



DATA GENERAL
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PROGRAM

Moving Head Disk Reliability Program

TAPES

Binary 095-000068

ABSTRACT

The Moving Head Disk Reliability Program is a maintenance program designed to exercise and test the 4046 disk controller and 1-4 disk drives. The disk drives may be shared between two computers in which case this program may be running in each computer.

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01
02
03
04      /      MOVING HEAD DISK RELIABILITY PROGRAM
05
06      /1.      ABSTRACT
07
08      /      THE MOVING HEAD DISK RELIABILITY PROGRAM
09      /      IS A MAINTENANCE PROGRAM DESIGNED TO
10      /      EXERCISE AND TEST THE 4046 DISK CONTROLLER
11      /      AND 1-4 DISK DRIVES.  THE DISK DRIVES MAY BE
12      /      SHARED BETWEEN TWO COMPUTERS IN WHICH CASE
13      /      THIS PROGRAM MAY BE RUNNING IN EACH COMPUTER.
14
15      /
16      /          NOTE
17      /          ****
18      /          ONE COMPUTER RUNNING RELIABILITY
19      /          TEST (SA 401), THE OTHER (SA 402)
20      /          ONLY!!!
21
22      /      THE CONTROL CAN BE DEVICE 33 OR 73.
23
24      /12.     MACHINE REQUIREMENTS
25
26      /      NOVA FAMILY CENTRAL PROCESSOR
27      /      4K READ/WRITE MEMORY
28      /      TELETYPE
29      /      4046 DISK CONTROL
30      /      4047 OR 4048 CONTROL ADAPTER
31      /      1-4 MOVING HEAD DISK DRIVES
32
33      /13.     OPERATING PROCEDURES
34
35      /      A. LOAD PROGRAM USING BINARY LOADER
36      /      B. RESET AND START AT ONE OF THE
37      /      ADDRESSES SHOWN BELOW.
38
39      /      STARTING ADDRESS
40      /      2      RUN ALL
41      /      4      SET DISK CONTROL ADDRESS TO 33
42      /      5      SET DISK CONTROL ADDRESS TO 73
43      /      400     RELIABILITY TEST, ALL CYLINDERS
44      /      401     RELIABILITY TEST, EVEN CYLINDERS
45      /      402     RELIABILITY TEST, ODD CYLINDERS
46      /      403     DISK ADDRESS TEST
47      /      404     NOT USED
48      /      405     COMMAND STRING INTERPRETER
49      /      406     ONES TEST
50      /      407     ZEROS TEST
51      /      410     110110110 TEST
52      /      411     FLOATING ONE TEST
53      /      412     FLOATING ZERO TEST
54      /      413     RUN ALL
55      /      414     RECALIBRATE UNIT 0
56      /      415     RECALIBRATE UNIT 1
57      /      416     RECALIBRATE UNIT 2
58      /      417     RECALIBRATE UNIT 3

```

A 0002 .MAIN

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01      )
02      )
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07      )
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15      )
16      )
17      )
18      )
19
20      14.  PROGRAM DESCRIPTION
21
22      )
23      )
24      )
25      )
26      )
27      )
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29      )
30      )
31      )
32      )
33      )
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35      )
36      )
37      )
38
39      )
40      )
41      )
42      )
43      )
44      )
```

C. ERRORS - ERROR STATUS IS PRINTED
WHENEVER ENCOUNTERED. WHEN DATA ERRORS
ARE FOUND ONLY THREE ARE PRINTED PER
ENCOUNTER. (SEE PARAGRAPH 5)

SWITCH SETTINGS
SW0=1 DO NOT HALT FOLLOWING ERROR
SW1=1 INHIBIT ERROR PRINTOUTS
SW2=1 REPEAT CURRENT TEST (SCOPE LOOP)
SW3=1 INHIBIT CHECK WORD AND DATA ERROR MESSAGES
SW4=1 BREAK TO ALLOW DISK INTERCHANGE
SW5=1 FOR READ ONLY MODE

D. STATISTICS - TYPE ANY KEY DURING
RANDOM TESTING TO GET A REPORT OF THE
NUMBER OF WORDS WRITTEN AND READ, PLUS
THE NUMBER OF ERRORS.

A. RELIABILITY TEST (SA 400)
A RANDOM NUMBER GENERATOR IS USED TO SELECT A
DISK DRIVE, CYLINDER, HEAD, BEGINNING SECTOR,
AND NUMBER OF CONSECUTIVE SECTORS. RANDOM
DATA IS THEN GENERATED, WRITTEN, AND READ.
THE SEQUENCE IS REPEATED INDEFINITELY.

B. RELIABILITY TEST (SA 401)
SAME AS A. EXCEPT THAT ONLY EVEN
NUMBERED CYLINDERS ARE USED. THIS
ALLOWS A TWO COMPUTER SYSTEM TO RUN
SIMULTANEOUS RELIABILITY TESTS.

C. RELIABILITY TEST (SA 402)
SAME AS B. ONLY FOR ODD NUMBERED
CYLINDERS.

D. DISK ADDRESS TEST (SA 403)
RANDOM DATA IS FIRST WRITTEN THEN READ
FROM ALL SECTORS ON EACH READY DISK. THIS
INSURES THAT ALL DISK PACK SURFACES ARE
USEABLE AND THAT THE DISK PACK IS FORMATTED
PROPERLY.

A 0004 .MAIN

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01
02      ;
03      ;
04      ;
05      ;
06      ;
07
08      ;
09      ;
10      ;
11
12
13      ;
14      ;
15      ;
16      ;
17      ;
18      ;
19      ;
20      ;
21
22      ;
23      ;
24
25      ;
26      ;
27      ;
28      ;
29      ;
30
31      ;
32      ;
33      ;
34      ;
35      ;
36      ;
37      ;
```

THE FOLLOWING EXAMPLE WOULD CAUSE UNIT
1 TO REPEATEDLY SEEK CYLINDER
50, WRITE SECTORS 2 AND 3 WITH HEAD 5,
THEN READ IT BACK AND CHECK. DATA IS SPECIFIED
AS ALTERNATE WORDS OF ZEROS THEN ONES.

UNIT: 1
DATA: 0,177777
COMMAND STRING: SEEK 50 WRITE 5,2,2 READ SAME LOOP

G. ONES TEST (DATA = ALL 1'S)
ZEROS TEST (DATA = ALL 0'S)
110110 TEST (DATA = WORDS OF 1101101101101101)
FLOATING ONE TEST (EACH SUCCESSIVE WORD
CONTAINS ONE 1 BIT WHICH IS MOVED
RIGHT ONE BIT EACH WORD)
FLOATING ZERO TEST (COMPLEMENT OF THE
FLOATING 1 TEST)

EACH OF THE ABOVE USE THE BASIC DISK ADDRESS
TEST, SUBSTITUTING THE APPROPRIATE DATA.

ANY OF THESE PATTERNS INCLUDING THE RANDOM
DATA USED FOR THE DISK ADDRESS TEST MAY
BE RUN IN THE "READ ONLY" MODE. THIS IS USEFUL
FOR CHECKING THE INTERCHANGEABILITY OF DISK
PACKS BETWEEN VARIOUS DISK DRIVES.

TO GENERATE A DATA PATTERN START AT THE
APPROPRIATE LOCATION AND SET SW4 TO A 1.
WHEN THE ENTIRE PACK HAS BEEN WRITTEN AND
READ THE TELETYPE PRINTS "INTERCHANGE DISK"
AND THE PROGRAM HALTS. THIS PACK MAY NOW
BE READ FROM OTHER DISK DRIVES IN THE READ
ONLY MODE (SW5=1).

```
01
02      15. ERROR REPORTING AND RECOVERY
03
04      /      ALL PHASES OF THE SOFTWARE WORK THROUGH
05      /      4 MAIN SUBROUTINES DESCRIBED BELOW.  EACH
06      /      SUBROUTINE HAS A NORMAL RETURN (+3) AND
07      /      AN ERROR RETURN (+1).  EACH SUBROUTINE WAITS FOR DISK
08      /      COMPLETION WITH INTERRUPT ENABLED.  A FAILURE
09      /      TO DETECT INTERRUPT WITHIN 500MS (3 SEC FOR
10      /      RECALIBRATE) RESULTS IN A "TIMEOUT" ERROR.
11
12      /      RECALIBRATE - ANY UNUSUAL STATUS IS REPORTED
13      /      IMMEDIATELY AND AN ERROR RETURN EXECUTED.
14
15      /      SEEK - SEEK ERROR STATUS INCREMENTS SEEK
16      /      ERROR COUNTER.  ANY ERROR STATUS RESULTS
17      /      IN STATUS PRINTOUT.
18
19      /      WRITE - FOLLOWING "DONE" ON A WRITE, ERRORS ARE
20      /      CHECKED IN THE SEQUENCE SHOWN BELOW.  ERROR
21      /      RECOVERY PROCEDURE IS OUTLINED FOR EACH CASE.
22      /      IF THE ERROR IS NOT PRESENT THE NEXT CHECK IS MADE.
23
24      /      1. READ/WRITE DONE STATUS - IF NONE, INCREMENT THE
25      /      MISC ERROR COUNT, PRINT ILLEGAL STATUS MESSAGE
26      /      AND DO AN ERROR RETURN.
27
28      /      2. MISC STATUS BITS - (ANY SEEK DONE, ANY SEEKING
29      /      BIT, SEEK ERROR, END CYLINDER, OR DATA LATE).
30      /      IF ANY ERROR INCREMENT THE MISC ERROR COUNT,
31      /      PRINT THE ILLEGAL STATUS, AND DO AN ERROR RETURN.
32
33      /      3. ADDRESS ERROR
34      /      3.1 FIRST TIME - INCREMENT ADDRESS ERROR COUNT
35      /      AND REPEAT THE WRITE.
36      /      3.2 SECOND SUCCESSIVE FAILURE - INCREMENT
37      /      PERMANENT ADDRESS ERROR COUNT AND DO A
38      /      ERROR RETURN.
39
40      /      4. ENDING MEMORY ADDRESS - INCREMENT THE MISC ERROR
41      /      COUNTER, PRINT THE ERROR MESSAGE, SET THE FATAL FLAG,
42      /      AND GO TO 5.
43
44      /      5. ENDING DISK ADDRESS - INCREMENT THE MISC ERROR
45      /      COUNTER, PRINT THE ERROR MESSAGE, SET THE FATAL FLAG,
46      /      AND GO TO 6.
47
48      /      6. NO FURTHER CHECKS
49      /      6.1 FATAL SWITCH ON - DO A ERROR RETURN.
50      /      6.2 OTHERWISE - DO A NORMAL RETURN.
```

```

01      )
02      ) READ - FOLLOWING "DONE" ON A READ, ERRORS ARE
03      ) CHECKED IN THE SEQUENCE SHOWN BELOW.  ERROR
04      ) RECOVERY PROCEDURE IS OUTLINED FOR EACH CASE.
05      ) IF THE ERROR IS NOT PRESENT THE NEXT CHECK IS MADE.
06
07      )
08      ) 1. READ/WRITE DONE STATUS - IF NONE, INCREMENT THE
09      ) MISC ERROR COUNT, PRINT ILLEGAL STATUS MESSAGE
10      ) AND DO AN ERROR RETURN.
11
12      ) 2. MISC STATUS BITS - (ANY SEEK DONE, ANY SEEKING
13      ) BIT, SEEK ERROR, END CYLINDER, OR DATA LATE).
14      ) IF ANY ERROR INCREMENT THE MISC ERROR COUNT,
15      ) PRINT THE ILLEGAL STATUS, AND DO AN ERROR RETURN.
16
17      ) 3. ADDRESS ERROR
18      ) 3.1 FIRST TIME - INCREMENT ADDRESS ERROR COUNT
19      ) AND REPEAT THE READ.
20      ) 3.2 SECOND SUCCESSIVE FAILURE - INCREMENT
21      ) PERMANENT ADDRESS ERROR COUNT AND DO A
22      ) ERROR RETURN.
23
24      ) 4. CHECK WORD ERROR
25      ) 4.1 FIRST TIME - INCREMENT THE CHECK WORD
26      ) ERROR COUNT AND SET THE RETRY FLAG.  PRINT
27      ) "CHECK WORD ERROR" AND GO TO 5.
28      ) 4.2 SECOND SUCCESSIVE ERROR - INCREMENT THE
29      ) PERMANENT CHECK WORD ERROR COUNTER AND SET
30      ) THE FATAL FLAG.  PRINT "CHECK WORD ERROR"
31      ) AND GO TO 5.
32
33      ) 5. DATA ERROR
34      ) 5.1 FIRST TIME - SET THE RETRY FLAG AND PRINT
35      ) ERROR REPORT.
36      ) 5.1.1 CHECK WORD ERROR - DECREMENT THE
37      ) CHECK WORD ERROR COUNTER AND INCREMENT
38      ) THE CHECK WORD & DATA ERROR COUNTER.
39      ) GO TO 6.
40      ) 5.1.2 NO CHECK WORD ERROR - INCREMENT
41      ) THE DATA ERROR COUNTER AND GO TO 6.
42      ) 5.2 SECOND SUCCESSIVE ERROR - SET THE FATAL
43      ) FLAG AND PRINT THE ERROR REPORT.
44      ) 5.2.1 CHECK WORD ERROR - DECREMENT
45      ) THE PERMANENT CHECK WORD ERROR COUNTER
46      ) AND INCREMENT THE PERMANENT CHECK WORD
47      ) & DATA ERROR COUNTER.  GO TO 6.
48      ) 5.2.2 NO CHECK WORD ERROR - INCREMENT
49      ) THE PERMANENT DATA ERROR COUNTER.
      ) GO TO 6.

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A 0007 .MAIN

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;

6. ENDING MEMORY ADDRESS = INCREMENT THE MISC ERROR
COUNTER, PRINT THE ERROR MESSAGE, SET THE FATAL FLAG
AND GO TO 7.

7. ENDING DISK ADDRESS = INCREMENT THE MISC ERROR
COUNTER, PRINT THE ERROR MESSAGE, SET THE FATAL FLAG
AND GO TO 8.

8. NO FURTHER CHECKS

8.1 RETRY SWITCH ON = PRINT "TRY AGAIN"
AND REPEAT THE TEST.

8.2 FATAL SWITCH ON = DO A ERROR RETURN.

8.3 NO SWITCHES ON = DO A NORMAL RETURN.


```

A 0008 .MAIN
01
02
03      000001      .LOC 1
04 00001 000670      INTERRUPT
05 00002 002003      JMP 0,+1      /START HERE, RUN ALL
06 00003 000413      .RAL
07 00004 002006      JMP 0,+2      /SET ADDR TO 33
08 00005 002007      JMP 0,+2      /SET ADDR TO 73
09 00006 000520      FXADD
10 00007 000521      FXADD+1
11
12      000022      .LOC 22
13
14 00022 000001  DRVS:  1      /UNIT 0 CODE
15 00023 000002      2      /      1
16 00024 000004      4      /      2
17 00025 000010      10     /      3
18
19 00026 000000  UNTINS: 0
20 00027 040000      40000
21 00030 100000      100000
22 00031 140000      140000
23 00032 040000  UNTDN:  40000
24 00033 020000      20000
25 00034 010000      10000
26 00035 004000      4000
27 00036 000000  FLO1:  0
28 00037 000000  FLO2:  0
29
30      000041      .LOC 41
31 00041 003740      TYPE

```

```

A 0000 .MAIN
01
02      000045      .LOC 45
03      000004 CYLF:  .BLK 4      )FROM CYLINDERS
04      000004 CYLT:  .BLK 4      )TO CYLINDERS
05      000010 SEEKT: .BLK 10     )TOTAL SEEKS
06      000004 SEKER: .BLK 4      )TOTAL SEEK ERRORS
07      000010 WDSW:  .BLK 10     )WORDS WRITTEN
08      000010 WDSR:  .BLK 10     )WORDS READ
09      000004 CWER:  .BLK 4      )CHECK WORD ERRORS
10      000004 CWERP: .BLK 4      )PERM CHECK WORD ERRORS
11      000004 ADDER: .BLK 4      )ADDRESS ERRORS
12      000004 PADER: .BLK 4      )PERMANENT ADDR ERR
13      000004 DATER: .BLK 4      )DATA ERRORS
14      000004 CWDE:  .BLK 4      )CHK WD AND DATA ERROR
15      000004 CWDEP: .BLK 4     )PERM CHK WD AND DATA ERROR
16      000004 PDER:  .BLK 4     )PERMANENT DATA ERRORS
17      000004 MISC:  .BLK 4     )MISC ERRORS
18
19 00155 000000 HSW:  0      )HEADER SWITCH
20 00156 000000 CSIF: 0      )CMD STRING INTRP FLAG
21 00157 000000 UNIT: 0      )CURRENT DISK DRIVE UNIT
22 00160 000000 RDYUNT:0     )AVAILABLE UNITS
23 00161 000000 RALL: 0      )RUN ALL MODE FLAG
24 00162 000000 RETRY:0     )RETRY TEST FLAG
25 00163 000000 FATAL:0     )FATAL TEST RESULT FLAG
26 00164 000000 MODE: 0      )0=RECAL, 1=SEEK, 2=READ, 3=WRITE
27 00165 000000 LUPSW:0     )LOOP ON TEST SWITCH
28 00166 000000 SSW:  0      )SEEK SWITCH
29 00167 000167      .
30
31 00170 000000 LHD:  0      )LAST HEAD+1) 2,10,OR 20.
32 00171 000000 LSI:  0      )LAST SECTOR+1) 6 OR 12
33
34 00172 002000 UNTSK: 2000
35 00173 001000      1000
36 00174 000400      400
37 00175 000200      200

```

A 0010 .MAIN

01
02 000023 C2=DRVS+1
03 00176 000003 C3: 3
04 000024 C4=DRVS+2
05 00177 000007 C7: 7
06 000025 C10=DRVS+3
07 00200 000012 C12: 12
08 00201 000017 C17: 17
09 00202 000020 C20: 20
10 00203 000033 C33: 33
11 00204 000037 C37: 37
12 00205 000040 C40: 40
13 00206 000054 C54: 54
14 00207 000060 C60: 60
15 00210 000067 C67: 67
16 00211 000100 C100: 100
17 00212 000177 C177: 177
18 00213 000313 C203.: 203.
19 00214 000212 C212: 212
20 00215 000215 C215: 215
21 00216 000377 C377: 377
22 000174 C400=UNTSK+2
23 000173 C1000=UNTSK+1
24 00217 001400 C1400: 1400
25 000172 C2000=UNTSK
26 000035 C4K=UNTDN+3
27 00220 007400 C7400: 7400
28 00221 017400 C174M: 17400
29 000034 C10K=UNTDN+2
30 00222 170000 C170K: 170000
31 00223 176000 C176K: 176000
32 00224 077662 CSP: 77662
33 00225 177677 CSP1: 177677
34 00226 060033 CWRD: 60033
35 00227 077666 CSP3: 77666
36
37
38
39
40
41
42
43
44
45 00230 177760 M16.: -16.
46 00231 177540 M160.: -160.
47 00232 177406 M250.: -250.
48 00233 177737 M41: -41

A 0011 .MAIN

01
02 00234 000000 TIME: 0
03 00235 000000 TIMER: 0
04 00236 000000 ISTAT: 0
05 00237 000000 SAV0: 0
06 00240 000000 SAV1: 0
07 00241 000000 SAV2: 0
08 00242 000000 SAV3: 0
09 00243 123456 RANDOM: 123456
10 00244 123456 .RAN: 123456
11 00245 000000 RELRAN: 0
12 00246 060200 CNIOC: NIOC 0
13 00247 005150 LAST: PRGEND
14 00250 000000 LINCT: 0
15 00251 000000 SEC: 0
16 00252 000000 SCI: 0
17 00253 000000 HDI: 0
18 00254 005150 CAI: PRGEND
19 00255 040055 SAM: 40055
20 00256 000000 TERM: 0
21 00257 011710 UBPI: UBUFF+UBUFF
22 00260 012074 CSBP: CBUFF+CBUFF
23 00261 005127 VARST: VAR-1
24 00262 005147 VARED: VAR+15,
25 00263 000000 VARSP: 0
26 00264 000000 VARPT: 0
27 00265 005150 BUFF: PRGEND
28 00266 014000 CMEND: 14000
29 00267 000000 SMAX: 6
30 00270 000000 EVDON: 0
31 00271 000000 AECNT: 0
32 00272 000000 CWCNT: 0
33 00273 000000 DACNT: 0
34 00274 000000 RWRET: 0
35 00275 000000 DADAT: 0
36 00276 000000 CFLG: 0
37 00277 000033 CDSK: 33
38 00300 000000 CSC: 0
39 00301 000400 FIRST: BEGIN
40 00302 000000 LMSK: 0
41 00303 000000 HMSK: 0
42 00304 000000 SMSK: 0
43 00305 003400 LMSK: 3400
44 00306 000000 .SCI: 0
45 00307 000000 RLUP: 0
46 00310 000000 ALLRET: 0

I# ISZ'8 FOR 12.5MS (THIS COMPUTER)
I12.5MS TIMER
ISTATUS AT INTERRUPT
ISAVE AC0,1,2

ICURRENT RANDOM NUMBER
IRANDOM BASE NUMBER

IPROGRAM END
IBYTE POINTER
ISTARTING SECTOR (POS)
ISECTOR COUNT
IHEAD
IBEGINNING ADDRESS (VARIABLE)
I"SAME
IHOLDS TERMINATOR FLAG
IUNIT BYTE POINTER
ICMD STRING BYTE POINTER
IVARIABLE DATA, SRT ADDR-1
I " " TABLE END
I " " END MARKER

IVAR POINTER
IDATA BUFFER SRT ADDR (CONSTANT)
ITOP OF USABLE CORE
IMAX SECTOR COUNT
ICYLINDERS, (0)EVEN, (15)ODD

IDATA ADDRESS (DISK ADDR TEST)
IEND CYL FLAG

IUNIT MASK 1400 OR 400 OR 0
IHEAD MASK 7400 OR 17400 OR 400
ISECTOR MASK 7400 OR 3400
I# SECTORS MASK 7400 OR 3400
I# SECTOR TRANSFERRED ON CHK WD ERR
IREPEAT TEST ADDRESS

A 0012 .MAIN

01				
02	00311	000577	ISET.:	SET.1
03	00312	000670	IRUP:	INTERRUPT
04	00313	000045	ICYLF:	CYLF
05	00314	001234	IALL:	ALL
06	00315	001256	IDLY:	DLY
07	00316	003752	ISAC:	SAC
08	00317	003756	ISTAC:	STAC
09	00320	003600	IPDEC:	PDEC
10	00321	003575	ITAC1:	POCT
11	00322	003574	ITZ1:	ZOCT
12	00323	003551	IMESS:	MESS
13	00324	003714	ICRLF:	CRLF
14	00325	003010	ISRH:	SRH
15	00326	003066	IGATM:	GATM
16	00327	002737	IHSS:	HSS
17	00330	003762	IINP:	INP
18	00331	003241	IGEN:	G
19	00332	003240	ICHK:	C
20	00333	003363	IVAR:	VAR.0
21	00334	001016	ICLRB:	CLRB
22	00335	001030	ISET:	SET
23	00336	003020	ISM:	SM
24	00337	000560	ISTB:	STB
25	00340	000612	INIL:	INIL.
26	00341	000726	WAT:	WAIT+1
27	00342	003434	I.DBD:	.DBD
28	00343	002647	IRDAT:	RDATA
29	00344	002325	IWDAT:	WDATA
30	00345	002105	IGCS:	GCS
31	00346	002611	IR:	.READ
32	00347	002310	IW:	.WRITE
33	00350	002253	IS:	.SEEK
34	00351	002223	IRC:	RECL
35	00352	001265	IPS:	PS
36	00353	003170	IHED:	HED
37	00354	002774	ICSW:	.CSW
38	00355	001747	ISCNT:	SCNT
39	00356	002003	ICSI:	CMDST
40	00357	002001	IQUEST:	QUEST
41	00360	000725	IWT:	WAIT
42	00361	003377	IRAN:	RAN
43	00362	001274	I.GSD:	.GSD
44	00363	000622	ISU:	.SET
45	00364	000560	IRCAL:	RCALL

A 0013 .MAIN

```
01
02      000020 IDX0=20
03      000021 IDX1=21
04      000033 .DSKP=33
05      006314 DOALL=JSR @IALL      JDO FOLLOWING ROUTINE FOR ALL RDY UNITS
06      006315 DLY12=JSR @IDLY     JDELAY 12.5MS
07      006301 RAND=JSR @IRAN      JGENERATE RANDOM # IN AC0
08      006316 SAVAC=JSR @ISAC     JSAVE AC0,1,2
09      006317 SETAC=JSR @ISTAC    JRESTORE AC0,1,2
10      006320 TYPDEC=JSR @IPDEC   JTYPE (AC1) IN DECIMAL
11      006321 TYPAC1=JSR @ITAC1  JTYPE (AC1) IN OCTAL
12      006322 TYPZ1=JSR @ITZ1    JTYPE (AC1) IN OCTAL, SUPP LEAD 0'S
13      006323 MESSAGE=JSR @IMESS JTYPE FOLLOWING MESSAGE IN ASCII
14      006324 PCRLF=JSR @ICRLF   JTYPE CR=LF
15      006330 INPUT=JSR @IINP     JGET A LINE OF INPUT
16      006332 CHECK=JSR @ICLK    JCHECK ALL OF DATA BUFFER
17      006331 GEN=JSR @IGEN      JGENERATE DATA BUFFER
18      006327 GETPAR=JSR @IHSS    JGET HEAD=SECT=# SECT FROM INPUT LINE
19      006326 GETATM=JSR @IGATM  JGET NAME OR # FROM INPUT LINE
20      006325 SEARCH=JSR @ISRH   JSEARCH FOLLOWING TABLE FOR MATCH ON AC1
21      006334 CLRRB=JSR @ICLRB   JCLEAR READ BUFFER
22      006335 SETP=JSR @ISET     JSET DISK PARAMETERS
23      006336 SMEM=JSR @ISM      JSIZE MEMORY
24      006337 SETB=JSR @ISTB     JSET TIME BASE
25      006340 INITE=JSR @INIL    JINITIALIZE ERROR COUNTERS ETC.
26      002352 PSTAT=JMP @IPS     JPRINT STATUS
27      006346 READ=JSR @IR       JDISK READ & CHECK DATA
28      006347 WRITE=JSR @IW      JGENERATE DATA AND WRITE DISK
29      006350 SEEK=JSR @IS       JSEEK NEW CYLINDER
30      006351 RECAL=JSR @IRC     JRECALIBRATE
31      006354 CKSW=JSR @ICSW     JCHECK CONSOLE SWITCHES
32      006353 HEADER=JSR @IHED   JPRINT ERROR MESSAGE HEADER
33      006360 INTWT=JSR @IWT     JINTERRUPT WAIT ROUTINE
34      006041 TYPASC=JSR @41     JTYPE (AC0)R IN ASCII
35
36      006363 SETU=JSR @ISU      JSET READY UNITS
37
38      .EOT
```

```

0014 .MAIN
01      ) *****
02      ) **      STARTING ADDRESSES      **
03      ) *****
04
05      000400      .LOC 400
06
07 00400 004420 BEGIN: JSR STRT      )RELIABILITY TEST, ALL CYL.
08 00401 004417      JSR STRT      )      "      EVEN  "
09 00402 004416      JSR STRT      )      "      ODD  "
10 00403 004415      JSR STRT      )DISK ADDRESS TEST
11 00404 0063077     HALT           )NOT USED
12 00405 000464     JMP STRC      )COMMAND STRING INTERPRETER
13 00406 004412     JSR STRT      )ONES TEST
14 00407 004411     JSR STRT      )ZEROS TEST
15 00410 004410     JSR STRT      )110110 TEST
16 00411 004407     JSR STRT      )FLOATING ONES TEST
17 00412 004406     JSR STRT      )FLOATING ZEROS TEST
18 00413 004405     .RAL: JSR STRT      )RUN ALL
19 00414 002364     JMP @IRCAL    )RECALIBRATE UNIT 0
20 00415 002364     JMP @IRCAL    )RECALIBRATE UNIT 1
21 00416 002364     JMP @IRCAL    )RECALIBRATE UNIT 2
22 00417 002364     JMP @IRCAL    )RECALIBRATE UNIT 3
23
24      ) *****
25      ) ***      INITIALIZATION      **
26      ) *****
27
28 00420 020301 STRT:  LDA 0,FIRST    )INITIALIZATION, ALL
29 00421 116400      SUB 0,3
30 00422 054471      STA 3,INDEX
31 00423 006336 RSTRT: SMEM           )SIZE MEMORY
32 00424 006337      SETB           )SET TIME BASE
33 00425 006340      INITE          )INITIALIZE BUFFERS, COUNTERS, ETC.
34 00426 006363      SETU           )SET READY UNITS
35 00427 126400      SUB 1,1        )AC0=READY UNIT PATTERN
36 00430 101225     MOVZR 0,0,SNR
37 00431 000404     JMP RS3           )UNIT 0 ONLY
38 00432 101224     MOVZR 0,0,SZR
39 00433 125140     MOVOL 1,1        )UNIT 2 OR 3      MASK=3
40 00434 125140     MOVOL 1,1        )UNIT 1          MASK=1
41 00435 125300 RRS3: MOVS 1,1
42 00436 044302     STA 1,UMSK      )UNIT MASK
43 00437 062677     IORST
44 00440 020170     LDA 0,LHD       )IS DISK SIZE
45 00441 101005     MOV 0,0,SNR     )SPECIFIED ??
46 00442 006362     JSR @I.GSD      )NO, GET IT
47 00443 006324     PCRLF
48 00444 006323     MESSAGE
49 00445 004670     MSG70         )"TESTING UNIT "
50 00446 006314     DOALL
51 00447 000457     TUN           )TYPE UNIT NUMBERS
52 00450 063511     SKPBZ TTO      )WAIT FOR TTO
53 00451 000777     JMP .-1        )TO FINISH
54 00452 060211     NIOC TTO      )CLEAR DONE
55 00453 020423     LDA 0,STR.2
56 00454 030437     LDA 2,INDEX
57 00455 113000     ADD 0,2
58 00456 003000     JMP 00,2      )GO TO IT !!

```

A 0015 .MAIN

01

02 00457 054410 TUN: STA 3,TUNRET ;TYPE UNIT NUMBER
03 00460 020157 LDA 0,UNIT ;FOLLOWED BY A ",",
04 00461 024207 LDA 1,C60
05 00462 123000 ADD 1,0
06 00463 006041 TYPASC
07 00464 020404 LDA 0,COMA
08 00465 006041 TYPASC
09 00466 002401 JMP 0TUNRET

10 00467 000000 TUNRET: 0

11 00470 000054 COMA: ",

12

13

;/COMMAND STRING INTERPRETER DOES NOT REQUIRE
/NORMAL INITIALIZATION.

14

15

16 00471 006336 STRC: SMEM ;SIZE MEMORY
17 00472 006337 SETB ;SET TIME BASE
18 00473 006340 INITE ;INITIALIZE BUFFERS ETC.
19 00474 006362 JSR 0I.GSD ;SET LAST HEAD/SECTOR
20 00475 002407 JMP 0.CMD ;DISPATCH TO ROUTINE

21

22

23

;/ *****
/ *** DISPATCH TABLE TO PROGRAMS **
/ *****

24

25

26

27 00476 000476 STR.2: .
28 00477 001350 RELALL ;RELIABILITY TEST, ALL CYL
29 00500 001346 RELEV ; " EVEN "
30 00501 001345 RELOD ; " ODD "
31 00502 001557 DATR ;DISK ADDRESS TEST
32 00503 000000 0 ;NOT USED
33 00504 002003 .CMD: CMDST ;COMMAND STRING INTERPRETER
34 00505 001563 DAT1 ;ONES TEST
35 00506 001565 DAT0 ;ZEROS TEST
36 00507 001567 DATP ;110110 PATTERN
37 00510 001871 DATF1 ;FLOAT ONE
38 00511 001873 DATF0 ;FLOAT ZERO
39 00512 001530 RUNALL ;RUN ALL PARTS
40 00513 000000 INDEX: 0


```

A 0016 .MAIN
01
02 00514 000000 CSP2: 0
03 00515 160037 CIOMSK: 160037 ;*****
04 ;** INITIALIZATION **
05 ;** SUBROUTINES **
06 00516 002773 .LST1: HIADD ;*****
07 00517 000420 .LST1: STRT
08
09 ;CHANGE I/O ADDRESS TO 33 OR 73
10
11 00520 102401 FXADD: SUB 0,0,SKP ;MAKE IT 33
12 00521 020205 LDA 0,C40 ;MAKE IT 73
13 00522 040772 STA 0,CSP2
14 00523 030774 LDA 2,.LST1 ;POINTER IN MEMORY
15 00524 024771 FX.2: LDA 1,CIOMSK ;INST MASK
16 00525 021000 LDA 0,0,2 ;GET A WORD
17 00526 107400 AND 0,1
18 00527 034226 LDA 3,CWRD ;IS IT AN I/O 33 OR 73 ?
19 00530 136404 SUB 1,3, SZR
20 00531 000406 JMP FX.3 ;NO
21 00532 024233 LDA 1,M41 ;MASK
22 00533 123400 AND 1,0 ;GET RID OF BIT 10
23 00534 024760 LDA 1,CSP2
24 00535 123000 ADD 1,0 ;MAKE ADDR 33 OR 73
25 00536 041000 STA 0,0,2 ;ADDR CHANGED
26 00537 151400 FX.3: INC 2,2
27 00540 034756 LDA 3,.LST
28 00541 156404 SUB 2,3, SZR
29 00542 000762 JMP FX.2 ;MORE
30 00543 020203 LDA 0,C33 ;SET (CDSK) TO
31 00544 024750 LDA 1,CSP2 ;EQUAL THE DEVICE ADDR
32 00545 107000 ADD 0,1
33 00546 044277 STA 1,CDSK
34 00547 063077 FX.4: HALT ;ALL DONE
35
36 ;RECALIBRATE THE UNIT IN SW 14-15
37
38 00550 060477 RCALL: READS 0
39 00551 024176 LDA 1,C3
40 00552 123400 AND 1,0
41 00553 040157 STA 0,UNIT
42 00554 006351 RECAL ;RECALIBRATE !
43 00555 000772 JMP FX.4
44 00556 000771 JMP FX.4
45 00557 000770 JMP FX.4

```

THESE PATCHES, ELIMINATE THE
DEPENDENCY OF THIS PROGRAM FOR
TELETYPE (SOURCE OF 100MS TIME STD)

A 0017 .MAIN

```

01
02
03
04
05 00560 062677 STB: IORST
06 00561 054430 STA 3,STBRET
07 00562 020311 LDA 0,ISET. (577)
08 00563 040001 STA 0,1 ; ISET INTERRUPT RETURN (PHONY)
09 00564 020216 102600 LDA 0,C377 SUBZR 0,0 ; MAKE +1 FOR RTC SPEED
10 00565 126400 SUB 1,1
11 00566 044234 STA 1,TIME
12 00567 061114 14 DOAS 0,TT0 RTC ; SYNC THE CLOCK
13 00570 063614 14 SKPDN TT0 RTC
14 00571 000777 JMP .-1
15 00572 061114 14 DOAS 0,TT0 RTC ; START TIMING INTERVAL
16 00573 060177 INTEN
17 00574 010234 ISZ TIME
18 00575 000777 JMP .-1
19 00576 063077 HALT ; WAITED TOO LONG
20
21 00577 060214 14 SET.1: NIOC TT0 RTC
22 00600 020234 LDA 0,TIME ; TIME=100MS COUNT
23 00601 101220 MOVZR 0,0
24 00602 101220 MOVZR 0,0
25 00603 101220 MOVZR 0,0
26 00604 040234 STA 0,TIME ; TIME=12.5MS COUNT
27 00605 062677 IORST
28 00606 020312 LDA 0,IRUP ; RESTORE REAL INTERRUPT RETURN
29 00607 040001 STA 0,1
30 00610 002401 JMP 0,STBRET
31 00611 000000 STBRET: 0
32
33 ; CLEAR ERROR COUNTERS ETC.
34
35 00612 030313 INIL.: LDA 2,ICYLF
36 00613 024167 LDA 1,SSW+1
37 00614 102400 SUB 0,0
38 00615 041000 STA 0,0,2
39 00616 151400 INC 2,2
40 00617 132414 SUB# 1,2,SZR
41 00620 000775 JMP .-3
42 00621 001400 JMP 0,3
43

```

```

A 0017 .MAIN
01
02
03          /FIND COMPUTER TIME BASE
04
05 00560 062677 STB:   IORST
06 00561 054430      STA 3,STBRET
07 00562 020311      LDA 0,ISET.
08 00563 040001      STA 0,1          /ISET INTERRUPT RETURN
09 00564 020210      LDA 0,C377
10 00565 126400      SUB 1,1
11 00566 044234      STA 1,TIME
12 00567 061111      DOAS 0,TTO
13 00570 063011      SKPDN TTO
14 00571 000777      JMP .-1
15 00572 061111      DOAS 0,TTO
16 00573 060177      INTEN
17 00574 010234      ISZ TIME
18 00575 000777      JMP .-1
19 00576 063077      HALT          /WAITED TOO LONG
20
21 00577 060211 SET.1: NIOC TTO
22 00600 020234      LDA 0,TIME          /TIME=100MS COUNT
23 00601 101220      MOVZR 0,0
24 00602 101220      MOVZR 0,0
25 00603 101220      MOVZR 0,0
26 00604 040234      STA 0,TIME          /TIME=12.5MS COUNT
27 00605 062677      IORST
28 00606 020312      LDA 0,IRUP
29 00607 040001      STA 0,1
30 00610 002401      JMP #STBRET
31 00611 000000 STBRET: 0
32
33          /CLEAR ERROR COUNTERS ETC.
34
35 00612 030313 INIL.1 LDA 2,ICYLF
36 00613 024167      LDA 1,SSW+1
37 00614 102400      SUB 0,0
38 00615 041000      STA 0,0,2
39 00616 151400      INC 2,2
40 00617 132414      SUB# 1,2,8ZR
41 00620 000775      JMP .-3
42 00621 001400      JMP 0,3
43

```

A 0018 .MAIN

```
01
02          ISET READY UNITS
03
04 00622 054445 .SET1: STA 3, .SRET
05 00623 102400          SUB 0,0          IDO A SEEK ON UNIT 0
06 00624 063033          DOC 0, .DSKP        ITO SELECT THE ADAPTER
07 00625 020173          LDA 0, C1000
08 00626 061333          DOAP 0, .DSKP
09
10 00627 024172          LDA 1, C2000          IWAIT FOR SEEKING
11 00630 060433          DIA 0, .DSKP        IFLOP TO TURN ON
12 00631 123405          AND 1,0, SNR
13 00632 000776          JMP .-2
14
15 00633 020230          LDA 0, M16.          IWAIT 200MS FOR
16 00634 006315          OLY12              ITHE SEEK 0 TO END
17 00635 101404          INC 0,0, SZR
18 00636 000776          JMP .-2
19
20 00637 152400          SUB 2,2
21 00640 050160          STA 2, RDYUNT       ISET ALL UNITS "NOT READY"
22 00641 021026 .SET1: LDA 0, UNTINS, 2     ISELECT UNITS 0-3
23 00642 063033          DOC 0, .DSKP        IAND CHECK EACH
24 00643 060433          DIA 0, .DSKP        IFOR "DUR"
25 00644 024211          LDA 1, C100
26 00645 123405          AND 1,0, SNR
27 00646 000405          JMP .SET2           INOT READY
28 00647 021022          LDA 0, DRVS, 2     I(RDYUNT) DEFINES WHICH
29 00650 024160          LDA 1, RDYUNT       IUNITS ARE READY
30 00651 123000          ADD 1,0             IBIT 15=UNIT 0, BIT 14=UNIT 1
31 00652 040160          STA 0, RDYUNT      IBIT 13=UNIT 2, BIT 12=UNIT 3
32
33 00653 151400 .SET2: INC 2,2
34 00654 024024          LDA 1, C4
35 00655 132414          SUB# 1,2, SZR
36 00656 000763          JMP .SET1           IEXIT AFTER ALL UNITS
37                                     I TESTED
38 00657 020160          LDA 0, RDYUNT
39 00660 101004          MOV 0,0, SZR
40 00661 002406          JMP 0, .SRET
41 00662 006324          PCRLF
42 00663 006323          MESSAGE
43 00664 004230          MSG16              I"NO READY UNITS"
44 00665 063077          HALT
45 00666 000735          JMP .SET+1
46 00667 000000 .SRET: 0
```

```

A 0019 .MAIN
01
02
03 ) *****
04 ) ***      INTERRUPT SERVICING      **
05 ) *****
06 00670 054242 INTER: STA 3,SAV3
07 00671 006310 SAVAC
08 00672 066477 INTA 1          )WHO DID IT???
09 00673 044424 STA 1,S0
10 00674 030277 LDA 2,CDSK
11 00675 132415 SUB# 1,2,SNR
12 00676 000422 JMP INT.1      )DISK PACK INTERRUPT
13 00677 030025 LDA 2,C10
14 00700 132415 SUB# 1,2,SNR
15 00701 000443 JMP ITTI      )ITTI INTERRUPT
16 00702 034246 LDA 3,CNIOC   )SOMEONE ELSE
17 00703 137000 ADD 1,3
18 00704 054401 STA 3,.,+1
19 00705 060200 NIOC 0        )DEV ADDR ADDED DYNAMICALLY
20 00706 006324 PCRLF
21 00707 006323 MESSAGE
22 00710 004172 MSG0         )INTERRUPT FROM DEVICE
23 00711 024406 LDA 1,S0
24 00712 006322 TYPZ1
25 00713 006317 SETAC
26 00714 034242 LDA 3,SAV3
27 00715 060177 INTEN
28 00716 002000 JMP 00        )RETURN
29 00717 000000 S01 0
30
31 )DISK PACK INTERRUPT
32
33 00720 060633 INT.1: DIAC 0,.DSKP   )READ STATUS
34 00721 040236 STA 0,ISTAT   )SAVE FOR ALL TO USE
35 00722 030157 LDA 2,UNIT
36 00723 010420 ISZ WTRET
37 00724 002417 JMP 0WTRET
38
39 )WAIT FOR INTERRUPT
40 )RUN TIMER TO PREVENT HANGUP
41
42 00725 020231 WAIT: LDA 0,M100.   )WAIT 2 SEC.
43 00726 126400 SUB 1,1
44 00727 054414 STA 3,WTRET   )USE # IN AC0 FOR TIME
45 00730 060177 INTEN        )ENABLE INTERRUPTS
46 00731 006315 DLY12       )TIME FOR 12.5MS
47 00732 101404 INC 0,0,SZR
48 00733 000776 JMP .-2
49
50 00734 060277 INTDS      )TIMEOUT, DISABLE INTER.
51 00735 062677 IORST     )CLEAR ADAPTER FOR 2ND COMP.
52 00736 006353 HEADER     )PRINT
53 00737 006324 PCRLF     )ERROR MESSAGE
54 00740 006323 MESSAGE
55 00741 004525 MSG00
56 00742 002401 JMP 0WTRET   )"INTERRUPT TIMEOUT"
57 00743 000000 WTRET: 0 )ERROR RETURN (+1)

```

A 0020 .MAIN

```
01
02                               ;TELETYPE INTERRUPT
03
04 00744 060210 ITT1:  NIOC TTI           ;KNOCK DOWN THE TTI FLAG
05 00745 020156      LDA 0,CSIF          ;CSI FLAG (8A 405)
06 00746 101004      MOV 0,0,SZR
07 00747 002356      JMP 0,CSI           ;RETURN TO CSI
08 00750 020270      LDA 0,EVODN        ;IF TWO COMPUTERS
09 00751 101005      MOV 0,0,SNR        ;ONLY PRINT DURING
10 00752 000404      JMP .+4           ;READ OR WRITE
11 00753 020164      LDA 0,MODE
12 00754 101225      MOVZR 0,0,SNR
13 00755 000433      JMP ITT.5         ;A SEEK OR RECAL
14 00756 006324      PCRLF
15 00757 006324      PCRLF
16 00760 020157      LDA 0,UNIT
17 00761 040433      STA 0,SAVU
18 00762 020310      LDA 0,ALLRET       ;SAVE ALL RETURN
19 00763 040432      STA 0,SAVA
20 00764 020544      LDA 0,POT=1
21 00765 040021      STA 0,IDX1
22 00766 022021 ITT.1: LDA 0,@IDX1      ;PRINT TABLE
23 00767 101005      MOV 0,0,SNR
24 00770 000414      JMP ITT.4         ;END TABLE, DONE.
25 00771 040405      STA 0,ITT.2
26 00772 022021      LDA 0,@IDX1
27 00773 040405      STA 0,ITT.3
28 00774 006324      PCRLF
29 00775 006323      MESSAGE
30 00776 000000 ITT.2: 0                ;TITLE
31 00777 006314      DOALL              ;PRINT FOR ALL RDY UNITS
32 01000 000000 ITT.3: 0                ;PRINT ROUTINE ADDRESS
33 01001 063610      SKPDN TTI          ;QUIT IF KEY STRUCK
34 01002 000764      JMP ITT.1
35 01003 060210      NIOC TTI
36 01004 020410 ITT.4: LDA 0,SAVU        ;RESTORE UNIT #
37 01005 040157      STA 0,UNIT
38 01006 020407      LDA 0,SAVA        ;RESTORE ALL RETURN
39 01007 040310      STA 0,ALLRET
40 01010 006317 ITT.5: SETAC           ;RESTORE AC'S
41 01011 034242      LDA 3,SAV3
42 01012 060177      INTEN
43 01013 002000      JMP 00
44 01014 000000 SAVU: 0
45 01015 000000 SAVAI: 0
46
47                               ;CLEAR READ BUFFER
48
49 01016 102400 CLRBI: SUB 0,0           ;CLEAR READ BUFFER
50 01017 030265      LDA 2,BUFF        ;SPACE TO ZEROS
51 01020 024252      LDA 1,SC
52 01021 125300      MOVS 1,1
53 01022 147000      ADD 2,1
54 01023 041000      STA 0,0,2
55 01024 151400      INC 2,2
56 01025 132414      SUB# 1,2,SZR
57 01026 000775      JMP .-3
58 01027 001400      JMP 0,3
```

A 0021 .MAIN

01

02

03

);SET PARAMETERS

04 01030 054465 SET1

STA 3, SERET

);SETUP DISK CONTROL

05 01031 030167

LDA 2, UNIT

);FOR CURRENT INSTRUCTION

06 01032 020252

LDA 0, SC

07 01033 040306

STA 0, SC

08 01034 034267

LDA 3, SMAX

);MAX # SECT DUE TO MEM SIZE

09 01035 116433

SUBZ# 0, 3, SNC

10 01036 000460

JMP 8, 1

);MEMORY TOO SMALL

11 01037 100400

NEG 0, 0

);CA=HEAD=SECTOR

12 01040 024201

LDA 1, C17

);SECTOR COUNT

13 01041 107400

AND 0, 1

14 01042 021026

LDA 0, UNTINS, 2

15 01043 107000

ADD 0, 1

16 01044 020251

LDA 0, SEC

);FIRST SECTOR

17 01045 103120

ADDZL 0, 0

18 01046 103120

ADDZL 0, 0

19 01047 107000

ADD 0, 1

20 01050 020253

LDA 0, HD

21 01051 101300

MOVS 0, 0

22 01052 107000

ADD 0, 1

23 01053 067233

DOCC 1, DSKP

);LOAD UNIT=HEAD=SECT=Cnt

24 01054 062433

DIC 0, DSKP

);READ IT BACK

25 01055 122415

SUB# 1, 0, SNR

);CHECK

26 01056 000406

JMP SET1

27 01057 006316

SAVAC

);LOAD ERROR

28 01060 006324

PCRLF

29 01061 006323

MESSAGE

30 01062 004472

MSG53

);"DOC"

31 01063 000412

JMP SET2

32

33 01064 024254 SET11

LDA 1, CA

34 01065 066033

DOB 1, DSKP

);LOAD CURRENT ADDRESS

35 01066 061433

DIB 0, DSKP

);READ IT BACK

36 01067 106415

SUB# 0, 1, SNR

);CHECK

37 01070 002425

JMP 0SERET

38 01071 006316

SAVAC

);LOAD ERROR

39 01072 006324

PCRLF

40 01073 006323

MESSAGE

41 01074 004475

MSG54

);"DOB"

42 01075 006323 SET21

MESSAGE

43 01076 004500

MSG55

);"LOAD ERROR"

44 01077 006324

PCRLF

45 01100 006323

MESSAGE

46 01101 004464

MSG51

);GOOD

47 01102 024240

LDA 1, SAV1

48 01103 006321

TYPAC1

49 01104 006323

MESSAGE

50 01105 004467

MSG52

);BAD

A 0022 .MAIN

01					
02	01106	024237		LDA 1,SAV0	
03	01107	006321		TYPAC1	
04	01110	030157		LDA 2,UNIT	ICOUNT AS A MISC ERROR
05	01111	011151		ISZ MISC,2	
06	01112	006354		CKSW	ICHECK SWITCHES
07	01113	000710		JMP SET+1	
08	01114	002401		JMP 0SERET	
09	01115	000000	SERET:	0	
10					
11	01116	006316	S.1:	SAVAC	
12	01117	006324		PCRLF	
13	01120	006323		MESSAGE	
14	01121	004422		MSG39	IMEM TOO SMALL
15	01122	024237		LDA 1,SAV0	
16	01123	006322		TYPZ1	
17	01124	006323		MESSAGE	
18	01125	004435		MSG40	ISECTORS. RESTART
19	01126	063077		HALT	
20	01127	000400		JMP .	
21					
22				IPRINT TABLE	
23					
24	01130	001130		.	
25	01131	004206	POT:	MSG13	
26	01132	001166		PHDR	
27	01133	004221		MSG15	
28	01134	001176		PTSEK	
29	01135	004212		MSG14	
30	01136	001172		PSKER	
31	01137	004314		MSG25	
32	01140	001201		PTWW	
33	01141	004324		MSG26	
34	01142	001206		PTWR	
35	01143	004361		MSG29	
36	01144	001215		PTAER	
37	01145	004371		MSG30	
38	01146	001217		PTPAE	
39	01147	004333		MSG27	
40	01150	001211		PTCWE	
41	01151	004345		MSG28	
42	01152	001213		PTCWP	
43	01153	004404		MSG31	
44	01154	001221		PTDER	
45	01155	004531		MSG61	
46	01156	001223		PTPDE	
47	01157	004570		MSG65	
48	01160	001227		PTCWD	
49	01161	004605		MSG66	
50	01162	001231		PTPCW	
51	01163	004543		MSG62	
52	01164	001225		PTMS	
53	01165	000000		0	


```

A 0023 .MAIN
01
02 01166 054445 PHDR: STA 3,TRET IPRINT HEADER NUMBER
03 01167 024167 LDA 1,UNIT
04 01170 006322 TYPZ1
05 01171 002442 JMP @TRET
06
07 01172 025065 PSKER: LDA 1,SEKER,2 IPRINT # SEEK ERRORS
08 01173 054440 PS.1: STA 3,TRET
09 01174 006320 TYPDEC
10 01175 002436 JMP @TRET
11
12 01176 025065 PTSEK: LDA 1,SEEKT,2 IPRINT # SEEKS
13 01177 031061 LDA 2,SEEKT+4,2
14 01200 000403 JMP PT.1
15
16 01201 025071 PTWW: LDA 1,WDSW,2 IPRINT WORDS WRITTEN
17 01202 031075 LDA 2,WDSW+4,2
18 01203 054430 PT.1: STA 3,TRET
19 01204 006342 JSR @I.DBD
20 01205 002426 JMP @TRET
21
22 01206 025101 PTWR: LDA 1,WDSR,2 IPRINT WORDS READ
23 01207 031105 LDA 2,WDSR+4,2
24 01210 000773 JMP PT.1
25
26 01211 025111 PTCWE: LDA 1,CWER,2 IPRINT CHECK WORD ERRORS
27 01212 000761 JMP PS.1
28
29 01213 025115 PTCWP: LDA 1,CWERP,2 IPRINT PERM CHK WD ERRS
30 01214 000757 JMP PS.1
31
32 01215 025121 PTAER: LDA 1,ADDER,2 IPRINT ADDRESS ERRORS
33 01216 000755 JMP PS.1
34
35 01217 025125 PTPAE: LDA 1,PADER,2 IPRINT PERM ADDR ERRS
36 01220 000753 JMP PS.1
37
38 01221 025131 PTDER: LDA 1,DATER,2 IPRINT DATA ERRORS
39 01222 000751 JMP PS.1
40
41 01223 025145 PTPDE: LDA 1,PDER,2 IPRINT PERM DATA ERRS
42 01224 000747 JMP PS.1
43
44 01225 025151 PTMS: LDA 1,MISC,2 IPRINT # MISC ERRORS
45 01226 000745 JMP PS.1
46
47 01227 025135 PTCWD: LDA 1,CWDE,2 IPRINT # CHK WD AND
48 01230 000743 JMP PS.1 IPRINT # DATA ERRORS.
49
50 01231 025141 PTPCW: LDA 1,CWDEP,2 IPRINT # PERM CHECK WORD
51 01232 000741 JMP PS.1 IPRINT # AND DATA ERRORS
52
53 01233 000000 TRET: 0

```

A 0024 .MAIN

```
01
02
03
04
05
06 01234 054310 ALL: STA 3,ALLRET
07 01235 102400 SUB 0,0
08 01236 040157 ALL.1: STA 0,UNIT
09 01237 034310 LDA 3,ALLRET
10 01240 030157 LDA 2,UNIT
11 01241 021022 LDA 0,DRVS,2
12 01242 024160 LDA 1,RDYUNT
13 01243 123414 AND# 1,0,SRZ
14 01244 007400 JSR 0,3
15 01245 000401 JMP .+1
16 01246 000401 JMP .+1
17 01247 010157 ISZ UNIT
18 01250 020157 LDA 0,UNIT
19 01251 024024 LDA 1,C4
20 01252 122414 SUB# 1,0,SRZ
21 01253 000763 JMP ALL.1
22 01254 010310 ISZ ALLRET
23 01255 002310 JMP 0ALLRET
24
25
26
27
28
29 01256 054406 DLY: STA 3,DLYRET
30 01257 030234 LDA 2,TIME
31 01260 050235 STA 2,TIMER
32 01261 014235 DSZ TIMER
33 01262 000777 JMP .-1
34 01263 002401 JMP 0DLYRET
35 01264 000000 DLYRET: 0
36
37
38
39
40
41 01265 006353 PSI: HEADER
42 01266 006324 PCRLF
43 01267 024236 LDA 1,ISTAT
44 01270 006321 TYPAC1
45 01271 006323 MESSAGE
46 01272 004154 MSG1
47 01273 002274 JMP 0RWRET
```

EXECUTE THE ROUTINE POINTED TO BY
THE WORD FOLLOWING THE CALL. DO TO
ONCE FOR EACH ACTIVE UNIT

DO IT FOR THIS UNIT
IGNORE RETURN+1,+2 ROUT'S

DELAY 12.5MS
DO NOT USE AC0,1

PRINT STATUS

" = ENDING STATUS"

```

A 0025 .MAIN
01
02          TASK FOR DISK SIZE
03
04 01274 054425 .GSD:  STA 3,FDSRET
05 01275 006324      PCRLF
06 01276 006323      MESSAGE
07 01277 004647      MSG60          !"TYPE THE NUMBER OF DISK SURFACES "
08 01300 006330      INPUT          !WAIT FOR INPUT
09 01301 000257      UBP           !BYTE POINTER
10 01302 000440      JMP .GSD1       !"CR" ONLY IS ERROR
11 01303 006326      GETATM        !GET THE NUMBER
12 01304 105000      MOV 0,1
13 01305 006325      SEARCH        !IS NUMBER 2,10 OR 20
14 01306 001322      HNUM          !TABLE ADDRESS
15 01307 000433      JMP .GSD1       !NO !!
16 01310 021007 FDS,2: LDA 0,SMX=HNUM,2
17 01311 040171      STA 0,LS        !LAST SECTOR+1
18 01312 021004      LDA 0,HMX=HNUM,2
19 01313 040170      STA 0,LHD       !LAST HEAD+1
20 01314 021012      LDA 0,MS1=HNUM,2 !HEAD MASK
21 01315 040303      STA 0,HMSK
22 01316 021015      LDA 0,MS2=HNUM,2 !SECTOR MASK
23 01317 040304      STA 0,SMSK
24 01320 002401      JMP @FDSRET
25 01321 000000 FDSRET: 0

```

A 0026 .MAIN

01					
02	01322	000002	HNUM:	2	ICARTRIDGE
03	01323	000010		10	I2311
04	01324	000020		20	I2314
05	01325	000000		0	
06					
07	01326	000002	HMX:	2	ICARTRIDGE
08	01327	000012		10.	I2311
09	01330	000024		20.	I2314
10					
11	01331	000014	SMX:	12.	
12	01332	000006		6	
13	01333	000014		12.	
14					
15	01334	000400	MS1:	400	IHEAD MASKS
16	01335	007400		7400	
17	01336	017400		17400	
18					
19	01337	007400	MS2:	7400	ISECTOR MASKS
20	01340	003400		3400	
21	01341	007400		7400	
22					
23	01342	006323	.GSD1:	MESSAGE	IERROR
24	01343	004444		MSG43	I "-?-"
25	01344	000731		JMP .GSD+1	

A 0027 .MAIN

```
01
02 ; *****
03 ; *** DISK RELIABILITY TEST *****
04 ; *****
05
06 01345 102621 RELOD: SUBZR 0,0,SKP ;USE ODD CYLINDERS
07 01346 102520 RELEV: SUBZL 0,0 ;USE EVEN CYLINDERS
08 01347 101001 MOV 0,0,SKP
09 01350 102400 RELALL: SUB 0,0 ;USE ALL CYLINDERS
10 01351 040270 STA 0,EVODN
11 01352 020361 LDA 0,IRAN ;SET FOR RANDOM DATA
12 01353 042343 STA 0,IRDAT
13 01354 042344 STA 0,IWDAT
14 01355 020265 LDA 0,BUFF ;MEM ADDR, CONST
15 01356 040254 STA 0,CA
16
17 01357 006361 REL.1: RAND ;GET RANDOM UNIT #
18 01360 030302 LDA 2,UMSK ;UNIT SIZE MASK
19 01361 113700 ANDS 0,2
20 01362 021022 LDA 0,DRVS,2
21 01363 024160 LDA 1,RDYUNT ;UNIT READY ?
22 01364 123405 AND 1,0,SNR
23 01365 000772 JMP REL.1 ;NO, TRY AGAIN
24 01366 050157 STA 2,UNIT
25
26 01367 006361 REL.2: RAND ;GET RANDOM HEAD #
27 01370 024303 LDA 1,HMSK ;HEAD SIZE MASK
28 01371 123700 ANDS 1,0
29 01372 024170 LDA 1,LHD ;HEAD # OK ?
30 01373 106437 SUBZ# 0,1,SBN
31 01374 000773 JMP REL.2 ;TOO LARGE, TRY AGAIN
32 01375 040253 STA 0,HD
33
34 01376 006361 REL.3: RAND ;GET RANDOM STARTING SECTOR
35 01377 024304 LDA 1,SMASK ;SECTOR SIZE MASK
36 01400 123700 ANDS 1,0
37 01401 024171 LDA 1,LS ;SECT # OK ?
38 01402 106437 SUBZ# 0,1,SBN
39 01403 000764 JMP REL.2 ;TOO LARGE, TRY AGAIN
40 01404 040251 STA 0,SEC
41
42 01405 006361 REL.4: RAND ;GET RANDOM # OF SEC
43 01406 024305 LDA 1,LMSK ;# SECTORS MASK
44 01407 123705 ANDS 1,0,SNR ;DON'T ALLOW 0
45 01410 020202 LDA 0,C20 ;ZERO IS ACTUALLY 20
46 01411 024267 LDA 1,SMAX ;ENOUGH CORE ?
47 01412 106433 SUBZ# 0,1,SNC
48 01413 000772 JMP REL.4 ;NO, TRY AGAIN
49 01414 040252 STA 0,SC
50 01415 024251 LDA 1,SEC ;CHECK TO SEE IF
51 01416 030253 LDA 2,HD ;TRANSFER WILL CAUSE
52 01417 006316 SAVAC ;"END CYLINDER"
53 01420 010237 ISZ SAV0
```

A 0028 .MAIN

```
01
02 01421 014237 REL.5: DSZ SAV0
03 01422 000402      JMP .+2
04 01423 000420      JMP REL.6           ;SECTOR COUNT OK!
05 01424 010240      ISZ SAV1           ;CURRENT SECT+1
06 01425 020240      LDA 0,SAV1
07 01426 024171      LDA 1,LS           ;HEAD OVERFLOW ?
08 01427 122434      SUBZ# 1,0,SZR
09 01430 000771      JMP REL.5           ;NO, COUNT ANOTHER SECT
10 01431 102400      SUB 0,0
11 01432 040240      STA 0,SAV1
12 01433 010241      ISZ SAV2           ;YES, SELECT NEXT HEAD
13 01434 020241      LDA 0,SAV2
14 01435 024170      LDA 1,LHD         ;END CYLINDER ?
15 01436 122414      SUB# 1,0,SZR
16 01437 000762      JMP REL.5           ;NO, COUNT ANOTHER SECTOR
17 01440 020237      LDA 0,SAV0         ;YES, DONE IF THIS IS
18 01441 101224      MOVZR 0,0,SZR     ;THE LAST SECTOR
19 01442 000743      JMP REL.4         ; GET ANOTHER RAND #
20
21 01443 006361 REL.6: RAND           ;GET RANDOM CYLINDER #
22 01444 024216      LDA 1,C377
23 01445 123400      AND 1,0
24 01446 024270      LDA 1,EVDON
25 01447 125005      MOV 1,1,SNR
26 01450 000404      JMP REL.7           ;USE ALL CYLINDERS
27 01451 101220      MOVZR 0,0         ;CYL # RIGHT ONE
28 01452 125100      MOVL 1,1         ;ODD BIT TO (C)
29 01453 101100      MOVL 0,0         ;CYL #, ODD OR EVEN
30 01454 024213 REL.7: LDA 1,C203.   ;IS CYL # < 203.
31 01455 122432      SUBZ# 1,0,SZC
32 01456 000765      JMP REL.6           ;NO, TRY ANOTHER #
33 01457 030157      LDA 2,UNIT
34 01460 025051      LDA 1,CYLT,2
35 01461 045045      STA 1,CYLF,2     ;"TO"="FROM"
36 01462 041051      STA 0,CYLT,2     ;NEW "TO"
37
38                    ;**
39                    ;**      SEEK
40                    ;**
41
42 01463 102000      ADC 0,0
43 01464 040155      STA 0,HSW
44 01465 006350      SEEK
45 01466 006354      CKSW
46 01467 000776      JMP .-2           ;SEEK NEW CYLINDER
                                   ;ERROR, CHECK SWITCHES
                                   ;LOOP ON IT
```

```

A 0029 .MAIN
01
02
03
04
05
06 01470 102000      ADC 0,0
07 01471 040155      STA 0,HSW
08 01472 020243      LDA 0,RANDOM      ;SAVE BEGINNING OF
09 01473 040245      STA 0,RELHAN      ;RANDOM NUMBERS
10 01474 020245      LDA 0,RELHAN      ;RESET RANDOM NUMBERS
11 01475 040243      STA 0,RANDOM      ;FOR LOOPING
12 01476 006347      WRITE             ;GEN DATA & WRITE
13 01477 006354      CKSW             ;ERROR, CHECK SWITCHES
14 01500 000774      JMP .-4          ;LOOP ON IT
15
16 01501 020270      LDA 0,EVDON      ;IF TWO COMPUTERS, SEEK AGAIN
17 01502 101005      MOV 0,0,SNR
18 01503 000406      JMP .RED         ;ONLY ONE
19 01504 102000      ADC 0,0
20 01505 040155      STA 0,HSW
21 01506 006350      SEEK             ;SEEK SAME CYLINDER
22 01507 006354      CKSW             ;ERROR, CHECK SWITCH CONTROL
23 01510 000776      JMP .-2          ;LOOP ON IT
24
25
26
27
28
29 01511 102000 .RED:  ADC 0,0
30 01512 040155      STA 0,HSW
31 01513 020245      LDA 0,RELHAN      ;SET RAN # GEN FOR THE
32 01514 040243      STA 0,RANDOM      ;READ CHECK
33 01515 006346      READ             ;READ AND CHECK DATA
34 01516 006354      CKSW             ;ERROR, CHECK SWITCHES
35 01517 000774      JMP .-4          ;LOOP ON IT
36
37
38
39 01520 020161      LDA 0,RALL
40 01521 101005      MOV 0,0,SNR
41 01522 000635      JMP REL.1        ;MORE RELIABILITY
42 01523 014422      DSZ CRALL        ;RUN ALL MODE
43 01524 000633      JMP REL.1        ;DO 512 LOOPS ONLY
44 01525 006324      PCRLF
45 01526 006323      MESSAGE
46 01527 004441      MSG41           ;"PASS"
47
48
49
50
.EOT

```

0030 .MAIN

```

01      ; *****
02      ; *****          RUN ALL TESTS          *****
03      ; *****
04
05      ;RUN ALL DISK ADDRESS PATTERNS
06      ;THEN RUN RANDOM EXERCISER FOR A
07      ;WHILE. THEN REPEAT
08
09 01530 020173 RUNALL: LDA 0,C1000
10 01531 040414      STA 0,C1ALL
11 01532 040161      STA 0,RALL
12 01533 030414      LDA 2,A1=1
13 01534 050412      STA 2,PADD
14 01535 010411 R.1:  ISZ PADD
15 01536 022410      LDA 0,@PADD
16 01537 101005      MOV 0,0,SNR
17 01540 000610      JMP RELALL
18 01541 040275      STA 0,DADAT
19 01542 006314      DOALL          ;DO DISK ADDRESS
20 01543 001615      DAT.
21 01544 000771      JMP R.1          ;TEST FOR EACH PATTERN
22 01545 000000 CRALL: 0
23 01546 000000 PADD: 0
24
25 01547 001547      .
26 01550 004134 A1:  ZEROS
27 01551 004135      ONES
28 01552 004140      PAT1
29 01553 004142      FL1
30 01554 004147      FLZ
31 01555 003377      RAN
32 01556 000000      0

```



```

A 0031 .MAIN
01
02 01557 020776 DATR: LDA 0,A1+5 ;DISK ADDR TEST
03 01560 024244 LDA 1,,RAN ;SET RANDOM BASE
04 01561 044243 STA 1,RANDOM ; NUMBER
05 01562 000412 JMP DATF0+1
06
07 01563 020766 DAT1: LDA 0,A1+1
08 01564 000410 JMP DATF0+1
09
10 01565 020763 DAT0: LDA 0,A1
11 01566 000406 JMP DATF0+1
12
13 01567 020763 DATP: LDA 0,A1+2
14 01570 000404 JMP DATF0+1
15
16 01571 020762 DATF1: LDA 0,A1+3
17 01572 000402 JMP DATF0+1
18
19 01573 020761 DATF0: LDA 0,A1+4
20 01574 040275 STA 0,DADAT
21 01575 060210 NIOC TTI
22 01576 006324 PCRLF
23 01577 006323 MESSAGE
24 01600 004700 MSG71 ;"SET SW4 FOR INTERCHANGE....
25 01601 006324 PCRLF
26 01602 006323 MESSAGE ;"STRIKE ANY KEY TO CONTINUE"
27 01603 004726 MSG72
28 01604 063610 SKPDN TTI
29 01605 000777 JMP .-1
30 01606 060210 NIOC TTI
31 01607 006314 DAT: DOALL ;DO IT ONCE FOR EACH
32 01610 001615 DAT. ;READY DISK
33 01611 006324 PCRLF
34 01612 006323 MESSAGE
35 01613 004441 MSG41 ;"PASS"
36 01614 000773 JMP DAT

```

A 0032 .MAIN

```
01
02      ) *****
03      ) *****          DISK ADDRESS TEST          *****
04      ) *****
05
06      ) WRITE THE ENTIRE DISK, THEN READ.
07      ) DATA PATTERN IN (DADAT).
08      ) DISK DRIVE IN (UNIT).
09
10 01615 054525 DAT.1  STA 3,DARET
11 01616 074477      READS 3          )IF SW5=1, READ ONLY
12 01617 024172      LDA 1,C2000
13 01620 020524      LDA 0,DRD
14 01621 137404      AND 1,3, SZR
15 01622 000403      JMP .+3
16 01623 126000      ADC 1,1
17 01624 020521      LDA 0,DWT
18 01625 044516      STA 1,RFLG          )R/W FLAG
19 01626 040454      STA 0,DATRW        )WRITE FIRST
20 01627 020247      LDA 0,LAST
21 01630 040254      STA 0,CA          )BUFFER ADDRESS
22 01631 020275      LDA 0,DADAT
23 01632 042343      STA 0,0IRDAT       )DEFINE DATA
24 01633 042344      STA 0,0IWDAT       )PATTERN
25 01634 020243      LDA 0,RANDOM
26 01635 040511      STA 0,DARAN        )SAVE RANDOM START
27
28 01636 020510 DAT.01 LDA 0,DARAN          )RESET RANDOM FOR
29 01637 040243      STA 0,RANDOM        )RECYCLE
30 01640 102400      SUB 0,0
31 01641 040036      STA 0,FLO1         )RESET FLOATING 0&1
32 01642 040037      STA 0,FLOZ         )PATTERNS
33 01643 102000      ADC 0,0
34 01644 040155      STA 0,HSW          )SET HEADER SWITCH
35 01645 006351      RECAL          )RECALIBRATE DRIVE
36 01646 006354      CKSW          )ERROR, CHECK SWITCHES
37 01647 000776      JMP .-2          )LOOP ON ERROR
38
39 01650 030157 DAT.11 LDA 2,UNIT          )SEEK NEW CYLINDER
40 01651 021051      LDA 0,CYLT,2        )TO = FROM
41 01652 041045      STA 0,CYLF,2
42 01653 011051      ISZ CYLT,2        )TO+1 = TO
43 01654 101400      INC 0,0
44 01655 024213      LDA 1,C203.
45 01656 122405      SUB 1,0,SNR
46 01657 000437      JMP DAT.3          )DONE, READ OR WRITE
47 01660 102000      ADC 0,0          )SET HEADER SWITCH
48 01661 040155      STA 0,HSW
49 01662 006350      SEEK
50 01663 006354      CKSW          )ERROR, CHECK SWITCHES
51 01664 000776      JMP .-2          )LOOP ON ERROR
52 01665 102400      SUB 0,0          )BEGIN WITH HEAD 0
53 01666 040253      STA 0,HD          )SECTOR 0
54 01667 040251      STA 0,SEC
55 01670 040276      STA 0,CFLG
56 01671 020267      LDA 0,SMAX        )MAX # OF SECTORS
57 01672 040252      STA 0,SC          )DUE TO MEM SIZE
58 01673 040300      STA 0,CSC
```

```

A 0033 .MAIN
01
02 01674 102000 DAT.2:  ADC 0,0           ISET THE HEADER SWITCH
03 01675 040155          STA 0,HSW
04 01676 020243          LDA 0,RANDOM        ISAVE RAN # POSITION
05 01677 040245          STA 0,RELIN        IIN CASE OF SCOPE LOOP
06 01700 020245          LDA 0,RELIN        IRESTORE RANDOM #
07 01701 040243          STA 0,RANDOM       IFOR SCOPE LOOP
08 01702 006347 DATRW:  WRITE             IREAD OR WRITE
09 01703 006354          CKSW              IERROR, CHECK SWITCHES
10 01704 000774          JMP .-4           ILOOP ON ERROR
11 01705 020276          LDA 0,CPLG        IEND CYL NOW ?
12 01706 101004          MOV 0,0,SZR
13 01707 000741          JMP DAT.1
14 01710 004437          JSR SCNT
15 01711 040251          STA 0,SEC
16 01712 044253          STA 1,HD
17 01713 004434          JSR SCNT
18 01714 050252          STA 2,SC
19 01715 000757          JMP DAT.2
20
21 01716 010425 DAT.3:  ISZ RFLG
22 01717 000404          JMP DAT.4
23 01720 020424          LDA 0,ORD
24 01721 040761          STA 0,DATRW
25 01722 000714          JMP DAT.0
26 01723 060477 DAT.4:  READS 0
27 01724 024035          LDA 1,C4K
28 01725 107404          AND 0,1,SZR
29 01726 000407          JMP DAT.5
30 01727 024172          LDA 1,C2000
31 01730 107405          AND 0,1,SNR
32 01731 002411          JMP 0DARET
33 01732 024244          LDA 1,.RAN
34 01733 044243          STA 1,RANDOM
35 01734 002406          JMP 0DARET
36 01735 006324 DAT.5:  PCRLF
37 01736 006323          MESSAGE
38 01737 004636          MSG68
39 01740 063077          HALT
40 01741 000777          JMP .-1
41 01742 000000 DARET:  0
42 01743 000000 RFLG:  0
43 01744 006346 DRD:   READ
44 01745 006347 DWT:   WRITE
45 01746 000000 DARAN:  0

```

A 0034 ,MAIN

```
01
02 ; MOVE BEGINNING SECTOR AND HEAD ADDRESS
03 ; FORWARD BY THE NUMBER OF SECTORS IN (CSC).
04 ; IF END CYLINDER SET "CFLG".
05
06 ; EXIT = AC0= NEW SECTOR START
07 ; AC1= NEW HEAD START
08 ; AC2= SECTOR COUNT
09
10 01747 054430 SCNT: STA 3,SCRET
11 01750 020300 LDA 0,CSC
12 01751 040427 STA 0,WORK
13 01752 020251 LDA 0,SEC ;CURRENT BEGINNING SECTOR
14 01753 024253 LDA 1,HD ;CURRENT BEGINNING HEAD
15
16 01754 101400 SC.1: INC 0,0 ;SECT+1
17 01755 030171 LDA 2,LS ;CHECK FOR SECTOR OVERFLOW
18 01756 112405 SUB 0,2,SNR
19 01757 000405 JMP SC.3 ;OVERFLOW
20 01760 014420 SC.2: DSZ WORK ;DONE ?
21 01761 000773 JMP SC.1 ;NO
22 01762 030300 LDA 2,CSC ;YES, EXIT
23 01763 002414 JMP @SCRET
24
25 01764 141000 SC.3: MOV 2,0 ;SECT=0
26 01765 125400 INC 1,1 ;HEAD+1
27 01766 030170 LDA 2,LHD
28 01767 132404 SUB 1,2,SZR ;HEAD OVERFLOW ?
29 01770 000770 JMP SC.2 ;NO
30 01771 010276 ISZ CFLG ;YES, END CYLINDER
31 01772 034406 LDA 3,WORK
32 01773 030300 LDA 2,CSC
33 01774 172400 SUB 3,2
34 01775 151400 INC 2,2
35 01776 002401 JMP @SCRET
36 01777 000000 SCRET: 0
37 02000 000000 WORK: 0
```

A 0035 ,MAIN

```
01
02
03
04
05
06
07
08 02001 006323 QUEST: MESSAGE
09 02002 004444 MSG43
10 02003 102520 CMDST: SUBZL 0,0
11 02004 040156 STA 0,CSIF
12 02005 060210 NIOC TTI
13 02006 060233 NIOC ,DSKP
14 02007 006324 PCRLF
15 02010 006323 MESSAGE
16 02011 004240 MSG17
17 02012 006330 INPUT
18 02013 000257 UBP
19 02014 000417 JMP CMD,2
20 02015 102400 SUB 0,0
21 02016 040160 STA 0,RDYUNT
22 02017 006326 GETATM
23 02020 125004 MOV 1,1,SZR
24 02021 000760 JMP QUEST
25 02022 024024 LDA 1,C4
26 02023 122432 SUBZ# 1,0,SZC
27 02024 000755 JMP QUEST
28 02025 040157 STA 0,UNIT
29 02026 101003 MOV 0,0,SNC
30 02027 000752 JMP QUEST
31 02030 000403 JMP CMD,2
32
33
34
35 02031 006323 MESSAGE
36 02032 004444 MSG43
37 02033 006324 CMD,2: PCRLF
38 02034 006323 MESSAGE
39 02035 004244 MSG18
40 02036 006330 INPUT
41 02037 000257 UBP
42 02040 000445 JMP GCS
43 02041 006326 GETATM
44 02042 125005 MOV 1,1,SNR
45 02043 000412 JMP CMD,3
46 02044 006325 SEARCH
47 02045 004117 DNT
48 02046 000763 JMP CMD,2=2
49 02047 025007 LDA 1,DNT.1-DNT,2
50 02050 046343 STA 1,@IRDAT
51 02051 046344 STA 1,@IWDAT
52 02052 101005 MOV 0,0,SNR
53 02053 000756 JMP CMD,2=2
54 02054 000431 JMP GCS
```

***** COMMAND STRING INTERPRETER *****

);GET COMMAND STRING PARAMETERS
);UNIT SELECT
); -?-
);SET THE CSI FLAG
);CLEAR TTI FLAG
);CLEAR DISK GARBAGE
);"UNIT: "
);ACCEPT INPUT
);SAME AS LAST TIME
);CLEAR ALL UNITS
);AC0=# AC1=NAME
);NAMES NOT LEGAL
);UNIT #>3
);MORE LEFT, ERROR

);DATA SELECT
); -?-
);"DATA: "
);ACCEPT INPUT
);SAME AS LAST TIME
);NO NAME, MUST BE #
);SEARCH NAME TABLE
);NOT FOUND
);NO CR FOLLOWING NAME
);GET COMMAND STRING

A 0036 .MAIN

```
01
02 02055 024261 CMD.3: LDA 1,VARST
03 02056 044020 STA 1,IDX0
04 02057 042020 STA 0,0IDX0
05 02060 024256 LDA 1,TERM
06 02061 125004 MOV 1,1,SZR
07 02062 000416 JMP CMD.5
08 02063 006326 CMD.4: GETATM
09 02064 125004 MOV 1,1,SZR
10 02065 000744 JMP CMD.2-2 ;NAMES NOT ALLOWED
11 02066 042020 STA 0,0IDX0
12 02067 101002 MOV 0,0,SZC
13 02070 000410 JMP CMD.5
14 02071 020262 LDA 0,VARED
15 02072 024020 LDA 1,IDX0
16 02073 122414 SUB# 1,0,SZR
17 02074 000767 JMP CMD.4
18 02075 006324 PCRLF
19 02076 006323 MESSAGE
20 02077 004261 MSG20
21
22 02100 020020 CMD.5: LDA 0,IDX0
23 02101 040263 STA 0,VARSP
24 02102 020333 LDA 0,IVAR
25 02103 042343 STA 0,0IRDAT
26 02104 042344 STA 0,0IWDAT
27
28
29
30 ;GET COMMAND STRING
31
32 02105 006324 GCS: PCRLF
33 02106 006323 MESSAGE
34 02107 004250 MSG10 ;"COMMAND STRING: "
35 02110 006330 INPUT ;ACCEPT INPUT
36 02111 000260 CSBP ;CMD STR BYTE POINTER
37 02112 000401 JMP .+1 ;SAME AS BEFORE
38 02113 063710 GCS.1: SKPDZ TTI
39 02114 000667 JMP CMDST ;INTERRUPT CMD STRING
40 02115 102000 ADC 0,0
41 02116 040155 STA 0,HSW
42 02117 006326 GETATM ;LINCT=BYTE POINTER
43 02120 006325 SEARCH
44 02121 004102 DCT ;NAME IN AC1
45 02122 000402 JMP CSER ;NOT FOUND
46 02123 003007 JMP 0DCT.1=DCT,2;DISPATCH
47
48 02124 006323 CSER: MESSAGE ;COMMAND STRING ERROR
49 02125 004444 MSG43 ; -?-
50 02126 000757 JMP GCS
```

A 0037 .MAIN

01

02

!READ COMMAND

03

04 02127 101002 RE1

MOV 0,0,SZC

05 02130 000774

JMP CSER

!CR TERMINATOR ILLEGAL

06 02131 006327

GETPAR

!GET R/W PARAMETERS

07 02132 020245

LDA 0,RELRA

!SET RAN # BEGIN

08 02133 040243

STA 0,RANDM

09 02134 006346

READ

!READ AND CHECK DATA

10 02135 006354

CKSW

!ERROR, LOOK AT SWITCHES

11 02136 000774

JMP .-4

!LOOP ON ERROR

12 02137 020256 RE1:

LDA 0,TERM

13 02140 101004

MOV 0,0,SZR

14 02141 000642

JMP CMDST

!ALL DONE

15 02142 000751

JMP GCS,1

!GET ANOTHER COMMAND

16

17

!WRITE COMMAND

18 02143 101002 WT:

MOV 0,0,SZC

19 02144 000760

JMP CSER

!CR TERMINATOR ILLEGAL

20 02145 006327

GETPAR

!GET R/W PARAMETERS

21 02146 020243

LDA 0,RANDM

!SAVE BEGIN OF RANDOM

22 02147 040245

STA 0,RELRA

!NUMBERS IN CASE OF LOOP

23 02150 020245

LDA 0,RELRA

!RESET RAN # BEGINNING IN

24 02151 040243

STA 0,RANDM

!THE SCOPE LOOP

25 02152 006347

WRITE

!GENERATE DATA AND WRITE

26 02153 006354

CKSW

!ERROR, CHECK SWITCHES

27 02154 000774

JMP .-4

!LOOP ON ERROR

28 02155 000762

JMP RE1

A 0038 .MAIN

```
01
02          ]SEEK COMMAND
03
04 02156 101002 SKI      MOV 0,0,SZC
05 02157 000745          JMP CSER          ]CR TERMINATOR ILLEGAL
06 02160 006326          GETATM          ]GET CYL # IN AC0
07 02161 152560          SUBCL 2,2
08 02162 050256          STA 2,TERM
09 02163 125004          MOV 1,1,SZR
10 02164 000740          JMP CSER          ]NAMES ILLEGAL
11 02165 030157          LDA 2,UNIT
12 02166 025051          LDA 1,CYLT,2     ]TO = CYL #
13 02167 045045          STA 1,CYLF,2     ]TO BECOMES FROM
14 02170 041051          STA 0,CYLT,2     ]SET NEW TO
15 02171 006350          SEEK           ]DO THE SEEK
16 02172 006354          CKSW           ]ERROR, LOOK AT SWITCHES
17 02173 000776          JMP .-2         ]LOOP ON ERROR
18 02174 000743          JMP RE1
19
20          ]RECALIBRATE
21
22 02175 102560 RCL:     SUBCL 0,0
23 02176 040256          STA 0,TERM       ]SAVE (C), 1=TERM
24 02177 006351          RECAL          ]RECALIBRATE
25 02200 006354          CKSW           ]ERROR, CHECK SWITCHES
26 02201 000776          JMP .-2         ]LOOP ON ERROR
27 02202 000735          JMP RE1
28
29          ]LOOP
30
31 02203 020260 LUP:     LDA 0,CSBP       ]RESET THE COMMAND STRING
32 02204 040250          STA 0,LINCT     ]BYTE POINTER
33 02205 102000          ADC 0,0         ]SET THE HEADER FLAG
34 02206 040155          STA 0,HSW
35 02207 000704          JMP GCS.1
36
37          ]DELAY
38
39 02210 101002 DLAY:    MOV 0,0,SZC
40 02211 000713          JMP CSER
41 02212 006326          GETATM          ]GET DELAY #
42 02213 125005          MOV 1,1,SNR
43 02214 101002          MOV 0,0,SZC     ]NAMES ILLEGAL
44 02215 000707          JMP CSER        ]CR TERM IS ILLEGAL
45 02216 100400          NEG 0,0
46 02217 006315          DLY12          ]12.5MS DELAY LOOP
47 02220 101404          INC 0,0,SZR
48 02221 000776          JMP .-2
49 02222 000671          JMP GCS.1
50
```


A 0039 .MAIN

```
01
02 ; *****
03 ; ***** DISK HANDLER SUBROUTINES *****
04 ; *****
05
06 ;RECALIBRATE
07 ;RETURN+1 FATAL ERROR
08 ;RETURN+3 NORMAL
09
10 02223 054274 RECL: STA 3,RWRET
11 02224 102400 SUB 0,0 ;SET THE PROGRAM MODE
12 02225 040164 STA 0,MODE
13 02226 030157 LDA 2,UNIT
14 02227 021020 LDA 0,UNTINS,2
15 02230 063233 DOCC 0,,DSKP ;SELECT UNIT
16 02231 020217 LDA 0,C1400
17 02232 061333 DOAP 0,,DSKP ;RECAL
18 02233 021051 LDA 0,CYLT,2
19 02234 041045 STA 0,CYLF,2 ;TO = FROM
20 02235 102000 ADC 0,0
21 02236 041051 STA 0,CYLT,2
22 02237 020232 LDA 0,M250. ;3 SECOND TIMER
23 02240 006341 JSR @WAT ;WAITING FOR INTERRUPT
24 02241 002274 JMP @RWRET ;TIMEOUT!!!
25 02242 025032 LDA 1,UNTDN,2 ;RECAL INT. RETURN
26 02243 107405 AND 0,1,SNR
27 02244 002352 PSTAT ;NO DONE STATUS
28 02245 124000 COM 1,1
29 02246 034225 LDA 3,CSP1 ;177677
30 02247 167400 AND 3,1
31 02250 107404 AND 0,1,SZR
32 02251 002352 PSTAT ;BAD STATUS
33 02252 000535 JMP GENRET
```

```

A 0040 .MAIN
01
02          ;SEEK SUBROUTINE
03          ;RETURN+3 NORMAL
04          ;RETURN+1 FATAL ERROR
05
06 02253 054274 .SEEK: STA 3,RWRET
07 02254 102520          SUBZL 0,0          ;SET THE PROGRAM MODE
08 02255 040164          STA 0,MODE
09 02256 030157          LDA 2,UNIT
10 02257 021026          LDA 0,UNTINS,2
11 02260 063233          DOCC 0,.DSKP      ;SELECT UNIT
12 02261 021051          LDA 0,CYLT,2      ;CYL #
13 02262 024173          LDA 1,C1000
14 02263 123000          ADD 1,0
15 02264 061333          DOAP 0,.DSKP      ;SEEK!!
16 02265 011061          ISZ SEEKT+4,2    ;COUNT SEEKS
17 02266 000402          JMP .+2
18 02267 011055          ISZ SEEKT,2      ;DOUBLE PRES.
19 02270 006360          INTWT          ;WAIT FOR INTERRUPT
20 02271 002274          JMP 0RWRET      ;TIMEOUT!!!
21
22 02272 025032          LDA 1,UNTON,2    ;INTERRUPT RETURN AC2=UNIT #
23 02273 107415          AND# 0,1,SNR      ;AC0 = STATUS
24 02274 000407          JMP SE.1        ;IMPROPER DONE STATUS
25 02275 124000          COM 1,1
26 02276 034225          LDA 3,CSP1        ;177677
27 02277 167400          AND 3,1
28 02300 107404          AND 0,1,SZR
29 02301 000402          JMP SE.1        ;WRONG STATUS
30 02302 000505          JMP GENRET
31
32 02303 024205 SE.1:   LDA 1,C40        ;SEEK ERR ??
33 02304 107404          AND 0,1,SZR
34 02305 011065          ISZ SEKER,2    ;COUNT SEEK ERRORS
35 02306 002352          PSTAT

```

```

A 0041 .MAIN
01
02
03          IWRITE SUBROUTINE
04          IRETURN+3, NORMAL
05          IRETURN+1, FATAL ERROR
06 02307 002326          WDATA+1          IRETRY ADDRESS
07 02310 054274 .WRITE: STA 3,RWRET
08 02311 020776          LDA 0,.WRITE=1 ISET THE RETRY ADDRESS
09 02312 040307          STA 0,RLUP
10 02313 020176          LDA 0,C3          ISET THE PROGRAM MODE
11 02314 040164          STA 0,MODE
12 02315 102000          ADC 0,0
13 02316 040271          STA 0,AECNT
14 02317 040272          STA 0,CWCNT
15 02320 102400          SUB 0,0
16 02321 040163          STA 0,FATAL          ICLEAR FATAL FLAG
17 02322 020252          LDA 0,SC
18 02323 040306          STA 0,.SC          I# SECTORS TO XFER
19 02324 006331          GEN
20 02325 000000 WDATA: 0          IADDR OF DATA GEN ROUT
21 02326 006335          SETP          ISET PARAMETERS
22 02327 020174          LDA 0,C400
23 02330 061133          DOAS 0,.DSKP          IWRITE
24 02331 006360          INTWT          IWAIT FOR INTERRUPT
25 02332 002274          JMP 0RWRET          ITIMEOUT
26
27 02333 101113          MOVL# 0,0,9NC          IINTERRUPT RETURN
28 02334 000475          JMP RE.1          INO R/W DONE FLAG
29 02335 024227          LDA 1,CSP3          I077666
30 02336 107404          AND 0,1,8ZR
31 02337 000472          JMP RE.1          IFATAL STATUS
32 02340 024025          LDA 1,C10
33 02341 107404          AND 0,1,8ZR
34 02342 000471          JMP RE.2          IADDRESS ERROR
35 02343 061433          DIB 0,.DSKP          IREAD MEM ADDR
36 02344 024252          LDA 1,SC          ISECTOR COUNT
37 02345 125300          MOVS 1,1          IWORD COUNT
38 02346 034254          LDA 3,CA          ISTARTING ADDRESS
39 02347 167000          ADD 3,1
40 02350 125400          INC 1,1
41 02351 125400          INC 1,1          IADDR+WC SHOULD EQUAL
42 02352 106414          SUB# 0,1,8ZR          ITHE ENDING ADDRESS
43 02353 000442          JMP WE.1          IERROR

```

A 0042 .MAIN

```
01
02 02354 020252 .W1: LDA 0,SC          /FIND ENDING DISK
03 02355 040300      STA 0,CSC        /ADDRESS
04 02356 006355      JSR @ISCNT       /AC0=SECT, AC1=HEAD
05 02357 101004      MOV 0,0,SZR      /IF THE SECT = 0 THE LAST
06 02360 000404      JMP .+4          /ICR HEAD DID NOT OCCUR
07 02361 020171      LDA 0,LS          /SECT = LAST SECT
08 02362 124400      NEG 1,1          /HEAD =1
09 02363 124000      COM 1,1
10 02364 030157      LDA 2,UNIT
11 02365 035026      LDA 3,UNITS,2    /FORM THE ENDING DISK
12 02366 125300      MOVS 1,1        /ADDRESS AS READ BY "DIC"
13 02367 167000      ADD 3,1
14 02370 103120      ADDZL 0,0
15 02371 103120      ADDZL 0,0        / SECT*4
16 02372 107000      ADD 0,1        /EXPECTED ADDRESS
17 02373 062433      DIC 0,.DSKP    /READ ACTUAL
18 02374 106414      SUB# 0,1,SZR
19 02375 000426      JMP WE.2        /ENDING DISK ADDRESS ERROR
20
21 02376 020252 .W2: LDA 0,SC          /ADD WORDS WRITTEN
22 02377 101300      MOVS 0,0        /TO TOTAL COUNT
23 02400 025075      LDA 1,WDSW+4,2
24 02401 107022      ADDZ 0,1,SZC    /DOUBLE PRECISION
25 02402 011071      ISZ WDSW,2
26 02403 045075      STA 1,WDSW+4,2
27 02404 020163      LDA 0,FATAL     /WAS THERE A FATAL ERROR ?
28 02405 101004      MOV 0,0,SZR
29 02406 002274      JMP @RWRET      /ERROR RETURN
30 02407 020165 GENRET: LDA 0,LUPSW    /IS THE LOOP SWITCH ON ?
31 02410 101004      MOV 0,0,SZR
32 02411 002274      JMP @RWRET      /ERROR RETRUN
33 02412 010274      ISZ RWRET
34 02413 010274      ISZ RWRET
35 02414 002274      JMP @RWRET      /NORMAL RETURN
36
37 02415 004547 WE.1: JSR SWCE          /ENDING MEM ADDR ERROR
38 02416 004512      MSG57          /IDENTIFIER
39 02417 030157      LDA 2,UNIT
40 02420 011151      ISZ MISC,2      /COUNT AS MISC TYPE ERROR
41 02421 010163      ISZ FATAL       /SET FATAL FLAG
42 02422 000732      JMP .W1         /GO ON
43
44 02423 004541 WE.2: JSR SWCE          /ENDING DISK ADDR ERROR
45 02424 004622      MSG67
46 02425 030157      LDA 2,UNIT
47 02426 011151      ISZ MISC,2      /COUNT AS MISC TYPE ERROR
48 02427 010163      ISZ FATAL       /SET FATAL FLAG
49 02430 000746      JMP .W2         /GO ON
```

A 0043	.MAIN				
01					
02	02431	011151	RE.1:	ISZ MISC,2	ICOUNT AS MISC TYPE ERROR
03	02432	002352		PSTAT	IPRINT STATUS & ERR RETURN
04					
05	02433	006353	RE.2:	HEADER	IADDRESS ERROR
06	02434	006324		PCRLF	
07	02435	006323		MESSAGE	
08	02436	004361		MSG29	I"ADDRESS ERROR"
09	02437	030157		LDA 2,UNIT	
10	02440	010271		ISZ AECNT	IADDRESS ERROR COUNTER
11	02441	000410		JMP RE.21	I2ND FAILURE IN A ROW
12	02442	011121		ISZ ADDER,2	IFIRST FAILURE
13	02443	020270	RE.20:	LDA 0,EVODN	IIF TWO COMPUTERS
14	02444	101004		MOV 0,0,SZR	IDON'T TRY AGAIN
15	02445	002274		JMP 0RWRET	IHEADS MAY HAVE MOVED
16	02446	006324		PCRLF	
17	02447	006323		MESSAGE	
18	02450	004552		MSG63	I"TRY AGAIN"
19	02451	020245		LDA 0,RELRA	IRESET RAN # GEN FOR
20	02452	040243		STA 0,RANDM	ITHE RETRY
21	02453	102400		SUB 0,0	
22	02454	040162		STA 0,RETRY	ICLEAR RETRY SWITCH
23	02455	062677		IORST	
24	02456	002307		JMP 0RLUP	IDO IT AGAIN
25					
26	02457	011125	RE.21:	ISZ PADER,2	ICOUNT PERM ADDR ERRS
27	02460	002274		JMP 0RWRET	IERROR RETURN
28					
29	02461	060477	RE.3:	READS 0	ICHECK WORD ERROR
30	02462	103120		ADDZL 0,0	
31	02463	103122		ADDZL 0,0,SZC	IIF SW3=1 DON'T PRINT
32	02464	000405		JMP ,+5	
33	02465	006353		HEADER	
34	02466	006324		PCRLF	
35	02467	006323		MESSAGE	
36	02470	004557		MSG64	I"CHECK WORD ERROR"
37	02471	030157		LDA 2,UNIT	
38	02472	010272		ISZ CWCNT	ICHECK WORD ERR COUNTER
39	02473	000404		JMP RE.31	I2ND ERROR IN A ROW
40	02474	011111		ISZ CWER,2	IFIRST ERROR
41	02475	010162		ISZ RETRY	ISET RETRY FLAG
42	02476	000403		JMP RE.32	
43	02477	011115	RE.31:	ISZ CWERP,2	ICOUNT PERM CHK WD ERRS
44	02500	010163		ISZ FATAL	ISET FATAL FLAG
45	02501	020254	RE.32:	LDA 0,CA	ITHE CHECK WORD ERROR MAY
46	02502	065433		DIB 1,,DSKP	IHAVE STOPPED THE DATA
47	02503	106400		SUB 0,1	ITRANSFER PREMATURELY.
48	02504	020221		LDA 0,C174H	IFIND THE # OF SECTORS
49	02505	123705		ANDS 1,0,SNR	ITRANSFERRED AND SAVE IT
50	02506	102520		SUBZL 0,0	IFOR THE DATA COMPARE ROUTINE.
51	02507	040306		STA 0,,SC	ITIT MUST BE AT LEAST ONE.
52	02510	000536		JMP .R1	

A 0044 .MAIN

01					
02	02511	030157	RE.41	LDA 2,UNIT	!DATA ERROR
03	02512	020272		LDA 0,CWCNT	
04	02513	010273		ISZ DACNT	!DATA ERROR COUNTER
05	02514	000422		JMP RE.44	!2ND DATA ERROR
06	02515	010162		ISZ RETRY	!SET THE RETRY FLAG
07	02516	101404		INC 0,0,SZR	!FIRST DATA ERROR
08	02517	000403		JMP RE.41	!DATA AND CHECK WORD ERROR
09	02520	011131		ISZ DATER,2	!NO CHK WD ERR
10	02521	000530		JMP .R2	!GO ON
11	02522	024163	RE.41:	LDA 1,FATAL	
12	02523	125004		MOV 1,1,SZR	
13	02524	000405		JMP RE.43	!2 CHECK WORD ERRORS
14	02525	015111		DSZ CWER,2	!ONLY 1 CHECK WORD ERROR
15	02526	000401		JMP .+1	!SKIPS SOMETIMES
16					
17	02527	011135	RE.42:	ISZ CWDE,2	!COUNT CHK WD & DATA ERRS
18	02530	000521		JMP .R2	!GO ON
19	02531	015115	RE.43:	DSZ CWERP,2	!DON'T COUNT FATAL CHK WD ERR
20	02532	000401		JMP .+1	
21	02533	102400		SUB 0,0	!RESET FATAL ERROR FOR NOW
22	02534	040163		STA 0,FATAL	
23	02535	000772		JMP RE.42	!TRY IT A 3RD TIME
24	02536	024163	RE.44:	LDA 1,FATAL	!FATAL=NON-ZERO IF 2 CHK WD ERR
25	02537	125004		MOV 1,1,SZR	
26	02540	000403		JMP RE.45	!DATA & CHK WD ERR
27	02541	011145		ISZ PDER,2	!DATA ERR ONLY
28	02542	000404		JMP RE.46	!2ND ONE IS FATAL
29	02543	015115	RE.45:	DSZ CWERP,2	!DISCOUNT PERM CHK WD ERR
30	02544	000401		JMP .+1	
31	02545	011141		ISZ CWDEP,2	!COUNT PERM COMBO ERR
32	02546	010163	RE.46:	ISZ FATAL	!SET THE FATAL FLAG
33	02547	000502		JMP .R2	!GO ON

```

A 0045 .MAIN
01
02 02550 004414 RE.5: JSR SWCE          ;ENDING MEM ADDR ERR
03 02551 004512      MSG67          ;IDENTIFIER
04 02552 030157      LDA 2,UNIT
05 02553 011151      ISZ MISC,2
06 02554 010163      ISZ FATAL          ;IT'S FATAL
07 02555 000503      JMP .R3
08
09 02556 004406 RE.6: JSR SWCE          ;ENDING DISK ADDR ERROR
10 02557 004622      MSG67          ;IDENTIFIER
11 02560 030157      LDA 2,UNIT
12 02561 011151      ISZ MISC,2          ;COUNT AS MISC TYPE ERR
13 02562 010163      ISZ FATAL          ;IT'S FATAL
14 02563 000532      JMP .R4
15
16                      ;SA + WC ERROR
17                      JAC0 = BAD, AC1 = GOOD
18
19 02564 054423 SWCE1: STA 3,SWCRET
20 02565 035400      LDA 3,0,3          ;GET ERROR IDENTIFIER
21 02566 054405      STA 3,SWCE1
22 02567 006316      SAVAC
23 02570 006353      HEADER
24 02571 006324      PCRLF
25 02572 006323      MESSAGE
26 02573 000000 SWCE1: 0
27 02574 006324      PCRLF
28 02575 006323      MESSAGE
29 02576 004464      MSG51          ;"GOOD"
30 02577 024240      LDA 1,SAV1
31 02600 006321      TYPAC1
32 02601 006323      MESSAGE
33 02602 004467      MSG52          ;"BAD"
34 02603 024237      LDA 1,SAV0
35 02604 006321      TYPAC1
36 02605 010402      ISZ SWCRET
37 02606 002401      JMP 0SWCRET
38 02607 000000 SWCRET: 0

```

A 0046 .MAIN

01				
02			IRREAD SUBROUTINE	
03			IRETURN+3, NORMAL	
04			IRETURN+1, FATAL ERROR	
05				
06				
07	02610	002625	RSRD	IRETRY ADDRESS
08	02611	054274	.READ: STA 3,RWRET	
09	02612	020776	LDA 0,.READ-1	IRETRY ADDRESS
10	02613	040307	STA 0,RLUP	
11	02614	020023	LDA 0,C2	IRETRY ADDRESS
12	02615	040164	STA 0,MODE	
13	02616	102000	ADC 0,0	
14	02617	040271	STA 0,AECNT	IRETRY ADDRESS
15	02620	040272	STA 0,CWCNT	
16	02621	040273	STA 0,DACNT	
17	02622	102400	SUB 0,0	
18	02623	040162	STA 0,RETRY	IRETRY ADDRESS
19	02624	040163	STA 0,FATAL	IRETRY ADDRESS
20	02625	006334	RSRD: CLRFB	IRETRY ADDRESS
21	02626	006335	SETP	IRETRY ADDRESS
22	02627	102400	SUB 0,0	
23	02630	061133	DOAS 0,.DSKP	IRETRY ADDRESS
24	02631	006360	INTWT	IRETRY ADDRESS
25	02632	002274	JMP 0RWRET	IRETRY ADDRESS
26				
27	02633	101113	MOVL# 0,0,SNC	IRETRY ADDRESS
28	02634	002501	JMP 0IRE1	IRETRY ADDRESS
29	02635	024224	LDA 1,CSP	IRETRY ADDRESS
30	02636	107404	AND 0,1,SZR	IRETRY ADDRESS
31	02637	002476	JMP 0IRE1	IRETRY ADDRESS
32	02640	024025	LDA 1,C10	IRETRY ADDRESS
33	02641	107404	AND 0,1,SZR	IRETRY ADDRESS
34	02642	002474	JMP 0IRE2	IRETRY ADDRESS
35	02643	024024	LDA 1,C4	IRETRY ADDRESS
36	02644	107404	AND 0,1,SZR	IRETRY ADDRESS
37	02645	000614	JMP RE.3	IRETRY ADDRESS
38				
39	02646	006332	.R1: CHECK	IRETRY ADDRESS
40	02647	000000	RDATA: 0	IRETRY ADDRESS
41	02650	000641	JMP RE.4	IRETRY ADDRESS
42				
43	02651	061433	.R2: DIB 0,.DSKP	IRETRY ADDRESS
44	02652	024306	LDA 1,.SC	IRETRY ADDRESS
45	02653	125300	MOVS 1,1	IRETRY ADDRESS
46	02654	030254	LDA 2,CA	IRETRY ADDRESS
47	02655	147000	ADD 2,1	IRETRY ADDRESS
48	02656	106414	SUB# 0,1,SZR	IRETRY ADDRESS
49	02657	000671	JMP RE.5	IRETRY ADDRESS

A 0047 .MAIN

```
01
02 02660 020306 .R3: LDA 0,.SC ;FIND ENDING DISK ADDR
03 02661 040300 STA 0,CSC
04 02662 006355 JSR 0ISCNT ;AC0=SECT AC1=HEAD
05 02663 034306 LDA 3,.SC ;IF .SC NOT = SC A CHK WD ERR
06 02664 030252 LDA 2,SC ;TERMINATED THE DATA XFER
07 02665 172414 SUB# 3,2,SZR
08 02666 000406 JMP 0,+6 ;CHK WD ERR
09 02667 101004 MOV 0,0,SZR ;IF SECT = 0 NO HEAD ICR
10 02670 000404 JMP 0,+4 ;OCCURRED AT THE END OF
11 02671 020171 LDA 0,LS ;THE DATA TRANSFER
12 02672 124400 NEG 1,1 ;SECT = LAST SECTOR ON DISK
13 02673 124000 COM 1,1 ;HEAD = HEAD-1
14 02674 030157 LDA 2,UNIT
15 02675 035026 LDA 3,UNTINS,2
16 02676 125300 MOVS 1,1 ;FORM THE DISK ADDR
17 02677 167000 ADD 3,1 ;WORD AS READ VIA "DIC"
18 02700 103120 ADDZL 0,0
19 02701 103120 ADDZL 0,0 ; SECT+4
20 02702 107000 ADD 0,1
21 02703 020306 LDA 0,.SC ;# SECT XFERRED
22 02704 030252 LDA 2,SC ;# SECT SPECIFIED
23 02705 112400 SUB 0,2 ;AC2= # SECT NOT XFERRED
24 02706 020201 LDA 0,C17
25 02707 150400 NEG 2,2
26 02710 113400 AND 0,2 ;FINALLY AC0= EXPECTED
27 02711 147000 ADD 2,1 ;DISK ADDRESS
28 02712 062433 DIC 0,.DSKP ;READ ACTUAL
29 02713 106414 SUB# 0,1,SZR
30 02714 000642 JMP RE.6 ;ENDING DISK ADDR ERROR
31
32 02715 030157 .R4: LDA 2,UNIT ;ADD WORDS READ TO TOTAL
33 02716 020306 LDA 0,.SC
34 02717 101300 MOVS 0,0
35 02720 025105 LDA 1,WDSR+4,2 ;DOUBLE PRECISION
36 02721 107022 ADDZ 0,1,SZC
37 02722 011101 ISZ WDSR,2
38 02723 045105 STA 1,WDSR+4,2
39 02724 020163 LDA 0,FATAL ;END OF TEST
40 02725 101004 MOV 0,0,SZR ;WHAT TO DO NOW
41 02726 002274 JMP 0RWRET ;(FATAL) ERROR RETURN
42 02727 020162 LDA 0,RETRY
43 02730 101005 MOV 0,0,SNR
44 02731 002403 JMP 0,+3 ;DO NORMAL RETURN
45 02732 002401 JMP 0,+1 ;TRY AGAIN
46 02733 002443 RE.20
47 02734 002407 GENRET
48
49 02735 002431 IRE1: RE.1
50 02736 002433 IRE2: RE.2
```

A 0048 .MAIN

```
01
02 ; *****
03 ; **** GENERAL PURPOSE SUBROUTINES ****
04 ; *****
05
06 ;GET CYL(MAYBE)=HEAD=SECTOR=SECTOR COUNT
07 ;SET (C)=1 ON RETURN IF CR TERMINATOR
08
09 02737 054433 HSS: STA 3,HSSRET
10 02740 006326 GETATM ;GET "SAME", OR HEAD #
11 02741 034255 LDA 3,SAM ;AC0=# AC1= NAME
12 02742 136415 SUB# 1,3,SNR
13 02743 000424 JMP HSS.1 ;"SAME"
14 02744 125003 MOV 1,1,SNC
15 02745 125004 MOV 1,1,SZR
16 02746 002345 JMP @IGCS ;OTHER NAMES OR CR ILLEGAL
17 02747 024170 LDA 1,LHD ;CHECK HEAD LIMIT
18 02750 106437 SUBZ# 0,1,SNB
19 02751 002357 JMP @IGUST ;LIMIT EXCEEDED
20 02752 040253 STA 0,HD ;HEAD #
21 02753 006326 GETATM ;GET SECTOR #
22 02754 125003 MOV 1,1,SNC ;AC0=# AC1=NAME
23 02755 125004 MOV 1,1,SZR
24 02756 002345 JMP @IGCS ;NAME OR CR TERM ILLEGAL
25 02757 024171 LDA 1,LS ;CHECK SECT # LIMIT
26 02760 106437 SUBZ# 0,1,SNB
27 02761 002357 JMP @IGUST ;LIMIT EXCEEDED
28 02762 040251 STA 0,SEC ;SECTOR #
29 02763 006326 GETATM ;GET # OF SECTORS
30 02764 125004 MOV 1,1,SZR
31 02765 002345 JMP @IGCS ;NAME ILLEGAL
32 02766 040252 STA 0,SC ;# OF SECTORS
33 02767 102560 HSS.1: SUBCL 0,0
34 02770 040256 STA 0,TERM
35 02771 002401 JMP @HSSRET
36 02772 000000 HSSRET: 0
37 02773 000000 HIADD: 0 ;I/O ADDRESS MODIFICATION, HI END
38
39
40 ; CHECK SWITCH REGISTER ON ERROR.
41 ; IF SW0 = 0 HALT
42 ; IF SW2 = 1 DO RETURN +1 (SCOPE LOOP)
43 ; IF SW2 = 0 DO RETURN +2
44
45 02774 060477 .CSW: READS 0
46 02775 101103 MOVL 0,0,SNC
47 02776 063077 HALT ;HALT ON ERROR
48 02777 062677 IORST
49 03000 060477 READS 0 ;READ SWITCHES AGAIN IN CASE
50 03001 101120 MOVZL 0,0 ;THEY WERE CHANGED.
51 03002 103103 ADDL 0,0,SNC
52 03003 175401 INC 3,3,SKP ;NORMAL RETURN
53 03004 102521 SUBZL 0,0,SKP ;SET LOOP SWITCH
54 03005 102400 SUB 0,0
55 03006 040165 STA 0,LUPSW
56 03007 001400 JMP 0,3
57
58 .EOT
```

```

0049 .MAIN
01
02          ;SEARCH ROUTINE
03
04          ;CALL  SEARCH          AC1=NAME
05          ;          TABLE ADDR.
06          ;          RETURN = NOT FOUND
07          ;          RETURN = FOUND, AC2=POINTER
08
09 03010 031400 SRH1  LDA 2,0,3          ;AC2=TABLE ADDRESS
10 03011 021000      LDA 0,0,2
11 03012 101005      MOV 0,0,SNR
12 03013 001401      JMP 1,3          ;NOT FOUND
13 03014 122415      SUB# 1,0,SNR
14 03015 001402      JMP 2,3          ;FOUND
15 03016 151400      INC 2,2
16 03017 000772      JMP SRH+1
17
18
19          ;SIZE MEMORY, 4K SEGMENTS
20
21 03020 152400 SM1   SUB 2,2
22 03021 020034      LDA 0,C10K
23 03022 113000 SM.11 ADD 0,2
24 03023 151112      MOVL# 2,2,SZC
25 03024 000405      JMP SM.2          ;32K MACHINE
26 03025 051000      STA 2,0,2          ;STORE
27 03026 025000      LDA 1,0,2          ;READ BACK
28 03027 146405      SUB 2,1,SNR
29 03030 000772      JMP SM.1
30 03031 024212 SM.21 LDA 1,C177
31 03032 132400      SUB 1,2          ;PROTECT LOADERS
32 03033 050266      STA 2,CMEND
33 03034 020247      LDA 0,LAST
34 03035 112400      SUB 0,2
35 03036 020222      LDA 0,C170K      ;HOW MANY SECTORS WILL MEM
36 03037 143414      AND# 2,0,SZR      ;ALLOW
37 03040 000413      JMP SM.4          ;MAXIMUM, 20 OCTAL
38 03041 020220      LDA 0,C7400
39 03042 113700      ANDS 0,2          ;ROOM FOR 17 OR LESS
40 03043 050267      STA 2,SMAX       ;MAX SECTOR COUNT
41 03044 126400      SUB 1,1
42 03045 125140      MOVOL 1,1        ;GENERATE # SECTORS
43 03046 151224      MOVZR 2,2,SZR   ; MASK
44 03047 000776      JMP .-2
45 03050 125300 SM.31 MOVS 1,1
46 03051 044305      STA 1,LMSK
47 03052 001400      JMP 0,3
48
49
50 03053 024201 SM.41 LDA 1,C17
51 03054 121400      INC 1,0
52 03055 040267      STA 0,SMAX       ;MAX SECT CNT=20
53 03056 000772      JMP SM.3

```

A 0050 .MAIN

```
01
02          ;LINE SCAN SUBROUTINE
03          ;BYTE POINTER IS LINCT
04
05          ;CALL  GETATM
06          ;      RETURN = AC0 = #
07          ;      AC1=NAME
08          ;      (C)=1 IF CR DELIMITER
09
10 03057 020510 GA.01 LDA 0,FIND
11 03060 101005      MOV 0,0,SNR
12 03061 000413      JMP GA.1          ;NO NAME OR # YET
13 03062 020250      LDA 0,LINCT
14 03063 040502      STA 0,SLNCT      ;REMEMBER LINCT
15 03064 040502      STA 0,SRCH      ;SET SEARCH FLAG
16 03065 000407      JMP GA.1
17
18 03066 054474 GATM: STA 3,GARET
19 03067 102400      SUB 0,0
20 03070 040473      STA 0,ANAM
21 03071 040473      STA 0,ANUM
22 03072 040474      STA 0,SRCH
23 03073 040474      STA 0,FIND
24 03074 030250 GA.1: LDA 2,LINCT
25 03075 010250      ISZ LINCT
26 03076 151220      MOVZR 2,2
27 03077 021000      LDA 0,0,2
28 03100 024216      LDA 1,C377
29 03101 101002      MOV 0,0,SZC
30 03102 101300      MOVS 0,0
31 03103 123400      AND 1,0          ;(AC0)R = BYTE
32 03104 024205      LDA 1,C40
33 03105 122415      SUB# 1,0,SNR
34 03106 000751      JMP GA.0          ;SPACE DELIMITER
35 03107 024206      LDA 1,C54
36 03110 122415      SUB# 1,0,SNR
37 03111 000746      JMP GA.0          ;COMMA DELIMITER
38 03112 024215      LDA 1,C215
39 03113 122415      SUB# 1,0,SNR
40 03114 000442      JMP EXIT        ;CR DELIMITER
41 03115 024451      LDA 1,SRCH
42 03116 125004      MOV 1,1,SZR
43 03117 000434      JMP EX.1        ;SEARCH FLAG ON
44 03120 030207      LDA 2,C60
45 03121 034210      LDA 3,C67
46 03122 102033      ADCZ# 3,0,SNC
47 03123 112032      ADCZ# 0,2,SZC
48 03124 000412      JMP ASSN        ;NOT #
49 03125 024177      LDA 1,C7
50 03126 123400      AND 1,0
51 03127 024435      LDA 1,ANUM
52 03130 127120      ADDZL 1,1        ;ASSEMBLE OCTAL #
53 03131 125120      MOVZL 1,1
54 03132 123000      ADD 1,0
55 03133 040431      STA 0,ANUM
56 03134 010433      ISZ FIND
57 03135 000737      JMP GA.1        ;GET MORE
```

```

A 0051 .MAIN
01
02 03136 024204 ASSN: LDA 1,C37          1ASSEMBLE NAME
03 03137 123400          AND 1,0
04 03140 024423          LDA 1,ANAM
05 03141 030223          LDA 2,C176K      13 LETTERS YET ?
06 03142 133404          AND 1,2,SZR
07 03143 000731          JMP GA.1         1YES, IGNORE THE REST
08 03144 127120          ADDZL 1,1
09 03145 127120          ADDZL 1,1         15 LEFT
10 03146 125120          MOVZL 1,1
11 03147 123000          ADD 1,0
12 03150 040413          STA 0,ANAM
13 03151 010416          ISZ FIND
14 03152 000722          JMP GA.1         1GET MORE
15
16 03153 020412 EX.1:  LDA 0,SLNCT
17 03154 040250          STA 0,LINCT
18 03155 101021          MOVZ 0,0,SKP    1CLEAR CARRY
19 03156 101040 EXIT:  MOV0 0,0        1SET CARRY
20 03157 020405          LDA 0,ANUM
21 03160 024403          LDA 1,ANAM
22 03161 002401          JMP 0GARET
23
24 03162 000000 GARET:  0
25 03163 000000 ANAM:   0
26 03164 000000 ANUM:   0
27 03165 000000 SLNCT:  0
28 03166 000000 SRCH:   0
29 03167 000000 FIND:   0

```

A 0052 .MAIN

01					
02				PRINT HEADER	
03					
04	03170	010155	HED:	ISZ HSW	PRINT HEADER ONLY ONCE
05	03171	001400		JMP 0,3	FOR EACH COMPLETE TEST
06	03172	054440		STA 3,HRET	
07	03173	020440		LDA 0,HRET+1	THE MODE DETERMINES
08	03174	030164		LDA 2,MODE	THE TYPE OF OPERATION
09	03175	113000		ADD 0,2	IN PROGRESS
10	03176	021000		LDA 0,0,2	
11	03177	040404		STA 0,HED.1	
12	03200	006324		PCRLF	
13	03201	006324		PCRLF	
14	03202	006323		MESSAGE	
15	03203	000000	HED.1:	0	"RECAL OR SEEK, ETC.
16	03204	006323		MESSAGE	
17	03205	004447		MSG44	CYL=
18	03206	030157		LDA 2,UNIT	
19	03207	025051		LDA 1,CYLT,2	
20	03210	006322		TYPZ1	
21	03211	006323		MESSAGE	
22	03212	004452		MSG45	HEAD=
23	03213	024253		LDA 1,HD	
24	03214	006322		TYPZ1	
25	03215	006323		MESSAGE	
26	03216	004455		MSG46	SECT=
27	03217	024251		LDA 1,SEC	
28	03220	006322		TYPZ1	
29	03221	006323		MESSAGE	
30	03222	004460		MSG47	#SECT=
31	03223	024252		LDA 1,SC	
32	03224	006322		TYPZ1	
33	03225	006323		MESSAGE	
34	03226	004240		MSG17	UNIT:
35	03227	024157		LDA 1,UNIT	
36	03230	006322		TYPZ1	
37	03231	002401		JMP 0HRET	
38	03232	000000	HRET:	0	
39	03233	003234		.+1	
40	03234	004163		MSG2	00 RECAL
41	03235	004167		MSG3	01 SEEK
42	03236	004413		MSG32	02 READ
43	03237	004416		MSG33	03 WRITE

```

A 0053 .MAIN
01
02
03
04 03240 102541 C1      SUBOL 0,0,SKP      ;CHECK DATA...
05 03241 102520 G1      SUBZL 0,0          ;GENERATE DATA...
06 03242 040514          STA 0,FSTGC        ;C(CA)=START ADDRESS
07 03243 054511          STA 3,GRET         ;C(SC) =NUMBER OF SECTORS
08 03244 021400          LDA 0,0,3         ;WORD FOLLOWING THE CALL
09 03245 040512          STA 0,PATT        ;DEFINES THE PATTERN.
10 03246 010500          ISZ GRET
11 03247 020261          LDA 0,VARST
12 03250 040264          STA 0,VARPT
13 03251 020254          LDA 0,CA
14 03252 040020          STA 0,IDX0
15 03253 014020          DSZ IDX0
16 03254 020300          LDA 0,.SC
17 03255 101300          MOVS 0,0
18 03256 100400          NEG 0,0
19 03257 040501          STA 0,GWC
20 03260 014476          DSZ FSTGC        ;GEN/CHECK FIRST SWITCH
21 03261 000446          JMP CC
22 03262 006475 GG1     JSR @PATT        ;GENERATE DATA
23 03263 042020          STA 0,@IDX0     ;STORE IN MEMORY
24 03264 010474          ISZ GWC
25 03265 000775          JMP GG
26 03266 002466          JMP @GRET
27
28
29 03267 070477 CKER:   READS 2          ;IF SW3=1 DON'T PRINT ERRORS
30 03270 153120          ADDZL 2,2
31 03271 153122          ADDZL 2,2,SZC
32 03272 000432          JMP CK4
33 03273 054462          STA 3,CKRET     ;A ERROR DETECTED
34 03274 044465          STA 1,BAD
35 03275 040465          STA 0,GOOD
36 03276 010460          ISZ FSTGC
37 03277 000405          JMP CK1        ;DON'T PRINT HEADER
38 03300 006353          HEADER        ;"ADDR GOOD BAD WORD
39 03301 006324          PCRLF        ;ETC.
40 03302 006323          MESSAGE
41 03303 004301          MSG22
42 03304 030452 CK1:   LDA 2,FSTGC
43 03305 176120          ADCZL 3,3
44 03306 157036          ADDZ# 2,3,SEZ
45 03307 002446          JMP @CKRET     ;EXIT IF>3 ERRORS.

```

A 0054 .MAIN

```
01
02 03310 006324 PCRLF
03 03311 024020 LDA 1,IDX0
04 03312 006322 TYPZ1 ;PRINT ADDRESS
05 03313 024447 LDA 1,GOOD
06 03314 006321 TYPAC1 ;GOOD DATA
07 03315 024444 LDA 1,BAD
08 03316 006321 TYPAC1 ;BAD DATA
09
10 03317 020254 LDA 0,CA
11 03320 024020 LDA 1,IDX0
12 03321 106400 SUB 0,1
13 03322 006322 TYPZ1 ;WORD#
14 03323 002432 JMP #CKRET
15
16 03324 010432 CK4: ISZ FSTGC ;COUNT ERRORS
17 03325 000401 JMP .+1
18 03326 001400 JMP 0,3 ;RETURN
19
20 03327 006430 CC1 JSR #PATT ;CHECK THE DATA
21 03330 026020 LDA 1,#IDX0
22 03331 106414 SUB# 0,1,SZR
23 03332 004735 JSR CKER ;CHECK ERROR
24 03333 010425 ISZ GWC
25 03334 000773 JMP CC
26 03335 010421 ISZ FSTGC ;ANY ERRORS ??
27 03336 000402 JMP .+2
28 03337 000413 JMP CC1 ;NO, EXIT
29 03340 060477 READS 0 ;IF SW3#1 DONIT PRINT ERRORS
30 03341 103120 ADDZL 0,0
31 03342 103122 ADDZL 0,0,SZC
32 03343 002411 JMP #GRET
33 03344 006324 PCRLF ;YES, PRINT THE
34 03345 024411 LDA 1,FSTGC ;TOTAL # OF ERRORS
35 03346 006322 TYPZ1
36 03347 006323 MESSAGE
37 03350 004506 MSG56 ;"ERRORS"
38 03351 002403 JMP #GRET
39
40 03352 010402 CC1: ISZ GRET ;NORMAL RETURN + 2
41 03353 002401 JMP #GRET
42
43 03354 000000 GRET: 0
44 03355 000000 CKRET: 0
45 03356 000000 FSTGC: 0
46 03357 000000 PATT: 0
47 03360 000000 GWC: 0
48 03361 000000 BAD: 0
49 03362 000000 GOOD: 0
```


A 0055 .MAIN

01

02

OPERATOR SPECIFIED WORDS

03

04 03363 054413 VAR.0: STA 3,VARET

05 03364 010264 ISZ VARPT

06 03365 030264 LDA 2,VARPT

07 03366 034263 LDA 3,VARSP

08 03367 172015 ADC# 3,2,SNR

09 03370 000403 JMP VAR.1 JEND INPUT

10 03371 021000 LDA 0,0,2

11 03372 002404 JMP 0VARET

12 03373 030261 VAR.1: LDA 2,VARST

13 03374 050264 STA 2,VARPT

14 03375 000767 JMP VAR.0+1

15

16 03376 000000 VARET: 0

17

18

19

20

RANDOM NUMBER GENERATOR

21

22 03377 054431 RAN: STA 3,.UD03 JGENERATE A RANDOM

23 03400 050427 STA 2,.UD02

24 03401 044425 STA 1,.UD01

25 03402 020243 LDA 0,RANDOM JNUMBER IN ACC

26 03403 004410 JSR .UD50

27 03404 034426 LDA 3,.UD20

28 03405 163000 ADD 3,0

29 03406 040243 STA 0,RANDOM JSTORE NEW VALUE.

30 03407 111100 MOVL 0,2

31 03410 030417 LDA 2,.UD02

32 03411 024415 LDA 1,.UD01

33 03412 002416 JMP 0,UD03

34

35 03413 024420 .UD50: LDA 1,.UD21 JRANDOM CONTINUED

36 03414 044415 STA 1,.UD10

37 03415 105120 MOVZL 0,1

38 03416 125120 MOVZL 1,1

39 03417 014412 DSZ .UD10

40 03420 000776 JMP .-2

41 03421 107000 ADD 0,1

42 03422 125120 MOVZL 1,1

43 03423 125120 MOVZL 1,1

44 03424 123000 ADD 1,0

45 03425 001400 JMP 0,3

46 03426 000000 .UD01: 0

47 03427 000000 .UD02: 0

48 03430 000000 .UD03: 0

49 03431 000000 .UD10: 0

50 03432 033031 .UD20: 33031

51 03433 000010 .UD21: 10

```

A 0056 .MAIN
01 ; BINARY TO DECIMAL ASCII CONVERT
02 ; CONVERTS A DOUBLE PRECISION, TWO'S COMPLEMENT NUMBER
03 ; TO AN ASCII DECIMAL CHARACTER STRING
04
05 ; INPUT:          D IN AC1, AC2 (HIGH, LOW)
06
07 ; OUTPUT:        ASCII CHARACTER STRING, TERMINATED BY A
08 ;                NULL WORD,
09 ;                CHARACTERS PASSED RIGHT ADJUSTED,
10 ;                BIT 8 = 0, IN AC0 TO USER
11 ;                ROUTINE WHOSE ADDRESS MUST BE
12 ;                STORED IN LOCATION 41 OF PAGE 0
13
14 ;                STRING OF FORM:
15 ;                +NNNNNNNNNN(NULL)
16 ;                OR   -NNNNNNNNNN(NULL)
17
18 ; CALLING SEQUENCE
19 ;     JSR     .DBD
20 ;     RETURN
21
22 ; DESTROYED:     AC1, AC2, AC3, CARRY
23 ; UNCHANGED:    AC0
24
25 03434 054456 .DBD:  STA 3, .FD03      ; SAVE RETURN
26 03435 040454          STA 0, .FD00      ; SAVE AC0
27 03436 020502          LDA 0, .FD30      ; POINT TO HIGH ORDER POWER IN
28                                ; TABLE
29 03437 040506          STA 0, .FD12
30 03440 176400          SUB 3,3
31 03441 054452          STA 3, DIGIT
32 03442 044500 .FD99: STA 1, .FD10      ; SAVE ABS(NUMBER)
33 03443 050500          STA 2, .FD10+1
34 03444 034447          LDA 3, DIGIT
35 03445 175004          MOV 3,3, SZR
36 03446 006041          JSR 0, .FD40      ; PUT OUT SIGN OR DIGIT
37 03447 024473          LDA 1, .FD10      ; RESTORE ABS(NUMBER)
38 03450 030473          LDA 2, .FD10+1
39 03451 020477          LDA 0, .FD22      ; GET OCTAL 57
40 03452 040472          STA 0, .FD11      ; COUNT IT UP IN STORAGE
41 03453 034472          LDA 3, .FD12      ; CURRENT POINTER TO POWER OF
42                                ; 10 TABLE
43
44
45 03454 021401 .FD98:  LDA 0, 1, 3      ; LOW ORDER WORD
46 03455 101235          MOVZRN# 0,0, SNR
47 03456 010435          ISZ DIGIT
48 03457 101005          MOV 0,0, SNR      ; TEST FOR END OF TABLE
49 03460 000426          JMP .FD97      ; DONE
50 03461 112420          SUBZ 0,2
51 03462 021400          LDA 0,0,3      ; HIGH ORDER WORD
52 03463 101003          MOV 0,0, SNC
53 03464 106001          ADC 0,1, SKP
54 03465 106400          SUB 0,1
55 03466 010456          ISZ .FD11      ; COUNT UP DIGIT
56 03467 125113          MOVL# 1,1, SNC   ; TEST FOR <0
57 03470 000764          JMP .FD98      ; KEEP SUBTRACTING

```

```

A 0057 .MAIN
01
02 03471 021401 LDA 0,1,3 ; RESTORE POSITIVE VALUE
03 03472 113022 ADDZ 0,2,8ZC
04 03473 125400 INC 1,1
05 03474 021400 LDA 0,0,3
06 03475 107000 ADD 0,1
07 03476 175400 INC 3,3 ; BUMP ACS TO NEXT TABLE ENTRY
08 03477 175400 INC 3,3
09 03500 054445 STA 3,.FD12
10 03501 020443 LDA 0,.FD11 ; GET DIGIT
11 03502 034207 LDA 3,C60
12 03503 116414 SUB# 0,3,8ZR
13 03504 010407 ISZ DIGIT
14 03505 000735 JMP .FD09 ; PUT IT OUT
15
16 03506 006323 .FD07: JSR 0IMES8
17 03507 004313 MSG23 ;"TAB"
18
19 03510 002402 JMP 0.FD03 ; RETURN
20
21 03511 000000 .FD00: 0 ; SAVE AC0
22 03512 000000 .FD03: 0 ; SAVE RETURN
23 03513 000000 DIGIT: 0
24
25 03514 035632 .FD05: 35632 ; 10**9
26 03515 145000 145000
27 03516 002765 2765 ; 10**8
28 03517 160400 160400
29 03520 000230 230 ; 10**7
30 03521 113200 113200
31 03522 000017 17 ; 10**6
32 03523 041100 41100
33 03524 000001 1 ; 10**5
34 03525 103240 103240
35 000012 .RDX 10
36 03526 000000 0 ; 10**4
37 03527 023420 10000
38 03530 000000 0 ; 10**3
39 03531 001750 1000
40 03532 000000 0 ; 10**2
41 03533 000144 100
42 03534 000000 0 ; 10**1
43 03535 000012 10
44 03536 000000 0 ; 10**0
45 03537 000001 1
46 03540 003514 .FD30: .FD05 ; POINTER TO CONVERSION TABLE
47 03541 000000 0 ; END OF TABLE INDICATION
48 000010 .RDX 0
49
50 000002 .FD10: .BLK 2 ; SAVE CURRENT DOUBLE WORD
51 03544 000000 .FD11: 0 ; COUNT UP DIGIT WORD
52 03545 000000 .FD12: 0 ; POINTER TO POWER OF TEN ENTRY
53
54 03546 000053 .FD20: "+" ; ASCII "+"
55 03547 000055 .FD21: "=" ; ASCII "="
56 03550 000057 .FD22: 57 ; ASCII "0" -1
57 000041 .FD40=41 ; PAGE 0 PUT CHARACTER ADDRESS

```

A 0058 .MAIN

```
01      ;TTO NON INTERRUPT PACKAGE
02      ;"MESS" PRINTS ASCII MESSAGES AS SPECIFIED BY ASSEMBLR
03      ;"CHAR" PRINTS ASCII CHARACTER, C(0)R,C(0)L MUST BE 0
04      ;WILL RETURN +2 IF C(0)R=0,CORRECTS THE PARITY,33 SIMULATE
05      ;"TYPE" PRINTS C(0)R. MUST HAVE PROPER PARITY. RETURN IS
06      ;TO CALL+1.REPLACE THIS ROUTINE WITH INTERRUPT TYPE IF DESIRED
07      ;"CRLF" PRINTS A CARRIAGE RETURN
08      ;"POCT" PRINTS C(1) IN OCTAL FOLLOWED BY A TAB
09      ;"PDEC" PRINTS C(1) IN DECIMAL,LEADING ZEROS SUPPRESSED,
10      ;FOLLOWED BY A TAB.
11 03551 054566 MESS:  STA 3,MESSR      ;PRINT A TEXT MESSAGE
12 03552 070477      READS 2
13 03553 153102      ADDL 2,2,SZC      ;NO PRINT IF SW1=1
14 03554 001401      JMP 1,3
15 03555 010562      ISZ MESSR
16 03556 031400      LDA 2,0,3      ;C(2) POINTS TO MESSAGE
17 03557 024216      LDA 1,C377     ;A 8 BIT MASK
18 03560 021000 MES.1: LDA 0,0,2      ;C(2)=DATA WORD
19 03561 125112      MOVL# 1,1,SZC
20 03562 123701      ANDS 1,0,SKP
21 03563 123401      AND 1,0,SKP     ;C(0)=DATA CHARACTER RIGHT
22 03564 151400      INC 2,2      ;INC TO NEXT WORD
23 03565 124000      COM 1,1      ;FLIP MASK
24 03566 004470      JSR CHAR,      ;PRINT
25 03567 000771      JMP MES.1      ;ANOTHER
26 03570 063511      SKPBZ TTO
27 03571 000777      JMP .-1
28 03572 060211      NIOC TTO
29 03573 002544      JMP @MESSR      ;LAST
30
31 03574 102401 ZOCT:  SUB 0,0,SKP
32 03575 020207 POCT:  LDA 0,C60
33 03576 030437      LDA 2,OCTAB     ;PRINT C(1) IN OCTAL
34 03577 000403      JMP .+3
35 03600 030445 PDEC:  LDA 2,DECTB     ;PRINT C(1) IN DECIMAL
36 03601 102400      SUB 0,0
37 03602 054453      STA 3,RADRET     ;BOTH ENTRYS PRINT NUMBER
38 03603 074477      READS 3
39 03604 177102      ADDL 3,3,SZC     ;NO PRINT IF SW1=1
40 03605 002450      JMP @RADRET
41 03606 040446      STA 0,ZSUPP     ;THEN TAB TO NEXT POSITION
42 03607 050401      STA 2,.-1
43 03610 000000 DECOCT: 0      ;A"LDA 2,TABLE" INSTRUCTION
44 03611 010777      ISZ .-1
45 03612 034443      LDA 3,RADRET     ;SETUP "TAB" AT END
46 03613 020516      LDA 0,CHTAB
47 03614 151005      MOV 2,2,SNR     ;IF TABLE ENTRY=0
48 03615 000441      JMP CHAR,      ;EXIT WITH TAB
49 03616 034436      LDA 3,ZSUPP     ;ZEROS SUPPRESS STUF
50 03617 102400      SUB 0,0
51 03620 146512 DECOY:  SUBL# 2,1,SZC
52 03621 000405      JMP DECP
53 03622 146400      SUB 2,1      ;FORM THE DIGIT
54 03623 034207      LDA 3,C60
55 03624 101400      INC 0,0
56 03625 000773      JMP DECOY
```

```

A 0059 .MAIN
01
02 03626 151235 DECP:  MOVZR# 2,2,8NR
03 03627 034207      LDA 3,C60
04 03630 054424      STA 3,ZSUPP      ;C(0)=DIGIT
05 03631 163000      ADD 3,0         ;MAKE ASCII
06 03632 175004      MOV 3,3,8ZR
07 03633 004423      JSR CHAR.      ;PRINT
08 03634 000754      JMP DECOCT     ;GET NEXT DIGIT
09
10
11 03635 030426 OCTAB:  LDA 2,.,+1+.=DECOCT
12 03636 100000      100000
13 03637 010000      10000
14 03640 001000      1000
15 03641 000100      100
16 03642 000010      10
17 03643 000001      1
18 03644 000000      0
19
20 03645 030436 DECTB:  LDA 2,.,+1+.=DECOCT
21          000012 .RDX 10
22 03646 023420      10000
23 03647 001750      1000
24 03650 000144      100
25 03651 000012      10
26 03652 000001      1
27 03653 000000      0
28          000010 .RDX 0
29
30 03654 000000 ZSUPP:  0
31 03655 000000 RADRET: 0

```

A 0060 .MAIN

```
01
02 03656 054454 CHAR.1 STA 3,CHRET      IPRINT C(0) RIGHT
03 03657 101325          MOVZS 0,0,SNR     IRETURN +2 IF NULL
04 03660 001401          JMP 1,3
05 03661 040452          STA 0,CHSAV
06 03662 176000          ADC 3,3          ICOMPUTE THE PARITY
07 03663 117000          ADD 0,3
08 03664 163404          AND 3,0,8ZR
09 03665 000775          JMP .-3
10 03666 176660          SUBCR 3,3       ICOMBIND PARITY WITH CHAR
11 03667 020444          LDA 0,CHSAV
12 03670 163300          ADDS 3,0
13
14 03671 034440 CHAR1:  LDA 3,CHTAB      IIS THIS A TAB
15 03672 116415          SUB# 0,3,SNR
16 03673 000407          JMP .+7         IYES
17 03674 004444          JSR TYPE        INO PRINT IT
18 03675 000413          JMP CHAR2+1     IEXIT
19
20 03676 020436          LDA 0,CHORZ    ISIMULATE A TAB
21 03677 034200          LDA 3,C12      IVIA 1 TO 10 SPACES
22 03700 162426          SUBZ 3,0,SEZ
23 03701 000777          JMP .-1
24 03702 101005          MOV 0,0,SNR
25 03703 000404          JMP CHAR2
26 03704 020431          LDA 0,CH240
27 03705 004433          JSR TYPE
28 03706 000770          JMP .-10
29 03707 040425 CHAR2:  STA 0,CHORZ
30 03710 063511          SKPBZ TTO
31 03711 000777          JMP .-1
32 03712 060211          NI0C TTO
33 03713 002417          JMP 0CHRET
```

```

A 0061 .MAIN
01
02 03714 054422 CRLF: STA 3,CRLFR
03 03715 060477 READS 0
04 03716 103102 ADDL 0,0,SZC )NO PRINT IF SW1=1
05 03717 000407 JMP CRLF1
06 03720 020215 LDA 0,C215
07 03721 004735 JSR CHAR. )PRINT CARRIAGE AND LF
08 03722 020214 LDA 0,C212
09 03723 004733 JSR CHAR.
10 03724 020216 LDA 0,C377 )PRINT RUB
11 03725 004731 JSR CHAR.
12 03726 102400 CRLF1: SUB 0,0
13 03727 040405 STA 0,CHORZ )CLEAR HORZ POSISTION
14 03730 002406 JMP @CRLFR )EXIT
15
16 03731 000011 CHTAB: 11
17 03732 000000 CHRET: 0
18 03733 000000 CHSAV: 0
19 03734 000000 CHORZ: 0
20 03735 000240 CH240: 240
21 03736 000000 CRLFR: 0
22
23 03737 000000 MESSR: 0
24 03740 054411 TYPE: STA 3,TYPRET )TYPE THE C(0)R IF
25 03741 010773 ISZ CHORZ
26 03742 074477 READS 3
27 03743 177112 ADDL# 3,3,SZC )AC1=1 DON'T TYPE
28 03744 002405 JMP @TYPRET
29 03745 063511 SKPBZ TTO
30 03746 000777 JMP .-1
31 03747 061111 DOAS 0,TTO
32 03750 002401 JMP @TYPRET
33 03751 000000 TYPRET: 0
34
35
36
37
38 03752 040237 SAC: )SAVE AC0,1,2
39 03753 044240 STA 0,SAV0
40 03754 050241 STA 1,SAV1
41 03755 001400 STA 2,SAV2
42 JMP 0,3
43
44 03756 020237 STAC: )RESTORE AC0,1,2
45 03757 024240 LDA 0,SAV0
46 03760 030241 LDA 1,SAV1
47 03761 001400 LDA 2,SAV2
48 JMP 0,3

```

A 0062 .MAIN

```
01 ;TELETYPE INPUT ROUTINE, NON INTERRUPT
02 ;
03 ;CALL INPUT
04 ; ADDR OF BYTE POINTER
05 ; RETURN = CR ONLY
06 ; RETURN = NORMAL
07 ;INPUT IS STORED R=L IN 7 BIT ASCII
08 ;INPUT IS TERMINATED BY CR, (215) IS
09 ;STORED. LINE FEED ECHOS CR=LF
10 ;NO DATA STORED, INPUT CONTINUES.
11
12 03762 054514 INPI: STA 3,INPRET
13 03763 023400 LDA 0,00,3 ;GET BYTE POINTER
14 03764 040511 STA 0,BASE
15 03765 040512 STA 0,BPTR
16 03766 060210 NIOC TTI
17 03767 020512 LDA 0,M115.
18 03770 040510 STA 0,CHCNT
19 03771 063610 TTWAIT: SKPDN TTI ;WAIT FOR INPUT
20 03772 000777 JMP .-1
21 03773 064610 DIAC 1,TTI ;READ INPUT CHAR
22 03774 020216 LDA 0,C377
23 03775 106415 SUB# 0,1,SNR
24 03776 000442 JMP RUB ;RUB OUT
25 03777 020200 LDA 0,C12
26 04000 106414 SUB# 0,1,SZR
27 04001 000403 JMP .+3
28 04002 006324 PCRLF ;LINE FEED TYPED
29 04003 000766 JMP TTWAIT
30 04004 065111 DOAS 1,TTO ;ECHO CHAR
31 04005 030472 LDA 2,BPTR
32 04006 010471 ISZ BPTR
33 04007 034215 LDA 3,C215 ;CR CODE
34 04010 136405 SUB 1,3,SNR
35 04011 000456 JMP CRCOD ;CR TYPED
36 04012 020212 LDA 0,C177 ;7 BIT MASK
37 04013 151223 INP.01: MOVZR 2,2,SNC
38 04014 107401 AND 0,1,SKP ;STORE INTO RH
39 04015 107701 ANDS 0,1,SKP
40 04016 000403 JMP .+3
41 04017 021000 LDA 0,0,2
42 04020 107000 ADD 0,1
43 04021 045000 STA 1,0,2 ;STORE BYTE
44 04022 010456 ISZ CHCNT
45 04023 000402 JMP .+2
46 04024 000435 JMP OVFL
47 04025 175004 MOV 3,3,SZR ;AC3=0 IF CR TYPED
48 04026 000743 JMP TTWAIT
49 04027 010447 ISZ INPRET ;ALL DONE
50 04030 006324 INP.1: PCRLF
51 04031 020444 LDA 0,BASE
52 04032 040250 STA 0,LINCT
53 04033 010443 ISZ INPRET
54 04034 063511 SKPBZ TTO ;WAIT FOR ECHO TO
55 04035 000777 JMP .-1 ;FINISH
56 04036 060211 NIOC TTO ;CLEAR INTERRUPT
57 04037 002437 JMP @INPRET
```


A 0063 .MAIN

01

02 04040 020441 RUB: LDA 0,M115.

03 04041 024437 LDA 1,CHCNT

04 04042 122405 SUB 1,0,SNR

05 04043 000726 JMP TTWAIT

!NOTHING TO RUB

06 04044 014433 DSZ BPTR

07 04045 014433 DSZ CHCNT

08 04046 030431 LDA 2,BPTR

09 04047 151220 MOVZR 2,2

10 04050 021000 LDA 0,0,2

!GET BYTE

11 04051 101003 MOV 0,0,SNC

12 04052 000405 JMP RUB1

13 04053 024216 LDA 1,C377

14 04054 107400 AND 0,1

!SAVE RH ONLY

15 04055 045000 STA 1,0,2

16 04056 101300 MOVS 0,0

!ECHO LH (RUBBED OUT)

17 04057 001111 RUB1: DOAS 0,TO

!ECHO RUBBED CHAR

18 04060 000711 JMP TTWAIT

19

20 04061 006324 OVFL: PCRLF

!LINE OVERFLOW

21 04062 006323 MESSAGE

22 04063 004271 MSG21

!"INPUT OVERFLOW"

23 04064 014413 DSZ BPTR

!BACKUP BYTE POINTER

24 04065 014413 DSZ CHCNT

25 04066 000703 JMP TTWAIT

26

27 04067 020406 CRCOD: LDA 0,BASE

28 04070 112415 SUB# 0,2,SNR

29 04071 000737 JMP INP.1

!YES

30 04072 020216 LDA 0,C377

31 04073 176400 SUB 3,3

32 04074 000717 JMP INP.0

33

34 04075 000000 BASE: 0

35 04076 000000 INPRET: 0

36 04077 000000 BPTR: 0

37 04100 000000 CHCNT: 0

38 04101 177615 M115.: -115.

A 0064 .MAIN

01				JDISK COMMAND TABLE	
02					
03	04102	044241	DCT:	044241	JREAD
04	04103	057111		057111	JWRITE
05	04104	040245		040245	JSEEK
06	04105	044243		044243	JRECALIBRATE
07	04106	030757		030757	JLOOP
08	04107	010254		010254	JDELAY
09	04110	000000		0	

10
11 JDISPATCHES

12					
13	04111	002127	DCT.1:	RE	
14	04112	002143		WT	
15	04113	002156		SK	
16	04114	002175		RCL	
17	04115	002203		LUP	
18	04116	002210		DLAY	

19
20 JDATA TABLE

21					
22	04117	014632	DNT:	14632	JFLOATING ZERO
23	04120	014617		14617	JFLOATING ONE
24	04121	044056		044056	JRANDOM
25	04122	002617		2617	JALL 1'S
26	04123	002632		2632	JALL ZEROS
27	04124	040064		40064	J110110 PAT
28	04125	000000		0	

29
30 JDISPATCHES

31					
32	04126	004147	DNT.1:	FLZ	
33	04127	004142		FL1	
34	04130	003377		RAN	
35	04131	004135		ONES	
36	04132	004134		ZEROS	
37	04133	004140		PAT1	

```

A 0065 .MAIN
01
02 04134 102401 ZEROS: SUB 0,0,SKP
03 04135 102000 ONES:  ADC 0,0
04 04136 001400          JMP 0,3
05
06 04137 155555          155555
07 04140 020777 PAT1:   LDA 0,,-1
08 04141 001400          JMP 0,3
09
10 04142 020036 FL1:    LDA 0,FLO1
11 04143 101225          MOVZR 0,0,SNR
12 04144 101240          MOVOR 0,0
13 04145 040036          STA 0,FLO1
14 04146 001400          JMP 0,3
15
16 04147 020037 FLZ:    LDA 0,FLOZ
17 04150 101243          MOVOR 0,0,SNC
18 04151 102220          ADCZR 0,0
19 04152 040037          STA 0,FLOZ
20 04153 001400          JMP 0,3

```

A 0066 .MAIN

01
02
03

MSG1: ENDING STATUS
.TXTE ENDING STATUS!

04154 047305
04155 144504
04156 043516
04157 051640
04160 040724
04161 052724
04162 000123

04
05

MSG2: PRECAL
.TXTE PRECAL !

04163 142722
04164 040703
04165 004714
04166 000000

06
07

MSG3: SEEK
.TXTE SEEK !

04167 142523
04170 045705
04171 000011

08
09

MSG9: INTERRUPT FROM DEVICE
.TXTE INTERRUPT FROM DEVICE !

04172 047311
04173 142724
04174 151322
04175 050125
04176 120324
04177 151306
04200 046717
04201 042240
04202 053305
04203 141711
04204 120305
04205 000000

10
11

MSG13: DISK
.TXTE DISK !

04206 144504
04207 045523
04210 004411
04211 000011

12
13

MSG14: SEEK ERRORS
.TXTE SEEK ERRORS !

04212 142523
04213 045705
04214 142640
04215 151322
04216 151317
04217 004523
04220 000011

14
15

MSG15: TOTAL SEEKS
.TXTE TOTAL SEEKS !

04221 147724
04222 040724
04223 120314
04224 142523
04225 045705
04226 004523
04227 000011

```

0067 .MAIN
01
02      04230 147516      MSG16:  !NO READY UNITS
      04231 151240      .TXTE !NO READY UNITS!
      04232 040705
      04233 054504
      04234 052640
      04235 144516
      04236 051724
      04237 000000
03
04      04240 047125      MSG17:  !UNIT:
      04241 152311      .TXTE !UNIT: !
      04242 120072
      04243 000000
05
06      04244 040504      MSG18:  !DATA:
      04245 040724      .TXTE !DATA: !
      04246 120072
      04247 000000
07
08      04250 147703      MSG19:  !COMMAND STRING:
      04251 046515      .TXTE !COMMAND STRING: !
      04252 047101
      04253 120104
      04254 152123
      04255 144722
      04256 043516
      04257 120072
      04258 000000
09
10      04261 033261      MSG20:  !16 NUMBERS MAX.
      04262 047240      .TXTE !16 NUMBERS MAX.!
      04263 046525
      04264 142502
      04265 051722
      04266 046640
      04267 154101
      04270 000056
11
12      04271 047311      MSG21:  !INPUT OVERFLOW
      04272 052520      .TXTE !INPUT OVERFLOW!
      04273 120324
      04274 053317
      04275 151305
      04276 146306
      04277 153717
      04300 000000
13
14      04301 042101      MSG22:  !ADDR GOOD BAD WORD
      04302 151104      .TXTE !ADDR GOOD BAD WORD!
      04303 043411
      04304 147717

```

```

0068 .MAIN
04305 004504
04306 040502
04307 004504
04310 147727
04311 042322
04312 000000

01          ) TAB
02          MSG23: .TXTE ! !
04313 000011

03          )WORDS WRITTEN
04          MSG25: .TXTE !WORDS WRITTEN !
04314 147727
04315 042322
04316 120123
04317 151327
04320 152311
04321 142724
04322 004516
04323 000011

05          )WORDS READ
06          MSG26: .TXTE !WORDS READ !
04324 147727
04325 042322
04326 120123
04327 142722
04330 042101
04331 004411
04332 000000

07          )CHECK WORD ERRORS
08          MSG27: .TXTE !CHECK WORD ERRORS !
04333 044303
04334 141705
04335 120113
04336 147727
04337 042322
04340 142640
04341 151322
04342 151317
04343 004523
04344 000011

09          )PERM CHECK WORD ERRORS
10          MSG28: .TXTE !PERM CHECK WORD ERRORS !
04345 142520
04346 046722
04347 141640
04350 142510
04351 045703
04352 153640
04353 151317
04354 120104
04355 151305
04356 147722
04357 051722
04360 000011

11          )ADDRESS ERROR
12          MSG29: .TXTE !ADDRESS ERROR !
04361 042101
04362 151104
04363 051705

```

```

0069 .MAIN
04364 120123
04365 151305
04366 147722
04367 004722
04370 000011
01
02          IPERM ADDRESS ERROR
MSG30:     .TXTE IPERM ADDRESS ERROR
04371 142520
04372 046722
04373 040640
04374 042104
04375 142722
04376 051523
04377 142640
04400 151322
04401 151317
04402 004411
04403 000000
03
04          IDATA ERRORS
MSG31:     .TXTE IDATA ERRORS
04404 040504
04405 040724
04406 142640
04407 151322
04410 151317
04411 004523
04412 000011
05
06          IREAD
MSG32:     .TXTE IREAD
04413 142722
04414 042101
04415 000011
07
08          IWRITE
MSG33:     .TXTE IWRITE
04416 151327
04417 152311
04420 004705
04421 000000
09
10          IMEMORY TOO SMALL
MSG39:     .TXTE IMEMORY TOO SMALL FOR
04422 142515
04423 147515
04424 054722
04425 152240
04426 147717
04427 051640
04430 040515
04431 146314
04432 143240
04433 151317
04434 000240
11
12          ISECTORS
MSG40:     .TXTE ISECTORS
04435 142523
04436 152303
04437 151317
04440 000123
13
14          IPASS
MSG41:     .TXTE IPASS

```

0070 .MAIN
04441 040520
04442 051523
04443 000000

01
02 MSG43: !-?-
!TXTE !-?-!
04444 026640
04445 026477
04446 000000

03
04 MSG44: !CYL-
!TXTE !CYL-!
04447 054703
04450 026714
04451 000000

05
06 MSG45: !HEAD-
!TXTE !HEAD-!
04452 142510
04453 042101
04454 000055

07
08 MSG46: !SECT-
!TXTE !SECT-!
04455 142523
04456 152303
04457 000055

09
10 MSG47: !#SECT-
!TXTE !#SECT-!
04460 051643
04461 141705
04462 026724
04463 000000

11
12 MSG51: !GOOD
!TXTE !GOOD !
04464 147507
04465 042317
04466 000240

13
14 MSG52: !BAD
!TXTE !BAD !
04467 040502
04470 120104
04471 000000

15
16 MSG53: !"DOC"
!TXTE !"DOC"!
04472 042042
04473 141717
04474 000042

17
18 MSG54: !"DOB"
!TXTE !"DOB"!
04475 042042
04476 041317
04477 000042

19
20 MSG55: !LOAD ERROR
!TXTE !LOAD ERROR!
04500 146240
04501 040717
04502 120104
04503 151305
04504 147722
04505 000322

21
22 MSG56: !ERRORS
!TXTE !ERRORS!

0071 .MAIN
04506 151305
04507 147722
04510 051722
04511 000000

01
02

MSG57:)ENDING MEM ADDR ERROR
.TXTE)ENDING MEM ADDR ERROR!

04512 047305
04513 144504
04514 043510
04515 046640
04516 046705
04517 040640
04520 042104
04521 120322
04522 151305
04523 147722
04524 000322

03
04

MSG59:)TIMEOUT
.TXTE)TIMEOUT!

04525 144724
04526 142515
04527 052717
04530 000324

05
06

MSG61:)PERM DATA ERRORS
.TXTE)PERM DATA ERRORS

04531 142520
04532 046722
04533 042240
04534 152101
04535 120101
04536 151305
04537 147722
04540 051722
04541 004411
04542 000000

07
08

MSG62:)MISC ERRORS
.TXTE)MISC ERRORS

04543 144515
04544 141523
04545 142640
04546 151322
04547 151317
04550 004523
04551 000011

09
10

MSG63:)TRY AGAIN
.TXTE)TRY AGAIN!

04552 151324
04553 120131
04554 043501
04555 144501
04556 000116

11
12

MSG64:)CHECK WORD ERROR
.TXTE)CHECK WORD ERROR!

04557 044303
04560 141705
04561 120113
04562 147727
04563 042322
04564 142640

0072 .MAIN
04565 151322
04566 151317
04567 000000

01
02 MSG65: !CHECK WORD & DATA ERROR
.TXTE !CHECK WORD & DATA ERRORS !

04570 044303
04571 141705
04572 120113
04573 147727
04574 042322
04575 123240
04576 042240
04577 152101
04600 120101
04601 151305
04602 147722
04603 051722
04604 000011

03
04 MSG66: !PERM CHK WD & DATA ERRS
.TXTE !PERM CHK WD & DATA ERRS !

04605 142520
04606 046722
04607 141640
04610 045510
04611 153640
04612 120104
04613 120246
04614 040504
04615 040724
04616 142640
04617 151322
04620 004523
04621 000000

05
06 MSG67: !ENDING DISK ADDR ERROR
.TXTE !ENDING DISK ADDR ERROR!

04622 047305
04623 144504
04624 043516
04625 042240
04626 051711
04627 120113
04630 042101
04631 151104
04632 142640
04633 151322
04634 151317
04635 000000

07
08 MSG68: !INTERCHANGE DISK
.TXTE !INTERCHANGE DISK!

04636 047311
04637 142724
04640 141722
04641 040510
04642 043516
04643 120305
04644 144504
04645 045523
04646 000000

09 !TYPE THE NUMBER OF DISK SURFACES

0073 .MAIN

01 MSG69: .TXTE !TYPE THE NUMBER OF DISK SURFACES !

04647 054724
04650 142520
04651 152240
04652 142510
04653 047240
04654 046525
04655 142502
04656 120322
04657 143317
04660 042240
04661 051711
04662 120113
04663 052523
04664 143322
04665 141501
04666 051705
04667 000240

02 !TESTING UNIT

03 MSG70: .TXTE !TESTING UNIT !

04670 142724
04671 152123
04672 047311
04673 120107
04674 047125
04675 152311
04676 120240
04677 000000

04 !SET SW4 FOR INTERCHANGE, SW5 FOR READ ONLY

05 MSG71: .TXTE !SET SW4 FOR INTERCHANGE, SW5 FOR READ ONL

04700 142523
04701 120324
04702 153523
04703 120264
04704 147706
04705 120322
04706 047311
04707 142724
04710 141722
04711 040510
04712 043516
04713 126305
04714 051640
04715 032727
04716 143240
04717 151317
04720 151240
04721 040705
04722 120104
04723 047317
04724 054714
04725 000000

06 !STRIKE ANY KEY TO CONTINUE

07 MSG72: .TXTE !STRIKE ANY KEY TO CONTINUE!

04726 152123
04727 144722
04730 142513
04731 040640
04732 054516

0074 .MAIN
04733 045640
04734 054705
04735 152240
04736 120317
04737 147703
04740 152116
04741 047311
04742 142525
04743 000000

A 0075 .MAIN

01

02 000072 UBUFF: .BLK 58.

03 000072 CBUFF: .BLK 58.

04 000020 VAR: .BLK 16.

05 05150 000000 PRGEND: 0

06

07

08

.END