLLARS SIGN
0056  37360 027366          JMP CHAN2     $
0057  37361          CHAN3  EQU *
```

```
0058  37361 173627          STA OUTWD,I    STORE CURRENT CHARACTER
0059  37362 037627          ISZ OUTWD      COUNT UP STORE POINTER
0060  37363 037625          ISZ INCHR      COUNT UP STORE COUNTERS
0061  37364 027373          JMP CHAN1
0062  37365 027601          JMP CHAN7+1    INVALID NAME
0063  37366           CHAN2 EQU *
0064  37366 061002          LDA A000       SET UP FOR PUBLIC SEARCH
0065  37367 070020          STA LTEMP
0066  37370 037624          ISZ INWRD      CHECK PICKUP COUNTER
0067  37371 027376          JMP CHAN1+3
0068  37372 027601          JMP CHAN7+1    INVALID NAME
0069  37373           CHAN1 EQU *
0070  37373 037624          ISZ INWRD      CHECK PICKUP COUNTER
0071  37374 002001          RSS
0072  37375 027404          JMP CHAN4      JUMP IF DONE WITH INPUT STRING
0073  37376 017605          JSB CHNCH      GET A CHARACTER                  B1
0074  37377 002003          SZA,RSS      END OF STRING?
0075  37400 027601          JMP CHAN7+1   YES - NO CLOSE QUOTE
0076  37401 050570          CPA .+42B     CLOSE QUOTE?
0077  37402 002001          RSS          YES - END OF NAME
0078  37403 027361          JMP CHAN3    NO - PROCESS CHAFACTER
0079  37404           CHAN4 EQU *
0080  37404 060566          LDA .+40B      GET BLANK
0081  37405 173627          STA OUTWD,I    STORE INTO BUFFER
0082  37406 037627          ISZ OUTWD      COUNT UP BUFFER POINTER
0083  37407 037625          ISZ INCHR      COUNT UP BUFFER COUNTER
0084  37410 027405          JMP CHAN4+1
0085  37411 036751          ISZ SCHLQ      PAST FIRST TYPE OF ERROR
0086  37412 064523          LDB .-3
0087  37413 077623          STB PKCNT      3 WORDS TO PACK
0088  37414 063626          LDA OUTWR
0089  37415 073627          STA OUTWD
0090  37416 163627    CHAN5 LDA OUTWD,I
0091  37417 001727          ALF,ALF        LEFT HALF
0092  37420 037627          ISZ OUTWD
0093  37421 133627          IOR OUTWD,I    RIGHT HALF
0094  37422 170024          STA CHNP,I     STORE IT
0095  37423 034024          ISZ CHNP
0096  37424 037627          ISZ OUTWD
0097  37425 037623          ISZ PKCNT      THREE WORDS FINISHED?
0098  37426 027416          JMP CHAN5      NO
0099  37427 061643          LDA SPROG
0100  37430 073624          STA INWRD
0101  37431 016202          JSB DLOOK     SEARCH DIRECTORY FOR PROGRAM
0102  37432 002001          RSS
0103  37433 027600          JMP CHAN7      PROGRAM NOT FOUND
0104  37434 036751          ISZ SCHLQ      PAST SECOND ERROR
0105  37435 064025          LDB CHNPD
0106  37436 044530          ADB .+2
0107  37437 160001          LDA 1,I
0108  37440 002020          SSA
0109  37441 027600          JMP CHAN7      ENTRY IS A FILE
0110  37442 036751          ISZ SCHLQ      PAST THIRD ERROR
0111*
0112* FOUND CORRECT ENTRY. FIRST CHECK TO SEE IF IT FITS
0113*
```

```
0114  37443 044530          ADB .+2                                    XJ
0115  37444 160001          LDA 1,I        SAVE START-OF-
0116  37445 070031          STA LIBSP        PROGRAM POINTER
0117  37446 044531          ADB .+3        GET PROGRAM LENGTH
0118  37447 160001          LDA 1,I
0119  37450 070032          STA CHNLN
0120  37451 003004          CMA,INA        COMPUTE FIRST
0121  37452 040031          ADA LIBSP        UNUSED WORD
0122  37453 070035          STA LIBPB
0123  37454 003004          CMA,INA        COMPUTE NEGATIVE
0124  37455 040427          ADA U4475       TOTAL LENGTH
0125  37456 002020          SSA             COMPARE WITH MAX ALLOWED
0126  37457 027600          JMP CHAN7       PROGRAM TOO LARGE
0127  37460 016403          JSB DATE       SET NEW DATE
0128  37461 064025          LDB CHNPD        INTO
0129  37462 044533          ADB .+5            DIRECTORY
0130  37463 170001          STA 1,I
0131  37464 006004          INB            SET PROGRAM
0132  37465 160001          LDA 1,I          DISC ADDRESS
0133  37466 070034          STA CHND
0134  37467 160024          LDA CHNP,I     WRITE DIRECTORY
0135  37470 070065          STA WORD         BACK TO
0136  37471 060024          LDA CHNP           DISC
0137  37472 040534          ADA .+6
0138  37473 160000          LDA 0,I
0139  37474 064424          LDB LIBD
0140  37475 016625          JSB DISCL
0141  37476 160026          LDA CHNI,I     GET USER'S ID
0142  37477 034025          ISZ CHNPD      BUMP POINTERS UP
0143  37500 034026          ISZ CHNI         TO FIRST WORD OF NAME
0144  37501 164025          LDB CHNPD,I
0145  37502 051002          CPA A000       IF SYSTEM MASTER CLEAR
0146  37503 005665          ELB,CLE,ERB      RUN-ONLY BIT
0147  37504 174026          STB CHNI,I     STORE FIRST WORD OF NAME
0148  37505 034026          ISZ CHNI       BUMP POINTER TO NEXT WORD
0149  37506 104200          DLD LTEMP+2    GET LAST 2 WORDS OF NAME
0150  37510 104400          DST CHNI,I     STORE IN TABLE
0151  37512 064352          LDB MLINK+1    SET TO NULL PROGRAM
0152  37513 044514          ADB .+?PROG-?LINK
0153  37514 063624          LDA INWRD
0154  37515 170001          STA 1,I
0155  37516 016362          JSB RDPRG      READ IN FIXED AREA
0156  37517 060032          LDA CHNLN       SET UP TRANSFER FOR
0157  37520 070065          STA WORD         READING IN PROGRAM
0158  37521 060034          LDA CHND
0159  37522 064031          LDB LIBSP       => START OF PROGRAM
0160  37523 045163          ADB BIT15
0161  37524 016625          JSB DISCL      APPEND LIBRARY PROGRAM
0162  37525 017077          JSB SEMIC
0163  37526 114642          JSB ABCK,I      ABORT?
0164*
0165* SET TO RUN
0166*
0167  37527 103100          CLF 0
0168  37530 064261          LDB MAIN
0169  37531 044535          ADB .+?TSTA    DON'T
```

```
0170  37532 160001          LDA 1,I
0171  37533 031002          IOR UNABT       ALLOW
0172  37534 170001          STA 1,I
0173  37535 044551          ADB .-?TSTA+?STAT  ABORTS
0174  37536 134001          ISZ 1,I         SET STATUS TO RUN
0175  37537 034264          ISZ TIMEF      SET FLAG FOR TIMING
0176  37540 065643          LDB SPROG       NULL
0177  37541 054051          CPB PBPTR         PROGRAM?
0178  37542 027575          JMP CHAN6       YES
0179  37543 075435          STB PRGCT       SET PROGRAM COUNTER
0180  37544 060566          LDA .+40B       TURN ON
0181  37545 071637          STA BLANK         BLANK SUPPRESSION
0182  37546 064261          LDB MAIN       SET THE CHAIN                    XJ
0183  37547 044545          ADB .+?MASK    FLAG FOR THIS USER               XJ
0184  37550 060267          LDA CHNFG                                       XJ
0185  37551 130001          IOR 1,I                                         XJ
0186  37552 070267          STA CHNFG                                       XJ
0187  37553 044537          ADB .-?MASK+?CLOC
0188  37554 134001          ISZ 1,I         BUMP USER'S TIMEOUT CLOCK
0189  37555 027603          JMP CHAN8
0190  37556 044532          ADB .+?PLEV-?CLOC
0191  37557 060532          LDA .+4         SET PRIORITY TO 4
0192  37560 170001          STA 1,I
0193  37561 044523          ADB .+?RSTR-?PLEV
0194  37562 063622          LDA CHNRT       SET RESTART ADDRESS
0195  37563 170001          STA 1,I           TO COMPILER
0196  37564 002400          CLA             BLOCK
0197  37565 170401          STA DCLC1,I       CLOCK
0198  37566 102100          STF 0           ENABLE INTERRUPT
0199  37567 064352          LDB MLINK+1
0200  37570 160001          LDA 1,I         REMOVE  USER
0201  37571 070352          STA MLINK+1       FROM QUEUE
0202  37572 017051          JSB INSEQ       INSERT HIM AGAIN AT END
0203  37573 127574          JMP *+1,I       JUMP TO SCHEDULER
0204  37574 034256          DEF SCH1
0205  37575 102100  CHAN6    STF 0          ENABLE INTERRUPT
0206  37576 127577          JMP *+1,I
0207  37577 021726          DEF EXIT3
0208  37600 016362  CHAN7    JSB RDPRG      READ BACK USER PROGRAM
0209  37601 114642          JSB ABCK,I     ABORT?
0210  37602 027021          JMP SCHBL      NO
0211  37603 102100  CHAN8    STF 0
0212  37604 127622          JMP CHNRT,I
0213  37605 000000  CHNCH    NOP                                             BJ
0214  37606 060027          LDA CHNC        LOAD PICKUP POINTER
0215  37607 000065          CLE,ERA
0216  37610 160000          LDA 0,I         LOAD WORD WITH CURRENT CHARACTER
0217  37611 002041          SEZ,RSS         SKIP IF RIGHT CHARACTER
0218  37612 001727          ALF,ALF
0219  37613 010626          AND B177        MASK OFF CURRENT CHARACTER
0220  37614 040454          ADA M96                                         BJ
0221  37615 002021          SSA,RSS         SKIP IF UPPER CASE              BJ
0222  37616 040470          ADA M32         MAKE INTO UPPER CASE            BJ
0223  37617 041120          ADA .140        RESTORE CHARACTER               BJ
0224  37620 034027          ISZ CHNC        INCREMENT PICKUP POINTER
0225  37621 127605          JMP CHNCH,I                                     BJ
```

```
0226  37622 016613  CHNRT DEF  CMPL0
0227  37623 000000  PKCNT BSS  1
0228  37624 000000  INWRD BSS  1
0229  37625 000000  INCHR BSS  1
0230  37626 037630  OUTWR DEF  OUTWD+1
0231  37627 000000  OUTWD BSS  8
0232  00024         CHNP  EQU  LTEMP+4
0233  00025         CHNPD EQU  LTEMP+5
0234  00026         CHNI  EQU  LTEMP+6
0235  00027         CHNC  EQU  LTEMP+7
0236  00032         CHNLN EQU  LTEMP+10
0237  00034         CHND  EQU  LTEMP+12
0238  37637         $CHN  EQU  *
```

```
0240* THE SAVE COMMAND IS USED TO SAVE PROGRAMS IN THE USER LIBRARY.
0241* THE PROCEDURE IS AS FOLLOWS:
0242*     1) CHECK THAT PROGRAM IS LISTABLE (OR ID=A000), HAS A NAME,
0243*        AND ISN'T NULL.
0244*     2) DECOMPILE.
0245*     3) CHECK FOR IDT OR ADT OVERFLOW.
0246*     4) CHECK FOR DUPLICATELY NAMED PROGRAM.
0247*     5) UPDATE DIRECTORY.
0248*     6) UPDATE IDT AND ADT.
0249*     7) MOVE PROGRAM TO LIBRARY AREA.
0250*
0251* STEP 5 IS WRITTEN AS AN OVERLAY, WHICH IS CALLED WHENEVER THE PAR-
0252* TICULAR DIRECTORY TRACK NEEDED IS ALREADY FULL. ITS JOB IS TO GAR-
0253* BAGE COLLECT THE DIRECTORY TRACKS.

0255  37300                ORG LIBRA

0257  37300 064352         LDB MLINK+1    B=>LINK WORD.
0258  37301 044515         ADB .+?ID-?LINK  ID LOCN.
0259  37302 074043         STB MOVES
0260  37303 160001         LDA 1,I
0261  37304 070045         STA ID
0262  37305 044525         ADB .+?PROG-?ID
0263  37306 074032         STB SAVP
0264  37307 044525         ADB .+?DISC-?PROG
0265  37310 074033         STB SAVD
0266  37311 104200         DLD MOVES,I    A=ID,B=1ST WORD OF NAME.
0267  37313 006002         SZB          TEST FOR NO PROGRAM NAME
0268  37314 054340         CPB ASCBB
0269  37315 027613         JMP SAV3
0270  37316 164032         LDB SAVP,I     TEST FOR NULL PROGRAM.
0271  37317 060513         LDA .-11
0272  37320 054433         CPB PBUFF
0273  37321 027614         JMP SAV4
0274  37322 016362         JSB RDPRG          READ INTO CORE
0275*
0276  37323 064032         LDB SAVP       TEST FOR COMPILED.
0277  37324 044524         ADB .+?MASK-?PROG
0278  37325 160001         LDA 1,I
0279  37326 010053         AND CFLAG
0280  37327 002002         SZA            PROGRAM COMPILED?
0281*
0282  37330 015423         JSB DCMPL      DECOMPILE IT.
0283  37331 065643         LDB SPROG      ANY COMMON ALLOCATED?
0284  37332 054433         CPB PBUFF
0285  37333 015617         JSB ALCOM      NO - GO DO IT
0286  37334 060051         LDA PBPTR      RESET PROGRAM BOUND
0287  37335 170032         STA SAVP,I      INTO TABLE.
0288  37336 003004         CMA,INA        COMPUTE # OF
0289  37337 041321         ADA USE         WORDS.
0290  37340 070065         STA WORD
0291  37341 160033         LDA SAVD,I     GET DISC ADDRESS.
0292  37342 065321         LDB USE        WRITE OUT TO
0293  37343 016625         JSB DISCL       DISC.
0294*
```

```
0295  37344 164032          LDB SAVP,I   COMPUTE -PROGRAM LENGTH
0296  37345 007004          CMB,INB
0297  37346 045643          ADB SPROG      ADD PROG POINTER
0298  37347 074027          STB SAVWD     SAVE IN WORDS
0299  37350 101027          ASR 7        AND                                X]
0300  37351 074035          STB SAVLN       SECTORS.
0301  37352 065643          LDB SPROG      SET PROGRAM POINTER
0302  37353 074032          STB SAVP       INTO SAVP  FOR LATER
0303*
0304  37354 016414          JSB FIDT       FIND ID ENTRY
0305  37355 044535          ADB .+7       GET DISC USED TO DATE.
0306  37356 160001          LDA 1,I
0307  37357 003004          CMA,INA       GET TOTAL AMNT TO BE USED AS
0308  37360 040035          ADA SAVLN      NEGATIVE.
0309  37361 044525          ADB .-1
0310  37362 000040          CLE
0311  37363 140001          ADA 1,I       COMPARE WITH ALLOTMENT.
0312  37364 002040          SEZ
0313  37365 027402          JMP SAV6      OK.
0314  37366 067371          LDB *+3
0315  37367 060506          LDA .-16
0316  37370 026746          JMP LIBER
0317  37371 037372          DEF *+1
0318  37372 005106          OCT 5106      LF-F
0319  37373 044514          ASC 7,ILE SPACE FULL
0320*
0321* SEARCH ADT FOR SPACE TO PUT THE PROGRAM.
0322*
0323  37402 160043  SAV6    LDA MOVES,I  LOAD ID
0324  37403 070020          STA LTEMP    SAVE FOR FDISC
0325  37404 017121          JSB FDISC    GO FIND DISC SPACE
0326  37405 060323          LDA DLTEM    LOAD POINTER TO NAME
0327  37406 070044          STA MOVED      LTEMP(0:3).
0328  37407 064522          LDB .-4
0329  37410 016352          JSB MOVEW
0330  37411 016202          JSB DLOOK     SEARCH FOR ENTRY.
0331  37412 027627          JMP SAV12     ENTRY FOUND--ILLEGAL.
0332  37413          SAV97  EQU *
0333  37413 017173          JSB FDIRC    COMPUTE DIRECTORY
0334  37414 060020          LDA LTEMP    SET BIT 15                         X]
0335  37415 031163          IOR BIT15      OF ID                            X]
0336  37416 070020          STA LTEMP    SET UP TO                          X]
0337  37417 160024          LDA LTEMP+4,I   LOAD TRACK LENGTH
0338  37420 002003          SZA,RSS     IF ZERO  THEN NEXT TRACK
0339  37421 027562          JMP SAV72
0340  37422 060323          LDA DLTEM    COMPARE                            X]
0341  37423 064024          LDB LTEMP+4  ENTRIES                            X]
0342  37424 006004          INB                                             X]
0343  37425 016471          JSB DIRCM    IS ENTRY ON THIS TRACK?            X]
0344  37426 027562          JMP SAV72    NO                                 X]
0345  37427 016202  SAV73    JSB DLOOK    YES, GO FIND IT                    X]
0346  37430 000000          NOP                                  T           X]
0347*
0348  37431 164024          LDB SAVI,I     IF TRACK IS FULL, GO DO
0349  37432 054446          CPB M3072
0350  37433 027606          JMP SAV98
```

```
0351   37434 007000          CMB             SET UP SOURCE FOR
0352   37435 044424          ADB LIBD         MOVE.
0353   37436 074043          STB MOVES
0354   37437 044536          ADB .+8         SET UP DESTINATION.
0355   37440 074044          STB MOVED
0356   37441 007000          CMB             COMPUTE LENGTH.
0357   37442 044546          ADB .+16
0358   37443 044025          ADB SAVS
0359   37444 016633          JSB MOVEB
0360*
0361   37445 060020          LDA LTEMP     LOAD ID  AND CLEAR BIT 15
0362   37446 001665          ELA,CLE,ERA
0363   37447 070020          STA LTEMP
0364   37450 060323          LDA DLTEM       MOVE 5 WORDS IN FOR
0365   37451 070043          STA MOVES        NEW ENTRY.
0366   37452 060025          LDA SAVS
0367   37453 040536          ADA .+8
0368   37454 070044          STA MOVED
0369   37455 064522          LDB .-4
0370   37456 016352          JSB MOVEW
0371   37457 060032          LDA SAVP         SET PROGRAM START
0372   37460 170044          STA MOVED,I      INTO DIRECTORY
0373   37461 016403          JSB DATE        STORE DATE IN ALSO.
0374   37462 034044          ISZ MOVED
0375   37463 170044          STA MOVED,I
0376   37464 034044          ISZ MOVED
0377   37465 060026          LDA SAVDS       INSERT DISC ADDRESS AND
0378   37466 064027          LDB SAVWD        LENGTH.
0379   37467 104400          DST MOVED,I
0380*
0381   37471 160024          LDA SAVI,I      ADJUST
0382   37472 040516          ADA .-8          DIRECTORY
0383   37473 170024          STA SAVI,I        LENGTH.
0384   37474 070065          STA WORD
0385   37475 060024          LDA SAVI        WRITE DIRECTORY BACK OUT.
0386   37476 002004          INA
0387   37477 070044          STA MOVED
0388   37500 040533          ADA .+5
0389   37501 160000          LDA 0,I
0390   37502 064424          LDB LIBD
0391   37503 074043          STB MOVES
0392   37504 016625          JSB DISCL
0393*
0394   37505 064522          LDB .-4         RESET DIREC.
0395   37506 016352          JSB MOVEW
0396*
0397   37507 016414          JSB FIDT        FIND ID ENTRY
0398   37510 044535          ADB .+7
0399   37511 060035          LDA SAVLN       ADJUST AMOUNT
0400   37512 003004          CMA,INA          OF DISC
0401   37513 140001          ADA 1,I           USED.
0402   37514 170001          STA 1,I
0403   37515 160071          LDA IDTRA,I      OURPUT ID TRACK TO DISC
0404   37516 064424          LDB LIBD
0405   37517 016625          JSB DISCL
0406   37520 060204          LDA ADLEN        INPUT AD TABLE
```

```
0407  37521 070065          STA WORD
0408  37522 060203          LDA ADLOC
0409  37523 064425          LDB LIBDI
0410  37524 016625          JSB DISCL
0411*
0412  37525 064034          LDB SAVDF      GET NEW ADT ENTRY LENGTH
0413  37526 060035          LDA SAVLN      COMPUTE NEW ADT ENTRY LOC.
0414  37527 003004          CMA,INA
0415  37530 140030          ADA SAVA,I
0416  37531 104400          DST SAVA,I     SET NEW ADT ENTRY.
0417  37533 006002          SZB            TEST FOR ADT ENTRY ALL USED.
0418  37534 027550          JMP SAV22      NO--GO TO WRITE TO DISC.
0419*
0420  37535 064030          LDB SAVA       SQUEEZE OUT ADT ENTRY.
0421  37536 074044          STB MOVED      DESTINATION IS LOC OF ENTRY
0422  37537 044530          ADB .+2         BEING REMOVED; SOURCE IS
0423  37540 074043          STB MOVES         NEXT ENTRY.
0424  37541 044432          ADB MLIBD      B=# WORDS PRECEDING.
0425  37542 044065          ADB WORD       B=-# OF WORDS TO MOVE.
0426  37543 016352          JSB MOVEW
0427*
0428  37544 034204          ISZ ADLEN      REDUCE SIZE OF ADT BY 2 WORDS.
0429  37545 034204          ISZ ADLEN
0430  37546 034065          ISZ WORD       REDUCE # OF WORDS TO WRITE OUT
0431  37547 034065          ISZ WORD        BY TWO.
0432  37550 060203  SAV22 LDA ADLOC        WRITE ADT TO DISC
0433  37551 064424          LDB LIBD
0434  37552 016625          JSB DISCL
0435*
0436  37553 016362          JSB RDPRG      READ USER PROGRAM AGAIN.
0437  37554 060027          LDA SAVWD      WRITE IT OUT.
0438  37555 070065          STA WORD        TO LIBRARY.
0439  37556 060026          LDA SAVDS         AREA.
0440  37557 064032          LDB SAVP
0441  37560 114350          JSB DISC,I
0442*
0443  37561 026622          JMP LLEND
0444*
0445*
0446  37562 064024  SAV72 LDB LTEMP+4  GO BACK TO FIRST                X]
0447  37563 044517          ADB .-7        TRACK                       X]
0448  37564 074024          STB LTEMP+4                                X]
0449  37565 006004          INB                                        X]
0450  37566 060323          LDA DLTEM                                  X]
0451  37567 016471          JSB DIRCM    IS ENTRY ON THIS TRACK?       X]
0452  37570 027573          JMP SAV74    NO, MAKE IT THE FIRST ONE     X]
0453  37571 027427          JMP SAV73                                  X]
0454  37572 027427          JMP SAV73                                  X]
0455  37573 064024  SAV74 LDB LTEMP+4     LOAD THE
0456  37574 160001          LDA 1,I      CORRECT
0457  37575 070065          STA WORD
0458  37576 044534          ADB .+6        DIRECTORY TRACK INTO
0459  37577 160001          LDA 1,I           BEFORE WE
0460  37600 064425          LDB LIBDI               START MOVING THINGS
0461  37601 016625          JSB DISCL
0462  37602 060424          LDA LIBD
```

```
0463  37603 040516          ADA .-8         ADDRESS TO THE FRONT        XJ
0464  37604 070025          STA SAVS                                    XJ
0465  37605 027431          JMP SAV73+2
0466*
0467*
0468  37606 060452  SAV98 LDA M252 LOAD SUPERSAVE
0469  37607 070065         STA WORD
0470  37610 163643         LDA SAVOV,I
0471  37611 064317         LDB #LIBI
0472  37612 027674         JMP LIBRA+252
0473  37613 060506  SAV3   LDA .-16
0474  37614 067616  SAV4   LDB *+2
0475  37615 026746         JMP LIBER
0476  37616 037617         DEF *+1
0477  37617 005116         OCT 5116       LF-N
0478  37620 047440         ASC 7,0 PROGRAM NAME
0479*
0480  37627          SAV12 EQU *
0481  37627 060506         LDA .-16
0482  37630 067632         LDB *+2
0483  37631 026746         JMP LIBER
0484  37632 037633         DEF *+1
0485  37633 005104         OCT 5104
0486  37634 052520         ASC 7,UPLICATE ENTRY
0487*
0488  00024          SAVI   EQU LTEMP+4
0489  00025          SAVS  EQU LTEMP+5
0490  00026          SAVDS EQU LTEMP+6
0491  00027          SAVWD EQU LTEMP+7
0492  00030          SAVA  EQU LTEMP+8
0493  00032          SAVP  EQU LTEMP+10
0494  00033          SAVD  EQU LTEMP+11
0495  00034          SAVDF EQU LTEMP+12
0496  00035          SAVLN EQU LTEMP+13
0497*
0498  37643 036056  SAVOV DEF SAVE+1+COM6-COM3
0499*
0500  37674                ORG LIBRA+252
0501  37674 016625         JSB DISCL
0502  37675 027300         JMP LIBRA
0503  37676 027413         JMP SAV97
0504  37677          $SAV  EQU *
```

```
0002* THE SAVE OVERLAY ROUTINE IS CALLED BY THE SAVE AND OPEN ROUTINES
0003* * WHENEVER THEY WANT TO MAKE A DIRECTORY ENTRY ON A TRACK THAT IS
0004* ALREADY FULL. THE FOLLOWING LOCATIONS MUST BE APPROPRIATELY SET:
0005*     LTEMP(0:3)=1ST 4 WORDS OF ENTRY.
0006*     LTEMP(4:5)=SAME AS LEFT BY DLODIC
0007*     LTEMP(6:7)=DISC ADR AND LENGTH OF ENTRY.
0008  37300                 ORG LIBRA

0010  37300 017173         JSB FDIRC      RECOMPUTE DIRECTORY
0011  37301 060024        LDA LTEMP+4
0012  37302 040517         ADA .-7
0013  37303 070024         STA LTEMP+4      RESET LTEMP+4 TO FIRST TRACK
0014  37304 160024         LDA LTEMP+4,I COMPUTE TOTAL DIRECTORY
0015  37305 070065         STA WORD         LENGTH
0016  37306 073524         STA SUPL1
0017  37307 064024         LDB LTEMP+4
0018  37310 044535         ADB .+7
0019  37311 140001         ADA 1,I
0020  37312 070036         STA LTEMP+14      SAVE TOTAL
0021  37313 043527         ADA S6136         IS SYSTEM FULL?
0022  37314 002020         SSA
0023  37315 027510         JMP SUP9       YES - ALL FULL
0024  37316 060036         LDA LTEMP+14
0025  37317 007400         CCB            NO - DIVIDE BY 16 TO GET
0026  37320 100400         DIV .+16
0027  37322 100200         MPY .+8          NUMBER OF ENTRIES/2 * 8=WORDS
0028  37324 073526         STA SUPLN      SAVE IT
0029  37325 060024         LDA LTEMP+4    READ
0030  37326 040534         ADA .+6          IN
0031  37327 160000         LDA 0,I            FIRST
0032  37330 064425         LDB LIBDI            TRACK
0033  37331 016625         JSB DISCL
0034  37332 063526         LDA SUPLN      IS NEW LENGTH
0035  37333 003004         CMA,INA          OF TRACK LONGER
0036  37334 040065         ADA WORD         THAN CURRENT LENGTH
0037  37335 002020         SSA
0038  37336 027426         JMP SUP1       NO
0039  37337 003004         CMA,INA        READ IN THAT MUCH
0040  37340 070065         STA WORD         FROM TRACK 2
0041  37341 073525         STA SUPL2
0042  37342 060024         LDA LTEMP+4    GET DISC
0043  37343 040543         ADA .+13         ADDRESS
0044  37344 160000         LDA 0,I
0045  37345 067524         LDB SUPL1      COMPUTE CORE
0046  37346 007004         CMB,INB          ADDRESS
0047  37347 044425         ADB LIBDI
0048  37350 016625         JSB DISCL      READ IT IN
0049  37351 063526         LDA SUPLN      OUTPUT
0050  37352 070065         STA WORD         TRACK
0051  37353 060024         LDA LTEMP+4        TO
0052  37354 040534         ADA .+6        TRACK
0053  37355 160000         LDA 0,I              ONE
0054  37356 064424         LDB LIBD
0055  37357 016625         JSB DISCL
0056  37360 060065         LDA WORD       RESET
0057  37361 170024         STA LTEMP+4,I    LENGTH
```

```
0058  37362 064024          LDB LTEMP+4    READ IN
0059  37363 044535          ADB .+7          SECOND
0060  37364 160001          LDA 1,I            TRACK
0061  37365 070065          STA WORD
0062  37366 044534          ADB .+6
0063  37367 160001          LDA 1,I
0064  37370 064425          LDB LIBDI
0065  37371 016625          JSB DISCL
0066  37372 063525          LDA SUPL2      COMPUTE FIRST
0067  37373 003004          CMA,INA          WROD OF
0068  37374 040424          ADA LIBD           TACK
0069  37375 070043          STA MOVES              2
0070  37376 060424          LDA LIBD       MOVE
0071  37377 070044          STA MOVED        TRACK 2
0072  37400 067525          LDB SUPL2      COMPUTE
0073  37401 007004          CMB,INB          NEW
0074  37402 044065          ADB WORD           LENGTH
0075  37403 074065          STB WORD
0076  37404 016352          JSB MOVEW      MOVE DOWN
0077  37405 064024          LDB LTEMP+4    RESET
0078  37406 044535          ADB .+7          TRACK
0079  37407 060065          LDA WORD           LENGTH
0080  37410 170001          STA 1,I
0081  37411 060424          LDA LIBD       UPDATE
0082  37412 070043          STA MOVES        BASE
0083  37413 060024          LDA LTEMP+4        PAGE
0084  37414 040536          ADA .+8              DIRECTORY
0085  37415 070044          STA MOVED
0086  37416 064522          LDB .-4
0087  37417 016352          JSB MOVEW
0088  37420 060024          LDA LTEMP+4    OUTPUT
0089  37421 040543          ADA .+13         TRACK
0090  37422 160000          LDA 0,I            TO
0091  37423 064424          LDB LIBD             DISC
0092  37424 016625          JSB DISCL
0093  37425 027503          JMP SUPR       DONE
0094*
0095*      IFRST DIRECTORY TRACK IS THE LONG ONE
0096*
0097  37426 063526  SUP1    LDA SUPLN      WRITE
0098  37427 170024          STA LTEMP+4,I    TRACK 1
0099  37430 070065          STA WORD           BACK
0100  37431 060024          LDA LTEMP+4          OUT
0101  37432 040534          ADA .+6                TO
0102  37433 160000          LDA 0,I                  DISC
0103  37434 064424          LDB LIBD
0104  37435 016625          JSB DISCL
0105  37436 063526          LDA SUPLN      MOVE
0106  37437 003004          CMA,INA        REMAINDER
0107  37440 040424          ADA LIBD       DOWN
0108  37441 070043          STA MOVES
0109  37442 060424          LDA LIBD
0110  37443 070044          STA MOVED
0111  37444 067526          LDB SUPLN      COMPUTE #
0112  37445 007004          CMB,INB          OF WORDS
0113  37446 047524          ADB SUPL1          TO MOVE
```

```
0114  37447 077525          STB SUPL2
0115  37450 016352          JSB MOVEW
0116  37451 064024          LDB LTEMP+4    READ
0117  37452 044535          ADB .+7          IN 2ND TRACK
0118  37453 160001          LDA 1,I
0119  37454 070065          STA WORD       SET LENGTH
0120  37455 044534          ADB .+6          GET DISC
0121  37456 160001          LDA B,I
0122  37457 064044          LDB MOVED      GET CORE
0123  37460 045163          ADB BIT15        ADDRESS
0124  37461 016625          JSB DISCL
0125  37462 060065          LDA WORD       COMPUTE
0126  37463 043525          ADA SUPL2        NEW TRACK
0127  37464 070065          STA WORD           LENGTH
0128  37465 064024          LDB LTEMP+4    RESET
0129  37466 044535          ADB .+7          LENGTH
0130  37467 170001          STA 1,I            OF TRACK
0131  37470 044534          ADB .+6         WRITE
0132  37471 160001          LDA 1,I           TO
0133  37472 064424          LDB LIBD             DISC
0134  37473 016625          JSB DISCL
0135  37474 060424          LDA LIBD       RESET
0136  37475 070043          STA MOVES        BASE PAGE
0137  37476 060024          LDA LTEMP+4        VALUES
0138  37477 040536          ADA .+8
0139  37500 070044          STA MOVED
0140  37501 064522          LDB .-4
0141  37502 016352          JSB MOVEW
0142  37503 063530  SUPR    LDA SAVLL
0143  37504 070065          STA WORD
0144  37505 160262          LDA LIB,I
0145  37506 064317          LDB #LIBI
0146  37507 027670          JMP LIBRA+248
0147*
0148*      SYSTEM OVERLOAD
0149*
0150  37510 103100  SUP9    CLF 0
0151  37511 034262          ISZ LIB
0152  37512 102100          STF 0
0153  37513 060442          LDA MFLAG      WHERE DO WE PRINT
0154  37514 002003          SZA,RSS          THE ERROR MESSAGE?
0155  37515 027143          JMP FD.5       ON USER'S TERMINAL.
0156  37516 002400          CLA            ON SYSTEM CONSOLE.
0157  37517 070442          STA MFLAG      FIRST CLEAR THE FLAG
0158  37520 067146          LDB FD.5+3     THEN PRINT THE MESSAGE.
0159  37521 060540          LDA .+10
0160  37522 114324          JSB TTY35,I
0161  37523 026652          JMP LENDR
0162*
0163  37524 000000  SUPL1   NOP
0164  37525 000000  SUPL2   NOP
0165  37526 000000  SUPLN   NOP
0166  37527 013760  S6136   DEC 6128
0167  37530 177410  SAVLL   DEC -248
0168  37670                 ORG LIBRA+248
0169  37670 016625          JSB DISCL
```

```
0170  37671 027676          JMP LIBRA+254
0171  37672            $$SAV EQU *
```

```
0173* THE GET ROUTINE IS RESPONSIBLE FOR LOADING A PROGRAM FROM THE
0174* USER LIBRARY. IT CAN BE USED TO LOAD FROM EITHER THE USER'S
0175* PRIVATE LIBRARY OR FROM THE PUBLIC LIBRARY. IF THE PROGRAM IS TO
0176* BE FROM THE PUBLIC LIBRARY, THE PROGRAM NAME SHOULD BE PRECEDED
0177* BY A DOLLAR SIGN ($).

0179  37300                ORG LIBRA

0181  37300 060352         LDA MLINK+1   GET USER'S ID.
0182  37301 040515         ADA .+?ID-?LINK
0183  37302 070026         STA GETI
0184  37303 160000         LDA 0,I
0185  37304 070020         STA LTEMP     STORE IN LTEMP.
0186  37305 060323         LDA DLTEM     SET UP POINTER FOR NAME.
0187  37306 002004         INA
0188  37307 070024         STA GETP
0189  37310 060523         LDA .-3       SET UP COUNTER.
0190  37311 070027         STA GETC
0191  37312 016550         JSB LCHAR     GET FIRST INPUT CHAR.
0192  37313 027333         JMP GET1      ERROR IF NONE.
0193  37314 050572         CPA .+44B     IF $ GO TO SET UP FOR
0194  37315 027346         JMP GET2       SEARCHING PUBLIC LIBRARY.
0195  37316 001727  GET3   ALF,ALF       SAVE CHARACTER IN TABLE.
0196  37317 170024         STA GETP,I
0197  37320 016550         JSB LCHAR     GET RIGHT CHARACTER.
0198  37321 060566         LDA .+40B     IF END CHANGE TO BLANK.
0199  37322 130024         IOR GETP,I
0200  37323 170024         STA GETP,I
0201  37324 034024         ISZ GETP      BUMP POINTER.
0202  37325 016550         JSB LCHAR     GET NEXT CHARACTER.
0203  37326 060566         LDA .+40B
0204  37327 034027         ISZ GETC      DO WE WANT IT?
0205  37330 027316         JMP GET3      YES.
0206  37331 050566         CPA .+40B     NO--A SHOULD NOW BE BLANK.
0207  37332 027353         JMP GET4
0208*
0209  37333 060511  GET1   LDA .-13
0210  37334 067336         LDB *+2
0211  37335 026746         JMP LIBER
0212  37336 037337         DEF *+1
0213  37337 005111         OCT 5111
0214  37340 047126         ASC 6,NVALID NAME
0215*
0216  37346 061002  GET2   LDA A000      SET UP FOR PUBLIC LIBRARY SEARCH
0217  37347 070020         STA LTEMP
0218  37350 016550         JSB LCHAR     GET FIRST CHAR OF NAME.
0219  37351 027333         JMP GET1      FAIL IF NONE.
0220  37352 027316         JMP GET3
0221*
0222  37353 016362  GET4   JSB RDPRG
0223  37354 061643         LDA SPROG     SAVE END-OF-
0224  37355 070033         STA GETS        COMMON POINTER
0225  37356 016202         JSB DLOOK     SEARCH DIRECTORY FOR PROGRAM
0226  37357 027374         JMP GET9
0227*
0228  37360 060506         LDA .-16
```

```
0229  37361 067363         LDB *+2
0230  37362 026746         JMP LIBER
0231  37363 037364         DEF *+1
0232  37364 005116         OCT 5116
0233  37365 047440         ASC 7,0 SUCH PROGRAM
0234  37374 064025  GET9   LDB GETPD      TEST FOR FILE RATHER
0235  37375 044530         ADB .+2         THAN PROGRAM.
0236  37376 160001         LDA 1,I
0237  37377 002021         SSA,RSS
0238  37400 027415         JMP GET10
0239*
0240  37401 060506         LDA .-16
0241  37402 067404         LDB *+2
0242  37403 026746         JMP LIBER
0243  37404 037405         DEF *+1
0244  37405 005105         OCT 5105       LF-E
0245  37406 047124         ASC 7,NTRY IS A FILE
0246*
0247* FOUND CORRECT ENTRY. FIRST CHECK TO SEE IF IT FITS
0248*
0249  37415 044530  GET10  ADB .+2       RETRIEVE START-                  XJ
0250  37416 160001         LDA 1,I          OF-PROGRAM
0251  37417 070031         STA LIBSP          POINTER
0252  37420 044531         ADB .+3       GET PROGRAM
0253  37421 160001         LDA 1,I         LENGTH.
0254  37422 070032         STA GETLN
0255  37423 003004         CMA,INA       COMPUTE FIRST
0256  37424 040031         ADA LIBSP       UNUSED WORD
0257  37425 070035         STA LIBPB
0258  37426 003004         CMA,INA       COMPUTE NEGATIVE
0259  37427 040427         ADA U4475     TOTAL LENGTH
0260  37430 002021         SSA,RSS       COMPARE WITH MAX ALLOWED.
0261  37431 027447         JMP GET13     OK
0262  37432 060504         LDA .-18
0263  37433 067435         LDB *+2
0264  37434 026746         JMP LIBER
0265  37435 037436         DEF *+1
0266  37436 005120         OCT 5120       LF-P
0267  37437 051117         ASC 8,ROGRAM TOO LARGE
0268*
0269  37447 016403  GET13  JSB DATE       SET NEW DATE
0270  37450 064025         LDB GETPD       INTO
0271  37451 044533         ADB .+5       DIRECTORY.
0272  37452 170001         STA 1,I
0273  37453 006004         INB           GET PROGRAM
0274  37454 160001         LDA 1,I        DISC ADDRESS.
0275  37455 070034         STA GETD
0276*
0277  37456 160024         LDA GETP,I    WRITE DIRECTORY
0278  37457 070065         STA WORD       BACK TO
0279  37460 060024         LDA GETP        DISC.
0280  37461 040534         ADA .+6
0281  37462 160000         LDA 0,I
0282  37463 064424         LDB LIBD
0283  37464 016625         JSB DISCL
0284*
```

```
0285   37465 160026          LDA GETI,I     GET USER'S ID
0286   37466 034025          ISZ GETPD      BUMP POINTERS UP TO
0287   37467 034026          ISZ GETI       FIRST WORD OF NAME.
0288   37470 164025          LDB GETPD,I    GET FIRST WORD OF NAME.
0289   37471 051002          CPA A000       IF SYSTEM MASTER, CLEAR
0290   37472 005665          ELB,CLE,ERB     RUN ONLY BIT
0291   37473 174026          STB GETI,I     STORE FIRST WORD OF NAME.
0292   37474 034026          ISZ GETI       BUMP POINTER TO NEXT WORD
0293   37475 104200          DLD LTEMP+2    GET LAST 2 WORDS OF NAME.
0294   37477 104400          DST GETI,I     STORE IN TABLE.
0295*
0296   37501 064352          LDB MLINK+1    SET TO NULL PROGRAM
0297   37502 044514          ADB .+?PROG-?LINK
0298   37503 060033          LDA GETS
0299   37504 170001          STA 1,I
0300   37505 016362          JSB RDPRG      READ IN CURRENT PROGRAM
0301   37506 060032          LDA GETLN       SET UP TRANSFER
0302   37507 070065          STA WORD         FOR READING IN PROGRAM.
0303   37510 060034          LDA GETD
0304   37511 064031          LDB LIBSP      GET START OF PROGRAM POINTER
0305   37512 045163          ADB BIT15
0306   37513 016625          JSB DISCL
0307   37514 017077          JSB SEMIC
0308   37515 026622          JMP LLEND      TERMINATE
0309*
0310   00024          GETP   EQU LTEMP+4
0311   00025          GETPD  EQU LTEMP+5
0312   00026          GETI   EQU LTEMP+6
0313   00027          GETC   EQU LTEMP+7
0314   00032          GETLN  EQU LTEMP+10
0315   00033          GETS   EQU LTEMP+11
0316   00034          GETD   EQU LTEMP+12
0317   37516          $GET   EQU *
```

```
0319* THE APPEND COMMAND ALLOWS A USER TO APPEND A LIBRARY PROGRAM ON TO
0320* THE END OF HIS CURRENT PROGRAM. THE FIRST STATEMENT OF THE NEW
0321* PROGRAM MUST HAVE A SEQUENCE NUMBER GREATER THAN THAT OF THE LAST
0322* STATEMENT OF THE ORIGINAL PROGRAM. IF THE NEW SECTION IS PROTECTED
0323* THE ENTIRE PROGRAM WILL BE PROTECTED.  PROGRAMS WITH COMMON MAY
0324* NOT BE APPENDED.
0325*
0326* THE CODE FOR APPEND MUST FOLLOW THE CODE FOR "GET".

0328  37300                ORG LIBRA        THE CODE IS IDENTICAL TO "GET"
0329  37300 060352         LDA MLINK+1      UP TO LOCATION GET10
0330  37415                ORG GET10
0331*
0332  37415 044530         ADB .+2                                  [X]
0333  37416 160001         LDA 1,I
0334  37417 050433         CPA PBUFF      COMMON AREA?
0335  37420 027441         JMP APP02      NO
0336  37421 060477         LDA .-23
0337  37422 067424         LDB *+2
0338  37423 026746         JMP LIBER
0339  37424 037425         DEF *+1
0340  37425 005116         OCT 5116       LF-N
0341  37426 047440         ASC 11,0 COMMON AREA ALLOWED
0342  37441 016403  APP02   JSB DATE       SET DATE OF LAST REFERENCE
0343  37442 064025         LDB GETPD       INTO DIRECTORY ENTRY.
0344  37443 044533         ADB .+5
0345  37444 170001         STA 1,I
0346  37445 044522         ADB .-4        SAVE LIST BIT.
0347  37446 160001         LDA 1,I
0348  37447 070026         STA APPLS
0349  37450 044533         ADB .+5        GET PROGRAM DISC ADDRESS
0350  37451 104200         DLD 1,I         AND LENGTH.
0351  37453 070034         STA GETD
0352  37454 074032         STB GETLN
0353*
0354  37455 160024         LDA GETP,I     WRITE DIRECTORY
0355  37456 070065         STA WORD        BACK TO DISC.
0356  37457 060024         LDA GETP
0357  37460 040534         ADA .+6
0358  37461 160000         LDA 0,I
0359  37462 064424         LDB LIBD
0360  37463 016625         JSB DISCL
0361*
0362  37464 016362         JSB RDPRG      READ IN USER'S PROGRAM AND
0363  37465 015423         JSB DCMPL       DECOMPILE IT.
0364*
0365  37466 060032         LDA GETLN      TEST FOR PROGRAM TOO
0366  37467 003004         CMA,INA         LARGE.
0367  37470 040051         ADA PBPTR      LAST WORD+1 OF COMBINED PROGS.
0368  37471 070035         STA LIBPB
0369  37472 003004         CMA,INA        COMPUTE NEGATIVE
0370  37473 040427         ADA U4475      TOTA LENGTH
0371  37474 002021         SSA,RSS        COMPARE WITH MAX ALLOWED.
0372  37475 027516         JMP APP1       O.K.
0373  37476 060352         LDA MLINK+1    SET MAIN TO SAY PROGRAM IN
0374  37477 040473         ADA .-?LINK     CORE.
```

```
0375  37500 070261         STA MAIN
0376  37501 060504         LDA .-18
0377  37502 067504         LDB *+2
0378  37503 026746         JMP LIBER
0379  37504 037505         DEF *+1
0380  37505 005120         OCT 5120       LF-P
0381  37506 051117         ASC 8,ROGRAM TOO LARGE
0382*
0383  37516 060032  APP1   LDA GETLN      READ IN APPENDED
0384  37517 070065         STA WORD        PROGRAM.
0385  37520 060034         LDA GETD
0386  37521 064051         LDB PBPTR
0387  37522 045163         ADB BIT15
0388  37523 114350         JSB DISC,I
0389*
0390* SCAN ORIGINAL PROGRAM TO DETERMINE LAST SEQUENCE NUMBER.
0391*
0392  37524 061643         LDA SPROG      SET A TO POINT AT LENGTH OF
0393  37525 002004         INA             FIRST STATEMENT.
0394  37526 064051         LDB PBPTR      SET B TO POINT AT LENGTH OF
0395  37527 006004         INB             FIRST NEW PROGRAM.
0396  37530 050001         CPA 1          IF EQUAL, PROGRAM IS NULL, SO
0397  37531 027554         JMP APP2        IT'S OK.
0398  37532 003004         CMA,INA                                      BJ
0399  37533 040001         ADA 1                                        BJ
0400  37534 002021         SSA,RSS        SPROG>PBPTR?                  BJ
0401  37535 027541         JMP APP5-2     NO                            BJ
0402  37536 060051         LDA PBPTR      YES, RESET                    BJ
0403  37537 071643         STA SPROG        SPROG                       BJ
0404  37540 027554         JMP APP2                                     BJ
0405*
0406  37541 061643         LDA SPROG                                    BJ
0407  37542 002004         INA                                          BJ
0408  37543 070027  APP5   STA APPS       SAVE LOCN OF THIS STATE. LENGTH.
0409  37544 140000         ADA 0,I        LINK TO NEXT ONE.
0410  37545 050001         CPA 1          IF SAVE AS B, APPS=>LAST STATE.
0411  37546 002001         RSS
0412  37547 027543         JMP APP5       OTHERWISE, LOOP.
0413*
0414  37550 003400         CCA            GET SEQUENCE # OF LAST STATE-
0415  37551 040027         ADA APPS        MENT.
0416  37552 160000         LDA 0,I        MAKE NEGATIVE AND SUBTRACT
0417  37553 003001         CMA,RSS         ONE.
0418  37554 003400  APP2   CCA            SET TO -1 (SEQNO=0) IF NO PROG.
0419*
0420  37555 064263         LDB ENDSK      WAIT FOR DISC TO TERMINATE.
0421  37556 006002         SZB
0422  37557 027555         JMP *-2
0423*
0424  37560 140051         ADA PBPTR,I    CHECK THAT FIRST SEQUENCE # IS
0425  37561 002021         SSA,RSS         GREATER THAN LAST ONE OF OLD
0426  37562 027606         JMP APP3          PROGRAM.
0427*
0428  37563 060352         LDA MLINK+1    SET MAIN TO SAY PROGRAM IN
0429  37564 040473         ADA .-?LINK     CORE.
0430  37565 070261         STA MAIN
```

```
0431  37566 060476          LDA .-24       ERROR.
0432  37567 067571          LDB *+2
0433  37570 026746          JMP LIBER
0434  37571 037572          DEF *+1
0435  37572 005123          OCT 5123       LF-S
0436  37573 042521          ASC 11,EQUENCE NUMBER OVERLAP
0437*
0438  37606 060035  APP3    LDA LIBPB      SET NEW VALUE OF
0439  37607 070051          STA PBPTR       PBPTR.
0440  37610 064352          LDB MLINK+1    GET USER ID.
0441  37611 044515          ADB .+?ID-?LINK
0442  37612 160001          LDA 1,I
0443  37613 006004          INB            SET POINTER TO NAME.
0444  37614 051002          CPA A000       TEST FOR SPECIAL
0445  37615 027622          JMP APP6        USER.
0446  37616 060026          LDA APPLS      IF NOT, GET LIST BIT
0447  37617 011163          AND BIT15       AND MERGE INTO NAME.
0448  37620 130001          IOR 1,I
0449  37621 170001          STA 1,I
0450  37622 044503  APP6 ADB .-?NAME      SET MAIN.
0451  37623 074261          STB MAIN
0452  37624 026622          JMP LLEND      TERMINATE.
0453*
0454  00026         APPLS EQU LTEMP+6
0455  00027         APPS  EQU LTEMP+7
0456  37625         $APP  EQU *
```

```
0002* THE HELLO COMMAND IS USED TO LOG A USER ON TO THE SYSTEM. IT
0003* PERFORMS THE FOLLOWING FUNCTIONS:
0004*     1) IF A USER IS ALREADY ON, HE IS LOGGED OFF.
0005*     2) READ USER ID AND PASSWORD, AND ENTER INTO TTY TABLE.
0006*     3) READ TERMINAL SUBTYPE AND SET UP CARRIAGE RETURN AND
0007*        LINEFEED DELAYS.


0009  37300                 ORG LIBRA
0010  37300 060352          LDA MLINK+1    SET HELID TO
0011  37301 040515          ADA .+?ID-?LINK POINT TO USER'S
0012  37302 070026          STA HELID      ID.
0013  37303 040532          ADA .+?TIME-?ID SET POINTER TO
0014  37304 070027          STA HELTP        STARTING TIME.
0015  37305 043667          ADA HELST      COMPUTE PORT NUMBER.
0016  37306 006400          CLB
0017  37307 077663          STB HFLG       CLEAR COMMA FLAG
0018  37310 100400          DIV .+TTY01-TTY00
0019  37312 070021          STA HELPT      SAVE IT.
0020  37313 154026          CPB HELID,I    TEST FOR USER IN CORE.
0021  37314 027351          JMP HEL7       GO INPUT IDT.
0022*
0023  37315 060453          LDA M128      INPUT FUSS TABLE
0024  37316 070065          STA WORD
0025  37317 160331          LDA FUSS,I
0026  37320 064425          LDB LIBDI
0027  37321 016625          JSB DISCL
0028*
0029  37322 060021          LDA HELPT      COMPUTE LOCATION OF USER'S
0030  37323 001723          ALF,RAR            MULTIPLY BY 8              [X]
0031  37324 040424          ADA LIBD
0032  37325 070020          STA LTEMP
0033*
0034  37326 002400          CLA            ZERO OUT HIS SECTION.
0035  37327 064516          LDB .-8                                       X]
0036  37330 170020          STA LTEMP,I
0037  37331 034020          ISZ LTEMP
0038  37332 006006          INB,SZB
0039  37333 027330          JMP *-3
0040*
0041  37334 160331          LDA FUSS,I     WRITE BACK TO
0042  37335 064424          LDB LIBD        DISC.
0043  37336 016625          JSB DISCL
0044*
0045  37337 103100          CLF 0
0046  37340 060207          LDA PHR        SET UP TIMING
0047  37341 064352          LDB MLINK+1
0048  37342 044506          ADB .+?PHON-?LINK
0049  37343 170001          STA B,I
0050  37344 044522          ADB .+?TSTA-?PHON
0051  37345 160001          LDA B,I
0052  37346 030615          IOR LTBT
0053  37347 170001          STA B,I
0054  37350 102100          STF 0
0055  37351 160026  HEL7    LDA HELID,I    IS ANYBODY
0056  37352 002003          SZA,RSS          LOGGED ON?
```

```
0057  37353 027422          JMP HEL1       NO
0058  37354 070045          STA ID         YES
0059*
0060*
0061  37355 104200          DLD HELTP,I    GET STARTING TIME.
0062  37357 003004          CMA,INA        MAKE BOTH PARTS NEGATIVE.
0063  37360 007004          CMB,INB
0064  37361 104400          DST HELTM      SAVE.
0065  37363 104200          DLD DATIM      GET CURRENT TIME.
0066  37365 040030          ADA HELTM      COMPUTE DIFFERENCES:A=#OF HRS,
0067  37366 000040          CLE            B=# OF 100 MS UNITS,
0068  37367 044031          ADB HELTM+1     E INDICATES SIGN OF B.
0069  37370 074031          STB HELTM+1    SAVE UNITS.
0070  37371 100200          MPY D60        CHANGE HRS TO MINS.
0071  37373 070030          STA HELTM
0072  37374 060031          LDA HELTM+1    GET UNIT COUNT. IF E=0
0073  37375 002041          SEZ,RSS        THEN COUNT AS NEGATIVE.
0074  37376 007400          CCB
0075  37377 100400          DIV D600       CHANGE TO MINUTES.
0076  37401 040030          ADA HELTM      ADD PREVIOUS COMPUTATION +1
0077  37402 070030          STA HELTM
0078*
0079  37403 160026          LDA HELID,I    SET UP LOGOFF
0080  37404 031163          IOR BIT15       ENTRY.
0081  37405 017624          JSB HELOG
0082*
0083*
0084*
0085  37406 016414          JSB FIDT       FIND THE ID
0086  37407 044533          ADB .+5        COMPUTE NEW TOTAL TIME.
0087  37410 000040          CLE
0088  37411 160001          LDA 1,I
0089  37412 040030          ADA HELTM
0090  37413 002040          SEZ            IF OVERFLOW, USE MAXIMUM.
0091  37414 003400          CCA
0092  37415 170001          STA 1,I
0093*
0094  37416 160071          LDA IDTRA,I
0095  37417 064424          LDB LIBD
0096  37420 016625          JSB DISCL
0097*
0098  37421 170026          STA HELID,I    REMOVE USER'S ID FROM TABLE.
0099*
0100* CONVERT ID
0101*
0102  37422 016667  HEL1    JSB GETID      TRANSLATE ID.
0103  37423 002001          RSS
0104  37424 026741          JMP GTFER      ERROR--NO COMMA
0105  37425 050602          CPA .+54B
0106  37426 002001          RSS
0107  37427 026741          JMP GTFER      ERROR--NO COMMA.
0108*
0109*                                                          B1
0110  37430 016414          JSB FIDT
0111  37431 002001          RSS
0112  37432 027617          JMP HELF
```

```
0113*
0114  37433 060523          LDA .-3       CHECK PASSWORD.
0115  37434 070032          STA HELC
0116  37435 074033          STB HELP
0117  37436 034033  HEL3    ISZ HELP      BUMP TO NEXT PASSWORD ENTRY.
0118  37437 067663          LDB HFLG      COMMA PREVIOUSLY
0119  37440 006002          SZB             ENCOUNTERED?
0120  37441 027450          JMP HEL3A     YES
0121  37442 016550          JSB LCHAR     NO, GET 1ST CHARACTER
0122  37443 027450          JMP HEL3A     CARRIAGE RETURN
0123  37444 050602          CPA .+54B     COMMA?
0124  37445 002001          RSS
0125  37446 027451          JMP HEL3B     NO
0126  37447 073663          STA HFLG      YES, SET FLAG
0127  37450           HEL3A EQU *
0128  37450 002400          CLA
0129  37451           HEL3B EQU *
0130  37451 001727          ALF,ALF       FIRST CHARACTER ON LEFT
0131  37452 070034          STA HELGT
0132  37453 067663          LDB HFLG      COMMA PREVIOUSLY
0133  37454 006002          SZB             ENCOUNTERED?
0134  37455 027464          JMP HEL3C     YES
0135  37456 016550          JSB LCHAR     NO, GET 2ND CHARACTER
0136  37457 027464          JMP HEL3C     CARRIAGE RETURN
0137  37460 050602          CPA .+54B     COMMA?
0138  37461 002001          RSS
0139  37462 027465          JMP HEL3D     NO
0140  37463 073663          STA HFLG      YES, SET FLAG
0141  37464           HEL3C EQU *
0142  37464 002400          CLA
0143  37465           HEL3D EQU *
0144  37465 040034          ADA HELGT     ADD FIRST CHARACTER
0145  37466 150033          CPA HELP,I    DOES THIS PORTION OF
0146  37467 002001          RSS             THE PASSWORD COMPARE?
0147  37470 027617          JMP HELF      NO - GO TO ERROR PRINT
0148  37471 034032          ISZ HELC      YES, BUMP CHARACTER COUNTER
0149  37472 027436          JMP HEL3      GET NEXT CHARACTER PAIR
0150*
0151**    PASSWORD OK - PROCESS THE SUBTYPE
0152*
0153  37473 067663          LDB HFLG      COMMA PREVIOUSLY
0154  37474 006002          SZB             ENCOUNTERED?
0155  37475 027503          JMP HEL3E     YES
0156  37476 016550          JSB LCHAR     NO, GET NEXT CHARACTER
0157  37477 027514          JMP HEL3F     'CR' - MUST BE SUBTYPE 0
0158  37500 050602          CPA .+54B     COMMA?
0159  37501 002001          RSS
0160  37502 026744          JMP ILFER     NO - ERROR
0161  37503           HEL3E EQU *
0162  37503 016550          JSB LCHAR
0163  37504 026744          JMP ILFER     CARRIAGE RETURN - ERROR
0164  37505 040461          ADA D66
0165  37506 002021          SSA,RSS       CHECK
0166  37507 026744          JMP ILFER
0167  37510 040534          ADA .+6       PARAMETER
0168  37511 002020          SSA
```

```
0169  37512 026744          JMP ILFER          RANGE
0170  37513 002001          RSS
0171  37514           HEL3F EQU *
0172  37514 002400          CLA
0173  37515 073664          STA HTYPE        SAVE SUBTYPE
0174  37516 064352          LDB MLINK+1
0175  37517 044502          ADB .+?TSTA-?LINK
0176  37520 160001          LDA B,I          A = USER'S I/O STATUS
0177  37521 001700          ALF
0178  37522 010516          AND TMASK        REMOVE OLD SUBTYPE
0179  37523 033664          IOR HTYPE        ADD NEW SUBTYPE
0180  37524 001727          ALF,ALF
0181  37525 001700          ALF
0182  37526 170001          STA B,I          STORE NEW STATUS
0183  37527 044533          ADB .+?RPRM-?TSTA
0184  37530 160001          LDA B,I          GET BAUD RATE
0185  37531 030301          IOR BIT12          MAKE SURE ECHO
0186  37532 170001          STA B,I              IS TURNED ON,
0187  37533 010630          AND B377               AND ADJUST FOR
0188  37534 043665          ADA M277                 TABLE LOOK-UP
0189  37535 067571          LDB BAUDT        B => LOOK-UP TABLE
0190  37536           HEL3G EQU *
0191  37536 140001          ADA B,I
0192  37537 002021          SSA,RSS          RIGHT RANGE?
0193  37540 027543          JMP HEL3H        YES
0194  37541 044535          ADB .+7          NO, BUMP POINTER TO NEXT GROUP
0195  37542 027536          JMP HEL3G        TRY AGAIN
0196  37543           HEL3H EQU *
0197  37543 006004          INB
0198  37544 047664          ADB HTYPE
0199  37545 160001          LDA B,I          A = DELAY VALUES
0200  37546 073664          STA HTYPE
0201  37547 064352          LDB MLINK+1
0202  37550 044504          ADB .+?CDLY-?LINK
0203  37551 001727          ALF,ALF
0204  37552 010630          AND B377
0205  37553 003004          CMA,INA          NEGATE
0206  37554 170001          STA B,I          STORE 'CR' DELAY
0207  37555 006004          INB
0208  37556 063664          LDA HTYPE
0209  37557 010630          AND B377
0210  37560 003004          CMA,INA          NEGATE
0211  37561 170001          STA B,I          STORE 'LF' DELAY
0212*
0213**     SUBTYPE OK - GET THE OVERLAY
0214*
0215  37562 063666          LDA HLEN
0216  37563 070065          STA WORD
0217  37564 064262          LDB LIB          LOAD
0218  37565 006004          INB                OVERLAY
0219  37566 160001          LDA 1,I
0220  37567 064317          LDB #LIBI
0221  37570 027622          JMP HOVRL        GO LOAD OVERLAY


0223*
```

```
0224**     CARRIAGE RETURN - LINEFEED DELAY TABLE
0225*
0226*               UPPER 8 BITS - CARRIAGE RETURN
0227*               LOWER 8 BITS - LINEFEED
0228*

0230*                          DELAY      SUBTYPE

0232  37571 037572  BAUDT DEF *+1
0233  37572 000075        OCT 75          =277-202
0234*                                          *
0235  37573 000400        OCT 400         0     *
0236  37574 000000        OCT 0           1     *
0237  37575 000000        OCT 0           2     ** DELAYS FOR 110 BAUD
0238  37576 000001        OCT 1           3     *
0239  37577 000011        OCT 11          4     *
0240  37600 000400        OCT 400         5     *

0242  37601 000043        OCT 43          =202-137
0243*                                          *
0244  37602 000000        OCT 0           0     *
0245  37603 001000        OCT 1000        1     *
0246  37604 000400        OCT 400         2     **  DELAYS FOR 150 BAUD
0247  37605 000003        OCT 3           3     *
0248  37606 000015        OCT 15          4     *
0249  37607 001000        OCT 1000        5     *

0251  37610 000060        OCT 60          =137-57
0252*                                          *
0253  37611 000000        OCT 0           0     *
0254  37612 002000        OCT 2000        1     *
0255  37613 000000        OCT 0           2     **  DELAYS FOR 300 BAUD
0256  37614 000010        OCT 10          3     *
0257  37615 000034        OCT 34          4     *
0258  37616 007007        OCT 7007        5     *


0260  37617 060512  HELF  LDA .-12        PRINT ILL. ACCESS
0261  37620 067032        LDB HELK
0262  37621 026746        JMP LIBER


0264  37622         HOVRL EQU *
0265  37622 016625        JSB DISCL       LOAD OVERLAY
0266  37623 027300        JMP LIBRA


0268  37624 000000  HELOG NOP             MAKE ENTRY IN LOG TABLE
0269  37625 064370        LDB LOGCT       WAIT UNTIL
0270  37626 054546        CPB .+16          THERE IS ROOM
0271  37627 027625        JMP *-2
0272  37630 064372        LDB LOGP2       SET POINTER TO NEXT
0273  37631 006004        INB               LOCATION IN LOG QUEUE
0274  37632 054374        CPB LOGND
0275  37633 064373        LDB LOGBG
0276  37634 103100        CLF 0
```

```
0277  37635 074372          STB LOGP2
0278  37636 170372          STA LOGP2,I    ENTER ID
0279  37637 060041          LDA DATIM      GET DAY COUNT
0280  37640 006400          CLB            GET HOURS OF TODAY
0281  37641 100400          DIV .+24
0282  37643 060001          LDA B
0283  37644 100200          MPY D60        CONVERT TO MINUTES.
0284  37646 070034          STA HELGT      SAVE
0285  37647 060042          LDA DATIM+1    GET UNIT COUNTER
0286  37650 040435          ADA D36K       ADJUST
0287  37651 100400          DIV D600       GET IN MINUTES
0288  37653 040034          ADA HELGT
0289  37654 034372          ISZ LOGP2      PUT IN QUEUE
0290  37655 001700          ALF
0291  37656 030021          IOR HELPT      MERGE IN PORT NUMBER
0292  37657 170372          STA LOGP2,I
0293  37660 034370          ISZ LOGCT      BUMP COUNT
0294  37661 102100          STF 0
0295  37662 127624          JMP HELOG,I    RETURN


0297  37663 000000  HFLG    OCT 0
0298  37664 000000  HTYPE   BSS 1
0299  37665 177501  M277    OCT 177501
0300  37666 177456  HLEN    ABS LIBRA-HOVRL
0301  37667 144466  HELST   ABS -TTY00-?TIME
0302  37670 021726  HELRT   DEF EXIT3
0303  00516         TMASK   EQU .-10B
0304  00021         HELPT   EQU LTEMP+1
0305  00026         HELID   EQU LTEMP+6
0306  00027         HELTP   EQU LTEMP+7
0307  00030         HELTM   EQU LTEMP+8
0308  00032         HELC    EQU LTEMP+10
0309  00033         HELP    EQU LTEMP+11
0310  00034         HELGT   EQU LTEMP+12
0311  37671 044105  HELM    ASC 3,HELLO
0312  37674         $HEL    EQU *
```

```
0314*
0315**   CHECK FOR ANY TIME LEFT
0316*
0317  37300                 ORG LIBRA
0318  37300 034033          ISZ HELP        COMPUTE
0319  37301 104200          DLD HELP,I       ALLOWED TIME-TIME TO DATE.
0320  37303 003104          CMA,CLE,INA
0321  37304 040001          ADA 1
0322  37305 002040          SEZ
0323  37306 027352          JMP HELG        NO TIME LEFT.
0324*
0325  37307 060045          LDA ID          MAKE LOG ENTRY.
0326  37310 017624          JSB HELOG
0327  37311 104200          DLD DATIM        SET STARTING TIME AND ID
0328  37313 104400          DST HELTP,I       INTO TABLE.
0329  37315 060045          LDA ID          INSERT NEW ID AND CLEAR
0330  37316 006400          CLB              NAME.
0331  37317 104400          DST HELID,I
0332  37321 060433          LDA PBUFF       ALSO SCRATCH
0333  37322 064352          LDB MLINK+1
0334  37323 044514          ADB .+?PROG-?LINK
0335  37324 170001          STA 1,I
0336  37325 103100          CLF 0
0337  37326 044514          ADB .+?TSTA-?PROG
0338  37327 160001          LDA B,I         REMOVE LOG
0339  37330 011170          AND LTNBT         TIMING BIT
0340  37331 170001          STA B,I
0341  37332 061002          LDA A000        MOVE SETUP FOR
0342  37333 070020          STA LTEMP        $HELLO PROGRAM
0343  37334 063671          LDA HELM          INTO LTEMP(0:3).
0344  37335 070021          STA LTEMP+1
0345  37336 104200          DLD HELM+1
0346  37340 104400          DST LTEMP+2
0347*
0348  37342 016202          JSB DLOOK       SEARCH FOR PROGRAM IN LIBRARY.
0349  37343 027360          JMP HEL6        FOUND IT.
0350*
0351*
0352  37344 103100  HEL4    CLF 0
0353  37345 034262          ISZ LIB
0354  37346 102100          STF 0
0355  37347 060520          LDA .-6         OUTPUT READY MESSAGE
0356  37350 064342          LDB READY
0357  37351 026746          JMP LIBER
0358  37352 060510  HELG LDA .-14
0359  37353 067041          LDB HELH
0360  37354 103100          CLF 0           MAKE SURE SWAPPER
0361  37355 034262          ISZ LIB           KNOWS HELLO IS NOT
0362  37356 102100          STF 0               IN CORE
0363  37357 026746          JMP LIBER
0364*
0365*
0366*
0367* SET UP USER TO RUN $HELLO PROGRAM.
0368*
0369  37360 064025  HEL6  LDB LTEMP+5    TEST FOR FILE
```

```
0370   37361 044530          ADB .+2
0371   37362 160001          LDA 1,I
0372   37363 002020          SSA
0373   37364 027344          JMP HEL4
0374*
0375   37365 044530          ADB .+2                                        [X]
0376   37366 160001          LDA 1,I         SAVE START-OF-
0377   37367 070031          STA LIBSP         PROGRAM POINTER
0378   37370 044530          ADB .+2         GET PROGRAM DISC ADDRESS AND
0379   37371 104200          DLD 1,I          LENGTH.
0380   37373 070033          STA HELP        SAVE DISK ADDRESS.
0381   37374 074032          STB HELC        STORE LENGTH.
0382   37375 007004          CMB,INB         COMPUTE FIRST
0383   37376 044031          ADB LIBSP         UNUSED WORD
0384   37377 074035          STB LIBPB
0385   37400 007004          CMB,INB         TEST FOR OVERFLOW.
0386   37401 044427          ADB U4475
0387   37402 006020          SSB
0388   37403 027344          JMP HEL4
0389*
0390   37404 016362          JSB RDPRG       READ IN FIXED AREA.
0391   37405 060032          LDA HELC        READ IN $HELLO.
0392   37406 070065          STA WORD
0393   37407 060033          LDA HELP
0394   37410 064031          LDB LIBSP       GET START OF PROGRAM POINTER
0395   37411 045163          ADB BIT15
0396   37412 016625          JSB DISCL
0397   37413 017077          JSB SEMIC
0398   37414 103100          CLF 0           PLAY SAFE.
0399   37415 064352          LDB MLINK+1                                    X]
0400   37416 044512          ADB .-?LINK+?MASK                              X]
0401   37417 160001          LDA 1,I                                        X]
0402   37420 030270          IOR HFLAG                                      X]
0403   37421 070270          STA HFLAG                                      X]
0404   37422 044541          ADB .-?MASK+?STAT                              X]
0405   37423 060533          LDA %SYNT+1     SET STATUS TO RUN.
0406   37424 170001          STA 1,I
0407   37425 034264          ISZ TIMEF       SET FLAG FOR TIMING.
0408   37426 065643          LDB SPROG
0409   37427 054051          CPB PBPTR       NULL PROGRAM
0410   37430 127670          JMP HELRT,I     YES
0411   37431 075435          STB PRGCT
0412   37432 060566          LDA .+40B
0413   37433 071637          STA BLANK
0414   37434 034262          ISZ LIB         HELLO NOT IN CORE
0415   37435 102100          STF 0           INTERRUPT BACK ON.
0416   37436 127437          JMP *+1,I
0417   37437 016606          DEF CMP14
0418*
0419   37440          $$HEL EQU *
```

```
0421* THE BYE COMMAND IS USED TO LOG A USER OFF. BYE MUST PERFORM THE
0422* FOLLOWING FUNCTIONS:
0423*     1) DETERMINE AMOUNT OF CONSOLE TIME USED
0424*     2) UPDATE USER'S CLOCK IN ID-TABLE
0425*     3) SET FLAG FOR SYSTEM TO UNHOOK.
0426*     4) OUTPUT TERMINATION MESSAGE


0428  37300                ORG LIBRA
0429  37300 064352         LDB MLINK+1
0430  37301 044515         ADB .-?LINK+?ID                              XJ
0431  37302 160001         LDA 1,I        GET ID
0432  37303 002003         SZA,RSS        IF ID=0, USER NEVER
0433  37304 026622         JMP LLEND      LOGGED ON, SO EXIT
0434  37305 074020         STB BYEID      SAVE POINTER TO ID
0435  37306 070045         STA ID
0436  37307 060453         LDA M128      INPUT FUSS TABLE
0437  37310 070065         STA WORD
0438  37311 160331         LDA FUSS,I
0439  37312 064425         LDB LIBDI
0440  37313 016625         JSB DISCL
0441*
0442  37314 060352         LDA MLINK+1    COMPUTE USER'S PORT NO.
0443  37315 043523         ADA BYESP
0444  37316 006400         CLB
0445  37317 100400         DIV .+TTY01-TTY00
0446  37321 070024         STA BYEPT
0447*
0448  37322 001723         ALF,RAR
0449  37323 040424         ADA LIBD
0450  37324 070021         STA LTEMP+1
0451  37325 060516         LDA .-8       CLEAR USER'S FUSS              XJ
0452  37326 174021         STB LTEMP+1,I
0453  37327 034021         ISZ LTEMP+1
0454  37330 002006         INA,SZA
0455  37331 027326         JMP *-3
0456*
0457  37332 160331         LDA FUSS,I     WRITE FUSS
0458  37333 064424         LDB LIBD        BACK TO DISC.
0459  37334 016625         JSB DISCL
0460*
0461*
0462  37335 060352         LDA MLINK+1
0463  37336 040521         ADA .+?TIME-?LINK  SET POINTER TO START TIME.
0464  37337 104200         DLD 0,I           GET STARTING TIME.
0465  37341 003004         CMA,INA        SET BOTH PARTS NEGATIVE.
0466  37342 007004         CMB,INB
0467  37343 104400         DST BYETM      SAVE
0468  37345 104200         DLD DATIM      NOW GET CURRENT TIME
0469  37347 040021         ADA BYETM      COMPUTE DIFFERENCES: A=# OF HRS,
0470  37350 000040         CLE            B=# OF 100 MS UNITS,
0471  37351 044022         ADB BYETM+1     E INDICATES SIGN OF B.
0472  37352 074022         STB BYETM+1    SAVE UNITS.
0473  37353 100200         MPY D60        CHANGE HRS TO MINS.
0474  37355 070021         STA BYETM
0475  37356 060022         LDA BYETM+1    GET UNIT COUNT. IF E=0
```

```
0476  37357 002041        SEZ,RSS       THEN COUNT AS NEGATIVE.
0477  37360 007400        CCB
0478  37361 100400        DIV D600      CHANGE TO MINUTES.
0479  37363 040021        ADA BYETM     ADD PREVIOUS COMPUTATION PLUS
0480  37364 070021        STA BYETM
0481*
0482  37365 060370        LDA LOGCT     CHECK FOR ROOM IN LOG TABLE
0483  37366 050546        CPA .+16
0484  37367 027365        JMP *-2
0485  37370 060372        LDA LOGP2     SET LOGP2 TO NEXT LOCATION IN
0486  37371 002004        INA            LOG TABLE.
0487  37372 050374        CPA LOGND
0488  37373 060373        LDA LOGBG
0489  37374 070372        STA LOGP2
0490  37375 160020        LDA BYEID,I   PLACE ID IN LOG TABLE AND
0491  37376 031163        IOR BIT15      SAY LOGOFF.
0492  37377 170372        STA LOGP2,I
0493  37400 034372        ISZ LOGP2
0494  37401 104200        DLD DATIM     COMPUTE TIME OF DAY.
0495  37403 074022        STB BYETM+1   SAVE UNIT COUNTER.
0496  37404 006400        CLB           GET # OF HRS IN B BY MOD'ING
0497  37405 100400        DIV .+24       OFF THE DAY COUNT.
0498  37407 060001        LDA 1
0499  37410 100200        MPY D60       CONVERT TO MINS.
0500  37412 070023        STA BYET      SAVE THAT.
0501  37413 060022        LDA BYETM+1   GET UNIT COUNTER.
0502  37414 040435        ADA D36K      ADJUST
0503  37415 100400        DIV D600       GET MINUTES.
0504  37417 040023        ADA BYET      PACK TOGETHER AND PUT IN LOG
0505  37420 001700        ALF
0506  37421 030024        IOR BYEPT
0507  37422 170372        STA LOGP2,I    TABLE.
0508  37423 034370        ISZ LOGCT     BUMP COUNTER.
0509  37424 016414        JSB FIDT
0510*
0511  37425 044533        ADB .+5       COMPUTE NEW TOTAL TIME.
0512  37426 000040        CLE
0513  37427 160001        LDA 1,I
0514  37430 040021        ADA BYETM
0515  37431 002040        SEZ           IF OVERFLOW, USE MAXIMUM.
0516  37432 003400        CCA
0517  37433 170001        STA 1,I
0518*
0519  37434 160071        LDA IDTRA,I   WRITE ID TRACK BACK OUT
0520  37435 064424        LDB LIBD
0521  37436 114350        JSB DISC,I
0522*
0523  37437 002400        CLA           REMOVE USER'S ID
0524  37440 170020        STA BYEID,I    FROM TABLE
0525*
0526  37441 060540        LDA .+128
0527  37442 016516        JSB LOUT
0528*
0529  37443 060021        LDA BYETM
0530  37444 006400        CLB           OUTPUT # OF MINUTES.
0531  37445 100400        DIV .100
```

```
0532  37447 074023          STB BYET
0533  37450 040606          ADA .+60B
0534  37451 016516          JSB LOUT       HUNDREDS
0535  37452 060023          LDA BYET
0536  37453 006400          CLB
0537  37454 100400          DIV .+10
0538  37456 074023          STB BYET
0539  37457 040606          ADA .+60B
0540  37460 016516          JSB LOUT       TENS
0541  37461 060023          LDA BYET
0542  37462 040606          ADA .+60B
0543  37463 016516          JSB LOUT       UNITS.
0544*
0545  37464 060475          LDA .-25       OUTPUT THE REST OF
0546  37465 067505          LDB BYEM        THE MESSAGE.
0547  37466 016542          JSB LTYPE
0548  37467 060502          LDA .-20       DISCONNECT USER
0549  37470 064352          LDB MLINK+1
0550  37471 044506          ADB .+?PHON-?LINK
0551  37472 170001          STA B,I
0552  37473 044522          ADB .+?TSTA-?PHON
0553  37474 160001          LDA B,I
0554  37475 030615          IOR LTBT
0555  37476 010515          AND RNNBT
0556  37477 170001          STA B,I
0557  37500 044533          ADB .+?RPRM-?TSTA
0558  37501 160001          LDA B,I        A = RECEIVE PARAM
0559  37502 030301          IOR BIT12      MAKE SURE USER'S
0560  37503 170001          STA B,I          ECHO IS TURNED ON
0561  37504 026622          JMP LLEND
0562*
0563  00020           BYEID EQU LTEMP
0564  00021           BYETM EQU LTEMP+1
0565  00023           BYET  EQU LTEMP+3
0566  00024           BYEPT EQU LTEMP+4
0567  37505 037506    BYEM  DEF *+1
0568  37506 020115          ASC 13, MINUTES OF TERMINAL TIME.
0569  37523 144461    BYESP ABS -TTY00-?LINK
0570  37524           $BYE  EQU *
```

```
0002* THE KILL ROUTINE IS USED TO DELETE A PROGRAM FROM THE USER
0003* LIBRARY. THE PROCESS IS AS FOLLOWS:
0004*      1) CHECK FORMAT AND DETERMINE PROGRAM NAME.
0005*      2) SEARCH DIRECTORY FOR ENTRY.
0006*      3) OBTAIN LOCATION AND LENGTH.
0007*      4) COLLAPSE DIRECTORY.
0008*      5) UPDATE ADT AND IDT.

0010  37300                ORG LIBRA

0012  37300 003400         CCA             SET FLAG TO SAY WE HAVE TO CHECK
0013  37301 070033         STA KILTS        FOR BUSY FILE.
0014  37302 060352         LDA MLINK+1     GET USER'S ID.
0015  37303 040515         ADA .+?ID-?LINK
0016  37304 160000         LDA 0,I
0017  37305 070020         STA LTEMP       STORE IN LTEMP.
0018  37306 070045         STA ID
0019  37307 060323         LDA DLTEM       SET UP POINTER FOR
0020  37310 002004         INA             NAME.
0021  37311 070024         STA KILP
0022  37312 060523         LDA .-3         SET UP COUNTER.
0023  37313 070026         STA KILC
0024  37314 016550  KIL1   JSB LCHAR       GET LEFT CHAR.
0025  37315 060566         LDA .+40B       BLANK IF NONE.
0026  37316 001727         ALF,ALF
0027  37317 170024         STA KILP,I
0028  37320 016550         JSB LCHAR       GET RIGHT CHAR.
0029  37321 060566         LDA .+40B
0030  37322 130024         IOR KILP,I
0031  37323 170024         STA KILP,I
0032  37324 034024         ISZ KILP        BUMP POINTER.
0033  37325 034026         ISZ KILC        ANY MORE?
0034  37326 027314         JMP KIL1        YES.
0035  37327 060021         LDA LTEMP+1
0036  37330 050340         CPA ASCBB
0037  37331 027334         JMP KIL2        NO CHARS--ERROR.
0038  37332 016550         JSB LCHAR       TEST FOR TOO MANY.
0039  37333 027347         JMP KIL3        O.K.
0040*
0041  37334 067337  KIL2   LDB *+3
0042  37335 060511         LDA .-13
0043  37336 026746         JMP LIBER
0044  37337 037340         DEF *+1
0045  37340 005111         OCT 5111
0046  37341 046114         ASC 6,LLEGAL NAME
0047*
0048  37347 016202  KIL3   JSB DLOOK      SEARCH DIRECTORY FOR PROGRAM.
0049  37350 002001         RSS            FOUND IT                          [
0050*
0051  37351 027651         JMP KIL4     NO SUCH PROGRAM                     [
0052*
0053* FOUND ENTRY. NOW REMOVE IT
0054*
0055  37352 064025         LDB KILPD       GET LOCATION OF DISC ADDRESS
0056  37353 074044         STB MOVED
0057  37354 044534         ADB .+6
```

```
0058  37355 104200          DLD 1,I       A=DISC ADDRESS, B=LENGTH.
0059  37357 070031          STA KILD      SAVE THEM.
0060  37360 074032          STB KILN
0061*
0062  37361 034033          ISZ KILTS     TEST FOR OK TO KILL.
0063  37362 027441          JMP KIL18     O.K.
0064  37363 064025          LDB KILPD     TEST FOR FILE.
0065  37364 044530          ADB .+2
0066  37365 160001          LDA 1,I
0067  37366 002021          SSA,RSS
0068  37367 027441          JMP KIL18     NOT A FILE.
0069*
0070  37370 060453          LDA M128     INPUT FUSSS TABLE
0071  37371 070065          STA WORD
0072  37372 001100          ARS     COMPUTE NUMBER OF ENTRIES
0073  37373 070026          STA KILC      SAVE IN KILC ALSO.
0074  37374 160331          LDA FUSS,I
0075  37375 064425          LDB LIBDI
0076  37376 016625          JSB DISCL
0077*
0078  37377 060352          LDA MLINK+1   COMPUTE USER'S
0079  37400 043665          ADA KILSP      PORT #.
0080  37401 006400          CLB
0081  37402 100400          DIV .+TTY01-TTY00
0082  37404 001723          ALF,RAR      COMPUTE LOCATION OF            X]
0083  37405 040424          ADA LIBD       USER'S FUSS.
0084  37406 070034          STA KILDF     ZERO OUT USER'S FUSS.
0085  37407 060516          LDA .-8                                      X]
0086  37410 174034          STB KILDF,I
0087  37411 034034          ISZ KILDF
0088  37412 002006          INA,SZA
0089  37413 027410          JMP *-3
0090  37414 060424          LDA LIBD      SEARCH FUSS TABLE TO SEE IF
0091  37415 064031          LDB KILD       FILE IS BEING USED.
0092  37416 154000  KIL20   CPB 0,I
0093  37417 027427          JMP KIL19
0094  37420 040530          ADA .+2                                      X]
0095  37421 034026          ISZ KILC                                     X]
0096  37422 027416          JMP KIL20                                    X]
0097  37423 160331          LDA FUSS,I    WRITE BACK FUSS TABLE.
0098  37424 064424          LDB LIBD
0099  37425 016625          JSB DISCL
0100  37426 027347          JMP KIL3      GO GET DIRECTORY AGAIN.
0101*
0102  37427 060512  KIL19    LDA .-12
0103  37430 067432          LDB *+2
0104  37431 026746          JMP LIBER
0105  37432 037433          DEF *+1
0106  37433 005106          OCT 5106      LF-F
0107  37434 044514          ASC 5,ILE IN USE
0108*
0109  37441 064025  KIL18    LDB KILPD     SET UP PARAMETERS FOR MOVE.
0110  37442 044536          ADB .+8
0111  37443 074043          STB MOVES
0112  37444 144024          ADB KILP,I
0113  37445 044432          ADB MLIBD
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0114  37446 016352          JSB MOVEW
0115*
0116  37447 160024          LDA KILP,I     REDUCE DIRECTORY LENGTH BY 8.
0117  37450 040536          ADA .+8
0118  37451 170024          STA KILP,I
0119  37452 070065          STA WORD       WRITE DIRECTORY BACK OUT.
0120  37453 060024          LDA KILP
0121  37454 040534          ADA .+6
0122  37455 160000          LDA 0,I
0123  37456 064424          LDB LIBD
0124  37457 074043          STB MOVES
0125  37460 016625          JSB DISCL
0126*
0127  37461 060024          LDA KILP       ADJUST WORDS 1-4 OF DIREC.
0128  37462 002004          INA
0129  37463 070044          STA MOVED
0130  37464 064522          LDB .-4
0131  37465 016352          JSB MOVEW
0132*
0133  37466 016414          JSB FIDT      READ IN ADT TRACK
0134  37467 060032          LDA KILN       GET PROGRAM LENGTH.
0135  37470 001121          ARS,ARS        CONVERT TO
0136  37471 001121          ARS,ARS         SECTORS.
0137  37472 001121          ARS,ARS
0138  37473 001100          ARS
0139  37474 003004          CMA,INA
0140  37475 070032          STA KILN
0141  37476 003004          CMA,INA
0142  37477 044535          ADB .+7        ADJUST DISC
0143  37500 140001          ADA 1,I         USAGE.
0144  37501 002020          SSA                IS IT NEG?
0145  37502 002400          CLA                YES, SET TO 0
0146  37503 170001          STA 1,I
0147  37504 160071          LDA IDTRA,I   WRITE ID TRACK BACK OUT
0148  37505 064424          LDB LIBD
0149  37506 016625          JSB DISCL
0150  37507 060204          LDA ADLEN     READ IN ADT TABLE
0151  37510 070065          STA WORD
0152  37511 060203          LDA ADLOC
0153  37512 064425          LDB LIBDI
0154  37513 016625          JSB DISCL
0155*
0156  37514 064424          LDB LIBD
0157  37515 060031          LDA KILD      LOAD DISC ADDRESS                [X]
0158  37516 011072          AND DHMSK     GET SUBCHANNEL                   [X]
0159  37517 070030          STA LTEMP+8   SAVE IT                          [X]
0160  37520 160001  KIL13   LDA 1,I       LOAD ADT ENTRY                   [X]
0161  37521 011072          AND DHMSK     GET SUBCHANNEL                   [X]
0162  37522 050030          CPA LTEMP+8   IS IT THE ONE?                   [X]
0163  37523 027526          JMP KIL12     YES                                [
0164  37524 044530          ADB .+2       NO  TYR THE NEXT ONE             [X]
0165  37525 027520          JMP KIL13                                      [X]
0166  37526 060031  KIL12   LDA KILD      NOW SEARCH FOR THE RIGHT SPOT    [X]
0167  37527 003104          CMA,CLE,INA   LOOK FOR FIRST ENTRY BIGGER THAN
0168  37530 140001          ADA 1,I                                        [X]
0169  37531 002040          SEZ                                             [X
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0170  37532 027540          JMP KIL16     WE HAVE FOUND THE SPOT          [X]
0171  37533 044530          ADB .+2       NOT YET - TRY NEXT ONE          [X]
0172  37534 160001          LDA 1,I                                       (L)
0173  37535 011072          AND DHMSK                                     (L)
0174  37536 050030          CPA LTEMP+8     SAME SUBCHANNEL?              (L)
0175  37537 027526          JMP KIL12       YES                           (L)
0176  37540 074024  KIL16    STB KILP      SAVE ADT ADDRESS                [X]
0177  37541 044524          ADB .-2        TEST FOR PREVIOUS ENTRY ADJACENT
0178  37542 160001          LDA 1,I         TO NEW ONE.
0179  37543 006004          INB
0180  37544 140001          ADA 1,I
0181  37545 050031          CPA KILD
0182  37546 027606          JMP KIL14      IT IS--GO COMBINE AREAS.
0183*
0184  37547 060031          LDA KILD       TEST FOR NEXT ENTRY ADJACENT TO
0185  37550 040032          ADA KILN        NEW ONE.
0186  37551 150024          CPA KILP,I
0187  37552 027577          JMP KIL15      IT IS--GO COMBINE AREAS.
0188*
0189* THE NEW ENTRY IS ADJACENT TO NEITHER THE PRECEDING NOR THE FOLLOW-
0190* ING ENTRIES. WE HAVE TO CREATE ROOM FOR IT BY SLIDING DOWN THE
0191* ADT.
0192*
0193*
0194  37553 064065          LDB WORD       IF NO ROOM TO EXPAND ADT, WE
0195  37554 054446          CPB M3072     HAVE TO LOSE THE SPACE
0196  37555 027615          JMP KIL50
0197  37556 007000          CMB            SET UP SOURCE FOR THE MOVE.
0198  37557 044424          ADB LIBD
0199  37560 074043          STB MOVES
0200  37561 044530          ADB .+2        SET UP DESTINATION.
0201  37562 074044          STB MOVED
0202  37563 007004          CMB,INB        COMPUTE LENGTH.
0203  37564 006004          INB
0204  37565 044024          ADB KILP
0205  37566 016633          JSB MOVEB      MOVE IT.
0206  37567 060031          LDA KILD       INSERT NEW
0207  37570 064032          LDB KILN        ENTRY.
0208  37571 104400          DST KILP,I
0209*
0210  37573 060204          LDA ADLEN      ADJUST ADLEN.
0211  37574 040524          ADA .-2
0212  37575 070204          STA ADLEN
0213  37576 027615          JMP KIL50
0214*
0215* COME HERE WHEN THE NEW AREA IS ADJACENT TO THE FOLLOWING ONE, BUT
0216* NOT TO THE PRECEDING ONE.
0217  37577 104200  KIL15   DLD KILP,I    GET FOLLOWING ENTRY.
0218  37601 044032          ADB KILN       COMBINE LENGTHS.
0219  37602 060031          LDA KILD       USE NEW DISC ADDRESS.
0220  37603 104400          DST KILP,I     REPLACE.
0221  37605 027615          JMP KIL50
0222*
0223* COME HERE WHEN THE NEW AREA IS ADJACENT TO THE PRECEDING AREA.
0224*
0225  37606 160001  KIL14   LDA 1,I        ADD LENGTH OF OLD AREA TO
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```
37607 040032          ADA KILN        LENGTH OF NEW ONE.
37610 170001          STA 1,I
37611 060031          LDA KILD        NOW TEST TO SEE IF TEH COMBINED
37612 040032          ADA KILN         AREA IS ADJACENT TO THE NEXT
37613 150024          CPA KILP,I
37614 027633          JMP KIL17       IT IS--GO COMBINE THEM.
*
37615 060204   KIL50  LDA ADLEN        WRITE ADT TABLE OUT
37616 070065          STA WORD
37617 060203          LDA ADLOC
37620 064424          LDB LIBD
37621 016625          JSB DISCL
37622 060033          LDA KILTS       DID WE JUST KILL A
37623 002003          SZA,RSS          FILE?
37624 026622          JMP LLEND       NO.
37625 016362          JSB RDPRG       IF WE DID, WE HAVE TO DICOMPILE
37626 015423          JSB DCMPL        THE GUY TO MAKE SURE HE DOESN'T
37627 060352          LDA MLINK+1       USE IT.
37630 040473          ADA .-?LINK     LEAVE USER IN CORE.
37631 070261          STA MAIN
37632 026622          JMP LLEND       TERMINATE.
*
* NEW AREA WAS ADJACENT TO 2 OTHERS. COMBINE THEM ALL.
*
37633 034024   KIL17  ISZ KILP        COMBINE
37634 160001          LDA 1,I          THE
37635 140024          ADA KILP,I       LENGTHS.
37636 170001          STA 1,I
37637 006004          INB             COLLAPSE ADT.
37640 074044          STB MOVED       SET UP MOVE DESTINATION.
37641 044530          ADB .+2
37642 074043          STB MOVES SET UP SOURCE.
37643 044432          ADB MLIBD       COMPUTE # OF WORDS
37644 044065          ADB WORD         TO MOVE.
37645 016352          JSB MOVEW
*
37646 034204          ISZ ADLEN       REDUCE SIZE OF ADT BY
37647 034204          ISZ ADLEN        TWO.
37650 027615          JMP KIL50
*
37651 060506   KIL4   LDA .-16
37652 067654          LDB *+2
37653 026746          JMP LIBER
37654 037655          DEF *+1
37655 005116          OCT 5116
37656 047440          ASC 7,0 SUCH PROGRAM
00024          KILP    EQU LTEMP+4
00025          KILPD  EQU LTEMP+5
00026          KILC   EQU LTEMP+6
00031          KILD   EQU LTEMP+9
00032          KILN   EQU LTEMP+10
00033          KILTS  EQU LTEMP+11
00034          KILDF  EQU LTEMP+12
37665 144461   KILSP  ABS -TTY00-?LINK
37666          $KIL   EQU *
```

```
0282* THE RENUMBER ROUTINE IS CALLED BY A USER TO ASSIGN A NEW
0283* SET OF SEQUENCE NUMBERS TO HIS PROGRAM. RENUMBER MAY
0284* BE GIVEN 2 PARAMETERS--THE STARTING SEQUENCE NUMBER
0285* AND THE INCREMENT. IF EITHER IS NOT GIVEN, IT IS AUTOMATICALLY
0286* SET TO 10.


0288  37300                ORG LIBRA
0289  37300 060352         LDA MLINK+1
0290  37301 040514         ADA .+?PROG-?LINK
0291  37302 164000         LDB 0,I
0292  37303 054433         CPB PBUFF      NULL PROGRAM?
0293  37304 026622         JMP LLEND      YES
0294  37305 016362         JSB RDPRG      READ IN USER PROGRAM.
0295*
0296*  SET UP INITIAL SEQUENCE NUMBER AND INCREMENT
0297*
0298  37306 060540         LDA .+10       DEFAULT
0299  37307 070021         STA RENM
0300  37310 070022         STA RENN         VALUES
0301  37311 017550         JSB RENUM      PARAMETER?
0302  37312 027325         JMP REN1       NO
0303  37313 074021         STB RENM       YES, RECORD IT
0304  37314 050543         CPA .+15B      END OF RECORD?
0305  37315 027325         JMP REN1       YES
0306  37316 050602         CPA .+54B      NO--CHECK FOR COMMA
0307  37317 017550         JSB RENUM      DEMAND SECOND
0308  37320 027605         JMP RENF1      NO
0309  37321 074022         STB RENN       RECORD IT
0310  37322 050543         CPA .+15B      END OF RECORD?
0311  37323 002001         RSS            YES
0312  37324 027605         JMP RENF1      NO
0313*
0314* TEST FOR WHETHER SEQUENCING WILL OVERFLOW PAST 9999
0315  37325 064051  REN1   LDB PBPTR    COMPUTE                          X]
0316  37326 060053         LDA CFLAG                                      X]
0317  37327 011626         AND LMSK       PROGRAM                         X]
0318  37330 070023         STA RENC            AND
0319  37331 002002         SZA                   END-OF-
0320  37332 065641         LDB SYMTB               PROGRAM
0321  37333 074030         STB RENEN                 POINTER
0322  37334 002404         CLA,INA        INITIALIZE STATEMENT
0323  37335 070031         STA RENNS       COUNTER TO ONE.
0324  37336 065643         LDB SPROG
0325  37337 060021         LDA RENM       COMPUTE INITIAL
0326  37340 041106         ADA MAXSN        SEQUENCE NUMBER - 10000
0327  37341 006004  REN2   INB            MOVE TO
0328  37342 144001         ADB 1,I          NEXT
0329  37343 044525         ADB .-1            STATEMENT
0330  37344 054030         CPB RENEN      DONE?
0331  37345 027353         JMP REN3       YES
0332  37346 040022         ADA RENN       NO, ADD IN SEQUENCE INCREMENT
0333  37347 002021         SSA,RSS        PAST 9999 ?
0334  37350 027527         JMP RENF2      YES
0335  37351 034031         ISZ RENNS      BUMP STATEMENT COUNTER.
0336  37352 027341         JMP REN2       NO
```

```
0337  37353 064023  REN3  LDB RENC      PROGRAM
0338  37354 006002        SZB           COMPILED?
0339  37355 027472        JMP REN9      YES
0340*
0341  37356 060031        LDA RENNS     GET # OF STATEMENTS IN PROGRAM.
0342  37357 100400        DIV .+32      DIVIDE INTO 32 PARTS.
0343  37361 007000        CMB           SET B=-1-#OF OVERSIZE GROUPS,
0344  37362 002003        SZA,RSS       BUT IF <32 STATEMENTS USE -#.
0345  37363 006004        INB
0346  37364 002004        INA           SET A TO SIZE OF LARGER GROUP.
0347  37365 070032        STA RENC1     SET COUNTER.
0348  37366 074033        STB RENC2
0349  37367 064736        LDB ERSCA     SET INITIAL POINTER TO ERSEC.
0350  37370 074036        STB RENSN
0351*
0352* NOW BUILD A TABLE IN ERSEC HAVING TH FOLLOWING STRUCTURE:
0353*     ERSEC(0:31) ARE SEQUENCE NOS. OF STATEMENTS WHICH DIVIDE
0354* THE PROGRAM INTO 32 ALMOST EQUAL PARTS. ERSEC(32:63) ARE THE ABSO-
0355* LUTE ADDRESSES OF THESE STATEMENTS. ERSEC(0) IS THE SEQ.NO. OF THE
0356* FIRST STATEMENTS.
0357*
0358  37371 061643        LDA SPROG
0359  37372 044566  REN15 ADB .+32
0360  37373 170001        STA 1,I       SET ABSOLUTE ADDRESS INTO TABLE.
0361  37374 164000        LDB 0,I       SET SEQUENCE # INTO TABLE.
0362  37375 174036        STB RENSN,I
0363  37376 034036        ISZ RENSN     BUMP POINTERS.
0364*
0365  37377 034033        ISZ RENC2     TEST FOR ANY MORE OVERSIZE
0366  37400 006401        CLB,RSS       GROUPS.
0367  37401 007400        CCB           COMPUTE SIZE OF NEXT GROUP.
0368  37402 044032        ADB RENC1
0369  37403 074032        STB RENC1
0370  37404 007000        CMB
0371  37405 074034        STB RENC3
0372*
0373  37406 064036        LDB RENSN     TEST FOR DONE.
0374  37407 054426        CPB ERS32
0375  37410 027417        JMP REN14
0376*
0377  37411 034034        ISZ RENC3     COMPUTE 1ST STATEMENT IN
0378  37412 002005        INA,RSS       NEXT GROUP.
0379  37413 027372        JMP REN15
0380  37414 140000        ADA 0,I
0381  37415 040525        ADA .-1
0382  37416 027411        JMP *-5
0383*
0384* SCAN THROUGH PROGRAM FOR SEQUENCE NUMBER REFERENCES.
0385* FOR EACH ONE, DETERMINE ABSOLUTE ADDRESS OF THE LABEL
0386* AND REPLACE IT WITH THAT ADDRESS. IF LABEL IS NONEXISTENT,
0387* PLACE THE NEGATIVE LABEL IN TO INDICATE THIS FACT.
0388*
0389  37417 061643  REN14 LDA SPROG     INITIALIZE POINTERS
0390  37420 070025        STA RENQ      FOR RENSK.
0391  37421 040525        ADA .-1
0392  37422 070024        STA RENP
```

```
0393*
0394  37423 017620  REN4   JSB RENSK      GET NEXT STATEMENT REFERENCE.
0395  37424 027472         JMP REN9       NONE LEFT.
0396*
0397  37425 064736         LDB ERSCA
0398  37426 160001  REN7   LDA 1,I        FIRST STATEMENT >=SOUGHT STATE.?
0399  37427 003000         CMA
0400  37430 140024         ADA RENP,I
0401  37431 002024         SSA,INA
0402  37432 027442         JMP REN5       FOUND ONE.
0403  37433 006004         INB
0404  37434 054426         CPB ERS32      TEST FOR DONE.
0405  37435 002001         RSS
0406  37436 027426         JMP REN7
0407*
0408  37437 044565         ADB .+31
0409  37440 060051         LDA PBPTR      STATEMENT IS IN LAST GROUP.
0410  37441 027451         JMP REN6
0411  37442 044566  REN5   ADB .+32       B=>FIRST STATEMENT IN GROUP.
0412  37443 002003         SZA,RSS        TEST FOR FOUND.
0413  37444 027464         JMP REN18
0414  37445 054426         CPB ERS32      TEST FOR NOT THERE.
0415  37446 027466         JMP REN17
0416  37447 160001         LDA 1,I        SET A=>FIRST WORD BEYOND GROUP.
0417  37450 044525         ADB .-1          AT FIRST WORD BEYOND GROUP.
0418  37451 164001  REN6   LDB 1,I
0419  37452 070032         STA RENC1      SAVE END TEST.
0420  37453 160024         LDA RENP,I     GET SEQUENCE NUMBER.
0421  37454 006004  REN16  INB            BUMP STATEMENT POINTER.
0422  37455 144001         ADB 1,I
0423  37456 044525         ADB .-1
0424  37457 054032         CPB RENC1      TEST FOR DONE.
0425  37460 027466         JMP REN17
0426  37461 150001         CPA 1,I        TEST FOR FOUND.
0427  37462 027470         JMP REN8
0428  37463 027454         JMP REN16
0429*
0430  37464 164001  REN18  LDB 1,I
0431  37465 027470         JMP *+3
0432  37466 164024  REN17  LDB RENP,I     SET BIT15 FOR
0433  37467 045163         ADB BIT15       UNDEFINED LABELS.
0434  37470 174024  REN8   STB RENP,I
0435  37471 027423         JMP REN4
0436*
0437* NOW CHANGE ALL LABELS TO THEIR NEW VALUES.
0438*
0439  37472 061643  REN9   LDA SPROG      FIRST PROGRAM STATEMENT
0440  37473 064021         LDB RENM       INITIAL LINE NUMBER
0441  37474 050030  REN10  CPA RENEN      DONE?
0442  37475 027504         JMP REN11      YES
0443  37476 174000         STB 0,I        NO, RECORD NEW LINE NUMBER
0444  37477 044022         ADB RENN       INCREMENT TO NEXT LINE NUMBER
0445  37500 002004         INA            MOVE TO
0446  37501 140000         ADA 0,I          NEXT
0447  37502 040525         ADA .-1            STATEMENT
0448  37503 027474         JMP REN10

0500  37570 005222         RBL,RBL        MULTIPLY
```

```
0449*
0450* SCAN REFERENCES AGAIN. IF ABSOLUTE ADDRESS IS THERE,
0451* REPLACE BY NEW LABEL. OTHERWISE REPLACE BY OLD LABEL.
0452*
0453  37504 060023  REN11 LDA RENC       IS PROGRAM
0454  37505 002002        SZA             COMPILED?
0455  37506 027523        JMP REN13       YES
0456  37507 061643        LDA SPROG
0457  37510 070025        STA RENQ
0458  37511 040525        ADA .-1
0459  37512 070024        STA RENP        SEEK EMBEDDED
0460  37513 017620  REN12 JSB RENSK         STATEMENT REFERENCES
0461  37514 027523        JMP REN13       NONE LEFT
0462  37515 160024        LDA RENP,I      IF REFERENCE IS
0463  37516 001275        RAL,CLE,SLA,ERA     NEGATIVE, CLEAR BIT 15.
0464  37517 002001        RSS                 OTHERWISE, REPLACE IT.
0465  37520 160000        LDA 0,I              WITH THE NEW
0466  37521 170024        STA RENP,I             LINE NUMBER
0467  37522 027513        JMP REN12
0468  37523 060352  REN13 LDA MLINK+1    SET FLAG TO SAY
0469  37524 040473        ADA .-?LINK       'USER PROGRAM TO CORE'
0470  37525 070261        STA MAIN
0471  37526 026622        JMP LLEND
0472  37527 060475  RENF2 LDA .-25
0473  37530 067532        LDB REN0
0474  37531 026746        JMP LIBER
0475  37532 037533  REN0  DEF *+1
0476  37533 005123        OCT 5123        LF-S
0477  37534 042521        ASC 12,EQUENCE NUMBER OVERFLOW
0478*
0479* RENUM SCANS INPUT BUFFER FOR A NUMBER. IF IT FINDS NOTHING
0480* IT RETURNS WITHOUT SKIPPING.IF IT FINDS A LEGAL LABEL
0481* (1-9999) IT RETURNS WITH IT IN B AND THE NEXT CHARACTER IN A,
0482* AND SKIPS ON THE WAY BACK. IF IT FINDS AN ERROR IT GOES TO RENF.
0483*
0484  37550 000000  RENUM NOP
0485  37551 002400        CLA             INITIALIZE INTEGER
0486  37552 070020        STA RENL          TO ZERO
0487  37553 016550        JSB LCHAR       ANY CHARACTERS?
0488  37554 127550        JMP RENUM,I     NO
0489  37555 040462  RENU1 ADA M72B        YES, IS IT
0490  37556 002021        SSA,RSS           < ASCII 72 ?
0491  37557 027600        JMP RENU2       NO
0492  37560 040540        ADA .+10        YES,
0493  37561 002020        SSA               > ASCII 57 ?
0494  37562 027600        JMP RENU2       NO
0495  37563 064020        LDB RENL        YES, PREVIOUS
0496  37564 044450        ADB M1000         INTEGER
0497  37565 006021        SSB,RSS             < 1000 ?
0498  37566 027605        JMP RENF1       NO
0499  37567 064020        LDB RENL        YES
0500  37570 005222        RBL,RBL         MULTIPLY
0501  37571 044020        ADB RENL          BY
0502  37572 005200        RBL                 10
0503  37573 040001        ADA 1           ADD IN
0504  37574 070020        STA RENL          NEW DIGIT
```

```
0505  37575 016550          JSB LCHAR      FETCH NEXT
0506  37576 027601          JMP *+3          CHARACTER
0507  37577 027555          JMP RENU1
0508  37600 040606  RENU2    ADA .+60B      RESTORE ANY LEGAL CHARACTER
0509  37601 064020          LDB RENL
0510  37602 037550          ISZ RENUM
0511  37603 006002          SZB            NON-ZERO INTEGER?
0512  37604 127550          JMP RENUM,I    YES
0513  37605 060510  RENF1   LDA .-14
0514  37606 067610          LDB *+2
0515  37607 026746          JMP LIBER
0516  37610 037611          DEF *+1
0517  37611 005102          OCT 5102       LF-B
0518  37612 040504          ASC 6,AD PARAMETER
0519  37620 000000  RENSK    NOP
0520  37621 034024          ISZ RENP       INCREMENT POINTER
0521  37622 064024          LDB RENP       STATEMENT
0522  37623 054025          CPB RENQ         FINISHED?
0523  37624 027630          JMP RENS2      YES
0524  37625 037620  RENS1   ISZ RENSK      NO, RETURN WITH RENP
0525  37626 127620          JMP RENSK,I      SET TO NEXT REFERENCE
0526  37627 074025          STB RENQ       UPDATE TO NEXT STATEMENT
0527  37630 054051  RENS2   CPB PBPTR      PROGRAM EXHAUSTED?
0528  37631 127620          JMP RENSK,I    YES
0529  37632 034025          ISZ RENQ
0530  37633 064025          LDB RENQ
0531  37634 034025          ISZ RENQ       EXTRACT
0532  37635 160025          LDA RENQ,I       STATEMENT
0533  37636 011054          AND OPMSK           TYPE
0534  37637 144001          ADB 1,I        SET (B) TO
0535  37640 044525          ADB .-1          NEXT STATEMENT
0536  37641 053671          CPA RESOP      <RESTORE STATEMENT> ?
0537  37642 027666          JMP RENS5      YES
0538  37643 053672          CPA GOTOP      NO, <GOTO STATEMENT> ?
0539  37644 027653          JMP RENS3      YES
0540  37645 053673          CPA GOSOP      NO, <GOSUB STATEMENT> ?
0541  37646 027653          JMP RENS3      YES
0542  37647 053674          CPA IFOP       NO, <IF STATEMENT> ?
0543  37650 002001          RSS            YES
0544  37651 027627          JMP RENS2-1    NO
0545  37652 063675          LDA THNOP      LOAD 'THEN'
0546  37653 031060  RENS3    IOR INTFL      CREATE REFERENCE HEADER
0547  37654 074025          STB RENQ       SET POINTER TO NEXT STATEMENT
0548  37655 044525          ADB .-1        SET POINTER TO
0549  37656 074024  RENS4   STB RENP         PROSPECTIVE REFERENCE
0550  37657 044525          ADB .-1        PRECEDED BY
0551  37660 150001          CPA 1,I          REFERENCE HEADER?
0552  37661 027625          JMP RENS1      YES
0553  37662 061076          LDA OFOP       NO, LOAD HEADER FOR
0554  37663 150001          CPA 1,I
0555  37664 027625          JMP RENS1
0556  37665 027656          JMP RENS4        REFERENCE LIST
0557  37666 150025  RENS5   CPA RENQ,I     ANY REFERENCE?
0558  37667 027627          JMP RENS2-1    NO
0559  37670 027653          JMP RENS3      YES
0560  00020         RENL    EQU LTEMP
```

```
0561  00021          RENM   EQU LTEMP+1
0562  00022          RENN   EQU LTEMP+2
0563  00023          RENC   EQU LTEMP+3
0564  00024          RENP   EQU LTEMP+4
0565  00025          RENQ   EQU LTEMP+5
0566  00030          RENEN  EQU LTEMP+8
0567  00031          RENNS  EQU LTEMP+9
0568  00032          RENC1  EQU LTEMP+10
0569  00033          RENC2  EQU LTEMP+11
0570  00034          RENC3  EQU LTEMP+12
0571  00036          RENSN  EQU LTEMP+14
0572  37671 066000   RESOP  OCT 66000
0573  37672 052000   GOTOP  OCT 52000
0574  37673 056000   GOSOP  OCT 56000
0575  37674 053000   IFOP   OCT 53000
0576  37675 075000   THNOP  OCT 75000
0577  37676          $REN   EQU *
```

```
0579* THE NAME ROUTINE ALLOWS A USER TO ASSIGN HIS PROGRAM A NAME.

0581  37300                 ORG LIBRA

0583  37300 060352          LDA MLINK+1    SET POINTER TO NAME.
0584  37301 040516          ADA .+?NAME-?LINK
0585  37302 070020          STA LTEMP
0586  37303 070023          STA LTEMP+3    SAVE NAME POINTER IN LTEMP+3.
0587  37304 160000          LDA 0,I        SAVE RUN-ONLY BIT IN LTEMP+4.
0588  37305 011163          AND BIT15
0589  37306 070024          STA LTEMP+4
0590  37307 060523          LDA .-3        SET COUNTER.
0591  37310 070021          STA LTEMP+1
0592  37311 002400          CLA            SET FLAG TO SAY
0593  37312 070022          STA LTEMP+2    FIRST CHARACTER
0594  37313 017355  NAME1    JSB NAMER      GET A CHAR.
0595  37314 001727          ALF,ALF
0596  37315 170020          STA LTEMP,I
0597  37316 017355          JSB NAMER      GET 2ND CHAR.
0598  37317 130020          IOR LTEMP,I
0599  37320 170020          STA LTEMP,I
0600  37321 034020          ISZ LTEMP      BUMP NAME POINTER.
0601  37322 034021          ISZ LTEMP+1    TEST FOR DONE.
0602  37323 027313          JMP NAME1
0603  37324 160023          LDA LTEMP+3,I  GET FIRST WORD OF NAME
0604  37325 030024          IOR LTEMP+4    MERGE IN RUN-ONLY BIT.
0605  37326 170023          STA LTEMP+3,I
0606  37327 017355          JSB NAMER      TEST FOR ONLY 6 CHARS.
0607  37330 050566          CPA .+40B
0608  37331 026622          JMP LLEND
0609*
0610  37332 063354          LDA NAM27
0611  37333 067335          LDB *+2
0612  37334 026746          JMP LIBER
0613  37335 037336          DEF *+1
0614  37336 005117          OCT 5117       LF-0
0615  37337 047114          ASC 13,NLY 6 CHARACTERS ACCEPTED
0616  37354 177745  NAM27    DEC -27
0617*
0618  37355 000000  NAMER    NOP            GETS NEXT NAME CHARACTER.
0619  37356 016550          JSB LCHAR
0620  37357 060566          LDA .+40B      USE BLANK IF END OF LINE.
0621  37360 070001          STA 1          HOLD IN B.
0622  37361 011120          AND .140       TEST FOR CONTROL CHAR.
0623  37362 002002          SZA
0624  37363 051120          CPA .140
0625  37364 027356          JMP NAMER+1    SKIP CONTROL CHARS.
0626  37365 060001          LDA 1          GET IN A AGAIN.
0627  37366 050602         CPA .+54B      COMMA?
0628  37367 027422          JMP NAME2      YES
0629  37370 050570          CPA .+42B      QUOTE?
0630  37371 027422          JMP NAME2      YES
0631  37372 064022          LDB LTEMP+2    GET 1ST CHAR FLAG.
0632  37373 034022          ISZ LTEMP+2
0633  37374 050572          CPA .+44B      IF $ AND
0634  37375 006002          SZB             FIRST CHAR., IT'S ILLEGAL.
```

```
0635  37376 127355          JMP NAMER,I
0636*
0637  37377 063425          LDA NAM29      PRINT ERROR.
0638  37400 067402          LDB *+2
0639  37401 026746          JMP LIBER
0640  37402 037403          DEF *+1
0641  37403 005044          OCT 5044       LF-$
0642  37404 020111          ASC 14, ILLEGAL AS FIRST CHARACTER
0643*
0644  37422 060024  NAME2    LDA LTEMP+4    CLEAR
0645  37423 170023           STA LTEMP+3,I    NAME
0646  37424 026744           JMP ILFER
0647  37425 177743  NAM29    DEC -29
0648  37426         $NAM     EQU *
```

```
0002* CATALOG PRINTS A LIST OF USER FILES ON THE USER TELETYPE.
0003* IT PRINTS THESE, 5 PER LINE, ALONG WITH THEIR LENGTHS AND
0004* AN INDICATION OF FILES.  CATALOG IS IDENTICAL TO LIBRARY,
0005* EXCEPT THAT LIBRARY PRINTS FROM THE A000 FILE DIRECTORY.
0006* LIBRARY MUST FOLLOW CATALOG IN SEQUENCE.
0007*
0008  37300                ORG LIBRA
0009*
0010  37300 000000         NOP
0011*
0012  37301 060352  CAT1   LDA MLINK+1    SET USER ID INTO LTEMP.
0013  37302 040515         ADA .+?ID-?LINK
0014  37303 160000         LDA 0,I
0015  37304 070020  CAT2   STA LTEMP      RENDEZVOUS WITH "LIBRARY".
0016*
0017  37305 060521         LDA .-5     SET LINE COUNTER
0018  37306 070027         STA CATN
0019  37307 060540         LDA .+12B      OUTPUT LF
0020  37310 016516         JSB LOUT
0021  37311 060516          LDA .-8       SET TRACK COUNTER TO 8
0022  37312 070021          STA CATTR
0023  37313 064334         LDB DIRD0      SET POINTER TO FIRST
0024  37314 074024         STB LTEMP+4      DIRECTORY TRACK
0025  37315 160001  CAT5    LDA 1,I       LOAD LENGTH
0026  37316 002003          SZA,RSS       IS TRACK EMPTY?
0027  37317 027531          JMP CAT3      YES GO TO NEXT TRACK
0028  37320 006004         INB      LOAD ID
0029  37321 160001         LDA 1,I
0030  37322 003004         CMA,INA    MAKE NEGATIVE
0031  37323 040020         ADA LTEMP    IS IT THE ONE WERE LOOKING FOR?
0032  37324 002020         SSA         IF POSITIVE THEN IT IS
0033  37325 027531          JMP CAT3     NO TRY NEXT TRACK
0034  37326 060424          LDA LIBD      YES
0035  37327 070025          STA LTEMP+5 SET POINTER TO TRACK
0036*
0037*       ENTRIES FOR THE GIVEN ID
0038*       MAY BE ON THIS TRACK, SO READ IT IN
0039*
0040  37330 044533          ADB .+5
0041  37331 160001          LDA 1,I       LOAD DISC ADDRESS
0042  37332 070022         STA CATDA     SAVE IT
0043  37333 044520          ADB .-6
0044  37334 164001          LDB 1,I       LOAD LENGTH
0045  37335 074065          STB WORD
0046  37336 074030          STB CATDL     SAVE LENGTH
0047  37337 064425          LDB LIBDI     READ IN DIRECTORY TRACK
0048  37340 016625          JSB DISCL
0049*
0050*       THE TRACK HAS BEEN READ IN
0051*      NOW SCAN IT FOR THE CORRECT ID
0052*
0053  37341 064030  CAT4   LDB CATDL      SAVE END-OF-TRACK POINTER
0054  37342 007004          CMB,INB
0055  37343 044424         ADB LIBD
0056  37344 074035          STB LTEMP+13
0057  37345 064025  CAT10  LDB LTEMP+5    LOAD ENTRY POINT
```

```
0058  37346 054035  CAT11 CPB LTEMP+13
0059  37347 027531         JMP CAT3      TRACK IS ALL DONE
0060  37350 160001         LDA 1,I       LOAD ID
0061  37351 050020         CPA LTEMP     SAME?
0062  37352 027355         JMP CAT12     YES - OUTPUT
0063  37353 044536         ADB .+8       NEXT ENTRY
0064  37354 027346        JMP CAT11
0065  37355 074025  CAT12 STB LTEMP+5
0066  37356 060523         LDA .-3       SET COUNTER FOR
0067  37357 070032        STA CATC        PRINTING NAME.
0068  37360 034025  CAT15 ISZ CATP       BUMP P TO NEXT WORD.
0069  37361 160025        LDA CATP,I
0070  37362 001727        ALF,ALF        GET LEFT CHAR.
0071  37363 016516        JSB LOUT       PRINT IT.
0072  37364 160025        LDA CATP,I     OUTPUT IT
0073  37365 016516        JSB LOUT
0074  37366 034032       ISZ CATC        TEST FOR 6 CHARS OUT.
0075  37367 027360        JMP CAT15
0076  37370 060566        LDA .+40B      OUTPUT A BLANK.
0077  37371 016516        JSB LOUT
0078  37372 007400        CCB
0079  37373 044025        ADB CATP       => SECOND WORD OF NAME
0080  37374 160001        LDA 1,I
0081  37375 011163        AND BIT15
0082  37376 002003        SZA,RSS        FILE?
0083  37377 027402        JMP CAT20      NO
0084  37400 063542        LDA ASCF       YES--OUTPUT
0085  37401 027403        JMP CAT21        AN 'F'
0086  37402              CAT20 EQU *                                    XJ
0087  37402 060566        LDA .+40B      OUTPUT A BLANK
0088  37403 016516  CAT21 JSB LOUT
0089  37404 060025        LDA CATP       BUMP TO PROGRAM LENGTH
0090  37405 040532        ADA .+4
0091  37406 070025        STA CATP
0092*
0093  37407 160025        LDA CATP,I     GET NUMBER.
0094  37410 003004        CMA,INA
0095  37411 006400        CLB
0096  37412 100400        DIV DVSRS+1    DIV BY 1000.
0097  37414 074033        STB CATLN      SAVE REMAINDER.
0098  37415 040346        ADA ASC00
0099  37416 016516        JSB LOUT
0100  37417 060033        LDA CATLN      GET HUNDREDS.
0101  37420 006400        CLB
0102  37421 100400        DIV DVSRS+2
0103  37423 074033        STB CATLN
0104  37424 040346        ADA ASC00
0105  37425 016516        JSB LOUT
0106  37426 060033        LDA CATLN      GET TENS.
0107  37427 006400        CLB
0108  37430 100400        DIV .+10
0109  37432 074033        STB CATLN
0110  37433 040346        ADA ASC00
0111  37434 016516        JSB LOUT
0112  37435 060033        LDA CATLN      GET UNITS
0113  37436 040346        ADA ASC00
```

```
0114  37437 016516          JSB LOUT
0115  37440 060566          LDA .+40B      OUTPUT A BLANK
0116  37441 016516          JSB LOUT
0117  37442 060566          LDA .+40B
0118  37443 016516          JSB LOUT
0119*
0120  37444 034025          ISZ CATP       BUMP POINTER TO NEXT ENTRY.
0121  37445 060025          LDA CATP
0122  37446 034027          ISZ CATN       END OF LINE?
0123  37447 027345          JMP CAT10      NO
0124  37450 016362          JSB RDPRG     READ IN USER AREA
0125  37451 060030          LDA CATDL
0126  37452 071710          STA ERSEC+7
0127  37453 060022          LDA CATDA
0128  37454 071711          STA ERSEC+8
0129  37455 060021          LDA CATTR
0130  37456 071712          STA ERSEC+9
0131  37457 060020           LDA LTEMP     R  SET VALUES FOR SUSPEND
0132  37460 071704           STA ERSEC+3
0133  37461 060024           LDA LTEMP+4
0134  37462 071705           STA ERSEC+4
0135  37463 060025           LDA LTEMP+5
0136  37464 071706           STA ERSEC+5
0137  37465 064352          LDB MLINK+1
0138  37466 044514          ADB .+?PROG-?LINK
0139  37467 160001          LDA 1,I        COMPUTE
0140  37470 003004          CMA,INA
0141  37471 041321          ADA USE          LENGTH
0142  37472 070065          STA WORD
0143  37473 044525          ADB .+?DISC-?PROG
0144  37474 160001          LDA 1,I        DISC ADDRESS
0145  37475 065321          LDB USE        CORE ADDRESS
0146  37476 016625          JSB DISCL
0147*
0148  37477 060543          LDA .+15B      OUTPUT CR.
0149  37500 016516          JSB LOUT
0150  37501 060540          LDA .+12B     OUTPUT LINE FEED
0151  37502 016516          JSB LOUT
0152  37503 114347          JSB SCHOU,I    OUTPUT WAIT.
0153*
0154* READ THE LAST ENTRY OUT OF ERSEC(0:2) AND
0155* PUT IT INTO LTEMP(1:3).
0156*
0157  37504 016362          JSB RDPRG      READ IN USER PROGRAM
0158  37505 061704           LDA ERSEC+3
0159  37506 070020           STA LTEMP     RESTORE POINTERS AFTER SUSPEND
0160  37507 061705           LDA ERSEC+4
0161  37510 070024           STA LTEMP+4
0162  37511 061706           LDA ERSEC+5
0163  37512 070025           STA LTEMP+5
0164  37513 061710          LDA ERSEC+7
0165  37514 070030          STA CATDL
0166  37515 061711          LDA ERSEC+8
0167  37516 070022          STA CATDA
0168  37517 061712          LDA ERSEC+9
0169  37520 070021          STA CATTR
```

```
0170   37521 060521          LDA .-5   RESET LINE COUNTER
0171   37522 070027          STA CATN
0172   37523 060030           LDA CATDL     READ THE DIRECTORY TRACK BACK IN
0173   37524 070065           STA WORD
0174   37525 060022           LDA CATDA
0175   37526 064425           LDB LIBDI
0176   37527 016625           JSB DISCL
0177   37530 027341           JMP CAT4
0178   37531 034021  CAT3     ISZ CATTR
0179   37532 027536           JMP *+4       STILL MORE TRACKS
0180   37533 060543           LDA .+15B     ALL DONE
0181   37534 016516           JSB LOUT
0182   37535 026622           JMP LLEND
0183   37536 064024           LDB LTEMP+4 POINT TO NEXT BASE PAGE ENTRY
0184   37537 044535           ADB .+7
0185   37540 074024           STB LTEMP+4
0186   37541 027315           JMP CAT5
0187   00025          CATP   EQU LTEMP+5
0188   00027          CATN   EQU LTEMP+7
0189   00032          CATC   EQU LTEMP+10
0190   00033          CATLN  EQU LTEMP+11
0191   00030          CATDL  EQU LTEMP+8
0192   00022          CATDA  EQU LTEMP+2
0193   00021          CATTR  EQU LTEMP+1
0194   37542 000106   ASCF   OCT 106
0195   37543          $CAT   EQU *
```

```
0197* LIBRARY IS IDENTICAL TO CATALOG EXCEPT THAT IT USES A000
0198* AS ID RATHER THAN THE USER ID. IT MUST BE LOADED IMMEDIATELY
0199* AFTER CATALOG.

0201  37300                 ORG LIBRA
0202  37300 002400          CLA
0203  37301                 ORG CAT1
0204  37301 061002          LDA A000
0205  37302 027304          JMP CAT2
```

```
0207* THE DELETE COMMAND ALLOWS A USER TO DELETE A SECTION OF HIS
0208* PROGRAM IN A SINGLE LINE. THE FORMAT IS:
0209*     DELETE-M,N
0210*  OR
0211*     DELETE-M
0212* WITH THE FIRST FORMAT, ALL LINES FROM M THROUGH N ARE
0213* DELETED. WITH THE SECOND, ALL LINES FROM M TO THE END OF
0214* THE PROGRAM ARE DELETED.

0216  37300                ORG LIBRA
0217  37300 017374         JSB DELNM      GET M.
0218  37301 070020         STA DELM
0219  37302 063426         LDA DEL99
0220  37303 054602         CPB .+54B      IF COMMA FOLLOWS, GO
0221  37304 017374         JSB DELNM       GET N.
0222  37305 070021         STA DELN
0223  37306 054543         CPB .+15B      NEXT CHAR MUST BE A CR.
0224  37307 027311         JMP DEL2
0225  37310 026744         JMP ILFER
0226*
0227  37311 003000  DEL2   CMA            CHECK FOR M<=N
0228  37312 040020         ADA DELM
0229  37313 002021         SSA,RSS
0230  37314 026744         JMP ILFER
0231*
0232  37315 016362         JSB RDPRG      READ IN PROGRAM AND
0233  37316 015423         JSB DCMPL       DECOMPILE IT.
0234*
0235  37317 060051         LDA PBPTR      LOCATE FIRST
0236  37320 064020         LDB DELM        STATEMENT TO BE DELETED.
0237  37321 015415         JSB FNDPS
0238  37322 002001         RSS
0239  37323 000000         NOP
0240  37324 074044         STB MOVED
0241*
0242  37325 060051         LDA PBPTR      LOCATE FIRST STATEMENT
0243  37326 064021         LDB DELN        NOT TO BE DELETED.
0244  37327 070043         STA MOVES
0245  37330 057426         CPB DEL99
0246  37331 027337         JMP DEL3
0247  37332 006004         INB
0248  37333 015415         JSB FNDPS
0249  37334 002001         RSS
0250  37335 000000         NOP
0251  37336 074043         STB MOVES
0252*
0253  37337 064043  DEL3   LDB MOVES      IF DEST=SOURCE, NOTHING DELETED.
0254  37340 054044         CPB MOVED
0255  37341 027354         JMP DEL4
0256  37342 007004         CMB,INB        OTHERWISE, MOVE UP.
0257  37343 044051         ADB PBPTR
0258  37344 007004         CMB,INB
0259  37345 016352         JSB MOVEW
0260  37346 060044         LDA MOVED      SET NEW VALUE OF
0261  37347 070051         STA PBPTR       PBPTR.
0262  37350 060352         LDA MLINK+1    TELL SCHEDULER THAT
```

```
0263  37351 040473          ADA .-?LINK    PROGRAM IS IN CORE.
0264  37352 070261          STA MAIN
0265  37353 026622          JMP LLEND
0266*
0267  37354 060352  DEL4    LDA MLINK+1
0268  37355 040473          ADA .-?LINK
0269  37356 070261          STA MAIN
0270  37357 060505          LDA .-17
0271  37360 067362          LDB *+2
0272  37361 026746          JMP LIBER
0273  37362 037363          DEF *+1
0274  37363 005116          OCT 5116       LF-N
0275  37364 047524          ASC 7,OTHING DELETED
0276  37373 006400          OCT 6400       CR
0277*
0278* DELNM READS A NUMBER FROM THE USER'S BUFFER. IN CASE OF ERROR IT
0279* GOES TO DEL1. OTHERWISE IT RETURNS WITH A=# AND B=NEXT CHAR.
0280*
0281  37374 000000  DELNM NOP
0282  37375 002400          CLA            INITIALIZE TO 0.
0283  37376         DEL7    EQU *                                    BJ
0284  37376 070022          STA DELT
0285  37377 016550          JSB LCHAR      GET A CHARACTER           BJ
0286  37400 000000          NOP
0287  37401 070001          STA 1          SAVE IN B.
0288  37402 040462          ADA M72B       TEST FOR DIGIT.
0289  37403 002021          SSA,RSS
0290  37404 027422          JMP DEL6
0291  37405 040540          ADA .+10
0292  37406 002020          SSA
0293  37407 027422          JMP DEL6
0294  37410 064022          LDB DELT                                 BJ
0295  37411 047427          ADB DELMX                                BJ
0296  37412 006021          SSB,RSS                                  BJ
0297  37413 026744          JMP ILFER      NUMBER TOO LARGE          BJ
0298  37414 064022          LDB DELT       MPY OLD VALUE BY 10.
0299  37415 005222          RBL,RBL
0300  37416 044022          ADB DELT
0301  37417 005200          RBL
0302  37420 040001          ADA 1          ADD IN NEW.
0303*                                                              BJ
0304  37421 027376          JMP DEL7       LOOP.
0305*
0306  37422 060022  DEL6    LDA DELT       GET VALUE
0307  37423 002002          SZA            FAIL IF ZERO.
0308  37424 127374          JMP DELNM,I
0309  37425 026744          JMP ILFER
0310*
0311  00020         DELM    EQU LTEMP
0312  00021         DELN    EQU LTEMP+1
0313  00022         DELT    EQU LTEMP+2
0314  37426 023417  DEL99   DEC 9999
0315  37427 176030  DELMX    DEC -1000                               BJ
0316  37430         $DEL    EQU *
```

```
0318* THE TIME COMMAND PRINTS THE USER'S CONSOLE TIME DURING THIS
0319* SESSION AND HIS TOTAL CONSOLE TIME TO DATE.

0321  37300                 ORG LIBRA

0323  37300 060506         LDA .-16       OUTPUT START OF
0324  37301 067353         LDB TIM1        MESSAGE.
0325  37302 016523         JSB LTYPR
0326*
0327  37303 060352         LDA MLINK+1    COMPUTE LOC OF USER'S
0328  37304 040521         ADA .+?TIME-?LINK  STARTING TIME.
0329  37305 104200         DLD 0,I        GET STARTING TIME.
0330  37307 003004         CMA,INA        MAKE NEGATIVE AND
0331  37310 007004         CMB,INB         SAVE IN TIMT.
0332  37311 104400         DST TIMT
0333  37313 104200         DLD DATIM      GET CURRENT TIME.
0334  37315 040021         ADA TIMT       COMPUTE DIRRERENCES: A=# OF HRS;
0335  37316 000040         CLE            B=# OF 100 MS UNITS.
0336  37317 044022         ADB TIMT+1      E=-SIGN OF B.
0337  37320 074022         STB TIMT+1     SAVE UNITS.
0338  37321 100200         MPY D60        CHANGE HRS TO MINS.
0339  37323 070021         STA TIMT
0340  37324 060022         LDA TIMT+1     GET UNIT COUNT. IF E=0
0341  37325 002041         SEZ,RSS         THEN COUNT IS NEGATIVE.
0342  37326 007400         CCB
0343  37327 100400         DIV D600       CHANGE TO MINS.
0344  37331 040021         ADA TIMT       ADD IN PREVIOUS AMT.
0345  37332 070021         STA TIMT
0346  37333 017402         JSB TIMPR      PRINT IT.
0347*
0348  37334 060510         LDA .-14       OUTPUT SOME MORE
0349  37335 067364         LDB TIM2        CHARACTERS.
0350  37336 016523         JSB LTYPR
0351*
0352  37337 060352         LDA MLINK+1  GET USER
0353  37340 040515         ADA .+?ID-?LINK
0354  37341 160000         LDA 0,I            ID
0355  37342 070045         STA ID
0356  37343 016414         JSB FIDT     SEARCH IDT
0357*
0358  37344 044533         ADB .+5         GET TIME TO DATE.
0359  37345 160001         LDA 1,I
0360  37346 040021         ADA TIMT       ADD IN CURRENT TIME.
0361  37347 017402         JSB TIMPR      PRINT IT.
0362*
0363  37350 060543         LDA .+15B      OUTPUT CR.
0364  37351 016516         JSB LOUT
0365  37352 026622         JMP LLEND      TERMINATE.
0366*
0367  37353 037354  TIM1   DEF *+1
0368  37354 005103         OCT 5103       LF-C
0369  37355 047516         ASC 7,ONSOLE TIME =
0370  37364 037365  TIM2   DEF *+1
0371  37365 020124         ASC 7, TOTAL TIME =
0372  37374 037375  TIM3   DEF *+1
0373  37375 020115         ASC 5, MINUTES.
```

```
0374*
0375* TIMPR OUTPUTS THE INTEGER IN A TO THE CONSOLE.
0376*
0377  37402 000000  TIMPR NOP
0378  37403 002003        SZA,RSS        SPECIAL CASE OF ZERO.
0379  37404 027431        JMP TIMP1
0380  37405 070023        STA TIMNM      SAVE ORIGINAL NUMBER.
0381  37406 067437        LDB TIMXK      GET INITIAL DIVISOR OF 10000.
0382  37407 074024        STB TIMDV
0383  37410 006400  TIMP4 CLB            COMPUTE A DIGIT.
0384  37411 100400        DIV TIMDV
0385  37413 074020        STB TIMN       SAVE REMAINDER.
0386  37414 054023        CPB TIMNM      IF REMAINDER=ORIGINAL NUMBER
0387  37415 027420        JMP TIMP2      THIS IS A LEADING ZERO.
0388  37416 040606        ADA .+60B      OUTPUT
0389  37417 016516        JSB LOUT        DIGIT.
0390  37420 060024  TIMP2 LDA TIMDV      PRODUCE NEW DIVISOR.
0391  37421 006400        CLB
0392  37422 100400        DIV .+10
0393  37424 070024        STA TIMDV
0394  37425 002003        SZA,RSS        DONE IF DIVISOR IS ZERO.
0395  37426 027433        JMP TIMP3
0396  37427 060020        LDA TIMN       GET # AGAIN AND LOOP.
0397  37430 027410        JMP TIMP4
0398  37431 060606  TIMP1 LDA .+60B      OUTPUT SINGLE 0.
0399  37432 016516        JSB LOUT
0400  37433 060515  TIMP3 LDA .-9        PRINT
0401  37434 067374        LDB TIM3        "MINUTES."
0402  37435 016523        JSB LTYPR
0403*
0404  37436 127402        JMP TIMPR,I
0405*
0406  37437 023420  TIMXK DEC 10000
0407  00020         TIMN  EQU LTEMP
0408  00021         TIMT  EQU LTEMP+1
0409  00023         TIMNM EQU LTEMP+3
0410  00024         TIMDV EQU LTEMP+4
0411  37440         $TIM  EQU *
```

```
0413*                                                    [X]
0414*     THE DISC COMMAND IS ANALOGOUS                  [X]
0415*     TO THE TIME COMMAND, IT OUTPUTS                [X]
0416*     THE TOTAL NUMBER OF SECTORS                    [X]
0417*     ALLOWED AND THE NUMBER USED.                   [X]
0418*                                                    [X]

0420  37300               ORG LIBRA                              [X]

0422  37300 064352        LDB MLINK+1   SET ID
0423  37301 044515        ADB .+?ID-?LINK
0424  37302 160001        LDA 1,I          FOR
0425  37303 070045        STA ID               FIDT
0426  37304 060506        LDA .-16      OUTPUT                   [X]
0427  37305 067364        LDB DU1       "DISC ALLOWED ="         [X]
0428  37306 016523        JSB LTYPR                              [X]
0429  37307 016414        JSB FIDT      GET ID ENTRY
0430  37310 044534        ADB .+6                                [X]
0431  37311 074022        STB LTEMP+2                            [X]
0432  37312 160001        LDA 1,I       GET DISC ALLOWED         [X]
0433  37313 017331        JSB DUNM      CONVERT + OUTPUT         [X]
0434  37314 060500        LDA .-22      OUTPUT                   [X]
0435  37315 067375        LDB DU2       MIDDLE PORTION           [X]
0436  37316 016523        JSB LTYPR                              [X]
0437  37317 064022        LDB LTEMP+2                            [X]
0438  37320 006004        INB                                    [X]
0439  37321 160001        LDA 1,I                                [X]
0440  37322 017331        JSB DUNM      OUTPUT DISC USED         [X]
0441  37323 060516        LDA .-8       OUTPUT FINAL             [X]
0442  37324 067411        LDB DU3       PORTION OF MESSAGE       [X]
0443  37325 016523        JSB LTYPR                              [X]
0444  37326 060543        LDA .+15B     TERMINATE                [X]
0445  37327 016516        JSB LOUT                               [X]
0446  37330 026622        JMP LLEND                              [X]
0447*                                                    [X]
0448*        SUBROUTINE TO CONVERT TO                        [X]
0449*     ASCII AND OUTPUT IT.                           [X]
0450*                                                    [X]
0451  37331 000000  DUNM  NOP                                    [X]
0452  37332 002003        SZA,RSS       ZERO?                    [X]
0453  37333 027360        JMP DUNM1     YES                      [X]
0454  37334 070020        STA LTEMP                              [X]
0455  37335 067363        LDB DIDV      DEC 10000                [X]
0456  37336 074023        STB LTEMP+3   SAVE DIVISOR             [X]
0457  37337 006400  DUNM4 CLB           GET A DIGIT              [X]
0458  37340 100400        DIV LTEMP+3                            [X]
0459  37342 074021        STB LTEMP+1                            [X]
0460  37343 054020        CPB LTEMP     LEADING ZERO?            [X]
0461  37344 027347        JMP DUNM2     YES                      [X]
0462  37345 040606        ADA .+60B     MAKE ASCII               [X]
0463  37346 016516        JSB LOUT      OUTPUT DIGIT             [X]
0464  37347 060023  DUNM2 LDA LTEMP+3   FORM NEXT               [X]
0465  37350 006400        CLB           DIVISOR                  [X]
0466  37351 100400        DIV .+10                               [X]
0467  37353 070023        STA LTEMP+3                            [X]
```

```
0468  37354 002003        SZA,RSS      IF ZERO THEN DONE          [X]
0469  37355 127331        JMP DUNM,I   DONE                       [X]
0470  37356 060021        LDA LTEMP+1  LOAD REMAINDER             [X]
0471  37357 027337        JMP DUNM4                               [X]
0472  37360 060606 DUNM1  LDA .+60B    ZERO!                      [X]
0473  37361 016516        JSB LOUT                                [X]
0474  37362 127331        JMP DUNM,I                              [X]
0475*                                                        [X]
0476*                                                        [X]
0477  37363 023420 DIDV   DEC 10000                               [X]
0478  37364 037365 DU1    DEF *+1                                 [X]
0479  37365 005104        OCT 5104                                [X]
0480  37366 044523        ASC 7,ISC ALLOWED =                     [X]
0481  37375 037376 DU2    DEF *+1                                 [X]
0482  37376 020123        ASC 11, SECTORS  DISC USED =            [X]
0483  37411 037412 DU3    DEF *+1                                 [X]
0484  37412 020123        ASC 4, SECTORS                          [X]
0485  37416        $UDIS  EQU *                                   [X]
```

```
0487*    THE MESSAGE COMMAND IS USED TO SEND
0488*   A MESSAGE TO THE CONSOLE
0489  37300                 ORG LIBRA
0490  37300 060076          LDA MSQCT      ALREADY A MESSAGE IN QUEUE?
0491  37301 002002          SZA
0492  37302 027362          JMP MESS1      NO
0493*
0494  37303 060077          LDA MSQP1      LOAD BUFFER POINTER
0495  37304 002004          INA
0496  37305 064255          LDB CRLF       LOAD CR-LF AND
0497  37306 174000          STB A,I          STORE IN BUFFER
0498  37307 002004          INA
0499  37310 073411          STA MSQP2      SET POINTER
0500  37311 060352          LDA MLINK+1    GET THE USER NUMBER
0501  37312 040473          ADA .+?TNUM-?LINK
0502  37313 160000          LDA 0,I          INTO A REGISTER
0503  37314 001727          ALF,ALF
0504  37315 006400          CLB
0505  37316 100400          DIV .+10      DIVIDE BY 10
0506  37320 001727          ALF,ALF
0507  37321 030001          IOR 1
0508  37322 030346          IOR ASC00      CONVERT TO ASCII
0509  37323 173411          STA MSQP2,I    STORE IT IN BUFFR
0510  37324 037411          ISZ MSQP2
0511  37325 060340          LDA ASCBB      STORE TWO BLANKS
0512  37326 173411          STA MSQP2,I
0513  37327 067411          LDB MSQP2      TURN BUFFER
0514  37330 006004          INB              POINTER INTO
0515  37331 005000          BLS                CHARACTER
0516  37332 077411          STB MSQP2            POINTER
0517  37333 060534          LDA .+6
0518  37334 170077          STA MSQP1,I    SET LENGTH
0519  37335 002400          CLA
0520  37336 072600          STA LCHR2      PREVENT DEBLANKING
0521  37337 016550          JSB LCHAR      GET A CHAR
0522  37340 027357          JMP MESER      NONE? - ERROR
0523  37341 064640  MESS2   LDB .+74       IS MESSAGE TOO LONG?
0524  37342 154077          CPB MSQP1,I
0525  37343 027350          JMP MESS4      YES - STOP HERE
0526  37344 017375          JSB MESCH      STORE CHAR
0527  37345 016550          JSB LCHAR      NEXT CHAR
0528  37346 027350          JMP MESS4      ALL DONE
0529  37347 027341          JMP MESS2
0530  37350 060540  MESS4   LDA .+12B      LF
0531  37351 017375          JSB MESCH
0532  37352 067410          LDB MESWK      RESTORE LCHAR
0533  37353 076600          STB LCHR2
0534  37354 034076          ISZ MSQCT      INC. MESSAGE FLAG
0535  37355 034076          ISZ MSQCT       SET MESSAGE COUNT =2
0536  37356 026622          JMP LLEND
0537*
0538  37357 067410  MESER   LDB MESWK      FIX LCHAR
0539  37360 076600          STB LCHR2
0540  37361 026744          JMP ILFER
0541*
0542  37362 060510  MESS1   LDA .-14
```

```
0543  37363 067365          LDB *+2
0544  37364 026746          JMP LIBER
0545  37365 037366          DEF *+1
0546  37366 005103          OCT 5103
0547  37367 047516          ASC 6,ONSOLE BUSY
0548*
0549*      ROUTINE TO STORE CHARS INTO BUFFER
0550*
0551  37375 000000  MESCH NOP
0552  37376 067411          LDB MSQP2       LOAD CHAR POINTER
0553  37377 004065          CLE,ERB         TURN INTO WORD POINTER
0554  37400 002041          SEZ,RSS         UPPER/LOWER?
0555  37401 001727          ALF,ALF         UPPER
0556  37402 002040          SEZ
0557  37403 130001          IOR B,I               LOWER
0558  37404 170001          STA B,I         STORE WORD
0559  37405 037411          ISZ MSQP2       ADVANCE POINTER
0560  37406 134077          ISZ MSQP1,I     AND COUNTER
0561  37407 127375          JMP MESCH,I
0562*
0563  37410 026561  MESWK JMP LCHR1
0564  37411 000000  MSQP2 BSS 1
0565  37412         $MESS EQU *
```

```
0567* THE PROTECT COMMAND CAN BE USED BY A000 TO PROTECT PROGRAMS AND
0568* FILES FROM BEING READ BY OTHER USERS. ALL THE COMMAND DOES IS TO
0569* SET BIT 15 OF WORD 1 IN THE DIRECTORY ENTRY FOR THE PROGRAM.

0571  37300                 ORG LIBRA

0573  37300 060352         LDA MLINK+1   GET USER'S ID.
0574  37301 040515         ADA .+?ID-?LINK
0575  37302 160000         LDA 0,I       CHECK FOR PROPER
0576  37303 051002         CPA A000       USER.
0577  37304 027323         JMP PRO1
0578*
0579  37305 060503         LDA .-19
0580  37306 067310         LDB *+2
0581  37307 026746         JMP LIBER
0582  37310 037311         DEF *+1
0583  37311 005120         OCT 5120      LF-P
0584  37312 051111         ASC 9,RIVILEGED COMMAND
0585*
0586  37323 070020  PRO1   STA LTEMP     PLACE ID INTO LTEMP.
0587  37324 060323         LDA DLTEM     SET POINTER FOR PROGRAM NAME.
0588  37325 070027         STA PROC
0589  37326 060523         LDA .-3       SET UP COUNTER.
0590  37327 070026         STA PROD
0591  37330 016550         JSB LCHAR     GET FIRST CHAR.
0592  37331 027347         JMP PRO2      ERROR IF NONE.
0593  37332 001727  PRO3   ALF,ALF       SAVE CHARACTER IN
0594  37333 034027         ISZ PROC       TABLE.
0595  37334 170027         STA PROC,I
0596  37335 016550         JSB LCHAR     GET RIGHT CHAR.
0597  37336 060566         LDA .+40B     IF END CHANGE TO BLANK
0598  37337 130027         IOR PROC,I
0599  37340 170027         STA PROC,I
0600  37341 016550         JSB LCHAR     GET NEXT CHAR.
0601  37342 060566         LDA .+40B
0602  37343 034026         ISZ PROD      DO WE WANT IT?
0603  37344 027332         JMP PRO3      YES.
0604  37345 050566         CPA .+40B     MUST BE A BLANK.
0605  37346 027362         JMP PRO4
0606*
0607  37347 060511  PRO2   LDA .-13
0608  37350 067352         LDB *+2
0609  37351 026746         JMP LIBER
0610  37352 037353         DEF *+1
0611  37353 005111         OCT 5111      LF-I
0612  37354 047126         ASC 6,NVALID NAME
0613*
0614  37362 016202  PRO4   JSB DLOOK     SEARCH FOR PROG. IN DIRECTORY.
0615  37363 027400         JMP PRO6      FOUND.
0616*
0617  37364 060506         LDA .-16
0618  37365 067367         LDB *+2
0619  37366 026746         JMP LIBER
0620  37367 037370         DEF *+1
0621  37370 005116         OCT 5116      LF-N
0622  37371 047440         ASC 7,0 SUCH PROGRAM
```

```
0623*
0624   37400 064025  PR06  LDB LTEMP+5   SET PROTECT BIT.
0625   37401 006004        INB
0626   37402 160001        LDA 1,I
0627   37403 031163  PR07  IOR BIT15
0628   37404 170001        STA 1,I
0629*
0630   37405 064024        LDB LTEMP+4   WRITE OUT DIRECTORY.
0631   37406 160001        LDA 1,I
0632   37407 070065        STA WORD
0633   37410 044534        ADB .+6
0634   37411 160001        LDA 1,I
0635   37412 064424        LDB LIBD
0636   37413 114350        JSB DISC,I
0637   37414 026622        JMP LLEND
0638   00026         PROD  EQU LTEMP+6
0639   00027         PROC  EQU LTEMP+7
0640   37415         $PRO  EQU *
```

```
0002* UNPROTECT IS IDENTICAL TO PROTECT EXCEPT THAT IT CLEARS THE
0003* PROTECT BIT INSTEAD OF SETTING IT.
0004  37300                 ORG LIBRA
0005  37300 060352          LDA MLINK+1
0006  37403                 ORG PRO7
0007  37403 001665          ELA,CLE,ERA
```

```
0009* THE OPEN COMMAND IS A USER FUNCTION WHICH CAUSES THE SYSTEM TO
0010* CREATE ROOM FOR A DATA FILE. THE FORMAT FOR THE COMMAND IS:
0011*
0012*      OPEN-FILENAME,LENGTH
0013*
0014* THE FILENAME IS SUBJECT TO ALL THE RULES OF PROGRAM NAMES. THE
0015* LENGTH IS A DECIMAL INTEGER FROM 1 TO 128 INDICATING THE FILE
0016* LENGTH IN SECTORS.


0018  37300                ORG LIBRA
0019  37300 060352         LDA MLINK+1   GET ID AND STORE
0020  37301 040515         ADA .+?ID-?LINK    IN LTEMP.
0021  37302 160000         LDA 0,I
0022  37303 070045         STA ID
0023  37304 070020         STA LTEMP
0024  37305 060323         LDA DLTEM     SET UP POINTER FOR
0025  37306 070032         STA OPEP       NAME.
0026  37307 060523         LDA .-3       SET UP COUNTER.
0027  37310 070031         STA OPEC
0028  37311 002400         CLA           SET FLAG SAYING FIRST
0029  37312 070035         STA OPEF       CHAR.
0030  37313 017330  OPE1   JSB OPER      GET A CHARACTER.
0031  37314 001727         ALF,ALF       STORE IN
0032  37315 034032         ISZ OPEP       NAME AREA.
0033  37316 170032         STA OPEP,I
0034  37317 017330         JSB OPER      GET RIGHT CHAR.
0035  37320 130032         IOR OPEP,I    MERGE IN.
0036  37321 170032         STA OPEP,I
0037  37322 034031         ISZ OPEC      TEST FOR ANY MORE.
0038  37323 027313         JMP OPE1
0039*
0040  37324 017330         JSB OPER      NEXT CHARACTER MUST BE
0041  37325 050566         CPA .+40B      BLANK.
0042  37326 027363         JMP OPE2
0043  37327 026744         JMP ILFER     OUTPUT ILLEGAL FORMAT MESSAGE.
0044*
0045  37330 000000  OPER   NOP           GET NEXT CHAR FOR NAME.
0046  37331 060035         LDA OPEF      TEST TO SEND BACK BLANK.
0047  37332 050566         CPA .+40B
0048  37333 127330         JMP OPER,I
0049  37334 016550  OPER1  JSB LCHAR     GET NEXT CHAR.
0050  37335 026744         JMP ILFER     FAIL IF NONE.
0051  37336 064000         LDB 0         SAVE IN B.
0052  37337 011120         AND .140      SKIP CONTROL CHARS.
0053  37340 002002         SZA
0054  37341 051120         CPA .140
0055  37342 027334         JMP OPER1
0056  37343 060035         LDA OPEF      GET 1ST CHAR. FLAG.
0057  37344 002002         SZA           TEST FOR 1ST CHAR.
0058  37345 027355         JMP OPER2     NOT.
0059  37346 054602         CPB .+54B     TEST FOR COMMA OR $
0060  37347 026744         JMP ILFER
0061  37350 054572         CPB .+44B
0062  37351 026744         JMP ILFER
0063  37352 060001  OPER3  LDA 1         RETURN CHAR IN B
```

```
0064   37353 034035          ISZ OPEF
0065   37354 127330          JMP OPER,I
0066   37355 054602  OPER2    CPB .+54B       COMMA TEST
0067   37356 002001          RSS
0068   37357 027352          JMP OPER3
0069   37360 060566          LDA .+40B
0070   37361 070035          STA OPEF
0071   37362 127330          JMP OPER,I
0072*
0073* GET FILE LENGTH.
0074*
0075   37363 002400  OPE2    CLA             INITIALIZE # TO 0
0076   37364 070035          STA OPEF
0077   37365 016550          JSB LCHAR       GET A CHAR.
0078   37366 027406          JMP OPE3        DONE
0079   37367 040462          ADA M72B        DIGIT TEST.
0080   37370 002021          SSA,RSS
0081   37371 026744          JMP ILFER
0082   37372 040540          ADA .+10
0083   37373 002020          SSA
0084   37374 026744          JMP ILFER
0085   37375 070031          STA OPEC        SAVE DIGIT.
0086   37376 060035          LDA OPEF
0087   37377 100200          MPY .+10        BUILD NEW
0088   37401 000040          CLE              NUMBER.
0089   37402 040031          ADA OPEC
0090   37403 006043          SEZ,SZB,RSS     OVERFLOW CHECK.
0091   37404 027364          JMP OPE2+1
0092   37405 026744          JMP ILFER
0093*
0094   37406 060035  OPE3    LDA OPEF        TEST FOR LEGAL VALUE.
0095   37407 003107          CMA,CLE,INA,SZA,RSS
0096   37410 026744          JMP ILFER
0097   37411 040606          ADA .+48      TOO BIG?
0098   37412 002041          SEZ,RSS
0099   37413 026744          JMP ILFER
0100*
0101   37414 060035          LDA OPEF
0102   37415 003004          CMA,INA
0103   37416 100027          ASL 7         CONVERT TO WORDS                  X1
0104   37417 070027          STA OPEFN
0105   37420 016414          JSB FIDT     READ ID TRACK
0106   37421 044534          ADB .+6       TEST FOR USER OUT OF CORE.
0107   37422 160001          LDA 1,I
0108   37423 003100          CMA,CLE
0109   37424 006004          INB
0110   37425 140001          ADA 1,I
0111   37426 040035          ADA OPEF
0112   37427 002041          SEZ,RSS
0113   37430 027445          JMP OPE4
0114*
0115   37431 067434          LDB *+3
0116   37432 060506          LDA .-16
0117   37433 026746          JMP LIBER
0118   37434 037435          DEF *+1
0119   37435 005106          OCT 5106
```

```
0120  37436 044514          ASC 7,ILE SPACE FULL
0121*
0122* SEARCH ADT FOR SPACE TO PUT THE FILE.
0123*
0124  37445 060035  OPE4    LDA OPEF      MAKE THE REQUIRED DISC SPACE
0125  37446 003004          CMA,INA       NEGATIVE FOR FDISC
0126  37447 070035          STA OPEF      SAVE NEGATIVE LENGTH
0127  37450 017121          JSB FDISC     SEARCH FOR DISC SPACE
0128  37451 064030          LDB LTEMP+8   LOAD ADT POINTER
0129  37452 074031          STB OPEC                                        X]
0130*
0131  37453 060022          LDA LTEMP+2    SET
0132  37454 031163          IOR BIT15      FILES
0133  37455 070022          STA LTEMP+2    BIT
0134  37456 016202          JSB DLOOK      SEARCH FOR ENTRY.
0135  37457 027612          JMP OPE8       ENTRY FOUND--ILLEGAL.
0136  37460          OPE11  EQU *
0137  37460 017173          JSB FDIRC     COMPUTE DIRECTORY
0138  37461 060020          LDA LTEMP      SET UP TO LOOK
0139  37462 031163          IOR BIT15
0140  37463 070020          STA LTEMP          FOR ONLY 1 TRACK
0141  37464 160024          LDA LTEMP+4,I
0142  37465 002003          SZA,RSS       IF TRACK IS EMPY THEN TRY
0143  37466 027561          JMP OPE53     FIRST TRACK
0144*
0145  37467 060323          LDA DLTEM                                       X]
0146  37470 064024          LDB LTEMP+4                                     X]
0147  37471 006004          INB                                             X]
0148  37472 016471          JSB DIRCM                                        X]
0149  37473 027561          JMP OPE53                                        X]
0150  37474 016202  OPE54   JSB DLOOK                                        X]
0151  37475 000000          NOP
0152*
0153  37476 164024          LDB LTEMP+4,I IF DIRECTORY TRACK IS
0154  37477 054446          CPB M3072     FULL, DO                          X]
0155  37500 027605          JMP OPE98       OVERLAY.
0156*
0157  37501 007000          CMB           SET UP SOURCE
0158  37502 044424          ADB LIBD       FOR MOVE.
0159  37503 074043          STB MOVES
0160  37504 044536          ADB .+8       SET UP DESTINATION.
0161  37505 074044          STB MOVED
0162  37506 007000          CMB           COMPUTE LENGTH.
0163  37507 044546          ADB .+16
0164  37510 044025          ADB LTEMP+5
0165  37511 016633          JSB MOVEB
0166*
0167  37512 060020          LDA LTEMP       CLEAR BIT 15 OF ID
0168  37513 001665          ELA,CLE,ERA
0169  37514 070020          STA LTEMP
0170  37515 060323          LDA DLTEM     MOVE 4 WORDS IN FOR
0171  37516 070043          STA MOVES      NEW ENTRY.
0172  37517 060025          LDA LTEMP+5
0173  37520 040536          ADA .+8
0174  37521 070044          STA MOVED
0175  37522 064522          LDB .-4
```

```
0176  37523 016352          JSB MOVEW
0177  37524 016403          JSB DATE       STORE DATE IN ALSO.
0178  37525 034044          ISZ MOVED
0179  37526 170044          STA MOVED,I
0180  37527 034044          ISZ MOVED
0181  37530 064027          LDB OPEFN
0182  37531 060026          LDA OPEDS
0183  37532 104400          DST MOVED,I
0184*
0185  37534 160024          LDA LTEMP+4,I  ADJUST DIRECTORY
0186  37535 040516          ADA .-8         LENGTH.
0187  37536 170024          STA LTEMP+4,I
0188  37537 070065          STA WORD
0189  37540 060024          LDA LTEMP+4    WRITE DIRECTORY
0190  37541 002004          INA             BACK OUT.
0191  37542 070044          STA MOVED
0192  37543 040533          ADA .+5
0193  37544 160000          LDA 0,I
0194  37545 064424          LDB LIBD
0195  37546 074043          STB MOVES
0196  37547 016625          JSB DISCL
0197*
0198  37550 064522          LDB .-4        RESET
0199  37551 016352          JSB MOVEW       DIREC.
0200*
0201  37552 067627          LDB OPLOV
0202  37553 074065          STB WORD
0203  37554 064262          LDB LIB        LOAD
0204  37555 006004          INB              OVERLAY
0205  37556 160001          LDA 1,I
0206  37557 064317          LDB #LIBI
0207  37560 027672          JMP OPOVL
0208*
0209  37561 064024  OPE53    LDB LTEMP+4                                    X]
0210  37562 044517          ADB .-7                                        X]
0211  37563 074024          STB LTEMP+4                                    X]
0212  37564 006004          INB                                            X]
0213  37565 060323          LDA DLTEM                                      X]
0214  37566 016471          JSB DIRCM                                      X]
0215  37567 027572          JMP OPE55                                      X]
0216  37570 027474          JMP OPE54                                      X]
0217  37571 027474          JMP OPE54                                      X]
0218  37572 060424  OPE55    LDA LIBD                                       X]
0219  37573 040516          ADA .-8                                        X]
0220  37574 070025          STA LTEMP+5                                    X]
0221  37575 064024          LDB LTEMP+4                                    X]
0222  37576 160001          LDA 1,I     MAKE SURE THE CORRECT DIREC
0223  37577 070065          STA WORD      TRACK IS IN CORE
0224  37600 044534          ADB .+6         BEFORE WE CONTINUE
0225  37601 160001          LDA 1,I
0226  37602 064425          LDB LIBDI
0227  37603 016625          JSB DISCL
0228  37604 027476          JMP OPE54+2                                    X]
0229*
0230  37605 063630  OPE98    LDA M250
0231  37606 070065          STA WORD
```

```
0232  37607 163626          LDA OPEOV,I
0233  37610 064317          LDB #LIBI
0234  37611 027674          JMP LIBRA+252
0235*
0236  00026           OPEDS EQU LTEMP+6
0237  00027           OPEFN EQU LTEMP+7
0238  00035           OPEF  EQU LTEMP+13
0239  00034           OPEDF EQU LTEMP+12
0240  00031           OPEC  EQU LTEMP+9
0241  00032           OPEP EQU LTEMP+10
0242  37612 060506    OPE8  LDA .-16
0243  37613 067615          LDB *+2
0244  37614 026746          JMP LIBER
0245  37615 037616          DEF *+1
0246  37616 005104          OCT 5104
0247  37617 052520          ASC 7,UPLICATE ENTRY
0248*
0249  37626 036056  OPEOV DEF SAVO+COM6-COM3
0250  37627 177670  OPLOV ABS LIBRA-$$OPE
0251  37630 177406  M250  DEC -250
0252*
0253  37672                 ORG LIBRA+250
0254  37672 016625  OPOVL  JSB DISCL      LOAD
0255  37673 027300          JMP LIBRA       OVERLAY
0256  37674                 ORG LIBRA+252
0257  37674 016625          JSB DISCL
0258  37675 027300          JMP LIBRA
0259  37676 027460          JMP OPE11       NORMAL RETURN.
0260  37677 027143          JMP FD.1+7        SYSTEM OVERLOAD
0261  37700           $OPE  EQU *
```

```
0263  37300                ORG LIBRA
0264*
0265  37300 016414         JSB FIDT
0266  37301 044535         ADB .+7
0267  37302 060035         LDA OPEF       ADJUST AMOUNT OF DISC USED.
0268  37303 003004         CMA,INA       MAKE OPEF POSITIVE
0269  37304 070035         STA OPEF
0270  37305 140001         ADA 1,I
0271  37306 170001         STA 1,I
0272*
0273  37307 160071         LDA IDTRA,I     DUMP
0274  37310 064424         LDB LIBD         IDT
0275  37311 016625         JSB DISCL           BACK
0276  37312 060204         LDA ADLEN               TO DISC
0277  37313 070065         STA WORD       LOAD ADT FROM
0278  37314 060203         LDA ADLOC        DISC
0279  37315 064425         LDB LIBDI
0280  37316 016625         JSB DISCL
0281  37317 064034         LDB OPEDF      GET -# OF SECTORS LEFT IN ADT.
0282  37320 060035         LDA OPEF       GET # OF SECTORS USED.
0283  37321 006002         SZB          TEST FOR ANY PART LEFT
0284  37322 027337         JMP OPE9       NON EMPTY ADT ENTRY.
0285*
0286  37323 064031         LDB OPEC       SQUEEZE OUT ADT ENTRY.
0287  37324 074044         STB MOVED
0288  37325 044530         ADB .+2
0289  37326 074043         STB MOVES
0290  37327 044432         ADB MLIBD
0291  37330 044065         ADB WORD
0292  37331 016352         JSB MOVEW
0293*
0294  37332 034204         ISZ ADLEN      REDUCE ADLEN BY 2.
0295  37333 034204         ISZ ADLEN
0296  37334 034065         ISZ WORD       REDUCE TRANSFER LENGTH
0297  37335 034065         ISZ WORD        BY 2.
0298  37336 027342         JMP OPE10
0299*
0300  37337 140031  OPE9   ADA OPEC,I     MODIFY ADT ENTRY.
0301  37340 104400         DST OPEC,I
0302*
0303  37342 060203  OPE10  LDA ADLOC      WRITE ADT BACK TO DISC
0304  37343 064424         LDB LIBD
0305  37344 016625         JSB DISCL
0306*
0307  37345 064476         LDB .-24       WRITE -1 (EOF) IN EACH OF 24  X]
0308  37346 074031         STB OPEC        SECTORS.
0309  37347 064424         LDB LIBD
0310  37350 003400         CCA
0311  37351 170001         STA 1,I
0312  37352 044627         ADB B200                                     X]
0313  37353 034031         ISZ OPEC
0314  37354 027351         JMP *-3
0315*
0316  37355 060026         LDA OPEDS      A=FILE ADDRESS.
0317  37356 064035         LDB OPEF     GET # OF SECTORS.
0318  37357 044475         ADB .-25       IS FILE LONGER
```

```
0319   37360 006020          SSB               THAN 24?
0320   37361 027375          JMP OPO1          NO
0321   37362 007000          CMB               YES - FIRST TAKE CARE OF EXTRA
0322   37363 005727          BLF,BLF           WRITE EOFS
0323   37364 005300          RBR                 TO DISC
0324   37365 074065          STB WORD
0325   37366 064424          LDB LIBD
0326   37367 016625          JSB DISCL
0327   37370 060026          LDA OPEDS         COMPUTE NEW
0328   37371 040035          ADA OPEF            DISC ADDRESS
0329   37372 040476          ADA .-24
0330   37373 064556          LDB .+24
0331   37374 002001          RSS                  OF THE REST
0332*
0333   37375 064035  OPO1    LDB OPEF          WRITE EOFS
0334   37376 007004          CMB,INB
0335   37377 005727          BLF,BLF
0336   37400 005300          RBR
0337   37401 074065          STB WORD
0338   37402 064424          LDB LIBD
0339   37403 114350          JSB DISC,I
0340   37404 103100          CLF 0
0341   37405 034262          ISZ LIB           OPEN NOT IN CORE
0342   37406 102100          STF 0
0343   37407 026622          JMP LLEND         TERMINATE
0344*
0345   37410          $$OPE  EQU *
```

```
0347* THE LENGTH COMMAND CAUSES THE LENGTH OF THE USER'S PROGRAM TO
0348* BE PRINTED ON THE USER'S CONSOLE.

0350   37300                ORG LIBRA
0351   37300 016362         JSB RDPRG      READ IN USER PROGRAM.
0352   37301 064352         LDB MLINK+1
0353   37302 044514         ADB .+?PROG-?LINK
0354   37303 160001         LDA 1,I        GET POINTER TO END OF
0355   37304 070020         STA LTEMP       PROGRAM.
0356   37305 050433         CPA PBUFF      IF NULL PROGRAM GO TO PRINTOUT
0357   37306 027317         JMP LEN1        SECTION.
0358   37307 044524         ADB .-?PROG+?MASK                [X]
0359   37310 060053         LDA CFLAG       TEST FOR COMPILED [X]
0360   37311 110001         AND 1,I                           [X]
0361   37312 044507         ADB .-?MASK                       [X]
0362   37313 002003         SZA,RSS
0363   37314 027317         JMP LEN1       USER NOT COMPILED.
0364   37315 061641         LDA SYMTB      USE SOURCE PROGRAM POINTER
0365   37316 002001         RSS
0366   37317 060020  LEN1   LDA LTEMP
0367   37320 003000         CMA            COMPUTE LENGTH IN WORDS.
0368   37321 041643         ADA SPROG
0369   37322 003000         CMA
0370   37323 002020         SSA            IF NEGATIVE,
0371   37324 002400         CLA              SET TO ZERO
0372   37325 070020         STA LTEMP
0373*
0374   37326 060540         LDA .+12B      OUTPUT LINE FEED.
0375   37327 016516         JSB LOUT
0376   37330 060524         LDA .-2        SET COUNTER.
0377   37331 070021         STA LTEMP+1
0378   37332 060020         LDA LTEMP      GET FIRST 2 DIGITS IN A.
0379   37333 006400         CLB             LAST 2 IN B.
0380   37334 100400         DIV .100
0381   37336 074020         STB LTEMP
0382   37337 006400  LEN2   CLB
0383   37340 100400         DIV .+10       GET 2 DIGITS.
0384   37342 074022         STB LTEMP+2    SAVE 2ND.
0385   37343 040606         ADA .+60B
0386   37344 016516         JSB LOUT       PRINT 1ST
0387   37345 060022         LDA LTEMP+2
0388   37346 040606         ADA .+60B      PRINT
0389   37347 016516         JSB LOUT        2ND.
0390   37350 060020         LDA LTEMP      GET 2ND PAIR.
0391   37351 034021         ISZ LTEMP+1    TEST FOR DONE.
0392   37352 027337         JMP LEN2
0393   37353 060520         LDA .-6        PRINT " WORDS".
0394   37354 067356         LDB *+2
0395   37355 026746         JMP LIBER
0396   37356 037357         DEF *+1
0397   37357 020127         ASC 3, WORDS
0398   37362         $LEN   EQU *
```

```
0400*
0401*      ECHO-OFF SETS THE TERMINAL TO HALF DUPLEX
0402*      MODE.
0403*      ECHO-ON RETURNS THE TERMINL TO FULL DUPLEX
0404*


0406  37300                ORG LIBRA
0407  37300 016550         JSB LCHAR      GET CHARACTER
0408  37301 026744         JMP ILFER      ILLEGAL FORMAT
0409  37302 001727         ALF,ALF        ROTATE IT UP
0410  37303 070020         STA ECHR       SAVE IT
0411  37304 016550         JSB LCHAR      GET NEXT CHAR
0412  37305 026744         JMP ILFER
0413  37306 030020         IOR ECHR       ADD ON PREVIOUS CHAR
0414  37307 064352         LDB MLINK+1
0415  37310 044507         ADB .+?RPRM-?LINK
0416  37311 053331         CPA ECON       ECHO-ON?
0417  37312 027316         JMP ECHO1      YES
0418  37313 053332         CPA ECOF       ECHO-OFF?
0419  37314 027322         JMP ECHO2      YES
0420  37315 026744         JMP ILFER      ILLEGAL FORMAT
0421*
0422  37316 160001  ECHO1  LDA 1,I        LOAD RECEIVE PARAM.
0423  37317 030301         IOR ECOBT      ADD ON ECHO BIT
0424  37320 170001         STA 1,I        RESTORE RECEIVE PARAM
0425  37321 027325         JMP ECHO3      OUTPUT IT
0426*
0427  37322 061172  ECHO2  LDA NECHO      REMOVE ECHO BIT
0428  37323 110001         AND 1,I          FROM RPRM
0429  37324 170001         STA 1,I
0430*
0431*      OUTPUT RECEIVE PARAMETER
0432*
0433  37325 044512  ECHO3  ADB .+?TNUM-?RPRM
0434  37326 164001         LDB B,I        LOAD TELETYPE NUMBER
0435  37327 114355         JSB MUXR,I     OUTPUT RECEIVE PARAMETER
0436  37330 026622         JMP LLEND      TERMINATE
0437*
0438  00301          ECOBT  EQU BIT12
0439  00020          ECHR   EQU LTEMP
0440  37331 047516   ECON   ASC 1,ON
0441  37332 047506   ECOF   ASC 1,OF
0442  37333          $ECH   EQU *
```

```
0444* THE REPORT COMMAND CAUSES IDT INFO TO BE LISTED ON THE SYSTEM
0445* TELETYPE. EACH USER ID IS LISTED, ALONG WITH THE DISC AND TIME
0446* USED TO DATE. DISC STORAGE IS LISTED IN WORDS, AND TIME IS LISTED
0447* IN MINUTES.


0449  37300                ORG LIBRA
0450  37300 060171         LDA IDTTA    SET ID TRACK POINTER
0451  37301 040531         ADA .+3
0452  37302 070247         STA REPTA
0453  37303 060176         LDA IDTRL
0454  37304 040531         ADA .+3
0455  37305 070250         STA REPTL      POINTER
0456*
0457  37306 060424         LDA LIBD     SET WORD POINTER
0458  37307 070252         STA REPID
0459  37310 060413         LDA T35B1     TO PRINT
0460  37311 070044         STA MOVED      BUFFER.
0461  37312 063507         LDA REPHD
0462  37313 070043         STA MOVES
0463  37314 067552         LDB REP29
0464  37315 016352         JSB MOVEW
0465  37316 064170         LDB IDLEN    USE WORD 35 OF THE BUFFER TO
0466  37317 005121         BRS,BRS
0467  37320 005100         BRS
0468  37321 074254         STB REPLN     COUNT ID ENTRIES.
0469  37322 063553         LDA REP57    WE WILL PRINT 57 CHARACTERS.
0470  37323 006002         SZB          IF ID TABLE IS LENGTH >0, GO TO
0471  37324 027327         JMP REP1      PRINT AND SUSPEND.
0472  37325 064413  REP2   LDB T35B1    OTHERWISE, JUST PRINT THE
0473  37326 026651         JMP LEND2    HEADING AND TERMINATE.
0474*
0475  37327 064413  REP1   LDB T35B1    PRINT AND
0476  37330 016607         JSB T35SP     SUSPEND.
0477  37331 060523         LDA .-3      SET COUNTER
0478  37332 070021         STA REPCT      FOR THREE ENTRIES
0479  37333 060413         LDA T35B1
0480  37334 070253         STA REPBF
0481*
0482  37335 160250  REP8   LDA REPTL,I    READ ID TRACK
0483  37336 070065         STA WORD
0484  37337 160247         LDA REPTA,I
0485  37340 064425         LDB LIBDI
0486  37341 016625         JSB DISCL
0487  37342 160250         LDA REPTL,I      COMPUTE
0488  37343 003004         CMA,INA            END
0489  37344 040424         ADA LIBD             POINTER
0490  37345 073546         STA REPND
0491*
0492*
0493*
0494* NOW CONVERT ENTRIES INTO THE BUFFER. REPID POINTS AT THE ENTRY,
0495* REPBF POINTS TO THE OUTPUT BUFFER.
0496*
0497  37346 160252  REP4   LDA REPID,I   GET ID.
0498  37347 010362         AND B1777    MASK NUMBER PART.
```

```
0499   37350 006400          CLB             GET #/100 IN A, # MOD 100 IN B.
0500   37351 100400          DIV .100
0501   37353 074251          STB REPT        SAVE LAST 2 DIGITS.
0502   37354 070001          STA 1           COMBINE FIRST DIGIT WITH
0503   37355 160252          LDA REPID,I      LETTER.
0504   37356 001121          ARS,ARS
0505   37357 013547          AND REPMS
0506   37360 040001          ADA 1
0507   37361 043550          ADA REPFX
0508   37362 170253          STA REPBF,I     STORE ASCII LETTER&DIGIT IN BUF.
0509   37363 034253          ISZ REPBF
0510   37364 060251          LDA REPT        CONVERT LAST 2 DIGITS
0511   37365 017453          JSB REPNM        AND STORE IN BUFFER.
0512   37366 170253          STA REPBF,I
0513   37367 034253          ISZ REPBF       MOVE REPBF TO POINT AT TIME AREA
0514   37370 060252          LDA REPID       SET REPID TO POINT
0515   37371 040533          ADA .+5          TO USERS TIME.
0516   37372 070252          STA REPID
0517   37373 160252          LDA REPID,I     GET USERS TIME.
0518   37374 002020          SSA             IF NEGATIVE, SET
0519   37375 002400          CLA               TO ZERO.
0520   37376 017463          JSB REPTR       CONVERT INTO BUFFER.
0521   37377 034252          ISZ REPID       POINT TO DISC USED
0522   37400 034252          ISZ REPID        AND
0523   37401 160252          LDA REPID,I
0524   37402 002020          SSA             IF NEGATIVE, SET
0525   37403 002400          CLA               TO ZERO.
0526   37404 017463          JSB REPTR       CONVERT IT.
0527   37405 034253          ISZ REPBF       MOVE BUFFER POINTER UP FOR
0528   37406 034253          ISZ REPBF        NEXT ENTRY.
0529   37407 034252          ISZ REPID       MOVE ID POINTER ALSO.
0530   37410 034021          ISZ REPCT        ALL DONE?
0531   37411 002001          RSS              NO
0532   37412 027426          JMP REP5         YES?
0533*
0534   37413 034254          ISZ REPLN        ANY MORE ID'S?
0535   37414 002001          RSS              YUP
0536   37415 027422          JMP REP6        NO - TERMINATE
0537   37416 060252          LDA REPID        END OF ID TRACK?
0538   37417 053546          CPA REPND
0539   37420 027436          JMP REP7         YES
0540   37421 027346          JMP REP4
0541*
0542   37422 060253  REP6    LDA REPBF       COMPUTE
0543   37423 043545          ADA REPTT         # OF CHARS
0544   37424 001000          ALS                    TO OUTPUT
0545   37425 027325          JMP REP2        TERMINATE
0546   37426 034254  REP5    ISZ REPLN       ALL DONE?
0547   37427 002001          RSS             NO
0548   37430 027422          JMP REP6           YUP
0549   37431 060252          LDA REPID        END-OF-TRACK?
0550   37432 053546          CPA REPND
0551   37433 027436          JMP REP7
0552   37434 063554          LDA REP56
0553   37435 027327          JMP REP1         NO
0554   37436 060247  REP7    LDA REPTA       YES, SET POINTERS
```

```
0555  37437 040525          ADA .-1              TO NEXT
0556  37440 070247          STA REPTA           TRACK
0557  37441 060250          LDA REPTL
0558  37442 040525          ADA .-1
0559  37443 070250          STA REPTL
0560  37444 060424          LDA LIBD
0561  37445 070252          STA REPID
0562  37446 060021          LDA REPCT
0563  37447 002002          SZA
0564  37450 027335          JMP REP8
0565  37451 063554          LDA REP56
0566  37452 027327          JMP REP1
0567*
0568  37453 000000  REPNM NOP             CONVERT A #<100 TO ASCII.
0569  37454 006400        CLB             GET 1ST DIGIT IN A.
0570  37455 100400        DIV .+10         2ND IN B.
0571  37457 001727        ALF,ALF         PACK AND
0572  37460 040001        ADA 1            ADD ON ASCII
0573  37461 040346        ADA ASC00         BITS.
0574  37462 127453        JMP REPNM,I
0575*
0576  37463 000000  REPTR NOP             TRANSLATE A 5-DIGIT NUMBER
0577  37464 006400        CLB               INTO THE BUFFER.
0578  37465 100400        DIV DVSPS       CONVERT FIRST
0579  37467 043551        ADA REPB0        DIGIT.
0580  37470 170253        STA REPBF,I     PUT IN
0581  37471 034253        ISZ REPBF        BUFFER.
0582  37472 060001        LDA 1           NOW GET THE REST.
0583  37473 006400        CLB
0584  37474 100400        DIV .100        COMPUTE AS 2 2-DIGIT #S.
0585  37476 074020        STB REPK        SAVE 2ND HALF.
0586  37477 017453        JSB REPNM       CONVERT AND STORE
0587  37500 170253        STA REPBF,I      FIRST PART.
0588  37501 034253        ISZ REPBF
0589  37502 060020        LDA REPK        SAME WITH
0590  37503 017453        JSB REPNM        2ND PART.
0591  37504 170253        STA REPBF,I
0592  37505 034253        ISZ REPBF
0593  37506 127463        JMP REPTR,I
0594*
0595  37507 037510  REPHD DEF *+1
0596  37510 005040        OCT 5040
0597  37511 044504        ASC 20,ID   TIME DISC      ID   TIME DISC
0598  37535 044504        ASC  8,ID   TIME DISC
0599  00254         REPLN EQU T35BF+35
0600  00020         REPK  EQU LTEMP
0601  00021         REPCT EQU LTEMP+1
0602  00253         REPBF EQU T35BF+34
0603  00252         REPID EQU T35BF+33
0604  00251         REPT  EQU T35BF+32
0605  00250         REPTL EQU T35BF+31
0606  00247         REPTA EQU T35BF+30
0607  37545 177565  REPTT ABS -T35BF-2
0608  37546 000000  REPND NOP
0609  37547 017400  REPMS OCT 17400
0610  37550 040060  REPFX ASC 1,@0
```

```
0611   37551 020060   REPB0 ASC 1, 0
0612   37552 177743   REP29 DEC -29
0613   37553 000071   REP57 DEC 57
0614   37554 000070   REP56 DEC 56
0615   37555          $REP  EQU *
```

```
0002* THE DIRECTORY COMMAND IS A SYSTEM COMMAND WHICH CAUSES THE
0003* CONTENTS OF THE DISC DIRECTORY TO BE PRINTED ON THE SYSTEM
0004* CONSOLE.  THE FORMAT OF THE PRINTOUT IS AS FOLLOWS:
0005*
0006* <ID> <NAME>  <PURGE DATE> <DISC ADR> <LENGTH>
0007*
0008* THE PURGE DATE IS PRINTED AS A 3-DIGIT INTEGER INDICATING THE DAY
0009* OF YEAR AND A 2-DIGIT INTEGER INDICATING THE YEAR. THE DISC
0010* ADDRESS CONSISTS OF 3 INTEGERS INDICATING DISC, TRACK, AND SECTOR.
0011* THESE ARE ALL PRINTED IN DECIMAL.
0012* TYPING DIR-ID WILL START THE LISTING WITH THAT ID.


0014  37300                ORG LIBRA

0016  37300 002400         CLA
0017  37301 070253         STA CID       CLEAR CURRENT ID
0018  37302 070325         STA DID
0019  37303 114341         JSB T35CH,I   S GET CHARACTER
0020  37304 027654         JMP DIRNI     COMPLETE LIST
0021  37305 040462         ADA M72B      DIGIT?
0022  37306 002021         SSA,RSS       COULD BE
0023  37307 027326         JMP DIR.1     NO - GET ID
0024  37310 040540         ADA .+10
0025  37311 002020         SSA
0026  37312 026656         JMP LFRER     INVLAID CHARACTER
0027  37313 064000         LDB 0         SAVE DIGIT
0028  37314 044522         ADB .-4         TOO BIG?
0029  37315 006021         SSB,RSS
0030  37316 026656         JMP LFRER     YES - ERROR
0031*
0032  37317 006400         CLB           DIGIT ID OK
0033  37320 074252         STB DSUBF     SET FLAG TO INDICATE ONLY
0034  37321 070250         STA DSUBC       1 SUBCHANNEL
0035  37322 100200         MPY .+14      COMPUTE B.P.
0036  37324 040334         ADA DIRD0     CIRECTORY
0037  37325 027352         JMP DIR.2
0038  37326 003400 DIR.1   CCA           BACKSPACE TTY
0039  37327 040047         ADA T35CP
0040  37330 070047         STA T35CP
0041  37331 016667         JSB GETID     GO TRY FOR ID
0042  37332 026656         JMP LFRER     NO CR AT END
0043  37333 060045         LDA ID
0044  37334 070325         STA DID
0045  37335 003004         CMA,INA
0046  37336 070640         STA DMID
0047  37337 007400         CCB
0048  37340 061002         LDA A000    MASTER USER?
0049  37341 070252         STA DSUBF     SET FLAG FOR ALL DISCS
0050*
0051  37342 006004 DIR11   INB           INCREMTN SUBCHANNEL
0052  37343 074250         STB DSUBC     SAVE SUBCHANNEL
0053  37344 054532         CPB .+4       DONE?
0054  37345 026647         JMP LEND      YES
0055  37346 074000         STB 0         SUBCHANNEL IN A
0056  37347 100200         MPY .+14      GET BP DIRECTORY
```

```
0057  37351 040334         ADA DIRD0
0058  37352 064253  DIR.2  LDB CID       GET CURRENT ID
0059  37353 006002         SZB
0060  37354 027370         JMP DR.17
0061*
0062*      OUTPUT HEADER
0063*
0064  37355 070247         STA DPNT      SAVE POINTER
0065  37356 063216         LDA DIRHD     LOAD ADDRESS OF HEADING
0066  37357 070043         STA MOVES
0067  37360 060413         LDA T35B1     MOVE HEADING INTO TTY35 BUF
0068  37361 070044         STA MOVED
0069  37362 064477         LDB .-23
0070  37363 016352         JSB MOVEW
0071  37364 060603         LDA .+45
0072  37365 064413         LDB T35B1
0073  37366 016607         JSB T35SP     OUTPUT HEADING AND SUSPEND
0074  37367 002001         RSS
0075*
0076  37370 070247  DR.17  STA DPNT      SAVE POINTER
0077  37371 064524         LDB .-2       SET FLAG TO CHECK BOTH TRACKS
0078  37372 060325         LDA DID        ID?
0079  37373 002002         SZA           IF ID=0 THEN BOTH TRACKS
0080  37374 006004         INB           NO - JUST CHECK ONE TRACK
0081  37375 074251         STB DTFLG
0082  37376 064247         LDB DPNT
0083  37377 002003         SZA,RSS       IF ALL IDS TO BE CHEKED THEN
0084  37400 027416         JMP DIR.3       SKIP THE TEST
0085  37401 044535         ADB .+7
0086  37402 160001         LDA 1,I       LOAD LENGTH
0087  37403 006004         INB
0088  37404 002003         SZA,RSS       IF ZERO, THEN NEXT TRACK
0089  37405 027412         JMP DIR.4
0090  37406 160001         LDA 1,I       GET ID
0091  37407 050325         CPA DID        SAME?
0092  37410 027662         JMP DR.18
0093  37411 040640         ADA DMID       NO, SUBTRACT REQUESTED ID
0094  37412 044516  DIR.4  ADB .-8       BACK TO FIRST TRACK
0095  37413 002020         SSA
0096  37414 044535         ADB .+7       TRACK 2
0097  37415 074247         STB DPNT      SAVE B.P. ENTRY
0098*
0099*  B REG POINTES TO B.P. DIREC. ENTRY TO BE SCANNED
0100*
0101  37416 160001  DIR.3  LDA 1,I       LOAD LENGTH
0102  37417 002003         SZA,RSS       ZERO?
0103  37420 027640         JMP DIR.5     YES - NO CHECK
0104  37421 070065          STA WORD     SET LENGTH
0105  37422 044534         ADB .+6
0106  37423 160001         LDA 1,I       LOAD DISC ADDRESS
0107  37424 064425         LDB LIBDI     INPUT DIRECTORY TRACK
0108  37425 016625         JSB DISCL
0109*
0110*
0111*
0112  37426 160247         LDA DPNT,I    LOAD DIRECTORY LENGTH
```

```
0113  37427 003004          CMA,INA       SET END OF TRACK
0114  37430 040424          ADA LIBD      POINTER
0115  37431 070246          STA DEND
0116  37432 064424          LDB LIBD
0117  37433 060325  DIR.9    LDA DID        ID CHECK (ARE YA 21 KID)
0118  37434 002003          SZA,RSS
0119  37435 027444          JMP DIR.6     NO (THROW 'IM OUT)
0120*
0121  37436 150001          CPA 1,I       RIGHT ID?
0122  37437 027444          JMP DIR.6     YES
0123  37440 044536  DIR.8    ADB .+8       NEXT ENTRY
0124  37441 054246          CPB DEND      ALL DONE?
0125  37442 027640          JMP DIR.5     YES - CHECK IF MORE
0126  37443 027433          JMP DIR.9     NO - NEXT ENTRY
0127*
0128*     THE ENTRY IS POINTERED TO BY THE B REGISTER
0129*
0130  37444 074254  DIR.6    STB DIRAD     SAVE ADDRESS
0131  37445 160001          LDA 1,I       LOAD ID
0132  37446 002003          SZA,RSS      IF THIS IS A DUMMY ENTRY THEN SKIP
0133  37447 027440          JMP DIR.8
0134  37450 050525          CPA .-1
0135  37451 027440          JMP DIR.8
0136  37452 050253          CPA CID       IS IT CURRENT?
0137  37453 027633          JMP DIR15     YES - DON'T OUTPUT IT
0138  37454 070253          STA CID       NO - SET IT
0139  37455 010362          AND B1777     GET #
0140  37456 006400          CLB
0141  37457 100400           DIV .100     FIRST DIGIT IN A
0142  37461 070211          STA T35BF     SAVE IT
0143  37462 160254          LDA DIRAD,I   RELOAD ID
0144  37463 001323          RAR,RAR       GET LETTER
0145  37464 013246          AND DIRMS       PART OF ID
0146  37465 030211          IOR T35BF
0147  37466 043247          ADA DIRFS     MAKE ASCII
0148  37467 070211          STA T35BF
0149  37470 060001          LDA 1         GET REMAINER IN A
0150  37471 017666          JSB DIRNM     CONVERT TOA ASCII
0151  37472 070212          STA T35BF+1
0152  37473 034254          ISZ DIRAD     POINT TO NAME
0153  37474 060340          LDA BB
0154  37475 070213          STA T35BF+2   STORE BLANKS
0155  37476 104200  DIR16    DLD DIRAD,I   GET NAME
0156  37500 104400          DST T35BF+3     SAVE IT IN THE BUFFER
0157  37502 064254          LDB DIRAD
0158  37503 044530          ADB .+2
0159  37504 160001          LDA 1,I
0160  37505 070216          STA T35BF+5
0161  37506 060340          LDA BB
0162  37507 070217          STA T35BF+6
0163*
0164*
0165  37510 034254          ISZ DIRAD     POINT TO DATE
0166  37511 044530          ADB .+2       POINT TO DATE
0167  37512 074254          STB DIRAD     RESOTRE POINTER
0168  37513 160254          LDA DIRAD,I   GET DATE
```

```
0169  37514 010633          AND B777      GET DAY
0170  37515 006400          CLB
0171  37516 100400          DIV .+10      A=1ST TWO DIGITS
0172  37520 005727          BLF,BLF       B=3RD
0173  37521 047251          ADB DIR0S     MAKE ASCII
0174  37522 074221          STB T35BF+8
0175  37523 017666          JSB DIRNM     CONVERT FIRST 2
0176  37524 070220          STA T35BF+7
0177  37525 160254          LDA DIRAD,I   NO GET YEAR
0178  37526 001727          ALF,ALF       ROTATE YEAR PORTION DOWN
0179  37527 001300          RAR
0180  37530 010626          AND B177
0181  37531 017666          JSB DIRNM     CONVERT TO ASCII
0182  37532 070222          STA T35BF+9
0183*
0184  37533 034254          ISZ DIRAD
0185  37534 060340          LDA BB
0186  37535 070223          STA T35BF+10
0187  37536 060250          LDA DSUBC      LOAD SUBCHANNEL
0188  37537 001727          ALF,ALF        ROTATE DIGIT UP
0189  37540 033252          IOR DIR0B       MAKE ASCII
0190  37541 070224          STA T35BF+11
0191  37542 060340          LDA BB
0192  37543 070225          STA T35BF+12
0193*
0194*     TRACK/SECTOR
0195*
0196  37544 160254          LDA DIRAD,I   GET DISC ADDRESS
0197  37545 006400          CLB
0198  37546 101027          ASR 7          GET TRACK
0199  37547 010630          AND B377
0200  37550 100400          DIV .+10      CONVERT TO ASCII
0201  37552 005727          BLF,BLF
0202  37553 047251          ADB DIR0S
0203  37554 074227          STB T35BF+14
0204  37555 017666          JSB DIRNM
0205  37556 070226          STA T35BF+13
0206*
0207*
0208  37557 160254          LDA DIRAD,I
0209  37560 010614          AND B77         GET SECTOR
0210  37561 017666          JSB DIRNM
0211  37562 070230          STA T35BF+15
0212*
0213*
0214  37563 034254          ISZ DIRAD     POINT TO LENGTH
0215  37564 060340          LDA BB
0216  37565 070231          STA T35BF+16 STORE BLANKS
0217  37566 070232          STA T35BF+17
0218  37567 006400          CLB
0219  37570 160254          LDA DIRAD,I   CONVERT TO POSITIVE
0220  37571 010453          AND M128      ROUND UP TO NEXT SECTOR
0221  37572 003004          CMA,INA         SECTORS
0222  37573 101027          ASR 7
0223  37574 017666          JSB DIRNM
0224  37575 070233          STA T35BF+18
```

ASCØB

```
0225*
0226*      NOW GET FILE AND PROTECT BITS
0227*
0228  37576 060254          LDA DIRAD     GET FILE BIT
0229  37577 040521          ADA .-5
0230  37600 070254          STA DIRAD
0231  37601 164000          LDB 0,I       LOAD WORD
0232  37602 060340          LDA BB        LOAD BLANKS
0233  37603 070234          STA T35BF+19
0234  37604 006020          SSB           IF FILE?
0235  37605 063676          LDA BF          THEN OUTPUT F
0236  37606 070235          STA T35BF+20
0237  37607 060254          LDA DIRAD     GET PROTECT BIT
0238  37610 040525          ADA .-1
0239  37611 164000          LDB 0,I
0240  37612 060340          LDA BB        LOAD BLANKS
0241  37613 006020          SSB
0242  37614 063677          LDA PB         PROTECTED
0243  37615 070236          STA T35BF+21
0244  37616 060601          LDA .+43
0245  37617 064413          LDB T35B1
0246  37620 016607          JSB T35SP     OUPTU LINE
0247  37621 064247          LDB DPNT    READ DIRECTORY TRACK BACK IN
0248  37622 160001          LDA 1,I     GET LENGTH
0249  37623 070065          STA WORD
0250  37624 044534          ADB .+6    GET DISC ADDRESS
0251  37625 160001          LDA 1,I
0252  37626 064425          LDB LIBDI
0253  37627 016625          JSB DISCL    INPUT DIRECTORY TRACK
0254  37630 064254          LDB DIRAD     POINT BACK TO ENTRY
0255  37631 044524          ADB .-2
0256  37632 027440          JMP DIR.8
0257  37633 060340  DIR15    LDA BB        NO ID TO BE OUTPUT
0258  37634 070211          STA T35BF     SO FILL WITH BLANKS
0259  37635 070212          STA T35BF+1
0260  37636 034254          ISZ DIRAD
0261  37637 027476          JMP DIR16
0262*
0263*
0264*
0265  37640 034251  DIR.5    ISZ DTFLG     CHECK IF TWO TRACKS
0266  37641 002001          RSS           YES - GO FOR NEXT ONE
0267  37642 027647          JMP DIR10     NO - SEE IF ANOTHER SUBCHAN
0268  37643 064247          LDB DPNT      LOAD BASE PABE POINTER
0269  37644 044535          ADB .+7       SET TO NEXT TRACK
0270  37645 074247          STB DPNT
0271  37646 027416          JMP DIR.3     GO READ TRACK
0272  37647 060252  DIR10    LDA DSUBF     ONLY 1 SUBCHANNEL?
0273  37650 002003          SZA,RSS
0274  37651 026647          JMP LEND      YES - DONE?
0275  37652 064250          LDB DSUBC     NO - GO TO NEXT ONE
0276  37653 027342          JMP DIR11
0277*
0278  37654 006400  DIRNI    CLB           CLEAR SUBCHANNEL
0279  37655 074250          STB DSUBC
0280  37656 006004          INB           SET FLAG TO SEARCH ALL SUBCHANS
```

```
0281   37657 074252          STB DSUBF
0282   37660 060334          LDA DIRD0
0283   37661 027352          JMP DIR.2
0284*
0285   37662 060524  DR.18    LDA .-2         SET FLAG TO CHECK BOTH TRACKS
0286   37663 070251          STA DTFLG
0287   37664 002400          CLA             CLEAR A SO TEST IS RIGHT
0288   37665 027412          JMP DIR.4
0289*
0290   37666 000000  DIRNM   NOP
0291   37667 006400          CLB             CONVERT TWO DIGIT NUMBER IN A
0292   37670 100400          DIV .+10        TO ASCII CHARACTERS
0293   37672 001727          ALF,ALF
0294   37673 040001          ADA 1
0295   37674 040346          ADA ASC00
0296   37675 127666          JMP DIRNM,I
0297*
0298*
0299   37676 020106  BF      ASC 1, F
0300   37677 050040  PB      ASC 1,P
0301   00340         BB      EQU ASCBB
0302   00254         DIRAD   EQU T35BF+35
0303   00253         CID     EQU T35BF+34
0304   00252         DSUBF   EQU T35BF+33
0305   00251         DTFLG   EQU T35BF+32
0306   00250         DSUBC   EQU T35BF+31
0307   00247         DPNT    EQU T35BF+30
0308   00246         DEND    EQU T35BF+29
0309*
0310   37700         $DIR    EQU *
```

```
0312* ROSTER PRINTS A LISTING, ON THE SYSTEM CONSOLE, OF ALL
0313* IDS OF CURRENTLY ACTIVE USERS. THEY ARE PRINTED 8 PER LINE.


0315  37300                 ORG LIBRA
0316  37300 063377          LDA ROSLB      SET LF-BLANK IN BUFFER
0317  37301 070211          STA T35BF
0318  37302 017317          JSB ROST8      PROCESS FIRST 8
0319  37303 033306          DEF TTY00+?ID
0320  37304 060606          LDA .+48       OUTPUT THEM.
0321  37305 064413          LDB T35B1
0322  37306 016607          JSB T35SP
0323  37307 060211          LDA T35BF
0324  37310 030451          IOR HIMSK
0325  37311 070211          STA T35BF
0326  37312 017317          JSB ROST8      PROCESS LAST 8
0327  37313 033656          DEF TTY10+?ID
0328  37314 060606          LDA .+48       OUTPUT THEM
0329  37315 064413          LDB T35B1
0330  37316 026651          JMP LEND2

0332* ROST8 FILLS THE TELETYPE BUFFER WITH 8 IDS. THE FORMAT IS:
0333*     LF,BLANK,7(ID,BLANK,BLANK),ID

0335  37317 000000  ROST8   NOP
0336  37320 060413          LDA T35B1      SET UP POINTER FOR FIRST ID.
0337  37321 002004          INA
0338  37322 070020          STA ROSP
0339  37323 060516          LDA .-8        SET UP COUNTER.
0340  37324 070021          STA ROSC
0341  37325 163317          LDA ROST8,I    SET UP POINTER TO ID.
0342  37326 070022          STA ROSID
0343  37327 027333          JMP ROS2       GO DO FIRST ID.
0344  37330 060340  ROS1    LDA ASCBB      PUT BLANKS IN AS SEPARATORS.
0345  37331 170020          STA ROSP,I
0346  37332 034020          ISZ ROSP
0347  37333 160022  ROS2    LDA ROSID,I    GET ID
0348  37334 002003          SZA,RSS        TEST FOR NO ID.
0349  37335 027363          JMP ROS3
0350  37336 010362          AND B1777      MASK NUMBER PART
0351  37337 006400          CLB            GET #/100 IN A,# MOD 100 IN B.
0352  37340 100400          DIV .100
0353  37342 074023          STB ROST       SAVE LAST 2 DIGITS.
0354  37343 070001          STA 1          COMBINE FIRST DIGIT WITH LETTER.
0355  37344 160022          LDA ROSID,I
0356  37345 001121          ARS,ARS
0357  37346 013400          AND ROSMS
0358  37347 040001          ADA 1
0359  37350 043401          ADA ROSFX
0360  37351 170020          STA ROSP,I     STORE IN BUFFER.
0361  37352 034020          ISZ ROSP
0362  37353 060023          LDA ROST       GET LAST 2 DIGITS.
0363  37354 006400          CLB
0364  37355 100400          DIV .+10       SEPARATE THEM.
0365  37357 001727          ALF,ALF        PACK AND CONVERT
0366  37360 040001          ADA 1           TO ASCII.
```

```
0367   37361 040346          ADA ASC00
0368   37362 027366          JMP ROS4       GO STORE IN BUFFER.
0369   37363 063402  ROS3    LDA ROSDD      IF NO ID, PUT DOTS IN BUFFER.
0370   37364 170020          STA ROSP,I
0371   37365 034020          ISZ ROSP
0372   37366 170020  ROS4    STA ROSP,I
0373   37367 034020          ISZ ROSP
0374   37370 060022          LDA ROSID      ADVANCE ID POINTER.
0375   37371 040563          ADA .+TTY01-TTY00
0376   37372 070022          STA ROSID
0377   37373 034021          ISZ ROSC       ANY MORE?
0378   37374 027330          JMP ROS1       YES.
0379   37375 037317          ISZ ROST8
0380   37376 127317          JMP ROST8,I    NO
0381*
0382   00020         ROSP    EQU LTEMP
0383   00021         ROSC    EQU LTEMP+1
0384   37377 005040  ROSLB   OCT 5040
0385   00022         ROSID   EQU LTEMP+2
0386   00023         ROST    EQU LTEMP+3
0387   37400 017400  ROSMS   OCT 17400
0388   37401 040060  ROSFX   ASC 1,@0
0389   37402 027056  ROSDD   ASC 1,..
0390   37403         $ROS    EQU *
```

```
0392* RESET ALLOWS A USER'S TIME-TO-DATE ENTRY TO BE MODIFIED.
0393* THE FORMAT IS AS FOLLOWS:
0394*
0395* RESET-ALL          ALL TIMES ARE SET TO ZERO
0396*
0397* RESET-ID           SPECIFIED USER'S TIME SET TO ZERO
0398*
0399* RESET-ID,TIME      SPECIFIED ID SET TO SPECIFIED TIME.
0400*


0402  37300                ORG LIBRA
0403*
0404  37300 002400         CLA             INITIALIZE ID TO 0.
0405  37301 070045         STA ID
0406  37302 070021         STA REST        INITIALIZE TIME ALSO.
0407  37303 114341         JSB T35CH,I     GET 1ST CHAR.
0408  37304 026656         JMP LFRER       CR - - NO PARAMETERS
0409*
0410  37305 053463         CPA RESCA       "A" ?
0411  37306 027401         JMP RESX1       YES
0412  37307 003400         CCA             BACKSPACE
0413  37310           RESXE EQU *
0414  37310 040047         ADA T35CP        BUFFER POINTER.
0415  37311 070047         STA T35CP
0416*
0417  37312 016667         JSB GETID       GET THE ID.
0418  37313 027416         JMP RES2        GO GET TIME--NO CARRIAGE RETURN.
0419*
0420  37314           RES7  EQU *
0421  37314 016414         JSB FIDT       FIND REQUESTED ID
0422  37315 002001         RSS           GOT IT
0423  37316 027443         JMP RES8
0424*
0425*
0426  37317 044533         ADB .+5         SET IN
0427  37320 060021         LDA REST         NEW TIME.
0428  37321 170001         STA 1,I
0429*
0430  37322 160071         LDA IDTRA,I      OUTPUT ID TO DISC
0431  37323 064424         LDB LIBD
0432  37324 016625         JSB DISCL
0433  37325 026647         JMP LEND
0434*
0435  37326           RES1  EQU *
0436  37326 060045         LDA ID        ALL?
0437  37327 002002         SZA
0438  37330 027314         JMP RES7      NO
0439  37331 060171         LDA IDTTA      YES - SET TO SCAN ALL TRACKS
0440  37332 070071         STA IDTRA
0441  37333 060176         LDA IDTRL
0442  37334 070072         STA IDTLA
0443*
0444  37335 160072  RES6     LDA IDTLA,I    INPUT ID TRACK
0445  37336 002003         SZA,RSS
0446  37337 027362         JMP RES5          EMPTY TRACK
```

```
0447   37340 070065          STA WORD
0448   37341 160071          LDA IDTRA,I
0449   37342 064425          LDB LIBDI
0450   37343 016625          JSB DISCL          READ TRACK
0451*
0452   37344 064424          LDB LIBD
0453   37345 160072          LDA IDTLA,I    COMPUTE # OF ENTRIES ON THIS TRA
0454   37346 001121          ARS,ARS                TRACK
0455   37347 001100          ARS
0456   37350 070020          STA RESC
0457*
0458   37351 044533          ADB .+5
0459   37352 060021          LDA REST
0460   37353 170001          STA 1,I          SET TIME TO INDICATED VALUE
0461   37354 044536          ADB .+8
0462   37355 034020          ISZ RESC         MORE?
0463   37356 027353          JMP *-3          YES
0464*
0465   37357 160071          LDA IDTRA,I      NO - OUTPUT THIS TRACK
0466   37360 064424          LDB LIBD
0467   37361 016625          JSB DISCL
0468   37362 060171  RES5    LDA IDTTA        ANY MORE TRACKS?
0469   37363 040531          ADA .+3
0470   37364 050071          CPA IDTRA
0471   37365 026647          JMP LEND
0472   37366 034071          ISZ IDTRA
0473   37367 034072          ISZ IDTLA
0474   37370 027335          JMP RES6
0475   37371 044533  RES4    ADB .+5          CLEAR ALL TIMERS.
0476   37372 060021          LDA REST         GET TIME
0477   37373         RES42   EQU *
0478   37373 034020          ISZ RESC         TEST FOR ANY MORE.
0479   37374 002001          RSS
0480   37375 027335          JMP RES6         GO WRITE IDT BACK OUT.
0481   37376 170001          STA 1,I          STORE TIME
0482   37377 044536          ADB .+8          BUMP ADDRESS TO NEXT ENTRY.
0483   37400 027373          JMP RES42        LOOP
0484*
0485   37401         RESX1   EQU *
0486   37401 114341          JSB T35CH,I      GET NEXT CHARACTER
0487   37402 026656          JMP LFRER        ERROR, NOT ENOUGH CHARACTERS
0488   37403 053464          CPA RESCL        "L" ?
0489   37404 027407          JMP RESX2        YES
0490   37405 060524          LDA .-2
0491   37406 027310          JMP RESXE        GO TRY TO PACK ID
0492   37407         RESX2   EQU *
0493   37407 114341          JSB T35CH,I      GET ANOTHER
0494   37410 026656          JMP LFRER        ERROR, NOT ENOUGH CHARACTERS
0495   37411 053464          CPA RESCL        "L" ?
0496   37412 027414          JMP RESX3        YES, RESET ALL USERS
0497   37413 026656          JMP LFRER        NOT "ALL" OR LEGAL ID
0498   37414         RESX3   EQU *
0499   37414 114341          JSB T35CH,I      GET ANOTHER CHARACTER
0500   37415 027326          JMP RES1         CR, RESET TO ZERO
0501*
0502*  COMPUTE THE TIME
```

```
0503*
0504   37416 050602  RES2   CPA .+54B      TEST FOR COMMA
0505   37417 114341         JSB T35CH,I    COMMA OK--GET NEXT CHAR.
0506   37420 026656         JMP LFRER      ERROR IF NONE.
0507   37421 027424         JMP *+3
0508   37422 114341  RES3   JSB T35CH,I    GET NEXT CHAR.
0509   37423 027326         JMP RES1
0510   37424 040462         ADA M72B       TEST FOR DIGIT.
0511   37425 002021         SSA,RSS
0512   37426 026656         JMP LFRER      ERROR.
0513   37427 040540         ADA .+10
0514   37430 002120         CLE,SSA
0515   37431 026656         JMP LFRER      ERROR.
0516   37432 070022         STA RESD       SAVE DIGIT.
0517   37433 060021         LDA REST       GET PARTIAL RESULT.
0518   37434 100200         MPY .+10       COMPUTE NEW VALUE.
0519   37436 040022         ADA RESD       ADD IN NEW DIGIT.
0520   37437 070021         STA REST       SAVE NEW RESULT.
0521   37440 006043         SEZ,SZB,RSS    TEST FOR OVERFLOW.
0522   37441 027422         JMP RES3
0523   37442 026656         JMP LFRER      ERROR.
0524*
0525   37443 063454  RES8   LDA RESMA      MOVE
0526   37444 070043         STA MOVES        ERROR
0527   37445 060413         LDA T35B1          MESSAGE
0528   37446 070044         STA MOVED            TO
0529   37447 064520         LDB .-6                TTY35
0530   37450 016352         JSB MOVEW                BUFFER
0531   37451 060541         LDA .+11
0532   37452 064413         LDB T35B1
0533   37453 026651         JMP LEND2
0534*
0535   37454 037455  RESMA  DEF *+1
0536   37455 005116         OCT 5116
0537   37456 047440         ASC 5,0 SUCH ID
0538   37463 000101  RESCA  OCT 101         ASCII "A"
0539   37464 000114  RESCL  OCT 114         ASCII "L"
0540*
0541   00020         RESC   EQU LTEMP
0542   00021         REST   EQU LTEMP+1
0543   00022         RESD   EQU LTEMP+2
0544   37465         $RES   EQU *
```

```
0546*   THE SPEED COMMAND IS USED TO CONFIGURE A PORT FOR A
0547*   SPECIFIED SPEED AND CHARACTER SIZE.  THE FORMAT FOR
0548*   THE COMMAND IS:
0549*
0550*       SPEED-BAUD RATE,CHAR. SIZE,PORT# OR ALL [,PORT#]...
0551*

0553  37300                 ORG LIBRA
0554  37300 017454          JSB SPEDN     GET THE
0555  37301 063502          LDA SNUM        BAUD RATE
0556  37302 010630          AND B377      MASK TO 8 BITS.
0557  37303 064000          LDB A         STORE TEMPORARILY.
0558  37304 043500          ADA BAUDL     LESS THAN 47B(=300 BAUD)?
0559  37305 002020          SSA
0560  37306 026656          JMP LFRER     YES. ERROR!
0561  37307 060001          LDA B         NO. GREATER THAN 277B(=75 BAUD)?
0562  37310 043501          ADA BAUDH
0563  37311 002021          SSA,RSS
0564  37312 026656          JMP LFRER     YES. ERROR!
0565  37313 077503          STB SPRAM     NO. STORE BAUD RATE.
0566  37314 017454          JSB SPEDN     GET CHARACTER SIZE
0567  37315 063503          LDA SPRAM     A = BAUD RATE
0568  37316 067502          LDB SNUM
0569  37317 054527          CPB .+1       CHARACTER SIZE = 1?
0570  37320 002001          RSS
0571  37321 027324          JMP SPD1      NO
0572  37322 030631          IOR BIT8      YES, ADD TO SPEED PARAMETER
0573  37323 027330          JMP SPD2
0574  37324 054530  SPD1    CPB .+2       CHARACTER SIZE = 2?
0575  37325 002001          RSS
0576  37326 026656          JMP LFRER     NO - ERROR
0577  37327 031000          IOR BIT9      YES, ADD TO SPEED PARAMETER
0578  37330 073503  SPD2    STA SPRAM
0579*
0580**    BAUD RATE AND SPEED OK - NOW GET PORT NUMBERS
0581*
0582  37331 016330          JSB T35CQ     GET NEXT CHARACTER
0583  37332 026656          JMP LFRER     CR - ERROR
0584  37333 053506          CPA SP,A      IS CHARACTER AN "A"?
0585  37334 027373          JMP SPD7      YES
0586  37335 003400          CCA           NO, BACK-UP
0587  37336 040047          ADA T35CP       CHARACTER
0588  37337 070047          STA T35CP          POINTER
0589  37340 002400  SPD3    CLA           CLEAR PORT
0590  37341 073502          STA SNUM        INDICATOR
0591  37342 016330  SPD4    JSB T35CQ     GET NEXT CHARACTER
0592  37343 027363          JMP SPD5      CARRIAGE RETURN
0593  37344 050602          CPA .+54B     COMMA?
0594  37345 027365          JMP SPD6      YES
0595  37346 040462          ADA D72       NO
0596  37347 002021          SSA,RSS       CHECK
0597  37350 026656          JMP LFRER       FOR
0598  37351 040540          ADA .+10           DIGIT
0599  37352 002020          SSA
0600  37353 026656          JMP LFRER     NO - ERROR
0601  37354 073504          STA STEMP     COMPUTE
```

```
0602  37355 063502         LDA SNUM
0603  37356 100200         MPY .+10          PORT
0604  37360 043504         ADA STEMP
0605  37361 073502         STA SNUM             NUMBER
0606  37362 027342         JMP SPD4        GET NEXT CHARACTER
0607*
0608  37363 003400  SPD5   CCA              CR, SET COUNTER
0609  37364 073505         STA SCNTR          FOR LAST PORT
0610  37365 063502  SPD6   LDA SNUM        IS PORT NUMBER
0611  37366 040206         ADA NPORT          IN CORRECT RANGE?
0612  37367 002021         SSA,RSS
0613  37370 026656         JMP LFRER       NO
0614  37371 017417         JSB SPORT       YES, UPDATE SPEED FOR THIS PORT
0615  37372 027340         JMP SPD3
0616*
0617**   ADJUST SPEED FOR ALL PORTS
0618*
0619  37373 016330  SPD7   JSB T35CQ       GET NEXT CHAR.
0620  37374 026656         JMP LFRER       CR - ERROR
0621  37375 053507         CPA SP.L        CHAR. A "L"?
0622  37376 002001         RSS
0623  37377 026656         JMP LFRER       NO - ERROR
0624  37400 016330         JSB T35CQ       GET NEXT CHAR
0625  37401 026656         JMP LFRER       CR - ERROR
0626  37402 053507         CPA SP.L        CHAR A "L"?
0627  37403 002001         RSS
0628  37404 026656         JMP LFRER       NO - ERROR
0629  37405 016330         JSB T35CQ       GET NEXT CHAR
0630  37406 002001         RSS
0631  37407 026656         JMP LFRER       ERROR - NOT CR
0632  37410 060206         LDA NPORT       SET COUNTER TO
0633  37411 073505         STA SCNTR          NUMBER OF PORTS
0634  37412 002400         CLA             INITIALIZE PORT
0635  37413 073502         STA SNUM           NUMBER INDICATOR
0636  37414 017417  SPD8   JSB SPORT       SET SPEED FOR NEXT PORT
0637  37415 037502         ISZ SNUM        BUMP PORT NUMBER INDICATOR
0638  37416 027414         JMP SPD8
0639*
0640**   SPEED UPDATE SUBROUTINE
0641*
0642  37417 000000  SPORT  NOP
0643  37420 063502         LDA SNUM        A = PORT#
0644  37421 040357         ADA TTYTP       ADD TELETYPE TABLE POINTER
0645  37422 164000         LDB A,I
0646  37423 044550         ADB .+?ID       B => ID
0647  37424 160001         LDA B,I         A = ID
0648  37425 002002         SZA             IS A USER LOGGED ON THIS PORT?
0649  37426 027451         JMP SPRT        YES - SKIP
0650  37427 044520         ADB .+?RPRM-?ID  NO
0651  37430 160001         LDA B,I         B = RECEIVE PARAM
0652  37431 013510         AND SMASK       SET
0653  37432 033503         IOR SPRAM          NEW
0654  37433 170001         STA B,I               SPEED
0655  37434 073504         STA STEMP
0656  37435 006004         INB
0657  37436 160001         LDA B,I         B = SEND PARAM
```

```
0658  37437 010451          AND HIMSK      SET
0659  37440 033503          IOR SPRAM        NEW
0660  37441 170001          STA B,I            SPEED
0661  37442 067502          LDB SNUM
0662  37443 005727          BLF,BLF        B = POSITIONED UNIT#
0663  37444 114355          JSB MUXR,I     OUTPUT SEND PARAM
0664  37445 063504          LDA STEMP      A = RECEIVE PARAM
0665  37446 067502          LDB SNUM
0666  37447 005727          BLF,BLF        B = POSITIONED UNIT#
0667  37450 114355          JSB MUXR,I     OUTPUT RECEIVE PARAM
0668  37451          SPRT   EQU *
0669  37451 037505          ISZ SCNTR      ALL DONE?
0670  37452 127417          JMP SPORT,I    NO
0671  37453 026647          JMP LEND       HAUL

0673*
0674**   NUMBER RETRIEVAL SUBROUTINE
0675*
0676  37454 000000  SPEDN NOP
0677  37455 002400          CLA            INITIALIZE
0678  37456 073502          STA SNUM         ACCUMULATOR
0679  37457 016330  SPDN    JSB T35CQ      GET CHARACTER
0680  37460 026656          JMP LFRER      CR - ERROR
0681  37461 050602          CPA .+54B      COMMA?
0682  37462 127454          JMP SPEDN,I    YES, RETURN
0683  37463 040462          ADA D72        NO
0684  37464 002021          SSA,RSS        CHECK
0685  37465 026656          JMP LFRER        FOR
0686  37466 040540          ADA .+10           DIGIT
0687  37467 002020          SSA
0688  37470 026656          JMP LFRER      ERROR
0689  37471 073504          STA STEMP
0690  37472 063502          LDA SNUM       COMPUTE
0691  37473 100200          MPY .+10         THE
0692  37475 043504          ADA STEMP          NUMBER
0693  37476 073502          STA SNUM
0694  37477 027457          JMP SPDN       GET NEXT CHAR
0695*
0696  37500 177721  BAUDL   DEC -47
0697  37501 177500  BAUDH   DEC -192
0698  37502 000000  SNUM    BSS 1
0699  37503 000000  SPRAM   BSS 1
0700  37504 000000  STEMP   BSS 1
0701  37505 000000  SCNTR   OCT 0
0702  37506 000101  SP.A    OCT 101
0703  37507 000114  SP.L    OCT 114
0704  37510 174000  SMASK   OCT 174000
0705  37511          $SPE   EQU *
```

```
0002*     THE PORT COMMAND PRINTS THE CHARACTER SIZE AND BAUD
0003*     RATE FOR EACH PORT NUMBER.
0004*

0006  37300                ORG LIBRA
0007  37300 063375         LDA PORLB      SET LF-BLANK
0008  37301 070211         STA T35BF        IN BUFFER
0009  37302 017317         JSB PRT        PROCESS FIRST 8
0010  37303 033300         DEF TTY00+?RPRM
0011  37304 060615         LDA .64        OUTPUT THEM
0012  37305 064413         LDB T35B1
0013  37306 016607         JSB T35SP
0014  37307 060211         LDA T35BF
0015  37310 030451         IOR HIMSK
0016  37311 070211         STA T35BF
0017  37312 017317         JSB PRT        PROCESS LAST 8
0018  37313 033650         DEF TTY10+?RPRM
0019  37314 060615         LDA .64        OUTPUT THEM
0020  37315 064413         LDB T35B1        AND TERMINATE
0021  37316 026651         JMP LEND2


0023*   PRT FILLS THE TELETYPE BUFFER WITH THE CHARACTER SIZE
0024*   AND BAUD RATE OF 8 PORTS.  THE FORMAT IS:
0025*         LF,BLANK,8(CHAR. SIZE-BAUD RATE,BLANK,BLANK,BLANK)

0027  37317 000000  PRT    NOP
0028  37320 060413         LDA T35B1      SET UP POINTER FOR
0029  37321 002004         INA              FIRST INFORMATION BLOCK
0030  37322 073400         STA PPNTR
0031  37323 060516         LDA .-8        SET UP COUNTER
0032  37324 073377         STA PCNTR
0033  37325 163317         LDA PRT,I      SET UP POINTER TO
0034  37326 073401         STA PRPRM        RECEIVE PARAMETER
0035  37327 027333         JMP PRT2
0036*
0037  37330 060340  PRT1   LDA ASCBB      PUT IN BLANKS
0038  37331 173400         STA PPNTR,I      AS SEPARATORS
0039  37332 037400         ISZ PPNTR
0040  37333 163401  PRT2   LDA PRPRM,I    A = RECEIVE PARAM
0041  37334 013373         AND PMASK      MASK OUT CHARACTER SIZE
0042  37335 043374         ADA PCHAR      CONVERT TO ASCII
0043  37336 173400         STA PPNTR,I      AND STORE IN BUFFER
0044  37337 037400         ISZ PPNTR
0045  37340 163401         LDA PRPRM,I    A = RECEIVE PARAM
0046  37341 010630         AND B377       MASK TO BAUD RATE
0047  37342 006400         CLB
0048  37343 100400         DIV .100       OBTAIN HUNDREDS
0049  37345 001727         ALF,ALF
0050  37346 073376         STA PDIGT        AND TENS DIGIT,
0051  37347 060001         LDA B
0052  37350 006400         CLB                CONVERT TO ASCII,
0053  37351 100400         DIV .+10
0054  37353 043376         ADA PDIGT            AND STORE IN BUFFER
0055  37354 040346         ADA ASC00
0056  37355 173400         STA PPNTR,I
```

```
0057  37356 037400          ISZ PPNTR
0058  37357 060001          LDA B          A = UNITS DIGIT
0059  37360 001727          ALF,ALF
0060  37361 040400          ADA ASC0B      CONVERT TO ASCII
0061  37362 173400          STA PPNTR,I      AND STORE IN BUFFER
0062  37363 037400          ISZ PPNTR
0063  37364 063401          LDA PRPRM
0064  37365 040563          ADA .+TTY01-TTY00
0065  37366 073401          STA PRPRM      UPDATE TTY TABLE POINTER
0066  37367 037377          ISZ PCNTR      BUMP COUNTER - DONE?
0067  37370 027330          JMP PRT1       NO
0068  37371 037317          ISZ PRT        YES
0069  37372 127317          JMP PRT,I      RETURN
0070*
0071  00615           .64   EQU B100
0072  37373 001400    PMASK OCT 1400
0073  37374 030055    PCHAR ASC 1,0-
0074  37375 005040    PORLB OCT 5040
0075  37376 000000    PDIGT BSS 1
0076  37377 000000    PCNTR BSS 1
0077  37400 000000    PPNTR BSS 1
0078  37401 000000    PRPRM BSS 1
0079  37402           $POR  EQU *
```

```
0081* THE CHANGEID COMMAND CAN BE USED TO MODIFY THE PARAMETERS IN AN
0082* ID ENTRY. THE MODIFIABLE ENTRIES ARE THE PASSWORD, TIME ALLOWED,
0083* AND DISC ALLOWED. THE POSSIBLE FORMATS ARE:
0084*
0085*      CHANGEID-ID,PASSWORD,TIME,DISC
0086*      CHANGEID-ID,PASSWORD,TIME
0087*      CHANGEID-ID,PASSWORD,,DISC
0088*      CHANGEID-ID,,TIME,DISC
0089*      CHANGEID-ID,PASSWORD
0090*      CHANGEID-ID,,TIME
0091*      CHANGEID-ID,,,DISC


0093  37300                 ORG LIBRA

0095  37300 016667          JSB GETID
0096  37301 002001          RSS              SKIP TO COMMA TEST.
0097  37302 026656          JMP LFRER        FAIL IF NOTHING FOLLOWS.
0098  37303 050602          CPA .+54B        TEST FOR COMMA FOLLOWING.
0099  37304 002001          RSS              OK.
0100  37305 026656          JMP LFRER        FAIL IF NO COMMA FOLLOWS.
0101*
0102  37306 016414          JSB FIDT       INPUT ID ENTRY
0103  37307 027330          JMP CHA3       FOUND IT
0104*
0105  37310 063321          LDA CHA2E        OUTPUT NO ID MESSAGE
0106  37311 070043          STA MOVES
0107  37312 060413          LDA T35B1
0108  37313 070044          STA MOVED
0109  37314 064520          LDB .-6
0110  37315 016352          JSB MOVEW
0111  37316 060541          LDA .+11
0112  37317 064413          LDB T35B1
0113  37320 026651          JMP LEND2
0114  37321 037322  CHA2E    DEF *+1
0115  37322 005116          OCT 5116         LF-N
0116  37323 047440          ASC 5,0 SUCH ID
0117*
0118* B NOW POINTS TO THE CORRECT ID.
0119*
0120  37330 006004  CHA3     INB              SET CHAID TO POINT TO THE
0121  37331 074020          STB CHAID         PASSWORD.
0122  37332 074021          STB CHAI1        STORE COPY IN CHAI1.
0123  37333 114341          JSB T35CH,I      GET FIRST CHARACTER OF POSSIBLE
0124  37334 026656          JMP LFRER         PASSWORD--ERROR IF NONE.
0125  37335 050602          CPA .+54B        IF COMMA, WE DON'T WANT TO
0126  37336 027376          JMP CHA5          CHANGE PASSWORD.
0127  37337 006400          CLB              INITIALIZE PASSWORD
0128  37340 034020          ISZ CHAID          TO NULLS.
0129  37341 174020          STB CHAID,I
0130  37342 034020          ISZ CHAID
0131  37343 174020          STB CHAID,I
0132  37344 064021          LDB CHAI1        SET CHAID TO POINT AT
0133  37345 074020          STB CHAID          PASSWORD AGAIN.
0134  37346 064523          LDB .-3          SET COUNTER FOR 3 WORD
0135  37347 074022          STB CHAC          PASSWORD.
```

```
0136  37350 001727  CHA4   ALF,ALF        SET LEFT CHARACTER OF WORD.
0137  37351 170020         STA CHAID,I
0138  37352 114341         JSB T35CH,I    GET RIGHT CHARACTER.
0139  37353 027414         JMP CHA10      TERMINATE IF CR.
0140  37354 050602         CPA .+54B      IF COMMA, WE'RE DONE WITH
0141  37355 027376         JMP CHA5        PASSWORD.
0142  37356 130020         IOR CHAID,I    MERGE IN WITH LEFT CHAR.
0143  37357 170020         STA CHAID,I
0144  37360 034022         ISZ CHAC       TEST FOR ALL OF PASSWORD IN.
0145  37361 002001         RSS            NOT ALL IN YET.
0146  37362 027371         JMP CHA6
0147  37363 034020         ISZ CHAID      BUMP POINTER.
0148  37364 114341         JSB T35CH,I    GET ANOTHER PASSWORD CHARACTER.
0149  37365 027414         JMP CHA10      DONE IF CR.
0150  37366 050602         CPA .+54B      TEST FOR COMMA.
0151  37367 027376         JMP CHA5
0152  37370 027350         JMP CHA4       LOOP.
0153*
0154  37371 114341  CHA6   JSB T35CH,I    TEST FOR TOO MANY PASSWORD CHARS
0155  37372 027414         JMP CHA10      END OF REQUEST.
0156  37373 050602         CPA .+54B      TEST COMMA.
0157  37374 002001         RSS
0158  37375 026656         JMP LFRER      FAIL.
0159*
0160  37376 060021  CHA5   LDA CHAI1      SET CHAID TO POINT TO
0161  37377 040531         ADA .+3        TIME ALLOWED.
0162  37400 070020         STA CHAID
0163*
0164  37401 114341         JSB T35CH,I    GET 1ST CHAR OF POSSIBLE TIME.
0165  37402 026656         JMP LFRER      ERROR IF NONE.
0166  37403 050602         CPA .+54B      IF COMMA, GO TO DO DISC PART.
0167  37404 002001         RSS
0168  37405 017422         JSB CHA#       OTHERWISE GET NEW ALLOTTED TIME.
0169  37406 034020         ISZ CHAID      SET POINTER TO ALLOTTED DISC
0170  37407 034020         ISZ CHAID       SPACE.
0171  37410 114341         JSB T35CH,I    GET FIRST DIGIT OF DISC.
0172  37411 026656         JMP LFRER      FAIL IF NONE.
0173  37412 017422         JSB CHA#       COMPUTE IT.
0174  37413 026656         JMP LFRER      RETURN HERE IS ILLEGAL.
0175*
0176  37414 160072  CHA10  LDA IDTLA,I OUTPUT UPDATED ID TRACK
0177  37415 070065         STA WORD
0178  37416 160071         LDA IDTRA,I
0179  37417 064424         LDB LIBD
0180  37420 114350         JSB DISC,I
0181  37421 026647         JMP LEND
0182* CHA# SCANS THE INPUT BUFFER FOR A # FROM 0 TO 65535. IF IT FINDS
0183* ONE, IT STORES IT IN CHAID,I. IF NO CHARACTER FOLLOWS THE #,
0184* CHA# TRANSFERS TO CHA10. IF A COMMA FOLLOWS IT RETURNS. IF AN
0185* ERROR IS FOUND, IT TRANSFERS TO LFRER. THE 1ST CHARACTER OF
0186* THE NUMBER IS IN A UPON ENTRY.

0188  37422 000000  CHA#   NOP
0189  37423 006400         CLB            INITIALIZE # TO ZERO.
0190  37424 174020         STB CHAID,I
0191  37425 040462  CHA7   ADA M72B       TEST FOR DIGIT.
```

```
0192  37426 002021          SSA,RSS
0193  37427 026656          JMP LFRER      FAIL.
0194  37430 040540          ADA .+10
0195  37431 002020          SSA
0196  37432 026656          JMP LFRER      FAIL.
0197  37433 070023          STA CHAD       SAVE DIGIT.
0198  37434 160020          LDA CHAID,I    GET OLD VALUE.
0199  37435 100200          MPY .+10        * 10
0200  37437 000040          CLE
0201  37440 040023          ADA CHAD        + NEW DIGIT.
0202  37441 006043          SEZ,SZB,RSS    TEST FOR OVERFLOW.
0203  37442 002001          RSS            OK
0204  37443 026656          JMP LFRER      FAIL
0205  37444 170020          STA CHAID,I    STORE AGAIN.
0206  37445 114341          JSB T35CH,I    GET NEXT CHAR.
0207  37446 027414          JMP CHA10      DONE IF CR.
0208  37447 050602          CPA .+54B      RETURN IF COMMA.
0209  37450 127422          JMP CHA#,I
0210  37451 027425          JMP CHA7       ELSE LOOP.

0212  00020          CHAID  EQU LTEMP
0213  00021          CHAI1  EQU LTEMP+1
0214  00022          CHAC   EQU LTEMP+2
0215  00023          CHAD   EQU LTEMP+3
0216  37452          $CHA   EQU *
```

```
0218*   THE ANNOUNCE (ANNOY) COMMAND IS USED TO SEND A MESSAGE FROM
0219*   THE SYSTEM CONSOLE TO THE USER CONSOLES.  THE FORMAT IS:
0220*
0221*           ANN=<PORT #>,<MESSAGE TEXT>
0222*
0223*   WHERE PORT # IS AN INTEGER BETWEEN 0 AND 15 OR 'ALL' AND
0224*   MESSAGE IS A STRING OF CHARACTERS ENDING WITH A CARRIAGE
0225*   RETURN.
0226*
0227  37300                 ORG LIBRA
0228  37300 114341          JSB T35CH,I    GET 1ST CHAR
0229  37301 026656          JMP LFRER
0230  37302 053470          CPA ANN.A      'A'
0231  37303 027346          JMP ANN2       YES
0232  37304 040462          ADA M72B       NO
0233  37305 002021          SSA,RSS          DIGIT?
0234  37306 026656          JMP LFRER      NO
0235  37307 040540          ADA .+10       MAYBE
0236  37310 002020          SSA
0237  37311 026656          JMP LFRER      NO
0238  37312 070020          STA LTEMP      YES, SAVE IT
0239  37313 114341          JSB T35CH,I    NEXT CHAR
0240  37314 026656          JMP LFRER
0241  37315 050602          CPA .+54B      COMMA?
0242  37316 027343          JMP ANN1       YES
0243  37317 040462          ADA M72B       NO
0244  37320 002021          SSA,RSS          DIGIT?
0245  37321 026656          JMP LFRER      NO
0246  37322 040540          ADA .+10       MAYBE
0247  37323 002020          SSA
0248  37324 026656          JMP LFRER      NO
0249  37325 070021          STA LTEMP+1    YES
0250  37326 060020          LDA LTEMP
0251  37327 100200          MPY .+10
0252  37331 040021          ADA LTEMP+1    NUMBER
0253  37332 070020          STA LTEMP
0254  37333 040206          ADA NPORT
0255  37334 002021          SSA,RSS        TOO BIG?
0256  37335 026656          JMP LFRER      YES, ERROR
0257  37336 114341          JSB T35CH,I
0258  37337 026656          JMP LFRER
0259  37340 050602          CPA .+54B      COMMA?
0260  37341 002001          RSS            YES
0261  37342 026656          JMP LFRER      NO
0262  37343           ANN1  EQU *
0263  37343 003400          CCA            SET FOR
0264  37344 070021          STA LTEMP+1     ONE PORT
0265  37345 027365          JMP ANN3
0266  37346           ANN2  EQU *
0267  37346 114341          JSB T35CH,I    NEXT CHAR
0268  37347 026656          JMP LFRER
0269  37350 053471          CPA ANN.L      'L'?
0270  37351 114341          JSB T35CH,I    YES - NEXT CHAR
0271  37352 026656          JMP LFRER      NO
0272  37353 053471          CPA ANN.L      'L'?
0273  37354 114341          JSB T35CH,I    YES - NEXT CHAR
```

```
0274  37355 026656          JMP LFRER      NO
0275  37356 050602          CPA .+54B      COMMA?
0276  37357 002001          RSS            YES
0277  37360 026656          JMP LFRER      NO
0278  37361 060206          LDA NPORT      # OF PORTS
0279  37362 070021          STA LTEMP+1
0280  37363 002400          CLA            1ST PORT IS 0
0281  37364 070020          STA LTEMP
0282  37365          ANN3   EQU *
0283  37365 060543          LDA .+15B      CR
0284  37366 017437          JSB ANNCH
0285  37367 060540          LDA .+12B      LF
0286  37370 017437          JSB ANNCH
0287  37371 060540          LDA .+12B      LF
0288  37372 017437          JSB ANNCH
0289  37373 060535          LDA .+7B       BELL
0290  37374 017437          JSB ANNCH
0291  37375          ANN4   EQU *
0292  37375 002400          CLA            ALLOW BLANKS
0293  37376 072347          STA T35C1
0294  37377 114341          JSB T35CH,I    NEXT CHAR
0295  37400 027403          JMP ANN5       CR
0296  37401 017437          JSB ANNCH      OUTPUT IT
0297  37402 027375          JMP ANN4       LOOP
0298  37403          ANN5   EQU *
0299  37403 017437          JSB ANNCH      CR
0300  37404 060540          LDA .+12B      LF
0301  37405 017437          JSB ANNCH
0302  37406 060540          LDA .+12B      LF
0303  37407 017437          JSB ANNCH
0304  37410 063472          LDA ANNJM      RESTORE BLANK
0305  37411 072347          STA T35C1        SUPPRESSION
0306  37412 060357   ANN6   LDA TTYTP
0307  37413 040020          ADA LTEMP
0308  37414 164000          LDB A,I        B => USER'S TTY TABLE
0309  37415 044560          ADB .+?STAT
0310  37416 160001          LDA B,I        A = STATUS
0311  37417 050530          CPA .+2        IS STATUS INPUT WAIT?
0312  37420 002001          RSS
0313  37421 027433          JMP ANN7       NO
0314  37422 044503          ADB .+?TSTA-?STAT
0315  37423 160001          LDA B,I        YES, REMOVE
0316  37424 010523          AND NINBT        'NO INPUT
0317  37425 170001          STA B,I              ALLOWED' BIT
0318  37426 044533          ADB .+?RPRM-?TSTA  TURN
0319  37427 160001          LDA B,I
0320  37430 044512          ADB .+?TNUM-?RPRM    ECHO
0321  37431 164001          LDB B,I
0322  37432 114355          JSB MUXR,I             ON
0323  37433 034020   ANN7   ISZ LTEMP       BUMP PORT#
0324  37434 034021          ISZ LTEMP+1     ALL PORTS DONE?
0325  37435 027412          JMP ANN6        NO
0326  37436 026647          JMP LEND        ALL DONE
0327*
0328*
0329  37437 000000   ANNCH  NOP
```

```
0330   37440 070022          STA LTEMP+2    SAVE CHAR
0331   37441 060021          LDA LTEMP+1    # OF PORTS
0332   37442 070023          STA LTEMP+3
0333   37443 060020          LDA LTEMP      1ST PORT
0334   37444 070024          STA LTEMP+4
0335   37445 064357  ANNC1   LDB TTYTP      FIND TTY TABLE FOR
0336   37446 044024          ADB LTEMP+4      FOR THIS PORT
0337   37447 164001          LDB 1,I
0338   37450 044550          ADB .+?ID      IS HE ACTIVE?
0339   37451 160001          LDA 1,I          CHECK ID TO
0340   37452 002003          SZA,RSS            FIND OUT
0341   37453 027464          JMP ANNC2      NOPE - GET NEXT PORT
0342   37454 044505          ADB .+?CCNT-?ID
0343   37455 160001          LDA 1,I        CHECK
0344   37456 040525          ADA .-1          IF
0345   37457 050366          CPA MAXBL          BUFFER FULL
0346   37460 027445          JMP ANNC1      YES
0347   37461 044525          ADB .-?CCNT    NO - OK TO OUTPUT
0348   37462 060022          LDA LTEMP+2
0349   37463 114356  ANNC3   JSB POCR,I     OUTPUT CHAR
0350   37464 034024  ANNC2   ISZ LTEMP+4    BUMP PORT #
0351   37465 034023          ISZ LTEMP+3    ALL DONE?
0352   37466 027445          JMP ANNC1      NO
0353   37467 127437          JMP ANNCH,I    YES
0354*
0355   37470 000101  ANN.A   OCT 101
0356   37471 000114  ANN.L   OCT 114
0357   37472 026334  ANNJM   JMP T35C0
0358   37473         $ANN    EQU *
```

```
0360*
0361*      THE SLEEP COMMAND IS A SYSTEM COMMAND WHICH
0362*      IS USED FOR SYSTEM SHUTDOWN. SLEEP IS CALLED
0363*      AFTER ALL USER DISCS HAVE BEEN REMOVED FROM
0364*      THE SYSTEM WITH THE 'DISC-DN,<SUBCHANNEL>'
0365*      DIRECTIVE. THE SLEEP ROUTINE PERFORMS
0366*      THE FOLLOWING FUNCTIONS:
0367*
0368*      1) PLACE ALL USERS IN DISCONNECT MODE
0369*      2) OUTPUT SPECIFIED MESSAGE TO ALL TERMINALS
0370*      3) DISCONNECT ALL USERS
0371*      4) LOG OFF ALL ACTIVE USERS
0372*      5) CLEAR FUSS TABLE
0373*      6) DUMP SYSTEM DISC TO CARTRIDGE DISC
0374*
0375  37300                 ORG LIBRA                                    X)
0376  37300 002400          CLA             BLOACK
0377  37301 170401          STA DCLC1,I       CLOCK
0378  37302 060047          LDA T35CP       SAVE CONTENTS OF LOCATION
0379  37303 001100          ARS             POINTED TO BY T35CP
0380  37304 164000          LDB A,I
0381  37305 074023          STB LTEMP+3
0382  37306 060546          LDA .+16
0383  37307 067672          LDB MAGMS
0384  37310 114324          JSB TTY35,I     ASK IF MAG TAPE
0385  37311 060414          LDA T35F1       WAIT FOR RESPONSE
0386  37312 002002          SZA
0387  37313 027311          JMP *-2
0388  37314 070415          STA T35F2
0389  37315 060415          LDA T35F2
0390  37316 002003          SZA,RSS
0391  37317 027315          JMP *-2
0392  37320 160413          LDA T35B1,I     LOAD RESPONSE
0393  37321 001727          ALF,ALF
0394  37322 010626          AND B177        GET SINGLE CHARACTER
0395  37323 006400          CLB
0396  37324 053673          CPA SY          IS IT YES?
0397  37325 006004          INB             YES SET MAG TAPE FLAG
0398  37326 074036          STB MGFLG
0399  37327 103100          CLF 0
0400  37330 160402          LDA DCLC2,I     UNBLOACK
0401  37331 170401          STA DCLC1,I       CLOCK
0402  37332 006002          SZB
0403  37333 027356          JMP MG.SP
0404*                                                    (X)
0405*      SCAN THE DIRECTORY FOR REFERENCES TO DISCS     (X)
0406*      OTHER THAN THE SYSTEM DISC. ERROR IF A         (X)
0407*      REFERENCE IS FOUND                             (X)
0408*                                                     (X)
0409  37334 006700          CLB,CCE       SET DIRECTORY POINTER          [
0410  37335 005620          ELB,BLS         TO 2*DISC SUBCHANNEL         [
0411  37336 074020          STB LTEMP                                  (X)
0412  37337 064334          LDB DIRD0     SET LTEMP+1 TO POINT         (X)
0413  37340 044544          ADB .+14      TO FIRST WORD OF             (X)
0414  37341 074021          STB LTEMP+1   USER DISC DIRECTORIES        (X)
0415  37342 064520          LDB .-6                                    (X)
```

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0416  37343 074022          STB LTEMP+2                                          [
0417*
0418  37344 064021  SLE0    LDB LTEMP+1   INDEX (B) TO DIRECTORY                (X)
0419  37345 044534          ADB .+6       DISC ADDRESS                          (X)
0420  37346 160001          LDA 1,I       GET DIRECTORY TRACK ADR IN (A)        (X)
0421  37347 002002          SZA           GO TO SLE00 UPON FINDING              (X)
0422  37350 027565          JMP SLE00     THAT THE DISC IS ON SYSTEM            (X)
0423  37351 044527          ADB .+1                                             [X]
0424  37352 074021          STB LTEMP+1   UPDATE TO NEXT DIR ENTRY              (X)
0425  37353 034020          ISZ LTEMP                                           (X)
0426  37354 034022          ISZ LTEMP+2   ALL DIRECTORY TRACKS CHECKED?         (X)
0427  37355 027344          JMP SLE0      NO                                    (X)
0428  37356          MG.SP  EQU *                                               X)
0429  37356 006400          CLB                                                 X)
0430  37357 076347          STB T35C1     NO DEBLANKING ON ASR35                X)
0431  37360 074265          STB MPCOM                                           X)
0432  37361 060351          LDA MLINK                                           X)
0433  37362 070406          STA T35LK                                           X)
0434*                                                        X)
0435  37363 064206          LDB NPORT      PLACE ALL USERS IN ABORT
0436  37364 074020          STB LTEMP     MODE AND WAIT FOR OUTPUT              X)
0437  37365 064333          LDB DTTY0     TO COMPLETE                           X)
0438  37366 044560  SLE1    ADB .+?STAT                                         X)
0439  37367 003400          CCA                                                 X)
0440  37370 170001          STA 1,I                                             X)
0441  37371 044475          ADB .+?CCNT-?STAT                                   X)
0442  37372 170001          STA 1,I                                             X)
0443  37373 044562          ADB .-?CCNT+TTY01-TTY00                             X)
0444  37374 034020          ISZ LTEMP                                           X)
0445  37375 027366          JMP SLE1                                            X)
0446*                                                        X)
0447  37376 060430          LDA ONEI      OUTPUT                                X)
0448  37377 064431          LDB DEH       LINE-FEED                             X)
0449  37400 114324          JSB TTY35,I                                         X)
0450*
0451  37401 060047          LDA T35CP      RESTORE CONTENTS OF LOCATION
0452  37402 001100          ARS            POINTED TO BY T35CP
0453  37403 064023          LDB LTEMP+3
0454  37404 174000          STB A,I
0455*                                                        X)
0456  37405 017645          JSB SLE4    WAIT FOR ALL OUTPUT TO END.
0457*
0458***   OUTPUT SLEEP MESSAGE TO ALL ACTIVE USERS    X)
0459*                                                 X)
0460  37406 060543          LDA .+15B     FIRST OUTPUT CR-LF-LF                 X)
0461  37407 017616          JSB SLECH                                           X)
0462  37410 060540          LDA .+12B                                           X)
0463  37411 017616          JSB SLECH                                           X)
0464  37412 060540          LDA .+12B                                           X)
0465  37413 017616          JSB SLECH                                           X)
0466*                                                        X)
0467  37414 016330          JSB T35CQ     OUTPUT 'SLEEP' MESSAGE                X)
0468  37415 027420          JMP *+3       TO ALL ACTIVE USERS                   X)
0469  37416 017616          JSB SLECH                                           X)
0470  37417 027414          JMP *-3                                             X)
0471*                                                        X)
```

```
0472  37420 017616          JSB SLECH     THEN ...                          X)
0473  37421 060540          LDA .+12B     OUTPUT CR-LF-LF                   X)
0474  37422 017616          JSB SLECH                                       X)
0475  37423 060540          LDA .+12B                                       X)
0476  37424 017616          JSB SLECH                                       X)
0477*                                                          X)
0478  37425 017645          JSB SLE4    WAIT FOR ALL OUTPUT TO END.
0479*
0480*      NOW DISABLE MUX
0481*
0482  37426 106714          CLC MPX       DISABLE MUX.
0483  37427 106716          CLC DSCB      DISABLE PHONES.
0484*
0485*                                                          X)
0486***    NOW WE HAVE TO LOG OFF ALL ACTIVE USERS             X)
0487*                                                          X)
0488*                                                          X)
0489  37430 064333          LDB DTTY0     SEARCH USER TABLES                X)
0490  37431 044550          ADB .+?ID     FOR ACTIVE IDS.                   X)
0491  37432 060206          LDA NPORT
0492  37433 070020          STA LTEMP                                       X)
0493  37434 160001  SLE2    LDA 1,I       GET ID                            X)
0494  37435 002003          SZA,RSS       TEST FOR ACTIVE                   X)
0495  37436 027545          JMP SLE3      NOT ACTIVE USER                   X)
0496  37437 074021          STB LTEMP+1   SAVE POINTER                      X)
0497*                                                          X)
0498***    COMPUTE TIME USED                                   X)
0499*                                                          X)
0500  37440 044532          ADB .+?TIME-?ID                                 X)
0501  37441 104200          DLD 1,I       GET STARTING TIME                 X)
0502  37443 003004          CMA,INA       SET BOTH PARTS NEGATIVE           X)
0503  37444 007004          CMB,INB                                         X)
0504  37445 103100          CLF 0                                           X)
0505  37446 040041          ADA DATIM     (A) = # HRS USED                  X)
0506  37447 000040          CLE                                             X)
0507  37450 044042          ADB DATIM+1   (B) = # UNITS, OVERFLOW IN (E)    X)
0508  37451 102100          STF 0                                           X)
0509  37452 074022          STB LTEMP+2   SAVE # OF UNITS                   X)
0510  37453 100200          MPY D60       HRS ==> MINS                      X)
0511  37455 070023          STA LTEMP+3                                     X)
0512  37456 060022          LDA LTEMP+2   GET UNITS COUNT; IF E=0           X)
0513  37457 002041          SEZ,RSS       THEN COUNT AS NEGATIVE            X)
0514  37460 007400          CCB                                             X)
0515  37461 100400          DIV D600      CHANGE TO MINUTES                 X)
0516  37463 040023          ADA LTEMP+3   ADD IN OTHER MINUTES              X)
0517  37464 070022          STA LTEMP+2   TOTAL IN LTEMP(2)                 X)
0518*                                                          X)
0519***    SEARCH IDT FOR USER                                 X)
0520*                                                          X)
0521  37465 160021          LDA LTEMP+1,I                                   X)
0522  37466 070045          STA ID        SET UP FOR FIDT
0523  37467 016414          JSB FIDT       FINDT ID ENTRY
0524  37470 044533          ADB .+5       COMPUTE NEW TOTAL TIME            X)
0525  37471 000040          CLE                                             X)
0526  37472 160001          LDA 1,I                                         X)
0527  37473 040022          ADA LTEMP+2                                     X)
```

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0528  37474 002040          SEZ             IF OVERFLOW,                    X)
0529  37475 003400          CCA             USE MAXIMUM                     X)
0530  37476 170001          STA 1,I                                         X)
0531*                                                      X)
0532  37477 060370          LDA LOGCT       CHECK FOR ROOM IN LOG TABLE     X)
0533  37500 050546          CPA .+16                                        X)
0534  37501 027477          JMP *-2                                         X)
0535  37502 060372          LDA LOGP2       SET LOGP2 TO NEXT LOCATION      X)
0536  37503 002004          INA             IN LOG TABLE                    X)
0537  37504 050374          CPA LOGND                                       X)
0538  37505 060373          LDA LOGBG                                       X)
0539  37506 070372          STA LOGP2                                       X)
0540  37507 160021          LDA LTEMP+1,I                                   X)
0541  37510 031163          IOR BIT15       PLACE ID IN LOG TABLE           X)
0542  37511 170372          STA LOGP2,I                                     X)
0543  37512 034372          ISZ LOGP2                                       X)
0544  37513 104200          DLD DATIM       COMPUTE TIME OF DAY             X)
0545  37515 074022          STB LTEMP+2     SAVE UNIT COUNTER               X)
0546  37516 006400          CLB                                             X)
0547  37517 100400          DIV .+24                                        X)
0548  37521 060001          LDA 1                                           X)
0549  37522 100200          MPY D60         CHANGE TO MINUTES               X)
0550  37524 070023          STA LTEMP+3     SAVE                            X)
0551  37525 060022          LDA LTEMP+2     CHANGE UNITS TO MINUTES         X)
0552  37526 040435          ADA D36K                                        X)
0553  37527 100400          DIV D600                                        X)
0554  37531 040023          ADA LTEMP+3     COMPUTE TOTAL TIME              X)
0555  37532 001700          ALF             ROTATE                          (X)
0556  37533 064206          LDB NPORT        ADD IN PORT NUMBER.
0557  37534 007004          CMB,INB
0558  37535 044020          ADB LTEMP
0559  37536 040001          ADA B
0560  37537 170372          STA LOGP2,I     STORE IN TABLE                  X)
0561  37540 034370          ISZ LOGCT       INDEX COUNTER                   X)
0562  37541 160071          LDA IDTRA,I      WRITE ID
0563  37542 064424          LDB LIBD           TRACK
0564  37543 016625          JSB DISCL             BACK OUTP
0565*                                                      X)
0566  37544 064021          LDB LTEMP+1     GET POINTER AGAIN               X)
0567  37545 044563  SLE3    ADB .+TTY01-TTY00                               X)
0568  37546 034020          ISZ LTEMP       TEST FOR DONE                   X)
0569  37547 027434          JMP SLE2                                        X)
0570*                                                      X)
0571***   CLEAR FUSS TABLE                                 X)
0572*                                                      X)
0573  37550 060370          LDA LOGCT       WAIT FOR LOG TABLE              X)
0574  37551 002002          SZA             TO EMPTY                        X)
0575  37552 027550          JMP *-2                                         X)
0576  37553 050414          CPA T35F1       WAIT FOR TTY TO STOP            X)
0577  37554 002001          RSS                                             X)
0578  37555 027553          JMP *-2                                         X)
0579*
0580***   READ IN SLEEP OVERLAY
0581*
0582  37556 060452          LDA M252                                        (X)
0583  37557 070065          STA WORD                                        (X)
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0584  37560 104200          DLD LIB,I                                    (X)
0585  37562 060001          LDA 1                                        (X)
0586  37563 064317          LDB #LIBI                                    (X)
0587  37564 027676          JMP LIBRA+254                                (X)
0588*
0589*
0590***   INFORM SYSTEM OPERATOR TO DOWN DISC
0591*
0592  37565 060020  SLE00 LDA LTEMP    COMPUTE SUBCHANNEL               (X)
0593  37566 000065          CLE,ERA     OF DISC TO BE REMOVED            (X)
0594  37567 033604          IOR SLPM-1  ADD ASCII NUMBER BITS            (X)
0595  37570 073614          STA SLPML-1 AND STORE IN MESSAGE             (X)
0596  37571 063605          LDA SLPM                                     (X)
0597  37572 067615          LDB SLPML   TRANSFER                         (X)
0598  37573 070043          STA MOVES    THE MESSAGE                     (X)
0599  37574 060413          LDA T35B1     TO THE CONSOLE                 (X)
0600  37575 070044          STA MOVED      TTY BUFFER                    (X)
0601  37576 016352          JSB MOVEW       AND                          (X)
0602  37577 063615          LDA SLPML         INITIATE PRINTING          (X)
0603  37600 001000          ALS                                          [X]
0604  37601 003004          CMA,INA                                      (X)
0605  37602 064413          LDB T35B1                                    (X)
0606  37603 026651          JMP LEND2    RETURN.
0607*
0608  37604 020060          ASC 1, 0                                     (X)
0609  37605 037606  SLPM    DEF *+1                                      (X)
0610  37606 005104          OCT 5104     LF-D
0611  37607 047527          ASC 6,OWN SUBCH 0
0612  37615 177771  SLPML    ABS SLPM-SLPML+1                           (X)
0613*                                                    X)
0614*
0615*                                                    X)
0616***   SLECH OUTPUTS THE CHARACTER IN (A) TO         X)
0617***   ALL ACTIVE USER TERMINALS                     X)
0618*                                                    X)
0619  37616 000000  SLECH NOP                                          X)
0620  37617 070020          STA LTEMP    SAVE CHARACTER                 X)
0621  37620 060206          LDA NPORT     SET PORT COUNT
0622  37621 070021          STA LTEMP+1                                 X)
0623  37622 064333          LDB DTTY0    GET INITIAL POINTER            X)
0624  37623 044550          ADB .+?ID                                   X)
0625  37624 160001  SLEC1   LDA 1,I      TEST FOR ACTIVE                X)
0626  37625 002003          SZA,RSS                                     X)
0627  37626 027641          JMP SLEC2    INACTIVE USER TERMINAL         X)
0628  37627 074022          STB LTEMP+2  SAVE POINTER                   X)
0629  37630 044505          ADB .+?CCNT-?ID
0630  37631 160001          LDA 1,I
0631  37632 040525          ADA .-1       IS U BUFFER ALMOST FULL?
0632  37633 050366          CPA MAXBL
0633  37634 027631          JMP *-3
0634  37635 044525          ADB .-?CCNT
0635  37636 060020          LDA LTEMP                                   X)
0636  37637 114356          JSB POCR,I    OUTPUT IT
0637  37640 064022          LDB LTEMP+2  GET ID POINTER AGAIN           X)
0638  37641 044563  SLEC2   ADB .+TTY01-TTY00                          X)
0639  37642 034021          ISZ LTEMP+1  TEST FOR DONE                   (X
```

```
0640  37643 027624          JMP SLEC1                                    X)
0641  37644 127616          JMP SLECH,I                                  X)
0642*
0643*  WAIT FOR ALL OUTPUT TO END
0644*
0645  37645 000000  SLE4    NOP
0646  37646 060206          LDA NPORT
0647  37647 070023          STA LTEMP+3
0648  37650 064333          LDB DTTY0
0649  37651 044535          ADB .+?TSTA    GET TTY STATUS.
0650  37652 160001  SLE5A    LDA B,I        IS IT IN INPUT MODE?
0651  37653 010527          AND IOBT
0652  37654 002003          SZA,RSS
0653  37655 027652          JMP SLE5A      NO. WAIT.
0654  37656 044563          ADB .+TTY01-TTY00  YES. NEXT PORT.
0655  37657 034023          ISZ LTEMP+3    ALL DONE?
0656  37660 027652          JMP SLE5A      NO.
0657  37661 127645          JMP SLE4,I     YES.
0658*
0659*
0660  37662 005115  MAGMM   OCT 5115
0661  37663 040507          ASC 7,AG TAPE SLEEP?
0662  37672 037662  MAGMS   DEF MAGMM
0663  37673 000131  SY      OCT 131
0664  37676                 ORG LIBRA+254                                (X)
0665  37676 016625          JSB DISCL                                    (X)
0666  37677 027300          JMP LIBRA                                    (X)
0667  37700         $SLE    EQU *                                        (X)
```

```
0002* THE SLEEP OVERLAY IS RESPONSIBLE FOR CLEANING UP THE DISC LIBRARY.
0003* IT DOES THIS BY COMPACTING ALL PROGRAMS ON EACH TRACK SO THAT EACH
0004* TRACK HAS AT MOST ONE AVAILABLE AREA ON IT. AFTER PERFORMING THIS
0005* OPERATION, IT DUMPS THE CONTENTS OF THE SYSTEM DISC TO
0006* THE SLEEP CARTRIDGE DISC.


0008  37300                ORG LIBRA
0009  37300 064424         LDB LIBD       CLEAR
0010  37301 002400         CLA
0011  37302 170001         STA 1,I          FUSS
0012  37303 006004         INB
0013  37304 054330         CPB L128           TABLE
0014  37305 002001         RSS
0015  37306 027302         JMP *-4
0016  37307 060453         LDA M128
0017  37310 070065         STA WORD
0018  37311 160331         LDA FUSS,I
0019  37312 064424         LDB LIBD
0020  37313 016625         JSB DISCL
0021  37314 060204         LDA ADLEN      READ IN
0022  37315 070065         STA WORD        ADT.
0023  37316 060203         LDA ADLOC
0024  37317 064425         LDB LIBDI
0025  37320 016625         JSB DISCL
0026*
0027  37321 006400         CLB                                              [
0028  37322 074030         STB LTEMP+8                                      [
0029  37323 064205         LDB ?TBL       GET DISC TRACK LENGTH             (X
0030  37324 101050         LSR 8                                            (X
0031  37325 074027         STB LTEMP+7    SAVE TRACK LENGTH                 [X]
0032  37326 060623         LDA B300         INITIALIZE TRACK COUNTER TO 1
0033  37327 070020  SLE5   STA LTEMP                                        [X]
0034  37330 064522         LDB .-4          IS IT AN ID TRACK?
0035  37331 060171         LDA IDTTA
0036  37332 070071         STA IDTRA
0037  37333 060020         LDA LTEMP
0038  37334 150071         CPA IDTRA,I    COMPARE DISC ADDRESS
0039  37335 027632         JMP SLE17       YES IT IS AN ID TRACK
0040  37336 034071         ISZ IDTRA        NO - NOT THIS ONE
0041  37337 006006         INB,SZB
0042  37340 027334         JMP *-4          TRY NEXT ID TRACK
0043*
0044  37341 050106         CPA DIREC+6
0045  37342 027632         JMP SLE17                                        [X]
0046  37343 050115         CPA DIREC+13
0047  37344 027632         JMP SLE17                                        [X]
0048*
0049  37345 064204         LDB ADLEN
0050  37346 007004         CMB,INB
0051  37347 044424         ADB LIBD
0052  37350 054424  SLE8   CPB LIBD
0053  37351 027632         JMP SLE17
0054  37352 044524         ADB .-2
0055  37353 160001         LDA 1,I                                    [X]
0056  37354 010460         AND M64
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0057  37355 050020          CPA LTEMP                                    [X]
0058  37356 006005          INB,RSS        FOUND AN ENTRY.
0059  37357 027350          JMP SLE8
0060  37360 160001          LDA 1,I        GET ENTRY LENGTH.
0061  37361 002002          SZA            IF LENGTH=0 OR SLETL, THERE ARE
0062  37362 050027          CPA LTEMP+7  NO PROGRAMS ON IT              [X]
0063  37363 027632          JMP SLE17                                   [X]
0064*
0065  37364 060204          LDA ADLEN      WE WANT TO PACK ALL THE PROGRAMS
0066  37365 070065          STA WORD        ON THE TRACK. FIRST WRITE THE
0067  37366 060203          LDA ADLOC        ADT BACK OUT.
0068  37367 064424          LDB LIBD
0069  37370 016625          JSB DISCL
0070*
0071* WE NOW ARE GOING TO BUILD A TABLE WITH ONE ENTRY FOR EACH PROGRAM
0072* ON THE TRACK. THE 2 WORDS IN THE ENTRY ARE THE CURRENT DISC
0073* ADDRESS AND THE NEW DISC ADDRESS FOR THE FOLLOWING PROGRAM.
0074*
0075  37371 060020          LDA LTEMP    INITIALIZE                     [X]
0076  37372 070021          STA LTEMP+1   DISC ADDRESS                  [X]
0077  37373 070022          STA LTEMP+2    POINTERS                     [X]
0078  37374 063655          LDA STAB       INITIALIZE
0079  37375 070023          STA LTEMP+3    TABLE                        [X]
0080  37376 070024          STA LTEMP+4    POINTERS.                    [X]
0081  37377 060334          LDA DIRD0      INITIALIZE DIRECTORY
0082  37400 070025  SLE9    STA LTEMP+5    TRACK POINTER                [X]
0083  37401 164000          LDB 0,I        READ DIRECTORY.
0084  37402 074065          STB WORD
0085  37403 040534          ADA .+6
0086  37404 160000          LDA 0,I
0087  37405 064425          LDB LIBDI
0088  37406 016625          JSB DISCL
0089*
0090  37407 002400          CLA            CLEAR FLAG SAYING NO CHANGE
0091  37410 070026          STA LTEMP+6    YET IN DIRECTORY.            [X]
0092  37411 164025          LDB LTEMP+5,I    SET (B) TO POINT TO        [XG
0093  37412 007004          CMB,INB         END OF DIRECTORY.
0094  37413 044424          ADB LIBD
0095  37414 054424  SLE12    CPB LIBD       DONE SCANNING DIRECTORY?
0096  37415 027450          JMP SLE10      YES.
0097  37416 044524          ADB .-2        B=>DISC ADR OF ENTRY.
0098  37417 160001          LDA 1,I        GET DISC ADR.
0099  37420 010460          AND M64      CLEAR SECTOR PART
0100  37421 050020          CPA LTEMP      ON THIS TRACK?               [X]
0101  37422 027425          JMP SLE11      YES.
0102  37423 044520          ADB .-6        NO--BUMP BACK FOR NEXT ENTRY.
0103  37424 027414          JMP SLE12
0104  37425 160001  SLE11    LDA 1,I        GET DISC ADDRESS AGAIN.
0105  37426 170023          STA LTEMP+3,I  STORE TABLE.                 [X]
0106  37427 060021          LDA LTEMP+1  ASSIGN NEW DISC ADDRESS.       [X]
0107  37430 170001          STA 1,I
0108  37431 006004          INB
0109  37432 160001          LDA 1,I        GET PROGRAM LENGTH.
0110  37433 001121          ARS,ARS        CONVERT TO FULL SECTORS
0111  37434 001121          ARS,ARS
0112  37435 001121          ARS,ARS
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0113  37436 001100          ARS                                          (X
0114  37437 003004          CMA,INA
0115  37440 040021          ADA LTEMP+1   ADD TO NEW DISC ADR. COUNTER   [X]
0116  37441 070021          STA LTEMP+1                                  [X]
0117  37442 034023          ISZ LTEMP+3   ALSO STORE IN TABLE.           [X]
0118  37443 170023          STA LTEMP+3,I                                [X]
0119  37444 034023          ISZ LTEMP+3                                  [X]
0120  37445 034026          ISZ LTEMP+6   SET FLAG TO WRITE DIREC BACK   [X]
0121  37446 044517          ADB .-7        GO DO NEXT ENTRY.
0122  37447 027414          JMP SLE12
0123*
0124  37450 060026  SLE10 LDA LTEMP+6   IF F=0 WE DIDN'T MODIFY THE     [X]
0125  37451 002003          SZA,RSS        DIRECTORY, SO WE DON'T HAVE TO
0126  37452 027460          JMP SLE13       WRITE IT BACK.
0127  37453 060025          LDA LTEMP+5                                  [X]
0128  37454 040534          ADA .+6
0129  37455 160000          LDA 0,I
0130  37456 064424          LDB LIBD
0131  37457 016625          JSB DISCL
0132  37460 060025  SLE13 LDA LTEMP+5                                   [X]
0133  37461 050335          CPA DIRD1     LAST DIRECTORY TRACK?          (X
0134  37462 027465          JMP *+3
0135  37463 040535          ADA .+7
0136  37464 027400          JMP SLE9
0137*
0138* NOW READ IN ALL THE LIBRARY PROGRAMS IN THE ORDER THAT WE'RE
0139* GOING TO WRITE THEM BACK.
0140*
0141  37465 060024  SLE14 LDA LTEMP+4   ALL PROGRAMS IN YET?            [X]
0142  37466 050023          CPA LTEMP+3                                  [X]
0143  37467 027512          JMP SLE15      YES
0144  37470 104200          DLD LTEMP+4,I  GET DISC ADDRESS OF PROGRAM [X]
0145  37472 007004          CMB,INB        COMPUTE -SECTOR LENGTH
0146  37473 044022          ADB LTEMP+2                                  [X]
0147  37474 002400          CLA
0148  37475 100027          ASL 7          CHANGE TO WORDS               (X
0149  37476 074065          STB WORD
0150  37477 064022          LDB LTEMP+2   COMPUTE CORE ADDRESS           [X]
0151  37500 100052          LSL 10
0152  37501 101043          LSR 3
0153  37502 044425          ADB LIBDI
0154  37503 160024          LDA LTEMP+4,I                                [X]
0155  37504 016625          JSB DISCL
0156  37505 034024          ISZ LTEMP+4   SET NEW VALUES                 [X]
0157  37506 160024          LDA LTEMP+4,I     OF LTEMP+2, +4             [X]
0158  37507 070022          STA LTEMP+2                                  [X]
0159  37510 034024          ISZ LTEMP+4                                  [X]
0160  37511 027465          JMP SLE14
0161*
0162  37512 060022  SLE15 LDA LTEMP+2   WRITE ENTIRE TRACK              [X]
0163  37513 003004          CMA,INA
0164  37514 040020          ADA LTEMP                                    [X]
0165  37515 100027          ASL 7                                        (X
0166  37516 070065          STA WORD
0167  37517 060020          LDA LTEMP                                    [X]
0168  37520 064424          LDB LIBD
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0169  37521 016625          JSB DISCL
0170*
0171  37522 060204          LDA ADLEN      READ ADT.
0172  37523 070065          STA WORD
0173  37524 060203          LDA ADLOC
0174  37525 064425          LDB LIBDI
0175  37526 016625          JSB DISCL
0176*
0177* WE NOW WANT TO REPLACE ALL ADT ENTRIES REFERENCING THIS TRACK BY A
0178* SINGLE ENTRY, WITH VALUES OF R AND SLETL-R (SECTOR).
0179*
0180  37527 064424          LDB LIBD       SEARCH FOR FIRST ENTRY AT
0181  37530 060020  SLE16   LDA LTEMP      THIS TRACK OR BEYOND          [X]
0182  37531 003104          CMA,CLE,INA
0183  37532 140001          ADA 1,I
0184  37533 002040          SEZ
0185  37534 027537          JMP *+3
0186  37535 044530          ADB .+2
0187  37536 027530          JMP SLE16
0188*
0189  37537 074021          STB LTEMP+1                                  [X]
0190  37540 160001          LDA 1,I        TEST FOR ENTRY ON THIS TRACK.
0191  37541 050525          CPA .-1        CHECK FOR SPECIAL ENTRY.
0192  37542 027546          JMP *+4
0193  37543 010460          AND M64
0194  37544 050020          CPA LTEMP                                    [X]
0195  37545 027571          JMP SLE18      ENTRY IS ON THIS TRACK.
0196*
0197* HAVE TO CREATE A NEW ENTRY.
0198*
0199  37546 060020          LDA LTEMP    IS TRACK TO BE                  [X]
0200  37547 040027          ADA LTEMP+7   EMPTY?                         [X]
0201  37550 050022          CPA LTEMP+2                                  [X]
0202  37551 027632          JMP SLE17      YES--FORGET IT.
0203  37552 060204          LDA ADLEN
0204  37553 050446          CPA M3072                                     (X
0205  37554 027632          JMP SLE17      NO--FORGET IT.
0206*
0207  37555 064204          LDB ADLEN
0208  37556 044524          ADB .-2
0209  37557 074204          STB ADLEN      NEW ADLEN.
0210  37560 007000          CMB
0211  37561 044424          ADB LIBD       MOVE
0212  37562 074044          STB MOVED       ADT
0213  37563 044524          ADB .-2           DOWN.
0214  37564 074043          STB MOVES
0215  37565 007000          CMB
0216  37566 044021          ADB LTEMP+1                                  [X]
0217  37567 016633          JSB MOVEB
0218  37570 027623          JMP SLE19      GO INSERT NEW ENTRY.
0219*
0220  37571 044530  SLE18   ADB .+2        SEARCH FOR FIRST ENTRY NOT ON
0221  37572 160001          LDA 1,I         THIS TRACK.
0222  37573 050525          CPA .-1
0223  37574 027600          JMP *+4
0224  37575 010460          AND M64
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0225  37576 050020          CPA LTEMP                                    [X]
0226  37577 027571          JMP SLE18
0227*
0228  37600 074043          STB MOVES      SET SOURCE FOR MOVE
0229  37601 044204          ADB ADLEN      SET WORD COUNT.
0230  37602 044432          ADB MLIBD
0231  37603 060020          LDA LTEMP    SET DESTINATION ACCORDING TO   [X]
0232  37604 040027          ADA LTEMP+7   WHETHER WE'RE MAKING AN       [X]
0233  37605 050022          CPA LTEMP+2     INSERT OR NOT.              [X]
0234  37606 002401          CLA,RSS
0235  37607 060530          LDA .+2
0236  37610 040021          ADA LTEMP+1                                  [X]
0237  37611 070044          STA MOVED
0238  37612 016352          JSB MOVEW
0239  37613 060044          LDA MOVED      COMPUTE NEW ADLEN.
0240  37614 003004          CMA,INA
0241  37615 040424          ADA LIBD
0242  37616 070204          STA ADLEN
0243*
0244  37617 060020          LDA LTEMP    ANY ENTRY?                     [X]
0245  37620 040027          ADA LTEMP+7                                 [X]
0246  37621 050022          CPA LTEMP+2                                 [X]
0247  37622 027632          JMP SLE17      NO.
0248*
0249  37623 064022  SLE19    LDB LTEMP+2  MAKE ENTRY                    [X]
0250  37624 007004          CMB,INB
0251  37625 044020          ADB LTEMP                                   [X]
0252  37626 044027          ADB LTEMP+7                                 [X]
0253  37627 060022          LDA LTEMP+2                                 [X]
0254  37630 104400          DST LTEMP+1,I                               [X]
0255*
0256  37632 060020  SLE17    LDA LTEMP    GET NEXT TRACK NUMBER          [X]
0257  37633 040627          ADA B200
0258  37634 034030          ISZ LTEMP+8      DONE???????????
0259  37635 064030          LDB LTEMP+8                                  [
0260  37636 054622          CPB D203         NOW WE TEST IT              [X
0261  37637 002001          RSS                                          (X
0262  37640 027327          JMP SLE5     NO.                             (X
0263  37641 060204          LDA ADLEN     WRITE ADT BACK OUT
0264  37642 070065          STA WORD
0265  37643 060203          LDA ADLOC
0266  37644 064424          LDB LIBD
0267  37645 016625          JSB DISCL
0268*
0269* LOAD SYSTEM DISC DUMP
0270*
0271  37646 060452          LDA M252                                     [X]
0272  37647 070065          STA WORD                                      (X
0273  37650 060262          LDA LIB                              [X]
0274  37651 040530          ADA .+2                              [X]
0275  37652 160000          LDA 0,I                              [X]
0276  37653 064317          LDB #LIBI                                     (X
0277  37654 027676          JMP LIBRA+254                                [X]
0278*
0279  37655 021331  STAB     DEF LIBUS+8192                               [X]
0280  37656         $$SLE    EQU *                                         (X
```

```
0282  37300                ORG LIBRA
0283*
0284***   DUMP BASE PAGE TO SYSTEM DISC
0285*
0286  37300 063502         LDA AMAIN
0287  37301 070020         STA LTEMP
0288  37302 002400         CLA
0289  37303 170401         STA DCLC1,I   BLOCK CLOCK
0290  37304 064514         LDB .-10
0291  37305 170020         STA LTEMP,I
0292  37306 034020         ISZ LTEMP
0293  37307 006006         INB,SZB
0294  37310 027305         JMP *-3
0295  37311 070210         STA SLEPT     SET FLAG=0.
0296  37312 070337         STA LCHCR
0297  37313 060351         LDA MLINK
0298  37314 070352         STA MLINK+1     SET QUEUE EMPTY
0299  37315 064451         LDB M256
0300  37316 074065         STB WORD                                    (X)
0301  37317 060542         LDA .+12
0302  37320 006400         CLB                                         (X)
0303  37321 030615         IOR B100
0304  37322 016625         JSB DISCL                                   (X)
0305  37323 060036         LDA MGFLG     MAG TAPE?
0306  37324 002002         SZA
0307  37325 027427         JMP MGS.L
0308*                                                  X)
0309***   SET UP FOR SYSTEM DISC DUMP                  X)
0310*                                                  X)
0311  37326 063514         LDA #MSGA-1                                    (X
0312  37327 067515         LDB #MSGA                                     X)
0313  37330 017455         JSB ANSER     OUTPUT MESSAGE.
0314  37331 002400         CLA           READ
0315  37332 064521         LDB .-5         LABEL
0316  37333 074065         STB WORD          ON
0317  37334 064425         LDB LIBDI           SUBCH #1.
0318  37335 016625         JSB DISCL
0319  37336 064424         LDB LIBD
0320  37337 006004         INB
0321  37340 160001         LDA B,I
0322  37341 053477         CPA PTS       IS IT A TIME-SHARE DISC?
0323  37342 002001         RSS
0324  37343 027363         JMP SLP5      NO. DUMP.
0325  37344 060523         LDA .-3       YES. SET COUNTER
0326  37345 070020         STA LTEMP
0327  37346 006004         INB
0328  37347 160001  SLP7   LDA B,I       LOAD LABEL WORD.
0329  37350 153500         CPA PSSAA,I   SYSTEM DISC?
0330  37351 002001         RSS
0331  37352 027360         JMP SLP8      NO.
0332  37353 006004         INB           MAY BE. BUMP POINTERS.
0333  37354 037500         ISZ PSSAA
0334  37355 034020         ISZ LTEMP     DONE?
0335  37356 027347         JMP SLP7      NO.
0336  37357 027363         JMP SLP5      YES. SYSTEM DISC. DUMP.
0337*
```

```
0338  37360 060605  SLP8  LDA .+47       OUTPUT
0339  37361 067561        LDB #MSG3        WARNING
0340  37362 017455        JSB ANSER          MESSAGE.
0341*                                                X)
0342***   DUMP ALL 203 TRACKS OF SYSTEM DISC
0343*                                                X)
0344  37363 064446  SLP5  LDB M3072      SET TO TRANSFER 3072 WORDS
0345  37364 074065        STB WORD                                    X)
0346  37365 067473        LDB M203       SET TO TRANSFER 203 TRACKS
0347  37366 074020        STB LTEMP                                   X)
0348  37367 002400        CLA           SET TRACK POINTER             X)
0349  37370 027373        JMP *+3     (X)    (X)
0350  37371 060021  SLP6  LDA LTEMP+1       COMPUTE DISC ADDRESSES
0351  37372 040627        ADA B200             NEXT TRACK
0352  37373 070021        STA LTEMP+1
0353  37374 040556        ADA .+24                SECOND 1/2 OF THIS TRACK
0354  37375 070022        STA LTEMP+2
0355  37376 060021        LDA LTEMP+1
0356  37377 064425        LDB LIBDI          INPUT FROM SYSTEM DISC 1ST 1/
0357  37400 030615        IOR B100
0358  37401 016625        JSB DISCL
0359  37402 060021        LDA LTEMP+1
0360  37403 064424        LDB LIBD         OUTPUT TO CARTRIDGE (1ST 1/2)
0361  37404 016625        JSB DISCL
0362  37405 060022        LDA LTEMP+2     INPUT FROM 2ND 1/2
0363  37406 030615        IOR B100
0364  37407 064425        LDB LIBDI
0365  37410 016625        JSB DISCL
0366  37411 060022        LDA LTEMP+2
0367  37412 064424        LDB LIBD
0368  37413 016625        JSB DISCL
0369  37414 034020        ISZ LTEMP     ALL TRACKS DUMPED?
0370  37415 027371        JMP SLP6
0371*                                                X)
0372  37416 060546        LDA .+16       OUTPUT "SLEEP COMPLETE".
0373  37417 067503        LDB #MSG2                                  (X)
0374  37420 114324        JSB TTY35,I                                (X)
0375  37421 006400        CLB                                        (X)
0376  37422 054414        CPB T35F1                                  (X)
0377  37423 002001        RSS                                        (X)
0378  37424 027422        JMP *-2                                    (X)
0379  37425 017431        JSB LLOAD     LOAD UTILITY.
0380  37426 124445        JMP UTLTY,I
0381*
0382*
0383*



0385  37427 017431  MGS.L JSB LLOAD     LOAD UTILITY.
0386  37430 124641        JMP MGSLE,I   GO TO SLEEP.
0387*
0388*
0389*  LOAD LOADER/UTILITY, CLEAR ALL DEVICES AND
0390*  DISABLE POWER FAIL.
0391*
```

```
37431 000000  LLOAD NOP
37432 063472        LDA SLLN
37433 070065        STA WORD
37434 002404        CLA,INA
37435 040615        ADA B100
37436 067474        LDB S2002
37437 016625        JSB DISCL
37440 063475        LDA LDRLN
37441 070065        STA WORD
37442 060623        LDA B300
37443 067476        LDB RSYS0
37444 016625        JSB DISCL
37445 006400        CLB            CLEAR ALL DEVICES.
37446 107700        CLC 0,C
37447 107700        CLC 0,C
37450 034001        ISZ B
37451 027446        JMP *-3
37452 063501        LDA HLT4       DISABLE POWER FAIL.
37453 070004        STA 4
37454 127431        JMP LLOAD,I
*
*
*
37455 000000  ANSER NOP
37456 114324        JSB TTY35,I    OUTPUT MESSAGE.
37457 006400        CLB            WAIT
37460 054414        CPB T35F1        UNTIL
37461 002001        RSS                COMPLETED.
37462 027460        JMP *-2
37463 107700        CLC 0,C        CLEAR ALL DEVICES.
37464 107700        CLC 0,C
37465 034001        ISZ B
37466 027463        JMP *-3
37467 103011        HLT 11B,C      HALT.
37470 102100        STF 0          START UP AGAIN.
37471 127455        JMP ANSER,I
*
*
*
37472 176000  SLLN  DEC -1024
37473 177465  M203  DEC -203
37474 102002  S2002 OCT 102002
37475 164000  LDRLN DEC -6144
37476 104000  RSYS0 OCT 104000
37477 052123  PTS   ASC 1,TS
37500 017762  PSSAA DEF SYSAA
37501 102004  HLT4  HLT 4
00036         MGFLG EQU LTEMP+14
37502 000261  AMAIN DEF MAIN
*
37503 037504  #MSG2 DEF *+1
37504 006412        OCT 6412
37505 051514        ASC 7,SLEEP COMPLETE
*                                                    X)
37514 000105        DEC 69                                    (X
37515 037516  #MSGA DEF *+1                                  X)
```

```
0448  37516 006412          OCT 6412                                        X)
0449  37517 044516          ASC 19,INSERT CARTRIDGE FOR SYSTEM DISC DUMP.
0450  37542 006412          OCT 6412                                        X)
0451  37543 050122          ASC 14,PRESS 'RUN' WHEN DISC READY              X)
0452  37561 037562  #MSG3 DEF *+1
0453  37562 005125          OCT 5125       LF-U
0454  37563 051505          ASC 10,SER DISC ON SUBCH 1!
0455  37575 006412          OCT 6412       CR-LF
0456  37576 050122          ASC 12,PRESS 'RUN' TO CONTINUE
0457  37612          $$$SL EQU *
```

```
0459* NEWID CREATES NEW ENTRIES IN THE SYSTEM ID TABLE. THE INPUT
0460* FORMAT IS AS FOLLOWS:
0461*
0462*     NEWID IDCODE,PASSWORD,TIME,DISC
0463*
0464* THESE PROVIDE, RESPECTIVELY, WORDS 0,1-3,4, AND 6 OF THE ID ENTRY.
0465* WORDS 5 AND 7 ARE INTIALIZED TO ZERO.


0467  37300                 ORG LIBRA
0468* INPUT ID-TABLE *
0469  37300 060170          LDA IDLEN     A=LENGTH OF IDTABLE.
0470  37301 050075          CPA IDMAX
0471  37302 027444          JMP NEWI2     ID TABLE IS FULL
0472*
0473*
0474* NOW INTERPRET PARAMETERS
0475*
0476  37303 016667          JSB GETID     GET
0477  37304 002001          RSS
0478  37305 026656          JMP LFRER     ID ENTRY.
0479  37306 050602          CPA .+54B     TEST FOR COMMA.
0480  37307 002401          CLA,RSS       OK
0481  37310 026656          JMP LFRER     NOT OK
0482  37311 064045          LDB ID
0483  37312 074020          STB LTEMP
0484*
0485* NOW SCAN PASSWORD
0486*
0487  37313 070050          STA T35LC
0488  37314 017540          JSB NEWIP
0489  37315 070021          STA LTEMP+1
0490  37316 017540          JSB NEWIP
0491  37317 070022          STA LTEMP+2
0492  37320 017540          JSB NEWIP
0493  37321 070023          STA LTEMP+3
0494*
0495* GET THE ALLOWED TIME
0496*
0497  37322 060050          LDA T35LC     CHECK FOR
0498  37323 050602          CPA .+54B      COMMA
0499  37324 027332          JMP NEWI4
0500  37325 114341          JSB T35CH,I   GET NEXT CHAR.
0501  37326 026656          JMP LFRER
0502  37327 050602          CPA .+54B     MUST BE A COMMA.
0503  37330 002001          RSS
0504  37331 026656          JMP LFRER
0505*
0506  37332 017505  NEWI4   JSB NEWI#     GET THE ALLOTTED TIME
0507  37333 070024          STA LTEMP+4     IN MINUTES.
0508  37334 060050          LDA T35LC
0509  37335 050602          CPA .+54B
0510  37336 002001          RSS
0511  37337 026656          JMP LFRER
0512*
0513  37340 017505          JSB NEWI#     GET THE DISC ALLOWED.
```

```
0514  37341 070026          STA LTEMP+6
0515  37342 060050          LDA T35LC      MUST BE END OF
0516  37343 050543          CPA .+15B       LINE.
0517  37344 002001          RSS
0518  37345 026656          JMP LFRER
0519  37346 002400          CLA            ZERO
0520  37347 070025          STA LTEMP+5      TIME AND
0521  37350 070027          STA LTEMP+7        DISC USED
0522*
0523  37351 016414          JSB FIDT      FIND SPOT FOR NEW ID
0524  37352 027447          JMP NEWI6       DUPLICATE ENTRY
0525  37353 060170          LDA IDLEN      UPDATE
0526  37354 040516          ADA .-8          TOTAL
0527  37355 070170          STA IDLEN        IDT LENGTH
0528*
0529  37356 074074          STB IDCAD
0530  37357 064073          LDB IDCNT       COMPUTE # OF WORDS
0531  37360 005020          BLS,BLS         TO MOVE UP
0532  37361 005000          BLS
0533  37362 007004          CMB,INB
0534  37363 060074          LDA IDCAD     COMPUTE LAST ADDRESS
0535  37364 040525          ADA .-1         OF ID TABLE
0536  37365 040001          ADA 1
0537  37366 070043          STA MOVES     SET SOURCE ADDRESS
0538  37367 040536          ADA .+8
0539  37370 070044          STA MOVED     SET DESTINATION ADDRESS
0540  37371 007004          CMB,INB
0541  37372 016633          JSB MOVEB     MOVE UP TALBE
0542*
0543  37373 060074          LDA IDCAD     MOVE NEW INTRY INTO
0544  37374 070044          STA MOVED     SPACE PROVEDED
0545  37375 060323          LDA DLTEM
0546  37376 070043          STA MOVES
0547  37377 064516          LDB .-8
0548  37400 016352          JSB MOVEW
0549*
0550  37401 160072  NEW11    LDA IDTLA,I     IS TRACK TOO LARGE?
0551  37402 040516          ADA .-8           COMPARE WITH
0552  37403 050446          CPA M3072       MAX TRACK LENGTH
0553  37404 002001          RSS
0554  37405 027436          JMP NEW10       NO - OK TO JUST WRITE OUT
0555*
0556  37406 160071          LDA IDTRA,I     OUTPUT FULL
0557  37407 064424          LDB LIBD        ID TRACK
0558  37410 016625          JSB DISCL
0559*
0560  37411 060424          LDA LIBD       MOVE LAST ENTRY
0561  37412 070044          STA MOVED     TO MOTTOM OF NEXT TRACK
0562  37413 160072          LDA IDTLA,I    LOAD TRACK LENGTH
0563  37414 003004          CMA,INA
0564  37415 040424          ADA LIBD
0565  37416 070043          STA MOVES
0566  37417 064516          LDB .-8
0567  37420 016352          JSB MOVEW
0568*
0569  37421 060072          LDA IDTLA      LOAD LENGTH OF NEXT TRACK
```

```
0570   37422 040525          ADA .-1
0571   37423 070072          STA IDTLA
0572   37424 160000          LDA 0,I
0573   37425 070065          STA WORD
0574   37426 060071          LDA IDTRA      LOAD DISC ADDRESS
0575   37427 040525          ADA .-1
0576   37430 070071          STA IDTRA        OF NEXT TRACK
0577   37431 160000          LDA 0,I
0578   37432 064425          LDB LIBDI
0579   37433 044536          ADB .+8         READ IN NEXT ID TRACK
0580   37434 016625          JSB DISCL
0581*
0582   37435 027401          JMP NEW11
0583*
0584   37436 170072  NEW10 STA IDTLA,I     RESET TRACK LENGTH
0585   37437 070065          STA WORD
0586   37440 160071          LDA IDTRA,I     OUTPUT TO ID TRACK
0587   37441 064424          LDB LIBD          TO DISC
0588   37442 016625          JSB DISCL
0589   37443 026647          JMP LEND
0590   37444 063464  NEWI2 LDA NEWIA       OUTPUT TABLE FULL MESSAGE
0591   37445 064517          LDB NEWIB
0592   37446 027451          JMP NEWI8
0593   37447 063474  NEWI6 LDA NEWIE       OUTPUT DUPLICATE ENTRY MESSAGE.
0594   37450 064516          LDB NEWIF
0595*
0596   37451 070043  NEWI8 STA MOVES       SET UP FOR MOVE
0597   37452 060413          LDA T35B1        ROUTINE
0598   37453 070044          STA MOVED       MOVE STRING
0599   37454 074020          STB LTEMP        INTO BUFFER.
0600   37455 016352          JSB MOVEW
0601   37456 060020          LDA LTEMP
0602   37457 001000          ALS
0603   37460 003004          CMA,INA         CALL
0604   37461 064413          LDB T35B1        DRIVER.
0605   37462 114324          JSB TTY35,I
0606   37463 026652          JMP LENDR       TERMINATE.
0607*
0608* OUTPUT MESSAGES
0609*
0610   37464 037465  NEWIA DEF *+1
0611   37465 005111          OCT 5111
0612   37466 042040          ASC 6,D TABLE FULL
0613   00517         NEWIB EQU .-*+NEWIA+1
0614   37474 037475  NEWIE DEF *+1
0615   37475 005104          OCT 5104
0616   37476 052520          ASC 7,UPLICATE ENTRY
0617   00516         NEWIF EQU .-*+NEWIE+1
0618   37505 000000  NEWI# NOP             SCAN FOR A NUMBER.
0619   37506 002400          CLA            INITIALIZE
0620   37507 073561          STA NEWIT        TO ZERO.
0621   37510 114341          JSB T35CH,I    GET NEXT CHARACTER
0622   37511 027536          JMP NEWIZ      DONE
0623   37512 040462          ADA M72B       TEST FOR DIGIT
0624   37513 002021          SSA,RSS
0625   37514 027536          JMP NEWIZ      NOT A DIGIT
```

```
0626  37515 040540          ADA .+10
0627  37516 002120          CLE,SSA
0628  37517 027536          JMP NEWIZ
0629  37520 067561          LDB NEWIT
0630  37521 005626          ELB,ELB
0631  37522 006051          SEZ,SLB,RSS
0632  37523 002001          RSS
0633  37524 026656          JMP LFRER
0634  37525 047561          ADB NEWIT
0635  37526 005600          ELB
0636  37527 006051          SEZ,SLB,RSS
0637  37530 002001          RSS
0638  37531 026656          JMP LFRER
0639  37532 040001          ADA 1
0640  37533 002040          SEZ
0641  37534 026656          JMP LFRER
0642  37535 027507          JMP NEWI#+2
0643  37536 063561  NEWIZ LDA NEWIT
0644  37537 127505          JMP NEWI#,I
0645  37540 000000  NEWIP NOP             GET NEXT 2 PASSWORD LETTERS.
0646  37541 002400          CLA
0647  37542 064050          LDB T35LC      IF LAST CHARACTER A
0648  37543 054602          CPB .+54B        COMMA, RETURN ZERO.
0649  37544 127540          JMP NEWIP,I
0650  37545 114341          JSB T35CH,I    GET NEXT CHAR.
0651  37546 026656          JMP LFRER
0652  37547 050602          CPA .+54B      IF A COMMA
0653  37550 027541          JMP NEWIP+1
0654  37551 001727          ALF,ALF        SAVE 1ST
0655  37552 073561          STA NEWIT       CHAR.
0656  37553 114341          JSB T35CH,I
0657  37554 026656          JMP LFRER
0658  37555 050602          CPA .+54B      IF COMMA TAKE AS
0659  37556 002400          CLA             ZERO.
0660  37557 043561          ADA NEWIT
0661  37560 127540          JMP NEWIP,I
0662  37561 000000  NEWIT BSS 1
0663  37562         $NEW   EQU *
```

```
0002* THE KILLID ROUTINE IS USED TO REMOVE ID CODES FROM THE SYSTEM
0003* IDTABLE. THE FORMAT IS:
0004*
0005*     KILLID - IDCODE
0006*
0007* IDCODE A000 CANNOT BE KILLED BY THIS COMMAND.
0008*
0009* KILLID PERFORMS THE FOLLOWING FUNCTIONS:
0010*
0011* 1. THE ID-CODE IS REMOVED FROM THE IDT.
0012* 2. ANY USERS LOGGED ON WITH THIS NUMBER ARE DUMPED.
0013* 3. ALL LIBRARY SPACE ALLOCATED TO THIS ID IS RETURNED TO THE
0014*    SYSTEM.


0016  37300                 ORG LIBRA
0017  37300 016667          JSB GETID      TRANSLATE THE IDCODE.
0018  37301 026656          JMP LFRER      ERROR IF NO CR FOLLOWD.
0019  37302 060045          LDA ID         TEST FOR A000.
0020  37303 051002          CPA A000
0021  37304 027502          JMP KID31
0022*
0023* READ IN IDT.
0024*
0025  37305 016414          JSB FIDT      FIND ID ENTRY
0026  37306 002001          RSS           GOT IT
0027  37307 027505          JMP KID32      NO SUCH ID
0028*
0029* REMOVE ID FROM TABLE.
0030*
0031  37310 074044          STB MOVED
0032  37311 044536          ADB .+8
0033  37312 074043          STB MOVES
0034  37313 044432          ADB MLIBD
0035  37314 144072          ADB IDTLA,I
0036  37315 016352          JSB MOVEW
0037  37316 060071  KID.1   LDA IDTRA       IS THIS THE
0038  37317 050171          CPA IDTTA         LAST TRACK?
0039  37320 027375          JMP KID33       YES
0040*
0041  37321 160072          LDA IDTLA,I      WAS THE TRACK FULL?
0042  37322 040516          ADA .-8
0043  37323 050446          CPA M3072
0044  37324 002001          RSS             YES
0045  37325 027375          JMP KID33        NO - WRITE IT OUT
0046  37326 060072          LDA IDTLA     GO TO NEXT TRACK
0047  37327 040525          ADA .-1          TO FILL IN THIS ONE
0048  37330 070033          STA KDTP1      SAVE POINTER TO NEXT TRACK LENG
0049  37331 164000          LDB 0,I       LOAD TRACK LENGTH
0050  37332 006003          SZB,RSS        EMPTY?
0051  37333 027375          JMP KID33
0052  37334 060071          LDA IDTRA     SET ADDRESS POINTER TO
0053  37335 040525          ADA .-1          NEXT TRACK
0054  37336 070034          STA KDTP2           AND SAVE IT
0055  37337 164072          LDB IDTLA,I   COMPUTE
0056  37340 044536          ADB .+8           LAST CORE ADDRESS
```

```
0057  37341 007004          CMB,INB              OF PREVIOUS
0058  37342 044425          ADB LIBDI                 TRACK
0059  37343 060516          LDA .-8        READ IN
0060  37344 070065          STA WORD          ONE MORE ENTRY
0061  37345 160034          LDA KDTP2,I
0062  37346 016625          JSB DISCL
0063  37347 160072          LDA IDTLA,I OUTPUT
0064  37350 070065          STA WORD      FULL
0065  37351 160071          LDA IDTRA,I     TRACK
0066  37352 064424          LDB LIBD           TO
0067  37353 016625          JSB DISCL             DISC
0068*
0069  37354 060033          LDA KDTP1     UPDATE
0070  37355 070072          STA IDTLA        POINTERS
0071  37356 060034          LDA KDTP2          TO
0072  37357 070071          STA IDTRA             NEXT TRACK
0073  37360 160072          LDA IDTLA,I    READ IN
0074  37361 070065          STA WORD
0075  37362 160071          LDA IDTRA,I       THE NEXT TRACK
0076  37363 064425          LDB LIBDI             OF THE
0077  37364 016625          JSB DISCL                IDT
0078  37365 060424          LDA LIBD
0079  37366 070044          STA MOVED
0080  37367 040536          ADA .+8       SQUEEZE OUT
0081  37370 070043          STA MOVES        FIRST ENTRY
0082  37371 164072          LDB IDTLA,I         (WHICH IS NOW ON PREVIOUS T
0083  37372 044536          ADB .+8
0084  37373 016352          JSB MOVEW
0085  37374 027316          JMP KID.1
0086*
0087  37375 160072  KID33 LDA IDTLA,I    OUPUT
0088  37376 040536          ADA .+8        ID
0089  37377 170072          STA IDTLA,I      TRACK
0090  37400 070065          STA WORD
0091  37401 160071          LDA IDTRA,I
0092  37402 064424          LDB LIBD
0093  37403 016625          JSB DISCL
0094  37404 060170          LDA IDLEN     UPDATE TOTAL ID LENGTH
0095  37405 040536          ADA .+8
0096  37406 070170          STA IDLEN
0097*
0098* SEARCH TTY TABLES FOR ANY USER TO BE DUMPED.
0099*
0100  37407 060506          LDA .-16      SET COUNTER
0101  37410 070021          STA KIDC
0102  37411 003400          CCA           SET KIDT TO SAY NONE
0103  37412 070032          STA KIDT       FOUND YET.
0104  37413 064333          LDB DTTY0
0105  37414 044550          ADB .+?ID
0106  37415 160001  KID34 LDA 1,I         GET ID FROM TABLE.
0107  37416 050045          CPA ID        IS IT THIS USER?
0108  37417 027424          JMP KID35     YES--GO DUMP HIM.
0109  37420 044563  KID37 ADB .+TTY01-TTY00
0110  37421 034021          ISZ KIDC      ANY MORE TO TEST?
0111  37422 027415          JMP KID34     YES.
0112  37423 027466          JMP KID36     NO--TRANSFER TO NEXT PART.
```

```
0113*
0114* DUMP THE USER.
0115*
0116  37424 074022  KID35 STB KIDB       SAVE POINTER TO TABLE.
0117  37425 103100        CLF 0          INHIBIT INTERRUPT.
0118  37426 002400        CLA            CLEAR USER'S ID.
0119  37427 170001        STA 1,I
0120  37430 044536        ADB .+?STAT-?ID
0121  37431 060524        LDA .-2        SET USER'S STATUS TO -2 TO FORCE
0122  37432 170001        STA 1,I        DISCONNECT.
0123  37433 044513        ADB .-?STAT+?MASK                          XJ
0124  37434 060265        LDA MPCOM     SET COMM FLAG                XJ
0125  37435 130001        IOR 1,I       TO INFORM                    XJ
0126  37436 070265        STA MPCOM     SCHEDULER                    XJ
0127  37437 044542        ADB .-?MASK+?LINK
0128  37440 117501        JSB KIDEQ,I   REMOVE FROM QUEUE.
0129  37441 102100        STF 0
0130  37442 034032        ISZ KIDT      IS FUSS TABLE IN CORE?
0131  37443 027451        JMP KID38     YES.
0132  37444 060453        LDA M128      NO -- READ IT IN
0133  37445 070065        STA WORD
0134  37446 160331        LDA FUSS,I
0135  37447 064425        LDB LIBDI
0136  37450 016625        JSB DISCL
0137*
0138  37451 060021  KID38 LDA KIDC      COMPUTE LOCATION OF USER'S FUSS
0139  37452 040546        ADA .+16
0140  37453 001723        ALF,RAR                                    XJ
0141  37454 040424        ADA LIBD
0142  37455 070020        STA KIDP
0143  37456 064516        LDB .-8      ZERO OUT USER'S FUSS AREA     XJ
0144  37457 002400        CLA
0145  37460 170020        STA KIDP,I
0146  37461 034020        ISZ KIDP
0147  37462 006006        INB,SZB
0148  37463 027460        JMP *-3
0149*
0150  37464 064022        LDB KIDB      GET POINTER AGAIN.
0151  37465 027420        JMP KID37     GO TEST NEXT USER.
0152*
0153  37466 160331  KID36 LDA FUSS,I    WRITE BACK FUSS
0154  37467 064424        LDB LIBD       IF ANY USERS
0155  37470 034032        ISZ KIDT        WERE DUMPED.
0156  37471 016625        JSB DISCL
0157*
0158* WE HAVE NOW GOTTEN RID OF THE USER. THE NEXT STEP IS TO CALL
0159* THE KILLID OVERLAY TO RELEASE ANY SYSTEM SPACE CONSUMED BY THE
0160* USER.
0161*
0162  37472 060452        LDA M252      SET WORD COUNT
0163  37473 070065        STA WORD
0164  37474 104200        DLD LIB,I     GET DISC ADDRESS
0165  37476 060001        LDA 1          OF OVERLAY.
0166  37477 064317        LDB #LIBI
0167  37500 027676        JMP LIBRA+254
0168  37501 035542  KIDEQ DEF DEQUE
```

```
0169*
0170   37502 063522  KID31 LDA KIDM1      PRINT "A000 NOT ALLOWED"
0171   37503 064505        LDB .-17
0172   37504 027507        JMP *+3
0173   37505 063534  KID32 LDA KIDM2      PRINT "NO SUCH ID"
0174   37506 064513        LDB .-11
0175   37507 074021        STB KIDC
0176   37510 070043        STA MOVES
0177   37511 060413        LDA T35B1
0178   37512 070044        STA MOVED
0179   37513 005100        BRS
0180   37514 016352        JSB MOVEW
0181   37515 060021        LDA KIDC
0182   37516 003004        CMA,INA
0183   37517 064413        LDB T35B1
0184   37520 114324        JSB TTY35,I
0185   37521 026652        JMP LENDR
0186*
0187   37522 037523  KIDM1 DEF *+1
0188   37523 005101        OCT 5101
0189   37524 030060        ASC 8,000 NOT ALLOWED
0190   37534 037535  KIDM2 DEF *+1
0191   37535 005116        OCT 5116
0192   37536 047440        ASC 5,0 SUCH ID
0193*
0194   37676               ORG LIBRA+254 PERFORM OVERLAY.
0195   37676 016625        JSB DISCL
0196   37677 027300        JMP LIBRA
0197   37700         $KID  EQU *
```

```
0199* THE KILLID OVERLAY IS CALLED BY KILLID AFTER IT HAS TAKEN CARE OF
0200* THE EASY PART OF KILLID. THIS SECTION HAS THE JOB OF REMOVING ALL
0201* FILES BELONGING TO THE ID BEING KILLED FROM THE USER LIBRARY, AND
0202* UPDATING THE ADT APPROPRIATELY.
0203  37300                 ORG LIBRA
0204  37300 060336          LDA DIRD3      TEST INDIVIDUAL DIRECTORIES
0205  37301 070023  KID4    STA KIDI       KIDI POINTS TO THE ONE TESTED.
0206  37302 104200          DLD KIDI,I     GET LENGTH AND FIRST ID.
0207  37304 074032          STB KIDT       SAVE FIRST ID FOR LATER.
0208  37305 000040          CLE                                          BJ
0209  37306 044046          ADB MID        B=FIRST ID- KEYID
0210  37307 002002          SZA            FORGETTRACK IF IT'S EMPTY
0211  37310 006042          SEZ,SZB          OR IF FIRSTID>KEYID         BJ
0212  37311 002001          RSS
0213  37312 027320          JMP KID2
0214  37313 060023  KID1    LDA KIDI
0215  37314 050334          CPA DIRD0
0216  37315 027653          JMP KID18
0217  37316 040517          ADA .-7        BUMP TO NEXT TRACK.
0218  37317 027301          JMP KID4
0219*
0220* PROCESS DIRECTORY TRACK IN ORDER TO REMOVE KEY ID ENTRIES. THE
0221* DIRECTORY IS READ INTO THE BEGINNING OF THE WORKSPACE AND IS
0222* SCANNED IN REVERSE ORDER. A TABLE OF PATCHES IS BUILT UP FROM THE
0223* OTHER END. THE FOLLOWING POINTERS ARE USED:
0224*
0225* KIDP1 => DIRECTORY ENTRY BEING TESTED
0226* KIDP2 => FIRST ENTRY FOLLOWING LAST KID ENTRY
0227* KIDP3 => LAST ENTRY IN DIRECTORY
0228* KIDP4 => LAST ENTRY IN PATCH TABLE
0229* KIDK  = -# OF WORDS AVAILABLE FOR PATCH TABLE.
0230*
0231  37320 070065  KID2    STA WORD       SET UP LENGTH FOR DISC TRANSFER.
0232  37321 040326          ADA USEND      GET # WORDS
0233  37322 003004          CMA,INA          LEFT
0234  37323 040424          ADA LIBD            IN
0235  37324 070025          STA KIDK              KIDK
0236  37325 060065          LDA WORD       SET END
0237  37326 003004          CMA,INA          OF DIRECTORY
0238  37327 040516          ADA .-8            POINTER
0239  37330 040424          ADA LIBD
0240  37331 070030          STA KIDP3       ENTRY IN DIRECTORY.
0241  37332 070026          STA KIDP1      SET POINTER TO CURRENT ENTRY.
0242  37333 060326          LDA USEND      INITIALIZE PATCH TABLE
0243  37334 070031          STA KIDP4       POINTER.
0244  37335 060023          LDA KIDI       GET DIRECTORY
0245  37336 040534          ADA .+6         DISC ADDRESS
0246  37337 160000          LDA 0,I          IN A,
0247  37340 064425          LDB LIBDI        ADDRESS OF WORKSPACE
0248  37341 016625          JSB DISCL        IN B, & READ DISC.
0249*
0250  37342 160026  KID7    LDA KIDP1,I    GET ID OF NEXT ENTRY
0251  37343 001665          ELA,CLE,ERA
0252  37344 040046          ADA MID        COMPARE WITH KEY ID.
0253  37345 002020          SSA            TEST FOR <
0254  37346 027433          JMP KID6
```

```
0255  37347 002002          SZA             TEST FOR >
0256  37350 027425          JMP KID8
0257*
0258* FOUND AN ENTRY FOR KID. NOW REMOVE IT.
0259*
0260  37351 064026          LDB KIDP1       IF THIS IS THE FIRST
0261  37352 044536          ADB .+8          SUCH ENTRY, SET KIDP2 AS
0262  37353 060031          LDA KIDP4          STATED ABOVE.
0263  37354 050326          CPA USEND
0264  37355 074027          STB KIDP2
0265  37356 160023          LDA KIDI,I      ADJUST THE DIRECTORY LENGTH.
0266  37357 040536          ADA .+8
0267  37360 170023          STA KIDI,I
0268*
0269  37361 044524          ADB .-2         SAVE DISC LOC & LENGTH OF AREA
0270  37362 104200          DLD 1,I          IN LTEMP.
0271  37364 104400          DST LTEMP
0272  37366 064025          LDB KIDK        TEST FOR ANY ROOM IN
0273  37367 006002          SZB              PATCH AREA.
0274  37370 027412          JMP KID9
0275*
0276* MAKE ROOM BY PUSHING UP PARTIALLY EXAMINED DIRECTORY.
0277*
0278  37371 064026          LDB KIDP1       SET UP
0279  37372 074044          STB MOVED        DEST AND
0280  37373 064027          LDB KIDP2          SOURCE.
0281  37374 074043          STB MOVES
0282  37375 007000          CMB             COMPUTE #
0283  37376 044030          ADB KIDP3        OF WORDS
0284  37377 007000          CMB                TO MOVE
0285  37400 044516          ADB .-8              AND
0286  37401 016352          JSB MOVEW            DO IT.
0287*
0288  37402 064027          LDB KIDP2       SET B=-# OF WORDS
0289  37403 007004          CMB,INB          GAINED.
0290  37404 044026          ADB KIDP1
0291  37405 060026          LDA KIDP1       ADJUST KIDP2,KIDP3, AND KIDK.
0292  37406 070027          STA KIDP2
0293  37407 060030          LDA KIDP3
0294  37410 040001          ADA 1
0295  37411 070030          STA KIDP3
0296*
0297  37412 044530  KID9    ADB .+2         TAKE 2 WORDS FROM
0298  37413 074025          STB KIDK         PATCH TABLE.
0299  37414 064031          LDB KIDP4       MOVE PATCH POINTER
0300  37415 044524          ADB .-2         BACK2 WORDS.
0301  37416 074031          STB KIDP4
0302  37417 064021          LDB LTEMP+1      GET NEGATIVE WORD LENGTH.
0303  37420 101027          ASR 7           CONVERT TO POSITIVE                X]
0304  37421 007004          CMB,INB          SECTORS.
0305  37422 060020          LDA LTEMP       GET DISC ADDRESS.
0306  37423 104400          DST KIDP4,I     STORE PATCH.
0307*
0308  37425 064026  KID8    LDB KIDP1       TEST FOR FINISHED
0309  37426 054424          CPB LIBD         EXAMINING DIRECTORY ENTRIES.
0310  37427 027433          JMP KID6
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0311  37430 044516          ADB .-8        IF NOT, MOVE POINTER BACK TO
0312  37431 074026          STB KIDP1      NEXT ENTRY.
0313  37432 027342          JMP KID7
0314*
0315* THE PATCH TABLE IS NOW BUILT. THE NEXT STEP IS TO FIXUP THE DIREC.
0316*
0317  37433 060031  KID6    LDA KIDP4      IF THE PATCH TABLE IS EMPTY, WE
0318  37434 050326          CPA USEND      DIDN'T DO ANYTHING
0319  37435 027313          JMP KID1
0320*
0321  37436 160023          LDA KIDI,I
0322  37437 002003          SZA,RSS        IF LENGTH=0 WE DONT HAVE TO
0323  37440 027475          JMP KID10       WRITE IT BACK OUT.
0324  37441 070065          STA WORD       SET UP FOR DISC DRIVER.
0325*
0326* WE FIRST HAVE TO CLOSE UP THE HOLE. THER ARE 2
0327* CASES, DEPENDING UPON WHITHER THE HOLE IS AT THE
0328* BEGINNING OR IN THE MIDDLE.
0329*
0330  37442 060027          LDA KIDP2      WE WILL MOVE FROM KIDP2 IN
0331  37443 070043          STA MOVES       ANY CASE.
0332  37444 064032          LDB KIDT       GET FIRST ID IN B.
0333  37445 054045          CPB ID         IF = HOLE IS AT BEGINNING
0334  37446 027460          JMP KID11      GO SET NEW FIRST ID.
0335  37447 060026          LDA KIDP1      SET DEST. TO BE RIGHT AFTER
0336  37450 040536          ADA .+8         LAST ENTRY EXAMINED.
0337  37451 050043          CPA MOVES      FORGET IT IF SAME AS SOURCE.
0338  37452 027465          JMP KID12
0339  37453 064030          LDB KIDP3      COMPUTE # OF WORDS TO MOVE.
0340  37454 007004          CMB,INB
0341  37455 044027          ADB KIDP2
0342  37456 044516          ADB .-8
0343  37457 027463          JMP KID13      GO MOVE IT.
0344*
0345  37460 060023  KID11   LDA KIDI       SET UP NEW FIRST ID.
0346  37461 002004          INA
0347  37462 064521          LDB .-5
0348  37463 070044  KID13   STA MOVED
0349  37464 016352          JSB MOVEW
0350*
0351* NOW WRITE DIRECTORY BACK TO DISC.
0352*
0353  37465 064424  KID12   LDB LIBD       DETERMINE CORE ADDRESS.
0354  37466 060045          LDA ID
0355  37467 050032          CPA KIDT
0356  37470 064027          LDB KIDP2
0357  37471 060023          LDA KIDI       GET DISC ADDRESS.
0358  37472 040534          ADA .+6
0359  37473 160000          LDA 0,I
0360  37474 016625          JSB DISCL      WRITE DISC.
0361*
0362  37475 060204  KID10   LDA ADLEN      READ IN ADT.
0363  37476 070065          STA WORD
0364  37477 060203          LDA ADLOC
0365  37500 064425          LDB LIBDI
0366  37501 016625          JSB DISCL
```

```
0367*
0368* GO THROUGH THE PATCH TABLE ONE ELEMENT AT A TIME,
0369* POINTING TO IT WITH KIDP4.
0370*
0371  37502 064424         LDB LIBD      SCAN ADT FOR FIRST ENTRY BEYOND
0372  37503 160031  KID14 LDA KIDP4,I  SAVE THE DISC AND HEAD        X]
0373  37504 011072         AND DHMSK     ADDRESS OF THE DISC          X]
0374  37505 070036         STA LTEMP+14  ADDRESS                      X]
0375  37506 160001  KID.5 LDA 1,I       LOAD ADT ENTRY               X]
0376  37507 011072         AND DHMSK     GET DISC AND HEAD            X]
0377  37510 050036         CPA LTEMP+14  SAME AS REQUIRED?             X]
0378  37511 027514         JMP KID.4     YES                          X]
0379  37512 044530         ADB .+2       NO, NEXT ENTRY               X]
0380  37513 027506         JMP KID.5                                  X]
0381  37514 074035  KID.4 STB LTEMP+13 SAVE ENTRY POINTER            X]
0382  37515 160001         LDA 1,I       LOAD ENTRY                   X]
0383  37516 003104         CMA,CLE,INA   SUBTRACT REQUIRED ONE         X
0384  37517 140031         ADA KIDP4,I                                X
0385  37520 002003         SZA,RSS       IF = FORGET THE WHOLE PATCH.THIS
0386  37521 027636         JMP KID17     MIGHT HAPPEN IF ADT+PATCHTABLE
0387*                                        IS TOO BIG.
0388  37522 002041         SEZ,RSS
0389  37523 027532         JMP KD.10
0390  37524 044530         ADB .+2       NOPE, TRY NEXT ENTRY         X]
0391  37525 160001         LDA 1,I       LOAD ENTRY                   X]
0392  37526 011072         AND DHMSK     GET DISC AND HEAD            X]
0393  37527 050036         CPA LTEMP+14 IF SAME AS BEFORE STILL NOT DONE
0394  37530 027515         JMP KID.4+1   SAME    TRY NEXT ENTRY       X]
0395  37531 044524         ADB .-2                                  (L)
0396*
0397* FOUND FIRST ENTRY BEYOND PATCH.
0398*
0399  37532         KD.10 EQU *
0400  37532 074026         STB KIDP1     SAVE ADDRESS OF THAT ENTRY.
0401  37533 064031         LDB KIDP4     SET A=LOC(PATCH)+LEN(PATCH)
0402  37534 006004         INB                -LOC(NEXT ENTRY)=0 IF
0403  37535 140001         ADA 1,I              ADJACENT.
0404  37536 040525         ADA .-1
0405  37537 070025         STA KIDK
0406  37540 064026         LDB KIDP1     NOW DETERMINE IF PREVIOUS
0407  37541 044524         ADB .-2        ENTRY IS ADJACENT TO NEW
0408  37542 104200         DLD 1,I          ENTRY.
0409  37544 044000         ADB 0
0410  37545 074024         STB KIDJ
0411  37546 104200         DLD KIDP4,I
0412  37550 050024         CPA KIDJ
0413  37551 027607         JMP KID15     IT IS.
0414*
0415* THE NEW ENTRY IS NOT ADJACENT TO THE PREVIOUS ENTRY.
0416*
0417  37552 034025         ISZ KIDK      ADJACENT TO NEXT AREA?
0418  37553 027561         JMP KID16       NO.
0419  37554 170026         STA KIDP1,I   RESET FOLLOWING ENTRY SO ITS AD-
0420  37555 034026         ISZ KIDP1      DRESS IS THAT OF THE NEW ONE &
0421  37556 144026         ADB KIDP1,I      ITS SIZE IS THE SUM.
0422  37557 174026         STB KIDP1,I
```

```
0423  37560 027636         JMP KID17
0424*
0425  37561 104400  KID16  DST LTEMP      SAVE NEW ENTRY.
0426  37563 060204         LDA ADLEN
0427  37564 040524         ADA .-2        GET ADLEN-2
0428  37565 070001         STA 1          SAVE IN B.
0429  37566 040332         ADA P3072    MAKE SURE IT WILL FIT          X]
0430  37567 002020         SSA            OK
0431  37570 027636         JMP KID17      FORGET IT IF NO FIT.
0432  37571 007000         CMB            SET DEST FOR MOVE TO
0433  37572 044424         ADB LIBD         LIBUS-ADLEN+1
0434  37573 074044         STB MOVED
0435  37574 044524         ADB .-2        SET SOURCE TO LIBUS-ADLEN-1
0436  37575 074043         STB MOVES
0437  37576 007000         CMB            #OF WORDS =-(LIBUS-ADLEN-P1)
0438  37577 044026         ADB KIDP1
0439  37600 016633         JSB MOVEB
0440  37601 104200         DLD LTEMP      NOW SET NEW ENTRY
0441  37603 104400         DST KIDP1,I     INTO TABLE,
0442  37605 060524         LDA .-2          BUMP ADLEN.
0443  37606 027627         JMP KID21
0444*
0445  37607 034025  KID15  ISZ KIDK       ADJACENT TO PREVIOUS AREA---
0446  37610 027632         JMP KID19      ---BUT NOT TO FOLLOWING ONE.
0447  37611 060026         LDA KIDP1      WE ARE GOING TO COMBINE 3 AREAS.
0448  37612 070044         STA MOVED
0449  37613 002004         INA
0450  37614 144000         ADB 0,I        ADD LENGTH OF FOLLOWING AREA.
0451  37615 040524         ADA .-2
0452  37616 144000         ADB 0,I        ADD LENGTH OF PRECEDING AREA
0453  37617 174000         STB 0,I        SET AS NEW LENGTH.
0454  37620 040531         ADA .+3        SET B=SOURCE OF SLIDE.
0455  37621 070043         STA MOVES
0456  37622 064204         LDB ADLEN      COMPUTE
0457  37623 044432         ADB MLIBD      LENGTH OF MOVE.
0458  37624 044000         ADB 0
0459  37625 016352         JSB MOVEW
0460  37626 060530         LDA .+2        DECREMENT
0461  37627 040204  KID21  ADA ADLEN        ADLEN.
0462  37630 070204         STA ADLEN
0463  37631 027636         JMP KID17
0464*
0465  37632 003400  KID19  CCA            ADJUST LENGTH OF PREVIOUS AREA
0466  37633 040026         ADA KIDP1       BY ADDING LENGTH OF NEW AREA.
0467  37634 144000         ADB 0,I
0468  37635 174000         STB 0,I
0469*
0470  37636 060031  KID17  LDA KIDP4      BUMP KIDP4 TO POINT AT NEW
0471  37637 040530         ADA .+2         PATCH ENTRY.
0472  37640 050326         CPA USEND      TEST FOR DONE
0473  37641 027645         JMP *+4
0474  37642 070031         STA KIDP4
0475  37643 064035         LDB LTEMP+13                                  X]
0476  37644 027503         JMP KID14    GO FOR NEXT PATCH ENTRY          X
0477*
0478* WRITE ADT TO DISC
```

```
0479*
0480   37645 064204          LDB ADLEN
0481   37646 074065          STB WORD
0482   37647 060203          LDA ADLOC
0483   37650 064424          LDB LIBD
0484   37651 016625          JSB DISCL
0485*
0486   37652 027313          JMP KID1
0487   37653 103100  KID18    CLF 0
0488   37654 002400          CLA
0489   37655 070262          STA LIB
0490   37656 026647          JMP LEND
0491   37657         $$KID   EQU *
0492   00020                 ORG LTEMP
0493   00020 000000  KIDP    BSS 1
0494   00021 000000  KIDC    BSS 1
0495   00022 000000  KIDB    BSS 1
0496   00023 000000  KIDI    BSS 1
0497   00024 000000  KIDJ    BSS 1
0498   00025 000000  KIDK    BSS 1
0499   00026 000000  KIDP1   BSS 1
0500   00027 000000  KIDP2   BSS 1
0501   00030 000000  KIDP3   BSS 1
0502   00031 000000  KIDP4   BSS 1
0503   00032 000000  KIDT    BSS 1
0504   00033 000000  KDTP1   BSS 1
0505   00034 000000  KDTP2   BSS 2
```

```
0507*
0508*     THE MOVE ROUTINE IS USED TO MOVE PROGRAMS
0509* AND FILES FROM 1 DISC TO ANOTHER.
0510*     THE FORM OF THE COMMAND IS:
0511* MOVE-<ID>,<NAME>,<SUBCHANNEL>
0512*     THE INDICATED PROGRAM OR FILE IS MOVED
0513* TO THE NEW SUBCHANNEL.
0514*


0516  37300                ORG LIBRA

0518  37300 016667         JSB GETID     GET THE ID
0519  37301 002001         RSS
0520  37302 026656         JMP LFRER     STATEMENT END
0521  37303 050602         CPA .+54B     COMMA?
0522  37304 002001         RSS           YES
0523  37305 026656         JMP LFRER     NO-ERROR
0524  37306 114341         JSB T35CH,I   GET NEXT CHAR
0525  37307 026656         JMP LFRER     ERROR-CR
0526  37310 050602         CPA .+54B     COMMA?
0527  37311 026656         JMP LFRER
0528*
0529*     GET FILE OR PROGRAM NAME
0530*
0531  37312 001727         ALF,ALF
0532  37313 030566         IOR .+40B
0533  37314 070021         STA LTEMP+1
0534  37315 060524         LDA .-2
0535  37316 070254         STA MOVCT
0536  37317 060323         LDA DLTEM
0537  37320 040530         ADA .+2
0538  37321 070253         STA MOVPT
0539  37322 114341         JSB T35CH,I   GET CHAR
0540  37323 026656         JMP LFRER     NONE LEFT
0541  37324 050602         CPA .+54B     COMMA?
0542  37325 027361         JMP MOV.1     YES
0543  37326 060021         LDA LTEMP+1    TAKE CARE
0544  37327 020566         XOR .+40B        BLANK
0545  37330 030050         IOR T35LC      ADD NEW CHARACTER
0546  37331 070021         STA LTEMP+1
0547  37332 060323         LDA DLTEM
0548  37333 040530         ADA .+2
0549  37334 070253         STA MOVPT     SAVE POINTER
0550  37335 114341  MOV.3   JSB T35CH,I
0551  37336 026656         JMP LFRER
0552  37337 050602         CPA .+54B     DO WE WANT IT.
0553  37340 027361         JMP MOV.1
0554  37341 001727         ALF,ALF   ROTATE CHARACTER TO UPPER HALF
0555  37342 170253         STA MOVPT,I
0556  37343 114341         JSB T35CH,I
0557  37344 026656         JMP LFRER
0558  37345 050602         CPA .+54B
0559  37346 060566         LDA .+40B
0560  37347 130253         IOR MOVPT,I
0561  37350 170253         STA MOVPT,I
```

```
0562  37351 060050          LDA T35LC RELOAD LAST CHARACTER
0563  37352 034253          ISZ MOVPT
0564  37353 034254          ISZ MOVCT  DONE?
0565  37354 002001          RSS
0566  37355 027366          JMP MOV.2
0567  37356 050602          CPA .+54B
0568  37357 002001          RSS
0569  37360 027335          JMP MOV.3
0570  37361 063652  MOV.1 LDA MOVBL     FILL IN
0571  37362 170253          STA MOVPT,I  BLANKS FOR
0572  37363 034253          ISZ MOVPT    REMAINDER
0573  37364 034254          ISZ MOVCT    IF NAME
0574  37365 027362          JMP *-3
0575  37366 060050  MOV.2 LDA T35LC    GET LAST CHARACTER AGAIN
0576  37367 050602          CPA .+54B    COMMA?
0577  37370 027376          JMP MV.F     OK
0578  37371 114341          JSB  T35CH,I   NO - GET COMMA
0579  37372 026656          JMP LFRER        NOT THERE
0580  37373 050602          CPA .+54B      COMMA??
0581  37374 027376          JMP MV.F         YES
0582  37375 026656          JMP LFRER        NO
0583  37376          MV.F   EQU *
0584  37376 114341          JSB T35CH,I  GET SUBCHANEL
0585  37377 026656          JMP LFRER    NONE
0586  37400 070251          STA MOVSB    SAVE CHAR
0587  37401 114341          JSB T35CH,I  CR?
0588  37402 002001          RSS
0589  37403 026656          JMP LFRER    NO-ERROR
0590  37404 060251          LDA MOVSB    LOAD SUBCHANNEL
0591  37405 040462          ADA M72B     TEST FOR DIGIT
0592  37406 002021          SSA,RSS
0593  37407 026656          JMP LFRER    NO
0594  37410 040540          ADA .+10
0595  37411 002020          SSA
0596  37412 026656          JMP LFRER    NO
0597*
0598*     SUBCHANNEL IS IN A
0599*     NOW FORM DISC ADDRESS
0600*
0601  37413 070001          STA 1
0602  37414 044522          ADB .-4      VALID SUBCHANNEL
0603  37415 006021          SSB,RSS
0604  37416 026656          JMP LFRER    NO
0605  37417 000065          CLE,ERA
0606  37420 001300          RAR
0607  37421 002041          SEZ,RSS
0608  37422 030615          IOR B100      FIXED DISC BIT
0609  37423 070032          STA MOVDS    SAVE IT
0610*
0611*     NOW LOOK FOR PROGRAM NAME
0612*
0613*
0614  37424 060045          LDA ID
0615  37425 070020          STA LTEMP
0616  37426 016202          JSB DLOOK    SEARCH DIRECTORY
0617  37427 002001          RSS
```

```
0618*
0619*      NO SUCH PROGRAM
0620   37430 027625          JMP MV.ER     NO SUCH PROGRAM
0621   37431 064025          LDB LTEMP+5
0622   37432 044534          ADB .+6
0623   37433 160001          LDA 1,I
0624   37434 070034          STA MDADA     SAVE DISC ADDRESS
0625   37435 044522          ADB .-4       IS THIS
0626   37436 160001          LDA 1,I         A FILE?
0627   37437 002021          SSA,RSS       *
0628   37440 027505          JMP MOV.4     NO
0629   37441 060453          LDA M128      YES -
0630   37442 070065          STA WORD        CHECK IF
0631   37443 160331          LDA FUSS,I        BUSY
0632   37444 064425          LDB LIBDI     LOAD
0633   37445 016625          JSB DISCL       FUSS
0634   37446 064424          LDB LIBD
0635   37447 160001  MVR.1    LDA 1,I
0636   37450 050034          CPA MDADA     FILE BUSY?
0637   37451 027456          JMP MOVFB     YES
0638   37452 044530          ADB .+2
0639   37453 054330          CPB L128      DONE?
0640   37454 027476          JMP MVR.2     YES - IT'S OK
0641   37455 027447          JMP MVR.1     NO
0642*
0643   37456 063470  MOVFB   LDA MBFMS     OUTPUT
0644   37457 070043          STA MOVES       BUSY
0645   37460 060413          LDA T35B1         MESSAGE
0646   37461 070044          STA MOVED
0647   37462 064521          LDB .-5
0648   37463 016352          JSB MOVEW
0649   37464 060540          LDA .+10
0650   37465 064413          LDB T35B1
0651   37466 114324          JSB TTY35,I
0652   37467 026652          JMP LENDR
0653*
0654   37470 037471  MBFMS    DEF *+1
0655   37471 005102          OCT 5102
0656   37472 052523          ASC 4,USY FILE
0657   37476 064024  MVR.2    LDB LTEMP+4   RELOAD
0658   37477 160001          LDA 1,I         DIRECTORY
0659   37500 070065          STA WORD          TRACK
0660   37501 044534          ADB .+6
0661   37502 160001          LDA 1,I
0662   37503 064425          LDB LIBDI
0663   37504 016625          JSB DISCL
0664   00034         MDADA   EQU LTEMP+12
0665   37505 064025  MOV.4    LDB LTEMP+5   GO TO ENTRY
0666   37506 044534          ADB .+6       GET DISC ADDRESS
0667   37507 160001          LDA 1,I
0668   37510 011072          AND DHMSK     IS IT ON CORRECT
0669   37511 050032          CPA MOVDS       DISC?
0670   37512 026647          JMP LEND      YES-ALL DONE
0671*
0672   37513 160001          LDA 1,I
0673   37514 070027          STA MOVD1     DAVE OLD DISC ADR
```

```
0674  37515 006004          INB
0675  37516 160001          LDA 1,I
0676  37517 070252          STA MOVWD     SAVE LENGTH
0677  37520 007400          CCB
0678  37521 101027          ASR 7         CONVERT TO SECTORS
0679  37522 070030          STA MOVLN
0680  37523 064025          LDB LTEMP+5    MOVE
0681  37524 074043          STB MOVES        CORRECT
0682  37525 064323          LDB DLTEM          NAME WITH
0683  37526 074044          STB MOVED            FILE AND PROTECT
0684  37527 064522          LDB .-4                BITS
0685  37530 016352          JSB MOVEW                TO TEMPORARY BUFFER
0686*
0687*     SEARCH ADT FOR ENTRY ON THE RIGHT DISC
0688*
0689  37531 060204          LDA ADLEN
0690  37532 070065          STA WORD
0691  37533 001100          ARS
0692  37534 070254          STA MOVCT
0693  37535 060203          LDA ADLOC
0694  37536 064425          LDB LIBDI
0695  37537 016625          JSB DISCL     READ ADT
0696*
0697  37540 064424          LDB LIBD
0698  37541 074253          STB MOVPT     SAVE POINTER
0699  37542 160001  MOV.6   LDA 1,I
0700  37543 011072          AND DHMSK     RIGHT DISC?
0701  37544 050032          CPA MOVDS
0702  37545 027552          JMP MOV.5
0703  37546        MOV.A    EQU *
0704  37546 044530          ADB .+2
0705  37547 034254          ISZ MOVCT     NO MORE?
0706  37550 027542          JMP MOV.6
0707  37551 027613          JMP MOV.C
0708  37552 006004  MOV.5   INB           GET LENGTH
0709  37553 160001          LDA 1,I       POINT BACK AGAIN
0710  37554 044525          ADB .-1
0711  37555 040030          ADA MOVLN
0712  37556 002020          SSA
0713  37557 027546          JMP MOV.A
0714*
0715*     SUFFICIENT SPACE HAS GEEN FOUND
0716*     ON THE REQUESTED DISC
0717*
0718  37560 104200          DLD 1,I       LOAD ENTRY
0719  37562 104400          DST MADT      SAVE ADT ENTRY
0720*
0721  37564 064024          LDB LTEMP+4    LOAD
0722  37565 160001          LDA 1,I          DIRECTORY TRACK
0723  37566 070065          STA WORD
0724  37567 044534          ADB .+6
0725  37570 160001          LDA 1,I
0726  37571 064425          LDB LIBDI
0727  37572 016625          JSB DISCL
0728  37573 064025          LDB LTEMP+5   GET PROG START
0729  37574 044532          ADB .+4
```

```
0730  37575 160001          LDA 1,I
0731  37576 070250          STA MPROG     SAVE PROGRAM START
0732  37577 006004          INB
0733  37600 160001          LDA 1,I       GET PURGE DATE
0734  37601 070035          STA MPURG     *SAVE IT
0735*
0736  37602 060032          LDA MOVDS     SET UP*
0737  37603 070026          STA LTEMP+6   COMPUTE REQUESTED
0738  37604 063637  MOV.G    LDA MVOVL
0739  37605 070065          STA WORD
0740  37606 064262          LDB LIB
0741  37607 006004          INB
0742  37610 160001          LDA 1,I
0743  37611 064317          LDB #LIBI
0744  37612 027674          JMP LIBRA+252
0745*
0746*     DISC OVERLOAD
0747*
0748  37613 063640  MOV.C    LDA MVER1         MOVE ERROR MESSAGE
0749  37614 070043          STA MOVES              TO TTY 35 BUFFER
0750  37615 060413          LDA T35B1
0751  37616 070044          STA MOVED
0752  37617 064516          LDB .-8
0753  37620 016352          JSB MOVEW
0754  37621 060537          LDA .+9
0755  37622 064413          LDB T35B1
0756  37623 114324          JSB TTY35,I       OUTPUT 'SYSTEM OVERLOAD'
0757  37624 026652          JMP LENDR
0758  37625 063641  MV.ER    LDA MVSMS    LOAD MESSAGE ADDRESS
0759  37626 070043          STA MOVES    AND SAVE FOR MOVE BUFFER ROUTINE
0760  37627 060413          LDA T35B1    SET DESTINATION ADDRESS
0761  37630 070044          STA MOVED
0762  37631 064516          LDB .-8       MOVE 8 WORDS
0763  37632 016352          JSB MOVEW     MOVE ERROR MESSAGE INTO TTY35 BUF
0764  37633 060546          LDA .+16
0765  37634 064413          LDB T35B1
0766  37635 114324          JSB TTY35,I   OUTPUT MESSAGE
0767  37636 026652          JMP LENDR
0768*
0769  37637 177401  MVOVL    ABS LIBRA-$$MOV
0770  37640 037147  MVER1    DEF FD.1+11
0771  37641 037642  MVSMS    DEF *+1
0772  37642 005116           OCT 5116
0773  37643 047440           ASC 7,0 SUCH PROGRAM
0774  37652 020040  MOVBL    ASC 1,
0775  37674                  ORG LIBRA+252
0776  37674 016625           JSB DISCL     LOAD OVERLAY
0777  37675 027300           JMP LIBRA
0778  37676          $MOV    EQU *
```

```
0002*
0003*     THE MOVE OVERLAY DOES THE ACTUAL MOVING
0004* OF THE PROGRAM
0005*


0007  37300                ORG LIBRA

0009  37300 017173  MOV.E  JSB FDIRC      GET DIREC
0010  37301 164024         LDB LTEMP+4,I    TRACK
0011  37302 006003         SZB,RSS         EMPTY?
0012  37303 027323         JMP MOV.B       YES - GO BACK ONE
0013  37304 060323         LDA DLTEM       ON THIS TRACK?
0014  37305 064024         LDB LTEMP+4
0015  37306 006004         INB
0016  37307 016471         JSB DIRCM
0017  37310 027323         JMP MOV.B       NO - GO BACK ONE TRACK
0018  37311 000000         NOP                                (L)
0019  37312 060020  MOV.D  LDA LTEMP       YES
0020  37313 031163         IOR BIT15         LOOK
0021  37314 070020         STA LTEMP           FOR
0022  37315 016202         JSB DLOOK             IT
0023  37316 026647         JMP LEND        ALREADY THERE
0024  37317 060020         LDA LTEMP       FOUND WHERE IT GOES
0025  37320 001665         ELA,CLE,ERA
0026  37321 070020         STA LTEMP
0027  37322 027327         JMP MOV.H
0028  37323 064024  MOV.B  LDB LTEMP+4     GO BACK
0029  37324 044517         ADB .-7           ONE
0030  37325 074024         STB LTEMP+4         TRACK
0031  37326 027312         JMP MOV.D
0032*
0033*     WE HAVE FOUND WHERE THE NEW ENTRY
0034*     FITS, SO PUT IT IN
0035*
0036  37327          MOV.H  EQU *
0037  37327 064024         LDB LTEMP+4     MAKE
0038  37330 160001         LDA 1,I           SURE
0039  37331 070065         STA WORD            DIRECTORY
0040  37332 044534         ADB .+6               TRACK
0041  37333 160001         LDA 1,I                 IS
0042  37334 064425         LDB LIBDI                 IN
0043  37335 016625         JSB DISCL                   CORE
0044  37336 164024         LDB LTEMP+4,I
0045  37337 054446         CPB M3072
0046  37340 027622         JMP MVSUP       IF TRACK FULL THEN SUPERSAVE
0047  37341 007000         CMB
0048  37342 044424         ADB LIBD
0049  37343 074043          STB MOVES    SET SOURCE ADR
0050  37344 044536         ADB .+8
0051  37345 074044         STB MOVED       SET DESTINATION ADDRESS
0052  37346 064043         LDB MOVES       COMPUTE
0053  37347 007004         CMB,INB           LENGTH
0054  37350 044025         ADB LTEMP+5
0055  37351 044535         ADB .+7
0056  37352 016633         JSB MOVEB       MOVE UP DIRECTORY
```

```
0057*
0058  37353 060025          LDA LTEMP+5   MOVE NEW
0059  37354 040536          ADA .+8       ENTRY INTO
0060  37355 070044          STA MOVED     POSITION
0061  37356 060323          LDA DLTEM
0062  37357 070043          STA MOVES
0063  37360 064522          LDB .-4
0064  37361 016352          JSB MOVEW
0065*
0066  37362 060250          LDA MPROG     SET IN PROG START
0067  37363 170044          STA MOVED,I
0068  37364 060035          LDA MPURG     STORE DATE
0069  37365 034044          ISZ MOVED
0070  37366 170044          STA MOVED,I
0071  37367 034044          ISZ MOVED
0072  37370 060033          LDA MADT      STORE AND LENGTH
0073  37371 064252          LDB MOVWD     ADDRESS AND LENGTH
0074  37372 104400          DST MOVED,I
0075  37374 064024          LDB LTEMP+4   UPDATE DIRECTORY
0076  37375 074044          STB MOVED     TRACK
0077  37376 160001          LDA 1,I       LENGTH
0078  37377 040516          ADA .-8
0079  37400 170001          STA 1,I
0080  37401 070065          STA WORD
0081  37402 044534          ADB .+6
0082  37403 160001          LDA 1,I
0083  37404 064424          LDB LIBD
0084  37405 016625          JSB DISCL     OUTPUT DIREC TO DISC
0085*
0086  37406 034044          ISZ MOVED
0087  37407 064424          LDB LIBD
0088  37410 074043          STB MOVES
0089  37411 064522          LDB .-4       UPDATE B.P. DIREC.
0090  37412 016352          JSB MOVEW
0091*
0092*     READ IN ADT TABLE+UPDATE
0093*
0094  37413 060204          LDA ADLEN
0095  37414 070065          STA WORD
0096  37415 060203          LDA ADLOC
0097  37416 064425          LDB LIBDI
0098  37417 016625          JSB DISCL     READ IN ADT
0099*
0100  37420 064424          LDB LIBD
0101  37421 160001          LDA 1,I       GET ENTRY
0102  37422 050033          CPA MADT      IS THIS THE NEW ENTRY
0103  37423 027426          JMP *+3       YES
0104  37424 044530          ADB .+2
0105  37425 027421          JMP *-4       NEXT ENTRY
0106*
0107  37426 060030          LDA MOVLN
0108  37427 003004          CMA,INA
0109  37430 040033          ADA MADT
0110  37431 170001          STA 1,I
0111  37432 060030          LDA MOVLN     RESET NEW LENGTH
0112  37433 040034          ADA MADT+1    INTO ADT ENTRY
```

```
0113  37434 006004          INB
0114  37435 170001          STA 1,I
0115  37436 002002          SZA              IS IT ZERO?
0116  37437 027454          JMP MOV.7        NO - GO LOOK FOR L OLD ONE
0117  37440 006004          INB              YES-DELETE IT
0118  37441 074043          STB MOVES
0119  37442 074000          STB 0
0120  37443 044524          ADB .-2
0121  37444 074044          STB MOVED
0122  37445 040204          ADA ADLEN
0123  37446 064424          LDB LIBD
0124  37447 007004          CMB,INB
0125  37450 044000          ADB 0
0126  37451 016352          JSB MOVEW        COMPACT ADT TABLE
0127  37452 034204          ISZ ADLEN        REDUCE LENGTH
0128  37453 034204          ISZ ADLEN
0129*
0130*     NOW SEARCH FOR OLD ENTRY POSITION
0131*
0132  37454 064424  MOV.7 LDB LIBD
0133  37455 060027         LDA MOVD1
0134  37456 011072         AND DHMSK
0135  37457 070032         STA MOVDS
0136  37460          MV.C  EQU *
0137  37460 160001         LDA 1,I          LOAD ENTRY
0138  37461 011072         AND DHMSK          RIGHT
0139  37462 050032         CPA MOVDS             DISC?
0140  37463 027466         JMP MV.B
0141  37464 044530         ADB .+2          NO- NEXT ENTRY
0142  37465 027460         JMP MV.C
0143  37466          MV.B  EQU *
0144  37466 160001         LDA 1,I          RELOAD ADT ENTRY
0145  37467 011072         AND DHMSK                              (L)
0146  37470 050032         CPA MOVDS     SAME SUB-CHANNEL?        (L)
0147  37471 002001         RSS           YES, CONT. SEARCH        (L)
0148  37472 027502         JMP MOV.8     NO
0149  37473 160001         LDA 1,I
0150  37474 003004         CMA,INA
0151  37475 040027         ADA MOVD1      ARE WE BEYOND OLD ENTRY
0152  37476 002020         SSA
0153  37477 027502         JMP MOV.8      YES INSERT ENTRY
0154  37500 044530         ADB .+2
0155  37501 027466         JMP MV.B
0156  37502 074031  MOV.8 STB MVADT      SAVE ADDRESS
0157  37503 060030         LDA MOVLN      LOAD LENGTH
0158  37504 003004         CMA,INA        POSITIVE SECTORS
0159  37505 040027         ADA MOVD1      ADD DISC ADDRESS
0160  37506 150031         CPA MVADT,I    ADJACENT?
0161  37507 027542         JMP MOV.9      YES
0162  37510 044524         ADB .-2        GO BACK TO PREVIOUS
0163  37511 160001         LDA 1,I        LOAD DISC ADDRESS
0164  37512 006004         INB
0165  37513 140001         ADA 1,I        ADD LENGTH
0166  37514 050027         CPA MOVD1      ADJACENT?
0167  37515 027602         JMP MOV10      YES
0168*
```

```
0169*      THE NEW ADT ENTRY IS NOT ADJACENT
0170*      TO ANY OTHERS, SO SEPARATE TABLE
0171*      AND INSERT NEW ENTRY
0172*
0173  37516 064204          LDB ADLEN      MOVE
0174  37517 007000          CMB              ADT
0175  37520 044424          ADB LIBD           APART
0176  37521 074043          STB MOVES
0177  37522 044530          ADB .+2
0178  37523 074044          STB MOVED
0179  37524 007004          CMB,INB
0180  37525 006004          INB
0181  37526 044031          ADB MVADT
0182  37527 016633          JSB MOVEB      SEPARATE ADT TABLES
0183  37530 060027          LDA MOVD1      SET NEW ADDRESS
0184  37531 170031          STA MVADT,I
0185  37532 060030          LDA MOVLN
0186  37533 003004          CMA,INA
0187  37534 034031          ISZ MVADT      SET LENGTH
0188  37535 170031          STA MVADT,I
0189  37536 060524          LDA .-2        RESET
0190  37537 040204          ADA ADLEN      ADT TABLE
0191  37540 070204          STA ADLEN      LENGTH
0192  37541 027606          JMP MOV11
0193*      THE NEW ENTRY IS ADJACENT TO THE
0194*      NEXT ONE
0195*
0196  37542 060027  MOV.9    LDA MOVD1      SET NEW ADDRESS
0197  37543 170001          STA 1,I        INTO TABLE
0198  37544 060030          LDA MOVLN      COMPUTE NEW
0199  37545 003004          CMA,INA        LENGTH
0200  37546 006004          INB            AND STORE
0201  37547 140001          ADA 1,I        IN TABLE
0202  37550 170001          STA 1,I
0203*
0204  37551 044523          ADB .-3        CHECK IF PREVIOUS
0205  37552 160001          LDA 1,I        ENTRY IS ADJACENT
0206  37553 006004          INB
0207  37554 140001          ADA 1,I
0208  37555 150031          CPA MVADT,I
0209  37556 002001          RSS            YES
0210  37557 027606          JMP MOV11
0211  37560 044530          ADB .+2        COMPUTE NEW
0212  37561 160001          LDA 1,I        LENGHT
0213  37562 044524          ADB .-2        (ADDRESS IS
0214  37563 140001          ADA 1,I        CORRECT AS IS)
0215  37564 170001          STA 1,I
0216*
0217*      NOW COMPACT TABLE
0218*
0219  37565 060031          LDA MVADT      SET UP FOR
0220  37566 070044          STA MOVED      MOVEW SUBROUTINE
0221  37567 040530          ADA .+2
0222  37570 070043          STA MOVES
0223  37571 064424          LDB LIBD       COMPUTE # OF
0224  37572 007004          CMB,INB        WORDS TO MAVE
```

```
0225  37573 044204          ADB ADLEN
0226  37574 044031          ADB MVADT
0227  37575 044530          ADB .+2
0228  37576 016352          JSB MOVEW     MOVE TABLE DOWN
0229  37577 034204          ISZ ADLEN     RESET TABLE
0230  37600 034204          ISZ ADLEN     LENGTH
0231  37601 027606          JMP MOV11
0232*
0233*      NEW ENTRY IS ADJACENT TO PREVIOUS
0234*      ENTRY BUT NOT TO NEXT ENTRY
0235*
0236  37602 060030  MOV10 LDA MOVLN     RESET LENGTH
0237  37603 003004         CMA,INA       (ADDRESS IS OK)
0238  37604 140001         ADA 1,I
0239  37605 170001         STA 1,I
0240*
0241*      THE ADT HAS BEEN RESET
0242*      NOW DELET OLD DIRECTORY ENTRY
0243*
0244  37606 060204  MOV11 LDA ADLEN
0245  37607 070065         STA WORD
0246  37610 060203         LDA ADLOC
0247  37611 064424         LDB LIBD
0248  37612 016625         JSB DISCL
0249  37613 063632         LDA MV.LN
0250  37614 070065         STA WORD
0251  37615 060262         LDA LIB
0252  37616 040530         ADA .+2
0253  37617 160000         LDA 0,I
0254  37620 064317         LDB #LIBI
0255  37621 027630         JMP MOV15
0256  37622 034442  MVSUP  ISZ MFLAG      SET FLAG TO INDICATE ERROR
0257  37623 060452         LDA M252       MESSAGE TO GO TO CONSOLE.
0258  37624 070065         STA WORD       LOAD "SUPER SAVE"
0259  37625 163634         LDA MOV17,I
0260  37626 064317         LDB #LIBI
0261  37627 027674         JMP LIBRA+252
0262  37630 016625  MOV15 JSB DISCL
0263  37631 027300         JMP LIBRA
0264  37632 177641  MV.LN ABS LIBRA-$$$MV
0265  37633 177402  MVLN  ABS LIBRA-$MOV
0266  37634 036056  MOV17 DEF SAVE+1+COM6-COM3  POINTER TO "SUPER SAVE"
0267  37674               ORG LIBRA+252
0268  37674 016625         JSB DISCL
0269  37675 027300         JMP LIBRA
0270  37676 027604         JMP MOV.G
0271*
0272  00027         MOVD1 EQU LTEMP+7
0273  00030         MOVLN EQU LTEMP+8
0274  00031         MVADT EQU LTEMP+9
0275  00032         MOVDS EQU LTEMP+10
0276  00033         MADT  EQU LTEMP+11
0277  00035         MPURG EQU LTEMP+13
0278  00250         MPROG EQU T35BF+31
0279  00254         MOVCT EQU T35BF+35
0280  00253         MOVPT EQU T35BF+34
```

```
0281  00252          MOVWD EQU T35BF+33
0282  00251          MOVSB EQU T35BF+32
0283  37677          $$MOV EQU *
```

```
0285  37300                ORG LIBRA

0287  37300 060027         LDA MOVD1
0288  37301 011072         AND DHMSK
0289  37302 070026         STA LTEMP+6
0290  37303 017173         JSB FDIRC     COMPUTE DIRECTORY
0291*
0292  37304 060020         LDA LTEMP     SET UP TO LOOK
0293  37305 031163         IOR BIT15     FOR ONLY 1 TRACK
0294  37306 070020         STA LTEMP
0295  37307 160024         LDA LTEMP+4,I
0296  37310 002003         SZA,RSS       EMPTY TRACK
0297  37311 027405         JMP MOV13     GO TO NEXT ONE
0298  37312 060323         LDA DLTEM     NOW CHECK IF
0299  37313 064024         LDB LTEMP+4   ENTRY IS ON
0300  37314 006004         INB           THIS TRACK
0301  37315 016471         JSB DIRCM
0302  37316 027405         JMP MOV13     NO
0303  37317 000000         NOP                                   (L)
0304  37320 016202  MOV14  JSB DLOOK     YES-FIND IT
0305  37321 002001         RSS
0306  37322 026656         JMP LFRER     WHAT HAPPENED TO MY PROG?
0307  37323 064025         LDB LTEMP+5    READ IN THE PROGRAM
0308  37324 044535         ADB .+7
0309  37325 160001         LDA 1,I
0310  37326 070065         STA WORD
0311  37327 070254         STA MOVCT
0312  37330 040332         ADA P3072
0313  37331 002020         SSA
0314  37332 027411         JMP TOMCH
0315  37333 044525         ADB .-1
0316  37334 160001         LDA 1,I
0317  37335 064425         LDB LIBDI
0318  37336 016625         JSB DISCL
0319  37337 060033         LDA MADT       WRITE TO
0320  37340 064424         LDB LIBD         NEW
0321  37341 016625         JSB DISCL          LOCATION
0322  37342         MOV16  EQU *
0323  37342 064024         LDB LTEMP+4    RELOAD
0324  37343 160001         LDA 1,I          DIRECTORY TRACK
0325  37344 070065         STA WORD           TRACK
0326  37345 044534         ADB .+6
0327  37346 160001         LDA 1,I
0328  37347 064425         LDB LIBDI
0329  37350 016625         JSB DISCL
0330*
0331*     THE OLD ENTRY HAS BEEN FOUND, DELETE IT.
0332*
0333  37351 060025         LDA LTEMP+5   MOVE DIRECTORY
0334  37352 070044         STA MOVED     DOWN.
0335  37353 040536         ADA .+8
0336  37354 070043         STA MOVES
0337  37355 064424         LDB LIBD
0338  37356 007004         CMB,INB
0339  37357 144024         ADB LTEMP+4,I
```

```
0340   37360 044025          ADB LTEMP+5
0341   37361 044536          ADB .+8
0342   37362 016352          JSB MOVEW     MOVE!
0343   37363 160024          LDA LTEMP+4,I
0344   37364 040536          ADA .+8
0345   37365 170024          STA LTEMP+4,I
0346   37366 070065          STA WORD
0347   37367 064024          LDB LTEMP+4
0348   37370 044534          ADB .+6
0349   37371 160001          LDA 1,I
0350   37372 064424          LDB LIBD
0351   37373 074043          STB MOVES
0352   37374 016625          JSB DISCL     WRITE DIRECTORY TO DISC
0353   37375 060024          LDA LTEMP+4
0354   37376 002004          INA
0355   37377 070044          STA MOVED
0356   37400 064522          LDB .-4
0357   37401 016352          JSB MOVEW     RESET B.P. DIREC.
0358*
0359*       WE ARE NOW ALL DONE!
0360*       WHEW!  (YOU CAN SAY THAT AGAIN!)
0361*
0362   37402 103100          CLF 0
0363   37403 034262          ISZ LIB        SAY MOVE NOT IN CORE
0364   37404 026647          JMP LEND       END OF MOVE
0365   37405 060024  MOV13 LDA LTEMP+4   POINT TO
0366   37406 040517          ADA .-7          NEXT DIRECTORY
0367   37407 070024          STA LTEMP+4        TRACK BACK
0368   37410 027320          JMP MOV14      GO FIND PROG
0369   37411 060446  TOMCH LDA M3072
0370   37412 070065          STA WORD
0371   37413 044525          ADB .-1
0372   37414 160001          LDA 1,I
0373   37415 070032          STA MOVDS
0374   37416 064425          LDB LIBDI
0375   37417 016625          JSB DISCL
0376   37420 060033          LDA MADT
0377   37421 064424          LDB LIBD
0378   37422 016625          JSB DISCL
0379   37423 060254          LDA MOVCT
0380   37424 040332          ADA P3072
0381   37425 070065          STA WORD
0382   37426 060032          LDA MOVDS
0383   37427 040556          ADA .+24
0384   37430 064425          LDB LIBDI
0385   37431 016625          JSB DISCL
0386   37432 060033          LDA MADT
0387   37433 040556          ADA .+24
0388   37434 064424          LDB LIBD
0389   37435 016625          JSB DISCL
0390   37436 027342          JMP MOV16
0391   37437          $$$MV EQU *
```

```
0393* THE PURGE COMMAND MAKES IT POSSIBLE TO REMOVE FROM THE LIBRARY
0394* PROGRAMS WHICH HAVE NOT BEEN ACCESSED FOR SOME PERIOD OF TIME.
0395* THE FORMAT FOR THE COMMAND IS AS FOLLOWS:
0396*
0397*     PURGE-DAY/YEAR
0398*
0399* WHERE DAY IS AN INTEGER FROM 1 TO 366 AND YEAR IS AN INTEGER FROM
0400* 0 TO 99. ALL PROGRAMS OR FILES WHICH HAVE NOT BEEN ACCESSED SINCE
0401* THE SPECIFIED DATE ARE DELETED FROM THE LIBRARY.
0402*
0403* PURGE WILL REFUSE TO OPERATE IF THE SPECIFIED DATE IS BEYOND
0404* TODAY'S DATE.
0405*
0406* THE ALGORITHM USED OPERATES IN A MANNER ALMOST IDENTICAL TO THAT
0407* USED IN THE LOCK OVERLAY SECTION, EXCEPT THAT THE ADT MUST BE
0408* UPDATED IN ADDITION TO THE IDT.  THE ACTUAL UPDATING OF THESE IS
0409* PERFORMED BY CALLING THE ROUTINE PURFX, WHICH READS IN THE PURGE
0410* OVERLAY ROUTINE TO DO THE UPDATING.



0412  37300                ORG LIBRA
0413  37300 061002         LDA A000        IF HELLO PROGRAM
0414  37301 070020         STA LTEMP        EXISTS, ASSIGN IT
0415  37302 063675         LDA PURHE          TODAY'S DATE SO IT
0416  37303 070021         STA LTEMP+1          DOESN'T GET PURGED.
0417  37304 104200         DLD PURHE+1
0418  37306 104400         DST LTEMP+2
0419  37310 016202         JSB DLOOK
0420  37311 002001         RSS
0421  37312 027324         JMP PUR2
0422  37313 016403         JSB DATE
0423  37314 064025         LDB LTEMP+5
0424  37315 044533         ADB .+5
0425  37316 170001         STA 1,I
0426  37317 060024         LDA LTEMP+4
0427  37320 040534         ADA .+6
0428  37321 160000         LDA 0,I
0429  37322 064424         LDB LIBD
0430  37323 016625         JSB DISCL
0431*
0432* INTERPRET DATE.
0433*
0434  37324 017365  PUR2   JSB PURNO       GET DAY OF YEAR.
0435  37325 177221         DEC -367
0436  37326 050605         CPA .+57B       TEST FOR NONZERO AND SLASH FOL-
0437  37327 006003         SZB,RSS          LOWING.
0438  37330 027422         JMP PUR1        PARAMETER ERROR.
0439  37331 074020         STB PURDT       SAVE DATE.
0440  37332 017365         JSB PURNO       NOW GET THE YEAR.
0441  37333 177634         DEC -100
0442  37334 050543         CPA .+15B       CHECK FOR RETURN FOLLOWING.
0443  37335 002401         CLA,RSS
0444  37336 027422         JMP PUR1
0445*
0446  37337 101107         RRR 7           MERGE YEAR AND DATE.
```

```
0447  37340 030020          IOR PURDT
0448  37341 070020          STA PURDT
0449  37342 016403          JSB DATE        NOW GET TODAY'S DATE.
0450  37343 064020          LDB PURDT       MAKE SURE SPECIFIED DATE IS
0451  37344 007104          CMB,CLE,INB      <=TODAY'S DATE
0452  37345 040001          ADA 1
0453  37346 002041          SEZ,RSS
0454  37347 027422          JMP PUR1
0455*
0456* THE NEXT STEP IS TO GUARANTEE THAT WE DON'T KILL ANY FILES CUR-
0457* RENTLY IN USE. TO DO THIS WE WILL CHECK THAT THE FUSS TABLE IS
0458* EMPTY.
0459*
0460  37350 060453          LDA M128        INPUT FUSS
0461  37351 070065          STA WORD          TABLE.
0462  37352 160331          LDA FUSS,I
0463  37353 064425          LDB LIBDI
0464  37354 016625          JSB DISCL
0465*
0466  37355 064424          LDB LIBD
0467  37356 054330  PUR4    CPB L128        DONE?
0468  37357 027462          JMP PUR3         YES.
0469  37360 160001          LDA 1,I
0470  37361 002002          SZA
0471  37362 027435          JMP PUR7
0472  37363 006004          INB
0473  37364 027356          JMP PUR4
0474*
0475* ROUTINE TO INPUT A NUMBER
0476*
0477  37365 000000  PURNO   NOP
0478  37366 017407          JSB PURDG       GET A DIGIT
0479  37367 026656          JMP LFRER       ILLEGAL IF NONE.
0480  37370 074021  PURN1   STB PURN        SAVE PARTIAL RESULT.
0481  37371 147365          ADB PURNO,I     CHECK FOR OVERFLOW.
0482  37372 006021          SSB,RSS
0483  37373 027422          JMP PUR1
0484  37374 017407          JSB PURDG       GET NEXT DIGIT.
0485  37375 027404          JMP PURN2       END OF NUMBER.
0486  37376 060021          LDA PURN        MULTIPLY PREVIOUS RESULT BY 10.
0487  37377 001222          RAL,RAL
0488  37400 040021          ADA PURN
0489  37401 001200          RAL
0490  37402 044000          ADB 0           ADD IN NEW VALUE
0491  37403 027370          JMP PURN1       LOOP
0492  37404 064021  PURN2   LDB PURN        RETURN NO.
0493  37405 037365          ISZ PURNO
0494  37406 127365          JMP PURNO,I
0495*
0496*
0497  37407 000000  PURDG   NOP             GET DECIMAL DIGIT
0498  37410 016330          JSB T35CQ       GET CHAR.
0499  37411 127407          JMP PURDG,I     NONE THERE.
0500  37412 064000          LDB 0           DO DIGIT TEST.
0501  37413 044462          ADB M72B
0502  37414 006021          SSB,RSS
```

```
0503  37415 127407          JMP PURDG,I
0504  37416 044540          ADB .+10
0505  37417 006021          SSB,RSS
0506  37420 037407          ISZ PURDG
0507  37421 127407          JMP PURDG,I
0508*
0509* ERROR PRINT.
0510*
0511  37422 064504  PUR1    LDB .-18
0512  37423 017446          JSB PURER
0513  37424 005111          OCT 5111
0514  37425 046114          ASC 8,LLEGAL PARAMETER
0515  37435 064513  PUR7    LDB .-11
0516  37436 017446          JSB PURER
0517  37437 005102          OCT 5102
0518  37440 052523          ASC 6,USY FILES
0519  37446 000000  PURER   NOP
0520  37447 074021          STB PURN
0521  37450 060413          LDA T35B1
0522  37451 070044          STA MOVED
0523  37452 063446          LDA PURER
0524  37453 070043          STA MOVES
0525  37454 005100          BRS
0526  37455 016352          JSB MOVEW
0527  37456 060021          LDA PURN
0528  37457 003004          CMA,INA
0529  37460 064413          LDB T35B1
0530  37461 026651          JMP LEND2
0531*
0532  37462         PUR3    EQU *
0533  37462 060446          LDA M3072      COMPUTE NEGATIVE
0534  37463 064446          LDB M3072        POINTER TO TEST
0535  37464 007004          CMB,INB          WHEN PURFX MUST
0536  37465 044204          ADB ADLEN         BE CALLED.
0537  37466 006020          SSB
0538  37467 060204          LDA ADLEN
0539  37470 040432          ADA MLIBD
0540  37471 040522          ADA .-4
0541  37472 070031          STA PURID
0542*
0543  37473 060326          LDA USEND      INITIATE POINTER TO
0544  37474 070022          STA PURP        END OF CORE TABLE.
0545  37475 060334          LDA DIRD0      INITIALIZE DIRECTORY POINTER.
0546  37476 070023  PUR10    STA PURI
0547  37477 060022          LDA PURP       CAN DIRECTORY FIT?
0548  37500 140023          ADA PURI,I
0549  37501 040432          ADA MLIBD
0550  37502 002020          SSA
0551  37503 017663          JSB PURFX      NO--PERFORM CLEARNUP.
0552  37504 160023          LDA PURI,I     READ DIRECTORY.
0553  37505 070065          STA WORD
0554  37506 060023          LDA PURI
0555  37507 040534          ADA .+6
0556  37510 160000          LDA 0,I
0557  37511 070024          STA PURDD
0558  37512 064425          LDB LIBDI
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0559  37513 016625          JSB DISCL
0560*
0561  37514 060424          LDA LIBD       INITIALIZE POINTERS.
0562  37515 070044          STA MOVED
0563  37516 070043          STA MOVES
0564  37517 003000          CMA
0565  37520 140023          ADA PURI,I
0566  37521 003000          CMA
0567  37522 070025          STA PURD
0568*
0569  37523 064043  PUR11    LDB MOVES      FINISHED SCANNING DIRECTORY?
0570  37524 054025          CPB PURD
0571  37525 027627          JMP PUR12      YES.
0572  37526 044533          ADB .+5        DO WE WANT TO DELETE THIS ENTRY?
0573  37527 060020          LDA PURDT
0574  37530 003104          CMA,CLE,INA
0575  37531 140001          ADA 1,I
0576  37532 002041          SEZ,RSS
0577  37533 027537          JMP PUR13      YES.
0578  37534 064516          LDB .-8        NO-MOVE UP ENTRY
0579  37535 016352          JSB MOVEW
0580  37536 027523          JMP PUR11
0581*
0582* ENTRY DELETION.
0583*
0584  37537 160043  PUR13    LDA MOVES,I    COPY ID,DISC ADR.,LENGTH INTO T.
0585  37540 070026          STA PURT
0586  37541 044531          ADB .+3
0587  37542 074043          STB MOVES
0588  37543 044524          ADB .-2
0589  37544 104200          DLD 1,I
0590  37546 070027          STA PURT+1
0591  37547 101027          ASR 7                                          X1
0592  37550 007004          CMB,INB
0593  37551 074030          STB PURT+2
0594*
0595  37552 060025          LDA PURD       CAN NEW ENTRY FIT IN WITH THE
0596  37553 003004          CMA,INA         DIRECTORY?
0597  37554 070001          STA 1
0598  37555 040523          ADA .-3
0599  37556 040022          ADA PURP
0600  37557 002021          SSA,RSS
0601  37560 027572          JMP PUR14      YES--GO DO NEXT TEST.
0602*
0603* SQUEEZE DIRECTORY.
0604*
0605  37561 060044          LDA MOVED      SAVE DEST
0606  37562 070021          STA PURN        POINTER.
0607  37563 044043          ADB MOVES      MOVE REMAINDER
0608  37564 016352          JSB MOVEW       OF DIRECTORY.
0609  37565 060044          LDA MOVED      RESET
0610  37566 070025          STA PURD        POINTERS.
0611  37567 060021          LDA PURN
0612  37570 070044          STA MOVED
0613  37571 070043          STA MOVES
0614*
```

```
0615  37572 060022  PUR14 LDA PURP      WILL IDT AND ADT STILL FIT IF
0616  37573 040031        ADA PURID      WE MAKE ANOTHER ENTRY?
0617  37574 002021        SSA,RSS
0618  37575 027614        JMP PUR15      YES.
0619*
0620  37576 060025        LDA PURD       WRITE OUT DIRECTORY.
0621  37577 003004        CMA,INA
0622  37600 040424        ADA LIBD
0623  37601 070065        STA WORD
0624  37602 070032        STA PURW
0625  37603 060024        LDA PURDD
0626  37604 064424        LDB LIBD
0627  37605 016625        JSB DISCL
0628*
0629  37606 017663        JSB PURFX      CLEAN UP.
0630*
0631  37607 060032        LDA PURW       READ
0632  37610 070065        STA WORD        DIRECTORY
0633  37611 060024        LDA PURDD         BACK.
0634  37612 064425        LDB LIBDI
0635  37613 016625        JSB DISCL
0636*
0637  37614 007400  PUR15 CCB            MAKE TABLE ENTRY.
0638  37615 044022        ADB PURP
0639  37616 060030        LDA PURT+2
0640  37617 170001        STA 1,I
0641  37620 044524        ADB .-2
0642  37621 074022        STB PURP
0643  37622 104200        DLD PURT
0644  37624 104400        DST PURP,I
0645  37626 027523        JMP PUR11
0646  37627 060044  PUR12 LDA MOVED      UPDATE DIREC.
0647  37630 003004        CMA,INA
0648  37631 040424        ADA LIBD
0649  37632 170023        STA PURI,I
0650  37633 070065        STA WORD
0651  37634 060424        LDA LIBD
0652  37635 070043        STA MOVES
0653  37636 060023        LDA PURI
0654  37637 002004        INA
0655  37640 070044        STA MOVED
0656  37641 064522        LDB .-4
0657  37642 016352        JSB MOVEW
0658  37643 060024        LDA PURDD      WRITE OUT DIRECTORY.
0659  37644 064424        LDB LIBD
0660  37645 016625        JSB DISCL
0661  37646 060023        LDA PURI       LAST TRACK?
0662  37647 050336        CPA DIRD3
0663  37650 027653        JMP *+3
0664  37651 040535        ADA .+7
0665  37652 027476        JMP PUR10
0666  37653 017663        JSB PURFX
0667  37654 026647        JMP LEND
0668  37655 063674  PURXF LDA PURLN      GET BACK TO PURGE.
0669  37656 070065        STA WORD
0670  37657 160262        LDA LIB,I
```

```
0671   37660 064317          LDB #LIBI
0672   37661 016625          JSB DISCL
0673   37662 127663          JMP PURFX,I
0674*
0675   37663 000000   PURFX  NOP              ROUTINE TO CALL IN OVERLAY.
0676   37664 104200          DLD LIB,I
0677   37666 060001          LDA 1
0678   37667 067674          LDB PURLN
0679   37670 074065          STB WORD
0680   37671 064317          LDB #LIBI
0681   37672 016625          JSB DISCL
0682   37673 027300          JMP LIBRA
0683   37674 177423   PURLN  ABS LIBRA-PURXF
0684   37675 044105   PURHE  ASC 3,HELLO
0685   37700          $PUR   EQU *
```

```
0002* PURFX IS CALLED WHENEVER THE PATCH TABLE HAS REACHED ITS LIMIT.
0003* THIS ROUTINE FIRST UPDATES IDT BY DECREASING THE "DISC USED" ENTRY
0004* IN EACH IDT ENTRY REFERENCED BY A PATCH. IT THEN BUILDS A NEW ADT
0005* BASED ON THE RELEASED DISC SPACE.


0007  37300                ORG LIBRA
0008  37300 060044         LDA MOVED
0009  37301 064043         LDB MOVES
0010  37302 104400         DST PURM
0011  37304 060171         LDA IDTTA      INPUT FIRST
0012  37305 040531         ADA .+3          ID TRACK
0013  37306 070071         STA IDTRA
0014  37307 064176         LDB IDTRL
0015  37310 044531         ADB .+3
0016  37311 074072         STB IDTLA
0017  37312 164001         LDB 1,I
0018  37313 074065         STB WORD
0019  37314 064425         LDB LIBDI
0020  37315 160000         LDA 0,I
0021  37316 016625         JSB DISCL
0022  37317 064424         LDB LIBD       SET FIRST ENTRY
0023  37320 060022         LDA PURP       COPY PURP
0024  37321 070033  PURX1  STA PURPP      DONE WITH
0025  37322 050326         CPA USEND            IDT?
0026  37323 027356         JMP PURX2        YES
0027  37324 160033         LDA PURPP,I
0028  37325 150001         CPA 1,I        FOUND IDT ENTRY?
0029  37326 027343         JMP PURX5      YES
0030  37327 054424         CPB LIBD       END OF ID TRACK?
0031  37330 027333         JMP PUR.4      YES
0032  37331 044516         ADB .-8        NO - GO BACK
0033  37332 027325         JMP *-5
0034  37333 160176  PUR.4  LDA IDTRL,I
0035  37334 070065         STA WORD       OUTPUT ID TRACK
0036  37335 160071         LDA IDTRA,I
0037  37336 064424         LDB LIBD
0038  37337 016625         JSB DISCL
0039  37340 160033         LDA PURPP,I    RELOAD ID
0040  37341 070045         STA ID
0041  37342 016414         JSB FIDT       SEARCH ID TRACKS FOR ID ENTRY
0042  37343          PURX5  EQU *
0043*
0044  37343 044535         ADB .+7         UPDATE IDT ENTRY.
0045  37344 034033         ISZ PURPP
0046  37345 034033         ISZ PURPP
0047  37346 160033         LDA PURPP,I    GET LENGTH.
0048  37347 003004         CMA,INA        SUBTRACT FROM IDT ENTRY.
0049  37350 140001         ADA 1,I
0050  37351 170001         STA 1,I
0051  37352 044517         ADB .-7        RESTORE IDT POINTER.
0052  37353 060033         LDA PURPP      BUMP PATCH POINTER.
0053  37354 002004         INA
0054  37355 027321         JMP PURX1
0055*
0056  37356 160071  PURX2  LDA IDTRA,I    WRITE BACK IDT
```

```
0057  37357 064424          LDB LIBD
0058  37360 016625          JSB DISCL
0059*
0060  37361 060204          LDA ADLEN      READ IN ADT.
0061  37362 070065          STA WORD
0062  37363 060203          LDA ADLOC
0063  37364 064425          LDB LIBDI
0064  37365 016625          JSB DISCL
0065*
0066  37366 060022  PURX3 LDA PURP        IS PATCH TABLE EMPTY?
0067  37367 050326          CPA USEND
0068  37370 027530          JMP PURX4      YES--GO WRITE ADT.
0069  37371 034022          ISZ PURP       PURP=>DISC ADR OF PATCH.
0070  37372 064424          LDB LIBD       SEARCH ADT FOR AN ENTRY BEYOND
0071  37373          PUR.1 EQU *
0072  37373 160001          LDA 1,I      STANDARD ADT TABLE SEARCH      [X]
0073  37374 011072          AND DHMSK                                    X]
0074  37375 070036          STA LTEMP+14                                 X]
0075  37376 160022          LDA PURP,I
0076  37377 011072          AND DHMSK                                     X]
0077  37400 050036          CPA LTEMP+14                                  X]
0078  37401 027404          JMP PUR.2                                     X]
0079  37402 044530          ADB .+2                                       X]
0080  37403 027373          JMP PUR.1                                    X]
0081  37404 160001  PUR.2 LDA 1,I                                       X]
0082  37405 003104          CMA,CLE,INA                                  X]
0083  37406 140022          ADA PURP,I                                   X]
0084  37407 044530          ADB .+2
0085  37410 002041          SEZ,RSS                                      X]
0086  37411 027417          JMP PUR.3                                    X]
0087  37412 160001          LDA 1,I                                      X]
0088  37413 011072          AND DHMSK                                    X]
0089  37414 050036          CPA LTEMP+14                                 X]
0090  37415 027404          JMP PUR.2                                    X]
0091  37416 044530          ADB .+2                                (L)
0092  37417          PUR.3 EQU *                                         X]
0093*
0094* TRY  TO  MERGE WITH NEXT ENTRY
0095*
0096  37417 034022          ISZ PURP
0097  37420 140022          ADA PURP,I
0098  37421 002002          SZA
0099  37422 027463          JMP PURX6      CAN'T DO IT.
0100  37423 044525          ADB .-1        COMBINE
0101  37424 160001          LDA 1,I         LENGTHS
0102  37425 140022          ADA PURP,I
0103  37426 170001          STA 1,I
0104  37427 044525          ADB .-1
0105  37430 003400          CCA
0106  37431 040022          ADA PURP
0107  37432 070022          STA PURP
0108  37433 160022          LDA PURP,I
0109  37434 170001          STA 1,I
0110  37435 003004          CMA,INA        TRY TO COMINE 2 ADJACENT
0111  37436 044524          ADB .-2         ENTRIES.
0112  37437 140001          ADA 1,I
```

```
0113  37440 006004          INB
0114  37441 140001          ADA 1,I
0115  37442 002002          SZA
0116  37443 027520          JMP PURX9      CAN'T COMBINE ENTRIES
0117  37444 044530          ADB .+2
0118  37445 160001          LDA 1,I        GET LENGTH OF 2ND ENTRY.
0119  37446 044524          ADB .-2
0120  37447 140001          ADA 1,I        ADD TO
0121  37450 170001          STA 1,I         LENGTH OF 1ST.
0122  37451 006004          INB            SMDE
0123  37452 074044          STB MOVED       TOGETHER.
0124  37453 044530          ADB .+2
0125  37454 074043          STB MOVES
0126  37455 044432          ADB MLIBD
0127  37456 044204          ADB ADLEN
0128  37457 016352          JSB MOVEW
0129  37460 034204  PRX10    ISZ ADLEN      ADJUST
0130  37461 034204          ISZ ADLEN       ADLEN.
0131  37462 027520          JMP PURX9
0132  37463 003400  PURX6    CCA            CAN WE MERGE WITH PREVIOUS ENTRY
0133  37464 040022          ADA PURP
0134  37465 070022          STA PURP
0135  37466 044522          ADB .-4
0136  37467 160001          LDA 1,I
0137  37470 006004          INB
0138  37471 140001          ADA 1,I
0139  37472 150022          CPA PURP,I
0140  37473 027523          JMP PURX8      YES--GO DO IT.
0141*
0142* HAVE TO CREATE A NEW ENTRY. FIRST TEST TO SEE IF
0143* THERE IS ROOM TO EXPAND THE ADT.
0144*
0145  37474 060204          LDA ADLEN
0146  37475 040524          ADA .-2
0147  37476 070204          STA ADLEN
0148  37477 040332          ADA P3072                                      X]
0149  37500 002020          SSA
0150  37501 027460          JMP PRX10      NOT ENOUGH--FORGET IT.
0151  37502 060204          LDA ADLEN      SLIDE
0152  37503 003000          CMA             DOWN.
0153  37504 040424          ADA LIBD
0154  37505 070044          STA MOVED
0155  37506 040524          ADA .-2
0156  37507 070043          STA MOVES
0157  37510 003004          CMA,INA
0158  37511 044000          ADB 0
0159  37512 016633          JSB MOVEB
0160  37513 034043          ISZ MOVES      INSERT NEW ENTRY
0161  37514 104200          DLD PURP,I
0162  37516 104400          DST MOVES,I
0163  37520 034022  PURX9    ISZ PURP       ADJUST PURP &
0164  37521 034022          ISZ PURP        LOOP/
0165  37522 027366          JMP PURX3
0166*
0167  37523 034022  PURX8    ISZ PURP       MERGE NEW ENTRY WITH PREVIOUS
0168  37524 160022          LDA PURP,I
```

```
0169   37525 140001          ADA 1,I
0170   37526 170001          STA 1,I
0171   37527 027521          JMP PURX9+1
0172*
0173*
0174   37530 104200  PURX4   DLD PURM        RESTORE MOVES AND MOVED.
0175   37532 070044          STA MOVED
0176   37533 074043          STB MOVES
0177   37534 060204          LDA ADLEN       WITE ADT BACK.
0178   37535 070065          STA WORD
0179   37536 060203          LDA ADLOC
0180   37537 064424          LDB LIBD
0181   37540 016625          JSB DISCL
0182   37541 060446          LDA M3072       COMPUTE NEW VALUE
0183   37542 064446          LDB M3072         FOR PURID
0184   37543 007004          CMB,INB
0185   37544 044204          ADB ADLEN
0186   37545 006020          SSB
0187   37546 060204          LDA ADLEN
0188   37547 040432          ADA MLIBD
0189   37550 040522          ADA .-4
0190   37551 070031          STA PURID
0191   37552 027655          JMP PURXF
0192   37553         $$PUR   EQU *           (MUST BE <= PURXF)
0193*
0194   00020                 ORG LTEMP
0195   00020 000000  PURDT   BSS 1
0196   00021 000000  PURN    BSS 1
0197   00022 000000  PURP    BSS 1
0198   00023 000000  PURI    BSS 1
0199   00024 000000  PURDD   BSS 1
0200   00025 000000  PURD    BSS 1
0201   00026 000000  PURT    BSS 3
0202   00031 000000  PURID   BSS 1
0203   00032 000000  PURW    BSS 1
0204   00033 000000  PURPP   BSS 1
0205   00034 000000  PURM    BSS 2
```

```
0207*
0208*      THE PHONES COMMAND INFORMS THE SYSTEM
0209*      OF THE PRESENCE OF A PHONES CONTROL
0210*      BOARD.  IT ALSO SETS THE TIME ALLOWED FOR LOGGING ON.
0211*


0213  37300                ORG LIBRA
0214  37300 002400         CLA             SET INITIAL
0215  37301 070020  PH01   STA LTEMP          TIME TO ZERO
0216  37302 040451         ADA M256        TOO BIG?
0217  37303 002021         SSA,RSS
0218  37304 026656         JMP LFRER       YES
0219  37305 016330         JSB T35CQ       GET CHARACTER
0220  37306 027323         JMP PH02        NO MORE
0221  37307 040462         ADA M72B        DIGIT?
0222  37310 002021         SSA,RSS
0223  37311 026656        JMP LFRER      NO
0224  37312 040540         ADA .+10
0225  37313 002020         SSA
0226  37314 026656         JMP LFRER
0227  37315 064020         LDB LTEMP       YES - MULTIPLY
0228  37316 005020         BLS,BLS         OLD VALUE
0229  37317 044020         ADB LTEMP           BY 10
0230  37320 005000         BLS
0231  37321 040001         ADA 1           ADD IN NEW
0232  37322 027301         JMP PH01          DIGIT
0233*
0234  37323 060020  PH02   LDA LTEMP       CHECK VALUE
0235  37324 002003         SZA,RSS
0236  37325 026656         JMP LFRER       INVALID
0237  37326 006400         CLB
0238  37327 003004         CMA,INA         SET COUNTER FOR
0239  37330 070207         STA PHR           TENTHS OF SECONDS
0240  37331 026647         JMP LEND        TERMINATE
0241*
0242  37332          $PH0  EQU *
```

```
37300                 ORG LIBRA                                    X]
*                                                   X]
*                                                   X]
37300 114341          JSB T35CH,I  GET A CHAR                      X]
37301 026656          JMP LFRER    NONE LEFT                       X]
37302 001727          ALF,ALF      MOVE UP                         X]
37303 070026          STA SDIS1     AND SAVE                         [
37304 114341          JSB T35CH,I  GET NEXT CHAR                   X]
37305 026656          JMP LFRER    NONE LEFT                       X]
37306 030026          IOR SDIS1     FORM WORD                        [
37307 053600          CPA ASCDN    DOWN?                           X]
37310 027314          JMP DIS11     YES.
37311 053601          CPA ASCUP    UP?                             X]
37312 002001          RSS
37313 026656          JMP LFRER    NO - ILLEGAL                    X]
*                                                   X]
*     DISC,DN,#                                     X]
*                                                   X]
*                                                   X]
37314 073602  DIS11   STA UPDN      SAVE "UP" OR "DN".
*
*  GET SUBCHANNEL AND FORM DISC ADDRESS
*
37315 114341          JSB T35CH,I    GET NEXT CHAR.
37316 027637          JMP SUBER     CR.
37317 050602          CPA .+54B     COMMA?
37320 002001          RSS
37321 027637          JMP SUBER     NO.
37322 114341          JSB T35CH,I   YES. NEXT CHAR.
37323 027637          JMP SUBER     CR.
37324 040462          ADA M72B      TEST FOR DIGIT.
37325 002021          SSA,RSS
37326 027637          JMP SUBER     NOT A DIGIT.
37327 040540          ADA .+10
37330 002020          SSA
37331 027637          JMP SUBER     NOT A DIGIT.
37332 064000          LDB A
37333 044522          ADB .-4       TEST FOR TOO BIG.
37334 006020          SSB
37335 002003          SZA,RSS
37336 027637          JMP SUBER     IT IS TOO BIG OR =0.
37337 064000          LDB A         COMPUTE DISC
37340 004065          CLE,ERB         ADDRESS FOR THIS
37341 005300          RBR               SUBCHANNEL.
37342 002041          SEZ,RSS
37343 044615          ADB B100
37344 070024          STA SCHAN    SAVE SUBCHANNEL                 X]
37345 074025          STB SDISC    SAVE DISC ADDRESS               X]
37346 063602          LDA UPDN
37347 053601          CPA ASCUP     UP?
37350 027543          JMP UP        YES.
37351 060024          LDA SCHAN     NO. DOWN!
37352 100200          MPY .+14     MULTIPLY IT BY 14               X]
37354 040334          ADA DIRD0    ADD DIRECTORY ADR TO IT          X
37355 164000          LDB A,I       IF TRACK 1 LENGTH=0, THEN
37356 006003          SZB,RSS
```

```
0300  37357 027554          JMP DIS10       ALREADY DOWN.
0301  37360 070020          STA LTEMP      SAVE POINTER.
0302  37361 060521          LDA .-5        READ
0303  37362 070065          STA WORD
0304  37363 060025          LDA SDISC
0305  37364 064425          LDB LIBDI
0306  37365 016625          JSB DISCL        LABEL.
0307  37366 164424          LDB LIBD,I     GET USER DISC FLAG.
0308  37367 006021          SSB,RSS        IF=0, OUTPUT ERROR MESSAGE.
0309  37370 027657          JMP DIS12
0310  37371 060020          LDA LTEMP      IF=1, RESTORE POINTER.
0311  37372 064510          LDB .-14       SET COUNTER TO 14                X
0312  37373 077672          STB DCNT       SAVE COUNTER                     X
0313  37374 164000          LDB 0,I        LOAD TRACK 1 LENGTH              X
0314  37375 077673          STB DT1L       SAVE TRACK 1 LENGTH              X
0315  37376 040535          ADA .+7        ADD 7 TO ADDRESS                 X
0316  37377 164000          LDB 0,I        LOAD TRACK 2 LENGTH              X
0317  37400 077674          STB DT2L       SAVE IT                          X
0318  37401 040517          ADA .-7        RESTORE TRACK 1 ADDRESS          X
0319  37402 070020          STA LTEMP       SAVE ADDRESS
0320  37403 060453          LDA M128        INPUT
0321  37404 070065          STA WORD          FUSS
0322  37405 160331          LDA FUSS,I          TABLE
0323  37406 064425          LDB LIBDI
0324  37407 016625          JSB DISCL
0325  37410 064424          LDB LIBD        SEE IF ANY
0326  37411          DIS.9  EQU *
0327  37411 160001          LDA 1,I           BUSY FILES
0328  37412 002003          SZA,RSS        IF NO FILE THEN SKIP
0329  37413 027417          JMP DIS.8
0330  37414 011072          AND DHMSK            ON THIS
0331  37415 050025          CPA SDISC              DISC
0332  37416 027557          JMP DIS.7       YES
0333  37417          DIS.8  EQU *
0334  37417 044530          ADB .+2         NEXT ONE
0335  37420 054330          CPB L128
0336  37421 002001          RSS
0337  37422 027411          JMP DIS.9
0338  37423 060020          LDA LTEMP
0339  37424 006400          CLB            SET 14 WORDS TO 0                X
0340  37425 174000          STB A,I        THIS CLEARS THE DIRECTORY        X
0341  37426 002004          INA            FOR THIS DISC                    X
0342  37427 037672          ISZ DCNT                                        X
0343  37430 027425          JMP *-3                                         X
0344*                                                                       X
0345*     THE DIRECTORY HAS BEEN CLEARED.                                   X
0346*     NOW GET THE SYSTEM ADT TABLE AND DELETE THOSE PORTIONS WHICH
0347*     REFER TO THE DOWNED DISC.  SAVE THOSE PROTIONS A ON THE
0348*     DOWNED DISC                                                      X]
0349*                                                                      X]
0350*                                                                      X]
0351  37431 060204          LDA ADLEN      READ THE SYSTEM ADT              X]
0352  37432 070065          STA WORD       SYSTEM ADT LENGTH                X]
0353  37433 060203          LDA ADLOC      DISC ADDRESS                     X]
0354  37434 064425          LDB LIBDI      CORE ADDRESS FOR INPUT           X]
0355  37435 016625          JSB DISCL      LOAD THE ADT                     X]
```

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0356*                                                          X]
0357*                                                          X]
0358  37436 064424          LDB LIBD      LOAD POINTER TO ADT CORE ADDRESS
0359  37437 160001  DIS.2    LDA B,I       LOAD ADT ENTRY                 X]
0360  37440 011072          AND DHMSK     GET DISC AND HEAD              X]
0361  37441 050025          CPA SDISC     RIGHT DISC?                    X]
0362  37442 027445          JMP DIS.1     YES                            X]
0363  37443 044530          ADB .+2       NO  GET NEXT ENTRY             X]
0364  37444 027437          JMP DIS.2                                    X]
0365  37445 074027  DIS.1    STB DADT      SAVE POINTER TO ADT BLACK FOR TH
0366  37446 060524          LDA .-2       SET WORD COUNT=-2              X]
0367  37447 073672  DIS.4    STA DCNT                                     X]
0368  37450 044530          ADB .+2       GO TO NEXT ENTRY               X]
0369  37451 160001          LDA 1,I       LOAD IT                        X]
0370  37452 050525          CPA .-1        IF IT SI PSEUDO ENTRY,
0371  37453 027463          JMP DIS.3        WE FOUND THE END.
0372  37454 011072          AND DHMSK     IS IT THE                      X]
0373  37455 050025          CPA SDISC     RIGHT SUBCHAN?                 X]
0374  37456 002001          RSS           YES                            X]
0375  37457 027463          JMP DIS.3     NO - WE HAVE FOUND THE END     X]
0376  37460 063672          LDA DCNT      UPDATE WORD COUNT              X]
0377  37461 040524          ADA .-2       FOR THE ADT BLOCK              X]
0378  37462 027447          JMP DIS.4                                    X]
0379*                                                             X]
0380*     WE KNOW HOW LONG THE ADT FOR THIS DISC IS, X]
0381*     SO SAVE IT, AND OUTPUT IT TO TRACK 0 SECTOR 1
0382*     ALSO OUTPUT THE DIRECTORY TRACK LENGTHS TO THAT SECTOR
0383*                                                             X]
0384*                                                             X]
0385  37463 060523  DIS.3    LDA .-3                                      X]
0386  37464 070065          STA WORD      WORD COUNT IS -3               X]
0387  37465 067675          LDB DTAB      DEF DCNT                       X]
0388  37466 060025          LDA SDISC     FORM DISC ADDRESS              X]
0389  37467 002004          INA           SECTOR IS 1                    X]
0390  37470 016625          JSB DISCL     OUTPUT IT                      X]
0391*                                                             X]
0392*                                                             X]
0393  37471 064027          LDB DADT      LOAD ADT CORE ADDRESS          X]
0394  37472 063672          LDA DCNT      LOAD WORD COUNT FOR THE BLOCK  X]
0395  37473 070065          STA WORD                                     X]
0396  37474 060025          LDA SDISC     FORM DISC ADDRESS              X]
0397  37475 040530          ADA .+2       START IN SECOTR 2              X]
0398  37476 016625          JSB DISCL     OUTPUT ADT BLOCK TO DISC       X]
0399*                                                             X]
0400*     THE DISC HAS BEEN SAVED.  NOW UPDATE SYSTEM ADT
0401*                                                             X]
0402  37477 060424          LDA LIBD      COMPUTE THE LENGTH             X]
0403  37500 003004          CMA,INA       OF THE LAST SECTION            X]
0404  37501 040204          ADA ADLEN     OF THE ADT TABLE               X]
0405  37502 040027          ADA DADT      THIS SECTION MUST              X]
0406  37503 067672          LDB DCNT      LOAD COUNT                     X]
0407  37504 007004          CMB,INB       MAKE IT +                      X]
0408  37505 044000          ADB 0         COMPUTE LENGTH                 X]
0409*                                                             X]
0410  37506 006003          SZB,RSS       TEST IF ANY TO MOVE            X]
0411  37507 027552          JMP DIS.5     NO                             X]
```

```
0412  37510 060027         LDA DADT     SET DEST. ADDRESS                X]
0413  37511 070044         STA MOVED    FOR MOVE WORD SUBOUTINE          X]
0414  37512 063672         LDA DCNT     COMPUT START ADDRESS             X]
0415  37513 003004         CMA,INA      FROM POSITIVE BLACK COUNT        X]
0416  37514 040027         ADA DADT     AND BLOCK ADDRESS                X]
0417  37515 070043         STA MOVES                                     X]
0418  37516 016352         JSB MOVEW    MOVE WORDS DOWN                  X]
0419  37517 063672         LDA DCNT     COMPUT THE NEW                   X]
0420  37520 003004         CMA,INA      ADT LENGTH                       X]
0421  37521 040204         ADA ADLEN                                     X]
0422  37522 070204         STA ADLEN                                     X]
0423  37523 070065  DIS.6  STA WORD                                      X]
0424  37524 060203         LDA ADLOC    TO THE SYSTEM                    X]
0425  37525 064424         LDB LIBD     DISC                             X]
0426  37526 016625         JSB DISCL                                     X]
0427*
0428  37527 060521         LDA .-5       READ
0429  37530 070065         STA WORD
0430  37531 060025         LDA SDISC
0431  37532 064425         LDB LIBDI
0432  37533 016625         JSB DISCL       LABEL.
0433  37534 064424         LDB LIBD     SET USER DISC
0434  37535 160001         LDA B,I        FLAG TO 0.
0435  37536 001665         ELA,CLE,ERA
0436  37537 170001         STA B,I
0437  37540 060025         LDA SDISC    WRITE
0438  37541 016625         JSB DISCL      LABEL BACK OUT.
0439*
0440*                                                        X]
0441*     EVERYTHING HAS BEEN UPDATED                        X]
0442  37542 026647         JMP LEND     ALL DONE
0443*
0444  37543 063603  UP     LDA UPLEN    LOAD "DISC-UP" ROUTINE.
0445  37544 070065         STA WORD
0446  37545 060262         LDA LIB
0447  37546 002004         INA
0448  37547 160000         LDA A,I
0449  37550 064317         LDB #LIBI
0450  37551 027676         JMP DIS13
0451*
0452*                                                        X]
0453  37552 060204  DIS.5  LDA ADLEN                                    X]
0454  37553 027523         JMP DIS.6                                     X]
0455*                                                        X]
0456  37554 063562  DIS10  LDA DISAD     OUTPUT
0457  37555 064520         LDB .-6        "ALREADY DOWN"
0458  37556 027641         JMP DMES         MESSAGE.
0459*
0460  37557 063571  DIS.7  LDA DISFB     OUTPUT
0461  37560 064520         LDB .-6      BUSY FILES
0462  37561 027641         JMP DMES         MESSAGE
0463*
0464  37562 037563  DISAD   DEF *+1
0465  37563 005101         OCT 5101     LF-A
0466  37564 046122         ASC 5,LREADY DN!
0467  37571 037572  DISFB   DEF *+1
```

```
0468  37572 005102         OCT 5102
0469  37573 052523         ASC 5,USY FILES
0470  37600 042116  ASCDN  ASC 1,DN
0471  37601 052520  ASCUP  ASC 1,UP
0472  37602 000000  UPDN   BSS 1
0473  37603 177443  UPLEN  ABS LIBRA-$UP
```

```
0476  37637                ORG 37637B


0478*                                                          X]
0479*     SUBCHANNEL IS TOO BIG                                X]
0480*                                                          X]
0481  37637 063663  SUBER LDA DISR                                    X]
0482  37640 064520        LDB .-6       OUTPUT ERROR MESSAGE.
0483*                                                          X]
0484  37641 070043  DMES  STA MOVES     SET SOURCE                    X]
0485  37642 060413        LDA T35B1     SET DESTINATION               X]
0486  37643 070044        STA MOVED                                   X]
0487  37644 077662        STB DMESL     SAVE LENGTH                   X]
0488  37645 016352        JSB MOVEW     MOVE TO TTY35 BUF             X]
0489  37646 063662        LDA DMESL                                   X]
0490  37647 001000        ALS                                         X]
0491  37650 003004        CMA,INA                                     X]
0492  37651 103100        CLF 0
0493  37652 006400        CLB
0494  37653 074262        STB LIB
0495  37654 064413        LDB T35B1
0496  37655 102100        STF 0
0497  37656 026651        JMP LEND2     OUTPUT THE MESSAGE.
0498*
0499  37657 063255  DIS12 LDA ILL       OUTPUT "ILL. DISC"
0500  37660 064521        LDB .-5         MESSAGE.
0501  37661 027641        JMP DMES
0502*
0503  37662 000000  DMESL NOP                                       X]
0504  37663 037664  DISR  DEF *+1                                   X]
0505  37664 005123        OCT 5123      LF-S
0506  37665 052502        ASC 5,UBCH ERROR
0507  37672 000000  DCNT  NOP                                 [X]
0508  37673 000000  DT1L  NOP                                 [X]
0509  37674 000000  DT2L  NOP                                 [X]
0510  37675 037672  DTAB DEF DCNT                             [X]
0511  00024         SCHAN EQU LTEMP+4                         [X]
0512  00025         SDISC EQU LTEMP+5                         [X]
0513  00026         SDIS1 EQU LTEMP+6                         [X]
0514  00027         DADT EQU LTEMP+7                          [X]
0515*
0516  37676               ORG LIBRA+254
0517  37676 016625  DIS13 JSB DISCL     LOAD OVERLAY.
0518  37677 027300        JMP LIBRA     START UP OVERLAY.
0519*
0520  37700         $DN    EQU *                                      [X]
```

```
0002  37300                ORG LIBRA                                    X]
0003*                                                                   X]
0004*     BRING A NEW DISC UP                                           X]
0005*                                                                   X]
0006*     DISC-UP,#                                                     X]
0007*                                                                   X]
0008  37300 060024          LDA SCHAN      GET SUBCHANNEL
0009  37301 064025          LDB SDISC        AND DISC ADDRESS.
0010  37302 006400          CLB
0011  37303 100200          MPY .+14       COMPUTE
0012  37305 040334          ADA DIRD0        DIRECTORY
0013  37306 164000          LDB 0,I            ADDRESS (B.P.)
0014  37307 006002          SZB
0015  37310 027556          JMP UP.1       ALREADY UP
0016  37311 103100          CLF 0
0017  37312 160401          LDA DCLC1,I    SAVE "BLOCK/UNBLOCK" WORD
0018  37313 073634          STA UBLK         IN SCHEDULER.
0019  37314 174401          STB DCLC1,I    BLOCK CLOCK.
0020  37315 075135          STB STATS      CLEAR STATUS STORAGE WORD.
0021  37316 167264          LDB PLDR5,I    REPLACE "HALT" IN
0022  37317 177263          STB PLDR2,I      DISC DRIVER.
0023  37320 060025          LDA SDISC
0024  37321 064521          LDB .-5
0025  37322 074065          STB WORD           VALID
0026  37323 064425          LDB LIBDI            USER
0027  37324 016625          JSB DISCL              DISC?
0028  37325 103100          CLF 0
0029  37326 063634          LDA UBLK       RESTORE "BLOCK/UNBLOCK" WORD
0030  37327 170401          STA DCLC1,I      IN SCHEDULER.
0031  37330 102100          STF 0
0032  37331 061135          LDA STATS      GET DISC STATUS.
0033  37332 000010          SLA            ANY ERRORS?
0034  37333 027554          JMP DUP.9
0035*
0036  37334 064424          LDB LIBD       NO.
0037  37335 006004          INB
0038  37336 160001          LDA 1,I
0039  37337 053633          CPA TS               IS IT A USER DISC
0040  37340 002001          RSS
0041  37341 027561          JMP DUP.5            NO
0042  37342 060523          LDA .-3        SET COUNTER
0043  37343 070020          STA LTEMP        FOR 3 WORDS
0044  37344 006004          INB
0045  37345 160001  DUP10   LDA B,I        LOAD LABEL WORD.
0046  37346 153632          CPA DUSYA,I    CHECK IF
0047  37347 002001          RSS              SYSTEM DISC
0048  37350 027356          JMP DUP11      NOT SYSTEM DISC.
0049  37351 006004          INB            NEXT
0050  37352 037632          ISZ DUSYA        WORD
0051  37353 034020          ISZ LTEMP      DONE?
0052  37354 027345          JMP DUP10      NO.
0053  37355 027561          JMP DUP.5      SYSTEM DISC - INVALID
0054  37356 064424  DUP11   LDB LIBD
0055  37357 160001          LDA B,I        GET USER DISC FLAG.
0056  37360 002020          SSA            IF=1, OUTPUT ERROR MESSAGE.
0057  37361 027657          JMP DIS12      IF=0, CHECK IF SYSTEM
```

```
0058  37362 050306          CPA SYSID              ID = DISC ID
0059  37363 002001          RSS
0060  37364 027564          JMP DUP.6          NO
0061  37365           DUP.7 EQU *
0062  37365 060025          LDA SDISC
0063  37366 002004          INA
0064  37367 064523          LDB .-3        READ 3 WORDS                    X]
0065  37370 074065          STB WORD       FROM THE DISC                   X]
0066  37371 067250          LDB DTABI                                      X]
0067  37372 016625          JSB DISCL                                      X]
0068*                                                        X]
0069*       THE ADT LENGTH AND THE DIRECTORY TRACK LENGTHS ARE
0070*       NOW IN CORE AT DCNT, DTIL & DT2L                 X]
0071*                                                        X]
0072*       NOW READ THE SYSTEM DISC INTO CORE               X]
0073*       AND FIND WHERE TO INSERT THE NEW ADT.            X]
0074*                                                        X]
0075  37373 060204          LDA ADLEN            CHECK
0076  37374 043672          ADA DCNT               IF
0077  37375 040332          ADA P3072                ENOUGH
0078  37376 002020          SSA                        ROOM
0079  37377 027403          JMP DUP.1
0080  37400 040332          ADA P3072      CHECK IF TOO BIG                X]
0081  37401 002021          SSA,RSS
0082  37402 027406          JMP DUP.4       OK.
0083  37403 003004    DUP.1 CMA,INA         TOO BIG.
0084  37404 043672          ADA DCNT
0085  37405 073672          STA DCNT
0086*                                                        X]
0087*                                                        X]
0088  37406 060204    DUP.4 LDA ADLEN      READ THE SYSTEM ADT              X]
0089  37407 070065          STA WORD       INTO USER CORE                  X]
0090  37410 060203          LDA ADLOC                                      X]
0091  37411 064425          LDB LIBDI                                      X]
0092  37412 016625          JSB DISCL                                      X]
0093*                                                        X]
0094  37413 060024          LDA SCHAN      COMPUTE DISC ADDRESS            X]
0095  37414 002004          INA            THAT FOLLOWS THE                X]
0096  37415 000065          CLE,ERA        NEW DISC ADDRESS                X]
0097  37416 001300          RAR
0098  37417 002041          SEZ,RSS                                        X]
0099  37420 030615          IOR B100
0100  37421 070026          STA SDIS1                                      X]
0101*                                                        X]
0102  37422 064424          LDB LIBD       SET POIKNTER TO START OF ADT    X]
0103  37423 160001    DUP.3 LDA 1,I        LOAD ADT ENTRY                  X]
0104  37424 050525          CPA .-1        LAST ONE?
0105  37425 027433          JMP DUP.2       YES
0106  37426 011072          AND DHMSK      GET DISC ADDRESS                X]
0107  37427 050026          CPA SDIS1      RIGHT ONE?                      X]
0108  37430 027433          JMP DUP.2      YES                             X]
0109  37431 044530          ADB .+2        NEXT ENTRY                      X]
0110  37432 027423          JMP DUP.3                                      X]
0111  37433 074027    DUP.2 STB DADT       SAVE IT                         X]
0112  37434 064204          LDB ADLEN      LOAD LENGTH                     X]
0113  37435 007000          CMB            AND COMPUTE                     X]

0167  37511 044627          ADB B200       SET TO TRACK 2
```

```
0114  37436 044424        ADB LIBD     END OF CURRENT ADT              X]
0115*                                                                  X]
0116  37437 074043        STB MOVES    SET SOURCE ADDRESS              X]
0117  37440 067672        LDB DCNT     LOAD COUNT OF NEW SPACE         X]
0118  37441 007004        CMB,INB      MAKE IT +                       X]
0119  37442 044043        ADB MOVES    COMPUTE FINAL ADDRESS           X]
0120  37443 074044        STB MOVED    SET DESTINATION ADDRESS         X]
0121  37444 064043        LDB MOVES    COMPUTE THE NUMBER              X]
0122  37445 007000        CMB          OF WORDS TO MOVE                X]
0123  37446 044027        ADB DADT                                     X]
0124  37447 016633        JSB MOVEB    SEPARATE THE ADT TABLE          X]
0125*                                                                  X]
0126*                                                                  X]
0127  37450 063672        LDA DCNT     READ NEW ADT                    X]
0128  37451 070065        STA WORD     INTO POSTION                    X]
0129  37452 060027        LDA DADT     LOAD CORE ADDRESS               X]
0130  37453 031163        IOR BIT15    SET FOR INPUT                   X]
0131  37454 070001        STA 1        SAVE IN B                       X]
0132  37455 060025        LDA SDISC    LOAD AND FORM DISC ADDRESS      X]
0133  37456 040530        ADA .+2                                      X]
0134  37457 016625        JSB DISCL    LOAD IN NEW ADT                 X]
0135  37460 160027        LDA DADT,I     LOAD FIRST TRACK ENTRY
0136  37461 011072        AND DHMSK      CHECK IF RIGHT DISC
0137  37462 050025        CPA SDISC
0138  37463 002001        RSS
0139  37464 027637        JMP SUBER
0140*                                                                  X]
0141*     THE NEW SYSTEM ADT SHOULD NOW BE IN CORE                     X]
0142*                                                                  X]
0143  37465 060204        LDA ADLEN    UPDATE WORD COUNT               X]
0144  37466 043672        ADA DCNT     FOR THE ADT                     X]
0145  37467 070204        STA ADLEN                                    X]
0146  37470 070065        STA WORD     WRITE THE NEW SYSTEM ADT        X]
0147  37471 060203        LDA ADLOC    TO THE SYSTEM DISC              X]
0148  37472 064424        LDB LIBD                                     X]
0149  37473 016625        JSB DISCL                                    X]
0150*                                                                  X]
0151*     ADT TABLE HAS BEEN UPDATED                                   X]
0152*     NOW WE UPDATE THE BASE PAGE DIRECTORY                        X]
0153*                                                                  X]
0154  37474 060024        LDA SCHAN    MULTIPLY SUBCHANNEL BY 14       X]
0155  37475 100200        MPY .+14                                     X]
0156  37477 040334        ADA DIRD0    ADD DIREC. BP ADDRESS           X]
0157  37500 067673        LDB DT1L     SET DIRECTORY TRACK LENGTH      X]
0158  37501 174000        STB 0,I                                      X]
0159  37502 040535        ADA .+7      LOAD AND SET                    X]
0160  37503 067674        LDB DT2L     2ND DIREC TRACK                 X]
0161  37504 174000        STB 0,I      LENGTH                          X]
0162*                                                                  X]
0163  37505 064025        LDB SDISC    LOAD DISC ADDRESS               X]
0164  37506 044627        ADB B200     SET TO TRACK 1 SECTOR 0
0165  37507 040525        ADA .-1      SET DIRECT TRACK 1              X]
0166  37510 174000        STB 0,I      DISC ADDRESS                    X]
0167  37511 044627        ADB B200     SET TO TRACK 2
0168  37512 040535        ADA .+7      DISC ADDRESS                    X]
0169  37513 174000        STB 0,I                                      X]
```

```
*                                                          X]
37514 040512          ADA .-12      SET CORE ADDRESS                X]
37515 031163          IOR BIT15     TO DIRECT ENTRY 1               X]
37516 070026          STA SDIS1     SAVE IT                         X]
37517 064522          LDB .-4       SET WORD COUNT TO -4            X]
37520 074065          STB WORD                                      X]
37521 060025          LDA SDISC     GET DISC ADR                    X]
37522 040627          ADA B200        AND SET IT
37523 064026          LDB SDIS1     LOAD CORE ADDRESS               X]
37524 016625          JSB DISCL     READ FORST DIRECT TRACK         X]
*                                                          X]
37525 064522          LDB .-4                                       X]
37526 074065          STB WORD                                      X]
37527 060025          LDA SDISC     GET DISC ADDRESS                X]
37530 040627          ADA B200      FOR SECOND TRACK                X]
37531 040627          ADA B200
37532 064026          LDB SDIS1                                     X]
37533 044535          ADB .+7                                       X]
37534 016625          JSB DISCL     READ IT IN                      X]
*                                                          X]
*     DIRECTORY HAS BEEN UPDATED                           X]
*                                                          X]
37535 060521          LDA .-5        READ
37536 070065          STA WORD
37537 060025          LDA SDISC
37540 064425          LDB LIBDI
37541 016625          JSB DISCL        LABEL.
37542 064424          LDB LIBD       SET USER DISC FLAG=1.
37543 160001          LDA B,I
37544 031163          IOR BIT15
37545 170001          STA B,I
37546 060025          LDA SDISC
37547 016625          JSB DISCL      WRITE LABEL BACK OUT.
*
37550 002400          CLA            CLEAR SYSTEM INHIBIT.
37551 103100          CLF 0
37552 070262          STA LIB        CLEAR LIB INDICATOR
37553 026647          JMP LEND       ALL DONE.
*
37554 063623  DUP.9   LDA PNRDY      OUTPUT "ALREADY UP"
37555 002001          RSS              MESSAGE.
37556 063614  UP.1    LDA UPALR      OUTPUT
37557 064520          LDB .-6          "ALREADY UP"
37560 027641          JMP DMES           MESSAGE.
*
37561 063253  DUP.5   LDA UPMS1
37562 064517          LDB .-7
37563 027641          JMP DMES
*
37564 063254  DUP.6   LDA UPMS2
37565 070043          STA MOVES
37566 060413          LDA T35B1
37567 070044          STA MOVED
37570 064510          LDB .-14
37571 016352          JSB MOVEW
37572 060562          LDA .+28
```

```
0226  37573 064413          LDB T35B1
0227  37574 114324          JSB TTY35,I
0228  37575 027365          JMP DUP.7
0229*
0230  37576 005127  UPAMS   OCT 5127       LF-W
0231  37577 040522          ASC 13,ARNING! DISC ID NOT SYS ID
0232  37614 037615  UPALR   DEF *+1
0233  37615 005101          OCT 5101       LF-A
0234  37616 046122          ASC 5,LREADY UP!
0235  37623 037624  PNRDY   DEF *+1
0236  37624 005104          OCT 5104       LF-D
0237  37625 044523          ASC 5,ISC ERROR
0238  37632 017762  DUSYA   DEF SYSAA
0239  37633 052123  TS      ASC 1,TS
0240  37634 000000  UBLK    NOP
0241  37635         $UP     EQU *                                          XJ
```

```
0243*
0244**  THIS OVERLAY IS LOADED INTO CORE WHEN SYSTEM IS BROUGHT UP.
0245*
0246  37300                 ORG LIBRA
0247  37300 002400          CLA             CLEAR
0248  37301 107700          CLC 0,C           ALL
0249  37302 034000          ISZ A               DEVICES.
0250  37303 027301          JMP *-2
0251  37304 060206          LDA NPORT       SET COUNTER TO
0252  37305 070256          STA TCNTR         NUMBER OF PORTS.
0253  37306 164357          LDB TTYTP,I     B=> START OF TTY TABLE.
0254  37307           TSB1  EQU *
0255  37307 074257          STB TPNTR       SAVE IN ADDRESS POINTER.
0256  37310 044535          ADB .+?TSTA     B=> ?TSTA
0257  37311 160001          LDA B,I         A= ?TSTA
0258  37312 011050          AND TPMSK       LEAVE ONLY THE TYPE
0259  37313 030527          IOR IOBT          BITS, SET THE IOBT BIT
0260  37314 170001          STA B,I             AND SAVE.
0261  37315 044533          ADB .+?RPRM-?TSTA  B=> ?RPRM
0262  37316 074260          STB TSPNT       SAVE ?RPRM POINTER.
0263  37317 160001          LDA B,I         OUTPUT ?RPRM
0264  37320 164257          LDB TPNTR,I
0265  37321 114355          JSB MUXR,I
0266  37322 034260          ISZ TSPNT       BUMP POINTER. POINTS TO ?SPRM
0267  37323 160260          LDA TSPNT,I     OUTPUT ?SPRM
0268  37324 164257          LDB TPNTR,I
0269  37325 114355          JSB MUXR,I
0270  37326 034260          ISZ TSPNT       BUMP POINTER. POINTS TO ?PPRM
0271  37327 160260          LDA TSPNT,I     OUTPUT ?PPRM
0272  37330 033402          IOR BB360
0273  37331 102616          OTA DSCB
0274  37332 064257          LDB TPNTR           BUMP POINTER TO NEXT
0275  37333 044563          ADB .+TTY01-TTY00     USER'S TABLE.
0276  37334 034256          ISZ TCNTR       BUMP COUNTER. DONE?
0277  37335 027307          JMP TSB1        NO.
0278*
0279  37336 060206          LDA NPORT       A= NUMBER OF PORTS
0280  37337 040546          ADA .+16          NOT INITIALIZED.
0281  37340 003007          CMA,INA,SZA,RSS   ANY PORTS LEFT?
0282  37341 027353          JMP TSB3        NO.
0283  37342 070256          STA TCNTR       YES. SET COUNTER.
0284  37343 044535          ADB .+?TSTA     B=> ?TSTA
0285  37344           TSB2  EQU *
0286  37344 160001          LDA B,I         SET
0287  37345 011050          AND TPMSK
0288  37346 030530          IOR NIBT          NIBT
0289  37347 170001          STA B,I             BIT.
0290  37350 044563          ADB .+TTY01-TTY00  BUMP POINTER TO NEXT USER.
0291  37351 034256          ISZ TCNTR       BUMP COUNTER. DONE?
0292  37352 027344          JMP TSB2        NO.
0293  37353           TSB3  EQU *
0294  37353 060042          LDA DATIM+1     INITIALIZE TIMES FOR
0295  37354 173400          STA SPT1A,I       PHONES LOGIC.
0296  37355 060041          LDA DATIM
0297  37356 173401          STA SPT2A,I
0298  37357 003400          CCA             READ
```

```
0299  37360 070065          STA WORD          SYSTEM
0300  37361 060615          LDA B100            ID
0301  37362 067377          LDB SYSDF             CODE.
0302  37363 114350          JSB DISC,I
0303  37364 060531          LDA .+3         START UP TBG
0304  37365 102617          OTA CLOCK         COUNTING IN
0305  37366 103717          STC CLOCK,C         100 MS UNITS.
0306  37367 103714          STC MPX,C       START UP MUX.
0307  37370 103716          STC DSCB,C      START UP PHONES.
0308  37371 106710          CLC ?SC         CLEAR CONSOLE.
0309  37372 060534          LDA .+6         OUTPUT "READY"
0310  37373 064342          LDB READY         ON
0311  37374 114324          JSB TTY35,I         SYSTEM CONSOLE.
0312  37375 127376          JMP TSCH1,I     EXIT TO SCHEDULER
0313*
0314*
0315  37376 034256  TSCH1 DEF SCH1
0316  37377 100306  SYSDF DEF SYSID,I
0317  37400 034421  SPT1A DEF SPT1
0318  37401 034422  SPT2A DEF SPT2
0319  37402 000360  BB360 OCT 360
0320  37403         $TSB  EQU *
```

```
0322*
0323*  THIS IS PART OF THE AUTO RESTART LOGIC WHICH IS
0324*  LOADED INTO THE OVERLAY SECTION.
0325*  THE FIRST PART OF THE CORE RESIDENT AUTO RESTART
0326*  LOGIC MUST HAVE BEEN EXECUTED BEFORE CONTROL CAN
0327*  COME TO THIS SECTION.
0328*
0329*
0330  37300                 ORG LIBRA
0331  37300 060533          LDA .+5         INITIALIZE J AS POWER FAIL
0332  37301 073527          STA POWJ        POINTER AND I AS DMA POINTER.
0333  37302 002004          INA
0334  37303 073526          STA POWI
0335  37304 060531          LDA .+3         RESET TBG FREQUENCY.
0336  37305 102617          OTA CLOCK
0337  37306 163560          LDA PPWFL,I     COPY FLAG WORDS.
0338  37307 073530          STA POWF
0339  37310 064417          LDB TBITS       IF CONSOLE FLAG WAS CLEAR, SET
0340  37311 010546          AND .+20B       UP CORRECT STATE OF CONSOLE
0341  37312 002003          SZA,RSS         OTHERWISE LEAVE IT SET IN
0342  37313 106610          OTB ?SC         INPUT STATE.
0343*
0344  37314 063530          LDA POWF        IF DMA FLAG WAS SET,
0345  37315 000010          SLA             SET IT.
0346  37316 102106          STF 6
0347*
0348*
0349*  NOW TEST THE DEVICE FLAGS. IF A FLAG WAS
0350*  CLEAR, EXECUTE A "CLF SC". IF IT WAS SET, TAKE
0351*  STRONGER ACTION.
0352*
0353  37317 063530  POW4 LDA POWF          GET FLAG WORD. THE ONE TO BE
0354  37320 001300        RAR               TESTED IS IN BIT 0 AND I= ITS
0355  37321 073530        STA POWF          SELECT CODE.
0356  37322 002020        SSA               WAS FLAG SET?
0357  37323 027335        JMP POW5          YES.
0358*
0359  37324 063526        LDA POWI          NO. BUILD "CLF SC" INSTRUCTION
0360  37325 043402        ADA CLF0
0361  37326 073327        STA *+1
0362  37327 000000        NOP                 AND EXECUTE IT.
0363  37330 063526  POW6  LDA POWI
0364  37331 050546        CPA .+20B         TESTING DONE?
0365  37332 027411        JMP POW14         YES.
0366  37333 037526        ISZ POWI          NO. BUMP I AND LOOP.
0367  37334 027317        JMP POW4
0368*
0369*  FLAG WAS SET. TEST IF DRIVER WAS ACTUALLY
0370*  ENTERED. IF SO, PERFORM A DUMMY INTERRUPT
0371*  TO PREVENT IT FROM BEING REENTERED.
0372*
0373*
0374*  DEVICE FLAG WAS SET. CHECK IF IT WAS PENDING.
0375*
0376  37335 067522  POW5  LDB POWTB       COMPUTE LOCATION OF RET. ADDR.
0377  37336 047527        ADB POWJ        OF HIGHEST PRIORITY DRIVER NOT
```

```
0378  37337 164001          LDB B,I       YET TESTED.
0379  37340 160001          LDA B,I       GET ITS RETURN ADDRESS.
0380  37341 073551          STA POWSV     SAVE TEMPORARILY.
0381  37342 067522          LDB POWTB
0382  37343 047526          ADB POWI      WAS DRIVER INTERRUPTED?
0383  37344 003000          CMA
0384  37345 140001          ADA B,I
0385  37346 002020          SSA
0386  37347 027365          JMP ADB11     MAY BE. DO MORE CHECKING.
0387  37350 063526          LDA POWI      MIGHT IF CHECKING ON MUX(DATA).
0388  37351 050014          CPA MPX       DOES "I" POINT TO MUX(DATA)?
0389  37352 002001          RSS
0390  37353 027330          JMP POW6      NO. INTERRUPT WAS PENDING!
0391  37354 063551          LDA POWSV     YES.INTERRUPTED IN "MUXOR"?
0392  37355 003000          CMA
0393  37356 040355          ADA MUXR
0394  37357 002021          SSA,RSS
0395  37360 027330          JMP POW6      NO. INTERRUPT WAS PENDING.
0396  37361 043552          ADA POWD7     MAY BE.
0397  37362 002020          SSA
0398  37363 027330          JMP POW6      NO. INTERRUPT WAS PENDING.
0399  37364 027371          JMP POW99     YES. INTERRUPTED IN "MUXOR".
0400  37365 044537  ADB11   ADB .+11B
0401  37366 140001          ADA B,I
0402  37367 002020          SSA
0403  37370 027330          JMP POW6      INTERRUPT WAS PENDING!
0404*
0405*  INTERRUPT HAS OCCURRED.
0406*  PERFORM A DUMMY INTERRUPT.
0407*
0408  37371         POW99   EQU *
0409  37371 063365          LDA ADB11     PLACE "ADB 11B" IN TRAP CELL
0410  37372 173526          STA POWI,I
0411  37373 063526          LDA POWI
0412  37374 043532          ADA STC0      CREATE "STC SC".
0413  37375 073377          STA POWST
0414  37376 021126          XOR B4000     CREATE "CLC SC" INSTRUCTION.
0415  37377 102700  POWST    STC 0       EXECUTE "STC SC".
0416  37400 102100  STF0    STF 0         ENABLE INTERRUPT, CAUSING EXE-
0417  37401 073403          STA POWCL     CUTION OF "ADB 10B".
0418  37402 103100  CLF0    CLF 0         DISABLE INTERRUPT.
0419  37403 106700  POWCL   CLC 0         DISABLE DEVICE.
0420  37404 160001          LDA B,I       RESTORE CORRECT CONTENTS
0421  37405 173526          STA POWI,I      OF TRAP CELL.
0422  37406 063526          LDA POWI      UPDATE POINTERS.
0423  37407 073527          STA POWJ
0424  37410 027330          JMP POW6      GO TEST NEXT DEVICE.
0425*
0426*
0427*  ALL DUMMY INTERRUPTS ARE DONE.
0428*  NOW RE-INSTATE MUX AND PHONES.
0429*
0430  37411         POW14   EQU *
0431  37411 060206          LDA NPORT     SET COUNTER TO
0432  37412 073537          STA PPCTR       NUMBER OF PORTS.
0433  37413 164357          LDB TTYTP,I   B=> START OF TTY TABLES.
```

```
0434  37414          POW90 EQU *
0435  37414 077540        STB PTNUM     SAVE ?TNUM POINTER.
0436  37415 044542        ADB .+?RPRM   B=> ?RPRM
0437  37416 077541        STB RPRMP     SAVE ?RPRM POINTER.
0438  37417 160001        LDA B,I       OUTPUT ?RPRM
0439  37420 044521        ADB .-5         => TO ?TSTA                    (L
0440  37421 164001        LDB 1,I         GET STATUS WORD                (L
0441  37422 005310        RBR,SLB         SKIP IF NIBT IS 0              (L
0442  37423 011172        AND NECHO       TURN OFF ECHO                  (L
0443  37424 167540        LDB PTNUM,I
0444  37425 017502        JSB POW91
0445  37426 017510        JSB POW92
0446  37427 037541        ISZ RPRMP     => ?SPRM
0447  37430 163541        LDA RPRMP,I    OUTPUT ?SPRM
0448  37431 167540        LDB PTNUM,I
0449  37432 017502        JSB POW91
0450  37433 067540        LDB PTNUM     B=> ?TNUM
0451  37434 044535        ADB .+?TSTA   B=> ?TSTA
0452  37435 160001        LDA B,I       A= ?TSTA
0453  37436 010530        AND BIT1
0454  37437 002003        SZA,RSS       NIBT SET?
0455  37440 027445        JMP POW93     NO.
0456  37441 017510        JSB POW92     YES. CHECK SEEKING.
0457  37442 060360        LDA SYNCC     SEND SYNC. CHAR.
0458  37443 167540        LDB PTNUM,I
0459  37444 017502        JSB POW91
0460  37445          POW93 EQU *
0461  37445 037541        ISZ RPRMP     => ?PPRM
0462  37446 163541        LDA RPRMP,I   A= ?PPRM
0463  37447 033543        IOR OC360     TURN ON "DTR" AND "RQS"
0464  37450 102616        OTA DSCB      OUTPUT ?PPRM
0465  37451 067540        LDB PTNUM     ADJUST POINTER TO NEXT
0466  37452 044563        ADB .+TTY01-TTY00 USER'S TABLE.
0467  37453 017510        JSB POW92     CHECK SEEKING.
0468  37454 037537        ISZ PPCTR     BUMP COUNTER. DONE?
0469  37455 027414        JMP POW90     NOT YET.
0470*
0471  37456 006400        CLB
0472  37457 163516        LDA PPNSK,I   WAS DISC DRIVER BUSY?
0473  37460 002003        SZA,RSS
0474  37461 027472        JMP POW95     NO. SET FLAG=0.
0475  37462 163517        LDA PPOWP,I   YES. FAILED IN DISC DRIVER?
0476  37463 043520        ADA POWD5
0477  37464 002020        SSA
0478  37465 027471        JMP POW94     NO. SET FLAG=1.
0479  37466 043521        ADA POWD6     MAY BE.
0480  37467 002020        SSA
0481  37470 006004        INB           YES. SET FLAG=2.
0482  37471          POW94 EQU *
0483  37471 006004        INB           NO. SET FLAG=1.
0484  37472          POW95 EQU *
0485  37472 177515        STB PCKFL,I
0486*
0487  37473 163554        LDA PPWSW,I   RESTORE
0488  37474 102601        OTA 01          SWITCH REGISTER.
0489  37475 163557        LDA PPWEO,I    RESTORE E AND O
```

```
0490  37476 103101          CLO                 REGISTERS.
0491  37477 000036          SLA,ELA
0492  37500 102101          STO
0493*
0494  37501 127550          JMP PPW57,I    GO TO CORE RESIDENT SECTION.
0495*
0496*
0497*
0498*  OUTPUT PARAMETER/DATA TO MUX.
0499*
0500  37502 000000  POW91 NOP
0501  37503 005222          RBL,RBL        POSITION UNIT NR.
0502  37504 102614          OTA MPX        OUTPUT PARAMETER/DATA.
0503  37505 106615          OTB MPX+1      OUTPUT UNIT NR.
0504  37506 102714          STC MPX
0505  37507 127502          JMP POW91,I
0506*
0507*
0508*  CHECK SEEKING ON MUX.
0509*
0510  37510 000000  POW92 NOP
0511  37511 102515          LIA MPX+1      GET STATUS.
0512  37512 002020          SSA            CHECK SEEKING BIT.
0513  37513 027511          JMP *-2        NOT CLEAR YET.
0514  37514 127510          JMP POW92,I
0515*
0516*
0517  37515 031741  PCKFL DEF CKFLG
0518  37516 031752  PPNSK DEF PNDSK
0519  37517 031753  PPOWP DEF POWP
0520  37520 146444  POWD5 ABS -LDISC
0521  37521 177622  POWD6 ABS -LDSND+LDISC
0522  37522 037516  POWTB DEF *-4         POINTER TO TABLE BELOW.
0523*
0524*  THIS TABLE POINTS TO DRIVER RETURN ADDRESSES.
0525*
0526  37523 031512          DEF POW        POWER FAIL.
0527  37524 031742          DEF PDINT
0528  37525 032350          DEF ?TT2       SYSTEM CONSOLE.
0529  37526         POWH1 EQU *
0530  37526 000000          BSS 2          DISC.
0531  37530 000000          BSS 1          PHOTOREADER
0532  37531 032602          DEF MPXIO      MUX(DATA)
0533  37532         POWH3 EQU *
0534  37532 000000          BSS 1          MUX(STATUS)
0535  37533 032222          DEF DSCBL      PHONES
0536  37534 034204          DEF CLKIN      TNG.
0537*
0538*
0539*  THIS TABLE CONTAINS THE LENGTH OF EACH DRIVER
0540*  SO THAT POWER FAIL/AUTO RESTART ROUTINE CAN
0541*  DETERMINE IF A DRIVER WAS ENTERED.
0542*
0543  37535 000054          ABS LDSND-DINT  DISC
0544  37536 000166          ABS TTYED-?TT2  CONSOLE.
0545  37537         POWH4 EQU *
```

```
0546  37537 000000        BSS 2          DISC
0547  37541          POWH5 EQU *
0548  37541 000000        BSS 1          PHOTOREADER
0549  37542 000462        ABS MPXED-MPXIO   MUX(DATA)
0550  37543          POWH6 EQU *
0551  37543 000000        BSS 1          MUX(STATUS)
0552  37544 000101        ABS DSCED-DSCBL   PHONES
0553  37545 000025        ABS CLKED-CLKIN TBG.
0554*
0555*
0556*  THIS TABLE CONTAINS THE CORRECT
0557*  CONTENTS OF THE TRAP CELLS.
0558*
0559  37546 114315        JSB ?ADIN,I
0560  37547 114313        JSB T35DR,I  CONSOLE.
0561  37550          POWH8 EQU *
0562  37550 000000        BSS 2   DISC
0563  37552          POWH9 EQU *
0564  37552 000000        BSS 1   PHOTOREADER
0565  37553 114354        JSB MPXO,I          MUX(DATA)
0566  37554          POWH0 EQU *
0567  37554 000000        BSS 1   MUX(STATUS)
0568  37555 114316        JSB DSCBA,I   PHONES
0569  37556 114314        JSB CLKDR,I   TBG.
0570  37557          POWH7 EQU *
0571*
0572  37526                ORG POWH1
0573  37526 000000  POWI   BSS 1
0574  37527 000000  POWJ   BSS 1
0575  37530 000000  POWF   BSS 1
0576  37532                ORG POWH3
0577  37532 102700  STC0   STC 0
0578  37537                ORG POWH4
0579  37537 000000  PPCTR  BSS 1
0580  37540 000000  PTNUM  BSS 1
0581  37541 000000  RPRMP  BSS 1
0582  37543                ORG POWH6
0583  37543 000360  OC360  OCT 360
0584  37550                ORG POWH8
0585  37550 031663  PPW57   DEF POW57
0586  37551 000000  POWSV  BSS 1
0587  37552 000014  POWD7  ABS MUXND-MUXOR
0588  37554                ORG POWH0
0589  37554 031746  PPWSW  DEF POWSW
0590  37557                ORG POWH7
0591  37557 031745  PPWEO  DEF POWEO
0592  37560 031733  PPWFL  DEF POWFL
0593  37561          $PFRS EQU *
```

```
0595*
0596*  THIS AREA IS USED TO SAVE DATA OF THE LIBRARY
0597*  ROUTINE WHICH WAS IN CORE AT THE TIME
0598*  OF POWER FAILURE.
0599*
0600*
0601   37300                ORG LIBRA
0602   37300 000000         NOP            RESERVE 2 SECTORS
0603   37301 000000         BSS 254          ON THE DISC.
0604   37677 000000         NOP
0605   37700          $PFSW EQU *
```

```
0607  37300          ORG LIBRA
0608  37300 177771   DEC -7
0609  37301 047525   ASC 15,OUT OF STORAGE
0610  37320 177763   DEC -13
0611  37321 044514   ASC 15,ILLEGAL OR MISSING INTEGER
0612  37340 177763   DEC -13
0613  37341 042530   ASC 15,EXTRANEOUS LIST DELIMITER
0614  37360 177762   DEC -14
0615  37361 046511   ASC 15,MISSING ASSIGNMENT OPERATOR
0616  37400 177761   DEC -15
0617  37401 041510   ASC 15,CHARACTERS AFTER STATEMENT END
0618  37420 177762   DEC -14
0619  37421 046511   ASC 15,MISSING OR ILLEGAL SUBSCRIPT
0620  37440 177761   DEC -15
0621  37441 046511   ASC 15,MISSING OR BAD LIST DELIMITER
0622  37460 177762   DEC -14
0623  37461 046511   ASC 15,MISSING OR BAD FUNCTION NAME
0624  37500 177761   DEC -15
0625  37501 046511   ASC 15,MISSING OR BAD SIMPLE VARIABLE
0626  37520 177764   DEC -12
0627  37521 046511   ASC 15,MISSING OR ILLEGAL 'OF'
0628  37540 177763   DEC -13
0629  37541 046511   ASC 15,MISSING OR ILLEGAL 'THEN'
0630  37560 177764   DEC -12
0631  37561 046511   ASC 15,MISSING OR ILLEGAL 'TO'
0632  37600 177763   DEC -13
0633  37601 046511   ASC 15,MISSING OR ILLEGAL 'STEP'
0634  37620 177762   DEC -14
0635  37621 046511   ASC 15,MISSING OR ILLEGAL DATA ITEM
0636  37640 177770   DEC -8
0637  37641 044514   ASC 15,ILLEGAL EXPONENT
0638  37660 177766   DEC -10
0639  37661 051511   ASC 15,SIGN WITHOUT NUMBER


0641  37300          ORG LIBRA
0642  37300 177762   DEC -14
0643  37301 046511   ASC 15,MISSING RELATIONAL OPERATOR
0644  37320 177765   DEC -11
0645  37321 044514   ASC 15,ILLEGAL READ VARIABLE
0646  37340 177762   DEC -14
0647  37341 044514   ASC 15,ILLEGAL SYMBOL FOLLOWS 'MAT'
0648  37360 177761   DEC -15
0649  37361 046501   ASC 15,MATRIX CANNOT BE ON BOTH SIDES
0650  37400 177761   DEC -15
0651  37401 047117   ASC 15,NO '*' AFTER RIGHT PARENTHESIS
0652  37420 177761   DEC -15
0653  37421 047117   ASC 15,NO LEGAL BINARY OPERATOR FOUND
0654  37440 177764   DEC -12
0655  37441 046511   ASC 15,MISSING LEFT PARENTHESIS
0656  37460 177763   DEC -13
0657  37461 046511   ASC 15,MISSING RIGHT PARENTHESIS
0658  37500 177761   DEC -15
0659  37501 050101   ASC 15,PARAMETER NOT STRING VARIABLE
0660  37520 177765   DEC -11
0661  37521 052516   ASC 15,UNDECIPHERABLE OPERAND
```

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0662  37540 177761          DEC -15
0663  37541 046511          ASC 15,MISSING OR BAD ARRAY VARIABLE
0664  37560 177761          DEC -15
0665  37561 051524          ASC 15,STRING VARIABLE NOT LEGAL HERE
0666  37600 177761          DEC -15
0667  37601 046511          ASC 15,MISSING OR BAD STRING OPERAND
0668  37620 177770          DEC -8
0669  37621 047117          ASC 15,NO CLOSING QUOTE
0670  37640 177762          DEC -14
0671  37641 033462          ASC 15,72 CHARACTERS MAX FOR STRING
0672  37660 177761          DEC -15
0673  37661 051524          ASC 15,STATEMENT HAS EXCESSIVE LENGTH

0675  37300                 ORG LIBRA
0676  37300 177761          DEC -15
0677  37301 046511          ASC 15,MISSING OR BAD FILE REFERENCE
0678  37320 000017          DEC 15
0679  37321 052516          ASC 15,UNDEFINED STATEMENT REFERENCE
0680  37340 000015          DEC 13
0681  37341 047105          ASC 15,NEXT WITHOUT MATCHING FOR
0682  37360 000014          DEC 12
0683  37361 051501          ASC 15,SAME FOR-VARIABLE NESTED
0684  37400 000013          DEC 11
0685  37401 043125          ASC 15,FUNCTION DEFINED TWICE
0686  37420 000015          DEC 13
0687  37421 053101          ASC 15,VARIABLE DIMENSIONED TWICE
0688  37440 000014          DEC 12
0689  37441 046101          ASC 15,LAST STATEMENT NOT 'END'
0690  37460 177771          DEC -7
0691  37461 052516          ASC 15,UNMATCHED FOR
0692  37500 177767          DEC -9
0693  37501 052516          ASC 15,UNDEFINED FUNCTION
0694  37520 177770          DEC -8
0695  37521 040522          ASC 15,ARRAY TOO LARGE
0696  37540 177762          DEC -14
0697  37541 040522          ASC 15,ARRAY OF UNKNOWN DIMENSIONS
0698  37560 000007          DEC 7
0699  37561 047525          ASC 15,OUT OF STORAGE
0700  37600 000015          DEC 13
0701  37601 042111          ASC 15,DIMENSIONS NOT COMPATIBLE
0702  37620 177762          DEC -14
0703  37621 041510          ASC 15,CHARACTERS AFTER COMMAND END
0704  37640 177763          DEC -13
0705  37641 041101          ASC 15,BAD FORMAT OR ILLEGAL NAME
0706  37660 177763          DEC -13
0707  37661 046511          ASC 15,MISSING OR PROTECTED FILE

0709  37300                 ORG LIBRA
0710  37300 000013          DEC 11
0711  37301 043517          ASC 15,GOSUBS NESTED TEN DEEP
0712  37320 000015          DEC 13
0713  37321 051105          ASC 15,RETURN WITH NO PRIOR GOSUB
0714  37340 000014          DEC 12
0715  37341 051525          ASC 15,SUBSCRIPT OUT OF BOUNDS
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0716  37360 000013        DEC 11
0717  37361 047105        ASC 15,NEGATIVE STRING LENGTH
0718  37400 000017        DEC 15
0719  37401 047117        ASC 15,NON-CONTIGUOUS STRING CREATED
0720  37420 000010        DEC 8
0721  37421 051524        ASC 15,STRING OVERFLOW
0722  37440 000006        DEC 6
0723  37441 047525        ASC 15,OUT OF DATA
0724  37460 000011        DEC 9
0725  37461 042101        ASC 15,DATA OF WRONG TYPE
0726  37500 000014        DEC 12
0727  37501 052516        ASC 15,UNDEFINED VALUE ACCESSED
0728  37520 000011        DEC 9
0729  37521 046501        ASC 15,MATRIX NOT SQUARE
0730  37540 000017        DEC 15
0731  37541 051105        ASC 15,REDIMENSIONED ARRAY TOO LARGE
0732  37560 000013        DEC 11
0733  37561 047105        ASC 15,NEARLY SINGULAR MATRIX
0734  37600 000014        DEC 12
0735  37601 046117        ASC 15,LOG OF NEGATIVE ARGUMENT
0736  37620 000014        DEC 12
0737  37621 051521        ASC 15,SQR OF NEGATIVE ARGUMENT
0738  37640 000011        DEC 9
0739  37641 055105        ASC 15,ZERO TO ZERO POWER
0740  37660 000017        DEC 15
0741  37661 047105        ASC 15,NEGATIVE NUMBER TO REAL POWER

0743  37300               ORG LIBRA
0744  37300 000017        DEC 15
0745  37301 040522        ASC 15,ARGUMENT OF SIN OR TAN TOO BIG
0746  37320 177761        DEC -15
0747  37321 047526        ASC 15,OVER/UNDERFLOWS - WARNING ONLY
0748  37340 177761        DEC -15
0749  37341 046101        ASC 15,LAST INPUT IGNORED, RETYPE IT
0750  37360 177763        DEC -13
0751  37361 052117        ASC 15,TOO MANY FILES STATEMENTS
0752  37400 000016        DEC 14
0753  37401 047117        ASC 15,NON-EXISTENT FILE REQUESTED
0754  37420 000017        DEC 15
0755  37421 053522        ASC 15,WRITE TRIED ON READ-ONLY FILE
0756  37440 000015        DEC 13
0757  37441 042516        ASC 15,END-OF-FILE/END OF RECORD
0758  37460 000017        DEC 15
0759  37461 044516        ASC 15,INVALID PROGRAM NAME IN CHAIN
0760  37500 000017        DEC 15
0761  37501 047117        ASC 15,NON-EXISTENT PROGRAM REQUESTED
0762  37520 000014        DEC 12
0763  37521 041510        ASC 15,CHAIN REQUEST IS A FILE
0764  37540 000016        DEC 14
0765  37541 050122        ASC 15,PROGRAM CHAINED IS TOO LARGE
0766  37560 177763        DEC -13
0767  37561 041517        ASC 15,COM STATEMENT OUT OF ORDER
0768  37600 000016        DEC 14
0769  37601 040522        ASC 15,ARGUMENT OF TIM OUT OF RANGE
0770  37620 177762        DEC -14
```

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0771  37621 041101          ASC 15,BAD INPUT, RETYPE FROM ITEM
0772  37640 000015          DEC 13
0773  37641 046117          ASC 15,LOG OF ZERO - WARNING ONLY
0774  37660 000017          DEC 15
0775  37661 055105          ASC 15,ZERO TO NEGATIVE POWER-WARNING


0777  37300                 ORG LIBRA
0778  37300 000017          DEC 15
0779  37301 042111          ASC 15,DIVIDE BY ZERO - WARNING ONLY
0780  37320 000016          DEC 14
0781  37321 042530          ASC 15,EXP OVERFLOW - WARNING ONLY
0782  37340 000014          DEC 12
0783  37341 047526          ASC 15,OVERFLOW - WARNING ONLY
0784  37360 000014          DEC 12
0785  37361 052516          ASC 15,UNDERFLOW - WARNING ONLY
0786  37400 177763          DEC -13
0787  37401 042530          ASC 15,EXTRA INPUT - WARNING ONLY
0788  37420 177770          DEC -8
0789  37421 051105          ASC 15,READ-ONLY FILES!


0791  00000                 ORG 0
0792  00000 000000          NOP             SIGNAL LOADER THAT WE'RE DONE.
0793                        END
**  NO ERRORS*
```