

**DataGeneral**

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**TECHNICAL  
STATEMENT**

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TEXT LISTING

068-000647-01

PROGRAM

ECL MULTI-PROGRAMMING RELI TST  
(LONG)

TEXT TAPE

097-000647-01

ABSTRACT

THE ECLMORT ECLIPSE MULTIPROGRAMMING RELIABILITY TEST  
CONSISTS OF A SERIES OF INDIVIDUAL PROCESSOR AND PERIPHERAL  
TESTS AND A SUPERVISOR PROGRAM, THE DIAGNOSTIC LINKER.



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REVISION HISTORY
REV. 0 INITIAL RELEASE FOR M600,S130 SUPPORT
REV. 1 UPDATE TO SUPPORT:
      IOP ARRAY PROCESSOR
      MULTIPLE IOP SUPPORT
      PIT TEST REMOVED
      DCU=200 SUPPORT ADDED

ABSTRACT
THE (ECLMORT) ECLIPSE MULTIPROGRAMMING RELIABILITY TEST
CONSISTS OF A SERIES OF INDIVIDUAL PROCESSOR
AND PERIPHERAL TESTS AND A
SUPERVISOR PROGRAM. (THE DIAGNOSTIC LINKER)

THE DIAGNOSTIC LINKER IS A PROGRAM
DESIGNED TO "LINK" THE VARIETY OF
PROCESSOR AND PERIPHERAL TESTS IN
SUCH A FASHION THAT THEY MAY BE
RUN CONCURRENTLY, THEREBY, TESTING
THE INTERACTIVE CAPABILITIES OF
THE PROCESSOR AND ITS PERIPHERAL
EQUIPMENT.

THIS TEST IS PROVIDED IN THREE VERSIONS:
SHORT, LONG, PERIPHERAL.

ALL THREE VERSIONS WILL PERMIT RUNNING OF
SLAVE IOPS CONTAINING IPMORT IF THEY
WERE LOADED BY DTOS. (HIOP DIRECTORY)

THE LONG VERSION INCLUDES TESTS
THAT APPLY TO THE CPU, MEMORY, FLOATING POINT,
MAP, DEMAND PAGING, CHARACTER/COMMERCIAL,
ARRAY PROCESSOR, DCU-50/200;
PLUS PRIMARY DEVICE CODE TESTS FOR THE 6063/64
DISK, MOVING HEAD DISK, 6060/61 DISK,
MAGNETIC TAPE, AND LINE PRINTER, RTC, TTY.

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12. HARDWARE CONFIGURATIONS SUPPORTED
:
: 2.1 MINIMUM MACHINE REQUIREMENTS
: 2.1.1 ECLIPSE M600, S130, S250, C350, C150 PROCESSOR
: 2.1.2 32K OF READ WRITE MEMORY (MUST
: BE CONTIGUOUS)
: 2.1.3 TTY/CONSOLE(DEV. 10/11)
:
: 2.2 OPTIONAL EQUIPMENT
: 2.2.1 1024K OF READ/WRITE MEMORY(MUST BE CONTIGUOUS)
: 2.2.2 ERROR CORRECTION
: 2.2.3 MMPUI
: 2.2.4 MMPUR (DEMAND PAGING)
: 2.2.5 CHARACTER/COMMERCIAL INSTRUCTION SET
: 2.2.6 FLOATING POINT UNIT, FLT.PT.FUNCTIONS
: 2.2.7 DCU 50 COMMUNICATIONS CONTROLLER
: 2.2.8 I/O PROCESSORS(DEV. 60-67)
: 2.2.9 ARRAY PROCESSOR(AP)
: 2.2.10 6060 SERIES DISK (ANY/ALL DRIVES)
: 2.2.11 6063/64 DISK (ANY/ALL DRIVES)
: 2.2.12 MOVING HEAD DISK (ANY/ALL DRIVES)
: 2.2.13 MAGNETIC TAPE (ANY/ALL DRIVES)
: 2.2.14 REAL TIME CLOCK(DEV. 14)
: 2.2.15 I/O TESTER(DEV. 0)

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0007      LEWRT
01      : (C/D)
02      RESTARTS THE PROGRAM AT LOC 202
03      AFTER RESETTING SWREG TO ALL 0'S
04      : (C/R)
05      RESTARTS THE PROGRAM AT LOC 202
06      WITHOUT DISTURBING SWREG.
07      :
08      EXAMPLE:
09      TO DELETE ERROR TYPEOUTS AND LOOP ON FAILING
10      SCRATCH AREAS TYPE 0,1,2, AND CR.
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10008      LEWRT
01      OPERATING PROCEDURES
02      :
03      :4.1 LOAD THE PROGRAM VIA THE BINARY LOADER
04      :
05      :4.2 SET SWITCHES TO:
06      :
07      :   200 FOR AUTO SIZE AND GO
08      :   202 FOR MANUAL SELECT/DELETE
09      :   204 TO IGNORE MMPU
10      :   206 TO RESTART LAST TESTS SELECTED
11      :   210 TO START IN 000
12      :   212 TO AUTO START WITH IPMORT
13      :
14      : NOTE: THE TEST MUST HAVE BEEN STARTED
15      :       AND RUN FOR A FEW SECONDS
16      :       BEFORE ADRS 206 MAY BE UTILIZED
17      :
18      :4.3 PRESS START
19      :
20      :   PROCESSOR WILL TYPE:
21      :   ECLMORT=(S,L,P) (MULTI-PROGRAMMING REL. TEST XXX VER)
22      :   TOTAL #1K*5XXX(DECIMAL) MMPU1 OR NO MMPU1
23      :   IOP EXISTS(IF FOUND)
24      :   PROGRAM RUN LIST
25      :   PROG# DESCRIPTION
26      :
27      :4.4 IF START WAS 200 (OR 206) THE LIST OF
28      :   PROGRAMS TO BE RUN CONCURRENTLY WILL
29      :   THEN BE LISTED AND THE TEST SYSTEM
30      :   WILL AUTO START
31      :
32      :4.5 IF START WAS 202 LINKER WILL
33      :   PAUSE AT THE END OF EACH TEST
34      :   DESCRIPTION AND WAIT FOR KEYBOARD
35      :   INPUT. TYPING IN A SPACE WILL
36      :   ENABLE THAT TEST TO BE RUN.
37      :   TYPING IN ANY OTHER CHARACTER WILL
38      :   DELETE THAT TEST FROM BEING RUN
39      :
40      :4.6 IF THE STARTING ADDRESS WAS 204 THE LINKER
41      :   WILL SIZE MEMORY WITHOUT UTILIZING
42      :   OR EVEN LOOKING FOR THE MMPU1 OPTION
43      :   AND THEN PROCEED AS IN STARTING AT ADRS. 202
44      :   WITH THE MMPU1 NONEXISTENT.
45      :
46      :4.7 IF THE 00T WAS STARTED (ADDRESS 210) AND "P"
47      :   IS TYPED THE TEST WILL BE STARTED AS IF
48      :   IT WAS STARTED AT 202.
49      :
50      :4.8 OPTION SETUP
51      :
52      :4.8.1 THE PROGRAM WILL PAUSE AFTER PRINTING
53      :   "ENTER OPTIONS:CR TO CONTINUE" AND ALLOW
54      :   KEY ENTRY OF SWITCH REG. OPTIONS. TYPE
55      :   A "CR" KEY TO START TESTS.
56      :
57      :4.8.2 IF AN AUTOSTART ADDRESS WASN'T USED
58      :   AND AN IOP WAS FOUND DURING SIZING
59      :   THE OPERATOR WILL BE ASKED TO SPECIFY THE
60      :   IOP STARTING ADDRESS FOR EACH IOP.
61      :
62      :   ENTER VALUE FROM 200 TO 210 TO START. 0 TO DELETE.
63      :   TERMINATE INPUT WITH A CR.(VALUES OUTSIDE
64      :   THIS RANGE WILL NOT BE ACCEPTED.)
65      :   (SEE IPMORT LISTING FOR STARTING ADDRESS
66      :   DESCRIPTIONS).
67      :
68      :4.9 IF STARTED THE IOPS WILL OUTPUT THEIR HEADER
69      :   AND RUN LISTS AT THIS TIME AND IF NOT AN AUTO
70      :   START WILL ALLOW TEST SELECTION/DELETION
71      :   AND OPTION SETUP.
72      :
73      :   EACH TEST WHICH HAS SIZING INFORMATION
74      :   WILL PRINT THAT INFORMATION THE FIRST TIME
75      :   THE TEST IS SELECTED FOR EXECUTION.

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:4.10 DUAL PORT DISK START UP PROCEDURE
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: 4.10.1 PROGRAM LOAD ECLMORT(LONG OR PERIPHERAL)
: INTO EACH CPU.
:
: 4.10.2 INSTALL APPROPRIATE ODD/EVEN CYLINDER
: PATCHES INTO THE PROGRAM FOR EACH CPU.
: (SEE PARAG. 4.10.6)
:
: 4.10.3 START ONE CPU AT 202 WHEN QUERRED
: ABOUT TEST DELETIONS, START OTHER
: CPU AT 202.
:
: 4.10.4 WHEN QUERRED ABOUT TEST DELETIONS
: ON SECOND CPU, ENTER ALL TEST
: SELECTIONS ON BOTH CPU'S.
:
: 4.10.5 ENTER ANY SWREG OPTIONS. CARRIAGE
: RETURN STARTS THE PROGRAM.
:
: 4.10.6 PATCH LIST
:
: 4.10.6.1 PRIMARY DEVICE CODE DISKS
:
:
: LOCATION LABEL TEST ONE SYS OTHER SYS
052355 PATCHE PD.3L*6 16063/64 DISK 101232 101233
054362 PATCHE MH.3L*6 MOVING HEAD 101232 101233
057257 PATCHE ZB.3L*6 16060/61 DISK 101232 101233

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:4.11 DATA LATE RETRIES FOR DISK TESTS
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: DUE TO IMPLEMENTATION OF DISK CONFIGURATIONS WHICH WILL
: RECEIVE DATA LATE STATUS ERRORS IN THEIR NORMAL COURSE
: OF OPERATION, IF THEY ARE SECONDARY PRIORITY ON THE DATA
: CHANNEL BUSS TO A DISK WHICH IS A FAST ACCESS TYPE, MULTI-
: PROGRAMMING DISK TESTS NOW ARE CODED TO RETRY UP TO 16 TIMES
: UPON DETECTION OF A DATA LATE ERROR. IF AFTER 16 RETRIES THE
: ERROR STILL CONTINUES, THE ERROR WILL BE REPORTED. ALL
: DATA LATE ERRORS WILL BE REPORTED AT SYSTEM STATUS REPORT
: TIME, I.E. WHEN A "7" IS TYPED ON THE CONSOLE.
:
: 4.11.1 PATCHES TO DISABLE DATA LATE RETRIES
:
: THE FOLLOWING PATCHES SHOULD BE INSTALLED IN THE DISK
: TESTS WHICH LEGALLY SHOULDN'T RECEIVE ANY DATA LATE ERRORS.
: THIS WILL DISABLE THE RETRY FEATURE FOR THAT TEST.
:
: 4.11.1.1 PRIMARY DEVICE CODE DISK TESTS
:
: LOCATION LABEL TEST WAS CHANGE TO
052576 PATCH=PD.SS=1 16063/64 DISK 403 401
054573 PATCH=MHRWI+8 MOVING HEAD 402 401
057624 PATCH=ZBRTY 16060/61 DISK 402 401

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ERROR DESCRIPTIONS
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 PRECEED,
(I.E. INTERRUPT STACK OVERFLOWS)
NOTE:
AFTER 50 ERRORS HAVE BEEN DETECTED, THE
TEST WILL INDICATE SUCH VIA TYPEOUT, THEN
WAIT FOR A CR KEY FROM DEVICE TTI IF TYPEOUTS
AREN'T DELETED(SM1=1).
ERROR FORMAT
NOTE: ALL TYPEOUTS ORIGINATING IN A
SLAVE IOP WILL BE PRE-FACED BY THE
IOP NUMBER.
ERROR TYPEOUTS INCLUDE:
PROGRAM # AND NAME AT TIME OF ERROR
IN UP TO 2 SETS OF 5 VARIABLES.
EACH SET OF VARIABLES (1 STATE BLOCK) INCLUDE
AC0 TO ACS AND THE PC WITH CARRY.
AND LAST 5 ENTRIES ON THE FIRST
IF THESE ARE SAY SEVEN ENTRIES ON THE STACK
THESE STATE BLOCKS WILL OVERLAP AND FOR THIS
REASON THE START ADRS OF EACH STATE BLOCK
IS INCLUDED IN THE TYPEOUT
5.1.3 LOGICAL SCRATCH AND DATA CHANNEL LIMITS
5.1.4 MEMORY ALLOCATION TABLE
PHYSICAL 1K PAGE# +LOGICAL ADDRESS
+REL. LOG. ADDR(IF RELOCATED AND REMAPPED)
5.1.5 CONTINUATION INFORMATION IN GROUPS
OF 3 MEMORY LOCATIONS PERTINENT TO
THE INDIVIDUAL TEST THAT FAILED
5.1.6 THE CPU TESTS THAT RELOCATE/REMAP WILL
IN THEIR ERROR TYPEOUTS:
ST.LA START/ERROR (RES.)
:XXXXXX YYYYYY ZZZZZZ
ST.LA THE LOGICAL START OF THE RELOCATED TEST LOOP
:XXXXXX (I.E. THE LAST LCALL SETUL)
START THIS NUMBER INDICATES WHERE THE RESIDENT COPY
:YYYYYY OF THE TEST LOOP MAY BE FOUND IN THE LISTING
ERROR THIS NUMBER INDICATES WHERE IN THE RESIDENT
:ZZZZZZ COPY OF THE LISTING THE ERROR CALL MAY BE FOUND
(FOR SOME VALIDITY TRAP ERRORS THIS NUMBER
MAY NOT APPEAR TO BE VALID.)

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5.1.8 DEMAND PAGING DATA FOR PAGE AND
BREAKPOINT FAULTS.
IF THE DEMAND PAGING TEST IS SELECTED AND THE SW9/SW10
SELECTION IS IN THE ENABLE STATE(=0), THEN ANY ERRORS
INCURRED IN THE CPU TESTS WHICH REMAP AND RELOCATE COULD
BE DUE TO INTERACTIONS WITH THE MMPU2. TO DETERMINE
IF THIS IS THE CASE EITHER SET SW9 TO THE INHIBIT
STATE (=1) OR RESELECT TESTS WITH THE DEMAND PAGING
TEST DELETED.
5.1.8.1 CONTEXT BLOCK INFORMATION RETRIEVAL
IF A TEST WAS TAKING PAGE/BREAKPOINT FAULTS
AND SM11 IS IN THE ENABLE STATE(=0)
FOLLOWING THE MEMORY ALLOCATION TABLE, ALSO THE CONTEXT
BLOCK INFO. CAN BE OBTAINED BY ENTERING THE ODT AND TYPING
A "C". (SEE SECTION 7. FOR ODT DESCRIPTION)
NOTE: THIS TABLE IS 38 WORDS LONG BY FIVE WORDS WIDE
USE A HARDCOPY OUTPUT DEVICE TO RECOVER ALL
THE ERROR OUTPUT.
5.1.8.2 CONTEXT BLOCK OUTPUT ORGANIZATION
THE CONTEXT BLOCK DATA IS PRINTED IN FIVE VERTICAL
COLUMNS, THE MOST RECENT BEING ON THE LEFT AND THE
LEAST CURRENT ON THE RIGHT, USUALLY THE TWO LEFT
COLUMNS WILL BE EXACT COPIES BECAUSE BEFORE THE DPOP
BY THE FAULT HANDLER THE CONTEXT INFORMATION IS
SHIFTED TOWARD THE RIGHT. IF THE TWO LEFT COLUMNS
AREN'T IDENTICAL THEN THE LEFT MOST COLUMN WAS
CAUSED BY A VALIDITY MMPU1 FAULT, NOT A MMPU2 FAULT.
NOTE: THE FPU INFORMATION IN THE CONTEXT BLK
IS ONLY VALID IF WORD 15 BIT 0 IS A "1"
CONTEXT BLOCK FORMAT
WORD 1 VALIDITY WORD # 1
2 " " # 2
3-5 GR0 = GR2
6-9 JSR0 = JSR3
10 STATUS(BITS0=3)+RAS
11 CPU STATE(BITS0=7)+BREAKCONTROL
12 I.R.
13 CPU BIT COUNTER
14 PAGE #
15 F.P.+BREAKPOINT ADDR.
16-19 AC0 = ACS
20 P.C.
21 " "
22 FLOAING POINT STATUS REG BITS 0-15
23-26 " " " " " " "
27-30 FPAC0
31-34 FPAC1
35-38 FPAC2
FPAC3

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10013 LEMRT

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01 15.1.9 FLOATING POINT AC'S
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04 ALL CPU TESTS WHICH MAKE USE OF THE FLOATING
05 POINT WILL IN THEIR ERROR OUTPUT INCLUDE THE CURRENT
06 STATE OF THE FPSR AND FPAC0 THRU FPAC3 IN THE FOLLOWING
07 FORMAT:
08
09 FPSR = SSSSSS SSSSSS
10 FPAC0-3
11 0 15 16 31 32 47 48 63
12 XXXXX XXXXXX XXXXXX XXXXXX
13 YYYYY YYYYY YYYYY YYYYY
14 ZZZZZ ZZZZZ ZZZZZ ZZZZZ
15 00000 00000 00000 00000
16
17 WHERE XXXXX = FPAC0
18 YYYYY = FPAC1
19 ZZZZZ = FPAC2
20 00000 = FPAC3
21
22 15.1.10 RELOCATED CODE ERROR
23
24 UPON DETECTION OF AN ERROR BY A RELOCATED TEST
25 THE RELOCATED CODE IS COMPARED TO THE ORIGINAL
26 COPY. IF A DIFFERENCE IS FOUND THE FOLLOWING
27 INFORMATION IS TYPED:
28
29 RELOCATED CODE ERROR ADDR-A
30 EXPECTED ACTUAL ADDR-E ADDR-A
31 XXXXX YYYYY 00000 ZZZZZ
32
33 WHERE, XXXXX IS THE ORIGINAL WORD
34 YYYYY IS THE RELOCATED WORD
35 00000 IS THE ADDRESS OF ORIGINAL WORD
36 ZZZZZ IS THE ADDRESS OF RELOCATED WORD
37
38 WHEN THIS OCCURS THE ERROR WAS
39 PROBABLY CAUSED BY THE MODIFICATION OF THE
40 RELOCATED CODE.
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10014 LEMRT

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01 15.1.11 BMC CHANNEL
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04 IN THE NORMAL M600 CONFIGURATION THE 6060/61
05 AND 6063/64 DISKS ARE CONNECTED TO THE BMC
06 CHANNEL. IF PROBLEMS ARE FOUND TO EXIST
07 ON EITHER DISK THE DISK COULD BE RECONFIGURED
08 TO USE THE DCH INSTEAD. THIS WILL HELP ISOLATE
09 WHETHER THE PROBLEM IS THE BMC OR DISK.
10 THE DISK TESTS WILL SIZE THE CHANNEL
11 IN USE UPON INITIALIZATION. ALSO DISK
12 TESTS WHICH USE THE BMC WILL OUTPUT THE
13 BMC STATUS WORD IN AC1 UPON A STATUS ERROR
14
15 *****
16 BMC CHANNEL STATUS WORD *****
17 *****
18 MEANING *****
19
20 ERROR
21
22 I/O DIRECTION
23 1 TWO STEP MODE
24 2 VALIDITY PROTECT ERROR
25 3 4-6 N/A
26 7 ADDR PARITY ERROR
27 8 DATA PARITY ERROR
28 *****
29 ERROR ANALYSIS *****
30
31 DUE TO THE INTERACTIVE NATURE OF
32 THE TESTS INVOLVED, A SERIES OF
33 ERROR TYPEDS WILL PROBABLY BE
34 REQUIRED FOR ANALYSIS BEFORE A
35 PROBLEM WILL BE ISOLATED.
36 A RESTART AT 202 AND DELETION OF ALL
37 BUT THE TEST THAT ORIGINALLY
38 FAILED MAY HELP TO ISOLATE
39 INTERACTIVE PROBLEMS AS FOLLOWS:
40
41 15.2.1 IF THE TEST RUNS BY ITSELF THE PROBLEM
42 IS INTERACTIVE-RE-ENABLE ONE OTHER TEST AT
43 A TIME TO DETERMINE WHICH ONE IS THE PROBLEM.
44 IF THE TEST DOES NOT RUN BY ITSELF
45 RESORT TO SIMILAR BUT LOWER LEVEL TESTS
46 FOR ISOLATION
47
48
49 PERTINENT MEMORY LOC'S TYPED
50
51 CHECKERBOARD RAN
52
53 THE AC'S AT ERROR WILL INDICATE:
54 GOOD DATA- BAD DATA-LOGICAL ADDRESS
55
56 IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED:
57 CB.1K TEST COUNTER
58 0 GENERATE CHECKERBOARD
59 1 DISTURB PASS
60 2 CHECK PATTERN
61 3 CHECKSUM THE # OF -1'S IN PATTERN
62 CB.LC STARTING LOGICAL ADDRESS OF "BEGIN"
63 CB.8E RELOCATED TO SCRATCH
64 AC3 AT ERROR CALL

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:5.3.2 ARITHMETIC TEST
:
: THE AC'S WILL BE TYPED AS THEY WERE AT THE
: TIME OF ERROR DETECTION
:
: IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED:
: AT-LC STARTING ADDRESS OF ARITH IN SCRATCH
: AT-LO LOW LIMIT OF SCRATCH AREA AFTER IT IS
: REMAPPED FOR EXECUTION
: AT-LA AT-LC IN RELATION TO AT-LO
: (LOGICAL START OF ARITH AFTER REMAPPING)
: THE LAST THREE RANDOM NUMBERS GENERATED
: (SEE DISCUSSION OF ST.LA,ETC AT PARA.5.1.6)
:
:5.3.3 EIS/MRI TEST
:
: THE AC'S WILL BE TYPED AS THEY WERE AT THE
: TIME OF ERROR DETECTION
:
: IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED:
: EI-TK SEE DISCUSSION OF TEST FOR THE
: SEQUENCE BEING EXECUTED
: EI-LO LOW LIMIT OF SCRATCH AREA AFTER IT WAS
: REMAPPED FOR EXECUTION
: EI-LA LOGICAL START OF TEST AFTER REMAP
: (SEE DISCUSSION OF ST.LA,ETC AT PARA.5.1.6)
:
:5.3.4 FLT PT AND FLT PT FUNCTIONS TEST
:
: THE AC'S WILL BE TYPED AS THEY WERE AT THE
: TIME OF ERROR DETECTION
:
: IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED:
: FP-LC START ADRS. OF FLT. PT. TEST
: FOR RELOCATION
: FP-LO LOW LIMIT OF SCRATCH AREA AFTER IT WAS
: REMAPPED FOR EXECUTION
: FP-LA LOGICAL START OF TEST AFTER REMAP
: (SEE DISCUSSION OF ST.LA,ETC AT PARA.5.1.6)
:
:5.3.5 EXTENDED ADDRESSING TEST TEST
:
: THE AC'S WILL BE TYPED AS THEY WERE AT THE
: TIME OF ERROR DETECTION
:
: IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED:
: EA-LC START ADRS. OF TEST
: FOR RELOCATION
: EA-LO LOW LIMIT OF SCRATCH AREA AFTER IT WAS
: REMAPPED FOR EXECUTION
: EA-LA LOGICAL START OF TEST AFTER REMAP
: (SEE DISCUSSION OF ST.LA,ETC AT PARA.5.1.6)
:
:5.3.2 ARITHMETIC TEST
:
: THE AC'S WILL BE TYPED AS THEY WERE AT THE
: TIME OF ERROR DETECTION
:
: IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED:
: LF-LC START ADRS. OF TEST
: FOR RELOCATION
: LF-LO LOW LIMIT OF SCRATCH AREA AFTER IT WAS
: REMAPPED FOR EXECUTION
: LF-LA LOGICAL START OF TEST AFTER REMAP
: (SEE DISCUSSION OF ST.LA,ETC AT PARA.5.1.6)
:
:5.3.3 ADDRESS TEST
:
: THE AC'S 0-1 AND 2 WILL
: BE TYPED AS THEY
: WERE AT THE TIME OF ERROR
: AC0 WILL CONTAIN THE ADDRESS THAT COMPARE WILL
: STOP AT (AC0<AC2=COMPARE IS TOP TO BOTTOM)
: AC1 WILL CONTAIN THE DATA FOUND TO BE INCORRECT
: AC2 WILL CONTAIN THE ADDRESS OR COMPLIMENT
: OF THE ADDRESS THAT FAILED
: AC3 WILL CONTAIN THE CURRENT RANDOM OFFSET
: IN ADDITION THE FOLLOWING LOC.'S WILL BE TYPED:
: A.TSK TEST COUNTER
: 0 ADRS. TO ADRS LOADED LOW TO HIGH
: 2 COM. ADRS TO ADRS LOW TO HIGH
: 4 ADRS. TO ADRS LOADED HIGH TO LOW
: 6 COM. ADRS TO ADRS LOADED HIGH TO LOW
: 10 ADRS TO ADRS LOADED LOW TO HIGH
: 10 ADRS TO ADRS LOADED LOW TO HIGH
: 1,5. AND 11 COMPARE EACH ADRS. TO EQUAL ITSELF
: 3 AND 7 COMPARE EACH ADRS. TO EQUAL ITS COM.
: AD-ST STARTING ADDRESS OF TEST IN CORE
: AD-S3 ADRS. (AC3) OF ERROR CALL
:
:5.3.6 LEF/ERROR TEST
:
: THE AC'S WILL BE TYPED AS THEY WERE AT THE
: TIME OF ERROR DETECTION
:
: IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED:
: LF-LC START ADRS. OF TEST
: FOR RELOCATION
: LF-LO LOW LIMIT OF SCRATCH AREA AFTER IT WAS
: REMAPPED FOR EXECUTION
: LF-LA LOGICAL START OF TEST AFTER REMAP
: (SEE DISCUSSION OF ST.LA,ETC AT PARA.5.1.6)
:
:5.3.7 ADDRESS TEST
:
: THE AC'S 0-1 AND 2 WILL
: BE TYPED AS THEY
: WERE AT THE TIME OF ERROR
: AC0 WILL CONTAIN THE ADDRESS THAT COMPARE WILL
: STOP AT (AC0<AC2=COMPARE IS TOP TO BOTTOM)
: AC1 WILL CONTAIN THE DATA FOUND TO BE INCORRECT
: AC2 WILL CONTAIN THE ADDRESS OR COMPLIMENT
: OF THE ADDRESS THAT FAILED
: AC3 WILL CONTAIN THE CURRENT RANDOM OFFSET
: IN ADDITION THE FOLLOWING LOC.'S WILL BE TYPED:
: A.TSK TEST COUNTER
: 0 ADRS. TO ADRS LOADED LOW TO HIGH
: 2 COM. ADRS TO ADRS LOW TO HIGH
: 4 ADRS. TO ADRS LOADED HIGH TO LOW
: 6 COM. ADRS TO ADRS LOADED HIGH TO LOW
: 10 ADRS TO ADRS LOADED LOW TO HIGH
: 10 ADRS TO ADRS LOADED LOW TO HIGH
: 1,5. AND 11 COMPARE EACH ADRS. TO EQUAL ITSELF
: 3 AND 7 COMPARE EACH ADRS. TO EQUAL ITS COM.
: AD-ST STARTING ADDRESS OF TEST IN CORE
: AD-S3 ADRS. (AC3) OF ERROR CALL

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:0016 LEMRT
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10017 LEMRT

01 : 5.3.9 ARRAY PROCESSOR TEST  
02 :  
03 : THE AC'S AT THE TIME OF ERROR WILL BE PRINTED  
04 : ALONG WITH THE FOLLOWING:  
05 :  
06 : AP-PC START OF TEST BEFORE REMAPPING  
07 : AP-LO SCRATCH LOW AFTER REMAPPING  
08 : AP-LA LOGICAL START OF TEST AFTER REMAPPING  
09 : AP-LA (SEE DISCUSSION OF ST.LA,ETC. AT PARAG. 5.1.6)  
10 :  
11 : ALSO THERE ARE THREE DIFFERENT ERROR PRINTOUTS  
12 : THAT MAY ARISE DURING THE AP TESTS:  
13 :  
14 : WHEN COMPARING REAL ARRAYS THE ROUTINE .RCMP  
15 : IS USED. THE FIRST 3 BAD COMPARISONS ARE PRINTED OUT,  
16 : PRINTED ON THE FIRST LINE. OF THIS AP OUTPUT SECTION,  
17 : IS THE INDEX OF THE ERROR, AND THE GOOD PIECE OF DATA.  
18 : THE NEXT LINE CONTAINS THE BAD DATA ADDRESS AND THE BAD  
19 : PIECE OF DATA. THE ADDRESS OF THE GOOD DATA CAN BE FOUND  
20 : ON THE LISTING, IN THE SUBROUTINE CALL.  
21 : AFTER A MAXIMUM OF THREE ERROR ARE PRINTED A  
22 : FINAL LINE WILL CONTAIN THE FOLLOWING:  
23 : A)THE NUMBER OF ELEMENTS COMPARED = N  
24 : B)THE GOOD ARRAY INDEX VALUE = IJ  
25 : C)THE BAD ARRAY INDEX VALUE = IK  
26 : D)THE TOTAL # OF ERRORS IN THAT COMPARISON  
27 :  
28 : THE INTEGER ARRAY COMPARE ROUTINE, .ICMP, HAS  
29 : A VERY SIMILAR OUTPUT TO .RCMP. THE EXCEPTIONS ARE:  
30 : A)LINE ONE CONTAINS THE INDEX OF THE BAD DATA AND  
31 : THE ADDRESS OF THE BAD DATA.  
32 : B)THE NEXT LINE CONTAINS THE GOOD DATA AND THE  
33 : BAD DATA.  
34 :  
35 : \*\*\*\*\*  
36 : \*  
37 : \* NOTE: THIS TEST ASSUMES THAT THE ARRAY  
38 : \* PROCESSOR MICRO-CODE HAS BEEN  
39 : \* PREVIOUSLY LOADED  
40 : \*  
41 : \*\*\*\*\*  
42 : 5.3.10 WCS TEST  
43 :  
44 : THE AC'S WILL BE TYPED AS THEY WERE AT THE TIME  
45 : OF ERROR DETECTION .  
46 :  
47 : IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED:  
48 :  
49 : WS.LC STARTING ADDRESS OF WCS TEST IN SCRATCH  
50 : WS.LO LOW LIMIT OF SCRATCH AREA AFTER IT IS  
51 : REMAPPED FOR EXECUTION.  
52 : WS.LA WS.LC IN RELATION TO WS.LO  
53 : (LOGICAL START OF WCS TEST AFTER REMAPPING)  
54 : THE LAST THREE NUMBERS GENERATED  
55 : (SEE DISCUSSION OF ST.LA,ETC. AT PARAGRAPH X.X.X)  
56 :  
57 :

10018 LEMRT

01 : 5.3.11 COMMERCIAL INSTRUCTION TEST  
02 :  
03 : THE AC'S WILL BE TYPED AS THEY WERE AT THE  
04 : TIME OF ERROR DETECTION  
05 :  
06 : IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED:  
07 : CM.LC START ADDR OF TEST (RELOCATED)  
08 : CM.LLO LOW LIMIT OF SCRATCH AREA AFTER IT  
09 : WAS REMAPPED FOR EXECUTION  
10 : CM.LLA LOGICAL START OF TEST AFTER REMAP  
11 : (SEE DISCUSSION OF ST.LA,ETC. AT PARA. 5.1.6)  
12 :  
13 : A COMMERCIAL FAULT WILL CAUSE AN ADDITIONAL  
14 : STACK ENTRY TO BE PUSHED WHICH WILL CONTAIN  
15 : THE AC'S AT THE TIME OF ERROR PLUS THE PC  
16 : OF THE RELOCATED INSTRUCTION CAUSING THE FAULT.  
17 : THE SECOND STACK ENTRY WILL BE PUSHED BY  
18 : THE ERROR HANDLER AND AC1 WILL CONTAIN  
19 : THE FAULT CODE AS DETERMINED BY THE HARDWARE.  
20 : \*\*\*\*\*  
21 : COMMERCIAL FAULT CODES:  
22 : \*\*\*\*\*  
23 : CODE MEANING  
24 : 0 "EDIT" INSTRUCTION TRIED TO  
25 : PROCESS AN INVALID OP CODE.  
26 : 1 INVALID DATA TYPE  
27 : 2 INVALID SIGN  
28 : 3 INVALID DIGIT OR CHARACTER  
29 : 4 NUMBER OUT OF RANGE USING  
30 : LDI OR STI INSTRUCTION  
31 :  
32 : 5.3.12 DCU=50/200 TEST  
33 :  
34 : THIS IS AN ARITHMETIC TEST PERFORMED BY THE  
35 : DCU=50/200 USING THE DATA CHANNEL.  
36 :  
37 : THE AC'S AT THE TIME OF ERROR DETECTION WILL  
38 : BE TYPED .  
39 : IN ADDITION THE FOLLOWING DATA IS TYPED:  
40 : RANDOM DATA AC0,AC1,AC2  
41 : DCLOR LOGICAL START OF LOOP  
42 : DCLPK LOOP COUNT  
43 : DCLER LOGICAL ERR ADDR  
44 : DC.LA LOGICAL START OF TEST  
45 : DCLLP LISTING START OF LOOP  
46 : ERROR LISTING ADDR OF ERROR  
47 :

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10019 LEMRT
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:5.3.13 SC MEMORY TEST
:
: THIS IS AN ISZ/DSZ TEST FOR SC-MEMORIES.
:
: THE AC'S AT ERROR WILL INDICATE:
: AC0 AC1 AC2
: ACTUAL EXPECTED LOGICAL ADDRESS
:
: IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED:
: MM,TRK ERROR NUMBER:
: 0 PATTERN STORING ERROR(SHOD 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 " " " "
: 8 SAME AS 3, EXCEPT " " " "
: 9 MM,SE INSTRUCTION ADDRESS FOLLOWING ERROR CALL
: 10 LOCATION ADDRESS OF FAILING LOCATION(LOGICAL)
: 11
: 12
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: 19
: 20
: 21

10020 LEMRT
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54
:5.3.14 6063/6064 DISK
:
: PD.SA IS THE KEY TO USING THE ERROR PRINT OUT.
: IF PD.SA=ADDRESS OF SAVED DATA WORD
: (PDDW1 TO PDDW4), THEN THE ERROR WAS DATA COMPARE
: ERROR IN THE FIRST 4 WORDS IN THE BUFFER
: AC0=GOOD DATA
: AC1=BAD DATA
: AC2=ADRS. OF BAD DATA
: =MINUS NUMBER, THEN ERROR WAS DATA COMPARE ERROR
: IN THE REMAINDER OF THE DATA BUFFER.
: AC0=GOOD DATA
: AC1=BAD DATA
: AC2=ADRS. OF GOOD DATA
: ADDR OF BAD IS AC2+4
: =AC2, THEN ERROR WAS DISK STATUS ERROR
: AC0= DRV, TRK, SECTOR
: FROM WORD 2 OF CMD QUEUE
: AC1= BMC CHANNEL STATUS(IF USING BMC)
: AC2= DISK DIC STATUS
:
: ALSO THE FOLLOWING INFORMATION IS OUTPUTTED:
: PDDST DATA START IN CORE
: PD.CA LOGICAL ADDR OF CHANNEL IN 1K'S OCTAL
: PDSTA DISK STATUS(DIC)
: PDADR DRIVE+TRACK+SECTOR(FIRST WORD OF QUEUE)
: PD.CO 0=READ, 1=WRITE, 2=DATA VERIFY
:
: ALSO IF THE ERROR OCCURS IN A READ OPERATION
: THE FOLLOWING DATA IS PRINTED:
: WRITE PDCST = XXXX MD3 MD4
: MD1 MD2 MD3 MD4
: 6666 HHHH JJJJ KKKK
:
: WHERE, XXXXX = 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.
:
: *****
: 6063/64 DISK STATUS WORD
: *****
: BIT(S) MEANING BIT(S) MEANING
: 0 ERROR FLAG 10 DISK RDY
: 3 BUS ENABLE 11 UNSAFE
: 4-5 DISK CAPACITY 12 DATA LATE
: 6 IDLE DONE 13 ECC
: 7 WRITE PARITY 14 DATA VERIFY
: 8 DCH ERROR 15 PAGE DONE
: 9 READ/WRITE TIMEOUT
:

```

10021 LEMRT

01 : 5.3.15 MOVING HEAD DISK TEST  
02 :  
03 : MH-SA IS THE KEY TO USING THE ERROR PRINT OUT.  
04 : IF MH-SA=ADDRESS OF SAVED DATA WORD  
05 : (MHDW1 TO MHDW4), THEN THE ERROR WAS DATA COMPARE  
06 : ERROR IN THE FIRST 4 WORDS IN THE BUFFER  
07 : AC0=GOOD DATA  
08 : AC1=BAD DATA  
09 : AC2=ADRS. OF BAD DATA  
10 : =MINUS NUMBER, THEN ERROR WAS DATA COMPARE ERROR  
11 : IN THE REMAINDER OF THE DATA BUFFER.  
12 : AC0=GOOD DATA  
13 : AC1=BAD DATA  
14 : AC2=ADRS. OF GOOD DATA  
15 : ADDR OF BAD IS AC2+4  
16 : =AC2, THEN ERROR WAS DISK STATUS ERROR  
17 : AC0=DIB DISK  
18 : AC1=DIC DISK  
19 : AC2=DISK STATUS(DIA)  
20 : AC3=DIC DISK  
21 : IN ADDITION THE FOLLOWING LOC'S ARE TYPED  
22 : MHDST= LOGICAL ADDRESS OF DATA BUFFER  
23 : MHCST= LOGICAL ADDRESS OF DATA FOR DCH MAP  
24 : MHDQA= LAST DOA TO DISK(DIA)  
25 : MHDQAC= LAST DOA TO DISK(COMMAND)  
26 : MHDQCC= LAST DOC TO DISK  
27 :  
28 : ALSO IF THE ERROR OCCURS IN A READ OPERATION  
29 : THE FOLLOWING DATA IS PRINTED:  
30 : WRITE MHCST = XXXXX  
31 : MD1 MD2 MD3 MD4  
32 : GGGG HHHH JJJJ KKKK  
33 : WHERE XXXX = STARTING CHANNEL ADDRESS OF WRITE OPERATION  
34 : GGGG = FIRST PHYS 1K USED IN DISK WRITE  
35 : HHHH = 2ND " " " " " "  
36 : JJJJ = 3RD " " " " " "  
37 : KKKK = 4TH " " " " " "  
38 : NOTE: UPON DETECTION OF AN ERROR THE TEST WILL  
39 : RETRY THE OPERATION FOUR TIMES.  
40 : \*\*\*\*\*  
41 : MOVING HEAD DISK STATUS WORDS \*\*\*\*\*  
42 : \*\*\*\*\*  
43 : BITS 4047 4048,57 4231 6030,45 6067  
44 : 0 SAME SAME DC DNE  
45 : 1 SEEK 0 DNE SAME SAME CMD DNE 0  
46 : 2 SEEK 1 DNE SAME SAME CMD DNE 1  
47 : 3 SEEK 2 DNE SAME SAME CMD DNE 2  
48 : 4 SEEK 3 DNE SAME SAME CMD DNE 3  
49 : 5 SEEK ON DRV 0 SAME DUAL PRC DKT DISKETTE  
50 : 6 SEEK ON DRV 1 SAME HEAD ERR N/A SEL.  
51 : 7 SEEK ON DRV 2 SAME ADDR ERR UNSAFE  
52 : 8 DRIVE RDY SAME SAME SAME  
53 : 9 ECC ERR SAME SAME SAME  
54 : 10 ECC ERR SAME SAME SAME  
55 : 11 UNSAFE ADDR ERR UNSAFE ADDR ERROR  
56 : 12 DATA LATE SAME SAME SAME  
57 : 13 DATA LATE SAME SAME SAME  
58 : 14 DATA LATE SAME SAME SAME  
59 : 15 ERR SAME SAME SAME  
60 : \*\*\*\*\*

0022 LEMRT

01 : 5.3.16 6060/61 DISK TEST  
02 :  
03 : ZB-SA IS THE KEY TO USING THE ERROR PRINT OUT.  
04 : IF ZB-SA=ADDRESS OF SAVED DATA WORD  
05 : (ZBDW1 TO ZBDW4), THEN THE ERROR WAS DATA COMPARE  
06 : ERROR IN THE FIRST 4 WORDS IN THE BUFFER  
07 : AC0=GOOD DATA  
08 : AC1=BAD DATA  
09 : AC2=ADRS. OF BAD DATA  
10 : =MINUS NUMBER, THEN ERROR WAS DATA COMPARE ERROR  
11 : IN THE REMAINDER OF THE DATA BUFFER.  
12 : AC0=GOOD DATA  
13 : AC1=BAD DATA  
14 : AC2=ADRS. OF GOOD DATA  
15 : ADDR OF BAD IS AC2+4  
16 : =AC2, THEN ERROR WAS DISK STATUS ERROR  
17 : AC0=DIB DISK  
18 : AC1=BMC CHANNEL STATUS(IF USING BMC)  
19 : AC2=DISK STATUS(DIA)  
20 : AC3=DIC DISK  
21 : IN ADDITION THE FOLLOWING LOC'S ARE TYPED  
22 : ZBDST= LOGICAL ADDRESS OF DATA BUFFER  
23 : ZBCST= LOGICAL ADDRESS OF DATA FOR DCH MAP  
24 : ZBDSTA= LAST DOA TO DISK(DIA)  
25 : ZBDQAA= LAST DOA TO DISK(COMMAND)  
26 : ZBDQCC= LAST DOC TO DISK  
27 :  
28 : ALSO IF THE ERROR OCCURS IN A READ OPERATION  
29 : THE FOLLOWING DATA IS PRINTED:  
30 : WRITE ZBCST = XXXXX  
31 : MD1 MD2 MD3 MD4  
32 : GGGG HHHH JJJJ KKKK  
33 : WHERE XXXX = STARTING CHANNEL ADDRESS OF WRITE OPERATION  
34 : GGGG = FIRST PHYS 1K USED IN DISK WRITE  
35 : HHHH = 2ND " " " " " "  
36 : JJJJ = 3RD " " " " " "  
37 : KKKK = 4TH " " " " " "  
38 : NOTE: UPON DETECTION OF AN ERROR THE TEST WILL  
39 : RETRY THE OPERATION FOUR TIMES.  
40 : \*\*\*\*\*  
41 : 6060/61 STATUS WORDS \*\*\*\*\*  
42 : \*\*\*\*\*  
43 : BITS DIA DIB  
44 : 0 CNL FULL INVALID STATUS  
45 : 1 R/W DONE DRV RESERVED  
46 : 2 SEEK 0 DONE TRESPASSED  
47 : 3 SEEK 1 DONE READY  
48 : 4 SEEK 2 DONE BUSY  
49 : 5 SEEK 3 DONE OFFSET  
50 : 6 PARITY ERROR WRITE DISABLE  
51 : 7 ILLEGAL SECT N/A  
52 : 8 ECC ERROR ILLEGAL ADDR  
53 : 9 BAD SECTOR ILLEGAL CMD  
54 : 10 CYL ERROR PMR FAULT  
55 : 11 SURF/SECT ERR PACK UNSAFE  
56 : 12 VERIFY ERROR POSITIONER  
57 : 13 R/W TIMEOUT CLK FAULT  
58 : 14 DATA LATE WRITE FAULT  
59 : 15 RD/WRT FAULT DRIVE DONE  
60 : \*\*\*\*\*



0023 LEMRT

```
01 ;5.3.17 MAGNETIC TAPE TEST
02 ;
03 ; AC0 GOOD DATA
04 ; AC1 BAD DATA
05 ; AC2 ADRS OF BAD DATA (GOOD IS AT AC2-4)
06 ; IN ADDITION THE FOLLOWING LOC'S ARE TYPED
07 ; MODE OSREWIND I=WRITE 2BACKSPACE OR READ
08 ; DRIVE # WILL APPEAR IN BITS 4,5&6
09 ; STATUS LAST TAPE STATUS
10 ; MT.EK ERR COUNTER STARTS AT 3 AND COUNTS
11 ; DOWN FOR EACH REREAD
12 ; #READ NUMBER OF BLOCKS READ
13 ; W/DOB LOGICAL DCH ADDR USED IN WRITING TAPE
14 ; LAST/DOB CURRENT DCH LOGICAL ADDRESS
15 ;
16 ; NOTE: IF STATUS INDICATES TAPE ERR (BIT 0=1)
17 ; THE CONTENTS OF AC0,1,AND 2 SHOULD BE IGNORED**.
18 ;
19 ; *****
20 ; TAPE STATUS WORD = DIA X,MTA
21 ; *****
22 ;
23 ; BIT MEANING
24 ;
25 ; 0 ERROR
26 ; 1 DATA LATE
27 ; 2 REWINDING
28 ; 3 ILLEGAL
29 ; 4 HI-DENSITY
30 ; 5 PARITY ERROR
31 ; 6 END OF TAPE
32 ; 7 END OF FILE
33 ; *****
34 ;
35 ;
36 ;
37 ;
38 ;
39 ; NO ERROR TYPEOUTS.
40 ; PRINTER OUTPUT MUST BE EXAMINED VISUALLY.
```

10024 LEMRT

```
01 ;5.4 SPECIAL CASE ERROR TYPEOUTS
02 ;
03 ;
04 ; 5.4.1 POWER FAIL INTERRUPT
05 ; UPON DETECTION OF A POWER FAIL INTERRUPT
06 ; THE LOGICAL ADRS. OF THE P.C. AT INTERRUPT
07 ; WILL BE SAVED.
08 ; IF AUTO-RESTART IS ENABLED OR THE POWER
09 ; FAIL WAS ONLY MOMENTARY, THE TEST WILL RE-
10 ; START AS IN A START AT 206 AFTER TYPING
11 ; POWER FAIL @XXXXX (WHERE XXXXX IS THE PC AT INTR.)
12 ;
13 ; 5.4.2 ILLEGAL SUPERVISOR CALL
14 ;
15 ; SUPERVISOR CALLS IN MULTI-PROGRAMMING ARE OF THE
16 ; FORMAT:
17 ; SVC 3,3 ;SUPERVISOR CALL
18 ; JSR @XXXX ;SUBROUTINE CALL
19 ;
20 ; WHERE XXXX IS A PAGE 0 ADDRESS WITHIN
21 ; SPECIFIED MEMORY LIMITS.
22 ;
23 ; THESE CALLS IN THIS PROGRAM ALLOW A MAPPED
24 ; TEST TO MAKE CALLS TO SUBROUTINES CONTAINED
25 ; IN THE LINKER AND RETURN. THE JSR IS EXECUTED
26 ; IN UNMAPPED SPACE BY THE CALL HANDLER.
27 ; THERE ARE SEVERAL CASES OF ILLEGAL SUPER-CALL'S
28 ; 1.) IF THE LOCATION INDICATED IS 000001
29 ; THEN THE PROGRAM DETECTED THAT FOR SOME REASON
30 ; LOCATION 00000 WAS EXECUTED. THE ILLEGAL
31 ; SUPERCALL WAS FORCED BY THE ERROR HANDLER
32 ; TO INDICATE WHICH TEST WAS EXECUTING AT THE
33 ; TIME OF ERROR AND ITS ASSOCIATED INFORMATION.
34 ; 2.) IF OTHER THAN LOCATION 000001 THEN
35 ; THE SUPERCALL HANDLER WAS ENTERED AND UPON
36 ; CHECKING THE LOCATION FOLLOWING THE SUPER-
37 ; CALL THERE WASN'T A VALID "JSR @XXXX".
38 ; THIS COULD HAPPEN IN SEVERAL WAYS:
39 ; A.) A DATA AREA WHICH HAD JUMPED INTO
40 ; RECOGNIZED AS A SUPERCALL. IN THIS
41 ; CASE AC3 OF THE SECOND ENTRY OF THE
42 ; STACK USUALLY ISN'T 177510(SYC 3,3).
43 ; B.) THE JSR @XXXX WORD WAS OVER WRITTEN
44 ; BY ANOTHER TEST.
45 ; C.) THE 177510(SYC 3,3) OR THE JSR @XXXX
46 ; WAS IN A BAD MEMORY AREA CAUSING THE
47 ; WORDS TO DROP OR ADD BITS.
48 ; D.) THE JSR @XXXX WAS IN A DIFFERENT MAP
49 ; PAGE WHOSE CONTENTS ISN'T CORRECT.
50 ; E.) SOME OTHER REASON ??
51 ;
52 ; IN ANY CASE THE FOLLOWING INFORMATION IS TYPED:
53 ; THE STACK SHOULD CONTAIN TWO BLOCKS.
54 ; THE FIRST IS PUSHED BY THE ILLEGAL CALL.
55 ; (IF SYC 3,3 THEN HEADER IS CORRECT)
56 ; THE SECOND IS BUILT BY THE FOLLOWING CALL
57 ; HANDLER AND INCLUDES THE FOLLOWING INFO.
58 ; ACO ILLEGAL CALL IN LOC. XXXXX
59 ; AC3 CONTENTS OF LOC. XXXXX-1
60 ; (SHOULD = SYC 3,3 OR 177510)
```



10027 LEMRT

```
01 ;
02 ;FOR CONVENIENCE THE FOLLOWING TABLE
03 ;IS INCLUDED TO HELP DETERMINE WHICH BIT
04 ;IS FAILING IN AN ERROR CORRECTION MEMORY
05 ;COR.CODE
06 ; 0 NO ERROR
07 ; 1 CHECK BIT 4
08 ; 2 CHECK BIT 3
09 ; 3 DATA BIT 0
10 ; 4 CHECK BIT 2
11 ; 5 DATA BIT 1
12 ; 6 MULTIPLE BIT
13 ; 7 DATA BIT 3
14 ; 8 CHECK BIT 1
15 ; 9 DATA BIT 4
16 ; 10 ALL 21 BITS WERE=1
17 ; 11 DATA BIT 6
18 ; 12 DATA BIT 7
19 ; 13 DATA BIT 8
20 ; 14 DATA BIT 9
21 ; 15 MULT. BITS FAILED
22 ; 16 CHECK BIT 0
23 ; 17 DATA BIT 11
24 ; 18 DATA BIT 12
25 ; 19 DATA BIT 13
26 ; 20 DATA BIT 14
27 ; 21 ALL 21 BITS READ AS 0'S
28 ; 22 DATA BIT 2
29 ; 23 MULTIPLE BIT'S
30 ; 24 DATA BIT 10
31 ; 25 MULTIPLE BITS
32 ; 26 DATA BIT 5
33 ; 27 MULTIPLE BITS
34 ; 28 DATA BIT 15
35 ; 29 MULTIPLE BITS
36 ; 30 SAME
37 ; 31 SAME
38 ;
39 ;THE DATA TYPED BY THE ERROR CORRECTION
40 ;TYPEOUT IS AFTER CORRECTION HAS OCCURED.
41 ;THEREFORE, FOR THE BIT TO HAVE FAILED,
42 ;IT WOULD HAVE BEEN READ AS THE COMPLIMENT
43 ;OF HOW IT APPEARS IN THE TYPEOUT
44 ;
45 ;NOTE THAT ALL SINGLE BIT ERROR CODES
46 ; INDICATE A CORRECTION BIT FAILED
```

10028 LEMRT

```
01 ;
02 ;6.2 PROGRAM INITIALIZE
03 ;THE DIAGNOSTIC LINKER INITIALIZES ITSELF
04 ;AND INDIVIDUAL TESTS IN THE FOLLOWING
05 ;SEQUENCE:
06 ; 1. SYSTEM IS RESET. MAP OPTION IS
07 ; DETERMINED TO EXIST OR NOT EXIST
08 ; AND SWITCHES ARE SET UP
09 ; ACCORDINGLY
10 ; 2. ANY OTHER NECESSARY CONSTANTS
11 ; ARE INITIALIZED
12 ; (MEM ALLOCATION TABLES)
13 ; 3. INTERRUPT VECTOR TABLES ARE SET UP TO
14 ; PROCESS UNEXPECTED DEVICE INTERRUPTS
15 ; 4. MEMORY IS SIZED IN 1K INCREMENTS
16 ; FROM 0 TO 1024K AND BUILDS A 64 WORD
17 ; BIT MAP OF EXISTING CONTIGUOUS
18 ; MEMORY
19 ;
20 ; 5. THE EXIST MAP IS MOVED TO THE
21 ; AVAILABLE MAP AND EACH BIT
22 ; CORRESPONDING TO 1K OF UTILIZED
23 ; MEMORY IS REMOVED FROM THE MAP
24 ; SO THAT IT WILL NOT BE ASSIGNED
25 ; AS A SCRATCH AREA TO ANY TEST.
26 ; (INCLUDES PROGRAM STORAGE, MEMORY ALLOC.
27 ; TABLES, INTERRUPT MASKS AND STACK AREA AND
28 ; THE LAST 1K OF MEMORY TO PRESERVE THE
29 ; BINARY LOADER)
30 ; 6. EACH TEST IS ENTERED IN SEQUENCE AT ITS
31 ; INIT. ENTRY POINT. OPTION TESTS DETERMINE
32 ; IF THE DEVICE THEY ARE ASSOC. WITH EXISTS
33 ; OR NOT AND PASS INTERRUPT SERVICE PARAM'S
34 ; TO THE LINKER.
35 ; (DEV#, MASK AND INTERRUPT SERVICE
36 ; ADDRESS)
37 ; 7. LINKER THEN TYPES THE SYSTEM SIZE
38 ; INFORMATION ALONG WITH THE PROGRAM
39 ; RUN LIST. THE OPERATOR CAN THEN
40 ; SELECT OR DELETE SPECIFIC TESTS.
41 ; START THE IOP, AND ENTER KEY OPTIONS
42 ; IF START WAS 202 OR 204.
43 ; 8. AFTER STARTING, THOSE TESTS THAT HAVE
44 ; "SIZED" THEIR SUBSYSTEM FOR SPECIFIC
45 ; PARAMETERS TYPE AN INDICATION OF THE PARAMETERS
46 ; THEY DETERMINED TO EXIST.(SEE THE
47 ; INDIVIDUAL DISK TEST DESCRIPTIONS.)
48 ;
```

10029 LEMRT

16.3

PROGRAM RUN  
ONCE THE LINKER HAS COMPLETED ALL  
INITIALIZATION THE FOLLOWING SERIES  
OF OPERATIONS IS LOOPEO THROUGH

1. LINKER RANDOMLY SELECTS ONE OF THE INDIVIDUAL TESTS UNTIL IT FINDS ONE THAT IS NOT WAITING FOR INTERRUPT (WAIT IS BIT 0 OF THE THIRD WORD IN TEST#1) AND THAT THE NEXT RANDOM NUMBER FALLS WITHIN ITS ENTER LIMITS
2. IF THE MAP OPTION EXISTS, ALL LOGICAL PAGES EXCEPT PAGE 0 ARE ACCESS PROTECTED WITH THE PHYSICAL AREA OF THE SELECTED TEST MAPPED TO ITSELF AND ANY ASSIGNED SCRATCH AREA MAPPED TO START AT 1K ABOVE THE TEST. MEMORY LOCATIONS SCRLO AND SCRHI (SCRATCH LOW AND HIGH) ARE SET TO INDICATE THE LIMITS OF THE SCRATCH AREA AVAILABLE TO THE TEST.
3. DATA CHANNEL LIMITS (DCHLO AND DCHHI) ARE CALCULATED AND ENTERED (IF USED)
4. BMC LIMITS ARE CALCULATED AND SETUP. (IF USED)
5. ITS SPECIFIED EXECUTE ENTRY POINT

10030 LEMRT

16.4 INDIVIDUAL TEST DESCRIPTIONS

16.4.1 DEMAND PAGING TEST

```

THIS TEST DOESN'T RUN IF THE OPTION TO RUN UNMAPPED
WAS SELECTED. IF ENABLED THIS TEST CAUSES THE CPU TESTS
WHICH REMAP AND RELOCATE TO TAKE PAGE FAULTS AND BREAKPOINT
FAULTS IN THEIR THEIR NORMAL PROCESS OF TESTING.
TO ACCOMMODATE THE FAULTING PROCESS THE TESTS ARE RESTRICTED
TO USER "B" AND THE TESTS WHICH REMAP WILL DO SO IN USER "A".
INSTEAD OF SETTING UP THE MAP FOR USER "A" AS REQUIRED
BY THE TEST WHICH IS REMAPPING, ALL PAGES ARE SETUP TO PAGE
FAULT. THE TEST IS ENTERED BY FAULTING INTO THE STARTING
PAGE. AS EACH FAULT OCCURS THE MICRO-CODE PUSHES A CONTEXT
BLOCK AND GIVES CONTROL TO THE SUPERVISOR'S FAULT HANDLER.
THE FAULT HANDLER SETS UP THE MAP AS REQUIRED BY THE TEST
FOR THAT 1K AND INVALIDATES THE LAST 1K USED. THE FAULT
HANDLER THEN SAVES THE CONTEXT BLOCK IN A PUSH DOWN STACK.
AFTER WHICH IT RESTARTS THE TEST VIA A DPOP INSTRUCTION.
TESTS WHICH ARE TAKING DOWN STACK WILL OUTPUT THE
CONTENTS OF THE PUSH DOWN STACK UPON OCCURRING AN ERROR
IF SW11 IS NOT SET.

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01 ; 16.4.2 ERROR CORRECTION
02 ;
03 ; THE ERROR CORRECTION OPTION IN MULTIPROGRAMMING
04 ; NORMALLY ENABLES ERROR CORRECTION IN MODE 3 (CORRECT
05 ; AND INTERRUPT). IF AN ERROR CORRECTION INTERRUPT OCCURS THIS
06 ; TEST SAVES ALL INFORMATION AVAILABLE PERTAINING TO THE FIRST
07 ; ERROR FOR LATER TYPEOUT. BETWEEN THE TIME OF THE ERROR CORRECTION
08 ; INTERRUPT AND COMPLETION OF THE TYPEOUT ERROR CORRECTION IS
09 ; RE-ENABLED IN "MODE 3". HOWEVER, UNTIL THE TYPEOUT IS COMPLETED,
10 ; ERROR CORRECTION INTERRUPTS ARE ONLY COUNTED
11 ; NOTE: THE TYPEOUT DOES NOT OCCUR IMMEDIATELY AT THE TIME
12 ; OF INTERRUPT, IT IS INITIATED AFTER
13 ; COMPLETION OF THE CURRENT PASS OF THE TEST THAT
14 ; WAS RUNNING WHEN THE INTERRUPT OCCURRED. ALSO,
15 ; IF THE ADDRESS OF THE ERROR WAS OUTSIDE OF THE
16 ; SCRATCH AND RESIDENT AREAS OF THE TEST THAT WAS
17 ; RUNNING, ONE SHOULD SUSPECT THAT THE ERROR
18 ; COULD HAVE OCCURRED DURING A DATA CHANNEL.
19 ;
20 ; 16.4.3 CHECKERBOARD RAN
21 ;
22 ; THIS MEMORY CHECKER BOARD TEST IS A SUBSET OF OTHER MEMORY
23 ; CHECKERBOARDS. A COMPLETE TEST OF AN AVAILABLE SCRATCH
24 ; AREA IS COMPRISED OF THE FOLLOWING SEQUENCE:
25 ;
26 ; CB.TK=0
27 ; REQUEST 1 TO 32K OF SCRATCH, RANDOMLY RE-
28 ; INTO SCRATCH AND GENERATE THE CHECKERBOARD
29 ; PATTERN
30 ;
31 ; CB.TK=1
32 ; DISTURB PASS-COMPLIMENT A SINGLE BIT IN EACH
33 ; OF THE FIRST 16 WORDS OF SCRATCH, SHUFFLE THESE
34 ; WORDS 16 TIMES SUCH THAT THEY END UP IN THEIR
35 ; ORIGINAL POSITION, RE-COMPLIMENT THE SINGLE
36 ; BIT IN EACH WORD--PROCEED WITH EACH GROUP OF
37 ; 16 WORDS UNTIL ALL MEMORY HAS BEEN EXERCISED.
38 ;
39 ; CB.TK=2
40 ; CHECK PASS--COMPARE EACH WORD IN SCRATCH WITH
41 ; THE PATTERN EXPECTED
42 ;
43 ; CB.TK=3
44 ; FAST CHECKSUM MEMORY TO ENSURE THAT ALL DATA
45 ; IS INTACT (RETURNS TO CHECK PASS IF CHECK-
46 ; SUM DOES NOT AGREE.)
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01 ; 16.4.4 ADDRESS TEST
02 ;
03 ; THE MULTIPROGRAMMING ADDRESS TEST GENERATES A VARIETY OF
04 ; ADDRESS AND COMPLIMENT ADDRESS PATTERNS IN AVAILABLE
05 ; SCRATCH. THE TEST SEG FOLLOWS:
06 ;
07 ; A.TSK=0
08 ; SELECT A SCRATCH AREA TO WORK IN, MOVE THE
09 ; EXECUTE PORTION OF THE ADDRESS TEST TO
10 ; EITHER THE HIGH OR LOW END OF SCRATCH
11 ; GENERATE THE ADDRESS TO ADDRESS PAT-
12 ; TERN IN THE UPWARD (LOW SCRATCH TO HIGH-
13 ; SCRATCH) DIRECTION, THE PATTERN IS GEN-
14 ; ERATED IN TWO STEPS. FIRST A RANDOM # OF
15 ; WORDS (OFFSET A.AGS) IS FILLED VIA A BAM
16 ; ((ADRS(AC2))*1(AC0) TO ADRS(AC3) THE
17 ; REST OF SCRATCH IS FILLED VIA A SECOND BAM
18 ; ((ADRS (AC2))+OFFSET+1(AC0) TO ADRS AC3.
19 ;
20 ; VERIFY THAT EACH SCRATCH LOCATION CONTAINS
21 ; ITS OWN LOGICAL ADDRESS.
22 ;
23 ; PATTERN GENERATION IS PERFORMED AS IN
24 ; A.TSK=2
25 ; SCRATCH LOCATION WITH THE 1'S COMPLIMENT OF
26 ; ITS LOGICAL ADDRESS.
27 ;
28 ; A.TSK=3
29 ; VERIFY THAT EACH LOCATION CONTAINS THE 1'S
30 ; COMPLIMENT OF ITS LOGICAL ADDRESS.
31 ;
32 ; EACH SCRATCH LOCATION IS AGAIN FILLED WITH
33 ; ITS OWN LOGICAL ADDRESS. HOWEVER, THE PATTERN IS
34 ; GENERATED IN THE DOWNWARD DIRECTION (HIGH SCRATCH
35 ; TO LOW SCRATCH) TWO STEPS ARE TAKEN. A RANDOM
36 ; # OF WORDS EQUAL TO OFFSET (A.AGS) ARE FILLED
37 ; WITH THEIR LOGICAL ADRS. THE REST OF SCRATCH IS
38 ; THEN FILLED VIA AN ELDA AC2+OFFSET, OFFSET IS
39 ; SUBTRACTED AND THE AN 5TH INTO THE LOWER
40 ; LOCATION,
41 ;
42 ; (SEE A.TSK=1)
43 ;
44 ; GENERATION IS AS A.TSK=4 EXCEPT EACH LOCATION
45 ; IS FILLED WITH THE 1'S COMPLIMENT OF ITS
46 ; LOGICAL ADDRESS
47 ;
48 ; (SEE A.TSK=3)
49 ;
50 ; THE PATTERN GENERATION OF A.TSK=0 IS RERUN
51 ; (SEE A.TSK=1)
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16.4.5 EIS/MRI TEST
;
; THE MULTIPROGRAMMING EXTENDED INSTRUCTION SET - MEMORY
; REFERENCE INSTRUCTION TEST IS ESSENTIALLY ANOTHER MEMORY
; CHECKERBOARD EXERCISE. THIS TEST, HOWEVER, INCLUDES 19
; BIT PATTERNS FOR ERROR CORRECTION MEMORY'S AND UTILIZES
; BYTE, BIT AND BLM INSTRUCTIONS TO EXERCISE THE MEM-
; ORY. A COMPLETE PASS OF THE EIS/MRI TEST INCLUDES ALL
; OF THE FOLLOWING:
;
; EI.TK=0
; LOCATE EXECUTABLE CODE INTO THE SCRATCH AREA,
; GENERATE CHECKERBOARD PATTERN, (1 OF 4 RANDOM
; SELECTED IF ERROR CORRECTION)
;
; EI.TK=1
; VERIFY THAT THE SCRATCH AREA CONTAINS THE
; CORRECT CHECKERBOARD PATTERN
;
; EI.TK=2
; RANDOMLY SELECT GROUPS OF 16 WORDS COMPLIMENT
; A SINGLE BIT IN EACH WORD, SHUFFLE 16 WORDS
; 16 TIMES, RECOMPLIMENT THE SINGLE BIT IN
; EACH WORD.
;
; (SEE EI.TK=1) COMPARE
;
; SELECT RANDOM X DRIVERS, COMPLIMENT A
; SINGLE BIT ON EACH OF 16 DRIVERS (EVERY 64TH WORD)
; WORD) BLM ALL OF THE PATTERN AREA BACK TO ITSELF,
; RECOMPLIMENT BITS
; (SEE EI.TK=1) COMPARE
; BLM THE PATTERN AREA TO ITSELF
; (SEE EI.TK=1) COMPARE
; STB LDB - RE-COMPLIMENT - STB EACH
; SEQUENTIAL BYTE IN THE PATTERN AREA.
; (COMPARE AGAIN)
; GENERATE COMPLIMENT WORST CASE PATTERN
; (SEE EI.TK=1) COMPARE
; (SEE EI.TK=2) BIT TEST
; (SEE EI.TK=3) COMPARE
; (SEE EI.TK=4) DRIVERS
; (SEE EI.TK=5) COMPARE
; (SEE EI.TK=6,7,10) BLM'S
; (SEE EI.TK=11) COMPARE
; (SEE EI.TK=12) BYTE'S
; (SEE EI.TK=13) COMPARE
;
16.4.6 ARITHMETIC TEST
;
; THE MULTIPROGRAMMING RELIABILITY ARITHMETIC TEST WAS
; DERIVED FROM THE STAND ALONE ARITHMETIC TEST. THIS TEST
; REQUIRES 2K OF SCRATCH FOR EXECUTION. THE EXECUTE POR-
; TION OF THE TEST IS RANDOMLY RELOCATED WITHIN AVAILBLE
; SCRATCH. IF THE SYSTEM IS MAPPED, (HAS AN MMPU) THE
; SCRATCH AREA IS RANDOMLY REMAPPED TO SOME OTHER LOGICAL AD-
; DRESS FOR EXECUTION. 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.
;
16.4.7 FLOATING POINT TEST
;
; THE MULTIPROGRAMMING FLOATING POINT TEST IS SIMILAR IN OP-
; ERATION TO THE ARITHMETIC TEST. THE FPU TEST DATA BUFFER IS
; LOCATED RANDOMLY WITHIN 32 WORDS IN THE CENTER OF THE EX-
; ECUTE PORTION OF THE FLT PT TEST. THE FLT. PT. NUMBERS PRO-
; CESSSED BY THIS TEST ARE FIXED (NOT RANDOM) AND CAN BE FOUND
; SPECIFIED ON THE LISTING FOR EACH TEST.
;
16.4.8 FLOATING POINT FUNCTIONS TEST
;
; FLOATING POINT FUNCTIONS BEING TESTED INCLUDE: SQUARE ROOT,
; EXPONENTIAL, NATURAL LOGARITHM, SINE, COSINE, AND POLYNOMIAL
; (SINGLE AND DOUBLE PRECISION FOR ALL TESTS). THE TEST IS RANDOMLY
; RELOCATED TO THE ASSIGNED SCRATCH AREA WHERE IT IS EXECUTED.
;
16.4.9 LEF/ERROR TEST
;
; THE LEF MODE - ERROR TEST IN MULTIPROGRAMMING RELIABILITY IS
; ONLY RUN IF AN MMPU EXISTS. THE LEF PORTION OF THIS TEST VERIFIES
; THAT THE LEF ENABLE ON THE MMPU FUNCTIONS IN ALL ADDRESSING
; MODES. THE ERROR PORTION OF THE TEST VERIFIES THAT THE WRITE, I/O
; DEFER AND VALIDITY PROTECT FEATURES OF THE MMPU FUNCTION
; CORRECTLY. SCRATCH AND EXECUTION ARE TREATED AS IN ARITH-
; METIC TEST.
;
16.4.10 EXTENDED ADDRESSING TEST
;
; THE EXTENDED ADDRESSING TEST
; VERIFIES THE CORRECT OPERATION OF THE DOUBLE LENGTH
; INSTRUCTIONS, THE IMMEDIATE MODE DOUBLE LENGTH,
; DISPA,CLM,NSP,HLV AND ELP.
; SCRATCH AREA IS TREATED AS INTHE EIS/MRI TEST
; WITH TEST EXECUTION SIMILAR TO THE ARITH,FLT PT.
; AND LEF/ERROR TESTS

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;6.4.11 ARRAY PROCESSOR TEST
;
; THIS TEST, VERIFIES THE LDR AND
; INSTRUCTIONS AS A PAIR, USING LDR, AN ARRAY OF 128,
; SEQUENTIAL FLOATING POINT NUMBERS ARE LOADED TO AP RAM
; FROM MAIN (MEMORY BUFFER #1. ALL TESTS USE FIRST IK
; OF AP RAM. THEN USING STR INSTRUCTION, THE ARRAY IN RAM
; IS STORED BACK TO MM IN BUFFER #2. BUFFERS #1 AND #2
; ARE THEN COMPARED AND SHOULD BE THE SAME.
;
; THE SRS AND ARS INSTRUCTIONS ARE ALSO TESTED AS
; A PAIR. USING THE SEQUENTIAL, FLOATING POINT DATA AL.
; READY LOADED IN RAM FROM PREVIOUS TEST AND THE ARS IN-
; STRUCTION, 1.0 IS ADDED TO THIS ARRAY (CALL IT ARRAY A).
; THE RESULT OF THIS OPERATION IS PUT RIGHT ABOVE ARRAY A
; IN AP RAM (ARRAY B). THEN USING SRS INSTRUCTION 1.0 IS
; SUBTRACTED FROM ARRAY B. THE RESULT OF THIS OPERATION
; IS STILL IN ARRAY B. ARRAYS A AND B ARE THEN COMPARED
; AND SHOULD BE THE SAME.
;
; THE 3RD AND FINAL TEST IS MUCH MORE COMPLICATED.
; THIS TEST FOURIER TRANSFORMS AN IMPULSE TO A STEP, THE
; STEP IS THEN INVERSE TRANSFORMED BACK TO AN IMPULSE.
; THE OUTPUT SHOULD EQUAL THE INPUT.
;
; FIRST AN IMPULSE FUNCTION OF STRENGTH ONE, 128.
; ELEMENTS LONG IS CREATED IN MM AS AN INTEGER ARRAY.
; USING FLL INSTRUCTION, IT IS CONVERTED TO A FLOATING
; POINT ARRAY AND LOADED TO AP RAM. THIS ARRAY IS FOURIER
; TRANSFORMED USING FFTC INSTRUCTION. THE RESULT SHOULD
; BE A STEP WHICH IS STORED IN A COMPLEX FORM. ALL 128
; REAL PARTS ARE 1.0. ALL 128 IMAGINARY PARTS ARE 0.0.
; THIS IS TESTED USING THE CMS EQ INSTRUCTION. IF THERE
; IS AN ERROR HERE, THE ACS WILL BE PRINTED WITH ACO
; CONTAINING RETURNED VALUE AND ACI CONTAINING EXPECTED
; VALUE. THE STEP IS NOW INVERSE TRANSFORMED USING THE
; FFTC INSTRUCTION. THE RESULT SHOULD BE AN IMPULSE
; WITH MAXIMUM HEIGHT 128. THIS MAX ELEMENT SHOULD BE
; THE ZEROth ELEMENT IN THE ARRAY. BOTH THESE CONDITIONS
; ARE CHECKED USING THE MXP INSTRUCTION. ALL OTHER REAL
; AND IMAGINARY ELEMENTS OF THIS IMPULSE ARRAY SHOULD
; BE 0.0. THIS IS CHECKED VIA THE CMS EQ INSTRUCTION.
; THIS IMPULSE FUNCTION ARRAY IN AP RAM IS THEN SCALED
; DOWN TO STRENGTH ONE USING THE MRS INSTRUCTION. THEN
; THE RESULTING REAL IMPULSE ARRAY IS INTEGRATED BACK
; TO MM USING THE FX8 INSTRUCTION. THE RESULTING INTERGER
; ARRAY IS CHECKED AGAINST THE ORIGINAL IMPULSE ARRAY.
; THEY SHOULD BE THE SAME.
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;6.4.12 WCS TEST
;
; THIS TEST CAN'T BE RUN WITH THE ARRAY
; PROCESSOR TEST. IF THE ARRAY PROCESSOR
; IS INSTALLED BUT NOT TO BE TESTED, A
; PATCH IS REQUIRED TO ENABLE THE WCS
; TEST BEFORE IT CAN BE RUN.
;
035231 PATCH= APSEL ;PATCH TO 401
;
; THE WCS TEST IS DIVIDED INTO FOUR MAIN
; AREAS WHICH ARE DESCRIBED BELOW.
;
;6.4.12.1 DECI,DEC2 TEST
;
; A DECI IS PERFORMED TO A RANDOM LOCATION
; IN WCS, FROM THERE A DEC2 IS PERFORMED
; TO ANOTHER RANDOM LOCATION IN WCS AND THEN
; AN EXIT OCCURS. THE LAST THREE RANDOM
; NUMBERS ARE USED AS FOLLOWS:
;
; ACO BITS 12-15 = ENTRY # =DEC1 ADDRESS
; AC1 BITS 1-4 = ACS ACD
; ADDRESS FOR DEC2 = 6-9,1-4, FROM XOP1
;
;6.4.12.2 FILE TEST
;
; A RANDOM LOCATION IN THE FILE IS LOADED
; WITH RANDOM DATA. THE FILE IS THEN READ AND
; CHECKED.
;
; ACO = RANDOM DATA
; AC2 = RANDOM ADDRESS (BITS 8-15)
;
;6.4.12.3 ALU TEST
;
; THE ALU TEST IS A GROUP OF MICRO-INSTRUCTIONS
; WHICH ARE LOADED WITH A RANDOM STARTING LOCATION
; IN WCS AND WHICH EXERCISE ALL THE ALU FUNCTIONS
; ALONG WITH FUNCTIONS IN THE FOLLOWING FIELDS:
; A-PORT, A-INPUT, B-PORT, SHIFT, LOAD, AND CARRY.
;
; THE THREE RANDOM #'S IN ACO, AC1, AC2 ARE USED AS
; OPERANDS AND THE RESULTS FROM EXECUTION
; OF THE WCS SEQUENCE ARE COMPARED WITH SIMULATED
; RESULTS.
;
; THE LAST THREE RANDOM NUMBERS ARE USED AS FOLLOWS:
; ACO BITS 8-15 =FIRST ADDRESS IN WCS
; AC1 BITS 12-15 =ENTRY # (0-17)
; AC2 =OPERAND 1
; AC3 =OPERAND 2
; AC4 =OPERAND 3
;
;6.4.12.4 MEMORY TEST
;
; THE WCS MEMORY TEST PRIMARILY EXERCISES THE
; MA AND MBUS FIELDS.
;
; THE TEST SEQUENCE IN WCS GENERATES TWO
; NEW WORDS DEPENDENT UPON THE

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01 ORIGINAL RANDOM NUMBER IN TWO WORK LOCATIONS.  
02 THE MAIN PROGRAM SIMULATES THE PROCEDURE AND  
03 COMPARES THE ACTUAL WITH THE EXPECTED RESULTS.  
04  
05 THE LAST THREE RANDOM NUMBERS ARE USED AS FOLLOWS:  
06  
07 AC0 BITS 8-15 =FIRST ADDRESS IN WCS  
08 AC2 BITS 12-15 =ENTRY # (0-17)  
09 AC0 =ORIGINAL MRO  
10 AC1 =ORIGINAL MRI  
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:16.4.13 COMMERCIAL INSTRUCTION TEST  
:  
:UPON ENTERING FOR INITIALIZATION THIS TEST DOES A TRIAL  
:INSTRUCTION TO DETERMINE IF THE COMMERCIAL OPTION AND  
:THE FLOATING POINT OPTION ARE INSTALLED TOGETHER  
:UPON ENTERING FOR EXECUTION THE TEST TRIES TO ACQUIRE  
:4K OF SCRATCH. IF OBTAINED THE TEST MODULE IS  
:MOVED UP INTO SCRATCH LEAVING THE AREA ABOVE AND  
:BELOW THE TEST AS DATA SCRATCH BUFFERS.  
:THE SIX INSTRUCTIONS TESTED ARE: ELDB, ESTB, CMV, CMP  
:CTR, AND CMT.  
:THE EXTENDED LOAD BYTE STORE BYTE INSTRUCTIONS ARE  
:TESTED TOGETHER. A RANDOM BYTE ADDRESS IS GENERATED IN  
:EITHER THE HIGH OR THE LOW SCRATCH BUFFER. A RANDOM  
:NUMBER (16 BITS) IS THEN STORED INTO MEMORY LOCATION  
:CONTAINING THAT BYTE. BITS 8-15 OF THIS RANDOM NUMBER  
:IS AGAIN STORED INTO THAT BYTE ADDRESS BY THE ESTB INSTR  
:THESE TWO ADJACENT BYTES OF THE SAME WORD ARE THEN LOADED  
:ONE AT A TIME BY THE ELDB INSTRUCTION BACK INTO THE ACCU  
:THE RANDOM NUMBER IS REWOUND RECONSTRUCTED AND COMPARED WITH  
:THE ORIGINAL FOR ERROR. THIS EXERCISE CHECKS THAT THE EL  
:ESTB INSTRUCTIONS DO NOT DISTURB THE ADJACENT BYTES.  
:ALL FOUR ADDRESSING MODES ARE TESTED SEPARATELY.  
:THE CMV, CMP, CTR, AND CMT INSTRUCTIONS ALL DEAL  
:WITH STRINGS OF BYTES FROM A SOURCE TO A DESTINATION  
:FIELD. THE SIZES OF THE LOW AND HIGH BUFFER ARE COMPARED  
:AND THE SMALLER BUFFER IS SELECTED AS THE SOURCE  
:BUFFER WHILE THE LARGER IS THE DESTINATION. THE SOURCE  
:BUFFER IS FILLED WITH RANDOM DATA AT THE START OF THE  
:TEST IN ORDER TO MINIMIZE THE USE OF THE RANDOM DATA  
:GENERATOR. THE CMV AND CMP INSTRUCTIONS ARE EXERCISED TO  
:THE CTR AND CMT INSTR. ARE EXERCISED SEPARATELY  
:AND THEIR TRANSLATION TABLE IS LOCATED RANDOMLY IN THE  
:BUFFER. SINCE THE CTR INSTRUCTION REQUIRES A TRANSLATION  
:OF 128 WORDS, A SCHEME IS SETUP WHICH DIVIDES THE  
:LARGER BUFFER INTO TWO HALVES IF THE SMALLER BUFFER  
:SIZE IS LESS OF 256 WORDS. IN THIS CASE THE LOWER HAL  
:CHOSEN AS THE SOURCE AND THE UPPER HALF AS THE DESTINATION  
:BUFFER.  
:THE LDI, STI, LDI, LSN AND FINT INSTRUCTIONS HANDLE THE  
:CONVERSION OF INTEGERS AND FLOATING POINT NUMBERS.  
:A RANDOM NUMBER IS FLOATED FROM MEMORY INTO FPAC0.  
:THE EXPONENT OF WHICH IS THEN RANDOMIZED. FPAC0 IS  
:INTEGERIZED (BY FINT) AND STORED (BY STI) AS AN  
:INTEGER 16 BYTES LONG. THIS INTEGER IS THEN LOADED BY  
:LDI INTO FPAC1, AND COMPARED WITH FPAC0 FOR ERROR.  
:THE SAME INTEGER IS ALSO TESTED BY THE LSN INSTRUCTION  
:A SIMILAR APPROACH IS USED IN TESTING THE LDI, STI  
:INSTRUCTIONS. ALL EIGHT FORMATS OF INTEGERS (TYPES 0-7)  
:ARE TESTED SEPARATELY.  
:THE EDIT INSTRUCTION IS USED TO CONVERT INTEGERS  
:FROM ONE FORMAT TO THE OTHER. THREE TESTS ARE  
:WRITTEN IN WHICH ALL EDIT OP CODES ARE EXERCISED.



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;6.4.14 DCU=50/200 TEST
;
;THE MULTI-PROGRAMMING DCU=50/200 TEST RUNS
;AN ARITHMETIC TEST VIA THE DATA CHANNEL INTO
;THE HOST MEMORY.
;THE DCU=50/200 INTERRUPTS THE HOST CPU WHEN EITHER IT
;COMPLETES THE TEST OR UPON DETECTING AN ERROR.
;
;THIS TEST WILL AUTO-SIZE FOR THE EXISTANCE OF THE DCU AT
;DEVICE CODE 64. IF OTHER DEVICE CODES ARE TO BE USED,
;PATCH THEM INTO LOCATION DDDV. IF NOT FOUND THE TEST
;WILL BE AUTOMATICALLY DELETED.
;
;6.4.15 SC MEMORY TEST
;
;THIS MEMORY TEST DOES A READ/MODIFY/WRITE TO THE AVAILABLE
;SCRATCH AREA USING THE "ISZ AND DSZ" INSTRUCTION.
;THE ISZ/DSZ TEST IS MOVED INTO SCRATCH AT EITHER END
;AND TESTED. AREA IS THE UNOCCUPIED SCRATCH AREA.
;THE TEST IS BROKEN INTO THE
;FOLLOWING CHECKS:
;
;MM.TK= 0 WRITE INTO EACH MEMORY LOCATION A MINUS
; ONE AND VERIFY EACH LOCATION.
;
;MM.TK= 1 READ A LOCATION BEFORE DOING THE ISZ
; TO VERIFY IT HASN'T BEEN DISTURBED.
;
;MM.TK= 2 ISZ DIDN'T SKIP
;
;MM.TK= 3 LOCATION NOT 0 AFTER ISZ
;
;MM.TK= 4 DSZ SKIPPED=ERROR
;
;MM.TK= 5 DSZ TST= LOCATION NOT -1 AFTER DSZ
;
;MM.TK= 6 SAME AS 1, EXCEPT TESTING IN THE REVERSE
; DIRECTION
;
;MM.TK= 7 SAME AS 2, EXCEPT TESTING IN THE REVERSE
; DIRECTION.
;
;MM.TK= 10 SAME AS 3, EXCEPT TESTING IN THE REVERSE
; DIRECTION.
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;6.4.16 6063/64 PAGING DISK
;
;DURING INITIALIZATION THE TEST CHECKS FOR THE
;EXISTANCE OF A DISK CONTROLLER AND THEN CHECKS
;FOR THE EXISTANCE OF ANY/ALL DRIVES. A WRITE
;BUFFERS COMMAND IS USED TO SIZE FOR AVAILABLE
;DRIVES. THEN THE CONTROLLER IS CHECKED IF CABLED
;TO THE BMC CHANNEL.
;
;THE TESTING OF EACH AVAILABLE DRIVE IS CONTROLLED
;BY SELECTION OF ONE OF THREE OPERATION TABLES
;PER DRIVE. EACH CONTROL TABLE IS 13 WORDS IN
;LENGTH. THE FIRST WORD CONTAINS THE TRACK NUMBER
;(RANDOMLY SELECTED), THE SECOND WORD CONTAINS THE
;STARTING SECTOR AND NUMBER OF SECTORS USED. THE
;STARTING SECTOR IS RANDOMLY SELECTED AND THE NUMBER
;OF SECTORS IS DETERMINED BY THE AMOUNT OF SCRATCH
;AREA ASSIGNED TO THE DISK TEST WHEN THE DISK
;IS WRITTEN.
;THE THIRD WORD CONTAINS THE ERROR COUNT
;FOR RETRY USEAGE.
;THE FOURTH WORD CONTAINS THE FIRST WORD OF THE
;COMMAND QUEUE, I.E., DRIVE+TRACK+SECTOR.
;THE FIFTH THRU 8TH WORDS ARE THE RANDOM DATA
;WORDS USED TO CREATE THE TEST PATTERN. (THEY REPEAT
;EVERY FOUR WORDS)
;THE 9TH WORD IS THE STARTING CANNEL ADDR. USED
;IN WRITING TO THE DISK. THE 10TH THRU 13TH WORDS
;ARE THE PHYS IK ADDRESS USED IN WRITING TO THE DISK.
;
;UPON ENTERING FOR INITIAL EXECUTION, THE TEST ATTEMPS TO
;ACQUIRE 1-4K OF SCRATCH AREA. THE TEST THEN RANDOMLY
;SELECTS A DATA STARTING ADDRESS AFTER THE FIRST
;256 WORDS IN SCRATCH. THE FIRST 256 WORDS ARE RESERVED
;FOR THE COMMAND QUEUE.
;THE TEST THEN SELECTS ONE OF THE AVAILABLE
;DRIVES AND ONE OF THE THREE OP TABLES FOR THAT DRIVE.
;IF THE FIRST WORD OF THE TABLE IS NON-ZERO (INDICATING
;THE TRACK # IN WORD #1, STARTING AT THE SECTOR IN
;BITS 11-15 OF THE SECOND WORD, FOR THE # OF SECTORS
;SPECIFIED BY THE BITS 3-7 IN THE SECOND WORD, RANDOM DATA
;HAS BEEN WRITTEN THAT IS EQUAL TO THE CONTENTS OF WORDS
;5 THRU 8 OF THE OP TABLE) THEN THE NEXT OPERATION OF
;READ OR DATA VERIFY IS RANDOMLY SELECTED.
;IF THE FIRST WORD OF THE TABLE IS ZERO, A TRACK IS
;SELECTED WHICH IS NOT CURRENTLY IN AN OP TABLE,
;AND A STARTING SECTOR # IS RANDOMLY SELECTED SUCH THAT
;THE # OF SECTORS WRITTEN WILL NOT MAKE THE SECTOR #
;FIELD OVERFLOW INTO THE TRACK FIELD. (I.E., THE STARTING
;SECTOR FALLS BETWEEN 0 AND 32-# OF SECTORS TO BE WRITTEN)
;THE DATA PATTERN IS GENERATED IN SCRATCH AREA AND
;A WRITE OPERATION IS SELECTED.
;
;AFTER SELECTION OF THE OPERATION TO BE PERFORMED,
;A COMMAND QUEUE IS GENERATED IN THE FIRST 256 WORDS
;OF SCRATCH (FIVE WORDS PER SECTOR) THE FIRST WORD
;CONTAINS THE DRIVE, TRACK AND SECTOR TO BE EXERCISED.
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10039 LEMRT
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;6.4.16 6063/64 PAGING DISK
;
;DURING INITIALIZATION THE TEST CHECKS FOR THE
;EXISTANCE OF A DISK CONTROLLER AND THEN CHECKS
;FOR THE EXISTANCE OF ANY/ALL DRIVES. A WRITE
;BUFFERS COMMAND IS USED TO SIZE FOR AVAILABLE
;DRIVES. THEN THE CONTROLLER IS CHECKED IF CABLED
;TO THE BMC CHANNEL.
;
;THE TESTING OF EACH AVAILABLE DRIVE IS CONTROLLED
;BY SELECTION OF ONE OF THREE OPERATION TABLES
;PER DRIVE. EACH CONTROL TABLE IS 13 WORDS IN
;LENGTH. THE FIRST WORD CONTAINS THE TRACK NUMBER
;(RANDOMLY SELECTED), THE SECOND WORD CONTAINS THE
;STARTING SECTOR AND NUMBER OF SECTORS USED. THE
;STARTING SECTOR IS RANDOMLY SELECTED AND THE NUMBER
;OF SECTORS IS DETERMINED BY THE AMOUNT OF SCRATCH
;AREA ASSIGNED TO THE DISK TEST WHEN THE DISK
;IS WRITTEN.
;THE THIRD WORD CONTAINS THE ERROR COUNT
;FOR RETRY USEAGE.
;THE FOURTH WORD CONTAINS THE FIRST WORD OF THE
;COMMAND QUEUE, I.E., DRIVE+TRACK+SECTOR.
;THE FIFTH THRU 8TH WORDS ARE THE RANDOM DATA
;WORDS USED TO CREATE THE TEST PATTERN. (THEY REPEAT
;EVERY FOUR WORDS)
;THE 9TH WORD IS THE STARTING CANNEL ADDR. USED
;IN WRITING TO THE DISK. THE 10TH THRU 13TH WORDS
;ARE THE PHYS IK ADDRESS USED IN WRITING TO THE DISK.
;
;UPON ENTERING FOR INITIAL EXECUTION, THE TEST ATTEMPS TO
;ACQUIRE 1-4K OF SCRATCH AREA. THE TEST THEN RANDOMLY
;SELECTS A DATA STARTING ADDRESS AFTER THE FIRST
;256 WORDS IN SCRATCH. THE FIRST 256 WORDS ARE RESERVED
;FOR THE COMMAND QUEUE.
;THE TEST THEN SELECTS ONE OF THE AVAILABLE
;DRIVES AND ONE OF THE THREE OP TABLES FOR THAT DRIVE.
;IF THE FIRST WORD OF THE TABLE IS NON-ZERO (INDICATING
;THE TRACK # IN WORD #1, STARTING AT THE SECTOR IN
;BITS 11-15 OF THE SECOND WORD, FOR THE # OF SECTORS
;SPECIFIED BY THE BITS 3-7 IN THE SECOND WORD, RANDOM DATA
;HAS BEEN WRITTEN THAT IS EQUAL TO THE CONTENTS OF WORDS
;5 THRU 8 OF THE OP TABLE) THEN THE NEXT OPERATION OF
;READ OR DATA VERIFY IS RANDOMLY SELECTED.
;IF THE FIRST WORD OF THE TABLE IS ZERO, A TRACK IS
;SELECTED WHICH IS NOT CURRENTLY IN AN OP TABLE,
;AND A STARTING SECTOR # IS RANDOMLY SELECTED SUCH THAT
;THE # OF SECTORS WRITTEN WILL NOT MAKE THE SECTOR #
;FIELD OVERFLOW INTO THE TRACK FIELD. (I.E., THE STARTING
;SECTOR FALLS BETWEEN 0 AND 32-# OF SECTORS TO BE WRITTEN)
;THE DATA PATTERN IS GENERATED IN SCRATCH AREA AND
;A WRITE OPERATION IS SELECTED.
;
;AFTER SELECTION OF THE OPERATION TO BE PERFORMED,
;A COMMAND QUEUE IS GENERATED IN THE FIRST 256 WORDS
;OF SCRATCH (FIVE WORDS PER SECTOR) THE FIRST WORD
;CONTAINS THE DRIVE, TRACK AND SECTOR TO BE EXERCISED.
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10041 LEMRT
01 ;6.4.16 60x3/64 DISK (CONTINUED)
02 ;
03 ;THE SECOND WORD CONTAINS THE COMMAND AND EXTENDED
04 ;ADDRESS BITS OF THE DATA ADDRESS. WORD # 3 CONTAINS
05 ;THE LOWER 16 BITS OF THE LOGICAL ADDRESS OF THE
06 ;DATA. WORD # 4 IS USED BY THE DISK TO STORE THE
07 ;STATUS WORD. WORD # 5 IS NOT CURRENTLY USED.
08 ;THE LAST QUEUE BLOCK CONTAINS A HALT BIT IN WORD
09 ;# 2 WHICH TERMINATES THE OPERATION AFTER
10 ;COMPLETION OF THE SECTOR AND CAUSES THE DISK
11 ;TO INTERRUPT THE CPU.
12 ;THE DISK STATUS IS CHECKED AT THE TIME OF THE INTERRUPT
13 ;AND IF OK THE SCRATCH AREA IS VERIFIED. AS THE
14 ;DATA COMPARES ARE PERFORMED A NEGATIVE COUNT IS
15 ;STORED IN THE CHECKED LOCATION TO CLEAR THE BUFFER.

10042 LEMRT
01 ;6.4.17 MOVING HEAD DISK TEST
02 ;WHEN ENTERED FOR INITIALIZATION, THE MOVING HEAD
03 ;DISK TEST SIZES EACH DISK THAT IS "READY".
04 ;A. THE HIGHEST AVAILABLE SECTOR IS FOUND BY A SERIES
05 ; OF SEKS AND RECALIBRATE COMMANDS.
06 ;B. THE NUMBER OF AVAILABLE SECTORS ON A SURFACE ARE
07 ; FOUND BY INITIATING A SERIES OF 2 SECTORS READS.
08 ;C. THE NUMBER OF SURFACES ARE DETERMINED BY INITIATING
09 ; ANOTHER SERIES OF 2 SECTOR READS AT THE LAST
10 ; SECTOR ON EACH SURFACE UNTIL END OF CYLINDER.
11 ;THIS INFORMATION IS TYPED THE
12 ;FIRST TIME THE TEST IS ENTERED DURING "RUN"
13 ;NOTE: IF DISK IS FOUND TO HAVE 4 SURFACES THE OPERATOR
14 ;WILL BE ASKED IF THE FIVED PLATTER IS TO BE TESTED.
15 ; IF NOT THEN THE SIZED INFORMATION WILL BE MODIFIED
16 ; TO PROTECT THIS AREA OF THE DISK. THE NEW SIZED
17 ; INFORMATION WILL BE PRINTED.
18 ;NOTE: THIS TEST CANNOT DETERMINE IF
19 ; THE DISK CONTROL IS ON THE PRIMARY OR
20 ; SECONDARY SIDE OF THE DISK ADAPTER
21 ;THE TESTING OF EACH AVAILABLE DRIVE IS CONTROLLED BY
22 ;AN INDIVIDUAL CONTROL TABLE FOR EACH DRIVE.
23 ;AFTER RANDOMLY SELECTING AN AVAILABLE DRIVE, THE
24 ;SEQUENCE PROCEEDS AS FOLLOWS:
25 ;THE OPERATION OF THE EACH MOVING HEAD DISK IS CONTROLLED BY
26 ;THE CONTENTS OF 3 TABLES. EACH CONTROL TABLE IS 13 WORDS
27 ;IN LENGTH. THE FIRST WORD CONTAINS THE CYLINDER NUMBER,
28 ;(RANDOMLY SELECTED), THE SECOND WORD CONTAINS THE STARTING
29 ;SECTOR AND NUMBER OF SECTORS UTILIZED. THE START SECTOR IS
30 ;RANDOMLY SELECTED AND THE NUMBER OF SECTORS IS CONTROLLED BY THE
31 ;AMOUNT OF SCRATCH AREA AVAILABLE TO THE DISK TEST WHEN THE
32 ;DISK IS WRITTEN.
33 ;THE 3RD WORD IS AN ERROR COUNTER. FOR EACH ERROR DETECTED, THE
34 ;DISK IS RECALIBRATED AND THE OPERATION IS REPEATED.
35 ;THIS "RECAL/REPEAT" IS EXECUTED UP TO 4 TRYS.
36 ;THE FOURTH THROUGH 7TH WORDS ARE THE RANDOM DATA
37 ;USED TO GENERATE THE TEST PATTERN. (THEY REPEAT EVERY
38 ;4 WORDS.
39 ; THE 8TH WORD IS A RANDOM SEC.# THAT IS TREATED
40 ;SINGLY AS THE CONTIGUOUS SECTORS IN WORD 2. IF THE LAST
41 ;SECTOR ON THE CYLINDER, READS AND WRITES FORCE THE EDC
42 ;STATUS AS EVERY OPERATION IS DONE WITH A SEC. COUNT=2
43 ;THE 9TH WORD IS THE CHANNEL ADDRESS USED TO WRITE TO
44 ;THE DISK. THE 10TH THRU 13TH WORDS ARE THE PHYS 1K ADDR
45 ;USED TO WRITE TO THE DISK.
46 ;
47 ;WHEN INITIALLY ENTERED, THE DISK TEST ATTEMPTS TO ACQUIRE 1
48 ;TO 4K OF SCRATCH AREA. THE TEST THEN RANDOMLY SELECTS A DATA
49 ;START ADDRESS WITHIN THE FIRST 256 WORDS OF SCRATCH.
50 ;THE TEST THEN RANDOMLY SELECTS ONE OF THE AVAIL DISKS
51 ;THE TEST THEN RANDOMLY SELECTS ONE OF THE 3 OP TABLES. IF
52 ;THE FIRST WORD OF THE OP TABLE IS NOT=0 IT INDICATES THAT =
53 ;AT THE CYLINDER NUMBER IN THE FIRST WORD = STARTING WITH THE
54 ;SECTOR # IN BITS 6 TO 15 OF THE 2ND WORD = FOR THE # OF SECTORS
55 ;SPECIFIED BY IN BITS 2 TO 5 OF THE 2ND WORD = RANDOM DATA HAS
56 ;BEEN WRITTEN THAT IS EQUAL TO THE DATA IN WORDS 4 TO 7
57 ;OF THE OP TABLE. READ FROM DISK IS SELECTED.

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10043 LEMRT

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01 ;6.4.17 (CONTINUED)
02 ;IF THE FIRST WORD OF THE TABLE IS=0 THE TEST - RANDOMLY
03 ;SELECTS A CYLINDER NOT CURRENTLY IN AN OP TABLE - RANDOMLY
04 ;SELECTS A START SECTOR (THE # OF SECTORS IS = TO THE AMOUNT
05 ;OF SCRATCH AVAILABLE) AND GETS FOUR RANDOM DATA WORDS.WRITE
06 ;TO DISK IS SELECTED.
07 ;THE TEST THEN INITIATES A SEEK TO THE CYLINDER SELECTED
08 ;AND AT SUCCESSFUL COMPLETION OF THE SEEK EITHER READS OR
09 ;WRITES THE # OF SECTORS AVAILABLE.
10 ;AT SUCCESSFUL COMPLETION OF EITHER THE READ OR WRITE, THE
11 ;DATA BUFFER IS CHECKED TO VERIFY THAT IT CONTAINS THE
12 ;CORRECT DATA. AS DATA COMPARES CORRECTLY, THE CORRECT
13 ;WORDS ARE FILLED WITH THE NEGATIVE COUNT=TO THE NUMBER
14 ;OF WORDS LEFT IN THE BUFFER.
15 ;
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10044 LEMRT

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01 ;6.4.18 6060/61 DISK TEST
02 ;
03 ; THE 6060/61 DISK TEST IS SIMILAR TO THE MOVING
04 ; HEAD DISK TEST IN OPERATION.
05 ; DISC SIZING IS LIMITED TO DRIVES AVAILABLE,
06 ; DENSITY AND WHETHER CABLED TO BMC OR DCH.
07 ;6.4.19 MAGNETIC TAPE TEST
08 ;
09 ; A SCRATCH AREA IS ASSIGNED, THREE TO SIXTY THREE RECORDS
10 ;OF RANDOM DATA ARE WRITTEN, THE DATA BUFFER IS CHECKED,
11 ;THE MAG TAPE IS BACKSPACED TO THE BEGIN-
12 ;NING OF THE JUST WRITTEN RECORDS. THEN, AS MANY RECORDS
13 ;AS THE SCRATCH AREA WILL CONTAIN ARE READ BACK, THE
14 ;DATA IS VERIFIED AND THE SEQUENCE (HEAD/VERIFY) IS RE-
15 ;PEATED UNTIL ALL RECORDS IN THE SEQUENCE HAVE BEEN READ.
16 ;
17 ;FOR TAPE WRITE STATUS ERRORS, THE TAPE IS BACKSPACED/RE-
18 ;WRITTEN UNTIL THE ERROR NO LONGER OCCURS. FOR TAPE READ
19 ;STATUS ERRORS THE TEST BACKSPACES AND REREADS A TOTAL OF
20 ;3 TRYS. STATUS ERRORS DURING BACKSPACE ARE CONSIDERED NON-
21 ;RECOVERABLE. FOR ALL ERRORS TYPED, THE TAPE IS REWOUND
22 ;AND THE TEST RESTARTED AT LOAD POINT.
23 ;
24 ;WHEN THE TAPE REACHES EOT DURING THE WRITE OPERATION, TAPE
25 ;IS REWOUND AND THE TEST RESTARTS AT LOAD POINT.
26 ;
27 ;THE RANDOM DATA IS A SEQUENCE OF 4 WORDS REPEATED EVERY 4TH
28 ;WORD. ALL RECORDS ARE 256 WORDS IN LENGTH. AS DATA IS
29 ;VERIFIED IN THE BUFFER IT IS REPLACED WITH A WORD EQUAL
30 ;TO THE NEGATIVE COUNT OF THE NUMBER OF WORDS LEFT
31 ;TO BE COMPARED.
32 ;
33 ;THESE TAPE TESTS UTILIZE 1 TO 6K OF SCRATCH AND THE
34 ;DATA BUFFER START IS RANDOMLY SELECTED TO BE IN THE FIRST 256
35 ;WORDS.
36 ;
37 ;ANY COMBINATION OF 1 TO 8 DRIVES MAY BE TESTED SIMPLY BY
38 ;HAVING THEM ON LINE WRITE ENABLED.
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10045 LEMRT

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01 ;6.4.20 LINE PRINTER TEST
02 ;
03 ;REGULAR LINE PRINTER;
04 ;THE LINE PRINTER TEST
05 ;PRINT PER PAGE WITH RANDOM STALLS EVERY 1 TO 9 LINES.
06 ;EACH LINE OF PRINT CONSISTS OF THE CHARACTERS SPACE
07 ;(40) TO Z (13Z). THE TEST FILLS THE PRINT BUFFER UNTIL THE
08 ;FIRST PRINT CYCLE STARTS. CONTINUATION OF PRINTING UNTIL
09 ;RANDOM STALL IS THEN RUN OFF INTERRUPTS FROM THE PRINTER
10 ;
11 ;DCH LINE PRINTER;
12 ;1 OR 2K OF SCRATCH IS ASSIGNED, RANDOM NUMBER
13 ;OF LINES ARE SELECTED(10-60), SCRATCH AREA IS FILLED WITH
14 ;DATA PATTERN CONSISTING OF SPACE THRU BRACKET, THEN
15 ;THE LINE PRINTER IS STARTED. A TAB RUNAWAY STATUS
16 ;ERROR WILL RESULT IN A PROGRAMMED HALT.
17 ;6.4.21 REAL TIME CLOCK
18 ;
19 ;THE REAL TIME CLOCK IS RUN AT 100 HERTZ. RUNTIME ALONG
20 ;WITH ACCUMULATED ERROR COUNT ARE PRINTED AT 5 MINUTES
21 ;15 MINUTES, 30 MINUTES AND EVERY 30 MINUTES OF RUNTIME
22 ;THEREAFTER. THIS TIMEOUT ALSO OCCURS AFTER EVERY ERROR
23 ;TYPEOUT OR IF TTY KEY 'A' IS TYPED.
24 ;* * * * * NOTE * * * * *
25 ;* WHEN RUNNING THIS TEST WITH THE DCU-50/200 TEST AND/OR
26 ;* WITH IPWORT STARTED USING IT'S MAP, THE PRINTED TIME
27 ;* CAN LOSE TIME WITH RESPECT TO REAL RUN TIME. THIS IS
28 ;* DUE TO THE HEAVY CONCENTRATION OF DCH ACTIVITY CAUSED BY
29 ;* THESE DEVICES AS TESTED BY MULTI-PROGRAMMING REL. TEST
30 ;* * * * *
31 ;
32 ;6.4.22 TELETYPE TEST
33 ;
34 ;THE TELETYPE TEST PRINTS A SINGLE LINE CONSISTING OF THE
35 ;CHARACTERS SPACE TO Z. THE TEST WILL ALSO ECHO CHARACTERS
36 ;AS TYPED.
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10046 LEMRT

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01 ;7.0 ODT EDITOR
02 ;
03 ;REQUESTING THE ODT EDITOR
04 ;TO ENTER THE ODT TYPE A CONTROL 0 ON
05 ;THE TTY. THIS CAN BE DONE AT ANY POINT IN THE
06 ;PROGRAM.
07 ;7.2
08 ;ON ENTERING THE ODT A CARRIAGE RETURN, LINE FEED
09 ;AND AN @ IS TYPED ON THE TTY.
10 ;
11 ;7.3 CONVENTIONS AND SYMBOLS IN COMMAND LINES
12 ;-----
13 ; CR PRESSING THE RETURN KEY IS REPRESENTED BY CR .
14 ; LF PRESSING THE LINE FEED KEY IS REPRESENTED BY LF .
15 ; ? PRESSING AN ILLEGAL KEY CAUSES THE ODT TO RESPONSE WITH
16 ; A ?.
17 ; ^ PRESSING AN UP-ARROW KEY IS REPRESENTED BY ^ .
18 ; @ ODT IS READY AND AT YOUR SERVICE.
19 ;
20 ;
21 ;
22 ;
23 ;7.4 COMMAND STRUCTURE
24 ;-----
25 ;
26 ; AN ODT COMMAND HAS THE GENERAL FORMAT:
27 ; [ARGUMENT][COMMAND]
28 ;
29 ; ARGUMENT MAY BE ONE OF THE FOLLOWING:
30 ;
31 ; ADR AN OCTAL ADDRESS OR AN EXPRESSION OF THE FORM:
32 ; X+Y+X,***
33 ; WHERE EACH X IS AN OCTAL INTEGER, SEPARATED
34 ; FROM THE FOLLOWING X BY EITHER +(PLUS)
35 ; OR -(MINUS). LEADING ZEROS NEED NOT BE TYPED.
36 ; N AN OCTAL INTEGER.
37 ;
38 ; A COMMAND IS A SINGLE TELETYPE CHARACTER
39 ;
40 ; CHARACTERS USED TO OPEN/CLOSE LOCATIONS INCLUDE:
41 ; "/" "CR" "LF" "R" "P"
42 ;
43 ; CHARACTERS USED TO ENTER/EXIT ODT INCLUDE:
44 ; "--0"(CTRL 0) "R" "P"
45 ;
46 ; CHARACTERS USED TO MODIFY CURRENT ARGUMENTS ARE:
47 ; "RUBOUT" "+" "-" AND THE INTEGERS 0 TO 7
48 ;
49 ; THE CHARACTER "=" ALLOWS THE CURRENT ARGUMENT TO BE
50 ; EXAMINED WITHOUT OPENING OR CLOSING THE CURRENT LOC.
51 ;
52 ; CHARACTERS TO SPECIFY IOP OR HOST INCLUDE:
53 ; "I" "P" "R" "H"
54 ;
55 ; NOTE: A "R" OR "P" WHILE IN "I" MODE PLACES ODT IN
56 ; HOST MODE.
57 ;
58 ; CHARACTERS USED TO MANIPULATE THE ECLIPSE MAP INCLUDE:
59 ; "MM" "MA" "MB" "MU" "MT" "MNE" "MNL"
60 ;
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0047 LEMRT

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01 :7.5 COMMANDS TO OPEN/CLOSE A LOCATION
02 : *****
03 :
04 : THE MEMORY LOCATION TO BE OPENED IS TYPEDOUT.
05 :ADR/ OPEN THE LOCATION AND PRINT ITS CONTENTS
06 :./ AND PRINT ITS CONTENTS.
07 :+ADR/ ADD ADR TO THE POINTER, OPEN THE LOCATION AND
08 :PRINT ITS CONTENTS.
09 :*-ADR/ SUBTRACT ADR FROM THE POINTER, OPEN THE LOCATION AND
10 :PRINT ADDR CONTENTS.
11 : CR CLOSE THE OPEN LOCATION WITH OR WITHOUT
12 : MODIFICATION OF ITS CONTENTS.
13 : LF CLOSE THE OPEN LOCATION WITH OR WITHOUT
14 : MODIFICATION OF ITS CONTENTS AND OPEN THE
15 : SUCCEEDING LOCATION.
16 :/ CLOSE THE OPEN LOCATION WITHOUT MODIFYING
17 : ITS CONTENTS AND OPEN THE CELL POINTED
18 : BY ITS CONTENTS
19 :+ADR/ CLOSE THE OPEN LOCATION WITHOUT MODIFYING
20 : ITS CONTENTS AND OPEN THE LOCATION POINTED
21 : BY ITS CONTENTS+ADR
22 :-ADR/ CLOSE THE OPEN LOCATION WITHOUT MODIFYING ITS
23 : CONTENTS AND OPEN THE LOCATION POINTED BY
24 : ITS CONTENTS-ADR.
25 : ^ CLOSE THE CURRENT LOCATION AND OPEN ".-1"
26 :
27 :
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10048 LEMRT

```
01 :7.6 OTHER COMMANDS
02 : *****
03 :
04 :RUBOUT THE RUBOUT KEY IS USED TO DELETE ERRONEOUSLY TYPED
05 : DIGITS EACH TIME THE RUBOUT KEY IS PRESSED. THE RIGHT
06 : MOST DIGIT IS DELETED AND ECHOED ON THE TERMINAL.
07 : IF THE RUBOUT KEY IS PRESSED RIGHT AFTER OPENING A CELL
08 : THEN IT ALLOWS THE MODIFICATION OF THE CONTENTS AS IF
09 : THEY WERE TYPED JUST BEFORE THE KEY WAS PRESSED.
10 :
11 : P RESTART THE EXECUTION OF THE PROGRAM AT THE LOCATION
12 : FOLLOWING THE ONE WHICH CALLED ENTRY TO ODT. IF IN
13 : "I" MODE, THE IOP WILL BE STARTED AT THE SAVED PC
14 : AND THE MODE WILL BE CHANGED TO "H"(HOST).
15 :
16 : ADDR START EXECUTION OF THE PROGRAM AT LOCATION ADR AFTER
17 : AN IO RESET. IF IN "I" MODE, THE SART WILL BE TO THE
18 : IOP AND THE MODE WILL BE SET TO "H"(HOST). USE ONLY
19 : THE STARTING ADDRESSES 200 TO 212 AS APPROPRIATE.
20 :
21 : I STOPS THE IOP,SETS MODE TO IOP. ALL FOLLOWING COMMANDS
22 : WILL BE INTERPRETED AS IOP COMMANDS UNTIL EITHER
23 : " H,P,R " ARE TYPED.
24 :
25 : NA TYPE THE CONTENTS OF SAVED ACCUMULATOR "N".
26 :
27 : K KILL THE STRING TYPED SO FAR. ODT RESPONDS WITH A ? AND
28 : THE OPEN LOCATION IS CLOSED WITHOUT MODIFICATION.
29 :
30 : = PRINT THE CURRENT ARGUMENT (I.E. TYPING ".=" WILL
31 : PRINT THE ADRS OF THE LAST OPENED LOCATION)
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10049 LEMRT

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01 : 7.7 MAPPED COMMANDS
02 :
03 : ALL MAPPED COMMANDS MUST BE PRECEDED WITH A "M"
04 : COMMAND, I.E. "MM" "MA" "MB" "MC" "MT" "MNE" "MNL"
05 : ETC.
06 : ALL MAPPED COMMANDS ARE VALID ONLY UNDER LOCAL MODE.
07 : IE. NOT TO AN IOP
08 :
09 : MM SETS SWITCH SO THAT ALL MEMORY ACCESSES ARE
10 : MAPPED USING THE LAST USER'S SETUP UNTIL A "MU"
11 : "MA" OR "MB" IS INPUTED.
12 :
13 : MA SETS SWITCH SO THAT ALL FURTHER MEMORY ACCESSES
14 : ARE MAPPED USING USER-A UNTIL A "MB" OR "MU" IS
15 : ENTERED.
16 :
17 : MB SETS SWITCH SO THAT ALL FURTHER MEMORY ACCESSES
18 : ARE MAPPED USING USER-B UNTIL A "MA" OR "MU"
19 : IS ENTERED.
20 :
21 : MC PRINTS THE CONTENTS OF THE LAST FIVE CONTEXT BLOCKS
22 : NOTE: FIRST TWO WILL BE IDENTICAL COPIES IF THE
23 : MOST RECENT PUSH WASN'T A MAP VIOLATION TRAP.
24 : THE "MC" COMMAND IS USEFUL ONLY ON MPPU2 TYPE
25 : PROCESSORS.
26 :
27 : MT PRINTS THE CURRENT CONTENTS OF ALL MAP ENTRY TABLES
28 :
29 : MNE PRINTS THE MAP ENTRY CORRESPONDING TO THE VALUE OF
30 : N TYPED, WHERE N IS THE LOGICAL PAGE ADDRESS.
31 : IF NO VALUE FOR N IS ENTERED THEN THE NEXT
32 : LOGICAL MAP ENTRY IS TYPED.
33 :
34 : MNL SETS MAP LAST BLOCK TO VALUE ENTERED .
35 : OCTAL VALUES CAN RANGE FROM 0 TO 377.
36 : COMMANDS "A,B" CAN BE USED TO MODIFY FORMAT IF CALLED
37 : BEFORE "L" COMMAND.
38 :
39 : MU CLEARS MAP MODE TO STOP MAPPING OF MEMORY ACCESSES.
40 :
41 : MNS PRINTS THE CONTENTS OF THE BMC MAP WHICH CORRESPONDS
42 : TO THE LOGICAL PAGE ENTERED "N".
43 :
44 : NOTE: ENTERING OR EXITING ODT CLEARS MAPPED MODE.
45 :

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10050 LEMRT

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01 : 7.8 MODIFICATION OF A LOCATION
02 : *****
03 :
04 :
05 : ONCE A LOCATION HAS BEEN OPENED ITS CONTENTS CAN BE
06 : MODIFIED IN ONE OF THE FOLLOWING WAYS:
07 :
08 : 1) TYPE THE OCTAL NUMBER OR A STRING OF NUMBERS SEPERATED
09 : BY + OR -, FOLLOWED BY CR, OR LF. IN THIS CASE THE SUM
10 : OF THE TOTAL NUMBERS TYPED-IN WILL BE DEPOSITED. LEADING
11 : ZEROS NEED NOT BE TYPED.
12 :
13 : 2) TYPE + OR - FOLLOWED BY A NUMBER OR A STRING OF NUMBERS
14 : SEPERATED BY + OR -, FOLLOWED BY CR, OR LF. IN THIS
15 : CASE SUM OF THE TOTAL NUMBERS TYPED IN WILL BE ADDED TO
16 : OR SUBTRACTED FROM THE PREVIOUS CONTENTS OF THE LOCATION.
17 : LEADING ZEROS NEED NOT BE TYPED.
18 :
19 : 3) ADDRESS ITSELF OR AN OCTAL NUMBER RELATIVE TO THE
20 : ADDRESS OF THE LOCATION CAN BE DEPOSITED IN A MEMORY
21 : LOCATION BY TYPING A . OR +ADR FOLLOWED BY A CR, OR LF.
22 : A RUBOUT COMMAND GIVEN RIGHT AFTER OPENING A
23 : LOCATION ALLOWS THE MODIFICATION OF ITS CONTENTS
24 : AS IF THEY WERE TYPED IN JUST BEFORE THE COMMAND
25 : WAS ISSUED.

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