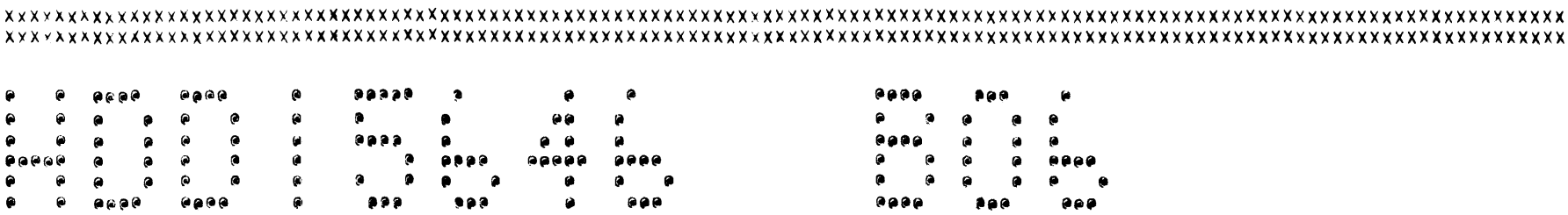

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```
*****************************************
*****************************************
**                                     **
**  PDP-9 MINI TIME-SHARING SYSTEM     **
**       MTSS SYSTEM LOADER            **
**             DTSS:LDR                **
**             MTSS:B06                **
**                                     **
*****************************************
*****************************************
```

LOADER INITIALIZATION

```
100             .STITL  LOADER INITIALIZATION
110             .NAME   LDR--B06
120             .TITLE  GROWTH SYSTEM LOADER
130
140
150     *       REVISED 20 JAN 1971 BY ROBERT W. BLEAN
160
170             .INSRT  DEFINS
100             .IFUND  DEFINS
```

LOADER INITIALIZATION

```
5720            .LIST   ON
5730            .END
180             .HEAD   M
```

```
M                                   LOADER INITIALIZATION

                    190             .STITL  LOADER INITIALIZATION
                    200     ENTER   .DEFIN
                    210             .PMC    SAVE,OFF
                    220             .CRSM   SAVE,ON
                    230             .PMC    ON
                    240             .USE    IMPURE
                    250     #1      HLT
                    260             JMP     #2
                    270             .USE    PREVIOUS
                    280     #2      .EQU    .
                    290             .PMC    OFF
                    300             .CRSM   RESTORE
                    310             .PMC    RESTORE
                    320             .ENDM
                    330
                    340     PREAD   .OPDEF  705003
                    350     PWRITE  .OPDEF  705005
000001              360     PURCOD  .EQU    1
                    370             .HEAD
000001              380     DEBUG   .EQU    1
                    390             .HEAD   M
014000              400     BASE    .EQU    14000           LOADER STARTING LOCATION
002170              410     BUF     .EQU    BUFFER
002170              420     TBUF    .EQU    BUFFER
001000              430     BMAX    .EQU    1000
001000              440     TBFL    .EQU    1000
000012              450     CMDX    .EQU    12
                    460             .HEAD
003714              470     NEXTL   .EQU    M$NEXTL
                    480             .HEAD   M
003714              490     MONXT   .EQU    NEXTL
                    500     *
                    510     *       ARRANGE THE USE COUNTERS IN ORDER
                    520     *
003170              530     IMPSTR  .EQU    3170            START OF THE IMPURE CODE
003700              540     PURSTR  .EQU    3700            START OF THE PURE CODE
000000              550             .USE    IMPURE
003170              560             .LOC    IMPSTR
003700              570             .USE    PURE
                    580     *
                    590     *       CHECK FOR OVERLENGTH PURE CODE
                    600     *
                    610             .IFG    CHECK,3600
003700  602026      630             .ACI6   +P06+           SET THE NAME OF THE PURE CODE PORTION OF THIS PROGRAM
                    640
                    650             .HEAD
                    660             .INSRT  :DLIBRARY:PDP9LIB:LIBMACRO
                    100             .INE    DEBUG,1
                    120             .IFE    $DEBUG          AVOID FORM-FEED UNLESS LISTING IS BEING PRINTED
                    140
                    150
                    160     *
```

LOADER INITIALIZATION

```
170      *       THESE MACROS ARE FOR USE WITH THE PROGRAM PDP9LIB***;TTY-NON
180      *       TTY-NON IS A NON-INTERRUPT DRIVEN TELETYPE HANDLER FOR THE CONSOLE
190      *       TELETYPE ON THE PDP-9.
200      *
210      *       LINE INPUT MACRO IS:
220      *
230      *            LINE  -- GETS THE NEXT LINE FROM THE TELETYPE, PACKS IT IN THE
240      *                     INCLUDED LINE BUFFER, AND RETURNS TO THE USER. USE BACK-ARROW
250      *                     FOR CHARACTER DELETION AND CONTROL X FOR LINE DELETION.
260      *                     THE ROUTINE PROTECTS AGAINST BUFFER UNDERFLOW OR OVERFLOW.
270      *
280      *       WORD INPUT MACROS ALL DELETE LEADING BLANKS, RETURNING TO THE USER
290      *       AT +1 WITH THE DELIMITER IN THE AC IF A DELIMITER IS THE FIRST NON-
300      *       BLANK CHARACTER, THEY ALL UTILIZE WORDB AND WORDB+1 FOR STORAGE, AND
310      *       ANY VALUE ACCUMULATED THERE REMAINS UNTIL THE NEXT TIME A WORD-PACKING
320      *       MACRO IS USED ('WORD' OR 'NUM'). THE DELIMITER THAT ENDED THE WORD
330      *       IS STORED IN DLMTR UNTIL THE NEXT TIME A WORD PACKING MACRO IS USED
340      *       OR UNTIL THE USER PROGRAM USES THE ROUTINE 'CHRID'.
350      *       THE AVAILABLE MACROS ARE:
360      *
370      *            WORD  -- PACKS CHARACTERS, IN A LEFT-JUSTIFIED SIXBIT PACK,
380      *                     INTO WORDB, WORDB+1, .... RETURNS THE FIRST THREE (OR
390      *                     FEWER) CHARACTERS LEFT JUSTIFIED IN THE AC.
400      *
410      *            NUM   -- GETS A NUMBER, AND RETURNS IT IN THE AC. A FORMAT ERROR
420      *                     IS CAUSED BY A LETTER BEING FOUND OR BY A DECIMAL DIGIT
430      *                     (8 OR 9) BEING FOUND WITHOUT A TRAILING DECIMAL POINT.
440      *                     THAT THE DECIMAL VALUE IS DESIRED IS SIGNALLED BY THE
450      *                     DELIMITER BEING A PERIOD, OTHERWISE THE OCTAL VALUE IS
460      *                     RETURNED. THE VALUE RETURNED REMAINS AVAILABLE IN WORDB.
470      *                     THIS IS THE VALUE FOUND MOD 2*18 -- I.E. OVERFLOW IS LOST.
480      *
490      *                     RETURN IS:
500      *                          +1 WITH LINK = 0 FOR A FORMAT ERROR
510      *                          +1 WITH LINK = 1 FOR THE FIRST NON-BLANK CHARACTER A DELIMITER
520      *                          +2 FOR SUCCESS
530      *
540      *            WORD1 -- GETS THE CONTENTS FROM WORDB. THIS IS THE FIRST THREE
550      *                     SIXBIT CHARACTERS OR THE VALUE.
560      *            WORD2 -- GETS THE CONTENTS OF WORDB+1. THIS IS THE SECOND THREE
570      *                     SIXBIT CHARACTERS OR THE "DECIMAL" VALUE. NOTE THAT THE
580      *                     "DECIMAL" VALUE WILL BE GARBAGE IF AN OCTAL NUMBER WAS INPUT.
590      *
600      *                     IN THE CASE OF SIXBIT INPUT, FURTHER INPUT WILL BE LOST.
610      *
620      *            COUNT -- GETS THE OCTAL COUNT OF THE NUMBER OF TIMES 'WORD' AND
630      *                     'NUM' HAVE BEEN CALLED SINCE THE LINE WAS INPUT. THIS
640      *                     IS THE COUNT OF THE NUMBER OF WORDS EXTRACTED SO FAR
650      *                     FROM THE CURRENT LINE BUFFER.
660      *
670      *            DELIM -- GETS THE LAST DELIMITER SEEN BY 'CHRID'. THIS WILL BE
680      *                     THE DELIMITER THAT ENDED THE LAST WORD FETCHED UNLESS
```

```
690     *                   THE USER PROGRAM IS ACCESSING 'CHRID' ITSELF.
700     *
710     *       MISCELLANEOUS CHARACTER-ORIENTED MACROS:
720     *
730     *            CHAR  -- GETS THE OLDEST REMAINING CHARACTER FROM THE LINE BUFFER.
740     *                     THIS PERMITS THE USER PROGRAM TO EXAMINE THE ENTIRE INPUT
750     *                     STRING, WHICH IS A HARD THING TO DO USING 'WORD'.
760     *                  RETURNS +1 WITH THE CHARACTER IN THE AC
770     *
780     *            CRLF  -- PRINTS A CARRIAGE RETURN AND LINE FEED. IT DISTURBS NO
790     *                     STORAGE OR POINTERS.
800     *
810     *            CHROT -- PRINTS THE SINGLE ASCII CHARACTER IN THE AC.
820     *
830     *
840     *       OUTPUT MACROS ARE:
850     *
860     *            OCT   -- OUTPUTS AS SIX DIGIT OCTAL THE CONTENTS OF THE AC.
870     *
880     *            OCTZ  -- OUTPUTS AS OCTAL WITH LEADING ZEROES SUPPRESSED THE CONTENTS OF THE AC.
890     *
900     *            MESS <TEXT>,<CHARACTER COUNT> USES SIXBIT FORMAT TO OUTPUT THE
910     *                     CARRIAGE RETURN AND LINE FEED, FOLLOWED BY THE TEXT. IT
920     *                     FIRST DOES A 'KRB' INSTRUCTION TO CLEAR ANY PRINT-INHIBIT.
930     *
940     *            MESSR <TEXT>,<CHARACTER COUNT> IS THE SAME AS 'MESS', BUT NO
950     *                     'KRB' IS SUPPLIED. THIS PERMITS CONTINUATION OF A SINGLE
960     *                     MESSAGE.
970     *
980     *            NMESS <TEXT>,<CHARACTER COUNT> IS THE SAME AS 'MESSR' EXCEPT
990     *                     NO CARRIAGE RETURN NOR LINE FEED IS SUPPLIED. THIS PERMITS
1000    *                     CONTINUING THE MESSAGE ON THE SAME LINE.
1010    *
1020    *       HITTING ANY KEY ON THE TELETYPE DURING OUTPUT WILL INHIBIT THE ACTUAL
1030    *       PRINTING OF THE REST OF THE MESSAGE UNTIL THE NEXT 'MESS' OR KRB
1040    *       INSTRUCTION. NOTE THAT EXCEPT THE CHARACTER IS NOT PRINTED, THE REST
1050    *       OF THE PROGRAM CARRIES ON AS USUAL.
1060    *
1070
1080
1090
1100    LINE    .DEFIN
1110            JMS     T$INLIN
1120            .ENDM

1130
1140    WORD    .DEFIN
1150            JMS     T$SIXIN
1160            .ENDM
1170
1180    WORD1   .DEFIN
1190            LAC     T$WORDB
1200            .ENDM
```

LOADER INITIALIZATION

```
1210
1220    WORD2   .DEFIN
1230            LAC     TSWORDB+1
1240            .ENDM
1250
1260    NUM     .DEFIN
1270            JMS     TSNUMIN
1280            .ENDM
1290
1300    CRLF    .DEFIN
1310            JMS     TSCRLF
1320            .ENDM
1330
1340    CHROT   .DEFIN
1350            JMS     TSTTYOT
1360            .ENDM
1370
1380    CHAR    .DEFIN
1390            JMS     TSFGET
1400            .ENDM
1410
1420    DELIM   .DEFIN
1430            LAC     TSDLMTR
1440            .ENDM
1450
1460    COUNT   .DEFIN
1470            LAC     TSCOUNT
1480            .ENDM
1490
1500
1510
1520    MESSR   .DEFIN
1530            .CRSM   SAVE,ON
1540            LAW     -#2-2
1550            JMS     TSSIXOT
1560            .PMC    SAVE,OFF
1570    #5      .ACI6   ↑[]#1↑
1580            .PMC    RESTORE
1590            .CRSM   RESTORE
1600            .ENDM
1610
1620    MESS    .DEFIN
1630            KRB
1640            MESSR   <#1>,#2
1650            .ENDM
1660
1670    NMESS   .DEFIN
1680            .CRSM   SAVE,ON
1690            LAW     -#2
1700            JMS     TSSIXOT
1710    #5      .ACI6   ↑#1↑
1720            .CRSM   RESTORE
```

GROWTH SYSTEM STANDARD DEFINITIONS

```
                130             .STITL  GROWTH SYSTEM STANDARD DEFINITIONS
                140
                150     *       PROGRAMMED BY ROBERT W. BLEAN
                160
                170     *       LATEST REVISION 20 JAN 1971
                180
                190     *       ASCII CHARACTERS
                200
000212          210     LF      .EQU    212
000215          220     CR      .EQU    215
000230          230     CONTX   .EQU    230
000337          240     BKARR   .EQU    337
000240          250     SPACE   .EQU    240
000241          260     EXCLAM  .EQU    241             EXCLAMATION POINT
000243          270     NUMSGN  .EQU    243
000244          280     DOLLAR  .EQU    244             $
000246          290     AMPRSN  .EQU    246             &
000252          300     STAR    .EQU    252             ASTERISK (*)
000253          310     PLUS    .EQU    253
000254          320     COMMA   .EQU    254
000255          330     MINUS   .EQU    255
000256          340     PERIOD  .EQU    256             .
000256          350     POINT   .EQU    PERIOD
000257          360     SLASH   .EQU    257
000272          370     COLON   .EQU    272
000273          380     SCOLON  .EQU    273
000334          390     BSLASH  .EQU    334             BACK SLASH (\)
                400
                410     *       CONSTANTS
                420
017777          430     ADRSS   .EQU    17777           ADRESS FIELD MASK
002000          440     BOUNDA  .EQU    2000            TSS USER CORE START
017500          450     TAPIN   .EQU    17500
017502          460     TAPOT   .EQU    17502
017505          470     RECOV   .EQU    17505
017777          480     VFLAG   .EQU    17777
000010          490     INDEX   .EQU    10              GENERAL PURPOSE AUTO-INDEX REGISTER
000011          500     CATX    .EQU    11              CATALOG ROUTINES' AUTO-INDEX REGISTER
000012          510     CMDX    .EQU    12
017740          520     BOOT    .EQU    17740           BOOTSTRAP LOADER STARTING ADDRESS
017735          530     SYSDEV  .EQU    BOOT-3          HOLDS DEVICE ADDRESS OF CATALOG BLOCK ON THE SYSTEM DEVICE
017000          540     CATLOG  .EQU    17000           START OF THE RESIDENT CATALOG BLOCK
000001          550     CATBLK  .EQU    1               CATALOG IS AT LOGICAL BLOCK 1 OF ANY DEVICE

000400          560     CATLEN  .EQU    400             CATALOG LENGTH IS 400 WORDS MAXIMUM
000005          570     FCBLEN  .EQU    5               FILE CONTROL BLOCK IS FIVE WORDS LONG
000004          580     HDRLEN  .EQU    4               CATALOG HEADER IS FOUR WORDS LONG
017005          590     CPARAM  .EQU    CATLOG+5        POINTER TO PARAMETERS FOR CATALOG READ/WRITE
740000          600     DVCMSK  .EQU    740000          MASK TO EXTRACT HANDLER NUMBER AND TYPE FROM DEVICE ADDRESS
001777          610     BLKMSK  .EQU    1777            MASK TO RETRIEVE DEVICE BLOCK NUMBER
777716          620     CATMAX  .EQU    -50.            MAXIMUM NUMBER OF FILE CONTROL BLOCKS IN A CATALOG
000400          630     BLKLEN  .EQU    400             NUMBER OF WORDS IN ONE LOGICAL BLOCK
776701          640     DTMAX   .EQU    -1077           MAXIMUM NUMBER OF USABLE BLOCKS ON A DECTAPE
```

GROWTH SYSTEM STANDARD DEFINITIONS

```
777601      650     DKMAX   .EQU    -177            MAXIMUM NUMBER OF USABLE BLOCKS ON A LOGICAL DISK
            660
            670     *       DEVICE NAMES
            680
606064      690     PPT     .EQU    606064
606462      700     PTR     .EQU    606462
606460      710     PTP     .EQU    606460
446400      720     DT.     .EQU    446400
646000      730     TP.     .EQU    646000
445300      740     DK.     .EQU    445300
004464      750     .DT     .EQU    004464
006460      760     .TP     .EQU    006460
004453      770     .DK     .EQU    004453
445320      780     DK0     .EQU    445320
            790
            800     *       FILENAMES
436454      810     CTL     .EQU    436454          CATALOG BLOCK
            820
            830     *       FORMATS
            840
414263      850     ABS     .EQU    414263          LOADSTRING BINARY
425156      860     BIN     .EQU    425156          BINARY
476257      870     GRO     .EQU    476257          GROWTH SYSTEM FORMAT (CORE IMAGE)
435762      880     COR     .EQU    435762          CORE
            890
            900     *       MACROS
            910
            920     ENTER   .DEFIN
            930     #1      XX
            940             .ENDM
            950
            960     LOOP    .DEFIN
            970             ISZ     #1
            980             JMP     #2
            990             .ENDM
            1000
            1010    NEG     .DEFIN
            1020            CMA
            1030            TAD     (1              )
            1040            .ENDM
            1050
            1060    FORMAT  .DEFIN
            1070            JMP     FORMAT
            1080            .ENDM
            1090
            1100    START   .DEFIN                  STANDARD INITIALIZATION MACRO FOR THE GROWTH SYSTEM
            1110            .PMC    SAVE,ON         PRINT THIS ONE MACRO, AT LEAST
            1120            CAF
            1130            IOFICLOF
            1140            LAC     (700000         )
            1150            ISA                     API ON, NO PAPER TAPE READER ATTACHED
            1160            TLS+10
```

GROWTH SYSTEM STANDARD DEFINITIONS

```
                1170            DLP                     DISABLE THE LIGHT PEN, ON GENERAL PRINCIPLES
                1180            DZM     CATALT          WE WON'T MESS WITH SOMEONE ELSE'S ALTERED CATALOG
                1190            MESS    <#1             HERE>,#2-5
                1200    NEXTL   MESS    <               )>;1 "PRINT THE INPUT REQUEST
                1210            LINE                    GET THE USER'S INPUT
                1220            ,PMC    RESTORE
                1230            ,ENDM
                1240
                1250            ,LIST   ON
                1260            ,END
002175          680     CPARAM  ,EQU    BUFFER+5
002170          690     CATLOG  ,EQU    BUFFER
                700     RET     ,OPDEF  JMP+020000
                710             ,HEAD   M
```

M MAIN PROGRAM

```
                    720             .STITL  MAIN PROGRAM
                    730     *
                    740     *
                    750     *       MACRO TO SET UP PURE-CODED SUBROUTINE ENTRANCES
                    760     *
                    770     ENTER   .DEFIN
                    780             .PMC    SAVE,OFF
                    790     9MAPBUG .EQU    .
                    800             .USE    IMPURE          SUBROUTINE ENTRANCES CANNOT BE PURE CODE
                    810             .PMC    SAVE,ON
                    820     #1      ...
                    830             .PMC    RESTORE
                    840             HLT
                    850             JMP     9MAPBUG
                    860             .USE    PREVIOUS
                    870             .PMC    RESTORE
                    880             .ENDM
                    890     *
                    900     *
                    910     *
003701  703302      920     START   CAF
003702  700002      930             IOF
003703  700416      940             TLS+10
003704  142156      950             DZM     DSBALT          DON'T MESS AROUND WITH SOMEONE ELSE'S ALTERED BUFFER
    003705          960             CRLF
    003706          970             MESS    <LOADER>,6
    003714          980     NEXTL   MESS    <?>,1           REQUEST THE NEXT LINE OF INPUT
    003720          990             LINE                    AND GET IT
                   1000     *
                   1010     *
                   1020     *       SCAN NEXT COMMAND
                   1030     *
    003721         1040             WORD                    GET THE NEXT COMMAND
003722  603714     1050             JMP     NEXTL           IGNORE VACUOUS LINES
003723  765112     1060     MONX2   LAW     COMTB-1         POINT TO COMMAND TABLE
003724  040012     1070             DAC     CMDX            SAVE IT
003725  777754     1080             LAW     COMTB-COME
003726  043246     1090             DAC     CSCTEM1         SAVE COUNT
    003727         1100             WORD1                   RECOVER THE COMMAND
003730  560012     1110     COML    SAD     CMDX,X          CHECK(1)WORD
003731  620012     1120             JMP     CMDX,X          GO TO IT
    003732         1130             LOOP    CSCTEM1,COML
    003734         1140     ERROR   MESS    <COMMAND ERROR>,13.
003744  603714     1150             JMP     NEXTL
    003745         1160     FORMAT  MESS    <FORMAT ERROR WORD # >+20.
    003760         1170             COUNT
    003761         1180             OCTZ
003763  603714     1190             JMP     NEXTL
    003764         1200     HARD    MESS    <DEVICE ERROR>,12.
003774  603714     1210             JMP     NEXTL
    003775         1220     NSAVE   MESS    <FILE NOT SAVED>,14.
004006  603714     1230             JMP     NEXTL
```

```
                M                              MAIN PROGRAM

          004007      1240    DSAVE   MESS    <FILE ALREADY SAVED>,18.
      004021  603714  1250            JMP     NEXTL
```

M MAIN PROGRAM

```
                    1260            .EJECT
                    1270    *
                    1280    *       COPY SUBROUTINE
                    1290    *
                    1300    *       COPIES FROM DEVICE INDA TO DEVICE OUTDA FOR LEN WORDS
                    1310    *
    004022          1320            ENTER   COPY
                                    .PMC    SAVE,ON
    003170                  COPY    ...
004022  103212  1330                JMS     FORCE           FORCE THE BUFFER OUT IF ALTERED
004023  762170  1340                LAW     BUFFER
004024  042154  1350                DAC     D$BCA           BE SURE THE CORE ADDRESS IS SET CORRECTLY
004025  203230  1360    COPL        LAC     LEN             GET LENGTH REMAINING
004026  741200  1370                SNA
004027  623170  1380                RET     COPY            RETURN IF DONE
004030  346066  1390                TAD     (-BMAX)         SUBTRACT AMOUNT WE CAN COPY IN (1) OPERATION
004031  741100  1400                SPA
004032  604036  1410                JMP     COPL2
004033  043230  1420                DAC     LEN             RESTORE LENGTH REMAINING
004034  206067  1430                LAC     (BMAX)          GET AMOUNT FOR CURRENT COPY
004035  604040  1440                JMP     COPL4           SKIP THE OTHER BRANCH
004036  203230  1450    COPL2       LAC     LEN             GET LENGTH FOR COPY
004037  143230  1460                DZM     LEN             NONE REMAINING
004040  042155  1470    COPL4       DAC     D$BLEN          SAVE NEW LENGTH TO COPY
004041  203227  1480                LAC     INDA            GET INPUT DA
004042  042153  1490                DAC     D$BDA           SAVE IT
004043  543232  1500                SAD     OUTDA           CHECK FOR NOTHINGISH COPIES
004044  623170  1510                RET     COPY
004045  346070  1520                TAD     (BMAX/BLKLEN)   COMPUTE AMOUNT TO COPY IN BLKLENKS
004046  043227  1530                DAC     INDA            RESTORE FOR NEXT COPY
004047  103251  1540                JMS     C$RCOVR         SET UP THE ERROR RECOVERY
004050  764055  1550                LAW     .+5
004051  652000  1560                LMQ                     SET THE RESTART ADDRESS
004052  762153  1570                LAW     D$BDA           LOAD THE PARAMETER POINTER
004053  705003  1580                PREAD                   DO THE OPERATION
004054  605223  1590                JMP     C$RCVR4         ERROR RETURN
004055  203232  1600                LAC     OUTDA           GET OUTPUT DA
004056  741200  1610                SNA
004057  623170  1620                RET     COPY            RETURN IF INPUT ONLY
004060  042153  1630                DAC     D$BDA           SAVE IT
004061  346070  1640                TAD     (BMAX/BLKLEN)
004062  043232  1650                DAC     OUTDA           SET THE UPDATED OUTPUT DEVICE ADDRESS FOR NEXT TIME
004063  762153  1660                LAW     D$BDA           GET PARAMETERS
004064  103172  1670                JMS     TPOT            COPY OUT
004065  604025  1680                JMP     COPL            LOOP
```

M  MAIN PROGRAM

```
                    1690            .EJECT
                    1700    *
                    1710    *       DEVICE WRITE SETUP ROUTINE
                    1720    *
     004066         1730            ENTER   TPOT
                                    .PMC    SAVE,ON
     003172                 TPOT    ...
004066  043235      1740            DAC     PARW            SAVE CALLING PARAMETERS
004067  103251      1750            JMS     CSRCOVR         SET UP THE ERROR RECOVERY
004070  764075      1760            LAW     .+5
004071  652000      1770            LMQ                     SET THE RESTART ADDRESS
004072  203235      1780    TPOT1   LAC     PARW            GET PARAMETER WORD
004073  705005      1790            PWRITE                  DO THE WRITE OPERATION
004074  605223      1800            JMP     CSRCVR4         ERROR RETURN
004075  623172      1810            RET     TPOT
                    1820    *
                    1830    *       READ A WORD OF PAPER TAPE
                    1840    *
                    1850    *       RETURN IS +1 IF TIMEOUT
                    1860    *       RETURN IS +2 IF OK, WITH THE CHARACTER IN THE AC
                    1870    *
     004076         1880            ENTER   GETW
                                    .PMC    SAVE,ON
     003174                 GETW    ...
004076  700144      1890            RSB                     SLELECT BINARY
     004077         1900    GEWL    ...
004077  700101      1910            RSF                     WAIT FOR READER
004100  741000      1920            SKP
004101  604107      1930            JMP     GW1             WE GOT IT
004102  700314      1940            IORS                    NOT YET -- LOOK FOR STATUS
004103  506067      1950            AND     (001000)        RECOVER OUT-OF-TAPE BIT
004104  740200      1960            SZA                     SKIP IF NOT TRUE
004105  623174      1970            RET     GETW            RETURN TO CALLER WHEN OUT-OF-TAPE
004106  604077      1980            JMP     GEWL            ELSE WAIT MORE
004107  700112      1990    GW1     RRB                     GET THE CHAR
004110  043245      2000            DAC     WT              SAVE
004111  243225      2010            XOR     CKSUM           COMPUTE CHECKSUM
004112  043225      2020            DAC     CKSUM
004113  203245      2030            LAC     WT              RESTORE WORD
004114  443174      2040            ISZ     GETW            SHOW OUR SUCESS
004115  623174      2050            RET     GETW
     003176         2060            .USE    IMPURE
003176  740040      2070    TIME    XX
     004116         2080            .USE    PURE
```

```
            M                                   LOADER COMMANDS

                    2090                ,STITL  LOADER COMMANDS
                    2100    *
                    2110    *           CLEAR
                    2120    *
                    2130    *           CLE <DEVICE>
                    2140    *
                    2150    *           CLEARS THE CATALOG FOR A DEVICE
                    2160    *
004116  103212      2170    CLE         JMS     FORCE           FORCE OUT THE OLD CATALOG
004117  103271      2180                JMS     C$DEVCV         GET THE DEVICE NAME AND CONVERT IT TO DEVICE ADDRESS FORMAT
    004120          2190                FORMAT                  FORMAT ERROR -- PAPER TAPE NOT LEGAL FOR THIS OPERATION
004121  103177      2200                JMS     NEWHDR          GO CLEAR THE HEADER AND CATALOG FILE CONTROL BLOCK
004122  603714      2210                JMP     NEXTL
                    2220
                    2230
                    2240
                    2250    *
                    2260    *           NEWHDR THE HEADER AND THE CATALOG FILE CONTROL BLOCK OF THE CORE CATALOG
                    2270    *           FOR THE HANDLER WHOSE DEVICE ADDRESS IS PASSED IN THE AC.
                    2280    *
    004123          2290                ENTER   NEWHDR          SUBROUTINE TO INITIALIZE THE CATALOG HEADER AND FIRST FILE CONTROL BLOCK
                                        .PMC    SAVE,ON
    003177                      NEWHDR  ...
004123  346071      2300                TAD     (1)
004124  042175      2310                DAC     CPARAM          SET THE CATALOG DEVICE ADDRESS
004125  042153      2320                DAC     D$BDA           SET IT ALSO TO BE THE BUFFER DEVICE ADDRESS
004126  346071      2330                TAD     (1)
004127  042170      2340                DAC     CATLOG          SET THE DEVICE ADDRESS OF THE FIRST FREE BLOCK
004130  776701      2350                LAW     $DTMAX
004131  042173      2360                DAC     CATLOG+3        SET THE DECTAPE MAXIMUM BLOCK NUMBER
004132  202175      2370                LAC     CPARAM          LOAD THE CATALOG DEVICE ADDRESS
004133  506072      2380                AND     (40000)         CHECK FOR  DISK
004134  741200      2390                SNA                     YES IF SKP
004135  604140      2400                JMP     NEW2
004136  777601      2410                LAW     $DKMAX
004137  042173      2420                DAC     CATLOG+3        SET THE MAXIMUM DISK BLOCK NUMBER
004140  777010      2430    NEW2        LAW     17010
004141  042171      2440                DAC     CATLOG+1        SET THE INITIAL POINTER TO THE FIRST FREE FCB
004142  762200      2450                LAW     CATLOG+10
004143  040012      2460                DAC     CMDX
004144  777777      2470                LAW     -1
004145  042172      2480                DAC     CATLOG+2        SET THE INITIAL FCB COUNT
004146  206073      2490                LAC     ($CTL)
004147  042174      2500                DAC     CATLOG+4        SET THE CATALOG BLOCK'S NAME (CTL)
004150  777000      2510                LAW     17000
004151  042176      2520                DAC     CATLOG+6        SET THE CATALOG BLOCK'S CORE ADDRESS
004152  762170      2530                LAW     CATLOG
004153  042154      2540                DAC     D$BCA           SET THE REAL CORE ADDRESS
004154  206074      2550                LAC     (CATLEN)
004155  042177      2560                DAC     CATLOG+7        SET THE CATALOG BLOCK LENGTH
004156  042155      2570                DAC     D$BLEN          SET THE BUFFER LENGTH AS WELL
004157  777740      2580                LAW     $B00
```

M  LOADER COMMANDS

```
004160  042200  2590          DAC     CATLOG+10       SET THE CATALOG BLOCK'S TRANSFER IN CASE IT GETS LOADED
004161  442156  2600          ISZ     DSBALT          SET THE ALTERED CATALOG FLAG
004162  623177  2610          RET     NEWHDR
```

M  LOADER COMMANDS

```
                    2620            .EJECT
                    2630    *
                    2640    *       UNSAVE
                    2650    *
                    2660    *       UNSAVE <TREE NAME>
                    2670    *
                    2680    *       UNSAVE DELETES AN ENTRY FROM A CATALOG
                    2690    *
004163  103266      2700    UNS     JMS     C$GNAME         GET THE CTL
    004164          2710            FORMAT                  FORMAT ERROR -- PAPER TAPE NOT LEGAL FOR THIS OPERATION
004165  103254      2720            JMS     C$CATL          LOOK IT UP
004166  603775      2730            JMP     NSAVE           FILE NOT SAVED
004167  200011      2740            LAC     $CATX           GET THE POINTER
004170  043240      2750            DAC     TEMP
004171  163240      2760            DZM     TEMP,X          A NAME OF ZERO INDICATES NOTHING THERE
004172  442156      2770            ISZ     D$BALT          SET CATALOG ALTERED FLAG
004173  603714      2780            JMP     NEXTL
```

M LOADER COMMANDS

```
                    2790            .EJECT
004174  103212      2800    EXIT    JMS     FORCE           CLEAR ANY REMAINING BUFFER ALTERATIONS
004175  705001      2810            TERMINAT
```

M  LOADER COMMANDS

```
                    2820            ,EJECT
                    2830    *
                    2840    *       PURGE
                    2850    *
                    2860    *       PURGE <DEVICE>
                    2870    *
                    2880    *       PURGE COMPACTS STORAGE FOR A GIVEN DEVICE
                    2890    *
        004176      2900    PUR     ...
004176  103271      2910            JMS     C$DEVCV         GET THE DEVICE NAME AND CONVERT IT TO HANDLER DEVICE ADDRESS FORMAT
        004177      2920            FORMAT                  FORMAT ERROR -- PAPER TAPE NOT LEGAL FOR THIS OPERATION
004200  043227      2930            DAC     INDA
004201  043232      2940            DAC     OUTDA           INPUT AND OUTPUT BOTH
004202  604211      2950            JMP     PCOPY           COPY OVER THE FILES
                    2960    *
                    2970    *       LDUMP
                    2980    *
                    2990    *       LDUMP <DEVICE> <DEVICE>
                    3000    *
                    3010    *       LDUMP DUMPS THE FILES ON THE FIRST DEVICE TO THE SECOND DEVICE
                    3020    *
        004203      3030    LDU     ...
004203  103271      3040            JMS     C$DEVCV         GET THE DEVICE NAME AND CONVERT IT TO HANDLER DEVICE ADDRESS FORMAT
        004204      3050            FORMAT                  FORMAT ERROR -- PAPER TAPE NOT LEGAL FOR THIS OPERATION
004205  043227      3060            DAC     INDA            SET THE INPUT HANDLER DEVICE ADDRESS
004206  103271      3070            JMS     C$DEVCV         GET THE DEVICE NAME AND CONVERT IT TO HANDLER DEVICE ADDRESS FORMAT
        004207      3080            FORMAT                  FORMAT ERROR -- PAPER TAPE NOT LEGAL FOR THIS OPERATION
004210  043232      3090            DAC     OUTDA           SET THE OUTPUT HANDLER DEVICE ADDRESS
                    3100    *
                    3110    *       ROUTINE TO COPY CATALOG FOR PURGE AND LDUMP
                    3120    *
        004211      3130    PCOPY   ...
004211  203227      3140            LAC     INDA
004212  103247      3150            JMS     C$RCAT          READ THE INPUT DEVICE CATALOG
004213  202172      3160            LAC     CATLOG+2
004214  043237      3170            DAC     PTMP            SAVE THE FCB COUNT
004215  203232      3180            LAC     OUTDA
004216  103177      3190            JMS     NEWHDR          CLEAR THE OUTPUT DEVICE CATALOG
                    3200    *
                    3210    *       LOOP TO RECOPY FILES
                    3220    *
                    3230    *       CMDX RUNS DOWN THE INPUT DEVICE CATALOG
                    3240    *       CATX RUNS DOWN THE OUTPUT DEVICE CATALOG
                    3250    *
004217  443237      3260    PURL    ISZ     PTMP            CHECK FOR DONE
004220  741000      3270            SKP
004221  603714      3280            JMP     NEXTL
004222  220012      3290            LAC     CMDX,X          GET THE NEXT FILE
004223  741200      3300            SNA
004224  604252      3310            JMP     PURZ            NOT THERE
004225  103275      3320            JMS     C$SAVE          SAVE IT
004226  740040      3330            HLT                     %#&*!  THE FILE CANNOT POSSIBLY BE SAVED  !*&#%
```

M  LOADER COMMANDS

```
004227  220012  3340        LAC     CMDX,X
004230  043227  3350        DAC     INDA            SET THE INPUT FILE'S CURRENT DEVICE ADDRESS
004231  220012  3360        LAC     CMDX,X
004232  043240  3370        DAC     TEMP            SAVE THE FILE'S CORE ADDRESS
004233  220012  3380        LAC     CMDX,X
004234  043230  3390        DAC     LEN             SAVE THE FILE'S LENGTH
004235  103277  3400        JMS     C$ALC           ALLOCATE SPACE ON THE DEVICE FOR IT
004236  060011  3410        DAC     $CATX,X         SET ITS NEW DEVICE ADDRESS
004237  043232  3420        DAC     OUTDA           SAVE FOR OUTPUT
004240  203240  3430        LAC     TEMP
004241  060011  3440        DAC     $CATX,X         SET IT'S CORE ADDRESS
004242  203230  3450        LAC     LEN
004243  060011  3460        DAC     $CATX,X         SET IT'S LENGTH
004244  220012  3470        LAC     CMDX,X
004245  060011  3480        DAC     $CATX,X         SET ITS TRANSFER CARD
004246  103170  3490        JMS     COPY
004247  203232  3500        LAC     OUTDA
004250  103247  3510        JMS     C$RCAT          GET THE OUTPUT CATALOG BACK
004251  604217  3520        JMP     PURL            2LOOP
004252  206075  3530  PURZ  LAC     (FCBLEN-1)
004253  340012  3540        TAD     CMDX
004254  040012  3550        DAC     CMDX            SAVE NEW POSITION
004255  604217  3560        JMP     PURL            LOOP
```

M LOADER COMMANDS

```
                    3570            .EJECT
                    3580    *
                    3590    *       SAVE
                    3600    *
                    3610    *       SAVE <TREE NAME> <START> <END> <FORMAT> <DEVICE>
                    3620    *
                    3630    *       SAVE CREATES A NEW CATALOG ENTRY AND LOADS
                    3640    *       IT WITH A FILE
                    3650    *
004256  103266      3660    SAV     JMS     CSGNAME         GET A NAME
    004257          3670            FORMAT                  FORMAT ERROR -- PAPER TAPE NOT LEGAL FOR THIS OPERATION
004260  103275      3680            JMS     CSSAVE          SAVE IF POSSIBLE
004261  604007      3690            JMP     DSAVE           DUPLICATE
004262  200011      3700            LAC     $CATX
004263  043223      3710            DAC     CATP            SET A POINTER TO THE FILENAME IN THE CATALOG
    004264          3720            NUM
    004265          3730            FORMAT
004266  043222      3740            DAC     BOTM            SET THE START ADDRESS
004267  440011      3750            ISZ     $CATX
004270  060011      3760            DAC     $CATX,X         SAVE IT
    004271          3770            NEG
004273  043230      3780            DAC     LEN
    004274          3790            NUM                     GET THE END ADDRESS
    004275          3800            FORMAT
004276  343230      3810            TAD     LEN             SUBTRACT THE START ADDRESS
004277  741100      3820            SPA
    004300          3830            FORMAT                  FORMAT ERROR -- END ADDRESS LESS THAN START ADDRESS
004301  043230      3840            DAC     LEN
004302  060011      3850            DAC     $CATX,X         SET THE LENGTH
004303  103277      3860            JMS     CSALC           ALLOCATE FOR IT
004304  443223      3870            ISZ     CATP            INDEX POINTER
004305  063223      3880            DAC     CATP,X          SET THE FILE'S DEVICE ADDRESS
004306  604322      3890            JMP     REP1            JOIN REPLACE
```

M  LOADER COMMANDS

```
                    3900            .EJECT
                    3910    *
                    3920    *       REPLACE
                    3930    *
                    3940    *       REPLACE <TREE NAME> <FORMAT> <DEVICE>
                    3950    *
004307  103266      3960    REP     JMS     CSGNAME         GET A CATALOG
004310              3970            FORMAT                  FORMAT ERROR -- PAPER TAPE NOT LEGAL FOR THIS OPERATION
004311  103254      3980            JMS     CSCATL
004312  603775      3990            JMP     NSAVE           NOT THERE
004313  440011      4000            ISZ     SCATX           SKIP THE DEVICE ADDRESS
004314  200011      4010            LAC     SCATX
004315  043223      4020            DAC     CATP            SAVE A POINTER TO THE DEVICE ADDRESS IN THE CATALOG
004316  220011      4030            LAC     SCATX,X
004317  043222      4040            DAC     BOTM            SET THE CORE ADDRESS
004320  220011      4050            LAC     SCATX,X
004321  043230      4060            DAC     LEN             SET THE LENGTH
                    4070
004322              4080    REP1    WORD                    GET FORMAT
004323              4090            FORMAT
004324  546076      4100            SAD     (CAL SABS)      NECESSARY TO DO IT THIS WAY OR ELSE ASSEMBLER TAKES ABS OPCODE
004325  604445      4110            JMP     ABSF
004326  546077      4120            SAD     ($BIN)
004327  604355      4130            JMP     BINF
004330  546100      4140            SAD     ($GRO)
004331  604333      4150            JMP     GROF
004332              4160            FORMAT                  NO OTHER FORMATS
```

M LOADER COMMANDS

```
                    4170            .EJECT
                    4180    *
                    4190    *       LOAD FORMATS -- GROWTH
                    4200    *
                    4210    *       GROWTH TAKES A FILE FROM ANOTHER GROWTH DEVICE
                    4220    *
004333  202175      4230    GROF    LAC     CPARAM          GET THE CURRENT CATALOG DEVICE ADDRESS
004334  043240      4240            DAC     TEMP
004335  103266      4250            JMS     C$GNAME         GET A NAME
    004336          4260            FORMAT                  FORMAT ERROR -- PAPER TAPE NOT LEGAL FOR THIS OPERATION
004337  103254      4270            JMS     C$CATL
004340  603775      4280            JMP     NSAVE           NOT THERE
004341  220011      4290            LAC     $CATX,X         GET THE DEVICE ADDRESS
004342  043227      4300            DAC     INDA            SAVE INPUT DA
004343  440011      4310            ISZ     $CATX           BYPASS LOC
004344  440011      4320            ISZ     $CATX           AND LEN
004345  220011      4330            LAC     $CATX,X         GET TCD
004346  043245      4340            DAC     WT              SAVE IT
004347  203240      4350            LAC     TEMP
004350  103247      4360            JMS     C$RCAT          READ IN OLD CATALOG
    004351          4370    GRO1    ...;
004351  223223      4380            LAC     CATP,X
004352  043232      4390            DAC     OUTDA           SET THE OUTPUT DEVICE ADDRESS
004353  103170      4400            JMS     COPY            COPY OVER FILE
004354  604771      4410            JMP     NXLT1
```

M LOADER COMMANDS

```
                    4420            .EJECT
                    4430    *       LOADER FORMATS -- BINARY
                    4440    *
                    4450    *       BINARY LOADS ABSOLUTE BINARY DATA FROM
                    4460    *       PAPER TAPE, DISK, OR TAPE
                    4470    *
004355  103271      4480    BINF    JMS     C$DEVCV         GET THE DEVICE NAME AND CONVERT IT TO HANDLER DEVICE ADDRESS FORMAT
004356  604366      4490            JMP     BINPPT          PAPER TAPE
004357  043227      4500            DAC     INDA            SET THE INPUT HANDLER DEVICE ADDRESS
    004360          4510            NUM                     GET BLOCK NUMBER
    004361          4520            FORMAT
004362  343227      4530            TAD     INDA
004363  043227      4540            DAC     INDA            SET THE INPUT FILE DEVICE ADDRESS
004364  143245      4550            DZM     WT              MAKE SURE WE GET A TCD
004365  604351      4560            JMP     GRO1            HANDLE LIKE GROWTH
                    4570    *
                    4580    *       LOAD FROM PAPER TAPE
                    4590    *
004366  777000      4600    BINPPT  LAW     -BMAX           GET BUFFER LENGTH
004367  043217      4610            DAC     BCOUNT          SAVE IT
004370  762167      4620            LAW     BUF-1           GET BUFFER POINTER
004371  040012      4630            DAC     CMDX            SAVE IT
004372  777777      4640            LAW     -1              COMPLEMENT LEN
004373  343230      4650            TAD     LEN
004374  740001      4660            CMA
004375  043230      4670            DAC     LEN
004376  223223      4680            LAC     CATP,X          GET OUTPUT DA
004377  043232      4690            DAC     OUTDA
004400  103174      4700    BINL    JMS     GETW            GET A WORD OF PPT
004401  604410      4710            JMP     BDONE           DONE IF READER IS NOT READY
004402  060012      4720            DAC     CMDX,X          SAVE IN BUFFER
004403  443230      4730            ISZ     LEN             SEE IF WE HAVE MORE
004404  741000      4740            SKP
004405  604410      4750            JMP     BDONE           NO
004406  443217      4760            ISZ     BCOUNT          COUNT AMOUNT IN BUFFER
004407  604400      4770            JMP     BINL            GET ANOTHER WORD IF NOT FULL
004410  775611      4780    BDONE   LAW     -BUF+1          GET ORIGINAL POINTER
004411  340012      4790            TAD     CMDX            COMPUTE AMOUNT TO WRITE
004412  043244      4800            DAC     TPARAM+2
004413  203232      4810            LAC     OUTDA           GET OUTPUT DA
004414  043242      4820            DAC     TPARAM
004415  346070      4830            TAD     (BMAX/BLKLEN)
004416  043232      4840            DAC     OUTDA           RESTORE NEW POINTER
004417  763242      4850            LAW     TPARAM          POINT TO PARAMETERS
004420  103172      4860            JMS     TPOT            OUTPUT TAPE
004421  203230      4870            LAC     LEN
004422  740200      4880            SZA
004423  604400      4890            JMP     BINL            LOOP
```

M LOADER COMMANDS

```
                    4900            .EJECT
                    4910    *
                    4920    *
                    4930    *       GET THE TRANSFER CARD
                    4940    *
    004424          4950    TCD     MESS    <TDC?>,4
    004431          4960            LINE                    READ THE REPLY
004432  760003      4970            LAW     3
004433  343223      4980            TAD     CATP
004434  043240      4990            DAC     TEMP            MOVE THE CATALOG POINTER TO THE TRANSFER CARD SLOT
    004435          5000            NUM                     GET THE NUMBER
004436  604424      5010            JMP     TCD             VACUOUS LINE -- ASK AGAIN
004437  345140      5020            TAD     JMPW            ADD A JUMP INSTRUCTION
    004440          5030    TCD1    ...,
004440  563240      5040            SAD     TEMP,X          CHECK AGAINST THE CURRENT ONE
004441  741000      5050            SKP
004442  442156      5060            ISZ     DSBALT          WE CHANGED THE CATALOG
004443  063240      5070            DAC     TEMP,X          SAVE THE NEW POINTER
004444  603714      5080            JMP     NEXTL           EXIT
```

M  LOADER COMMANDS

```
                    5090            .EJECT
                    5100    *
                    5110    *       LOADER FORMAST -- ABS
                    5120    *
                    5130    *       ABS LOADS A FILE IN ABSOLUTE ASSEMBLY FORMAT
                    5140    *
004445  143225      5150    ABSF    DZM     CKSUM           CLEAR RANDOM FLAGS
004446  143231      5160            DZM     NP
004447  143234      5170            DZM     P2
004450  143233      5180            DZM     OFFSET
004451  143224      5190            DZM     CBASE
004452  203222      5200            LAC     BOTM            GET CORE BOTM
004453  343230      5210            TAD     LEN             COMPUTE TOP
    004454          5220            NEG
004456  043241      5230            DAC     TOP
004457  143236      5240            DZM     PFLAG           CLEAR PPT FLAG
004460  103271      5250            JMS     CSDEVCV         GET THE DEVICE NAME AND CONVERT IT TO HANDLER DEVICE ADDRESS FORMAT
004461  604470      5260            JMP     PAPER           PAPER TAPE
004462  043227      5270            DAC     INDA            SET THE INPUT HANDLER DEVICE ADDRESS
    004463          5280            NUM                     GET THE BLOCK NUMBER
    004464          5290            FORMAT
004465  343227      5300            TAD     INDA            ADD IN THE DA
004466  043227      5310            DAC     INDA            SET THE INPUT FILE DEVICE ADDRESS
004467  604613      5320            JMP     ML01
                    5330    *
                    5340    *       PAPER TAPE
                    5350    *
    004470          5360    PAPER   ...
004470  143225      5370            DZM     CKSUM           CLEAR OUT OLD CHECKSUM
004471  443236      5380            ISZ     PFLAG           SET PAPER TAPE FLAG
    004472          5390            MESS    <MOUNT PAPER TAPE AND TYPE GO>,28.
    004507          5400            LINE
    004510          5410            CRLF                    MOVE TO A FRESH LINE
004511  103174      5420            JMS     GETW            GET THE FIRST WORD
004512  604470      5430            JMP     PAPER           RETRY TIMEOUTS
004513  505141      5440            AND     INSTM           MASK INSTRUCTION FIELD
004514  545137      5450            SAD     DACW            CHECK FOR DAC
004515  604533      5460            JMP     PL01            FOUND FIRST WORD
004516  700104      5470            RSA                     IGNORE LOADER
004517  700101      5480            RSF
004520  604517      5490            JMP     .-1
004521  700112      5500            RRB
004522  740200      5510            SZA
004523  604516      5520            JMP     .-5
004524  143225      5530            DZM     CKSUM           CLEAR CHECKSUM
004525  103174      5540    PL02    JMS     GETW            GET A WORD
004526  603764      5550            JMP     HARD            TIMEOUT
004527  505141      5560            AND     INSTM           MASK INSTRUCTION FIELD
004530  545137      5570            SAD     DACW            CHECK FOR DAC
004531  741000      5580            SKP
004532  604667      5590            JMP     LEND            END IF NOT
004533  203245      5600    PL01    LAC     WT              GET WORD
```

M  LOADER COMMANDS

```
004534  343233  5610          TAD     OFFSET          OFFSET IT
004535  506101  5620          AND     (17777)         TRIM TO ADDRESS
004536  045142  5630          DAC     ADD             SET LOAD ADDRESS
004537  103174  5640          JMS     GETW            GET A WORD OF SOURCE
004540  603764  5650          JMP     HARD            TIMEOUT
    004541      5660          NEG                     FORM - COUNT
004543  043226  5670          DAC     COUNT
004544  103174  5680          JMS     GETW            READ CHECKSUM
004545  603764  5690          JMP     HARD            TIMEOUT
004546  203225  5700          LAC     CKSUM           CHECK IT
004547  740200  5710          SZA                     OK
004550  604560  5720          JMP     CKERR           CHECKSUM ERROR
004551  103174  5730          JMS     GETW            GET A WORD
004552  603764  5740          JMP     HARD            TIMEOUT
004553  103201  5750          JMS     PUTW            PUT IT
004554  445142  5760          ISZ     ADD             COUNT ADDRESS
004555  443226  5770          ISZ     COUNT           COUNT WORDS
004556  604551  5780          JMP     .-5             LOOP
004557  604525  5790          JMP     PL02            LOOP
    004560      5800  CKERR   MESS    <CHECKSUM ERROR>,14.
004571  604470  5810          JMP     PAPER           TRY AGAIN
                5820  *
                5830  *       SUBROUTINE TO PLACE A WORD OF SOURCE IN CORE
                5840  *
    004572      5850          ENTER   PUTW
                              ,PMC    SAVE,ON
    003201              PUTW  ...
004572  043245  5860          DAC     WT              SAVE WORD TO PUT
004573  205142  5870          LAC     ADD             GET ADDRESS
004574  343224  5880          TAD     CBASE           ADD BASE OF CORE
004575  741100  5890          SPA                     CHECK FOR SMALL ADDRESS
004576  623201  5900          RET     PUTW
004577  205142  5910          LAC     ADD             GET ADDRESS
004600  346102  5920          TAD     (-TBUF)         CHECK IF REASONABLE
004601  740100  5930          SMA
004602  604606  5940          JMP     PUTW1           NO -- CHECK IF WE REALLY NEED TO LOAD THIS
004603  203245  5950          LAC     WT
004604  065142  5960          DAC     ADD,X           SET WORD
004605  623201  5970          RET     PUTW            RETURN
004606  205142  5980  PUTW1   LAC     ADD             CHECK IF ADDRESS IS IN BOUNDS
004607  343241  5990          TAD     TOP
004610  741100  6000          SPA
004611  443231  6010          ISZ     NP
004612  623201  6020          RET     PUTW
004613  203227  6030  ML01    LAC     INDA            GET INPUT BLOCK NUMBER
004614  043214  6040          DAC     BLOCK
004615  103203  6050          JMS     BUFIN           READ FIRST BUFFERS
004616  604633  6060          JMP     NBLOCK          TREAT LIKE NEW BLOCK
004617  443226  6070  ML02    ISZ     COUNT           COUNT WORDS IN THIS STRING
004620  741000  6080          SKP
004621  604633  6090          JMP     NBLOCK          READ NEW ONE
004622  443221  6100  ML03    ISZ     BWS             COUNT BUFFER WORDS
```

M  LOADER COMMANDS

```
004623  741000  6110            SKP
004624  103203  6120            JMS     BUFIN
004625  223220  6130            LAC     BUFA,X          GET NEXT WORD FROM BUFFER
004626  445142  6140            ISZ     ADD             INCREMENT ADDRESS
004627  740000  6150            NOP                     IN CASE OF - ADDRESSES
004630  443220  6160            ISZ     BUFA            AND BUFFER POINTER
004631  103201  6170            JMS     PUTW            OUTPUT IT
004632  604617  6180            JMP     ML02            LOOP
004633  203220  6190    NBLOCK  LAC     BUFA            GET BUFFER ADDRESS
004634  346103  6200            TAD     (377)           ROUND UP TO NEXT BLOCK
004635  506104  6210            AND     (17400)
004636  546105  6220            SAD     (BASE)          CHECK FOR END
004637  103203  6230            JMS     BUFIN           GET BUFFER IN IF SO
004640  203220  6240            LAC     BUFA            REPEAT THE PREVIOUS OPPERATION
004641  346103  6250            TAD     (377)
004642  506104  6260            AND     (17400)
004643  043220  6270            DAC     BUFA            SAVE IT
004644  773611  6280            LAW     -TBUF-1777
004645  343220  6290            TAD     BUFA            COMPUTE BUFFER COUNT
004646  043221  6300            DAC     BWS             SAVE
004647  223220  6310            LAC     BUFA,X          GET COUNT
004650  043226  6320            DAC     COUNT           SAVE AS SUCH
004651  443220  6330            ISZ     BUFA            INCREMENT COUNTER
004652  760100  6340            LAW     -17700          CHECK FOR VERY HIGH ADDRESS
004653  363220  6350            TAD     BUFA,X          WHICH SIGNNALS END OF BLOCK
004654  740100  6360            SMA
004655  604663  6370            JMP     MTCD            YES A TCD
004656  223220  6380            LAC     BUFA,X          GET ADDRESS AGAIN
004657  343233  6390            TAD     OFFSET
004660  045142  6400            DAC     ADD             SET IT
004661  443220  6410            ISZ     BUFA
004662  604617  6420            JMP     ML02            RETURN
004663  443220  6430    MTCD    ISZ     BUFA            INCREMENT BUFFER ADDRESS
004664  223220  6440            LAC     BUFA,X          GET WORD
004665  043245  6450            DAC     WT              SAVE
004666  604667  6460            JMP     LEND
                6470    *
                6480    *
                6490    *       END OF LOAD
                6500    *
    004667      6510    LEND    ...
004667  203234  6520            LAC     P2              CHECK IF PASS 2
004670  740200  6530            SZA
004671  604767  6540            JMP     P2L             FORCE BUFFER AND EXIT IF SO
004672  203223  6550            LAC     CATP            POINT TO CATALOG
004673  103172  6560            JMS     TPOT            WRITE IT OUT
004674  203231  6570            LAC     NP              CHECK FOR NEW PASS NEEDED
004675  741200  6580            SNA
004676  604771  6590            JMP     NXLT1           NO
004677  777700  6600            LAW     -100            SET CORE BASE
004700  043224  6610            DAC     CBASE
004701  766000  6620            LAW     -BASE+2000
```

M LOADER COMMANDS

```
004702  343222  6630            TAD     BOTM            CHECK FOR NOTHING LOADED AT ALL
004703  740100  6640            SMA
004704  604756  6650            JMP     LEND1
004705  203222  6660            LAC     BOTM            TRIM POINTER
004706  506103  6670            AND     (377)
004707  740200  6680            SZA
004710  346106  6690            TAD     (-400)
004711          6700            NEG
004713  346107  6710            TAD     (-TBUF+100)     FORM POINTER
004714  043233  6720            DAC     OFFSET
004715  203222  6730            LAC     BOTM
004716  740001  6740            CMA                     FORM PARAMETERS FOR FUTURE OUTPUT
004717  346110  6750            TAD     (TBUF+1)
004720  506104  6760            AND     (174000)        TRIM AGAIN
004721  043240  6770            DAC     TEMP
004722          6780            NEG
004724  343230  6790            TAD     LEN             DECREMENT LENGTH
004725  043244  6800            DAC     TPARAM+2
004726  203240  6810            LAC     TEMP            GET NUMBER OF BLOCKS PROCESSED
004727  660510  6820            LRSS    8.
004730  043240  6830            DAC     TEMP
004731  223223  6840            LAC     CATP,X          GET START BLOCK
004732  343240  6850            TAD     TEMP
004733  043242  6860            DAC     TPARAM          SET BLOCK NUMBER
004734  203236  6870  LEND2     LAC     PFLAG           SEE IF PPT
004735  443234  6880            ISZ     P2
004736  740200  6890            SZA
004737  604470  6900            JMP     PAPER
004740  604613  6910            JMP     ML01
                6920
004741          6930            ENTER   BUFIN
                                .PMC    SAVE,ON
003203                  BUFIN   ...
004741  764746  6940            LAW     .+5
004742  652000  6950            LMQ                     SET THE RESTART ADDRESS
004743  763214  6960            LAW     BPARAM          GET THE PARAMETER POINTER
004744  705003  6970            PREAD                   DO THE READ
004745  605223  6980            JMP     CSRCVR4         ERROR RETURN
004746  203214  6990            LAC     BLOCK           INCREMENT BLOCK NUMBER
004747  346075  7000            TAD     (4)
004750  043214  7010            DAC     BLOCK
004751  762170  7020            LAW     TBUF            GET POINTER BO BUFFER
004752  043220  7030            DAC     BUFA            SET BUFFER ADDRESS
004753  776000  7040            LAW     -2000           GET COUNT
004754  043221  7050            DAC     BWS             SET
004755  623203  7060            RET     BUFIN
004756  203222  7070  LEND1     LAC     BOTM            COMPUTE PROPER OFFSET FOR BIG LOWER BOUND
004757  740001  7080            CMA
004760  346111  7090            TAD     (101)
004761  043233  7100            DAC     OFFSET
004762  223223  7110            LAC     CATP,X
004763  043242  7120            DAC     TPARAM
```

M  LOADER COMMANDS

```
004764  203230  7130          LAC     LEN
004765  043244  7140          DAC     TPARAM+2        SET IT
004766  604734  7150          JMP     LEND2           EXIT LOAD END PROPERLY
004767  763242  7160    P2L   LAW     TPARAM          FLOSH CORE
004770  103172  7170          JMS     TPOT
004771          7180    NXLT1 ...
004771  760003  7190          LAW     3               GET THREE
004772  343223  7200          TAD     CATP
004773  043240  7210          DAC     TEMP
004774  203245  7220          LAC     WT              GET LAST THING PROCESSED
004775  505141  7230          AND     INSTM           GET INSTRUCTION
004776  545140  7240          SAD     JMPW            CHECK FOR JMP
004777  741000  7250          SKP
005000  604424  7260          JMP     TCD             GET TCD
005001  203245  7270          LAC     WT              GET WORD
005002  103273  7280          JMS     CSPAPER         CHECK FOR PAPER TAPE
005003  604470  7290          JMP     PAPER           YES
005004  604440  7300          JMP     TCD1            SET IT
```

M LOADER COMMANDS

```
                    7310            .EJECT
                    7320    *       PUNCH <TREE NAME>
                    7330    *
                    7340    *       PUNCH PUNCHES A HARDWARE LOADABLE BINARY TAPE OF THE FILE NAME
                    7350    *
005005  103266      7360    PUN     JMS     C$GNAME         GET A NAME
    005006          7370            FORMAT                  FORMAT ERROR -- PAPER TAPE NOT LEGAL FOR THIS OPERATION
005007  103254      7380            JMS     C$CATL          LOOK IT UP
005010  603775      7390            JMP     NSAVE           NOT SAVED
005011  143232      7400            DZM     OUTDA           SET NO FILE FLAG FOR COPY
005012  103210      7410            JMS     LEADER          GET SOME LEADER
005013  220011      7420            LAC     $CATX,X         GET THE DEVICE ADDRESS
005014  043227      7430            DAC     INDA            SAVE FOR COPY
005015  440011      7440            ISZ     $CATX           BYPASS STARTING LOCATION
005016  220011      7450            LAC     $CATX,X         GET LENGTH TO COPY
005017  043230      7460            DAC     LEN
005020  220011      7470            LAC     $CATX,X         LOAD THE TRANSFER CARD
005021  042000      7480            DAC     TEMP0           SAVE IT FOR NOW
005022  143205      7490            DZM     PUNF            SET  FORMAT TO NORMAL
005023  203230      7500    BUFN    LAC     LEN             GET LENGTH NOW
005024  741200      7510            SNA
005025  605044      7520            JMP     PUNX            END OF BUFFERS
    005026          7530            NEG                     MAKE 2'S COMPLEMENT
005030  043226      7540            DAC     COUNT           SAVE IT
005031  103170      7550            JMS     COPY            COPY FILE
005032  203230      7560            LAC     LEN             GET NEW LENGTH
005033  343226      7570            TAD     COUNT           FORM COUNT
005034  043226      7580            DAC     COUNT
005035  762167      7590            LAW     BUF-1           POINT TO BUFFER ADDRESS
005036  040012      7600            DAC     CMDX            SAVE IT
005037  220012      7610    PUNL    LAC     CMDX,X          GET A WORD
005040  103206      7620            JMS     PNCH            PUNCH IT
    005041          7630            LOOP    COUNT,PUNL      LOOP ON COUNTER
005043  605023      7640            JMP     BUFN            GET SOME MORE TO PUNCH
                    7650    *
                    7660    *       END OF PUNCHING
                    7670    *
005044  443205      7680    PUNX    ISZ     PUNF            SET FLAG FOR PUNCH ROUTINE
005045  202000      7690            LAC     TEMP0           RECOVER THE TRANSFER CARD
005046  103206      7700            JMS     PNCH            PUNCH AS LAST WORD
005047  103210      7710            JMS     LEADER
005050  603714      7720            JMP     NEXTL           GET NEXT LINE
                    7730    *
                    7740    *       SUBROUTINE TO PUNCH A WORD OF BINARY
                    7750    *
    003205          7760            .USE    IMPURE
003205  740040      7770    PUNF    XX                      FORMAT FLAG
    005051          7780            .USE    PURE
    005051          7790            ENTER   PNCH
                                    .PMC    SAVE,ON
    003206                  PNCH    ...
005051  652000      7800            LMQ                     PUT ARGUMENT AWAY
```

```
                M                                LOADER COMMANDS

                        7810            ,DUP    4,2
005052  640606  7820            LLS     6,
005053  700244  7830            PSB
005054  700201  7840            PSF
005055  605054  7850            JMP     .-1
005056  640606                  LLS     6,
005057  700244                  PSB
005060  700201                  PSF
005061  605060                  JMP     .-1
005062  760002  7860            LAW     2               GET A 2
005063  243205  7870            XOR     PUNF            GET FORMAT
005064  640606  7880            LLS     6,              FORM CHARACTER
005065  700204  7890            PSA                     PUNCH A CHARACTER
005066  700201  7900            PSF
005067  605066  7910            JMP     .-1
005070  623206  7920            RET     PNCH            RETURN
                        7930    *
                        7940    *       SUBROUTINE TO PUNCH LEADER/TRAILER
                        7950    *
    005071      7960            ENTER   LEADER
                                ,PMC    SAVE,ON
    003210              LEADER  ...;
005071  777500  7970            LAW     -300            2COUNT FOR LEADER
005072  043226  7980            DAC     COUNT
    005073      7990    LEAD1   ...;
005073  700214  8000            PSA+10                  PUNCH
005074  700201  8010            PSF
005075  605074  8020            JMP     .-1
    005076      8030            LOOP    COUNT,LEAD1
005100  623210  8040            RET     LEADER
                        8050    *
                        8060    *
                        8070    *       WRITE OUT THE BUFFER IF THE ALTERED FLAG IS ON
                        8080    *
    005101      8090            ENTER   FORCE
                                ,PMC    SAVE,ON
    003212              FORCE   ...;
005101  202156  8100            LAC     D$BALT          LOAD THE ALTERS FLAG
005102  142156  8110            DZM     D$BALT          CLEAR IT ON GENERAL PRINCIPLES
005103  741200  8120            SNA                     SKIP IF IT WAS SET
005104  623212  8130            RET     FORCE           ELSE EXIT
005105  103251  8140            JMS     C$RCOVR         SET UP THE ERROR RECOVERY
005106  203212  8150            LAC     FORCE           LOAD THE RETURN
005107  652000  8160            LMQ                     PASS IT TO THE EXEC
005110  762153  8170            LAW     D$BDA           LOAD A POINTER TO THE PARAMETERS
005111  705005  8180            PWRITE                  WRITE OUT THE BUFFER
005112  605223  8190            JMP     C$RCVR4         IN CASE OF ERROR
```

```
                M                                STORAGE

                        8200                     .STITL  STORAGE
                        8210     *
            005113      8220     COMTB   ...
005113      435445      8230             435445
005114      604116      8240             JMP     CLE
005115      655663      8250             655663
005116      604163      8260             JMP     UNS
005117      606562      8270             606562
005120      604176      8280             JMP     PUR
005121      544465      8290             544465
005122      604203      8300             JMP     LDU
005123      700000      8310             700000
005124      604174      8320             JMP     EXIT
005125      457051      8330             457051
005126      604174      8340             JMP     EXIT
005127      634166      8350             634166
005130      604256      8360             JMP     SAV
005131      624560      8370             624560
005132      604307      8380             JMP     REP
005133      606556      8390             606556
005134      605005      8400             JMP     PUN
005135      456262      8410             .AC16   /ERR/
005136      603734      8420             JMP     ERROR
            005137      8430     COME    ...
005137      040000      8440     DACW    DAC     0
005140      600000      8450     JMPW    JMP     0
005141      740000      8460     INSTM   740000
005142      000000      8470     ADD     0
            003214      8480             .USE    IMPURE
            003214      8490     BLOCK   ...
003214      000000      8500     BPARAM  .DATA   0,TBUF,TBFL
003215      002170
003216      001000
003217      000000      8510     BCOUNT  0
003220      000000      8520     BUFA    0
003221      000000      8530     BWS     0
003222      000000      8540     BQTM    0
003223      000000      8550     CATP    0
003224      000000      8560     CBASE   0
003225      000000      8570     CKSUM   0
003226      000000      8580     COUNT   0
003227      000000      8590     INDA    0
003230      000000      8600     LEN     0
003231      000000      8610     NP      0
003232      000000      8620     OUTDA   0
003233      000000      8630     OFFSET  0
003234      000000      8640     P2      0
003235      000000      8650     PARW    0
003236      000000      8660     PFLAG   0
003237      000000      8670     PTMP    0
003240      000000      8680     TEMP    0
003241      000000      8690     TOP     0
```

```
                M                                   STORAGE

003242  000000  8700    TPARAM  .DATA   0,BUFFER,0
003243  002170
003244  000000
003245  000000  8710    WT      0
    005143      8720            .USE    PURE
                8730            .HEAD
                8740            .INSRT  MTSSCAT
```

DESCRIPTION OF THE GROWTH SYSTEM CATALOG STRUCTURE

```
100             .STITL  DESCRIPTION OF THE GROWTH SYSTEM CATALOG STRUCTURE
110             .HEAD   C
120
130
140     *
150     *       MAJOR REVISION -- JAN 21, 1972 BY ROBERT W. BLEAN
160     *
170     *       A GROWTH CATALOG FOR A FILE-ORIENTED DEVICE IS LOCATED IN THE 400 WORDS
180     *       OF LOGICAL BLOCK 1 OF THE LOGICAL DEVICE; THIS PERMITS DISK AND DECTAPE
190     *       TO BE USED INTERCHANGEABLY BY THE GROWTH SYSTEM PROGRAMS.
200     *
210     *       THE DEVICE ADDRESS OF A HANDLER IS THE HANDLER NUMBER IN BITS 0-2
220     *       AND THE TYPE (DISK (1) OR DECTAPE (0)) IN BIT 3.
230     *
240     *       THE DEVICE ADDRESS OF A FILE IS THE DEVICE ADDRESS OF THE HANDLER IT
250     *       IS ON PLUS IN BITS 8-17 ITS STARTING BLOCK NUMBER.
260     *
270     *       ALL DEVICE ADDRESSES IN A DECTAPE CATALOG ARE CORRECT FOR THE HANDLER
280     *       THE TAPE WAS MOUNTED ON THE LAST TIME IT WAS ALTERED.
290     *
300     *       THE FIRST FOUR WORDS OF THE CATALOG BLOCK ARE A HEADER:
310     *            1) THE DEVICE ADDRESS OF THE FIRST FREE BLOCK ON THE DEVICE
320     *            2) POINTER TO THE FIRST FREE WORD IN THE CATALOG MINUS ONE PLUS THE CATALOG'S CORE ADDRESS
330     *            3) TWOS COMPLEMENT COUNT OF THE NUMBER OF FILES CATALOGED
340     *            4) TWOS COMPLEMENT MAXIMUM BLOCK NUMBER ON THE DEVICE
350     *
360     *       THE REMAINDER OF THE CATALOG CONSISTS OF A SERIES OF FIVE WORD FILE-
370     *       CONTROL BLOCKS, THE FIRST FILE CONTROL BLOCK IS FOR THE CATALOG ITSELF.
380     *       THEN THERE IS ONE FILE CONTROL BLOCK FOR EACH FILE ON THE DEVICE.
390     *
400     *       FORMAT OF THE FILE CONTROL BLOCKS:
410     *            1) THE FIRST WORD IS THE SIXBIT ASCII (EIGHTBIT ASCII - 240)
420     *               FILENAME. THIS MEANS THE FILENAME IS RESTRICTED TO THREE
430     *               CHARACTERS, WITH NO EXTENSION OR PASSWORD.
440     *            2) THE DEVICE ADDRESS OF THE FILE.
450     *            3) THE FILE'S CORE ADDRESS
460     *            4) THE FILE'S LENGTH (IN WORDS)
470     *            5) THE PROGRAM START
480     *
490     *       THIS LEAVES TWO WORDS OF THE CATALOG BLOCK UNUSED. IT IS SUGGESTED THAT
500     *       THE SECOND OF THESE CONTAIN THE BLOCK NUMBER OF A CONTINUATION OF THE
510     *       CATALOG, SHOULD THIS EVER BE NECESSARY; IT WOULD BE ZERO IF THERE
520     *       IS NO CONTINUED CATALOG BLOCK.
```

```
C                                   GROWTH SYSTEM STANDARD CATALOG ROUTINES

                    530             ,STITL  GROWTH SYSTEM STANDARD CATALOG ROUTINES
     003246         540             ,USE    IMPURE
                    550
003246  000000      560     CTEM1   ,DSA                    CATALOG ROUTINE'S PRIVATE TEMP
     005143         570             ,USE    PURE
                    580
                    590
                    600     *
                    610     *       RCAT -- THE BASIC CATALOG ROUTINE, IT READS IN CATALOGS AND UPDATES THEM
                    620     *       FOR THE CURRENT DEVICE AND (POSSIBLY NON-STANDARD) CATALOG LOCATION.
                    630     *
                    640     *
                    650     *       A HANDLER DEVICE ADDRESS IS PASSED IN THE AC, THE REQUESTED
                    660     *       CATALOG IS READ IN AND ALL OF THE DEVICE ADDRESSES ARE UPDATED.
                    670     *       AS A RESULT, THE CATALOG IN CORE ALWAYS HAS THE PROPER DEVICE ADDRESSES
                    680     *       FOR THE DEVICE IT WAS READ FROM.
                    690     *
                    700     *       RETURN IS +1 WHEN THE DESIRED CATALOG IS IN CORE.
                    710     *
                    720     *       IN THE EVENT OF UNRECOVERABLE ERROR, EXIT IS TO AN ERROR ROUTINE.
                    730     *
     005143         740             ENTER   RCAT
                                    .PMC    SAVE,ON
     003247                 RCAT    ...
005143  043246      750             DAC     CTEM1           SAVE THE DEVICE ADDRESS OF THE DEVICE WHOSE CATALOG IS BEING REQUESTED
005144  103212      760             JMS     M$FORCE         FORCE THE OLD BUFFER BEFORE READING A NEW ONE
                    770
     005145         780     RCAT1   ...
005145  203246      790             LAC     CTEM1
005146  506112      800             AND     (DVCMSK)        GET THE NEW HANDLER'S DEVICE ADDRESS
005147  042153      810             DAC     D$BDA           SET THE HANDLER DEVICE ADDRESS
005150  506072      820             AND     (040000)        RECOVER JUST THE DISK/DECTAPE BIT
005151  740200      830             SZA                     SKIP FOR DECTAPE
005152  206113      840             LAC     ($SYSBAS)       ELSE LOAD THE DISK SYSTEM BASE ADDRESS
005153  242153      850             XOR     D$BDA           ADD THE BASE ADDRESS INTO THE HANDLER DEVICE ADDRESS
005154  246071      860             XOR     ($CATBLK)       ADD IN THE CATALOG BLOCK NUMBER
005155  042153      870             DAC     D$BDA           SAVE THE NEW CATALOG'S DEVICE ADDRESS
005156  762170      880             LAW     BUFFER          LOAD A POINTER TO THE BUFFER
005157  042154      890             DAC     D$BCA           SET IT AS THE CORE ADDRESS
005160  206074      900             LAC     (400)           LOAD THE LENGTH
005161  042155      910             DAC     D$BLEN          SET IT AS THE BUFFER LENGTH
005162  103251      920             JMS     C$RCOVR         SET UP THE ERROR RECOVERY
005163  765170      930             LAW     RCAT3
005164  652000      940             LMQ                     LOAD THE RESTART ADDRESS
005165  762153      950             LAW     D$BDA           GET A POINTER TO THE CATALOG PARAMETERS
005166  705003      960             PREAD                   READ IN THE NEW CATALOG
005167  605223      970             JMP     RCVR4           IN CASE OF ERROR
                    980     *
                    990     *       NOW UPDATE THE DEVICE ADDRESSES
                    1000    *
005170  203246      1010    RCAT3   LAC     CTEM1
005171  506112      1020            AND     (DVCMSK)
```

C GROWTH SYSTEM STANDARD CATALOG ROUTINES

```
005172  043246  1030            DAC     CTEM1           SET THE CURRENT DEVICE ADDRESS
                1040
005173  202170  1050            LAC     CATLOG
005174  506114  1060            AND     (BLKMSK)
005175  243246  1070            XOR     CTEM1
005176  042170  1080            DAC     CATLOG          UPDATE THE OLD DEVICE ADDRESS OF THE FIRST FREE BLOCK
                1090
005177  762175  1100            LAW     CATLOG+5
005200  043212  1110            DAC     M$FORCE
005201  043254  1120            DAC     CATL            SET POINTERS TO THE FIRST OLD DEVICE ADDRESS
005202  202172  1130            LAC     CATLOG+2
005203  043251  1140            DAC     RCOVR           SET THE COUNT OF FCB'S
                1150
005204  223212  1160    RCAT4   LAC     M$FORCE,X       LOAD THE NEXT OLD DEVICE ADDRESS
005205  506114  1170            AND     (BLKMSK)        RECOVER THE BLOCK NUMBER
005206  243246  1180            XOR     CTEM1           ADD IN THE CURRENT HANDLER DEVICE ADDRESS
005207  063254  1190            DAC     CATL,X          SAVE THE UPDATED FILE DEVICE ADDRESS
                1200
005210  443251  1210            ISZ     RCOVR           COUNT THE FILES DONE
005211  741000  1220            SKP
005212  623247  1230            JMP     RCAT,X          ALL DONE
                1240
005213  203212  1250            LAC     M$FORCE         LOAD THE FCB POINTER
005214  346115  1260            TAD     (FCBLEN)        ADVANCE IT TO THE NEXT FCB
005215  043212  1270            DAC     M$FORCE
005216  043254  1280            DAC     CATL            SAVE THE NEW POINTER
005217  605204  1290            JMP     RCAT4           LOOP
```

C GROWTH SYSTEM STANDARD CATALOG ROUTINES

```
                    1300            .EJECT
                    1310
                    1320
                    1330
     005220         1340            ENTER   RCOVR           SUBROUTINE TO SET UP RECOVERY FROM HARDWARE ERRORS
                                    .PMC    SAVE,ON
     003251                 RCOVR   ...,
005220   777776     1350            LAW     -2              SET FOR FIVE RETRIES BEFORE GIVING UP
005221   043253     1360            DAC     ERCNT
005222   623251     1370            JMP     RCOVR,X
                    1380
     005223         1390    RCVR4   MESS    <DEVICE ERROR>,12.
005233   443253     1400            ISZ     ERCNT           COUNT THE ERROR
005234   623251     1410            JMP     RCOVR,X
     005235         1420    RCVR5   MESS    <TYPE 'IGNORE' OR 'CONTINUE': >,29.
     005253         1430            LINE                    GET THE USER'S ANSWER TO WHAT HE WANTS TO DO ABOUT IT
     005254         1440            WORD                    READ HIS ANSWER
005255   605235     1450            JMP     RCVR5           NO INPUT IS ILLEGAL
005256   545263     1460            SAD     IGN
005257   603714     1470            JMP     $NEXTL          IGNORE THE LAST COMMAND
005260   545264     1480            SAD     CON
005261   603252     1490            JMP     RCOVR+1         SET UP TO TRY AGAIN
005262   605235     1500            JMP     RCVR5           ANY OTHER ANSWER IS ILLEGAL
     003253         1510            .USE    IMPURE
003253   000000     1520    ERCNT   .DSA
     005263         1530            .USE    PURE
005263   514756     1540    IGN     .ACI6   *IGN*
005264   435756     1550    CON     .ACI6   *CON*
```

C GROWTH SYSTEM STANDARD CATALOG ROUTINES

```
                    1560            .EJECT
                    1570    *
                    1580    *       CATL
                    1590    *
                    1600    *       CATL SEARCHES THE CATALOG IN CORE FOR THE FILENAME
                    1610    *       PASSED IN THE AC
                    1620    *
                    1630    *       RETURN +2 WITH CATX POINTING TO THE FILE NAME IF SUCCESSFUL
                    1640    *
                    1650    *       RETURN +1 WITH CATX POINTING TO THE FIRST FREE SPACE -1 IN THE
                    1660    *       CATALOG IF THE FILE NAME IS NOT FOUND
                    1670    *
    005265          1680            ENTER   CATL
                                    .PMC    SAVE,ON
    003254                  CATL    ...
005265  043301      1690            DAC     TSWORDB         SAVE CATALOG NAME
                    1700    *
                    1710    *       FIRST CHECK WHETHER OR NOT THIS IS A SPECIAL FILE
                    1720    *
005266  203270      1730            LAC     CDFLG           LOAD THE CORE/DISK SPECIAL FILE FLAG
005267  741200      1740            SNA                     SKIP IF IT IS SET
005270  605312      1750            JMP     CATL1           NO -- THEREFORE IT IS A NORMAL FILE
                    1760    *
                    1770    *       FIND OUT WHICH KIND OF SPECIAL FILE WE ARE TALKING ABOUT
                    1780    *
    005271          1790            WORD1
005272  543256      1800            SAD     CORE
005273  605331      1810            JMP     CORE1           IT IS THE USER CORE FILE
005274  543262      1820            SAD     DISK
005275  605343      1830            JMP     DISK1           IT IS THE USER DISK FILE
    005276          1840            MESS    <ILLEGAL SPECIAL FILE>;20,
005311  603714      1850            JMP     MSNEXTL         GET THE NEXT COMMAND
                    1860    *
                    1870    *       NEXT CHECK FOR NORMAL FILES
                    1880    *
005312  762173      1890    CATL1   LAW     CATLOG+3
005313  040011      1900            DAC     SCATX           SET A POINTER TO THE FIRST FCB IN THE CATALOG AUTO-INDEX REGISTER
005314  202172      1910            LAC     CATLOG+2        GET CATALOG COUNT
005315  043246      1920            DAC     CTEM1           SAVE IT
    005316          1930    CATLL   WORD1                   RESTORE NAME TO SEARCH FOR
005317  560011      1940            SAD     SCATX,X         CHECK IT
005320  605327      1950            JMP     CATL9           FOUND IT
005321  200011      1960            LAC     SCATX
005322  346075      1970            TAD     (FCBLEN-1)      FAILED -- MOVE THE POINTER TO THE NEXT FILE CONTROL BLOCK
005323  040011      1980            DAC     SCATX
005324  443246      1990            ISZ     CTEM1           COUNT
005325  605316      2000            JMP     CATLL           LOOP
005326  623254      2010            JMP     CATL,X          EXHAUSTED, NO FILE FOUND -- BAD RETURN
005327  443254      2020    CATL9   ISZ     CATL            GOOD RETURN
005330  623254      2030            JMP     CATL,X
                    2040    *
                    2050    *       SPECIAL CATALOG AND ROUTINES  FOR THE USER CORE IMAGE
```

C GROWTH SYSTEM STANDARD CATALOG ROUTINES

```
                    2060    *
     003256         2070            .USE    IMPURE

 003256  435762     2080    CORE    .ACI6   *COR*
 003257  000000     2090    CORDA   .DSA                    DISK ADDRESS OF THE USER CORE IMAGE
 003260  002000     2100    CORCA   BOUNDARY                STARTING CORE ADDRESS OF THE USER CORE
 003261  014000     2110    CORLN   CORMAX-BOUNDARY         LENGTH OF USER CORE
                    2120
     005331         2130            .USE    PURE
     005331         2140    CORE1   ...                     SET UP THE USER CORE IMAGE AS A FILE
     005331         2150            MPOFF
                                    .PMC    SAVE,ON
 005331  705000                     SPECIAL+0               TURN OFF MEMORY PROTECT
 005332  201766     2160            LAC     $UCORE          LOAD THE USER CORE IMAGE DISK ADDRESS
 005333  744000     2170            CLL                     PROTECT THE SHIFT
 005334  640510     2180            LRS     8,              MAKE THE PHYSICAL ADDRESS INTO A BLOCK ADDRESS
 005335  246072     2190            XOR     (040000)        SET THE DISK BIT ON
 005336  043257     2200            DAC     CORDA           SET IT IN THE TEMPORARY CATALOG
 005337  701742     2210            MPEU                    RE-ENABLE USER MODE
 005340  763256     2220            LAW     CORE            LOAD A POINTER TO THE CATALOG
 005341  040011     2230            DAC     $CATX           AND PASS IT TO THE CALLER
 005342  605327     2240            JMP     CATL9           EXIT
                    2250    *
                    2260    *       SPECIAL CATALOG AND ROUTINES FOR  THE USER "PHYSICAL DISK"
                    2270    *
     003262         2280            .USE    IMPURE
 003262  445163     2290    DISK    .ACI6   *DIS*
 003263  000000     2300    DISDA   .DSA                    DISK ADDRESS OF THE USER "PHYSICAL DISK
 003264  000000     2310    DISCA   0                       MINIMUM USER "PHYSICAL DISK" ADDRESS
 003265  016000     2320    DISLN   $DKLEN                  LENGTH OF THE USER "PHYSICAL DISK"
                    2330
     005343         2340            .USE    PURE
     005343         2350    DISK1   ...
     005343         2360            MPOFF
                                    .PMC    SAVE,ON
 005343  705000                     SPECIAL+0               TURN OFF MEMORY PROTECT
 005344  201767     2370            LAC     $UDISK          LOAD THE USER "PHYSICAL DISK" DISK ADDRESS
 005345  744000     2380            CLL                     PROTECT THE SHIFT
 005346  640510     2390            LRS     8,              MAKE THE PHYSICAL ADDRESS INTO A DISK ADDRESS
 005347  246072     2400            XOR     (040000)        SET THE DISK BIT ON
 005350  043263     2410            DAC     DISDA           AND SET IT IN THE TEMPORARY CATALOG
 005351  701742     2420            MPEU                    RE-ENABLE USER MODE
 005352  763262     2430            LAW     DISK            LOAD A POINTER TO THE CATALOG
 005353  040011     2440            DAC     $CATX           PASS IT TO THE CALLER
 005354  605327     2450            JMP     CATL9           EXIT
```

C GROWTH SYSTEM STANDARD CATALOG ROUTINES

```
                    2460            .EJECT
                    2470    *
                    2480    *       GNAME
                    2490    *
                    2500    *       GNAME GETS A FILE NAME FROM THE TTY BUFFER
                    2510    *       AND READS IN THE CATALOG IF NECESSARY
                    2520    *
                    2530    *       RETURN IS +1 FOR PAPER TAPE DESIRED
                    2540    *       RETURN IS +2 FOR SUCCESS ON DISK OR DECTAPE
                    2550    *       OTHERWISE EXIT IS TO FORMAT ERROR
                    2560    *
                    2570    *       THE FILE NAME IS RETURNED IN T$WORDB AND IN THE AC.
                    2580    *
    005355          2590            ENTER   GNAME
                                    .PMC    SAVE,ON
    003266                  GNAME   ...
005355  143270      2600            DZM     CDFLG           INITIALIZE THE SPECIAL FILE FLAG
    005356          2610            WORD                    GET A WORD OF SIX BIT ASCII
005357  605412      2620            JMP     GNAM90          CHECK FOR A SPECIAL FILE IF A DELIMITER IS FIRST CHARACTER
    005360          2630            DELIM                   GET THE DELIMITER
005361  546116      2640            SAD     ($COLON)        CHECK FOR COLON
005362  605366      2650            JMP     GNAM2
005363  103273      2660    GNAM1   JMS     PAPER           CHECK FOR PAPER TAPE
005364  623266      2670            JMP     GNAME,X         YES -- PAPER TAPE
005365  605376      2680            JMP     GNAM5           NO -- SO USE CURRENT CATALOG
                    2690
005366  765372      2700    GNAM2   LAW     GNAM3
005367  043271      2710            DAC     DEVCV
    005370          2720            WORD1                   RELOAD THE CATALOG NAME
005371  605426      2730            JMP     DEVC3           CONVERT IT TO A DEVICE ADDRESS
005372  623266      2740    GNAM3   JMP     GNAME,X
005373  103247      2750            JMS     RCAT            READ IN THE CATALOG
    005374          2760            WORD                    GET ANOTHER WORD
005375  740000      2770            NOP
    005376          2780    GNAM5   DELIM                   GET THE DELIMITER
005377  546117      2790            SAD     ($SLASH)        CHECK FOR SLASH
005400  605405      2800            JMP     GNAME6          LOOK FOR OCTAL
    005401          2810            WORD1                   ELSE RECOVER THE SIXBIT NAME
005402  741200      2820            SNA                     CHECK FOR ALL SPACES
    005403          2830            FORMAT                  FORMAT ERROR -- ALL SPACES IS AN ILLEGAL NAME
005404  605410      2840            JMP     GNAM8
    005405          2850    GNAME6  NUM                     GET THE NUMBER
    005406          2860            FORMAT

005407  043301      2870            DAC     T$WORDB         TO BE COMPATABLE WITH SIXBIT INPUT
005410  443266      2880    GNAM8   ISZ     GNAME           GOOD RETURN
005411  623266      2890            JMP     GNAME,X
                    2900    *
                    2910    *
                    2920    *       CHECK FOR A SPECIAL FILE REQUEST (E.G. 'CORE' OR 'DISK')
                    2930    *
    003270          2940            .USE    IMPURE
003270  000000      2950    CDFLG   .DSA                    FLAG FOR PRESENCE OF SPECIAL FILE REQUEST
```

C GROWTH SYSTEM STANDARD CATALOG ROUTINES

```
005412          2960            .USE    PURE
                2970
005412          2980    GNAM90  ...
005412          2990            DELIM                   RECOVER THE DELIMITER
005413  546116  3000            SAD     ($COLON)        CHECK FOR A VACUOUS COLON
005414  741000  3010            SKP                     YES -- IT IS A SPECIAL FILE
005415  605363  3020            JMP     GNAM1           NO -- RETURN TO NORMAL PROCESSING
                3030
005416  206120  3040            LAC     ($DK0)          LOAD THE IMPLIED SYSTEM DISK MNEMONIC
005417  043301  3050            DAC     T$WORDB         FAKE THAT IT WAS TYPED
005420  443270  3060            INX     CDFLG           FLAG THE SPECIAL FILE REQUEST
005421  605366  3070            JMP     GNAM2           RESUME NORMAL PROCESSING OF THE FAKED INPUT
```

C GROWTH SYSTEM STANDARD CATALOG ROUTINES

```
                    3080            .EJECT
                    3090    *
                    3100    *       DEVCV -- READS THE NEXT WORD.
                    3110    *       RETURN IS +1 WITH THE NAME IN THE AC IF IT IS A PAPER TAPE CALL
                    3120    *
                    3130    *       OTHERWISE IT ATTEMPTS TO CONVERT THE NAME TO DEVICE ADDRESS FORMAT.
                    3140    *       IF SUCCESSFUL, IT RETURNS +2 WITH THE HANDLER NUMBER IN AC(0-2) AND
                    3150    *       THE DEVICE TYPE (DISK (1) OR DECTAPE (0)) IN AC(3). REMAINING BITS
                    3160    *       ARE ZEROED.
                    3170    *
                    3180    *       EXIT IS TO THE FORMAT ERROR MESSAGE IF THE DEVICE IS NEITHER PAPER TAPE
                    3190    *       NOR DISK NOR DECTAPE.
                    3200    *
    005422          3210            ENTER   DEVCV
                                    .PMC    SAVE,ON
    003271                  DEVCV   ...
    005422          3220            WORD                    GET THE DEVICE NAME
    005423          3230            FORMAT
005424  103273      3240            JMS     PAPER           CHECK FOR PAPER TAPE
005425  623271      3250            JMP     DEVCV,X         YES -- PAPER TAPE
005426  506121      3260    DEVC3   AND     (777700)        REMOVE DEVICE NUMBER
005427  546122      3270            SAD     ($TP.)          CHECK FOR DECTAPE
005430  605440      3280            JMP     DEVC1           YES
005431  546123      3290            SAD     ($DT.)          CHECK FOR DECTAPE
005432  605440      3300            JMP     DEVC1
005433  546124      3310            SAD     ($DK.)          CHECK FOR DISK
005434  605446      3320            JMP     DEVC4           IT IS DISK -- CKECK FOR VALIDATION
005435  603723      3330            JMP     MSMONX2         NO OTHERS -- MAYBE IT IS A COMMAND
005436  650004      3340    DEVC35  CLQ!CMQ                 FOR DISK PUT THE SIGN BIT ON IN THE MQ
005437  741000      3350            SKP
005440  650000      3360    DEVC1   CLQ                     CLEAR Q FOR TAPE
    005441          3370            WORD1                   RESTORE NAME
005442  640617      3380            LLS     18.-3           SHIFT TO POSITION
005443  506112      3390            AND     (DVCMSK)        CONVERT TO HANDLER DEVICE ADDRESS FORMAT
005444  443271      3400            ISZ     DEVCV           INCREMENT RETURN
005445  623271      3410            JMP     DEVCV,X         AND NOW RETURN
                    3420    *
                    3430    *
                    3440    *       DISK FILE OPERATIONS ARE PERMITTED ONLY FOR VALIDATED USERS
                    3450    *
    005446          3460    DEVC4   ...
    005446          3470            MPOFF
                                    .PMC    SAVE,ON
005446  705000                      SPECIAL+0               TURN OFF MEMORY PROTECT
005447  201770      3480            LAC     SVALID          LOAD THE USER'S VALIDATION WORD
005450  701742      3490            MPEU
005451  740200      3500            SZA                     SKIP IF THE USER IS NOT VALIDATED
005452  605436      3510            JMP     DEVC35          ELSE THE OPERATION CAN PROCEED
                    3520    *
                    3530    *       CHECK FOR A SPECIAL FILE OPERATION -- IF SO, IT IS ALLOWED
                    3540    *
005453  203270      3550            LAC     CDFLG           LOAD THE SPECIAL FILE FLAG
```

```
                C                       GROWTH SYSTEM STANDARD CATALOG ROUTINES

005454  740200  3560            SZA                     SKIP IF NOT SET -- THEN THE OPERATION IS ILLEGAL
005455  605436  3570            JMP     DEVC35          IT IS A SPECIAL FILE OPERATION, SO ALLOW IT
                3580    *
                3590    *       DISK OPERATION IS ILLEGAL
                3600    *
    005456      3610            MESS    <DISK OPERATION IS FORBIDDEN>,27,
005473  603714  3620            JMP     MSNEXTL         GET THE NEXT COMMAND LINE
                3630    *
                3640    *       PAPER CHECKS THE AC FOR A PAPER TAPE MNEMONIC. IT RETURNS +1 IF IT
                3650    *       FINDS ONE, ELSE RETURNS +2. THE AC IS UNCHANGED.
                3660    *
    005474      3670            ENTER   PAPER
                                ,PMC    SAVE,ON
    003273              PAPER   ...,
005474  546125  3680            SAD     ($PPT)
005475  623273  3690            JMP     PAPER,X
005476  546126  3700            SAD     ($PTR)
005477  623273  3710            JMP     PAPER,X
005500  546127  3720            SAD     ($PTP)
005501  623273  3730            JMP     PAPER,X
005502  443273  3740            ISZ     PAPER           NO PAPER TAPE MNEMONIC
005503  623273  3750            JMP     PAPER,X
```

C GROWTH SYSTEM STANDARD CATALOG ROUTINES

```
                    3760            ,EJECT
                    3770    *
                    3780    *       SAVE CHECKS THE CATALOG FOR THE NAME FOUND IN THE AC
                    3790    *
                    3800    *       RETURN IS +1 IF THE FILE IS ALREADY SAVED
                    3810    *       A CATALOG ENTRY IS CREATED FOR THE NAME AND RETURN IS +2 OTHERWISE
                    3820    *       EXITS TO AN ERROR MESSAGE IF THE CATALOG IS FULL
                    3830    *
                    3840    *       ON RETURN CATX POINTS TO THE FILE NAME IN THE CATALOG
                    3850    *
    005504          3860            ENTER   SAVE
                                    .PMC    SAVE,ON
    003275                  SAVE    ...,
005504  103254      3870            JMS     CATL            LOOK UP NAME
005505  741000      3880            SKP
005506  623275      3890            JMP     SAVE,X          DON;T ALLOW DUPLICATES
005507  202172      3900            LAC     CATLOG+2        LOAD THE FCB COUNT
005510  546130      3910            SAD     (CATMAX)        CHECK FOR CATALOG ALREADY FULL
005511  605524      3920            JMP     CFULL           YES -- EXIT TO ERROR MESSAGE
005512  346131      3930            TAD     (-1)            COUNT THE NEW FILE
005513  042172      3940            DAC     CATLOG+2        UPDATE THE FCB COUNT
005514  202171      3950            LAC     CATLOG+1        GET FREE POINTER
005515  346115      3960            TAD     (FCBLEN)        ADD ONE FILE CONTROL BLOCK LENGTH FOR THE NEW ENTRY
005516  042171      3970            DAC     CATLOG+1
    005517          3980            WORD1                   RECOVER THE FILE NAME
005520  060011      3990            DAC     SCATX,X         SAVE IT
005521  442156      4000            ISZ     DSBALT          FLAG THE CATALOG HAS BEEN ALTERED
005522  443275      4010            ISZ     SAVE
005523  623275      4020            JMP     SAVE,X
                    4030
    005524          4040    CFULL   MESS    <CATALOG FULL>,12.
005534  603714      4050            JMP     $NEXTL
                    4060    *
                    4070    *       ALC RECEIVES A WORD COUNT IN THE AC AND CALCULATES THE LEAST INTEGER
                    4080    *       NUMBER OF BLOCKS THAT CAN HOLD THAT LENGTH. IT THEN ALLOCATES THE STORAGE
                    4090    *       IN THE CORE CATALOG HEADER AND RETURNS WITH THE DEVICE ADDRESS OF THE
                    4100    *       FIRST FREE BLOCK IN THE AC.
                    4110    *
                    4120    *       EXIT IS TO AN ERROR MESSAGE IF THIS ALLOCATION WOULD RESULT IN
                    4130    *       OVERFLOWING THE DEVICE. IN THIS CASE THE CATALOG IS UNALTERED.
                    4140    *
    005535          4150            ENTER   ALC
                                    .PMC    SAVE,ON
    003277                  ALC     ...,
005535  346103      4160            TAD     (377)           ROUND UP TO A BLOCK
005536  660510      4170            LRSS    8.              AC = MINIMUM INTEGER NUMBER OF BLOCKS REQUIRED
005537  043246      4180            DAC     CTEM1           SAVE IN A GOOD RANDOM PLACE
005540  202170      4190            LAC     CATLOG          GET THE POINTER TO THE FIRST FREE BLOCK
005541  652000      4200            LMQ                     SAVE IT
005542  343246      4210            TAD     CTEM1           ADD THE REQUESTED NUMBER OF BLOCKS TO FORM A NEW POINTER
005543  043246      4220            DAC     CTEM1           SAVE THE NEW POINTER
005544  506114      4230            AND     (1777)          EXTRACT BLOCK NUMBER
```

C GROWTH SYSTEM STANDARD CATALOG ROUTINES

```
005545  342173  4240            TAD     CATLOG+3        SEE IF WE OVERFLOWED THE DEVICE
005546  740100  4250            SMA                     NO IF SKP
005547  605554  4260            JMP     DFULL           FULL -- HELP*?!*
005550  203246  4270            LAC     CTEM1
005551  042170  4280            DAC     CATLOG          SET THE FREE FCB POINTER NOW WE KNOW IT WILL BE OK
005552  641002  4290            LACQ                    RESTORE THE DEVICE ADDRESS OF THE FIRST FREE BLOCK
005553  623277  4300            JMP     ALC,X
                4310
  005554        4320    DFULL   MESS    <DEVICE FULL>,11.
005564  603714  4330            JMP     $NEXTL
                4340            .END
                8750            .HEAD
                8760            .INSRT  :DLIBRARY:PDP9LIB:TTYNON
                100             .INE    $DEBUG,1
                120             .IFE    $DEBUG,1
```

MTSS-PDP9 NON-INTERRUPTING TELETYPE HANDLER

```
130             .STITL  MTSS-PDP9 NON-INTERRUPTING TELETYPE HANDLER
140             .HEAD   T
150     *
160     *
170     *       PROGRAMMED BY ROBERT W. BLEAN
180     *
190     *
200     *       LAST REVISED 24 MARCH 1972
210     *
220     *
230     *       THIS HANDLER PERMITS NON-INTERRUPT DRIVEN INPUT FROM AND OUTPUT
240     *       TO THE CONSOLE TELETYPE ON THE PDP-9 COMPUTER.
250     *
260     *       THIS HANDLER ALTERS THE  AC, AND MQ. IT DOES NOT ALTER ANY CORE
270     *       MEMORY OUTSIDE OF ITSELF. IN PARTICULAR IT DOES NOT ALTER ANY AUTO-INDEX REGISTER.
280     *
290     *       DATA FORMATS:
300     *
310     *            1) OCTAL
320     *
330     *            2) SIXBIT -- SIXBIT IS 8-BIT ASCII MINUS 240. THIS MAPS THE PRINTING
340     *               CHARACTERS ONTO THE SET 0-77. ASCII VALUE 333 ([) IS USED FOR
350     *               CARRIAGE RETURN AND 335 (]) IS USED FOR LINEFEED. NOTE THAT NEITHER
360     *               333, 335, NOR ANY CONTROL CHARACTERS CAN BE RECOGNIZED IN SIXBIT.
370     *
380     *            3) ASCII -- ONE ASCII CHARACTER IS STORED PER WORD. LINE INPUT
390     *               IS STORED IN THIS FORMAT, SINCE THERE IS ONLY ONE LINE-BUFFER
400     *               THE EXTRA BUFFER LENGTH WASTES LESS SPACE THAN WOULD THE HANDLING
410     *               ROUTINES NECESSARY FOR OTHER FORMS OF PACKING CHHRACTERS.
```

```
                T                       (MTSS TELETYPE HANDLER) STORAGE AREA

                        420             .STITL  (MTSS TELETYPE HANDLER) STORAGE AREA
                        430             .IFE    PURCOD,1
            003301      440             .USE    IMPURE
                        450
                        460
            003301      470     WORDB   .BLOCK  2               ROOM TO ACCUMULATE TWO VALID WORDS
            000120      480     STD     .EQU    80.             STANDARD IS AN 80-CHARACTER LINE BUFFER
            003303      490     BUFFR   .BLOCK  STD
                        500     *
                        510     *
                        520     *       VARIABLES
                        530     *
    003423  003422      540     BEND    .-1                     END OF THE CHARACTER BUFFER
    003424  000000      550     BPTR    .DSA                    POINTER TO CURRENTLY ACTIVE WORD IN LINE BUFFER
    003425  000000      560     T1      .DSA                    TEMPORARY VARIABLE
    003426  000000      570     T2      .DSA                    TEMPORARY VARIABLE
    003427  000000      580     CHAR    .DSA                    STORES LATEST CHARACTER FROM FGET
    003430  000000      590     DLMTR   .DSA                    STORES LATEST DELIMITER THROUGH CHRID
    003431  000000      600     COUNT   .DSA
                        610             .IFE    PURCOD,1
            005565      620             .USE    PURE
```

```
T                       (MTSS TELETYPE HANDLER) LINE BUFFER INPUT

                  630           .STITL  (MTSS TELETYPE HANDLER) LINE BUFFER INPUT
                  640
                  650
                  660     *
                  670     *     THE PROGRAM IS PROTECTED AGAINST OVERFLOW OR UNDERFLOW OF THE LINE
                  680     *     BUFFER. UNDERFLOW (EXCESS DELETIONS) IS IGNORED, AND OVERFLOW CHARACTERS
                  690     *     ARE LOST, EXCEPT FOR THE LAST CHARACTER TYPED.
                  700     *
                  710
     005565       720           ENTER   INLIN           SUBROUTINE TO READ IN AND BUFFER A LINE FROM THE TELETYPE
                                .PMC    SAVE,ON
     003432               INLIN  ...
005565  700312  730           KRB                     ONCE, ON ENTRANCE, CLEAN UP ANY PRIOR INPUT
005566  206132  740     INL   LAC     (BUFFR-1)       LOAD A POINTER TO START OF THE BUFFER MINUS ONE
005567  043424  750           DAC     BPTR            INITIALIZE THE BUFFER POINTER
005570  143431  760           DZM     COUNT           INITIALIZE THE WORD FETCHED COUNT
005571  143430  770           DZM     DLMTR           INITIALIZE THE LAST DELIMITER STORAGE
005572  700313  780     IN1   KSF!KRB                 GET THE NEXT INPUT CHARACTER
005573  605572  790           JMP     .-1
005574  546133  800           SAD     ($BKARR)
005575  605617  810           JMP     1CHAR           DELETE ONE CHARACTER IF IT WAS A BACKARROW
005576  546134  820           SAD     ($CONTX)
005577  605615  830           JMP     1LINE           DELETE THE ENTIRE LINE IF IT WAS A CONTROL X
005600  652000  840     IN4   LMQ                     SAVE THE CHARACTER
005601  203424  850           LAC     BPTR            LOAD THE CURRENT BUFFER POINTER
005602  543423  860           SAD     BEND            SKIP IF NO OVERFLOW
005603  741000  870           SKP                     AVOID DAMAGE DUE TO OVERFLOW
005604  443424  880           ISZ     BPTR            ADVANCE THE POINTER -- IT IS STILL WITHIN THE BUFFER
005605  641002  890           LACQ                    RELOAD THE CHARACTER
005606  063424  900           DAC     BPTR,X          AND PUT IT IN THE BUFFER
005607  546135  910           SAD     ($CR)
005610  741000  920           SKP                     EXIT WHEN A CARRIAGE RETURN IS FOUND
005611  605572  930           JMP     IN1             ELSE GET THE NEXT CHARACTER
005612  763302  940           LAW     BUFFR-1
005613  043424  950           DAC     BPTR            RESET THE BUFFER POINTER AT THE END OF THE LINE
005614  623432  960           JMP     INLIN,X         AND RETURN TO THE CALLER
                  970
005615  103460  980     1LINE JMS     CRLF            PRINT THE RESPONSE TO A LINE-DELETE
005616  605566  990           JMP     INL             REREAD THE LINE
005617  203424  1000    1CHAR LAC     BPTR            LOAD THE BUFFER POINTER
005620  545566  1010          SAD     INL             SKIP IF NO UNDERFLOW
005621  605572  1020          JMP     IN1             ELSE IGNORE THE COMMAND
005622  346131  1030          TAD     (-1)            DECREMENT THE BUFFER POINTER
005623  043424  1040          DAC     BPTR            AND SAVE IT
005624  605572  1050          JMP     IN1             GET THE NEXT CHARACTER
```

```
T                                   (MTSS TELETYPE HANDLER) OCTAL WORD INPUT/OUTPUT

                1060                .STITL  (MTSS TELETYPE HANDLER) OCTAL WORD INPUT/OUTPUT
                1070
                1080    *
                1090    *       OPERATION RETURN L   AC     MQ    MEANING
                1100    *       --------- ------ - ------ ------ ------------------------------
                1110    *       INPUT       +1   0   X      X    FORMAT ERROR DISCOVERED
                1120    *                   +1   1 DELIM    X    FIRST NON-BLANK CHARACTER IS A DELIMITER
                1130    *                   +2   1 OCTAL  DELIM  SUCCESSFUL READ OF AN OCTAL NUMBER
                1140    *       OUTPUT      +1   X   X      X    SUCCESSFUL WRITE OF AN OCTAL NUMBER
                1150    *
                1160
    005625      1170            ENTER   NUMIN
                                .PMC    SAVE,ON
    003434              NUMIN   ...
005625  143426  1180            DZM     T2              INITIALIZE THE DECIMAL-DIGIT-RECEIVED FLAG
005626  103452  1190            JMS     INTIN           INITIALIZE THE INPUT STRING, ETC
005627  623434  1200            JMP     NUMIN,X         RETURN +1 FOR DELIMITER IS FIRST NON-BLANK CHARACTER
005630  103450  1210    NUM20   JMS     FGET            GET THE NEXT CHARACTER
005631  103454  1220            JMS     CHRID           IDENTIFY IT
005632  605654  1230            JMP     NUM26           IT IS A DELIMITER, SO EXIT
005633  623434  1240            JMP     NUMIN,X         IT IS A LETTER, SO EXIT +1 FOR A FORMAT ERROR
005634  741400  1250            SZL                     SKIP IF THE CHARACTER IS AN OCTAL DIGIT
005635  443426  1260            ISZ     T2              ELSE BE SURE THE DECIMAL-DIGIT-RECEIVED FLAG IS SET
005636  506136  1270            AND     (17)            RETAIN JUST THE DIGIT
005637  043425  1280            DAC     T1              AND SAVE IT FOR DECIMAL ACCUMULATION
                1290
005640  640503  1300            LRS     3               SAVE THE "OCTAL DIGIT"
005641  203301  1310            LAC     WORDB           LOAD THE PREVIOUSLY GATHERED "OCTAL NUMBER"
005642  640603  1320            LLS     3               CONCATENATE THE "OCTAL DIGITS"
005643  043301  1330            DAC     WORDB           AND SAVE THE RESULT
                1340
005644  203302  1350            LAC     WORDB+1         LOAD THE PREVIOUSLY GATHERED "DECIMAL NUMBER"
005645  744000  1360            CLL                     SET THE LINK FOR THE MULTIPLY
005646  653122  1370            MUL                     MULTIPLY THE PREVIOUS "DECIMAL VALUE"
005647  000012  1380            10.                     BY 10 FOR DECIMAL
005650  641002  1390            LACQ                    LOAD THE RESULT
005651  343425  1400            TAD     T1              ADD THE CURRENT "DECIMAL DIGIT"
005652  043302  1410            DAC     WORDB+1         AND SAVE THE TOTAL "DECIMAL NUMBER"
                1420
005653  605630  1430            JMP     NUM20           LOOP
                1440
                1450
005654  546137  1460    NUM26   SAD     ($POINT)        CHECK FOR A PERIOD
005655  605663  1470            JMP     NUM27           IF SO, PICK UP THE DECIMAL VALUE
005656  203426  1480            LAC     T2              ELSE LOAD THE DECIMAL-DIGITS-RECEIVED FLAG
005657  744200  1490            SZA!CLL                 AND SKIP IF THERE WERE NONE
005660  623434  1500            JMP     NUMIN,X         RETURN +1, LK=0 FOR A FORMAT ERROR; DECIMAL DIGITS, BUT NO PERIOD
005661  203301  1510            LAC     WORDB           LOAD THE OCTAL VALUE
005662  605672  1520            JMP     NUM29
005663  103450  1530    NUM27   JMS     FGET            GET THE NEXT CHARACTER
005664  103454  1540            JMS     CHRID           AND IDENTIFY IT
005665  605671  1550            JMP     NUM28           A DELIMITER IS LEGAL, SO EXIT
```

```
                T                       (MTSS TELETYPE HANDLER) OCTAL WORD INPUT/OUTPUT

005666  623434  1560            JMP     NUMIN,X         A LETTER -- EXIT +1 FOR A FORMAT ERROR
005667  744000  1570            CLL                     A NUMBER -- CLEAR THE LINK FOR A FORMAT ERROR
005670  623434  1580            JMP     NUMIN,X         AND EXIT +1
005671  203302  1590    NUM28   LAC     WORDB+1         LOAD THE DECIMAL VALUE
005672  043301  1600    NUM29   DAC     WORDB           SAVE THE CORRECT VALUE
005673  443434  1610            ISZ     NUMIN           BUMP TO A RETURN +2 FOR SUCCESSFUL
005674  623434  1620            JMP     NUMIN,X
                1630
                1640
                1650
    005675      1660            ENTER   OCTOT
                                .PMC    SAVE,ON
    003436              OCTOT   ...
005675  652000  1670    OCT42   LMQ                     SET THE VALUE TO BE OUTPUT
005676  741400  1680            SZL                     SKIP IF NO LEADING ZEROES ARE TO BE SUPPRESSED
005677  750201  1690            SZA!CLC                 SET A FLAG TO PRINT ONE CHARACTER, ANYWAY, IF THE AC IS ZERO
005700  777772  1700            LAW     -6              ELSE SET THE COUNT FOR THE STANDARD SIX CHARACTERS
005701  043425  1710            DAC     T1              SET THE NUMBER OF CHARACTERS TO BE OUTPUT
005702  641002  1720            LACQ                    RELOAD THE USER'S VALUE
005703  741200  1730            SNA                     SKIP FOR A NON-ZERO VALUE
005704  744000  1740            CLL                     ELSE FORCE A SINGLE ZERO TO PRINT
005705  641603  1750    OCT44   LLSC    3.              GET THE NEXT OCTAL DIGIT
005706  740200  1760            SZA                     IF IT IS ZERO, DON'T CHANGE PRINT-SUPPRESSION STATE
005707  744000  1770            CLL                     ELSE CLEAR THE PRINT INHIBIT AT THE FIRST NON-ZERO FOUND
005710  346140  1780            TAD     (260)           MAKE ASCII IN ANY CASE
005711  740400  1790            SNL                     BUT SKIP IF PRINT IS INHIBITED
005712  103456  1800            JMS     TTYOT           ELSE PRINT THE DIGIT
005713  443425  1810            ISZ     T1              DONE???
005714  605705  1820            JMP     OCT44           NO -- LOOP
005715  700401  1830            TSF
005716  605715  1840            JMP     .-1             WAIT FOR THE TELETYPE TO SETTLE
005717  623436  1850            JMP     OCTOT,X         YES -- EXIT
```

T (MTSS TELETYPE HANDLER) SIXBIT WORD INPUT & SIXBIT BUFFER OUTPUT

```
                    1860            ,STITL  (MTSS TELETYPE HANDLER) SIXBIT WORD INPUT & SIXBIT BUFFER OUTPUT
                    1870
                    1880
                    1890    *
                    1900    *       OPERATION RETURN L   AC     MQ   MEANING
                    1910    *       --------- ------ - ------ ------ ------------------------------
                    1920    *       INPUT       +1   1 DELIM    X    FIRST NON-BLANK CHARACTER IS A DELIMITER
                    1930    *                   +2   1 SIXBIT DELIM  SUCCESSFUL READ OF A SIXBIT WORD
                    1940    *       OUTPUT      +1   X   X      X    SUCCESSFUL WRITE OF A SIXBIT BUFFER
                    1950    *
                    1960
    005720          1970            ENTER   SIXIN
                                    ,PMC    SAVE,ON
    003440                  SIXIN   ...
005720  763301      1980            LAW     WORDB
005721  043425      1990            DAC     T1              INITIALIZE THE SIXBIT BUFFER POINTER
005722  103452      2000            JMS     INTIN           INITIALIZE THE INPUT
005723  623440      2010            JMP     SIXIN,X         RETURN +1 FOR DELIMITER IS FIRST NON-BLANK CHARACTER
005724  443440      2020            ISZ     SIXIN           ELSE BUMP TO A GOOD RETURN
005725  103442      2030    SIX2    JMS     SIX5            GET THE FIRST GOOD CHARACTER
005726  660714      2040            ALSS    12.             AND PUT IT IN THE FIRST CHARACTER POSITION
005727  063425      2050            DAC     T1,X            AND SAVE IT
005730  103442      2060            JMS     SIX5            GET THE SECOND CHARACTER
005731  660706      2070            ALSS    6.              PUT IT IN THE SECOND CHARACTER POSITION
005732  263425      2080            XOR     T1,X            CONCATENATE THE CHARACTERS
005733  063425      2090            DAC     T1,X            AND SAVE THE RESULT
005734  103442      2100            JMS     SIX5            GET THE THIRD CHARACTER
005735  263425      2110            XOR     T1,X            CONCATENATE THE CHARACTERS
005736  063425      2120            DAC     T1,X            AND SAVE THE RESULT
005737  443425      2130            ISZ     T1              BUMP THE STORAGE BUFFER POINTER
005740  605725      2140            JMP     SIX2            LOOP
                    2150
005741  203301      2160    SIX9    LAC     WORDB           LOAD THE FIRST SIXBIT WORD
005742  623440      2170            JMP     SIXIN,X         EXIT
                    2180
    005743          2190            ENTER   SIX5           SUBROUTINE TO GET THE NEXT CHARACTER, MAKE IT SIXBIT, EXIT IF A DELIMITER
                                    ,PMC    SAVE,ON
    003442                  SIX5    ...
005743  103450      2200            JMS     FGET            GET THE NEXT CHARACTER
005744  103454      2210            JMS     CHRID           IDENTIFY IT
005745  605741      2220            JMP     SIX9            EXIT IF IT IS A DELIMITER
005746  740000      2230            NOP                     PERMIT LETTERS
005747  346141      2240            TAD     (-240)          MAKE SIXBIT

005750  623442      2250            JMP     SIX5,X
                    2260
                    2270
    005751          2280            ENTER   SIXOT
                                    ,PMC    SAVE,ON
    003444                  SIXOT   ...
005751  043425      2290            DAC     T1              SET THE NEGATIVE CHARACTER COUNT
005752  223444      2300    SIX24   LAC     SIXOT,X         LOAD THE NEXT WORD OF OUTPUT
005753  652000      2310            LMQ                     SAVE IT FOR PRINTING
```

```
                T                       (MTSS TELETYPE HANDLER) SIXBIT WORD INPUT & SIXBIT BUFFER OUTPUT

005754  443444  2320            ISZ     SIXOT           BUMP THE POINTER
005755  103446  2330            JMS     SIX26           OUTPUT THE FIRST CHARACTER
005756  103446  2340            JMS     SIX26           OUTPUT THE SECOND CHARACTER
005757  103446  2350            JMS     SIX26           OUTPUT THE THIRD CHARACTER
005760  605752  2360            JMP     SIX24           LOOP
                2370
    005761      2380            ENTER   SIX26
                                .PMC    SAVE,ON
    003446              SIX26   ...
005761  641606  2390            LLSC    6,              GET THE NEXT SIXBIT CHARACTER
005762  346142  2400            TAD     (240)           MAKE IT ASCII
005763  546143  2410            SAD     (333)           CHECK FOR CARRIAGE RETURN MAPPING
005764  760215  2420            LAW     $CR
005765  546144  2430            SAD     (335)           CHECK FOR LINE FEED MAPPING
005766  760212  2440            LAW     $LF
005767  103456  2450            JMS     TTYOT           PRINT THE CHARACTER
005770  443425  2460            ISZ     T1              ALL CHARACTERS PRINTED?
005771  623446  2470            JMP     SIX26,X         NO -- LOOP
005772  700401  2480            TSF
005773  605772  2490            JMP     .-1             WAIT FOR THE TELETYPE TO SETTLE
005774  623444  2500            JMP     SIXOT,X         YES -- EXIT
                2510    *
                2520    *
```

```
T                                   (MTSS TELETYPE HANDLER) MISCELLANEOUS LINE BUFFER ROUTINES

                    2530            .STITL  (MTSS TELETYPE HANDLER) MISCELLANEOUS LINE BUFFER ROUTINES
                    2540
                    2550
                    2560
                    2570
     005775         2580            ENTER   FGET            SUBROUTINE TO GET THE FIRST REMAINING CHARACTER FROM THE LINE BUFFER
                                    .PMC    SAVE,ON
     003450                 FGET    ...
005775  443424      2590            ISZ     BPTR            NO -- BUMP THE POINTER
005776  223424      2600            LAC     BPTR,X          LOAD THE NEXT CHARACTER
005777  043427      2610            DAC     CHAR            AND SAVE IT
006000  623450      2620    FGET9   JMP     FGET,X
                    2630
     006001         2640            ENTER   INTIN           INITIALIZE INPUT WORD-GETTING
                                    .PMC    SAVE,ON
     003452                 INTIN   ...
006001  443431      2650            ISZ     COUNT           COUNT THE WORD, SUCCESSFUL OR NOT
006002  143301      2660            DZM     WORDB           INITIALIZE THE TWO FIRST WORDS OF THE INPUT BUFFER
006003  143302      2670            DZM     WORDB+1
006004  103450      2680            JMS     FGET            GET THE NEXT CHARACTER
006005  546142      2690            SAD     ($SPACE)        CHECK IT FOR A SPACE
006006  606004      2700            JMP     .-2             THROW AWAY SPACES
006007  103454      2710            JMS     CHRID           IDENTIFY THE NON-SPACE
006010  623452      2720            JMP     INTIN,X         RETURN +1 FOR A DELIMITER
006011  740000      2730            NOP
006012  443452      2740            ISZ     INTIN           ELSE BUMP THE RETURN FOR A NUMBER OR A LETTER
006013  750001      2750            CLC
006014  343424      2760            TAD     BPTR            BACK UP THE POINTER TO POINT TO THE FIRST GOOD CHARACTER
006015  043424      2770            DAC     BPTR
006016  623452      2780            JMP     INTIN,X
```

```
T                       (MTSS TELETYPE HANDLER) MISCELLANEOUS CHARACTER-HANDLING SUBROUTINES

                2790            .STITL  (MTSS TELETYPE HANDLER) MISCELLANEOUS CHARACTER-HANDLING SUBROUTINES
                2800    *
                2810    *
                2820    *       CHRID -- SUBROUTINE TO CLASSIFY EIGHT-BIT ASCII CHARACTERS.
                2830    *       ENTER WITH THE CHARACTER IN THE AC; LEAVE WITH THE EIGHT-BIT CHARACTER
                2840    *       IN AC(0-17) AND THE LINK AS FOLLOWS:
                2850    *
                2860    *       RETURN LINK MEANING
                2870    *       ------ ---- ------------------------------------------------
                2880    *         +1    1   THE CHARACTER IS A DELIMITER (I.E. NEITHER A DIGIT NOR A LETTER
                2890    *         +2    0   THE CHARACTER IS EITHER AN UPPER CASE OR A LOWER CASE LETTER
                2900    *         +3    0   THE CHARACTER IS AN OCTAL DIGIT
                2910    *         +3    1   THE CHARACTER IS A DECIMAL DIGIT (8 OR 9)
                2920    *
    006017      2930            ENTER   CHRID
                                ,PMC    SAVE,ON
    003454                      CHRID   ...
006017  506103  2940            AND     (377)
006020  043456  2950            DAC     TTYOT           SAVE THE EIGHT-BIT ASCII CHARACTER
006021  346145  2960            TAD     (-260)          AC < 0 FOR DELIMITERS
006022  745102  2970            SPA!STL
006023  606041  2980            JMP     DLMR            CHARACTER IS A DELIMITER
006024  346146  2990            TAD     (-10)           AC < 0 FOR OCTAL DIGITS
006025  745100  3000            SPA!CLL
006026  606044  3010            JMP     DIGIT           CHARACTER IS AN OCTAL DIGIT
006027  346147  3020            TAD     (-2)            AC < 0 FOR DECIMAL DIGITS
006030  745102  3030            SPA!STL
006031  606044  3040            JMP     DIGIT           CHARACTER IS A DECIMAL DIGIT
006032  346150  3050            TAD     (-6)            AC <= 0 FOR DELIMITERS
006033  745302  3060            SNA!SPA!STL
006034  606041  3070            JMP     DLMR            CHARACTER IS A DELIMITER
006035  506151  3080            AND     (777737)        MAP LOWER CASE INTO UPPER CASE
006036  346152  3090            TAD     (-33)           AC < 0 FOR LETTERS -- L=1 FOR LETTERS; L=0 FOR DELIMITERS
006037  741102  3100            SPA!CML
006040  606045  3110            JMP     LETTR           THE CHARACTER IS A LETTER
                3120
006041  203456  3130    DLMR    LAC     TTYOT           LOAD THE DELIMITER
006042  043430  3140            DAC     DLMTR           SAVE IT
006043  623454  3150            JMP     CHRID,X
                3160
006044  443454  3170    DIGIT   ISZ     CHRID
006045  443454  3180    LETTR   ISZ     CHRID
006046  203456  3190            LAC     TTYOT           RELOAD THE CHARACTER
006047  623454  3200            JMP     CHRID,X
                3210
                3220
                3230
    006050      3240            ENTER   TTYOT
                                ,PMC    SAVE,ON
    003456                      TTYOT   ...
006050  700401  3250            TSF
006051  606050  3260            JMP     .-1             WAIT FOR THE TELEPRINTER TO BE FREE
```

T (MTSS TELETYPE HANDLER) MISCELLANEOUS CHARACTER-HANDLING SUBROUTINES

```
006052  700301  3270            KSF                     KILL-THE-OUTPUT FEATURE
006053  700406  3280            TLS                     PRINT THE CHARACTER IN THE AC
006054  623456  3290            JMP     TTYOT,X
                3300
                3310
    006055      3320            ENTER   CRLF
                                .PMC    SAVE,ON
    003460              CRLF    ...
006055  760215  3330            LAW     215
006056  103456  3340            JMS     TTYOT
006057  760215  3350            LAW     215
006060  103456  3360            JMS     TTYOT
006061  760212  3370            LAW     212
006062  103456  3380            JMS     TTYOT
006063  700401  3390            TSF
006064  606063  3400            JMP     .-1             WAIT FOR THE TTY TO SETTLE
006065  623460  3410            JMP     CRLF,X
                3420
                3430
                3440            ,HEAD                   TURN OFF THE INSERT'S HEAD SYMBOL
                3450            ,LIST   ON
                3460            ,END
                8770            ,HEAD
    003462      8780            ,USE    IMPURE
    003462      8790    CHECK   ,EQU    .
    003700      8800            ,LOC    PURSTR
    006066      8810            ,USE    PURE
                8820    RET     ,OPDEF  JMP+020000
006066  777000  8830            ,END    MSSTART
006067  001000
006070  000002
006071  000001
006072  040000
006073  436454
006074  000400
006075  000004
006076  414263
006077  425156
006100  476257
006101  017777
006102  775610
006103  000377
006104  017400
006105  014000
006106  777400
006107  775710
006110  002171
006111  000101
006112  740000
006113  001300
006114  001777
006115  000005
```

```
006116  000272
006117  000257
006120  445320
006121  777700
006122  646000
006123  446400
006124  445300
006125  606064
006126  606462
006127  606460
006130  777716
006131  777777
006132  003302
006133  000337
006134  000230
006135  000215
006136  000017
006137  000256
006140  000260
006141  777540
006142  000240
006143  000333
006144  000335
006145  777520
006146  777770
006147  777776
006150  777772
006151  777737
006152  777745

TRANSFER ADDRESS  603701
```

CROSS REFERENCE TABLE

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1713 | .0 | 4510 | 4520 | | | | | | | | | | |
| 26 | .310 | 3400 | | | | | | | | | | | |
| 27 | .311 | 3410 | | | | | | | | | | | |
| 4453 | .DK | 770 | | | | | | | | | | | |
| 4464 | .DT | 750 | | | | | | | | | | | |
| 6460 | .TP | 760 | | | | | | | | | | | |
| 2023 | 10SAVE | 1870 | 1880 | | | | | | | | | | |
| 2024 | 11SAVE | 1880 | 1920 | | | | | | | | | | |
| 5 | 3AC | 3370 | | | | | | | | | | | |
| 305 | 3REST | 3870 | 3880 | | | | | | | | | | |
| 51 | 3TEM0 | 3530 | 3540 | | | | | | | | | | |
| 52 | 3TEM1 | 3540 | 3550 | | | | | | | | | | |
| 53 | 3TEM2 | 3550 | 3560 | | | | | | | | | | |
| 54 | 3TEM3 | 3560 | 3570 | | | | | | | | | | |
| 55 | 3TEM4 | 3570 | 3580 | | | | | | | | | | |
| 56 | 3TEM5 | 3580 | 3590 | | | | | | | | | | |
| 57 | 3TEM6 | 3590 | 3600 | | | | | | | | | | |
| 50 | 3TM20 | 3520 | 3530 | | | | | | | | | | |
| 2 | 3TM21 | 3350 | | | | | | | | | | | |
| 3 | 3TM22 | 3360 | | | | | | | | | | | |
| 14000 | 7K | 1030 | | | | | | | | | | | |
| 16000 | 8K | 1020 | 910 | 1010 | 2640 | 2650 | | | | | | | |
| 6055 | 9MAPBU | 3320 | 1320 | 1730 | 1880 | 2290 | 5850 | 6930 | 7790 | 7960 | 8090 | 740 | 1340 | 1680 |
| | | | 2590 | 3210 | 3670 | 3860 | 4150 | 720 | 1170 | 1660 | 1970 | 2190 | 2280 | 2380 |
| | | | 2580 | 2640 | 2930 | 3240 | 3320 | | | | | | | |
| 414263 | ABS | 850 | 4100 | | | | | | | | | | |
| 1753 | AC | 4520 | 4530 | | | | | | | | | | |
| 1756 | ACS | 4550 | 4560 | | | | | | | | | | |
| 2015 | ACSAVE | 1810 | 1820 | | | | | | | | | | |
| 2022 | ACSW | 1860 | 1870 | | | | | | | | | | |
| 17737 | ADRBS | 430 | 4110 | | | | | | | | | | |
| 246 | AMPRSN | 290 | | | | | | | | | | | |
| 300 | AT | 2950 | | | | | | | | | | | |
| 300 | ATSGN | 2900 | | | | | | | | | | | |
| 422030 | BAS | 420 | | | | | | | | | | | |
| 2151 | BCNTRL | 2330 | 2340 | | | | | | | | | | |
| 3217 | BCOUNT | 8510 | 4610 | 4760 | | | | | | | | | |
| 425156 | BIN | 860 | 4120 | | | | | | | | | | |
| 4366 | BINPPT | 4600 | 4490 | | | | | | | | | | |
| 634 | BIT0 | 3970 | 3980 | | | | | | | | | | |
| 641 | BIT17 | 4020 | 4030 | | | | | | | | | | |
| 635 | BIT36 | 3980 | 3990 | | | | | | | | | | |
| 636 | BIT5 | 3990 | 4000 | | | | | | | | | | |
| 637 | BIT6 | 4000 | 4010 | | | | | | | | | | |
| 640 | BIT7 | 4010 | 4020 | | | | | | | | | | |
| 337 | BKARR | 240 | 800 | | | | | | | | | | |
| 642 | BL7 | 4030 | 4040 | | | | | | | | | | |
| 643 | BL8 | 4040 | 4050 | | | | | | | | | | |
| 400 | BLKLEN | 630 | 1520 | 1640 | 4830 | | | | | | | | |
| 1777 | BLKMSK | 610 | 1060 | 1170 | | | | | | | | | |
| 17740 | BOOT | 520 | 530 | 2580 | | | | | | | | | |
| 2090 | BOUNDA | 440 | 960 | 980 | 990 | 1000 | 1630 | 5040 | 5080 | 2100 | 2110 | | |

CROSS REFERENCE TABLE

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3214 | BPARAM | 8500 | 6960 | | | | | | | | | | |
| 377 | BRK | 5550 | | | | | | | | | | | |
| 334 | BSLASH | 390 | | | | | | | | | | | |
| 2170 | BUFFER | 2490 | 2550 | 410 | 420 | 680 | 690 | 1340 | 8700 | 880 | | | |
| 1000 | BUFLEN | 2500 | 2550 | | | | | | | | | | |
| 3277 | C ALC | 4150 | 3400 | 3860 | 4300 | | | | | | | | |
| 5264 | C CON | 1550 | 1480 | | | | | | | | | | |
| 5263 | C IGN | 1540 | 1460 | | | | | | | | | | |
| 3254 | C CATL | 1680 | 2720 | 3980 | 4270 | 7380 | 1120 | 1190 | 1280 | 2010 | 2020 | 2030 | 3870 |
| 3256 | C CORE | 2080 | 1800 | 2220 | | | | | | | | | |
| 3262 | C DISK | 2290 | 1820 | 2430 | | | | | | | | | |
| 3247 | C RCAT | 740 | 3150 | 3510 | 4360 | 1230 | 2750 | | | | | | |
| 3275 | C SAVE | 3860 | 3320 | 3680 | 3890 | 4010 | 4020 | | | | | | |
| 5226 | C,010, | 1390 | | | | | | | | | | | |
| 5240 | C,011, | 1420 | | | | | | | | | | | |
| 5301 | C,012, | 1840 | | | | | | | | | | | |
| 5461 | C,013, | 3610 | | | | | | | | | | | |
| 5527 | C,014, | 4040 | | | | | | | | | | | |
| 5557 | C,015, | 4320 | | | | | | | | | | | |
| 1 | CATBLK | 550 | 860 | | | | | | | | | | |
| 400 | CATLEN | 560 | 2550 | | | | | | | | | | |
| 2170 | CATLOG | 690 | 590 | 2340 | 2360 | 2420 | 2440 | 2450 | 2480 | 2500 | 2520 | 2530 | 2560 | 2590 |
| | | | 3160 | 1050 | 1080 | 1100 | 1130 | 1890 | 1910 | 3900 | 3940 | 3950 | 3970 | 4190 |
| | | | 4240 | 4280 | | | | | | | | | | |
| 777716 | CATMAX | 620 | 3910 | | | | | | | | | | | |
| 41 | CATX | 500 | 2740 | 3410 | 3440 | 3460 | 3480 | 3700 | 3750 | 3760 | 3850 | 4000 | 4010 | 4030 |
| | | | 4050 | 4290 | 4310 | 4320 | 4330 | 7420 | 7440 | 7450 | 7470 | 1900 | 1940 | 1960 |
| | | | 1980 | 2230 | 2440 | 3990 | | | | | | | | |
| 644 | CB0 | 4050 | 4060 | | | | | | | | | | | |
| 645 | CB1 | 4060 | 4070 | | | | | | | | | | | |
| 646 | CB5 | 4070 | 4080 | | | | | | | | | | | |
| 647 | CB7 | 4080 | 4090 | | | | | | | | | | | |
| 650 | CBLB | 4090 | 4100 | | | | | | | | | | | |
| 5312 | CCATL1 | 1890 | 1750 | | | | | | | | | | | |
| 5327 | CCATL9 | 2020 | 1950 | 2240 | 2450 | | | | | | | | | |
| 5316 | CCATLL | 1930 | 2000 | | | | | | | | | | | |
| 3270 | CCDFLG | 2950 | 1730 | 2600 | 3060 | 3550 | | | | | | | | |
| 5524 | CCFULL | 4040 | 3920 | | | | | | | | | | | |
| 3260 | CCORCA | 2100 | | | | | | | | | | | | |
| 3257 | CCORDA | 2090 | 2200 | | | | | | | | | | | |
| 5331 | CCORE1 | 2140 | 1810 | | | | | | | | | | | |
| 3261 | CCORLN | 2110 | | | | | | | | | | | | |
| 3246 | CCTEM1 | 560 | 1090 | 1130 | 750 | 790 | 1010 | 1030 | 1070 | 1180 | 1920 | 1990 | 4180 | 4210 |
| | | | 4220 | 4270 | | | | | | | | | | |
| 5440 | CDEVC1 | 3360 | 3280 | 3300 | | | | | | | | | | |
| 5426 | CDEVC3 | 3260 | 2730 | | | | | | | | | | | |
| 5446 | CDEVC4 | 3460 | 3320 | | | | | | | | | | | |
| 3271 | CDEVCV | 3210 | 2180 | 2910 | 3040 | 3070 | 4480 | 5250 | 2710 | 3250 | 3400 | 3410 | | |
| 5554 | CDFULL | 4320 | 4260 | | | | | | | | | | | |
| 3264 | CDI$CA | 2310 | | | | | | | | | | | | |
| 3263 | CDISDA | 2300 | 2410 | | | | | | | | | | | |
| 5343 | CDI$K1 | 2350 | 1830 | | | | | | | | | | | |

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| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 3265 | CDI$LN | 2320 | | | | | | | | | |
| 3253 | CERCNT | 1520 | 1360 | 1400 | | | | | | | |
| 5363 | CGNAM1 | 2660 | 3020 | | | | | | | | |
| 5366 | CGNAM2 | 2700 | 2650 | 3070 | | | | | | | |
| 5372 | CGNAM3 | 2740 | 2700 | | | | | | | | |
| 5376 | CGNAM5 | 2780 | 2680 | | | | | | | | |
| 5410 | CGNAM8 | 2880 | 2840 | | | | | | | | |
| 3266 | CGNAME | 2590 | 2700 | 3660 | 3960 | 4250 | 7360 | 2670 | 2740 | 2880 | 2890 |
| 3462 | CHECK | 8790 | | | | | | | | | |
| 6 | CHRMAX | 3180 | 3200 | | | | | | | | |
| 2 | CHRPAK | 3130 | 3200 | | | | | | | | |
| 50 | CLKMAX | 2840 | 3180 | | | | | | | | |
| 60 | CLKSPD | 3160 | 3170 | | | | | | | | |
| 1757 | CLOCK | 4560 | 4570 | | | | | | | | |
| 12 | CMDX | 510 | | | | | | | | | |
| 45 | CMP1 | 3490 | 3500 | | | | | | | | |
| 46 | CMP2 | 3500 | 3510 | | | | | | | | |
| 6 | CNTRL | 3380 | 3390 | | | | | | | | |
| 272 | COLON | 370 | 2640 | 3000 | | | | | | | |
| 2053 | COMFLG | 2200 | 2210 | | | | | | | | |
| 254 | COMMA | 320 | | | | | | | | | |
| 2150 | COM$TO | 2270 | 2280 | | | | | | | | |
| 230 | CONTX | 230 | 820 | | | | | | | | |
| 435762 | COR | 880 | | | | | | | | | |
| 16000 | CORMAX | 910 | 980 | 2110 | | | | | | | |
| 3273 | CPAPER | 3670 | 7280 | 2660 | 3240 | 3690 | 3710 | 3730 | 3740 | 3750 | |
| 2175 | CPARAM | 680 | 2310 | 2370 | 4230 | | | | | | |
| 215 | CR | 220 | 910 | 2420 | | | | | | | |
| 5145 | CRCAT1 | 780 | | | | | | | | | |
| 5170 | CRCAT3 | 1010 | 930 | | | | | | | | |
| 5204 | CRCAT4 | 1160 | 1290 | | | | | | | | |
| 3251 | CRCOVR | 1340 | 1540 | 1750 | 8140 | 920 | 1140 | 1210 | 1370 | 1410 | 1490 |
| 5223 | CRCVR4 | 1390 | 1590 | 1800 | 6980 | 8190 | 970 | | | | |
| 5235 | CRCVR5 | 1420 | 1450 | 1500 | | | | | | | |
| 47 | CSPL | 3510 | 3520 | | | | | | | | |
| 44 | CSWP | 3480 | 3490 | | | | | | | | |
| 60 | CTBFR | 3600 | 3630 | 3640 | | | | | | | |
| 100 | CTBIN | 3640 | 3650 | 3670 | 4250 | | | | | | |
| 2000 | CTEMP0 | 1630 | | | | | | | | | |
| 2001 | CTEMP1 | 1640 | | | | | | | | | |
| 2002 | CTEMP2 | 1650 | | | | | | | | | |
| 2003 | CTEMP3 | 1660 | | | | | | | | | |
| 2004 | CTEMP4 | 1670 | | | | | | | | | |
| 2005 | CTEMP5 | 1680 | | | | | | | | | |
| 2006 | CTEMP6 | 1690 | | | | | | | | | |
| 2007 | CTEMP7 | 1700 | | | | | | | | | |
| 2010 | CTEMP8 | 1710 | | | | | | | | | |
| 2011 | CTEMP9 | 1720 | | | | | | | | | |
| 102 | CTFLG | 3650 | 3660 | | | | | | | | |
| 436454 | CTL | 810 | 2490 | | | | | | | | |
| 104 | CTNAM | 3660 | | | | | | | | | |
| 2043 | D PC | 2120 | 2130 | | | | | | | | |

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| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2154 | D BCA | 2370 | 2380 | 1350 | 2540 | 890 | | | | | | |
| 2153 | D BDA | 2360 | 2370 | 1490 | 1570 | 1630 | 1660 | 2320 | 8170 | 810 | 850 | 870 | 950 |
| 2163 | D FDA | 2440 | 2450 | | | | | | | | | |
| 2042 | D LOC | 2110 | 2120 | | | | | | | | | |
| 2022 | D ACSW | 1860 | | | | | | | | | | |
| 2156 | D BALT | 2390 | 2400 | 950 | 2600 | 2770 | 5060 | 8100 | 8110 | 4000 | | |
| 2155 | D BLEN | 2380 | 2390 | 1470 | 2570 | 910 | | | | | | |
| 2161 | D BMAX | 2420 | 2430 | | | | | | | | | |
| 2157 | D BMIN | 2400 | 2410 | | | | | | | | | |
| 2162 | D BPTR | 2430 | 2440 | | | | | | | | | |
| 2167 | D FMAX | 2480 | 2490 | | | | | | | | | |
| 2165 | D FMIN | 2460 | 2470 | | | | | | | | | |
| 2046 | D MASK | 2150 | 2160 | | | | | | | | | |
| 2164 | D MFDA | 2450 | 2460 | | | | | | | | | |
| 2036 | DADRSW | 2070 | 2080 | | | | | | | | | |
| 1762 | DAP0 | 4590 | 4600 | | | | | | | | | |
| 1763 | DAP1 | 4600 | 4610 | | | | | | | | | |
| 653 | DBK | 4120 | 4130 | | | | | | | | | |
| 24 | DBKNUM | 2220 | 2270 | | | | | | | | | |
| 2054 | DBKTAB | 2210 | 2270 | | | | | | | | | |
| 2035 | DBSTOR | 2050 | 2060 | | | | | | | | | |
| 422027 | DDT | 410 | | | | | | | | | | |
| 12000 | DDTST | 5000 | | | | | | | | | | |
| 2037 | DDUMSW | 2080 | 2090 | | | | | | | | | |
| 1 | DEBUG | 380 | 100 | 120 | 100 | 120 | 180 | 120 | | | | |
| 5436 | DEVC35 | 3340 | 3510 | 3570 | | | | | | | | |
| 1761 | DFLAG | 4580 | 4590 | | | | | | | | | |
| 1764 | DFN | 4610 | 4620 | | | | | | | | | |
| 2151 | DFTYPE | 2340 | 2350 | | | | | | | | | |
| 2045 | DHICOR | 2140 | 2150 | | | | | | | | | |
| 2050 | DINDIR | 2170 | 2180 | | | | | | | | | |
| 445300 | DK. | 740 | 3310 | | | | | | | | | |
| 445320 | DK0 | 780 | 3040 | | | | | | | | | |
| 127 | DK1 | 4310 | | | | | | | | | | |
| 156 | DK2 | 4350 | | | | | | | | | | |
| 37 | DKCA | 2750 | | | | | | | | | | |
| 675 | DKDON | 4170 | 4180 | | | | | | | | | |
| 16000 | DKLEN | 2650 | 2660 | 2320 | | | | | | | | |
| 34 | DKLENB | 2660 | | | | | | | | | | |
| 266 | DKLOK | 3830 | 3840 | | | | | | | | | |
| 777601 | DKMAX | 650 | 2410 | | | | | | | | | |
| 672 | DKOVR | 4160 | 4170 | | | | | | | | | |
| 2 | DKRD | 2760 | | | | | | | | | | |
| 36 | DKWC | 2740 | | | | | | | | | | |
| 4 | DKWRT | 2770 | | | | | | | | | | |
| 2041 | DLIMIT | 2100 | 2110 | | | | | | | | | |
| 2044 | DLOCOR | 2130 | 2140 | | | | | | | | | |
| 2160 | DMBMIN | 2410 | 2420 | | | | | | | | | |
| 2166 | DMFMIN | 2470 | 2480 | | | | | | | | | |
| 654 | DO | 4130 | 4140 | | | | | | | | | |
| 662 | DO2 | 4140 | 4150 | | | | | | | | | |
| 663 | DO3 | 4150 | 4160 | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4036 | MCOPL2 | 1450 | 1410 | | | | | | | | | | |
| 4040 | MCOPL4 | 1470 | 1440 | | | | | | | | | | |
| 3226 | MCOUNT | 8580 | 5670 | 5770 | 6070 | 6320 | 7540 | 7570 | 7580 | 7630 | 7980 | 8030 | |
| 4007 | MDSAVE | 1240 | 3690 | | | | | | | | | | |
| 3734 | MERROR | 1140 | 8420 | | | | | | | | | | |
| 3212 | MFORCE | 8090 | 1330 | 2170 | 2800 | 8130 | 8150 | 760 | 1110 | 1160 | 1250 | 1270 | |
| 10 | MINBUF | 3200 | 3610 | | | | | | | | | | |
| 5141 | MINSTM | 8460 | 5440 | 5560 | 7230 | | | | | | | | |
| 255 | MINUS | 330 | | | | | | | | | | | |
| 5073 | MLEAD1 | 7990 | 8030 | | | | | | | | | | |
| 4756 | MLEND1 | 7070 | 6650 | | | | | | | | | | |
| 4734 | MLEND2 | 6870 | 7150 | | | | | | | | | | |
| 3723 | MMONX2 | 1060 | 3330 | | | | | | | | | | |
| 3714 | MMONXT | 490 | | | | | | | | | | | |
| 3714 | MNEXTL | 980 | 470 | 490 | 1050 | 1150 | 1190 | 1210 | 1230 | 1250 | 2210 | 2780 | 3280 | 5080 |
| | | | 7720 | 1850 | 3620 | | | | | | | | |
| 3775 | MNSAVE | 1220 | 2730 | 3990 | 4280 | 7390 | | | | | | | |
| 4771 | MNXLT1 | 7180 | 4410 | 6590 | | | | | | | | | |
| 3232 | MOUTDA | 8620 | 1500 | 1600 | 1650 | 2940 | 3090 | 3180 | 3420 | 3500 | 4390 | 4690 | 4810 | 4840 |
| | | | 7400 | | | | | | | | | | |
| 422023 | MP1 | 350 | | | | | | | | | | | |
| 422024 | MP2 | 360 | | | | | | | | | | | |
| 2032 | MPACSW | 1980 | | | | | | | | | | | |
| 4470 | MPAPER | 5360 | 5260 | 5430 | 5810 | 6900 | 7290 | | | | | | |
| 4211 | MPCOPY | 3130 | 2950 | | | | | | | | | | |
| 3236 | MPFLAG | 8660 | 5240 | 5380 | 6870 | | | | | | | | |
| 1004 | MPOPR | 4920 | | | | | | | | | | | |
| 1000 | MPST | 4880 | 4890 | | | | | | | | | | |
| 4606 | MPUTW1 | 5980 | 5940 | | | | | | | | | | |
| 1754 | MQ | 4530 | 4540 | | | | | | | | | | |
| 2016 | MQSAVE | 1820 | 1830 | | | | | | | | | | |
| 3701 | MSTART | 920 | 8830 | | | | | | | | | | |
| 2000 | MTEMP0 | 1630 | 7480 | 7690 | | | | | | | | | |
| 2001 | MTEMP1 | 1640 | | | | | | | | | | | |
| 2002 | MTEMP2 | 1650 | | | | | | | | | | | |
| 2003 | MTEMP3 | 1660 | | | | | | | | | | | |
| 2004 | MTEMP4 | 1670 | | | | | | | | | | | |
| 2005 | MTEMP5 | 1680 | | | | | | | | | | | |
| 2006 | MTEMP6 | 1690 | | | | | | | | | | | |
| 2007 | MTEMP7 | 1700 | | | | | | | | | | | |
| 2010 | MTEMP8 | 1710 | | | | | | | | | | | |
| 2011 | MTEMP9 | 1720 | | | | | | | | | | | |
| 4072 | MTPOT1 | 1780 | | | | | | | | | | | |
| 422025 | MTR | 370 | | | | | | | | | | | |
| 2000 | MTRST | 5080 | | | | | | | | | | | |
| 1772 | NAME | 4670 | 4680 | | | | | | | | | | |
| 4633 | NBLOCK | 6190 | 6060 | 6090 | | | | | | | | | |
| 580 | NEWBR | 3930 | 3940 | | | | | | | | | | |
| 3177 | NEWHDR | 2290 | 2200 | 2610 | 3190 | | | | | | | | |
| 3714 | NEXTL | 470 | 1470 | 4050 | 4330 | | | | | | | | |
| 1771 | NUMBR | 4660 | 4670 | | | | | | | | | | |
| 243 | NUMSGN | 270 | | | | | | | | | | | |

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| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 623 | NXPTR | 3960 | 3970 | | | | |
| 702 | OC0 | 4180 | 4190 | | | | |
| 703 | OC1 | 4190 | 4200 | | | | |
| 704 | OC2 | 4200 | 4210 | | | | |
| 705 | OC3 | 4210 | | | | | |
| 574646 | OFF | 2730 | | | | | |
| 3233 | OFFSET | 8630 | 5180 | 5610 | 6390 | 6720 | 7100 |
| 575600 | ON | 2720 | | | | | |
| 1773 | OVER | 4680 | 4690 | | | | |
| 700 | OVLEN | 940 | | | | | |
| 1000 | OVSTRT | 930 | 920 | 940 | 4750 | 4880 | 4960 |
| 2033 | P10SAV | 1990 | 2000 | | | | |
| 2034 | P11SAV | 2000 | 2050 | | | | |
| 2025 | PACSAV | 1930 | 1940 | | | | |
| 2032 | PACSW | 1980 | 1990 | | | | |
| 241 | PBFLAG | 3810 | 3820 | | | | |
| 2017 | PCSAVE | 1830 | 1840 | | | | |
| 256 | PERIOD | 340 | 350 | | | | |
| 227 | PFLAG | 3770 | 3780 | | | | |
| 77 | PH0 | 4260 | 4270 | | | | |
| 146 | PH1 | 4300 | 4310 | | | | |
| 155 | PH2 | 4340 | 4350 | | | | |
| 1 | PHANTO | 2780 | | | | | |
| 2150 | PHFLAG | 2280 | 2330 | | | | |
| 1700 | PHLEN | 2640 | | | | | |
| 2025 | PHSTOR | 1920 | 1930 | | | | |
| 274 | PIDN2 | 3850 | 3860 | | | | |
| 270 | PIDON | 3840 | 3850 | | | | |
| 1001 | PINT | 4890 | 4900 | | | | |
| 303 | PIOUT | 3860 | 3870 | | | | |
| 602026 | PLDR | 400 | | | | | |
| 253 | PLUS | 310 | | | | | |
| 2026 | PMQSAV | 1940 | 1950 | | | | |
| 602025 | PMTR | 380 | | | | | |
| 256 | POINT | 350 | 1460 | | | | |
| 2027 | PPCSAV | 1950 | 1960 | | | | |
| 606064 | PPT | 690 | 3680 | | | | |
| 2031 | PSCSAV | 1970 | 1980 | | | | |
| 2030 | PSTSAV | 1960 | 1970 | | | | |
| 606460 | PTP | 710 | 3720 | | | | |
| 606462 | PTR | 700 | 3700 | | | | |
| 1 | PURCOD | 360 | 5140 | 5270 | 430 | 610 | |
| 12100 | PURLEN | 1010 | | | | | |
| 1775 | PURNM | 4700 | 4710 | | | | |
| 3700 | PURSTR | 540 | 990 | 1010 | 2560 | 8800 | |
| 546 | PUTIN | 3940 | 3950 | | | | |
| 34 | RACS | 3440 | | | | | |
| 6 | RCNT | 3390 | | | | | |
| 35 | RCORE | 3450 | | | | | |
| 1003 | RDBLK | 4910 | 4920 | | | | |
| 32 | RDT0 | 3420 | | | | | |
| 33 | RDT1 | 3430 | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2001 | TTEMP1 | 1640 | | | | | | | | | | | | |
| 2002 | TTEMP2 | 1650 | | | | | | | | | | | | |
| 2003 | TTEMP3 | 1660 | | | | | | | | | | | | |
| 2004 | TTEMP4 | 1670 | | | | | | | | | | | | |
| 2005 | TTEMP5 | 1680 | | | | | | | | | | | | |
| 2006 | TTEMP6 | 1690 | | | | | | | | | | | | |
| 2007 | TTEMP7 | 1700 | | | | | | | | | | | | |
| 2010 | TTEMP8 | 1710 | | | | | | | | | | | | |
| 2011 | TTEMP9 | 1720 | | | | | | | | | | | | |
| 3456 | TTTYOT | 3240 | 1800 | 2450 | 2950 | 3130 | 3190 | 3290 | 3340 | 3360 | 3380 | | | |
| 6 | TTYCLK | 3170 | 3180 | | | | | | | | | | | |
| 3 | TTYNUM | 3140 | | | | | | | | | | | | |
| 10 | TTYSPD | 3150 | 3170 | | | | | | | | | | | |
| 3301 | TWORDB | 470 | 1100 | 1690 | 1790 | 1930 | 2720 | 2810 | 2870 | 3050 | 3370 | 3980 | 1310 | 1330 |
| | | | 1350 | 1410 | 1510 | 1590 | 1600 | 1980 | 2160 | 2660 | 2670 | | | |
| 1774 | TYPE | 4690 | 4700 | | | | | | | | | | | |
| 1766 | UCORE | 4630 | 4640 | 2160 | | | | | | | | | | |
| 1767 | UDISK | 4640 | 4650 | 2370 | | | | | | | | | | |
| 336 | UPARR | 2940 | | | | | | | | | | | | |
| 76 | US0 | 4250 | 4260 | 4280 | | | | | | | | | | |
| 125 | US1 | 4290 | 4300 | 4320 | | | | | | | | | | |
| 154 | US2 | 4330 | 4340 | 4360 | | | | | | | | | | |
| 0 | USER | 2790 | | | | | | | | | | | | |
| 3 | USERS | 2850 | 3200 | | | | | | | | | | | |
| 14000 | USLEN | 980 | 2640 | | | | | | | | | | | |
| 2015 | USTORE | 1800 | 1810 | | | | | | | | | | | |
| 75 | UT0 | 4280 | | | | | | | | | | | | |
| 124 | UT1 | 4320 | | | | | | | | | | | | |
| 153 | UT2 | 4360 | | | | | | | | | | | | |
| 1704 | UTEM0 | 4440 | 4450 | | | | | | | | | | | |
| 1705 | UTEM1 | 4450 | 4460 | | | | | | | | | | | |
| 1706 | UTEM2 | 4460 | 4470 | | | | | | | | | | | |
| 1707 | UTEM3 | 4470 | 4480 | | | | | | | | | | | |
| 1710 | UTEM4 | 4480 | 4490 | | | | | | | | | | | |
| 1711 | UTEM5 | 4490 | 4500 | | | | | | | | | | | |
| 1712 | UTEM6 | 4500 | 4510 | | | | | | | | | | | |
| 1770 | VALID | 4650 | 4660 | 3480 | | | | | | | | | | |
| 17777 | VFLAG | 480 | | | | | | | | | | | | |

UNDEFINED SYMBOLS

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| #1 | 5630 | | | | | | | | | | | |
| #2 | 5640 | | | | | | | | | | | |
| #3 | 5650 | | | | | | | | | | | |
| #4 | 5660 | | | | | | | | | | | |
| #5 | 5680 | | | | | | | | | | | |
| DEFINS | 100 | 100 | 120 | 120 | 580 | 580 | 2680 | 2680 | 3210 | 3210 | 5330 | 5330 |
| M BAD | 620 | | | | | | | | | | | |
| MCHECK | 610 | | | | | | | | | | | |
| OCTZ | 1790 | | | | | | | | | | | |

MACRO CROSS REFERENCE TABLE

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CHAR | 1380 | | | | | | | | | | | | |
| CHROT | 1340 | | | | | | | | | | | | |
| COUNT | 1460 | 1170 | | | | | | | | | | | |
| CRLF | 1300 | 960 | 5410 | | | | | | | | | | |
| DELIM | 1420 | 2630 | 2780 | 2990 | | | | | | | | | |
| EMESS | 1750 | | | | | | | | | | | | |
| ENTER | 770 | 1320 | 1730 | 1880 | 2290 | 5850 | 6930 | 7790 | 7960 | 8090 | 740 | 1340 | 1680 |
| | | 2590 | 3210 | 3670 | 3860 | 4150 | 720 | 1170 | 1660 | 1970 | 2190 | 2280 | 2380 |
| | | 2580 | 2640 | 2930 | 3240 | 3320 | | | | | | | |
| FORMAT | 1060 | 2190 | 2710 | 2920 | 3050 | 3080 | 3670 | 3730 | 3800 | 3830 | 3970 | 4090 | 4160 |
| | | 4260 | 4520 | 5290 | 7370 | 2830 | 2860 | 3230 | | | | | |
| LINE | 1100 | 990 | 4960 | 5400 | 1430 | | | | | | | | |
| LOOP | 960 | 1130 | 7630 | 8030 | | | | | | | | | |
| MESS | 1620 | 970 | 980 | 1140 | 1160 | 1200 | 1220 | 1240 | 4950 | 5390 | 5800 | 1390 | 1420 |
| | | 1840 | 3610 | 4040 | 4320 | | | | | | | | |
| MESSR | 1520 | 970 | 980 | 1140 | 1160 | 1200 | 1220 | 1240 | 4950 | 5390 | 5800 | 1390 | 1420 |
| | | 1840 | 3610 | 4040 | 4320 | | | | | | | | |
| MPOFF | 5430 | 2150 | 2360 | 3470 | | | | | | | | | |
| NEG | 1010 | 3770 | 5220 | 5660 | 6700 | 6780 | 7530 | | | | | | |
| NMESS | 1670 | | | | | | | | | | | | |
| NUM | 1260 | 3720 | 3790 | 4510 | 5000 | 5280 | 2850 | | | | | | |
| OCT | 1890 | | | | | | | | | | | | |
| OCTZ | 1840 | 1180 | | | | | | | | | | | |
| START | 1100 | | | | | | | | | | | | |
| SWAP | 5610 | | | | | | | | | | | | |
| WORD | 1140 | 1040 | 4080 | 1440 | 2610 | 2760 | 3220 | | | | | | |
| WORD1 | 1180 | 1100 | 1790 | 1930 | 2720 | 2810 | 3370 | 3980 | | | | | |
| WORD2 | 1220 | | | | | | | | | | | | |

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| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | .:.:.: | | | | | | | | | | | | |
| 0 | .REL. | | | | | | | | | | | | |
| 0 | IMPURE | 550 | 1320 | 1730 | 1880 | 2060 | 2290 | 5850 | 6930 | 7760 | 7790 | 7960 | 8090 | 8480 |
| | | | 540 | 740 | 1340 | 1510 | 1680 | 2070 | 2280 | 2590 | 2940 | 3210 | 3670 | 3860 |
| | | | 4150 | 440 | 720 | 1170 | 1660 | 1970 | 2190 | 2280 | 2380 | 2580 | 2640 | 2930 |
| | | | 3240 | 3320 | 8780 | | | | | | | | | |
| 3700 | PURE | 570 | 1320 | 1730 | 1880 | 2080 | 2290 | 5850 | 6930 | 7780 | 7790 | 7960 | 8090 | 8720 |
| | | | 570 | 740 | 1340 | 1530 | 1680 | 2130 | 2340 | 2590 | 2960 | 3210 | 3670 | 3860 |
| | | | 4150 | 620 | 720 | 1170 | 1660 | 1970 | 2190 | 2280 | 2380 | 2580 | 2640 | 2930 |
| | | | 3240 | 3320 | 8810 | | | | | | | | | |