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                                ;THIS SUB-PROGRAM ASSEMBLED WITH SYSTEM PARAMETER FILE - S.MAC(V414)
                                        XLIST
                                        LIST
                                TITLE   MTCSR6 - MAGNETIC TAPE ROUTINES FOR 516 CONTROL
                                SUBTTL C,WHITE 27-APR-69 V406
                                        XP      VMTCSR,406      ;DEFINE GLOBAL VERSION NUMBER FOR LOADER MAP.


                                ENTRY MTCSR6
000000                          MTCSR6:
                                INTERNAL FTCHECK,FTMONP
                                IFN FTCHECK+FTMONP,<
                                EXTERNAL MTCDDB,MTCDDS,MTECNT,MTBKCN
                                >
                                IFE FTCHECK+FTMONP,<

                                INTERNAL MTCDDB,MTCDSP

                                ;MTC  DEVICE DATA BLOCK
                                ;REMAINING MTA DDB'S  (IF ANY)  ARE
                                ;GENERATED OUT OF LINE AT BUILD TIME
                        000000'         ZZ=.
000000  556441  200000  MTCDDB: SIXBIT  /MTA0/
000001  000002  000001          XWD     2*HUNGST,MTSIZ+1
000002  000000  000000          0
000003  000000  000015'         EXP     MTCDSP
000004  001023  154407          XWD     DVMTA+DVIN+DVOUT+DVLNG,154407
000005  000000  000000          0
000006  000000  000000          0
000007  000007  000000          XWD     PROG,0
000010  000007  000000          XWD     PROG,0
                                XP      MTECNT,.-ZZ+
000011  000000  000000          0                       ;CUMMULATIVE  ERROR COUNT FOR THIS UNIT
                                                        ;BITS 0-8=LONG, PARITY ERROR COUNT
                                                        ;BITS 9-17=LAT, PARITY ERROR COUNT
                                                        ;BITS 18-26=ILL, OP, COUNT
                                                        ;BITS 27-35=DATA MISSED COUNT
                                XP      MTBKCN,.-ZZ+
000012  000000  000000          0                       ;CUMMULATIVE RECORD COUNTER FOR THIS UNIT
                                XP      MTCDDS,.-ZZ     ;SIZE OF MTC DDB


                                >
```

```
                    000004          T=ITEM
                                ; MAG TAPE SERVICE SUBROUTINES

000013  254000  000273'          JRST MTCINI             ;INITIALIZATION
000014  254000  000172'          JRST MTHUNG             ;MTA HUNG TIMEOUT, RELEASE DATA CONTROL,
                                                        ;MAGTAPE CONTROL, PRINT ERROR AND STOP JOB
000015  263140  000000  MTCDSP: POPJ PDP,               ;RELEASE
000016  254000  000257'          JRST MTCLSO             ;CLOSE OUTPUT
000017  254000  000225'          JRST MTOUT              ;OUTPUT
000020  254000  000125'          JRST MTIN               ;INPUT
000021  254000  000000          JRST CPOPJ1             ;ENTER IN DIRECTORY
000022  254000  000021'          JRST CPOPJ1             ;LOOKUP IN DIRECTORY
000023  254000  000630'          JRST MTDMPO             ;DUMP OUTPUT
000024  254000  000677'          JRST MTDMPI             ;DUMP INPUT
000025  263140  000000          POPJ PDP,               ;SETO
000026  263140  000000          POPJ PDP,               ;SETI
000027  263140  000000          POPJ PDP,               ;GETF
000030  254000  000022'          JRST CPOPJ1             ;RENAME
000031  263140  000000          POPJ PDP,               ;CLOSE INPUT
000032  263140  000000          POPJ PDP,               ;UTPCLR
                                                        ;MTAPE UUO (FALL INTO THIS CODE WHICH FOLLOWS)


                        DEFINE  MTAPES (A)      ;MACRO TO DEFINE LEGAL MTAPE UUO EFFECTIVE ADDRESSES.
                        <       CODES=0
                                IRP     A, <
                                CODES=CODES!<1B<+D35-+0'A>>>>

                                MTAPES  <0,1,11,7,17,3,6,13,16,10>      ;DEFINE WHICH CODES ARE LEGAL.

000033  201200  000001          MOVEI   T,1             ;CHECK FOR LEGAL MTAPE UUO
000034  242214  000000          LSH     T,(UUO)         ;SHIFT BIT ACCORDING TO THE USER'S UUO
000035  606200  145713          TRNN    T,CODES         ;DID HE SPECIFY A LEGAL CODE ?
000036  254000  000000          JRST    UUOERR          ;NO--TYPE MONITOR ERROR MESSAGE,
000037  362200  000171'          SOJE    T,MTP0          ;CHECK FOR MTAPE 0 (SPECIAL SYNC WAIT NO-OP)

000040  260140  000144'          PUSHJ PDP,MTCHK2
000041  620000  776000          TRZ IOS,776000          ;CLEAR ERROR BITS ,IOF,
                                                        ;IOACT, IOBOT AND IOTEND.
000042  334200  000014          SKIPA T,UUO             ;CALL MTAPE2
```

```
                                                
000043  260140  000144' MTAPE:  PUSHJ PDP,MTCHK2        ;CHECK IF MAG TAPE CONTROL AVAIL.
000044  630000  000712' MTAPE2: TDZ IOS,[XWD IODT!IOSEOF,IOACT]
000045  606200  000340          TRNN T,SLICE            ;SET SLICE LEVEL THIS UUO?
000046  254000  000052'         JRST NOSET              ;NO
000047  621000  022000          TLZ IOS,IOSLIC          ;YES, CLEAR LEVEL
000050  602200  000020          TRNE T,SLEVEL           ;SET TO 1?
000051  661000  022000          TLO IOS,IOSLIC          ;YES
000052                  NOSET:
000052  242200  000010          LSH T,+DB               ;MOVE TO FUNCTION
000053  405200  007400          ANDI T,7400             ;MODE BITS
000054  306200  004000          CAIN T,4000             ;LOGICAL EOT?
000055  254000  000613'         JRST MTLEOT
000056  302200  001400          CAIE T,1400             ;WRITE EOF
000057  306200  005400          CAIN T,5400             ;OR WRITE BLANK TAPE?
000060  254000  000253'         JRST CHKLOK             ;YES, CHECK WRITE-LOCK
000061  722740  004000          CONSO 224,4000          ;AT LOAD POINT?
000062  254000  000070'         JRST MTGO0              ;NO
000063  302200  003400          CAIE T,3400             ;YES, BACKSPACE RECORD?

000064  306200  000400          CAIN T,400              ;NO, REW?
000065  254000  000354'         JRST MTFIN              ;YES
000066  306200  007400          CAIN T,7400             ;NO, BACKSPACE FILE?
000067  254000  000354'         JRST MTFIN              ;YES
000070  205040  000001  MTGO0:  MOVSI TAC,TCF           ;LOOK FOR TAPE CONTROL FREE ONLY
```

```
110
111                                     ;HERE FROM INPUT AND OUTPUT UUOS AND INTERRUPT TO DO NEXT RECORD.
112
113  000071  135100  000000  MTGO1:  LDB TAC1,PUNIT          ;UNIT
114  000072  137100  000713'        DPB TAC1,[POINT 3,T,31] ;UNIT
115  000073  135100  000714'        LDB TAC1, [POINT 3, IOS,28]     ;DENSITY PARITY
116  000074  606100  000007         TRNN TAC1,7             ;NO DENSITY OR PARITY SPECIFIED?
117  000075  435100  000000         IORI TAC1,STDENS                ;YES, USE STANDARD
118  000076  431100  000005         XORI TAC1, 5            ;ODD, 556
119  000077  137100  000715'        DPB TAC1,[POINT 3,T,23]
120  000100  541044  000000         HRRI TAC,MTCCHN(T)      ;CHANNEL
121  000101  660040  000200         TRO TAC, 200            ;INHIBIT RETURN TO POOL
122  000102  603000  020000         TLNE IOS,IOSLIC         ;SLICE LEVEL A 1?
123  000103  660040  100000         TRO TAC,100000          ;YES, SET COMMAND.
124  000104  542300  000600'        HRRM DEVDAT,MTDEV       ;COMMAND, DVDB
125  000105  506040  000600'        HRLM TAC,MTDEV
126  000106  201100  000317' MTGO3:  MOVEI TAC1,MTPDUN
127  000107  542100  000612'        HRRM TAC1,MTIDSP
128  000110  402000  000577'        SETZM MTEOFF            ;CLEAR EOF FLAG
129  000111  607000  010000         TLNN IOS,IODT           ;IS THIS A DATA TRANSFER OPERATION
130                                                          ;REQUIRING DATA CONTROL
131  000112  254000  000115'        JRST MTGO2              ;NO, MUST BE SPACING OPERATION
132  000113  720220  000603'        CONO DC,@MDCSAV         ;YES, ATTACH DC TO MAGTAPE
133  000114  700600  000000         CONO PI,DCON            ;TURN DC PI CHANNEL ON
134  000115  402000  000604' MTGO2:  SETZM MISSED           ;CLEAR DATA MISSED FLAG
135                                  STARTDV MTC+EXTERNAL PIOFF,PION
136  000116  700600  000000         CONO PI,PIOFF
137  000117  722201  000000         CONO MTC,(TAC)
138  000120  546040  000611'        HLRM TAC,MTCCON
139  000121  700600  000000         CONO PI,PION
140  000122  557000  000001         HLRZS TAC
141  000123  722601  000000         CONO 224,(TAC)          ;ENABLE FOR TCF OR ERF
142  000124  254000  000000         JRST STOIOS             ;STORE HUNG COUNT, EXIT
143
144                                  ;READ
145  000125  260140  000135' MTIN:   PUSHJ PDP,MTCHEK        ;IS SYSTEM AVAILABLE?
146  000126  621000  000020         TLZ IOS,IO              ;READING.
147  000127  460066  000007  MTIN1:  SETCM TAC,@DEVIAD(DEVDAT)       ;-SIZE-1
148  000130  541066  000007         HRRI TAC,@DEVIAD(DEVDAT)       ;BUFFER ADDRESS,PROG INCLUDED
149  000131  270040  000716'        ADD TAC,[XWD 2,1]       ;-SIZE+1,BUFFER+1
150  000132  201200  002400         MOVEI T,2400    ;READ
151  000133  200100  004717' MTIN2:  MOVE TAC1,[BLKI DC,4*00+MTDC*10]
152  000134  254000  000235'        JRST MTINDC
```

```
153
154                                     ;IS SYSTEM AVAILABLE
155  000135  260140  000000  MTCHEK: PUSHJ PDP,GETDCMT       ;GET DATA AND MAG TAPE CONTROLS
156  000136  352000  000000          AOSE MTREQ              ;ARGUMENT
157  000137  200036  000002          MOVE IOS,DEVIOS(DEVDAT)
158  000140  661000  010000          TLO IOS,IODT            ;FLAG DATA TRANSFER
159  000141  256023  000000          XCT @(PDP)
160  000142  260140  000152'         PUSHJ PDP,MTCHK4        ;WAIT FOR REWIND
161  000143  254000  000135'         JRST MTCHEK             ;GET DC & MT AGAIN
162
163  000144  352000  000136' MTCHK2: AOSE MTREQ
164  000145  260140  000000          PUSHJ PDP,MTWAIT
165  000146  200036  000002          MOVE IOS,DEVIOS(DEVDAT)
166  000147  621000  000020          TLZ IOS,IO              ;CLEAR IO INDICATION SO "REWCK" WILL WORK
167  000150  260140  000152'         PUSHJ PDP,MTCHK4        ;CHECK STATUS
168  000151  254000  000144'         JRST MTCHK2             ;GET MT AGAIN
169
170  000152  661000  040000  MTCHK4: TLO IOS,HASMT           ;THIS JOB NOW HAS MTC
171  000153  623000  000002          TLZE IOS,IOBEG          ;FIRST OPERATION AFTER INIT OR SETSTS

172  000154  621000  020000          TLZ IOS,IOSLIC          ;YES, SET SLICE LEVEL TO 0.
173  000155  621000  400000          TLZ IOS,IOREW           ;CLEAR MAG TAPE REWINDING
174  000156  260140  000212'         PUSHJ PDP,REWCK         ;CHECK IF REWINDING?
175  000157  254000  000000          JRST TPOPJ              ;NO - STATUS OK
176  000160  254000  000167'         JRST QSTAT              ;QUERY STATUS
177  000161  260140  000172'         PUSHJ PDP,DETMDC        ;REWINDING- DETACH MTC, DC AND TURN OFF
178                                                          ;IODT AND HASMT
179  000162  661000  400000          TLO IOS,IOREW           ;SET DEVICE ACTIVE AND IN REWIND WAIT
180  000163  260140  003000          PUSHJ PDP,DRACT
181  000164  357000  007676'         AOSG MTREWN             ;ADD 1 TO REWIND WAIT COUNT
182  000165  260140  000426'         PUSHJ PDP,MTCLK         ;PUT IN CLOCK REQUEST,
183                                                          ;(NO OTHER UNITS IN REWIND WAIT)
184
185  000166  254040  000000          JRST WSYNC
186
187  000167  260140  000172' QSTAT:  PUSHJ PDP,DETMDC        ;DETACH MTC AND DC
188  000170  254000  000000          JRST HNGSTP             ;CHECK STATUS (PULL FINGERS OUT, ETC)
189
```

```
                        ;MTAPE 0 WAITS UNTIL THE CONTROL IS FREE
                        ;THUS MTAPE 0 PROVIDES THE ONLY WAY FOR A USER TO WAIT UNTIL A SPACING OPERATION
                        ; (I.E., SKIP, BACKSPACE, OR REWIND) IS COMPLETED.

000171  260140  000144' MTP0:   PUSHJ   P,MTCHK2       ;WAIT FOR CONTROL TO BECOME FREE,
                                                       ; THEN GIVE IT BACK IMMEDIATELY,
                                                       ; AND RETURN TO THE USER.



                        ;DETMDC-
                        ;       DETACH MTC, AND TURN OFF HASMT,
                        ;       THEN (IFF IODT ON)
                        ;       TURN OFF IODT AND DETACH DC

000172                  DETMDC:
000172                  MTHUNG:
000172  627000  040000          TLZN IOS,HASMT          ;THIS JOB HAS MTC?
000173  254000  000124'          JRST STOIOS             ;NO
000174  260140  000206'          PUSHJ P,RELCON
000175  371000  000144'          SOSL MTREQ              ;YES- ANYONE ELSE WAITING FOR IT?
000176  476000  000000          SETOM MTAVAL            ;YES- FLAG AS JUST BECOME AVAILABLE
000177  627000  010000  DETDC:  TLZN IOS,IODT           ;DOES JOB HAVE DATA CONTROL?
000200  254000  000173'          JRST STOIOS             ;NO- EXIT
000201  720200  000000          CONO DC,0
000202  700600  000000          CONO PI,DCOFF
000203  371000  000000          SOSL DCREQ              ;ANYONE ELSE WAITING FOR IT?
000204  476000  000000          SETOM DCAVAL            ;YES- FLAG AS JUST BECOME AVAILABLE
000205  254000  000200'          JRST STOIOS             ;AND EXIT

000206  722200  000000  RELCON: CONO 220,0
000207  722600  000000          CONO 224,0
000210  402000  000611'          SETZM MTCCON
000211  263140  000000          POPJ P,
```

```
                                ;ROUTINE TO SEE IF UNIT IS REWINDING
                                ;CALL   MOVE DEVDAT,ADDRESS OF DCB
                                ;       PUSHJ PDP,REWCK
                                ;       UNIT READY
                                ;       UNIT OFF OR WRITE LOCKED
                                ;       UNIT REWINDING

000212  135040  000071' REWCK: LDB TAC,PUNIT
000213  241040  000004         ROT TAC,4
000214  722271  000200         CONO MTC,200(TAC)
000215  722600  000002         CONO MTS1,SEL          ;JAM UNIT INTO COMMAND BUFFER
000216  722730  020000         CONSZ MTS1,20000       ;SKIP IF REWIND MOTION OFF
000217  254000  000000         JRST CPOPJ2            ;RETURN TO CALL+2 IF TAPE REWINDING
000220  603020  000020         TLNE IOS,IO            ;OUTPUT ?
000221  722740  002200         CONSO MTS1,200         ;YES-WRITE LOCKED ?
000222  722740  000002         CONSO MTS1,2           ;NO-IS UNIT READY?
000223  350073  000000         AOS (PDP)
000224  263140  000000         POPJ PDP,              ;YES- RETURN TO CALL+1


                                REPEAT 0,<
                                THIS WORKS WITH THE FOLLOWING MOD TO 545 TRANSPORT:

                                DELETE 1823K TO ??

                                ADD     1818H TO 1808K          REW(1)(GND)
                                        1819S TO 1808L          FWD/LP(1)(GND)
                                        1808N TO 1823K          (REW(1),OR,FWD/LP(1))

                                THIS MOD SETS IOP22(1) WHILE MAGTAPE IS REWINDING OR SPACING FORWARD
                                TO LOAD POINT- IF ENABLES THE PROCESSOR TO DISTINGUISH BETWEEN A
                                TAPE WHICH IS AT THE END OF A REWIND COMMAND, AND A TAPE WHICH IS
                                SWITCHED TO LOCAL, OR OFF>
```

```
                                ;WRITE
000225  260140  000135' MTOUT:  PUSHJ PDP,MTCHEK
000226  661000  000020          TLO IOS,IO                      ;WRITING
000227  201066  000010  MTOUT1: MOVEI TAC,@DEVOAD(DEVDAT)       ;BUFFER ADDRESS, PROG INCLUDED
000230  210161  000001          MOVN TAC1,1(TAC)                ;-WD COUNT
000231  504640  000002          HRL TAC,TAC1                    ;-WD CNT,BUFFER
000232  347040  000434'         AOJG TAC,MTNOTI                 ;BUFFER+1, TEST FOR ZERO WORD COUNT
000233  200100  000720' MTOUT2: MOVE TAC1,[BLKO DC,3400+MTDC*10]
000234  201200  001000          MOVEI T,1000                    ;WRITE
000235  202040  000601' MTINDC: MOVEM TAC,MTDCCN                ;BLKO POINTER
000236  435100  000000          IORI TAC1,DCTCHN                        ;DC PI CHANNEL NO.
000237  202040  000602'         MOVEM TAC,DCWRD
000240  552100  000603'         HRREM TAC1, MDCSAV              ;SAVE DC COMMAND
000241  541100  000602'         HRRI TAC1,DCWRD
000242  700600  000222'         CONO PI,DCOFF                   ;TURN DC PI CHANNEL OFF
000243  202100  000000          MOVEM TAC1,DCLOC                ;BLK COMMAND
000244  200100  000721'         MOVE TAC1,[JSR MTDCND]
000245  202100  000000          MOVEM TAC1,DCLOC1
000246  660000  012000          TRO IOS,IOACT                   ;SET IOACT
000247  205040  000004          MOVSI TAC, ERF                  ;ENABLE FOR EOR IF EOR FLAG NOT ON,
000250  722700  000004          CONSZ 224,ERF                   ;END OF RECORD?
000251  205040  040000          MOVSI TAC,XNC                   ;NO. COME BACK WHEN COMMAND BUFFER IS EMPTY
000252  254000  000071'         JRST MTG01

000253  722740  000200  CHKLOK: CONSO 224,200                   ;WRITE LOCKED?
000254  254000  000070'         JRST MTG00                      ;NO, DO MTAPE
000255  260140  000167'         PUSHJ PDP,QSTAT
000256  254000  000253'         JRST CHKLOK
```

```
                                ;CLOSE OUTPUT

000257  607300  004000  MTCLSO: TLNN DEVDAT,OUTPB        ;HAS AN OUTPUT BEEN DONE?
000260  263140  000000          POPJ PDP,               ;NO. DON'T WRITE ON TAPE.
000261  135040  000000          LDB TAC,PIOMOD          ;DUMP MODE?
000262  305040  000016          CAIGE TAC,16
000263  260140  000000          PUSHJ PDP,OUT           ;NO. OUTPUT LAST PARTIAL BUFFER
000264  260140  000000          PUSHJ PDP,WAIT1         ;WAIT FOR OUTPUT TO FINISH
000265  201200  000003  MWLEOT: MOVEI T,3              ;WRITE EOF
000266  260140  000043'         PUSHJ PDP, MTAPE
000267  201200  000003          MOVEI T,3               ;WRITE EOF
000270  260140  000043'         PUSHJ PDP, MTAPE
000271  201200  000007          MOVEI T,7               ;BSP
000272  254000  000043'         JRST MTAPE


000273  260140  000206' MTCINI: PUSHJ PDP,RELCON
000274  476000  000636'         SETOM MTREWN            ;SET CLOCK REQUEST COUNT TO -1
000275  254000  000361'         JRST MTNI01


                                ;BLK COUNTED OUT

                                IFE FTCHECK+FTMONP,<
000276  000000  000000  MTDCND: 0
                                >
000277  700600  000242' MTDCN1: CONO PI,DCOFF           ;SHUT OFF DC CHANNEL
000300  720300  010000          CONSZ DC,10000
000301  476000  000624'         SETOM MISSED
000302  254520  000276'         JEN @MTDCND
```

```
322
323                                     ;FLAG FROM TAPE CONTROL,  SET UP BY INSERT MACRO
324  000303  722760  000611' MTCINT: CONSO 224,@MTCCON
325  000304  254000  000304'         JRST .
326  000305  264000  000000          JSR MTCSAV                      ;SAVE AC'S
327  000306  550300  000600'         HRRZ DEVDAT,MTDEV               ;DVDB
328  000307  135340  000000          LDB PROG,PJOBN;                 JOB NUMBER
329  000310  200347  000000          MOVE PROG,JBTADR(PROG)
330  000311  200046  000002          MOVE IOS, DEVIOS(DEVDAT)
331  000312  722740  000001          CONSO 224,TCF                   ;TAPE CONTROL FREE
332  000313  254000  000460'         JRST MTEOR
333  000314  256000  000612'         XCT MTIOSP
334  000315  254000  000556'         JRST MTBSP                      ;AFTER BACKSPACE
335  000316  254000  000531'         JRST MTERR                      ;IF ERROR FOUND
336  000317  607040  010000  MTPDUN: TLNN IOS,IODT
337  000320  254000  000451'         JRST MTNIO2
338  000321  135040  000261'         LDB TAC,PIOMOD
339  000322  301040  000016          CAIL TAC,16
340  000323  254000  000341'         JRST DMPDUN                     ;DUMP
341  000324  603000  000020          TLNE IOS,IO
342  000325  254000  000434'         JRST MTNOTI                     ;WRITING
343  000326  332000  000577'         SKIPE MTEOFF                    ;NOT EOF?
344  000327  254000  000345'         JRST MTEOF
345  000330  201066  000007          MOVEI TAC,@DEVIAD(DEVDAT)       ;BUFFER ADDRESS
346  000331  210100  000601'         MOVN TAC1,MTDCCN                ;WD CNT-1
347  000332  253100  000333'         AOBJN TAC1, .+1                 ;WD CNT
348  000333  513000  000002          HLLES TAC1                      ;CLR RT HALF
349  000334  270100  000602'         ADD TAC1,DCWRD                  ;ADD CURRENT COUNT=NO, OF WDS
350  000335  546101  000001          HLRM TAC1,1(TAC)                ;STORE AT WORD COUNT
351  000336  260140  000000          PUSHJ PDP,ADVBFF
352  000337  254000  000347'         JRST MTEND1                     ;NEXT BUFFER FULL
353  000340  254000  000436'         JRST MTCON                      ;CONTINUE MODE
354
355  000341  607040  000020  DMPDUN: TLNN IOS,IO
356  000342  336000  000577'         SKIPN MTEOFF
357  000343  254000  000346'         JRST MTEOF+1
358  000344  664000  020000          TROA IOS,IODEND
359
360  000345  661040  000040  MTEOF:  TLO IOS,IOEND
361  000346  402000  000577'         SETZM MTEOFF                    ;CLEAR EOF FLAG
362
363                                     ;AND FALL INTO MTEND1
```

```
364
365  000347  260140  000177' MTEND1: PUSHJ PDP,DETDC          ;DETACH DC (IF ASSIGNED)
366  000350  260140  000414'         PUSHJ PDP,ETCHK          ;CHECK FOR END OF TAPE (FOR DUMP MODE OUT)
367  000351  260140  000000         PUSHJ PDP,CLRACT
368  000352  722740  000001         CONSO 224,TCF            ;TAPE CONTROL FREE?
369  000353  254000  000544'         JRST MTICN               ;NO. WAIT FOR IT.
370  000354                  MTFIN:
371  000354  623000  000001  MTNIO:  TLZE IOS,IOW             ;CLEAR WAIT
372  000355  260140  000000         PUSHJ PDP,SETIOD
373  000356  260140  000172'         PUSHJ PDP,DETMDC         ;DETACH MTC (IF HASMT SET) AND DC (IF IODT)
374  000357  260140  000414'         PUSHJ PDP,ETCHK          ;CHECK FOR END OF TAPE
375  000360  260140  000351'         PUSHJ PDP,CLRACT         ;RESTORE BITS,CLEAR IOACT
376
377                          ;AND FALL INTO MTNIC1
```

```
000361  213040  000627' MTNI01: MOVN TAC,MTRCDO          ;REPEAT COUNTER
000362  572040  000625'         HRREM TAC,MTERCN
000363  335000  000626'         SKIPGE MTREWN           ;IS ANY OTHER UNIT REWINDING AND
                                                        ;A SECOND COMMAND HELD UP?
000364  263140  000000          POPJ PDP,               ;NO, DISMISS INTERRUPT

                        ;SOME UNIT IS REWINDING AND HAS HAD ANOTHER COMMAND HELD UP,
                        ;CHECK ALL UNITS

                        EXTERNAL SETIOD

000365  476000  000626' MTREWW: SETOM MTREWN            ;SET COUNT TO NO. UNITS IN REW WAIT
000366  261140  000006         PUSH PDP,DEVDAT
000367  201340  000000'         MOVEI DEVDAT,MTCDDB     ;GET BEGINNING OF MT DATA BLOCK CHAIN

000370  200006  000002  REWLP:  MOVE IOS,DEVIOS(DEVDAT)
000371  325000  000425'         JUMPGE IOS,REW2         ;IS UNIT IN A REW WAIT?
000372  260140  000212'         PUSHJ PDP,REWCK         ;YES,SEE IF FINISHED REW,
000373  254000  000376'         JRST .+3                ;HAS FINISHED
000374  254000  000424'         JRST REW1               ;OFF- LET HUNG LOGIC TAKE CARE OF IT
000375  254000  000403'         JRST REW2               ;STILL REWINDING
000376  630000  000722'         TDZ IOS,[XWD IOREW,IOACT];GET JOB OUT OF IO WAIT
000377  623000  000001          TLZE IOS,IOW
000400  260140  000355'         PUSHJ PDP,SETIOD        ;START JOB UP AGAIN
000401  202006  000002          MOVEM IOS,DEVIOS(DEVDAT)
000402  254000  000425'         JRST REW2

000403  260140  000275' REW0:   PUSHJ PDP,STOIOS       ;RESET HUNG COUNT IF STILL REWINDING
000404  350000  000626' REW1:   AOS MTREWN             ;INCREMENT COUNT OF REW WAIT UNITS
000405  554006  000003  REW2:   HLRZ DEVDAT,DEVSER(DEVDAT)          ;DEVDAT TO NEXT DDB
000406  322300  000412'         JUMPE DEVDAT,REW3               ;LAST ONE?
000407  554246  000000          HLRZ DAT,DEVNAM(DEVDAT)         ;NO,GET LH OF NAME
000410  306240  556441          CAIN DAT,(SIXBIT /MTA/)         ;STILL A MAGTAPE?
000411  254000  000370'         JRST REWLP              ;YES, CONTINUE
000412  262140  000006  REW3:   POP PDP,DEVDAT
000413  263140  000000          POPJ PDP,               ;YES, DISMISS INTERRUPT OR RETURN TO MTC OK

000414  722700  010000  ETCHK:  CONSZ MTS1,10000        ;EOT SEEN?
000415  660000  402000          IRO IOS,IOIMPM+IOTEND   ;YES-SET FLAGS
000416  630000  000723'         TDZ IOS,[XWD IOREW,IOBOT];NO LONGER REWINDING
000417  722700  024000          CONSZ MTS1,24002        ;UNLESS
000420  660000  004000          TRO IOS,IOBOT           ;IS REALLY REWINDING
000421  263140  000000          POPJ PDP,               ;EXIT
```

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                                ;ROUTINE CALLED AT CLOCK LEVEL TO SEE IF ANY UNITS WHICH ARE IN A
                                ;REW WAIT HAVE FINISHED REWIND.

                                INTERNAL MTCLOK

000422  335000  000175' MTCLOK: SKIPGE MTREQ              ;IS ANY JOB USING ANY UNIT NOW?
000423  260140  000365'         PUSHJ PDP,MTREWW         ;NO, CHECK ALL MAG TAPE
                                                         ;UNITS TO SEE IF JUST FINISHED
                                                         ;REWINDING(WHICH WERE IN REW WAIT)
000424  335000  000636'         SKIPGE MTREWN            ;YES,ARE ANY UNITS STILL IN REW WAIT?
000425  263140  000000          POPJ PDP,                ;NO, RETURN TO CLOCK ROUTINE WITHOUT
                                                         ;PUTTING IN CLOCK REQUEST

                                ;ROUTINE TO PUT IN A CLOCK REQUEST

                                EXTERNAL JIFSC2

000426  201120  000000  MTCLK:  MOVEI TAC1,JIFSC2         ;CHECK EVERY HALF SECOND
000427  505120  000422'         HRLI TAC1,MTCLOK         ;DISPATCH ADDRESS

000430  700620  000400          CONO PI,400              ;TURN OFF PI
000431  136120  000020          IDPB TAC1,CLOCK          ;STORE CLOCK REQUEST
000432  700620  000200          CONO PI,200              ;TURN ON PI
000433  263140  000000          POPJ PDP,
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```
445  000434  260140  000000  MTNOTI: PUSHJ PDP,ADVBFE          ;WRITING
446  000435  254000  000347'        JRST MTEND1
447  000436  722700  010000  MTCON:  CONSZ 224,10000           ;END OF TAPE?
448  000437  254000  000347'        JRST MTEND1               ;YES - B/SP , EOF & EXIT
449  000440  720200  000000        CONO DC,0                 ;CLEAR DATA CONTROL
450  000441  623000  000001        TLZE IOS,IOW
451  000442  260140  000400'        PUSHJ PDP,SETIOD
452  000443  202046  000002        MOVEM IOS,DEVIOS(DEVDAT)
453  000444  210040  000627'        MOVN TAC,MTREDO
454  000445  572240  000625'        HRREM TAC,MTERCN
455  000446  607000  000020        TLNN IOS,IO               ;INPUT OR OUTPUT?
456  000447  254000  000127'        JRST MTIN1                ;CALL INPUT SUBROUTINE
457  000450  254000  000227'        JRST MTOUT1               ;CALL OUTPUT SUBROUTINE
458  000451  554040  000600' MTNIO2: HLRZ TAC,MTDEV           ;COMMAND
459  000452  405040  007400        ANDI TAC,7400
460  000453  302040  003000        CAIE TAC,3000             ;NO. SPACING ONE RECORD?
461  000454  254000  003354'        JRST MTNIO                ;YES, EXIT
462  000455  722700  000400        CONSZ 224, 400            ;EOF?
463  000456  670000  000724'        TDO IOS,[XWD IOSEOF,IODEND]
464  000457  254000  000354'        JRST MTNIO                ;EXIT
465
466
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```
467  000460  201040  000004  MTEOR:  MOVEI TAC,ERF
468  000461  722740  007004          CONSO 224,ERF           ;END OF RECORD FLAG ON?
469  000462  254000  000545'        JRST MTIGN1             ;NO. WAIT FOR IT.
470  000463  720330  010000          CONSZ DC,10000          ;DATA MISSED
471  000464  476000  000604'        SETOM MISSED            ;YES
472  000465  720340  160000          CONSO DC,160000         ;ANY CHARS. LEFT?
473  000466  254000  000526'        JRST MTEOR1             ;NO
474  000467  200200  000602'        MOVE T,DCWRD            ;GET IOWD
475  000470  607000  000020          TLNN IOS,IO             ;O/P?
476  000471  332000  000604'        SKIPE MISSED            ;NO, DATA MISSED
477  000472  254000  000514'        JRST MTEOR2             ;YES
478  000473  720240  000002          CONI DC,TAC1            ;FETCH DC STATUS BITS
479  000474  242100  777763          LSH TAC1,-15            ;SHIFT CHARACTER COUNT TO LSBITS
480  000475  221100  777772          IMULI TAC1,-6           ;-NO OF BITS TOO FAR RIGHT
481  000476  720220  000603'        CONO DC,@MDCSAV         ;?? IF DON SAYS SO, WELL, OK (JUST)
482  000477  720040  000001          DATAI DC,TAC            ;FETCH LAST PART-WORD OF DATA
483  000500  720200  000000          CONO DC,0               ;SHUT DOWN DC
484  000501  242042  000044          LSH TAC,44(TAC1)        ;SHIFT LAST CHARACTERS TO LEFT END
485  000502  327200  000506'        JUMPG T,MTEOR1

486  000503  253200  000504'        AOBJN T,.+1             ;BUMP DATA POINTER
487  000504  202044  000000          MOVEM TAC,(T)           ;STORE LAST WORD
488  000505  202200  000602'        MOVEM T,DCWRD           ;AND BUMPED POINTER
489
490  000506  722700  400130  MTEOR1: CONSZ 224,LPE!CPE!400100        ;IF END OF RECORD, CHECK
491                                                          ;PARITY,DATA MISSED,  AND ILLEGAL FLAG
492  000507  254000  000514'        JRST    MTEOR2          ;IF ERROR CAUSE INTERRUPT TO
493                                                          ;ERROR ROUTIF VIA TCF
494  000510  722700  000400  MTECON: CONSZ 224, 400           ;EOF?
495  000511  476000  000577'        SETOM MTEOFF            ;SET EOF FLAG
496  000512  350006  000012          AOS     MTBKCN(DEVDAT)  ;COUNT NO. OF BLKS READ OR WRITTENE
497                                                          ;INCLUDING RETRIES
498  000513  254020  000612'        JRST @MTIDSP            ;YES.
499
500  000514  370000  000612' MTEOR2: SOS     MTIDSP          ;POINT TO ERROR ROUTINE
501  000515  201200  000000          MOVEI   T,0
502  000516  722700  000020          CONSZ   MTS1,20         ;LONGITUDINAL PARITY ERROR?
503  000517  661200  001000          TLO     T,1000          ;YES, COUNT IN QUARTER 1
504  000520  722700  000010          CONSZ   MTS1,10         ;LATERAL PARITY ERROR?
505  000521  661200  000001          TLO     T,1             ;YES, COUNT IN QUARTER 2
506  000522  722700  400000          CONSZ   MTS1,400000     ;ILLEGAL OP?
507  000523  662200  001000          TRO     T,1000          ;YES, COUNT IN QUARTER 3
508  000524  722740  000100          CONSO MTS1,100
509  000525  332000  000604'        SKIPE   MISSED          ;DATA MISSED?
510  000526  662200  000001          TRO     T,1             ;YES, COUNT IN QUARTER 4
511  000527  272206  000011          ADDM    T,MTECNT(DEVDAT);ADD TO ERROR COUNTS FOR THIS DRIVE
512  000530  254000  000510'        JRST    MTECON          ;CHECK EOF
```

```
513
514  000531  554040  000670' MTERR:  HLRZ TAC,MTDEV          ;COMMAND
515  000532  405040  007400         ANDI TAC,7400
516  000533  602000  000100         TRNE IOS,IONRCK
517  000534  254000  000550'        JRST MTERR2
518  000535  353100  000605'        AOSLE TAC1,MTERCN
519  000536  301100  000003         CAIL TAC1,3
520  000537  254000  000550'        JRST MTERR2
521  000540  554040  000670'        HLRZ TAC,MTDEV          ;COMMAND
522  000541  405040  770377         ANDI TAC,770377
523  000542  722201  003400         CONO 220,3400(TAC)      ;BSP
524  000543  370000  000612'        SOS MTIDSP
525  000544  201040  000001 MTIGN:  MOVEI  TAC,TCF
526  000545  722601  000000 MTIGN1: CONO   224,(TAC)
527  000546  552040  000611'        HRRZM  TAC,MTCCON
528  000547  254000  000000         JRST   MTCRET
529
530  000550  722740  400100 MTERR2: CONSO 224,400100        ;SET IODERR IF ILLEG OR MISSED CHAR FLAGS
531  000551  332000  000624'        SKIPE MISSED            ;SET IODERR IF DATA MISSED
532  000552  660000  200000         TRO IOS,IODERR
533  000553  722740  000030         CONSZ 224,30            ;SET IODTER IF LONG OR LAT PARITY
534  000554  660000  100000         TRO IOS,IODTER
535  000555  254000  000317'        JRST MTPDUN
536
537  000556  200040  000671' MTBSP:  MOVE TAC,MTDCCN        ;POINTER
538  000557  202040  000602'        MOVEM TAC,DCWRD         ;RESET POINTER WORD
539  000560  554040  000670'        HLRZ TAC,MTDEV          ;COMMAND
540  000561  722740  040000         CONSO 224,XNC           ;WAIT FOR XNC
541  000562  254000  000561'        JRST .-1                ;SHOULD ADD A COUNT(RUNAWAY TAPE TURNED OFF)
542  000563  333100  000605'        SKIPLE TAC1,MTERCN
543  000564  254000  000570'        JRST MTBSP3
544  000565  660000  010000 MTBSP2: TRO IOS,IOACT
545  000566  505040  000004         HRLI TAC,ERF
546  000567  254000  000106'        JRST MTGO3
547  000570  606040  001000 MTBSP3: TRNN TAC,1000           ;READING
548  000571  644040  100000         TRCA TAC,100000         ;YES-CHANGE SLICE LEVEL
549  000572  606100  000001         TRNN TAC1,1             ;NO
550  000573  254000  000565'        JRST MTBSP2
551  000574  722201  004400         CONO 220,4400(TAC)      ;WRITE BLANK TAPE
552  000575  350000  000605'        AOS    MTERCN
553  000576  254000  000544'        JRST MTIGN
```

```
                    000220  MTC=220          ;MAG TAPE CONTROL DEVICE NUMBER
                    000224  MTS1=224                ;MAG TAPE CONTROL STATUS REG 1
                    040000  XNC=40000        ;TRANSFER NEW COMMAND
                    000002  MTDC=2           ;MAG TAPE DATA CONTROL DEVICE NO.
                    000001  TCF=1            ;TAPE CONTROL FREE
                    000004  ERF=4            ;END OF RECORD FLAG
                    000020  LPE=20           ;LONG, PARITY ERROR
                    000010  CPE=10           ;CHAR. PARITY ERROR
                    000002  SEL=2            ;UNIT TO COMMAND BUFFER
                    004000  IOSEOF=4000       ;SPACING ONE RECORD FORWARD FOUND EOF
                    002000  IOTEND=2000       ;EOT INDICATION
                    001000  IONRCK=1000       ;DO NOT RE-TRY ON ERRORS
                    000400  IOROT=400         ;TAPE AT LOAD POINT
                    010000  IODT=10000        ;A 1 FOR A DATA TRANSFER TYPE COMMAND
                    020000  IOSLIC=20000      ;A 1 IF SLICE LEVEL IS 1, OTHERWISE 0.
                    040000  HASMT=40000       ;IF A 1, THIS JOB HAS THE MAG TAPE CONTROL
                    400000  IOREW=400000      ;A 1 IF UNIT IS REWINDING AND ANOTHER OPERATION
                                              ;IS ATTEMPTED ON SAME UNIT, MUST BE SIGN BIT.


                            EXTERNAL ADVREF,ADVBFE,DCREQ,MTCSAV,SETACT,CLRACT,ORACT,GETDCMT
                            EXTERNAL MTCRET, DCAVAL, MTAVAL, MTCCHN, MTREQ
                            EXTERNAL MTWAIT,OUT,SETIOD,CLOCK,HNGSTP,MTSIZ
                            EXTERNAL WSYNC,USRREL,WAIT1,ADRERR,PUNIT,PIOMOD,PJOBN
                            EXTERNAL JOBPD1,JOBSAV
                            EXTERNAL JBTADR,JOBPFI,STOENS,CPOPJ1,CPOPJ2,UUOERR
                            EXTERNAL DCTCHN,DCLOC,DCLOC1,DCOFF,DCON,STOIOS,TPOPJ

                            INTERNAL MTCINT,GETMDC,DETDC

                            IFN FTCHECK+FTMONP,<
                            EXTERNAL MTEOFF,MTDEV,MTDCCN,DCWRD,MDCSAV,MISSED,MTERCN
                            EXTERNAL MTREWN,MTCMDP,SVCNTR,MTCCON,MTIOSP,MTDCND
                            INTERNAL MTDCN1,MTPCUN
                            >
                            IFE FTCHECK+FTMONP,<
                            ;CONTROL DATA

000577  000000  000000  MTEOFF: 0          ;EOF FLAG
000600  000000  000000  MTDEV:  0          ;XWD COMMAND,DEVICE DATA BLOCK
000601  000000  000000  MTDCCN: 0          ;BLKI/O POINTER FOR REDO
000602  000000  000000  DCWRD:  0          ;BLKI/O POINTER FOR DC
000603  000000  000000  MDCSAV: 0          ;DC COMMAND
000604  000000  000000  MISSED: 0          ;-1 IF DC CONTAINS PARTIAL WORD
000605  000000  000000  MTERCN: 0          ;ERROR COUNTER
000606  000000  000000  MTREWN: 0          ;NO. OF MAG TAPE UNITS-1 IN IO WAIT DOING REWINDS
                                            ;BECAUSE THEY REQUESTED OTHER OPERATIONS BEFORE REW
                                            ;FINISHED, -1 MEANS NONE, 0 MEANS 1 IN QUEUE
000607  000000  000000  MTCMDP: 0          ;DUMP COMMAND LIST POINTER
000610  000000  000000  SVCNTR: 0          ;DUMP COMMAND IOWD NEGATIVE WORD COUNT
000611  000000  000000  MTCCON: 0          ;INTERRUPT FLAGS
```

```
   607  000612  254000  000317' MTIDSP: JRST MTPDUN
   608
   609                          >
```

```
610
611                                     ;LOGICAL END OF TAPE LOOP
612  000613  201270  000007  MTLEOT: MOVEI T,7                ;BACKSPACE
613  000614  260140  000044'         PUSHJ PDP,MTAPE2
614  000615  260140  000144'         PUSHJ PDP,MTCHK2        ;CALL INTERLOCK, PICKUP IOS
615                                                           ;AFTER PREVIOS TASK FINISHED.
616  000616  201270  000016  MTEOT2: MOVEI T,16               ;SPACE ONE FILE
617  000617  260140  000044'         PUSHJ PDP,MTAPE2
618  000620  201270  000006         MOVEI T,6               ;SPACE ONE RECORD
619  000621  260140  000043'         PUSHJ PDP, MTAPE
620  000622  260140  000144'         PUSHJ PDP,MTCHK2        ;CALL INTERLOCK, RETURN WHEN
621                                                           ;SPACING FINISHED WITH NEW IOS
622  000623  607000  004000         TLNN IOS, IOSEOF        ;WAS EOF DETECTED?
623  000624  254000  000616'         JRST MTEOT2             ;NO, RESUME SPACING.
624  000625  201270  000007         MOVEI T,7               ;PREPARE FOR BACKSPACE MTAPE
625  000626  254000  000044'         JRST MTAPE2             ;BACKSPACE, LOGICAL EOT FOUND
626                                                           ;RETURN TO MAIN PROGRAM
627  000627  000000  000012  MTREDO: 12                      ;NUMBER OF TIMES TO RE-EXECUTE
```

```
                                ;DEVICE DEPENDENT DUMP MODES, MODE 16.
                                ;OUTPUT:
000630  261140  000014  MTDMPO: PUSH    PDP,UUO
000631  260140  000135' MTDPO1: PUSHJ PDP,MTCHEK          ;IS SYSTEM AVAILABLE
000632  661000  000020          TLO IOS,IO                ;WRITING
000633  260140  000670'         PUSHJ PDP,SAVCHK
000634  200120  000233'         MOVE TAC1, @MTOUT2        ;BLKO AND DATA CONTROL COMMAND
000635  201200  001000          MOVEI T,1000              ;WRITING COMMAND
000636  505040  000007  MTDMP1: HRLI TAC, PROG            ;ACTUAL ADDRESS OF COMMAND LIST
000637  202040  003637'         MOVEM TAC, MTCMDP         ;COMMAND POINTER
000640  336060  000001          SKIPN TAC,@TAC            ;COMMAND WORD
000641  254000  000347'         JRST MTEND1
000642  327040  000636'         JUMPG TAC, MTDMP1         ;CHANGE COMMAND SEQUENCE
000643  576040  003610'         HLREM TAC, SVCNTR         ;SAVE COUNTER
000644  553000  000001          HRRZS TAC                 ;GET ADDRESS ALONE
000645  315040  000015          CAMGE TAC,AC1
000646  254000  000710'         JRST MTDMP2
000647  274040  000610'         SUB TAC, SVCNTR           ;GET LAST ADDRESS
000650  313040  000000          CAMLE TAC, USRREL         ;LESS THAN END?
000651  254000  000710'         JRST MTDMP2               ;OUT OF BOUNDS
000652  200060  000677'         MOVE TAC, @MTCMDP         ;PICK UP POINTER AGAIN
000653  271047  000020          ADDI TAC,(PROG)           ;GET ACTUAL ADDRESS
000654  350000  000677'         AOS     MTCMDP
000655  261140  000677'         PUSH    PDP,MTCMDP
000656  260140  000235'         PUSHJ PDP, MTINDC         ;MOVE TAPE
000657  260140  000264'         PUSHJ PDP,WAIT1
000660  607000  000020          TLNN IOS, IO              ;WRITING?
000661  254000  003700'         JRST MTDPI1               ;READING
000662  135700  000321'         LDB AC2,PIOMOD            ;GET MODE
000663  302700  000002          CAIE    AC2,2
000664  254000  000631'         JRST    MTDPO1
000665  260140  000265'         PUSHJ   PDP,MWLEOT
000666  260140  000144'         PUSHJ   PDP,MTCHK2
000667  254000  000347'         JRST    MTEND1

000670  201640  000000  SAVCHK: MOVEI AC1,JOBPFI
000671  200047  000000          MOVE TAC,JOBPD1(JDAT)
000672  607040  010000          TLNN    TAC,USRMOD
000673  201640  002000          MOVEI AC1,JOBSAV
000674  262140  000002          POP     PDP,TAC1
000675  262140  000001          POP     PDP,TAC
000676  254002  000000          JRST    (TAC1)
                                ;INPUT
000677  261140  000014  MTDMPI: PUSH    PDP,UUO
000700  602000  020000  MTDPI1: TRNE IOS,IODEND
000701  254000  000157'         JRST    TPOPJ
000702  260140  000135'         PUSHJ PDP,MTCHEK
000703  621000  000020          TLZ IOS,IO                ;READING
000704  260140  000670'         PUSHJ PDP,SAVCHK
000705  200120  000133'         MOVE TAC1,@MTIN2          ;BLKI AND DATA CONTROL COMMAND
000706  201200  002400          MOVEI T,2400              ;READ COMMAND
000707  254000  000636'         JRST MTDMP1               ;DUMP
                                ;ADDRESS ERROR
```

```
   681
   682  000710  260140  000347' MTDMP2: PUSHJ PDP,MTEND1
   683  000711  254000  000000          JRST ADRERR
   684
   685
   686                                  END
   687  000712  014002  010000
   688  000713  040300  000024
   689  000714  070300  000000
   690  000715  140300  000004
   691  000716  000002  000001
   692  000717  720000  004020
   693  000720  720100  003420
   694  000721  264000  000276'
   695  000722  400000  010000
   696  000723  400000  004000
   697  000724  004000  020000

NO ERRORS DETECTED


PROGRAM BREAK IS 000725
```

SYMBOL TABLE

AC1	000015	INT	AC2	000016	INT	ADRERR	000711'	EXT
ADVBFE	000434'	EXT	ADVBFF	000336'	EXT	CHKLOK	000253'	
CLOCK	000431'	EXT	CLRACT	000360'	EXT	CODES	145713	
CPE	000010		CPOPJ1	000030'	EXT	CPOPJ2	000217'	EXT
DAT	000005	INT	DCAVAL	000204'	EXT	DCLOC	000243'	EXT
DCLOC1	000245'	EXT	DCOFF	000277'	EXT	DCON	000114'	EXT
DCREQ	000203'	EXT	DCTCHN	000236'	EXT	DCWRD	000602'	
DETDC	000177'	INT	DETMDC	000172'	INT	DEVDAT	000006	INT
DEVIAD	000007	INT	DEVIOS	000002	INT	DEVNAM	000000	INT
DEVOAD	000010	INT	DEVSER	000003	INT	DMPDUN	000341'	
DVIN	000002	INT	DVLNG	001000	INT	DVMTA	000020	INT
DVOUT	000001	INT	ERF	000004		ETCHK	000414'	
ETCHEC	000000	INT	ETMONP	000000	INT	GETDCM	000135'	EXT
HASMT	040000		HNGSTP	000170'	EXT	HUNGST	000001	INT
IO	000020	INT	IOACT	010000	INT	IOBEG	000002	INT
IOBOT	004000	INT	IODEND	020000	INT	IODERR	200000	INT
IODT	010000		IODTER	100000	INT	IOEND	000040	INT
IOIMPM	400000	INT	IONRCK	000100	INT	IOREW	400000	
IOS	000000	INT	IOSEOF	004000		IOSLIC	020000	
IOTEND	002000	INT	IOW	000001	INT	ITEM	000004	INT
JBTADR	000310'	EXT	JDAT	000007	INT	JIFSC2	000426'	EXT
JORPO1	000671'	EXT	JOBPFI	000670'	EXT	JOBSAV	000673'	EXT
LPE	000020		MDCSAV	000603'		MISSED	000604'	
MTAPE	000043'		MTAPE2	000044'		MTAVAL	000176'	EXT
MTBKCN	000012	INT	MTBSP	000556'		MTBSP2	000565'	
MTBSP3	000570'		MTC	000220		MTCCHN	000100'	EXT
MTCCON	000611'		MTCDDB	000000'	INT	MTCDDS	000013	INT
MTCDSP	000015'	INT	MTCHEK	000135'		MTCHK2	000144'	
MTCHK4	000152'		MTCINI	000273'		MTCINT	000303'	INT
MTCLK	000426'		MTCLOK	000422'	INT	MTCLSO	000257'	
MTCMDP	000607'		MTCON	000436'		MTCRET	000547'	EXT
MTCSAV	000305'	EXT	MTCSR6	000000'	INT	MTDC	000002	
MTDCCN	000601'		MTDCN1	000277'		MTDCND	000276'	
MTDEV	000600'		MTDMP1	000636'		MTDMP2	000710'	
MTDMPI	000677'		MTDMPO	000630'		MTDPI1	000720'	
MTDPO1	000631'		MTECNT	000011	INT	MTECON	000510'	
MTEND1	000347'		MTEOF	000345'		MTEOFF	000577'	
MTFOR	000460'		MTEOR1	000526'		MTEOR2	000514'	
MTEOT2	000616'		MTERCN	000605'		MTERR	000531'	
MTERR2	000550'		MTFIN	000354'		MTGO0	000070'	
MTGO1	000071'		MTGO2	000115'		MTGO3	000106'	
MTHUNG	000172'		MTIDSP	000612'		MTIGN	000544'	
MTIGN1	000545'		MTIN	000125'		MTIN1	000127'	
MTIN2	000133'		MTINDC	000235'		MTLEOT	000613'	
MTNIO	000354'		MTNIO1	000361'		MTNIO2	000451'	
MTNOTI	000434'		MTOUT	000225'		MTOUT1	000227'	
MTOUT2	000233'		MTP0	000171'		MTPDUN	000317'	
MTREDO	000627'		MTREQ	000422'	EXT	MTREWN	000606'	
MTREWW	000365'		MTS1	000224		MTSIZ	000000	EXT
MTWAIT	000145'	EXT	MWLEOT	000265'		NOSET	000052'	
ORACT	000163'	EXT	OUT	000263'	EXT	OUTPB	004000	INT
POP	000003	INT	PIOFF	000116'	EXT	PIOMOD	000662'	EXT
PION	000121'	EXT	PJOBN	000307'	EXT	PROG	000007	INT

SYMBOL TABLE

PUNIT	000212'	EXT	OSTAT	000167'		RELCON	000206'	
REW0	000403'		REW1	000404'		REW2	000405'	
REW3	000412'		REWCK	000212'		REWLP	000370'	
SAVCHK	000670'		SEL	000002		SETACT	000000	EXT
SETIOD	000442'	EXT	SLEVEL	000020	INT	SLICE	000040	INT
STDEMS	000075'	EXT	STOIOS	000403'	EXT	SVCNTR	000610'	
T	000004		TAC	000001	INT	TAC1	000002	INT
TCF	000001		TPOPJ	000701'	EXT	USRMOD	010000	INT
USRREL	000650'	EXT	UUO	000014	INT	UUOERR	000036'	EXT
VMTCSR	000406	INT	WAIT1	000657'	EXT	WSYNC	000166'	EXT
XNC	040000		ZZ	000000'				

```
DEVFIL      6#      6
DEVIAD      6#      6      147     148     345
DEVIOS      6#      6      157     165     330     393     402     452
DEVLOG      6#      6
DEVMOD      6#      6
DEVNAM      6#      6      409
DEVOAD      6#      6      264
DEVPPN      6#      6
DEVPTR      6#      6
DEVSER      6#      6      407
DGF         6#      6
DHNG        6#      6
DIN         6#      6
DINI        6#      6
DLK         6#      6
DMPDUN      340     355#
DMT         6#      6
DNAERR      6#      6
DOU         6#      6
DR          6#      6
DRL         6#      6
DRN         6#      6

DSER        6#      6
DSI         6#      6
DSKRLB      6#      6
DSO         6#      6
DVAVAL      6#      6
DVCDP       6#      6
DVDIR       6#      6
DVDIRI      6#      6
DVDIS       6#      6
DVDSK       6#      6
DVDTA       6#      6
DVIN        6#      6      30
DVLNG       6#      6      30
DVLPT       6#      6
DVMTA       6#      6      30
DVOUT       6#      6      30
DVPTP       6#      6
DVPTR       6#      6
DVTTY       6#      6
ENTRB       6#      6
ERF         280     281     467     468     545     561#
ETCHK       366     374     415#
FBMERR      6#      6
FNFERR      6#      6
FRGSEG      6#      6
FT2RCL      6#
FTATTA      6#
FTCHEC      6#      14      15      18      314     586     591
FTEXAM      6#
FTFIMI      6#
FTGETT      6#
```

CODES	6#						
DISABL	6#						
ENABLE	6#						
MTAPES	70#	74					
NOSCHE	6#						
NOSHUF	6#						
QUEUES	6#						
SCHEDU	6#						
SHUFFL	6#						
STARTD	6#	135					
XP	6#	6	9	35	41	43	