

# DataGeneral

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## TECHNICAL STATEMENT

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LISTING

068-001655-00

PROGRAM

CS30 MULTI-PROGRAMMING RELIABILITY  
TEST LONG

TAPE

097-001655-00

ABSTRACT

THE CS30 MULTI-PROGRAMMING RELIABILITY TEST CONSISTS OF A SERIES OF INDIVIDUAL PROCESSOR AND PERIPHERAL TESTS AND A SUPERVISOR PROGRAM, THE DIAGNOSTIC LINKER.

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0001 C3MRT LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION  
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? NAME: CS30MORT.TX PART NUMBER: 097-001655  
? DESCRIPTION: CS30 MULTI-PROGRAMMING RELIABILITY TEST (LONG)  
CPU AND PERIPHERAL TESTS  
?  
? REVISION HISTORY:  
? REV. DATE  
? 00 5/09/79  
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10002 C5MRT LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION  
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000000 FPYTS=U  
000000 PEDSK=U  
000001 FXYTSE=I  
000000 LPTTSE=U  
000001 IOTST=I  
000000 PADSK=U

:FILE FOR CS30MORT LONG (CPU AND PERIPHERAL DEVICES)

LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION

10003 C3MKT

01 CS30 MULTIPROGRAMMING RELIABILITY TEST

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ABSTRACT

THE CS30 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.

MACHINE REQUIREMENTS

MICRO-NOVA PROCESSOR

32K OF READ/WRITE MEMORY

(MEMORY MUST BE CONTIGUOUS)

TTY INPUT/OUTPUT OR TERMINAL

OPTIONAL EQUIPMENT

6038/39 DISK (DEV.35ALL DRIVES)

6095(PHOENIX) DISK (DEV.27)

LINE PRINTER (DEV. 17)

PROGRAM BANK SELECT OPTION

WITH 1 TO 7 EXTENDED 8K MEMORY BANKS

SOFTWARE PREREQUISITES

THE SYSTEM SHOULD BE CAPABLE

OF RUNNING ALL INDIVIDUAL LOGIC AND

RELIABILITY TESTS PERTAINING TO THE

PROCESSOR AND ITS PERIPHERAL EQUIPMENT

BEFORE ATTEMPTING TO RUN THIS TEST

NOTE: ALTHOUGH THIS TEST MAY AT TIMES BE USEFUL

IN DETERMINING THE GO/NO GO STATUS OF AN

UNKNOWN SYSTEM, IT IS RECOMMENDED THAT:

ALL OTHER DIAGNOSTICS BE RUN EVEN IN THE

EVENT THAT THIS TEST FINDS NO PROBLEMS.

AN ATTEMPT BE MADE TO ISOLATE ANY PROBLEMS

FOUND BY FIRST UTILIZING THE LOWER

LEVEL TESTS FOR MORE CONCISE ERROR REPORTS.

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10004 C3MKT

01 HARDWARE SETUP

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IF THE 6038/39 DISKS ARE TO BE

EXERCISED THEY MUST HAVE A DISK INSTALLED

AND BE IN THE READY STATE AND WRITE ENABLED.

IF THE 6095 DISK IS TO BE TESTED

IT MUST HAVE A DISK PACK INSTALLED

AND BE IN THE READY STATE. THE OPERATOR

WILL HAVE THE OPTION OF PROTECTING THE

NON-REMOVEABLE PLATTER IF THE PROGRAM

WAS STARTED AT A NON-AUTO START LOCATION. (IE,

LOCATIONS 202,204)

OTHERWISE ALL SURFACES WILL BE TESTED.

OPTIONAL STARTING ADDRESSES

200 AUTO-SIZE AND GO START

202,204 MANUAL SELECT/DELETE TESTS

206 RESTART LAST TEST SELECTIONS

210 IMMEDIATELY ENTER ODT

KEY ENTERED OPTIONS

KEY 0 PLACES SWPACKAGE INTO INPUT MODE WHERE

MULTIPLE OPTIONS CAN

BE SET. TYPE A CR KEY TO EXIT THIS MODE.

ENTRIES TYPED IN SET BITS IN SWREG

FOR USE BY THE PROGRAM.

TYPING A KEY COMPLIMENTS THE PREVIOUS STATE

OF THE SWREG BIT.

KEY SWREG BIT FUNCTION

1 1 =1 DON'T RELEASE AND ALLOW REASSIGNMENT

OF MEMORY AFTER ERROR

2 2 =1 DELETE TTY TYPEOUTS

3 3 =1 RUN TTY & LPT TEST EVERY TIME SELECTED.

4 TYPING A 4 WILL CAUSE THE ELAPSED TIME TO

BE PRINTED IF THE REAL TIME CLOCK TEST WAS

ENABLED.

6 6=1 THE ERROR ROUTINE WILL PAUSE AFTER

EACH PHASE OF AN ERROR TYPEOUT.

TYPE A CR KEY ON DEVICE TTY TO PROCEED.

7 TYPING A 7 WILL CAUSE THE TEST RUN SUMMARY

TO BE PRINTED.

KEY (C) 0 ENTER THE ODT EDITOR

(SEE DESCRIPTION AT PARAGRAPH 7.0)

KEY (C) 0 DEFAULT MODE RESTART. SWREG

SET TO 0.

KEY (C) R RESTART WITHOUT RESETTING SWREG BITS.

KEY M TYPE THE CURRENT CONTENTS OF SWREG.

WHERE (C) SIGNIFIES A CONTROL KEY.

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10005 C3MRT
01      ? 4.      OPERATING PROCEDURES
02      ?
03      ?
04      ? 4.1     LOAD THE PROGRAM VIA WHICHEVER LOAD DEVICE
05      ?          AVAILABLE.
06      ?
07      ? 4.4     PROCESSOR WILL TYPE:
08      ?          C330MRT REV XX (WHERE XX WILL = THE CURRENT REV#)
09      ?          TOTAL #1K-SXXX(DECIMAL) PBS MAP=YYY
10      ?          PROGRAM RUN LIST
11      ?          IF START WAS 200 OR 206 THE LIST OF
12      ? 4.5     PROGRAMS TO BE RUN CONCURRENTLY WILL
13      ?          THEN BE LISTED AND THE TEST SYSTEM
14      ?          WILL AUTO START
15      ? 4.6     IF START WAS 202 OR 204 LINKER WILL
16      ?          PAUSE AT THE END OF EACH TEST
17      ?          DESCRIPTION AND WAIT FOR KEYBOARD
18      ?          INPUT. TYPING IN A SPACE WILL
19      ?          ENABLE THAT TEST TO BE RUN.
20      ?          TYPING IN ANY OTHER CHARACTER WILL
21      ?          DELETE THAT TEST FROM BEING RUN
22      ?          NEXT THE PROGRAM WILL WAIT FOR OPERATOR INPUTED
23      ?          SWITCH REGISTER OPTION SETUP. TYPING A CR KEY WILL
24      ?          EXIT AND START THE TESTING.
25      ?
26      ?
27      ?
28      ? 4.7     PBS MAPS (EXPLANATION)
29      ?          IF THE CS30 SYSTEM INCLUDES THE PROGRAM BANK SELECTOR OPTION
30      ?          THIS TYPEDOUT WILL BE INCLUDED IN THE TEST HEADER. THE NUMBER
31      ?          FOLLOWING THE = SHOULD BE 1,5,7,17,37,77 OR 377. EACH
32      ?          BIT OF THE UP TO 8 THAT WILL BE TYPED INDICATES AN EXISTING
33      ?          EXTENDED 8K MEMORY BANK. BANK 0 IS ASSUMED AND IS REPRESENTED
34      ?          BY BIT 15 OF THE MAP WORD AS IT IS TYPED WITH 0'S SUPPRESSED.
35      ?          BIT 14 REPRESENTS BANK1, BIT 13=BANK2, BIT12=BANK3,ETC.
36      ?          UNTIL BIT 8 REPRESENTS BANK7.
37      ?          FOR INSTANCE, BANK 0 IS ASSUMED,
38      ?          IF THE CONFIGURATION WAS SIZED SUCH THAT BANK 1 WAS NOT FOUND,
39      ?          BUT BANKS 2 AND 3 WERE FOUND, THE PBS MAP THAT WOULD BE TYPED
          ?          WOULD =15.

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10006 C3MRT
01      ? 15.     ERROR DESCRIPTION
02      ?
03      ? MOST ERRORS DETECTED BY EITHER
04      ? THE INDIVIDUAL TEST PROGRAMS OR
05      ? BY THE DIAGNOSTIC LINKER WILL
06      ? RESULT IN AN EXTENSIVE ERROR
07      ? TYPEDOUT. SOME SMALL NUMBER OF
08      ? HIGHLY IMPROBABLE ERRORS MAY RESULT
09      ? IN A PROGRAM HALT IF THEY ARE
10      ? OF A NATURE THAT THE LINKER CANNOT
11      ? RECOVER FROM AND LOGICALLY PROCEED,
12      ? (I.E. INTERRUPT STACK OVERFLOWS)
13      ?
14      ?
15      ? 15.1     ERROR FORMAT
16      ?
17      ? ERROR TYPEDOUTS INCLUDE:
18      ?
19      ?
20      ? 15.1.1   PROGRAM # AT TIME OF ERROR
21      ? 15.1.2   THE CURRENT PROGRAM BANK SELECT PARAMETERS
                INCLUDING PBSNO,PBDCN,PBSLF,PBSHF
22      ? PBSNO   INDICATES THE CURRENT EXTENDED BANK ASSIGNED
23      ? TO PROCESSOR TYPE TESTS (I.E. ARITHMETIC TEST)
24      ? PBDCN   INDICATES THE CURRENT EXTENDED BANK ASSIGNED TO
                DATA CHANNEL DEVICE TYPE TESTS
25      ? PBSLF   INDICATES THE CURRENT CONTENTS OF THE PROGRAM
                BANK SELECTOR LOW FENCE REGISTER.
26      ? PBSHF   INDICATES THE CURRENT CONTENTS OF THE PROGRAM
                BANK SELECTOR HIGH FENCE REGISTER
27      ?
28      ?
29      ? 15.1.3   THE CURRENT CONTENTS OF ACO, AC1, AC2, AC3
                (SCRLO/SCRHI)SCRATCH LIMITS
30      ? 15.1.4   CONTINUATION INFORMATION IN GROUPS
                OF 3 MEMORY LOCATIONS PERTINENT TO
31      ? 15.1.5   THE INDIVIDUAL TEST THAT FAILED
32      ?
33      ?
34      ?
35      ? 15.1.6   SOME CPU TESTS THAT RELOCATE WILL
                FAIL IN THEIR ERROR TYPEDOUTS:
36      ? 15.1.LA START/ERROR (RES.)
37      ?          :XXXXX YYYYYY ZZZZZZ
38      ?          :ST.LA THE START OF THE RELOCATED TEST LOOP
39      ?          :XXXXX (I.E. THE LAST LCALL SETUL)
40      ?
41      ?
42      ?
43      ?
44      ? START THIS NUMBER INDICATES WHERE THE RESIDENT COPY
45      ? YYYYYY START OF THE TEST LOOP MAY BE FOUND IN THE LISTING
46      ?
47      ? ERROR THIS NUMBER INDICATES WHERE IN THE RESIDENT
48      ? PZZZZZ COPY OF THE LISTING THE ERROR CALL MAY BE FOUND
49      ? THIS ADDRESS FOR SOME ERROR CONDITIONS MAY NOT
50      ? BE CORRECT.

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LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION

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15.2 ERROR ANALYSIS  
 ? DUE TO THE INTERACTIVE NATURE OF  
 ? THE TESTS INVOLVED, A SERIES OF  
 ? ERROR TYPEDS 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:  
 ?  
 ? 15.2.1 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  
 ?  
 ? 15.3 CHECKERBOARD RAN  
 ?  
 ? 15.3.1 THE AC'S AT ERROR WILL INDICATE:  
 ? GOOD DATA- BAD DATA-LOGICAL ADDRESS  
 ?  
 ? IN ADDITION THE FOLLOWING LOCATIONS ARE TYPED:  
 ? CB.TK TEST COUNTER  
 ? 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  
 ?  
 ? 15.3.2 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(SHD 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.FI 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 C3MRT

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15.3.3 ARITHMETIC TEST  
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 ? 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.S03 AC3 AT TIME OF ERROR  
 ? AT.B6 BEGINNING OF TEST IN THE LISTING  
 ? (SEE DISCUSSION OF ST.LAYETC AT PARA.5.1.6)  
 ?  
 ? 15.3.4 MUL/DIV TEST  
 ?  
 ? MULTIPLY DIVIDE FAILURES WILL INDICATE  
 ? EITHER MUL FOR MULTIPLY OR DIV 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 )  
 ?  
 ? 15.3.5 STACK ERROR TEST  
 ?  
 ? THE AC'S AT THE TIME OF ERROR DETECTION WILL  
 ? BE TYPED.  
 ?  
 ? AC0 = ACTUAL  
 ? AC1 = EXPECTED  
 ? AC3 = ADDRESS OF ERROR CALL  
 ?

10009 C3MRT LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION

75.3.6 6038/39 DISK
01 THE AC'S AT TIME OF ERROR
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FOR DATA ERRORS:
AC0 BAD DATA
AC1 GOOD DATA
AC2 ADDR. OF BAD DATA
AC3 ADDR. OF ERROR
FOR STATUS ERRORS
ACO-2 WILL CONTAIN THE STATUS WORD
FOR INVALID TRACK ADDRESSES:
ACO 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 START IN CORE
LAST DOB READ DATA STARTS AT FYDST+256.
STATUS ADDR. OF LAST SEEK
LAST CMD TO DISK LAST DISK STATUS
RETRY # NUMBER OF RETRIES
BLK # 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 C3MRT LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION
75.3.7 6095 (PHOENIX) DISK TEST
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ACU GOOD DATA (SEE PD.SA)
AC1 BAD DATA
AC2 ADDR. 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
=# ERROR WAS DISK STATUS
IN WHICH CASE:
AC2=DISK STATUS
AC1=DIC DISK FOR PDDSK
AC0=DIB DISK
PDDST DATA START IN CORE
PUCST DATA START FOR DCH MAP
STATUS LAST DISK STATUS
PDDOA LAST DUA TO DISK
PDDOC LAST DUC TO DISK
ALSO IF THE ERROR OCCURS IN A HEAD OPERATION
THE FOLLOWING DATA IS PRINTED:
WRITE PUCST = XXXXX MD3 MD4
MD1 MD2 JJJJ KKKK
GGGG HHHH JJJJ KKKK
WHERE,
XXXX = STARTING CHANNEL ADDRESS OF WRITE OPERATION
GGGG = FIRST PHYS. BK USED IN DISK WRITE
HHHH = 2ND " " " " "
JJJJ = 3RD " " " " "
KKKK = 4TH " " " " "
NOTE: UPON DETECTION OF AN ERROR THE TEST WILL
RETRY THE OPERATION FOUR TIMES.
\*\*\*\*\*
6095 (PHOENIX) DISK STATUS WORDS
\*\*\*\*\*
BITS
0 R/W DONE
1 SEEK 0 DONE
2-4 NOT USED
5 DKT
6 V.S.
7 N/A
8 UNSAFE
9 DRIVE RDY
10 SEEK ERR
11 EOC ERR
12 ADDR ERR
13 ECC ERR
14 DATA LATE
15 ERR
\*\*\*\*\*

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10011 C3MRT
01 LINE PRINTER TEST
02
03 THE LINE PRINTER TEST IS AN EXERCISOR ONLY AND
04 DOESN'T CONTAIN ANY ERROR PRINTOUTS.
05
06 THE PATTERN PRINTED MUST BE EXAMINED TO SEE IF
07 IT CONTAINS ANY ERRORS. THE PATTERN USED IS:
08
09 1"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNQRSTUVMXYZ
10
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LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION

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10012 C3MRT
01 SPECIAL CASE ERROR TYPEOUTS
02
03 POWER FAIL INTERRUPT
04 UPON DETECTION OF A POWER FAIL INTERRUPT
05 THE LOGICAL ADDR. OF THE P.C. AT INTERRUPT
06 WILL BE SAVED.
07 IF 'AUTO-RESTART' IS ENABLED OR THE POWER
08 FAIL WAS ONLY MOMENTARY, THE TEST WILL RE-
09 START AS IN A START AT 206 AFTER TYPING
10 'POWER FAIL @XXXXX (WHERE XXXXXX IS THE PC AT INTR.)'
11
12 ILLEGAL SUPERVISOR CALL
13
14 UPON DETECTION OF A SUPERVISOR CALL
15 WHICH DIDN'T MATCH THE LIST OF SUBROUTINES
16 CALLS THE FOLLOWING MESSAGE WILL BE TYPED:
17
18 ILLEGAL SUPER CALL AT XXXXXX
19
20 PROG# NN NAME
21
22 AC0 AC1 AC2 AC3
23 G00000 YYYYYY ZZZZZZ 000000
24 CALL ADDR= TTTTT
25 INSTRUCTION= IIIIII
26
27 WHERE XXXXXX IS THE LOGICAL ADDRESS OF THE
28 SUPER CALL.
29 NOTE: A ILLEGAL SUPERCALL AT LOCATION 0
30 INDICATES THAT THE PROGRAM WAS
31 EXECUTING LOCATION 0.
32
33 INTERRUPT WAIT ELAPSED
34
35 THE PERIPHERAL DEVICE ASSOCIATED WITH THE
36 PROG. NUMBER TYPED WAS NOT RESPONDED WITH
37 A PROGRAM INTERRUPT FOR AN EXTENDED
38 PERIOD OF TIME. THE 2ND NUMBER TYPED
39 SHOULD POINT AT THE INTERRUPT HANDLER
40 FOR THE DEVICE THAT FAILED
41
42 STACK OVERFLOW ERROR
43
44 UPON A STACK OVERFLOW CONDITION THE
45 STACK INTERRUPT HANDLER WILL PRINT THE
46 FOLLOWING ERROR MESSAGE:
47
48 STACK OVERFLOW ERROR @ XXXXX
49
50 SP FP STADR
51 YYYYY ZZZZZ SSSSS
52
53 AND THEN IF NOT RETURNABLE TO DTOS, HALT.
54
55 WHERE, XXXXX IS THE ADDRESS OF THE INTERRUPT
56 YYYYY IS THE STACK POINTER
57 ZZZZZ IS THE FRAME POINTER
58 SSSSS IS THE STACK BASE ADDRESS (CURRENTLY)
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LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION
;
;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 QQQQ ZZZZ
;
; WHERE,
; XXXX IS THE ORIGINAL WORD
; YYYY IS THE RELOCATED WORD
; QQQQ 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.

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LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION
;
;b.0 DIAGNOSTIC LINKER
;
;b.1 PROGRAM INITIALIZE
;THE DIAGNOSTIC LINKER INITIALIZES ITSELF
;AND INDIVIDUAL TESTS IN THE FOLLOWING
;SEQUENCE:
; 1. SYSTEM IS RESET.
; 2. ANY OTHER NECESSARY CUNSTANTS
; ARE INITIALIZED
; (MEM ALLOCATION TABLES)
; 3. INTERRUPT VECTOR TABLES ARE SET UP TO
; PROCESS UNEXPECTED DEVICE INTEKRUPTS
; FROM 0 TO 32K AND BUILD 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, INTEKRUPT 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.
; (DEVS, 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.

```



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10015 C3MRT
01          16.2  PROGRAM RUN
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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.

```

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10016 C3MRT
01          16.5  INDIVIDUAL TEST DESCRIPTIONS
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16.5.1  CHECKERBOARD RAM
;THIS MEMORY CHECKER BOARD TEST IS A SURSET OF OTHER MEMORY
;CHECKERBOARDS. A COMPLETE TEST OF AN AVAILABLE SCRATCH
;AREA IS COMPRISED OF THE FOLLOWING SEQUENCE:
;
;CB.TK=0
;REQUEST 1 TO 20K OF SCRATCH, RANDOMLY RE-
;LOCATE THE EXECUTE PORTION OF CHECKERBOARD
;INTO SCRATCH AND GENERATE THE CHECKERBOARD
;PATTERN
;
;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.
;
;CHECK PASS-COMPARE EACH WORD IN SCRATCH WITH
;THE PATTERN EXPECTED
;
;FAST CHECKSUM MEMORY TO ENSURE THAT ALL DATA
;IS INTACT (RETURNS TO CHECK PASS IF CHECK-
;SUM DOES NOT AGREE.)

```

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!0017 C5MKT

```

01 16.3.2 SC MEMORY TEST
02 ?
03 ? THIS MEMORY TEST DOES A READ/MODIFY/WRITE TO THE AVAILABLE
04 ? SCRATCH AREA USING AN "ISZ" INSTRUCTION. TEST IS BROKEN INTO THE
05 ? FOLLOWING CHECKS:
06 ?
07 ? MM.TK= 0 WRITE INTO EACH MEMORY LOCATION A MINUS
08 ? ONE STARTING AT SCRLO AND ENDING AT SCRHI
09 ? VERIFYING EACH GOT THERE.
10 ?
11 ? MM.TK= 1 READ A LOCATION BEFORE DOING THE ISZ
12 ? TO VERIFY IT HASN'T BEEN DISTURBED.
13 ?
14 ? MM.TK= 2 ISZ DIDN'T SKIP
15 ?
16 ? MM.TK= 3 LOCATION NOT 0 AFTER ISZ
17 ?
18 ? MM.TK= 4 DSZ SKIPPED=ERROR
19 ?
20 ? MM.TK= 5 DSZ TST- LOCATION NOT -1 AFTER DSZ
21 ?
22 ? MM.TK= 6 SAME AS 1, EXCEPT TESTING IN THE REVERSE
23 ? DIRECTION
24 ?
25 ? MM.TK= 7 SAME AS 2, EXCEPT TESTING IN THE REVERSE
26 ? DIRECTION.
27 ?
28 ? MM.TK= 10 SAME AS 3, EXCEPT TESTING IN THE REVERSE
29 ? DIRECTION.
30 ?
31 ? 16.3.3 ARITHMETIC TEST
32 ?
33 ? THE MULTIPROGRAMMING RELIABILITY ARITHMETIC TEST WAS
34 ? DERIVED FROM THE STAND ALONE ARITHMETIC TEST. THIS TEST
35 ? REQUIRES 2K OF SCRATCH FOR EXECUTION. THE EXECUTE POR-
36 ? TION OF THE TEST IS RANDOMLY RELOCATED WITHIN AVAILABLE
37 ? SCRATCH. AT THE END OF EACH EXECUTION PASS SCRATCH
38 ? AREA IS RANDOMLY RELEASED OR HELD. IF HELD, THE NEXT TIME
39 ? THE TEST IS ENTERED, THE EXECUTABLE PORTION OF THE TEST WILL
40 ? AGAIN BE RANDOMLY RELOCATED WITHIN SCRATCH FOR EXECUTION.
41 ?
42 ? 16.3.4 MUL/DIV TEST
43 ?
44 ? THIS TEST WAS DERIVED FROM THE STAND ALONE
45 ? MUL/DIV TEST.
46 ?
47 ? NO TEST RELOCATING IS DONE IN THIS TEST.

```

LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION

!0018 C5MKT

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01 ***NOLUC STKTS
02 ?
03 ? 16.3.5 STACK ERROR TEST
04 ?
05 ? THIS TEST VERIFIES THE OPERATION OF THE
06 ? HARDWARE STACK BY FORCING STACK OVERFLOW ERRORS
07 ? AND REALLOCATING THE STACK THROUGH OUT MEMORY.
08 ?
09 ? 16.3.6 REAL TIME CLOCK
10 ?
11 ? THE REAL TIME CLOCK RUNS AT 416.66 HERTZ. RUNTIME ALONG
12 ? WITH ACCUMULATED ERROR COUNT ARE PRINTED AT 5 MINUTES
13 ? 15 MINUTES, 30 MINUTES AND EVERY 30 MINUTES OF RUNTIME
14 ? THEREAFTER. THIS TYPEOUT ALSO OCCURS AFTER EVERY ERROR
15 ? TYPEOUT OR IF A ITY KEY WITH SW 4=1 IS TYPED.
16 ?
17 ? 16.3.7 TELETYPE TEST
18 ?
19 ? THE TELETYPE TEST PRINTS A SINGLE LINE CONSISTING OF THE
20 ? CHARACTERS SPACE TO Z. THE TEST WILL ALSO ECHO CHARACTERS
21 ? AS TYPED.
22 ?
23 ? 16.3.8 LINE PRINTER TEST
24 ?
25 ? THE LINE PRINTER TEST IS AN EXERCISUR WHICH PRINTS
26 ? A PATTERN ON THE LPT. TEN TO 60 LINES ARE
27 ? PRINTED WITH A FORM FEED TO THE TOP OF THE PAGE
28 ? FOR EACH GROUP. THE FREQUENCY OF SELECTION
29 ? OF THIS TEST CAN BE INCREASED BY SELECTION
30 ? OF A PROGRAM OPTION. SEE PARAGRAPH 3.5
31 ?
32 ? 16.3.9 6038/39 DISK TEST
33 ?
34 ? THE 6038/39 DISK TEST SIZES FOR THE EXISTANCE OF THE
35 ? DISK ON DRIVE 0 AND 1 FOR BOTH THE PRIMARY AND SECONDARY
36 ? DEVICE NUMBERS (33/73).
37 ?
38 ? THE TEST ASSIGNS 1K OF SCRATCH,
39 ? THEN GENERATES FOUR RANDOM
40 ? WORDS WHICH ARE REPEATED TO CREATE A 256
41 ? WORD BUFFER STARTING AT FYDST.
42 ? THE TEST THEN RANDOMLY SELECTS A DRIVE AND
43 ? RANDOMLY SELECTS A TRACK, SEEKS TO THAT TRACK
44 ? AND THEN READS TWO OF THE SECTORS
45 ? TO VERIFY THE DATA WAS WRITTEN OK.
46 ?
47 ? IF A DATA ERROR OCCURS THE TEST WILL
48 ? RETRY THE READ OPERATION 3 TIMES.
49 ?
50 ?
51 ? ALL OTHER ERRORS WILL EXIT THE TEST
52 ? AFTER PRINTING ERROR MESSAGES AND
53 ? RELEASING SCRATCH
54 ?

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LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION

10019 C3MRT

7b-3.10 6095 (PHEUNIX) DISK TEST

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```

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-REMOVABLE PLATTER IF DESIRED.  
 THE SIZE OF THE PHEUNIX 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 TRIES.  
 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 EUC  
 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 =  
 THE CYLINDER NUMBER IN THE FIRST WORD = STARTING WITH THE  
 SECTOR # IN BITS 6 TO 15 OF THE 2ND WORD = FOR THE # OF SECTORS  
 SPECIFIED BY IN BITS 2 TO 5 OF THE 2ND WORD. RANDOM DATA HAS  
 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.  
 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.

LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION

10020 C3MRT

7.0 ODI EDITOR

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REQUESTING THE ODI EDITOR  
 TO ENTER THE ODI TYPE A CONTROL 0 ON  
 THE TTI. THIS CAN BE DONE AT ANY POINT IN THE  
 PROGRAM.  
 ON ENTERING THE ODI A CARriage RETURN, LINE FEED  
 AND AN @ IS TYPED ON THE TIO.

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 ODI TO RESPOND WITH  
 A ?.  
 @ ODI IS READY AND AT YOUR SERVICE.

7.4 COMMAND STRUCTURE  
 =====  
 AN ODI 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" " " " " " "  
 CHARACTERS USED TO ENTER/EXIT ODI INCLUDE:  
 "0"(CTRL 0) "R" "P"  
 CHARACTERS USED TO MODIFY CURRENT ARGUMENTS ARE:  
 "RUBOUT" "+" "-" AND THE INTEGERS 0 TO 7  
 THE CHARACTER "=" ALLOWS THE CURRENT ARGUMENT TO BE  
 EXAMINED WITHOUT OPENING OR CLOSING THE CURRENT LOC.



10025 C3MKT LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION

\*\*00000 TOTAL ERRORS, 00000 PASS 1 ERRORS

0024 C3MKT LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION

ARITH 000000	2/07	8/02	17/30
CRMS 000000	2/05	7/20	16/03
FRYS 000000	2/10	9/01	18/32
FXTS 000001	2/12		
LOTST 000001	2/14	11/01	20/01
LPITS 000000	2/13	11/01	18/23
MUDVT 000000	2/08	8/14	17/41
PEDSK 000000	2/11	10/01	19/01
PXDSK 000000	2/15		
SCMTS 000000	2/06	7/35	17/01
STKTS 000000	2/09	8/23	

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