

# DataGeneral

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## TECHNICAL STATEMENT

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TEXT LISTING

068-000506-04

PROGRAM

MICRONOVA MULTI-PROGRAMMING  
RELIABILITY TEST (LONG)

TEXT TAPE

097-000506-04

ABSTRACT

THE MICRONOVA MULTI-PROGRAMMING RELIABILITY TEST (LONG VERSION) CONSISTS OF A SERIES OF INDIVIDUAL PROCESSOR AND PERIPHERAL TESTS AND A SUPERVISOR PROGRAM, THE DIAGNOSTIC LINKER.

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AOS ASSEMBLER REV 02.05
08:58:21 09/04/79
*****
NAME: MNMORTL.TX PART NUMBER: 097-000506
DESCRIPTION: MICRO-NOVA MULTI-PROGRAMMING RELIABILITY TEST
LONG VERSION
REVISION HISTORY:
REV. DATE
01 06/24/77
02 12/01/78
03 08/23/79
04 08/31/79
*****
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*****
;CONDITIONAL ASSEMBLY FLAGS
; 0=INCLUDE TEST
; 1=IGNORE TEST
;*****
;TILL MNMRT
;*****
;FILE FOR MNMORT LONG (CPU AND PERIPHERAL DEVICES)
000000 CARDS=0
000000 SCATS=0
000000 ARITH=0
000000 MOUTS=0
000000 STACK=0
000000 FPTS=0
000000 PEDSK=0
000000 FAYTS=0
000000 BYTES=0
000000 PMVDSK=0
000000 SMVDSK=0
000000 LPTS=0
000000 IOTST=0
;CHECKER BOARD RANDOM TEST
;ASC MEMORY TEST
;ARITHMETIC TEST
;MULTIPLY DIVIDE TEST
;STACK TEST
;PRIMARY FLOPPY DISK TEST
;PHOENIX DISK TEST
;SECONDARY FLOPPY DISK TEST
;LOAD/STORE BYTE TEST
;ECHO/SKYWALKER (DEV. 26)
;ECHO/SKYWALKER (DEV. 66)
;LINE PRINTER TEST
;I/O TESTER TEST

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10003 MNMRT

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01 MICRO-NOVA MULTIPROGRAMMING
02 RELIABILITY TEST
03
04 ABSTRACT
05 THE MICRO-NOVA MULTIPROGRAMMING RELIABILITY TEST
06 CONSISTS OF A SERIES OF INDIVIDUAL PROCESSOR
07 AND PERIPHERAL TESTS AND A
08 SUPERVISOR PROGRAM. (THE DIAGNOSTIC LINKER)
09
10 THE DIAGNOSTIC LINKER IS A PROGRAM
11 DESIGNED TO "LINK" THE VARIETY OF
12 PROCESSOR AND PERIPHERAL TESTS IN
13 SUCH A FASHION THAT THEY MAY BE
14 RUN CONCURRENTLY. THEREBY, TESTING
15 THE INTERACTIVE CAPABILITIES OF
16 THE PROCESSOR AND ITS PERIPHERAL
17 EQUIPMENT.
18 THIS TEST IS PROVIDED IN TWO LENGTHS
19
20 THE SHORT VERSION ONLY INCLUDES THOSE TESTS
21 THAT APPLY TO THE CPU, MEMORY,
22 MULADIV, STACK, TTY, AND REAL TIME CLOCK.
23
24 THE LONG VERSION INCLUDES THE ABOVE + PRIMARY DEVICE
25 CODE TESTS FOR THE 6095 DISK, LPT, AND I/O TESTER PLUS PRIMARY
26 AND SECONDARY DEVICE CODE TESTS FOR THE 6038/39 AND
27 6101/2 DISKS.
28
29 MACHINE REQUIREMENTS
30 MICRO-NOVA PROCESSOR
31 8K TO 32K OF READ/WRITE MEMORY (SHORT VER.)
32 16K TO 32K OF READ/WRITE MEMORY (LONG VER.)
33 (MEMORY MUST BE CONTIGUOUS)
34 TTY INPUT/OUTPUT OR TERMINAL
35
36 OPTIONAL EQUIPMENT
37 6038/39 DISK (DEV. 33873, ALL DRIVES)
38 6095 (PHOENIX) DISK (DEV. 27867)
39 LINE PRINTER (DEV. 17)
40 I/O TESTER (DEV. 0)
41 6101/2 DISK (DEV. 26 & 66, ALL DRIVES)
42
43 SOFTWARE PREREQUISITES
44 THE SYSTEM SHOULD BE CAPABLE
45 OF RUNNING ALL INDIVIDUAL LOGIC AND
46 RELIABILITY TESTS PERTAINING TO THE
47 PROCESSOR AND ITS PERIPHERAL EQUIPMENT
48 BEFORE ATTEMPTING TO RUN THIS TEST
49
50 NOTE: ALTHOUGH THIS TEST MAY AT TIMES BE USEFUL
51 IN DETERMINING THE GO/NO GO STATUS OF AN
52 UNKNOWN SYSTEM, IT IS RECOMMENDED THAT:
53 A. ALL OTHER DIAGNOSTICS BE RUN EVEN IN THE
54 EVENT THAT THIS TEST FINDS NO PROBLEMS.
55 B. AN ATTEMPT BE MADE TO ISOLATE ANY PROBLEMS
56 FOUND BY FIRST UTILIZING THE LOWER
57 LEVEL TESTS FOR MORE CONCISE ERROR REPORTS.

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10004 MNMRT

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01 HARDWARE SETUP
02
03 IF THE 6038/39/6102 DISKS ARE TO BE
04 EXERCISED THEY MUST HAVE A DISK INSTALLED
05 AND BE IN THE READY STATE AND WRITE ENABLED.
06
07 IF THE 6095/6101 DISKS ARE TO BE TESTED
08 THEY MUST HAVE A DISK PACK INSTALLED
09 AND BE IN THE READY STATE. THE OPERATOR
10 WILL HAVE THE OPTION OF PROTECTING THE
11 NON-REMOVABLE PLATTER IF THE PROGRAM
12 WAS STARTED AT A NON-AUTO START LOCATION. (IE,
13 LOCATIONS 202, 204)
14 OTHERWISE ALL SURFACES WILL BE TESTED.
15
16 OPTIONAL STARTING ADDRESSES
17 200 AUTO-SIZE AND GO START
18 202, 204 MANUAL SELECT/DELETE TESTS
19 RESTART LAST TEST SELECTIONS
20 IMMEDIATELY ENTER ODT
21
22 KEY ENTERED OPTIONS
23
24 KEY 0 PLACES SWAPPACKAGE INTO INPUT MODE WHERE
25 MULTIPLE OPTIONS CAN
26 BE SET. TYPE A CR KEY TO EXIT THIS MODE.
27 ENTRIES TYPED IN SET BITS IN SWREG
28 FOR USE BY THE PROGRAM.
29 TYPING A 4 WILL CAUSE THE PREVIOUS STATE
30 OF THE SWREG BIT.
31
32 KEY SWREG BIT FUNCTION
33
34 1 =1 DON'T RELEASE AND ALLOW REASSIGNMENT
35 OF MEMORY AFTER ERROR
36 2 =1 DELETE TTY TYPEDOUTS
37 3 =1 RUN TTY & LPT TEST EVERY TIME SELECTED.
38 TYPING A 4 WILL CAUSE THE ELAPSED TIME TO
39 BE PRINTED IF THE REAL TIME CLOCK TEST WAS
40 ENABLED.
41 6 =1 THE ERROR ROUTINE WILL PAUSE AFTER
42 EACH PHASE OF AN ERROR TYPEDOUT.
43 TYPE A CR KEY ON DEVICE III TO PROCEED.
44 TYPING A 7 WILL CAUSE THE TEST RUN SUMMARY
45 TO BE PRINTED.
46
47 KEY (C)0 ENTER THE ODT EDITOR
48 (SEE DESCRIPTION AT PARAGRAPH 7.0)
49 KEY (C)D DEFAULT MODE RESTART. SWREG
50 SET TO 0.
51 KEY (C)R RESTART WITHOUT RESETTING SWREG BITS.
52 KEY M TYPE THE CURRENT CONTENTS OF SWREG.
53
54 WHERE (C) SIGNIFIES A CONTROL KEY.
55

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03	? ?	03	? ?
04	? 4.1	04	? ?
05	? ?	05	? ?
06	? ?	06	? ?
07	? 4.4	07	? ?
08	? ?	08	? ?
09	? ?	09	? ?
10	? ?	10	? ?
11	? ?	11	? ?
12	? 4.5	12	? ?
13	? ?	13	? ?
14	? ?	14	? ?
15	? 4.6	15	? ?
16	? ?	16	? ?
17	? ?	17	? ?
18	? ?	18	? ?
19	? ?	19	? ?
20	? ?	20	? ?
21	? ?	21	? ?
22	? ?	22	? ?
23	? ?	23	? ?
24	? ?	24	? ?
25	? ?	25	? ?
26	? 4.7	26	? ?
27	? ?	27	? ?
28	? ?	28	? ?
29	? ?	29	? ?
30	? ?	30	? ?
31	? ?	31	? ?
32	? ?	32	? ?
33	? ?	33	? ?
34	? ?	34	? ?
35	? ?	35	? ?
36	? ?	36	? ?
37	? ?	37	? ?
38	? ?	38	? ?
39	? ?	39	? ?
40	? ?	40	? ?

OPERATING PROCEDURES

LOAD THE PROGRAM VIA WHICHEVER LOAD DEVICE AVAILABLE.

PROCESSOR WILL TYPE:  
 MNMORT (S OR L) REV  
 TOTAL #K/S=XXX(DECIMAL)  
 PROGRAM RUN LIST

PROGRAM DESCRIPTION  
 IF START WAS 200 OR 206 THE LIST OF PROGRAMS TO BE RUN CONCURRENTLY WILL THEN BE LISTED AND THE TEST SYSTEM WILL AUTO START  
 IF START WAS 202 OR 204 LINKER WILL PAUSE AT THE END OF EACH TEST DESCRIPTION AND WAIT FOR KEYBOARD INPUT. TYPING IN A SPACE WILL ENABLE THAT TEST TO BE RUN.  
 TYPING IN ANY OTHER CHARACTER WILL DELETE THAT TEST FROM BEING RUN  
 NEXT THE PROGRAM WILL WAIT FOR OPERATOR INPUTED SWITCH REGISTER OPTION SETUP. TYPING A CR KEY WILL EXIT AND START THE TESTING.

CAT/KITTEN OPERATION  
 THE SHORT VERSION OF THIS TEST WILL START THE CAT/KITTEN IF THE CAT SWITCH WAS SET.  
 THE LONG VERSION WILL NOT RUN THE CAT/KITTEN.

ERROR DESCRIPTION

MOST ERRORS DETECTED BY EITHER THE INDIVIDUAL TEST PROGRAMS OR BY THE DIAGNOSTIC LINKER WILL RESULT IN AN EXTENSIVE ERROR TYPEOUT. SOME SMALL NUMBER OF HIGHLY IMPROBABLE ERRORS MAY RESULT IN A PROGRAM HALT IF THEY ARE OF A NATURE THAT THE LINKER CANNOT RECOVER FROM AND LOGICALLY PROCEED, (I.E. INTERRUPT STACK OVERFLOWS)

ERROR FORMAT

ERROR TYPEOUTS INCLUDE:

PROGRAM # AT TIME OF ERROR  
 THE CURRENT CONTENTS OF AC0, AC1, AC2, AC3 (SCRLO/SCRPH)SCRATCH LIMITS  
 CONTINUATION INFORMATION IN GROUPS OF 5 MEMORY LOCATIONS PERTINENT TO THE INDIVIDUAL TEST THAT FAILED

SOME CPU TESTS THAT RELOCATE WILL IN THEIR ERROR TYPEOUTS:  
 ST=LA START/ERROR (RES.)  
 XXXXXX YYYYYY ZZZZZZ

ST=LA THE START OF THE RELOCATED TEST LOOP  
 XXXXXX (I.E. THE LAST LCALL SETUL)

START THIS NUMBER INDICATES WHERE THE RESIDENT COPY OF THE TEST LOOP MAY BE FOUND IN THE LISTING

YYYYYY START OF THE TEST LOOP MAY BE FOUND IN THE LISTING

ERROR THIS NUMBER INDICATES WHERE IN THE RESIDENT COPY OF THE LISTING THE ERROR CALL MAY BE FOUND

ZZZZZ THIS ADDRESS FOR SOME ERROR CONDITIONS MAY NOT BE CORRECT.

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? 5.2
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? ERROR ANALYSIS
? DUE TO THE INTERACTIVE NATURE OF
? THE TESTS INVOLVED, A SERIES OF
? ERROR TYPEOUTS WILL PROBABLY BE
? REQUIRED FOR ANALYSIS BEFORE A
? PROBLEM WILL BE ISOLATED.
? A RESTART AT 202 AND DELETION OF ALL
? BUT THE TEST THAT ORIGINALLY
? FAILED MAY HELP TO ISOLATE
? INTERACTIVE PROBLEMS AS FOLLOWS:
?
? IF THE TEST RUNS BY ITSELF THE PROBLEM
? IS INTERACTIVE=RE-ENABLE ONE OTHER TEST AT
? A TIME TO DETERMINE WHICH ONE IS THE PROBLEM.
? IF THE TEST DOES NOT RUN BY ITSELF
? RESORT TO SIMILAR BUT LOWER LEVEL TESTS
? FOR ISOLATION
? PERTINENT MEMORY LOC'S TYPED
?
? 5.3
? CHECKERBOARD RAN
?
? 5.3.1
? THE AC'S AT ERROR WILL INDICATE:
? GOOD DATA= BAD DATA=LOGICAL ADDRESS
?
? IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED:
? CB=TK
? 0 GENERATE CHECKERBOARD
? 1 DISTURB PASS
? 2 CHECK PATTERN
? 3 CHECKSUM THE # OF -1'S IN PATTERN
? CB=LC STARTING LOGICAL ADDRESS OF "BEGIN"
? RELOCATED TO SCRATCH
? CB=SE AC3 AT ERROR CALL
?
? 5.3.2
? SC MEMORY TEST
?
? THIS IS AN ISZ/DSZ TEST FOR SC-MEMORIES.
?
? THE AC'S AT ERROR WILL INDICATE:
? ACTUAL-EXPECTED=LOGICAL ADDRESS
?
? IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED:
? MM=TK
? ERROR NUMBER:
? 0 PATTERN STORING ERROR(SHO BE -1)
? 1 LOCATION NOT -1 BEFORE DOING ISZ
? 2 ISZ DIDN'T SKIP
? 3 LOCATION NOT EQUAL TO 0 AFTER ISZ
? 4 DSZ SKIP ERROR
? 5 DSZ TEST-LOCATION NOT -1 AFTER DSZ
? 6 SAME AS 1, EXCEPT TESTING IN REV DIRECTION
? 7 SAME AS 2, EXCEPT " " " "
? 10 SAME AS 3, EXCEPT " " " "
? MM=LC RELOCATED CODE ADDRESS START
? MM=FT START ADDRESS OF TESTED AREA
? MM=EN END OF TESTED AREA IN SCRATCH
? MM=SE INSTRUCTION ADDRESS FOLLOWING ERROR CALL
? LOCATION ADDRESS OF FAILING LOCATION

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10008 MNMRT

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? 5.3.3
? ARITHMETIC TEST
?
? THE AC'S WILL BE TYPED AS THEY WERE AT THE
? TIME OF ERROR DETECTION
?
? IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED:
? THE LAST THREE RANDOM NUMBERS GENERATED,
? AT=LC STARTING ADDRESS OF ARITH IN SCRATCH
? AT=03 AC3 AT TIME OF ERROR
? AT=BG BEGINNING OF TEST IN THE LISTING
? (SEE DISCUSSION OF ST.LA,ETC AT PARA.5.1.6)
?
? 5.3.4
? MULTIPLY/DIVIDE TEST
?
? MULTIPLY DIVIDE FAILURES WILL INDICATE
? EITHER MUL(S) FOR MULTIPLY OR DIV(S) FOR DIVIDE
? IN ADDITION, THREE SETS OF AC'S ARE TYPED
? ORIGINAL OPERANDS
? HARDWARE RESULT (ASSUMED TO BE INCORRECT )
? SOFTWARE RESULT (ASSUMED TO BE CORRECT )
?
? 5.3.5
? STACK ERROR TEST
?
? THE AC'S AT THE TIME OF ERROR DETECTION WILL
? BE TYPED.
?
? AC0 = ACTUAL
? AC1 = EXPECTED
? AC3 = ADDRESS OF ERROR CALL

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10009 MNMRT

15.3.6 6038/39 DISK

THE AC'S AT TIME OF ERROR

FOR DATA ERRORS:

AC0 BAD DATA
AC1 GOOD DATA
AC2 ADRS. OF BAD DATA
AC3 ADRS. OF ERROR

FOR STATUS ERRORS

AC0=2 WILL CONTAIN THE STATUS WORD

FOR INVALID TRACK ADDRESSES:

AC0 ACTUAL TRACK ADDRESS
AC1 MAXIMUM POSSIBLE ADDRESS

FOR DISK SEEK ERRORS:

AC0 ACTUAL TRACK ADDRESS
AC1 EXPECTED TRACK ADDRESS

ALL OTHER ERRORS THE AC'S AREN'T USED.

ALSO THE FOLLOWING INFORMATION IS TYPED:

FYDST

WRITE DATA STARTS IN CORE
READ DATA STARTS AT FYDST+256.

LAST D08

STATUS ADDR OF LAST XFER
LAST DISK STATUS
LAST CMD TO DISK

RETRY #

NUMBER OF RETRIES
DATA BLK IN ERROR
UNIT # UNDER TEST

TRACK TRACK # UNDER TEST

SECTOR SECTOR # UNDER TEST

ALSO TWO CONDITIONS WILL CAUSE THE PROGRAM

TO HALT. THEY ARE:

A) DRIVE SELECTION ERROR-DRIVE # IN STATUS NOT AS EXPECTED AFTER SELECTION OF DRIVE.

B) INTERRUPT EXPECTED DIDN'T OCCUR.

10010 MNMRT

15.3.7 6095 (PHOENIX) DISK TEST

AC0 GOOD DATA (SEE PD.SA)

AC1 BAD DATA

AC2 ADRS. OF GOOD DATA

BAD IS AT AC2+4 IF PD.SA IS A--#

IN ADDITION THE FOLLOWING LOC'S ARE TYPED

PD.SA =ADDRESS OF A RANDOM DATA CONTROL WORD

(PDDW1 TO PDDW4) THE ERR WAS IN ONE OF

THE FIRST 4 WORDS IN THE BUFFER

==# ERR IS AT AC2+4

=AC2 ERROR WAS DISK STATUS

IN WHICH CASE:

AC2=DISK STATUS

AC1=OTIC DISK FOR PDD9K

AC0=DISK

PDDST DATA START IN CORE

PDCST DATA START FOR DCH MAP

STATUS LAST DISK STATUS

PDD0A LAST DOA TO DISK

PDD0C LAST DOC TO DISK

ALSO IF THE ERROR OCCURS IN A READ OPERATION

THE FOLLOWING DATA IS PRINTED:

WRITE PDCST = XXXX MD3 MD4

MD1 MD2 HHHH JJJJ KKKK

GGGG WHERE,

XXXX = STARTING CHANNEL ADDRESS OF WRITE OPERATION

GGGG = FIRST PHYS 1K USED IN DISK WRITE

HHHH = 2ND " " " " " "

JJJJ = 3RD " " " " " "

KKKK = 4TH " " " " " "

NOTE: UPON DETECTION OF AN ERROR THE TEST WILL

RETRY THE OPERATION FOUR TIMES.

\*\*\*\*\* (PHOENIX) DISK STATUS WORDS \*\*\*\*\*

\*\*\*\*\* (PHOENIX) DISK STATUS WORDS \*\*\*\*\*

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\*\*\*\*\* (PHOENIX) DISK STATUS WORDS \*\*\*\*\*

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01 ? 5.3.8 I/O TESTER
02 ?
03 ? AC'S AT TIME OF ERROR
04 ?
05 ? FOR A WRITE SEQUENCE: 1.VERIFY BUFFERS
06 ?
07 ? AC0 BAD DATA
08 ? AC1 GOOD DATA
09 ? AC2 ADDRESS OF BAD DATA
10 ? AC3 ADDRESS OF ERROR
11 ?
12 ? 2. VERIFY ADDRESS
13 ?
14 ? AC0 BAD ADDRESS
15 ? AC1 GOOD ADDRESS
16 ? AC2 ADDRESS OF BAD ADDRESS
17 ? AC3 ADDRESS OF ERROR
18 ?
19 ? FOR READ SEQUENCE
20 ?
21 ? AC0 BAD DATA
22 ? AC1 GOOD DATA
23 ? AC2 ADDRESS OF BAD DATA
24 ? AC3 ADDRESS OF ERROR
25 ?
26 ? OTHER INFORMATION
27 ?
28 ? W/R 0=WRITE TO TESTER,1=READ FROM TESTER
29 ? IOERR NUMBER OF 64 WORD BLOCKS
30 ? 0ERR BLOCK ERROR OCCURED IN
31 ? IODST START OF BUFFER AREA
32 ? IODIB ADDRESS OF LAST WORD XFERRED
33 ? ERDST ADDRESS OF BAD DATA WORD
34 ?
35 ? 5.3.9 LINE PRINTER TEST
36 ?
37 ? THE LINE PRINTER TEST IS AN EXERCISOR ONLY AND
38 ? DOESN'T CONTAIN ANY ERROR PRINTOUTS.
39 ?
40 ? THE PATTERN PRINTED MUST BE EXAMINED TO SEE IF
41 ? IT CONTAINS ANY ERRORS. THE PATTERN USED IS:
42 ? !"#%&'()*+,-./0123456789:;<=>?@ABCDEFHIJKLMNPOQRSTUVWXYZ
43 ?

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01 ? 5.3.10 6101/2 DISK TEST
02 ?
03 ? THIS DISK TEST IDENTIFIES TWO TYPES OF ERRORS:
04 ? 1)STATUS ERRORS
05 ? 2)DATA COMPARE ERRORS
06 ?
07 ? THE FORMAT FOR A STATUS ERROR IS AS FOLLOWS:
08 ?
09 ? TEST #( ) 6101/2 DISK TEST
10 ? AC0 AC1 AC2 AC3
11 ? AAA BBB CCC DDD
12 ? SCRL0/SCRHI EEEEE/FFFFF
13 ? STATUS ERROR
14 ? <ERROR LIST>:= NOT READY
15 ? SEEK ERROR
16 ? DATA LATE
17 ? ADDR ERROR
18 ? CRC ERROR
19 ? OP TIME OUT
20 ? BAD SECTOR
21 ? OPERATION:<OP TYPE> DRIVE: # RETRY: #
22 ? WHERE <OP TYPE>:= RECALIBRATE
23 ? SEEK
24 ? READ
25 ? WRITE
26 ?
27 ? DISK ADDR CYL= HHH SEC= III
28 ? HEAD# JJJJJ DOB= KKKKK DOC= LLLLLL
29 ? DIA= MMMMMM DIB= NNNNNN DIC= OOOOOO
30 ?
31 ? THE STATUS ERROR SUMMARY STARTS WITH THE
32 ? MORT STANDARD ERROR CALL WHICH LISTS THE TEST NUMBER
33 ? NAME, THE CONTENTS OF THE FOUR AC'S AND THE
34 ? ASSIGNED MEMORY SPACE (SCRL0/SCRHI).
35 ? THE NEXT LINE IDENTIFIES THE ERROR TYPE AS A
36 ? STATUS ERROR. FOLLOWING IS A LIST OF THE STATUS
37 ? TYPE ERRORS THE DISK ENCOUNTER DURING THE OPERATION.
38 ? THE NEXT LINE CONTAINS THE OPERATION BEING EXECUTED,
39 ? DRIVE SELECTED AND RETRY COUNT. THE TEST WILL RETRY
40 ? THE FAILING OPERATION FOUR TIMES BEFORE GIVING UP.
41 ? THE DISK ADDRESS OF THE FAILURE IS GIVEN BY
42 ? HEAD,CYL AND SEC VALUES. THE DOA,DOB AND DOC
43 ? ARE THE COMMANDS USED TO INITIATE THE OPERATION
44 ? AND THE DIA,DIB AND DIC ARE THE RETURNED STATUS
45 ? PARAMETERS.

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10013 MNMRT

FOR DATA COMPARE ERRORS THE ERROR TEXT LOOKS AS FOLLOWS:

TEST# ( ) 6101/2 DISK TEST

AC0 AC1 AC2 AC3  
AAA BBB CCC DDD  
SCRLO/SCPHI EEEEE/FFFFFF  
DATA COMPARE ERROR  
AC0=0000 DATA AC1=BAD DATA  
AC2=0000 DATA ADDR AC3=BAD DATA ADDR  
BUFFER START/END GGGGG/HHHHH  
DISK ADDRESS  
CYL HEAD SEC  
III JJJ KKK  
DRIVE WORD# RETRY  
LLLL MMMM NNNN

THE COMPARE ERROR SUMMARY STARTS BY LISTING THE TEST NUMBER/NAME, CONTENTS OF ACS AND ASSIGNED SCRATCH LIMITS. THE NEXT LINE IDENTIFIES THE PROBLEM TYPE AS A COMPARE ERROR FOLLOWED BY A TWO LINE EXPLANATION OF THE ACS CONTENTS. BUFFER START/END INDICATE THE DATA MEMORY LOCATION. THE PROGRAM CALCULATES THE ERROR'S RESPECTIVE DISK ADDRESS AND LISTS IT AS DRIVE,CYLINDER,HEAD,SECTOR AND WORD# IN THE SECTOR. THE LAST VALUE IS THE RETRY COUNT STARTING AT 4 AND DECREMENT TO ZERO. IF A FAILURE OCCURS THE PROGRAM WILL RETRY THE ENTIRE TRANSFER UP TO FOUR TIMES

5.3.11 LOAD BYTE/STORE BYTE TEST

ERROR OUTPUT DESCRIPTION:

TEST # 3 LDB/STB TEST  
AC0 AC1 AC2 AC3  
000000 001040 003357 004347  
SCRLO/HI 014000 017777  
BASE ADDRESS= 4726 (1)  
BYT.B CNT.S DAT.B DST.B  
011667 000000 175236 011667 (2)  
BYT.T CNT.D SRC.B EXP.B  
011667 000000 175236 000236  
SUBTEST,(LOGICAL/LISTING)- 3496 11650 (3)  
ERRCALL,(LOGICAL/LISTING)- 3455 11657

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DIAGNOSIS

WHEN A SUBTEST DETECTS AN ERROR THE OUTPUT SHOWN BELOW WILL BE PRINTED. THE NUMBERED CALLOUTS EXPLAIN THE OUTPUT. USE THE LISTING ADDRESS GIVEN IN THE ERROR PRINTOUT TO DETERMINE THE FAILING SUBTEST, (EXAMPLE L8B01, L8B02, ETC.). EXAMINE THE DESCRIPTION GIVEN BELOW. FOR THE FAILING SUBTEST AND THE ERROR PRINTOUT TO DETERMINE THE FAULT.

1 - BASE REGISTER  
ADDRESS OF RELATIVE ADDRESS TABLE IN RELOCATED TEST  
2 - FAILURE INFORMATION.  
THIS BLOCK OF INFORMATION DESCRIBES WHAT WAS HAPPENING IN THE SUBTEST AT THE TIME OF THE FAILURE. THE HEADINGS IN THIS TABLE ARE THE NAMES OF MEMORY LOCATIONS USED IN THE TEST. THE CONTENTS OF THE LOCATIONS IS LISTED BELOW THEM. IN GENERAL VALUES LISTED ABOVE ONE ANOTHER SHOULD MATCH. A MISMATCH INDICATES WHERE THE PROBLEM LIES. (SEE DETAILED BREAKDOWN THAT FOLLOWS)

3 - SUBTEST AND ERROR CALL ADDRESSES  
WHEN AN ERROR OCCURS WHILE THE TEST IS RELOCATED THE TEST AUTOMATICALLY COMPUTES THE ADDRESS IN THE LISTING CORRESPONDING TO THE SETUP CALL AND THE ERROR CALL IN THE RELOCATED COPY. THESE VALUES ARE DISPLAYED UNDER THE HEADING "LISTING". THE ACTUAL LOGICAL ADDRESS WHERE THE CALL WAS MADE IS DISPLAYED UNDER "LOGICAL".

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10015 MNMWT

```

01 L I TESTING LDB FOR
02 S I SPECIAL CASE WHEN
03 B I BYTE POINTER AND
04 ? 0 I DESTINATION AC
05 ? 1 I ARE THE SAME.
06 * I
07 * I
08 ? 4 I
09
10 L I TESTING LDB FOR
11 S I THE GENERAL CASE
12 ? 0 I
13 ? 1 I
14 ? 5 I
15 * I
16 ? 1 I
17 ? 6 I
18
19 L I TESTING STB FOR
20 S I SPECIAL CASE WHEN
21 ? 0 I
22 ? 1 I SOURCE AC ARE THE
23 ? 7 I SAME.
24 * I
25 ? 2 I
26 ? 0 I
27
28 L I TESTING STB FOR
29 S I GENERAL CASE.
30 ? 0 I
31 ? 2 I
32 ? 1 I
33 ? 3 I
34 ? 2 I
35
36 L I PAIR TESTS FOR
37 S I LDB AND STB. STB
38 ? 0 I PERFORMED FIRST.
39 ? 3 I TESTING FOR INTER
40 ? 3 I ACTION THROUGH
41 ? 1 I THE BYTE POINTER.
42 ? 1 I
43 ? 1 I
44 ? 1 I
45
46 L I PAIR TEST FOR
47 S I LDB AND STB. LDB
48 ? 0 I PERFORMED FIRST.
49 ? 3 I TESTING FOR INTER
50 ? 3 I ACTION THROUGH
51 ? 1 I THE DATA AC.
52 ? 1 I
53 ? 1 I

```

10016 MNMWT

```

01 I B Y T . B = S T A R T I N G   V A L U E   O F   B Y T E   P O I N T E R
02 I B Y T . T = N O T   U S E D , S H O U L D   = B Y T . B .
03 I C N T . S = N O T   U S E D , S H O U L D   B E   0 .
04 I C N T . D = N O T   U S E D , S H O U L D   B E   0 .
05 I D A T . B = S T A R T I N G   T E S T   D A T A .
06 I S R C . B = S O U R C E   F O R   L D B , S H O U L D   = D A T . B .
07 I D S T . B = V A L U E   L D B   L E F T   I N   A C , S H O U L D   = E X P . B .
08 I E X P . B = V A L U E   E X P E C T E D   I N   A C   A F T E R   L D B .
09
10 I B Y T . B = S T A R T I N G   V A L U E   O F   B Y T E   P O I N T E R
11 I B Y T . T = P O I N T E R   A F T E R   L D B , S H O U L D   = B Y T . B .
12 I C N T . S = N O T   U S E D , S H O U L D   B E   0 .
13 I C N T . D = N O T   U S E D , S H O U L D   B E   0 .
14 I D A T . B = S T A R T I N G   T E S T   D A T A .
15 I S R C . B = S O U R C E   F O R   L D B , S H O U L D   = D A T . B .
16 I D S T . B = V A L U E   L D B   L E F T   I N   A C , S H O U L D   = E X P . B .
17 I E X P . B = V A L U E   E X P E C T E D   I N   A C   A F T E R   L D B .
18
19 L I TESTING STB FOR
20 S I SPECIAL CASE WHEN
21 ? 0 I
22 ? 1 I SOURCE AC ARE THE
23 ? 7 I SAME.
24 * I
25 ? 2 I
26 ? 0 I
27
28 L I TESTING STB FOR
29 S I GENERAL CASE.
30 ? 0 I
31 ? 2 I
32 ? 1 I
33 ? 3 I
34 ? 2 I
35
36 L I PAIR TESTS FOR
37 S I LDB AND STB. STB
38 ? 0 I PERFORMED FIRST.
39 ? 3 I TESTING FOR INTER
40 ? 3 I ACTION THROUGH
41 ? 1 I THE BYTE POINTER.
42 ? 1 I
43 ? 1 I
44 ? 1 I
45
46 L I PAIR TEST FOR
47 S I LDB AND STB. LDB
48 ? 0 I PERFORMED FIRST.
49 ? 3 I TESTING FOR INTER
50 ? 3 I ACTION THROUGH
51 ? 1 I THE DATA AC.
52 ? 1 I
53 ? 1 I

```

?5.4 SPECIAL CASE ERROR TYPEOUTS

```

?5.4.1 POWER FAIL INTERRUPT
UPON DETECTION OF A POWER FAIL INTERRUPT
THE LOGICAL ADRS. OF THE P.C. AT INTERRUPT
WILL BE SAVED.
IF AUTO-RESTART IS ENABLED OR THE POWER
FAIL WAS ONLY MOMENTARY, THE TEST WILL RE-
START AS IN A START AT 206 AFTER TYPING
POWER FAIL @XXXXXX (WHERE XXXXXX IS THE PC AT INTR.)

```

?5.4.2 ILLEGAL SUPERVISOR CALL

```

UPON DETECTION OF A SUPERVISOR CALL
WHICH DIDN'T MATCH THE LIST OF SUBROUTINES
CALLS THE FOLLOWING MESSAGE WILL BE TYPED:

```

ILLEGAL SUPER CALL AT XXXXXX

```

PROG# NN NAME
AC0 AC1 AC2 AC3
Q00000 YYYYYY ZZZZZZ ODDDDD
CALL ADDR= TTTTTT
INSTRUCTION= IIIIII

```

```

WHERE XXXXXX IS THE LOGICAL ADDRESS OF THE
SUPER CALL.
NOTE: A ILLEGAL SUPERCALL AT LOCATION 0
INDICATES THAT THE PROGRAM WAS
EXECUTING LOCATION 0.

```

?5.4.3 INTERRUPT WAIT ELAPSED

```

THE PERIPHERAL DEVICE ASSOCIATED WITH THE
PROG. NUMBER TYPED WAS NOT RESPONDED WITH
A PROGRAM INTERRUPT FOR AN EXTENDED
PERIOD OF TIME. THE 2ND NUMBER TYPED
SHOULD POINT AT THE INTERRUPT HANDLER
FOR THE DEVICE THAT FAILED

```

?5.4.4 STACK OVERFLOW ERROR

```

UPON A STACK OVERFLOW CONDITION THE
STACK INTERRUPT HANDLER WILL PRINT THE
FOLLOWING ERROR MESSAGE:

```

STACK OVERFLOW ERROR @ XXXXX

```

SP FP STADR
YYYYY ZZZZZ S9999

```

AND THEN IF NOT RETURNABLE TO OTOS, HALT.

```

WHERE, XXXXX IS THE ADDRESS OF THE INTERRUPT
YYYYY IS THE STACK POINTER
ZZZZZ IS THE FRAME POINTER
S9999 IS THE STACK BASE ADDRESS(CURRENTLY)

```

10017 MNMRT

```
? 5.4.5 RELOCATED CODE ERROR
? UPON DETECTION OF AN ERROR BY A RELOCATED TEST
? THE RELOCATED CODE IS COMPARED TO THE ORIGINAL
? COPY. IF A DIFFERENCE IS FOUND THE FOLLOWING
? INFORMATION IS TYPED:
?
? RELOCATED CODE ERROR
? EXPECTED ACTUAL ADDR=E ADDR=A
? XXXX YYYY 00000 ZZZZ
?
? WHERE:
? XXXX IS THE ORIGINAL WORD
? YYYY IS THE RELOCATED WORD
? 00000 IS THE ADDRESS OF ORIGINAL
? ZZZZ IS THE ADDRESS OF RELOCATED WORD
?
? WHEN THIS OCCURS THE ERROR WAS
? PROBABLY CAUSED BY THE MODIFICATION OF THE
? RELOCATED CODE.
```

10018 MNMRT

```
? 6.0 DIAGNOSTIC LINKER
?
? 6.1 PROGRAM INITIALIZE
? THE DIAGNOSTIC LINKER INITIALIZES ITSELF
? AND INDIVIDUAL TESTS IN THE FOLLOWING
? SEQUENCE:
? 1. SYSTEM IS RESET,
? 2. ANY OTHER NECESSARY CONSTANTS
? ARE INITIALIZED
? (MEM ALLOCATION TABLES)
? 3. INTERRUPT VECTOR TABLES ARE SET UP TO
? PROCESS UNEXPECTED DEVICE INTERRUPTS
? 4. MEMORY IS SIZED IN 1K INCREMENTS
? FROM 0 TO 32K AND BUILT A 2 WORD
? BIT MAP OF EXISTING CONTIGUOUS
? MEMORY
? 5. THE (EXIST)MEMORY SIZED BIT TABLE IS MOVED TO THE
? AVAILABLE (AVAIL)MEMORY BIT TABLE AND EACH BIT
? CORRESPONDING TO 1K OF UTILIZED
? MEMORY IS REMOVED FROM THE TABLE
? SO THAT IT WILL NOT BE ASSIGNED
? AS A SCRATCH AREA TO ANY TEST.
? (INCLUDES PROGRAM STORAGE, MEMORY ALLOC.
? TABLES, INTERRUPT MASKS AND STACK AREA AND
? THE LAST 1K OF MEMORY TO PRESERVE THE
? LOADER)
? 6. EACH TEST IS ENTERED IN SEQUENCE AT ITS
? INIT. ENTRY POINT. OPTION TESTS DETERMINE
? IF THE DEVICE THEY ARE ASSOC. WITH EXISTS
? OR NOT AND PASS INTERRUPT SERVICE PARAM'S
? TO THE LINKER.
? (DEV#, MASK AND INTERRUPT SERVICE
? ADDRESS)
? 7. LINKER THEN TYPES THE SYSTEM SIZE
? INFORMATION ALONG WITH THE PROGRAM
? RUN LIST. THE OPERATOR
? CAN SELECT OR DELETE SPECIFIC TESTS
? IF START WAS 202 OR 204.
```

10019 MNMRT

```
01 PROGRAM RUN
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16.2

ONCE THE LINKER HAS COMPLETED ALL  
INITIALIZATION THE FOLLOWING SERIES  
OF OPERATIONS ARE LOOPED THROUGH:

1. LINKER RANDOMLY SELECTS ONE OF  
THE INDIVIDUAL TESTS UNTIL IT  
FINDS ONE THAT IS NOT WAITING  
FOR INTERRUPT (WAITING IS BIT 0=1 OF  
THE THIRD WORD IN TEST) AND THAT  
THE NEXT RANDOM NUMBER FALLS WITHIN  
ITS ENTER LIMITS
2. MEMORY LOCATIONS SCRLO  
AND SCRHI (SCRATCH LOW AND HIGH) ARE  
SET TO INDICATE THE LIMITS OF  
THE SCRATCH AREA AVAILABLE TO THE TEST.
3. THE SELECTED TEST IS ENTERED AT  
ITS SPECIFIED EXECUTE ENTRY POINT
4. THE TEST THEN EXITS AND ITS PASS COUNT  
IS INCREMENTED UNLESS IT WAS UNABLE TO  
OBTAIN SCRATCH AREA.

10020 MNMRT

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16.3 INDIVIDUAL TEST DESCRIPTIONS

16.3-1 CHECKERBOARD RAN

THIS MEMORY CHECKER BOARD TEST IS A SUBSET OF OTHER MEMORY  
CHECKERBOARDS. A COMPLETE TEST OF AN AVAILABLE SCRATCH  
AREA IS COMPRISED OF THE FOLLOWING SEQUENCE:

1. REQUEST 1 TO 20K OF SCRATCH, RANDOMLY RE-  
LOCATE THE EXECUTE PORTION OF CHECKERBOARD  
INTO SCRATCH AND GENERATE THE CHECKERBOARD  
PATTERN

2. DISTURB PASS-COMPLIMENT A SINGLE BIT IN EACH  
OF THE FIRST 16 WORDS OF SCRATCH, SHUFFLE THESE  
WORDS 16 TIMES SUCH THAT THEY END UP IN THEIR  
ORIGINAL POSITION, RE-COMPLIMENT THE SINGLE  
BIT IN EACH WORD--PROCEED WITH EACH GROUP OF  
16 WORDS UNTIL ALL MEMORY HAS BEEN EXERCISED.

3. CHECK PASS-COMPRE EACH WORD IN SCRATCH WITH  
THE PATTERN EXPECTED

4. FAST CHECKSUM MEMORY TO ENSURE THAT ALL DATA  
IS INTACT (RETURNS TO CHECK PASS IF CHECK-  
SUM DOES NOT AGREE.)

10021	MMWR	10022	MMWR
01	16.3.2	01	SC MEMORY TEST
02	?	02	?
03	?	03	? THIS MEMORY TEST DOES A READ/MODIFY/WRITE TO THE AVAILABLE
04	?	04	? SCRATCH AREA USING AN "ISZ" INSTRUCTION. TEST IS BROKEN INTO THE
05	?	05	? FOLLOWING CHECKS:
06	?	06	?
07	?	07	? MM.TK= 0
08	?	08	? WRITE INTO EACH MEMORY LOCATION A MINUS
09	?	09	? ONE STARTING AT SCRLO AND ENDING AT SCRHI
10	?	10	? VERIFYING EACH GOT THERE.
11	?	11	?
12	?	12	? MM.TK= 1
13	?	13	? READ A LOCATION BEFORE DOING THE ISZ
14	?	14	? TO VERIFY IT HASN'T BEEN DISTURBED.
15	?	15	?
16	?	16	? MM.TK= 2
17	?	17	? ISZ DIDN'T SKIP
18	?	18	?
19	?	19	? MM.TK= 3
20	?	20	? LOCATION NOT 0 AFTER ISZ
21	?	21	?
22	?	22	? MM.TK= 4
23	?	23	? DSZ SKIPPED-ERROR
24	?	24	?
25	?	25	? MM.TK= 5
26	?	26	? DSZ TST= LOCATION NOT -1 AFTER DSZ
27	?	27	?
28	?	28	? MM.TK= 6
29	?	29	? SAME AS 1, EXCEPT TESTING IN THE REVERSE
30	?	30	? DIRECTION
31	?	31	?
32	?	32	? MM.TK= 7
33	?	33	? SAME AS 2, EXCEPT TESTING IN THE REVERSE
34	?	34	? DIRECTION.
35	?	35	?
36	?	36	? MM.TK= 10
37	?	37	? SAME AS 3, EXCEPT TESTING IN THE REVERSE
38	?	38	? DIRECTION.
39	?	39	?
40	?	40	? 16.3.3 ARITHMETIC TEST
41	?	41	?
42	?	42	? THE MULTIPROGRAMMING RELIABILITY ARITHMETIC TEST WAS
43	?	43	? DERIVED FROM THE STAND ALONE ARITHMETIC TEST. THIS TEST
44	?	44	? REQUIRES 2K OF SCRATCH FOR EXECUTION. THE EXECUTE PORTION
45	?	45	? OF THE TEST IS RANDOMLY RELOCATED WITHIN AVAILABLE
			? SCRATCH. AT THE END OF EACH EXECUTION PASS SCRATCH
			? AREA IS RANDOMLY RELEASED OR HELD. IF HELD, THE NEXT TIME
			? THE TEST IS ENTERED, THE EXECUTABLE PORTION OF THE TEST WILL
			? AGAIN BE RANDOMLY RELOCATED WITHIN SCRATCH FOR EXECUTION.
			?
			? 16.3.4 MUL(S)/DIV(S) TEST
			?
			? THIS TEST WAS DERIVED FROM THE STAND ALONE
			? MUL/DIV TEST.
			?
			? NO TEST RELOCATING IS DONE IN THIS TEST.

  

01	16.3.5	01	STACK ERROR TEST
02	?	02	?
03	?	03	? **MOLLOC STKTS
04	?	04	? THIS TEST VERIFIES THE OPERATION OF THE
05	?	05	? HARDWARE STACK BY FORCING STACK OVERFLOW ERRORS
06	?	06	? AND REALLOCATING THE STACK THROUGH OUT MEMORY.
07	?	07	?
08	?	08	? 16.3.6 REAL TIME CLOCK
09	?	09	?
10	?	10	? THE REAL TIME CLOCK RUNS AT 416.66 HERTZ. RUNTIME ALONG
11	?	11	? WITH ACCUMULATED ERROR COUNT ARE PRINTED AT 5 MINUTES
12	?	12	? 15 MINUTES, 30 MINUTES AND EVERY 30 MINUTES OF RUNTIME
13	?	13	? THEREAFTER. THIS TYPEOUT ALSO OCCURS AFTER EVERY ERROR
14	?	14	? TYPEOUT OR IF A TTY KEY WITH SW 4=1 IS TYPED.
15	?	15	?
16	?	16	? 16.3.7 TELETYPE TEST
17	?	17	?
18	?	18	? THE TELETYPE TEST PRINTS A SINGLE LINE CONSISTING OF THE
19	?	19	? CHARACTERS SPACE TO Z. THE TEST WILL ALSO ECHO CHARACTERS
20	?	20	? AS TYPED.
21	?	21	?
22	?	22	? 16.3.8 LINE PRINTER TEST
23	?	23	?
24	?	24	? THE LINE PRINTER TEST IS AN EXERCISOR WHICH PRINTS
25	?	25	? A PATTERN ON THE LPT. TEN TO 60 LINES ARE
26	?	26	? PRINTED WITH A FORM FEED TO THE TOP OF THE PAGE
27	?	27	? FOR EACH GROUP. THE FREQUENCY OF SELECTION
28	?	28	? OF THIS TEST CAN BE INCREASED BY SELECTION
29	?	29	? OF A PROGRAM OPTION. SEE PARAGRAPH 3.5
30	?	30	?
31	?	31	? 16.3.9 6038/59 DISK TEST
32	?	32	?
33	?	33	? THE 6038/59 DISK TEST SIZES FOR THE EXISTANCE OF THE Z
34	?	34	? DISK ON DRIVE 0 AND 1 FOR BOTH THE PRIMARY AND SECONDARY
35	?	35	? DEVICE NUMBERS (33/73).
36	?	36	?
37	?	37	? THE TEST ASSIGNS 1K OF SCRATCH,
38	?	38	? THEN GENERATES FOUR RANDOM
39	?	39	? WORDS WHICH ARE REPEATED TO CREATE A 256
40	?	40	? WORD BUFFER STARTING AT PYDST.
41	?	41	? THE TEST THEN RANDOMLY SELECTS A DRIVE AND
42	?	42	? RANDOMLY SELECTS A TRACK, SEEKS TO THAT TRACK
43	?	43	? WRITES THE DATA PATTERN ON THIS TRACK
44	?	44	? AND THEN READS TWO OF THE SECTORS
45	?	45	? TO VERIFY THE DATA WAS WRITTEN OK.
			?
			? IF A DATA ERROR OCCURS THE TEST WILL
			? RETRY THE READ OPERATION 3 TIMES.
			?
			? ALL OTHER ERRORS WILL EXIT THE TEST
			? AFTER PRINTING ERROR MESSAGES AND
			? RELEASING SCRATCH
			?
			? 54

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10023 MNMRT
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;6.3.10 6095 (PHEONIX) DISK TEST
;
;WHEN ENTERED FOR INITIALIZATION, THE 6095
;DISK TEST SIZES THAT THE DISK IS "READY".
; THE OPERATOR WILL BE ASKED IF THE WHOLE DISK
; IS TO BE TESTED. THIS WILL ALLOW HIM TO PROTECT
; THE NON-REMOVEABLE PLATTER IF DESIRED.
; THE SIZE OF THE PHEONIX DISK IS ADJUSTED
; IF NOT ALL THE DISK IS TO BE TESTED.
;THIS INFORMATION IS TYPED THE
;FIRST TIME THE TEST IS ENTERED DURING "RUN"
;THE TESTING OF EACH AVAILABLE DRIVE IS CONTROLLED BY
;AN INDIVIDUAL CONTROL TABLE FOR EACH DRIVE.
;THE OPERATION OF THE 6095 DISK IS CONTROLLED BY
;THE CONTENTS OF 3 TABLES. EACH CONTROL TABLE IS 13 WORDS
;IN LENGTH. THE FIRST WORD CONTAINS THE CYLINDER NUMBER,
;(RANDOMLY SELECTED), THE SECOND WORD CONTAINS THE STARTING
;SECTOR AND NUMBER OF SECTORS UTILIZED. THE START SECTOR IS
;RANDOMLY SELECTED AND THE NUMBER OF SECTORS IS CONTROLLED BY THE
;AMOUNT OF SCRATCH AREA AVAILABLE TO THE DISK TEST WHEN THE
;DISK IS WRITTEN.
;THE 3RD WORD IS AN ERROR COUNTER. FOR EACH ERROR DETECTED, THE
;DISK IS RECALIBRATED AND THE OPERATION IS REPEATED.
;THIS "RECAL/REPEAT" IS EXECUTED UP TO 4 TRYS.
;THE FOURTH THROUGH 7TH WORDS ARE THE RANDOM DATA
;USED TO GENERATE THE TEST PATTERN.(THEY REPEAT EVERY
;4 WORDS. THE 8TH WORD IS A RANDOM SEC.# THAT IS TREATED
;SINGLY AS THE CONTIGUOUS SECTORS IN WORD 2. IF THE LAST
;SECTOR ON THE CYLINDER, READS AND WRITES FORCE THE EOC
;STATUS AS EVERY OPERATION IS DONE WITH A SEC. COUNT=2
;THE NINTH WORD IS THE CHANNEL ADDR. USED TO WRITE
;TO THE DISK. WORDS TEN THRU THIRTEEN ARE THE MEM. 1K'S
;USED IN WRITING TO THE DISK.
;
;WHEN INITIALLY ENTERED, THE DISK TEST ATTEMPTS TO ACQUIRE 1
;TO 4K OF SCRATCH AREA. THE TEST THEN RANDOMLY SELECTS A DATA
;START ADDRESS WITHIN THE FIRST 256 WORDS OF SCRATCH.
;THE TEST THEN RANDOMLY SELECTS ONE OF THE 3 OP TABLES. IF
;THE FIRST WORD OF THE OP TABLE IS NOT=0 IT INDICATES THAT -
;AT THE CYLINDER NUMBER IN THE FIRST WORD - STARTING WITH THE
;SECTOR # IN BITS 6 TO 15 OF THE 2ND WORD - FOR THE # OF SECTORS
;BEEN WRITTEN THAT IS EQUAL TO THE DATA IN WORDS 4 TO 7
;OF THE OP TABLE. READ FROM DISK IS SELECTED.
;IF THE FIRST WORD OF THE TABLE IS=0 THE TEST - RANDOMLY
;SELECTS A CYLINDER NOT CURRENTLY IN AN OP TABLE - RANDOMLY
;SELECTS A START SECTOR (THE # OF SECTORS IS = TO THE AMOUNT
;OF SCRATCH AVAILABLE) - AND GETS FOUR RANDOM DATA WORDS WRITE
;TO DISK IS SELECTED
;
;THE TEST THEN INITIATES A SEEK TO THE CYLINDER SELECTED
;AND AT SUCCESSFUL COMPLETION OF THE SEEK EITHER READS OR
;WRITES THE # OF SECTORS AVAILABLE.
;AT SUCCESSFUL COMPLETION OF EITHER THE READ OR WRITE, THE
;DATA BUFFER IS CHECKED TO VERIFY THAT IT CONTAINS THE
;CORRECT DATA. AS DATA COMPARES CORRECTLY, THE CORRECT
;WORDS ARE FILLED WITH THE NEGATIVE COUNT=TO THE NUMBER
;OF WORDS LEFT IN THE BUFFER.

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10024 MNMRT

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;6.3.11 I/O TESTER TEST
;
;THE I/O TESTER TEST CHECKS FOR THE I/O TESTER.
;IF IT IS IN THE SYSTEM,THE TEST SETS UP THE
;PROPER PARAMETERS FOR TESTING.
;
;THE TEST ASSIGNS FROM 1-4K OF SCRATCH AREA.
;IT THEN FINDS THE NUMBER OF 64 WORD BLOCKS
;AND SETS UP ACCORDINGLY.
;
;THE TEST NOW SETS A RANDOM DATA WORD AND SAVES IT.
;NOW IT DECIDES RANDOMLY WHETHER TO READ OR WRITE.
;IF A WRITE IS SELECTED ALL THE BUFFERS ARE FILLED
;WITH THE RANDOM DATA WORD AND THE COMMAND IS GENERATED
;IF A READ IS SELECTED THE DATA WORD IS SENT TO THE TESTER
;AND THE COMMAND IS GENERATED.
;NOW THE TEST RANDOMLY GETS THE START DELAY TIME,SETS
;UP THE TIMER AND RETURNS TO LINRR. AFTER N TIMES
;THROUGH RANG THE TESTER IS STARTED.
;
;DATA ERRORS IN A WRITE OPERATION CAN BE CAUSED BY
;EITHER,A CHANGE IN THE READ WRITE BIT IN THE TESTER,
;OR A MEMORY FAILURE.
;OTHER ERRORS ON A WRITE WILL BE ADDRESS ERRORS.
;
;6.3.12 6101/2 DISK TEST
;
;THIS DISK TEST SIZES FOR THE EXISTENCE OF DISK
;ON DEVICE CODES 26 FOR PRIMARY AND 66 FOR THE
;SECONDARY TESTS. EACH DEVICE CODE IF USED WILL
;HAVE A 6101 FIXED SURFACE DISK AND A POSSIBILITY
;UP UP TO THREE 6102 DISKETTE DRIVES. THE TEST WILL
;REPORT THE DEVICES THAT IT FINDS READY AND WILL
;ASK IF YOU WANT TO PROTECT THE 6101. IF YOU
;RESPOND YES THE TEST WILL NOT EXERCISE THE FIXED
;DISK. THE PROGRAM TESTS THE DISK BY READING AND
;WRITING A FOUR WORD RANDOM DATA PATTERN TO A
;RANDOMLY SELECTED CYLINDER, HEAD AND SECTOR
;ADDRESS. THE TEST CHECKS FOR AN ERROR FREE DATA
;TRANSFER BY EXAMINING THE STATUS WORD (DIA)
;AND BY COMPARING THE DATA READ TO THE DATA
;PATTERN WRITTEN.

```

10025 MNMRT

6.3.13 LOAD BYTE/STORE BYTE TEST

01 ?  
 02 ?  
 03 ? TESTING OF EACH INSTRUCTION IS DIVIDED INTO TWO  
 04 ? SECTIONS. SUBTESTS LS801 THROUGH LS832 TRY OUT  
 05 ? ALL POSSIBLE COMBINATIONS OF ACCUMULATORS AS BYTE  
 06 ? POINTERS AND DATA REGISTERS. DATA IS TRANSFERRED  
 07 ? INTO AND OUT OF FIXED LOCATIONS IN MEMORY TO  
 08 ? SIMPLIFY DIAGNOSIS. THIS SECTION IS DESIGNED TO  
 09 ? CATCH THE GROSS FAILURES.  
 10 ?  
 11 ? SUBTESTS LS833 AND LS834 ARE INTENDED TO FORCE MORE  
 12 ? SUBTLE FAILURES. EACH TEST IN THIS SECTION EXERCISES  
 13 ? BOTH LOB AND STB TOGETHER IN AN EFFORT TO DETECT  
 14 ? INTERACTION BETWEEN INSTRUCTIONS. THESE TESTS ALSO  
 15 ? USE RANDOM BUFFERS AND EXECUTE MANY LOB AND STB  
 16 ? INSTRUCTIONS IN A SHORT PERIOD OF TIME IN AN EFFORT  
 17 ? TO DETECT FAILURES IN INTERACTING WITH THE SYSTEM  
 18 ? ENVIRONMENT.  
 19 ?

10026 MNMRT

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 03 ?  
 04 ?  
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7.0 ODT EDITOR  
 7.1 REQUESTING THE ODT EDITOR  
 TO ENTER THE ODT TYPE A CONTROL O ON  
 THE TT. THIS CAN BE DONE AT ANY POINT IN THE  
 PROGRAM.  
 7.2 ON ENTERING THE ODT A CARRIAGE RETURN, LINE FEED  
 AND AN @ IS TYPED ON THE TTY.  
 7.3 CONVENTIONS AND SYMBOLS IN COMMAND LINES  
 \*\*\*\*\*  
 CR PRESSING THE RETURN KEY IS REPRESENTED BY CR .  
 LF PRESSING THE LINE FEED KEY IS REPRESENTED BY LF .  
 ? ? PRESSING AN ILLEGAL KEY CAUSES THE ODT TO RESPOND WITH  
 A ?.  
 ? @ ODT IS READY AND AT YOUR SERVICE.  
 7.4 COMMAND STRUCTURE  
 \*\*\*\*\*  
 AN ODT COMMAND HAS THE GENERAL FORMAT:  
 [ARGUMENT] [COMMAND]  
 ARGUMENT MAY BE ONE OF THE FOLLOWING:  
 ADR AN OCTAL ADDRESS OR AN EXPRESSION OF THE FORM:  
 X+X.X...  
 WHERE EACH X IS AN OCTAL INTEGER, SEPARATED  
 FROM THE FOLLOWING X BY EITHER +(PLUS)  
 OR -(MINUS). LEADING ZEROS NEED NOT BE TYPED.  
 N AN OCTAL INTEGER.  
 A COMMAND IS A SINGLE TELETYPE CHARACTER  
 CHARACTERS USED TO OPEN/CLOSE LOCATIONS INCLUDE:  
 "/" "CR" "LF" "a"  
 CHARACTERS USED TO ENTER/EXIT ODT INCLUDE:  
 "o" (CTRL O) "R" "P"  
 CHARACTERS USED TO MODIFY CURRENT ARGUMENTS ARE:  
 "RUBOUT" "a" "a" AND THE INTEGERS 0 TO 7  
 THE CHARACTER "=" ALLOWS THE CURRENT ARGUMENT TO BE  
 EXAMINED WITHOUT OPENING OR CLOSING THE CURRENT LOC.

10027 MNMRT

```
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 ?
```

7.5 COMMANDS TO OPEN A LOCATION  
=====

THE MEMORY LOCATION TO BE OPENED IS TYPEDOUT.  
OPEN THE LOCATION AND PRINT ITS CONTENTS  
AND PRINT ITS CONTENTS.  
ADD ADR TO THE POINTER, OPEN THE LOCATION AND  
PRINT ITS CONTENTS.  
SUBTRACT ADR FROM THE POINTER, OPEN THE LOCATION AND  
PRINT ADR CONTENTS.  
CLOSE THE OPEN LOCATION WITH OR WITHOUT  
MODIFICATION OF ITS CONTENTS.  
CLOSE THE OPEN LOCATION WITH OR WITHOUT  
MODIFICATION OF ITS CONTENTS AND OPEN THE  
SUCCEEDING LOCATION.  
CLOSE THE OPEN LOCATION WITHOUT MODIFYING  
ITS CONTENTS AND OPEN THE CELL POINTED  
BY ITS CONTENTS  
CLOSE THE OPEN LOCATION WITHOUT MODIFYING  
ITS CONTENTS AND OPEN THE LOCATION POINTED  
BY ITS CONTENTS+ADR  
CLOSE THE OPEN LOCATION WITHOUT MODIFYING ITS  
CONTENT AND OPEN THE LOCATION POINTED BY  
ITS CONTENTS+ADR.  
CLOSE THE CURRENT LOCATION AND OPEN ",-1"  
LF CLOSE THE CURRENT LOCATION AND OPEN ",-1"

10028 MNMRT

```
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 ?
38 ?
39 ?
40 ?
41 ?
42 ?
43 ?
44 ?
45 ?
46 ?
47 ?
```

7.6 OTHER COMMANDS  
=====

RUBOUT THE RUBOUT KEY IS USED TO DELETE ERRONEOUSLY TYPED  
DIGITS EACH TIME THE RUBOUT KEY IS PRESSED, THE RIGHT  
MOST DIGIT IS DELETED AND ECHOED ON THE TERMINAL.  
IF THE RUBOUT KEY IS PRESSED RIGHT AFTER OPENING A CELL  
THEN IT ALLOWS THE MODIFICATION OF THE CONTENTS AS IF  
THEY WERE TYPED JUST BEFORE THE KEY WAS PRESSED.

RESTART THE EXECUTION OF THE PROGRAM AT THE LOCATION  
POINTED BY SAVED ACS .

START EXECUTING THE USERS PROGRAM AT LOCATION ADR AFTER  
AN IO RESET.

KILL THE STRING TYPED SO FAR. ODT RESPONDS WITH A ? AND  
THE OPEN LOCATION IS CLOSED WITHOUT MODIFICATION.  
PRINT THE CURRENT ARGUMENT (I.E. TYPING "2" WILL  
PRINT THE ADRS OF THE LAST OPENED LOCATION)

7.7 MODIFICATION OF A LOCATION  
=====

ONCE A LOCATION HAS BEEN OPENED ITS CONTENTS CAN BE  
MODIFIED IN ONE OF THE FOLLOWING WAYS:

- 1) TYPE THE OCTAL NUMBER OR A STRING OF NUMBERS SEPERATED  
BY + OR -, FOLLOWED BY CR , OR LF . IN THIS CASE THE SUM  
OF THE TOTAL NUMBERS TYPED-IN WILL BE DEPOSITED. LEADING  
ZEROS NEED NOT BE TYPED.
- 2) TYPE + OR - FOLLOWED BY A NUMBER OR A STRING OF NUMBERS  
SEPERATED BY + OR -, FOLLOWED BY CR , OR LF . IN THIS  
CASE SUM OF THE TOTAL NUMBERS TYPED IN WILL BE ADDED TO  
OR SUBTRACTED FROM THE PREVIOUS CONTENTS OF THE LOCATION.  
LEADING ZEROS NEED NOT BE TYPED.
- 3) ADDRESS ITSELF OR AN OCTAL NUMBER RELATIVE TO THE  
ADDRESS OF THE LOCATION CAN BE DEPOSITED IN A MEMORY  
LOCATION BY TYPING A . OR \*-ADR FOLLOWED BY A CR , OR LF .
- 4) LOCATION A RUBOUT COMMAND GIVEN RIGHT AFTER OPENING A  
LOCATION ALLOWS THE MODIFICATION OF ITS CONTENTS  
AS IF THEY WERE TYPED IN JUST BEFORE THE COMMAND  
WAS ISSUED.

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\*\*00000 TOTAL ERRORS, 00000 FIRST PASS ERRORS

0030 MNRMT

ARITH 000000	2/11#	8/02	21/30
BYTES 000000	2/17#	13/32	25/01
CARDS 000000	2/09#	7/20	20/03
FYTS 000000	2/14#	9/01	22/32
FXYS 000000	2/16#		
IOTSI 000000	2/21#	11/01	24/01
LPTSI 000000	2/20#	11/35	22/23
MDUST 000000	2/12#	8/14	21/41
PEDSK 000000	2/15#	10/01	23/01
PMVDS 000000	2/18#	12/01	24/26
SCMTS 000000	2/10#	7/35	21/01
SMVDS 000000	2/19#		
STKTS 000000	2/13#	8/23	