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PROGRAM

Moving Head Disk Control Diagnostic

TAPES

Binary 095-000069

ABSTRACT

The Moving Head Disk Control Diagnostic Program is a hardware diagnostic for the 4046 moving head disk controller and adapter logic. It is assumed that the disk terminal is functioning properly.

097-000039-01

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0001  .MAIN

                ;MOVING HEAD DISK CONTROL DIAGNOSTIC

        ;****** AUTO-RUN AUTO LOAD MODIFIED 3/7/72


        ; 1. ABSTRACT
        ;       THIS PROGRAM IS A HARDWARE DIAGNOSTIC FOR THE
        ;       4046 MOVING HEAD DISK CONTROLLER AND ADAPTER
        ;       LOGIC.  IT IS ASSUMED THAT THE DISK TERMINAL
        ;       IS FUNCTIONING PROPERLY.

        ; 2. REQUIREMENTS
        ;       1. NOVA FAMILY CENTRAL PROCESSOR
        ;       2. MINIMUM OF 4K READ/WRITE MEMORY
        ;       3. 4046 MOVING HEAD DISK CONTROL
        ;       4. 4047,4048,4049 OR 4057
        ;          DISK ADAPTER
        ;       5. 1 TO 4 DISK TERMINALS
        ;       6. TELETYPE AND CONTROL

        ; 3. OPERATING PROCEDURE
        ;       1. LOAD USING THE BINARY LOADER
        ;       2. STARTING ADDRESSES
        ;               SA2= TO IDENTIFY DISK TYPE
        ;                    PROGRAM THEN PROCEEDS TO 400.
        ;               SA4= SET DISK CONTROL ADDRESS TO 33
        ;               SA5= SET DISK CONTROL ADDRESS TO 73
        ;               SA400= START DIAGNOSTIC
        ;       3. THE PROGRAM PRINTS "PASS" FOLLOWING EACH
        ;          COMPLETE PASS THROUGH THE TESTS.
        ;       4. SWITCH SETTINGS
        ;               SW0= FROM ERROR, GO TO NEXT TEST.
        ;               SW1= INHIBIT TELETYPE PRINTING.
        ;               SW2= PRINT FAILURE RATE.
        ;               SW3= RECALIBRATE DURING SCOPE LOOP
        ;               SW4= 1 SEC DELAY IN SCOPE LOOP
        ;               SW5-6= UNIT # FOR RECAL DURING SCOPE LOOP

        ; 4. ERRORS
        ;       WHEN AN ERROR IS DETECTED THE PROGRAM HALTS.
        ;       (AC3) POINTS TO THE LOCATION FOLLOWING THE
        ;       ERROR HALT CALL "EHALT".  CONSULT THE COMMENTS
        ;       AREA OF THE DIAGNOSTIC PROGRAM LISTING FOR
        ;       CLUES AND POSSIBLE CAUSES OF THE FAILURE.
        ;       PUSHING CONTINUE WILL CAUSE THE PROGRAM TO
        ;       PRINT THE (AC3) AND ENTER A SCOPE LOOP.
        ;       SET SW2 TO CAUSE THE ERROR RATE (0-100%) TO BE
        ;       PRINTED.  SET SW0 TO EXIT FROM THE SCOPE LOOP
        ;       AND PROCEED TO THE NEXT TEST.
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;       SOME SCOPE LOOPS WILL REQUIRE A RECALIBRATE
;       TO INITIALIZE THE DISK DRIVE FOLLOWING A FAILURE.
;       SET SWITCH 3 TO INTRODUCE THE RECALIBRATE.  THE
;       UNIT TO BE RECALIBRATED MUST BE SET INTO SWITCHES
;       5 AND 6.

;       TESTS THAT PERFORM A RECALIBRATE HAVE A 2 SEC.
;       DELAY BUILT INTO THE SCOPE LOOP AS PROTECTION
;       FOR THE DISK DRIVE ELECTRONICS.  SET SWITCH 4
;       TO INTRODUCE AN ADDITIONAL 1 SECOND DELAY DURING
;       THE SCOPE LOOP.

;       IN GENERAL EACH SUCCESSIVE TEST ASSUMES ALL
;       PREVIOUS TESTS WORK.  BYPASSING ERRORS
;       CAN RESULT IN CONFUSING SITUATIONS
;       IN THE SETUP OF MORE COMPLEX TESTS.

; 5. DISK PACKS
;       ONLY USE DISK PACKS FORMATTED BY THE DGC DISK
;       PACK FORMATTER PROGRAM.  THE DIAGNOSTIC PROGRAM
;       WILL WRITE OVER MOST OF THE DISK SURFACE.
;       THE FORMAT MODE IS NOT CHECKED.
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▲ 0003  .MAIN

        000001          .LOC 1

00001 005776            IRET            ;INTERRUPT RETURN
00002 006251            INIT            ;INITIALIZE
00003 002006            JMP @TS         ;GO TO 400
00004 002244            JMP @IS33       ;SET ADDR TO 33
00005 002245            JMP @IS73       ;SET ADDR TO 73
00006 000412 TS:        A1

        000045          .LOC 45
00045 000046            EGGS
00046 000000 EGGS:      0               ;HEN FLAG
00047 000000            0               ;DEVICE CODE THIS RUN
00050 000000            0               ;NOT USED
00051 000000            0               ;# OF PASS THIS RUN
00052 000000            0               ;RETURN ADDRESS

00053 000000 .TU:       0
00054 040000            40000
00055 100000            100000
00056 140000            140000
00057 000001 UNTBIT:    1
00060 000002 KB14:      2
00061 000004 KB13:      4
00062 000010 KB12:      10
00063 000020 KB11:      20
00064 000040 KB10:      40
00065 000100 KB9:       100
00066 000200 KB8:       200
00067 000400 KB7:       400
00070 001000 KB6:       1000
00071 002000 KB5:       2000
00072 004000 KB4:       4000
00073 010000 KB3:       10000
00074 020000 KB2:       20000
        000054 KB1=.TU+1

00075 177775 ZB14:      177775
00076 177773 ZB13:      177773
00077 177767 ZB12:      177767
00100 177757 ZB11:      177757
00101 177737 ZB10:      177737
00102 177677 ZB9:       177677
00103 177577 ZB8:       177577
00104 177377 ZB7:       177377
00105 176777 ZB6:       176777
00106 175777 ZB5:       175777
00107 173777 ZB4:       173777
00110 167777 ZB3:       167777
00111 157777 ZB2:       157777
00112 137777 ZB1:       137777

00113 006231 TRCL:      RECL0
00114 006232            RECL1
00115 006233            RECL2
00116 006234            RECL3
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00117 000003 C3:      3
00120 000007 C7:      7
00121 000017 C17:     17
00122 000037 C37:     37
00123 000077 C77:     77
00124 000177 C177:    177
00125 000377 C377:    377
00126 000777 C777:    777
00127 001777 C1777:   1777
00130 003777 C3777:   3777
00131 007777 C7777:   7777
00132 017777 C017:    17777
00133 037777 C037:    37777

00134 010421 BIT1:    010421
00135 021042 BIT2:    021042
00136 042104 BIT4:    042104
00137 104210 BIT8:    104210

00140 052525 C2525:   052525
00141 125252 C5252:   125252
00142 123456 RANDOM:  123456
00143 123456 RELRAN:  123456
00144 000000 TEMP:    0
00145 000000 TIME:    0
00146 000000 TIME1:   0
00147 062000 KDOB:    DOR 0,0
00150 000000 DTYPE:   0                ;0=CART, 1=2311, 15=2314
00151 000001 NDSKS:   000001           ;15=UNIT 0, 14=1, 13=2, 12=3
00152 000000 TESTU:   0                ; 0&1 = UNIT #
00153 000000 UNUM:    0                ; 14-15 = UNIT #
00154 000033 CDSK:    33
00155 000000 CYL:     0
00156 000000 HEAD:    0
00157 000000 SECT:    0
00160 006605 BUFF:    PRGEND
00161 160037 MSK1:    160037
00162 060033 DPIO:    060033
00163 177700 MSK2:    177700
00164 000000 ITRCNT:  0
00165 005613 STALL:   .STL
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▲ 0005  .MAIN

00166 000004 C4:      4
00167 000005 C5:      5
00170 000006 C6:      6
00171 000011 C11:     11
00172 000012 C12:     12
00173 000015 C15:     15
00174 000016 C16:     16
00175 000030 C30:     30
00176 000033 C33:     33
00177 000036 C36:     36
00200 000060 C60:     60
00201 000063 C63:     63
00202 000070 C70:     70
00203 000120 C120:    120
00204 000137 C137:    137
00205 000157 C157:    157
00206 000277 C277:    277
00207 000312 C312:    312
00210 000317 C317:    317
00211 000402 C402:    402
00212 000420 C420:    420
00213 177400 C1774:   177400


00214 177400 M400:    -400
00215 001400 C1400:   1400
00216 003600 C3600:   3600
00217 020400 C204H:   20400
00220 074000 C74K:    74000
      000056 C140K=.TU+3
00221 174000 C174K:   174000
      000070 C1000=KB6

00222 024047 BEGIN:   LDA 1,EGGS+1
00223 020176          LDA 0,C33
00224 106414          SUB# 0,1,SZR
00225 002245          JMP @IS73
00226 002244          JMP @IS33
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▲ 0006   .MAIN
  00227 005635 I.WAIT:  .WAIT
  00230 005622 I.SSEK:  .SSEK
  00231 005704 I.RC0:   .RCL0
  00232 005706 I.RC1:   .RCL1
  00233 005710 I.RC2:   .RCL2
  00234 005711 I.RC3:   .RCL3
  00235 005764 I.IWT:   .IWT
  00236 006000 I.ADSK:  .ADSK
  00237 006027 ISET:    .SET
  00240 006032 I.SETP:  .SETP
  00241 006035 I.STUP:  .SETUP
  00242 006165 I.EHA:   .EHALT
  00243 006065 I.LOO:   .LOOP
  00244 005557 IS33:    .S33
  00245 005560 IS73:    .S73
  00246 006006 I.S:     .SK
  00247 006453 ICRLF:   CRLF
  00250 006310 IMESS:   MESS
  00251 005442 I.INI:   .INI
  00252 005655 ISTB:    STR
  00253 006162 I.EH1:   .EH1
  00254 005722 I.DO:    .DORW
  00255 005217 IRAN:    RAN
  00256 005276 IGEN:    .GEN
  00257 005336 IRFAD:   .READ
  00260 005311 IWRT:    .WRITE
  00261 005254 ICHK:    .CHECK
  00262 005354 IDOS:    .DOSEK
  00263 006057 I.LD:    .LUPD

        006241 .DUSR    SETUP=JSR @I.STUP
        006240 .DUSR    SETP1=JSR @I.SETP
        006242 .DUSR    EHALT=JSR @I.EHA
        006243 .DUSR    LOOP=JSR @I.LOO
        000033 .DUSR    DSKP=33
        006253 .DUSR    EHLT=JSR @I.EH1
        006263 .DUSR    LOOPD=JSR @I.LD

        006250 MESSAGE=JSR @IMESS
        006247 PCRLF=JSR @ICRLF
        006227 WAIT=JSR @I.WAIT
        006230 SSEEK=JSR @I.SSEK
        006231 RECL0=JSR @I.RC0
        006232 RECL1=JSR @I.RC1
        006233 RECL2=JSR @I.RC2
        006234 RECL3=JSR @I.RC3
        006235 ITRWT=JSR @I.IWT
        006236 GADSK=JSR @I.ADSK
        006246 SEEK=JSR @I.S
        006251 INTT=JSR @I.INI
        006256 GENDAT=JSR @IGEN
        006257 READ=JSR @IREAD
        006260 WRITE=JSR @IWRT
        006261 CHECK=JSR @ICHK
        006262 DOSEK=JSR @IDOS
        006254 DORW=JSR @I.DO

                        .EOT
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```
0007   .MAIN
       000400           .LOC 400

00400 006252 START:  JSR @ISTB
00401 024046         LDA 1,EGGS
00402 125004         MOV 1,1,SZR
00403 000405         JMP A1-2
00404 020150         LDA 0,DTYPE
00405 101005         MOV 0,0,SNR      ;IF PARAMETERS NOT YET SPECIFIED
00406 006251         INIT             ;DO IT NOW.
00407 000403         JMP A1
00410 126620         SUBZR 1,1
00411 044150         STA 1,DTYPE

00412 006241 A1:     SETUP            ;CHECK SELD BUS LINE
00413 063700         SKPDZ 0          ;SKIP IF LINE HIGH
00414 006242         EHALT            ;DSKP HAS SELD GROUNDED.
00415 006243         LOOP

00416 006241 A2:     SETUP            ;CHECK SELB BUS LINE
00417 063500         SKPBZ 0          ;SKIP IF LINE HIGH
00420 006242         EHALT            ;DSKP HAS SELB GROUNDED
00421 006243         LOOP

00422 006241 A3:     SETUP            ;CHECK DISK PACK BUSY
00423 063533         SKPBZ DSKP       ;SKIP IF BUSY 0
00424 006242         EHALT            ;"DP BUSY" STUCK ON
00425 006243         LOOP

00426 006241 A4:     SETUP            ;CHECK DISK PACK DONE
00427 063733         SKPDZ DSKP       ;SKIP IF DONE 0
00430 006242         EHALT            ;"DP DONE" STUCK ON
00431 006243         LOOP

00432 006241 A5:     SETUP            ;CHECK I/0 DATA LINES
00433 060400         DIA 0,0          ;DIA TO DEVICE 0
00434 101004         MOV 0,0,SZR
00435 006242         EHALT            ;GROUNDED DATA LINE(S)
00436 006243         LOOP

00437 006241 A6:     SETUP            ;CHECK CA REGISTER FOR
00440 061433         DIB 0,DSKP       ;ZEROS AFTER "RESET"
00441 101004         MOV 0,0,SZR      ;POSSIBLE FAILURE OF "RESET"
00442 006242         EHALT            ;OR THE REGISTER.
00443 006243         LOOP

00444 006241 A7:     SETUP            ;CHECK DISK ADDRESS REG.
00445 062433         DIC 0,DSKP       ;FOR ZEROS FOLLOWING IORST
00446 101004         MOV 0,0,SZR      ;FAILING REGISTER IC OR
00447 006242         EHALT            ;POSSIBLE FAILURE OF "RESET"
00450 006243         LOOP             ;OR "RESET S".

00451 006241 A8:     SETUP            ;TRY TO LOAD CA WITH
00452 102000         ADC 0,0          ;ALL ONES
00453 062033         DOB 0,DSKP       ;LOAD CA REGISTER
00454 065433         DIB 1,DSKP       ;READ IT BACK
00455 122434         SUBZ# 1,0,SZR    ;CHECK "DP DATOB",
00456 006242         EHALT            ;"DPDATIB", CA REGISTER,
00457 006243         LOOP             ;AND DATA PATH THRU MUX'S.
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00460 006241 A9:    SETUP           ;SEE IF DOB LOADS
00461 102000        ADC 0,0         ;DISK ADDRESS REGISTER
00462 062033        DOB 0,DSKP      ;LOAD CA REG.
00463 066433        DIC 1,DSKP      ;READ DISK ADDR REG.
00464 125004        MOV 1,1,SZR     ;IT SHOULD STILL BE ALL 0'S
00465 006242        EHALT
00466 006243        LOOP

00467 006241 A10:   SETUP           ;SEE IF DOC LOADS THE
00470 102000        ADC 0,0         ;CA REGISTER
00471 063033        DOC 0,DSKP      ;LOAD DISK ADDR REG
00472 065433        DIB 1,DSKP      ;READ CA REGISTER
00473 125004        MOV 1,1,SZR     ;CA REGISTER SHOULD
00474 006242        EHALT           ;REMAIN ALL ZERO

00475 006241 A11:   SETUP           ;SEE IF THE DISK ADDRESS
00476 102000        ADC 0,0         ;REGISTER EXISTS
00477 063033        DOC 0,DSKP      ;LOAD IT WITH ALL 1'S
00500 066433        DIC 1,DSKP      ;READ IT BACK
00501 122414        SUB# 1,0,SZR    ;CHECK REGISTER AND
00502 006242        EHALT           ;DATA PATHS THROUGH
00503 006243        LOOP            ;THE MUX'S

00504 006241 A12:   SETUP           ;SEE IF IORST WILL
00505 102000        ADC 0,0         ;CLEAR THE CA REGISTER
00506 062033        DOB 0,DSKP      ;LOAD IT WITH ALL 1'S
00507 062677        IORST           ;CLEAR IT TO ZEROS (RESET)
00510 065433        DIB 1,DSKP      ;READ IT BACK
00511 125004        MOV 1,1,SZR
00512 006242        EHALT
00513 006243        LOOP

00514 006241 A13:   SETUP           ;SEE IF IORST WILL
00515 102000        ADC 0,0         ;CLEAR DISK ADDRESS
00516 063033        DOC 0,DSKP      ;REGISTER. LOAD ALL 1'S
00517 062677        IORST           ;CLEAR TO ZEROS
00520 066433        DIC 1,DSKP      ;READ BACK
00521 125004        MOV 1,1,SZR     ;(S1,S2,S4,S8,ARE CLEARED
00522 006242        EHALT           ;VIA "RESET" THRU "RESET S")
00523 006243        LOOP

00524 006241 A14:   SETUP           ;TEST CA REGISTER FOR
00525 102520        SUBZL 0,0       ;SINGLE 1 BITS
00526 062033        DOB 0,DSKP      ;LOAD "CA15"
00527 065433        DIB 1 DSKP      ;READ CA REGISTER
00530 122414        SUB# 1,0,SZR    ;AC0=GOOD
00531 006242        EHALT           ;AC1=BAD
00532 006243        LOOP

00533 006241 A15:   SETUP           ;TEST CA REGISTER FOR
00534 020060        LDA 0,KB14      ;SINGLE 1 BITS
00535 062033        DOB 0,DSKP      ;LOAD "CA14"
00536 065433        DIB 1,DSKP      ;READ CA REGISTER
00537 122414        SUB# 1,0,SZR    ;AC0=GOOD
00540 006242        EHALT           ;AC1=BAD
00541 006243        LOOP
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00542 006241 A16:    SETUP              ;TEST CA REGISTER FOR
00543 020061         LDA 0,KB13         ;SINGLE 1 BITS
00544 062033         DOB 0,DSKP         ;LOAD "CA13"
00545 065433         DIB 1,DSKP         ;READ CA REGISTER
00546 122414         SUB# 1,0,SZR       ;AC0=GOOD
00547 006242         EHALT              ;AC1=BAD
00550 006243         LOOP

00551 006241 A17:    SETUP              ;TEST CA REGISTER FOR
00552 020062         LDA 0,KB12         ;SINGLE 1 BITS
00553 062033         DOB 0,DSKP         ;LOAD "CA12"
00554 065433         DIB 1,DSKP         ;READ CA REGISTER
00555 122414         SUB# 1,0,SZR       ;AC0=GOOD
00556 006242         EHALT              ;AC1=BAD
00557 006243         LOOP

00560 006241 A18:    SETUP              ;TEST CA REGISTER FOR
00561 020063         LDA 0,KB11         ;SINGLE 1 BITS
00562 062033         DOB 0,DSKP         ;LOAD "CA11"
00563 065433         DIB 1,DSKP         ;READ CA REGISTER
00564 122414         SUB# 1,0,SZR       ;AC0=GOOD
00565 006242         EHALT              ;AC1=BAD
00566 006243         LOOP

00567 006241 A19:    SETUP              ;TEST CA REGISTER FOR
00570 020064         LDA 0,KB10         ;SINGLE 1 BITS
00571 062033         DOB 0,DSKP         ;LOAD "CA10"
00572 065433         DIB 1,DSKP         ;READ CA REGISTER
00573 122414         SUB# 1,0,SZR       ;AC0=GOOD
00574 006242         EHALT              ;AC1=BAD
00575 006243         LOOP

00576 006241 A20:    SETUP              ;TEST CA REGISTER FOR
00577 020065         LDA 0,KB9          ;SINGLE 1 BITS
00600 062033         DOB 0,DSKP         ;LOAD "CA9"
00601 065433         DIB 1,DSKP         ;READ CA REGISTER
00602 122414         SUB# 1,0,SZR       ;AC0=GOOD
00603 006242         EHALT              ;AC1=BAD
00604 006243         LOOP

00605 006241 A21:    SETUP              ;TEST CA REGISTER FOR
00606 020066         LDA 0,KB8          ;SINGLE 1 BITS
00607 062033         DOB 0,DSKP         ;LOAD "CA8"
00610 065433         DIB 1,DSKP         ;READ CA REGISTER
00611 122414         SUB# 1,0,SZR       ;AC0=GOOD
00612 006242         EHALT              ;AC1=BAD
00613 006243         LOOP
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00614 006241 A22:    SETUP              ;TEST CA REGISTER FOR
00615 020067         LDA 0,KB7          ;SINGLE 1 BITS
00616 062033         DOB 0,DSKP         ;LOAD "CA7"
00617 065433         DIB 1,DSKP         ;READ CA REGISTER
00620 122414         SUB# 1,0,SZR       ;AC0=GOOD
00621 006242         EHALT              ;AC1=BAD
00622 006243         LOOP

00623 006241 A23:    SETUP              ;TEST CA REGISTER FOR
00624 020033         LDA 0,DSKP         ;SINGLE 1 BITS
00625 061433         DIB 0,DSKP         ;LOAD "CA6"
00626 065433         DIB 1,DSKP         ;READ CA REGISTER
00627 122414         SUB# 1,0,SZR       ;AC0=GOOD
00630 006242         EHALT              ;AC1=BAD

00631 006241 A24:    SETUP              ;TEST CA REGISTER FOR
00632 020071         LDA 0,KB5          ;SINGLE 1 BITS
00633 062033         DOB 0,DSKP         ;LOAD "CA5"
00634 065433         DIB 1,DSKP         ;READ CA REGISTER
00635 122414         SUB# 1,0,SZR       ;AC0=GOOD
00636 006242         EHALT              ;AC1=BAD
00637 006243         LOOP

00640 006241 A25:    SETUP              ;TEST CA REGISTER FOR
00641 020072         LDA 0,KB4          ;SINGLE 1 BITS
00642 062033         DOB 0,DSKP         ;LOAD "CA4"
00643 065433         DIB 1,DSKP         ;READ CA REGISTER
00644 122414         SUB# 1,0,SZR       ;AC0=GOOD
00645 006242         EHALT              ;AC1=BAD
00646 006243         LOOP

00647 006241 A26:    SETUP              ;TEST CA REGISTER FOR
00650 020073         LDA 0,KB3          ;SINGLE 1 BITS
00651 062033         DOB 0,DSKP         ;LOAD "CA3"
00652 065433         DIB 1,DSKP         ;READ CA REGISTER
00653 122414         SUB# 1,0,SZR       ;AC0=GOOD
00654 006242         EHALT              ;AC1=BAD
00655 006243         LOOP

00656 006241 A27:    SETUP              ;TEST CA REGISTER FOR
00657 020074         LDA 0,KB2          ;SINGLE 1 BITS
00660 062033         DOB 0,DSKP         ;LOAD "CA2"
00661 065433         DIB 1,DSKP         ;READ CA REGISTER
00662 122414         SUB# 1,0,SZR       ;AC0=GOOD
00663 006242         EHALT              ;AC1=BAD
00664 006243         LOOP
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00665 006241 A28:    SETUP              ;TEST CA REGISTER FOR
00666 020054         LDA 0,KB1          ;SINGLE 1 BITS
00667 062033         DOB 0,DSKP         ;LOAD "CA1"
00670 065433         DIB 1,DSKP         ;READ CA REGISTER
00671 122414         SUB# 1,0,SZR       ;AC0=GOOD
00672 006242         EHALT              ;AC1=BAD
00673 006243         LOOP

00674 006241 A29:    SETUP              ;TEST CA REGISTER
00675 102620         SUBZR 0,0          ;SINGLE 1 BITS
00676 062033         DOB 0,DSKP         ;LOAD "CA0"
00677 065433         DIB 1,DSKP         ;READ CA REGISTER
00700 122414         SUB# 1,0,SZR       ;AC0=GOOD
00701 006242         EHALT              ;AC1=BAD
00702 006243         LOOP

00703 006241 A30:    SETUP              ;TEST CA REGISTER FOR
00704 102120         ADCZL 0,0          ;SINGLE 0 BITS
00705 062033         DOB 0,DSKP         ;LOAD 177776
00706 065433         DIB 1,DSKP         ;READ CA REGISTER
00707 122414         SUB# 1,0,SZR       ;AC0=GOOD
00710 006242         EHALT              ;AC1=BAD
00711 006243         LOOP

00712 006241 A31:    SETUP              ;TEST CA REGISTER FOR
00713 020075         LDA 0,ZB14         ;SINGLE 0 BITS
00714 062033         DOB 0,DSKP         ;LOAD 177775
00715 065433         DIB 1,DSKP         ;READ CA REGISTER
00716 122414         SUB# 1,0,SZR       ;AC0=GOOD
00717 006242         EHALT              ;AC1=BAD
00720 006243         LOOP

00721 006241 A32:    SETUP              ;TEST CA REGISTER FOR
00722 020076         LDA 0,ZB13         ;SINGLE 0 BITS
00723 062033         DOB 0,DSKP         ;LOAD 177773
00724 065433         DIB 1,DSKP         ;READ CA REGISTER
00725 122414         SUB# 1,0,SZR       ;AC0=GOOD
00726 006242         EHALT              ;AC1=BAD
00727 006243         LOOP

00730 006241 A33:    SETUP              ;TEST CA REGISTER FOR
00731 020077         LDA 0,ZB12         ;SINGLE 0 BITS
00732 062033         DOB 0,DSKP         ;LOAD 177767
00733 065433         DIB 1,DSKP         ;READ CA REGISTER
00734 122414         SUB# 1,0,SZR       ;AC0=GOOD
00735 006242         EHALT              ;AC1=BAD
00736 006243         LOOP
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00737 006241 A34:    SETUP              ;TEST CA REGISTER FOR
00740 020100         LDA 0,ZB11         ;SINGLE 0 BITS
00741 062033         DOB 0,DSKP         ;LOAD 177757
00742 065433         DIB 1,DSKP         ;READ CA REGISTER
00743 122414         SUB# 1,0,SZR       ;AC0=GOOD
00744 006242         EHALT              ;AC1=BAD
00745 006243         LOOP

00746 006241 A35:    SETUP              ;TEST CA REGISTER FOR
00747 020101         LDA 0,ZB10         ;SINGLE ZERO BITS
00750 062033         DOB 0,DSKP         ;LOAD 177737
00751 065433         DIB 1,DSKP         ;READ CA REGISTER
00752 122414         SUB# 1,0,SZR       ;AC0=GOOD
00753 006242         EHALT              ;AC1=BAD
00754 006243         LOOP

00755 006241 A36:    SETUP              ;TEST CA REGISTER FOR
00756 020102         LDA 0,ZB9          ;SINGLE ZERO BITS
00757 062033         DOB 0,DSKP         ;LOAD 177677
00760 065433         DIB 1,DSKP         ;READ CA REGISTER
00761 122414         SUB# 1,0,SZR       ;AC0=GOOD
00762 006242         EHALT              ;AC1=BAD
00763 006243         LOOP

00764 006241 A37:    SETUP              ;TEST CA REGISTER FOR
00765 020103         LDA 0,ZB8          ;SINGLE 0 BITS
00766 062033         DOB 0,DSKP         ;LOAD 177577
00767 065433         DIB 1,DSKP         ;READ CA REGISTER
00770 122414         SUB# 1,0,SZR       ;AC0=GOOD
00771 006242         EHALT              ;AC1=BAD
00772 006243         LOOP

00773 006241 A38:    SETUP              ;TEST CA REGISTER FOR
00774 020104         LDA 0,ZB7          ;SINGLE 0 BITS
00775 062033         DOB 0,DSKP         ;LOAD 177377
00776 065433         DIB 1,DSKP         ;READ CA REGISTER
00777 122414         SUB# 1,0,SZR       ;AC0=GOOD
01000 006242         EHALT              ;AC1=BAD
01001 006243         LOOP

01002 006241 A39:    SETUP              ;TEST CA REGISTER FOR
01003 020105         LDA 0,ZB6          ;SINGLE ZERO BITS
01004 062033         DOB 0,DSKP         ;LOAD 176777
01005 065433         DIB 1,DSKP         ;READ CA REGISTER
01006 122414         SUB# 1,0,SZR       ;AC0=GOOD
01007 006242         EHALT              ;AC1=BAD
01010 006243         LOOP
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01011 006241 A40:    SETUP            ;TEST CA REGISTER FOR
01012 020106         LDA 0,ZB5        ;SINGLE ZERO BITS
01013 062033         DOB 0,DSKP       ;LOAD 175777
01014 065433         DIB 1,DSKP       ;READ CA REGISTER
01015 122414         SUB# 1,0,SZR     ;AC0=GOOD
01016 006242         EHALT            ;AC1=BAD
01017 006243         LOOP

01020 006241 A41:    SETUP            ;TEST CA REGISTER FOR
01021 020107         LDA 0,ZB4        ;SINGLE 0 BITS
01022 062033         DOB 0,DSKP       ;LOAD 173777
01023 065433         DIB 1,DSKP       ;READ CA REGISTER
01024 122414         SUB# 1,0,SZR     ;AC0=GOOD
01025 006242         EHALT            ;AC1=BAD
01026 006243         LOOP

01027 006241 A42:    SETUP            ;TEST CA REGISTER FOR
01030 020110         LDA 0,ZB3        ;SINGLE 0 BITS
01031 062033         DOB 0,DSKP       ;LOAD 167777
01032 065433         DIB 1,DSKP       ;READ CA REGISTER
01033 122414         SUB# 1,0,SZR     ;AC0=GOOD
01034 006242         EHALT            ;AC1=BAD
01035 006243         LOOP

01036 006241 A43:    SETUP            ;TEST CA REGISTER FOR
01037 020111         LDA 0,ZB2        ;SINGLE ZERO BITS
01040 062033         DOB 0,DSKP       ;LOAD 157777
01041 065433         DIB 1,DSKP       ;READ CA REGISTER
01042 122414         SUB# 1,0,SZR     ;AC0=GOOD
01043 006242         EHALT            ;AC1=BAD
01044 006243         LOOP

01045 006241 A44:    SETUP            ;TEST CA REGISTER FOR
01046 020112         LDA 0,ZB1        ;SINGLE 0 BIT
01047 062033         DOB 0,DSKP       ;LOAD 137777
01050 065433         DIB 1,DSKP       ;READ CA REGISTER
01051 122414         SUB# 1,0,SZR     ;AC0=GOOD
01052 006242         EHALT            ;AC1=BAD
01053 006243         LOOP

01054 006241 A45:    SETUP            ;TEST CA REGISTER FOR
01055 102220         ADCZR 0,0        ;SINGLE ZERO BIT
01056 062033         DOB 0,DSKP       ;LOAD 077777
01057 065433         DIB 1,DSKP       ;READ CA REGISTER
01060 122414         SUB# 1,0,SZR     ;AC0=GOOD
01061 006242         EHALT            ;AC1=BAD
01062 006243         LOOP
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01063 006241 A46:    SETUP              ;TEST DISK ADDRESS REGISTER
01064 102520         SUBZL 0,0          ;FOR SINGLE 1 BIT
01065 063033         DOC 0,DSKP         ;LOAD "SC1"
01066 066433         DIC 1,DSKP         ;READ BACK
01067 122414         SUB# 1,0,SZR       ;AC0=GOOD
01070 006242         EHALT              ;AC1=BAD
01071 006243         LOOP

01072 006241 A47:    SETUP              ;TEST DISK ADDRESS REGISTER
01073 020060         LDA 0,KB14         ;FOR SINGLE 1 BITS
01074 063033         DOC 0,DSKP         ;LOAD "SC2"
01075 066433         DIC 1,DSKP         ;READ BACK
01076 122414         SUB# 1,0,SZR       ;AC0=GOOD
01077 006242         EHALT              ;AC1=BAD
01100 006243         LOOP

01101 006241 A48:    SETUP              ;TEST DISK ADDRESS REGISTER
01102 020061         LDA 0,KB13         ;FOR SINGLE 1 BITS
01103 063033         DOC 0,DSKP         ;LOAD "SC4"
01104 066433         DIC 1,DSKP         ;READ BACK
01105 122414         SUB# 1,0,SZR       ;AC0=GOOD
01106 006242         EHALT              ;AC1=BAD
01107 006243         LOOP

01110 006241 A49:    SETUP              ;TEST DISK ADDRESS REGISTER
01111 020062         LDA 0,KB12         ;FOR SINGLE 1 BITS
01112 063033         DOC 0,DSKP         ;LOAD "SC8"
01113 066433         DIC 1,DSKP         ;READ BACK
01114 122414         SUB# 1,0,SZR       ;AC0=GOOD
01115 006242         EHALT              ;AC1=BAD
01116 006243         LOOP

01117 006241 A50:    SETUP              ;TEST DISK ADDRESS REGISTER
01120 020063         LDA 0,KB11         ;FOR SINGLE 1 BITS
01121 063033         DOC 0,DSKP         ;LOAD "S1"
01122 066433         DIC 1,DSKP         ;READ BACK
01123 122414         SUB# 1,0,SZR       ;AC0=GOOD
01124 006242         EHALT              ;AC1=BAD
01125 006243         LOOP

01126 006241 A51:    SETUP              ;TEST DISK ADDRESS REGISTER
01127 020064         LDA 0,KB10         ;FOR SINGLE 1 BITS
01130 063033         DOC 0,DSKP         ;LOAD "S2"
01131 066433         DIC 1,DSKP         ;READ BACK
01132 122414         SUB# 1,0,SZR       ;AC0=GOOD
01133 006242         EHALT              ;AC1=BAD
01134 006243         LOOP
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01135 006241 A52:    SETUP              ;TEST DISK ADDRESS REGISTER
01136 020065         LDA 0,KB9          ;FOR SINGLE 1 BITS
01137 063033         DOC 0,DSKP         ;LOAD "S4"
01140 066433         DIC 1,DSKP         ;READ IT BACK
01141 122414         SUB# 1,0,SZR       ;AC0=GOOD
01142 006242         EHALT              ;AC1=BAD
01143 006243         LOOP

01144 006241 A53:    SETUP              ;TEST DISK ADDRESS REGISTER
01145 020066         LDA 0,KB8          ;FOR SINGLE 1 BITS
01146 063033         DOC 0,DSKP         ;LOAD "S8"
01147 066433         DIC 1,DSKP         ;READ IT BACK
01150 122414         SUB# 1,0,SZR       ;AC0=GOOD
01151 006242         EHALT              ;AC1=BAD
01152 006243         LOOP

01153 006241 A54:    SETUP              ;TEST DISK ADDRESS REGISTER
01154 020067         LDA 0,KB7          ;FOR SINGLE 1 BITS
01155 063033         DOC 0,DSKP         ;LOAD "HD1"
01156 066433         DIC 1,DSKP         ;READ IT BACK
01157 122414         SUB# 1,0,SZR       ;AC0=GOOD
01160 006242         EHALT              ;AC1=BAD
01161 006243         LOOP

01162 006241 A55:    SETUP              ;TEST DISK ADDRESS REGISTER
01163 020070         LDA 0,KB6          ;FOR SINGLE 1 BITS
01164 063033         DOC 0,DSKP         ;LOAD "HD2"
01165 066433         DIC 1,DSKP         ;READ BACK
01166 122414         SUB# 1,0,SZR       ;AC0=GOOD
01167 006242         EHALT              ;AC1=BAD
01170 006243         LOOP

01171 006241 A56:    SETUP              ;TEST DISK ADDRESS REGISTER
01172 020071         LDA 0,KB5          ;FOR SINGLE 1 BITS
01173 063033         DOC 0,DSKP         ;LOAD "HD4"
01174 066433         DIC 1,DSKP         ;READ IT BACK
01175 122414         SUB# 1,0,SZR       ;AC0=GOOD
01176 006242         EHALT              ;AC1=BAD
01177 006243         LOOP

01200 006241 A57:    SETUP              ;TEST DISK ADDRESS REGISTER
01201 020072         LDA 0,KB4          ;FOR SINGLE 1 BITS
01202 063033         DOC 0,DSKP         ;LOAD "HD8"
01203 066433         DIC 1,DSKP         ;READ IT BACK
01204 122414         SUB# 1,0,SZR       ;AC0=GOOD
01205 006242         EHALT              ;AC1=BAD
01206 006243         LOOP
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01207 006241 A58:    SETUP              ;TEST DISK ADDRESS REGIE;STER
01210 020073         LDA 0,KB3          ;FOR SINGLE 1 BITS
01211 063033         DOC 0,DSKP         ;LOAD "HD16"
01212 066433         DIC 1,DSKP         ;READ IT BACK
01213 122414         SUB# 1,0,SZR       ;AC0=GOOD
01214 006242         EHALT              ;AC1=BAD
01215 006243         LOOP

01216 006241 A59:    SETUP              ;TEST DISK ADDRESS REGISTER
01217 020074         LDA 0,KB2          ;FOR SINGLE 1 BITS
01220 063033         DOC 0,DSKP         ;LOAD "FORMAT"
01221 066433         DIC 1,DSKP         ;READ IT BACK
01222 122414         SUB# 1,0,SZR       ;AC0=GOOD
01223 006242         EHALT              ;AC1=BAD
01224 006243         LOOP

01225 006241 A60:    SETUP              ;TEST DISK ADDRESS REGISTER
01226 020054         LDA 0,KB1          ;FOR SINGLE 1 BIT
01227 063033         DOC 0,DSKP         ;LOAD "D1"
01230 066433         DIC 1,DSKP         ;READ IT BACK
01231 122414         SUB# 1,0,SZR       ;AC0=GOOD
01232 006242         EHALT              ;AC1=BAD
01233 006243         LOOP

01234 006241 A61:    SETUP              ;TEST DISK ADDRESS REGISTER
01235 102620         SUBZR 0,0          ;FOR SINGLE 1 BITS
01236 063033         DOC 0,DSKP         ;LOAD "D0"
01237 066433         DIC 1,DSKP         ;READ IT BACK
01240 122414         SUB# 1,0,SZR       ;AC0=GOOD
01241 006242         EHALT              ;AC1=BAD
01242 006243         LOOP

01243 006241 A62:    SETUP              ;TEST DISK ADDRESS REGISTER
01244 102120         ADCZL 0,0          ;FOR SINGLE 0 BITS
01245 063033         DOC 0,DSKP         ;"SC1"=0
01246 066433         DIC 1,DSKP         ;READ THE REGISTER
01247 122414         SUB# 1,0,SZR       ;AC0=GOOD
01250 006242         EHALT              ;AC1=BAD
01251 006243         LOOP

01252 006241 A63:    SETUP              ;TEST DISK ADDRESS REGISTER
01253 020075         LDA 0,ZB14         ;FOR SINGLE 0 BITS
01254 063033         DOC 0,DSKP         ;"SC2" = 0
01255 066433         DIC 1,DSKP         ;READ REGISTER
01256 122414         SUB# 1,0,SZR       ;AC0=GOOD
01257 006242         EHALT              ;AC1=BAD
01260 006243         LOOP
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01261 006241 A64:    SETUP              ;TEST DISK ADDRESS REGISTER
01262 020076         LDA 0,ZB13         ;FOR SINGLE 0 BITS
01263 063033         DOC 0,DSKP         ;"SC4" = 0
01264 066433         DIC 1,DSKP         ;READ REGISTER
01265 122414         SUB# 1,0,SZR       ;AC0=GOOD
01266 006242         EHALT              ;AC1=BAD
01267 006243         LOOP

01270 006241 A65:    SETUP              ;TEST DISK ADDRESS REGISTER
01271 020077         LDA 0,ZB12         ;FOR SINGLE 0 BITS
01272 063033         DOC 0,DSKP         ;"SC8" = 0
01273 066433         DIC 1,DSKP         ;READ REGISTER
01274 122414         SUB# 1,0,SZR       ;AC0=GOOD
01275 006242         EHALT              ;AC1=BAD
01276 006243         LOOP

01277 006241 A66:    SETUP              ;TEST DISK ADDRESS REGISTER
01300 020100         LDA 0,ZB11         ;FOR SINGLE 0 BITS
01301 063033         DOC 0,DSKP         ;"S1" = 0
01302 066433         DIC 1,DSKP         ;READ REGISTER
01303 122414         SUB# 1,0,SZR       ;AC0=GOOD
01304 006242         EHALT              ;AC1=BAD
01305 006243         LOOP

01306 006241 A67:    SETUP              ;TEST DISK ADDRESS REGISTER
01307 020101         LDA 0,ZB10         ;FOR SINGLE ZERO BITS
01310 063033         DOC 0,DSKP         ;"S2" = 0
01311 066433         DIC 1,DSKP         ;READ IT BACK
01312 122414         SUB# 1,0,SZR       ;AC0=GOOD
01313 006242         EHALT              ;AC1=BAD
01314 006243         LOOP

01315 006241 A68:    SETUP              ;TEST DISK ADDRESS REGISTER
01316 020102         LDA 0,ZB9          ;FOR SINGLE ZERO BIT
01317 063033         DOC 0,DSKP         ;"S4" = 0
01320 066433         DIC 1,DSKP         ;READ IT BACK
01321 122414         SUB# 1,0,SZR       ;AC0=GOOD
01322 006242         EHALT              ;AC1=BAD
01323 006243         LOOP

01324 006241 A69:    SETUP              ;TEST DISK ADDRESS REGISTER
01325 020103         LDA 0,ZB8          ;FOR SINGLE ZERO BITS
01326 063033         DOC 0,DSKP         ;"S8" = 0
01327 066433         DIC 1,DSKP         ;READ IT BACK
01330 122414         SUB# 1,0,SZR       ;AC0=GOOD
01331 006242         EHALT              ;AC1=BAD
01332 006243         LOOP
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01333 006241 A70:    SETUP              ;TEST DISK ADDRESS REGISTER
01334 020104         LDA 0,787          ;FOR SINGLE 0 BIT
01335 063033         DOC 0,DSKP         ;"HD1" = 0
01336 066433         DIC 1,DSKP         ;READ IT BACK
01337 122414         SUB# 1,0,SZR       ;AC0=GOOD
01340 006242         EHALT              ;AC1=BAD
01341 006243         LOOP

01342 006241 A71:    SETUP              ;TEST DISK ADDRESS REGISTER
01343 020105         LDA 0,786          ;FOR SINGLE 0 BIT
01344 063033         DOC 0,DSKP         ;"HD2" = 0
01345 066433         DIC 1,DSKP         ;READ IT BACK
01346 122414         SUB# 1,0,SZR       ;AC0=GOOD
01347 006242         EHALT              ;AC1=BAD
01350 006243         LOOP

01351 006241 A72:    SETUP              ;TEST DISK ADDRESS REGISTER
01352 020106         LDA 0,785          ;FOR SINGLE ZERO BITS
01353 063033         DOC 0,DSKP         ;"HD4" = 0
01354 066433         DIC 1,DSKP         ;READ IT BACK
01355 122414         SUB# 1,0,SZR       ;AC0=GOOD
01356 006242         EHALT              ;AC1=BAD
01357 006243         LOOP

01360 006241 A73:    SETUP              ;TEST DISK ADDRESS REGISTER
01361 020107         LDA 0,784          ;FOR SINGLE 0 BIT
01362 063033         DOC 0,DSKP         ;"HD8" = 0
01363 066433         DIC 1,DSKP         ;READ IT BACK
01364 122414         SUB# 1,0,SZR       ;AC0=GOOD
01365 006242         EHALT              ;AC1=BAD
01366 006243         LOOP

01367 006241 A74:    SETUP              ;TEST DISK ADDRESS REGISTER
01370 020110         LDA 0,783          ;FOR SINGLE 0 BIT
01371 063033         DOC 0,DSKP         ;"HD16" = 0
01372 066433         DIC 1,DSKP         ;READ IT BACK
01373 122414         SUB# 1,0,SZR       ;AC0=GOOD
01374 006242         EHALT              ;AC1=BAD
01375 006243         LOOP

01376 006241 A75:    SETUP              ;TEST DISK ADDRESS REGISTER
01377 020111         LDA 0,782          ;FOR SINGLE ZERO BITS
01400 063033         DOC 0,DSKP         ;"FORMAT" = 0
01401 066433         DIC 1,DSKP         ;READ IT BACK
01402 122414         SUB# 1,0,SZR       ;AC0=GOOD
01403 006242         EHALT              ;AC1=BAD
01404 006243         LOOP

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01405 006241 A76:    SETUP              ;TEST DISK ADDRESS REGISTER
01406 020112         LDA 0,ZB1          ;FOR SINGLE 0 BIT
01407 063033         DOC 0,DSKP         ;"D1" = 0
01410 066433         DIC 1,DSKP         ;READ IT BACK
01411 122414         SUB# 1,0,SZR       ;AC0=GOOD
01412 006242         EHALT              ;AC1=BAD WORD
01413 006243         LOOP

01414 006241 A77:    SETUP              ;TEST DISK ADDRESS REGISTER
01415 102220         ADCZR 0,0          ;FOR SINGLE ZERO BIT
01416 063033         DOC 0,DSKP         ;"D0" = 0
01417 066433         DIC 1,DSKP         ;READ IT BACK
01420 122414         SUB# 1,0,SZR       ;AC0=GOOD
01421 006242         EHALT              ;AC1=BAD
01422 006243         LOOP

01423 102400 A78:    SUB 0,0            ;CHECK CA REGISTER, ALL
01424 006237         JSR @ISET          ;POSSIBLE PATTERNS
01425 062033         DOB 0,DSKP         ;LOAD CA
01426 065433         DIB 1,DSKP         ;READ IT BACK
01427 122414         SUB# 1,0,SZR       ;AC0=GOOD
01430 006242         EHALT              ;AC1=BAD
01431 006243         LOOP               ;DO IT ONLY ONCE FOR EACH PAT
01432 101404         INC 0,0,SZR        ;NEXT PATTERN
01433 000771         JMP .-7

01434 006237 A79:    JSR @ISET          ;CHECK DISK ADDRESS REGISTER
01435 063033         DOC 0,DSKP         ;ALL POSSIBLE PATTERNS
01436 066433         DIC 1,DSKP         ;LOAD/READ BACK
01437 122414         SUB# 1,0,SZR       ;AC0=GOOD
01440 006242         EHALT              ;AC1=BAD
01441 006243         LOOP
01442 101404         INC 0,0,SZR        ;NEXT PATTERN
01443 000771         JMP .-7

01444 006241 A80:    SETUP              ;SPECIAL TEST FOR 8291
01445 102400         SUB 0,0            ;IC PACKS.  SET RIGHTMOST
01446 030134         LDA 2,BIT1         ;BIT IN EACH PACK WITH
01447 072033         DOB 2,DSKP         ;3 SUCCESSIVE LOADS, THEN
01450 072033         DOB 2,DSKP         ;LOAD ZERO.  MARGINAL
01451 072033         DOB 2,DSKP         ;PACKS WILL HOLD THE "1".
01452 062033         DOB 0,DSKP
01453 065433         DIB 1,DSKP         ;TESTING CA REGISTER
01454 125004         MOV 1,1,SZR        ;AC0=GOOD
01455 006242         EHALT              ;AC1=BAD
01456 006243         LOOP
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01457 006241 A81:    SETUP              ;SPECIAL TEST FOR 8291
01460 102400         SUB 0,0            ;IC PACKS.  SET POSITION 2
01461 030135         LDA 2,BIT2         ;(PIN 9) IN EACH PACK WITH
01462 072033         DOB 2,DSKP         ;3 SUCCESSIVE LOADS, THEN
01463 072033         DOB 2,DSKP         ;LOAD ZEROS.  MARGINAL
01464 072033         DOB 2,DSKP         ;PACKS WILL HOLD A "1"
01465 062033         DOB 0,DSKP
01466 065433         DIB 1,DSKP         ;TESTING CA REGISTER
01467 122414         SUB# 1,0,SZR       ;AC0=GOOD
01470 006242         EHALT              ;AC1=BAD
01471 006243         LOOP

01472 006241 A82:    SETUP              ;SPECIAL TEST FOR 8291
01473 102400         SUB 0,0            ;IC PACKS.  SET POSITION 4
01474 030136         LDA 2,BIT4         ;(PIN 2) IN EACH PACK WITH
01475 072033         DOB 2,DSKP         ;3 SUCCESSIVE LOADS, THEN
01476 072033         DOB 2,DSKP         ;LOAD ZEROS.  MARGINAL
01477 072033         DOB 2,DSKP         ;PACKS WILL HOLD A "1".
01500 062033         DOB 0,DSKP
01501 065433         DIB 1,DSKP         ;TESTING CA REGISTER
01502 122414         SUB# 1,0,SZR       ;AC0=GOOD
01503 006242         EHALT              ;AC1=BAD
01504 006243         LOOP

01505 006241 A83:    SETUP              ;SPECIAL TEST FOR 8291
01506 102400         SUB 0,0            ;IC PACKS.  SET POSITION 8
01507 030137         LDA 2,BIT8         ;(PIN 12) IN EACH PACK WITH
01510 072033         DOB 2,DSKP         ;3 SUCCESSIVE LOADS.  THEN
01511 072033         DOB 2,DSKP         ;LOAD ZEROS.  MARGINAL
01512 072033         DOB 2,DSKP         ;PACKS WILL HOLD A "1"
01513 062033         DOB 0,DSKP
01514 065433         DIB 1,DSKP         ;TESTING CA REGISTER
01515 122414         SUB# 1,0,SZR       ;AC0=GOOD
01516 006242         EHALT              ;AC1=BAD
01517 006243         LOOP

01520 006241 A84:    SETUP              ;SPECIAL TEST FOR 8291
01521 102400         SUB 0,0            ;IC PACKS.  SET POSITION 1
01522 030134         LDA 2,BIT1         ;(PIN 5) OF EACH PACK WITH
01523 073033         DOC 2,DSKP         ;3 SUCCESSIVE LOADS, THEN
01524 073033         DOC 2,DSKP         ;LOAD ZEROS.  MARGINAL
01525 073033         DOC 2,DSKP         ;PACKS WILL HOLD A "1".
01526 063033         DOC 0,DSKP
01527 066433         DIC 1,DSKP         ;TESTING DTSK ADDR REG.
01530 122414         SUB# 1,0,SZR       ;AC0=GOOD
01531 006242         EHALT              ;AC1=BAD
01532 006243         LOOP
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01533 006241 A85:    SETUP              ;SPECIAL TEST FOR 8291
01534 102400         SUB 0,0            ;IC PACKS.  SET POSITION 2
01535 030135         LDA 2,BIT2         ;(PIN 9) OF EACH PACK WITH
01536 073033         DOC 2,DSKP         ;3 SUCCESSIVE LOADS, THEN
01537 073033         DOC 2,DSKP         ;LOAD ZEROS.  MARGINAL
01540 073033         DOC 2,DSKP         ;PACKS WILL RETAIN A "1".
01541 063033         DOC 0,DSKP
01542 066433         DIC 1,DSKP         ;TESTING DISK ADDR REG.
01543 122414         SUB# 1,0,SZR       ;AC0=GOOD
01544 006242         EHALT              ;AC1=BAD
01545 006243         LOOP

01546 006241 A86:    SETUP              ;SPECIAL TEST FOR 8291
01547 102400         SUB 0,0            ;IC PACKS.  SET POSITION 4
01550 030136         LDA 2,BIT4         ;(PIN 2) OF EACH PACK WITH
01551 073033         DOC 2,DSKP         ;3 SUCCESSIVE LOADS, THEN
01552 073033         DOC 2,DSKP         ;LOAD ZEROS.  MARGINAL
01553 073033         DOC 2,DSKP         ;PACKS WILL RETAIN A "1".
01554 063033         DOC 0,DSKP
01555 066433         DIC 1,DSKP         ;TESTING DISK ADDR REG.
01556 122414         SUB# 1,0,SZR       ;AC0=GOOD
01557 006242         EHALT              ;AC1=BAD
01560 006243         LOOP

01561 006241 A87:    SETUP              ;SPECIAL TEST FOR 8291
01562 102400         SUB 0,0            ;IC PACKS.  SET POSITION 8
01563 030137         LDA 2,BIT8         ;(PIN 12) OF EACH PACK WITH
01564 073033         DOC 2,DSKP         ;3 SUCCESSIVE LOADS, THEN
01565 073033         DOC 2,DSKP         ;LOAD ALL ZEROS.  MARGINAL
01566 073033         DOC 2,DSKP         ;PACKS WILL RETAIN A "1".
01567 063033         DOC 0,DSKP
01570 066433         DIC 1,DSKP         ;TESTING DISK ADDR REG.
01571 122414         SUB# 1,0,SZR       ;AC0=GOOD
01572 006242         EHALT              ;AC1=BAD
01573 006243         LOOP

01574 020147 B1:     LDA 0,KDOB         ;CHECK FOR ILLEGAL
01575 040403         STA 0,B1.1         ;DEVICE SELECT BY
01576 024140         LDA 1,C2525        ;DISK PACK CONTROL
01577 006240         SETP1              ;PERFORM "DOB" TO EVERY
01600 060000 B1.1:   DOB 1,0            ;OTHER DEVICE ADDRESS
01601 061433         DIB 0,DSKP         ;AND CHECK DSKP
01602 122415         SUB# 1,0,SNR       ;EACH TIME TO SEE
01603 006242         EHALT              ;IT RECOGNIZED THE "DOB".
01604 006243         LOOP
01605 010773 B1.2:   ISZ B1.1           ;CODE FROM HERE ON IS
01606 020772         LDA 0,B1.1         ;FOR INCREMENTING TO
01607 030123         LDA 2,C77          ;NEXT DEVICE ADDRESS
01610 143405         AND 2,0,SNR
01611 000405         JMP B2
01612 030154         LDA 2,CDSK
01613 142415         SUB# 2,0,SNR
01614 000771         JMP B1.2
01615 000762         JMP B1.1-1
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A 0022  .MAIN

01616 000241 B2:    SETUP               ;SEE IF (S) PULSE WILL SET
01617 020070        LDA 0,C1000         ;"DP BUSY".  START A
01620 061133        DOAS 0,DSKP         ;SEEK
01621 063433        SKPBN DSKP          ;SKIP IF "DP BUSY" = 1
01622 000253        FHLT                ;CHECK "DP START", "DP BUSY",
01623 000263        LOOPD               ;"SELB" DC GATE.

01624 000241 B3:    SETUP               ;SEE IF (C) PULSE WILL CLEAR
01625 020070        LDA 0,C1000         ;"DP BUSY".  START A SEEK.
01626 061133        DOAS 0,DSKP         ; THEN CLEAR
01627 060233        NIOC DSKP
01630 063533        SKPBZ DSKP          ;CHECK "CLEAR"
01631 000253        FHLT
01632 000263        LOOPD

01633 000241 B4:    SETUP               ;SEE IF TORST WILL CLEAR
01634 020070        LDA 0,C1000         ;"DP BUSY".  START A SEEK.
01635 061133        DOAS 0,DSKP         ; THEN CLEAR IT
01636 062677        TORST
01637 063533        SKPBZ DSKP          ;CHECK "RESET", "CLEAR"
01640 000253        FHLT
01641 000263        LOOPD

01642 000241 B5:    SETUP               ;CHECK TO INSURE THAT
01643 064433        DIA 1,DSKP          ;ALL SEEKING FF'S ARE
01644 024216        LDA 0,C3500         ;CLEARED BY TORST
01645 107404        AND 0,1,SZR         ;AC1=BAD SEEKING
01646 000242        FHALT               ;STATUS FROM DTA.
01647 000243        LOOP                ;CHECK DATA THRU MUX

01650 000241 B6:    SETUP               ;CHECK FOR PROPER
01651 102000        AFC 0,0             ;INPUT OF STATUS THRU
01652 062033        DOB 0,DSKP          ;THE MULTIPLEXORS TO
01653 063033        DOC 0,DSKP          ;THE DATA BUSS DC GATES
01654 064433        DIA 1,DSKP
01655 024216        LDA 0,C3500
01656 107414        AND# 0,1,SZR
01657 000242        FHALT               ;SEEKING STATUS ON
01660 000243        LOOP                ;ALL SHOULD BE ZERO.  (AC1)=STATUS

01661 000241 B7:    SETUP               ;TRY TO SET "SEEKING 0"
01662 020070        LDA 0,C1000         ;VIA (S) PULSE
01663 061133        DOAS 2,DSKP
01664 064433        DIA 1,DSKP          ;"DP START" SETS "START"
01665 020071        LDA 0,K65           ;CHECK "ADAPTER SEL", "SEEK"
01666 123415        AND# 1,0,SNR        ;AND "START SEEK"
01667 000253        FHLT
01670 000263        LOOPD
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01671 006241 B8:    SETUP              ;TRY TO SET "SEEKING 0"
01672 020070        LDA 0,C1000        ;WITH A (P) PULSE
01673 061333        DOAP 0,DSKP
01674 024071        LDA 1,KB5          ;CHECK "DP IOP"
01675 060433        DIA 0,DSKP         ;SET LINE TO "START"
01676 123415        AND# 1,0,SNR
01677 006253        EHLT
01700 006263        LOOPD

01701 006241 B9:    SETUP              ;CHECK UNIT SELECTION
01702 020070        LDA 0,C1000        ;START UNIT 0 SEEKING
01703 061333        DOAP 0,DSKP        ;AND VERIFY THAT NO
01704 070433        DIA 2,DSKP         ;OTHER UNIT SEEKS.
01705 020071        LDA 0,KB5          ;AC2=STATUS DURING SEEK
01706 024216        LDA 1,C3600        ;AC1=BAD SEEKING STATUS
01707 147400        AND 2,1            ;AC0=GOOD
01710 122414        SUB# 1,0,SZR       ;CHECK UNIT # DECODER
01711 006253        EHLT
01712 006263        LOOPD

01713 006241 B10:   SETUP              ;CHECK UNIT SELECTION 1
01714 020054        LDA 0,KB1          ;START UNIT 1 SEEKING
01715 063033        DOC 0,DSKP         ;AND VERIFY THAT NO
01716 020070        LDA 0,C1000        ;OTHER UNIT SEEKS.
01717 061333        DOAP 0,DSKP        ;AC2=STATUS DURING SEEK
01720 070433        DIA 2,DSKP         ;AC1=BAD SEEKING STATUS
01721 024216        LDA 1,C3600        ;AC0=GOOD
01722 020070        LDA 0,KB6          ;CHECK UNIT # DECODER,
01723 147400        AND 2,1            ;"UNIT 1", AND "SEEKING 1"
01724 122414        SUB# 1,0,SZR
01725 006253        EHLT
01726 006263        LOOPD

01727 006241 B11:   SETUP              ;CHECK UNIT SELECTION
01730 102620        SUBZR 0,0          ;START UNIT 2 SEEKING AND
01731 063033        DOC 0,DSKP         ;VERIFY THAT NO OTHER
01732 020070        LDA 0,C1000        ;UNIT SEEKS
01733 061333        DOAP 0,DSKP        ;AC2=STATUS DURING SEEK
01734 070433        DIA 2,DSKP         ;AC1=BAD SEEKING STATUS
01735 024216        LDA 1,C3600        ;AC0=GOOD
01736 020067        LDA 0,KB7          ;CHECK "UNIT 2",
01737 147400        AND 2,1            ;"SEEKING 2"
01740 122414        SUB# 1,0,SZR
01741 006253        EHLT
01742 006263        LOOPD
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001743 006241 B12:     SETUP              ;CHECK UNIT SELECTION
001744 020056          LDA 0,C140K        ;START UNIT 3 SEEKING
001745 063033          DOC 0,DSKP         ;AND VERIFY THAT NO
001746 020070          LDA 0,C1000        ;OTHER UNIT SEEKS.
001747 061333          DOAP 1,DSKP        ;AC2=STATUS DURING SEEK
001750 071433          DIA 2,DSKP         ;AC1=BAD SEEKING STATUS
001751 024216          LDA 1,C360Ø        ;AC0=GOOD
001752 020066          LDA 0,KB8          ;CHECK "UNIT 3", AND
001753 147400          AND 2,1            ;"SEEKING 3"
001754 122414          SUB# 1,0,SZR
001755 006253          FHLT
001756 006263          LOOPD

001757 006241 B13:     SETUP              ;CHECK THE "CLEAR"
001760 152520          SUBZL 2,2          ;RESET OF "SEEKING 0".
001761 006230          SSEEK              ;START UNIT 0 SEEKING
001762 060233          NIOC DSKP          ;ISSUE (C) PULSE
001763 020071          LDA 0,KB5
001764 064433          DIA 1,DSKP         ;READ STATUS
001765 107404          AND 0,1,SZR        ;"SEEKING 0" BIT NOT
001766 006253          FHLT               ;CLEARED BY (C) PULSE
001767 006263          LOOPD

001770 006241 B14:     SETUP              ;CHECK THE "CLEAR"
001771 030060          LDA 2,KB14         ;RESET OF "SEEKING 1"
001772 006230          SSEEK              ;START UNIT 1 SEEKING.
001773 060233          NIOC DSKP          ;ISSUE (C) PULSE
001774 020070          LDA 0,KB6          ;READ STATUS
001775 064433          DIA 1,DSKP         ;"SEEKING 1" BIT NOT
001776 107404          AND 0,1,SZR        ;CLEARED BY (C) PULSE
001777 006253          FHLT
002000 006263          LOOPD

002001 006241 B15:     SETUP              ;CHECK THE "CLEAR" RESET
002002 030061          LDA 2,KB13         ;OF "SEEKING 2".
002003 006230          SSEEK              ;START UNIT 2 SEEKING.
002004 060233          NIOC DSKP          ;ISSUE (C) PULSE
002005 020067          LDA 0,KB7
002006 064433          DIA 1,DSKP         ;READ STATUS
002007 107404          AND 0,1,SZR        ;"SEEKING 2" BIT NOT
002010 006253          FHLT               ;RESET BY (C) PULSE
002011 006263          LOOPD
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02012 006241 B16:     SETUP             ;CHECK THE "CLEAR" RESET
02013 030062          LDA 2,KB12        ;OF "SEEKING 3"
02014 006230          SSEEK             ;START UNIT 3 SEEKING.
02015 060233          NIOC DSKP         ;ISSUE (C) PULSE
02016 020066          LDA 0,KB8
02017 064433          DIA 1,DSKP        ;READ STATUS
02020 107404          AND 0,1,SZR       ;"SEEKING 3" BIT NOT
02021 006253          EHLT              ;CLEARED BY (C) PULSE
02022 006263          LOOPD

02023 020151 B17:     LDA 0,NDSKS       ;ATTEMPT TO OBTAIN
02024 101203          MOVR 0,0,SNC      ;"SEEK DONE 0" FROM
02025 000407          JMP B18           ;A RECALIBRATE
02026 006237          JSR @ISET         ;(SKIP OVER IF NO UNIT 0)
02027 006231          RECL0             ;RECAL UNIT 0
02030 020054          LDA 0,KB1         ;AC1=STATUS
02031 123415          AND# 1,0,SNR      ;"ATTEN0" DID NOT SET
02032 006253          EHLT              ;"SEEK DONE 0"
02033 006243          LOOP

02034 020151 B18:     LDA 0,NDSKS       ;ATTEMPT TO OBTAIN
02035 101200          MOVR 0,0          ;"SEEK DONE 1" FROM
02036 101203          MOVR 0,0,SNC      ;A RECALIBRATE
02037 000407          JMP B19           ;(SKIP OVER IF NO UNIT 1)
02040 006237          JSR @ISET
02041 006232          RECL1             ;RECAL UNIT 1
02042 020074          LDA 0,KB2         ;AC1=STATUS
02043 123415          AND# 1,0,SNR      ;"ATTEN1" DID NOT SET
02044 006253          EHLT              ;"SEEK DONE 1"
02045 006243          LOOP

02046 020151 B19:     LDA 0,NDSKS       ;ATTEMPT TO OBTAIN
02047 024061          LDA 1,KB13        ;"SEEK DONE 2" FROM
02050 123405          AND 1,0,SNR       ;A RECALIBRATE
02051 000407          JMP B20           ;(SKIP OVER IF NO UNIT 2)
02052 006237          JSR @ISET
02053 006233          RECL2             ;RECAL UNIT 2
02054 020073          LDA 0,KB3         ;AC1=STATUS
02055 123415          AND# 1,0,SNR      ;"ATTEN2" DID NOT SET
02056 006253          EHLT              ;"SEEK DONE 2"
02057 006243          LOOP
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002060 002151 B20:    LDA 0,NDSKS       ;ATTEMPT TO OBTAIN
002061 024062         LDA 1,KB12        ;"SEEK DONE 3" FROM
002062 123405         AND 1,0,SNR       ;A RECALIBRATE
002063 000407         JMP B21           ;(SKIP OVER IF NO UNIT 3)
002064 006237         JSR @ISET
002065 006234         RECL3             ;RECAL UNIT 3
002066 002072         LDA 0,KB4         ;AC1=STATUS
002067 123415         AND# 1,0,SNR      ;"ATTEN3" FAILED TO SET
002070 006253         HALT              ;"SEEK DONE 3"
002071 006243         LOOP

002072 062677 B21:    TORST             ;DISK DRIVE WILL NOT TAKE
002073 000167         LDA 2,C5          ;SUCCESSIVE RECALIBRATES
002074 006227         WAIT              ;DO A DELAY

002075 020151         LDA 0,NDSKS       ;SEE IF "SEEK DONE 0"
002076 101203         MOVR 0,0,SNC      ;WILL RESET "SEEKING 0"
002077 000407         JMP B22           ;(SKIP IF NO UNIT 0)
002100 006237         JSR @ISET
002101 006231         RECL0             ;RECAL UNIT 0
002102 002071         LDA 0,KB5         ;AC1=STATUS
002103 123414         AND# 1,0,SZR      ;"SEEKING 0" SHOULD GET
002104 006253         HALT              ;RESET BY "SEEK DONE 0"
002105 006243         LOOP

002106 020151 B22:    LDA 0,NDSKS       ;SEE IF "SEEK DONE 1"
002107 101200         MOVR 0,0          ;WILL RESET "SEEKING 1"
002110 101203         MOVR 0,0,SNC
002111 000407         JMP B23           ;(SKIP OVER IF NO UNIT 1)
002112 006237         JSR @ISET
002113 006232         RECL1             ;RECAL UNIT 1
002114 002070         LDA 0,KB6         ;AC1=STATUS
002115 123414         AND# 1,0,SZR      ;"SEEKING 1" SHOULD GET
002116 006253         HALT              ;RESET BY "SEEK DONE 1"
002117 006243         LOOP
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02120 020151 B23:    LDA 0,NDSKS      ;SEE IF "SEEK DONE 2"
02121 024061         LDA 1,KB13       ;WILL RESET "SEEKING 2"
02122 123405         AND 1,0,SNR
02123 000407         JMP B24          ;(SKIP OVER IF NO UNIT 2)
02124 006237         JSR @ISET
02125 006233         RECL2            ;RECAL UNIT 2
02126 020067         LDA 0,KB7        ;AC1=STATUS
02127 123414         AND# 1,0,SZR     ;"SEEKING 2" SHOULD GET
02130 006253         EHLT             ;RESET BY "SEEK DONE 2"
02131 006243         LOOP

02132 020151 B24:    LDA 0,NDSKS      ;SEE IF "SEEK DONE 3"
02133 024062         LDA 1,KB12       ;WILL RESET "SEEKING 3"
02134 123405         AND 1,0,SNR
02135 000407         JMP B25          ;(SKIP IF NO UNIT 3)
02136 006237         JSR @ISET
02137 006234         RECL3            ;RECAL UNIT 3
02140 020066         LDA 0,KB8        ;AC1=STATUS
02141 123414         AND# 1,0,SZR     ;"SEEKING 3" SHOULD GET
02142 006253         EHLT             ;RESET VIA "SEEK DONE 3"
02143 006243         LOOP

02144 062677 B25:    IORST            ;DISK DRIVE WILL NOT TAKE
02145 030173         LDA 2,C15        ;SUCCESSIVE RECALIBRATES
02146 006227         WAIT             ;WAIT 1.3 SEC

02147 020151         LDA 0,NDSKS      ;ATTEMPT TO RESET "SEEK DONE 0"
02150 101203         MOVR 0,0,SNC     ;WITH "DATOA"
02151 000411         JMP B26          ;SKIP OVER IF NO UNIT 0
02152 006237         JSR @ISET
02153 006231         RECL0            ;SET "SEEK DONE 0" VIA
02154 020054         LDA 0,KB1        ;RECALIBRATE
02155 061033         DOA 0,DSKP       ;ATTEMPT RESET
02156 064433         DIA 1,DSKP       ;READ STATUS
02157 123414         AND# 1,0,SZR
02160 006253         EHLT             ;"SEEK DONE 0" RESET FAILED
02161 006243         LOOP

02162 020151 B26:    LDA 0,NDSKS      ;ATTEMPT TO RESET "SEEK DONE 1"
02163 101200         MOVR 0,0         ;WITH "DATOA"
02164 101203         MOVR 0,0,SNC
02165 000411         JMP B27          ;(SKIP OVER IF NO UNIT 1)
02166 006237         JSR @ISET
02167 006232         RECL1            ;SET "SEEK DONE 1"
02170 020074         LDA 0,KB2        ;WITH A RECALIBRATE
02171 061033         DOA 0,DSKP       ;ATTEMPT RESET
02172 064433         DIA 1,DSKP       ;READ STATUS
02173 123414         AND# 1,0,SZR
02174 006253         EHLT             ;"SEEK DONE 1" RESET FAILED
02175 006243         LOOP
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A 0028  .MAIN

02176 020151 B27:    LDA 0,NDSKS      ;ATTEMPT TO RESET "SEEK DONE 2"
02177 024061         LDA 1,KB13       ;WITH "DATOA"
02200 123405         AND 1,0,SNR
02201 000411         JMP B28          ;(SKIP OVER IF NO UNIT 2)
02202 006237         JSR @ISET
02203 006233         RECL2            ;SET "SEEK DONE 2"
02204 020073         LDA 0,KB3        ;WITH A RECALIBRATE
02205 061033         DOA 0,DSKP       ;ATTEMPT RESET
02206 064433         DIA 1,DSKP       ;READ STATUS
02207 123414         AND# 1,0,SZR
02210 006253         EHLT             ;"SEEK DONE 2" RESET FAILED
02211 006243         LOOP

02212 020151 B28:    LDA 0,NDSKS      ;ATTEMPT TO RESET "SEEK DONE 3"
02213 024062         LDA 1,KB12       ;WITH "DATOA"
02214 123405         AND 1,0,SNR
02215 000411         JMP B29          ;(SKIP OVER IF NO UNIT 3)
02216 006237         JSR @ISET
02217 006234         RECL3            ;SET "SEEK DONE 3"
02220 020072         LDA 0,KB4        ;WITH A RECALIBRATE
02221 061033         DOA 0,DSKP       ;ATTEMPT RESET
02222 064433         DIA 1,DSKP       ;READ STATUS
02223 123414         AND# 1,0,SZR
02224 006253         EHLT             ;"SEEK DONE 3" RESET FAILED
02225 006243         LOOP

02226 020151 B29:    LDA 0,NDSKS      ;ATTEMPT TO RESET "SEEK DONE 0"
02227 101203         MOVR 0,0,SNC     ;WITH A (C) PULSE
02230 000411         JMP B30          ;(SKIP OVER IF NO UNIT 0)
02231 006237         JSR @ISET
02232 006231         RECL0            ;SET "SEEK DONE 0" VIA RECAL
02233 020054         LDA 0,KB1
02234 060233         NIOC DSKP        ;ATTEMPT CLEAR
02235 064433         DIA 1,DSKP       ;READ STATUS
02236 123414         AND# 1,0,SZR
02237 006253         EHLT             ;"SEEK DONE 0" RESET FAILED
02240 006243         LOOP

02241 020151 B30:    LDA 0,NDSKS      ;ATTEMPT TO RESET "SEEK DONE 1"
02242 101200         MOVR 0,0         ;WITH A (C) PULSE
02243 101203         MOVR 0,0,SNC
02244 000411         JMP B31          ;(SKIP IF NO UNIT 1)
02245 006237         JSR @ISET
02246 006232         RECL1            ;SET "SEEK DONE 1" VIA RECAL
02247 020074         LDA 0,KB2
02250 060233         NIOC DSKP        ;ATTEMPT RESET
02251 064433         DIA 1,DSKP       ;READ STATUS
02252 123414         AND# 1,0,SZR
02253 006253         EHLT             ;"SEEK DONE 1" RESET FAILED
02254 006243         LOOP
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02255 020151 B31:    LDA 0,NDSKS      ;ATTEMPT TO RESET "SEEK DONE 2"
02256 024061         LDA 1,KB13       ;WITH A (C) PULSE
02257 123405         AND 1,0,SNR
02260 000411         JMP B32          ;(SKIP OVER IF NO UNIT 2)
02261 006237         JSR @ISET
02262 006233         RECL2            ;SET "SEEK DONE 2" VIA RECAL
02263 020073         LDA 0,KB3
02264 060233         NIOC DSKP        ;ATTEMPT RESET
02265 064433         DIA 1,DSKP       ;READ STATUS
02266 123414         AND# 1,0,SZR
02267 006253         EHLT             ;"SEEK DONE 2" RESET FAILED
02270 006243         LOOP

02271 020151 B32:    LDA 0,NDSKS      ;ATTEMPT TO RESET "SEEK DONE 3"
02272 024062         LDA 1,KB12       ;WITH A (C) PULSE
02273 123405         AND 1,0,SNR
02274 000411         JMP B35          ;(SKIP OVER IF NO UNIT 3)
02275 006237         JSR @ISET
02276 006234         RECL3            ;SET "SEEK DONE 3" VIA RECAL
02277 020072         LDA 0,KB4
02300 060233         NIOC DSKP        ;ATTEMPT RESET
02301 064433         DIA 1,DSKP       ;READ STATUS
02302 123414         AND# 1,0,SZR
02303 006253         EHLT             ;"SEEK DONE 3" RESET FAILED
02304 006243         LOOP

02305 006241 B35:    SETUP            ;IDLE STATE STATUS CHECK
02306 064433         DIA 1,DSKP
02307 102620         SUBZR 0,0
02310 107414         AND# 0,1,SZR
02311 006242         EHALT            ;R/W DONE = 1
02312 006243         LOOP

02313 006241 B36:    SETUP            ;IDLE STATE STATUS CHECK
02314 064433         DIA 1,DSKP
02315 020175         LDA 0,C30
02316 123414         AND# 1,0,SZR
02317 006242         EHALT            ;ADDR ERR OR END CYL
02320 006243         LOOP
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002321 006241 B37:    SETUP             ;IDLE STATE STATUS CHECK
002322 064433         DIA 1,DSKP
002323 020061         LDA 0,KB13
002324 107414         AND# 0,1,SZR
002325 006242         FHALT             ;CHECK WORD ERROR = 1
002326 006243         LOOP

002327 006241 B38:    SETUP             ;IDLE STATE STATUS CHECK
002330 064433         DIA 1,DSKP
002331 020117         LDA 0,C3
002332 123414         AND# 1,0,SZR
002333 006242         FHALT             ;DATA LATE OR ERR
002334 006243         LOOP

002335 020151 B39:    LDA 0,NOSKS       ;SEE IF "SEEK DONE 0"
002336 101203         MOVR 0,0,SNC      ;WILL CAUSE INTERRUPT
002337 000406         JMP B40           ;(SKIP IF NO UNIT 0)
002340 006237         JSR @ISET
002341 006231         RFCL0             ;SET "SEEK DONE 0"
002342 006235         ITRWT             ;IS THERE AN INTERRUPT?
002343 006253         FHLT              ;NO, CHECK "INTERRUPT",
002344 006243         LOOP              ;"DP INT REQ".

002345 020151 B40:    LDA 0,NOSKS       ;SEE IF "SEEK DONE 1"
002346 101200         MOVR 0,0          ;WILL CAUSE INTERRUPT
002347 101203         MOVR 0,0,SNC
002350 000406         JMP B41           ;(SKIP IF NO UNIT 1)
002351 006237         JSR @ISET
002352 006232         RFCL1             ;SET "SEEK DONE 1"
002353 006235         ITRWT             ;IS THERE AN INTERRUPT ?
002354 006253         FHLT              ;NO, CHECK "INTERRUPT",
002355 006243         LOOP              ;"DP INT REQ".

002356 020151 B41:    LDA 0,NOSKS       ;SEE IF "SEEK DONE 2"
002357 024061         LDA 1,KB13        ;WILL CAUSE INTERRUPT
002360 123405         AND 1,0,SNR
002361 000406         JMP B42           ;(SKIP IF NO UNIT 2)
002362 006237         JSR @ISET
002363 006233         RFCL2             ;SET "SEEK DONE 2"
002364 006235         ITRWT             ;IS THERE AN INTERRUPT ?
002365 006253         FHLT              ;NO, CHECK "INTERRUPT",
002366 006243         LOOP              ;"DP INT REQ".

                      .EOT
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00031  .MAIN

02367 020151 B42:    LDA 0,NDSKS       ;SEE IF "SEEK DONE 3"
02370 024062         LDA 1,KB12        ;WILL CAUSE INTERRUPT
02371 123405         AND 1,0,SNR
02372 000406         JMP B43           ;(SKIP IF NO UNIT 3)
02373 006237         JSR @ISET
02374 006234         RECL3             ;SET "SEEK DONE 3"
02375 006235         ITRWT             ;IS THERE AN INTERRUPT ?
02376 006253         EHLT              ;NO, CHECK "INTERRUPT",
02377 006243         LOOP              ;"DP INT REQ".

02400 006240 B43:    SETP1             ;TEST SEEK TO CYLINDER 0
02401 020152         LDA 0,TESTU       ;(FIRST ATTEMPT AT COMPLETE SEEK)
02402 063033         DOC 0,DSKP        ;SELECT AN ACTIVE UNIT #
02403 020070         LDA 0,KB6
02404 061333         DOAP 0,DSKP       ;SEEK !
02405 030167         LDA 2,C5
02406 006227         WAIT              ;WAIT 500MS (OR UNTIL "DONE")
02407 020220         LDA 0,C74K        ;AC1=STATUS
02410 123415         AND# 1,0,SNR      ;NO SEEK DONE STATUS
02411 006242         EHALT             ;CHECK "SEEK","CONTROL 1","CYL",
02412 006243         LOOP              ;"HD+DIR","CONTROL 2", SEQUENCING.

02413 006240 B44:    SETP1             ;TEST SEEK TO CYLINDER 0
02414 020152         LDA 0,TESTU
02415 063033         DOC 0,DSKP        ;SELECT AN ACTIVE UNIT #
02416 020070         LDA 0,KB6
02417 061333         DOAP 0,DSKP       ;SEEK !
02420 030167         LDA 2,C5
02421 006227         WAIT              ;WAIT 500MS (OR UNTIL "DONE")
02422 020064         LDA 0,KB10        ;AC1=STATUS
02423 123414         AND# 1,0,SZR      ;SEEK ERROR STATUS
02424 006242         EHALT             ;CHECK "SEEK","CONTROL 1","CYL",
02425 006243         LOOP              ;"HD+DIR", "DIFF","CONTROL 2".

02426 006240 B45:    SETP1             ;TEST SEEK CYLINDER 77 (OCTAL)
02427 006236         GADSK
02430 006246         SEEK
02431 000077         77
02432 020065         LDA 0,KB9         ;AC1=ENDING STATUS
02433 030064         LDA 2,KB10
02434 107414         AND# 0,1,SZR
02435 147414         AND# 2,1,SZR      ;SEEK ERROR OR
02436 006242         EHALT             ;NO READY STATUS
02437 006243         LOOP

02440 006240 B46:    SETP1             ;TEST SEEK CYLINDER 300 (OCTAL)
02441 006236         GADSK
02442 006246         SEEK
02443 000300         300
02444 020065         LDA 0,KB9         ;AC1=ENDING STATUS
02445 030064         LDA 2,KB10
02446 107414         AND# 0,1,SZR
02447 147414         AND# 2,1,SZR      ;SEEK ERROR OR
02450 006242         EHALT             ;NO READY STATUS
02451 006243         LOOP
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V2452 V06240 B47:   SETP1           ;CHOOSE AN ACTIVE DISK
V2453 V06236        GADSK           ;AND SET INTERRUPT VIA SEEK.
V2454 V06246        SEEK            ;CHECK FOR PROPER DISK
V2455 V00000        0               ;ADDRESS RESPONSE TO INTA
V2456 V06235        ITRWT           ;ALLOW INTERRUPT
V2457 V00401        JMP .+1
V2460 V20154        LDA 0,CDSK
V2461 V65477        INTA 1          ;GET THE ADDRESS
V2462 122414        SUB# 1,0,SZR    ;INTA FAILED.
V2463 V06242        EHALT           ;AC0=GOOD
V2464 V06243        LOOP            ;AC1=BAD

V2465 V06240 B48:   SETP1           ;SEE IF (C) PULSE WILL
V2466 V06236        GADSK           ;CLEAR "DP INT REQ"
V2467 V06246        SEEK            ;SET "INTERRUPT" WITH
V2470 V00000        0               ;A SEEK
V2471 V60233        NIOC DSKP       ;CLEAR INT REQ
V2472 V06235        ITRUT           ;CHECK FOR INTERRUPT
V2473 V00402        JMP .+2         ;NO INTERRUPT, OK!!
V2474 V06242        EHALT           ;(C) THRU "CLEAR ALL" FAILS TO
V2475 V06243        LOOP            ;CLEAR "DP INT REQ".

V2476 V06240 B49:   SETP1           ;INSURE THAT "DP INT DISABLE"
V2477 V20067        LDA 1,KB7       ;INHIBITS INTERRUPTS
V2500 V62077        MSKO 0          ;SET DISABLE
V2501 V06236        GADSK           ;GET ACTIVE UNIT # IN (AC2)
V2502 V06246        SEEK            ;START A SEEK
V2503 V00000        0
V2504 V06235        ITRUT           ;IS THERE AN INTERRUPT ?
V2505 V00402        JMP .+2         ;NO, GOOD
V2506 V06242        EHALT           ;MSKO BIT 7 DID NOT SET "DP DISABLE"
V2507 V06243        LOOP            ;AND INHIBIT "DP INT REQ".

V2510 V06240 B50:   SETP1           ;INSURE THAT IORST WILL
V2511 V20067        LDA 0,KB7       ;CLEAR "DP INT DISABLE"
V2512 V62077        MSKO 0          ;SET "DP INT DISABLE"
V2513 V62677        IORST           ;CLEAR IT
V2514 V06236        GADSK           ;GET ACTIVE UNIT # IN (AC2)
V2515 V06246        SEEK            ;START A SEEK
V2516 V00000        0
V2517 V06235        ITRUT           ;IS THERE AN INTERRUPT
V2520 V06242        EHALT           ;NO, CHECK RESET OF "DP INT
V2521 V06243        LOOP            ;DISABLE".
```

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02522 020151 B51:     LDA 0,NDSKS       ;IF UNIT 0 NOT AVAILABLE
02523 101203          MOVR 0,0,SNC      ;GO ON TO UNIT 1
02524 000423          JMP B53           ;(UNIT 0 NOT BEING TESTED)
02525 006241          SETUP             ;IDLE STATE STATUS CHECK
02526 152520          SUBZL 2,2         ;SELECT THE ADAPTER
02527 006246          SEEK              ;WITH A SEEK 0
02530 000000          0
02531 064433          DIA 1,DSKP        ;READ STATUS
02532 020065          LDA 0,KB9
02533 123415          AND# 1,0,SNR
02534 006242          EHALT             ;NO READY STATUS, UNIT 0
02535 006243          LOOP

02536 006241 B52:     SETUP             ;IDLE STATE STATUS CHECK
02537 152520          SUBZL 2,2         ;SELECT THE ADAPTER
02540 006246          SEEK              ;WITH A SEEK 0
02541 000000          0
02542 064433          DIA 1,DSKP        ;READ STATUS
02543 020064          LDA 0,KB10
02544 123414          AND# 1,0,SZR
02545 006242          EHALT             ;SEEK ERROR STATUS, UNIT 0
02546 006243          LOOP


02547 020151 B53:     LDA 0,NDSKS       ;IF UNIT 1 IS NOT
02550 101200          MOVR 0,0          ;AVAILABLE, GO ON TO UNIT 2
02551 101203          MOVR 0,0,SNC
02552 000423          JMP B55           ;SKIP THIS TEST
02553 006241          SETUP             ;IDLE STATE STATUS CHECK
02554 030060          LDA 2,KB14        ;SELECT THE ADAPTER
02555 006246          SEEK              ;WITH A SEEK 0
02556 000000          0
02557 064433          DIA 1,DSKP        ;READ STATUS
02560 020065          LDA 0,KB9
02561 123415          AND# 1,0,SNR
02562 006242          EHALT             ;NO READY STATUS, UNIT 1
02563 006243          LOOP

02564 006241 B54:     SETUP             ;IDLE STATE STATUS CHECK
02565 030060          LDA 2,KB14
02566 006246          SEEK              ;SELECT THE ADAPTER
02567 000000          0                 ;WITH A SEEK 0
02570 064433          DIA 1,DSKP        ;READ STATUS
02571 020064          LDA 0,KB10
02572 123414          AND# 1,0,SZR
02573 006242          EHALT             ;SEEK ERROR STATUS, UNIT 1
02574 006243          LOOP
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02575 002151 B55:     LDA 0,NDSKS       ;IF UNIT 2 IS NOT AVAILABLE
02576 024061          LDA 1,KB13        ;GO ON TO UNIT 3
02577 123405          AND 0,1,SNR
02600 000423          JMP B57           ;SKIP THIS TEST, NO UNIT 2
02601 006241          SETUP             ;IDLE STATE STATUS CHECK
02602 030061          LDA 2,KB13        ;SELECT THE ADAPTER
02603 006246          SEEK              ;WITH A SEEK 0
02604 000020          0
02605 064433          DIA 1,DSKP        ;READ STATUS
02606 002005          LDA 0,KB9
02607 123415          AND# 1,0,SNR
02610 006242          HALT              ;NO READY STATUS, UNIT 2
02611 006243          LOOP

02612 006241 B56:     SETUP             ;IDLE STATE STATUS CHECK
02613 030061          LDA 2,KB13        ;SELECT THE ADAPTER
02614 006246          SEEK              ;WITH A SEEK 0
02615 000000          0
02616 064433          DIA 1,DSKP        ;READ STATUS
02617 002004          LDA 0,KB10
02620 123414          AND# 1,0,SZR
02621 006242          HALT              ;SEEK ERROR STATUS, UNIT 2
02622 006243          LOOP

02623 002151 B57:     LDA 0,NDSKS       ;IF UNIT 3 IS NOT AVAILABLE
02624 024062          LDA 1,KB12        ;GO TO NEXT TEST.
02625 123405          AND 1,0,SNR       ;
02626 000423          JMP D1            ;SKIP, NO UNIT 3
02627 006241          SETUP             ;IDLE STATE STATUS CHECK
02630 030062          LDA 2,KB12        ;SELECT THE ADAPTER
02631 006246          SEEK              ;WITH A SEEK 0
02632 000000          0
02633 064433          DIA 1,DSKP        ;READ STATUS
02634 002005          LDA 0,KB9
02635 123415          AND# 1,0,SNR
02636 006242          HALT              ;NO READY STATUS, UNIT 3
02637 006243          LOOP

02640 006241 B58:     SETUP             ;IDLE STATE STATUS CHECK
02641 030062          LDA 2,KB12        ;SELECT THE ADAPTER
02642 006246          SEEK              ;WITH A SEEK 0
02643 000000          0
02644 064433          DIA 1,DSKP        ;READ STATUS
02645 002004          LDA 0,KB10
02646 123414          AND# 1,0,SZR
02647 006242          HALT              ;SEEK ERROR STATUS, UNIT 3
02650 006243          LOOP
```

```
02651 006241 D1:    SETUP           ;CHECK THE FIRST 2 DATA
02652 020152        LDA 0,TESTU     ;CHANNEL CYCLES OF A WRITE
02653 063033        DOC 0,DSKP      ;(FIRST ATTEMPT AT WRITE)
02654 030160        LDA 2,BUFF
02655 072033        DOB 2,DSKP      ;LOAD CA REG.
02656 020067        LDA 0,KB7
02657 061133        DOAS 0,DSKP     ;WRITE !!
02660 006165        JSR @STALL      ;ALLOW TIME FOR DCH CYCLES
02661 060233        NIOC DSKP       ;CLEAR THE WRITE OPERATION
02662 061433        DIB 0,DSKP      ;AC0=ENDING MEMORY ADDRESS
02663 024060        LDA 1,KB14      ;AC2=STARTING MEMORY ADDRESS
02664 147000        ADD 2,1         ;2 DCH CYCLES SHOULD HAVE
02665 122414        SUB# 1,0,SZR    ;OCCURRED
02666 006242        EHALT           ;AC0=BAD, AC1=GOOD
02667 006243        LOOP            ;CHECK THE SEQUENCE "DP FLAG"-
                                    ;"REQ1"-"2ND REQ".  "DP FLAG"
                                    ;SETS "DP DCH REQ" WHICH STAYS
                                    ;ON FOR 2 MEMORY CYCLES.

02670 006241 D2:    SETUP           ;CHECK THE FIRST 2 DATA
02671 020152        LDA 0,TESTU     ;CHANNEL CYCLES OF A WRITE
02672 063033        DOC 0,DSKP
02673 030160        LDA 2,BUFF
02674 072033        DOB 2,DSKP      ;SET MEM ADDR REG.
02675 024140        LDA 1,C2525
02676 045000        STA 1,0,2       ;DATA = 052525
02677 045001        STA 1,1,2       ; 2 WORDS
02700 020067        LDA 0,KB7
02701 061133        DOAS 0,DSKP     ;WRITE !!
02702 006165        JSR @STALL      ;ALLOW TIME FOR 2 DCH'S
02703 060233        NIOC DSKP       ;CLEAR THE WRITE
02704 021000        LDA 0,0,2       ;IS THE DATA STILL IN MEMORY
02705 031001        LDA 2,1,2       ;IF NOT A DCHI MAY HAVE
02706 106415        SUB# 0,1,SNR    ;BEEN PERFORMED INSTEAD
02707 146414        SUB# 2,1,SZR    ;OF A DCHO
02710 006242        EHALT           ;AC0&AC2=BAD WORDS
02711 006243        LOOP            ;AC1=GOOD
```

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002712 006241 D3:      SETUP              ;CHECK PROPER CA REGISTER
002713 020152          LDA 0,TESTII       ;INCREMENT BY ALLOWING
002714 063033          DOC 0,DSKP         ;THE FIRST 2 DATA CHANNEL
002715 102400          SUB 0,0            ;CYCLES AT THE BEGINNING
002716 062033          DOB 0,DSKP         ;OF A WRITE.
002717 024067          LDA 1,KB7
002720 065133          DOAS 1,DSKP        ; WRITE !!
002721 006165          JSR @STALL
002722 063233          NIOC DSKP          ;STOP THE WRITE
002723 030060          LDA 2,KB14         ;AC0=STARTING MEMORY ADDRESS
002724 065433          DIB 1,DSKP         ;AC1=ACTUAL ENDING MEMORY
002725 113000          ADD 0,2            ;     ADDRESS
002726 146414          SUB# 2,1,SZR       ;AC2=CORRECT ENDING MEMORY
002727 006242          EHALT              ;     ADDRESS
002730 006243          LOOP

002731 006241 D4:      SETUP              ;CHECK PROPER CA REGISTER
002732 020152          LDA 0,TESTII       ;INCREMENT BY ALLOWING
002733 063033          DOC 0,DSKP         ;THE FIRST 2 DATA CHANNEL
002734 102520          SUBZL 0,0          ;CYCLES AT THE BEGINNING
002735 062033          DOB 0,DSKP         ;OF A WRITE.
002736 024067          LDA 1,KB7
002737 065133          DOAS 1,DSKP        ; WRITE !!
002740 006165          JSR @STALL
002741 063233          NIOC DSKP          ;STOP THE WRITE
002742 030060          LDA 2,KB14         ;AC0=STARTING MEMORY ADDRESS
002743 065433          DIB 1,DSKP         ;AC1=ACTUAL ENDING MEMORY
002744 113000          ADD 0,2            ;     ADDRESS
002745 146414          SUB# 2,1,SZR       ;AC2=CORRECT ENDING MEMORY
002746 006242          EHALT              ;     ADDRESS
002747 006243          LOOP

002750 006241 D5:      SETUP              ;CHECK PROPER CA REGISTER
002751 020152          LDA 0,TESTII       ;INCREMENT BY ALLOWING
002752 063033          DOC 0,DSKP         ;THE FIRST 2 DATA CHANNEL
002753 020117          LDA 0,C3           ;CYCLES AT THE BEGINNING
002754 062033          DOB 0,DSKP         ;OF A WRITE.
002755 024067          LDA 1,KB7
002756 065133          DOAS 1,DSKP        ; WRITE !!
002757 006165          JSR @STALL
002760 063233          NIOC DSKP          ;STOP THE WRITE
002761 030060          LDA 2,KB14         ;AC0=STARTING MEMORY ADDRESS
002762 065433          DIB 1,DSKP         ;AC1=ACTUAL ENDING MEMORY
002763 113000          ADD 0,2            ;     ADDRESS
002764 146414          SUB# 2,1,SZR       ;AC2=CORRECT ENDING MEMORY
002765 006242          EHALT              ;     ADDRESS
002766 006243          LOOP
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02767 006241 D6:    SETUP           ;CHECK PROPER CA REGISTER
02770 020152        LDA 0,TESTU     ;INCREMENT BY ALLOWING
02771 063033        DOC 0,DSKP      ;THE FIRST 2 DATA CHANNEL
02772 020120        LDA 0,C7        ;CYCLES AT THE BEGINNING
02773 062033        DOB 0,DSKP      ;OF A WRITE.
02774 024067        LDA 1,KB7
02775 065133        DOAS 1,DSKP     ; WRITE !!
02776 006165        JSR @STALL
02777 060233        NIOC DSKP       ;STOP THE WRITE
03000 030060        LDA 2,KB14      ;AC0=STARTING MEMORY ADDRESS
03001 065433        DIB 1,DSKP      ;AC1=ACTUAL ENDING MEMORY
03002 113000        ADD 0,2         ;     ADDRESS
03003 146414        SUB# 2,1,SZR    ;AC2=CORRECT ENDING MEMORY
03004 006242        EHALT           ;     ADDRESS
03005 006243        LOOP

03006 006241 D7:    SETUP           ;CHECK PROPER CA REGISTER
03007 020152        LDA 0,TESTU     ;INCREMENT BY ALLOWING
03010 063033        DOC 0,DSKP      ;THE FIRST 2 DATA CHANNEL
03011 020121        LDA 0,C17       ;CYCLES AT THE BEGINNING
03012 062033        DOB 0,DSKP      ;OF A WRITE.
03013 024067        LDA 1,KB7
03014 065133        DOAS 1,DSKP     ; WRITE !!
03015 006165        JSR @STALL
03016 060233        NIOC DSKP       ;STOP THE WRITE
03017 030060        LDA 2,KB14      ;AC0=STARTING MEMORY ADDRESS
03020 065433        DIB 1,DSKP      ;AC1=ACTUAL ENDING MEMORY
03021 113000        ADD 0,2         ;     ADDRESS
03022 146414        SUB# 2,1,SZR    ;AC2=CORRECT ENDING MEMORY
03023 006242        EHALT           ;     ADDRESS
03024 006243        LOOP

03025 006241 D8:    SETUP           ;CHECK PROPER CA REGISTER
03026 020152        LDA 0,TESTU     ;INCREMENT BY ALLOWING
03027 063033        DOC 0,DSKP      ;THE FIRST 2 DATA CHANNEL
03030 020122        LDA 0,C37       ;CYCLES AT THE BEGINNING
03031 062033        DOB 0,DSKP      ;OF A WRITE.
03032 024067        LDA 1,KB7
03033 065133        DOAS 1,DSKP     ; WRITE !!
03034 006165        JSR @STALL
03035 060233        NIOC DSKP       ;STOP THE WRITE
03036 030060        LDA 2,KB14      ;AC0=STARTING MEMORY ADDRESS
03037 065433        DIB 1,DSKP      ;AC1=ACTUAL ENDING MEMORY
03040 113000        ADD 0,2         ;     ADDRESS
03041 146414        SUB# 2,1,SZR    ;AC2=CORRECT ENDING MEMORY
03042 006242        EHALT           ;     ADDRESS
03043 006243        LOOP
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A 00036  .MAIN

003044 006241 D9:     SETUP              ;CHECK PROPER CA REGISTER
003045 002152         LDA 0,TESTU        ;INCREMENT BY ALLOWING
003046 063033         DOC 0,DSKP         ;THE FIRST 2 DATA CHANNEL
003047 002123         LDA 0,C77          ;CYCLES AT THE BEGINNING
003050 062033         DOB 0,DSKP         ;OF A WRITE.
003051 024067         LDA 1,KB7
003052 065133         DOAS 1,DSKP        ; WRITE !!
003053 006165         JSR @STALL
003054 060233         NIOC DSKP          ;STOP THE WRITE
003055 030060         LDA 2,KB14         ;AC0=STARTING MEMORY ADDRESS
003056 065433         DIB 1,DSKP         ;AC1=ACTUAL ENDING MEMORY
003057 113000         ADD 0,2            ;     ADDRESS
003060 146414         SUB# 2,1,SZR       ;AC2=CORRECT ENDING MEMORY
003061 006242         EHALT              ;     ADDRESS
003062 006243         LOOP

003063 006241 D10:    SETUP              ;CHECK PROPER CA REGISTER
003064 002152         LDA 0,TESTU        ;INCREMENT BY ALLOWING
003065 063033         DOC 0,DSKP         ;THE FIRST 2 DATA CHANNEL
003066 002124         LDA 0,C177         ;CYCLES AT THE BEGINNING
003067 062033         DOB 0,DSKP         ;OF A WRITE.
003070 024067         LDA 1,KB7
003071 065133         DOAS 1,DSKP        ; WRITE !!
003072 006155         JSR @STALL
003073 060233         NIOC DSKP          ;STOP THE WRITE
003074 030060         LDA 2,KB14         ;AC0=STARTING MEMORY ADDRESS
003075 065433         DIB 1,DSKP         ;AC1=ACTUAL ENDING MEMORY
003076 113000         ADD 0,2            ;     ADDRESS
003077 146414         SUB# 2,1,SZR       ;AC2=CORRECT ENDING MEMORY
003100 006242         EHALT              ;     ADDRESS
003101 006243         LOOP

003102 006241 D11:    SETUP              ;CHECK PROPER CA REGISTER
003103 002152         LDA 0,TESTU        ;INCREMENT BY ALLOWING
003104 063033         DOC 0,DSKP         ;THE FIRST 2 DATA CHANNEL
003105 002125         LDA 0,C377         ;CYCLES AT THE BEGINNING
003106 062033         DOB 0,DSKP         ;OF A WRITE.
003107 024067         LDA 1,KB7
003110 065133         DOAS 1,DSKP        ; WRITE !!
003111 006165         JSR @STALL
003112 060233         NIOC DSKP          ;STOP THE WRITE
003113 030060         LDA 2,KB14         ;AC0=STARTING MEMORY ADDRESS
003114 065433         DIB 1,DSKP         ;AC1=ACTUAL ENDING MEMORY
003115 113000         ADD 0,2            ;     ADDRESS
003116 146414         SUB# 2,1,SZR       ;AC2=CORRECT ENDING MEMORY
003117 006242         EHALT              ;     ADDRESS
003120 006243         LOOP
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03121 006241 D12:   SETUP           ;CHECK PROPER CA REGISTER
03122 020152        LDA 0,TESTU     ;INCREMENT BY ALLOWING
03123 063033        DOC 0,DSKP      ;THE FIRST 2 DATA CHANNEL
03124 020126        LDA 0,C777      ;CYCLES AT THE BEGINNING
03125 062033        DOB 0,DSKP      ;OF A WRITE.
03126 024067        LDA 1,KB7
03127 065133        DOAS 1,DSKP     ; WRITE !!
03130 006165        JSR @STALL
03131 060233        NIOC DSKP       ;STOP THE WRITE
03132 030060        LDA 2,KB14      ;AC0=STARTING MEMORY ADDRESS
03133 065433        DIB 1,DSKP      ;AC1=ACTUAL ENDING MEMORY
03134 113000        ADD 0,2         ;     ADDRESS
03135 146414        SUB# 2,1,SZR    ;AC2=CORRECT ENDING MEMORY
03136 006242        EHALT           ;     ADDRESS
03137 006243        LOOP

03140 006241 D13:   SETUP           ;CHECK PROPER CA REGISTER
03141 020152        LDA 0,TESTU     ;INCREMENT BY ALLOWING
03142 063033        DOC 0,DSKP      ;THE FIRST 2 DATA CHANNEL
03143 020127        LDA 0,C1777     ;CYCLES AT THE BEGINNING
03144 062033        DOB 0,DSKP      ;OF A WRITE.
03145 024067        LDA 1,KB7
03146 065133        DOAS 1,DSKP     ; WRITE !!
03147 006165        JSR @STALL
03150 060233        NIOC DSKP       ;STOP THE WRITE
03151 030060        LDA 2,KB14      ;AC0=STARTING MEMORY ADDRESS
03152 065433        DIB 1,DSKP      ;AC1=ACTUAL ENDING MEMORY
03153 113000        ADD 0,2         ;     ADDRESS
03154 146414        SUB# 2,1,SZR    ;AC2=CORRECT ENDING MEMORY
03155 006242        EHALT           ;     ADDRESS
03156 006243        LOOP

03157 006241 D14:   SETUP           ;CHECK PROPER CA REGISTER
03160 020152        LDA 0,TESTU     ;INCREMENT BY ALLOWING
03161 063033        DOC 0,DSKP      ;THE FIRST 2 DATA CHANNEL
03162 020130        LDA 0,C3777     ;CYCLES AT THE BEGINNING
03163 062033        DOB 0,DSKP      ;OF A WRITE.
03164 024067        LDA 1,KB7
03165 065133        DOAS 1,DSKP     ; WRITE !!
03166 006165        JSR @STALL
03167 060233        NIOC DSKP       ;STOP THE WRITE
03170 030060        LDA 2,KB14      ;AC0=STARTING MEMORY ADDRESS
03171 065433        DIB 1,DSKP      ;AC1=ACTUAL ENDING MEMORY
03172 113000        ADD 0,2         ;     ADDRESS
03173 146414        SUB# 2,1,SZR    ;AC2=CORRECT ENDING MEMORY
03174 006242        EHALT           ;     ADDRESS
03175 006243        LOOP
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003176 006241 D15:     SETUP              ;CHECK PROPER CA REGISTER
003177 020152          LDA 0,TESTU        ;INCREMENT BY ALLOWING
003200 063033          DOC 0,DSKP         ;THE FIRST 2 DATA CHANNEL
003201 021131          LDA 0,C7777        ;CYCLES AT THE BEGINNING
003202 062033          DOB 0,DSKP         ;OF A WRITE.
003203 024067          LDA 1,KB7
003204 065133          DOAS 1,DSKP        ; WRITE !!
003205 006165          JSR @STALL
003206 060233          NIOC DSKP          ;STOP THE WRITE
003207 030060          LDA 2,KB14         ;AC0=STARTING MEMORY ADDRESS
003210 065433          DIB 1,DSKP         ;AC1=ACTUAL ENDING MEMORY
003211 113000          ADD 0,2            ;     ADDRESS
003212 146414          SUB# 2,1,S7R       ;AC2=CORRECT ENDING MEMORY
003213 006242          EHALT              ;     ADDRESS
003214 006243          LOOP

003215 006241 D16:     SETUP              ;CHECK PROPER CA REGISTER
003216 020152          LDA 0,TESTU        ;INCREMENT BY ALLOWING
003217 063033          DOC 0,DSKP         ;THE FIRST 2 DATA CHANNEL
003220 021132          LDA 0,C0137        ;CYCLES AT THE BEGINNING
003221 062033          DOB 0,DSKP         ;OF A WRITE.
003222 024067          LDA 1,KB7
003223 065133          DOAS 1,DSKP        ; WRITE !!
003224 006165          JSR @STALL
003225 060233          NIOC DSKP          ;STOP THE WRITE
003226 030060          LDA 2,KB14         ;AC0=STARTING MEMORY ADDRESS
003227 065433          DIB 1,DSKP         ;AC1=ACTUAL ENDING MEMORY
003230 113000          ADD 0,2            ;     ADDRESS
003231 146414          SUB# 2,1,S7R       ;AC2=CORRECT ENDING MEMORY
003232 006242          EHALT              ;     ADDRESS
003233 006243          LOOP

003234 006241 D17:     SETUP              ;CHECK PROPER CA REGISTER
003235 020152          LDA 0,TESTU        ;INCREMENT BY ALLOWING
003236 063033          DOC 0,DSKP         ;THE FIRST 2 DATA CHANNEL
003237 021133          LDA 0,C0137        ;CYCLES AT THE BEGINNING
003240 062033          DOB 0,DSKP         ;OF A WRITE.
003241 024067          LDA 1,KB7
003242 065133          DOAS 1,DSKP        ; WRITE !!
003243 006165          JSR @STALL
003244 060233          NIOC DSKP          ;STOP THE WRITE
003245 030060          LDA 2,KB14         ;AC0=STARTING MEMORY ADDRESS
003246 065433          DIB 1,DSKP         ;AC1=ACTUAL ENDING MEMORY
003247 113000          ADD 0,2            ;     ADDRESS
003250 146414          SUB# 2,1,S7R       ;AC2=CORRECT ENDING MEMORY
003251 006242          EHALT              ;     ADDRESS
003252 006243          LOOP
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A 00041  .MAIN

03253 006241 D18:    SETUP              ;CHECK PROPER CA REGISTER
03254 020152         LDA 0,TESTW        ;INCREMENT BY ALLOWING
03255 063033         DOC 0,DSKP         ;THE FIRST 2 DATA CHANNEL
03256 102220         ADCZR 0,0          ;CYCLES AT THE BEGINNING
03257 062033         DOB 0,DSKP         ;OF A WRITE.
03260 024067         LDA 1,KB7
03261 065133         DOAS 1,DSKP        ; WRITE !!
03262 006165         JSR @STALL
03263 063233         NIOC DSKP          ;STOP THE WRITE
                                        ;AC0=STARTING MEMORY ADDRESS
03264 065433         DIB 1,DSKP         ;AC1=ACTUAL ENDING MEMORY
03265 152520         SUBZL 2,2          ;     ADDRESS
03266 146414         SUB# 2,1,SZR       ;AC2=CORRECT ENDING MEMORY
03267 006242         EHALT              ;     ADDRESS
03270 006243         LOOP

03271 006241 D19:    SETUP              ;CHECK PROPER CA REGISTER
03272 020152         LDA 0,TESTW        ;INCREMENT BY ALLOWING
03273 063033         DOC 0,DSKP         ;THE FIRST 2 DATA CHANNEL
03274 102000         ADC 0,0            ;CYCLES AT THE BEGINNING
03275 062033         DOB 0,DSKP         ;OF A WRITE.
03276 024067         LDA 1,KB7
03277 065133         DOAS 1,DSKP        ; WRITE !!
03300 006165         JSR @STALL
03301 063233         NIOC DSKP          ;STOP THE WRITE
03302 065433         DIB 1,DSKP         ;AC0=STARTING MEMORY ADDRESS
03303 152620         SUBZR 2,2          ;AC1=ACTUAL ENDING MEMORY
03304 151400         INC 2,2            ;     ADDRESS
03305 146414         SUB# 2,1,SZR       ;AC2=CORRECT ENDING MEMORY
03306 006242         EHALT              ;     ADDRESS
03307 006243         LOOP


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0042   .MAIN

003310 006240 D20:     SETF1                ;ATTEMPT A COMPLETE WRITE
003311 024160          LDA 1,BUFF           ;(FIRST WRITE WITH WC OVFLO)
003312 060033          DOB 1,DSKP           ;ONE SECTOR
003313 020152          LDA 0,TESTU
003314 024121          LDA 1,C17
003315 123000          ADD 1,0              ;UNIT # + SECT CNT
003316 063033          DOC 0,DSKP           ;SELECT UNIT
003317 020067          LDA 0,KB7
003320 061133          DOAS 0,DSKP          ;WRITE !!
003321 006235          INTEN                ;WAIT 100MS OR UNTIL INTERRUPT
003322 006242          HALT                 ;TIMEOUT, NO INTERRUPT
003323 006243          LOOP

003324 006240 D21:     SETF1                ;ATTEMPT TO CLEAR "DP DONE"
003325 024160          LDA 1,BUFF           ;WITH (C) PULSE.
003326 060033          DOB 1,DSKP
003327 020152          LDA 0,TESTU
003330 024121          LDA 1,C17            ;SET "DP DONE" WITH A ONE
003331 123000          ADD 1,0              ;SECTOR WRITE.
003332 063033          DOC 0,DSKP           ;SELECT UNIT
003333 020067          LDA 0,KB7
003334 061133          DOAS 0,DSKP          ;WRITE !!
003335 152520          SUBZL 2,2
003336 006227          WAIT                 ;WAIT 100MS OR UNTIL DONE
003337 063233          NIOC DSKP            ;ATTEMPT CLEAR
003340 063733          SKPDZ DSKP           ;(C) PULSE DOES NOT
003341 006242          HALT                 ;CLEAR "DP DONE" FF.
003342 006243          LOOP

003343 006240 D22:     SETF1                ;ATTEMPT TO RESET
003344 024160          LDA 1,BUFF           ;"DP DONE" WITH "DP DATOA"
003345 060033          DOB 1,DSKP           ;AND "DATA 0".
003346 020152          LDA 0,TESTU
003347 024121          LDA 1,C17            ;SET "DP DONE" WITH A 1 SECT.
003350 123000          ADD 1,0              ;WRITE.
003351 063033          DOC 0,DSKP           ;SELECT UNIT
003352 020067          LDA 0,KB7
003353 061133          DOAS 0,DSKP          ;WRITE !!
003354 152520          SUBZL 2,2
003355 006227          WAIT                 ;WAIT 100MS OR UNTIL DONE
003356 152620          SUBZR 3,0
003357 061033          DOA 0,DSKP           ;ATTEMPT RESET
003360 063733          SKPDZ DSKP           ;"DP DATOA" AND "DATA 0" DOES
003361 006242          HALT                 ;NOT CLEAR "DP DONE".
003362 006243          LOOP
```

```
@3363 @06240 D23:   SETP1           ;CHECK BUSY=DONE
@3364 @24160        LDA 1,BUFF      ;FOLLOWING A 1 SECTOR WRITE
@3365 @66033        DOB 1,DSKP
@3366 @20152        LDA 0,TESTU
@3367 @24121        LDA 1,C17
@3370 @30000        ADD 1,0
@3371 @63033        DOC 0,DSKP      ;SELECT UNIT / 1 SECT XFER
@3372 @20067        LDA 0,KB7
@3373 @61133        DOAS 0,DSKP     ;WRITE !!
@3374 15252@        SUBZL 2,2
@3375 @06227        WAIT            ;WAIT 100MS (OR UNTIL "DONE")
@3376 @63733        SKPBZ DSKP
@3377 @63533        SKPBZ DSKP      ;ERROR IF "DP DONE" = 0
@3400 @06242        EHALT           ;OR "DP BUSY" = 1
@3401 @06243        LOOP

@3402 @06240 D24:   SETP1           ;SEE IF A 1 SECTOR
@3403 @24160        LDA 1,BUFF      ;WRITE CAUSES "DATA LATE"
@3404 @66033        DOB 1,DSKP
@3405 @20152        LDA 0,TESTU
@3406 @24121        LDA 1,C17
@3407 123000        ADD 1,0
@3410 @63033        DOC 0,DSKP      ;SELECT UNIT / 1 SECT XFER
@3411 @20067        LDA 0,KB7
@3412 @61133        DOAS 0,DSKP     ;WRITE !!
@3413 15252@        SUBZL 2,2
@3414 @06227        WAIT            ;WAIT 100MS, (OR UNTIL "DONE")
@3415 @64433        DIA 1,DSKP
@3416 @20060        LDA 0,KB14
@3417 107414        AND# 0,1,SZR    ;"REQ1" DOES NOT CLEAR
@3420 @06242        EHALT           ;"DP FLAG".  RESULTS IN
@3421 @06243        LOOP            ;"DATA LATE" STATUS.

@3422 @06240 D25:   SETP1           ;CHECK ENDING MEMORY
@3423 @24160        LDA 1,BUFF      ;ADDRESS (CA REGISTER)
@3424 @66033        DOB 1,DSKP      ;FOLLOWING A 1 SECTOR WRITE
@3425 @20152        LDA 0,TESTU
@3426 @24121        LDA 1,C17
@3427 123000        ADD 1,0
@3430 @63033        DOC 0,DSKP      ;SELECT UNIT / 1 SECT XFER
@3431 @20067        LDA 0,KB7
@3432 @61133        DOAS 0,DSKP     ;WRITE !!
@3433 15252@        SUBZL 2,2
@3434 @06227        WAIT            ;WAIT 100MS ( OR UNTIL "DONE" )
@3435 @65433        DIB 1,DSKP      ;AC1=ENDING MEMORY ADDRESS
@3436 @20160        LDA 0,BUFF      ;CORRECT ENDING ADDRESS =
@3437 @30211        LDA 2,C402      ;(BUFF)+400+2, IN (AC0)
@3440 143000        ADD 2,0
@3441 122414        SUB# 1,0,SZR    ;ENDING MEM ADDR ERROR.
@3442 @06242        EHALT           ;AC0=GOOD
@3443 @06243        LOOP            ;AC1=BAD
```

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^ 0>44  .MAIN

 003444 006240 D26:     SETP1              ;CHECK FOR PROPER ENDING
 003445 024160          LDA 1,BUFF         ;DISK ADDRESS FOLLOWING
 003446 066033          DOB 1,DSKP         ;1 SECTOR WRITE ON HEAD 0
 003447 020152          LDA 0,TESTU        ;SECTOR 0
 003450 024121          LDA 1,C17          ;"INC SC" CAUSES "SC1=SC0"
 003451 123000          ADD 1,0            ;TO GO FROM 1111 TO 0000
 003452 063033          DOC 0,DSKP         ;AND SETS "S1".
 003453 020067          LDA 0,KB7
 003454 061133          DOAS 0,DSKP        ;WRITE !!
 003455 152520          SUBZL 2,2
 003456 006227          WAIT               ;WAIT 100MS (OR UNTIL "DONE")
 003457 066433          DIC 1, DSKP        ;READ ENDING DISK ADDRESS
 003460 033133          LDA 2,CM37
 003461 147400          AND 2,1            ;MASK OUT UNIT #
 003462 020063          LDA 0,KB11         ;SECTOR = 1
 003463 122414          SUB# 1,0,SZR
 003464 006242          EHALT              ;ENDING DISK ADDRESS NOT
 003465 006243          LOOP               ;HEAD=0, SECTOR=1, SC=0

 003466 006240 D27:     SETP1              ;ATTEMPT A 2 SECTOR
 003467 024160          LDA 0,BUFF         ;WRITE.
 003470 062033          DOB 0,DSKP         ;FIRST ATTEMPT AT A WRITE
 003471 020152          LDA 0,TESTU        ;LONGER THAN 1 SECTOR
 003472 024174          LDA 1,C16
 003473 123000          ADD 1,0
 003474 063033          DOC 0,DSKP         ;SELECT UNIT / 2 SECTORS
 003475 020067          LDA 0,KB7
 003476 061133          DOAS 0,DSKP        ;WRITE !!
 003477 152520          SUBZL 2,2
 003500 006227          WAIT               ;WAIT 100MS (OR UNTIL "DONE")
 003501 066433          DIC 1,DSKP         ;READ ENDING DISK ADDRESS
 003502 033133          LDA 2,CM37         ;MASK OFF UNIT #
 003503 147400          AND 0,1
 003504 020064          LDA 0,KB10
 003505 122414          SUB# 1,0,SZR       ;ENDING DISK ADDRESS NOT
 003506 006242          EHALT              ;HEAD=0, SECT=2, SC=0
 003507 006243          LOOP               ;AC0=GOOD ADDR, AC1=BAD

 003510 006240 D28:     SETP1              ;ATTEMPT A 2 SECTOR WRITE
 003511 024160          LDA 0,BUFF
 003512 062033          DOB 0,DSKP
 003513 020152          LDA 0,TESTU
 003514 024174          LDA 1,C16
 003515 123000          ADD 1,0
 003516 063033          DOC 0,DSKP         ;SELECT UNIT / 2 SECTORS
 003517 020067          LDA 0,KB7
 003520 061133          DOAS 0,DSKP        ;WRITE !!
 003521 152520          SUBZL 2,2
 003522 006227          WAIT               ;WAIT 100MS )OR UNTIL "DONE")
 003523 064433          DIA 1,DSKP         ;READ STATUS
 003524 063633          SKPDN DSKP         ;NO "DP DONE"
 003525 006242          EHALT              ;FOLLOWING 2 SECTOR WRITE
 003526 006243          LOOP               ;(AC1)=STATUS REG.
```

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03527 006240 D29:    SETP1              ;INSURE THAT "INC HEAD"
03530 020160         LDA 0,BUFF         ;FUNCTIONS PROPERLY
03531 062033         DOB 0,DSKP         ;TRANSFER 7 SECTORS OR 13
03532 020152         LDA 0,TESTU        ;SECTORS DEPENDING UPON
03533 030150         LDA 2,DTYPE        ;THE DISK TYPE
03534 024171         LDA 1,C11
03535 153103         ADDL 2,2,SNC
03536 024117         LDA 1,C3
03537 123000         ADD 1,0
03540 063033         DOC 0,DSKP         ;LOAD UNIT # & # SECTORS
03541 020067         LDA 0,KB7
03542 061133         DOAS 0,DSKP        ;WRITE !!
03543 152520         SUBZL 2,2
03544 006227         WAIT               ;WAIT 100 MS (OR UNTIL "DONE")
03545 066433         DIC 1,DSKP         ;READ ENDING DISK ADDRESS
03546 030133         LDA 2,C037
03547 147400         AND 2,1            ;THROW AWAY UNIT #
03550 020212         LDA 0,C420         ;AC0=GOOD,    HEAD=1 SECT=1
03551 122414         SUB# 1,0,SZR       ;AC1=BAD
03552 006242         EHALT              ;CHECK "ADV HD", "INC HEAD"
03553 006243         LOOP

03554 006240 D30:    SETP1              ;ATTEMPT A 16 SECTOR WRITE
03555 020160         LDA 0,BUFF         ;VERIFY CORRECT ENDING
03556 062033         DOB 0,DSKP         ;DISK ADDRESS
03557 020152         LDA 0,TESTU
03560 063033         DOC 0,DSKP         ;UNIT # / 16 SECTORS
03561 020067         LDA 0,KB7
03562 061133         DOAS 0,DSKP        ;WRITE !!
03563 152520         SUBZL 2,2
03564 006227         WAIT               ;WAIT 100MS (OR UNTIL "DONE")
03565 066433         DIC 1,DSKP         ;READ ENDING DISK ADDRESS
03566 020065         LDA 0,KB9          ;SECTOR 4
03567 034070         LDA 3,KB6          ;HEAD 2
03570 030150         LDA 2,DTYPE
03571 153103         ADDL 2,2,SNC       ;SKIP IF 2311
03572 175220         MOVZR 3,3          ;HEAD 1
03573 163000         ADD 3,0
03574 034133         LDA 3,C037
03575 167400         AND 3,1
03576 122414         SUB# 1,0,SZR       ;AC1=ACTUAL ENDING DISK ADDRESS
03577 006242         EHALT              ;AC0=CORRECT ENDING DISK ADDRESS
03600 006243         LOOP               ; 16 SECTOR TRANSFER.
```

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A 0046  .MAIN

03601 006240 D31:    SETP1              ;ATTEMPT A 16 SECTOR WRITE
03602 020160         LDA 0,BUFF         ;AND VERIFY CORRECT ENDING
03603 062033         DOB 0,DSKP         ;MEMORY ADDRESS
03604 020152         LDA 0,TESTU
03605 063033         DOC 0,DSKP         ;UNIT # / 16 SECTORS
03606 020067         LDA 0,KB7
03607 061133         DOAS 0,DSKP        ;WRITE !!
03610 152520         SUBZL 2,2
03611 006227         WAIT               ;WAIT 100MS (OR UNTIL "DONE")
03612 020160         LDA 0,BUFF         ;STARTING ADDRESS
03613 024060         LDA 1,KB14         ; TWO
03614 030073         LDA 2,KB3          ; 10,000
03615 123000         ADD 1,0
03616 143000         ADD 2,0            ;ENDING MEMORY ADDRESS
03617 065433         DIB 1,DSKP         ;ERROR FOLLOWING A 16 SECTOR
03620 122414         SUB# 1,0,SZR       ;WRITE
03621 006242         EHALT              ;AC0=GOOD
03622 006243         LOOP               ;AC1=BAD
                     .

03623 006240 D32:    SETP1              ;CAUSE "END OF CYLINDER"
03624 020150         LDA 0,DTYPE        ;TO OCCUR DURING A
03625 030427         LDA 2,DAD1-1       ;2 SECTOR WRITE
03626 101112         MOVL# 0,0,SZC
03627 000404         JMP .+4            ;CARTRIDGE DISK
03630 151400         INC 2,2
03631 101202         MOVR 0,0,SZC       ;SKIP IF 2311 DISK PACK
03632 151400         INC 2,2            ;2314 DISK PACK
03633 021000         LDA 0,0,2          ;GET PROPER DISK ADDRESS TO
03634 024152         LDA 1,TESTU        ;CAUSE "EOC"
03635 123000         ADD 1,0            ;ADD IN UNIT #
03636 063033         DOC 0,DSKP         ;FINALLY
03637 020160         LDA 0,BUFF
03640 062033         DOB 0,DSKP         ;LOAD MEM ADDR.
03641 020067         LDA 0,KB7
03642 061133         DOAS 0,DSKP        ;WRITE !!
03643 152520         SUBZL 2,2
03644 006227         WAIT               ;WAIT 100MS (OR UNTIL "DONE")
03645 064433         DIA 1,DSKP         ;READ STATUS
03646 020412         LDA 0,DAD4
03647 107400         AND 0,1
03650 100414         SUB# 0,1,SZR       ;NO "EOC" OR "ERR" OR "DP DONE"
03651 006242         EHALT              ;FOLLOWING WRITE OVER END CYL
03652 006243         LOOP               ;AC0=EXPECTED ENDING STATUS
03653 000406         JMP D33            ;AC1=ENDING STATUS

03654 003655         .+1
03655 000676 DAD1:   676                ;CART   HEAD 1  SECT 13 2 SECTORS
03656 004536         4536               ;2311   HEAD 9  SECT 5  2 SECTORS
03657 011676         11676              ;2314   HEAD 23 SECT 13 2 SECTORS
03660 100021 DAD4:   100021             ;"DP DONE","EOC","ERR",STATUS MASK.
```

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03661 006240 D33:   SETP1           ;ATTEMPT A READ
03662 020152        LDA 0,TESTU     ;( FIRST READ !!!!! )
03663 024121        LDA 1,C17
03664 123000        ADD 1,0
03665 063033        DOC 0,DSKP      ;UNIT # / 1 SECTOR XFER
03666 020074        LDA 0,KB2
03667 062033        DOB 0,DSKP      ;CA = 20000
03670 102400        SUB 0,0
03671 061133        DOAS 0,DSKP     ;READ !!
03672 152520        SUBZL 2,2
03673 006227        WAIT            ;WAIT 100MS (OR UNTIL "DONE")
03674 064433        DIA 1,DSKP      ;READ STATUS
03675 125113        MOVL# 1,1,SNC   ; DONE ?
03676 006242        FHALT           ;NO "DP DONE" ON READ
03677 006243        LOOP            ;AC1=BAD ENDING STATUS

03700 006240 D34:   SETP1           ;ATTEMPT A READ
03701 020152        LDA 0,TESTU     ; 1 SECTOR
03702 024121        LDA 1,C17
03703 123000        ADD 1,0
03704 063033        DOC 0,DSKP      ;UNIT # / 1 SECTOR XFER
03705 020074        LDA 0,KB2
03706 062033        DOB 0,DSKP      ;CA = 20000
03707 102400        SUB 0,0
03710 061133        DOAS 0,DSKP     ;READ !!
03711 152520        SUBZL 2,2
03712 006227        WAIT            ;WAIT 100MS (OR UNTIL "DONE")
03713 064433        DIA 1,DSKP      ;READ STATUS
03714 020060        LDA 0,KB14      ;"DATA LATE" STATUS ON
03715 123414        AND# 1,0,SZR    ;A 1 SECT READ
03716 006242        FHALT           ;AC1=BAD ENDING STATUS
03717 006243        LOOP

03720 006240 D35:   SETP1           ;ATTEMPT A READ
03721 020152        LDA 0,TESTU     ; 1 SECTOR READ
03722 024121        LDA 1,C17
03723 123000        ADD 1,0
03724 063033        DOC 0,DSKP      ; UNIT # / 1 SECT XFER
03725 020074        LDA 0,KB2
03726 062033        DOB 0,DSKP      ;CA = 20000
03727 102400        SUB 0,0
03730 061133        DOAS 0,DSKP     ;READ !!
03731 152520        SUBZL 2,2
03732 006227        WAIT            ;WAIT 100MS (OR UNTIL "DONE")
03733 065433        DIB 1,DSKP      ;READ STATUS
03734 020217        LDA 0,C204H     ;ENDING MEMORY ADDRESS
03735 122414        SUB# 1,0,SZR    ;IS WRONG FOLLWOING 1 SECT READ
03736 006242        FHALT           ;AC0=GOOD
03737 006243        LOOP            ;AC1=BAD
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▲ 0048  .MAIN

03740 006240 036:     SETP1             ;ATTEMPT A READ
03741 02M152          LDA M,TESTU       ; 1 SECTOR READ
03742 024121          LDA 1,C17
03743 123000          ADD 1,0
03744 063033          DOC 0,DSKP        ;UNIT # / 1 SECT XFER
03745 020074          LDA 0,KB2
03746 062033          DOB 0,DSKP        ;CA = 20000
03747 061133          NIOS DSKP         ;READ !!
03750 152520          SUBZL 2,2
03751 006227          WAIT              ;WAIT 100MS (OR UNTIL "DONE")
03752 020202          LDA 0,C70         ;AC1=STATUS
03753 123414          AND# 1,0,S7R      ;ERROR STATUS FOLLOWING A
03754 006242          FHALT             ;READ, "SEEK ER", OR "ADDRESS/
03755 006243          LOOP              ;UNSAFE"

03756 02M150 037:     LDA 0,DTYPE       ;IF CARTRIDGE DISK
03757 101102          MOVL 0,0,S7C      ;DON'T ATTEMPT A FORMAT
03760 000416          JMP E1            ;MODE READ
03761 006240          SETP1             ;ATTEMPT A READ
03762 02M152          LDA M,TESTU       ;IN THE FORMAT MODE
03763 024074          LDA 1,KB2         ;(FIRST USE OF FORMAT MODE)
03764 123000          ADD 1,0
03765 063033          DOC 0,DSKP        ;UNIT # FORMAT MODE BIT
03766 020074          LDA 0,KB2
03767 062033          DOB 0,DSKP        ;CA = 20000
03770 061133          NIOS DSKP         ;READ!!
03771 152520          SUBZL 2,2
03772 006227          WAIT              ;WAIT 100MS (OR UNTIL "DONE")
03773 125113          MOVL# 1,1,SNC     ;AC1=STATUS
03774 006242          FHALT             ;NO "DP DONE" FOLLOWING FMT READ
03775 006243          LOOP              ;CHECK "F DONE","R/W DONE"

                      .EOT
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0049  .MAIN

03776 006237 E1:    JSR @ISET       ;DO SEEK/WRITE/READ
03777 006262        DOSEK           ;CHECK DATA
04000 000000        0               ;SEEK CYLINDER ZERO
04001 006242        EHALT           ;ERROR DURING SEEK, AC1=STATUS
04002 000422        JMP E1E         ;SKIP REMAINDER OF TEST

04003 006256        GENDAT          ;GENERATE DATA
04004 005403        ZEROS           ;DATA=ALL ZEROS
04005 006605        PRGEND          ;DATA BUFFER ADDRESS

04006 006260        WRITE           ;DO THE WRITE
04007 006605        PRGEND          ;DATA BUFFER ADDRESS
04010 000017        17              ;HEAD=0, SECT=0, 1 SECTOR
04011 006242        EHALT           ;ERROR IN WRITE, AC1=STATUS
04012 000412        JMP E1E         ;SKIP REMAINDER OF TEST

04013 006257        READ            ;READ THE DATA
04014 007205        PRGEND+400      ;DATA BUFFER ADDRESS
04015 000017        17              ;HEAD=0, SECT=0, 1 SECTOR
04016 006242        EHALT           ;ERROR IN READ, AC1=STATUS
04017 000405        JMP E1E

04020 006261        CHECK           ;COMPARE DATA BUFFERS
04021 006605        PRGEND          ;GOOD BUFFER
04022 007205        PRGEND+400      ;QUESTIONABLE BUFFER
04023 006242        EHALT           ;ERROR, AC0=GOOD WORD
04024 006243 E1E:   LOOP            ;AC1=BAD WORD

04025 006237 E2:    JSR @ISET       ;DO SEEK/WRITE/READ
04026 006262        DOSEK           ;CHECK DATA
04027 000000        0               ;SEEK CYLINDER ZERO
04030 006242        EHALT           ;ERROR DURING SEEK, AC1=STATUS
04031 000422        JMP E2E         ;SKIP REMAINDER OF TEST

04032 006256        GENDAT          ;GENERATE DATA
04033 005402        ONES            ;DATA=ALL ONES
04034 006605        PRGEND          ;DATA BUFFER ADDRESS

04035 006260        WRITE           ;DO THE WRITE
04036 006605        PRGEND          ;DATA BUFFER ADDRESS
04037 000017        17              ;HEAD=0, SECT=0, 1 SECTOR
04040 006242        EHALT           ;ERROR IN WRITE, AC1=STATUS
04041 000412        JMP E2E         ;SKIP REMAINDER OF TEST

04042 006257        READ            ;READ THE DATA
04043 007205        PRGEND+400      ;DATA BUFFER ADDRESS
04044 000017        17              ;HEAD=0, SECT=0, 1 SECTOR
04045 006242        EHALT           ;ERROR IN READ, AC1=STATUS
04046 000405        JMP E2F

04047 006261        CHECK           ;COMPARE DATA BUFFERS
04050 006605        PRGEND          ;GOOD BUFFER
04051 007205        PRGEND+400      ;QUESTIONABLE BUFFER
04052 006242        EHALT           ;ERROR, AC0=GOOD WORD
04053 006243 E2E:   LOOP            ;AC1=BAD WORD
```

```
004054 006237 F3:      JSR @ISET       ;DO SEEK/WRITE/READ
004055 006262          DOSEK           ;CHECK DATA
004056 000000          0               ;SEEK CYLINDER ZERO
004057 006242          EHALT           ;ERROR DURING SEEK, AC1=STATUS
004060 000422          JMP F3F         ;SKIP REMAINDER OF TEST

004061 006256          GENDAT          ;GENERATE DATA
004062 005421          NUMSEQ          ;DATA=NUMBERS 0-377
004063 006605          PRGEND          ;DATA BUFFER ADDRESS

004064 006260          WRITE           ;DO THE WRITE
004065 006605          PRGEND          ;DATA BUFFER ADDRESS
004066 000017          17              ;HEAD=0, SECT=0, 1 SECTOR
004067 006242          EHALT           ;ERROR IN WRITE, AC1=STATUS
004070 000412          JMP F3E         ;SKIP REMAINDER OF TEST

004071 006257          READ            ;READ THE DATA
004072 007205          PRGEND+400      ;DATA BUFFER ADDRESS
004073 000017          17              ;HEAD=0, SECT=0, 1 SECTOR
004074 006242          EHALT           ;ERROR IN READ, AC1=STATUS
004075 000405          JMP F3F

004076 006261          CHECK           ;COMPARE DATA BUFFERS
004077 006605          PRGEND          ;GOOD BUFFER
004100 007205          PRGEND+400      ;QUESTIONABLE BUFFER
004101 006242          EHALT           ;ERROR, AC0=GOOD WORD
004102 006243 F3F:     LOOP            ;AC1=BAD WORD

004103 006237 F4:      JSR @ISET       ;DO SEEK/WRITE/READ
004104 006262          DOSEK           ;CHECK DATA
004105 000000          0               ;SEEK CYLINDER ZERO
004106 006242          EHALT           ;ERROR DURING SEEK, AC1=STATUS
004107 000422          JMP F4F         ;SKIP REMAINDER OF TEST

004110 006256          GENDAT          ;GENERATE DATA
004111 005411          ALT1            ;DATA PATTERN = 101010 ETC.
004112 006605          PRGEND          ;DATA BUFFER ADDRESS

004113 006260          WRITE           ;DO THE WRITE
004114 006605          PRGEND          ;DATA BUFFER ADDRESS
004115 000017          17              ;HEAD=0, SECT=0, 1 SECTOR
004116 006242          EHALT           ;ERROR IN WRITE, AC1=STATUS
004117 000412          JMP F4E         ;SKIP REMAINDER OF TEST

004120 006257          READ            ;READ THE DATA
004121 007205          PRGEND+400      ;DATA BUFFER ADDRESS
004122 000017          17              ;HEAD=0, SECT=0, 1 SECTOR
004123 006242          EHALT           ;ERROR IN READ, AC1=STATUS
004124 000405          JMP F4F

004125 006261          CHECK           ;COMPARE DATA BUFFERS
004126 006605          PRGEND          ;GOOD BUFFER
004127 007205          PRGEND+400      ;QUESTIONABLE BUFFER
004130 006242          EHALT           ;ERROR, AC0=GOOD WORD
004131 006243 F4F:     LOOP            ;AC1=BAD WORD
```

```
04132 006237 F5:    JSR @ISET       ;DO SEEK/WRITE/READ
04133 006262        DOSEK           ;CHECK DATA
04134 000000        0               ;SEEK CYLINDER ZERO
04135 006242        EHALT           ;ERROR DURING SEEK, AC1=STATUS
04136 000422        JMP E5E         ;SKIP REMAINDER OF TEST

04137 006256        GENDAT          ;GENERATE DATA
04140 005413        ALT%            ;DATA PATTERN = 0101010 ETC.
04141 006605        PRGEND          ;DATA BUFFER ADDRESS

04142 006260        WRITE           ;DO THE WRITE
04143 006605        PRGEND          ;DATA BUFFER ADDRESS
04144 000017        17              ;HEAD=0, SECT=0, 1 SECTOR
04145 006242        EHALT           ;ERROR IN WRITE, AC1=STATUS
04146 000412        JMP E5F         ;SKIP REMAINDER OF TEST

04147 006257        READ            ;READ THE DATA
0415% 007205        PRGEND+400      ;DATA BUFFER ADDRESS
04151 000017        17              ;HEAD=0, SECT=0, 1 SECTOR
04152 006242        EHALT           ;ERROR IN READ, AC1=STATUS
04153 000405        JMP E5F

04154 006261        CHECK           ;COMPARE DATA BUFFERS
04155 006605        PRGEND          ;GOOD BUFFER
04156 007205        PRGEND+400      ;QUESTIONABLE BUFFER
04157 006242        EHALT           ;ERROR, AC0=GOOD WORD
0416% 006243 E5E:   LOOP            ;AC1=BAD WORD
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▲ 0052  .MAIN

 04161 042142          LDA 0,RANDOM
 04162 044143          STA 0,RELRAN
 04163 006237 E6:      JSR @ISET           ;DO SEEK/WRITE/READ
 04164 006262          DOSEK               ;CHECK DATA
 04165 000000          0                   ;SEEK CYLINDER ZERO
 04166 006242          EHALT               ;ERROR DURING SEEK, AC1=STATUS
 04167 000424          JMP E6F             ;SKIP REMAINDER OF TEST

 04170 042143          LDA 0,RELRAN
 04171 044142          STA 0,RANDOM
 04172 006256          GENDAT              ;GENERATE DATA
 04173 005217          RAN                 ;DATA = RANDOM
 04174 006645          PRGEND              ;DATA BUFFER ADDRESS

 04175 006260          WRITE               ;DO THE WRITE
 04176 006645          PRGEND              ;DATA BUFFER ADDRESS
 04177 000017          17                  ;HEAD=0, SECT=0, 1 SECTOR
 04200 006242          EHALT               ;ERROR IN WRITE, AC1=STATUS
 04201 000412          JMP E6E             ;SKIP REMAINDER OF TEST

 04202 006257          READ                ;READ THE DATA
 04203 007245          PRGEND+400          ;DATA BUFFER ADDRESS
 04204 000017          17                  ;HEAD=0, SECT=0, 1 SECTOR
 04205 006242          EHALT               ;ERROR IN READ, AC1=STATUS
 04206 000405          JMP E6F

 04207 006261          CHECK               ;COMPARE DATA BUFFERS
 04210 006645          PRGEND              ;GOOD BUFFER
 04211 007245          PRGEND+400          ;QUESTIONABLE BUFFER
 04212 006242          EHALT               ;ERROR, AC0=GOOD WORD
 04213 006243 E6F:     LOOP                ;AC1=BAD WORD
```

```
;DISCUSSION OF TESTS E7/E8 AND E9/E10

;       AT THIS POINT IN TESTING IT HAS BEEN DETERMINED
;THAT READING AND WRITING CAN BE PERFORMED CORRECTLY.  THE
;NEXT FOUR TESTS ARE A CYLINDER ADDRESS CHECK.  CYLINDERS
;ARE FIRST SELECTED IN ORDER (0-312) AND DATA EQUAL TO THE
;CYLINDER NUMBER IS WRITTEN (TEST E7) ON HEAD-0
;SECTOR-0 OF EACH.  THE FOLLOWING TEST THEN READS THIS DATA
;BACK IN THE SAME SEQUENCE IN WHICH IT WAS WRITTEN.  IF ONE
;CYLINDER IS WRITTEN ON MORE THAN ONCE DUE TO A (ALWAYS 0 OR
;ALWAYS 1) CYLINDER ADDRESS BIT LINE AN ERROR WILL SHOW UP
;IN THE DATA COMPARE CHECK.

; I.E.  IF "CYL 4" IS ALWAYS A ZERO THEN AN ATTEMPT
;       TO SEEK TO CYLINDER 4 ACTUALLY SELECTS
;       CYLINDER 0.  DATA WORDS OF "4" ARE WRITTEN
;       THERE AND WHEN THE DATA AT CYLINDER 0 IS
;       LATER READ AND CHECKED IT WILL BE "4" WHEN
;       IT SHOULD BE "0".

;TESTS E7&E8 CHECK ALL CYLINDERS IN SEQUENCE 0-312
;AND TESTS E9&E10 CHECK THE CYLINDERS IN ORDER
;FROM 312 TO 0, USING THE COMPLEMENT OF THE CYLINDER
;NUMBER AS THE DATA WORDS.
```

```
04214 102400          SUB 0,0           ;CYL. ADDRESSING CHECK. SEE DISCUSSION
04215 040403          STA 0,E7.1        ;PRECEDING E7. WRITE ON HEAD=0, SECTOR=0
04216 006237 E7:      JSR @ISET         ;OF EACH CYLINDER.  IN EACH SECTOR DATA
                                        ;EQUALS THE CYL #.  WRITE IN ASCENDING
                                        ;ORDER FROM CYL 0 TO 312.
04217 006262          DOSEK             ;SEEK
04220 000000 E7.1:    0                 ;CYLINDER NUMBER (IT CHANGES)
04221 006242          FHALT             ;ERROR DURING SEEK, AC1=STATUS
04222 000411          JMP E7F           ;SKIP TO END OF TEST
04223 006256          GENDAT            ;GENERATE DATA
04224 005417          CYLN              ;ADDRESS OF DATA GENERATOR
04225 006605          PRGEND            ;DATA BUFFER ADDRESS
04226 006260          WRITE             ;WRITE !
04227 006605          PRGEND            ;DATA BUFFER ADDRESS
04230 000017          17                ;DISK ADDRESS
04231 006242          FHALT             ;ERROR DURING WRITE, AC1=STATUS
04232 000401          JMP .+1
04233 006243 E7F:     LOOP
04234 010764          ISZ E7.1          ;(E7.1)=CYL #
04235 020763          LDA 0,E7.1        ;DO IT ONCE FOR
04236 024207          LDA 1,C312        ;EACH CYLINDER
04237 122427          SUBZ 1,0,SNR
04240 000756          JMP E7


04241 102400          SUB 0,0           ;CYLINDER ADDRESS CHECK.  SEE DISCUSSION
04242 040403          STA 0,E8.1        ;PREVIOUS TO TEST E7.  READ FIRST SECTOR
04243 006237 E8:      JSR @ISET         ;OF EACH CYLINDER AND CHECK FOR PROPER
                                        ;DATA.  IN EACH CASE DATA SHOULD EQUAL
                                        ;THE CYLINDER #.
04244 006262          DOSEK             ;SEEK
04245 000000 E8.1:    0                 ;CYLINDER NUMBER (IT CHANGES)
04246 006242          FHALT             ;ERROR DURING SEEK, AC1=STATUS
04247 000412          JMP E8F
04250 006257          READ              ;READ
04251 006605 E8.2:    PRGEND            ;DATA BUFFER ADDRESS
04252 000017          17                ;DISK ADDRESS
04253 006242          FHALT             ;ERROR DURING READ, AC1=STATUS
04254 000405          JMP E8F           ;SKIP TO END OF TEST
04255 026774          LDA 1,@E8.2       ;FIRST WORD IN DATA BUFFER
04256 026767          LDA 0,E8.1        ;SHOULD = CYLINDER #
04257 122414          SUB# 1,0,SZR      ;AC0=GOOD
04260 006242          FHALT             ;AC1=BAD
04261 006243 E8F:     LOOP              ;READ THE TEST DESCRIPTION
04262 010763          ISZ E8.1          ;REPEAT THE TEST FOR
04263 020762          LDA 0,E8.1        ;EACH CYLINDER
04264 024207          LDA 1,C312
04265 122427          SUBZ 1,0,SNR
04266 000755          JMP E8
```

```
04267 020207          LDA 0,C312      ;CYL. ADDRESSING CHECK. SEE DISCUSSION
04270 040403          STA 0,E9.1      ;PRECEDING TEST E7.  WRITE ON HEAD=0
04271 006237 E9:      JSR @ISET       ;SECTOR=0, OF EACH CYLINDER.  IN
                                      ;EACH THE DATA WORDS EQUAL THE COMP.
                                      ;OF THE CYL #.  WRITE IN DESCENDING
                                      ;ORDER FROM CYL 312 TO 0.
04272 006262          DOSEK           ;SEEK
04273 000000 E9.1:    0               ;CYLINDER NUMBER (IT CHANGES)
04274 006242          EHALT           ;ERROR DURING SEEK, AC1=STATUS
04275 000411          JMP E9E         ;SKIP TO END OF TEST
04276 006256          GENDAT          ;GENERATE DATA
04277 005415          CYLNC           ;ADDRESS OF DATA GENERATOR
04300 006605          PRGEND          ;DATA BUFFER ADDRESS
04301 006260          WRITE           ;WRITE |
04302 006605          PRGEND          ;DATA BUFFER ADDRESS
04303 000017          17              ;DISK ADDRESS
04304 006242          EHALT           ;ERROR DURING WRITE, AC1=STATUS
04305 000401          JMP .+1
04306 006243 E9E:     LOOP
04307 014764          DSZ E9.1        ;(E9.1)=CYL #
04310 000401          JMP .+1
04311 020762          LDA 0,E9.1      ;DO IT ONCE FOR
04312 101103          MOVL 0,0,SNC    ;EACH CYLINDER
04313 000756          JMP E9



04314 020207          LDA 0,C312      ;CYLINDER ADDRESS CHECK.  SEE DISCUSSION
04315 040403          STA 0,E10.1     ;PREVIOUS TO TEST E7.  READ FIRST SECTOR
04316 006237 E10:     JSR @ISET       ;OF EACH CYLINDER AND CHECK FOR PROPER
                                      ;DATA.  IN EACH CASE DATA SHOULD EQUAL
                                      ;THE COMPLEMENT OF THE CYL #
04317 006262          DOSEK           ;SEEK
04320 000000 E10.1:   0               ;CYLINDER NUMBER (IT CHANGES)
04321 006242          EHALT           ;ERROR DURING SEEK, AC1=STATUS
04322 000413          JMP E10E
04323 006257          READ            ;READ
04324 006605 E10.2:   PRGEND          ;DATA BUFFER ADDRESS
04325 000017          17              ;DISK ADDRESS
04326 006242          EHALT           ;ERROR DURING READ, AC1=STATUS
04327 000406          JMP E10E        ;SKIP TO END OF TEST
04330 026774          LDA 1,@E10.2    ;FIRST WORD IN DATA BUFFER
04331 020767          LDA 0,E10.1     ;SHOULD = CYLINDER #
04332 100000          COM 0,0
04333 122414          SUB# 1,0,SZR    ;AC0=GOOD
04334 006242          EHALT           ;AC1=BAD
04335 006243 E10E:    LOOP            ;READ THE TEST DESCRIPTION
04336 014762          DSZ E10.1       ;REPEAT THE TEST FOR
04337 000401          JMP .+1
04340 020760          LDA 0,E10.1     ;EACH CYLINDER
04341 101103          MOVL 0,0,SNC
04342 000754          JMP E10

                      .EOT
```

```
0056  .MAIN

                ;DISCUSSION OF THE SECTOR ADDRESSING CHECK.
                ;(TESTS E11/E12 AND E13/E14)

                ;USING CYLINDER=0, HEAD=0 TEST E11 WRITES ON
                ;EACH SUCCESSIVE SECTOR INDIVIDUALLY FROM 0-5,
                ;OR 0-11.  IN EACH CASE EACH DATA WORD EQUALS
                ;THE SECTOR NUMBER.  TEST E12 READS THE INDIV-
                ;IDUAL SECTORS BACK IN THE SAME ORDER AND
                ;CHECKS THE DATA.  TESTS E13/E14 PERFORM THE SAME
                ;TASK EXCEPT THAT THE SECTOR SEQUENCE IS IN THE
                ;REVERSE ORDER AND THE DATA WRITTEN EQUALS THE
                ;COMPLEMENT OF THE SECTOR NUMBER.

                ;THIS TEST IS DESIGNED TO CATCH ERRONEOUS SECTOR
                ;SELECTION ERRORS.

                ;  I.E. IF "SC2" IS ALWAYS AT GROUND WHEN SECTOR
                ;       2 IS SELECTED, SECTOR 0 WILL ACTUALLY
                ;       BE CHOSEN AND "2'S" WILL BE WRITTEN THERE.
                ;       IN THE SUBSEQUENT READ A DATA COMPARE
                ;       ERROR WILL RESULT WITH THE GOOD="0",
                ;       AND THE BAD="2".

004343 102400           SUB 0,0         ;SEE DISCUSSION PRECEDING THIS TEST.
004344 040157           STA 0,SECT      ;WRITE ON CYL=0, HEAD=0, ONCE
004345 020121           LDA 0,C17       ;FOR EACH SECTOR.  IN EACH
004346 040413           STA 0,E11,1     ;CASE THE DATA WORDS EQUAL
004347 006237 E11:      JSR @ISET       ;THE SECTOR NUMBER
004350 006262           DOSEK           ;SEEK !
004351 000000           0               ;CYLINDER 0
004352 006242           EHALT           ;ERROR IN SEEK, AC1=STATUS
004353 000411           JMP E11E        ;SKIP TO END OF TEST
004354 006256           GENDAT          ;GENERATE DATA
004355 005440           SECTN           ;ADDRESS OF DATA GEN ROUT.
004356 006605           PRGEND          ;ADDRESS OF DATA BUFFER
004357 006250           WRITE           ;WRITE !
004360 006605           PRGEND          ;DATA BUFFER ADDRESS
004361 000017 E11.1:    17              ;DISK ADDRESS (IT CHANGES)
004362 006242           EHALT           ;ERROR IN WRITE, AC1=STATUS
004363 000401           JMP .+1
004364 006243 E11E:     LOOP

004365 010157           ISZ SECT        ;INCREMENT THE SECTOR
004366 020773           LDA 0,E11.1     ;NUMBER
004367 024063           LDA 1,K011
004370 123000           ADD 1,0
004371 040770           STA 0,E11.1
004372 024150           LDA 1,DTYPE     ;SEE IF DONE
004373 030205           LDA 2,C157
004374 127103           ADDL 1,1,SNC
004375 030210           LDA 2,C317
004376 112404           SUB 0,2,SZR
004377 000750           JMP E11         ;DO ANOTHER
```

```
04400 102400          SUB 0,0          ;SEE THE DISCUSSION PRECEDING
04401 040157          STA 0,SECT       ;TEST E11.  READ ONCE FROM
04402 020121          LDA 0,C17        ;EACH SECTOR AT CYL-0, HEAD-0.
04403 040410          STA 0,E12.2      ;CHECK DATA IN EACH CASE.
04404 006237 E12:     JSR @ISET        ;DATA WORDS=SECTOR #.
04405 006262          DOSEK            ;SEEK
04406 000000          0                ;CYLINDER 0
04407 006242          EHALT            ;ERROR IN SEEK, AC1=STATUS
04410 000412          JMP E12E         ;SKIP TO END OF TEST
04411 006257          READ             ;READ !
04412 006605 E12.1:   PRGEND           ;DATA BUFFER ADDRESS
04413 000017 E12.2:   17               ;DISK ADDRESS (IT CHANGES)
04414 006242          EHALT            ;ERROR IN READ, AC1=STATUS
04415 000405          JMP E12E         ;SKIP TO END OF TEST
04416 020157          LDA 0,SECT       ;GET SECT #
04417 026773          LDA 1,@E12.1     ;GET A WORD READ
04420 122414          SUB# 1,0,SZR     ;DATA ERROR, SEE ABOVE DESCRIPTION
04421 006242          EHALT            ;AC0=GOOD WORD
04422 006243 E12E:    LOOP             ;AC1=BAD

04423 010157          ISZ SECT         ;INCREMENT THE SECTOR
04424 020767          LDA 0,E12.2      ;NUMBER
04425 024063          LDA 1,KB11
04426 123000          ADD 1,0
04427 040764          STA 0,E12.2
04430 024150          LDA 1,DTYPE      ;SEE IF DONE
04431 030205          LDA 2,C157
04432 127103          ADDL 1,1,SNC
04433 030210          LDA 2,C317
04434 112404          SUB 0,2,SZR
04435 000747          JMP E12          ;GO AGAIN
```

```
A 0#58   .MAIN

  #4436 #2#150          LDA #,DTYPE       ;SEE DISCUSSION PRECEDING
  #4437 #242#4          LDA 1,C137        ;TEST E11.  WRITE ON CYL=#,
  #444# 1#31#3          ADDL #,#,SNC      ;HEAD=#, ONCE FOR EACH SECTOR.
  #4441 #242#6          LDA 1,C277        ;IN EACH CASE THE DATA EQUALS
  #4442 #44420          STA 1,F13.1       ;THE COMPLEMENT OF THE SECTOR
  #4443 125220          MOVZR 1,1         ;NUMBER
  #4444 125220          MOVZR 1,1
  #4445 125220          MOVZR 1,1
  #4446 125220          MOVZR 1,1
  #4447 #44157          STA 1,SECT        ;BEGINNING SECTOR
  #445# #06237 F13:     JSR @ISET         ;SETUP
  #4451 #06262          DOSEK             ;SEEK !
  #4452 #####0          0                 ;CYLINDER #
  #4453 006242          EHALT             ;ERROR IN SEEK, AC1=STATUS
  #4454 ###411          JMP E13E          ;SKIP TO END OF TEST
  #4455 #06256          GENDAT            ;GENERATE DATA
  #4456 #05436          SETNC             ;ADDRESS OF DATA GENERATOR
  #4457 ##6605          PRGEND            ;ADDRESS OF DATA BUFFER
  #446# #06260          WRITE             ;WRITE !
  #4461 006605          PRGEND            ;ADDRESS OF DATA BUFFER
  #4462 ##1#17 E13.1:   17                ;DISK ADDRESS (IT CHANGES)
  #4463 006242          EHALT             ;ERROR IN WRITE, AC1=STATUS
  #4464 ###401          JMP .+1
  #4465 006243 F13E:    LOOP

  #4466 #14157          DSZ SECT          ;DECREMENT THE SECTOR
  #4467 ###401          JMP .+1           ;NUMBER
  #447# #2#772          LDA #,F13.1
  #4471 #24#63          LDA 1,KB11
  #4472 1224#0          SUB 1,#
  #4473 #47767          STA #,E13.1
  #4474 101404          INC #,#,SZR       ;SEE IF DONE
  #4475 00#753          JMP E13           ;NOT YET
```

```
04476 020150          LDA 0,DTYPE     ;SEE THE DISCUSSION PRECEDING
04477 024204          LDA 1,C137      ;TEST 11.  READ ONCE FROM
04500 103103          ADDL 0,0,SNC    ;SECTOR OF CYL=0, HEAD=0,
04501 024206          LDA 1,C277      ;READ SUCCESSIVE SECTORS
04502 044415          STA 1,E14.2     ;IN ORDER FROM HI TO LO=.
04503 125220          MOVZR 1,1       ;IN EACH CASE THE DATA EQUALS
04504 125220          MOVZR 1,1       ;THE COMPLEMENT OF THE
04505 125220          MOVZR 1,1       ;SECTOR NUMBER
04506 125220          MOVZR 1,1
04507 044157          STA 1,SECT      ;STARTING SECTOR #
04510 006237 F14:     JSR @ISET
04511 006262          DOSEK           ;SEEK !
04512 000000          0               ;CYLINDER 0
04513 006242          EHALT           ;ERROR IN SEEK, AC1=STATUS
04514 000413          JMP E14E        ;SKIP TO END OF TEST
04515 006257          READ            ;READ !
04516 006605 E14.1:   PRGEND          ;DATA BUFFER ADDRESS
04517 000017 E14.2:   17              ;DISK ADDRESS (IT CHANGES)
04520 006242          EHALT           ;ERROR IN READ, AC1=STATUS
04521 000406          JMP E14E        ;SKIP TO END OF TEST
04522 020157          LDA 0,SECT      ;GET SECTOR #
04523 100000          COM 0,0
04524 026772          LDA 1,@E14.1    ;GET A WORD READ
04525 122414          SUB# 1,0,SZR    ;DATA ERROR, SEE ABOVE DESCRIPTION
04526 006242          EHALT           ;AC0=GOOD WORD
04527 006243 E14E:    LOOP            ;AC1=BAD

04530 014157          DSZ SECT        ;DECREMENT TO NEXT SECTOR
04531 000401          JMP .+1
04532 020765          LDA 0,E14.2
04533 024063          LDA 1,KB11
04534 122400          SUB 1,0
04535 040762          STA 0,E14.2
04536 101404          INC 0,0,SZR     ;DONE ?
04537 000751          JMP E14         ;NO, GO AGAIN
```

```
;DISCUSSION OF THE HEAD ADDRESSING CHECK.
; (TESTS E15/E16 AND E17/E18)

;USING CYLINDER=0, SECTOR=0, TEST E15 WRITES ONE
;SECTOR ON EACH SUCCESSIVE HEAD INDIVIDUALLY.
;IN EACH CASE THE DATA WORDS EQUAL THE HEAD
;NUMBER.  TEST E16 READS EACH OF THESE SECTORS
;BACK IN THE SAME ORDER THEY WERE WRITTEN AND
;CHECKS THE DATA.  TESTS E17 AND E18 PERFORM
;THE SAME FUNCTIONS EXCEPT THAT THE HEADS ARE
;SELECTED IN REVERSE ORDER AND THE COMPLEMENT
;OF THE HEAD NUMBER IS USED AS THE DATA.

;THESE TEST ARE DESIGNED TO CATCH ERRONEOUS
;HEAD SELECTION OR MULTIPLE HEAD SELECTION
;ERRORS.

;  I.E. IF "HD2" IS ALWAYS AT GROUND WHEN HEAD 2
;       IS SELECTED, HEAD 0 WILL ACTUALLY BE
;       CHOSEN.  "2'S" WILL BE WRITTEN ON THIS
;       SECTOR WHERE "0'S" HAD BEEN WRITTEN
;       PREVIOUSLY.  THE SUBSEQUENT READ WILL
;       THEN ENCOUNTER A DATA ERROR WITH THE
;       GOOD WORD = 0 AND THE BAD WORD = 2.
```

```
04540 102400          SUB 0,0          ;SEE THE DISCUSSION ABOVE.
04541 040156          STA 0,HEAD       ;WRITE ON CYL=0, SECT=0,
04542 020121          LDA 0,C17        ;ONCE FOR EACH HEAD.
04543 040413          STA 0,E15.1      ;DATA WORDS = HEAD #
04544 006237 E15:     JSR @ISET
04545 006262          DOSEK            ;SEEK !
04546 000000          0                ;CYLINDER 0
04547 006242          EHALT            ;ERROR IN SEEK, AC1=STATUS
04550 000411          JMP E15E         ;SKIP TO END OF TEST
04551 006256          GENDAT           ;GENERATE DATA
04552 005434          HDN              ;ADDRESS OF DATA GENERATOR
04553 006605          PRGEND           ;DATA BUFFER ADDRESS
04554 006260          WRITE            ;WRITE !
04555 006605          PRGEND           ;DATA BUFFER ADDRESS
04556 000017 E15.1:   17               ;DISK ADDRESS (IT CHANGES)
04557 006242          EHALT            ;ERROR IN WRITE, AC1=STATUS
04560 000401          JMP .+1
04561 006243 E15E:    LOOP

04562 010156          ISZ HEAD         ;INCREMENT TO NEXT HEAD
04563 020773          LDA 0,E15.1
04564 024067          LDA 1,K67
04565 123000          ADD 1,0
04566 040770          STA 0,E15.1
04567 024150          LDA 1,DTYPE      ;DONE ?
04570 030454          LDA 2,ADR-1
04571 125112          MOVL# 1,1,SZC
04572 000404          JMP .+4          ;CART DISK
04573 151400          INC 2,2
04574 125202          MOVR 1,1,SZC     ;SKIP IF 2311
04575 151400          INC 2,2          ;2314
04576 025000          LDA 1,0,2        ;GET END DISK ADDR
04577 122404          SUB 1,0,SZR
04600 000744          JMP E15          ;NOT DONE YET
```

```
004601 102400           SUB 0,0          ;SEE THE DISCUSSION PRECEDING
004602 040156           STA 0,HEAD       ;TEST E15.  READ ONCE FROM
004603 020121           LDA 0,C17        ;EACH HEAD ON CYL=0, SECT=0.
004604 040410           STA 0,E16.2      ;VERIFY THAT DATA=HEAD #
004605 006237 E16:      JSR @ISET
004606 006262           DOSEK            ;SEEK !
004607 000000           0                ;CYLINDER 0
004610 006242           EHALT            ;ERROR IN SEEK, AC1=STATUS
004611 000412           JMP E16E         ;SKIP TO END OF TEST
004612 006257           READ             ;READ !
004613 006605 E16.1:    PRGEND           ;ADDRESS OF DATA BUFFER
004614 000017 E16.2:    17               ;DISK ADDRESS (IT CHANGES)
004615 006242           EHALT            ;ERROR IN READ, AC1=STATUS
004616 000405           JMP E16E         ;SKIP TO END OF TEST
004617 020156           LDA 0,HEAD       ;GET HEAD #
004620 026773           LDA 1,@E16.1     ;GET A WORD READ
004621 122414           SUB# 1,0,SZR     ;DATA ERROR, SEE ABOVE DISCUSSION
004622 006242           EHALT            ;AC0=GOOD WORD
004623 006243 E16E:     LOOP             ;AC1=BAD

004624 010156           ISZ HEAD         ;INCREMENT TO NEXT HEAD
004625 020767           LDA 0,E16.2
004626 024067           LDA 1,KB7
004627 123000           ADD 1,0
004630 040764           STA 0,E16.2
004631 024150           LDA 1,DTYPE      ;DONE YET ??
004632 030412           LDA 2,ADR-1
004633 125112           MOVL# 1,1,SZC
004634 000404           JMP .+4          ;CART DISK
004635 151400           INC 2,2
004636 125202           MOVR 1,1,SZC     ;SKIP IF 2311
004637 151000           INC 2,2          ;2314
004640 025000           LDA 1,0,2        ;GET ENDING DISK ADDRESS
004641 122404           SUB 1,0,SZR
004642 000743           JMP E16          ;MORE TO GO
004643 000405           JMP .+5          ;GO TO NEXT TEST

004644 004645           .+1
004645 001017 ADR:      1017             ;CART,  HEAD 2  SECT 0  1 SECT
004646 005017           5017             ;2311,  HEAD 12 SECT 0  1 SECT
004647 012017           12017            ;2314,  HEAD 24 SECT 0  1 SECT
```

```
04650 020150          LDA 0,DTYPE       ;SEE THE DISCUSSION
04651 030506          LDA 2,ADR1-1      ;PRECEDING TEST E15.
04652 101112          MOVL# 0,0,SZC     ;WRITE ON CYL=0, SECT=0,
04653 000404          JMP .+4           ;ONCE FOR EACH HEAD.
04654 151400          INC 2,2           ;DATA = HEAD #
04655 101202          MOVR 0,0,SZC
04656 151400          INC 2,2
04657 025000          LDA 1,0,2         ;STARTING DISK ADDRESS
04660 044416          STA 1,E17.1       ;SELECT HEADS IN REVERSE ORDER
04661 020213          LDA 0,C1774
04662 123700          ANDS 1,0
04663 040156          STA 0,HEAD        ;CURRENT HEAD #
04664 006237 E17:     JSR @ISET
04665 006262          DOSEK             ;SEEK !
04666 000000          0                 ;CYLINDER 0
04667 006242          EHALT             ;ERROR IN SEEK, AC1=STATUS
04670 000411          JMP E17E          ;SKIP TO END OF TEST
04671 006256          GENDAT            ;GENERATE DATA
04672 005432          HDNC              ;ADDRESS OF DATA GENERATOR
04673 006605          PRGEND            ;DATA BUFFER ADDRESS
04674 006260          WRITE             ;WRITE !
04675 006605          PRGEND            ;DATA BUFFER ADDRESS
04676 000017 E17.1:   17                ;DISK ADDRESS (IT CHANGES)
04677 006242          EHALT             ;ERROR IN WRITE, AC1=STATUS
04700 000401          JMP .+1
04701 006243 E17E:    LOOP

04702 014156          DSZ HEAD
04703 000401          JMP .+1
04704 020772          LDA 0,E17.1       ;DECREMENT HEAD #
04705 024067          LDA 1,KB7
04706 122400          SUB 1,0
04707 040767          STA 0,E17.1
04710 101103          MOVL 0,0,SNC      ;DONE YET ?
04711 000753          JMP E17           ;NO
```

```
04712 020150          LDA 0,DTYPE      ;SEE THE DISCUSSION PRECEDING
04713 030444          LDA 2,ADR1-1     ;TEST E15.  READ ONCE FROM
04714 101112          MOVL# 0,0,SZC    ;EACH HEAD ON CYL=0, SECT=0.
04715 000404          JMP .+4          ;VERIFY THAT DATA=HEAD #
04716 151400          INC 2,2
04717 101202          MOVR 0,0,SZC     ;SKIP IF 2311
04720 151400          INC 2,2          ;2314
04721 025000          LDA 1,0,2        ;GET DISK ADDRESS TO BEGIN WITH
04722 044413          STA 1,E18.2
04723 020213          LDA 0,C1774
04724 123700          ANDS 1,0
04725 040156          STA 0,HEAD       ;BEGINNING HEAD #
04726 006237 E18:     JSR @ISET
04727 006262          DOSEK            ;SEEK !
04730 000000          0                ;CYLINDER 0
04731 006242          EHALT            ;ERROR IN SEEK, AC1=STATUS
04732 000413          JMP E18E         ;SKIP TO END OF TEST
04733 006257          READ             ;READ !
04734 006605 E18.1:   PRGEND           ;ADDRESS OF DATA BUFFER
04735 000017 E18.2:   17               ;DISK ADDRESS (IT CHANGES)
04736 006242          EHALT            ;ERROR IN READ, AC1=STATUS
04737 000406          JMP E18E         ;SKIP TO END OF TEST
04740 020156          LDA 0,HEAD       ;GET HEAD #
04741 100000          COM 0,0          ;USE THE COMP.
04742 026772          LDA 1,@E18.1     ;GET A WORD READ
04743 122414          SUB# 1,0,SZR     ;DATA ERROR, SEE ABOVE DISCUSSION
04744 006242          EHALT            ;AC0=GOOD WORD
04745 006243 E18E:    LOOP             ;AC1=BAD

04746 014156          DSZ HEAD
04747 000401          JMP .+1
04750 020765          LDA 0,E18.2      ;DECREMENT HEAD #
04751 024067          LDA 1,KB7
04752 122400          SUB 1,0
04753 040762          STA 0,E18.2
04754 101103          MOVL 0,0,SNC     ;DONE YET ?
04755 000751          JMP E18          ;NO
04756 000405          JMP E19          ;YES, GO TO NEXT TEST

04757 004760          .+1
04760 000417 ADR1:    417              ;CART,  HEAD 1  SECT 0  1 SECT
04761 004417          4417             ;2311,  HEAD 11 SECT 0  1 SECT
04762 011417          11417            ;2314,  HEAD 23 SECT 0  1 SECT
```

```
04763 006240 E19:    SETP1              ;CAUSE SEEK ERROR BY
04764 006262         DOSEK              ;SEEKING TO CYL 313
04765 000313         313
04766 000403         JMP .+3
04767 000402         JMP .+2            ;AC1=STATUS
04770 006242         EHALT              ;NO ERRORS ON SEEK
04771 006243         LOOP               ;TO CYL 313

04772 030153         LDA 2,UNUM         ;RECALIBRATE THE
04773 021113         LDA 0,TRCL,2       ;UNIT WITH A SEEK ERR
04774 040401         STA 0,.+1
04775 006231         RECL0

04776 006240 E20:    SETP1              ;CAUSE SEEK ERROR BY
04777 006262         DOSEK              ;SEEKING TO CYL 313
05000 000313         313
05001 020064         LDA 0,KB10
05002 123415         AND# 1,0,SNR       ;AC1=STATUS
05003 006242         EHALT              ;NO SEEK ERROR STATUS
05004 006243         LOOP               ;FOLLOWING SEEK TO CYL 313

05005 030153         LDA 2,UNUM         ;RECALIBRATE THE UNIT
05006 021113         LDA 0,TRCL,2       ;WITH A SEEK ERROR
05007 040401         STA 0,.+1
05010 006231         RECL0

05011 006240 E21:    SETP1              ;CHECK FOR ILLEGAL ERRORS
05012 006262         DOSEK              ;ALONG WITH SEEK ERROR
05013 000313         313                ;AC1=STATUS
05014 020177         LDA 0,C36          ;INTENTIONAL SEEK ERROR
05015 123414         AND# 1,0,SZR       ;ILLEGAL STATUS; "END CYL"
05016 006242         EHALT              ;OR "UNSAFE" OR "CHK WD"
05017 006243         LOOP               ;OR "DATA LATE"

05020 030153         LDA 2,UNUM         ;RECALIBRATE THE UNIT
05021 021113         LDA 0,TRCL,2       ;WITH A SEEK ERROR
05022 040401         STA 0,.+1
05023 006231         RECL0
```

```
005024 006254 E22:    DORW            ;SETUP SECTOR 3 & 4
005025 000000         0               ;CYL #
005026 005405         THREE           ;DATA TYPE
005027 000077         77              ;DISK ADDRESS

005030 006254         DORW            ;SECT 4
005031 000000         0
005032 005407         FOUR
005033 000117         117

005034 006237         JSR @ISET       ;TEST READ SECT 3=WRITE SECT 4
                                      ;SEQUENCE
005035 006257         READ            ;READ A SECTOR
005036 006605         PRGEND          ;MEM BUFFER ADDRESS
005037 000077         77              ;SECTOR THREE
005040 006242         EHALT           ;ERROR, AC1=STATUS
005041 000422         JMP E22E        ;SKIP TO END OF TEST

005042 006260         WRITE           ;WRITE A SECTOR
005043 006605         PRGEND          ;BUFF ADDR (3'S JUST READ)
005044 000117         117             ;SECTOR 4
005045 006242         EHALT           ;ERROR, AC1=STATUS
005046 000415         JMP E22E        ;SKIP TO END OF TEST

005047 006256         GENDAT          ;GENERATE DATA BUFFER
005050 005405         THREE           ;ADDR OF DATA GEN
005051 006605         PRGEND          ;BUFFER ADDR.

005052 006257         READ            ;READ A SECTOR
005053 007205         PRGEND+400      ;BUFF ADDR.
005054 000117         117             ;SECTOR 4
005055 006242         EHALT           ;ERROR, AC1=STATUS
005056 000405         JMP E22E        ;SKIP TO END OF TEST

005057 006261         CHECK           ;COMPARE BUFFERS A/B
005060 006605         PRGEND          ;ADDR OF BUFF A (CORRECT)
005061 007205         PRGEND+400      ;ADDR OF BUFF B
005062 006242         EHALT           ;COMPARE ERROR, AC0=GOOD
005063 006243 E22E:   LOOP            ;AC1=BAD
```

```
05064 006254 E23:   DORW            ;SETUP SECTOR 3 & 4
05065 000000        0               ;CYL # 0
05066 005405        THREE           ;DATA TYPE
05067 000077        77              ;DISK ADDRESS (SECT 3)

05070 006254        DORW
05071 000000        0
05072 005407        FOUR
05073 000117        117             ;SECTOR 4

05074 006237        JSR @ISET       ;TEST WRITE SECT 3=READ SECT 4
                                    ;SEQUENCE.
05075 006256        GENDAT          ;GENERATE DATA
05076 005407        FOUR            ;4'S
05077 006605        PRGEND          ;ADDR OF DATA BUFF

05100 006260        WRITE           ;WRITE A SECTOR
05101 006605        PRGEND          ;ADDR OF DATA BUFF
05102 000077        77              ;SECTOR 3
05103 006242        EHALT           ;ERROR, AC1=STATUS
05104 000417        JMP E23E        ;SKIP TO END OF TEST

05105 006257        READ            ;READ A SECTOR
05106 007205        PRGEND+400      ;MEM BUFF ADDRESS
05107 000117        117             ;SECTOR 4
05110 006242        EHALT           ;ERROR, AC1=STATUS
05111 000412        JMP E23E        ;SKIP TO END OF TEST

05112 006257        READ            ;READ A SECTOR
05113 006605        PRGEND          ;MEM ADDR
05114 000077        77              ;SECTOR 3
05115 006242        EHALT           ;ERROR, AC1=STATUS
05116 000405        JMP E23E        ;SKIP TO END OF TEST

05117 006261        CHECK           ;COMPARE SECTOR 3 & 4
05120 006605        PRGEND          ;SECT 3
05121 007205        PRGEND+400      ;SECT 4
05122 006242        EHALT           ;COMPARE ERROR, AC0=GOOD (SECT 3)
05123 006243 E23E:  LOOP            ;AC1=BAD (SECT 4)
```

```
05124 102400 E24:    SUB 0,0          ;WRITE CYL # INTO EACH
05125 040405         STA 0,.CL        ;SECT 0, HEAD 0, OF ALL
05126 040420         STA 0,.SCYL      ;CYLINDERS
05127 020207         LDA 0,C312
05130 040434         STA 0,LCYL
05131 006254         DORW
05132 000000 .CL:    0                ;CYL #
05133 005417         CYLN             ;ADDR OF DATA GEN ROUT.
05134 000017         17               ;DISK ADDRESS

05135 010775         ISZ .CL
05136 020774         LDA 0,.CL
05137 024207         LDA 1,C312
05140 122437         SUBZ# 1,0,SBN
05141 000770         JMP .CL-1
05142 020454         LDA 0,C500
05143 040452         STA 0,CCNT       ; DO 500 SEEKS

05144 006237 GO:     JSR @ISET
05145 006262         DOSEK            ;SEEK !!
05146 000000 .SCYL:  0                ;CYL #
05147 006242         EHALT            ;ERROR, AC1=STATUS
05150 000412         JMP E24E         ;SKIP TO END OF TEST

05151 006257         READ             ;READ DATA IN SECT 0
05152 006605         PRGEND           ;MEM ADDR
05153 000017         17               ;DISK ADDR
05154 006242         EHALT            ;ERROR, AC1=STATUS
05155 000405         JMP E24E         ;SKIP TO END OF TEST

05156 020155         LDA 0,CYL        ;CURRENT CYLINDER #
05157 026160         LDA 1,@BUFF      ;ACTUAL CYL #
05160 122414         SUB# 1,0,SZR     ;(LCYL) = LAST CORRECT
05161 006242         EHALT            ;CYLINDER #
05162 006243 E24E:   LOOP
05163 101001         MOV 0,0,SKP
05164 000000 LCYL:   0
05165 020761         LDA 0,.SCYL      ;SAVE CYLINDER JUST DONE
05166 040776         STA 0,LCYL
05167 006255 GRAN:   JSR @IRAN        ;GET RANDOM CYLINDER #
05170 024207         LDA 1,C312
05171 030125         LDA 2,C377       ;# MUST BE <313
05172 143400         AND 2,0
05173 106433         SUBZ# 0,1,SNC
05174 000773         JMP GRAN         ;TRY AGAIN
05175 040751         STA 0,.SCYL
05176 014417         DSZ CCNT
05177 000745         JMP GO
```

```
▲ 0069  .MAIN

05200 006247          PCRLF             ;END TEST
05201 006250          MESSAGE
05202 006602          MSG6              ;"PASS"
05203 030045          LDA 2,45
05204 025000          LDA 1,0,2
05205 125005          MOV 1,1,SNR
05206 002406          JMP @.+6
05207 015003          DSZ 3,2
05210 002404          JMP @.+4
05211 060277          INTDS
05212 035004          LDA 3,4,2
05213 001400          JMP 0,3
05214 000412          A1

05215 000000 CCNT:    0
05216 000764 C500:    500.

                      .EOT
```

```
0070  .MAIN

                        ;RANDOM NUMBER GENERATOR

05217 054431 RAN:       STA 3,.UD03       ;GENERATE A RANDOM
05220 050427            STA 2,.UD02
05221 044425            STA 1,.UD01
05222 020142            LDA 0,RANDOM      ;NUMBER IN AC0
05223 004410            JSR .UD50
05224 034426            LDA 3,.UD20
05225 163000            ADD 3,0
05226 040142            STA 0,RANDOM      ;STORE NEW VALUE.
05227 111100            MOVL 0,2
05230 030417            LDA 2,.UD02
05231 024415            LDA 1,.UD01
05232 002416            JMP @.UD03

05233 024420 .UD50:     LDA 1,.UD21       ;RANDOM CONTINUED
05234 044415            STA 1,.UD10
05235 105120            MOVZL 0,1
05236 125120            MOVZL 1,1
05237 014412            DSZ .UD10
05240 000776            JMP .-2
05241 107000            ADD 0,1
05242 125120            MOVZL 1,1
05243 125120            MOVZL 1,1
05244 123000            ADD 1,0
05245 001400            JMP 0,3
05246 000000 .UD01:     0
05247 000000 .UD02:     0
05250 000000 .UD03:     0
05251 000000 .UD10:     0
05252 033031 .UD20:     33031
05253 000010 .UD21:     10
```

```
                        ;CHECK DATA SUBROUTINE
                        ; CALL  CHECK
                        ;       ADDRESS OF DATA BUFFER 1
                        ;       ADDRESS OF DATA BUFFER 2
                        ;       ERROR RETURN, (AC1)=BAD (AC0)=GOOD
                        ;       NORMAL RETURN

05254 054460 .CHECK:  STA 3,GENRET
05255 030214          LDA 2,M400
05256 050417          STA 2,CTR
05257 031400          LDA 2,0,3
05260 035401          LDA 3,1,3
05261 010453          ISZ GENRET
05262 010452          ISZ GENRET
05263 021000 .CHE1:   LDA 0,0,2
05264 025400          LDA 1,0,3
05265 106414          SUB# 0,1,SZR
05266 002446          JMP @GENRET       ;ERROR
05267 151400          INC 2,2
05270 175400          INC 3,3
05271 010404          ISZ CTR
05272 000771          JMP .CHE1         ;CHECK MORE
05273 010441          ISZ GENRET
05274 002440          JMP @GENRET       ;NORMAL RETURN
05275 000000 CTR:     0

                        ;GENERATE ONE SECTOR OF DATA
                        ; CALL  GENDAT
                        ;       ADDRESS OF DATA GEN ROUTINE
                        ;       DATA BUFFER ADDRESS
                        ;       RETURN

05276 054436 .GEN:    STA 3,GENRET
05277 024214          LDA 1,M400
05300 031401          LDA 2,1,3
05301 034433 .GEN1:   LDA 3,GENRET
05302 007400          JSR @0,3          ;GET A DATA WORD
05303 041000          STA 0,0,2
05304 151400          INC 2,2
05305 125404          INC 1,1,SZR
05306 000773          JMP .GEN1         ;DO MORE
05307 034425          LDA 3,GENRET      ;DONE
05310 001402          JMP 2,3
```

```
                        ;WRITE SUBROUTINE
                        ; CALL  WRITE
                        ;       DATA BUFFER ADDRESS
                        ;       DISK ADDRESS
                        ;       ERROR RETURN, (AC1) = STATUS
                        ;       JMP TO END OF TEST
                        ;       NORMAL RETURN

                        ;ERROR RETURN IF
                        ;       TIMEOUT (100MS)
                        ;       DATA LATE
                        ;       ADDRESS ERROR/UNSAFE
                        ;       END CYLINDER
                        ;       SEEK ERROR
                        ;       ANY "SEEKING"
                        ;       ANY "SEEK DONE"
                        ;       NO "R/W DONE"

005311 054423 .WRITE: STA 3,GENRET
005312 021400         LDA 0,0,3
005313 062033         DOB 0,DSKP        ;CA
005314 020152         LDA 0,TESTU
005315 025401         LDA 1,1,3
005316 123000         ADD 1,0
005317 063233         DOCC 0,DSKP       ;UNIT # & DISK ADDRESS
005320 020126         LDA 0,C777        ;BIT 7 AND ALL CYL BITS=1
005321 061133         DOAS 0,DSKP       ;WRITE !
005322 010412         ISZ GENRET
005323 010411         ISZ GENRET
005324 006235         ITRWT             ;WAIT 100MS FOR INTERRUPT
005325 002407         JMP @GENRET       ;TIMEOUT
005326 020407 .WR1:   LDA 0,.WM         ;ERROR BIT MASK
005327 107415         AND# 0,1,SNR
005330 125113         MOVL# 1,1,SNC
005331 002403         JMP @GENRET       ;ERROR STATUS
005332 034402         LDA 3,GENRET
005333 001402         JMP 2,3

005334 000000 GENRET: 0
005335 077677 .WM:    77677
```

```
                        ;READ SUBROUTINE
                        ; CALL  READ
                        ;       DATA BUFFER ADDRESS
                        ;       DISK ADDRESS
                        ;       ERROR RETURN, (AC1)=STATUS
                        ;       JMP TO END TEST
                        ;       NORMAL RETURN

                        ;ERROR RETURN IF
                        ;       TIMEOUT (100MS)
                        ;       DATA LATE
                        ;       CHECK WORD ERROR
                        ;       ADDRESS ERROR/UNSAFE
                        ;       END CYLINDER
                        ;       SEEK ERROR
                        ;       ANY "SEEKING"
                        ;       ANY "SEEK DONE"
                        ;       NO "R/W DONE"

05336 054776 .READ:     STA 3,GENRET
05337 021400            LDA 0,0,3
05340 062033            DOB 0,DSKP          ;CA
05341 020152            LDA 0,TESTU
05342 025401            LDA 1,1,3
05343 123000            ADD 1,0
05344 063233            DOCC 0,DSKP         ;UNIT # & DISK ADDRESS
05345 102400            SUB 0,0
05346 061133            DOAS 0,DSKP         ;READ !
05347 010765            ISZ GENRET
05350 010764            ISZ GENRET
05351 006235            ITRWT               ;WAIT 100 MS FOR INTERRUPT
05352 002762            JMP @GENRET         ;TIMEOUT
05353 000753            JMP .WR1            ;CHECK STATUS
```

```
                        ;SEEK SUBROUTINE
                        ; CALL  DOSEK
                        ;       CYL #
                        ;       ERROR RETURN (AC1)=STATUS
                        ;       JMP TO END TEST
                        ;       NORMAL RETURN

                        ;ERROR RETURN IF
                        ;       TIMEOUT (500MS)
                        ;       DATA LATE
                        ;       CHECK WORD ERROR
                        ;       ADDRESS ERROR/UNSAFE
                        ;       END CYLINDER
                        ;       SEEK ERROR
                        ;       ANY "SEEKING"
                        ;       NO "SEEK DONE"
                        ;       "R/W DONE"

005354 054760 .DOSEK: STA 3,GENRET
005355 010757         ISZ GENRET
005356 020152         LDA 0,TESTU
005357 063233         DOCC 0,DSKP       ;SELECT UNIT
005360 021400         LDA 0,0,3
005361 024125         LDA 1,C377
005362 123400         AND 1,0
005363 040155         STA 0,CYL         ;SAVE CYL #
005364 024070         LDA 1,K66
005365 123000         ADD 1,0           ;CYL # + SEEK
005366 061333         DOAP 0,DSKP
005367 030167         LDA 2,C5
005370 006227         WAIT              ;WAIT 500MS (OR UNTIL "DONE")
005371 020410         LDA 0,.DM
005372 123414         AND# 1,0,SZR
005373 002741         JMP @GENRET       ;ERROR STATUS
005374 020220         LDA 0,C74K
005375 123415         AND# 1,0,SNR
005376 002736         JMP @GENRET       ;NO SEEK DONE
005377 034735         LDA 3,GENRET
005400 001402         JMP 2,3

005401 103677 .DM:    103677
```

```
▲ 0075  .MAIN

05402 102001 ONES:   ADC 0,0,SKP
05403 102400 ZEROS:  SUB 0,0
05404 001400         JMP 0,3

05405 020117 THREE:  LDA 0,C3
05406 001400         JMP 0,3

05407 020166 FOUR:   LDA 0,C4
05410 001400         JMP 0,3

05411 020140 ALT1:   LDA 0,C2525
05412 001400         JMP 0,3

05413 020141 ALT0:   LDA 0,C5252
05414 001400         JMP 0,3

05415 020155 CYLNC:  LDA 0,CYL
05416 100001         COM 0,0,SKP
05417 020155 CYLN:   LDA 0,CYL
05420 001400         JMP 0,3

05421 054407 NUMSEQ: STA 3,NSRET
05422 010407         ISZ NS1
05423 000401         JMP .+1
05424 020405         LDA 0,NS1
05425 034125         LDA 3,C377
05426 163400         AND 3,0
05427 002401         JMP @NSRET
05430 000000 NSRET:  0
05431 000000 NS1:    0

05432 020156 HDNC:   LDA 0,HEAD
05433 100001         COM 0,0,SKP
05434 020156 HDN:    LDA 0,HEAD
05435 001400         JMP 0,3

05436 020157 SETNC:  LDA 0,SECT
05437 100001         COM 0,0,SKP
05440 020157 SECTN:  LDA 0,SECT
05441 001400         JMP 0,3
```

```
                        ;PROGRAM INITILAIZATION

05442 054504 .INI:    STA 3,.INRET
05443 006247          PCRLF
05444 006250          MESSAGE
05445 006510          MSG1              ;DISK PACK TYPE
05446 006247          PCRLF
05447 006250          MESSAGE
05450 006523          MSG2              ;TYPE 0 FOR CART
05451 006247          PCRLF             ;      1 FOR 2311
05452 006250          MESSAGE           ;      2 FOR 2314
05453 006541          MSG3

05454 006247 .INI1:   PCRLF
05455 060210          NIOC TTI          ;WAIT FOR TTI INPUT
05456 063610          SKPDN TTI
05457 000777          JMP .-1
05460 060410          DIA 0,TTI         ;READ CHAR
05461 061111          DOAS 0,TTO        ;ECHO IT
05462 024124          LDA 1,C177        ;7 BIT MASK
05463 107400          AND 0,1
05464 030200          LDA 2,C60
05465 034201          LDA 3,C63
05466 132437          SUBZ# 1,2,SBN     ;CHAR MUST 0,1, OR 2
05467 166432          SUBZ# 3,1,SZC
05470 000457          JMP QUEST         ;ILLEGAL CHAR TYPED
05471 024117          LDA 1,C3
05472 123400          AND 1,0
05473 101224          MOVZR 0,0,SZR
05474 000404          JMP .+4           ;=2, 2314, BIT 15 IS SET, DONE
05475 101205          MOVR 0,0,SNR
05476 101241          MOVOR 0,0,SKP     ;=0, CART, MUST SET BIT 0
05477 101220          MOVZR 0,0         ;=1, 2311, MUST SET BIT 1
05500 040150          STA 0,DTYPE
```

```
05501 102400          SUB 0,0
05502 040151          STA 0,NDSKS
05503 006247 .INI2:   PCRLF
05504 006250          MESSAGE
05505 006562          MSG5              ;TYPE UNIT NUMBERS TO TEST
05506 006247          PCRLF

05507 060210 .INI3:   NIOC TTI
05510 063610          SKPDN TTI
05511 000777          JMP .-1
05512 060410          DIA 0,TTI         ;READ CHAR TYPED
05513 061111          DOAS 0,TTO        ;ECHO THE CHAR
05514 024124          LDA 1,C177
05515 107400          AND 0,1           ;7 BIT ASCII
05516 030173          LDA 2,C15
05517 132415          SUB# 1,2,SNR
05520 000422          JMP CR            ;CR TYPED
05521 030200          LDA 2,C60
05522 034201          LDA 3,C63
05523 166437          SUBZ# 3,1,SBN     ;# MUST BE 0,1,2, OR 3
05524 132436          SUBZ# 1,2,SEZ
05525 000426          JMP QST1          ;ILLEGAL CHAR TYPED
05526 030117          LDA 2,C3
05527 113400          AND 0,2
05530 021057          LDA 0,UNTBIT,2
05531 025053          LDA 1,.TU,2
05532 044152          STA 1,TESTU
05533 050153          STA 2,UNUM
05534 110000          COM 0,2
05535 024151          LDA 1,NDSKS
05536 147400          AND 2,1           ;(NDSKS) = BIT 15 = UNIT 0
05537 107000          ADD 0,1           ;          BIT 14 = UNIT 1
05540 044151          STA 1,NDSKS       ;          BIT 13 = UNIT 2
05541 000746          JMP .INI3         ;          BIT 12 = UNIT 3

05542 020151 CR:      LDA 0,NDSKS       ;IF NO UNIT NUMBERS TYPED
05543 101005          MOV 0,0,SNR       ;IT IS AN ERROR
05544 000407          JMP QST1
05545 002401          JMP @.INRET
05546 000000 .INRET:  0

05547 006247 QUEST:   PCRLF
05550 006250          MESSAGE
05551 006557          MSG4
05552 000702          JMP .INI1

05553 006247 QST1:    PCRLF
05554 006250          MESSAGE
05555 006557          MSG4
05556 000725          JMP .INI2
```

```
▲ 0078  .MAIN

                        ;SET ALL I/O ADDRESSES

05557 102401 .S33:    SUB 0,0,SKP       ;SET TO 33
05560 020064 .S73:    LDA 0,KB10        ;SET TO 73
05561 024176          LDA 1,C33
05562 123000          ADD 1,0
05563 040154          STA 0,CDSK
05564 030425          LDA 2,FIRST
05565 021000 .SN0:    LDA 0,0,2
05566 024161          LDA 1,MSK1
05567 107400          AND 0,1
05570 034162          LDA 3,DPIO
05571 166404          SUB 3,1,SZR
05572 000406          JMP .SN1          ;GO ON
05573 024163          LDA 1,MSK2        ;DISK PACK IO INST.
05574 034154          LDA 3,CDSK
05575 123400          AND 1,0
05576 163000          ADD 3,0
05577 041000          STA 0,0,2
05600 151400 .SN1:    INC 2,2
05601 024411          LDA 1,LAST
05602 132414          SUB# 1,2,SZR
05603 000762          JMP .SN0
05604 024046          LDA 1,EGGS
05605 125005          MOV 1,1,SNR
05606 063077          HALT
05607 002401          JMP @.+1
05610 000400          START

05611 000400 FIRST:   START
05612 006027 LAST:    .SFT

                        ;DELAY SUBROUTINE

05613 054406 .STL:    STA 3,.STLRET
05614 034050          LDA 3,KB14
05615 054000          STA 3,0
05616 014000          DSZ 0
05617 000777          JMP .-1
05620 002401          JMP @.STLRET
05621 000000 .STLRET:0
```

```
                        ;"SET A SEEKING FLOP" SUBROUTINE
                        ;FOR THE UNITS INDICATED BY (AC2).
                        ;       BIT 15 = UNIT 0
                        ;       BIT 14 = UNIT 1
                        ;       BIT 13 = UNIT 2
                        ;       BIT 12 = UNIT 3

05622 020056 .SSEK:     LDA 0,C140K
05623 151005            MOV 2,2,SNR
05624 001400            JMP 0,3             ;DONE
05625 024054            LDA 1,KB1
05626 123000            ADD 1,0
05627 151223            MOVZR 2,2,SNC
05630 000773            JMP .SSEK+1         ;TRY ANOTHER UNIT
05631 063033            DOC 0,DSKP          ;RECAL THIS UNIT
05632 024070            LDA 1,C1000
05633 065333            DOAP 1,DSKP         ;SEEK !!
05634 000767            JMP .SSEK+1

                        ;WAIT ROUTINE FOR "DONE"
                        ;RUN TIMER
                        ;(AC2) = MAX RUN TIME. (100MS/COUNT)

05635 050164 .WAIT:     STA 2,ITRCNT        ;# 100MS ITERATIONS
05636 030145            LDA 2,TIME          ;100 MS / COUNT
05637 050144            STA 2,TEMP          ;TEMP COUNTER
05640 030221            LDA 2,C174K         ;DISK DONE FLAG MASK
05641 063700            SKPDZ 0             ;DUMMY FOR TIME FILLER
05642 063077            HALT
05643 064433            DIA 1,DSKP          ;READ STATUS
05644 133414            AND# 1,2,SZR
05645 000406            JMP WTO             ;SOMEONE IS DONE
05646 014144            DSZ TEMP
05647 000772            JMP .-6
05650 014164            DSZ ITRCNT          ;DONE 100 MS
05651 000765            JMP .WAIT+1         ;DO SOME MORE
05652 001400            JMP 0,3             ;TIME OUT
05653 064433 WTO:       DIA 1,DSKP
05654 001400            JMP 0,3
```

```
▲ 0080  .MAIN

                        ;FIND COMPUTER TIME BASE

05655 062677 STB:       IORST
05656 126400            SUB 1,1
05657 044145            STA 1,TIME          ;TIME BASE 1
05660 044146            STA 1,TIME1         ;TIME BASE 1'
05661 020125            LDA 0,C377
05662 061111            DOAS 0,TTO          ;TYPE ONCE TO SYNC TTO
05663 063611            SKPDN TTO
05664 000777            JMP .-1
05665 061111            DOAS 0,TTO          ;START TIME BASE 1
05666 063711            SKPDZ TTO
05667 000407            JMP STB1            ;TIME BASE 1 ESTABLISHED
05670 064400            DIA 1,0             ;TIME FILLER
05671 127411            ANDS# 1,1,SKP       ;BFD
05672 063077            HALT                ;REAL TROUBLE
05673 010145            ISZ TIME            ;COUNT 1
05674 000772            JMP .-6
05675 063077            HALT                ;TTO CLOCK OFF!!

05676 061111 STB1:      DOAS 0,TTO          ;START TIME BASE 1'
05677 063711            SKPDZ TTO
05700 001400            JMP 0,3             ;TIME BASE 1' ESTABLISHED
05701 010146            ISZ TIME1
05702 000775            JMP .-3
05703 063077            HALT                ;TTO CLOCK OFF!!

                        ;RECALIBRATE SUBROUTINE

05704 102400 .RCL0:     SUB 0,0             ;UNIT 0 ENTRY
05705 000405            JMP .RCL3+1
05706 020054 .RCL1:     LDA 0,KB1           ;UNIT 1 ENTRY
05707 000403            JMP .RCL3+1
05710 102621 .RCL2:     SUBZR 0,0,SKP       ;UNIT 2 ENTRY
05711 020056 .RCL3:     LDA 0,C140K         ;UNIT 3 ENTRY
05712 063233            DOCC 0,DSKP         ;SELECT UNIT
05713 020215            LDA 0,C1400
05714 061333            DOAP 0,DSKP         ;RECALIBRATE
05715 054404            STA 3,RCLRET
05716 030173            LDA 2,C15
05717 006227            WAIT                ;WAIT 1.3SEC (OR UNTIL DONE)
05720 002401            JMP @RCLRET
05721 000000 RCLRET:    0
```

```
                        ;SEEK WRITE/READ/CHECK SUBROUTINE
                        ;CALL   DORW
                        ;       CYL#
                        ;       ADDRESS OF DATA GENERATOR
                        ;       DISK ADDRESS
                        ;       RETURN

05722 054441 .DORW:     STA 3,DRWRET
05723 021400            LDA 0,0,3       ;XFER CYL #
05724 040410            STA 0,.D0
05725 021401            LDA 0,1,3       ;XFER ADDR DAT GEN
05726 040412            STA 0,.D01
05727 021402            LDA 0,2,3       ;XFER DISK ADDR
05730 040414            STA 0,.D02
05731 040420            STA 0,.D03

05732 006237            JSR @ISET
05733 006262            DOSEK           ;SEEK !!
05734 000000 .D0:       0               ;CYL #
05735 006242            EHALT           ;ERROR, AC1=STATUS
05736 000422            JMP E.D0        ;SKIP TO END OF TEST

05737 006256            GENDAT          ;GENERATE DATA
05740 005402 .D01:      ONES            ;ADDRESS OF DATA GEN
05741 006605            PRGEND          ;MEM ADDR

05742 006260            WRITE           ;WRITE !!
05743 006605            PRGEND          ;MEM ADDR
05744 000017 .D02:      17              ;DISK ADDRESS
05745 006242            EHALT           ;ERROR, AC1=STATUS
05746 000412            JMP E.D0        ;SKIP TO END OF TEST

05747 006257            READ            ;READ !!
05750 007205            PRGEND+400      ;MEM ADDR
05751 000017 .D03:      17              ;DISK ADDRESS
05752 006242            EHALT           ;ERROR, AC1=STATUS
05753 000405            JMP E.D0        ;SKIP TO END OF TEST

05754 006261            CHECK           ;COMPARE BUFFER A/B
05755 006605            PRGEND          ; A
05756 007205            PRGEND+400      ; B
05757 006242            EHALT           ;COMPARE ERROR, AC0=GOOD
05760 006243 E.D0:      LOOP            ;AC1=BAD

05761 034402            LDA 3,DRWRET
05762 001403            JMP 3,3

05763 000000 DRWRET:    0
```

```
                        ;WAIT FOR INTERRUPT TIMEOUT AFTER 100 MS
                        ;RETURN+1  IF TIMEOUT
                        ;RETURN+2  IF INTERRUPT

05764 020146 .IWT:      LDA 0,TIME1
05765 040144            STA 0,TEMP
05766 060177            INTEN
05767 063700            SKPDZ 0             ;TIME FILLER
05770 063077            HALT
05771 014144            DSZ TEMP
05772 000775            JMP .-3
05773 060277            INTDS               ;NO INTERRUPT
05774 064433            DIA 1,DSKP
05775 001400            JMP 0,3             ;ERROR RETURN

05776 064433 IRET:      DIA 1,DSKP
05777 001401            JMP 1,3             ;NORM INTERRUPT RETURN

                        ;CHOOSE AN ACTIVE DISK UNIT
                        ;RETURN WITH UNIT # IN AC2
                        ;       UNIT 0 = 1
                        ;       UNIT 1 = 2
                        ;       UNIT 2 = 4
                        ;       UNIT 3 = 10

06000 152521 .ADSK:     SUBZL 2,2,SKP
06001 151120            MOVZL 2,2
06002 020151            LDA 0,NDSKS
06003 143405            AND 2,0,SNR
06004 000775            JMP .-3
06005 001400            JMP 0,3

                        ;SEEK SUBROUTINE
                        ; CALL  SEEK                ;AC2 = UNIT
                        ;       N                   ;CYL #
                        ;       RETURN              ;AC1 = STATUS

06006 054420 .SK:       STA 3,SKRET
06007 126400            SUB 1,1
06010 020054            LDA 0,KB1
06011 151222            MOVZR 2,2,SZC
06012 000403            JMP .SK1
06013 107000            ADD 0,1
06014 000775            JMP .-3

06015 067033 .SK1:      DOC 1,DSKP          ;SELECT UNIT
06016 021400            LDA 0,0,3
06017 024070            LDA 1,KB6
06020 123000            ADD 1,0             ;SEEK + CYL #
06021 061333            DOAP 0,DSKP
06022 030167            LDA 2,C5
06023 006227            WAIT                ;WAIT 500MS (OR UNTIL DONE)
06024 010402            ISZ SKRET           ;AC1=STATUS
06025 002401            JMP @SKRET
06026 000000 SKRET:     0
```

```
06027 054426 .SET:   STA 3,LOOPR      ;ITERATE ONCE
06030 176520         SUBZL 3,3
06031 000406         JMP .SETUP+2

06032 054423 .SETP1: STA 3,LOOPR      ;ITERATE 5 TIMES
06033 034167         LDA 3,C5
06034 000403         JMP .SETUP+2

06035 054420 .SETUP: STA     3,LOOPR  ;ADDRESS OF TOP OF LOOP
06036 034407         LDA 3,ITR        ;THIS ROUTINE INITIALIZES
06037 054407         STA 3,ITRCT      ;EACH TEST
06040 176400         SUB 3,3
06041 054406         STA 3,ESWIT
06042 054406         STA 3,ERRCT
06043 062677         IORST            ;,I/O RESET
06044 002411         JMP @LOOPR

06045 000144 ITR:    144
06046 000000 ITRCT:  0
06047 000000 ESWIT:  0
06050 000000 ERRCT:  0
06051 000000 .RTRN:  0
06052 000000 SAV2:   0
06053 000000 SAV1:   0
06054 000000 SAV0:   0
06055 000000 LOOPR:  0
06056 000000 DSWT:   0
```

```
06057 054772 .LUPD:  STA 3,.RTRN      ;INTRODUCE A SHORT
06060 034122         LDA 3,C37        ;DELAY IN THE LOOP
06061 054000         STA 3,0          ;ROUTINE TO ALLOW THE
06062 014000         DSZ 0            ;DISK CART. ATTENTION
06063 000777         JMP .-1          ;LINE TO COME UP
06064 000402         JMP .+2

06065 054764 .LOOP:  STA 3,.RTRN      ;END OF TEST ITERATION
06066 050764         STA 2,SAV2
06067 044764         STA 1,SAV1
06070 040764         STA 0,SAV0
06071 014755         DSZ ITRCT
06072 000430         JMP CYCTS        ;NOT 100 TIMES ITERATED
06073 034752         LDA 3,ITR        ;RESET ITERATION CNTR
06074 054752         STA 3,ITRCT
06075 034752         LDA     3,ESWIT
06076 175005         MOV     3,3,SNR
06077 002752         JMP     @.RTRN
06100 074477         READS 3
06101 175120         MOVZL 3,3
06102 175100         MOVL 3,3
06103 175103         MOVL 3,3,SNC
06104 000414         JMP PCENT+1
06105 006247         PCRLF            ;PRINT CARRIAGE
06106 024742         LDA 1,ERRCT
06107 030736         LDA 2,ITR
06110 004546         JSR MULT
06111 030734         LDA 2,ITR
06112 004530         JSR DIVD
06113 006506         JSR @IPDEC       ;PRINT VALUE
06114 020403         LDA 0,PCENT      ;EXAMPLE:  89%
06115 006503         JSR @ICHAR
06116 000402         JMP PCENT+1
```

```
06117 000045 PCENT:  "%                    ;CHARACTOR
06120 176400         SUB      3,3
06121 054727         STA      3,ERRCT
06122 034725 CYCTS:  LDA 3,ESWIT
06123 175004         MOV 3,3,SZR
06124 000410         JMP CNS               ;THERE HAS BEEN AN ERROR
06125 062677 CYC1:   IORST                 ;I/O RESET
06126 020726         LDA 0,SAV0            ;RESTORE AC'S
06127 024724         LDA 1,SAV1
06130 030722         LDA 2,SAV2
06131 175113         MOVL# 3,3,SNC         ;SWITCH 0
06132 002723         JMP @LOOPR            ;(0)=LOOP ROUTINE
06133 002716         JMP @.RTRN            ;(1)=PROCEED TO NEXT TEST

06134 074477 CNS:    READS 3               ;ERROR LOOP, IS A RECAL
06135 024073         LDA 1,KB3             ;REQUESTED ?
06136 137415         AND# 1,3,SNR
06137 000410         JMP CNS1              ;NO  GO-ON
06140 175300         MOVS 3,3              ;YES, ASSEMBLE THE
06141 024170         LDA 1,C6              ;UNIT # FROM SW5-6
06142 137620         ANDZR 1,3
06143 021513         LDA 0,TRCL,3
06144 040401         STA 0,.+1             ;PICK A RECAL
06145 006234         RECL3                 ;RECALIBRATE !!
06146 004524         JSR .DLY              ;DELAY 1 SEC

06147 074477 CNS1:   READS 3               ;IF SW4=1 DELAY
06150 020072         LDA 0,KB4             ; 1 SEC.
06151 117404         AND 0,3,SZR
06152 004520         JSR .DLY
06153 034703         LDA 3,DSWT            ;FORCED 2 SEC DELAY ??
06154 175005         MOV 3,3,SNR
06155 000403         JMP .+3               ;NO
06156 004514         JSR .DLY              ;YES,    1 SEC
06157 004513         JSR .DLY              ;        1 SEC
06160 074477         READS 3
06161 000744         JMP CYC1
```

```
▲ 0086  .MAIN

 06162 054667 .EH1:   STA 3,.RTRN      ;ERR WITH FORCED 1 SEC DELAY
 06163 176520         SUBZL 3,3
 06164 000403         JMP .EH2
 06165 054664 .EHALT: STA 3,.RTRN      ;ERROR SUBROUTINE
 06166 176400         SUB 3,3          ;ERROR WITH NO DELAY FORCED
 06167 054667 .EH2:   STA 3,DSWT       ;DELAY SWITCH
 06170 034657         LDA 3,ESWIT
 06171 175004         MOV 3,3,SZR
 06172 000423         JMP ERET
 06173 034656 ERR1:   LDA 3,.RTRN

                      ;ERROR. C(3)=PC
 06174 004430         JSR AUTOER       ;OPERATOR,SET SWITCHS!
 06175 054652         STA 3,ESWIT

 06176 074477         READS 3
 06177 177112         ADDL# 3,3,SZC    ;LOOK AT SWITCH 1
 06200 000415         JMP ERET


 06201 040653         STA     0,SAV0
 06202 044651         STA     1,SAV1
 06203 006247         PCRLF            ;PRINT CARRIAGE
 06204 006250         MESSAGE          ;AND HEADER
 06205 006222         HEADER
 06206 020643         LDA 0,.RTRN
 06207 040640         STA     0,ESWIT
 06210 126000         ADC 1,1
 06211 107000         ADD 0,1
 06212 004522         JSR PDCT         ;PC OF ERROR
 06213 020641         LDA     0,SAV0
 06214 024637         LDA     1,SAV1
 06215 010633 ERET:   ISZ     ERRCT
 06216 002633         JMP     @.RTRN
 06217 002632         JMP     @.RTRN

 06220 006415 ICHAR:  CHAR.
 06221 006337 IPDEC:  PDEC

              HEADER: .TXTE !
 06222 141520 PC      !
 06223 000011


 06224 024046 AUTOER: LDA 1,EGGS
 06225 125004         MOV 1,1,SZR
 06226 000405         JMP .+5
 06227 171000         MOV 3,2
 06230 034621         LDA 3,.RTRN
 06231 063077         HALT
 06232 001000         JMP 0,2
 06233 060277         INTDS
 06234 034052         LDA 3,EGGS+4
 06235 001400         JMP 0,3
```

```
                    ;AC1 REM AC0=(AC0,AC1)/AC2
06236 102400 DIVIO: SUB     0,0
06237 054431 DIVDO: STA     3,MSAV
06240 142432        SUBZ#   2,0,SZC
06241 000413        JMP     DEXT
06242 054426 DIVD:  STA 3,MSAV      ;DIVIDE
06243 034426        LDA 3,M20
06244 125120        MOVZL 1,1
06245 101100 DLOOP: MOVL 0,0
06246 142412        SUB# 2,0,SZC
06247 142400        SUB 2,0
06250 125100        MOVL 1,1
06251 175404        INC 3,3,SZR
06252 000773        JMP DLOOP
06253 176441        SUBO    3,3,SKP
06254 176420 DEXT:  SUBZ    3,3
06255 002413        JMP @MSAV

                    ;(AC0,AC1)=AC1*AC2+AC0
06256 102460 MULT:  SUBC 0,0        ;MULTIPLY
06257 054411        STA 3,MSAV
06260 034411        LDA 3,M20
06261 125203 MLOOP: MOVR 1,1,SNC
06262 101201        MOVR 0,0,SKP
06263 143220        ADDZR 2,0
06264 175404        INC 3,3,SZR
06265 000774        JMP MLOOP
06266 125260        MOVCR 1,1
06267 002401        JMP @MSAV
06270 000000 MSAV:  0

06271 177760 M20:   -20

06272 020172 .DLY:  LDA 0,C12       ;DELAY 1 SEC
06273 040164        STA 0,ITRCNT    ;10.X100MS
06274 020145 .DLY1: LDA 0,TIME
06275 040144        STA 0,TEMP
06276 063700        SKPDZ 0         ;
06277 063077        HALT            ;
06300 060433        DIA 0,DSKP      ;
06301 103411        AND# 0,0,SKP    ; 100 MS
06302 063077        HALT            ; DELAY LOOP
06303 014144        DSZ TEMP        ;
06304 000772        JMP .-6         ;
06305 014164        DSZ ITRCNT
06306 000766        JMP .DLY1
06307 001400        JMP 0,3
```

```
▲ 0088  .MAIN
                ;TTO NON INTERRUPT PACKAGE
                ;"MESS" PRINTS ASCII MESSAGES AS SPECIFIED BY ASSEMBLR
                ;"CHAR" PRINTS ASCII CHARACTOR, C(0)R,C(0)L MUST BE 0
                ;WILL RETURN +2 IF C(0)R=0,CORRECTS THE PARITY,33 SIMULATE
                ;"TYPE" PRINTS C(0)R. MUST HAVE PROPER PARITY. RETURN IS
                ;TO CALL+1.REPLACE THIS ROUTINE WITH INTERRUPT TYPE IF DESIRED.
                ;"CRLF" PRINTS A CARRIAGE RETURN
                ;"POCT" PRINTS C(1) IN OCTAL FOLLOWED BY A TAB
                ;"PDEC" PRINTS C(1) IN DECIMAL,LEADING ZEROS SUPPRESSED,
                ;FOLLOWED BY A TAB.
06310 054570 MESS:   STA 3,MESSR      ;PRINT A TEXT MESSAGE
06311 070477         READS 2
06312 153102         ADDL 2,2,SZC     ;NO PRINT IF SW1=1
06313 001401         JMP 1,3
06314 010564         ISZ MESSR
06315 031400         LDA 2,0,3        ;C(2) POINTS TO MESSAGE
06316 024125         LDA 1,C377       ;A 8 BIT MASK
06317 021000 MES.1:  LDA 0,0,2        ;C(2)=DATA WORD
06320 125112         MOVL# 1,1,SZC
06321 123701         ANDS 1,0,SKP
06322 123401         AND 1,0,SKP      ;C(0)=DATA CHARACTOR RIGHT
06323 151400         INC 2,2          ;INC TO NEXT WORD
06324 124000         COM 1,1          ;FLIP MASK
06325 004470         JSR CHAR.        ;PRINT
06326 000771         JMP MES.1        ;ANOTHER
06327 063511         SKPBZ TTO
06330 000777         JMP .-1
06331 060211         NIOC TTO
06332 002546         JMP @MESSR       ;LAST

06333 102401 ZOCT:   SUB 0,0,SKP
06334 020200 POCT:   LDA 0,C60
06335 030437         LDA 2,OCTAB      ;PRINT C(1) IN OCTAL
06336 000403         JMP .+3
06337 030445 PDEC:   LDA 2,DECTB      ;PRINT C(1) IN DECIMAL
06340 102400         SUB 0,0
06341 054453         STA 3,RADRET     ;BOTH ENTRYS PRINT NUMBER
06342 074477         READS 3
06343 177102         ADDL 3,3,SZC     ;NO PRINT IF SW1=1
06344 002450         JMP @RADRET
06345 040446         STA 0,ZSUPP      ;THEN TAB TO NEXT POSITION
06346 050401         STA 2,.+1
06347 000000 DECOCT: 0                ;A"LDA 2,TABLE" INSTRUCTION
06350 010777         ISZ .-1
06351 034443         LDA 3,RADRET     ;SETUP "TAB" AT END
06352 020516         LDA 0,CHTAB
06353 151005         MOV 2,2,SNR      ;IF TABLE ENTRY=0
06354 000441         JMP CHAR.        ;EXIT WITH TAB
06355 034436         LDA 3,ZSUPP      ;ZEROS SUPPRESS STUF
06356 102400         SUB 0,0
06357 146512 DECOT:  SUBL# 2,1,SZC
06360 000405         JMP DECP
06361 146400         SUB 2,1          ;FORM THE DIGIT
06362 034200         LDA 3,C60
06363 101400         INC 0,0
06364 000773         JMP DECOT
```

```
06365 151235 DECP:   MOVZR# 2,2,SNR
06366 034200         LDA 3,C60
06367 054424         STA 3,ZSUPP      ;C(0)=DIGIT
06370 163000         ADD 3,0          ;MAKE ASCII
06371 175004         MOV 3,3,SZR
06372 004423         JSR CHAR.        ;PRINT
06373 000754         JMP DECOCT       ;GET NEXT DIGIT


06374 030426 OCTAB:  LDA 2,.+1+.-DECOCT
06375 100000         100000
06376 010000         10000
06377 001000         1000
06400 000100         100
06401 000010         10
06402 000001         1
06403 000000         0

06404 030436 DECTB:  LDA 2,.+1+.-DECOCT
      000012 .RDX 10
06405 023420         10000
06406 001750         1000
06407 000144         100
06410 000012         10
06411 000001         1
06412 000000         0
      000010 .RDX 8

06413 000000 ZSUPP:  0
06414 000000 RADRET: 0
```

```
006415 054454 CHAR.:  STA 3,CHRET      ;PRINT C(0) RIGHT
006416 101325         MOVZS 0,0,SNR    ;RETURN +2 IF NULL
006417 001401         JMP 1,3
006420 040452         STA 0,CHSAV
006421 176000         ADC 3,3          ;COMPUTE THE PARITY
006422 117000         ADD 0,3
006423 163404         AND 3,0,SZR
006424 000775         JMP .-3
006425 176660         SUBCR 3,3        ;COMBIND PARITY WITH CHAR
006426 020444         LDA 0,CHSAV
006427 163300         ADDS 3,0

006430 034440 CHAR1:  LDA 3,CHTAB      ;IS THIS A TAB
006431 116415         SUB# 0,3,SNR
006432 000407         JMP .+7          ;YES
006433 004446         JSR TYPE         ;NO PRINT IT
006434 000413         JMP CHAR2+1      ;EXIT

006435 020436         LDA 0,CHORZ      ;SIMULATE A TAB
006436 034432         LDA 3,CHTAB      ;VIA 1 TO 9 SPACES
006437 162426         SUBZ 3,0,SEZ
006440 000777         JMP .-1
006441 101005         MOV 0,0,SNR
006442 000404         JMP CHAR2
006443 020431         LDA 0,CH240
006444 004435         JSR TYPE
006445 000770         JMP .-10
006446 040425 CHAR2:  STA 0,CHORZ
006447 063511         SKPBZ TTO
006450 000777         JMP .-1
006451 060211         NIOC TTO
006452 002417         JMP @CHRET
```

```
06453 060477 CRLF:   READS 0
06454 103102         ADDL 0,0,SZC      ;NO PRINT IF SW1=1
06455 001400         JMP 0,3
06456 054417         STA 3,CRLFR       ;SAVE RETURN
06457 020417         LDA 0,C215
06460 004735         JSR CHAR.         ;PRINT CARRIAGE AND LF
06461 020416         LDA 0,C212
06462 004733         JSR CHAR.
06463 020125         LDA 0,C377        ;PRINT RUB
06464 004731         JSR CHAR.
06465 102400         SUB 0,0
06466 040405         STA 0,CHORZ       ;CLEAR HORZ POSISTION
06467 002406         JMP @CRLFR        ;EXIT

06470 000011 CHTAB:  11
06471 000000 CHRET:  0
06472 000000 CHSAV:  0
06473 000000 CHORZ:  0
06474 000240 CH240:  240
06475 000000 CRLFR:  0
06476 000215 C215:   215
06477 000212 C212:   212

06500 000000 MESSR:  0
06501 054406 TYPE:   STA 3,TYPRET      ;TYPE THE C(0)R IF
06502 010771         ISZ CHORZ
06503 063511         SKPBZ TTO
06504 000777         JMP .-1
06505 061111         DOAS 0,TTO
06506 002401         JMP @TYPRET
06507 000000 TYPRET: 0
```

```
                        ;TYPE   0 FOR CARTRIDGE
                MSG1:   .TXTE |TYPE     0 FOR CARTRIDGE|
006510 054724
006511 142520
006512 030011
006513 143240
006514 151317
006515 141640
006516 151101
006517 151324
006520 042311
006521 142507
006522 000000
                        ;       1 FOR 10 SURFACE DISK PACK
                MSG2:   .TXTE | 1 FOR 10 SURFACE DISK PACK|
006523 130411
006524 143240
006525 151317
006526 130640
006527 120060
006530 052523
006531 143322
006532 141501
006533 120305
006534 144504
006535 045523
006536 050240
006537 141501
006540 000113
                        ;       2 FOR 20 SURFACE DISK PACK
                MSG3:   .TXTE | 2 FOR 20 SURFACE DISK PACK|
006541 131011
006542 143240
006543 151317
006544 131240
006545 120060
006546 052523
006547 143322
006550 141501
006551 120305
006552 144504
006553 045523
006554 050240
006555 141501
006556 000113
                        ; -?-
                MSG4:   .TXTE | -?-|
006557 026640
006560 026477
006561 000000
                        ;TYPE UNIT NUMBERS (0-3) TO TEST
                MSG5:   .TXTE |TYPE UNIT NUMBERS (0-3) TO TEST|
006562 054724
006563 142520
006564 052640
006565 144516
006566 120324
006567 052516
```

```
0093   .MAIN
 06570 041115
 06571 151305
 06572 120123
 06573 030050
 06574 031455
 06575 120251
 06576 147724
 06577 152240
 06600 051705
 06601 000324
                        !PASS
                MSG6:   .TXTE !PASS!
 06602 040520
 06603 051523
 06604 000000


 06605 000000 PRGEND: 0

       006700           .LOC 6700
                        .TXTE  !DKP DIAG 1!
 06700 045504
 06701 120120
 06702 144504
 06703 043501
 06704 130640
 06705 000000
 06706 000002           000002
 06707 000222           BEGIN
 06710 000002           000002
 06711 000000           000000
 06712 000020           000020
 06713 000000           000000
 06714 000000           000000
 06715 100033           100033

                        .END
```