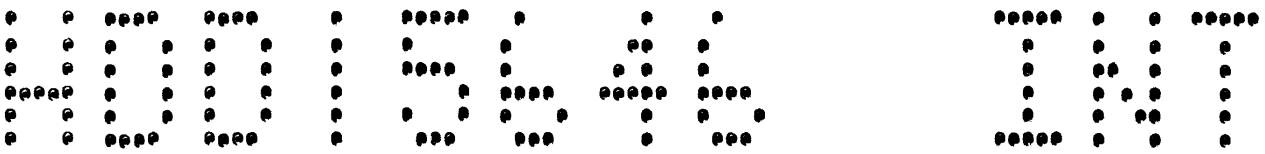

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```
PDP-9 MINI TIME-SHARING SYSTEM
SYSTEM INITIALIZATION PROGRAM
          DTSSI INT
          MTSSI INT
```

```
100             .TITLE  PDP-9 MINI TIME-SHARING SYSTEM INITIALIZATION PROGRAM
110             .NAME   INT--INT
120     *
130     *       **********PROGRAMS USED IN MTSS**********
140     *
150     *       INITIALIZATION PROGRAM
160     *       DARTMOUTH TIME-SHARING SYSTEM (SOURCE FILE) NAME: INT
170     *       MINI TIME-SHARING SYSTEM (NON-RELOCATABLE BINARY FILE) NAME: INT
180     *
190     *       EXECUTIVE -- RESIDENT PROGRAM
200     *       DTSS NAME: RES
210     *       MTSS NAME: B01
220     *
230     *       EXECUTIVE -- SWAPPER OVERLAY
240     *       DTSS NAME: SWP
250     *       MTSS NAME: B02
260     *
270     *       EXECUTIVE -- MEMORY PROTECTION OVERLAY #1
280     *       DTSS NAME: MP1
290     *       MTSS NAME: B03
300     *
310     *       EXECUTIVE -- MEMORY PROTECTION OVERLAY #2
320     *       DTSS NAME: MP2
330     *       MTSS NAME: B04
340     *
350     *       EXECUTIVE -- SPECIAL IOT (EXECUTIVE CALL) HANDLER #1 OVERLAY
360     *       DTSS NAME: SPL
370     *       MTSS NAME: B12
380     *
390     *       PHANTOM PROGRAM -- SYSTEM MONITOR AND MESSAGE OUTPUT
400     *       DTSS NAME: MTR
410     *       MTSS NAME: B05
420     *
430     *       PHANTOM PROGRAM -- SYSTEM LOADER PROGRAM
440     *       DTSS NAME: LDR
450     *       MTSS NAME: B06
460     *
470     *       $-USER PROGRAM -- DEBUGGER
480     *       DTSS NAME: DDT
490     *       MTSS NAME: B07
500     *
510     *       $-USER PROGRAM -- BASIC INTERPRETER
520     *       DTSS NAME: BAS
530     *       MTSS NAME: B08
540     *
550     *       USER PROGRAM -- PHYSICAL TELETYPE HANDLER SUBROUTINES PACKAGE
560     *       DTSS NAME: LIBTTY
570     *       MTSS NAME: B10
580     *
590     *       USER PROGRAM -- GROWTH CATALOG HANDLING SUBROUTINES PACKAGE
600     *       DTSS NAME: GROCAT
610     *       MTSS NAME B11
```

```
                .EJECT
*
*       CORE LAYOUT FOR THE INITIALIZATION PROGRAM
*
*       ********************************************************************
*       *                                                                  *
*       * LOCATIONS BUF TO BUF+4K ARE USED AS A BUFFER FOR COPYING FILES  *
*       * FROM THE LIBRARY DECTAPE TO THE SYSTEM DISK.                     *
*       *                                                                  *
*       ********************************************************************
*       *                                                                  *
*       * LOCATIONS BASE-LCATL ARE USED FOR THE MAIN INITIALIZATION PROGRAM *
*       *                                                                  *
*       ********************************************************************
*       *                                                                  *
*       * LOCATIONS LCATL-TSWORDB ARE USED FOR MISCELLANEOUS INITIALIZATION *
*       * PROGRAM SUBROUTINES.                                             *
*       *                                                                  *
*       ********************************************************************
*       *                                                                  *
*       * LOCATIONS TSWORDB-CSCTEM1 ARE USED FOR THE MTSS STANDARD TELETYPE *
*       * HANDLER.                                                         *
*       *                                                                  *
*       ********************************************************************
*       *                                                                  *
*       * LOCATIONS CSCTEM1-ISOFILES ARE USED FOR THE GROWTH SYSTEM        *
*       * STANDARD CATALOG ROUTINES.                                       *
*       *                                                                  *
*       ********************************************************************
*       *                                                                  *
*       * LOCATIONS ISOFILES-ISLCAT ARE USED FOR A LIST OF MTSS LIBRARY    *
*       * FILES, ASSORTED CONSTANTS, AND AN INITIALIZATION PROGRAM PHYSICAL *
*       * DISK CATALOG.                                                    *
*       ********************************************************************
*       *                                                                  *
*       * LOCATIONS LCAT-LCAT+377 ARE USED TO HOLD A COPY OF THE LIBRARY   *
*       * DECTAPE CATALOG.                                                 *
*       *                                                                  *
*       ********************************************************************
*       *                                                                  *
*       * LOCATIONS SCATLOG-SCATLOG+377 ARE USED FOR THE STANDARD GROWTH   *
*       * CATALOG, SINCE THIS INITIALIZATION PROGRAM IS LOADED FROM THE    *
*       * MTSS LIBRARY DECTAPE BY THE GROWTH SYSTEM MONITOR, AT START-UP   *
*       * TIME THIS CATALOG WILL BE A CATALOG OF THE MTSS LIBRARY DECTAPE. *
*       *                                                                  *
*       ********************************************************************
```

```
1080            ,EJECT
1090     *
1100     *      THE INITIALIZATION PROGRAM WILL INITIALIZE MTSS FOR ANY NUMBER
1110     *      OF FILES OF ANY TYPE, AND FOR ANY NUMBER OF TELETYPES/USERS.
1120     *
1130     *      THE SEQUENCE OF INITIALIZATION ACTIONS IS:
1140     *
1150     *           1 -- INITIALIZE THE HARDWARE
1160     *
1170     *           2 -- INITIALIZE THE SOFTWARE FLAGS
1180     *
1190     *           3 -- COPY THE CURRENT GROWTH CATALOG (IT SHOULD BE THE MTSS
1200     *                LIBRARY DECTAPE CATALOG) INTO LCAT, SINCE IT IS REPEATEDLY
1210     *                ACCESSED BY THIS PROGRAM.
1220     *
1230     *           4 -- COPY THE CATALOG FROM THE SYSTEM DISK INTO THE STANDARD
1240     *                GROWTH CATALOG BLOCK SO THE STANDARD CATALOG ROUTINES
1250     *                WILL WORK WITH IT.
1260     *
1270     *           5 -- UNSAVE FROM THE SYSTEM DISK ALL FILES ON THE LIST OF SYSTEM
1280     *                FILES WHICH BEGINS AT OFILES. DO NOT WORRY ABOUT ANY WHICH ARE
1290     *                NOT SAVED TO BEGIN WITH.
1300     *
1310     *                NOTE THAT OVERLAY FILES, USER-TYPE SYSTEM FILES, AND
1320     *                PHANTOM-TYPE SYSTEM FILES ARE UNSAVED IN DISCRETE OPERATIONS.
1330     *                THIS IS SO THAT IF IT BECOMES DESIRABLE TO HANDLE THEM IN
1340     *                DIFFERING MANNERS IN THE FUTURE, IT CAN BE EASILY DONE.
1350     *
1360     *           6 -- PURGE THE DISK TO COMPACT THE RESULTING CATALOG AND THE
1370     *                RESULTING DISK SAVED STORAGE.
1380     *
1390     *           7 -- COPY ALL FILES ON THE LIST OF SYSTEM FILES WHICH
1400     *                BEGINS AT OFILES FROM THE MTSS LIBRARY DECTAPE TO THE SYSTEM
1410     *                DISK.
1420     *
1430     *                NOTE THAT OVERLAY FILES, USER-TYPE SYSTEM FILES, AND
1440     *                PHANTOM-TYPE SYSTEM FILES ARE COPIED IN DISCRETE OPERATIONS.
1450     *                THIS IS SO THAT IF IT BECOMES DESIRABLE TO HANDLE THEM IN
1460     *                DIFFERING MANNERS IN THE FUTURE, IT CAN EASILY BE DONE.
1470     *
1480     *           8 -- THE ENTRIES IN THE SYSTEM DISK CATALOG REFER TO LOGICAL
1490     *                DISK BLOCK NUMBERS RELATIVE TO THE START OF THE GROWTH
1500     *                SYSTEM ON THE SYSTEM DISK, AND TO ACTUAL CORE ADDRESSES.
1510     *                COPY INTO INTCAT THE ENTRIES FOR ALL SWAPPABLE SYSTEM
1520     *                FILES (THOSE LISTED IN THE LIST BEGINNING AT OFILES)
1530     *                CHANGING LOGICAL DISK ADDRESSES TO PHYSICAL DISK ADDRESSES
1540     *                AND ACTUAL CORE ADDRESSES TO CORE ADDRESSES -1. ALSO CREATE
1550     *                THE ENTRIES FOR THE PURE CODE PORTION OF PHANTOM PROGRAMS.
1560     *
1570     *                NOTE THAT OVERLAY FILES, USER-TYPE SYSTEM FILES, AND
1580     *                PHANTOM-TYPE SYSTEM FILES ARE COPIED IN DISCRETE OPERATIONS.
1590     *                THIS IS BECAUSE THEY ARE NOT HANDLED IDENTICALLY.
```

```
1600    *               FOR PHANTOM PROGRAMS AN ENTRY MUST BE MADE FOR THE
1610    *               PURE CODE PORTION
1620    *
1630    *            9 -- CERTAIN OVERLAYS HAVE AN INTERNAL CATALOG THEY DEPEND
1640    *                 ON (E.G. SWAPPER, OR EACH MEMORY PROTECTION OVERLAY CALLS
1650    *                 THE NEXT ONE DIRECTLY). NOW THESE OVERLAYS ARE READ INTO
1660    *                 THE OVERLAY AREA, ONE AT A TIME, AND EACH HAS HIS CATALOG
1670    *                 INITIALIZED FOR HIM. THEN THE CORRECTED COPY IS READ BACK
1680    *                 OUT ONTO THE SYSTEM DISK.
1690    *
1700    *           10 -- THE RESIDENT PROGRAM IS READ INTO RESIDENT CORE AND ITS
1710    *                 RESIDENT CATALOG (WHOSE ONLY ENTRY IS THE SWAPPER POINTERS)
1720    *                 IS SET UP ACCORDING TO THE SYSTEM DISK CATALOG.
1730    *
1740    *           11 -- USER AND PHANTOM JOB TABLES ARE INITIALIZED TO INSURE
1750    *                  THEY DON'T CONTAIN EITHER GARBAGE OR RANDOM PERMISSIONS.
1760    *
1770    *           12 -- WITH INITIALIZATION COMPLETE, A MESSAGE IS PRINTED ON THE
1780    *                 CONSOLE TELETYPE, FINAL HARDWARE TIDYING UP IS DONE, AND
1790    *                 THE MONITOR IS CALLED FOR THE CONSOLE TELETYPE.
```

```
1800            .EJECT
1810
1820    *
1830    *
1840    *       TO INSERT A NEW PROGRAM INTO MTSS SAVE IT ON THE MTSS LIBRARY DECTAPE AND:
1850    *
1860    *            1 -- OVERLAY PROGRAMS: ADD ITS NAME TO THE LIST OF OVERLAY
1870    *                 PROGRAMS (OFILES). IN THE OFILES LIST THE MEMORY PROTECTION
1880    *                 OVERLAYS MUST BE LISTED CONSECUTIVELY. OTHER THAN THAT,
1890    *                 ORDER IS IMMATERIAL.
1900    *
1910    *            2 -- USER-TYPE SYSTEM PROGRAMS: ADD ITS NAME TO THE LIST OF
1920    *                 USER-TYPE SYSTEM PROGRAMS (UFILES). ORDER IS IMMATERIAL.
1930    *
1940    *            3 -- PHANTOM-TYPE SYSTEM PROGRAMS: ADD ITS NAME TO THE LIST OF
1950    *                 PHANTOM-TYPE USER PROGRAMS (PFILES). ORDER IS IMMATERIAL.
1960    *
1970    *       NOTE THAT ALL PROGRAM NAMES MUST ALREADY BE DEFINED IN THE DEFINS
1980    *       PROGRAM. THAT IS TO MAKE THEM AVAILABLE TO ALL MTSS PROGRAMS.
```

```
                                        DEFINITIONS LOCAL TO THE INITIALIZATION PROGRAM

                    1990                ,STITL  DEFINITIONS LOCAL TO THE INITIALIZATION PROGRAM
                    2000
000001              2010    DEFINS      ,EQU    1               TURN THE LISTING ON FOR THE DEFINITIONS INSERT
000001              2020    DEBUG       ,EQU    1               TURN THE LISTING ON FOR ALL OTHER INSERTS
012000              2030    NEXTL       ,EQU    I$START         RESTART ADDRESS FROM DISK/DECTAPE HARDWARE ERROR
012000              2040    FORMAT      ,EQU    I$START         AVOIDS ERROR FLAGS FROM THE GROWTH INSERTS
                    2050                ,HEAD   I
                    2060                ,PMC    ON              PRINT ALL MACRO CODE
                    2090                ,INSRT  DEFINS
```

MTSS SYSTEM DEFINITIONS

```
                    140             .HEAD                   MAKE SURE NO HEAD SYMBOL IS ON
                    150     *       LIBPW = PLBPROGS
                    160     *       DOCPW = BLN
                    170     *       RSTPW = CRC
                    180     *         CPW = UVLQ
                    190     *
                    200     *
                    210     *       THE FOLLOWING OPDEF STATEMENTS ARE FOR CONVENIENCE ONLY
                    220     *
                    230     INX     .OPDEF  ISZ             USED WHEN THE INCREMENT SHOULD NEVER SKIP
                    240     RET     .OPDEF  JMP             USED FOR SUBROUTINE EXITS
                    250     *
                    260     *       MTSS PROGRAMS ARE ASSIGNED SERIAL NAMES INSTEAD OF MORE MNEMONIC
                    270     *       NAMES TO MINIMIZE CONFUSION WITH OTHER USERS' PROGRAMS STORED ON THE
                    280     *       SYSTEM DISK UNDER THE GROWTH SYSTEM.
                    290     *
                    300     *       DEFINE THE MTSS SYSTEM PROGRAM NAMES
                    310     *
422020              320     INT     .EQU    422020          SYSTEM NAME IS B00
422021              330     RES     .EQU    422021          B01
422022              340     SWP     .EQU    422022          B02
422023              350     MP1     .EQU    422023          B03
422024              360     MP2     .EQU    422024          B04
422025              370     MTR     .EQU    422025          PHANTOM (ENTIRE CODE) NAME IS B05
602025              380     PMTR    .EQU    602025          PHANTOM (PURE CODE) NAME IS P05
422026              390     LDR     .EQU    422026          B06
602026              400     PLDR    .EQU    602026          P06
422027              410     DDT     .EQU    422027          B07
422030              420     BAS     .EQU    422028          B08
422122              430     SPL     .EQU    422122          B12
                    440     *
                    450     *       MTSS MUST BE ASSEMBLED FOR A SPECIFIC MAXIMUM NUMBER OF USERS IN
                    460     *       ORDER TO ALLOCATE INTERNAL STORAGE AND DISK STORAGE CORRECTLY.
                    470     *
                    480     *       HARDWARE DEVICE NAMES
                    490     *
606462              500     PTR     .EQU    606462          ACI6 PTR
606460              510     PTP     .EQU    606460          ACI6 PTP
606064              520     PPT     .EQU    606064          ACI6 PPT
445320              530     DKO     .EQU    445320          ACI6 DKO
646000              540     TP.     .EQU    646000          ACI6 *TP *
00646₀              55₀     .TP     .EQU    00646₀          ACI6 * TP*
446400              56₀     DT.     .EQU    446400          ACI6 *DT *
004464              57₀     .DT     .EQU    004464          ACI6 * DT*
```

MTSS SYSTEM DEFINITIONS

```
                600     *
                610     *
                620     *
                630     *            PDP-9 MINI TIME-SHARING SYSTEM CORE LAYOUT
                640     *
                650     *       0         ************************************
                660     *                   *                                  *
                670     *                   *  EXECUTIVE -- RESIDENT PROGRAM   *  RESLEN
                680     *                   *                                  *
                690     *       OVSTRT      ************************************
                700     *                   *                                  *
                710     *                   *  EXECUTIVE -- OVERLAY AREA       *  OVLEN
                720     *                   *                                  *
                730     *       JTSTRT      ************************************
                740     *                   *                                  *
                750     *                   *  USER JOB TABLE                  *  JTLEN
                760     *                   *                                  *
                770     *       BOUNDARY    ************************************
                780     *                   *                                  *
                790     *                   *                                  *
                800     *                   *                                  *
                810     *                   *  USER PROGRAM AREA               *  USLEN
                820     *                   *                                  *
                830     *                   *                                  *
                840     *                   *                                  *
                850     *       CORMAX      ************************************
                860     *
                870     *
                880     *
                890     *       MTSS CORE LAYOUT DEFINITIONS
                900     *
016000          910     CORMAX  ,EQU    8K
001000          920     RESLEN  ,EQU    OVSTRT
001000          930     OVSTRT  ,EQU    1000
000700          940     OVLEN   ,EQU    JTSTRT-OVSTRT
001700          950     JTSTRT  ,EQU    1700
000100          960     JTLEN   ,EQU    BOUNDARY-JTSTRT
002000          970     BOUNDARY,EQU    2000
014000          980     USLEN   ,EQU    CORMAX-BOUNDARY
001700          990     IMPLEN  ,EQU    PURSTRT-BOUNDARY
003700          1000    PURSTR  ,EQU    JTSTRT+BOUNDARY
012100          1010    PURLEN  ,EQU    8K-PURSTRT
016000          1020    8K      ,EQU    16000           FOR DEBUGGING PURPOSES ONLY --- WILL BE LENGTHENED TO 20000
014000          1030    7K      ,EQU    14000           FOR DEBUGGING PURPOSES ONLY -- WILL BE LENGTHEDED TO 16000
```

MTSS SYSTEM DEFINITIONS

```
1050
1060
1070
1080     *                    PHANTOM CORE LAYOUT
1090     *
1100     *        BOUNDARY ****************************
1110     *                 *                          *
1120     *                 *  TEMPORARY VARIABLES     *
1130     *                 *                          *
1140     *        USTORE   ****************************
1150     *                 *                          *
1160     *                 *  USER REGISTER STORAGE   *
1170     *                 *                          *
1180     *        PHSTOR   ****************************
1190     *                 *                          *
1200     *                 *  PHANTOM REGISTER STORAGE *
1210     *                 *                          *
1220     *        DBSTOR   ****************************
1230     *                 *                          *
1240     *                 *  DDT STORAGE             *
1250     *                 *                          *
1260     *        COMSTOR  ****************************
1270     *                 *                          *
1280     *                 *  COMMON PHANTOM STORAGE  *
1290     *                 *                          *
1300     *        BCNTRL   ****************************
1310     *                 *                          *
1320     *                 * FILE BUFFER CONTROL      *
1330     *                 *                          *
1340     *        BUFFER   ****************************
1350     *                 *                          *
1360     *                 *                          *
1370     *                 *  CORE BUFFER             *
1380     *                 *                          *
1390     *                 *                          *
1400     *        IMPSTRT  ****************************
1410     *                 *                          *
1420     *                 *                          *
1430     *                 *  IMPURE PHANTOM CODE     *
1440     *                 *                          *
1450     *                 *                          *
1460     *        PURSTRT  ****************************
1470     *                 *                          *
1480     *                 *                          *
1490     *                 *                          *
1500     *                 *  PURE PHANTOM CODE       *
1510     *                 *                          *
1520     *                 *                          *
1530     *                 *                          *
1540     *        CORMAX   ****************************
1550     *
1560     *
```

MTSS SYSTEM DEFINITIONS

```
                    1570    *       PHANTOM CORE LAYOUT DEFINITIONS
                    1580    *
                    1590    *
                    1600    *       TEMPORARY VARIABLES
                    1610    *
                    1620            .HEAD   0,M,C,T,D
002000              1630    TEMP0   .EQU    BOUNDARY
002001              1640    TEMP1   .EQU    TEMP0+1
002002              1650    TEMP2   .EQU    TEMP1+1
002003              1660    TEMP3   .EQU    TEMP2+1
002004              1670    TEMP4   .EQU    TEMP3+1
002005              1680    TEMP5   .EQU    TEMP4+1
002006              1690    TEMP6   .EQU    TEMP5+1
002007              1700    TEMP7   .EQU    TEMP6+1
002010              1710    TEMP8   .EQU    TEMP7+1
002011              1720    TEMP9   .EQU    TEMP8+1
002012              1730    TEMP10  .EQU    TEMP9+1
002013              1740    TEMP11  .EQU    TEMP10+1
002014              1750    TEMP12  .EQU    TEMP11+1
                    1760    *
                    1770    *       USER REGISTER STORAGE
                    1780    *
                    1790            .HEAD   0,D,M
002015              1800    USTORE  .EQU    TEMP12+1
002015              1810    ACSAVE  .EQU    USTORE
002016              1820    MQSAVE  .EQU    ACSAVE+1
002017              1830    PCSAVE  .EQU    MQSAVE+1
002020              1840    STSAVE  .EQU    PCSAVE+1
002021              1850    SCSAVE  .EQU    STSAVE+1
002022              1860    ACSW    .EQU    SCSAVE+1
002023              1870    10SAVE  .EQU    ACSW+1
002024              1880    11SAVE  .EQU    10SAVE+1
                    1890    *
                    1900    *       PHANTOM REGISTER STORAGE
                    1910    *
002025              1920    PHSTOR  .EQU    11SAVE+1
002025              1930    PACSAV  .EQU    PHSTOR
002026              1940    PMQSAV  .EQU    PACSAV+1
002027              1950    PPCSAV  .EQU    PMQSAV+1
002030              1960    PSTSAV  .EQU    PPCSAV+1
002031              1970    PSCSAV  .EQU    PSTSAV+1
002032              1980    PACSW   .EQU    PSCSAV+1
002033              1990    P10SAV  .EQU    PACSW+1
002034              2000    P11SAV  .EQU    P10SAV+1
                    2010    *
                    2020    *       DEBUGGER STORAGE
                    2030    *
                    2040            .HEAD   D
002035              2050    DBSTOR  .EQU    P11SAV+1
002035              2060    REGSW   .EQU    DBSTOR
002036              2070    ADRSW   .EQU    REGSW+1
002037              2080    DUMSW   .EQU    ADRSW+1
```

```
                D                       MTSS SYSTEM DEFINITIONS

002040      2090    PATSW   ,EQU    DUMSW+1
002041      2100    LIMIT   ,EQU    PATSW+1
002042      2110    LOC     ,EQU    LIMIT+1
002043      2120    PC      ,EQU    LOC+1
002044      2130    LOCOR   ,EQU    PC+1
002045      2140    HICOR   ,EQU    LOCOR+1
002046      2150    MASK    ,EQU    HICOR+1
002047      2160    RELOC   ,EQU    MASK+1
002050      2170    INDIR   ,EQU    RELOC+1
002051      2180    PCMSK   ,EQU    INDIR+1
002052      2190    REGBR   ,EQU    PCMSK+1
002053      2200    COMFLG  ,EQU    REGBR+1
002054      2210    BKTAB   ,EQU    COMFLG+1
000024      2220    BKNUM   ,EQU    20.             NUMBER OF BREAKPOINT CELLS
            2230    *
            2240    *       PHANTOM COMMON STORGAGE
            2250    *
            2260            ,HEAD   0
002150      2270    COMSTOR ,EQU    3*D$BKNUM+D$BKTAB
002150      2280    PHFLAG  ,EQU    COMSTOR
            2290    *
            2300    *       FILE BUFFER CONTROL STORAGE
            2310    *
            2320            ,HEAD   D
002151      2330    BCNTRL  ,EQU    PHFLAG+1
002151      2340    FTYPE   ,EQU    BCNTRL
002152      2350    OFTYP   ,EQU    FTYPE+1
002153      2360    BDA     ,EQU    OFTYP+1
002154      2370    BCA     ,EQU    BDA+1
002155      2380    BLEN    ,EQU    BCA+1
002156      2390    BALT    ,EQU    BLEN+1
002157      2400    BMIN    ,EQU    BALT+1
002160      2410    MBMIN   ,EQU    BMIN+1
002161      2420    BMAX    ,EQU    MBMIN+1
002162      2430    BPTR    ,EQU    BMAX+1
002163      2440    FDA     ,EQU    BPTR+1
002164      2450    MFDA    ,EQU    FDA+1
002165      2460    FMIN    ,EQU    MFDA+1
002166      2470    MFMIN   ,EQU    FMIN+1
002167      2480    FMAX    ,EQU    MFMIN+1
002170      2490    BUFFER  ,EQU    FMAX+1
001000      2500    BUFLEN  ,EQU    1000
            2510    *
            2520    *       ACTUAL CODE CONTROL
            2530    *
            2540            ,HEAD   M
003170      2550    IMPSTRT ,EQU    BUFFER+BUFLEN
003700      2560    PURSTR  ,EQU    $PURSTR
            2570            ,HEAD
```

MTSS SYSTEM DEFINITIONS

```
                    2590    *
                    2600    *
                    2610    *       MTSS DISK LAYOUT DEFINITIONS
                    2620    *
000100              2630    TABLEN  ,EQU    100             LENGTH OF A JOB TABLE
001700              2640    PHLEN   ,EQU    8K-USLEN-TABLEN  MAXIMUM LENGTH OF IMPURE PHANTOM CODE
016000              2650    DKLEN   ,EQU    8K              LENGTH OF EACH "USER PHYSICAL DISK"
000034              2660    DKLENB  ,EQU    DKLEN/400       LENGTH OF "USER PHYSICAL DISK" IN BLOCKS
640000              2670    SCRSTR  ,EQU    640000
```

MTSS SYSTEM DEFINITIONS

```
                    2700    *       SYSTEM-WIDE CONSTANTS FOR THE PDP-9 TIME-SHARING SYSTEM.
                    2710    *
575600              2720    ON      .EQU    575600          ACI6 ON
574646              2730    OFF     .EQU    574646          ACI6 OFF
000036              2740    DKWC    .EQU    36              HOLDS TWO'S COMPLEMENT WORD COUNT FOR DISK READS
000037              2750    DKCA    .EQU    37              CORE ADDRESS LOCATION FOR DISK READS
000002              2760    DKRD    .EQU    2               NON-INTERRUPTING DISK READ COMMAND
000004              2770    DKWRT   .EQU    4               NON-INTERRUPTING DISK WRITE COMMAND
000001              2780    PHANTOM .EQU    1               FLAG FOR A PHANTOM PROGRAM
000000              2790    USER    .EQU    0               FLAG FOR A USER PROGRAM
001300              2800    SYSBAS  .EQU    1300            STARTING (BASE) BLOCK OF SYSTEM LOGICAL DISK
041300              2810    SYSDA   .EQU    040000*SYSBAS
001777              2820    SYSMAX  .EQU    1777            MAXIMUM BLOCK OF THE SYSTEM LOGICAL DISK
300000              2830    IOBLK   .EQU    300000          MASK TO KEEP JUST THE I/O ROADBLOCK FLAGS
000050              2840    CLKMAX  .EQU    40.             2/3 SECOND TIMER (60 PER SECOND CLOCK)
000003              2850    USERS   .EQU    3               MAXIMUM NUMBER OF SIMULTANEOUS JOBS
                    2860    *
                    2870    *       ASCII CONSTANTS
                    2880    *
000243              2890    SHARP   .EQU    243             #
000300              2900    ATSGN   .EQU    300             @
000275              2910    EQUAL   .EQU    275             =
000274              2920    LESS    .EQU    274             <
000276              2930    GREAT   .EQU    276             >
000336              2940    UPARR   .EQU    336             Up-ARROW
000300              2950    AT      .EQU    300             @
                    2960    *
                    2970    *
                    2980    *       TELETYPE INPUT/OUTPUT BUFFERS MUST BE OF A CERTAIN MINIMUM SIZE
                    2990    *       IN ORDER TO PROVIDE UN-INTERRUPTED OUTPUT TO ALL TELETYPES.
                    3000    *       A TELETYPE I/O BUFFER MUST AT NO TIME BE EMPTIED PAST THE POINT
                    3010    *       WHERE IT HAS ENOUGH REMAINING OUTPUT TO TAKE UP THE TIME UNTIL
                    3020    *       ITS JOB'S NEXT CORE SHOT, EVEN IF ALL OTHER USER'S WERE TO USE THEIR
                    3030    *       MAXIMUM CORE ALLOWANCES.
                    3040    *
                    3050    *       WHEN THE TELETYPE I/O BUFFER HAS MORE THAN THE MINIMUM NUMBER OF CHARACTERS
                    3060    *       IN IT, ITS JOB CAN BE SUSPENDED FROM RUNNING (I/O ROADBLOCKED).
                    3070    *       IT FOLLOWS THAT FOR SYSTEM EFFICIENCY, THE BIGGER THE TELETYPE I/O
                    3080    *       BUFFERS CAN BE, THE BETTER, BECAUSE A JOB THAT IS I/O ROADBLOCKED
                    3090    *       COSTS VIRTUALLY NO PROCESSOR TIME.
                    3100    *
                    3110    *       TELETYPE I/O BUFFER CONSTANTS TO DETERMINE MINIMUM PERMISSIBLE BUFFER SIZE
                    3120    *
000002              3130    CHRPAK  .EQU    2               NUMBER OF CHARCTERS PACKED PER WORD IN THE TTY I/O BUFFER
000003              3140    TTYNUM  .EQU    3               MAXIMUM NUMBER OF TELETYPES ON THE SYSTEM
000010              3150    TTYSPD  .EQU    10              NUMBER OF CHARACTERS PER SECOND OF THE FASTEST TERMINAL ON THE SYSTEM
000060              3160    CLKSPD  .EQU    60              NUMBER OF CLOCK PULSES PER SECOND
000006              3170    TTYCLK  .EQU    CLKSPD/TTYSPD   NUMBER OF CLOCK COUNTS PER TTY OUTPUT CHARACTER
000006              3180    CHRMAX  .EQU    CLKMAX/TTYCLK   MAXIMUM NUMBER OF CHARACTERS PRINTED DURING ONE STANDARD CPU SHOT
000002              3190    FUDGE   .EQU    2               FUDGE FACTOR ON BUFFER SIZE
000010              3200    MINBUFF .EQU    USERS-1*CHRMAX/CHRPAK+FUDGE  MINIMUM TTY BUFFER SIZE FOR CONTINUOUS PRINTING
```

MTSS SYSTEM DEFINITIONS

```
                3230    *       DEFINITIONS OF LABELS REQUIRED FOR INTER-MODULE COMMUNICATIONS.
                3240    *       EXCEPT FOR THE RESIDENT PROGRAM THE ADDRESS GIVEN IS THAT OF A
                3250    *       POINTER TO THE ITEM WITHIN THE MODULE. IN THE CASE OF THE RESIDENT
                3260    *       PROGRAM THE ADDRESS GIVEN IS THE ACTUAL ADDRESS OF THE ITEM IN QUESTION. THIS
                3270    *       IS BECAUSE THE RESIDENT PROGRAM HAS NO ROOM FOR THE SIZEABLE
                3280    *       TRANSFER VECTOR THAT WOULD BE REQUIRED OTHERWISE.
                3290    *
                3300    *       THE LABELS DEFINED HERE ARE THE SAME AS THE LABELS DEFINED IN THE
                3310    *       MAIN PROGRAM, EXCEPT THAT HERE THEY ARE NOT UNDER A HEAD SYMBOL.
                3320    *
                3330    *       RESIDENT PROGRAM LABELS
                3340    *
000002          3350    3TM21   ,EQU    2
000003          3360    3TM22   ,EQU    3
000005          3370    3AC     ,EQU    5
000006          3380    CNTRL   ,EQU    6
000006          3390    RCNT    ,EQU    CNTRL
000026          3400    .310    ,EQU    26
000027          3410    .311    ,EQU    27
000032          3420    RDT0    ,EQU    32
000033          3430    RDT1    ,EQU    33
000034          3440    RACS    ,EQU    34
000035          3450    RCORE   ,EQU    35
000040          3460    SWPS    ,EQU    40
000040          3470    RESCAT  ,EQU    SWPS
000044          3480    C$WP    ,EQU    RESCAT+4
000045          3490    CMP1    ,EQU    C$WP+1
000046          3500    CMP2    ,EQU    CMP1+1
000047          3510    CSPL    ,EQU    CMP2+1
000050          3520    3TM20   ,EQU    CSPL+1
000051          3530    3TEM0   ,EQU    3TM20+1
000052          3540    3TEM1   ,EQU    3TEM0+1
000053          3550    3TEM2   ,EQU    3TEM1+1
000054          3560    3TEM3   ,EQU    3TEM2+1
000055          3570    3TEM4   ,EQU    3TEM3+1
000056          3580    3TEM5   ,EQU    3TEM4+1
000057          3590    3TEM6   ,EQU    3TEM5+1
000060          3600    CTBFR   ,EQU    3TEM6+1
000016          3610    KBLEN   ,EQU    MINBUF+6
000010          3620    KBNUM   ,EQU    8.
000076          3630    LQLOK   ,EQU    CTBFR+KBLEN
000100          3640    CTBIN   ,EQU    CTBFR+KBLEN+2
000102          3650    CTFLG   ,EQU    CTBIN+2
000104          3660    CTNAM   ,EQU    CTFLG+2
000107          3670    L1BFR   ,EQU    CTBIN+KBNUM-1
000125          3680    L1LOK   ,EQU    L1BFR+KBLEN
000127          3690    L1BIN   ,EQU    L1BFR+KBLEN+2
000131          3700    L1FLG   ,EQU    L1BIN+2
000133          3710    L1NAM   ,EQU    L1FLG+2
000136          3720    L2BFR   ,EQU    L1BIN+KBNUM-1
000154          3730    L2LOK   ,EQU    L2BFR+KBLEN
000156          3740    L2BIN   ,EQU    L2BFR+KBLEN+2
```

MTSS SYSTEM DEFINITIONS

```
000160  3750  L2FLG   .EQU   L2BIN+2
000162  3760  L2NAM   .EQU   L2FLG+2
000227  3770  PFLAG   .EQU   L2NAM+45
000230  3780  RPTP    .EQU   PFLAG+1
000234  3790  RFLAG   .EQU   RPTP+4
000235  3800  RPTR    .EQU   RFLAG+1
000241  3810  PBFLAG  .EQU   RPTR+4
000242  3820  RSCO    .EQU   PBFLAG+1
000266  3830  DKLOK   .EQU   RSCO+20.
000270  3840  PIDON   .EQU   DKLOK+2
000274  3850  PIDN2   .EQU   PIDON+4

000303  3860  PIOUT   .EQU   PIDN2+7
000305  3870  3REST   .EQU   PIOUT+2
000335  3880  SWAP    .EQU   3REST+24.
000336  3890  SWAP1   .EQU   SWAP+1
000340  3900  SWAP3   .EQU   SWAP1+2
000513  3910  IO.IN   .EQU   SWAP3+153
000525  3920  IO.OT   .EQU   IO.IN+10.
000540  3930  NEWBR   .EQU   IO.OT+11.
000546  3940  PUTIN   .EQU   NEWBR+6
000602  3950  FGET    .EQU   PUTIN+28.
000623  3960  NXPTR   .EQU   FGET+17.
000634  3970  BIT0    .EQU   NXPTR+9.
000635  3980  BIT36   .EQU   BIT0+1
000636  3990  BIT5    .EQU   BIT36+1
000637  4000  BIT6    .EQU   BIT5+1
000640  4010  BIT7    .EQU   BIT6+1
000641  4020  BIT17   .EQU   BIT7+1
000642  4030  BL7     .EQU   BIT17+1
000643  4040  BL8     .EQU   BL7+1
000644  4050  CB0     .EQU   BL8+1
000645  4060  CB1     .EQU   CB0+1
000646  4070  CB5     .EQU   CB1+1
000647  4080  CB7     .EQU   CB5+1
000650  4090  CBL8    .EQU   CB7+1
000651  4100  ADRSS   .EQU   CBL8+1
000652  4110  JMP     .EQU   ADRSS+1
000653  4120  DBK     .EQU   JMP+1
000654  4130  DQ      .EQU   DBK+1
000662  4140  DQ2     .EQU   DQ+6.
000663  4150  DQ3     .EQU   DQ2+1
000672  4160  DKOVR   .EQU   DQ3+7.
000675  4170  DKDON   .EQU   DKOVR+3.
000702  4180  QC0     .EQU   DKDON+5.
000703  4190  QC1     .EQU   QC0+1
000704  4200  QC2     .EQU   QC1+1
000705  4210  QC3     .EQU   QC2+1
        4220  *
        4230  *       DEFINE THE NAMES ASSOCIATED WITH EACH POSSIBLE USER
        4240  *
000076  4250  US0     .EQU   CTBIN-2          NAME OF THE USER PROGRAM FOR USER #0
000077  4260  PH0     .EQU   US0+1            NAME OF THE PHANTOM PROGRAM DISK STORAGE SPACE FOR USER #0
```

MTSS SYSTEM DEFINITIONS

```
000100      4270    DK0     .EQU    PH0+1           NAME OF THE USER "PHYSICAL DISK" DISK STORAGE SPACE FOR USER #0
000075      4280    UT0     .EQU    US0-1
000125      4290    US1     .EQU    L1BIN-2
000126      4300    PH1     .EQU    US1+1
000127      4310    DK1     .EQU    PH1+1
000124      4320    UT1     .EQU    US1-1
000154      4330    US2     .EQU    L2BIN-2
000155      4340    PH2     .EQU    US2+1
000156      4350    DK2     .EQU    PH2+1
000153      4360    UT2     .EQU    US2-1
            4370    *
            4380    *       JOB TABLE LABELS
            4390    *
001700      4400    FRDA    .EQU    JTSTRT
001701      4410    FRCA    .EQU    FRDA+1
001702      4420    FRLEN   .EQU    FRCA+1
001703      4430    FRSTA   .EQU    FRLEN+1
001704      4440    UTEM0   .EQU    FRSTA+1
001705      4450    UTEM1   .EQU    UTEM0+1
001706      4460    UTEM2   .EQU    UTEM1+1
001707      4470    UTEM3   .EQU    UTEM2+1
001710      4480    UTEM4   .EQU    UTEM3+1
001711      4490    UTEM5   .EQU    UTEM4+1
001712      4500    UTEM6   .EQU    UTEM5+1
001713      4510    .0      .EQU    UTEM6+1
001753      4520    AC      .EQU    .0+40
001754      4530    MQ      .EQU    AC+1
001755      4540    SC      .EQU    MQ+1
001756      4550    ACS     .EQU    SC+1
001757      4560    CLOCK   .EQU    ACS+1
001760      4570    IORS    .EQU    CLOCK+1
001761      4580    DFLAG   .EQU    IORS+1
001762      4590    DAP0    .EQU    DFLAG+1
001763      4600    DAP1    .EQU    DAP0+1
001764      4610    DFN     .EQU    DAP1+1
001765      4620    DSTAT   .EQU    DFN+1
001766      4630    UCORE   .EQU    DSTAT+1
001767      4640    UDISK   .EQU    UCORE+1
001770      4650    VALID   .EQU    UDISK+1
001771      4660    NUMBR   .EQU    VALID+1
001772      4670    NAME    .EQU    NUMBR+1
001773      4680    OVER    .EQU    NAME+1
001774      4690    TYPE    .EQU    OVER+1
001775      4700    PURNM   .EQU    TYPE+1
001776      4710    RSTRT   .EQU    PURNM+1
            4720    *
            4730    *       SWAPPING PROGRAM POINTER ADDRESSES
            4740    *
001000      4750    SWCAT   .EQU    OVSTRT
001001      4760    SWPPR   .EQU    SWCAT+1
001002      4770    SWMTR   .EQU    SWPPR+1
001003      4780    SWCLK   .EQU    SWMTR+1
```

MTSS SYSTEM DEFINITIONS

```
001004   4790   SWERR   .EQU    SWCLK+1
001005   4800   SWSPL   .EQU    SWERR+1
001006   4810   SXSPL   .EQU    SWSPL+1
001007   4820   SWMP1   .EQU    SXSPL+1
001010   4830   SWMP2   .EQU    SWMP1+1
001011   4840   SWOPR   .EQU    SWMP2+1
         4850   *
         4860   *       MEMORY PROTECTION PROGRAM POINTER ADDRESSES
         4870   *
001000   4880   MPST    .EQU    OVSTRT
001001   4890   PINT    .EQU    MPST+1
001002   4900   IOT0    .EQU    PINT+1
001003   4910   RDBLK   .EQU    IOT0+1
001004   4920   MPOPR   .EQU    RDBLK+1
         4930   *
         4940   *       SPECIAL IOT (EXECUTIVE CALL) HANDLER POINTER ADDRESSES
         4950   *
001000   4960   SPLST   .EQU    OVSTRT
         4970   *
         4980   *       DEBUGGER PROGRAM POINTER ADDRESSES
         4990   *
012000   5000   DDTST   .EQU    12000
         5010   *
         5020   *       MTSS LOADER PROGRAM POINTER ADDRESSES
         5030   *
002000   5040   LDRST   .EQU    BOUNDARY
         5050   *
         5060   *       MTSS MONITOR/MESSAGE OUTPUT PROGRAM POINTER ADDRESSES
         5070   *
002000   5080   MTRST   .EQU    BOUNDARY
         5090   *
         5100   *       THE FOLLOWING MACROS ARE USED ONLY IN PURE-CODED PHANTOM PROGRAMS.
         5110   *       THEY HELP TO KEEP IMPURE CODE SEPARATE FROM PURE CODE, AND TO
         5120   *       PUT ONLY THE NECESSARY THINGS IN THE IMPURE AREA.
         5130   *
         5280   ENTER   .DEFIN
         5290           .PMC    SAVE,ON
         5300   #1      XX
         5310           .PMC    RESTORE
         5320           .ENDM
```

MTSS SYSTEM DEFINITIONS

```
                5350    *       MTSS EXECUTIVE SERVICES ARE REQUESTED USING A SPECIAL SET OF
                5360    *       OTHERWISE UNUSED IOT INSTRUCTIONS (IOT+5000 - IOT+5377).
                5370    *       HENCE THE NAME 'SPECIALS'
                5380    *
    777400      5390    SPMSK   ,EQU    777400          MASK TO RETAIN THE "SPECIAL" BITS
                5400    SPECIAL ,OPDEF  IOT+5000
    000377      5410    SPCOD   ,EQU    377             MASK TO RETAIN JUST THE BIT-CODE FROM THE SPECIAL
                5420
                5430    MPOFF   ,DEFIN
                5440            ,PMC    SAVE,ON
                5450            SPECIAL+0               TURN OFF MEMORY PROTECT
                5460            ,PMC    RESTORE
                5470            ,ENDM
                5480    TERMINATE ,OPDEF SPECIAL+1
                5490    READ    ,OPDEF  SPECIAL+2
                5500    PREAD   ,OPDEF  SPECIAL+3
                5510    WRITE   ,OPDEF  SPECIAL+4
                5520    PWRITE  ,OPDEF  SPECIAL+5
    000375      5530    TRCON   ,EQU    375             DDT TRACE ON SPECIAL
    000376      5540    TRCOFF  ,EQU    376             DDT TRACE OFF SPECIAL
    000377      5550    BRK     ,EQU    377             DDT BREAKPOINT
                5560    *
                5570    *
                5580    *
                5590    *       MTSS EXECUTIVE CALL MACROS
                5600    *
                5610    SWAP    ,DEFIN                  CONTROL,NAME,RESTART,NUMBER,(.....)
                5620            SPECIAL 1               SPECIAL IOT SWAPPER REQUEST
                5630            #1                      SWAPPER CONTROL WORD
                5640            #2                      SYSTEM FILENAME
                5650            #3                      RESTART OVERRIDE
                5660            #4                      PASSED PARAMETER COUNT
                5670            ,IDRP   #5
                5680            #5
                5690            ,IDRP
                5700            ,ENDM
                5710
                5730            ,END
                2100            ,INSRT  :DLIBRARY:PDP9LIB:BRODEFIN
```

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
777601              650     DKMAX   ,EQU    -177            MAXIMUM NUMBER OF USABLE BLOCKS ON A LOGICAL DISK
```

GROWTH SYSTEM STANDARD DEFINITIONS

```
                    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     DKO     .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             IOF!CLOF
                   1140             LAC     (700000         )
                   1150             ISA                     API ON, NO PAPER TAPE READER ATTACHED
                   1160             TLS+10
                   1170             DLP                     DISABLE THE LIGHT PEN, ON GENERAL PRINCIPLES
```

GROWTH SYSTEM STANDARD DEFINITIONS

```
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
1260            .END
2110            .INSRT  :DLIBRARY:PDP9LIB:LIBMACRO
140
150
160     *
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
```

GROWTH SYSTEM STANDARD DEFINITIONS

```
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
```

GROWTH SYSTEM STANDARD DEFINITIONS

```
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$WORDB
1200            .ENDM
1210
1220    WORD2   .DEFIN
1230            LAC     T$WORDB+1
1240            .ENDM
1250
1260    NUM     .DEFIN
1270            JMS     T$NUMIN
1280            .ENDM
1290
1300    CRLF    .DEFIN
1310            JMS     T$CRLF
1320            .ENDM
1330
1340    CHROT   .DEFIN
1350            JMS     T$TTYOT
1360            .ENDM
1370
1380    CHAR    .DEFIN
1390            JMS     T$FGET
1400            .ENDM
1410
1420    DELIM   .DEFIN
1430            LAC     T$DLMTR
1440            .ENDM
1450
1460    COUNT   .DEFIN
1470            LAC     T$COUNT
1480            .ENDM
1490
1500
1510
1520    MESSR   .DEFIN
1530            .CRSM   SAVE,ON
1540            LAW     -#2-2
1550            JMS     T$SIXOT
1560            .PMC    SAVE,OFF
1570    #5      .ACI6   +[]#1+
1580            .PMC    RESTORE
1590            .CRSM   RESTORE
1600            .ENDM
```

GROWTH SYSTEM STANDARD DEFINITIONS

```
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
1730            .ENDM
1740
1750    EMESS   .DEFIN
1760            .CRSM   SAVE,ON
1770            MESS    <#1             WORD #>,#2+7
1780            COUNT
1790            OCTZ
1800            .CRSM   RESTORE
1810            .ENDM
1820
1830
1840    OCTZ    .DEFIN                  OCTAL PRINTOUT OF THE AC WITH LEADING ZEROES SUPPRESSED
1850            STL
1860            JMS     TSOCTOT
1870            .ENDM
1880
1890    OCT     .DEFIN                  OCTAL PRINTOUT OF THE AC
1900            CLL
1910            JMS     TSOCTOT
1920            .ENDM
1930
1950            .END
```

MAIN PROGRAM

```
445320          2130    SYSDSK  .EQU    DK0             DISK 0 IS OUR ONLY DISK, AND IS THE SYSTEM DISK
                2140    RET     .OPDEF  JMP             CORRECT GROWTH DEFINITION
013774          2150    LIBDEV  .EQU    ISLCAT
                2160            .HEAD   I
                2170
                2180    *
                2190    *       INITIALIZE THE HARDWARE
                2200    *
012000          2210            .LOC    12000
012000  703302  2220    START   CAF
012001  700006  2230            IOF!CLOF
012002  705514  2240            ISA+10
012003  707074  2250            DLAH+10
012004  214374  2260            LAC     (BOUNDARY)
012005  701704  2270            MPLD
012006  700721  2280            DLP
012007  700416  2290            TLS+10
                2300    *
                2310    *       INITIALIZE THE SOFTWARE
                2320    *
                2330    *       COPY THE LIBRARY DECTAPE CATALOG INTO LCAT.
                2340    *
012010  776777  2350            LAW     SCATLOG-1
012011  040010  2360            DAC     10              SET THE START ADDRESS OF THE REGULAR BLOCK
012012  773773  2370            LAW     LCAT-1
012013  040011  2380            DAC     11              SET THE START ADDRESS OF THE SPECIAL BLOCK
012014  777400  2390            LAW     -SCATLEN
012015  053651  2400            DAC     TEMP2           SET THE LENGTH TO COPY
012016  220010  2410    INT00   LAC     10,X
012017  060011  2420            DAC     11,X            TRANSFER THE NEXT  WORD
012020  453651  2430            ISZ     TEMP2           COUNT THE TRANSFER
012021  612016  2440            JMP     INT00           NOT DONE YET -- LOOP
                2450    *
                2460    *       COPY THE SYSTEM DISK CATALOG INTO SCATLOG
                2470    *
012022  772027  2480            LAW     INT01
012023  053516  2490            DAC     CSDEVCV         SET THE RETURN ADDRESS
012024  214375  2500            LAC     (SYSDSK)        GET THE SYSTEM DISK MNEMONIC
012025  052634  2510            DAC     T$WORDB         PASS THE MNEMONIC TO THE SUBROUTINE
012026  613523  2520            JMP     CSDEVC3         CONVERT IT TO DEVICE ADDRESS FORMAT
012027  740040  2530    INT01   XX                      FATAL ERROR IF CONVERSION THINKS IT IS A PAPER TAPE
012030  053657  2540            DAC     SYSDVC          SET THE SYSTEM DEVICE ADDRESS
012031  113306  2550            JMS     CSRCA"          GET THE SYSTEM DISK CATALOG
```

I MAIN PROGRAM

```
                    2570    *
                    2580    *       UNSAVE ALL SYSTEM FILES FROM THE DISK.
                    2590    *
012032  773634      2600            LAW     UFILES
012033  040010      2610            DAC     10              SET A POINTER TO THE LIST OF FILES TO UNSAVE
012034  112336      2620            JMS     UNSAVE          UNSAVE ALL OF THE OVERLAY FILES
012035  112336      2630            JMS     UNSAVE          UNSAVE ALL OF THE USER-TYPE SYSTEM PROGRAMS
012036  112336      2640            JMS     UNSAVE          UNSAVE ALL OF THE PHANTOM-TYPE SYSTEM PROGRAMS
012037  453305      2650            INX     SCATALT         DEBUGGING INSTRUCTION
012040  113354      2660            JMS     CSFORCE         DEBUGGING INSTRUCTION
                    2670    *
                    2680    *
                    2690    *       PURGE THE DISK TO CLEAN UP ITS CATALOG AND TO COMPACT ANY STORAGE ON IT
                    2700    *
012041  213657      2710            LAC     SYSDVC
012042  052421      2720            DAC     INDA            SET THE INPUT DEVICE
012043  052422      2730            DAC     OUTDA           SET THE OUTPUT DEVICE ADDRESS
012044  217002      2740            LAC     SCATLOG+2
012045  053650      2750            DAC     TEMP1           SET THE FILE CONTROL BLOCK COUNT
                    2760    *
                    2770    *       PUT A NEW HEADER ON THE CATALOG
                    2780    *
012046  217005      2790            LAC     SCPARAM         LOAD THE DEVICE ADDRESS OF THE CATALOG
012047  354376      2800            TAD     (1)
012050  057000      2810            DAC     SCATLOG         RESET THE DEVICE ADDRESS OF THE FIRST FREE BLOCK
012051  777010      2820            LAW     SCATLOG+10
012052  057001      2830            DAC     SCATLOG+1       RESET THE POINTER TO THE FIRST FREE FCB
012053  040012      2840            DAC     SCMDX
012054  040011      2850            DAC     SCATX
012055  777777      2860            LAW     -1
012056  057002      2870            DAC     SCATLOG+2       RESET THE FCB COUNT
012057  453305      2880            INX     SCATALT         RESET THE CATALOG ALTERED FLAG
                    2890    *
                    2900    *       NOW RECOPY THE FILES, COMPACTING CATALOG AND STORAGE
                    2910    *       SCMDX RUNS DOWN THE OLD DEVICE CATALOG
                    2920    *       CATX RUNS DOWN THE NEW DEVICE CATALOG
                    2930    *
012060  453650      2940    PURL    ISZ     TEMP1           CHECK FOR DONE
012061  741000      2950            SKP
012062  612115      2960            JMP     INT03
012063  220012      2970            LAC     SCMDX,X         GET THE NEXT FILE
012064  741200      2980            SNA
012065  612111      2990            JMP     PURZ            NOT THERE
012066  113555      3000            JMS     CSSAVE          SAVE IT
012067  740040      3010            HLT                     %#&*!  THE FILE CANNOT POSSIBLY BE SAVED  !*&#%
012070  220012      3020            LAC     SCMDX,X
012071  052421      3030            DAC     INDA            SET THE INPUT FILE'S CURRENT DEVICE ADDRESS
012072  220012      3040            LAC     SCMDX,X
012073  053651      3050            DAC     TEMP2           SAVE THE FILE'S CORE ADDRESS
012074  220012      3060            LAC     SCMDX,X
012075  052423      3070            DAC     LEN             SAVE THE FILE'S LENGTH
012076  113604      3080            JMS     CSALC           ALLOCATE SPACE ON THE DEVICE FOR IT
```

I MAIN PROGRAM

```
012077  060011  3090          DAC     $CATX,X         SET ITS NEW DEVICE ADDRESS
012100  052422  3100          DAC     OUTDA           SAVE FOR OUTPUT
012101  213651  3110          LAC     TEMP2
012102  060011  3120          DAC     $CATX,X         SET IT'S CORE ADDRESS
012103  212423  3130          LAC     LEN
012104  060011  3140          DAC     $CATX,X         SET IT'S LENGTH
012105  220012  3150          LAC     $CMDX,X
012106  060011  3160          DAC     $CATX,X         SET ITS TRANSFER CARD
012107  112424  3170          JMS     COPY
012110  612060  3180          JMP     PURL            LOOP
012111  214377  3190  PURZ    LAC     (FCBLEN-1)
012112  340012  3200          TAD     $CMDX
012113  040012  3210          DAC     $CMDX           SAVE NEW POSITION
012114  612060  3220          JMP     PURL            LOOP
                3230  *
                3240  *       THE DISK PURGE IS NOW DONE -- NOW COPY THE SYSTEM FILES TO THE DISK.
                3250  *
012115  113354  3260  INT03   JMS     CSFORCE         DEBUGGING AID
012116  773634  3270          LAW     UFILES
012117  040010  3280          DAC     10              SET A POINTER TO THE LIST OF FILES TO SAVE
012120  112350  3290          JMS     SAVE            SAVE ALL OF THE OVERLAY FILES
012121  112350  3300          JMS     SAVE            SAVE ALL OF THE USER-TYPE SYSTEM PROGRAMS
012122  112350  3310          JMS     SAVE            SAVE ALL OF THE PHANTOM-TYPE SYSTEM PROGRAMS
012123  113354  3320          JMS     CSFORCE         FORCE THE DISK CATALOG NOW
```

I MAIN PROGRAM

```
                    3340    *
                    3350    *
                    3360    *       INTCAT -- NOW COPY THE ENTRIES FROM THE SYSTEM DISK CATALOG INTO INTCAT
                    3370    *       ADJUSTING THE DISK ADDRESS TO BE PHYSICAL DISK ADDRESSES AS WE GO.
                    3380    *
012124  773634      3390    INT10   LAW     UFILES
012125  040010      3400            DAC     10              SET A POINTER TO THE FILES WHOSE CATALOG ENTRIES ARE TO BE COPIED
012126  773723      3410            LAW     UCAT
012127  040012      3420            DAC     12              SET A POINTER TO THE CATALOG INTO WHICH TO COPY THEM
012130  112464      3430            JMS     CORCPY          COPY THE USER-TYPE SYSTEM FILES
012131  112514      3440            JMS     PHCRCP          COPY THE PHANTOM-TYPE SYSTEM PROGRAMS, SETTING THEIR PURE CODE ENTRIES
012132  112547      3450            JMS     OVCRCP          COPY THE OVERLAY FILES
                    3460    *
                    3470    *       OVERLAYS -- SWAPPER
                    3480    *
012133  214400      3490            LAC     ($SWP)
012134  112573      3500            JMS     READ            GET THE SWAPPER OVERLAY
012135  201000      3510            LAC     $SWCAT
012136  040010      3520            DAC     10              SET THE POINTER TO THE SWAPPER CATALOG
012137  773657      3530            LAW     INTCAT-1
012140  040012      3540            DAC     12              SET THE POINTER TO THE INITIALIZATION CATALOG
012141  777700      3550            LAW     -CLEN
012142  053650      3560            DAC     TEMP1           SET THE CATALOG LENGTH
012143  220012      3570    INT05   LAC     12,X
012144  060010      3580            DAC     10,X            COPY THE NEXT CATALOG ENTRY
012145  453650      3590            ISZ     TEMP1           COUNT IT; SKIP IF DONE
012146  612143      3600            JMP     INT05           ELSE LOOP
012147  214400      3610            LAC     ($SWP)
012150  112603      3620            JMS     WRITE           DONE -- COPY THE CORRECTED SWAPPER BACK OUT
```

I MAIN PROGRAM

```
                    3640    *
                    3650    *
                    3660    *       INITIALIZE THE RESIDENT PROGRAM -- FIRST READ IT INTO CORE
                    3670    *
    012151          3680    INT50   ...
012151  214401      3690            LAC     ($RES)
012152  112326      3700            JMS     LCATL           LOOK UP THE RESIDENT PROGRAM IN THE LIBRARY CATALOG
012153  740040      3710            HLT                     FATAL ERROR IF CAN'T FIND IT
012154  440011      3720            INX     $CATX           MOVE THE POINTER TO THE DEVICE ADDRESS FOR THE PROGRAM
012155  113365      3730            JMS     C$RCOVR         SET UP THE HARDWARE ERROR RECOVERY
012156  200011      3740            LAC     $CATX           LOAD THE POINTER TO THE PROGRAM'S PARAMETERS
012157  117500      3750            JMS     $TAPIN          AND READ IN THE RESIDENT PROGRAM
                    3760    *
                    3770    *       NOW FILL IN THE RESIDENT CATALOG
012160  760043      3780            LAW     $CSWP-1
012161  040010      3790            DAC     10              SET A POINTER TO THE RESIDENT CATALOG
012162  214400      3800            LAC     ($SWP)
012163  112623      3810            JMS     FILL            ENTER THE SWAPPER IN THE RESIDENT CATALOG
012164  214402      3820            LAC     ($MP1)
012165  112623      3830            JMS     FILL            ENTER MEMORY PROTECTION #1 IN THE RESIDENT CATALOG
012166  214403      3840            LAC     ($MP2)
012167  112623      3850            JMS     FILL            ENTER MEMORY PROTECTION #2 IN THE RESIDENT CATALOG
012170  214404      3860            LAC     ($SPL)
012171  112623      3870            JMS     FILL            ENTER THE SPECIAL IOT HANDLER IN THE RESIDENT CATALOG
                    3880    *
                    3890    *
                    3900    *       NOW INITIALIZE THE JOB TABLES IN SCRATCH STORAGE ON THE SYSTEM DISK.
                    3910    *            $UCORE -- PHYSICAL DISK ADDRESS OF THE USER CORE IMAGE
                    3920    *            $UDISK -- PHYSICAL DISK ADDRESS OF THE 'USER DISK'
                    3930    *            $NUMBR -- USER NUMBER (= POINTER TO HIS TELETYPE BUFFER)
                    3940    *            $OVER  -- $MP1 = STANDARD USER OVERLAY
                    3950    *            $TYPE  -- 0 = USER TYPE PROGRAM
                    3960    *            $SYSNM -- PHANTOM PROGRAM'S OWN NAME
                    3970    *            $PURNAM -- 0 = NO PURE CODE
                    3980    *            $RSTRT -- <LAW BOUNDARY> ASSURES A LEGAL START ADDRESS WITH MEMORY PROTECTION ON.
                    3990    *
                    4000    *       FIRST ZERO A FULL BUFFER LENGTH OF CORE, PLUS A TABLE LENGTH,
                    4010    *       TO BE USED IN INTIALIZING THE DISK SCRATCH AREA.
                    4020    *
    012172          4030    INT55   ...
012172  767700      4040            LAW     -BMAX-$JTLEN
012173  053650      4050            DAC     TEMP1           SET THE LENGTH TO BE ZEROED
012174  761677      4060    INT56   LAW     $JTSTRT-1
012175  040010      4070            DAC     10              SET A POINTER TO THE TABLE
012176  160010      4080    INT60   DZM     10,X            ZERO THE NEXT LOCATION
012177  453650      4090            ISZ     TEMP1           COUNT THE AMOUNT ZEROED
012200  612176      4100            JMP     INT60           LOOP
                    4110    *
                    4120    *
                    4130    *       ZERO THE SCRATCH DISK AREA
                    4140    *
012201  214405      4150            LAC     (-SCRSTR)
```

```
                I                       MAIN PROGRAM

012202  053651  4160            DAC     TEMP2           SET THE AMOUNT OF DISK TO ZERO
012203  214406  4170            LAC     (SCRSTR)
012204  707024  4180            DLAL                    SET THE START OF THE DISK AREA TO ZERO
    012205      4190    INT70   ...
012205  213651  4200            LAC     TEMP2           LOAD THE REMAINING LENGTH TO BE ZEROED
012206  741200  4210            SNA                     SKIP IF THERE IS ANY
012207  612231  4220            JMP     INT80           ELSE CONTINUE THE INITIALIZATION PROCESS
012210  352172  4230            TAD     INT55           SUBTRACT THE AMOUNT OF ZEROED CORE
012211  740100  4240            SMA                     SKIP IF LESS THAN A FULL COPY REMAINS
012212  612220  4250            JMP     INT72           ELSE DO THE FULL COPY
012213  777777  4260            LAW     -1              PREPARE TO NEGATE THE LENGTH TO COPY
012214  353651  4270            TAD     TEMP2           LOAD THE REMAINING LENGTH
012215  153651  4280            DZM     TEMP2           FLAG THE ZERO-COPYING DONE
012216  740001  4290            CMA                     NEGATE IT
012217  612222  4300            JMP     INT74
                4310
    012220      4320    INT72   ...
012220  053651  4330            DAC     TEMP2           SET THE REMAINING AMOUNT TO ZERO
012221  212172  4340            LAC     INT55           LOAD THE BUFFER LENGTH
012222  040036  4350    INT74   DAC     SDKWC           SET THE LENGTH OF THE COPY
012223  212174  4360            LAC     INT56
012224  040037  4370            DAC     SDKCA           SET THE CORE ADDRESS OF THE COPY
012225  772205  4380            LAW     INT70
012226  040654  4390            DAC     SDO             SET THE RESTART
012227  214377  4400            LAC     (SDKWRT)        LOAD THE DISK WRITE COMMAND
012230  600672  4410            JMP     SDKOVR          DO THE COPY
                4420    *
                4430    *       NEXT FILL IN THE PHANTOM JOB TABLE, SINCE IT IS THE SAME FOR ALL USERS
                4440    *
012231  200045  4450    INT80   LAC     SCMP1
012232  041773  4460            DAC     SOVER
012233  762000  4470            LAW     BOUNDARY
012234  041776  4480            DAC     SRSTRT
                4490    *
                4500    *       MACRO TO FINISH SETTING UP A USER'S JOB TABLE AND TO INITIALIZE
                4510    *       HIS DISK STORAGE AREA
                4520    *
                4530    INTT    .DEFIN
                4540            .PMC    SAVE,ON
                4550            LAC     UC#1+1
                4560            DAC     SUCORE
                4570            LAC     (UDK#1          )
                4580            DAC     SUDISK
                4590            LAC     (SUS#1          )
                4600            DAC     SNUMBR
                4610            DAC     SNAME
                4620            LAW     TAB#1
                4630            JMS     UINIT
                4640            .PMC    RESTORE
                4650            .ENDM
                4660    *
                4670    *       SET UP THE JOB TABLE FOR USER #1 AND INITIALIZE HIS DISK SPACE
```

I MAIN PROGRAM

```
                    4680    *
    012235          4690            INTT    1
012235  213675                      LAC     UC1+1
012236  041766                      DAC     $UCORE
012237  214407                      LAC     (UDK1)
012240  041767                      DAC     $UDISK
012241  214410                      LAC     ($US1)
012242  041771                      DAC     $NUMBR
012243  041772                      DAC     $NAME
012244  773704                      LAW     TAB1
012245  112404                      JMS     UINIT
                    4700    *
                    4710    *       SET UP THE JOB TABLE FOR USER #2 AND INITIALIZE HIS DISK SPACE
                    4720    *
    012246          4730            INTT    2
012246  213711                      LAC     UC2+1
012247  041766                      DAC     $UCORE
012250  214411                      LAC     (UDK2)
012251  041767                      DAC     $UDISK
012252  214412                      LAC     ($US2)
012253  041771                      DAC     $NUMBR
012254  041772                      DAC     $NAME
012255  773720                      LAW     TAB2
012256  112404                      JMS     UINIT
                    4740    *
                    4750    *       SET UP THE JOB TABLE FOR USER #0 AND INITIALIZE HIS DISK SPACE
                    4760    *
    012257          4770            INTT    0
012257  213661                      LAC     UC0+1
012260  041766                      DAC     $UCORE
012261  214406                      LAC     (UDK0)
012262  041767                      DAC     $UDISK
012263  214413                      LAC     ($US0)
012264  041771                      DAC     $NUMBR
012265  041772                      DAC     $NAME
012266  773670                      LAW     TAB0
012267  112404                      JMS     UINIT
                    4780
012270  140266          4790            DZM     $DKLOK          FLAG THE DISK FREE
                    4800    *
                    4810    *
                    4820    *       SYSTEM INITIALIZATION HAS BEEN SUCCESSFUL, SO TELL THE OPERATOR
                    4830    *
    012271          4840            MESS    <SYSTEM INITIALIZATION COMPLETED[]>,33.
012271  700312                      KRB
    012272                          MESSR   <SYSTEM INITIALIZATION COMPLETED[]>,33.
012272  777735                      LAW     -33,-2
012273  113156                      JMS     TSSIXOT
                    4850    *
                    4860    *       NOW DO LAST MINUTE HARDWARE TIDYING UP
                    4870    *
012310  700312          4880            KRB                     KILL ANY MISCELLANEOUS TELETYPE INPUT
```

I MAIN PROGRAM

```
012311  704112  4890            KRBLT1
012312  704132  4900            KRBLT2
012313  701702  4910            MPCV
012314  777730  4920            LAW     -CLKMAX
012315  040007  4930            DAC     7               SET THE CLOCK
012316  700046  4940            IONICLON                AND TURN IT ON
                4950    *
                4960    *       SET UP THE MONITOR FOR ALL TELETYPES
                4970    *
012317  214413  4980            LAC     (SCTBIN-2)
012320  040076  4990            DAC     SCTBIN-2        SET UP THE CONSOLE TELETYPE
012321  214410  5000            LAC     (SL1BIN-2)
012322  040125  5010            DAC     SL1BIN-2        SET UP LT#1
012323  214412  5020            LAC     (SL2BIN-2)
012324  040154  5030            DAC     SL2BIN-2        SET Up LT#2
                5040    *
                5050    *       FAKE A MONITOR CALL BY THE CONSOLE TELETYPE
                5060    *
012325  601002  5070            JMP     SSWMTR          GET MONITOR FOR THE CONSOLE TELETYPE
```

I MISCELLANEOUS SUBROUTINES

```
                    5090
                    5100    *
                    5110    *
                    5120    *       LCATL OPERATES ON THE LIBRARY DEVICE CATALOG (LOCATED AT LCAT)
                    5130    *       IN ALL OTHER RESPECTS IT IS IDENTICAL TO CSCATL
                    5140    *
     012326         5150    LCATL   ENTER
012326  740040                     XX
012327  052634     5160            DAC     TSWORDB         PASS THE FILENAME TO CSCATL
012330  212326     5170            LAC     LCATL
012331  053440     5180            DAC     CSCATL          PASS THE RETURN TO CSCATL
012332  773777     5190            LAW     LCAT+3
012333  040011     5200            DAC     SCATX           PASS  A POINTER TO THE FIRST FCB IN THE LIBRARY CATALOG
012334  213776     5210            LAC     LCAT+2
012335  613445     5220            JMP     CSCATLL-1       NOW CSCATL IS SET TO OPERATE ON THE CORRECT  CATALOG
                    5230    *
                    5240    *
                    5250    *       UNSAVE UNSAVES FROM THE MAIN CATALOG THE FILES INDEXED BY AUTO-INDEX
                    5260    *       REGISTER 10. IT TERMINATES UPON INDEXING TO A ZERO FILENAME
                    5270    *
     012336         5280    UNSAVE  ENTER
012336  740040                     XX
012337  220010     5290    UNS1    LAC     10,X            LOAD THE NEXT FILENAME
012340  741200     5300            SNA
012341  632336     5310            RET     UNSAVE,X        ZERO FILENAME -- EXIT
012342  113440     5320            JMS     CSCATL          ELSE LOCATE THE FILE ENTRY IN THE CATALOG
012343  612337     5330            JMP     UNS1            FILE NOT SAVED -- DO THE NEXT ONE
012344  200011     5340            LAC     SCATX
012345  053650     5350            DAC     TEMP1           SET A POINTER TO THE FILENAME
012346  173650     5360            DZM     TEMP1,X         ZERO THE FILENAME TO UNSAVE THE FILE
012347  612337     5370            JMP     UNS1            LOOP
                    5380    *
                    5390    *
                    5400    *       SAVE SAVES INTO THE MAIN CATALOG THE FILES INDEXED BY AUTO-INDEX
                    5410    *       REGISTER 10. IT TERMINATES UPON INDEXING TO A ZERO FILENAME
                    5420    *
     012350         5430    SAVE    ENTER
012350  740040                     XX
012351  220010     5440    SAV1    LAC     10,X            LOAD THE NEXT FILENAME
012352  741200     5450            SNA
012353  632350     5460            RET     SAVE,X          ZERO FILENAME -- EXIT
012354  112326     5470            JMS     LCATL           LOCATE IT IN THE LIBRARY CATALOG
012355  740040     5480            HLT                     FATAL ERROR IF THE FILE CANNOT BE FOUND IN THE LIBRARY CATALOG
012356  200011     5490            LAC     SCATX
012357  040012     5500            DAC     SCMDX           SET A POINTER TO THE FILE IN THE LIBRARY CATALOG
012360  220012     5510            LAC     SCMDX,X
012361  052421     5520            DAC     INDA            SET THE INPUT DEVICE ADDRESS
     012362         5530            WORD1                   RECOVER THE FILENAME
012362  212634                     LAC     TSWORDB
012363  113555     5540            JMS     CSSAVE          SAVE THE FILE, IF POSSIBLE
012364  740040     5550            HLT                     FATAL ERROR IF THE FILE IS ALREADY SAVED -- SHOULD BE IMPOSSIBLE
012365  200011     5560            LAC     SCATX
```

```
                I                       MISCELLANEOUS SUBROUTINES

012366  040013  5570            DAC     13              SAVE A POINTER TO THE FILE'S SYSTEM DISK ADDRESS
012367  440011  5580            INX     SCATX           BYPASS THE DEVICE ADDRESS FOR NOW
012370  220012  5590            LAC     SCMDX,X
012371  060011  5600            DAC     SCATX,X         TRANSFER THE FILE'S CORE ADDRESS
012372  220012  5610            LAC     SCMDX,X
012373  060011  5620            DAC     SCATX,X         TRANSFER THE FILE'S LENGTH
012374  052423  5630            DAC     LEN             SET THE LENGTH FOR THE COPY ROUTINE
012375  113604  5640            JMS     CSALC           ALLOCATE SPACE FOR THE FILE, IF POSSIBLE
012376  060013  5650            DAC     13,X            SET THE SYSTEM DEVICE ADDRESS
012377  052422  5660            DAC     OUTDA           SET THE OUTPUT DEVICE ADDRESS FOR THE COPY
012400  220012  5670            LAC     SCMDX,X
012401  060011  5680            DAC     SCATX,X         COPY THE FILE'S TRANSFER CARD
012402  112424  5690            JMS     COPY            COPY THE FILE FROM THE LIBRARY DEVICE TO THE SYSTEM DEVICE
012403  612351  5700            JMP     SAV1            LOOP
                5710    *
                5720    *
                5730    *       UINIT IS A SUBROUTINE TO COPY THE USER'S INITIALIZED JOB TABLE OUT
                5740    *
    012404      5750    UINIT   ENTER
012404  740040                    XX
012405  040010  5760            DAC     10              SET THE PARAMETER POINTER
012406  220010  5770            LAC     10,X
012407  053650  5780            DAC     TEMP1           SET THE PHYSICAL DISK LOCATION
012410  220010  5790            LAC     10,X
012411  053651  5800            DAC     TEMP1+1         SET THE CORE ADDRESS -1
012412  220010  5810            LAC     10,X
012413  053652  5820            DAC     TEMP1+2         SET THE TWO'S COMPLEMENT LENGTH
012414  214377  5830            LAC     ($DKWRT)
012415  053653  5840            DAC     TEMP1+3
012416  773647  5850            LAW     TEMP1-1
012417  100654  5860            JMS     $DO             DO THE WRITE
012420  632404  5870            RET     UINIT,X
                5880    *
                5890    *
                5900    *       ALSO USE UINIT TO ZERO ON THE DISK
                5910    *            USER CORE STORAGE
                5920    *            PHANTOM CORE STORAGE
                5930    *            USER "PHYSICAL DISK" STORAGE
                5940    *
                5950    *
```

I MISCELLANEOUS SUBROUTINES

```
                    5970    *
                    5980    *       COPY SUBROUTINE
                    5990    *
                    6000    *       COPIES FROM DEVICE INDA TO DEVICE OUTDA FOR LEN WORDS
                    6010    *
     000100         6020    BUF     .EQU    100             START OF COPY BUFFER
     010000         6030    BMAX    .EQU    10000           ALLOW A 4K COPY BUFFER
                    6040
012421  000000      6050    INDA    .DSA
012422  000000      6060    OUTDA   .DSA
012423  000000      6070    LEN     .DSA
                    6080
012424  740040      6090    COPY    XX
012425  212423      6100    COPL    LAC     LEN             GET LENGTH REMAINING
012426  741200      6110            SNA
012427  632424      6120            RET     COPY,X          RETURN IF DONE
012430  354414      6130            TAD     (-BMAX)         SUBTRACT AMOUNT WE CAN COPY IN (1) OPERATION
012431  741100      6140            SPA
012432  612436      6150            JMP     COPL2
012433  052423      6160            DAC     LEN             RESTORE LENGTH REMAINING
012434  214415      6170            LAC     (BMAX)          GET AMOUNT FOR CURRENT COPY
012435  612440      6180            JMP     COPL4           SKIP THE OTHER BRANCH
012436  212423      6190    COPL2   LAC     LEN             GET LENGTH FOR COPY
012437  152423      6200            DZM     LEN             NONE REMAINING
012440  053656      6210    COPL4   DAC     TPARAM+2        SAVE NEW LENGTH TO COPY
012441  212421      6220            LAC     INDA            GET INPUT DA
012442  053654      6230            DAC     TPARAM          SAVE IT
012443  552422      6240            SAD     OUTDA           CHECK FOR NOTHINGISH COPIES
012444  632424      6250            RET     COPY,X
012445  354416      6260            TAD     (BMAX/$BLKLEN)  COMPUTE AMOUNT TO COPY IN BLOCKS
012446  052421      6270            DAC     INDA            RESTORE FOR NEXT COPY
012447  113365      6280            JMS     CSRCOVR         SET UP THE ERROR RECOVERY
012450  773654      6290            LAW     TPARAM          GET PARAMETERS FOR READ
012451  117500      6300            JMS     STAPIN          COPY IN
012452  212422      6310            LAC     OUTDA           GET OUTPUT DA
012453  741200      6320            SNA
012454  632424      6330            RET     COPY,X          RETURN IF INPUT ONLY
012455  053654      6340            DAC     TPARAM          SAVE IT
012456  354416      6350            TAD     (BMAX/$BLKLEN)
012457  052422      6360            DAC     OUTDA           SET THE UPDATED OUTPUT DEVICE ADDRESS FOR NEXT TIME
012460  113365      6370            JMS     CSRCOVR         SET UP THE HARDWARE ERROR RECOVERY
012461  773654      6380            LAW     TPARAM          GET PARAMETERS
012462  117502      6390            JMS     STAPOT          OUTPUT IT
012463  612425      6400            JMP     COPL            LOOP
```

I MISCELLANEOUS SUBROUTINES

```
                    6420    *
                    6430    *
                    6440    *       CORCPY COPIES THE FILE ENTRIES FOR THE FILES INDEXED BY AUTO-INDEX
                    6450    *       REGISTER 10 FROM THE MAIN CATALOG TO THE INITIALIZATION CATALOG (INTCAT),
                    6460    *       INDEXED BY AUTO-INDEX REGISTER 12, AT THE SAME TIME IT CONVERTS LOGICAL
                    6470    *       DISK BLOCK ADDRESSES TO PHYSICAL DISK ADDRESSES.
                    6480    *       IT TERMINATES UPON INDEXING TO A ZERO FILENAME.
                    6490    *
    012464          6500    CORCPY  ENTER
012464  740040                      XX
012465  220010      6510    COR2    LAC     10,X            LOAD THE NEXT FILENAME
012466  741200      6520            SNA
012467  632464      6530            RET     CORCPY,X        ZERO FILENAME -- EXIT
012470  112472      6540            JMS     CRCP            COPY THE CATALOG ENTRY, ADJUSTING DISK ADDRESS AND CORE ADDRESS FORMATS
012471  612465      6550            JMP     COR2            LOOP
                    6560    *
                    6570    *       SUBROUTINE TO COPY A FILES CATALOG ENTRY FROM THE MAIN CATALOG TO
                    6580    *       INTCAT, CONVERTING THE FORMAT OF CORE ADDRESSES AND DISK ADDRESSES.
                    6590    *
    012472          6600    CRCP    ENTER
012472  740040                      XX
012473  113440      6610            JMS     CSCATL          FIND THE FILE IN THE SYSTEM DEVICE CATALOG
012474  740040      6620            HLT                     FATAL ERROR IF THE FILE IS NOT SAVED
    012475          6630            WORD1                   RECOVER THE NAME
012475  212634                      LAC     TSWORDB
012476  060012      6640            DAC     12,X            SET THE FILENAME
012477  220011      6650            LAC     SCATX,X
012500  614417      6660            AND     (SBLKMSK)
012501  354420      6670            TAD     (SSYSBAS)
012502  660710      6680            ALSS    8,
012503  060012      6690            DAC     12,X            SET THE PHYSICAL DISK ADDRESS
012504  777777      6700            LAW     -1
012505  360011      6710            TAD     SCATX,X
012506  060012      6720            DAC     12,X            SET THE CORE ADDRESS -1
012507  777777      6730            LAW     -1
012510  360011      6740            TAD     SCATX,X
012511  740001      6750            CMA
012512  060012      6760            DAC     12,X            SET THE (TWO'S COMPLEMENT) LENGTH
012513  632472      6770            RET     CRCP,X
                    6780    *
                    6790    *
                    6800    *       PHCRCP DOES THE SAME THING FOR PHANTOM PROGRAMS THAT CORCPY DOES
                    6810    *       FOR OTHER PROGRAMS. IN ADDITION, PHCRCP ALSO SETS UP A CATALOG ENTRY FOR
                    6820    *       THE PURE CODE PORTION OF THE PHANTOM.
                    6830    *
    012514          6840    PHCRCP  ENTER
012514  740040                      XX
012515  220010      6850    PHCRC1  LAC     10,X            LOAD THE NEXT FILENAME
012516  741200      6860            SNA
012517  632514      6870            RET     PHCRCP,X        RETURN WHEN DONE
012520  112472      6880            JMS     CRCP            SET UP THE PROGRAM'S CATALOG ENTRY
                    6890    *
```

I MISCELLANEOUS SUBROUTINES

```
                    6900    *       SET UP THE ENTRIES FOR THE PURE-CODE SECTION OF THE PHANTOM PROGRAM
                    6910    *
012521  777775      6920            LAW     -3
012522  340011      6930            TAD     SCATX           BACK UP THE POINTER SO IT WILL SCAN THE SAME CATALOG ENTRY AGAIN
012523  040011      6940            DAC     SCATX
    012524          6950            WORD1                   RECOVER THE FILENAME
012524  212634                      LAC     T$WORD8
012525  514421      6960            AND     (7777)          GET RID OF THE FIRST CHARACTER
012526  354422      6970            TAD     (600000)        MAKE THE FIRST CHARACTER A 'P' (FOR 'PURE')
012527  060012      6980            DAC     12,X            SET THE PURE CODE FILENAME
012530  220011      6990            LAC     SCATX,X
012531  514417      7000            AND     ($BLKMSK)
012532  354420      7010            TAD     ($SYSBAS)
012533  660710      7020            ALSS    8.              AC NO INDICATES THE PHYSICAL DISK ADDRESS OF THE ENTIRE PHANTOM
012534  354423      7030            TAD     ($PURSTR-$IMPSTR)  MOVE IT TO THE START OF PURE CODE
012535  060012      7040            DAC     12,X            SET THE PHYSICAL DISK ADDRESS OF THE START OF PURE CODE
012536  763677      7050            LAW     $PURSTR-1       LOAD THE CORE ADDRESS OF THE PURE CODE
012537  440011      7060            INX     SCATX           MOVE THE POINTER OVER THE OTHER CORE ADDRESS
012540  060012      7070            DAC     12,X            SET THE CORE ADDRESS -1 OF THE PURE CODE
012541  777777      7080            LAW     -1
012542  360011      7090            TAD     SCATX,X
012543  740001      7100            CMA                     AC IS (TWO'S COMPLEMENT) LENGTH OF THE ENTIRE PHANTOM
012544  354423      7110            TAD     ($PURSTR-$IMPSTR)
012545  060012      7120            DAC     12,X            SET THE (TWO'S COMPLEMENT) LENGTH OF THE PURE CODE
012546  612515      7130            JMP     PHCRC1          LOOP
                    7140    *
                    7150    *
                    7160    *       OVCRCP DOES THE SAME THING FOR OVERLAY PROGRAMS THAT CORCPY DOES
                    7170    *       FOR USER PROGRAMS, THEN IT GOES THROUGH THE OVERLAY PROGRAMS AND
                    7180    *       SUBSTITUTES FOR THEIR NAME THEIR PHYSICAL DISK ADDRESS, WHICH
                    7190    *       BECOMES THEIR NAME AS FAR AS THE EXECUTIVE IS CONCERNED.
                    7200    *
    012547          7210    OVCRCP  ENTER
012547  740040                      XX
012550  200012      7220            LAC     12              LOAD THE INTCAT POINTER
012551  040015      7230            DAC     15              SAVE IT FOR LATER OPERATIONS
012552  040016      7240            DAC     16
012553  440016      7250            INX     16              SET A POINTER TO THE DISK ADDRESSES
012554  112464      7260            JMS     CORCP''         SET UP THE OVERLAY PROGRAMS IN THE STANDARD MANNER
                    7270
012555  777774      7280            LAW     OFILE1-EFILES+1  LOAD A COUNT OF THE NUMBER OF OVERLAY FILES
012556  040017      7290            DAC     17              SET IT
012557  220016      7300    OV1     LAC     16,X            LOAD THE NEXT DISK ADDRESS
012560  060015      7310            DAC     15,X            AND SET IT AS THE NEW OVERLAY NAME
012561  440017      7320            ISZ     17              COUNT THE FILE
012562  741000      7330            SKP                     NOT YET DONE
012563  632547      7340            RET     OVCRC',X        DONE -- EXIT
012564  200016      7350            LAC     16
012565  354424      7360            TAD     (3)
012566  040016      7370            DAC     16              UPDATE THE ADDRESS POINTER
012567  200015      7380            LAC     15
012570  354424      7390            TAD     (3)
```

```
                I                       MISCELLANEOUS SUBROUTINES

012571  040015  7400          DAC     15              UPDATE THE NAMES POINTER
012572  012557  7410          JMP     OV1             DO THE NEXT FILE
                7420    *
                7430    *
                7440    *       READ READS INTO CORE THE FILE WHOSE NAME IS PASSED IN THE AC
                7450    *
    012573      7460    READ    ENTER
012573  740040                  XX
012574  113440  7470          JMS     CSCATL          LOOK UP THE FILE
012575  740040  7480          HLT                     FATAL ERROR IF THE FILE CANNOT BE FOUND
012576  440011  7490          INX     SCATX           MOVE THE POINTER TO THE DEVICE ADDRESS
012577  113365  7500          JMS     CSRCOVR         SET UP HARDWARE ERROR RECOVERY
012600  200011  7510          LAC     SCATX           LOAD THE POINTER TO THE PARAMETERS
012601  117500  7520          JMS     STAPIN          READ THE FILE
012602  632573  7530          RET     READ,X
                7540    *
                7550    *
                7560    *       WRITE WRITES FROM CORE THE FILE WHOSE NAME IS PASSED IN THE AC
                7570    *
    012603      7580    WRITE   ENTER
012603  740040                  XX
012604  113440  7590          JMS     CSCATL          LOOK UP THE FILE
012605  740040  7600          HLT                     FATAL ERROR IF THE FILE CANNOT BE FOUND
012606  440011  7610          INX     SCATX           MOVE THE POINTER TO THE DEVICE ADDRESS
012607  113365  7620          JMS     CSRCOVR         SET UP THE HARDWARE ERROR RECOVERY
012610  200011  7630          LAC     SCATX           LOAD THE POINTER TO THE PARAMETERS
012611  117502  7640          JMS     STAPOT          WRITE THE FILE
012612  632603  7650          RET     WRITE,X
                7660    *
                7670    *
                7680    *       SETUP COPIES THREE SCATLOG ENTRIES INDEXED BY AUTO-INDEX REGISTER 12
                7690    *       INTO THE LOCATIONS REFERENCED BY AUTO-INDEX REGISTER 10.
                7700    *
    012613      7710    SETUP   ENTER
012613  740040                  XX
012614  220012  7720          LAC     12,X
012615  060010  7730          DAC     10,X            COPY THE FILE'S DEVICE ADDRESS
012616  220012  7740          LAC     12,X
012617  060010  7750          DAC     10,X            COPY THE FILE'S CORE ADDRESS
012620  220012  7760          LAC     12,X
012621  060010  7770          DAC     10,X            COPY THE FILE'S LENGTH
012622  632613  7780          RET     SETUP,X
                7790    *
                7800    *
                7810    *       FIND THE PHYSICAL DISK ADDRESS OF THE FILE WHOSE NAME WAS PASSED
                7820    *       IN THE AC AND ENTER IT IN THE RESIDENT CATALOG.
                7830    *
    012623      7840    FILL    ENTER
012623  740040                  XX
012624  113440  7850          JMS     CSCATL          LOOK UP THE SWAPPER PROGRAM IN THE SYSTEM DISK CATALOG
012625  740040  7860          HLT                     FATAL ERROR IF THE PROGRAM CAN'T BE FOUND
012626  220011  7870          LAC     SCATX,X         LOAD THE SYSTEM DISK LOGICAL BLOCK NUMBER
```

```
                I                       MISCELLANEOUS SUBROUTINES

012627  514417  7880            AND     ($BLKMSK)       RECOVER JUST THE BLOCK NUMBER
012630  354420  7890            TAD     ($SYSBAS)       CONVERT TO A PHYSICAL BLOCK NUMBER
012631  660710  7900            ALSS    8.              MAKE INTO A PHYSICAL DISK ADDRESS
012632  060010  7910            DAC     10,X            AND ENTER IT IN THE RESIDENT CATALOG
012633  632623  7920            RET     FILL,)
                7930
                7940            ,INSRT  :DLIBRARY:PDP9LIB:TTYNON
```

T 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 CHARACTERS.
```

T (MTSS TELETYPE HANDLER) STORAGE AREA

```
                    450
                    460
012634              470     WORDS   .BLOCK  2               ROOM TO ACCUMULATE TWO VALID WORDS
000120              480     STD     .EQU    80.             STANDARD IS AN 80-CHARACTER LINE BUFFER
012636              490     BUFFR   .BLOCK  STD
                    500     *
                    510     *
                    520     *       VARIABLES
                    530     *
012756  012755      540     BEND    .-1                     END OF THE CHARACTER BUFFER
012757  000000      550     BPTR    .DSA                    POINTER TO CURRENTLY ACTIVE WORD IN LINE BUFFER
012760  000000      560     T1      .DSA                    TEMPORARY VARIABLE
012761  000000      570     T2      .DSA                    TEMPORARY VARIABLE
012762  000000      580     CHAR    .DSA                    STORES LATEST CHARACTER FROM FGET
012763  000000      590     DLMTR   .DSA                    STORES LATEST DELIMITER THROUGH CHRID
012764  000000      600     COUNT   .DSA
```

T (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
          012765    720             ENTER   INLIN          SUBROUTINE TO READ IN AND BUFFER A LINE FROM THE TELETYPE
012765  740040              INLIN   XX
012766  700312    730               KRB                     ONCE, ON ENTRANCE, CLEAN UP ANY PRIOR INPUT
012767  214425    740       INL     LAC     (BUFFR-1)       LOAD A POINTER TO START OF THE BUFFER MINUS ONE
012770  052757    750               DAC     BPTR            INITIALIZE THE BUFFER POINTER
012771  152764    760               DZM     COUNT           INITIALIZE THE WORD FETCHED COUNT
012772  152763    770               DZM     DLMTR           INITIALIZE THE LAST DELIMITER STORAGE
012773  700313    780       IN1     KSF!KRB                 GET THE NEXT INPUT CHARACTER
012774  612773    790               JMP     .-1
012775  554426    800               SAD     ($BKARR)
012776  613020    810               JMP     1CHAR           DELETE ONE CHARACTER IF IT WAS A BACKARROW
012777  554427    820               SAD     ($CONTX)
013000  613016    830               JMP     1LINE           DELETE THE ENTIRE LINE IF IT WAS A CONTROL X
013001  652000    840       IN4     LMQ                     SAVE THE CHARACTER
013002  212757    850               LAC     BPTR            LOAD THE CURRENT BUFFER POINTER
013003  552756    860               SAD     BEND            SKIP IF NO OVERFLOW
013004  741000    870               SKP                     AVOID DAMAGE DUE TO OVERFLOW
013005  452757    880               ISZ     BPTR            ADVANCE THE POINTER -- IT IS STILL WITHIN THE BUFFER
013006  641002    890               LACQ                    RELOAD THE CHARACTER
013007  072757    900               DAC     BPTR,X          AND PUT IT IN THE BUFFER
013010  554430    910               SAD     ($CR)
013011  741000    920               SKP                     EXIT WHEN A CARRIAGE RETURN IS FOUND
013012  612773    930               JMP     IN1             ELSE GET THE NEXT CHARACTER
013013  772635    940               LAW     BUFFR-1
013014  052757    950               DAC     BPTR            RESET THE BUFFER POINTER AT THE END OF THE LINE
013015  632765    960               JMP     INLIN,X         AND RETURN TO THE CALLER
                    970
013016  113270    980       1LINE   JMS     CRLF            PRINT THE RESPONSE TO A LINE-DELETE
013017  612767    990               JMP     INL             REREAD THE LINE
013020  212757    1000      1CHAR   LAC     BPTR            LOAD THE BUFFER POINTER
013021  552767    1010              SAD     INL             SKIP IF NO UNDERFLOW
013022  612773    1020              JMP     IN1             ELSE IGNORE THE COMMAND
013023  354431    1030              TAD     (-1)            DECREMENT THE BUFFER POINTER
013024  052757    1040              DAC     BPTR            AND SAVE IT
013025  612773    1050              JMP     IN1             GET THE NEXT CHARACTER
```

```
                    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
    013026          1170            ENTER   NUMIN
013026  740040              NUMIN   XX
013027  152761  1180                DZM     T2              INITIALIZE THE DECIMAL-DIGIT-RECEIVED FLAG
013030  113211  1190                JMS     INTIN           INITIALIZE THE INPUT STRING, ETC
013031  633026  1200                JMP     NUMIN,X         RETURN +1 FOR DELIMITER IS FIRST NON-BLANK CHARACTER
013032  113204  1210        NUM20   JMS     FGET            GET THE NEXT CHARACTER
013033  113230  1220                JMS     CHRID           IDENTIFY IT
013034  613056  1230                JMP     NUM26           IT IS A DELIMITER, SO EXIT
013035  633026  1240                JMP     NUMIN,X         IT IS A LETTER, SO EXIT +1 FOR A FORMAT ERROR
013036  741400  1250                SZL                     SKIP IF THE CHARACTER IS AN OCTAL DIGIT
013037  452761  1260                ISZ     T2              ELSE BE SURE THE DECIMAL-DIGIT-RECEIVED FLAG IS SET
013040  614432  1270                AND     (17)            RETAIN JUST THE DIGIT
013041  052760  1280                DAC     T1              AND SAVE IT FOR DECIMAL ACCUMULATION
                    1290
013042  640503  1300                LRS     3               SAVE THE "OCTAL DIGIT"
013043  212634  1310                LAC     WORDB           LOAD THE PREVIOUSLY GATHERED "OCTAL NUMBER"
013044  640603  1320                LLS     3               CONCATENATE THE "OCTAL DIGITS"
013045  052634  1330                DAC     WORDB           AND SAVE THE RESULT
                    1340
013046  212635  1350                LAC     WORDB+1         LOAD THE PREVIOUSLY GATHERED "DECIMAL NUMBER"
013047  744000  1360                CLL                     SET THE LINK FOR THE MULTIPLY
013050  653122  1370                MUL                     MULTIPLY THE PREVIOUS "DECIMAL VALUE"
013051  000012  1380                10.                     BY 10 FOR DECIMAL
013052  641002  1390                LACQ                    LOAD THE RESULT
013053  352760  1400                TAD     T1              ADD THE CURRENT "DECIMAL DIGIT"
013054  052635  1410                DAC     WORDB+1         AND SAVE THE TOTAL "DECIMAL NUMBER"
                    1420
013055  613032  1430                JMP     NUM20           LOOP
                    1440
                    1450
013056  554433  1460        NUM26   SAD     (SPOINT)        CHECK FOR A PERIOD
013057  613065  1470                JMP     NUM27           IF SO, PICK UP THE DECIMAL VALUE
013060  212761  1480                LAC     T2              ELSE LOAD THE DECIMAL-DIGITS-RECEIVED FLAG
013061  744200  1490                SZA!CLL                 AND SKIP IF THERE WERE NONE
013062  633026  1500                JMP     NUMIN,X         RETURN +1, LK=0 FOR A FORMAT ERROR; DECIMAL DIGITS, BUT NO PERIOD
013063  212634  1510                LAC     WORDB           LOAD THE OCTAL VALUE
013064  613074  1520                JMP     NUM29
013065  113204  1530        NUM27   JMS     FGET            GET THE NEXT CHARACTER
013066  113230  1540                JMS     CHRID           AND IDENTIFY IT
013067  613073  1550                JMP     NUM28           A DELIMITER IS LEGAL, SO EXIT
013070  633026  1560                JMP     NUMIN,X         A LETTER -- EXIT +1 FOR A FORMAT ERROR
013071  744000  1570                CLL                     A NUMBER -- CLEAR THE LINK FOR A FORMAT ERROR
```

T (MTSS TELETYPE HANDLER) OCTAL WORD INPUT/OUTPUT

```
013072  633026  1580           JMP     NUMIN,X         AND EXIT +1
013073  212635  1590  NUM28    LAC     WORDB+1         LOAD THE DECIMAL VALUE
013074  052634  1600  NUM29    DAC     WORDB           SAVE THE CORRECT VALUE
013075  453026  1610           ISZ     NUMIN           BUMP TO A RETURN +2 FOR SUCCESSFUL
013076  633026  1620           JMP     NUMIN,X
                1630
                1640
                1650
    013077      1660           ENTER   OCTOT
013077  740040          OCTOT  XX
013100  652000  1670    OCT42  LMQ                     SET THE VALUE TO BE OUTPUT
013101  741400  1680           SZL                     SKIP IF NO LEADING ZEROES ARE TO BE SUPPRESSED
013102  750201  1690           SZA!CLC                 SET A FLAG TO PRINT ONE CHARACTER, ANYWAY; IF THE AC IS ZERO
013103  777772  1700           LAW     -6              ELSE SET THE COUNT FOR THE STANDARD SIX CHARACTERS
013104  052760  1710           DAC     T1              SET THE NUMBER OF CHARACTERS TO BE OUTPUT
013105  641002  1720           LACQ                    RELOAD THE USER'S VALUE
013106  741200  1730           SNA                     SKIP FOR A NON-ZERO VALUE
013107  744000  1740           CLL                     ELSE FORCE A SINGLE ZERO TO PRINT
013110  641603  1750    OCT44  LLSC    3,              GET THE NEXT OCTAL DIGIT

013111  740200  1760           SZA                     IF IT IS ZERO, DON'T CHANGE PRINT-SUPPRESSION STATE
013112  744000  1770           CLL                     ELSE CLEAR THE PRINT INHIBIT AT THE FIRST NON-ZERO FOUND
013113  354434  1780           TAD     (260)           MAKE ASCII IN ANY CASE
013114  740400  1790           SNL                     BUT SKIP IF PRINT IS INHIBITED
013115  113262  1800           JMS     TTYOT           ELSE PRINT THE DIGIT
013116  452760  1810           ISZ     T1              DONE???
013117  613110  1820           JMP     OCT44           NO -- LOOP
013120  700401  1830           TSF
013121  613120  1840           JMP     .-1             WAIT FOR THE TELETYPE TO SETTLE
013122  633077  1850           JMP     OCTOT,X         YES -- EXIT
```

T (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
      013123        1970            ENTER   SIXIN
013123  740040              SIXIN   XX
013124  772634      1980            LAW     WORDB
013125  052760      1990            DAC     T1              INITIALIZE THE SIXBIT BUFFER POINTER
013126  113211      2000            JMS     INTIN           INITIALIZE THE INPUT
013127  633123      2010            JMP     SIXIN,X         RETURN +1 FOR DELIMITER IS FIRST NON-BLANK CHARACTER
013130  453123      2020            ISZ     SIXIN           ELSE BUMP TO A GOOD RETURN
013131  113147      2030    SIX2    JMS     SIX5            GET THE FIRST GOOD CHARACTER
013132  660714      2040            ALSS    12.             AND PUT IT IN THE FIRST CHARACTER POSITION
013133  072760      2050            DAC     T1,X            AND SAVE IT
013134  113147      2060            JMS     SIX5            GET THE SECOND CHARACTER
013135  660706      2070            ALSS    6,              PUT IT IN THE SECOND CHARACTER POSITION
013136  272760      2080            XOR     T1,X            CONCATENATE THE CHARACTERS
013137  072760      2090            DAC     T1,X            AND SAVE THE RESULT
013140  113147      2100            JMS     SIX5            GET THE THIRD CHARACTER
013141  272760      2110            XOR     T1,X            CONCATENATE THE CHARACTERS
013142  072760      2120            DAC     T1,X            AND SAVE THE RESULT
013143  452760      2130            ISZ     T1              BUMP THE STORAGE BUFFER POINTER
013144  613131      2140            JMP     SIX2            LOOP
                    2150
013145  212634      2160    SIX9    LAC     WORDB           LOAD THE FIRST SIXBIT WORD
013146  633123      2170            JMP     SIXIN,X         EXIT
                    2180
      013147        2190            ENTER   SIX5            SUBROUTINE TO GET THE NEXT CHARACTER, MAKE IT SIXBIT, EXIT IF A DELIMITER
013147  740040              SIX5    XX
013150  113204      2200            JMS     FGET            GET THE NEXT CHARACTER
013151  113230      2210            JMS     CHRID           IDENTIFY IT
013152  613145      2220            JMP     SIX9            EXIT IF IT IS A DELIMITER
013153  740000      2230            NOP                     PERMIT LETTERS
013154  354435      2240            TAD     (-240)          MAKE SIXBIT
013155  633147      2250            JMP     SIX5,X
                    2260
                    2270
      013156        2280            ENTER   SIXOT
013156  740040              SIXOT   XX
013157  052760      2290            DAC     T1              SET THE NEGATIVE CHARACTER COUNT
013160  233156      2300    SIX24   LAC     SIXOT,X         LOAD THE NEXT WORD OF OUTPUT
013161  652000      2310            LMQ                     SAVE IT FOR PRINTING
013162  453156      2320            ISZ     SIXOT           BUMP THE POINTER
013163  113167      2330            JMS     SIX26           OUTPUT THE FIRST CHARACTER
013164  113167      2340            JMS     SIX26           OUTPUT THE SECOND CHARACTER
013165  113167      2350            JMS     SIX26           OUTPUT THE THIRD CHARACTER
```

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

```
013166  613160  2360            JMP     SIX24           LOOP
                2370
    013167      2380            ENTER   SIX26
013167  740040          SIX26   XX
013170  641606  2390            LLSC    6.              GET THE NEXT SIXBIT CHARACTER
013171  354436  2400            TAD     (240)           MAKE IT ASCII
013172  554437  2410            SAD     (333)           CHECK FOR CARRIAGE RETURN MAPPING
013173  760215  2420            LAW     SCR
013174  554440  2430            SAD     (335)           CHECK FOR LINE FEED MAPPING
013175  760212  2440            LAW     SLF
013176  113262  2450            JMS     TTYOT           PRINT THE CHARACTER
013177  452760  2460            ISZ     T1              ALL CHARACTERS PRINTED?
013200  633167  2470            JMP     SIX26,X         NO -- LOOP
013201  700401  2480            TSF
013202  613201  2490            JMP     .-1             WAIT FOR THE TELETYPE TO SETTLE
013203  633156  2500            JMP     SIXOT,X         YES -- EXIT
                2510    *
                2520    *
```

T (MTSS TELETYPE HANDLER) MISCELLANEOUS LINE BUFFER ROUTINES

```
                        2540
                        2550
                        2560
                        2570
    013204              2580                ENTER   FGET            SUBROUTINE TO GET THE FIRST REMAINING CHARACTER FROM THE LINE BUFFER
013204  740040                      FGET    XX
013205  452757          2590                ISZ     BPTR            NO -- BUMP THE POINTER
013206  232757          2600                LAC     BPTR,X          LOAD THE NEXT CHARACTER
013207  052762          2610                DAC     CHAR            AND SAVE IT
013210  633204          2620        FGET9   JMP     FGET,X
                        2630
    013211              2640                ENTER   INTIN           INITIALIZE INPUT WORD-GETTING
013211  740040                      INTIN   XX
013212  452764          2650                ISZ     COUNT           COUNT THE WORD, SUCCESSFUL OR NOT
013213  152634          2660                DZM     WORDB           INITIALIZE THE TWO FIRST WORDS OF THE INPUT BUFFER
013214  152635          2670                DZM     WORDB+1
013215  113204          2680                JMS     FGET            GET THE NEXT CHARACTER
013216  554436          2690                SAD     ($SPACE)        CHECK IT FOR A SPACE
013217  613215          2700                JMP     .-2             THROW AWAY SPACES
013220  113230          2710                JMS     CHRID           IDENTIFY THE NON-SPACE
013221  633211          2720                JMP     INTIN,X         RETURN +1 FOR A DELIMITER
013222  740000          2730                NOP
013223  453211          2740                ISZ     INTIN           ELSE BUMP THE RETURN FOR A NUMBER OR A LETTER
013224  750001          2750                CLC
013225  352757          2760                TAD     BPTR            BACK UP THE POINTER TO POINT TO THE FIRST GOOD CHARACTER
013226  052757          2770                DAC     BPTR
013227  633211          2780                JMP     INTIN,X
```

(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    *
    013230          2930            ENTER   CHRID
013230  740040              CHRID   XX
013231  614441  2940              AND     (377)
013232  053262  2950              DAC     TTYOT           SAVE THE EIGHT-BIT ASCII CHARACTER
013233  354442  2960              TAD     (-260)          AC < 0 FOR DELIMITERS
013234  745102  2970              SPA!STL
013235  613253  2980              JMP     DLMR            CHARACTER IS A DELIMITER
013236  354443  2990              TAD     (-10)           AC < 0 FOR OCTAL DIGITS
013237  745100  3000              SPA!CLL
013240  613256  3010              JMP     DIGIT           CHARACTER IS AN OCTAL DIGIT
013241  354444  3020              TAD     (-2)            AC < 0 FOR DECIMAL DIGITS
013242  745102  3030              SPA!STL
013243  613256  3040              JMP     DIGIT           CHARACTER IS A DECIMAL DIGIT
013244  354445  3050              TAD     (-6)            AC <= 0 FOR DELIMITERS
013245  745302  3060              SNA!SPA!STL
013246  613253  3070              JMP     DLMR            CHARACTER IS A DELIMITER
013247  614446  3080              AND     (777737)        MAP LOWER CASE INTO UPPER CASE
013250  354447  3090              TAD     (-33)           AC < 0 FOR LETTERS -- L=1 FOR LETTERS; L=0 FOR DELIMITERS
013251  741102  3100              SPA!CML
013252  613257  3110              JMP     LETTR           THE CHARACTER IS A LETTER
                    3120
013253  213262  3130    DLMR    LAC     TTYOT           LOAD THE DELIMITER
013254  052763  3140            DAC     DLMTR           SAVE IT
013255  633230  3150            JMP     CHRID,X
                    3160
013256  453230  3170    DIGIT   ISZ     CHRID
013257  453230  3180    LETTR   ISZ     CHRID
013260  213262  3190            LAC     TTYOT           RELOAD THE CHARACTER
013261  633230  3200            JMP     CHRID,X
                    3210
                    3220
                    3230
    013262          3240            ENTER   TTYOT
013262  740040              TTYOT   XX
013263  700401  3250              TSF
013264  613263  3260              JMP     .-1             WAIT FOR THE TELEPRINTER TO BE FREE
013265  700301  3270              KSF                     KILL-THE-OUTPUT FEATURE
013266  700406  3280              TLS                     PRINT THE CHARACTER IN THE AC
013267  633262  3290              JMP     TTYOT,X
```

T (MTSS TELETYPE HANDLER) MISCELLANEOUS CHARACTER-HANDLING SUBROUTINES

```
                    3300
                    3310
          013270    3320            ENTER   CRLF
013270    740040            CRLF    XX
013271    760215    3330            LAW     215
013272    113262    3340            JMS     TTYOT
013273    760215    3350            LAW     215
013274    113262    3360            JMS     TTYOT
013275    760212    3370            LAW     212
013276    113262    3380            JMS     TTYOT
013277    700401    3390            TSF
013300    613277    3400            JMP     .-1             WAIT FOR THE TTY TO SETTLE
013301    633270    3410            JMP     CRLF,X
                    3420
                    3430
                    3440            .HEAD                   TURN OFF THE INSERT'S HEAD SYMBOL
                    3460            .END
                    7950            .INSRT  :DLIBRARY:PDP9LIB:GROCAT
```

C DESCRIPTION OF THE GROWTH SYSTEM CATALOG STRUCTURE

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

C GROWTH SYSTEM STANDARD CATALOG ROUTINES

```
                    570
013302  000000      580     CTEM1   .DSA                    CATALOG ROUTINE'S PRIVATE TEMP
013303  017000      590             CATLOG                  CATALOG CORE ADDRESS
013304  000400      600             CATLEN                  CATALOG LENGTH
013305  000000      610     CATALT  .DSA                    CATALOG ALTERED FLAG
                    620
                    630
                    640     *
                    650     *       RCAT -- THE BASIC CATALOG ROUTINE, IT READS IN CATALOGS AND UPDATES THEM
                    660     *       FOR THE CURRENT DEVICE AND (POSSIBLY NON-STANDARD) CATALOG LOCATION.
                    670     *
                    680     *
                    690     *       A HANDLER DEVICE ADDRESS IS PASSED IN THE AC (POSSIBLY ALONG WITH OTHER
                    700     *       GARBAGE). IF THAT HANDLER'S CATALOG IS ALREADY IN CORE, RCAT EXITS
                    710     *       IMMEDIATELY. OTHERWISE THE CURRENT CATALOG IS READ OUT IF IT HAS BEEN
                    720     *       ALTERED SINCE IT WAS READ IN, THEN THE REQUESTED CATALOG IS READ
                    730     *       IN AND ALL OF THE DEVICE ADDRESSES ARE UPDATED. THE CATALOG ALTERS
                    740     *       FLAG IS CLEARED IF A CATALOG IS READ IN, UNTOUCHED OTHERWISE.
                    750     *
                    760     *
                    770     *       AS A RESULT, THE CATALOG IN CORE ALWAYS HAS THE PROPER DEVICE ADDRESSES
                    780     *       FOR THE DEVICE IT WAS READ FROM.
                    790     *
                    800     *       RETURN IS +1 WHEN THE DESIRED CATALOG IS IN CORE.
                    810     *
                    820     *       IN THE EVENT OF UNRECOVERABLE ERROR, EXIT IS TO AN ERROR ROUTINE.
                    830     *
    013306          840             .USE
013306  740040      850     RCAT    XX
013307  053302      860             DAC     CTEM1           SAVE THE DEVICE ADDRESS OF THE DEVICE WHOSE CATALOG IS BEING REQUESTED
013310  257000      870             XOR     CATLOG          COMPARE THE REQUESTED DEVICE ADDRESS WITH CURRENT CATALOG'S DEVICE ADDRESS
013311  514450      880             AND     (DVCMSK)        EXTRACT JUST THE DEVICE ADDRESS PORTION
013312  741200      890             SNA                     SKIP IF A DIFFERENT CATALOG IS BEING REQUESTED
013313  633306      900             JMP     RCAT,X          ELSE EXIT DIRECTLY
013314  113354      910             JMS     FORCE           FORCE THE OLD CATALOG BEFORE READING A NEW ONE
                    920
    013315          930     RCAT1   ...
013315  213302      940             LAC     CTEM1
013316  514450      950             AND     (DVCMSK)        GET THE NEW HANDLER'S DEVICE ADDRESS
013317  254376      960             XOR     (CATBLK)        ADD IN THE CATALOG BLOCK NUMBER
013320  053302      970             DAC     CTEM1           SAVE THE NEW CATALOG'S DEVICE ADDRESS
013321  113365      980             JMS     CSRCOVR         SET UP THE ERROR RECOVERY
013322  773302      990             LAW     CTEM1           GET A POINTER TO THE CATALOG PARAMETERS
013323  117500      1000            JMS     STAPIN          READ THE NEW CATALOG
                    1010    *
                    1020    *       NOW UPDATE THE DEVICE ADDRESSES
                    1030    *
013324  213302      1040            LAC     CTEM1
013325  514450      1050            AND     (DVCMSK)
013326  053302      1060            DAC     CTEM1           SET THE CURRENT DEVICE ADDRESS
                    1070
013327  217000      1080            LAC     CATLOG
```

C GROWTH SYSTEM STANDARD CATALOG ROUTINES

```
013330  514417  1090            AND     (BLKMSK)
013331  253302  1100            XOR     CTEM1
013332  057000  1110            DAC     CATLOG          UPDATE THE OLD DEVICE ADDRESS OF THE FIRST FREE BLOCK
                1120
013333  777005  1130            LAW     CATLOG+5
013334  053354  1140            DAC     FORCE
013335  053440  1150            DAC     CATL            SET POINTERS TO THE FIRST OLD DEVICE ADDRESS
013336  217002  1160            LAC     CATLOG+2
013337  053365  1170            DAC     RCOVR           SET THE COUNT OF FCB'S
                1180
013340  233354  1190    RCAT4   LAC     FORCE,X         LOAD THE NEXT OLD DEVICE ADDRESS
013341  514417  1200            AND     (BLKMSK)        RECOVER THE BLOCK NUMBER
013342  253302  1210            XOR     CTEM1           ADD IN THE CURRENT HANDLER DEVICE ADDRESS
013343  073440  1220            DAC     CATL,X          SAVE THE UPDATED FILE DEVICE ADDRESS
                1230
013344  453365  1240            ISZ     RCOVR           COUNT THE FILES DONE
013345  741000  1250            SKP
013346  633306  1260            JMP     RCAT,X          ALL DONE
                1270
013347  213354  1280            LAC     FORCE           LOAD THE FCB POINTER
013350  354451  1290            TAD     (FCBLEN)        ADVANCE IT TO THE NEXT FCB
013351  053354  1300            DAC     FORCE
013352  053440  1310            DAC     CATL            SAVE THE NEW POINTER
013353  613340  1320            JMP     RCAT4           LOOP
```

C GROWTH SYSTEM STANDARD CATALOG ROUTINES

```
                    1340    *
                    1350    *       FORCE WRITES THE CURRENT CATALOG TO ITS DEVICE IF IT HAS BEEN ALTERED
                    1360    *
013354  740040      1370    FORCE   XX
013355  213305      1380            LAC     CATALT          IS THE CATALOG ALTERED
013356  741200      1390            SNA                     SKIP IF THE CATALOG HAS BEEN ALTERED
013357  633354      1400            JMP     FORCE,X         ELSE DON'T BOTHER TO WRITE IT
013360  113365      1410            JMS     RCOVR           INITIALIZE THE ERROR RECOVERY
013361  777005      1420            LAW     CPARAM          POINT TO CATALOG
013362  117502      1430            JMS     $TAPOT          FORCE IT
013363  153305      1440            DZM     CATALT          CLEAR CATALOG ALTER FLAG
013364  633354      1450            JMP     FORCE,X         RETURN
                    1460
                    1470
                    1480
013365  740040      1490    RCOVR   XX                      SUBROUTINE TO SET UP RECOVERY FROM HARDWARE ERRORS
013366  777776      1500            LAW     -2              SET FOR TWO RETRIES BEFORE GIVING UP
013367  053435      1510            DAC     ERCNT
013370  214452      1520            LAC     (JMP RCVR4)
013371  057505      1530            DAC     $RECOV          SET UP THE ERROR JUMP TO THE ERROR MESSAGE
013372  633365      1540            JMP     RCOVR,X
                    1550
    013373          1560    RCVR4   MESS    <DEVICE ERROR>,12.
013373  700312                      KRB
    013374                          MESSR   <DEVICE ERROR>,12.
013374  777762                      LAW     -12.-2
013375  113156                      JMS     TSSIXOT
013403  453435      1570            ISZ     ERCNT           COUNT THE ERROR
013404  633365      1580            JMP     RCOVR,X
    013405          1590    RCVR5   MESS    <TYPE 'IGNORE' OR 'CONTINUE'! >,29.
013405  700312                      KRB
    013406                          MESSR   <TYPE 'IGNORE' OR 'CONTINUE'! >,29.
013406  777741                      LAW     -29.-2
013407  113156                      JMS     TSSIXOT
    013423          1600            LINE                    GET THE USER'S ANSWER TO WHAT HE WANTS TO DO ABOUT IT
013423  112765                      JMS     TSINLIN
    013424          1610            WORD                    READ HIS ANSWER
013424  113123                      JMS     TSSIXIN
013425  013405      1620            JMP     RCVR5           NO INPUT IS ILLEGAL
013426  553436      1630            SAD     IGN
013427  013433      1640            JMP     RCVR6           IGNORE THE LAST COMMAND
013430  553437      1650            SAD     CON
013431  013366      1660            JMP     RCOVR+1         SET UP TO TRY AGAIN
013432  013405      1670            JMP     RCVR5           ANY OTHER ANSWER IS ILLEGAL
                    1680
013433  153305      1690    RCVR6   DZM     CATALT          FORGET THE CATALOG WAS ALTERED
013434  012000      1700            JMP     $NEXTL          GET THE NEXT COMMAND LINE
                    1710
013435  000000      1720    ERCNT   .DSA
013436  514756      1730    IGN     .ACI6   *IGN*
013437  435756      1740    CON     .ACI6   *CON*
```

C GROWTH SYSTEM STANDARD CATALOG ROUTINES

```
                    1760    *
                    1770    *       CATL
                    1780    *
                    1790    *       CATL SEARCHES THE CATALOG IN CORE FOR THE FILENAME
                    1800    *       PASSED IN THE AC
                    1810    *
                    1820    *       RETURN +2 WITH CATX POINTING TO THE FILE NAME IF SUCCESSFUL
                    1830    *
                    1840    *       RETURN +1 WITH CATX POINTING TO THE FIRST FREE SPACE -1 IN THE
                    1850    *       CATALOG IF THE FILE NAME IS NOT FOUND
                    1860    *
013440  740040      1870    CATL    XX
013441  052634      1880            DAC     TSWORDB         SAVE CATALOG NAME
013442  777003      1890            LAW     CATLOG+3
013443  040011      1900            DAC     SCATX           SET A POINTER TO THE FIRST FCB IN THE CATALOG AUTO-INDEX REGISTER
013444  217002      1910            LAC     CATLOG+2        GET CATALOG COUNT
013445  053302      1920            DAC     CTEM1           SAVE IT
    013446          1930    CATLL   WORD1                   RESTORE NAME TO SEARCH FOR
013446  212634                      LAC     TSWORDB
013447  560011      1940            SAD     SCATX,X         CHECK IT
013450  013457      1950            JMP     CATL9           FOUND IT
013451  200011      1960            LAC     SCATX
013452  354377      1970            TAD     (FCBLEN-1)      FAILED -- MOVE THE POINTER TO THE NEXT FILE CONTROL BLOCK
013453  040011      1980            DAC     SCATX
013454  453302      1990            ISZ     CTEM1           COUNT
013455  013446      2000            JMP     CATLL           LOOP
013456  633440      2010            JMP     CATL,X          EXHAUSTED, NO FILE FOUND -- BAD RETURN
013457  453440      2020    CATL9   ISZ     CATL            GOOD RETURN
013460  633440      2030            JMP     CATL,X
```

C GROWTH SYSTEM STANDARD CATALOG ROUTINES

```
                    2050    *
                    2060    *       GNAME
                    2070    *
                    2080    *       GNAME GETS A FILE NAME FROM THE TTY BUFFER
                    2090    *       AND READS IN THE CATALOG IF NECESSARY
                    2100    *
                    2110    *       RETURN IS +1 FOR PAPER TAPE DESIRED
                    2120    *       RETURN IS +2 FOR SUCCESS ON DISK OR DECTAPE
                    2130    *       OTHERWISE EXIT IS TO FORMAT ERROR
                    2140    *
                    2150    *       THE FILE NAME IS RETURNED IN TSWORDB AND IN THE AC.
                    2160    *
013461  740040      2170    GNAME   XX
    013462          2180            WORD                    GET A WORD OF SIX BIT ASCII
013462  113123                      JMS     TSSIXIN
013463  740000      2190            NOP
    013464          2200            DELIM                   GET THE DELIMITER
013464  212763                      LAC     TSDLMTR
013465  554453      2210            SAD     ($COLON)        CHECK FOR COLON
013466  613472      2220            JMP     GNAM2
013467  113543      2230            JMS     PAPER           CHECK FOR PAPER TAPE
013470  633461      2240            JMP     GNAME,X         YES -- PAPER TAPE
013471  613502      2250            JMP     GNAM5           NO -- SO USE CURRENT CATALOG
013472  773476      2260    GNAM2   LAW     GNAM3
013473  053516      2270            DAC     DEVCV
    013474          2280            WORD1                   RELOAD THE CATALOG NAME
013474  212634                      LAC     TSWORDB
013475  613523      2290            JMP     DEVC3           CONVERT IT TO A DEVICE ADDRESS
013476  633461      2300    GNAM3   JMP     GNAME,X
013477  113306      2310            JMS     RCAT            READ IN THE CATALOG
    013500          2320            WORD                    GET ANOTHER WORD
013500  113123                      JMS     TSSIXIN
013501  740000      2330            NOP
    013502          2340    GNAM5   DELIM                   GET THE DELIMITER
013502  212763                      LAC     TSDLMTR
013503  554454      2350            SAD     ($SLASH)        CHECK FOR SLASH
013504  613511      2360            JMP     GNAME6          LOOK FOR OCTAL
    013505          2370            WORD1                   ELSE RECOVER THE SIXBIT NAME
013505  212634                      LAC     TSWORDB
013506  741200      2380            SNA                     CHECK FOR ALL SPACES
    013507          2390            FORMAT                  FORMAT ERROR -- ALL SPACES IS AN ILLEGAL NAME
013507  612000                      JMP     FORMAT
013510  613514      2400            JMP     GNAM8
    013511          2410    GNAME6  NUM                     GET THE NUMBER
013511  113026                      JMS     TSNUMIN
    013512          2420            FORMAT
013512  612000                      JMP     FORMAT
013513  052634      2430            DAC     TSWORDB         TO BE COMPATABLE WITH SIXBIT INPUT
013514  453461      2440    GNAM8   ISZ     GNAME           GOOD RETURN
013515  633461      2450            JMP     GNAME,X
```

```
                    2470    *
                    2480    *       DEVCV -- READS THE NEXT WORD.
                    2490    *       RETURN IS +1 WITH THE NAME IN THE AC IF IT IS A PAPER TAPE CALL
                    2500    *
                    2510    *       OTHERWISE IT ATTEMPTS TO CONVERT THE NAME TO DEVICE ADDRESS FORMAT.
                    2520    *       IF SUCCESSFUL, IT RETURNS +2 WITH THE HANDLER NUMBER IN AC(0-2) AND
                    2530    *       THE DEVICE TYPE (DISK (1) OR DECTAPE (0)) IN AC(3). REMAINING BITS
                    2540    *       ARE ZEROED.
                    2550    *
                    2560    *       EXIT IS TO THE FORMAT ERROR MESSAGE IF THE DEVICE IS NEITHER PAPER TAPE
                    2570    *       NOR DISK NOR DECTAPE.
                    2580    *
013516  740040      2590    DEVCV   XX
    013517          2600            WORD                    GET THE DEVICE NAME
013517  113123                      JMS     T$SIXIN
    013520          2610            FORMAT
013520  612000                      JMP     FORMAT
013521  113543      2620            JMS     PAPER           CHECK FOR PAPER TAPE
013522  633516      2630            JMP     DEVCV,X         YES -- PAPER TAPE
013523  514455      2640    DEVC3   AND     (777700)        REMOVE DEVICE NUMBER
013524  554456      2650            SAD     ($TP.)          CHECK FOR DECTAPE
013525  613535      2660            JMP     DEVC1           YES
013526  554457      2670            SAD     ($DT.)          CHECK FOR DECTAPE
013527  613535      2680            JMP     DEVC1
013530  554460      2690            SAD     ($DK.)          CHECK FOR DISK
013531  741000      2700            SKP
    013532          2710            FORMAT                  NO OTHERS -- FORMAT ERROR
013532  612000                      JMP     FORMAT
013533  650004      2720            CLQ!CMQ                 FOR DISK PUT THE SIGN BIT ON IN THE MQ
013534  741000      2730            SKP
013535  650000      2740    DEVC1   CLQ                     CLEAR Q FOR TAPE
    013536          2750            WORD1                   RESTORE NAME
013536  212634                      LAC     T$WORDB
013537  640617      2760            LLS     18.-3           SHIFT TO POSITION
013540  514450      2770            AND     (DVCMSK)        CONVERT TO HANDLER DEVICE ADDRESS FORMAT
013541  453516      2780            ISZ     DEVCV           INCREMENT RETURN
013542  633516      2790            JMP     DEVCV,X         AND NOW RETURN
                    2800    *
                    2810    *       PAPER CHECKS THE AC FOR A PAPER TAPE MNEMONIC. IT RETURNS +1 IF IT
                    2820    *       FINDS ONE, ELSE RETURNS +2. THE AC IS UNCHANGED.
                    2830    *
    013543          2840    PAPER   ENTER
013543  740040                      XX
    013544          2850            WORD1                   RECOVER THE WORD
013544  212634                      LAC     T$WORDB
013545  554461      2860            SAD     ($PPT)
013546  633543      2870            JMP     PAPER,X
013547  554462      2880            SAD     ($PTR)
013550  633543      2890            JMP     PAPER,X
013551  554463      2900            SAD     ($PTP)
013552  633543      2910            JMP     PAPER,X
013553  453543      2920            ISZ     PAPER           NO PAPER TAPE MNEMONIC
```

```
                C                       GROWTH SYSTEM STANDARD CATALOG RCUTINES

    013554  633543  2930                JMP     PAPER,X
```

C GROWTH SYSTEM STANDARD CATALOG ROUTINES

```
                    2980    *
                    2990    *       SAVE CHECKS THE CATALOG FOR THE NAME FOUND IN THE AC
                    3000    *
                    3010    *       RETURN IS +1 IF THE FILE IS ALREADY SAVED
                    3020    *       A CATALOG ENTRY IS CREATED FOR THE NAME AND RETURN IS +2 OTHERWISE
                    3030    *       EXITS TO AN ERROR MESSAGE IF THE CATALOG IS FULL
                    3040    *
                    3050    *       ON RETURN CATX POINTS TO THE FILE NAME IN THE CATALOG
                    3060    *
013555  740040      3070    SAVE    XX
013556  113440      3080            JMS     CATL            LOOK UP NAME
013557  741000      3090            SKP
013560  633555      3100            JMP     SAVE,X          DON'T ALLOW DUPLICATES
013561  217002      3110            LAC     CATLOG+2        LOAD THE FCB COUNT
013562  554464      3120            SAD     (CATMAX)        CHECK FOR CATALOG ALREADY FULL
013563  613573      3130            JMP     CFULL           YES -- EXIT TO AN ERROR MESSAGE
013564  354431      3140            TAD     (-1)            COUNT THE NEW FILE
013565  057002      3150            DAC     CATLOG+2        UPDSOATE THE FCB COUNT
    013566          3160            WORD1                   RECOVER THE FILE NAME
013566  212634                      LAC     T$WORDB
013567  060011      3170            DAC     $CATX,X         SAVE IT
013570  453305      3180            ISZ     CATALT          FLAG THE CATALOG HAS BEEN ALTERED
013571  453555      3190            ISZ     SAVE
013572  633555      3200            JMP     SAVE,X
                    3210
    013573          3220    CFULL   MESS    <CATALOG FULL>,12.
013573  700312                      KRB
    013574                          MESSR   <CATALOG FULL>,12.
013574  777762                      LAW     -12,-2
013575  113156                      JMS     T$$IXOT
013603  612000      3230            JMP     $NEXTL
                    3240    *
                    3250    *       ALC RECEIVES A WORD COUNT IN THE AC AND CALCULATES THE LEAST INTEGER
                    3260    *       NUMBER OF BLOCKS THAT CAN HOLD THAT LENGTH. IT THEN ALLOCATES THE STORAGE
                    3270    *       IN THE CORE CATALOG HEADER AND RETURNS WITH THE DEVICE ADDRESS OF THE
                    3280    *       FIRST FREE BLOCK IN THE AC.
                    3290    *
                    3300    *       EXIT IS TO AN ERROR MESSAGE IF THIS ALLOCATION WOULD RESULT IN
                    3310    *       OVERFLOWING THE DEVICE. IN THIS CASE THE CATALOG IS UNALTERED.
                    3320    *
013604  740040      3330    ALC     XX
013605  354441      3340            TAD     (377)           ROUND UP TO A BLOCK
013606  660510      3350            LRSS    8.              AC = MINIMUM INTEGER NUMBER OF BLOCKS REQUIRED
013607  053302      3360            DAC     CTEM1           SAVE IN A GOOD RANDOM PLACE
013610  217000      3370            LAC     CATLOG          GET THE POINTER TO THE FIRST FREE BLOCK
013611  652000      3380            LMQ                     SAVE IT
013612  353302      3390            TAD     CTEM1           ADD THE REQUESTED NUMBER OF BLOCKS TO FORM A NEW POINTER
013613  053302      3400            DAC     CTEM1           SAVE THE NEW POINTER
013614  514417      3410            AND     (1777)          EXTRACT BLOCK NUMBER
013615  357003      3420            TAD     CATLOG+3        SEE IF WE OVERFLOWED THE DEVICE
013616  740100      3430            SMA                     NO IF SKP
013617  613624      3440            JMP     DFULL           FULL -- HELP*?!@
```

C GROWTH SYSTEM STANDARD CATALOG ROUTINES

```
013620  213302  3450            LAC     CTEM1
013621  057000  3460            DAC     CATLOG          SET THE FREE FCB POINTER NOW WE KNOW IT WILL BE OK
013622  641002  3470            LACQ                    RESTORE THE DEVICE ADDRESS OF THE FIRST FREE BLOCK
013623  633604  3480            JMP     ALC,X
                3490
    013624      3500    DFULL   MESS    <DEVICE FULL>,11.
013624  700312                  KRB
    013625                      MESSR   <DEVICE FULL>,11.
013625  777763                  LAW     -11,-2
013626  113156                  JMS     T$$IXCT
013634  612000  3510            JMP     $NEXTL
    013635      3520    MON9    ...
                3530            .HEAD
                3550            .END
```

I CONSTANTS, TEMPORARY STORAGE, ETC

```
                    7970            ,HEAD   I               RESTORE THE HEAD SYMBOL AFTER THE INSERTS
                    7980
                    7990    *
                    8000    *
                    8010    *       LIST OF SWAPPABLE SYSTEM FILES ('INT' AND 'RES' ARE NOT SWAPPABLE
                    8020    *       AND SO LIVE ONLY ON THE LIBRARY DECTAPE)
                    8030    *
      013634        8040    UFILES  ,EQU    .-1             START OF USER-TYPE SYSTEM FILENAMES
013635  422027      8050            $DDT
013636  422030      8060            $BAS
013637  000000      8070    PFILES  0                       START OF PHANTOM-TYPE SYSTEM FILENAMES
013640  422025      8080            $MTR
013641  422026      8090            $LDR
013642  000000      8100    OFILES  0                       AUTO-INDEX POINTER TO THE LIST OF OVERLAY FILENAMES
013643  422022      8110            $SWP                    SWP MUST BE FIRST OVERLAY FILE, SINCE IT IS THE ONLY ONE ENTERED IN SWPCAT
013644  422023      8120            $MP1
013645  422024      8130            $MP2
013646  422122      8140            $SPL
013647  000000      8150    EFILES  0                       END OF THE FILES LIST
013650  000000      8160    TEMP1   ,DSA
013651  000000      8170    TEMP2   ,DSA
013652  000000      8180    TEMP3   ,DSA
013653  000000      8190    TEMP4   ,DSA
013654  000000      8200    TPARAM  ,DATA   0,BUF,0
013655  000100
013656  000000
013657  000000      8210    SYSDVC  ,DSA
```

I CONSTANTS, TEMPORARY STORAGE, ETC

```
                    8230
                    8240    *
                    8250    *
                    8260    *       CONSTANTS TO SET UP THE INITIALIZATION CATALOG
                    8270    *
001677              8280    USTRT   .EQU    BOUNDARY-STABLEN-1  USER CORE ADDRESS -1
640000              8290    SPTR    .EQU    $SCRSTR             POINTER TO SCRATCH STORAGE
                    8300    *
                    8310    *       MACRO TO SET UP A USER'S SCRATCH FILES IN INTCAT
                    8320    *
                    8330    INTUS   .DEFIN                      MACRO TO SET UP A SET OF SCRATCH FILE DATA FOR EACH USER
                    8340            .PMC    SAVE,ON             PRINT AT LEAST THIS MACRO!
                    8350
                    8360    UDK#1   .EQU    SPTR
                    8370    SPTR    .EQU    SPTR+$DKLEN
                    8380
                    8390    UC#1    $US#1                       USER NAME
                    8400            SPTR                        PHYSICAL DISK LOCATION ABOVE THE BASE OF THE SCRATCH AREA
                    8410            BOUNDARY-1                  CORE ADDRESS -1
                    8420            -$USLEN                     TWO'S COMPLEMENT LENGTH
                    8430    SPTR    .EQU    SPTR+$USLEN
                    8440
                    8450            $PH#1
                    8460    UP#1    SPTR
                    8470            BOUNDARY-1
                    8480            -$PHLEN
                    8490    SPTR    .EQU    SPTR+$PHLEN
                    8500
                    8510    TAB#1   $UT#1
                    8520            SPTR
                    8530            USTRT
                    8540            -$TABLEN
                    8550    SPTR    .EQU    SPTR+$TABLEN
                    8560
                    8570            .PMC    RESTORE
                    8580            .ENDM
                    8590    *
                    8600    *
                    8610    *       INITIALIZATION CATALOG
                    8620    *
013660              8630    INTCAT  ...,
                    8640    *
                    8650    *       SET UP THE CATALOG ENTRIES FOR EACH USER
013660              8669            INTUS   0                   SET UP USER #0

640000                      UDK0    .EQU    SPTR
656000                      SPTR    .EQU    SPTR+$DKLEN

013660  000076              UC0     $US0                        USER NAME
013661  656000                      SPTR                        PHYSICAL DISK LOCATION ABOVE THE BASE OF THE SCRATCH AREA
013662  001777                      BOUNDARY-1                  CORE ADDRESS -1
013663  764000                      -$USLEN                     TWO'S COMPLEMENT LENGTH
```

I CONSTANTS, TEMPORARY STORAGE, ETC

```
    672000              SPTR    ,EQU    SPTR+$USLEN

013664  000077                      $PH0
013665  672000          UP0     SPTR
013666  001777                      BOUNDARY-1
013667  776100                      -$PHLEN
    673700              SPTR    ,EQU    SPTR+$PHLEN

013670  000075          TAB0    $UT0
013671  673700                      SPTR
013672  001677                      USTRT
013673  777700                      -$TABLEN
    674000              SPTR    ,EQU    SPTR+$TABLEN

    013674      8670            INTUS   1              SET UP USER #1

    674000              UDK1    ,EQU    SPTR
    712000              SPTR    ,EQU    SPTR+$DKLEN

013674  000125          UC1     $US1                   USER NAME
013675  712000                  SPTR                   PHYSICAL DISK LOCATION ABOVE THE BASE OF THE SCRATCH AREA
013676  001777                  BOUNDARY-1             CORE ADDRESS -1
013677  764000                  -$USLEN                TWO'S COMPLEMENT LENGTH
    726000              SPTR    ,EQU    SPTR+$USLEN

013700  000126                      $PH1
013701  726000          UP1     SPTR
013702  001777                      BOUNDARY-1
013703  776100                      -$PHLEN
    727700              SPTR    ,EQU    SPTR+$PHLEN

013704  000124          TAB1    $UT1
013705  727700                      SPTR
013706  001677                      USTRT
013707  777700                      -$TABLEN
    730000              SPTR    ,EQU    SPTR+$TABLEN

    013710      8680            INTUS   2              SET UP USER #2

    730000              UDK2    ,EQU    SPTR
    746000              SPTR    ,EQU    SPTR+$DKLEN

013710  000154          UC2     $US2                   USER NAME
013711  746000                  SPTR                   PHYSICAL DISK LOCATION ABOVE THE BASE OF THE SCRATCH AREA
013712  001777                  BOUNDARY-1             CORE ADDRESS -1
013713  764000                  -$USLEN                TWO'S COMPLEMENT LENGTH
    762000              SPTR    ,EQU    SPTR+$USLEN

013714  000155                      $PH2
013715  762000          UP2     SPTR
013716  001777                      BOUNDARY-1
013717  776100                      -$PHLEN
```

```
                I                       CONSTANTS, TEMPORARY STORAGE, ETC

    763700              SPTR    .EQU    SPTR+$PHLEN

013720  000153          TAB2    $UT2
013721  763700                  SPTR
013722  001677                  USTRT
013723  777700                  -$TABLEN
    764000              SPTR    .EQU    SPTR+$TABLEN


                8690
                8700    *
                8710    *       ALLOCATE CATALOG ROOM FOR ALL SYSTEM FILES
                8720    *
    013723      8730    UCAT    .EQU    .-1             START OF THE CATALOG OF USER-TYPE SYSTEM FILES
    013724      8740            .BLOCK  PFILES-UFILES-1*4
    013733      8750    PCAT    .EQU    .-1
    013734      8760            .BLOCK  OFILES-PFILES-1*4*2  TWO FILE ENTRIES PER PHANTOM: <NAM> & <PNAM>
    000100      8770    CLEN    .EQU    .-INTCAT*4      LENGTH OF INTCAT
    013753      8780    OCAT    .EQU    .-1             START OF THE CATALOG OF OVERLAY FILES
    013754      8790            .BLOCK  EFILES-OFILES-1*4
                8800
    013774      8810    LCAT    .BLOCK  CATLEN          LIBRARY DEVICE CATALOG ROOM
014374  002000  8820            .END    START
014375  445320
014376  000001
014377  000004
014400  422022
014401  422021
014402  422023
014403  422024
014404  422122
014405  140000
014406  640000
014407  674000
014410  000125
014411  730000
014412  000154
014413  000076
014414  770000
014415  010000
014416  000020
014417  001777
014420  001300
014421  007777
014422  600000
014423  000510
014424  000003
014425  012635
014426  000337
014427  000230
014430  000215
014431  777777
014432  000017
```

I CONSTANTS, TEMPORARY STORAGE, ETC

```
014433  000256
014434  000260
014435  777540
014436  000240
014437  000333
014440  000335
014441  000377
014442  777520
014443  777770
014444  777776
014445  777772
014446  777737
014447  777745
014450  740000
014451  000005
014452  613373
014453  000272
014454  000257
014455  777700
014456  646000
014457  446400
014460  445300
014461  606064
014462  606462
014463  606460
014464  777716
014465  000000

TRANSFER ADDRESS  612000
```

I 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 | | | | | | | |
| 414263 | ABS | 850 | | | | | | | | | | | |
| 1753 | AC | 4520 | 4530 | | | | | | | | | | |
| 1756 | ACS | 4550 | 4560 | | | | | | | | | | |
| 2015 | ACSAVE | 1810 | 1820 | | | | | | | | | | |
| 2022 | ACSW | 1860 | 1870 | | | | | | | | | | |
| 17777 | ADRSS | 430 | 4110 | | | | | | | | | | |
| 246 | AMPRSN | 290 | | | | | | | | | | | |
| 300 | AT | 2950 | | | | | | | | | | | |
| 300 | ATSGN | 2900 | | | | | | | | | | | |
| 422030 | BAS | 420 | 8060 | | | | | | | | | | |
| 2151 | BCNTRL | 2330 | 2340 | | | | | | | | | | |
| 425156 | BIN | 860 | | | | | | | | | | | |
| 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 | 6260 | 6350 | | | | | | | | | |
| 1777 | BLKMSK | 610 | 6660 | 7000 | 7880 | 1090 | 1280 | | | | | | |
| 17740 | BOOT | 520 | 530 | | | | | | | | | | |
| 2000 | BOUNDA | 440 | 960 | 980 | 990 | 1000 | 1630 | 5040 | 5080 | 2260 | 4470 | 8280 | 8410 | 8470 |
| | | | 8660 | 8660 | 8670 | 8670 | 8680 | 8680 | | | | | |
| 377 | BRK | 5550 | | | | | | | | | | | |
| 334 | BSLASH | 390 | | | | | | | | | | | |
| 2170 | BUFFER | 2490 | 2550 | | | | | | | | | | |
| 1000 | BUFLEN | 2500 | 2550 | | | | | | | | | | |

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```
13604   C  ALC      3330   3080   5640   3480
13437   C  CON      1740   1650
13436   C  IGN      1730   1630
13440   C CATL      1870   5180   5320   6610   7470   7590   7850   1150   1220   1310   2010   2020   2030
                           3080
13635   C MON9      3520
13306   C RCAT       850   2550    900   1260   2310
13555   C SAVE      3070   3000   5540   3100   3190   3280
13376   C.001.      1560
13410   C.002.      1590
13576   C.003.      3220
13627   C.004.      3500
13395   CATALT       610   2650   2880   1380   1440   1690   3180
    1   CATBLK       550    960
  400   CATLEN       560   2390    600   8810
17000   CATLOG       540    590   2350   2740   2810   2820   2830   2870    590    870   1080   1110   1130
                           1160   1890   1910   3110   3150   3370   3420   3460
777716  CATMAX       620   3120
   11   CATX         500   2850   3090   3120   3140   3160   3720   3740   5200   5340   5490   5560   5580
                           5600   5620   5680   6650   6710   6740   6930   6940   6990   7060   7090   7490
                           7510   7610   7630   7870   1980   1940   1960   1980   3170
  644   CB0         4050   4060
  645   CB1         4060   4070
  646   CB5         4070   4080
  647   CB7         4080   4090
  650   CBL8        4090   4100
13457   CCATL9      2020   1950
13446   CCATLL      1930   5220   2000
13573   CCFULL      3220   3130
13302   CCTEM1       580    860    940    970    990   1040   1060   1100   1210   1920   1990   3360   3390
                           3400   3450
13535   CDEVC1      2740   2660   2680
13523   CDEVC3      2640   2520   2290
13516   CDEVCV      2590   2490   2270   2630   2780   2790
13624   CDFULL      3500   3440
13435   CERCNT      1720   1510   1570
13354   CFORCE      1370   2660   3260   3320    910   1140   1190   1280   1300   1400   1450
13472   CGNAM2      2260   2220
13476   CGNAM3      2300   2260
13502   CGNAM5      2340   2250
13514   CGNAM8      2440   2400
13461   CGNAME      2170   2240   2300   2440   2450
    6   CHRMAX      3180   3200
    2   CHRPAK      3130   3200
   50   CLKMAX      2840   3180   4920
   60   CLKSPD      3160   3170
 1757   CLOCK       4560   4570
   12   CMDX         510   2840   2970   3020   3040   3060   3150   3200   3210   5500   5510   5590   5610
                           5670
   45   CMP1        3490   3500   4450
   46   CMP2        3500   3510
    6   CNTRL       3380   3390
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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 653 | DBK | 4120 | 4130 | | | | | | | | | | |
| 24 | DBKNUM | 2220 | 2270 | | | | | | | | | | |
| 2054 | DBKTAB | 2210 | 2270 | | | | | | | | | | |
| 2035 | DBSTOR | 2050 | 2060 | | | | | | | | | | |
| 422027 | DDT | 410 | 8050 | | | | | | | | | | |
| 12000 | DDTST | 5000 | | | | | | | | | | | |
| 2037 | DDUMSW | 2080 | 2090 | | | | | | | | | | |
| 1 | DEBUG | 2020 | 100 | 120 | 100 | 120 | 180 | 120 | 180 | 120 | | | |
| 1 | DEFINS | 2010 | 100 | 100 | 120 | 120 | 580 | 580 | 2680 | 2680 | 3210 | 3210 | 5330 | 5330 |
| 1761 | DFLAG | 4580 | 4590 | | | | | | | | | | |
| 1764 | DFN | 4610 | 4620 | | | | | | | | | | |
| 2151 | DFTYPE | 2340 | 2350 | | | | | | | | | | |
| 2045 | DHICOR | 2140 | 2150 | | | | | | | | | | |
| 2050 | DINDIR | 2170 | 2180 | | | | | | | | | | |
| 445300 | DK. | 740 | 2690 | | | | | | | | | | |
| 445320 | DK0 | 780 | 2130 | | | | | | | | | | |
| 127 | DK1 | 4310 | | | | | | | | | | | |
| 156 | DK2 | 4350 | | | | | | | | | | | |
| 37 | DKCA | 2750 | 4370 | | | | | | | | | | |
| 675 | DKDON | 4170 | 4180 | | | | | | | | | | |
| 16000 | DKLEN | 2650 | 2660 | 8660 | 8670 | 8680 | | | | | | | |
| 34 | DKLENB | 2660 | | | | | | | | | | | |
| 266 | DKLOK | 3830 | 3840 | 4790 | | | | | | | | | |
| 777601 | DKMAX | 650 | | | | | | | | | | | |
| 672 | DKOVR | 4160 | 4170 | 4410 | | | | | | | | | |
| 2 | DKRD | 2760 | | | | | | | | | | | |
| 36 | DKWC | 2740 | 4350 | | | | | | | | | | |
| 4 | DKWRT | 2770 | 4400 | 5830 | | | | | | | | | |
| 2041 | DLIMIT | 2100 | 2110 | | | | | | | | | | |
| 2044 | DLOCOR | 2130 | 2140 | | | | | | | | | | |
| 2160 | DMBMIN | 2410 | 2420 | | | | | | | | | | |
| 2166 | DMFMIN | 2470 | 2480 | | | | | | | | | | |
| 654 | DO | 4130 | 4140 | 4390 | 5860 | | | | | | | | |
| 662 | DO2 | 4140 | 4150 | | | | | | | | | | |
| 663 | DO3 | 4150 | 4160 | | | | | | | | | | |
| 2152 | DOFTYP | 2350 | 2360 | | | | | | | | | | |
| 244 | DOLLAR | 280 | | | | | | | | | | | |
| 2032 | DPACSW | 1980 | | | | | | | | | | | |
| 2040 | DPATSW | 2090 | 2100 | | | | | | | | | | |
| 2051 | DPCMSK | 2180 | 2190 | | | | | | | | | | |
| 2052 | DREGBR | 2190 | 2200 | | | | | | | | | | |
| 2035 | DREGSW | 2060 | 2070 | | | | | | | | | | |
| 2047 | DRELOC | 2160 | 2170 | | | | | | | | | | |
| 1765 | DSTAT | 4620 | 4630 | | | | | | | | | | |
| 446400 | DT. | 720 | 2670 | | | | | | | | | | |
| 2000 | DTEMP0 | 1630 | | | | | | | | | | | |
| 2001 | DTEMP1 | 1640 | | | | | | | | | | | |
| 2002 | DTEMP2 | 1650 | | | | | | | | | | | |
| 2003 | DTEMP3 | 1660 | | | | | | | | | | | |
| 2004 | DTEMP4 | 1670 | | | | | | | | | | | |
| 2005 | DTEMP5 | 1680 | | | | | | | | | | | |
| 2006 | DTEMP6 | 1690 | | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2007 | DTEMP7 | 1700 | | | | | | | | | | | |
| 2010 | DTEMP8 | 1710 | | | | | | | | | | | |
| 2011 | DTEMP9 | 1720 | | | | | | | | | | | |
| 776701 | DTMAX | 640 | | | | | | | | | | | |
| 740000 | DVCMSK | 600 | 880 | 950 | 1050 | 2770 | | | | | | | |
| 13647 | EFILES | 8150 | 7280 | 8790 | | | | | | | | | |
| 275 | EQUAL | 2910 | | | | | | | | | | | |
| 241 | EXCLAM | 260 | | | | | | | | | | | |
| 5 | FCBLEN | 570 | 3190 | 1290 | 1970 | | | | | | | | |
| 602 | FGET | 3950 | 3960 | | | | | | | | | | |
| 12000 | FORMAT | 2040 | 2390 | 2420 | 2610 | 2710 | | | | | | | |
| 1701 | FRCA | 4410 | 4420 | | | | | | | | | | |
| 1700 | FRDA | 4400 | 4410 | | | | | | | | | | |
| 1702 | FRLEN | 4420 | 4430 | | | | | | | | | | |
| 1703 | FRSTA | 4430 | 4440 | | | | | | | | | | |
| 2 | FUDGE | 3190 | 3200 | | | | | | | | | | |
| 13511 | GNAME6 | 2410 | 2360 | | | | | | | | | | |
| 276 | GREAT | 2930 | | | | | | | | | | | |
| 476257 | GRO | 870 | | | | | | | | | | | |
| 4 | HDRLEN | 580 | | | | | | | | | | | |
| 100 | I BUF | 6020 | 8200 | | | | | | | | | | |
| 12423 | I LEN | 6070 | 3070 | 3130 | 5630 | 6100 | 6160 | 6190 | 6200 | | | | |
| 12557 | I OV1 | 7300 | 7410 | | | | | | | | | | |
| 13660 | I UC0 | 8660 | 4770 | | | | | | | | | | |
| 13674 | I UC1 | 8670 | 4690 | | | | | | | | | | |
| 13710 | I UC2 | 8680 | 4730 | | | | | | | | | | |
| 13665 | I UP0 | 8660 | | | | | | | | | | | |
| 13701 | I UP1 | 8670 | | | | | | | | | | | |
| 13715 | I UP2 | 8680 | | | | | | | | | | | |
| 10000 | I BMAX | 6030 | 4040 | 6130 | 6170 | 6260 | 6350 | | | | | | |
| 100 | I CLEN | 8770 | 3550 | | | | | | | | | | |
| 12425 | I COPL | 6100 | 6400 | | | | | | | | | | |
| 12424 | I COPY | 6090 | 3170 | 5690 | 6120 | 6250 | 6330 | | | | | | |
| 12465 | I COR2 | 6510 | 6550 | | | | | | | | | | |
| 12472 | I CRCP | 6600 | 6540 | 6770 | 6880 | | | | | | | | |
| 12623 | I FILL | 7840 | 3810 | 3830 | 3850 | 3870 | 7920 | | | | | | |
| 12421 | I INDA | 6050 | 2720 | 3030 | 5520 | 6220 | 6270 | | | | | | |
| 13774 | I LCAT | 8810 | 2150 | 2370 | 5190 | 5210 | | | | | | | |
| 13753 | I OCAT | 8780 | | | | | | | | | | | |
| 13733 | I PCAT | 8750 | | | | | | | | | | | |
| 12060 | I PURL | 2940 | 3180 | 3220 | | | | | | | | | |
| 12111 | I PURZ | 3190 | 2990 | | | | | | | | | | |
| 12573 | I READ | 7460 | 3500 | 7530 | | | | | | | | | |
| 12351 | I SAV1 | 5440 | 5700 | | | | | | | | | | |
| 12350 | I SAVE | 5430 | 3290 | 3300 | 3310 | 5460 | | | | | | | |
| 764000 | I SPTR | 8680 | 8400 | 8460 | 8520 | 8660 | 8660 | 8660 | 8660 | 8660 | 8660 | 8660 | 8670 |
| | | | 8670 | 8670 | 8670 | 8670 | 8670 | 8670 | 8670 | 8680 | 8680 | 8680 | 8680 | 8680 |
| | | | 8680 | 8680 | 8680 | | | | | | | | |
| 13670 | I TAB0 | 8660 | 4770 | | | | | | | | | | |
| 13704 | I TAB1 | 8670 | 4690 | | | | | | | | | | |
| 13720 | I TAB2 | 8680 | 4730 | | | | | | | | | | |
| 13723 | I UCAT | 8730 | 3410 | | | | | | | | | | |

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|---|---|---|---|---|---|---|---|
| 133 | L1NAM | 3710 | | | | | |
| 136 | L2BFR | 3720 | 3730 | 3740 | | | |
| 156 | L2BIN | 3740 | 3750 | 4330 | 5020 | 5030 | |
| 160 | L2FLG | 3750 | 3760 | | | | |
| 154 | L2LOK | 3730 | | | | | |
| 162 | L2NAM | 3760 | 3770 | | | | |
| 422026 | LDR | 390 | 8090 | | | | |
| 2000 | LDRST | 5040 | | | | | |
| 274 | LESS | 2920 | | | | | |
| 212 | LF | 210 | 2440 | | | | |
| 13774 | LIBDEV | 2150 | | | | | |
| 2022 | M ACSW | 1860 | | | | | |
| 10 | MINBUF | 3200 | 3610 | | | | |
| 255 | MINUS | 330 | | | | | |
| 422023 | MP1 | 350 | 3820 | 8120 | | | |
| 422024 | MP2 | 360 | 3840 | 8130 | | | |
| 2032 | MPACSW | 1980 | | | | | |
| 1004 | MPOPR | 4920 | | | | | |
| 1000 | MPST | 4880 | 4890 | | | | |
| 1754 | MQ | 4530 | 4540 | | | | |
| 2016 | MQSAVE | 1820 | 1830 | | | | |
| 2000 | MTEMP0 | 1630 | | | | | |
| 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 | | | | | |
| 422025 | MTR | 370 | 8080 | | | | |
| 2000 | MTRST | 5080 | | | | | |
| 1772 | NAME | 4670 | 4680 | 4690 | 4730 | 4770 | |
| 540 | NEWBR | 3930 | 3940 | | | | |
| 12000 | NEXTL | 2030 | 1700 | 3230 | 3510 | | |
| 1771 | NUMBR | 4660 | 4670 | 4690 | 4730 | 4770 | |
| 243 | NUM$GN | 270 | | | | | |
| 623 | NXPTR | 3960 | 3970 | | | | |
| 702 | OC0 | 4180 | 4190 | | | | |
| 703 | OC1 | 4190 | 4200 | | | | |
| 704 | OC2 | 4200 | 4210 | | | | |
| 705 | OC3 | 4210 | | | | | |
| 574646 | OFF | 2730 | | | | | |
| 13642 | OFILES | 8100 | 7280 | 8760 | 8790 | | |
| 575600 | ON | 2720 | | | | | |
| 12547 | OVCRCP | 7210 | 3450 | 7340 | | | |
| 1773 | OVER | 4680 | 4690 | 4460 | | | |
| 700 | OVLEN | 940 | | | | | |
| 1080 | OVSTRT | 930 | 920 | 940 | 4750 | 4880 | 4960 |
| 2033 | P10SAV | 1990 | 2000 | | | | |
| 2034 | P11SAV | 2000 | 2050 | | | | |

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| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 2025 | PACSAV | 1930 | 1940 | | | | | | |
| 2032 | PACSW | 1980 | 1990 | | | | | | |
| 241 | PBFLAG | 3810 | 3820 | | | | | | |
| 2017 | PCSAVE | 1830 | 1840 | | | | | | |
| 256 | PERIOD | 340 | 350 | | | | | | |
| 13637 | PFILES | 8070 | 8740 | 8760 | | | | | |
| 227 | PFLAG | 3770 | 3780 | | | | | | |
| 77 | PH0 | 4260 | 4270 | 8660 | | | | | |
| 126 | PH1 | 4300 | 4310 | 8670 | | | | | |
| 155 | PH2 | 4340 | 4350 | 8680 | | | | | |
| 1 | PHANTO | 2780 | | | | | | | |
| 12515 | PHCRC1 | 6850 | 7130 | | | | | | |
| 12514 | PHCRCP | 6840 | 3440 | 6870 | | | | | |
| 2150 | PHFLAG | 2280 | 2330 | | | | | | |
| 1700 | PHLEN | 2640 | 8480 | 8660 | 8660 | 8670 | 8670 | 8680 | 8680 |
| 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 | 2860 | | | | | | |
| 2031 | PSCSAV | 1970 | 1980 | | | | | | |
| 2030 | PSTSAV | 1960 | 1970 | | | | | | |
| 606460 | PTP | 710 | 2900 | | | | | | |
| 606462 | PTR | 700 | 2880 | | | | | | |
| 12100 | PURLEN | 1010 | | | | | | | |
| 1775 | PURNM | 4700 | 4710 | | | | | | |
| 3700 | PURSTR | 2560 | 990 | 1010 | 2560 | 7030 | 7050 | 7110 | |
| 546 | PUTIN | 3940 | 3950 | | | | | | |
| 34 | RACS | 3440 | | | | | | | |
| 6 | RCNT | 3390 | | | | | | | |
| 35 | RCORE | 3450 | | | | | | | |
| 1003 | RDBLK | 4910 | 4920 | | | | | | |
| 32 | RDT0 | 3420 | | | | | | | |
| 33 | RDT1 | 3430 | | | | | | | |
| 17505 | RECOV | 470 | 1530 | | | | | | |
| 422021 | RES | 330 | 3690 | 2950 | 2950 | | | | |
| 40 | RESCAT | 3470 | 3480 | | | | | | |
| 1000 | RESLEN | 920 | | | | | | | |
| 234 | RFLAG | 3790 | 3800 | | | | | | |
| 230 | RPTP | 3780 | 3790 | | | | | | |
| 235 | RPTR | 3800 | 3810 | | | | | | |
| 242 | RSCO | 3820 | 3830 | | | | | | |
| 1776 | RSTRT | 4710 | 4480 | | | | | | |
| 1755 | SC | 4540 | 4550 | | | | | | |
| 273 | SCOLON | 380 | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 640000 | SCRSTR | 2670 | 4150 | 4170 | 8290 | | | | | | | | | |
| 2021 | SCSAVE | 1850 | 1860 | | | | | | | | | | | |
| 243 | SHARP | 2890 | | | | | | | | | | | | |
| 257 | SLASH | 360 | 2350 | | | | | | | | | | | |
| 240 | SPACE | 250 | 2690 | | | | | | | | | | | |
| 377 | SPCOD | 5410 | | | | | | | | | | | | |
| 422122 | SPL | 430 | 3860 | 8140 | | | | | | | | | | |
| 1000 | SPLST | 4960 | | | | | | | | | | | | |
| 777400 | SPMSK | 5390 | | | | | | | | | | | | |
| 252 | STAR | 300 | | | | | | | | | | | | |
| 2020 | STSAVE | 1840 | 1850 | | | | | | | | | | | |
| 335 | SWAP | 3880 | 3890 | | | | | | | | | | | |
| 336 | SWAP1 | 3890 | 3900 | | | | | | | | | | | |
| 340 | SWAP3 | 3900 | 3910 | | | | | | | | | | | |
| 1000 | SWCAT | 4750 | 4760 | 3510 | | | | | | | | | | |
| 1003 | SWCLK | 4780 | 4790 | | | | | | | | | | | |
| 1004 | SWERR | 4790 | 4800 | | | | | | | | | | | |
| 1007 | SWMP1 | 4820 | 4830 | | | | | | | | | | | |
| 1010 | SWMP2 | 4830 | 4840 | | | | | | | | | | | |
| 1002 | SWMTR | 4770 | 4780 | 5070 | | | | | | | | | | |
| 1011 | SWOPR | 4840 | | | | | | | | | | | | |
| 422022 | SWP | 340 | 3490 | 3610 | 3800 | 8110 | | | | | | | | |
| 1001 | SWPPR | 4760 | 4770 | | | | | | | | | | | |
| 40 | SWP$ | 3460 | 3470 | | | | | | | | | | | |
| 1005 | SWSPL | 4800 | 4810 | | | | | | | | | | | |
| 1006 | SXSPL | 4810 | 4820 | | | | | | | | | | | |
| 1300 | SYSBAS | 2800 | 2810 | 6670 | 7010 | 7890 | | | | | | | | |
| 41300 | SYSDA | 2810 | | | | | | | | | | | | |
| 17735 | SYSDEV | 530 | | | | | | | | | | | | |
| 445320 | SYSDSK | 2130 | 2500 | | | | | | | | | | | |
| 13657 | SYSDVC | 8210 | 2540 | 2710 | | | | | | | | | | |
| 1777 | SYSMAX | 2820 | | | | | | | | | | | | |
| 12760 | T T1 | 560 | 1280 | 1400 | 1710 | 1810 | 1990 | 2050 | 2080 | 2090 | 2110 | 2120 | 2130 | 2290 |
| | | | 2460 | | | | | | | | | | | |
| 12761 | T T2 | 570 | 1180 | 1260 | 1480 | | | | | | | | | |
| 12773 | T IN1 | 780 | 930 | 1020 | 1050 | | | | | | | | | |
| 13001 | T IN4 | 840 | | | | | | | | | | | | |
| 12767 | T INL | 740 | 990 | 1010 | | | | | | | | | | |
| 120 | T STD | 480 | 490 | | | | | | | | | | | |
| 12756 | T BEND | 540 | 860 | | | | | | | | | | | |
| 12757 | T BPTR | 550 | 750 | 850 | 880 | 900 | 950 | 1000 | 1040 | 2590 | 2600 | 2760 | 2770 | |
| 12762 | T CHAR | 580 | 2610 | | | | | | | | | | | |
| 13270 | T CRLF | 3320 | 980 | 3410 | | | | | | | | | | |
| 13253 | T DLMR | 3130 | 2980 | 3070 | | | | | | | | | | |
| 13204 | T FGET | 2580 | 1210 | 1530 | 2200 | 2620 | 2680 | | | | | | | |
| 13131 | T SIX2 | 2030 | 2140 | | | | | | | | | | | |
| 13147 | T SIX5 | 2190 | 2030 | 2060 | 2100 | 2250 | | | | | | | | |
| 13145 | T SIX9 | 2160 | 2220 | | | | | | | | | | | |
| 13020 | T1CHAR | 1000 | 810 | | | | | | | | | | | |
| 13016 | T1LINE | 980 | 830 | | | | | | | | | | | |
| 100 | TABLEN | 2630 | 2640 | 8280 | 8540 | 8660 | 8660 | 8670 | 8670 | 8680 | 8680 | | | |
| 17500 | TAPIN | 450 | 3750 | 6300 | 7520 | 1000 | | | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|---|
| 17502 | TAPOT | 460 | 6390 | 7640 | 1430 | | | | | | |
| 12636 | TBUFFR | 490 | 740 | 940 | | | | | | | |
| 13230 | TCHRID | 2930 | 1220 | 1540 | 2210 | 2710 | 3150 | 3170 | 3180 | 3200 | |
| 12764 | TCOUNT | 600 | 760 | 2650 | | | | | | | |
| 13256 | TDIGIT | 3170 | 3010 | 3040 | | | | | | | |
| 12763 | TDLMTR | 590 | 770 | 3140 | 2200 | 2340 | | | | | |
| 2000 | TEMP0 | 1630 | 1640 | | | | | | | | |
| 2001 | TEMP1 | 1640 | 1650 | | | | | | | | |
| 2012 | TEMP10 | 1730 | 1740 | | | | | | | | |
| 2013 | TEMP11 | 1740 | 1750 | | | | | | | | |
| 2014 | TEMP12 | 1750 | 1800 | | | | | | | | |
| 2002 | TEMP2 | 1650 | 1660 | | | | | | | | |
| 2003 | TEMP3 | 1660 | 1670 | | | | | | | | |
| 2004 | TEMP4 | 1670 | 1680 | | | | | | | | |
| 2005 | TEMP5 | 1680 | 1690 | | | | | | | | |
| 2006 | TEMP6 | 1690 | 1700 | | | | | | | | |
| 2007 | TEMP7 | 1700 | 1710 | | | | | | | | |
| 2010 | TEMP8 | 1710 | 1720 | | | | | | | | |
| 2011 | TEMP9 | 1720 | 1730 | | | | | | | | |
| 13210 | TFGET9 | 2620 | | | | | | | | | |
| 12765 | TINLIN | 720 | 960 | 1600 | | | | | | | |
| 13211 | TINTIN | 2640 | 1190 | 2000 | 2720 | 2740 | 2780 | | | | |
| 13257 | TLETTR | 3180 | 3110 | | | | | | | | |
| 13032 | TNUM20 | 1210 | 1430 | | | | | | | | |
| 13056 | TNUM26 | 1460 | 1230 | | | | | | | | |
| 13065 | TNUM27 | 1530 | 1470 | | | | | | | | |
| 13073 | TNUM28 | 1590 | 1550 | | | | | | | | |
| 13074 | TNUM29 | 1600 | 1520 | | | | | | | | |
| 13026 | TNUMIN | 1170 | 1200 | 1240 | 1500 | 1560 | 1580 | 1610 | 1620 | 2410 | |
| 13100 | TOCT42 | 1670 | | | | | | | | | |
| 13110 | TOCT44 | 1750 | 1820 | | | | | | | | |
| 13077 | TOCTOT | 1660 | 1850 | | | | | | | | |
| 646000 | TP. | 730 | 2650 | | | | | | | | |
| 13654 | TPARAM | 8200 | 6210 | 6230 | 6290 | 6340 | 6380 | | | | |
| 376 | TRCOFF | 5540 | | | | | | | | | |
| 375 | TRCON | 5530 | | | | | | | | | |
| 13160 | TSIX24 | 2300 | 2360 | | | | | | | | |
| 13167 | TSIX26 | 2380 | 2330 | 2340 | 2350 | 2470 | | | | | |
| 13123 | TSIXIN | 1970 | 2010 | 2020 | 2170 | 1610 | 2180 | 2320 | 2600 | | |
| 13156 | TSIXOT | 2280 | 4840 | 2300 | 2320 | 2500 | 1560 | 1590 | 3220 | 3500 | |
| 2000 | TTEMP0 | 1630 | | | | | | | | | |
| 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 | | | | | | | | | |
| 13262 | TTTYOT | 3240 | 1800 | 2450 | 2950 | 3130 | 3190 | 3290 | 3340 | 3360 | 3380 |
| 6 | TTYCLK | 3170 | 3180 | | | | | | | | |

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CROSS REFERENCE TABLE

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3 | TTYNUM | 3140 | | | | | | | | | | | |
| 10 | TTYSPD | 3150 | 3170 | | | | | | | | | | |
| 12634 | TWORDB | 470 | 2510 | 5160 | 5530 | 6630 | 6950 | 1310 | 1330 | 1350 | 1410 | 1510 | 1590 | 1600 |
| | | | 1980 | 2160 | 2660 | 2670 | 1880 | 1930 | 2280 | 2370 | 2430 | 2750 | 2850 | 3160 |
| 1774 | TYPE | 4690 | 4700 | | | | | | | | | | | |
| 1766 | UCORE | 4630 | 4640 | 4690 | 4730 | 4770 | | | | | | | | |
| 1767 | UDISK | 4640 | 4650 | 4690 | 4730 | 4770 | | | | | | | | |
| 13634 | UFILES | 8040 | 2600 | 3270 | 3390 | 8740 | | | | | | | | |
| 12336 | UNSAVE | 5280 | 2620 | 2630 | 2640 | 5310 | | | | | | | | |
| 336 | UPARR | 2940 | | | | | | | | | | | | |
| 76 | US0 | 4250 | 4260 | 4280 | 4770 | 8660 | | | | | | | | |
| 125 | US1 | 4290 | 4300 | 4320 | 4690 | 8670 | | | | | | | | |
| 154 | US2 | 4330 | 4340 | 4360 | 4730 | 8680 | | | | | | | | |
| 0 | USER | 2790 | | | | | | | | | | | | |
| 3 | USERS | 2850 | 3200 | | | | | | | | | | | |
| 14000 | USLEN | 980 | 2640 | 8420 | 8660 | 8660 | 8670 | 8670 | 8680 | 8680 | | | | |
| 2015 | USTORE | 1800 | 1810 | | | | | | | | | | | |
| 75 | UT0 | 4280 | 8660 | | | | | | | | | | | |
| 124 | UT1 | 4320 | 8670 | | | | | | | | | | | |
| 153 | UT2 | 4360 | 8680 | | | | | | | | | | | |
| 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 | | | | | | | | | | | |
| 17777 | VFLAG | 480 | | | | | | | | | | | | |

I UNDEFINED SYMBOLS

| | | | | |
|---|---|---|---|---|
| #1 | 5630 | | | |
| #2 | 5640 | | | |
| #3 | 5650 | | | |
| #4 | 5660 | | | |
| #5 | 5680 | | | |
| LINE | 1210 | | | |
| MESS | 1190 | 1200 | | |
| OCTZ | 1790 | | | |
| PH#1 | 8450 | | | |
| PURCOD | 5140 | 5270 | 430 | 610 |
| US#1 | 8390 | | | |
| UT#1 | 8510 | | | |

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MACRO CROSS REFERENCE TABLE

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CHAR | 1380 | | | | | | | | | | | |
| CHROT | 1340 | | | | | | | | | | | |
| COUNT | 1460 | | | | | | | | | | | |
| CRLF | 1300 | | | | | | | | | | | |
| DELIM | 1420 | 2200 | 2340 | | | | | | | | | |
| EMESS | 1750 | | | | | | | | | | | |
| ENTER | 920 | 5150 | 5280 | 5430 | 5750 | 6500 | 6600 | 6840 | 7210 | 7460 | 7580 | 7710 | 7840 |
| | | 720 | 1170 | 1660 | 1970 | 2190 | 2280 | 2380 | 2580 | 2640 | 2930 | 3240 | 3320 |
| | | 2840 | | | | | | | | | | | |
| FORMAT | 1060 | 2390 | 2420 | 2610 | 2710 | | | | | | | | |
| INTT | 4530 | 4690 | 4730 | 4770 | | | | | | | | | |
| INTUS | 8330 | 8660 | 8670 | 8680 | | | | | | | | | |
| LINE | 1100 | 1600 | | | | | | | | | | | |
| LOOP | 960 | | | | | | | | | | | | |
| MESS | 1620 | 4840 | 1560 | 1590 | 3220 | 3500 | | | | | | | |
| MESSR | 1520 | 4840 | 1560 | 1590 | 3220 | 3500 | | | | | | | |
| MPOFF | 5430 | | | | | | | | | | | | |
| NEG | 1010 | | | | | | | | | | | | |
| NMESS | 1670 | | | | | | | | | | | | |
| NUM | 1260 | 2410 | | | | | | | | | | | |
| OCT | 1890 | | | | | | | | | | | | |
| OCTZ | 1840 | | | | | | | | | | | | |
| START | 1100 | | | | | | | | | | | | |
| SWAP | 5610 | | | | | | | | | | | | |
| WORD | 1140 | 1610 | 2180 | 2320 | 2600 | | | | | | | | |
| WORD1 | 1180 | 5530 | 6630 | 6950 | 1930 | 2280 | 2370 | 2750 | 2850 | 3160 | | | |
| WORD2 | 1220 | | | | | | | | | | | | |