```
 0001 MTOS9    MACRO REV 06.30          16:32:01 05/27/79
01
02        000020          .RDX    16
03          0010          .RDXO   16
04                        .ENT    ..LO    ;FOR XLDR
05                        .ENT    ..HI    ;DITTO
06          7000          .LOC    7000
07          7000          ..LO=   .
```

```
!0002 MTOS9
01
02
03
04
05
06
07                ;**********************************************************************
08                ;**********************************************************************
09                ;**********************************************************************
10                ;**********************************************************************
11                ;**********************************************************************
12                ;**********************************************************************
13                ;**********************************************************************
14                ;**********************************************************************
15                ;**********************************************************************
16                ;**********************************************************************
17                ;*****                                                        ********
18                ;*****                                                        ********
19                ;*****                                                        ********
20                ;*****          MTOS99          5-27-79                     ********
21                ;*****                                                        ********
22                ;*****                                                        ********
23                ;*****                  RT68/MX                             ********
24                ;*****                                                        ********
25                ;*****                  MAGTAPE DRIVER AND                  ********
26                ;*****                                                        ********
27                ;*****                  OPERATING SYSTEM                    ********
28                ;*****                                                        ********
29                ;*****                                                        ********
30                ;*****          COPYRIGHT (C) 1979 T. JENNINGS              ********
31                ;*****                                                        ********
32                ;**********************************************************************
33                ;**********************************************************************
34                ;**********************************************************************
35                ;**********************************************************************
36                ;**********************************************************************
37                ;**********************************************************************
38                ;**********************************************************************
39                ;**********************************************************************
40                ;**********************************************************************
41                ;**********************************************************************
42                ;**********************************************************************
43
44
45
```

```
!0003 MTOS9
01
02
03
                        .TITL   INTRO
05
06              ;       KEY BOARD COMMANDS:
07              ;               R       READ FROM TAPE
08              ;                       A <ALT ADR> LOAD FROM ALT ADR
09              ;                          &    KEEP PRESENT ALTADR
10              ;                       S       LOAD # RECDS SPEC'D
11              ;                               BY #RECDS.  ELSE LOAD
12              ;                               ALL IN FILE.
13              ;                       N       NOLOAD TO MEMORY.
14              ;                       L       LIST ALL ATTRIBUTES
15              ;                               OF EACH RECORD.
16              ;                       X       DONT RUN AFTER LOADING.
17              ;                               DEFAULTS TO RUN IT.
18              ;                       K       DISABLE INTERRUPTS
19              ;                               IF PGM IS TO BE RUN
20              ;               W       WRITE TO TAPE
21              ;                       N       SET NAME 10 CHARS MAX,
22              ;                               3 CHAR EXTENSION
23              ;                       F       KEEP FILE OPEN
24              ;                       D       SET DATE 8 CHARS
25              ;                       R       SET RUN ADDRESS
26              ;               O       OPEN A RECORD
27              ;               I       REWIND AND RE-INIT
28              ;               G       GOTO <ADDRESS>
29              ;                               K  DISABLE INTERRUPTS
30
31              ;               D       READY DRIVE ONLY, NO REWIND.
32              ;               ?       TYPE THE NEXT AVAILABLE RECD #.
33
```

```
!0004 MTOS9
01
02                      ;
03                      ;
04                      ;TAPE DATA FORMAT....
05                      ;
06                      ;DATA ISZTRANSFERED TO AND FROM TAPE IN FIXED LENGTH
07                      ;BLOCK FORMAT.  EACHBLOCK CONTAINS 287 BYTES.  255 OF WHICH
08                      ;ARE DATA, 32 FOR FILE AND SYSTEM MAINTAINANCE.  THERE
09                      ;IS NO DIRECTORY IMPLEMENTED (YET). EACH BLOCK IS SEPERATED
10                      ;BY A 60 MS GAP, WHICH ALLOWS ENOUGH TIME
11                      ;TO START AND STOP BETWEEN RECORDS.
12                      ;    EACH RECORD(BLOCK) CONTAINS A 'LINK', WHICH
13                      ;GROUPS RECORDS INTO FILES.  EACH RECORD IN A FILE WILL HAVE
14                      ;LINK SET, EXCEPT THE LAST.  A FALSE(ZERO) LINK INDICATES
15                      ;THE END OF A FILE.  DATA MAY BE ACESSED BY FILE OR RECORD,
16                      ;SPECIFIED BY A SWITCH AT LOAD TIME.
17                      ;    EACH RECORD CONTAINS INFORMATION PERTAINING
18                      ;TO THE RECORD AND THE FILE IT IS CONTANIED IN; FILENAME,
19                      ;RECORD #, LOAD ADDRESS, ETC... .  SOME OF THIS INFORMATION
20                      ;IS REDUNDANT IN NORMAL OPERATION, BUT ALLOWS GREAT FLEXIBIL
21                      ;WHEN OPERATING RECORD BY RECORD.
22                      ;    DATA IS GENERALLY READ BACK INTO THE LOCATIONS IT
23                      ;WAS WRITTEN FROM; THIS IS ONLY BY DEFAULT AND IS VERY EASY
24                      ;CHANGE AT LOAD TIME THE ADDRESS TO WRITE TO.  IN ADDITION, T
25                      ;SYSTEM WILL KEEP TRACK OF WHERE THE DATA WAS WRITTEN TO.  TH
26                      ;FEATURE ALLOWS SIMPLE INTERFACING TO PROGRAMS SUCH AS SWTP
27                      ;    USER CALLS ARE ALL MADE TO A SINGLE SUBROUTINE, 'FORKER'
28                      ;WHICH DISPATCHES TO THE PROPER ROUTINE DEPENDING ON THE
29                      ;CONTENTS OF AC(A).  THESE ARE LISTED IN THE 'MTOS99' LISTING
30                      ;CODE IS RETURNED IN AC(B) ON RETURN, 0 = NO ERROR.  THE CC I
31                      ;ON RETURN.  BEFORE THE CALL IS MADE, HOWEVER, THE PARAMETER
32                      ;MUST BE SET OR HAVE BEEN SET IN A PREVIOUS CALL.
33                      ;
34                      ;    EXPLANATIONS AND EXAMPLES FOLLOW..
```

```
!0005 MTOS9
01
02
03
04                ;       WRITE, SET NAME TO 'FOO.BIN', RUN ADDRESS (AT LOAD
05                ;       TIME) TO  0100, DATE TO 04-09-99. PROGRAM RESIDES  0100
06                ;       TO  56F4, START AT RECD # 4.
07
08                ;       W NFOO.BIN R 100  D04-09-99 .4  100  56F4
09                ;       ^ ^   ^    ^      ^          ^   ^   ^    ^
10                ;       A B   C    D      E          F   G   H    I
11
12                ;       A COMMAND
13                ;       B LETTER 'N' SAYS YOURE ENTERING NAME.  NEXT 10 CHARS MAX
14                ;         WILL BECOME NAME.  ON 11TH, PGM TYPES '.', MEANING TOO
15                ;       C EXTENSION MUST BE TYPED IF NAME IS USED.  TYPE A DOT IF
16                ;         NAME IS LESS THAN 10 CHARS
17                ;       D RUN ADDRESS.  MAY BE DECIMAL (.) OR HEX ( )
18                ;       E DATE.  ENTER 8 AND ONLY EIGHT CHARS, ANY.  VERY FUSSY.
19                ;       F STARTING RECD.  THIS IS THE FIRST RECORD TO BE WRITTEN
20                ;         IF THERE IS ALREADY STUFF ON TAPE, USE LAST RECD USED
21                ;         +1.
22                ;       G LOW CORE ADDRESS, DECIMAL OR HEX
23                ;       H HIGH CORE ADDRESS
24                ;       I TYPING ANY NON-DIGIT CHARACTER HERE WILL EXECUTE COMMA
25
26                ;NOTE
27                ;       B, C, D ARE ALL OPTIONAL.  THEY MAY APPEAR ANYWHERE IN
28                ;       COMMAND LINE IF USED.  IF NOT USED, THEY ARE ALL CLEARED.
29
30                ;       IF A RUN ADDRESS OF 0 IS USED, THE PROGRAM WILL NOT
31                ;       BE SELF STARTING
32
33
34                ;READ ENTIRE FILE JUST WRITTEN ABOVE
35
36                ;       R .4 .1
37                ;       ^ ^  ^
38                ;       A B  C
39                ;
40                ;       A COMMAND
41                ;       B FIRST RECD OF FILE.
42                ;       C NUMBER OF FILES.
43                ;       ANY OR ALL 'READ' SWITCHES MAY BE INSERTED IN ANY
44                ;       ORDER JUST AFTER 'A'.  READ ON TO SEE THERE EFFECT
```

```
!0006 MTOS9
01
02                  ;
03                  ;
04                  ;I   ALL USER PARAMETERS (NOT FLAGS) ARE 16 BIT...
05                  ;
06                  ;DESTR        ;THE 1ST RECD # YOU ARE TO WORK WITH
07                  ;NRECDS       ;THE # OF RECDS(OR FILES, SEE FLAG 'LNKFLG'; ASS
08                  ;
09                  ;EXAMPLE:
10                  ;     TO READ THE FILE BEGINNING AT RECD #7
11                  ;
12                  ;     LDX     # 7
13                  ;     STX     DESTR    ;SET RECD #
14                  ;     LDX     # 1
15                  ;     STX     NRECDS   ;SET # OF FILES
16                  ;     LDAA    # 2      ;SET CALL TYPE
17                  ;     JSR     FORK     ;CALL FORKER (OR FORK)
18                  ;     BNE     (WHEREEVER!)     ; BRANCHES IF ERROR
19                  ;                              ;WAS ENCOUNTERED
20                  ;
21                  ;LOWADR       LOW ADDRESS FOR WRITING
22                  ;HIADR        HIGH ADDRESS FOR WRITING
23                  ;
24                  ;TO WRITE TO TAPE, FROM LOCATION $100 TO $0D4F (TSC'S MICROBA
25                  ;STARTING AT RECD # 1,
26                  ;
27                  ;     LDX     # $0100
28                  ;     STX     LOADR    ;SET LOW ADDRESS,
29                  ;     LDX     # $0D4F
30                  ;     STX     HIADR    ;SET HIGH,
31                  ;     LDX     # 1
32                  ;     STX     DESTR    ;SET TARGET RECD #,
33                  ;     LDAA    # 3      ;SET AS WRITING,
34                  ;     JSR     FORK
35                  ;     BNE     ....     ;BRA IF ERROR
36                  ;
37                  ;
38                  ;WHEN DONE WRITING OR READING, THE NEXT SEQUENTIAL RECORD NUM
39                  ;IS KEPT IN SYSTEM VARIABLE 'RECORD'.
40                  ;
41                  ;ALTADR       ALTERNATE LOAD ADDRESS
42                  ;
43                  ;SET THIS ADDRESS TO THE DESIRED LOAD ADDRESS, TO LOAD DATA T
44                  ;OTHER THAN THE ORIGINAL ADDRESS, THE SET 'ALTFLG' (SEE FLAG
45                  ;SECTION), THE DO A READ AS USUAL. 'ALTADR' CONTAINS THE NEXT
46                  ;AVAILABLE RAM LOCATION AVAILABLE ON RETURN FROM FORK.
```

```
!0007 MTOS9
01
02                    ;
03                    ;
04                    ;     FLAG SECTION...
05                    ;
06                    ;     ALL FLAGS ARE    -TRUE-  WHEN FF (-1)
07                    ;                      -FALSE- WHEN ZERO(0)
08                    ;
09                    ;ALTFLG       USE 'ALTADR' WHEN READING
10                    ;LNKFLG       TRUE CAUSES 'NRECDS' TO BE #OF RECDS, NOT FILES.
11                           ;      IGNORES THE LINK, LOADS ONLY # IN NRECDS RECORDS
12                           ;      OTHERWISE LOADS NRECDS FILES
13                    ;LSTFLG       TYPE OUT ALL RECD INFO.  (SEE FLAG LOGIC)
14                    ;NLDFLG       DONT LOAD TO MEMORY WHEN READING( CHECK ONLY)
15                    ;RUNFLG       DONT RUN DATA JUST LOADED
16                    ;KFOFLG       KEEP FILE OPEN WHEN WRITING. (LEAVE LINK SET)
```

```
!0008 MTOS9
01
02                  ;
03                  ;
04                  ;;    FLAG LOGIC...
05                  ;
06                  ;     IN ORDER OF PRIORITY
07                  ;     READING
08                  ;
09                  ;     IF <NLDFLG> IS TRUE,
10                  ;     THEN DONT WRITE TO MEMORY,
11                  ;     ELSE DO,
12                  ;
13                  ;     IF <LNKFLG> IS TRUE,
14                  ;     THEN READ (NRECDS) RECORDS,
15                  ;     ELSE READ (NRECDS) FILES,          ;BOTH IN ACCORDANCE WITH
16                  ;                                        ;OF COURSE.
17                  ;
18                  ;     IF <LSTFLG> IS TRUE
19                  ;     THEN IF <LNKFLG> IS TRUE,
20                  ;               TYPE OUT THE HEADER OF EACH RECORD READ,
21                  ;     ELSE TYPE OUT ONLY THE HEADER FROM THE 1ST AND LAST RECD
22                  ;                  IN EACH FILE,
23                  ;         IF <KFOFLG> IS TRUE,
24                  ;         THEN KEEP FILE OPEN WHEN WRITING (LINK SET)
25                  ;         ELSE RESET LINK (CLOSE FILE) WHEN DONE WRITING
26                  ;
27                  ;EXAMPLE,
28                  ;     DESTR =1, NRECDS =1, LNKFLG = FALSE
29                  ;
30                  ;     STARTING WITH RECD #1, READ ALL RECDS IN THAT FILE.
31                  ;     READ ONLY THAT FILE.
32                  ;
33                  ;     DESTR =1, NRECDS =2, LNKFLG =FALSE
34                  ;
35                  ;     STARTING WITH RECD #1, READ ALL RECDS IN THAT FILE,
36                  ;     THEN STARTING WITH THE NEXT RECD # (AFTER THE FILE JUST
37                  ;     READ) READ ALL RECDS IN THAT FILE.
38                  ;
39                  ;     DESTR =1, NRECDS =2, LNKFLG =TRUE
40                  ;
41                  ;     STARTING WITH RECD #1, READ ONLY TWO RECDS FROM THAT FIL
```

```
!0009 MTOS9
01
02                      ;
03                      ;
04                      ;SYSTEM VARIABLES
05                      ;
06                      ;     DONT CHANGE THESE ! THINGS WILL GO NUTS.  THESE VARIABLES
07                      ;     ARE MAINTAINED BY THE SYSTEM.
08                      ;
09                      ;OURSUM       GENERATED AT READ TIME, IS THE READ CHECKSUM
10                      ;
11                      ;RECORD       NEXT AVAILABLE RECORD NUMBER
12                      ;
13                      ;NGAPS        CALCULATED # OF RECD TO THE DESTR RECD #
14                      ;
15                      ;CHAR         INTERRUPT DRIVEN CHAR INPUT ROUTINE LEAVES
16                      ;     ITS CHARACTER HERE.
17                      ;
18                      ;CALLTYPE     DEBUGGING ONLY, EACH CALL TO FORK GETS ITS
19                      ;      CALL TYPE STASHED HERE
20                      ;
21                      ;HLTFLG       ANY TIME THIS IS NONZERO, THE CURRENT TAPE
22                      ;     OPERATION IS SUSPENDED UNTIL IT GOES FALSE.
23                      ;     YOU OBVIOUSLY DONT WANT TO SET IT IN A NON-INTERRUPT
24                      ;     ENVIRONMENT
```

```
!0010 MTOS9
01
02                    ;
03                    ;
04                    ;ERROR CODES
05                    ;
06                    ;ON EVERY SYSTEM CALL AN ERROR CODE IS RETURNED IN AC(B)
07                    ;
08                    ;     CODE     INDICATES...     RETURNED BY...
09                    ;-------------------------------------------------
10                    ;
11                    ;     0        NO ERROR         ____________
12                    ;     3        BAD DIGIT        GET16
13                    ;     10       DRIVE NOT READY  MVTAPE
14                    ;     11       DRIVE WRITE
15                    ;              PROTECTED        MVTAPE
16                    ;     18       CHKSUM ERROR     RRCD,SRCD
17                    ;     99       NO SUCH FUNCTION  FORK,FORKER
```

```
!0011 MTOS9
01
02
03              ;*****************************************************************
04              ;*                                                               *
05              ;*                                                               *
06              ;*       KEYBOARD DRIVER FOR MTOS99                              *
07              ;*               5-17-79                                         *
08              ;*                                                               *
09              ;*****************************************************************
10
11                              ;  PROMABLE VERSION
12          8000 IOPORT= 8000
13          8008 PORT2=  8008
14
15
16              ;       INTERRUPT DRIVEN 'INEEE', WILL SUPPORT STUFF
17              ;       LIKE 'CORES' ONLY BY USING 'K' SWITCH ON 'G' OR
18              ;       'R' COMMANDS TO DISABLE INTERRUPTS.
19
20
                        .TITL   DRIVER
22
23
24
```

```
!0012 MTOS9
01
02
03
04                  MTOS99:
05  07000    0001 COLD:    NOP
06  07001    000F          SEI
07                         LDS      # STACK
08  07002    008E
09  07003    007F
10  07004    00F7
11  07005    004F          CLRA              ;REWIND THE TAPE, INIT DATA AREA
12                         JSR      FORK
13  07006    00BD
14  07007    0071
15  07008    00FC
16  07009    0001 WARM:    NOP
17  0700A    000F          SEI
18                         LDS      # STACK
19  0700B    008E
20  0700C    007F
21  0700D    00F7
22                         LDAA     # 5
23  0700E    0086
24  0700F    0005
25                         JSR      FORK
26  07010    00BD
27  07011    0071
28  07012    00FC
29                         BRA      TAPEIO
30  07013    0020
31  07014    0032
32
```

```
!0013 MTOS9
01
02                ;MIKBUG STUFF, I/O STUFF, ETC
03
04                ;*************************************************************
05
06          A012 IOVECT= 0A012
07          E0C8 OUT4HS= 0E0C8
08          E0CA OUT2HS= 0E0CA
09          E1D1 OUTEEE= 0E1D1
10          E1AC INEEE=  0E1AC
11          E07E PDATA1= 0E07E
12
13
14                ;INPUT A CHAR FROM TTY #1.  ABORT ON CONTROL-X.
15
16                TTI1:   JSR     INEE
17 07015    00BD
18 07016    0070
19 07017    0036
20                        CMPA    # 18
21 07018    0081
22 07019    0018
23                        BNE     TTI1R
24 0701A    0026
25 0701B    0006
26 0701C    005F                  CLRB          ' ;SET NO ERROR,
27                        LDX     RETN    ;GET RETN ADDR,
28 0701D    00FE
29 0701E    007E
30 0701F    0017
31                        JMP     X 0     ;RETURN
32 07020    006E
33 07021    0000
34 07022    0039 TTI1R:  RTS
35
36                ;READ ACHAR, SKIPPING SPACES
37
38                TTI1S:  BSR     TTI1
39 07023    008D
40 07024    00F0
41                        CMPA    # 20
42 07025    0081
43 07026    0020
44                        BEQ     TTI1S
45 07027    0027
46 07028    00FA
47 07029    0039          RTS
48
49                ;ACTUAL CHARACTER JUMPS.
50
51                OUTEE:  JMP     OUTEEE
52 0702A    007E
53 0702B    00E1
54 0702C    00D1
55                PDATA:  JMP     PDATA1
56 0702D    007E
57 0702E    00E0
58 0702F    007E
59                OUT4H:  JMP     OUT4HS
60 07030    007E
```

```
 0014 MTOS9
01 07031    00E0
02 07032    00C8
03                OUT2H:   JMP      OUT2HS
04 07033    007E
05 07034    00E0
06 07035    00CA
07
08                ;***************************************
09
10                INEE:
11 07036    0001           NOP
12 07037    000E           CLI
13                WCHIN:
14                           TST      CHAR     ;SEE IF CHAR.  IS WAITING.
15 07038    007D
16 07039    007E
17 0703A    000C
18                           BEQ      WCHIN
19 0703B    0027
20 0703C    00FB
21                           LDAA     CHAR     ;GET THE CHAR.
22 0703D    00B6
23 0703E    007E
24 0703F    000C
25                           CLR      CHAR     ;MARK IT TAKEN.
26 07040    007F
27 07041    007E
28 07042    000C
29                           JSR      OUTEE    ;ECHO IT.
30 07043    00BD
31 07044    0070
32 07045    002A
33 07046    0039           RTS
```

```
 0015 MTOS9
01
02
03
04                      ;GET COMMAND, JUMP TO PROPER ROUTINE.  (WHERE ELSE?)
05
06                      TAPEIO:
07                              JSR     CRLFPT  ;PROMPT PRETTYPRINT.
08 07047    00BD
09 07048    0076
10 07049    00B8
11                              BSR     TTI1S
12 0704A    008D
13 0704B    00D7
14                              CMPA    # "R
15 0704C    0081
16 0704D    0052
17                              BEQ     TREAD   ;READ,
18 0704E    0027
19 0704F    002C
20                              CMPA    # "W
21 07050    0081
22 07051    0057
23                              BNE     TI0
24 07052    0026
25 07053    0003
26                              JMP     TWRITE  ;WRITE,
27 07054    007E
28 07055    0070
29 07056    00E9
30                      TI0:    CMPA    # "O
31 07057    0081
32 07058    004F
33                              BNE     TI1
34 07059    0026
35 0705A    0003
36                              JMP     TOPEN   ;OPEN,
37 0705B    007E
38 0705C    0071
39 0705D    009F
40                      TI1:    CMPA    # "I
41 0705E    0081
42 0705F    0049
43                              BNE     TI2
44 07060    0026
45 07061    0003
46                              JMP     RWND    ;REINIT
47 07062    007E
48 07063    0071
49 07064    00B0
50                      TI2:    CMPA    # "G
51 07065    0081
52 07066    0047
53                              BNE     TI3
54 07067    0026
55 07068    0003
56                              JMP     GOTO    ;GOTO ADDRESS,
57 07069    007E
58 0706A    0071
59 0706B    00BB
60                      TI3:    CMPA    # "D
```

```
016 MTOS9
 1 0706C   0081
02 0706D   0044
03                      BNE     TI5
04 0706E   0026
05 0706F   0003
06                      JMP     DREADY  ;JUST READY THE DRIVE
07 07070   007E
08 07071   0071
09 07072   00DE
10              TI5:    CMPA    # "?
11 07073   0081
12 07074   003F
13                      BNE     TI6
14 07075   0026
15 07076   0003
16                      JMP     NEXTNUM ;TYPE NEXT RCD #.
17 07077   007E
18 07078   0071
19 07079   00E9
20              TI6:    BRA     TAPEIO  ;NONE OF THE ABOVE.
21 0707A   0020
22 0707B   00CB
```

```
!0017 MTOS9
01
02
03
04                ;READ FROM TAPE...
05          0000 ALTX=    0
06          0001 LNKX=    ALTX+1
07          0002 NLDX=    LNKX+1
08          0003 LSTX=    NLDX+1
09          0004 RUNX=    LSTX+1
10          0005 KFOX=    RUNX+1
11
12                TREAD:
13                        JSR       ZAPFLG   ;CLEAR ALL THE USER FLAGS.
14 0707C    00BD
15 0707D    0070
16 0707E    00DD
17
18                TR0:    JSR       TTI1S    ; GET SWITCH, OR NUM SPEC
19 0707F    00BD
20 07080    0070
21 07081    0023
22                        LDX       # ALTFLG          ;POINT TO FLAGS
23 07082    00CE
24 07083    007E
25 07084    001D
26                        LDAB      # -1
27 07085    00C6
28 07086    00FF
29                        CMPA      # "L
30 07087    0081
31 07088    004C
32                        BNE       TR1
33 07089    0026
34 0708A    0004
35                                  STAB      X LSTX   ;LIST OPTION
36 0708B    00E7
37 0708C    0003
38                                  BRA       TR0      ;GET NEXT SWITCH.
39 0708D    0020
40 0708E    00F0
41                TR1:    CMPA      # "N
42 0708F    0081
43 07090    004E
44                        BNE       TR2
45 07091    0026
46 07092    0004
47                                  STAB      X NLDX   ;SET NOT TO LOAD
48 07093    00E7
49 07094    0002
50                                  BRA       TR0
51 07095    0020
52 07096    00E8
53                TR2:    CMPA      # "X
54 07097    0081
55 07098    0058
56                        BNE       TR3
57 07099    0026
58 0709A    0004
59                                  STAB      X RUNX   ;SET NOT TO RUN IT
60 0709B    00E7
```

```
 0018 MTOS9
01 0709C   0004
02                          BRA     TR0
03 0709D   0020
04 0709E   00E0
05              TR3:    CMPA    # "S
06 0709F   0081
07 070A0   0053
08                          BNE     TR4
09 070A1   0026
10 070A2   0004
11                          STAB    X LNKX  ;SET NO LINK-LOAD
12 070A3   00E7
13 070A4   0001
14                          BRA     TR0
15 070A5   0020
16 070A6   00D8
17              TR4:    CMPA    # "K
18 070A7   0081
19 070A8   004B
20                          BNE     TR5
21 070A9   0026
22 070AA   0005
23                          STAB    INTFLG  ;TURN OFF INTERRUPTS
24 070AB   00F7
25 070AC   007E
26 070AD   000E
27                          BRA     TR0     ;WHEN WE RUN IT.
28 070AE   0020
29 070AF   00CF
30
31              TR5:    CMPA    # "A     ;USE ALTADR?
32 070B0   0081
33 070B1   0041
34                          BNE     TR6
35 070B2   0026
36 070B3   0012
37                          STAB    X ALTX  ;SET ALTFLG
38 070B4   00E7
39 070B5   0000
40                          JSR     TTI1S   ;GET ADDR SPEC,
41 070B6   00BD
42 070B7   0070
43 070B8   0023
44                          CMPA    # "&     ;ADDR OR "&", INICATING
45 070B9   0081
46 070BA   0026
47                          BEQ     TR5.1   ;USE LAST+1(CHAIN)
48 070BB   0027
49 070BC   0006
50                          JSR     GET16
51 070BD   00BD
52 070BE   0076
53 070BF   0013
54                          STX     ALTADR
55 070C0   00FF
56 070C1   007E
57 070C2   0015
58              TR5.1:      JMP     TR0
59 070C3   007E
60 070C4   0070
```

```
 0019 MTOS9
01 070C5   007F
02
03              TR6:    ;AC(A) CONTAINS $ OR . ,ELSE GET16 BARFS.
04
05                      JSR     GET16   ;GET RECD #,
06 070C6   00BD
07 070C7   0076
08 070C8   0013
09                      STX     DESTR
10 070C9   00FF
11 070CA   007E
12 070CB   0019
13                      JSR     TTI1S   ;GET NUMBER TYPE,
14 070CC   00BD
15 070CD   0070
16 070CE   0023
17                      JSR     GET16   ;GET # RECDS
18 070CF   00BD
19 070D0   0076
20 070D1   0013
21                      STX     NRECDS
22 070D2   00FF
23 070D3   007E
24 070D4   001B
25
26                      LDAA    # 2
27 070D5   0086
28 070D6   0002
29                      JSR     FORK    ;DOIT.
30 070D7   00BD
31 070D8   0071
32 070D9   00FC
33                      JMP     ERROR
34 070DA   007E
35 070DB   0076
36 070DC   009F
37
38              ZAPFLG: LDX     # ALTFLG
39 070DD   00CE
40 070DE   007E
41 070DF   001D
42                      CLR     X 0
43 070E0   006F
44 070E1   0000
45 070E2   0008         INX
46                      CPX     # FSYNC
47 070E3   008C
48 070E4   007E
49 070E5   0023
50                      BNE     ZAPFLG+3
51 070E6   0026
52 070E7   00F8
53 070E8   0039         RTS
```

```
!0020 MTOS9
01
02
03
04                      ;WRITE TO TAPE.
05
06                      TWRITE: JSR     CLRTDB
07 070E9    00BD
08 070EA    0071
09 070EB    0093
10
11                      TW0:    ;CHECK FOR SWITCHES; ELSE # SPEC
12                              JSR     TTI1S
13 070EC    00BD
14 070ED    0070
15 070EE    0023
16                              CMPA    # "N
17 070EF    0081
18 070F0    004E
19                              BNE     TW1
20 070F1    0026
21 070F2    0043
22                              ;SET THE NAME.
23                                      LDAB    # 10.
24 070F3    00C6
25 070F4    000A
26                                      STAB    XTEMP
27 070F5    00F7
28 070F6    007E
29 070F7    0006
30                                      LDX     # NAME
31 070F8    00CE
32 070F9    007E
33 070FA    0026
34                                      STX     XTEMP2
35 070FB    00FF
36 070FC    007E
37 070FD    0008
38
39                      TWN:            JSR     TTI1    ;GET THE CHAR,
40 070FE    00BD
41 070FF    0070
42 07100    0015
43                                      CMPA    # ".
44 07101    0081
45 07102    002E
46                                      BEQ     TWXN
47 07103    0027
48 07104    0013
49                                      LDX     XTEMP2  ;INSTALL IT,
50 07105    00FE
51 07106    007E
52 07107    0008
53                                      STAA    X 0
54 07108    00A7
55 07109    0000
56 0710A    0008                        INX
57                                      STX     XTEMP2
58 0710B    00FF
59 0710C    007E
60 0710D    0008
```

```
 0021 MTOS9
01                                  DEC     XTEMP
02 0710E    007A
03 0710F    007E
04 07110    0006
05                                  BNE     TWN         ;LOOP.
06 07111    0026
07 07112    00EB
08                                  LDAA    # ".        ;10 CHARS,
09 07113    0086
10 07114    002E
11                                  JSR     OUTEE       ;FORCE EXTN
12 07115    00BD
13 07116    0070
14 07117    002A
15                  TWXN:           LDAB    # 3         ;NOW DO EXTENSION.
16 07118    00C6
17 07119    0003
18                                  STAB    XTEMP
19 0711A    00F7
20 0711B    007E
21 0711C    0006
22                                  LDX     # EXTN
23 0711D    00CE
24 0711E    007E
25 0711F    0030
26                                  STX     XTEMP2
27 07120    00FF
28 07121    007E
29 07122    0008
30                  TWX:            JSR     TTI1        ;DO IT.
31 07123    00BD
32 07124    0070
33 07125    0015
34                                  LDX     XTEMP2
35 07126    00FE
36 07127    007E
37 07128    0008
38                                  STAA    X 0
39 07129    00A7
40 0712A    0000
41 0712B    0008                    INX
42                                  STX     XTEMP2
43 0712C    00FF
44 0712D    007E
45 0712E    0008
46                                  DEC     XTEMP
47 0712F    007A
48 07130    007E
49 07131    0006
50                                  BNE     TWX
51 07132    0026
52 07133    00EF
53                                  BRA     TW0
54 07134    0020
55 07135    00B6
56
57                  TW1:    CMPA    # "D     ;DATE?
58 07136    0081
59 07137    0044
60                          BNE     TW2
```

```
 0022 MTOS9
01 07138   0026
02 07139   001E
03                          LDAB    # 8
04 0713A   00C6
05 0713B   0008
06                          STAB    XTEMP
07 0713C   00F7
08 0713D   007E
09 0713E   0006
10                          LDX     # DATE
11 0713F   00CE
12 07140   007E
13 07141   0033
14                          STX     XTEMP2
15 07142   00FF
16 07143   007E
17 07144   0008
18              TWD:        JSR     TTI1    ;INPUT DATE, ALL 8
19 07145   00BD
20 07146   0070
21 07147   0015
22                          LDX     XTEMP2
23 07148   00FE
24 07149   007E
25 0714A   0008
26                          STAA    X 0
27 0714B   00A7
28 0714C   0000
29 0714D   0008              INX
30                          STX     XTEMP2
31 0714E   00FF
32 0714F   007E
33 07150   0008
34                          DEC     XTEMP
35 07151   007A
36 07152   007E
37 07153   0006
38                          BNE     TWD
39 07154   0026
40 07155   00EF
41                          BRA     TW0
42 07156   0020
43 07157   0094
44
45              TW2:    CMPA    # "R     ;SET RUN ADDRESS?
46 07158   0081
47 07159   0052
48                      BNE     TW3
49 0715A   0026
50 0715B   000B
51                          JSR     TTI1S   ;GET TYPE,
52 0715C   00BD
53 0715D   0070
54 0715E   0023
55                          JSR     GET16
56 0715F   00BD
57 07160   0076
58 07161   0013
59                          STX     RUN
60 07162   00FF
```

```
 0023 MTOS9
01 07163   007E
02 07164   003D
03                          BRA     TW0
04 07165   0020
05 07166   0085
06              TW3:        CMPA    # "F     ;KEEP FILE OPEN?
07 07167   0081
08 07168   0046
09                          BNE     TW4
10 07169   0026
11 0716A   0008
12                          LDAB    # -1
13 0716B   00C6
14 0716C   00FF
15                          STAB    KFOFLG
16 0716D   00F7
17 0716E   007E
18 0716F   0022
19                          JMP     TW0
20 07170   007E
21 07171   0070
22 07172   00EC
23
24              TW4:
25                          JSR     GET16    ;GET 1ST RECD #,
26 07173   00BD
27 07174   0076
28 07175   0013
29                          STX     DESTR
30 07176   00FF
31 07177   007E
32 07178   0019
33                          JSR     TTI1S
34 07179   00BD
35 0717A   0070
36 0717B   0023
37                          JSR     GET16    ;GET LOW ADDRESS
38 0717C   00BD
39 0717D   0076
40 0717E   0013
41                          STX     LOWADR
42 0717F   00FF
43 07180   007E
44 07181   0011
45                          JSR     TTI1S
46 07182   00BD
47 07183   0070
48 07184   0023
49                          JSR     GET16
50 07185   00BD
51 07186   0076
52 07187   0013
53                          STX     HIADR
54 07188   00FF
55 07189   007E
56 0718A   0013
57
58                          LDAA    # 3
59 0718B   0086
60 0718C   0003
```

```
 0024 MTOS9
01                          JSR     FORK    ;...DO IT.
02 0718D    00BD
03 0718E    0071
04 0718F    00FC
05                          JMP     ERROR
06 07190    007E
07 07191    0076
08 07192    009F
09
10
11                CLRTDB:
12                          LDX     # FSYNC
13 07193    00CE
14 07194    007E
15 07195    0023
16                          CLR     X 0
17 07196    006F
18 07197    0000
19 07198    0008            INX
20                          CPX     # BYTCNT
21 07199    008C
22 0719A    007E
23 0719B    0040
24                          BNE     CLRTDB+3
25 0719C    0026
26 0719D    00F8
27 0719E    0039            RTS
```

```
!0025 MTOS9
01
02
03
04                ;OPEN A RECORD
05
06                TOPEN:
07                        JSR     TTI1S
08 0719F    00BD
09 071A0    0070
10 071A1    0023
11                        JSR     GET16    ;GET RECORD #,
12 071A2    00BD
13 071A3    0076
14 071A4    0013
15                        STX     DESTR
16 071A5    00FF
17 071A6    007E
18 071A7    0019
19                        LDAA    # 4
20 071A8    0086
21 071A9    0004
22                        JSR     FORK
23 071AA    00BD
24 071AB    0071
25 071AC    00FC
26                        JMP     ERROR
27 071AD    007E
28 071AE    0076
29 071AF    009F
30
31
32
33                ;REWIND AND INIT TAPE
34
35                RWND:
36                        JSR     TTI1
37 071B0    00BD
38 071B1    0070
39 071B2    0015
40                        LDAA    # 1
41 071B3    0086
42 071B4    0001
43                        JSR     FORK
44 071B5    00BD
45 071B6    0071
46 071B7    00FC
47                        JMP     ERROR
48 071B8    007E
49 071B9    0076
50 071BA    009F
51
52
```

```
!0026 MTOS9
01
02
03
04                ;GOTO ADDRESS
05
06                GOTO:
07                        JSR     TTI1S
08 071BB    00BD
09 071BC    0070
10 071BD    0023
11                        CMPA    # "K    ;TURN OFF INTERRUPTS?
12 071BE    0081
13 071BF    004B
14                        BNE     GT1
15 071C0    0026
16 071C1    0008
17                        LDAB    # -1
18 071C2    00C6
19 071C3    00FF
20                        STAB    INTFLG
21 071C4    00F7
22 071C5    007E
23 071C6    000E
24                        JSR     TTI1S   ;GET # SPEC
25 071C7    00BD
26 071C8    0070
27 071C9    0023
28                GT1:    JSR     GET16
29 071CA    00BD
30 071CB    0076
31 071CC    0013
32                        TST     INTFLG
33 071CD    007D
34 071CE    007E
35 071CF    000E
36                        BEQ     GT2
37 071D0    0027
38 071D1    0007
39 071D2    0001                NOP
40 071D3    000F                SEI     ;TURN 'EM OFF.
41                              LDAA    # 15
42 071D4    0086
43 071D5    0015
44                              STAA    IOPORT  ;DISABLE INT
45 071D6    00B7
46 071D7    0080
47 071D8    0000
48                GT2:    JSR     X 0     ;JSR SO WE CAN RETURN
49 071D9    00AD
50 071DA    0000
51                        JMP     ERROR
52 071DB    007E
53 071DC    0076
54 071DD    009F
55
56
```

```
!0027 MTOS9
01
02
03
04
05                ;ENABLE THE INPUTS TO THE MAGTAPE(AFTER RESET)
06
07                DREADY: JSR     TTI1
08 071DE   00BD
09 071DF   0070
10 071E0   0015
11                        LDAA    # 5
12 071E1   0086
13 071E2   0005
14                        JSR     FORK
15 071E3   00BD
16 071E4   0071
17 071E5   00FC
18                        JMP     ERROR
19 071E6   007E
20 071E7   0076
21 071E8   009F
22
23
24                ;TYPE THE NEXT RECORD NUMBER.
25
26                NEXTNUM:
27                        JSR     TTI1
28 071E9   00BD
29 071EA   0070
30 071EB   0015
31                        LDX     # LSTRNG
32 071EC   00CE
33 071ED   0076
34 071EE   00CE
35                        JSR     PDATA
36 071EF   00BD
37 071F0   0070
38 071F1   002D
39                        LDX     # RECORD
40 071F2   00CE
41 071F3   007E
42 071F4   0002
43                        JSR     OUTDEC
44 071F5   00BD
45 071F6   0077
46 071F7   0040
47 071F8   005F           CLRB
48                        JMP     ERROR
49 071F9   007E
50 071FA   0076
51 071FB   009F
```

```
!0028 MTOS9
01
02
03
04              ;**************************************************************
05              ;*                                                            *
06              ;*      MTOS99          DEVICE DRIVERS ETC                    *
07              ;*                                                            *
08              ;*              MRU     5-27-79                               *
09              ;*                                                            *
10              ;**************************************************************
11
12
13              ;
14              ;       CALL WITH AC(A)=0 INIT ALL, TYPE TITLE
15              ;       CALL WITH AC(A)=1 INIT ALL, NO TITLE
16              ;       CALL WITH AC(A)=2 READ AS PER PARMS
17              ;       CALL WITH AC(A)=3 WRITE
18              ;       CALL WITH AC(A)=4 OPEN RECORD
19              ;       CALL WITH AC(A)=5 READY THE DRIVE.
```

```
!0029 MTOS9
01
02
                        .TITL   MTOS99
04
05
06          0001 RDY=               1       ;THESE ARE THE FLAGS
07          0002 PROT=              2
08          0004 BOT=               4
09
10          0001 FWD=               1       ;CONTROL BITS
11          0002 REV=               2
12          0004 RWD=               4
13          0008 WRT=               8
14          0010 OVW=               010
15          0020 WARS=              020
16          0040 GAP=               040
17
18          0010 STROBE=            010
19
20               ;MAGTAPE PORT ADDRESSES
21
22          8010 FLAGS=   8010
23          8012 MTRD=    8012
24          8014 MTSTAT=  8014
25          8016 MTWRT=   8016
26
27
28
29          A000 IRQVEC=            0A000
```

```
!0030 MTOS9
01
02
03                ;HERE IS THE FORKER...
04
05
06                FORK:
07                FORKER:
08                          STAA    CALLTYPE          ;DEBUG
09 071FC    00B7
10 071FD    007E
11 071FE    000D
12 071FF    004D          TSTA                ;FULL INIT?
13                        BEQ     INIT
14 07200    0027
15 07201    0020
16                        CMPA    # 1         ;FULL ALSO, NO TITLE
17 07202    0081
18 07203    0001
19                        BEQ     NIT1.5
20 07204    0027
21 07205    0022
22                FK0:    CMPA    # 2         ;READ DATA?
23 07206    0081
24 07207    0002
25                        BNE     FK1
26 07208    0026
27 07209    0003
28                        JMP     READ
29 0720A    007E
30 0720B    0072
31 0720C    00DB
32                FK1:    CMPA    # 3         ;WRITE DATA?
33 0720D    0081
34 0720E    0003
35                        BNE     FK2
36 0720F    0026
37 07210    0003
38                        JMP     WRITE
39 07211    007E
40 07212    0072
41 07213    009A
42                FK2:    CMPA    # 4         ;OPEN A RECORD?
43 07214    0081
44 07215    0004
45                        BNE     FK3
46 07216    0026
47 07217    0003
48                        JMP     ROPEN
49 07218    007E
50 07219    0073
51 0721A    0025
52                FK3:    CMPA    # 5
53 0721B    0081
54 0721C    0005
55                        BEQ     INIT5
56 0721D    0027
57 0721E    003B
58                        LDAB    # 99        ;NO? WHO KNOWS...
59 0721F    00C6
60 07220    0099
```

```
 0031 MTOS9
01 07221   0039          RTS                 ;RETURN AN ERROR.
02
```

```
!0032 MTOS9
01
02
03
04                ;INITIALIZE THE MAGTAPE CONTROLLER, AND SET NEXT RECORD
05                ;AS # 1.  CLEAR THE TEMPS, ETC.
06
07
08                INIT:   LDX     # PMPT   ;IDENTIFY OURSELVES
09 07222   00CE
10 07223   0076
11 07224   00D4
12                        JSR     PDATA
13 07225   00BD
14 07226   0070
15 07227   002D
16                NIT1.5: LDX     # NGAPS          ;  TOP OF WRITABLE AREA
17 07228   00CE
18 07229   007E
19 0722A   0004
20                        CLR     X 0
21 0722B   006F
22 0722C   0000
23                        CPX     # CHKSUM
24 0722D   008C
25 0722E   007F
26 0722F   0040
27                        BEQ     INIT2
28 07230   0027
29 07231   0003
30 07232   0008          INX
31                        BRA     .-9
32 07233   0020
33 07234   00F6
34
35
36                INIT2:  BSR     INIT5
37 07235   008D
38 07236   0023
39                        LDAA    # RWD            ;REWIND THE TAPE
40 07237   0086
41 07238   0004
42                        STAA    MTSTAT
43 07239   00B7
44 0723A   0080
45 0723B   0014
46                        CLR     MTSTAT
47 0723C   007F
48 0723D   0080
49 0723E   0014
50
51                        LDX     # 2
52 0723F   00CE
53 07240   0000
54 07241   0002
55                        STX     DESTR   ;NEXT RECD #
56 07242   00FF
57 07243   007E
58 07244   0019
59                        LDX     # 1
60 07245   00CE
```

```
 0033 MTOS9
01 07246   0000
02 07247   0001
03                      STX     NRECDS  ;  #RECDS TO READ
04 07248   00FF
05 07249   007E
06 0724A   001B
07                      STX     RECORD  ;CURRENT RECD #
08 0724B   00FF
09 0724C   007E
10 0724D   0002
11              INIT4:  LDAA    FLAGS           ;DONT LEAVE TIL
12 0724E   00B6
13 0724F   0080
14 07250   0010
15 07251   0043         COMA                    ;DRIVE IS READY.
16                      BITA    # RDY
17 07252   0085
18 07253   0001
19                      BEQ     INIT4
20 07254   0027
21 07255   00F8
22                      BSR     ISRSET  ;SET UP ISR
23 07256   008D
24 07257   0018
25 07258   005F         CLRB                    ;NO ERRORS.
26 07259   0039         RTS
27
```

```
4
5                       ;       JUST REINIT THE DRIVE ONLY.
6                       INIT5:  LDX     # FLAGS
7  0725A    00CE
8  0725B    0080
9  0725C    0010
10                              LDAB    # 8
11 0725D    00C6
12 0725E    0008
13                      INIT6:  CLR     X 0
14 0725F    006F
15 07260    0000
16 07261    0008                INX
17 07262    005A                DECB
18                              BNE     INIT6
19 07263    0026
20 07264    00FA
21                              LDAA    # 4
22 07265    0086
23 07266    0004
24                              STAA    FLAGS+1
25 07267    00B7
26 07268    0080
27 07269    0011
28                              STAA    MTRD+1
29 0726A    00B7
30 0726B    0080
31 0726C    0013
32                              BSR     ISRSET
33 0726D    008D
34 0726E    0001
35 0726F    0039                RTS
36
37                      ;SET UP THE IRQ VECTOR FOR THE ISR.
38
39                      ISRSET:
40 07270    0001                NOP
41 07271    000F                SEI
42                              LDX     # ISR
43 07272    00CE
44 07273    0077
45 07274    00B4
46                              STX     IRQVEC
47 07275    00FF
48 07276    00A0
49 07277    0000
50                              LDAA    # 95
51 07278    0086
52 07279    0095
53                              STAA    IOPORT  ;ENABLE INT FROM TTY
54 0727A    00B7
55 0727B    0080
56 0727C    0000
57                              LDAA    IOPORT  ;REMOVE ANY INT REQ
58 0727D    00B6
59 0727E    0080
60 0727F    0000
```

```
 5 MTOS9
                                LDX     # PORT2 ;INIT THE OTHER ACIA FOR CTOS
 02 07280   00CE
03 07281   0080
04 07282   0008
05                              LDAA    # 7     ;RESET IT,
06 07283   0086
07 07284   0007
08                              STAA    X 0
09 07285   00A7
10 07286   0000
11                              LDAA    # 19    ;SET IT,
12 07287   0086
13 07288   0019
14                              STAA    X 0
15 07289   00A7
16 0728A   0000
17 0728B   0001                 NOP
18 0728C   000E                 CLI             ;NOW WERE READY
19                              LDX     # WARM  ;SET POINTERS,
20 0728D   00CE
21 0728E   0070
22 0728F   0009
23                              STX     RETN
24 07290   00FF
25 07291   007E
26 07292   0017
27                              LDX     # FORK
28 07293   00CE
29 07294   0071
30 07295   00FC
31                              STX     FORKP
32 07296   00FF
33 07297   007D
34 07298   00FF
35 07299   0039                 RTS
```

```
36 MTOS9
                        ;WRITE DATA TO A RECORD OR RECORDS.  IF NOT AT
                        ;DESIRED RECORD, SKIP GAPS TIL WE GET THERE.
03                      ;SET DESIRED RECD # (DESTR), LOADR, HIADR, AND
04                      ;DESIRED OPTIONS AND CALL WRITE.
05
06
07                      WRITE:  JSR     ROPEN   ;OPEN DESIRED RECD,
08 0729A    00BD
09 0729B    0073
10 0729C    0025
11                              BNE     WFERR1
12 0729D    0026
13 0729E    0022
14                              LDAA    # WRT
15 0729F    0086
16 072A0    0008
17                              LDAB    # 0
18 072A1    00C6
19 072A2    0000
20                              JSR     MVTAPE
21 072A3    00BD
22 072A4    0075
23 072A5    008D
24                              BNE     WFERR1
25 072A6    0026
26 072A7    0019                                    6-14-79
27                              LDAA    # WRT!FWD        ;START MOTION
28 072A8    0086
29 072A9    0009
30                              LDAB    # 35.    ;30 MS +10%
31 072AA    00C6
32 072AB    0023
33                              JSR     MVTAPE
34 072AC    00BD
35 072AD    0075
36 072AE    008D
37                              BNE     WFERR1
38 072AF    0026
39 072B0    0010
40                              LDAA    FLAGS   ;IF AT BOT,
41 072B1    00B6
42 072B2    0080
43 072B3    0010
44 072B4    0043                COMA
45                              BITA    # BOT   ;THEN WRITE A BIG GAP.
46 072B5    0085
47 072B6    0004
48                              BEQ     WRT2
49 072B7    0027
50 072B8    0005
51                              LDAB    # 255.
52 072B9    00C6
53 072BA    00FF
54                              JSR     DELAY
55 072BB    00BD
56 072BC    0075
57 072BD    00A5
58                      WRT2:   JSR     WRCD    ;WRITE DATA,
59 072BE    00BD
60 072BF    0073
```

```
0037 MTOS9
1 072C0   0098
2 072C1   0037 WFERR1: PSHB            ;SAVE POSSIBLE ERROR,
3                      LDAA    # 0
4 072C2   0086
5 072C3   0000
6                      LDAB    # 30.
7 072C4   00C6
8 072C5   001E
9                      JSR     MVTAPE
10 072C6  00BD
11 072C7  0075
12 072C8  008D
13                     CLR     MTSTAT
14 072C9  007F
15 072CA  0080
16 072CB  0014
17                     LDX     # LSTRNG        ;TYPE NEXT AVAILABLE RECD #.
18 072CC  00CE
19 072CD  0076
20 072CE  00CE
21                     JSR     PDATA
22 072CF  00BD
23 072D0  0070
24 072D1  002D
25                     LDX     # RECORD
26 072D2  00CE
27 072D3  007E
28 072D4  0002
29                     JSR     OUTDEC
30 072D5  00BD
31 072D6  0077
32 072D7  0040
33 072D8  0033         PULB
34 072D9  005D         TSTB
35 072DA  0039         RTS
```

```
0038 MTOS9
01
02
03                      ;READ A RECORD OR RECORDS.  SKIP RECORDS TIL DESIRED RECORD
04                      ;IS REACHED, IF NOT ALREADY THERE.  SET DESIRED RECD #,
05                      ;(DESTR), # OF RECDS (NRECDS), ANY OPTIONS, CALL READ.
06
07
08
09                      READ:   JSR     ROPEN
10 072DB    00BD
11 072DC    0073
12 072DD    0025
13                              BNE     RFERR1  ;OPENING ERRORS?
14 072DE    0026
15 072DF    0017
16                              LDAA    # FWD           ;START MOTION,
17 072E0    0086
18 072E1    0001
19                              LDAB    # 10.
20 072E2    00C6
21 072E3    000A
22                              JSR     MVTAPE
23 072E4    00BD
24 072E5    0075
25 072E6    008D
26                              BNE     RFERR1
27 072E7    0026
28 072E8    000E
29
30
31
32
33                      READR:  JSR     RRCD    ;READ ONE,
34 072E9    00BD
35 072EA    0074
36 072EB    0066
37
38                              BNE     RFERR1  ;READ ERRORS?
39 072EC    0026
40 072ED    0009
41
42                              LDX     # NRECDS        ;DEC COUNT,
43 072EE    00CE
44 072EF    007E
45 072F0    001B
46                              JSR     DECMENT
47 072F1    00BD
48 072F2    0075
49 072F3    00CD
50
51                              BNE     READR   ;MORE?
52 072F4    0026
53 072F5    00F3
54 072F6    005F            CLRB            ;NO ERRORS,
55 072F7    0037 RFERR1:    PSHB            ;SAVE POSSIBLE ERROR,
56                              LDAA    # 0
57 072F8    0086
58 072F9    0000
59                              LDAB    # 20.
60 072FA    00C6
```

```
 0039 MTOS9
01 072FB   0014
02                      JSR     MVTAPE
03 072FC   00BD
04 072FD   0075
05 072FE   008D
06 072FF   0033         PULB            ;MAYBE LOSE AN ERROR HERE.
07 07300   005D         TSTB
08                      BNE     RDN
09 07301   0026
10 07302   0020
11
12
13                      LDAA    NLDFLG  ;DONT RUN IT IF ANY
14 07303   00B6
15 07304   007E
16 07305   001F
17                      ORAA    RUNFLG  ;FLAG EXCEPT LIST SET.
18 07306   00BA
19 07307   007E
20 07308   0021
21                      ORAA    LNKFLG
22 07309   00BA
23 0730A   007E
24 0730B   001E
25                      ORAA    ALTFLG
26 0730C   00BA
27 0730D   007E
28 0730E   001D
29 0730F   004D         TSTA
30                      BNE     RDN
31 07310   0026
32 07311   0011
33
34                      LDX     RUN     ;NOR IF ADDRESS IS ZERO.
35 07312   00FE
36 07313   007E
37 07314   003D
38                      CPX     # 0
39 07315   008C
40 07316   0000
41 07317   0000
42                      BEQ     RDN
43 07318   0027
44 07319   0009
45                      TST     INTFLG  ;TURN OFF INTERRUPTS?
46 0731A   007D
47 0731B   007E
48 0731C   000E
49                      BEQ     RUNIT
50 0731D   0027
51 0731E   0002
52 0731F   0001                 NOP
53 07320   000F                 SEI
54              RUNIT:
55                      JSR     X 0     ;RUN IT.
56 07321   00AD
57 07322   0000
58 07323   005D RDN:    TSTB
59 07324   0039         RTS
```

```
!0040 MTOS9
01
02
03                ;OPEN A RECORD.  SKP GAPS TIL WERE AT DESIRED RECORD.
04                ;SET IT AS CURRENT RECD #.
05                ;# TO SKIP = ABS(DESTR-RECORD)
06
07
08 07325   0001 ROPEN:  NOP
09 07326   000E          CLI
10                       LDAA    RECORD          ;SEE IF WE MUST INIT,
11 07327   00B6
12 07328   007E
13 07329   0002
14                       ORAA    RECORD+1        ;IF ILLEGAL RECD #0
15 0732A   00BA
16 0732B   007E
17 0732C   0003
18                       BNE     ROPEN2
19 0732D   0026
20 0732E   0003
21                       JSR     INIT2           ;OPEN #1.
22 0732F   00BD
23 07330   0072
24 07331   0035
25                ROPEN2: LDAA    # FWD          ;SET MOTION BIT FOR LATER...
26 07332   0086
27 07333   0001
28                       STAA    XTEMP
29 07334   00B7
30 07335   007E
31 07336   0006
32
33                       LDAA    DESTR+1         ;(LO) CALCULATE # RECDS TO SKIP
34 07337   00B6
35 07338   007E
36 07339   001A
37                       LDAB    DESTR           ;(HI)
38 0733A   00F6
39 0733B   007E
40 0733C   0019
41
42
43                       SUBA    RECORD+1                ;SUB LEASTS, (SET BORROW)
44 0733D   00B0
45 0733E   007E
46 0733F   0003
47                       SBCB    RECORD          ;MOSTS(-BORROW)
48 07340   00F2
49 07341   007E
50 07342   0002
51
52                       BCC     ROFWD           ;SKIP IF RESULT IS POS.
53 07343   0024
54 07344   000A
55
56 07345   0043          COMA
57 07346   0053          COMB                    ;COMPLEMENT, 1'S...
58
59 07347   000C          CLC
60
```

```
 0041 MTOS9
01                          ADDA    # 1             ;2'S    (LEAST)
02 07348    008B
03 07349    0001
04
05                          ADCB    # 0             ;MOST (CARRY)
06 0734A    00C9
07 0734B    0000
08                          ASL     XTEMP           ;SET REVERSE MOTION.
09 0734C    0078
10 0734D    007E
11 0734E    0006
12                ROFWD:    STAB    NGAPS           ;SAVE
13 0734F    00F7
14 07350    007E
15 07351    0004
16                          STAA    NGAPS+1
17 07352    00B7
18 07353    007E
19 07354    0005
20                          ORAA    NGAPS           ;DONT SKIP IF 0 TO DESTINATION.
21 07355    00BA
22 07356    007E
23 07357    0004
24                          BEQ     SGD
25 07358    0027
26 07359    003C
27
28                          LDAA    XTEMP
29 0735A    00B6
30 0735B    007E
31 0735C    0006
32                          LDAB    # 45.   ;1.5 RCD GAPS
33 0735D    00C6
34 0735E    002D
35                          JSR     MVTAPE  ;START MOTION
36 0735F    00BD
37 07360    0075
38 07361    008D
39                          BNE     SGD
40 07362    0026
41 07363    0032
42                          LDAA    # 5
43 07364    0086
44 07365    0005
45                          LDX     # 0     ;SET ILLEGAL RECD #
46 07366    00CE
47 07367    0000
48 07368    0000
49 07369    0001            NOP
50 0736A    000F            SEI
51                          STX     RECORD  ;INCASE WERE INTERRUPTED.
52 0736B    00FF
53 0736C    007E
54 0736D    0002
55                          LDAB    MTRD    ;RESET PIA IRQ
56 0736E    00F6
57 0736F    0080
58 07370    0012
59                          STAA    MTRD+1  ;ENABLE THE GAPPER.
60 07371    00B7
```

```
 0042 MTOS9
01 07372   0080
02 07373   0013
03 07374   0001          NOP
04 07375   000E          CLI              ;NOW WERE READY.
05
06                  ;HERES WHERE WED SET OURSELF AS HIGHEST PRIORITY,
07                  ;TURN OURSELF OFF, AND SWITCH TASKS.  THE IRQ SERVICE
08                  ;TASK WOULD REENABLE US, AND WE WOULD RUN AGAIN.
09
10                  TGAPS:  JSR      STPNWT   ;WAIT IF OPERATOR SAYS SO
11 07376   00BD
12 07377   0075
13 07378   00E0
14                          TST      NGAPS    ;BUT INSTEAD WE WAIT
15 07379   007D
16 0737A   007E
17 0737B   0004
18                          BNE      TGAPS
19 0737C   0026
20 0737D   00F8
21                          TST      NGAPS+1
22 0737E   007D
23 0737F   007E
24 07380   0005
25                          BNE      TGAPS
26 07381   0026
27 07382   00F3
28
```

```
!0043 MTOS9
01                              LDAA    # 4                ;DISABLE TIMERS
02 07383    0086
03 07384    0004
04                              STAA    MTRD+1
05 07385    00B7
06 07386    0080
07 07387    0013
08 07388    004F                CLRA
09                              LDAB    # 30.
10 07389    00C6
11 0738A    001E
12                              JSR     MVTAPE
13 0738B    00BD
14 0738C    0075
15 0738D    008D
16                              BNE     SGD
17 0738E    0026
18 0738F    0006
19                              LDX     DESTR    ;WERE THERE, SAY SO.
20 07390    00FE
21 07391    007E
22 07392    0019
23                              STX     RECORD
24 07393    00FF
25 07394    007E
26 07395    0002
27 07396    005D SGD:           TSTB
28 07397    0039                RTS
29
30
```

```
!0044 MTOS9
01
02                ;WRITE A RECORD OR RECORDS TIL ADDRESSES ARE EQUAL.
03
04                WRCD:   LDX     LOWADR
05  [illegible]7398   00FE
06  [illegible]7399   007E
07  0739A   0011
08                        STX     LOAD
09  0739B   00FF
10  0739C   007E
11  0739D   003B
12                        CLR     LINK    ;SET LINK TO INDICATE MORE THAN
13  0739E   007F
14  0739F   007E
15  073A0   003F
16                        COM     LINK    ; 1 RECD/ THIS FILE.  MAYBE RESET LATER.
17  073A1   0073
18  073A2   007E
19  073A3   003F
20  073A4   005F          CLRB
21                        CLR     BYTCNT
22  073A5   007F
23  073A6   007E
24  073A7   0040
25                        CLR     CHKSUM
26  073A8   007F
27  073A9   007F
28  073AA   0040
29                        LDX     # DATABK        ;MOVE IN DATA TO BE SAVED,
30  073AB   00CE
31  [illegible]73AC   007E
32  [illegible]73AD   0041
33                        STX     XTEMP
34  073AE   00FF
35  073AF   007E
36  073B0   0006
37                        LDX     LOWADR
38  073B1   00FE
39  073B2   007E
40  073B3   0011
41                MOVE:   LDAA    X 0
42  073B4   00A6
43  073B5   0000
44                        STX     LOWADR
45  073B6   00FF
46  073B7   007E
47  073B8   0011
48                        LDX     XTEMP
49  073B9   00FE
50  073BA   007E
51  073BB   0006
52                        STAA    X 0
53  073BC   00A7
54  073BD   0000
55  073BE   0008          INX
56                        STX     XTEMP
57  [illegible]73BF   00FF
58  073C0   007E
59  073C1   0006
60  073C2   0001          NOP
```

```
 0045 MTOS9
01 073C3   0001          NOP
02
03
04 073C4   005C          INCB
05                       LDX     LOWADR  ;WRITTEN LAST DATA?
06 073C5   00FE
07 073C6   007E
08 073C7   0011
09                       CPX     HIADR
10 073C8   00BC
11 073C9   007E
12 073CA   0013
13                       BEQ     CLLINK  ;DONE, SET LAST RECD
14 073CB   0027
15 073CC   000A
16 073CD   0008          INX
17                       STX     LOWADR  ;MORE...
18 073CE   00FF
19 073CF   007E
20 073D0   0011
21                       CMPB    # 255.
22 073D1   00C1
23 073D2   00FF
24                       BNE     MOVE    ;KEEP GOING
25 073D3   0026
26 073D4   00DF
27                       BRA     CKDRV   ;FULL
28 073D5   0020
29 073D6   0008
30
31              CLLINK:  TST     KFOFLG  ;SEE IF WE SHOULD CLOSE FILE
32 073D7   007D
33 073D8   007E
34 073D9   0022
35                       BNE     CKDRV
36 073DA   0026
37 073DB   0003
38                       CLR     LINK    ;RESET, LAST RECD
39 073DC   007F
40 073DD   007E
41 073DE   003F
42
43              CKDRV:   LDX     RECORD
44 073DF   00FE
45 073E0   007E
46 073E1   0002
47                       STX     RECD
48 073E2   00FF
49 073E3   007E
50 073E4   0024
51                       STAB    BYTCNT  ;BYTECOUNT
52 073E5   00F7
53 073E6   007E
54 073E7   0040
```

```
!0046 MTOS9
01
02
03
04                              LDX     # RECD   ;CALCULATE CHECKSUM
05  073E8   00CE
06  073E9   007E
07  073EA   0024
08  073EB   004F                CLRA
09                  CKLP:       ADDA    X 0
10  073EC   00AB
11  073ED   0000
12  073EE   0008                INX
13                              CPX     # CHKSUM
14  073EF   008C
15  073F0   007F
16  073F1   0040
17                              BNE     CKLP
18  073F2   0026
19  073F3   00F8
20                              STAA    CHKSUM
21  073F4   00B7
22  073F5   007F
23  073F6   0040
```

```
!0047 MTOS9
01 073F7   0001          NOP
02 073F8   000F          SEI              ;DONT WANT TO BE INTERRUPTED
03                       TST     FLAGS    ;WAIT TIL IN SYNC WITH
04 073F9   007D
05 073FA   0080
06 073FB   0010
07                       BMI     .-4      ;STROBE LINE,
08 073FC   002B
09 073FD   00FB
10                       TST     FLAGS
11 073FE   007D
12 073FF   0080
13 07400   0010
14                       BPL     .-4
15 07401   002A
16 07402   00FB
17                       LDAA    # 5
18 07403   0086
19 07404   0005
20                       TST     FLAGS    ;RESET WRITER
21 07405   007D
22 07406   0080
23 07407   0010
24                       STAA    FLAGS+1  ;ENABLE WRITER
25 07408   00B7
26 07409   0080
27 0740A   0011
28                       CLR     XTEMP    ;WE HAVE 104 US.
29 0740B   007F
30 0740C   007E
31 0740D   0006
32                       LDAB    # DATABK-FSYNC+1
33 0740E   00C6
34 0740F   001F
35                       LDX     # FSYNC  ;DO HEADER, 1ST BYTE...
36 07410   00CE
37 07411   007E
38 07412   0023
39               ;CRITICAL LOOP...
40               WLOOP:  LDAA    X 0
41 07413   00A6
42 07414   0000
43 07415   0044          LSRA             ;SWAP NYBBLE OVER TO LOW,
44 07416   0044          LSRA
45 07417   0044          LSRA
46 07418   0044          LSRA
47                       ANDA    # 0F
48 07419   0084
49 0741A   000F
50                       STAA    MTWRT    ;MOST SIG.  NYBBLE.
51 0741B   00B7
52 0741C   0080
53 0741D   0016
54                       TST     FLAGS+1  ;WAIT TIL WRITTEN,
55 0741E   007D
56 0741F   0080
57 07420   0011
58                       BPL     .-4
59 07421   002A
60 07422   00FB
```

```
 0048 MTOS9
01                          LDAA    FLAGS   ;RESET STROBE.
02 07423   00B6
03 07424   0080
04 07425   0010
05                          LDAA    X 0
06 07426   00A6
07 07427   0000
08                          ANDA    # 0F
09 07428   0084
10 07429   000F
11                          STAA    MTWRT
12 0742A   00B7
13 0742B   0080
14 0742C   0016
15                          TST     FLAGS+1
16 0742D   007D
17 0742E   0080
18 0742F   0011
19                          BPL     .-4     ;WAIT TIL STROBED,
20 07430   002A
21 07431   00FB
22                          LDAA    FLAGS
23 07432   00B6
24 07433   0080
25 07434   0010
26 07435   0008          INX
27 07436   005A          DECB
28                       BNE     WLOOP
29 07437   0026
30 07438   00DA
```

```
!0049 MTOS9
01                              TST     XTEMP   ;WRITTEN DATA YET?
02 07439    007D
03 0743A    007E
04 0743B    0006
05                              BNE     WDONE
06 0743C    0026
07 0743D    0007
08                              COM     XTEMP   ;NO, SET FLAG,
09 0743E    0073
10 0743F    007E
11 07440    0006
12                              LDAB    # -1    ;AND COUNT,
13 07441    00C6
14 07442    00FF
15                              BRA     WLOOP   ;REPEAT.
16 07443    0020
17 07444    00CE
18
19                      WDONE:  LDAA    # 4
20 07445    0086
21 07446    0004
22                              STAA    FLAGS+1 ;OFF THE STROBE.
23 07447    00B7
24 07448    0080
25 07449    0011
26 0744A    005F            CLRB
27                              LDX     # RECORD
28 0744B    00CE
29 0744C    007E
30 0744D    0002
31                              JSR     INCMENT ;BUMP RECORD #
32 0744E    00BD
33 0744F    0075
34 07450    00BA
35                              LDX     LOWADR  ;DONE WRITING?
36 07451    00FE
37 07452    007E
38 07453    0011
39                              CPX     HIADR
40 07454    00BC
41 07455    007E
42 07456    0013
43                              BEQ     ALLDONE
44 07457    0027
45 07458    0008
46                              LDAB    # 35.    ;WRITE GAP, THEN CONTINUE
47 07459    00C6
48 0745A    0023
49                              JSR     DELAY   ;WRITING DATA...
50 0745B    00BD
51 0745C    0075
52 0745D    00A5
53                              JMP     WRCD
54 0745E    007E
55 0745F    0073
56 07460    0098
57                      ALLDONE:
58                              JSR     STPNWT
59 07461    00BD
60 07462    0075
```

```
 0050 MTOS9
01 07463   00E0
02 07464   005F          CLRB
03 07465   0039          RTS
```

```
!0051 MTOS9
01
02
03                      ;READ A SINGLE RECORD.
04
05
06                      RRCD:
07                              CLR     RPTFLG  ;FIRST TIME THRU...
08 07466    007F
09 07467    007E
10 07468    000F
11                      SRCD:   CLR     CHKSUM
12 07469    007F
13 0746A    007F
14 0746B    0040
15
16                              LDX     # FSYNC-1       ;WHERE THE NUMBERS GO...
17 0746C    00CE
18 0746D    007E
19 0746E    0022
20
21                      ;*****************************************************************
22                      ;*****************************************************************
23
24                      ;CRITICAL LOOP.  EXTREMELY TOUCHY STUFF.  THIS MUST BE AS
25                      ;FAST AS POSSIBLE IN ORDER TO BE SPEED TOLERANT.  DO NOT TOUCH.
26
27                      ;FILL THE BLOCK WITH A RECORD FROM TAPE.
28
29 0746F    0001            NOP
30 07470    000F            SEI
31
32                              LDAA    # DATABK-FSYNC+1        ;SET 1ST COUNT,
33 07471    0086
34 07472    001F
35                              STAA    XTEMP
36 07473    00B7
37 07474    007E
38 07475    0006
39                              LDAA    # CHKSUM-DATABK ;SET 2ND COUNT
40 07476    0086
41 07477    00FF
42                              STAA    XTEMP+1
43 07478    00B7
44 07479    007E
45 0747A    0007
46                              ;TAKES 2 LOOPS, COUNT IS > 8 BITS.
47
48                      R1LOOP:
49
50                      RB1:            TST     MTRD            ;WAIT FOR 1ST NYBBLE,
51 0747B    007D
52 0747C    0080
53 0747D    0012
54                              BMI     RB1
55 0747E    002B
56 0747F    00FB
57
58                              LDAA    MTRD
59 07480    00B6
60 07481    0080
```

```
 0052 MTOS9
01 07482   0012
02 07483   0043                 COMA
03                              ANDA    # 0F            ;REMOVE GARBAGE.
04 07484   0084
05 07485   000F
06 07486   0008                 INX                     ;IN OUR SPARE TIME...
07 07487   0048                 ASLA
08 07488   0048                 ASLA
09
10                  RB2:        TST     MTRD            ;WAIT TIL ITS GONE,
11 07489   007D
12 0748A   0080
13 0748B   0012
14                              BPL     RB2
15 0748C   002A
16 0748D   00FB
17
18                  RB3:        TST     MTRD            ;2ND NYBBLE,
19 0748E   007D
20 0748F   0080
21 07490   0012
22                              BMI     RB3
23 07491   002B
24 07492   00FB
25                              LDAB    MTRD
26 07493   00F6
27 07494   0080
28 07495   0012
29 07496   0053                 COMB
30                              ANDB    # 0F
31 07497   00C4
32 07498   000F
33 07499   0048                 ASLA
34 0749A   0048                 ASLA
35 0749B   001B                 ABA                     ;MAKE A BYTE.
36                  RB4:        TST     MTRD
37 0749C   007D
38 0749D   0080
39 0749E   0012
40                              BPL     RB4
41 0749F   002A
42 074A0   00FB
43
44                              STAA    X 0
45 074A1   00A7
46 074A2   0000
47                              DEC     XTEMP           ;DONE?
48 074A3   007A
49 074A4   007E
50 074A5   0006
51                              BNE     R1LOOP
52 074A6   0026
53 074A7   00D3
54
55                  ;       CONTINUE...
56
57                  R2LOOP:
58
59                  RB5:        TST     MTRD            ;DO IT AGAIN, EXCEPT
60 074A8   007D
```

```
 0053 MTOS9
01 074A9   0080
02 074AA   0012
03                              BMI     RB5             ;WITH DIFFERENT COUNT.
04 074AB   002B
05 074AC   00FB
06                              LDAA    MTRD
07 074AD   00B6
08 074AE   0080
09 074AF   0012
10 074B0   0043                 COMA
11                              ANDA    # 0F
12 074B1   0084
13 074B2   000F
14
15 074B3   0008                 INX
16 074B4   0048                 ASLA
17 074B5   0048                 ASLA
18
19                      RB6:    TST     MTRD
20 074B6   007D
21 074B7   0080
22 074B8   0012
23                              BPL     RB6
24 074B9   002A
25 074BA   00FB
26
27                      RB7:    TST     MTRD
28 074BB   007D
29 074BC   0080
30 074BD   0012
31                              BMI     RB7
32 074BE   002B
33 074BF   00FB
34                              LDAB    MTRD
35 074C0   00F6
36 074C1   0080
37 074C2   0012
38 074C3   0053                 COMB
39                              ANDB    # 0F
40 074C4   00C4
41 074C5   000F
42
43 074C6   0048                 ASLA
44 074C7   0048                 ASLA
45 074C8   001B                 ABA
46                      RB8:    TST     MTRD
47 074C9   007D
48 074CA   0080
49 074CB   0012
50                              BPL     RB8
51 074CC   002A
52 074CD   00FB
53
54                              STAA    X 0
55 074CE   00A7
56 074CF   0000
57                              DEC     XTEMP+1
58 074D0   007A
59 074D1   007E
60 074D2   0007
```

```
 0054 MTOS9
01                                  BNE     R2LOOP
02 074D3    0026
03 074D4    00D3
04
05                  ;       CONTINUE...
06
07                  ;*************************************************************************
08                  ;*************************************************************************
09
10
11                  ;NOW CHECK THE CHECKSUM...
12
13                          LDX     # RECD
14 074D5    00CE
15 074D6    007E
16 074D7    0024
17 074D8    004F            CLRA
18                  R3LOOP: ADDA    X 0
19 074D9    00AB
20 074DA    0000
21 074DB    0008            INX
22                          CPX     # CHKSUM
23 074DC    008C
24 074DD    007F
25 074DE    0040
26                          BNE     R3LOOP
27 074DF    0026
28 074E0    00F8
29                          STAA    OURSUM  ;FOR DEBUG
30 074E1    00B7
31 074E2    007E
32 074E3    0001
33                          CMPA    CHKSUM
34 074E4    00B1
35 074E5    007F
36 074E6    0040
37
38                          BEQ     R3SK
39 074E7    0027
40 074E8    0003
41                          JMP     RERRC
42 074E9    007E
43 074EA    0075
44 074EB    0083
45                  R3SK:   TST     NLDFLG  ;MOVE TO MEMORY?
46 074EC    007D
47 074ED    007E
48 074EE    001F
49                          BNE     LMEX
50 074EF    0026
51 074F0    0033
52                          LDX     # DATABK        ;MOVE
53 074F1    00CE
54 074F2    007E
55 074F3    0041
56                          STX     XTEMP
57 074F4    00FF
58 074F5    007E
59 074F6    0006
60                          TST     ALTFLG  ;SEE WHETHER WE LOAD TO THE WRITTEN
```

```
 0055 MTOS9
01 074F7   007D
02 074F8   007E
03 074F9   001D
04                      BNE     GALT    ;ADR OR TO AN EXT ONE.
05 074FA   0026
06 074FB   0005
07                      LDX     LOAD
08 074FC   00FE
09 074FD   007E
10 074FE   003B
11                      BRA     GADR
12 074FF   0020
13 07500   0003
14              GALT:   LDX     ALTADR  ;GET ALT ADDRESS
15 07501   00FE
16 07502   007E
17 07503   0015
18              GADR:   STX     XTEMP2
19 07504   00FF
20 07505   007E
21 07506   0008
22                      LDAB    BYTCNT
23 07507   00F6
24 07508   007E
25 07509   0040
26                      BEQ     LMEX    ;IF ZERO.
27 0750A   0027
28 0750B   0018
29              LMOVE:  LDX     XTEMP   ;;"FROM"
30 0750C   00FE
31 0750D   007E
32 0750E   0006
33                      LDAA    X 0
34 0750F   00A6
35 07510   0000
36 07511   0008        INX
37                      STX     XTEMP
38 07512   00FF
39 07513   007E
40 07514   0006
41                      LDX     XTEMP2  ;"TO"
42 07515   00FE
43 07516   007E
44 07517   0008
45                      STAA    X 0
46 07518   00A7
47 07519   0000
48 0751A   0008        INX
49                      STX     XTEMP2
50 0751B   00FF
51 0751C   007E
52 0751D   0008
53                      STX     ALTADR  ;SO WE CAN CHAIN IF WE WANT TO
54 0751E   00FF
55 0751F   007E
56 07520   0015
57 07521   005A        DECB
58                      BNE     LMOVE
59 07522   0026
60 07523   00E8
```

```
 0056 MTOS9
01                LMEX:   TST     LSTFLG  ;LIST OUT HEADER?
02 07524   007D
03 07525   007E
04 07526   0020
05                        BEQ     CKNLST
06 07527   0027
07 07528   0043
08
09                ;SEE ABOUT TYPING A LIST OF THE DATABLOCK.
10
11                        TST     RPTFLG  ;DO 1ST BLK ALREADY?
12 07529   007D
13 0752A   007E
14 0752B   000F
15                        BNE     MLIST
16 0752C   0026
17 0752D   001F
18                        LDAA    # 0     ;STOP TAPE,
19 0752E   0086
20 0752F   0000
21                        LDAB    # 30.
22 07530   00C6
23 07531   001E
24                        JSR     MVTAPE
25 07532   00BD
26 07533   0075
27 07534   008D
28                        BNE     RNM
29 07535   0026
30 07536   004A
31                        JSR     LIST
32 07537   00BD
33 07538   0076
34 07539   00DF
35                        ;WHILE WERE AT IT, SEE IF WE
36                        ;SHOULD STOP FOR THE FLAG
37                        JSR     STPNWT
38 0753A   00BD
39 0753B   0075
40 0753C   00E0
41                        LDAA    # FWD
42 0753D   0086
43 0753E   0001
44                        LDAB    # 10.
45 0753F   00C6
46 07540   000A
47                        JSR     MVTAPE
48 07541   00BD
49 07542   0075
50 07543   008D
51                        BNE     RNM
52 07544   0026
53 07545   003B
54                        LDAB    # -1     ;SAY WE DID 1ST BLK
55 07546   00C6
56 07547   00FF
57                        STAB    RPTFLG
58 07548   00F7
59 07549   007E
60 0754A   000F
```

```
 0057 MTOS9
01                                      BRA     NLST
02 0754B   0020
03 0754C   0022
04
05                MLIST:        TST     LINK    ;ALREADY TYPED 1ST,
06 0754D   007D
07 0754E   007E
08 0754F   003F
09                              BNE     CKNLST  ;TRY TO TYPE LAST.
10 07550   0026
11 07551   001A
12                                      LDAA    # 0
13 07552   0086
14 07553   0000
15                                      LDAB    # 30.
16 07554   00C6
17 07555   001E
18                                      JSR     MVTAPE
19 07556   00BD
20 07557   0075
21 07558   008D
22                                      BNE     RNM
23 07559   0026
24 0755A   0026
25                                      JSR     LIST    ;LIST LAST BLK.
26 0755B   00BD
27 0755C   0076
28 0755D   00DF
29                                      JSR     STPNWT  ;CHECK FLAG
30 0755E   00BD
31 0755F   0075
32 07560   00E0
33                                      LDAA    # FWD
34 07561   0086
35 07562   0001
36                                      LDAB    # 10.
37 07563   00C6
38 07564   000A
39                                      JSR     MVTAPE  ;RESTART MOTION
40 07565   00BD
41 07566   0075
42 07567   008D
43                                      BNE     RNM
44 07568   0026
45 07569   0017
46                                      BRA     NLST    ;ALREADY CHECKED FLAG
47 0756A   0020
48 0756B   0003
49
50                ;                     CONTINUE. . .
51                ;           CONTINUE.
52
53
54                CKNLST: JSR     STPNWT  ;CKHECK FLAG
55 0756C   00BD
56 0756D   0075
57 0756E   00E0
58                NLST:   LDX     # RECORD         ;BUMP RECD #
59 0756F   00CE
60 07570   007E
```

```
 0058 MTOS9
01 07571   0002
02                      JSR     INCMENT
03 07572   00BD
04 07573   0075
05 07574   00BA
06                      LDAB    LNKFLG  ;IF LINK IS SET AND
07 07575   00F6
08 07576   007E
09 07577   001E
10 07578   0053          COMB            ;FLAG IS NOT SET
11                      ANDB    LINK    ;LOAD ALL LINKED RECDS.
12 07579   00F4
13 0757A   007E
14 0757B   003F
15                      BEQ     RNM
16 0757C   0027
17 0757D   0003
18                      JMP     SRCD    ;KEEP READING
19 0757E   007E
20 0757F   0074
21 07580   0069
22 07581   005D RNM:    TSTB
23 07582   0039          RTS
24
25              RERRC:  LDX     # RECORD
26 07583   00CE
27 07584   007E
28 07585   0002
29                      JSR     INCMENT
30 07586   00BD
31 07587   0075
32 07588   00BA
33                      LDAB    # 18
34 07589   00C6
35 0758A   0018
36                      BRA     RNM
37 0758B   0020
38 0758C   00F4
```

```
!0059 MTOS9
01                ;.SET TAPE CONTROL BITS, RETURN WITH PROPER
02                ;ERRORS, IF NECESSARY.
03
04 0758D   0037 MVTAPE: PSHB              ;SAVE   DELAY
05 0758E   004D         TSTA
06                      BEQ     DOIT      ;DONT CHECK IF 0
07 0758F   0027
08 07590   0010
09                      LDAB    FLAGS
10 07591   00F6
11 07592   0080
12 07593   0010
13 07594   0053         COMB
14                      BITB    # RDY     ;READY?
15 07595   00C5
16 07596   0001
17                      BEQ     MVERR1
18 07597   0027
19 07598   0019
20                      BITA    # WRT     ;WRITING?
21 07599   0085
22 0759A   0008
23                      BEQ     DOIT
24 0759B   0027
25 0759C   0004
26                      BITB    # PROT    ;PROTECTED?
27 0759D   00C5
28 0759E   0002
29                      BNE     MVERR2
30 0759F   0026
31 075A0   0015
32                DOIT:   STAA    MTSTAT
33 075A1   00B7
34 075A2   0080
35 075A3   0014
36 075A4   0033         PULB
37
38                ;DELAY AC(B) MILLISECONDS.
39
40 075A5   005D DELAY:  TSTB
41                      BNE     DLY1
42 075A6   0026
43 075A7   0001
44 075A8   0039         RTS
45
46                DLY1:   LDAA    # 166.
47 075A9   0086
48 075AA   00A6
49 075AB   004A DLY2:   DECA
50                      BNE     DLY2
51 075AC   0026
52 075AD   00FD
53 075AE   005A         DECB
54                      BNE     DLY1
55 075AF   0026
56 075B0   00F8
57 075B1   0039         RTS
58
59 075B2   0033 MVERR1: PULB
60                      LDAB    # 010     ;DRIVE NOT READY.
```

```
 0060 MTOS9
01 075B3   00C6
02 075B4   0010
03 075B5   0039          RTS
04 075B6   0033 MVERR2:  PULB
05                       LDAB    # 011   ;;WRITE PROTECTED.
06 075B7   00C6
07 075B8   0011
08 075B9   0039          RTS
```

```
!0061 MTOS9
01
02
03                ;INCREMENT A 16 BIT NUMBER.  SET X -> MSD OF #.
04                ;SETS CC FOR TEST FOR ZERO BY CALLER.
05
06  075BA   0036 INCMENT:        PSHA
07  075BB   0037                 PSHB
08                               LDAA    X 0
09  075BC   00A6
10  075BD   0000
11                               LDAB    X 1
12  075BE   00E6
13  075BF   0001
14                               ADDB    # 1      ;INC LEAST,
15  075C0   00CB
16  075C1   0001
17                               ADCA    # 0      ;ADD IN CARRY
18  075C2   0089
19  075C3   0000
20                               STAA    X 0
21  075C4   00A7
22  075C5   0000
23                               STAB    X 1
24  075C6   00E7
25  075C7   0001
26                               ORAA    X 1              ;SET CC
27  075C8   00AA
28  075C9   0001
29  075CA   0032                 PULA
30  075CB   0033                 PULB
31  075CC   0039                 RTS
32
33
```

```
0062 MTOS9
01
02
03
04                ;DECREMENT A 16 BIT NUMBER.  SET X -> #,
05                ;RETURNS WITH CC SET FOR TEST FOR ZERO.
06
07
08 075CD    0036 DECMENT:         PSHA
09 075CE    0037                  PSHB
10                                LDAA    X 0
11 075CF    00A6
12 075D0    0000
13                                LDAB    X 1
14 075D1    00E6
15 075D2    0001
16                                SUBB    # 1       ;DEC LEAST,
17 075D3    00C0
18 075D4    0001
19                                SBCA    # 0       ;BORROW. . .
20 075D5    0082
21 075D6    0000
22                                STAA    X 0
23 075D7    00A7
24 075D8    0000
25                                STAB    X 1
26 075D9    00E7
27 075DA    0001
28                                ORAA    X 1               ;SET CC
29 075DB    00AA
30 075DC    0001
31  75DD    0032                  PULA
32  75DE    0033                  PULB
33 075DF    0039                  RTS
```

```
                        ;IF HLTFLG IS SET, STOP TAPE AND WAIT TIL OPERATOR
                        ;RESETS IT BY TYPING ANY CHARACTER.

                        STPNWT:
075E0  0001             NOP
075E1  000E             CLI

                        TST     HLTFLG  ;SET?
075E2  007D
075E3  007E
075E4  0010
                        BNE     SWT
075E5  0026
075E6  0001
075E7  0039             RTS             ;JUST LEAVE
                        SWT:    LDAA    MTSTAT  ;SAVE STATUS
075E8  00B6
075E9  0080
075EA  0014
075EB  0036             PSHA
075EC  004F             CLRA
                        LDAB    # 30.
075ED  00C6
075EE  001E
                        JSR     MVTAPE
075EF  00BD
075F0  0075
075F1  008D
075F2  0001 SWT2:       NOP
075F3  000E             CLI
                        TST     HLTFLG  ;WAIT TIL RESET.
075F4  007D
075F5  007E
075F6  0010
                        BNE     SWT2
075F7  0026
075F8  00F9
075F9  0032             PULA            ;RESTORE STATUS
                        BITA    # WRT   ;WERE WE WRITING?
075FA  0085
075FB  0008
                        BEQ     SWT3
075FC  0027
075FD  000F
075FE  0036                     PSHA    ;IF SO, DO IT PROPERLY
                                LDAA    # WRT
075FF  0086
07600  0008
                                LDAB    # 0
07601  00C6
07602  0000
                                JSR     MVTAPE
07603  00BD
07604  0075
07605  008D
07606  0032                     PULA
```

```
 0064 MTOS9
01                                   LDAB    # 30.
02 07607   00C6
03 07608   001E
04                                   JSR     MVTAPE
05 07609   00BD
06 0760A   0075
07 0760B   008D
08 0760C   0039                      RTS
09                 SWT3:   LDAB    # 10.
10 0760D   00C6
11 0760E   000A
12                         JSR     MVTAPE
13 0760F   00BD
14 07610   0075
15 07611   008D
16 07612   0039                    RTS
```

```
!0065 MTOS9
01
02
03
04              ;*****************************************************************
05              ;*                                                               *
06              ;*                                                               *
07              ;*       SUBROUTINES FOR DRIVER/MTOS99                           *
08              ;*                                                               *
09              ;*                 5-27-79                                       *
10              ;*                                                               *
11              ;*****************************************************************
12
13
                        .TITL   ROUTINES
15
```

```
!0066 MTOS9
01
02
03
04                      ;GET A 16 BIT # FROM THE TTY.  MAY BE EITHER HEX OR DEC.,
05                      ;LEADING ZEROS NOT NEEDED.  ONLY THE LAST 4 CHARS ARE USED,
06                      ;SO TYPING 4 ZEROS LETS YOU START AGAIN.
07
08                      GET16:
09                              CMPA    # ".     ;DEC?
10 07613    0081
11 07614    002E
12                              BEQ     DEC16
13 07615    0027
14 07616    0028
15                              BRA     HEX16    ;ASSUME ITS HEX
16 07617    0020
17 07618    0005
18
19                      GHERR:  LDAB    # 3      ;BAD NUMBER
20 07619    00C6
21 0761A    0003
22                              JMP     ERROR
23 0761B    007E
24 0761C    0076
25 0761D    009F
26
27
28                      HEX16:
29                              CLR     GTEMP
30 0761E    007F
31 0761F    007E
32 07620    000A
33                              CLR     GTEMP+1
34 07621    007F
35 07622    007E
36 07623    000B
37                              LDX     # GTEMP
38 07624    00CE
39 07625    007E
40 07626    000A
41                              BSR     CKHEX    ;CHECK FOR HEX CHAR
42 07627    008D
43 07628    0053
44                              BCS     GHERR
45 07629    0025
46 0762A    00EE
47                      RDNEXT: LDAB    # 4      ;SHIFT 2 BYTES,
48 0762B    00C6
49 0762C    0004
50                              ASL     X 1
51 0762D    0068
52 0762E    0001
53                              ROL     X 0
54 0762F    0069
55 07630    0000
56 07631    005A            DECB
57                              BNE     RDNEXT+2
58 07632    0026
59 07633    00F9
60
```

```
 0067 MTOS9
01                          ORAA    X 1
02 07634    00AA
03 07635    0001
04                          STAA    X 1     ;ADD DIGIT AT RIGHT
05 07636    00A7
06 07637    0001
07                          BSR     RDHEX
08 07638    008D
09 07639    003F
10                          BCC     RDNEXT
11 0763A    0024
12 0763B    00EF
13                          LDX     X 0
14 0763C    00EE
15 0763D    0000
16 0763E    0039            RTS
17
18
```

```
!0068 MTOS9
01
02
03
04                ;INPUT A 16 BIT DECIMAL NUMBER, ERROR IF 1ST DIGIT IS
05                ;NON-DECIMAL, AFTER GETTING AT LEAST ONE DIGIT, EXIT ON FIRST
06                ;NON-DECIMAL DIGIT
07
08                DEC16:
09                          CLR       GTEMP
10 0763F    007F
11 07640    007E
12 07641    000A
13                          CLR       GTEMP+1
14 07642    007F
15 07643    007E
16 07644    000B
17                          LDX       # GTEMP
18 07645    00CE
19 07646    007E
20 07647    000A
21                          BSR       RDDEC
22 07648    008D
23 07649    0048
24                          BCS       GHERR
25 0764A    0025
26 0764B    00CD
27
28                RDEC:
29 0764C    005F            CLRB
30 0764D    0036            PSHA                ;SAVE DIGIT
31                          DSHL                ;DOUBLE SHIFT, *2
32 0764E    0068
33 0764F    0001
34 07650    0069
35 07651    0000
36                          DLDA                ;SAVE *2,
37 07652    00A6
38 07653    0001
39 07654    00E6
40 07655    0000
41                          DSHL                ;*4,
42 07656    0068
43 07657    0001
44 07658    0069
45 07659    0000
46                          DSHL                ;*8.
47 0765A    0068
48 0765B    0001
49 0765C    0069
50 0765D    0000
51                          DADD                ;*2+ *8 = *10.
52 0765E    00AB
53 0765F    0001
54 07660    00E9
55 07661    0000
56 07662    00A7
57 07663    0001
58 07664    00E7
59 07665    0000
60 07666    0032            PULA
```

```
 0069 MTOS9
01                          LDAB    # 0       ;ADD IN DIGIT,
02 07667    00C6
03 07668    0000
04                          DADD              ;ADD IT IN.
05 07669    00AB
06 0766A    0001
07 0766B    00E9
08 0766C    0000
09 0766D    00A7
10 0766E    0001
11 0766F    00E7
12 07670    0000
13                          BSR     RDDEC     ;GET CHAR,
14 07671    008D
15 07672    001F
16                          BCC     RDEC      ;LOOP IF DECIMAL DIGIT
17 07673    0024
18 07674    00D7
19                          LDX     X 0       ;GET BUILT UP NUMBER,
20 07675    00EE
21 07676    0000
22 07677    005F            CLRB
23 07678    0039            RTS
24
```

```
!0070 MTOS9
01
02
03
04                      ;GET A HEX DIGIT
05
06                      RDHEX:
07                              JSR     TTI1
08 07679    00BD
09 0767A    0070
10 0767B    0015
11                      CKHEX:
12                              SUBA    # 30    ;STRIP ASCII
13 0767C    0080
14 0767D    0030
15                              BLT     DBAD
16 0767E    002D
17 0767F    0010
18                              CMPA    # 9
19 07680    0081
20 07681    0009
21                              BLE     DGOOD
22 07682    002F
23 07683    000A
24                              SUBA    # 7     ;SEE IF A-F
25 07684    0080
26 07685    0007
27                              CMPA    # 0F
28 07686    0081
29 07687    000F
30                              BGT     DBAD
31 07688    002E
32 07689    0006
33                              CMPA    # 0A
34 0768A    0081
35 0768B    000A
36                              BLT     DBAD
37 0768C    002D
38 0768D    0002
39 0768E    000C DGOOD:     CLC
40 0768F    0039            RTS
41 07690    000D DBAD:      SEC
42 07691    0039            RTS
43
44
45                      ;GET A DECIMAL DIGIT
46
47                      RDDEC:
48                              JSR     TTI1
49 07692    00BD
50 07693    0070
51 07694    0015
52                              SUBA    # 30
53 07695    0080
54 07696    0030
55                              BLT     DBAD
56 07697    002D
57 07698    00F7
58                              CMPA    # 9
59 07699    0081
60 0769A    0009
```

```
 0071 MTOS9
01                          BGT     DBAD
02 0769B    002E
03 0769C    00F3
04                          BRA     DGOOD
05 0769D    0020
06 0769E    00EF
07
08                  ;REPORT AN ERROR,  IF ANY.
09
10                  ERROR:
11 0769F    005D            TSTB                ;IF NONE, DONT BOTHER.
12                          BEQ     NERROR
13 076A0    0027
14 076A1    000F
15                          STAB    XTEMP
16 076A2    00F7
17 076A3    007E
18 076A4    0006
19                          LDX     # ESTRNG
20 076A5    00CE
21 076A6    0076
22 076A7    00C6
23                          JSR     PDATA
24 076A8    00BD
25 076A9    0070
26 076AA    002D
27                          LDX     # XTEMP
28 076AB    00CE
29 076AC    007E
30 076AD    0006
31                          JSR     OUT2H   ;TYPE ERROR #
32 076AE    00BD
33 076AF    0070
34 076B0    0033
35                  NERROR:
36 076B1    0001            NOP
37 076B2    000E            CLI
38                          LDX     RETN
39 076B3    00FE
40 076B4    007E
41 076B5    0017
42                          JMP     X 0
43 076B6    006E
44 076B7    0000
45
46
47
48                  ;TYPE CR,LF,PROMPT
49
50                  CRLFPT:
51                          LDX     # PSTRNG
52 076B8    00CE
53 076B9    0076
54 076BA    00BF
55                          JSR     PDATA
56 076BB    00BD
57 076BC    0070
58 076BD    002D
59 076BE    0039            RTS
60
```

```
!0073 MTOS9
01
02
03
04                      ;DONT HAVE A TEXT PSEUDO-OP!
05
06                      PSTRNG:
07  076BF   000D                0D
08  076C0   000A                0A
09  076C1   0000                0
10  076C2   0020                20
11  076C3   002A                "*
12  076C4   0020                20
13  076C5   0004                4
14
15                      ESTRNG:
16  076C6   000D                0D
17  076C7   000A                0A
18  076C8   0000                0
19  076C9   0020                20
20  076CA   003E                ">
21  076CB   0020                20
22  076CC   0007                7
23  076CD   0004                4
24
25                      LSTRNG:
26  076CE   000D                0D
27  076CF   000A                0A
28  076D0   0000                0
29  076D1   0020                20
30  076D2   0020                20
31  076D3   0004                4
32                      PMPT:
33  076D4   000C                0C          ;CLEAR SCREEN
34  076D5   000D                0D
35  076D6   000A                0A
36  076D7   0000                0
37  076D8   004D                "M
38  076D9   0054                "T
39  076DA   004F                "O
40  076DB   0053                "S
41  076DC   0039                "9
42  076DD   0039                "9
43  076DE   0004                4
```

```
0074 MTOS9
01
02
03
04                ;LIST SUBROUTINE.  PART OF MTOS99 DEVICE DRIVERS.
05
06
07                LIST:
08                        LDX     # LSTRNG
09 076DF    00CE
10 076E0    0076
11 076E1    00CE
12                        JSR     PDATA
13 076E2    00BD
14 076E3    0070
15 076E4    002D
16                        LDX     # RECD
17 076E5    00CE
18 076E6    007E
19 076E7    0024
20                        BSR     OUTDEC  ;TYPE RECD # IN DECIMAL.
21 076E8    008D
22 076E9    0056
23
24                        CLR     XTEMP   ;COLUMN COUNTER.
25 076EA    007F
26 076EB    007E
27 076EC    0006
28                        LDAA    # 10.    ;START AT COLUMN 10,
29 076ED    0086
30 076EE    000A
31                        LDAB    # 10.    ;TYPE 10 CHARS,
32 076EF    00C6
33 076F0    000A
34                        LDX     # NAME  ;TYPE NAME
35 076F1    00CE
36 076F2    007E
37 076F3    0026
38                        BSR     OUTSTR
39 076F4    008D
40 076F5    0039
41
42                        LDAA    # ".     ;TYPE DOT,
43 076F6    0086
44 076F7    002E
45                        JSR     OUTEE
46 076F8    00BD
47 076F9    0070
48 076FA    002A
49
50                        LDAB    # 3
51 076FB    00C6
52 076FC    0003
53                        LDX     # EXTN  ;TYPE EXTENSION.
54 076FD    00CE
55 076FE    007E
56 076FF    0030
57                        JSR     OS0
58 07700    00BD
59 07701    0077
60 07702    0032
```

```
 0075 MTOS9
01
02                              LDAA    # 30.
03 07703   0086
04 07704   001E
05                              LDAB    # 8.     ;TYPE DATE
06 07705   00C6
07 07706   0008
08                              LDX     # DATE
09 07707   00CE
10 07708   007E
11 07709   0033
12                              JSR     OUTSTR
13 0770A   00BD
14 0770B   0077
15 0770C   002F
16
17                              LDAA    # 40.
18 0770D   0086
19 0770E   0028
20                              JSR     CTAB
21 0770F   00BD
22 07710   0077
23 07711   00A8
24
25                              LDX     # LOAD   ;THESE DONT COUNT COLUMNS.
26 07712   00CE
27 07713   007E
28 07714   003B
29                              JSR     OUT4H   ;TYPE LOAD ADR.
30 07715   00BD
31 07716   0070
32 07717   0030
33                              JSR     OUT4H   ;TYPE RUN ADR.
34 07718   00BD
35 07719   0070
36 0771A   0030
37 0771B   0008                 INX
38                              JSR     OUT2H   ;TYPE BYTE COUNT
39 0771C   00BD
40 0771D   0070
41 0771E   0033
42                              TST     LINK
43 0771F   007D
44 07720   007E
45 07721   003F
46                              BEQ     LST2    ;TYPE T IF LINK SET.
47 07722   0027
48 07723   0004
49                              LDAA    # "T
50 07724   0086
51 07725   0054
52                              BRA     LST3
53 07726   0020
54 07727   0002
55                      LST2:   LDAA    # "F
56 07728   0086
57 07729   0046
                        LST3:   JSR     OUTEE   ;TYPE T OR F.
   0772A   00BD
   0772B   0070
```

```
 0076 MTOS9
01 0772C   002A
02 0772D   005F          CLRB
03 0772E   0039          RTS
04
05
06                ;OUTPUT STRING
07
08                OUTSTR:
09                       JSR      CTAB
10 0772F   00BD
11 07730   0077
12 07731   00A8
13                OS0:   LDAA     X 0
14 07732   00A6
15 07733   0000
16                       CMPA     # 20
17 07734   0081
18 07735   0020
19                       BLT      OS1      ;DONT OUTPUT NON-PRINTING
20 07736   002D
21 07737   0003
22                       JSR      COUT
23 07738   00BD
24 07739   0077
25 0773A   0099
26 0773B   0008 OS1:     INX
27 0773C   005A          DECB
28                       BNE      OS0
29 0773D   0026
30 0773E   00F3
31 0773F   0039          RTS
```

```
!0077 MTOS9
01
02
03
04                ;OUTPUT A DOUBLE PREC.  BINARY # TO THE TELETYPE IN DECIMAL.
05
06                OUTDEC:
07                        LDAA    X 0
08 07740    00A6
09 07741    0000
10                        LDAB    X 1
11 07742    00E6
12 07743    0001
13
14                        LDX     # 10000.          ;COUNT OFF EACH DECADE,
15 07744    00CE
16 07745    0027
17 07746    0010
18                        BSR     CDECADE
19 07747    008D
20 07748    002E
21 07749    0036          PSHA
22                        LDAA    XTEMP             ;TYPE DIGIT,
23 0774A    00B6
24 0774B    007E
25 0774C    0006
26                        BSR     HOUT
27 0774D    008D
28 0774E    0048
29 0774F    0032          PULA
30
31                        LDX     # 1000.           ;REPEAT FOR ALL DIGITS.
32 07750    00CE
33 07751    0003
34 07752    00E8
35                        BSR     CDECADE
36 07753    008D
37 07754    0022
38 07755    0036          PSHA
39                        LDAA    XTEMP
40 07756    00B6
41 07757    007E
42 07758    0006
43                        BSR     HOUT
44 07759    008D
45 0775A    003C
46 0775B    0032          PULA
47
48                        LDX     # 100.
49 0775C    00CE
50 0775D    0000
51 0775E    0064
52                        BSR     CDECADE
53 0775F    008D
54 07760    0016
55 07761    0036          PSHA
56                        LDAA    XTEMP
57 07762    00B6
58 07763    007E
59 07764    0006
60                        BSR     HOUT
```

```
 0078 MTOS9
01 07765   008D
02 07766   0030
03 07767   0032          PULA
04
05                      LDX     # 10.
06 07768   00CE
07 07769   0000
08 0776A   000A
09                      BSR     CDECADE
10 0776B   008D
11 0776C   000A
12 0776D   0037          PSHB
13                      LDAA    XTEMP
14 0776E   00B6
15 0776F   007E
16 07770   0006
17                      BSR     HOUT
18 07771   008D
19 07772   0024
20 07773   0032          PULA
21
22                      BSR     HOUT            ;WHATS LEFT IS ONES.
23 07774   008D
24 07775   0021
25 07776   0039          RTS
```

```
!0079 MTOS9
01
02
03
04                      CDECADE:
05                              CLR     XTEMP   ;DIGIT CNTR
06 07777    007F
07 07778    007E
08 07779    0006
09                              STX     XTEMP2
10 0777A    00FF
11 0777B    007E
12 0777C    0008
13                              LDX     # XTEMP2        ;POINT TO CONSTANT,
14 0777D    00CE
15 0777E    007E
16 0777F    0008
17                      COUNT:  BSR     SUB16           ;KEEP SUBTRACTING
18 07780    008D
19 07781    0010
20                              INC     XTEMP           ;TIL UNDERFLOW
21 07782    007C
22 07783    007E
23 07784    0006
24                              BCC     COUNT
25 07785    0024
26 07786    00F9
27                              DEC     XTEMP           ;OFLO SAYS WE WENT TOO FAR.
28 07787    007A
29 07788    007E
30 07789    0006
31                              BSR     ADD16           ;ADD # IN AGAIN TO RESTORE.
32 0778A    008D
33 0778B    0001
34 0778C    0039            RTS
35
36                      ADD16:
37                              ADDB    X 1     ;ADD LEASTS,
38 0778D    00EB
39 0778E    0001
40                              ADCA    X 0     ;ADD MOSTS+CARRY, LEAVE SET.
41 0778F    00A9
42 07790    0000
43 07791    0039            RTS
44
45                      SUB16:
46                              SUBB    X 1
47 07792    00E0
48 07793    0001
49                              SBCA    X 0
50 07794    00A2
51 07795    0000
52 07796    0039            RTS
53
54                      ;TYPE BCD
55
56                      HOUT:
57                              ADDA    # 30
58 07797    008B
59 07798    0030
60
```

```
 0080 MTOS9
01                ;OUTPUT AND COUNT COLUMNS
02
03                COUT:
04                          STX       XTEMP2
05  0779?    00FF
06  0779A    007E
07  0779B    0008
08  0779C    0037          PSHB
09                          JSR       OUTEE
10  0779D    00BD
11  0779E    0070
12  0779F    002A
13  077A0    0033          PULB
14                          LDX       XTEMP2
15  077A1    00FE
16  077A2    007E
17  077A3    0008
18                          INC       XTEMP
19  077A4    007C
20  077A5    007E
21  077A6    0006
22  077A7    0039          RTS
23
24                ;TAB TO COLUMN(AC(A))
25
26                CTAB:
27  077A8    0036          PSHA
28                          LDAA      # 20
29  077A9    0086
30  077AA    0020
31                          BSR       COUT
32  077AB    008D
33  077AC    00EC
34  077AD    0032          PULA
35                          CMPA      XTEMP
36  077AE    00B1
37  077AF    007E
38  077B0    0006
39                          BNE       CTAB
40  077B1    0026
41  077B2    00F5
42  077B3    0039          RTS
```

```
!0081 MTOS9
01
02
03
04              ;*****************************************************************
05              ;*                                                               *
06              ;*                          ISR                                  *
07              ;*                                                               *
08              ;*                        5-8-79                                 *
09              ;*                                                               *
10              ;*****************************************************************
11
12
13
                        .TITL   ISR
15
16
17              ;INTERRUPT SERVICE ROUTINE FOR MTOS99.
18
19
20
21
22
```

```
!0082 MTOS9
01
02
03
04                ;       FORK OFF STUFF TO INTERRUPT HANDLERS,
05                ;       EXCEPT DO THE TTY STUFF OURSELVES.
06
07
08                ISR:
09                        LDAA    IOPORT  ;GET ACIA STATUS,
10 077B4    00B6
11 077B5    0080
12 077B6    0000
13                        BITA    # 81    ;SEE IF TTI
14 077B7    0085
15 077B8    0081
16                        BEQ     NTTY
17 077B9    0027
18 077BA    0025
19                        ;TELETYPE
20                                LDAA    IOPORT+1        ;GET THE CHAR
21 077BB    00B6
22 077BC    0080
23 077BD    0001
24                                ANDA    # 07F
25 077BE    0084
26 077BF    007F
27                                STAA    CHAR    ;SAVE CHAR FOR INEEE
28 077C0    00B7
29 077C1    007E
30 077C2    000C
31                                CMPA    # 1     ;CNTRL-A?
32 077C3    0081
33 077C4    0001
34                                BNE     TTSR1
35 077C5    0026
36 077C6    0006
37                                        LDAB    # -1     ;SET HLT FLAG,
38 077C7    00C6
39 077C8    00FF
40                                        STAB    HLTFLG
41 077C9    00F7
42 077CA    007E
43 077CB    0010
44 077CC    003B                          RTI
45
46                                                ;COLD START.
47                TTSR1:          CMPA    # 3               ;CNTRL-C?
48 077CD    0081
49 077CE    0003
50                                BNE     TTSR2
51 077CF    0026
52 077D0    000B
53                                        TST     HLTFLG  ;AND FLAG SET?
54 077D1    007D
55 077D2    007E
56 077D3    0010
57                                        BEQ     TTSR2   ;IF ...
58 077D4    0027
59 077D5    0006
60                                        LDX     RETN
```

```
 0083 MTOS9
01 077D6   00FE
02 077D7   007E
03 077D8   0017
04                                  JMP     X 0
05 077D9   006E
06 077DA   0000
07 077DB   003F                     SWI
08
09              ;                   JUST ANY OLD CHARACTER.
10
11              TTSR2:              CLR     HLTFLG
12 077DC   007F
13 077DD   007E
14 077DE   0010
15 077DF   003B                     RTI
16
17              ;NOT THE TELETYPE.
18
19              NTTY:
20              ;*************************************************************
21              ;*************************************************************
22              ;*************************************************************
23
24              ;INTERRUPT GAP SERVICE.  DECREMENT NGAPS UPON
25              ;RECEIPT OF AN INTERRUPT.
26
27              GAPISR: LDAA    MTRD    ;RESET REQUEST
28 077E0   00B6
29 077E1   0080
30 077E2   0012
31                      LDX     # NGAPS ;DEC # GAPS
32 077E3   00CE
33 077E4   007E
34 077E5   0004
35                      JSR     DECMENT ;EACH TIME THE HARDWARE
36 077E6   00BD
37 077E7   0075
38 077E8   00CD
39 077E9   003B         RTI             ;DETECTS DATA DROPOUT.
```

```
!0084 MTOS9
01
02
03
04                ;*****************************************************************
05                ;*                                                               *
06                ;*                WRITABLE AREA ALLOCATION                       *
07                ;*                    FOR MTOS99                                 *
08                ;*                                                               *
09                ;*                5-8-79                                         *
10                ;*                                                               *
11                ;*****************************************************************
12
13
                          .TITL   STACK
15
```

```
!0085 MTOS9
01
02                  ;WRITABLE AREA ALLOCATION
03
04                  ;SYSTEM VARIABLES
05
06          7DFF            .LOC    COLD+0FFF-200   ;512 BYTES
07
08
09 07DFF    0002 FORKP:     .BLK    2           ;POINTER TO FORK
10 07E01    0001 OURSUM:    .BLK    1           ;LOAD CHECKSUM
11 07E02    0002 RECORD:    .BLK    2           ;CURRENT RECD #
12 07E04    0002 NGAPS:     .BLK    2           ;# OF GAPS TO DESTINATION.
13 07E06    0002 XTEMP:     .BLK    2           ;TEMP
14 07E08    0002 XTEMP2:    .BLK    2           ;DITTO
15 07E0A    0002 GTEMP:     .BLK    2           ;DITTO DITTO
16 07E0C    0001 CHAR:      .BLK    1           ;CHARACTER INPUT FROM ISR,
17                          ;                   USED BY INEEE.
18 07E0D    0001 CALLTYPE:          .BLK    1           ;DEBUG
19 07E0E    0001 INTFLG:    .BLK    1           ;INTERRUPT OFF FLAG
20 07E0F    0001 RPTFLG:    .BLK    1           ;USED IN LISTING
21 07E10    0001 HLTFLG:    .BLK    1           ;STOP CURRENT OPERATION
22
23
24                  ;USER SETTABLE PARAMETERS
25
26 07E11    0002 LOWADR:    .BLK    2           ;LOW ADDRESS
27 07E13    0002 HIADR:     .BLK    2           ;HIGH ADDRESS
28 07E15    0002 ALTADR:    .BLK    2           ;ALT LOAD ADDRESS
29 07E17    0002 RETN:      .BLK    2           ;ABORT RETURN ADDR
30
31 07E19    0002 DESTR:     .BLK    2           ;DESINATION RECORD
32 07E1B    0002 NRECDS:    .BLK    2           ;# OF RECDS TO LOAD
33
34                  ;NOTE: ALTFLG MUST BE FIRST
35 07E1D    0001 ALTFLG:    .BLK    1           ;LOAD TO ALTADR FLG
36 07E1E    0001 LNKFLG:    .BLK    1           ;DONTLOAD ALL LINKED RECD FLAG
37 07E1F    0001 NLDFLG:    .BLK    1           ;NO-LOAD TO MEMORY FLAG
38 07E20    0001 LSTFLG:    .BLK    1           ;LIST ATTRIBUTES FLAG
39 07E21    0001 RUNFLG:    .BLK    1           ;DONTRUN AFTER LOAD FLAG
40 07E22    0001 KFOFLG:    .BLK    1           ;KEEP FILE OPEN FLAG
41
42
43
44                  ;TAPE DATA BLOCK AREA
45                  ;THESE MUST BE CONTIGOUS
46
47 07E23    0001 FSYNC:     .BLK    1           ;1ST BYTE READ
48 07E24    0002 RECD:      .BLK    2           ;CURRENTLY OPEN RCD #
49 07E26    000A NAME:      .BLK    10.         ;FILENAME
50 07E30    0003 EXTN:      .BLK    3           ;FILENAME EXTENSION
51 07E33    0008 DATE:      .BLK    8           ;TIME, DATE
52 07E3B    0002 LOAD:      .BLK    2           ;LOAD ADDRESS
53 07E3D    0002 RUN:       .BLK    2           ;START ADDRESS
54 07E3F    0001 LINK:      .BLK    1           ;LINKS MULT. RCDS/FILE
55 07E40    0001 BYTCNT:    .BLK    1           ;DATA BYTE COUNT
56 07E41    00FF DATABK:    .BLK    255.        ;DATA BLOCK
57 07F40    0001 CHKSUM:    .BLK    1           ;CHECKSUM
58 07F41    0001            .BLK    1           ;FUDGE FACTOR
59
60                  ;STACK ALLOCATION
```

```
 0086 MTOS9
01
02
03          7FF7 STACK=  COLD+0FFF-8
04
05
06
                         .TITL   MTOS99
08          7F42         ..HI=   .          ;FOR XLDR
09                       .END

**00000 TOTAL ERRORS, 00000 PASS 1 ERRORS
```

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| ADCA | 000FBF | MC | 61/17 | 79/40 | | | | | |
| ADCB | 001097 | MC | 41/05 | 68/54 | 69/07 | | | | |
| ADD16 | 00778D | | 79/33 | 79/36 | | | | | |
| ADDA | 000B6C | MC | 41/01 | 46/09 | 54/18 | 68/52 | 69/05 | 79/57 | |
| ADDB | 000BD8 | MC | 61/14 | 79/37 | | | | | |
| ALLDO | 007461 | | 49/45 | 49/57 | | | | | |
| ALTAD | 007E15 | | 18/56 | 18/57 | 55/16 | 55/17 | 55/55 | 55/56 | 85/28 |
| ALTFL | 007E1D | | 17/24 | 17/25 | 19/40 | 19/41 | 39/27 | 39/28 | 55/02 |
| | | | 55/03 | 85/35 | | | | | |
| ALTX | 000000 | | 17/05 | 17/06 | 18/39 | | | | |
| ANDA | 001103 | MC | 47/47 | 48/08 | 52/03 | 53/11 | 82/24 | | |
| ANDB | 001247 | MC | 52/30 | 53/39 | 58/11 | | | | |
| ASL | 0006EC | MC | 41/08 | 66/50 | 68/32 | 68/42 | 68/47 | | |
| BCC | 00089C | MC | 40/52 | 67/10 | 69/16 | 79/24 | | | |
| BCS | 000C44 | MC | 66/44 | 68/24 | | | | | |
| BEQ | 00020E | MC | 13/44 | 14/18 | 15/17 | 18/47 | 20/46 | 26/36 | 30/13 |
| | | | 30/19 | 30/55 | 32/27 | 33/19 | 36/48 | 39/42 | 39/49 |
| | | | 41/24 | 45/13 | 49/43 | 54/38 | 55/26 | 56/05 | 58/15 |
| | | | 59/06 | 59/17 | 59/23 | 63/46 | 66/12 | 71/12 | 75/46 |
| | | | 82/16 | 82/57 | | | | | |
| BGT | 000B3F | MC | 70/30 | 71/01 | | | | | |
| BITA | 00116F | MC | 33/16 | 36/45 | 59/20 | 63/43 | 82/13 | | |
| BITB | 0012E0 | MC | 59/14 | 59/26 | | | | | |
| BLE | 00040A | MC | 70/21 | | | | | | |
| BLT | 000C71 | MC | 70/15 | 70/36 | 70/55 | 76/19 | | | |
| BMI | 000B12 | MC | 47/07 | 51/54 | 52/22 | 53/03 | 53/31 | | |
| BNE | 00057B | MC | 13/23 | 15/23 | 15/33 | 15/43 | 15/53 | 16/03 | 16/13 |
| | | | 17/32 | 17/44 | 17/56 | 18/08 | 18/20 | 18/34 | 19/50 |
| | | | 20/19 | 21/05 | 21/50 | 21/60 | 22/38 | 22/48 | 23/09 |
| | | | 24/24 | 26/14 | 30/25 | 30/35 | 30/45 | 34/18 | 36/11 |
| | | | 36/24 | 36/37 | 38/13 | 38/26 | 38/38 | 38/51 | 39/08 |
| | | | 39/30 | 40/18 | 41/39 | 42/18 | 42/25 | 43/16 | 45/24 |
| | | | 45/35 | 46/17 | 48/28 | 49/05 | 52/51 | 54/01 | 54/26 |
| | | | 54/49 | 55/04 | 55/58 | 56/15 | 56/28 | 56/51 | 57/09 |
| | | | 57/22 | 57/43 | 59/29 | 59/41 | 59/50 | 59/54 | 63/16 |
| | | | 63/39 | 66/57 | 76/28 | 80/39 | 82/34 | 82/50 | |
| BOT | 000004 | | 29/08 | 36/47 | | | | | |
| BPL | 000313 | MC | 47/14 | 47/58 | 48/19 | 52/14 | 52/40 | 53/23 | 53/50 |
| BRA | 000070 | MC | 12/29 | 16/20 | 17/38 | 17/50 | 18/02 | 18/14 | 18/27 |
| | | | 21/53 | 22/41 | 23/03 | 32/31 | 45/27 | 49/15 | 55/11 |
| | | | 57/01 | 57/46 | 58/36 | 66/15 | 71/04 | 75/52 | |
| BSR | 0003DD | MC | 13/38 | 15/11 | 32/36 | 33/22 | 34/32 | 66/41 | 67/07 |
| | | | 68/21 | 69/13 | 74/20 | 74/38 | 77/18 | 77/26 | 77/35 |
| | | | 77/43 | 77/52 | 77/60 | 78/09 | 78/17 | 78/22 | 79/17 |
| | | | 79/31 | 80/31 | | | | | |
| BYTCN | 007E40 | | 24/22 | 24/23 | 44/23 | 44/24 | 45/53 | 45/54 | 55/24 |
| | | | 55/25 | 85/55 | | | | | |
| CALLT | 007E0D | | 30/10 | 30/11 | 85/18 | | | | |
| CDECA | 007777 | | 77/20 | 77/37 | 77/54 | 78/11 | 79/04 | | |
| CHAR | 007E0C | | 14/16 | 14/17 | 14/23 | 14/24 | 14/27 | 14/28 | 82/29 |
| | | | 82/30 | 85/16 | | | | | |
| CHKSU | 007F40 | | 32/25 | 32/26 | 44/27 | 44/28 | 46/15 | 46/16 | 46/22 |
| | | | 46/23 | 51/13 | 51/14 | 51/41 | 54/24 | 54/25 | 54/35 |
| | | | 54/36 | 85/57 | | | | | |
| CKDRV | 0073DF | | 45/29 | 45/37 | 45/43 | | | | |
| CKL | 00767C | | 66/43 | 70/11 | | | | | |
| CKLP | 0073EC | | 46/09 | 46/19 | | | | | |
| CKNLS | 00756C | | 56/07 | 57/11 | 57/54 | | | | |
| CLLIN | 0073D7 | | 45/15 | 45/31 | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| CLR | 0011DB | MC | 14/25 | 19/42 | 24/16 | 32/20 | 32/46 | 34/13 | 37/13 |
| | | | 44/12 | 44/21 | 44/25 | 45/38 | 47/28 | 51/07 | 51/11 |
| | | | 66/29 | 66/33 | 68/09 | 68/13 | 74/24 | 79/05 | 83/11 |
| CLRTD | 007193 | | 20/08 | 20/09 | 24/11 | 24/26 | | | |
| CM | 0009A1 | MC | 13/20 | 13/41 | 15/14 | 15/20 | 15/30 | 15/40 | 15/50 |
| | | | 15/60 | 16/10 | 17/29 | 17/41 | 17/53 | 18/05 | 18/17 |
| | | | 18/31 | 18/44 | 20/16 | 20/43 | 21/57 | 22/45 | 23/06 |
| | | | 26/11 | 30/16 | 30/22 | 30/32 | 30/42 | 30/52 | 54/33 |
| | | | 66/09 | 70/18 | 70/27 | 70/33 | 70/58 | 76/16 | 80/35 |
| | | | 82/31 | 82/47 | | | | | |
| CMPB | 000A0D | MC | 45/21 | | | | | | |
| COLD | 007000 | | 12/05 | 85/06 | 86/03 | | | | |
| COM | 000DE2 | MC | 44/16 | 49/08 | | | | | |
| COUNT | 007780 | | 79/17 | 79/26 | | | | | |
| COUT | 007799 | | 76/24 | 76/25 | 80/03 | 80/33 | | | |
| CPX | 00134C | MC | 19/46 | 24/20 | 32/23 | 39/38 | 45/09 | 46/13 | 49/39 |
| | | | 54/22 | | | | | | |
| CRLFP | 0076B8 | | 15/09 | 15/10 | 71/50 | | | | |
| CTAB | 0077A8 | | 75/22 | 75/23 | 76/11 | 76/12 | 80/26 | 80/41 | |
| DADD | 0013C4 | MC | 68/51 | 69/04 | | | | | |
| DATAB | 007E41 | | 44/31 | 44/32 | 47/34 | 51/34 | 51/41 | 54/54 | 54/55 |
| | | | 85/56 | | | | | | |
| DATE | 007E33 | | 22/12 | 22/13 | 75/10 | 75/11 | 85/51 | | |
| DBAD | 007690 | | 70/17 | 70/32 | 70/38 | 70/41 | 70/57 | 71/03 | |
| DEC | 00023B | MC | 21/01 | 21/46 | 22/34 | 52/47 | 53/57 | 79/27 | |
| DEC16 | 00763F | | 66/14 | 68/08 | | | | | |
| DECME | 0075CD | | 38/48 | 38/49 | 62/08 | 83/37 | 83/38 | | |
| DELAY | 0075A5 | | 36/56 | 36/57 | 49/51 | 49/52 | 59/40 | | |
| DESTR | 007E19 | | 19/11 | 19/12 | 23/31 | 23/32 | 25/17 | 25/18 | 32/57 |
| | | | 32/58 | 40/35 | 40/36 | 40/39 | 40/40 | 43/21 | 43/22 |
| | | | 85/31 | | | | | | |
| DGOOD | 00768E | | 70/23 | 70/39 | 71/06 | | | | |
| DLDA | 0013CD | MC | 68/36 | | | | | | |
| DLY1 | 0075A9 | | 59/43 | 59/46 | 59/56 | | | | |
| DLY2 | 0075AB | | 59/49 | 59/52 | | | | | |
| DOIT | 0075A1 | | 59/08 | 59/25 | 59/32 | | | | |
| DREAD | 0071DE | | 16/08 | 16/09 | 27/07 | | | | |
| DSHL | 0013BC | MC | 68/31 | 68/41 | 68/46 | | | | |
| ERROR | 00769F | | 19/35 | 19/36 | 24/07 | 24/08 | 25/28 | 25/29 | 25/49 |
| | | | 25/50 | 26/53 | 26/54 | 27/20 | 27/21 | 27/50 | 27/51 |
| | | | 66/24 | 66/25 | 71/10 | | | | |
| ESTRN | 0076C6 | | 71/21 | 71/22 | 73/15 | | | | |
| EXTN | 007E30 | | 21/24 | 21/25 | 74/55 | 74/56 | 85/50 | | |
| FK0 | 007206 | | 30/22 | | | | | | |
| FK1 | 00720D | | 30/27 | 30/32 | | | | | |
| FK2 | 007214 | | 30/37 | 30/42 | | | | | |
| FK3 | 00721B | | 30/47 | 30/52 | | | | | |
| FLAGS | 008010 | | 29/22 | 33/13 | 33/14 | 34/08 | 34/09 | 34/26 | 34/27 |
| | | | 36/42 | 36/43 | 47/05 | 47/06 | 47/12 | 47/13 | 47/22 |
| | | | 47/23 | 47/26 | 47/27 | 47/56 | 47/57 | 48/03 | 48/04 |
| | | | 48/17 | 48/18 | 48/24 | 48/25 | 49/24 | 49/25 | 59/11 |
| | | | 59/12 | | | | | | |
| FORK | 0071FC | | 12/14 | 12/15 | 12/27 | 12/28 | 19/31 | 19/32 | 24/03 |
| | | | 24/04 | 25/24 | 25/25 | 25/45 | 25/46 | 27/16 | 27/17 |
| | | | 30/06 | 35/29 | 35/30 | | | | |
| FORKP | 0071FC | | 30/07 | | | | | | |
| FORKP | 007DFF | | 35/33 | 35/34 | 85/09 | | | | |
| FSYNC | 007E23 | | 19/48 | 19/49 | 24/14 | 24/15 | 47/34 | 47/37 | 47/38 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | 51/18 | 51/19 | 51/34 | 85/47 | | | |
| FWD | 000001 | | 29/10 | 36/29 | 38/18 | 40/27 | 56/43 | 57/35 | |
| GADR | 007504 | | 55/13 | 55/18 | | | | | |
| GALT | 007501 | | 55/06 | 55/14 | | | | | |
| GAP | 000040 | | 29/16 | | | | | | |
| GA[illegible] | 0077E0 | | 83/27 | | | | | | |
| GET16 | 007613 | | 18/52 | 18/53 | 19/07 | 19/08 | 19/19 | 19/20 | 22/57 |
| | | | 22/58 | 23/27 | 23/28 | 23/39 | 23/40 | 23/51 | 23/52 |
| | | | 25/13 | 25/14 | 26/30 | 26/31 | 66/08 | | |
| GHERR | 007619 | | 66/19 | 66/46 | 68/26 | | | | |
| GOTO | 0071BB | | 15/58 | 15/59 | 26/06 | | | | |
| GT1 | 0071CA | | 26/16 | 26/28 | | | | | |
| GT2 | 0071D9 | | 26/38 | 26/48 | | | | | |
| GTEMP | 007E0A | | 66/31 | 66/32 | 66/35 | 66/36 | 66/39 | 66/40 | 68/11 |
| | | | 68/12 | 68/15 | 68/16 | 68/19 | 68/20 | 85/15 | |
| HEX16 | 00761E | | 66/17 | 66/28 | | | | | |
| HIADR | 007E13 | | 23/55 | 23/56 | 45/11 | 45/12 | 49/41 | 49/42 | 85/27 |
| HLTFL | 007E10 | | 63/14 | 63/15 | 63/37 | 63/38 | 82/42 | 82/43 | 82/55 |
| | | | 82/56 | 83/13 | 83/14 | 85/21 | | | |
| HOUT | 007797 | | 77/28 | 77/45 | 78/02 | 78/19 | 78/24 | 79/56 | |
| INC | 0008C9 | MC | 79/20 | 80/18 | | | | | |
| INCME | 0075BA | | 49/33 | 49/34 | 58/04 | 58/05 | 58/31 | 58/32 | 61/06 |
| INEE | 007036 | | 13/18 | 13/19 | 14/10 | | | | |
| INEEE | 00E1AC | | 13/10 | | | | | | |
| INIT | 007222 | | 30/15 | 32/08 | | | | | |
| INIT2 | 007235 | | 32/29 | 32/36 | 40/23 | 40/24 | | | |
| INIT4 | 00724E | | 33/11 | 33/21 | | | | | |
| INIT5 | 00725A | | 30/57 | 32/38 | 34/06 | | | | |
| INIT6 | 00725F | | 34/13 | 34/20 | | | | | |
| INTFL | 007E0E | | 18/25 | 18/26 | 26/22 | 26/23 | 26/34 | 26/35 | 39/47 |
| | | | 39/48 | 85/19 | | | | | |
| IO[illegible]R | 008000 | | 11/12 | 26/46 | 26/47 | 34/55 | 34/56 | 34/59 | 34/60 |
| | | | 82/11 | 82/12 | 82/22 | 82/23 | | | |
| IOVEC | 00A012 | | 13/06 | | | | | | |
| IRQVE | 00A000 | | 29/29 | 34/48 | 34/49 | | | | |
| ISR | 0077B4 | | 34/44 | 34/45 | 82/08 | | | | |
| ISRSE | 007270 | | 33/24 | 34/34 | 34/39 | | | | |
| JMP | 00009D | MC | 13/31 | 13/51 | 13/55 | 13/59 | 14/03 | 15/26 | 15/36 |
| | | | 15/46 | 15/56 | 16/06 | 16/16 | 18/58 | 19/33 | 23/19 |
| | | | 24/05 | 25/26 | 25/47 | 26/51 | 27/18 | 27/48 | 30/28 |
| | | | 30/38 | 30/48 | 49/53 | 54/41 | 58/18 | 66/22 | 71/42 |
| | | | 83/04 | | | | | | |
| JSR | 000F53 | MC | 12/12 | 12/25 | 13/16 | 14/29 | 15/07 | 17/13 | 17/18 |
| | | | 18/40 | 18/50 | 19/05 | 19/13 | 19/17 | 19/29 | 20/06 |
| | | | 20/12 | 20/39 | 21/11 | 21/30 | 22/18 | 22/51 | 22/55 |
| | | | 23/25 | 23/33 | 23/37 | 23/45 | 23/49 | 24/01 | 25/07 |
| | | | 25/11 | 25/22 | 25/36 | 25/43 | 26/07 | 26/24 | 26/28 |
| | | | 26/48 | 27/07 | 27/14 | 27/27 | 27/35 | 27/43 | 32/12 |
| | | | 36/07 | 36/20 | 36/33 | 36/54 | 36/58 | 37/09 | 37/21 |
| | | | 37/29 | 38/09 | 38/22 | 38/33 | 38/46 | 39/02 | 39/55 |
| | | | 40/21 | 41/35 | 42/10 | 43/12 | 49/31 | 49/49 | 49/58 |
| | | | 56/24 | 56/31 | 56/37 | 56/47 | 57/18 | 57/25 | 57/29 |
| | | | 57/39 | 57/54 | 58/02 | 58/29 | 63/29 | 63/56 | 64/04 |
| | | | 64/12 | 70/07 | 70/48 | 71/23 | 71/31 | 71/55 | 74/12 |
| | | | 74/45 | 74/57 | 75/12 | 75/20 | 75/29 | 75/33 | 75/38 |
| | | | 75/58 | 76/09 | 76/22 | 80/09 | 83/35 | | |
| KF[illegible] | 007E22 | | 23/17 | 23/18 | 45/33 | 45/34 | 85/40 | | |
| KFOX | 000005 | | 17/10 | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|
| LDAA | 0005A8 | MC | 12/22 | 14/21 | 19/26 | 21/08 | 23/58 | 25/19 | 25/40 |
| | | | 26/41 | 27/11 | 32/39 | 33/11 | 34/21 | 34/50 | 34/57 |
| | | | 35/05 | 35/11 | 36/14 | 36/27 | 36/40 | 37/03 | 38/16 |
| | | | 38/56 | 39/13 | 40/10 | 40/25 | 40/33 | 41/28 | 41/42 |
| | | | 43/01 | 44/41 | 47/17 | 47/40 | 48/01 | 48/05 | 48/22 |
| | | | 49/19 | 51/32 | 51/39 | 51/58 | 53/06 | 55/33 | 56/18 |
| | | | 56/41 | 57/12 | 57/33 | 59/46 | 61/08 | 62/10 | 63/20 |
| | | | 63/50 | 68/37 | 74/28 | 74/42 | 75/02 | 75/17 | 75/49 |
| | | | 75/55 | 76/13 | 77/07 | 77/22 | 77/39 | 77/56 | 78/13 |
| | | | 80/28 | 82/09 | 82/20 | 83/27 | | | |
| LDAB | 000614 | MC | 17/26 | 20/23 | 21/15 | 22/03 | 23/12 | 26/17 | 30/58 |
| | | | 34/10 | 36/17 | 36/30 | 36/51 | 37/06 | 38/19 | 38/59 |
| | | | 40/37 | 41/32 | 41/55 | 43/09 | 47/32 | 49/12 | 49/46 |
| | | | 52/25 | 53/34 | 55/22 | 56/21 | 56/44 | 56/54 | 57/15 |
| | | | 57/36 | 58/06 | 58/33 | 59/09 | 59/60 | 60/05 | 61/11 |
| | | | 62/13 | 63/26 | 63/53 | 64/01 | 64/09 | 66/19 | 66/47 |
| | | | 68/39 | 69/01 | 74/31 | 74/50 | 75/05 | 77/10 | 82/37 |
| LDS | 000000 | MC | 12/07 | 12/18 | | | | | |
| LDX | 00036D | MC | 13/27 | 17/22 | 19/38 | 20/30 | 20/49 | 21/22 | 21/34 |
| | | | 22/10 | 22/22 | 24/12 | 27/31 | 27/39 | 32/08 | 32/16 |
| | | | 32/51 | 32/59 | 34/06 | 34/42 | 35/01 | 35/19 | 35/27 |
| | | | 37/17 | 37/25 | 38/42 | 39/34 | 41/45 | 43/19 | 44/04 |
| | | | 44/29 | 44/37 | 44/48 | 45/05 | 45/43 | 46/04 | 47/35 |
| | | | 49/27 | 49/35 | 51/16 | 54/13 | 54/52 | 55/07 | 55/14 |
| | | | 55/29 | 55/41 | 57/58 | 58/25 | 66/37 | 67/13 | 68/17 |
| | | | 69/19 | 71/19 | 71/27 | 71/38 | 71/51 | 74/08 | 74/16 |
| | | | 74/34 | 74/53 | 75/08 | 75/25 | 77/14 | 77/31 | 77/48 |
| | | | 78/05 | 79/13 | 80/14 | 82/60 | 83/31 | | |
| LINK | 007E3F | | 44/14 | 44/15 | 44/18 | 44/19 | 45/40 | 45/41 | 57/07 |
| | | | 57/08 | 58/13 | 58/14 | 75/44 | 75/45 | 85/54 | |
| LI[illegible] | 0076DF | | 56/33 | 56/34 | 57/27 | 57/28 | 74/07 | | |
| LM[illegible] | 007524 | | 54/51 | 55/28 | 56/01 | | | | |
| LMOVE | 00750C | | 55/29 | 55/60 | | | | | |
| LNKFL | 007E1E | | 39/23 | 39/24 | 58/08 | 58/09 | 85/36 | | |
| LNKX | 000001 | | 17/06 | 17/07 | 18/13 | | | | |
| LOAD | 007E3B | | 44/10 | 44/11 | 55/09 | 55/10 | 75/27 | 75/28 | 85/52 |
| LOWAD | 007E11 | | 23/43 | 23/44 | 44/06 | 44/07 | 44/39 | 44/40 | 44/46 |
| | | | 44/47 | 45/07 | 45/08 | 45/19 | 45/20 | 49/37 | 49/38 |
| | | | 85/26 | | | | | | |
| LST2 | 007728 | | 75/48 | 75/55 | | | | | |
| LST3 | 00772A | | 75/54 | 75/58 | | | | | |
| LSTFL | 007E20 | | 56/03 | 56/04 | 85/38 | | | | |
| LSTRN | 0076CE | | 27/33 | 27/34 | 37/19 | 37/20 | 73/25 | 74/10 | 74/11 |
| LSTX | 000003 | | 17/08 | 17/09 | 17/37 | | | | |
| MLIST | 00754D | | 56/17 | 57/05 | | | | | |
| MOVE | 0073B4 | | 44/41 | 45/26 | | | | | |
| MTOS9 | 007000 | | 12/04 | | | | | | |
| MTRD | 008012 | | 29/23 | 34/30 | 34/31 | 41/57 | 41/58 | 42/01 | 42/02 |
| | | | 43/06 | 43/07 | 51/52 | 51/53 | 51/60 | 52/01 | 52/12 |
| | | | 52/13 | 52/20 | 52/21 | 52/27 | 52/28 | 52/38 | 52/39 |
| | | | 53/01 | 53/02 | 53/08 | 53/09 | 53/21 | 53/22 | 53/29 |
| | | | 53/30 | 53/36 | 53/37 | 53/48 | 53/49 | 83/29 | 83/30 |
| MTSTA | 008014 | | 29/24 | 32/44 | 32/45 | 32/48 | 32/49 | 37/15 | 37/16 |
| | | | 59/34 | 59/35 | 63/22 | 63/23 | | | |
| MTWRT | 008016 | | 29/25 | 47/52 | 47/53 | 48/13 | 48/14 | | |
| MVERR | 0075B2 | | 59/19 | 59/59 | | | | | |
| MV[illegible] | 0075B6 | | 59/31 | 60/04 | | | | | |
| MVTMP | 00758D | | 36/22 | 36/23 | 36/35 | 36/36 | 37/11 | 37/12 | 38/24 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | 38/25 | 39/04 | 39/05 | 41/37 | 41/38 | 43/14 | 43/15 |
| | | | 56/26 | 56/27 | 56/49 | 56/50 | 57/20 | 57/21 | 57/41 |
| | | | 57/42 | 59/04 | 63/31 | 63/32 | 63/58 | 63/59 | 64/06 |
| | | | 64/07 | 64/14 | 64/15 | | | | |
| NA[illegible] | 007E26 | | 20/32 | 20/33 | 74/36 | 74/37 | 85/49 | | |
| NERRO | 0076B1 | | 71/14 | 71/35 | | | | | |
| NEXTN | 0071E9 | | 16/18 | 16/19 | 27/26 | | | | |
| NGAPS | 007E04 | | 32/18 | 32/19 | 41/14 | 41/15 | 41/18 | 41/19 | 41/22 |
| | | | 41/23 | 42/16 | 42/17 | 42/23 | 42/24 | 83/33 | 83/34 |
| | | | 85/12 | | | | | | |
| NIT1. | 007228 | | 30/21 | 32/16 | | | | | |
| NLDFL | 007E1F | | 39/15 | 39/16 | 54/47 | 54/48 | 85/37 | | |
| NLDX | 000002 | | 17/07 | 17/08 | 17/49 | | | | |
| NLST | 00756F | | 57/03 | 57/48 | 57/58 | | | | |
| NRECD | 007E1B | | 19/23 | 19/24 | 33/05 | 33/06 | 38/44 | 38/45 | 85/32 |
| NTTY | 0077E0 | | 82/18 | 83/19 | | | | | |
| ORAA | 000109 | MC | 39/17 | 39/21 | 39/25 | 40/14 | 41/20 | 61/26 | 62/28 |
| | | | 67/01 | | | | | | |
| OS0 | 007732 | | 74/59 | 74/60 | 76/13 | 76/30 | | | |
| OS1 | 00773B | | 76/21 | 76/26 | | | | | |
| OURSU | 007E01 | | 54/31 | 54/32 | 85/10 | | | | |
| OUT2H | 00E0CA | | 13/08 | 14/05 | 14/06 | | | | |
| OUT2H | 007033 | | 14/03 | 71/33 | 71/34 | 75/40 | 75/41 | | |
| OUT4H | 007030 | | 13/59 | 75/31 | 75/32 | 75/35 | 75/36 | | |
| OUT4H | 00E0C8 | | 13/07 | 14/01 | 14/02 | | | | |
| OUTDE | 007740 | | 27/45 | 27/46 | 37/31 | 37/32 | 74/22 | 77/06 | |
| OUTEE | 00E1D1 | | 13/09 | 13/53 | 13/54 | | | | |
| OUTEE | 00702A | | 13/51 | 14/31 | 14/32 | 21/13 | 21/14 | 74/47 | 74/48 |
| | | | 75/60 | 76/01 | 80/11 | 80/12 | | | |
| OU[illegible]T | 00772F | | 74/40 | 75/14 | 75/15 | 76/08 | | | |
| OV[illegible] | 000010 | | 29/14 | | | | | | |
| PDATA | 00E07E | | 13/11 | 13/57 | 13/58 | | | | |
| PDATA | 00702D | | 13/55 | 27/37 | 27/38 | 32/14 | 32/15 | 37/23 | 37/24 |
| | | | 71/25 | 71/26 | 71/57 | 71/58 | 74/14 | 74/15 | |
| PMPT | 0076D4 | | 32/10 | 32/11 | 73/32 | | | | |
| PORT2 | 008008 | | 11/13 | 35/03 | 35/04 | | | | |
| PROT | 000002 | | 29/07 | 59/28 | | | | | |
| PSTRN | 0076BF | | 71/53 | 71/54 | 73/06 | | | | |
| R1LOO | 00747B | | 51/48 | 52/53 | | | | | |
| R2LOO | 0074A8 | | 52/57 | 54/03 | | | | | |
| R3LOO | 0074D9 | | 54/18 | 54/28 | | | | | |
| R3SK | 0074EC | | 54/40 | 54/45 | | | | | |
| RB1 | 00747B | | 51/50 | 51/56 | | | | | |
| RB2 | 007489 | | 52/10 | 52/16 | | | | | |
| RB3 | 00748E | | 52/18 | 52/24 | | | | | |
| RB4 | 00749C | | 52/36 | 52/42 | | | | | |
| RB5 | 0074A8 | | 52/59 | 53/05 | | | | | |
| RB6 | 0074B6 | | 53/19 | 53/25 | | | | | |
| RB7 | 0074BB | | 53/27 | 53/33 | | | | | |
| RB8 | 0074C9 | | 53/46 | 53/52 | | | | | |
| RDDEC | 007692 | | 68/23 | 69/15 | 70/47 | | | | |
| RDEC | 00764C | | 68/28 | 69/18 | | | | | |
| RDHEX | 007679 | | 67/09 | 70/06 | | | | | |
| RDN | 007323 | | 39/10 | 39/32 | 39/44 | 39/58 | | | |
| RDNEX | 00762B | | 66/47 | 66/59 | 67/12 | | | | |
| RD[illegible] | 000001 | | 29/06 | 33/18 | 59/16 | | | | |
| REA[illegible] | 0072DB | | 30/30 | 30/31 | 38/09 | | | | |
| READR | 0072E9 | | 38/33 | 38/53 | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|
| RECD | 007E24 | | 45/49 | 45/50 | 46/06 | 46/07 | 54/15 | 54/16 | 74/18 | |
| | | | 74/19 | 85/48 | | | | | | |
| RECOR | 007E02 | | 27/41 | 27/42 | 33/09 | 33/10 | 37/27 | 37/28 | 40/12 | |
| | | | 40/13 | 40/16 | 40/17 | 40/45 | 40/46 | 40/49 | 40/50 | |
| | | | 41/53 | 41/54 | 43/25 | 43/26 | 45/45 | 45/46 | 49/29 | |
| | | | 49/30 | 57/60 | 58/01 | 58/27 | 58/28 | 85/11 | | |
| RERRC | 007583 | | 54/43 | 54/44 | 58/25 | | | | | |
| RETN | 007E17 | | 13/29 | 13/30 | 35/25 | 35/26 | 71/40 | 71/41 | 83/02 | |
| | | | 83/03 | 85/29 | | | | | | |
| REV | 000002 | | 29/11 | | | | | | | |
| RFERR | 0072F7 | | 38/15 | 38/28 | 38/40 | 38/55 | | | | |
| RNM | 007581 | | 56/30 | 56/53 | 57/24 | 57/45 | 58/17 | 58/22 | 58/38 | |
| ROFWD | 00734F | | 40/54 | 41/12 | | | | | | |
| ROL | 0007C4 | MC | 66/53 | 68/34 | 68/44 | 68/49 | | | | |
| ROPEN | 007325 | | 30/50 | 30/51 | 36/09 | 36/10 | 38/11 | 38/12 | 40/08 | |
| ROPEN | 007332 | | 40/20 | 40/25 | | | | | | |
| RPTFL | 007E0F | | 51/09 | 51/10 | 56/13 | 56/14 | 56/59 | 56/60 | 85/20 | |
| RRCD | 007466 | | 38/35 | 38/36 | 51/06 | | | | | |
| RUN | 007E3D | | 23/01 | 23/02 | 39/36 | 39/37 | 85/53 | | | |
| RUNFL | 007E21 | | 39/19 | 39/20 | 85/39 | | | | | |
| RUNIT | 007321 | | 39/51 | 39/54 | | | | | | |
| RUNX | 000004 | | 17/09 | 17/10 | 18/01 | | | | | |
| RWD | 000004 | | 29/12 | 32/41 | | | | | | |
| RWND | 0071B0 | | 15/48 | 15/49 | 25/35 | | | | | |
| SBCA | 000C9E | MC | 62/19 | 79/49 | | | | | | |
| SBCB | 000D76 | MC | 40/47 | | | | | | | |
| SGD | 007396 | | 41/26 | 41/41 | 43/18 | 43/27 | | | | |
| SRCD | 007469 | | 51/11 | 58/20 | 58/21 | | | | | |
| STAA | 000830 | MC | 20/53 | 21/38 | 22/26 | 26/44 | 30/08 | 32/42 | 34/24 | |
| | | | 34/28 | 34/53 | 35/08 | 35/14 | 40/28 | 41/16 | 41/59 | |
| | | | 43/04 | 44/52 | 46/20 | 47/24 | 47/50 | 48/11 | 49/22 | |
| | | | 51/35 | 51/42 | 52/44 | 53/54 | 54/29 | 55/45 | 59/32 | |
| | | | 61/20 | 62/22 | 67/04 | 68/56 | 69/09 | 82/27 | | |
| STAB | 000935 | MC | 17/35 | 17/47 | 17/59 | 18/11 | 18/23 | 18/37 | 20/26 | |
| | | | 21/18 | 22/06 | 23/15 | 26/20 | 41/12 | 45/51 | 56/57 | |
| | | | 61/23 | 62/25 | 68/58 | 69/11 | 71/15 | 82/40 | | |
| STACK | 007FF7 | | 12/09 | 12/10 | 12/20 | 12/21 | 86/03 | | | |
| STPNW | 0075E0 | | 42/12 | 42/13 | 49/60 | 50/01 | 56/39 | 56/40 | 57/31 | |
| | | | 57/32 | 57/56 | 57/57 | 63/08 | | | | |
| STROB | 000010 | | 29/18 | | | | | | | |
| STX | 00050F | MC | 18/54 | 19/09 | 19/21 | 20/34 | 20/57 | 21/26 | 21/42 | |
| | | | 22/14 | 22/30 | 22/59 | 23/29 | 23/41 | 23/53 | 25/15 | |
| | | | 32/55 | 33/03 | 33/07 | 34/46 | 35/23 | 35/31 | 41/51 | |
| | | | 43/23 | 44/08 | 44/33 | 44/44 | 44/56 | 45/17 | 45/47 | |
| | | | 54/56 | 55/18 | 55/37 | 55/49 | 55/53 | 79/09 | 80/04 | |
| SUB16 | 007792 | | 79/19 | 79/45 | | | | | | |
| SUBA | 000437 | MC | 40/43 | 70/12 | 70/24 | 70/52 | | | | |
| SUBB | 0004A3 | MC | 62/16 | 79/46 | | | | | | |
| SWT | 0075E8 | | 63/18 | 63/20 | | | | | | |
| SWT2 | 0075F2 | | 63/33 | 63/41 | | | | | | |
| SWT3 | 00760D | | 63/48 | 64/09 | | | | | | |
| TAPEI | 007047 | | 12/31 | 15/06 | 16/22 | | | | | |
| TGAPS | 007376 | | 42/10 | 42/20 | 42/27 | | | | | |
| TI0 | 007057 | | 15/25 | 15/30 | | | | | | |
| TI1 | 00705E | | 15/35 | 15/40 | | | | | | |
| TI4 | 007065 | | 15/45 | 15/50 | | | | | | |
| TI3 | 00706C | | 15/55 | 15/60 | | | | | | |
| TI5 | 007073 | | 16/05 | 16/10 | | | | | | |

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|---|---|---|---|---|---|---|---|---|---|---|
| TI6 | 00707A | | 16/15 | 16/20 | | | | | | |
| TOPEN | 00719F | | 15/38 | 15/39 | 25/06 | | | | | |
| TR0 | 00707F | | 17/18 | 17/40 | 17/52 | 18/04 | 18/16 | 18/29 | 18/60 | |
| | | | 19/01 | | | | | | | |
| TR1 | 00708F | | 17/34 | 17/41 | | | | | | |
| TR2 | 007097 | | 17/46 | 17/53 | | | | | | |
| TR3 | 00709F | | 17/58 | 18/05 | | | | | | |
| TR4 | 0070A7 | | 18/10 | 18/17 | | | | | | |
| TR5 | 0070B0 | | 18/22 | 18/31 | | | | | | |
| TR5.1 | 0070C3 | | 18/49 | 18/58 | | | | | | |
| TR6 | 0070C6 | | 18/36 | 19/03 | | | | | | |
| TREAD | 00707C | | 15/19 | 17/12 | | | | | | |
| TST | 000E4E | MC | 14/14 | 26/32 | 39/45 | 42/14 | 42/21 | 45/31 | 47/03 | |
| | | | 47/10 | 47/20 | 47/54 | 48/15 | 49/01 | 51/50 | 52/10 | |
| | | | 52/18 | 52/36 | 52/59 | 53/19 | 53/27 | 53/46 | 54/45 | |
| | | | 54/60 | 56/01 | 56/11 | 57/05 | 63/12 | 63/35 | 75/42 | |
| | | | 82/53 | | | | | | | |
| TTI1 | 007015 | | 13/16 | 13/40 | 20/41 | 20/42 | 21/32 | 21/33 | 22/20 | |
| | | | 22/21 | 25/38 | 25/39 | 27/09 | 27/10 | 27/29 | 27/30 | |
| | | | 70/09 | 70/10 | 70/50 | 70/51 | | | | |
| TTI1R | 007022 | | 13/25 | 13/34 | | | | | | |
| TTI1S | 007023 | | 13/38 | 13/46 | 15/13 | 17/20 | 17/21 | 18/42 | 18/43 | |
| | | | 19/15 | 19/16 | 20/14 | 20/15 | 22/53 | 22/54 | 23/35 | |
| | | | 23/36 | 23/47 | 23/48 | 25/09 | 25/10 | 26/09 | 26/10 | |
| | | | 26/26 | 26/27 | | | | | | |
| TTSR1 | 0077CD | | 82/36 | 82/47 | | | | | | |
| TTSR2 | 0077DC | | 82/52 | 82/59 | 83/11 | | | | | |
| TW0 | 0070EC | | 20/11 | 21/55 | 22/43 | 23/05 | 23/21 | 23/22 | | |
| TW1 | 007136 | | 20/21 | 21/57 | | | | | | |
| TW2 | 007158 | | 22/02 | 22/45 | | | | | | |
| TW3 | 007167 | | 22/50 | 23/06 | | | | | | |
| TW4 | 007173 | | 23/11 | 23/24 | | | | | | |
| TWD | 007145 | | 22/18 | 22/40 | | | | | | |
| TWN | 0070FE | | 20/39 | 21/07 | | | | | | |
| TWRIT | 0070E9 | | 15/28 | 15/29 | 20/06 | | | | | |
| TWX | 007123 | | 21/30 | 21/52 | | | | | | |
| TWXN | 007118 | | 20/48 | 21/15 | | | | | | |
| WARM | 007009 | | 12/16 | 35/21 | 35/22 | | | | | |
| WARS | 000020 | | 29/15 | | | | | | | |
| WCHIN | 007038 | | 14/13 | 14/20 | | | | | | |
| WDONE | 007445 | | 49/07 | 49/19 | | | | | | |
| WFERR | 0072C1 | | 36/13 | 36/26 | 36/39 | 37/02 | | | | |
| WLOOP | 007413 | | 47/40 | 48/30 | 49/17 | | | | | |
| WRCD | 007398 | | 36/60 | 37/01 | 44/04 | 49/55 | 49/56 | | | |
| WRITE | 00729A | | 30/40 | 30/41 | 36/07 | | | | | |
| WRT | 000008 | | 29/13 | 36/16 | 36/29 | 59/22 | 63/45 | 63/52 | | |
| WRT2 | 0072BE | | 36/50 | 36/58 | | | | | | |
| XTEMP | 007E06 | | 20/28 | 20/29 | 21/03 | 21/04 | 21/20 | 21/21 | 21/48 | |
| | | | 21/49 | 22/08 | 22/09 | 22/36 | 22/37 | 40/30 | 40/31 | |
| | | | 41/10 | 41/11 | 41/30 | 41/31 | 44/35 | 44/36 | 44/50 | |
| | | | 44/51 | 44/58 | 44/59 | 47/30 | 47/31 | 49/03 | 49/04 | |
| | | | 49/10 | 49/11 | 51/37 | 51/38 | 51/44 | 51/45 | 52/49 | |
| | | | 52/50 | 53/59 | 53/60 | 54/58 | 54/59 | 55/31 | 55/32 | |
| | | | 55/39 | 55/40 | 71/17 | 71/18 | 71/29 | 71/30 | 74/26 | |
| | | | 74/27 | 77/24 | 77/25 | 77/41 | 77/42 | 77/58 | 77/59 | |
| | | | 78/15 | 78/16 | 79/07 | 79/08 | 79/22 | 79/23 | 79/29 | |
| | | | 79/30 | 80/20 | 80/21 | 80/37 | 80/38 | 85/13 | | |
| XTEMP | 007E08 | | 20/36 | 20/37 | 20/51 | 20/52 | 20/59 | 20/60 | 21/28 | |

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|---|---|---|---|---|---|---|---|---|---|
| | | | 21/29 | 21/36 | 21/37 | 21/44 | 21/45 | 22/16 | 22/17 |
| | | | 22/24 | 22/25 | 22/32 | 22/33 | 55/20 | 55/21 | 55/43 |
| | | | 55/44 | 55/51 | 55/52 | 79/11 | 79/12 | 79/15 | 79/16 |
| | | | 80/06 | 80/07 | 80/16 | 80/17 | 85/14 | | |
| ZA[illegible]L | 0070DD | | 17/15 | 17/16 | 19/38 | 19/52 | | | |
| ..HI | 007F42 | EN | 1/05 | 86/08 | | | | | |
| ..LO | 007000 | EN | 1/04 | 1/07 | | | | | |