```
00010                    XLIST
```

```
                                01970
                                00010
```

```
00030
00040                DTSIZ=1
00050
```

```
                                00060
                                00070
                                00080
                                00090      ;SUBROUTINE FOR DIRECTORY SEARCH
                                00100      ;PROG CONTAINS ACTUAL START OF PROGRAM
                                00110      ;DEVDAT CONTAINS ACTUAL START OF DVDB
                                00120      ;UUO CONTAINS RELATIVE ADDRESS OF DIRECTORY ENTRY IN USER AREA
                                00130      ;FORMAT   PUSHJ PDP, UDIRSH
                                00140      ;         JRST X                ;RETURN IF EMPTY ENTRY FOUND
                                00150      ;         NORMAL RETURN WHEN ENTRY IS FOUND
                                00160      INTERNAL ULOOK, UENTER
                                00170      EXTERNAL UXIT,PUUOAC,IOIERR,DIRERR,ADRCK,CPOPJ1,THSDAT
                                00180               UDIRLN=4
                                00190               UDIRIN=100           ;DIRECTORY IN
                                00200               UDIREN=200           ;DIRECTORY ENTERED INTO
                                00210               UNWFRE=400           ;FREE BLOCK POINTER CHANGED
                                00220               ULINKF=1000          ;LAST OUTPUT BLOCK LINKED TO STORAGE
                                00230               UX1=TAC
                                00240               UX2=TAC1
                                00250               UX3=DAT
000000  602600 777760          00260      UDIRSH:  TRNE UUO,777760      ;IS BLOCK IN UUO ACS?
000001  260140 000000          00270               PUSHJ PDP,ADRCK       ;NO. CHECK ADDRESS
000002  201054 000003          00280               MOVEI TAC,3(UUO)
000003  603000 000002          00290               TLNE IOS, IOBEG
000004  260140 000343'         00300               PUSHJ PDP, UBEG
000005  550040 000007          00310               HRRZ UX1, PROG                ;COPY ADR OF START OF PROGRAM
000006  272040 000014          00320               ADDM UX1, UUO                 ;ACTUAL START OF DIR. IN USER
000007  201066 000000          00330               MOVEI UX1,@UDIR(DEVDAT)       ;ACTUAL POINTER TO DIRECTORY
000010  550101 000000          00340               HRRZ UX2, 0(UX1)              ;RELATIVE ADDR OF 1ST ENTRY I
                               00350                                             ;DIRECTORY
000011  505042 777603          00360               HRLI UX1, -↑D129+UDIRLN(UX2)  ;ENTRY COUNTER
000012  272100 000001          00370               ADDM UX2, UX1                 ;START OF 1ST ENTRY IN DIRECT
000013  332000 000002          00380               SKIPE UX2
000014  303100 000174          00390               CAILE UX2,174       ;IS THE REL ADR OF 1ST ENTRY INSIDE BUF
000015  254000 000000          00400               JRST DIRERR         ;NO
000016  336101 000000          00410      UDIR2:   SKIPN UX2, 0 (UX1)            ;FIRST WORD OF ENTRY
000017  263140 000000          00420               POPJ PDP,                     ;SPACES FOUND
000020  316114 000000          00430               CAMN UX2, 0(UUO)              ;CHECK IF = TO USER AREA
000021  254000 000026'         00440               JRST UDIR4                    ;CHECK 2ND WORD
000022  270040 000034'         00450      UDIR3:   ADD UX1, UDIRK1
000023  321040 000016'         00460               JUMPL UX1, UDIR2
000024  262140 000001          00470               POP PDP, UX1                  ;TAKE PREVIOUS EXIT FROM TABL
000025  254000 000000          00480               JRST UXIT                     ;TABLE FULL
000026  554114 000001          00490      UDIR4:   HLRZ UX2, 1 (UUO)             ;2ND WORD IN USER ARE
000027  322100 000000          00500               JUMPE UX2, CPOPJ1
000030  554241 000001          00510               HLRZ UX3, 1 (UX1)             ;2ND WORD OF DIRECTORY AREA
000031  302242 000000          00520               CAIE UX3, 0 (UX2)
000032  254000 000022'         00530               JRST UDIR3                    ;CHECK MORE ENTRIES
000033  254000 000027'         00540               JRST CPOPJ1         ;MATCH, SKIP RETURN
                               00550
000034  000004 000004          00560      UDIRK1:  XWD UDIRLN, UDIRLN
```

```
                                00570
                                00580     ;SUBROUTINE FOR DIRECTORY LOOKUP
                                00590
                                00600     ;FORMAT   PUSHJ PDP, UDIRLU              ;VIA UUO
                                00610     ;         JRST X                         ;ENTRY NOT IN TABLE
                                00620
000035  260140 000000'          00630     ULOOK:    PUSHJ PDP, UDIRSH
000036  254000 000025'          00640               JRST UXIT                      ;TABLE FULL
000037  540241 000001           00650               HRR UX3, 1 (UX1)
000040  506246 000007           00660               HRLM UX3, DEVIAD (DEVDAT)
000041  505101 000000           00670     ULOOK1:   HRLI UX2, 0 (UX1)              ;FROM DIRECTORY
000042  541114 000000           00680               HRRI UX2, 0 (UUO)              ;TO USER
000043  251114 000003           00690               BLT UX2, UDIRLN-1(UUO)
000044  135100 001272'          00700               LDB UX2,[POINT 12,2(UX1),35]   ;GET DATE USER(ENTER)EXEC(LOO
000045  326100 000050'          00710               JUMPN UX2,.+3        ;IS IT 0?
000046  200100 000000           00720               MOVE UX2,THSDAT      ;YES, USE CURRENT DATE
000047  137100 001273'          00730               DPB UX2,[POINT 12,2(UUO),35]   ;SET EXEC
000050  350003 000000           00740               AOS (PDP)
000051  254000 000311'          00750               JRST UTWDR
                                00760
                                00770     ;SUBROUTINE TO ENTER NEW OR CHANGE OLD DIRECTORY ENTRY
                                00780     ;FORMAT   PUSHJ PDP, UDIRCH
                                00790     ;         JRST X                         ;NO ROOM IN TABLE
                                00800
000052  260140 000000'          00810     UENTER:   PUSHJ PDP, UDIRSH
000053  254000 000054'          00820               JRST .+1
000054  350246 000000           00830               AOS UX3, UFREE (DEVDAT)
000055  542254 000001           00840               HRRM UX3,1(UUO)
000056  506246 000010           00850               HRLM UX3, DEVOAD (DEVDAT)
000057  250040 000014           00860               EXCH UX1, UUO
000060  661000 001600           00870               TLO IOS, UDIREN+UNWFRE+ULINKF
000061  202006 000002           00880               MOVEM IOS, DEVIOS(DEVDAT)
000062  254000 000041'          00890               JRST ULOOK1
```

```
                                    00900
                                    00910     ;CREATE A CLEAN TAPE AND DIRECTORY
                                    00920
                                    00930     INTERNAL UTPCLR
                                    00940     EXTERNAL USRJDA
                                    00950
                                    00960
000063  135040 000000               00970     UTPCLR:   LDB TAC,PUUOAC
000064  200301 000000               00980               MOVE DEVDAT,USRJDA(TAC)
000065  322300 000000               00990               JUMPE DEVDAT,IOIERR
000066  554046 000000               01000               HLRZ TAC,DEVNAM(DEVDAT)
000067  302040 446441               01010               CAIE TAC,446441
000070  254000 000036'              01020               JRST UXIT           ;NOT DTA
000071  200006 000002               01030               MOVE IOS,DEVIOS(DEVDAT)
000072  621000 000002               01040               TLZ IOS,IOBEG
000073  661000 000700               01050               TLO IOS,UDIRIN+UDIREN+UNWFRE
                                    01060     IFE DTSIZ,<         MOVEM DEVDAT,DIREC>
                                              ;THIS FOR SINGLE DIRECTORY ONLY
000074  200046 000007'              01070               MOVE TAC,UDIR(DEVDAT)
000075  200100 001274'              01080               MOVE TAC1,[XWD 1,5]
000076  202101 000000               01090               MOVEM TAC1,(TAC)
000077  507000 000001               01100               HRLS TAC
000100  253040 000101'              01110               AOBJN TAC,.+1
000101  402001 000000               01120               SETZM (TAC)
000102  200100 000001               01130               MOVE TAC1,TAC
000103  350000 000001               01140               AOS TAC
000104  251042 000176               01150               BLT TAC,176(TAC1)
000105  201040 000001               01160               MOVEI TAC, 1
000106  202046 000054'              01170               MOVEM TAC, UFREE (DEVDAT)
000107  202006 000002               01180               MOVEM IOS, DEVIOS(DEVDAT)
000110  260140 000326'              01190               PUSHJ PDP,UTPREL
000111  254000 000070'              01200               JRST UXIT
                                    01210
                                    01220
                                    01230
                                    01240     ;END OF DTDR
```

```
01250
01260
```

```
                                01290
                                01300           UREV=10000              ;DT REVERSE BIT
                                01310           DTSIZ=1                 ;1 FOR ONE BUFFER PER TAPE UNIT
                                01320
                                01330           UBLK=1                  ;NUMBER OF BLOCKS/BLOCK
                                01340           UCHN=1                  ;CHANNEL OF DATA CONTROL = 1, LOC 42
                                01350           UCHA=42                 ;DATA CONTROL INTERRUPT POSITION
                                01360           EXTERNAL UXIT,ADVBFF,ADVBFE,IOSET,OUT,WAIT1,WSYNC
                                01370           EXTERNAL PIOMOD,PUNIT,UFREE,UDIR,ADRERR,JOBPFI
                                01380           ENTRY UTDSP
                                01390
                                01400
                                01410     DACI=4010                     ;DC INPUT DT
                                01420     DACO=3410                     ;DC OUTPUT DT
                                01430     SL=220000                     ;DT TURN ON, SELECT
                                01440           DTR=3000                      ;DT TURN AROUND DELAY
                                01450     DT=2000                       ;DT START/STOP DELAY
                                01460     RD=300                        ;DT RD
                                01470     WD=700                        ;DT WR
                                01480     RB=200                        ;DT READ BLOCK NOS.
                                01490     VEOT=2                        ;EOT FLAG BIT
R=10000                        ;DT REVERSE BIT
                                01510     JDE=40000                     ;JOB DONE ENABLE
                                01520     EE=100000                     ;ENABLE END FLAG
                                01530     URDIR=2000                    ;READING DIRECTORY
                                01540
000112  254000 000326'    01550     UTDSP:    JRST UTPREL             ;RELEASE
000113  254000 000312'    01560               JRST UTPCLS             ;CLOSE
000114  254000 000125'    01570               JRST UOUT               ;OUTPUT
000115  254000 000204'    01580               JRST UIN                ;INPUT
000116  254000 000052'    01590               JRST UENTER             ;ENTER IN DIRECTORY
000117  254000 000035'    01600               JRST ULOOK              ;LOOKUP IN DIRECTORY
000120  254000 000633'    01610               JRST UDMPO              ;DUMPOUT
000121  254000 001022'    01620               JRST UDMPI              ;DUMPIN
000122  254000 000272'    01630               JRST SETO               ;SET OUTPUT BLOCK NO.
000123  254000 000267'    01640               JRST SETI               ;SET INPUT BLOCK NO.
000124  254000 000277'    01650               JRST GETF               ;GET FREE BLOCK
```

```
                                01660
                                01670
000125  260140 001142'  01680   UOUT:   PUSHJ PDP, UINTER            ;CHECK INTERLOCK
000126  661000 000020  01690           TLO IOS, IO                  ;WRITING
000127  550046 000010  01700           HRRZ TAC,DEVOAD(DEVDAT)
000130  270040 000007  01710           ADD TAC, PROG                ;ACTUAL BUFFER ADDRESS
000131  554106 000010  01720           HLRZ TAC1,DEVOAD(DEVDAT)     ;BLOCK TO WRITE
000132  306100 000001  01730           CAIN TAC1,1
000133  254000 000171'  01740          JRST UOUT4                   ;COPY DIRECTORY
000134  554101 000001  01750           HLRZ TAC1, 1(TAC)            ;BLOCK TIE
000135  621000 001000  01760           TLZ IOS, ULINKF              ;NOT LINKED TO FREE STORAGE
000136  326100 000144'  01770          JUMPN TAC1, UOUT1            ;USE BLOCK NUMBER INDICATED
000137  623000 000002  01780           TLZE IOS, IOBEG              ;GET FREE STORAGE BLOCK
000140  260140 000370'  01790          PUSHJ PDP, UBEG3
000141  661000 001400  01800           TLO IOS,UNWFRE+ULINKF        ;LINKED TO FREE STORAGE
000142  202006 000002  01810           MOVEM IOS, DEVIOS (DEVDAT)
000143  350106 000106'  01820          AOS TAC1,UFREE(DEVDAT)       ;NEXT FREE BLOCK
000144  306100 000001  01830   UOUT1:  CAIN TAC1,1                   ;IF 1, THIS IS LAST BLOCK
000145  400100 000000  01840           SETZ TAC1,                   ;LAST BLOCK TIE = 0
000146  506101 000001  01850           HRLM TAC1,1(TAC)             ;BLOCK
000147  552040 001121'  01860          HRRZM TAC,UBUF               ;ACTUAL LOCATION OF DATA
000150  544046 000010  01870           HLR TAC,DEVOAD(DEVDAT)
000151  506106 000010  01880           HRLM TAC1, DEVOAD(DEVDAT)    ;NEXT BLOCK
000152  254000 000375'  01890          JRST USETW
                        01900   ;RETURN FROM WRITING 1 BLOCK
                        01910
000153  200046 000010  01920   UOUT2:  MOVE TAC,DEVOAD(DEVDAT)
000154  505040 000007  01930           HRLI TAC,PROG                ;PROG, BUFFER ADDRESS
000155  515100 400000  01940           HRLZI TAC1,IOUSE
000156  412120 000001  01950           ANDCAM TAC1,@TAC             ;SET USE BIT IN BUFFER
000157  554106 000010  01960           HLRZ TAC1,DEVOAD(DEVDAT)     ;BLOCK TIE
000160  322100 000167'  01970          JUMPE TAC1,UOUT3             ;WAS BLOCK WRITTEN THE LAST 0
000161  540060 000001  01980           HRR TAC,@TAC                 ;PROG, NEXT BUFFER ADDRESS
000162  542046 000010  01990           HRRM TAC,DEVOAD(DEVDAT)      ;NEXT BUFFER
000163  602000 000040  02000           TRNE IOS, IOCON              ;CONTINUOUS?
000164  254000 000167'  02010          JRST UOUT3                   ;STOP TAPE AND DISMISS
000165  335020 000001  02020           SKIPGE @TAC                  ;IS NEXT BUFFER EMPTY?
000166  254000 000126'  02030          JRST UOUT+1                  ;PROCESS NEXT BLOCK
000167  262140 000001  02040   UOUT3:  POP PDP, TAC                  ;REDUCE TABLE
000170  254000 001220'  02050          JRST DTC1                    ;STOP TAPE AND DISMISS
```

```
                                02060
                                02070
                                02080     ;COPY DIRECTORY WHEN WRITING BLOCK 1
000171  505101 000001           02090     UOUT4:    HRLI TAC1,1(TAC)              ;BUFFER ADDRESS, FROM
000172  540106 000074'          02100               HRR TAC1, UDIR(DEVDAT)        ;DIRECTORY ADDRESS, TO
000173  550046 000172'          02110               HRRZ TAC, UDIR(DEVDAT)        ;DIRECTORY ADDRESS
000174  251101 000177           02120               BLT TAC1, 177(TAC)            ;MORE BUFFER AREA TO DIRECTOR
000175  661000 000300           02130               TLO IOS, UDIRIN+UDIREN        ;SET DIRECTORY BITS
000176  200126 000173'          02140               MOVE TAC1, @UDIR(DEVDAT)      ;NEXT FREE BLOCK IN DIRECTORY
000177  556106 000143'          02150               HLRZM TAC1,UFREE(DEVDAT)      ;PLACE IN DATA BLOCK
000200  515100 400000           02160               HRLZI TAC1, IOUSE
000201  413101 000000           02170               ANDCAB TAC1, 0(TAC)           ;CLEAR USE BIT
000202  542106 000010           02180               HRRM TAC1, DEVOAD(DEVDAT)     ;ADVANCE BUFFER POINTER
000203  254000 000242'          02190               JRST UEND2
                                02200     ,INPUT- NON DUMP
                                02210
000204  260140 001142'          02220     UIN:      PUSHJ PDP, UINTER             ;CHECK INTERLOCK
000205  621000 000020           02230               TLZ IOS, IO                   ;READING
000206  550046 000007           02240               HRRZ TAC,DEVIAD(DEVDAT)       ;UBUF:=TAC:=DEVIAD+PROG
000207  270040 000007           02250               ADD TAC,PROG
000210  554106 000007           02260               HLRZ TAC1, DEVIAD(DEVDAT)     ;BLOCK TO READ
000211  306100 000001           02270               CAIN TAC1, 1                  ;TRYING TO READ DIRECTORY?
000212  254000 000251'          02280               JRST UIN2                     ;COPY DIRECTORY
000213  552040 001121'          02290               HRRZM TAC,UBUF
000214  554046 000007           02300               HLRZ TAC,DEVIAD(DEVDAT)       ;TAC:=C(DEVIAD LH)
000215  322040 000236'          02310               JUMPE TAC,UEND                ;NEXT BLOCK=0, THEN END OF FI
000216  254000 000377'          02320               JRST USETR
                                02330     ;RETURN FROM READING ONE BLOCK
                                02340
000217  550046 000007           02350     UIN1:     HRRZ TAC,DEVIAD(DEVDAT)
000220  270040 000007           02360               ADD TAC,PROG
000221  554101 000001           02370               HLRZ TAC1,1(TAC)
000222  506106 000007           02380               HRLM TAC1,DEVIAD(DEVDAT)      ;NEXT BLOCK NUMBER TO READ
000223  200046 000007           02390               MOVE TAC,DEVIAD(DEVDAT)
000224  505040 000007           02400               HRLI TAC,PROG
000225  515100 400000           02410               HRLZI TAC1,IOUSE
000226  436120 000001           02420               IORM TAC1,@TAC                ;SET USE BIT
000227  540060 000001           02430               HRR TAC,@TAC
000230  542046 000007           02440               HRRM TAC,DEVIAD(DEVDAT)       ;NEXT BUFFER ADDRESS
000231  602000 000040           02450               TRNE IOS, IOCON               ;CONTINUOUS?
000232  254000 000167'          02460               JRST UOUT3                    ;EXIT
000233  331020 000001           02470               SKIPL @TAC                    ;IS NEXT BUFFER FULL
000234  254000 000205'          02480               JRST UIN+1                    ;PROCESS NEXT BLOCK
000235  254000 000167'          02490               JRST UOUT3                    ;EXIT
                                02500
000236  661000 000040           02510     UEND:     TLO IOS, IOEND
000237  202006 000002           02520               MOVEM IOS, DEVIOS(DEVDAT)
000240  721300 020000           02530               CONSZ UTC, 20000              ;IS TAPE STOPPED?
000241  254000 000167'          02540               JRST UOUT3                    ;STOP TAPE AND EXIT
000242  371000 000000           02550     UEND2:    SOSL DCREQ          ;DECREMENT REQUEST COUNT, IS ANY ONE WA
000243  476000 000000           02560               SETOM DCAVAL                  ;YES,SET DATA CONTROL AVAILAB
000244  371000 000000           02570               SOSL DTREQ          ;DECREMENT REQUEST COUNT, IS ANYONE WAI
000245  476000 000000           02580               SETOM DTAVAL                  ;YES,SET DECTAPE CONTROL AVAI
000246  620000 010000           02590               TRZ IOS, IOACT                ;CLEAR ACTIVE BIT
000247  202006 000002           02600               MOVEM IOS, DEVIOS(DEVDAT)     ;RESTORE STATUS BITS
000250  263140 000000           02610               POPJ PDP, 0                   ;EXIT
```

```
                                02620
                                02630
                                02640      ;COPY DIRECTORY WHEN READING BLOCK 1
000251  623000 000002           02650      UIN2:     TLZE IOS, IOBEG                 ;IS DIRECTORY IN
000252  254000 000265'          02660                JRST UIN4                       ;READ IN DIRECTORY
000253  260140 000242'          02670                PUSHJ PDP, UEND2                ;CLR INDICATORS
000254  200106 000177'          02680      UIN3:     MOVE TAC1,UFREE(DEVDAT)         ;NEXT FREE BLOCK IN DATA BLOC
000255  506126 000176'          02690                HRLM TAC1, @UDIR(DEVDAT)        ;PLACE IN DIRECTORY
000256  541101 000001           02700                HRRI TAC1, 1(TAC)               ;BUFFER ADDDRESS, TO
000257  504106 000255'          02710                HRL TAC1, UDIR(DEVDAT)          ;DIRECTORY ADDRESS, FROM
000260  251101 000200           02720                BLT TAC1, 200 (TAC)             ;MOVE DIRECTORY TO BUFFER ARE
000261  515100 400000           02730                HRLZI TAC1, IOUSE
000262  437101 000000           02740                IORB TAC1, (TAC)                ;SET USE BIT
000263  542106 000007           02750                HRRM TAC1,DEVIAD(DEVDAT)        ;ADVANCE BUFFER
000264  263140 000000           02760                POPJ PDP, 0                     ;EXIT
000265  260140 000370'          02770      UIN4:     PUSHJ PDP, UBEG3
000266  254000 000254'          02780                JRST UIN3
000267  260140 000000           02790      SETI:     PUSHJ PDP,WAIT1
000270  506606 000007           02800                HRLM UUO,DEVIAD(DEVDAT)         ;SET INPUT BLOCK NO.
000271  254000 000111'          02810                JRST UXIT
                                02820
                                02830
000272  260140 000267'          02840      SETO:     PUSHJ PDP,WAIT1
000273  260140 001142'          02850                PUSHJ PDP, UINTER               ;WAIT FOR USE TO STOP
000274  260140 000242'          02860                PUSHJ PDP, UEND2                ;CLEAR INDICATORS
000275  506606 000010           02870                HRLM UUO,DEVOAD(DEVDAT)         ;SET OUTPUT BLOCK NO.
000276  254000 000271'          02880                JRST UXIT
                                02890
000277  260140 000272'          02900      GETF:     PUSHJ PDP,WAIT1
000300  603000 000002           02910                TLNE IOS,IOBEG
000301  260140 000343'          02920                PUSHJ PDP,UBEG
000302  661000 000400           02930                TLO IOS,UNWFRE
000303  202006 000002           02940                MOVEM IOS,DEVIOS(DEVDAT)
000304  350046 000254'          02950                AOS TAC, UFREE(DEVDAT)          ;GET FREE BLOCK
000305  506046 000010           02960                HRLM TAC, DEVOAD(DEVDAT)
000306  505600 000007           02970                HRLI UUO,PROG
000307  542060 000014           02980                HRRM TAC,@UUO
000310  254000 000276'          02990                JRST UXIT
```

```
                                03000
                                03010
                                03020      INTERNAL UTPCLS,UTWDR,UREG,UTPREL
                                03030
                                03040      UTWDR:    IFE DTSIZ,<          PUSHJ PDP,UTPREL>

000311  254000 000310'          03050                JRST UXIT
                                03060
                                03070
000312  607000 001000           03080      UTPCLS:   TLNN IOS, ULINKF
000313  254000 000326'          03090                JRST UTPREL
000314  135040 000000           03100                LDB TAC,PIOMOD       ;MODE
000315  301040 000016           03110                CAIL TAC,16
000316  254000 000326'          03120                JRST UTPREL
000317  544046 000006           03130                HLR TAC,DEVBUF(DEVDAT)
000320  505040 000007           03140                HRLI TAC, PROG
000321  540060 000001           03150                HRR TAC, @TAC                    ;TAC:=BUFFER ADDRESS
000322  271040 000001           03160                ADDI TAC,1
000323  201100 000001           03170                MOVEI TAC1,1
000324  506120 000001           03180                HRLM TAC1,@TAC
000325  254000 000000           03190                JRST OUT
                                03200
                                03210      UTPREL:   IFE DTSIZ,< TLNE IOS,IOBEG     ;RELEASE
                                03220       POPJ PDP,
                                03230       TLZE IOS,UDIREN
                                03240       JRST UTPRL1
                                03250       TLNN IOS,UNWFRE
                                03260       POPJ PDP,
                                03270       TLNN IOS,UDIRIN
                                03280       PUSHJ PDP,UBEG>

                                03290                IFN DTSIZ,< TLZN IOS,UDIREN+UNWFRE
                                03300       POPJ PDP,>
000326  627000 000600            TLZN IOS,UDIREN+UNWFRE
000327  263140 000000                POPJ PDP,
000330  260140 001142'          03310      UTPRL1:   PUSHJ PDP,UINTER     ;IS SYSTEM AVAILABLE?
000331  540046 000304'          03320                HRR TAC,UFREE(DEVDAT)
000332  506066 000257'          03330                HRLM TAC,@UDIR(DEVDAT)
000333  200046 000332'          03340                MOVE TAC,UDIR(DEVDAT)
000334  275040 000001           03350                SUBI TAC,1
000335  202040 001121'          03360                MOVEM TAC,UBUF
000336  661000 002000           03370                TLO IOS, URDIR
000337  202006 000002           03380                MOVEM IOS,DEVIOS(DEVDAT)
000340  201040 000001           03390                MOVEI TAC,1
000341  260140 000375'          03400                PUSHJ PDP,USETW
000342  254000 000277'          03410                JRST WAIT1
```

```
                                03420
                                03430
                                03440      ,READ THE DIRECTORY FROM THIS DEC-TAPE
                                03450
000343  335006 000004           03460      UBEG:     SKIPGE DEVMOD(DEVDAT)          ;IS DIRECTORY IN CORE?
000344  661000 000100           03470                TLO IOS,UDIRIN
000345  603000 000100           03480                TLNE IOS,UDIRIN
000346  263140 000000           03490                POPJ PDP, 0
000347  260140 001142'          03500                PUSHJ PDP, UINTER              ;CHECK INTERLOCK
000350  261140 000001           03510      UBEG2:    PUSH PDP, TAC                  ;SAVE TAC
000351  550046 000333'          03520                HRRZ TAC,UDIR(DEVDAT)
000352  275040 000001           03530                SUBI TAC, 1
000353  202040 001121'          03540                MOVEM TAC,UBUF
000354  661000 002100           03550                TLO IOS,UDIRIN+URDIR
000355  621000 000002           03560                TLZ IOS, IOBEG
000356  202006 000002           03570                MOVEM IOS,DEVIOS(DEVDAT)
000357  205040 400000           03580                MOVSI TAC,DVDIRIN   ;SET DIRECTORY IN CORE BIT
000360  436046 000004           03590                IORM TAC,DEVMOD(DEVDAT)
000361  201040 000001           03600                MOVEI TAC,1
000362  260140 000377'          03610                PUSHJ PDP,USETR
000363  260140 000000           03620                PUSHJ PDP,WSYNC
000364  544066 000351'          03630                HLR TAC,@UDIR(DEVDAT)
000365  552046 000331'          03640                HRRZM TAC,UFREE(DEVDAT)
000366  262140 000001           03650      UBEGX:    POP PDP,TAC
000367  263140 000000           03660                POPJ PDP, 0
                                03670
000370  603000 000100           03680      UBEG3:    TLNE IOS, UDIRIN
000371  263140 000000           03690                POPJ PDP, 0
000372  254000 000350'          03700                JRST UBEG2
                                03710
000373  260140 001220'          03720      UTBERR:   PUSHJ PDP, DTC1        ;ILL. BLOCK NO.
000374  254000 000000           03730                JRST UTBKER
                                03740
000375  201100 000535'          03750      USETW:    MOVEI TAC1,RIT
000376  334000 000000           03760                SKIPA
000377  201100 000527'          03770      USETR:    MOVEI TAC1,READ
000400  542100 000500'          03780                HRRM TAC1,DDIG
000401  552040 001117'          03790                HRRZM TAC,UBKN
000402  323040 000373'          03800                JUMPLE TAC,UTBERR     ;ILL. BLOCK NO.?
000403  301040 001102           03810                CAIL TAC,1102
000404  254000 000373'          03820                JRST UTBERR           ;ILL. BLOCK NO.
000405  135040 000000           03830                LDB TAC,PUNIT         ;UNIT
000406  241040 000003           03840                ROT TAC, 3
000407  271040 000000           03850                ADDI TAC, DTCCHN                ;DECTAPE CHANNEL
000410  202040 001116'          03860                MOVEM TAC, UNIT                 ;UNIT AND CHANNEL
000411  201040 000137           03870                MOVEI TAC, 137
000412  542040 001166'          03880                HRRM TAC, DTCINT
000413  275040 000021           03890                SUBI TAC, 21
000414  542040 001172'          03900                HRRM TAC, CONSZ1      ;FALL INTO FILL
```

```
                                03910
                                03920
000415  720200 000000   03930      FILL:    CONO DC,0                       ;DESELECT DC
000416  700600 002100   03940               CONO PI,2100                    ;TURN ON CHANNEL 1
000417  202300 001151'  03950               MOVEM DEVDAT, USVDB             ;SAVE DATA BLOCK ADDR
000420  202300 001122'  03960               MOVEM DEVDAT,UDVDAT             ;UDVDAT:=DTJIOS POINTER
000421  201040 000002   03970               MOVEI TAC, DEVIOS
000422  272040 001122'  03980               ADDM TAC,UDVDAT
000423  200040 001275'  03990               MOVE TAC, [JSR DDIF]            ;DATA CONTROL INTERRUPT CHANN
000424  202040 000042   04000               MOVEM TAC,UCHA
000425  202340 001120'  04010               MOVEM PROG,UPROG                ;UPROG:=PROG
000426  200040 001121'  04020               MOVE TAC,UBUF                   ;BLI:=XWD-200,C(UBUF)
000427  505040 777600   04030               HRLI TAC,-200
000430  202040 001114'  04040               MOVEM TAC,BLI                   ;BLO=XWD-200,C(UBUF+200)
000431  271040 000177   04050               ADDI TAC,200-1
000432  202040 001113'  04060               MOVEM TAC,BLO
000433  721300 020000   04070               CONSZ UTC, 20000                ;IS TAPE MOVING?
000434  254000 000453'  04080               JRST FILLC                      ;YES
000435  200040 001116'  04090               MOVE TAC, UNIT                  ;RDDA:=RDRM:=WTDA:=WTRM:=C(UN
000436  137040 000457'  04100               DPB TAC,F1
000437  137040 000460'  04110               DPB TAC,F2
000440  137040 000461'  04120               DPB TAC,F3
000441  137040 000462'  04130               DPB TAC,F4
000442  200040 001116'  04140               MOVE TAC,UNIT
000443  405040 000070   04150               ANDI TAC, 70                    ;TAC HAS UNIT ONLY
000444  271040 323201   04160                     ADDI TAC, SL+DTR+RB+EE+UCHN
000445  607000 010000   04170               TLNN IOS, UREV                  ;WAS REV, GO FWD
000446  271040 010000   04180               ADDI TAC, GR                    ;WAS FWD, GO REV
000447  721220 000001   04190               CONO UTC, @TAC
000450  720200 004011   04200      FILL2:   CONO DC, DACI+UCHN              ;SET UP DC FOR INPUT
000451  202006 000002   04210               MOVEM IOS, DEVIOS (DEVDAT)
000452  263140 000000   04220               POPJ PDP,
```

```
                                04230
                                04240
                                04250      ,TAPE IS ACTIVE - GIVE A COMMAND
000453  721240 000001           04260      FILLC:    CONI UTC,TAC                    ;UTC COMMAND:  UNIT, OLD DIRE
000454  405040 010070           04270                ANDI TAC,GR+70                  ;DIRECTION PLUS UNIT
000455  721201 320201           04280                CONO UTC,SL+RB+EE+UCHN(TAC)     ;NO TIME DELAY
000456  254000 000450'          04290                JRST FILL2
                                04300
000457  000600 000517'          04310      F1:       POINT 6,RDDA,35
000460  000600 000531'          04320      F2:       POINT 6,RDRM,35
000461  000600 000523'          04330      F3:       POINT 6,WTDA,35
000462  000600 000537'          04340      F4:       POINT 6,WTRM,35
                                04350      ,CHANGE DIRECTION - GIVE NEW COMMANDS
000463  721240 000001           04360      RRV:      CONI UTC,TAC
000464  431040 010000           04370                XORI TAC,GR                     ;REVERSE BIT
000465  405040 550777           04380                ANDI TAC,550777
000466  435040 002000           04390                IORI TAC,DT
000467  721201 220000           04400                CONO UTC,SL(TAC)
000470  720200 004011           04410                CONO DC,DACI+UCHN
000471  254000 000515'          04420                JRST DXIT
                                04430      ,EXAMINE BLOCK NUMBERS - DISPATCHED FROM INTERRUPT - UCHA, DC.
000472  000000 000000           04440      DDIF:     0                               ;GOING FORWARD
000473  202040 001115'          04450                MOVEM TAC,SV1                   ;SV1:=TAC
000474  721700 000002           04460                CONSZ UTS, VEOT
000475  254000 000463'          04470                JRST RRV
000476  720040 000001           04480                DATAI DC,TAC
000477  316040 001117'          04490                CAMN TAC,UBKN                   ;BLK NOT =STR
000500  254000 000500'          04500      DDIG:     JRST .                          ;JRST READ, RIT, IF RIGHT UBK
000501  721300 010000           04510                CONSZ UTC,10000                 ;GOING BACKWARDS
000502  254000 000506'          04520                JRST .+4                        ;BACKWARDS
000503  311040 001117'          04530                CAML TAC,UBKN                   ;BLK > STR > FORWARDS
000504  254000 000463'          04540                JRST RRV
000505  254000 000510'          04550                JRST .+3
000506  317040 001117'          04560                CAMG TAC,UBKN                   ;BACKWARDS
000507  254000 000463'          04570                JRST RRV                        ;BACKWARDS
000510  721240 000001           04580      DDIG2:    CONI UTC,TAC
000511  405040 550777           04590                ANDI TAC,550777
000512  721201 220000           04600                CONO UTC,SL(TAC)
000513  334000 000000           04610                SKIPA
000514  542040 000042           04620      DXIT1:    HRRM TAC,UCHA
000515  200040 001115'          04630      DXIT:     MOVE TAC,SV1                    ;RESTORE TAC
000516  254520 000472'          04640                JEN @DDIF                       ;RE-ENABLE, DISMISS.
```

```
                                04650
                                04660
                                04670     ,DISPATCH FROM UCHA INITIALLY ON CORRECT BLOCK MARK
                                04680     ,SETS OP TO READ, WRITE IN FWD, REVERSE
                                04690
                                04700     ;RD FORWARD
000517  721200 360300           04710     RDDA:     CONO UTC,SL+RD+JDE+EE                  ;GETS UNIT NO. - RE
000520  201040 000551'           04720               MOVEI TAC,RDFW
000521  720200 004011           04730               CONO DC,DACI+UCHN
000522  254000 000514'           04740               JRST DXIT1
                                04750
000523  721200 360700           04760     WTDA:     CONO UTC,SL+WD+JDE+EE                  ;GETS UNIT NO. - RE
000524  201040 000563'           04770               MOVEI TAC,WTFW
000525  720200 003411           04780               CONO DC,DACO+UCHN
000526  254000 000514'           04790               JRST DXIT1
                                04800
000527  721340 010000           04810     READ:     CONSO UTC,10000              ;ENTRY TO SET UP READ
000530  254000 000517'           04820               JRST, RDDA
                                04830     ;READ REVERSE
000531  721200 370300           04840     RDRM:     CONO UTC,SL+GR+RD+JDE+EE     ;GETS UNIT NO. - RESETS TO RD
000532  201040 000543'           04850               MOVEI TAC,RDRV
000533  720200 004011           04860               CONO DC,DACI+UCHN
000534  254000 000514'           04870               JRST DXIT1
000535  721340 010000           04880     RIT:      CONSO UTC,10000              ;GOING REVERSE - ENTRY TO SET
000536  254000 000523'           04890               JRST WTDA                    ;WRITE FORWARD
                                04900     ;WRITE REVERSE
000537  721200 370700           04910     WTRM:     CONO UTC,SL+WD+GR+JDE+EE     ;GETS UNIT NO. - RESETS TO WT
000540  201040 000555'           04920               MOVEI TAC,WTRV
000541  720200 003411           04930               CONO DC,DACO+UCHN
000542  254000 000514'           04940               JRST DXIT1
                                04950
                                04960     ,DC INTERRUPT PROCESSING TO READ/WRITE DATA IN EITHER
                                04970     ,DIRECTION, AND RE-ENABLE INTERRUPT.
                                04980     ,EXIT BLOCK PROCESSING AT ENPT(WRITE), ENPTI(READ)
                                04990
000543  000000 000000           05000     RDRV:     0                            ;ENTRY VIA UCHA - READ REV
000544  720000 001113'           05010               BLKI DC,BLO
000545  264000 000620'           05020               JSR ENPTI
000546  370000 001113'           05030               SOS BLO
000547  370000 001113'           05040               SOS BLO
000550  254520 000543'           05050               JEN @RDRV
                                05060
000551  000000 000000           05070     RDFW:     0                            ;ENTRY VIA UCHA - READ FWD
000552  720000 001114'           05080               BLKI DC,BLI
000553  264000 000620'           05090               JSR ENPTI
000554  254520 000551'           05100               JEN @RDFW
                                05110
000555  000000 000000           05120     WTRV:     0                            ;ENTRY VIA UCHA - WRITE REV
000556  720100 001113'           05130               BLKO DC,BLO
000557  264000 000567'           05140               JSR ENPT
000560  370000 001113'           05150               SOS BLO
000561  370000 001113'           05160               SOS BLO
000562  254520 000555'           05170               JEN @WTRV
                                05180
000563  000000 000000           05190     WTFW:     0                            ;ENTRY VIA UCHA - WRITE FWD
000564  720100 001114'           05200               BLKO DC,BLI
000565  264000 000567'           05210               JSR ENPT
```

000566 254520 000563'   05220   JEN @WTFW

```
                                05230
                                05240      ;END OF OUTPUT BLOCK
                                05250
000567  000000 000000           05260      ENPT:     0
000570  264000 000603'          05270                JSR, ENP
000571  202040 001115'          05280      ENPT2:    MOVEM TAC,SV1                    ;SV1:=TAC
000572  515040 010000           05290                HRLZI TAC,UREV
000573  721300 010000           05300                CONSZ UTC,10000
000574  412060 001122'          05310                ANDCAM TAC,@UDVDAT
000575  721340 010000           05320                CONSO UTC,10000
000576  436060 001122'          05330                IORM TAC,@UDVDAT
000577  201040 000615'          05340                MOVEI TAC,UOFF
000600  542040 000042           05350                HRRM TAC,UCHA
000601  200040 001115'          05360                MOVE TAC,SV1
000602  254120 000567'          05370                JRSTF @ENPT
                                05380
                                05390      ,CHECK ERROR BITS DC MISSED, OT PARITY, I LEG OP, TAPE END
000603  000000 000000           05400      ENP:      0
000604  720300 010000           05410                CONSZ DC, 10000;    DATA MISSED
000605  264000 000627'          05420                JSR ERROR2
000606  254120 000603'          05430                JRSTF @ENP
                                05440
                                05450      ,SAVE STATE OF UTS, UTC, DC, TURN OFF DC, UTC, +1@ERRTAL,+1@UERR
                                05460      ;ERROR LOOPS
000607  000000 000000           05470      ERROR:    0
000610  721640 001111'          05480                CONI UTS, C12
000611  721240 001112'          05490                CONI UTC, C13
000612  720240 001110'          05500                CONI DC, C11
000613  476000 001124'          05510                SETOM ERRFLG
000614  254120 000607'          05520                JRSTF @ERROR
                                05530      ;INTERRUPT FROM DATA FLAG AFTER BLKO HAS COUNTED OUT
000615  000000 000000           05540      UOFF:     0
000616  700600 001100           05550                CONO PI, 1100                    ;TURN DC CHANNEL OFF
000617  254520 000615'          05560                JEN @UOFF                        ;DISMISS EXTRA WRITE FLAG
                                05570
                                05580      ;END OF INPUT BLOCK
000620  000000 000000           05590      ENPTI:    0
000621  250040 000620'          05600                EXCH TAC, ENPTI
000622  202040 000567'          05610                MOVEM TAC, ENPT
000623  264000 000603'          05620                JSR ENP
000624  720200 000000           05630                CONO DC, 0
000625  200040 000620'          05640                MOVE TAC, ENPTI
000626  254000 000571'          05650                JRST ENPT2
                                05660      ;DETECT FIRST ERROR ONLY
000627  000000 000000           05670      ERROR2:   0
000630  336000 001124'          05680                SKIPN ERRFLG                     ;PREVIOUSLY DETECTED ERROR?
000631  264000 000607'          05690                JSR ERROR                        ;STORE ERROR CONDITIONS
000632  254120 000627'          05700                JRSTF @ERROR2                    ;CONTINUE LOOP
                                05710
                                05720
                                05730      ;END OF PART 1 DTSER2
```

05740

```
                                05760
                                05770                   EXTERNAL SETIOD
                                05780                   INTERNAL UDMP0, UDMPI
                                05790
                                05800           ; DUMP OUT
000633  661000 000020           05810           UDMP0:  TLO IOS, IO                     ;SET FOR OUTPUT
000634  260140 001142'           05820                   PUSHJ PDP, UINTER               ;CHECK INTERLOCK
000635  606600 777777           05830                   TRNN UUO, 777777                ;COMMAND ADDRESS?
000636  254000 000722'           05840                   JRST UDMP2-1                    ;ERROR
000637  201040 000727'           05850                   MOVEI TAC, DDUMP                ;RETURN WHEN BLOCK FOUND
000640  200100 001276'           05860           UDMP0:  MOVE TAC1, [JSR DMPADV]         ;BLKI OR BLKO RETURN,COMMANDS
                                05870
                                05880           ;COMMON ROUTINE FOR ALL DUMP MODES.  START SEARCH
000641  542040 000500'           05890           UDMP1:  HRRM TAC, DDIG                  ;SEARCH RETURN
000642  202100 000043           05900                   MOVEM TAC1, UCHA+1              ;INTERRUPT RETURN
000643  200040 001275'           05910                   MOVE TAC, [JSR DDIF]
000644  202040 000042           05920                   MOVEM TAC, UCHA                 ;DATA CONTROL CHANNEL
000645  554046 000010           05930                   HLRZ TAC, DEVOAD (DEVDAT)       ;BLOCK NUMBER
000646  607000 000020           05940                   TLNN IOS, IO                    ;WRITING?
000647  554046 000007           05950                   HLRZ TAC, DEVIAD(DEVDAT)        ;INPUT BLOCK NUMBER
000650  202040 001117'           05960                   MOVEM TAC, UBKN                 ;BLOCK TO LOOK FOR
000651  552300 001151'           05970                   HRRZM DEVDAT, USVDB             ;DATA BLOCK ADDRESS
000652  135040 000405'           05980                   LDB TAC,PUNIT           ;UNIT
000653  241040 000003           05990                   ROT TAC, 3
000654  271040 000407'           06000                   ADDI TAC, DTCCHN
000655  202040 001116'           06010                   MOVEM TAC, UNIT                 ;UNIT AND DT CHANNEL
000656  405040 000070           06020                   ANDI TAC, 70
000657  721201 323201           06030                     CONO UTC, SL+DTR+RB+EE+UCHN(TAC)
000660  476000 001153'           06040                   SETOM UERRCN                    ;SET ERROR COUNTER
000661  201040 000037           06050                   MOVEI TAC, 37                   ;DO NOT CHECK FOR INCOMPLETE
000662  542040 001166'           06060                   HRRM TAC, DTCINT
000663  201040 000016           06070                   MOVEI TAC,16
000664  542040 001172'           06080                   HRRM TAC, DTCINT+4
000665  720200 004011           06090                   CONO DC, DACI+UCHN              ;SET DATA CONTROL
000666  700600 002100           06100                   CONO PI,2100            ;INSURE CHANNEL 1 ON
000667  552340 001126'           06110                   HRRZM PROG, UDMPA               ;SAVE PROGRAM
000670  606600 777777           06120                   TRNN UUO, 777777                ;COMMAND ADDRESS
000671  263140 000000           06130                   POPJ PDP, 0                     ;COMMAND LIST ON TAPE, INPUT
000672  550040 000014           06140                   HRRZ TAC, UUO                   ;GET CMD PNTR
000673  550100 000001           06150                   HRRZ TAC1, TAC                  ;SAVE POINTER
000674  270100 000007           06160           UDMP1A: ADD TAC1, PROG                  ;GET ACTUAL POINTER
000675  552100 001125'           06170                   HRRZM TAC1, UDMP                ;STORE WORKING POINTER
                                06180
                                06190           ;CHECK ENTIRE COMMAND LIST FOR VALIDITY
000676  336120 001125'           06200           UDMP1B: SKIPN TAC1, @UDMP               ;GET COMMAND
000677  254000 000712'           06210                   JRST UDMP1C                     ;END OF COMMAND LIST
000700  327100 000674'           06220                   JUMPG TAC1, UDMP1A              ;CHANGE COMMAND SEQUENCE
000701  576100 001141'           06230                   HLREM TAC1, SVCNTR              ;SAVE -N
000702  553000 000002           06240                   HRRZS TAC1                      ;GET ADDRESS
000703  305100 000000           06250                   CAIGE TAC1, JOBPFI      ;IS IT ABOVE IO PROT. AREA
000704  254000 000000           06260                   JRST ADRERR             ;NO, ADDRESS CHECK ERROR
000705  274100 001141'           06270                   SUB TAC1, SVCNTR                ;GET AREA END
000706  313100 000000           06280                   CAMLE TAC1, USRREL              ;LESS THAN END?
000707  254000 000722'           06290                   JRST UDMP2-1                    ;OUT OF BOUNDS
000710  350000 001125'           06300                   AOS UDMP                        ;INDEX COMMAND LIST POINTER
000711  254000 000676'           06310                   JRST UDMP1B                     ;GET NEXT COMMAND
```

```
                                06320
                                06330     ;GET FIRST COMMAND
000712  270040 000007           06340     UDMP1C:   ADD TAC, PROG                   ;GET ACTUAL ADDRESS
000713  552040 001125'           06350               HRRZM TAC, UDMP               ;SAVE POINTER
000714  336060 001125'           06360               SKIPN TAC, @UDMP              ;1ST COMMAND
000715  254000 000723'           06370               JRST UDMP2                    ;NOTHING TO DO
000716  270040 000007           06380               ADD TAC, PROG                 ;ACTUAL POINTER
000717  325040 000713'           06390               JUMPGE TAC, .-4               ;CHANGE COMMAND SEQUENCE
000720  202040 001113'           06400               MOVEM TAC, BLO                ;SAVE I/O POINTER
000721  263140 000000           06410               POPJ PDP, 0
                                06420     ;EXIT WITH ERROR
000722  660000 040000           06430               TRO IOS, IOBKTL
000723  201040 777775           06440     UDMP2:    MOVEI TAC, -3
000724  572040 001153'           06450               HRREM TAC, UERRCN
000725  402000 001124'           06460               SETZM ERRFLG
000726  254000 000242'           06470               JRST UEND2
                                06480
                                06490     ;SEARCH RETURN,OUTPUT,COMMAND LIST IN MEMORY
000727  721300 010000           06500     DDUMP:    CONSZ UTC,GR
000730  254000 000510'           06510               JRST DDIG2              ;KEEP GOING
000731  200040 001277'           06520               MOVE TAC,[BLKO DC,BLO]
000732  202040 000042           06530               MOVEM TAC, UCHA
000733  720200 003411           06540               CONO DC,DACO+UCHN
000734  200040 001116'           06550               MOVE TAC,UNIT
                                06560
000735  721201 360700           06570               CONO UTC,SL+WD+JDE+EE(TAC)
000736  254000 000515'           06580               JRST DXIT
                                06590     ;BLKI OR BLKO RETURN, COMMAND LIST IN MEMORY
000737  000000 000000           06600     DMPADV:   0
000740  202040 001115'           06610               MOVEM TAC,SV1
000741  354040 001125'           06620               AOSA TAC,UDMP                     ;POINTER
```

```
                                06630
                                06640
000742  552040 001125'  06650   DMPA1:  HRRZM TAC, UDMP                  ;STORE POINTER
000743  336041 000000    06660           SKIPN TAC, 0(TAC)               ;IS WORD ZERO
000744  254000 000752'    06670           JRST DMPA2                      ;END
000745  270040 001126'    06680           ADD TAC, UDMPA                  ;ADD PROGRAM
000746  325040 000742'    06690           JUMPGE TAC, DMPA1               ;CHANGE COMMAND
000747  202040 001113'    06700           MOVEM TAC, BLO
000750  200040 001115'    06710   DMPXT:  MOVE TAC, SV1
000751  254520 000737'    06720           JEN @DMPADV
                                06730
                                06740   ;END OF COMMAND LIST, INPUT OR OUTPUT
000752  264000 000603'    06750   DMPA2:  JSR ENP
000753  700600 001100      06760           CONO PI, 1100                   ;TURN DATA CONTROL CHANNEL OF
000754  721740 000040      06770           CONSO UTS, 40                   ;WRITING?
000755  720200 000000      06780           CONO DC, 0                      ;SHUT OFF DATA CONTROL
000756  254000 000750'    06790           JRST DMPXT
                                06800   ;SEARCH RETURN, INPUT COMMAND LIST ON TAPE
000757  721300 010000      06810   DDMPI:  CONSZ UTC, GR                   ;GOING BACKWARDS?
000760  254000 000510'    06820           JRST DDIG2                      ;KEEP GOING
000761  200040 001300'    06830           MOVE TAC, [XWD -1,BLO-1]
000762  202040 001113'    06840           MOVEM TAC, BLO
                                06850
                                06860   ;COMMON INSTRUCTIONS FOR COMMAND LIST IN MEMORY OR ON TAPE
000763  200040 001301'    06870   DDMPI2: MOVE TAC, [BLKI DC,BLO]
000764  202040 000042      06880           MOVEM TAC, UCHA
000765  720200 004011      06890           CONO DC, DACI+UCHN
000766  200040 001116'    06900           MOVE TAC, UNIT
000767  721201 360300      06910           CONO UTC, SL+RD+JDE+EE(TAC)
000770  254000 000515'    06920           JRST DXIT
                                06930
                                06940   ;INPUT COMMAND LIST ON TAPE.  BLKI RETURN AFTER READING COMMAND
000771  000000 000000      06950   DMPRD:  0
000772  331000 001113'    06960           SKIPL BLO                       ;END OF COMMAND LIST?
000773  254000 001010'    06970           JRST DMPRD1
000774  202040 001115'    06980           MOVEM TAC, SV1                  ;SAVE TAC
000775  200040 001113'    06990           MOVE TAC, BLO                   ;PICK UP COMMAND
000776  576040 001141'    07000           HLREM TAC, SVCNTR               ;-N
000777  553000 000001      07010           HRRZS TAC                       ;ADDRESS
001000  274040 001141'    07020           SUB TAC, SVCNTR                 ;END ADDRESS
001001  303040 000000      07030   DMPRD0: CAILE TAC, 0                    ;<END?, MODIFIED
001002  254000 001102'    07040           JRST DMPERR                     ;OUT OF BOUNDS, EXIT
001003  200040 001126'    07050           MOVE TAC, UDMPA                 ;PROG
001004  272040 001113'    07060           ADDM TAC, BLO                   ;TO GET ACTUAL I/O POINTER
001005  201040 001012'    07070           MOVEI TAC, DMPRDA               ;NEW RETURN
001006  542040 000043      07080           HRRM TAC, UCHA+1
001007  334040 001115'    07090           SKIPA TAC, SV1                  ;RESTORE TAC
001010  720200 000000      07100   DMPRD1: CONO DC, 0
001011  254520 000771'    07110           JEN @DMPRD
```

```
                                07120
                                07130
                                07140     ;INPUT COMMAND LIST ON TAPE.  BLKI RETURN AFTER READING DATA
001012  000000 000000           07150     DMPRDA:   0
001013  202040 001115'           07160               MOVEM TAC, SV1                  ;SAVE TAC
001014  200040 001300'           07170               MOVE TAC, [XWD -1,BLO-1]
001015  202040 001113'           07180               MOVEM TAC, BLO                  ;READ INTO BLO
001016  201040 000771'           07190               MOVEI TAC, DMPRD                ;USE PREV. RETURN
001017  542040 000043            07200               HRRM TAC, UCHA+1
001020  200040 001115'           07210               MOVE TAC, SV1                   ;SAVE TAC
001021  254520 001012'           07220               JEN @DMPRDA
                                07230     ;DUMP IN
001022  621000 000020            07240     UDMPI:    TLZ IOS, IO
001023  260140 001142'           07250               PUSHJ PDP, UINTER
001024  602600 777777            07260               TRNE UUO, 777777                ;COMMAND LIST ON TAPE
001025  254000 001033'           07270               JRST UDMPI2                     ;COMMAND LIST IN CORE
001026  200040 000706'           07280               MOVE TAC, USRREL                ;LENGTH OF USER AREA
001027  542040 001001'           07290               HRRM TAC, DMPRD0
001030  201040 000757'           07300               MOVEI TAC, DDMPI                ;SEARCH RETURN
001031  200100 001302'           07310               MOVE TAC1, [JSR DMPRD]                    ;BLOCK IN RETURN
001032  254000 000641'           07320               JRST UDMP1
001033  201040 001035'           07330     UDMPI2:   MOVEI TAC, DDMPI3               ;COMMAND LIST IN CORE
001034  254000 000640'           07340               JRST UDMP0
                                07350     ;SEARCH RETURN, INPUT COMMAND LIST IN MEMORY
001035  721300 010000            07360     DDMPI3:   CONSZ UTC, GR
001036  254000 000510'           07370               JRST DDIG2                      ;KEEP GOING
001037  254000 000763'           07380               JRST DDMPI2                     INPUT COMMAND LIST IN CORE
                                07390     ;JOB DONE AFTER COMMAND LIST RUNS OUT
001040  332000 001124'           07400     DMPEND:   SKIPE ERRFLG
001041  660000 200000            07410               TRO IOS,IODERR
001042  202006 000002            07420               MOVEM IOS,DEVIOS(DEVDAT)
001043  200040 001116'           07430               MOVE TAC,UNIT
001044  405040 000070            07440               ANDI TAC, 70
001045  700600 002100            07450               CONO PI,2100
001046  720200 004011            07460               CONO DC, DACI+UCHN
001047  721201 220200            07470               CONO UTC, SL+RB(TAC)            ;SWITCH TO SEARCH MODE
001050  200040 001303'           07480               MOVE TAC, [JSR UDMPRB]
001051  202040 000042            07490               MOVEM TAC, UCHA
001052  254000 000000            07500               JRST DTCRET
                                07510     ;SEARCH RETURN TO READ NEXT FREE BLOCK
001053  000000 000000            07520     UDMPRB:   0
001054  250300 001151'           07530               EXCH DEVDAT, USVDB              ;GET DVDB
001055  202040 001130'           07540               MOVEM TAC,SVAC
001056  202000 001131'           07550               MOVEM IOS,SVAC+1
001057  202140 001132'           07560               MOVEM PDP,SVAC+2
001060  202100 001133'           07570               MOVEM TAC1,SVAC+3
001061  200006 000002            07580               MOVE IOS,DEVIOS(DEVDAT)
001062  607000 000020            07590               TLNN IOS,IO                     ;INPUT OR OUTPUT?
001063  254000 001066'           07600               JRST .+3                        ;INPUT
001064  720046 000365'           07610               DATAI DC,UFREE(DEVDAT)          ;LAST FREEBLOCK TALLY
001065  661000 000400            07620               TLO IOS,UNWFRE                  ;SET FREE BLOCK CHANGED BIT
001066  720200 000000            07630               CONO DC,0                       ;TURN OFF DATA CONTROL
001067  201040 000654'           07640               MOVEI TAC,DTCCHN
001070  721201 005000            07650               CONO UTC,5000(TAC)              ;STOP TAPE
001071  200140 001304'           07660               MOVE PDP,[XWD -5,SVAC+3]        ;USE REST OF SCAV BLOCK
001072  264000 001154'           07670               JSR IODSET
001073  260140 001227'           07680               PUSHJ PDP,DTC1B
```

```
001074  200040 001130'   07690                MOVE TAC,SVAC
001075  200000 001131'   07700                MOVE IOS,SVAC+1
001076  200140 001132'   07710                MOVE PDP,SVAC+2
001077  200100 001133'   07720                MOVE TAC1,SVAC+3
001100  250300 001151'   07730                EXCH DEVDAT,USVDB
001101  254520 001053'   07740                JEN @UDMPRB
                         07750      ;ADDRESS CHECK FROM COMMAND.  COMMANDS ON TAPE
001102  250300 001151'   07760      DMPERR:   EXCH DEVDAT, USVDB              ;GET DVDB
001103  201040 400000    07770                MOVEI TAC, IOIMPM              ;ERROR BITS
001104  436046 000002    07780                ORM TAC, DEVIOS(DEVDAT)        ;SET STATUS
001105  250300 001151'   07790                EXCH DEVDAT, USVDB             ;RESTORE DEVDAT
001106  200040 001115'   07800                MOVE TAC, SV1                  ;RESTORE TAC
001107  254000 001010'   07810                JRST DMPRD1
```

```
                                07820
                                07830
001110  000000 000000   07840  C11:    0          ;TEMP CONI DC
001111  000000 000000   07850  C12:    0          ;TEMP CONI UTS
001112  000000 000000   07860  C13:    0          ;TEMP CONI UTC
001113  000000 000000   07870  BLO:    0          ;XWD -200 C(UBUF)
001114  000000 000000   07880  BLI:    0          ;XWD,-200,C(UBUF+200)
001115  000000 000000   07890  SV1:    0          ;TEMPORARY FOR TAC DURING INTERRUPT
001116  000000 000000   07900  UNIT:   0          ;IN BITS 30-32
001117  000000 000000   07910  UBKN:   0          ;BLOCK BEING SEARCHED FOR
001120  000000 000000   07920  UPROG:  0          ;HOLDS PROG
001121  000000 000000   07930  UBUF:   0          ;ABS. LOC OF DATA
001122  000000 000000   07940  UDVDAT: 0          ;PTR TO IOS
001123  000000 000000   07950  ERRTAL: 0          ;TOTAL NO. OF ERRORS
001124  000000 000000   07960  ERRFLG: 0          ;-1 IF ERROR OCCURED, 0 OTHERWISE
                                07970
001125  000000 000000   07980  UDMP:   0          ;HOLDS DUMP UUO ADDRESS
001126  000000 000000   07990  UDMPA:  0          ;HOLDS USER PROGRAM STARTING ADDRESS
001127  000000 000000   08000  SV0:    0
                                08010  SVAC:   BLOCK 11
001141  000000 000000   08020  SVCNTR: 0          ;HOLDS -N OF DUMP COMMAND WORD
                                08030
                                08040  ;CHECK FOR INTERLOCK ON DECTAPE AND DATA CONTROLS
001142  660000 010000   08050  UINTER: TRO IOS, IOACT
001143  202006 000002   08060          MOVEM IOS, DEVIOS(DEVDAT)
001144  352000 000244'  08070          AOSE DTREQ                  ;IS DECTAPE CONTROL FREE?
001145  260140 000000   08080          PUSHJ PDP, DTWAIT           ;WAIT
001146  352000 000242'  08090          AOSE DCREQ                  ;IS DATA CONTROL FREE?
001147  260140 000000   08100          PUSHJ PDP, DCWAIT           ;WAIT
001150  263140 000000   08110          POPJ PDP, 0                 ;EXIT
                                08120
001151  000000 000000   08130  USVDB:  0                  ;SAVE DATA BLOCK ADDRESS
001152  000000 000000   08140  USVIOS: 0                  ;SAVE IOS
001153  777777 777775   08150  UERRCN: -3                 ;ERROR COUNTER
                                08160
001154  000000 000000   08170  IODSET: 0
001155  623000 000001   08180          TLZE IOS,IOW
001156  260140 000000   08190          PUSHJ PDP,SETIOD
001157  202006 000002   08200          MOVEM IOS,DEVIOS(DEVDAT)
001160  254020 001154'  08210          JRST @IODSET
```

```
                                08220
                                08230     ;INITIALZATION
                                08240
001161  201040 777775  08250     DTCINI:   MOVEI TAC, -3                   ;CLEAR ERROR COUNTER
001162  572040 001153' 08260               HRREM TAC, UERRCN
001163  402000 001124' 08270               SETZM ERRFLG
001164  721200 000000  08280               CONO UTC, 0
001165  263140 000000  08290               POPJ PDP, 0
                       08300
001166  721740 000137  08310     DTCINT:   CONSO UTS, 137                  ;ALL ERRORS AND JOB DONE
001167  254000 001167' 08320               JRST .                          ;MODIFIED BY INITIALIZATION
001170  721700 000020  08330               CONSZ UTS,20                    ;TIME FLAG
001171  254000 001244' 08340               JRST UTIME                      ;SET DECTAPE CONTROL AVAILABL
001172  721700 000116  08350     CONSZ1:   CONSZ UTS, 116                  ;INC BLK, PARITY, ILL OP, END
001173  264000 000627' 08360               JSR ERROR2                      ;ERROR
                       08370
                       08380     ;JOB DONE
001174  720200 000000  08390               CONO DC, 0                      ;TURN OFF DATA CONTROL
001175  202000 001127' 08400               MOVEM 0, SV0                    ;SAVE ZERO
001176  721240 000000  08410               CONI UTC, 0
001177  202000 001152' 08420               MOVEM 0, USVIOS
001200  405000 230070  08430               ANDI 0, 230070                  ;SAVE DIRECTION AND UNIT
001201  721220 000000  08440               CONO UTC, @0                    ;SWITCH TO MOVE MODE
001202  200000 001127' 08450               MOVE 0, SV0
001203  264000 000000  08460               JSR DTCSAV
001204  260140 001252' 08470               PUSHJ PDP, DSETAC
001205  332000 001124' 08480               SKIPE ERRFLG
001206  254000 001256' 08490               JRST DTREDO
001207  627000 002000  08500               TLZN IOS,URDIR
001210  254000 001213' 08510               JRST .+3
001211  264000 001154' 08520               JSR IODSET
001212  254000 001220' 08530               JRST DTC1
001213  640000 000017  08540               TRC IOS,17
001214  646000 000017  08550               TRCN IOS,17
001215  254000 001040' 08560               JRST DMPEND
001216  264000 001154' 08570               JSR IODSET
001217  254000 001237' 08580               JRST DTCONT
001220  200040 001152' 08590     DTC1:     MOVE TAC, USVIOS
001221  405040 010007  08600               ANDI TAC, 10007                 ;DIRECTION, CHANNEL
001222  435040 005000  08610               ORI TAC,5000                    ;TIME FLAG ENABLE
001223  721220 000001  08620               CONO UTC, @ TAC                 ;STOP TAPE, AND DESELECT
001224  621000 010000  08630               TLZ IOS, UREV
001225  602040 010000  08640               TRNE TAC, 10000
001226  661000 010000  08650               TLO IOS,UREV
```

```
                                08660
                                08670     DTC1A:
001227  371000 001146'          08680     DTC1B:    SOSL DCREQ          ;DECREMENT REQUEST COUNT, ANYONE LEFT W
001230  476000 000243'          08690               SETOM DCAVAL                ;YES,DATA CONTROL AVAILABLE
001231  620000 010000           08700               TRZ IOS, IOACT
001232  202006 000002           08710     DTC2:     MOVEM IOS, DEVIOS(DEVDAT)
001233  201040 777775           08720               MOVEI TAC, -3
001234  572040 001153'          08730               HRREM TAC, UERRCN
001235  402000 001124'          08740               SETZM ERRFLG
001236  263140 000000           08750               POPJ PDP,
                                08760
001237  201100 000153'          08770     DTCONT:   MOVEI TAC1, UOUT2
001240  607000 000020           08780               TLNN IOS, IO                ;WRITING?
001241  201100 000217'          08790               MOVEI TAC1, UIN1
001242  260142 000000           08800               PUSHJ PDP, 0(TAC1)
001243  254000 001232'          08810               JRST DTC2
                                08820
                                08830     ;INTERRUPT FROM TIME FLAG AFTER STOP DELAY
001244  721340 004000           08840     UTIME:    CONSO UTC,4000
001245  254000 001167'          08850               JRST DTCINT+1
001246  371000 001144'          08860               SOSL DTREQ          ;DECREMENT REQUEST COUNT, IS ANYONE STI
001247  476000 000245'          08870               SETOM DTAVAL                ;YES,DECTAPE CONTROL AVAILABL
001250  721200 000000           08880               CONO UTC, 0                 ;CLR FLAGS
001251  254520 000000           08890               JEN @DTCCHL
                                08900
                                08910     ;SET UP NECESSARY DECTAPE ACCUMULATORS
001252  200300 001151'          08920     DSETAC:   MOVE DEVDAT, USVDB
001253  200340 001120'          08930               MOVE PROG, UPROG
001254  200006 000002           08940               MOVE IOS, DEVIOS(DEVDAT)
001255  263140 000000           08950               POPJ PDP,
                                08960     ;RE-DO DECTAPE COMMAND IF AN ERROR OCCURED
001256  640000 000017           08970     DTREDO:   TRC IOS,17
001257  646000 000017           08980               TRCN IOS,17
001260  254000 001040'          08990               JRST DMPEND
001261  350000 001153'          09000               AOS UERRCN                  ;NOT YET 3 ERRORS
001262  254000 001266'          09010               JRST DTRD2                  ;THIRD ERROR
001263  402000 001124'          09020               SETZM ERRFLG                ;CLEAR FLAG
001264  260140 000415'          09030               PUSHJ PDP, FILL             ;RE-EXECUTE THE COMMAND
001265  254000 001052'          09040               JRST DTCRET                 ;EXIT
001266  660000 200000           09050     DTRD2:    TRO IOS, IODERR             ;SET ERROR INDICATION
001267  623000 000001           09060               TLZE IOS, IOW
001270  260140 001156'          09070               PUSHJ PDP, SETIOD           ;RELEASE WAIT
001271  254000 001220'          09080               JRST DTC1                   ;STOP THE TAPE
                                09090     EXTERNAL DTREQ, DCREQ, DTWAIT, DCWAIT, DTCSAV, DTCRET
                                09100     EXTERNAL DTAVAL, DCAVAL, DTCCHL, UTBKER, DTCCHN, USRREL
                                09110     INTERNAL DTCINT, DTCINI, DTSIZ,UBUF
                                09120
001272  001401 000002           09130               END,
001273  001414 000002
001274  000001 000005
001275  264000 000472'
001276  264000 000737'
001277  720100 001113'
001300  777777 001112'
001301  720000 001113'
001302  264000 000771'
001303  264000 001053'
```

```
      001304  777773 001133'

THERE ARE NO ERRORS

PROGRAM BREAK IS  001305
```

SYMBOL TABLE

```
A                   000000  INT
AC1                 000015  INT
AC2                 000016  INT
AC3                 000017  INT
ADRCK               000001' EXT
ADRERR              000704' EXT
ADVBFE              000000  EXT
ADVBFF              000000  EXT
AL                  000001  INT
ASSCON              400000  INT
ASSPRG              200000  INT
B                   000014  INT
BLI                 001114'
BLO                 001113'
BUFPNT              000012  INT
BUFWRD              000013  INT
C11                 001110'
C12                 001111'
C13                 001112'
CLOSB               002000  INT
CLSIN               000002  INT
CLSOUT              000001  INT
CONSZ1              001172'
CPOPJ1              000033' EXT
D                   000017  INT
DACI                004010
DACO                003410
DAT                 000005  INT
DCAVAL              001230' EXT
DCL                 000001  INT
DCREQ               001227' EXT
DCW                 020000  INT
DCWAIT              001147' EXT
DDI                 000007  INT
DDIF                000472'
DDIG                000500'
DDIG2               000510'
DDMPI               000757'
DDMPI2              000763'
DDMPI3              001035'
DDO                 000006  INT
DDTMEM              000037  INT
DDTSYM              000036  INT
DDUMP               000727'
DEN                 000004  INT
DEVADR              000007  INT
DEVBUF              000006  INT
DEVCHR              000001  INT
DEVCTR              000011  INT
DEVDAT              000006  INT
DEVIAD              000007  INT
DEVIOS              000002  INT
DEVLOG              000005  INT
DEVMOD              000004  INT
DEVNAM              000000  INT
```

SYMBOL TABLE

```
DEVOAD              000010  INT
DEVPTR              000010  INT
DEVSER              000003  INT
DGF                 000012  INT
DIN                 000003  INT
DIRERR              000015' EXT
DLK                 000005  INT
DMPA1               000742'
DMPA2               000752'
DMPADV              000737'
DMPEND              001040'
DMPERR              001102'
DMPRD               000771'
DMPRD0              001001'
DMPRD1              001010'
DMPRDA              001012'
DMPXT               000750'
DOU                 000002  INT
DR                  000016  INT
DRL                 000000  INT
DSETAC              001252'
DSI                 000011  INT
DSO                 000010  INT
DT                  002000
DTAVAL              001247' EXT
DTC1                001220'
DTC1A               001227'
DTC1B               001227'
DTC2                001232'
DTCCHL              001251' EXT
DTCCHN              001067' EXT
DTCINI              001161' INT
DTCINT              001166' INT
DTCONT              001237'
DTCRET              001265' EXT
DTCSAV              001203' EXT
DTR                 003000
DTRD2               001266'
DTREDO              001256'
DTREQ               001246' EXT
DTSIZ               000001  INT
DTW                 040000  INT
DTWAIT              001145' EXT
DVAVAL              000040  INT
DVCDR               100000  INT
DVDIR               000004  INT
DVDIRI              400000  INT
DVIN                000002  INT
DVLPT               040000  INT
DVMTA               000020  INT
DVOUT               000001  INT
DVTTY               000010  INT
DXIT                000515'
DXIT1               000514'
EE                  100000
```

SYMBOL TABLE

```
ENP                 000603'
ENPT                000567'
ENPT2               000571'
ENPTI               000620'
ENTRB               020000  INT
ERRFLG              001124'
ERROR               000607'
ERROR2              000627'
ERRTAL              001123'
F1                  000457'
F2                  000460'
F3                  000461'
F4                  000462'
FILL                000415'
FILL2               000450'
FILLC               000453'
GETF                000277'
GR                  010000
I                   000010  INT
IB                  000013  INT
IBUFB               200000  INT
INITB               400000  INT
INPB                010000  INT
IO                  000020  INT
IOACT               010000  INT
IOREG               000002  INT
IORKTL              040000  INT
IOCON               000040  INT
IODEND              020000  INT
IODERR              200000  INT
IODISC              400000  INT
IODONE              400000  INT
IODSET              001154'
IODTER              100000  INT
IOEND               000040  INT
IOFST               000004  INT
IOIERR              000065' EXT
IOIMPM              400000  INT
IONRCK              000100  INT
IORDEL              000100  INT
IORET               000020  INT
IOS                 000000  INT
IOSET               000000  EXT
IOSTRT              000010  INT
IOUSE               400000  INT
IOW                 000001  INT
IOWC                000020  INT
IOWS                400000  INT
ITEM                000004  INT
JBFADR              000000  INT
JBFCTR              000002  INT
JBFPTR              000001  INT
JBUF                000005  INT
JDAT                000011  INT
JDF                 040000
```

SYMBOL TABLE

```
JERR                000200  INT
JIOW                100000  INT
JNA                 004000  INT
JORPFI              000703' EXT
LOOKB               040000  INT
MTW                 010000  INT
OBUFB               100000  INT
OUT                 000325' EXT
OUTPB               004000  INT
PDP                 000003  INT
PICHN               000100  INT
PIOMOD              000314' EXT
PROG                000007  INT
PUNIT               000652' EXT
PUUOAC              000063' EXT
RB                  000200
RD                  000300
RDDA                000517'
RDFW                000551'
RDRM                000531'
RDRV                000543'
READ                000527'
RIT                 000535'
RRV                 000463'
RUN                 200000  INT
RUNABL              204000  INT
SETI                000267'
SETIOD              001270' EXT
SETO                000272'
SL                  220000
SV0                 001127'
SV1                 001115'
SVAC                001130'
SVCNTR              001141'
TAC                 000001  INT
TAC1                000002  INT
TEM                 000010  INT
THSDAT              000046' EXT
TTYATC              020000  INT
TTYUSE              010000  INT
UBFG                000343' INT
UBFG2               000350'
UBFG3               000370'
UBFGX               000366'
UBKN                001117'
UBLK                000001
UBUF                001121' INT
UCHA                000042
UCHN                000001
UDIR                000364' EXT
UDIR2               000016'
UDIR3               000022'
UDIR4               000026'
UDIREN              000200
UDIRIN              000100
```

SYMBOL TABLE

```
UDIRK1              000034'
UDIRLN              000004
UDIRSH              000000'
UDMP                001125'
UDMP0               000640'
UDMP1               000641'
UDMP1A              000674'
UDMP1B              000676'
UDMP1C              000712'
UDMP2               000723'
UDMPA               001126'
UDMPI               001022' INT
UDMPI2              001033'
UDMPO               000633' INT
UDMPRB              001053'
UDVDAT              001122'
UEND                000236'
UEND2               000242'
UENTER              000052' INT
UERRCN              001153'
UFREE               001064' EXT
UIN                 000204'
UIN1                000217'
UIN2                000251'
UIN3                000254'
UIN4                000265'
UINTER              001142'
ULINKF              001000
ULOOK               000035' INT
ULOOK1              000041'
UNIT                001116'
UNWFRE              000400
UOFF                000615'
UOUT                000125'
UOUT1               000144'
UOUT2               000153'
UOUT3               000167'
UOUT4               000171'
UPROG               001120'
URDIR               002000
UREV                010000
USFTR               000377'
USFTW               000375'
USRJDA              000064' EXT
USRMOD              010000  INT
USRREL              001026' EXT
USVDB               001151'
USVIOS              001152'
UTRERR              000373'
UTRKER              000374' EXT
UTOSP               000112' INT
UTIME               001244'
UTPCLR              000063' INT
UTPCLS              000312' INT
UTPREL              000326' INT
```

SYMBOL TABLE

```
UTPRL1              000330'
UTWDR               000311' INT
UUO                 000014  INT
UX1                 000001
UX2                 000002
UX3                 000005
UXIT                000311' EXT
VEOT                000002
WAIT1               000342' EXT
WD                  000700
WSYNC               000363' EXT
WTDA                000523'
WTFW                000563'
WTRM                000537'
WTRV                000555'
```

END OF ASSEMBLY