

DataGeneral

**TECHNICAL
STATEMENT**

LISTING

068-001653-00

PROGRAM

CS30 SC-MEMORY TEST

TAPE

097-001653-00

ABSTRACT

THE SC-MEMORY TEST CONSISTS OF A SERIES OF SC-MEMORY TESTS AND A SIMPLE SUPERVISOR PROGRAM, THE DIAGNOSTIC LINKER. THE DIAGNOSTIC LINKER IS A PROGRAM DESIGNED TO "LINK" THE VARIETY OF SC MEMORY TESTS.

COPYRIGHT © DATA GENERAL CORPORATION, 1979
ALL RIGHTS RESERVED. PRINTED IN U.S.A.

ONLY FOR OPERATION AND MAINTENANCE PURPOSES ON DATA GENERAL CORPORATION MANUFACTURED EQUIPMENT.

THE AFFIXATION OF A COPYRIGHT NOTICE ON THIS DIAGNOSTIC MATERIAL IS NOT INTENDED BY ITSELF TO RENDER THE DISTRIBUTION OF THIS DIAGNOSTIC MATERIAL A PUBLICATION.

NOTICE

DATA GENERAL CORPORATION (DGC) HAS PREPARED THIS DIAGNOSTIC MATERIAL FOR USE BY DGC PERSONNEL AND CUSTOMERS AS A GUIDE TO THE PROPER MAINTENANCE OF DGC EQUIPMENT AND SOFTWARE. THE DIAGNOSTIC MATERIALS CONTAINED HEREIN ARE THE PROPERTY OF DGC AND SHALL NEITHER BE REPRODUCED IN WHOLE OR IN PART WITHOUT DGC'S PRIOR WRITTEN APPROVAL NOR BE IMPLIED TO GRANT ANY LICENSE TO MAKE, USE, OR SELL EQUIPMENT OR SOFTWARE MANUFACTURED IN ACCORDANCE HERewith.

0001 .MAIN MACRO REV 04.30 09:45:01 06/29/79

10002 .MAIN LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION

```

01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
*****
? NAME: CSJUSCT.TX PART NUMBER: 097-001653
?
? DESCRIPTION: CS30 SC-MEMORY TEST
? REVISION HISTORY
? REVISION DATE
? *****
? 00 05/09/79
?
? COPYRIGHT © DATA GENERAL CORPORATION 1979
? ALL RIGHTS RESERVED.
*****

```

```

01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
*****
? MICRO-NOVA SC-MEMORY TEST
? ABSTRACT
? 11.
? THE SC-MEMORY TEST CONSISTS OF A SERIES
? OF SC-MEMORY TESTS AND A SIMPLE
? SUPERVISOR PROGRAM. (THE DIAGNOSTIC LINKER)
?
? THE DIAGNOSTIC LINKER IS A PROGRAM
? DESIGNED TO "LINK" THE VARIETY OF
? SC MEMORY TESTS.
?
? MACHINE REQUIREMENTS
? MICRO-NOVA PROCESSOR WITH 4 TO 32K OF
? READ/WRITE MEMORY
? (ALLOWS FOR EXPANSION IN 1K INCREMENTS
? BUT MEMORY MUST BE CONTIGUOUS)
?
? PREREQUISITES
? 12.6 SOFTWARE PREREQUISITES
? 12.6.2 THE MICRO-NOVA LOGIC TEST SHOULD HAVE
? BEEN RUN BEFORE ATTEMPTING THIS TEST.
?
? 13. SWITCH SETTINGS
? 13.1 AUTO-SIZE AND GO START AT 200
? 13.2 MANUAL SELECT/DELETE TESTS START AT 206
*****

```

LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION

10003 .MAIN

```

01 10003 .MAIN
02 3.4 KEY ENTERED OPTIONS
03 ?
04 ?
05 ?
06 ?
07 ?
08 ?
09 ?
10 ?
11 ?
12 ?
13 ?
14 ?
15 ?
16 ?
17 ?
18 ?
19 ?
20 ?
21 ?
22 ?
23 ?
24 ?
25 ?
26 ?
27 ?
28 ?
29 ?
30 ?
31 ?
32 ?
33 ?
34 ?
35 ?
36 ?
37 ?
38 ?
39 ?
40 ?
41 ?
42 ?
43 ?
44 ?
45 ?
46 ?
47 ?
48 ?
49 ?
50 ?
51 ?

KEY T
SETS SWRG2 BIT 0 = 1
WILL ALLOW THE OPERATOR TO
SET LOWER LIMIT OF TEST(PHSLO)
AND UPPER LIMIT OF TEST(PHSHI)
VALUE ENTERED SHOULD BE
A MODULO 1K DECIMAL NUMBER .

ENTERED LIMITS MUST:
1. FALL WITHIN THE MEMORY LIMITS
SIZED BY THE PROGRAM.
2. NOT INCLUDE AREA WHICH THE PROGRAM
OCCUPIES.
3. FOR PHSHI BE GREATER THAN OR EQUAL
TO PHSLO OR THE LIMITS WILL NOT
BE ACCEPTED.

EXAMPLE:
TO TEST AREA BETWEEN 16K
AND 32K ENTER:
(PHSLO,PHSHI) 16,31

TERMINATE INPUT LIMITS WITH A CARRIAGE
RETURN.

KEY 0 SW0=1
ENTER THE KEY PARAMETERS
UNTIL A CR IS INPUTTED.
EACH KEY WILL COMPLEMENT
THE PREVIOUS SELECTION
OF THE SAME KEY.

KEY 1 SW1=1
KEY 2 SW2=1
KEY 4 SW4=1
KEY 6 SW6=1
KEY Q
WILL CAUSE MARCH/GALPAT/GALWREC TO USE
ALL 1'S DATA PATTERN ON EACH PASS.
SWRG2 BIT 2 = 1
PRINT PASSED FOR EACH TEST COMPLETED
SUCCESSFULLY. SWRG2 BIT 1 = 1
PRINTS STATUS OF EACH TEST WHICH
HAS COMPLETED A PASS. SWRG2 BIT 15 = 1
WILL SET SWREG TO DEFAULT MODE
ALL BITS = 0
AND WILL RESTART THE PROGRAM.
LIST CURRENT OPERATING MODES
WILL RESTART THE PROGRAM
WITHOUT MODIFYING THE SWREG

WHERE (C) IS A CONTROL KEY

```

LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION

10004 .MAIN

```

01 10004 .MAIN
02 ?
03 ?
04 ?
05 ?
06 ?
07 ?
08 ?
09 ?
10 ?
11 ?
12 ?
13 ?
14 ?
15 ?
16 ?
17 ?
18 ?
19 ?
20 ?
21 ?
22 ?
23 ?
24 ?
25 ?
26 ?
27 ?
28 ?
29 ?
30 ?

OPERATING PROCEDURES
LOAD THE PROGRAM VIA DDOOS
OPTIONAL STARTING ADDRESS:
200 FOR AUTO SIZE AND GO
205 FOR MANUAL SELECT/DELETE

PROGRAM WILL TYPE:
MICRO-NOVA SC-MEMORY TEST
MEM SIZE #1K'S
PROGRAM RUN LIST
PROG# DESCRIPTION

IF START WAS 200 THE LIST OF
PROGRAMS TO BE RUN SEQUENTIALLY WILL
THEN BE LISTED AND THE TEST PROGRAM
WILL AUTO START.
NOTE: SDIAG,GALPAT AND GALWREC WILL
NOT BE SELECTED ON AN AUTO START.

IF START WAS 206 LINKER WILL
PAUSE AT THE END OF EACH TEST
DESCRIPTION AND WAIT FOR KEYBOARD
INPUT. TYPING IN A SPACE WILL
ENABLE THAT TEST TO BE RUN.
TYPING IN ANY OTHER CHARACTER WILL
DELETE THAT TEST FROM BEING RUN
THE PROGRAM WILL THEN WAIT FOR THE OPERATOR TO SET
ANY BIT SWITCH OPTIONS. TEST WILL START
AFTER PRESSING A CR ON THE KEYBOARD.

```

LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION

```

10005  *MAIN
01      ERROR DESCRIPTION
02      *5.
03      *5.1
04      *5.1
05      *5.1
06      *5.1
07      *5.1
08      *5.1
09      *5.1
10      *5.1
11      *5.1
12      *5.1
13      *5.1
14      *5.1
15      *5.1
16      *5.1
17      *5.1
18      *5.1
19      *5.1
20      *5.1
21      *5.1
22      *5.1
23      *5.1
24      *5.1
25      *5.1
26      *5.1
27      *5.1
28      *5.1
29      *5.1
30      *5.1
31      *5.1
32      *5.1
33      *5.1
34      *5.1
35      *5.1
36      *5.1
37      *5.1
38      *5.1
39      *5.1
40      *5.1
41      *5.1
42      *5.1
43      *5.1
44      *5.1
45      *5.1
46      *5.1
47      *5.1
48      *5.1

```

MOST ERRORS DETECTED BY EITHER THE INDIVIDUAL TESTS OR BY THE DIAGNOSTIC LINKER WILL RESULT IN AN ERROR TYPEOUT. SOME SMALL NUMBER OF HIGHLY IMPROBABLE ERRORS MAY RESULT IN A PROGRAM HALT IF THEY ARE OF A NATURE THAT THE LINKER CAN'T RECOVER FROM AND LOGICALLY PROCEED,

5.1 ERROR FORMAT
 EACH TEST WILL OUTPUT AN UNIQUE ERROR TYPEOUT INCLUDING TEST NAME, DATA ASSOCIATED WITH ERROR, ERROR LOCATIONS, SCRATCH LIMITS USED FOR THIS PASS OF THE TEST, AND THE MEMORY LIMITS SELECTED TO BE EXERCISED BY EITHER THE OPERATOR OR THE PROGRAM.

DEFINITION OF ERROR PRINTOUT TERMS:
 C(X) = CONTENTS OF LOCATION X
 LOC(X) = ADDRESS OF LOCATION X (LOGICAL OR PHYSICAL)
 C/LOC = COMPLEMENT OF THE CONTENTS OF LOCATION X
 SCRLO/HI = SCRATCH LIMITS OF THIS PASS OF THE TEST (LOGICAL OR PHYSICAL)
 TSTLO/HI = SCRATCH LIMITS EXPRESSED IN DECIMAL 1K'S
 PHSLO/HI = ENTERED FOR PROGRAM SELECTED, MEMORY LIMITS TO BE EXERCISED IN DECIMAL 1K'S.

EXAMPLES:
 ERROR TYPE OUT

 GALPAT C(X) LOC(X) LOC(Y)
 000000 000100 016010 017345
 SCRLO/HI 016000 017345
 TSTLO/HI 7 7
 PHSLO/HI 3 31 TYPE ANY KEY

IF SW6=1 THE TEST WILL HALT WAITING FOR THE OPERATOR TO PRESS A KEY ON THE CONSOLE

LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION

```

10006  *MAIN
01      PROGRAM INITIALIZATION
02      *6.0
03      *6.0
04      *6.0
05      *6.0
06      *6.0
07      *6.0
08      *6.0
09      *6.0
10      *6.0
11      *6.0
12      *6.0
13      *6.0
14      *6.0
15      *6.0
16      *6.0
17      *6.0
18      *6.0
19      *6.0
20      *6.0
21      *6.0
22      *6.0
23      *6.0
24      *6.0
25      *6.0
26      *6.0
27      *6.0
28      *6.0
29      *6.0
30      *6.0
31      *6.0
32      *6.0
33      *6.0
34      *6.0
35      *6.0
36      *6.0
37      *6.0
38      *6.0
39      *6.0
40      *6.0
41      *6.0
42      *6.0
43      *6.0
44      *6.0
45      *6.0
46      *6.0
47      *6.0
48      *6.0
49      *6.0
50      *6.0
51      *6.0
52      *6.0
53      *6.0
54      *6.0
55      *6.0
56      *6.0
57      *6.0
58      *6.0
59      *6.0

```

THE DIAGNOSTIC LINKER INITIALIZES ITSELF AND INDIVIDUAL TESTS IN THE FOLLOWING SEQUENCE:
 1. SYSTEM IS RESET.
 2. ANY OTHER NECESSARY CONSTANTS ARE INITIALIZED
 3. MEMORY IS SIZED IN 1K INCREMENTS FROM 0 TO 32K
 4. LINKER THEN TYPES THE PROGRAM NAME AND REVISION LEVEL, SYSTEM SIZE, THE PROGRAM RUN LIST (AND WILL ALLOW THE OPERATOR TO SELECT OR DELETE SPECIFIC TESTS IF START WAS 206

6.1 OPTION SELECTION
 IF THE PROGRAM WAS NOT AUTOSTARTED (NOT LOC 200) THE LINKER WILL PRINT "OPTIONS?" AND WAIT FOR A CARRIAGE RETURN TO START EXECUTING THE TESTS. THIS ALLOWS THE OPERATOR TO SET UP THE KEY ENTRY OPTIONS INCLUDING KEY "T" WHICH ALLOWS SETTING OF MEMORY TEST AREA LIMITS.

6.2 PROGRAM EXECUTION
 ONCE THE LINKER HAS COMPLETED ALL INITIALIZATION THE FOLLOWING SERIES OF OPERATIONS IS LOOPED THROUGH

- LINKER SEARCHES THRU LIST OF TESTS UNTIL IT FINDS ONE WHICH IS NOT DELETED.
- LINKER THEN SETS UP SEGMENT SIZE BASED ON THE VALUE IN THE PARAMETER TABLE FOR EACH TEST.
- THE LINKER THEN SETS SCRL0 AS THE BEGINNING OF THE SEGMENT TO BE TESTED AND SCRHI AS THE END OF THE SEGMENT.
- THE LINKER RE-ENTERS THE TEST WITH EACH SEGMENT UNTIL THE AREA SELECTED HAS BEEN EXERCISED. AFTER COMPLETION THE LINKER SEARCHES FOR ANOTHER TEST IN THE SERIES.
- AFTER SEVERAL PASSES OF EACH TEST SELECTED THE LINKER WILL PRINT "PASS XX" IF SWREG BIT 4 HAS NOT BEEN SET.
- IF PROGRAM WAS LOADED FROM DTOS WITH EITHER CAT OR "KITTEN IT WILL START CAT/KITTEN AFTER FIRST "PASS".

```

LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION
10007 .MAIN
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
47
48
49
50
51

7.0 TEST DESCRIPTIONS
7.1 DATA EQUALS ADDRESS TEST
THIS TEST WRITES THE ADDRESS OF EACH LOCATION INTO EACH LOCATION AS DATA
IT THEN READS BACK ALL LOCATIONS AND CHECKS THE VALUE READ AGAINST THE ADDRESS.
7.2 ISZ INSTRUCTION TEST
7.2.1 FORWARD ISZ TEST
THIS TEST FILLS ALL SCRATCH WITH A MINUS ONE PATTERN, THEN PERFORMS A ISZ INSTR. FOLLOWED BY A READ OF THE LOC. TO VERIFY IT CONTAINS A ZERO. THIS IS DONE AT EACH LOCATION FROM SCHLO TO SCRHI.
7.2.2 REVERSE ISZ TEST
THIS TEST IS IDENTICAL TO THE ABOVE TEST EXCEPT THAT THE MEMORY ADDRESSES ARE SCANNED FROM SCRHI TO SCHLO.
7.3 MARCH
THIS TEST FUNCTIONALLY CHECKS EACH BIT IN THE MEMORY AND THE ADDRESSING.
THIS TEST USES EITHER RANDOM DATA (KEY OPTION "g"=0) OR ALL ONES DATA (OPTION "g"= 1).
A TEST PATTERN IS WRITTEN INTO THE BACKGROUND STARTING AT SCHLO AND ENDING AT SCRHI. ADDRESSING IS THEN SCANNED ACROSS THIS RANGE AND AT EACH ADDRESS THE TEST WORD IS READ AND A COMPLEMENTED TEST WORD IS WRITTEN BACK INTO THE SAME LOCATION.
THE DATA IS THEN COMPLEMENTED AND THE ABOVE SEQUENCE REPEATED.
THE PROCESS IS THEN REPEATED STARTING AT SCRHI AND PROCEEDING TO SCHLO.

```

LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION

```

10008 .MAIN
01
02
03
04
05
06
07
08
09
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35

7.4 MASEST (SEGMENT MAX. = 2)
CHECKS FOR DESTRUCTION OF STORED DATA THAT MAY RESULT FROM MULTIPLE SELECTION OF ADDRESSES INTERNAL TO THE MEMORY CAUSED BY FAULTY DECODERS OR LOGICAL SWITCHING HAZARDS.
ALTERNATE ALL ONE'S, ALL ZERO'S ARE WRITTEN IN ASCENDING LOCATIONS. EACH LOCATION IS THEN READ AND VERIFIED WHILE GOING THRU THE ADDRESS SEQUENCE OF ADDRESS, COMPLEMENT OF ADDRESS, ADDRESS PLUS ONE, COMPLEMENT OF ADDRESS PLUS ONE, ETC. MEMORY IS THEN READ SEQUENTIALLY AND THE ALTERNATE ONE'S ZERO'S PATTERN VERIFIED.
7.5 SDIAG (SEGMENT MAX = 1)
THIS TEST IS NOT SELECTED IF THE PROGRAM IS STARTED AT LOC 200.
THIS TEST FILLS THE BACKGROUND WITH ALL 0'S PATTERN AND THEN WRITES A DIAGONAL PATTERN USING THE COMPLEMENT OF THE BACKGROUND.
THE ARRAY IS THEN VERIFIED READING DOWN EACH COLUMN INSTEAD OF ACROSS EACH ROW.
IF NO ERRORS ARE FOUND THE PROCES IS REPEATED WITH THE DIAGONAL SHIFTED ONE POSITION UNTIL ALL POSITIONS ARE USED.
NEXT THE BACKGROUND IS COMPLEMENTED AND THE TEST REPEATED.

```

LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION

0010 .MAIN
 **000000 TOTAL ERRORS, 00000 PASS 1 ERRORS

10009 .MAIN

```

01 ;
02 ; 7.6 GALPAT (SEGMENT MAX = 1)
03 ;
04 ; THIS TEST DOESN'T RUN ON AN AUTOSTART.
05 ;
06 ; THIS TEST CHECKS ADDRESSING, INTERACTION
07 ; BETWEEN BITS, AND PATTERN AND SEQUENCE
08 ; DEPENDENCY FOR TRANSIENT PERFORMANCE.
09 ;
10 ; THIS TEST EITHER USES RANDOM DATA OR ALL ONES
11 ; (SEE KEY OPTION "Q")
12 ;
13 ; A BACKGROUND PATTERN IS WRITTEN THRU-OUT
14 ; MEMORY. THEN STARTING AT THE FIRST LOCATION,
15 ; A TEST WORD IS WRITTEN (COMPLEMENT OF
16 ; BACKGROUND).
17 ; MEMORY IS THEN READ IN ALL LOCATIONS IN THE
18 ; FOLLOWING SEQUENCE: BACKGROUND, TEST WORD
19 ; NEXT BACKGROUND, TEST WORD, NEXT
20 ; BACKGROUND, ETC.
21 ; AFTER COMPLETION OF A PASS FROM SCRLO TO
22 ; SCRHI , THE TEST WORD IS MOVED TO THE
23 ; NEXT SEQUENTIAL LOCATION AND THE
24 ; PROCESS OF READING REPEATED.
25 ; THIS CONTINUES UNTIL THE TEST WORD HAS
26 ; BEEN LOCATED IN EVERY MEMORY LOCATION
27 ; FROM SCRLO TO SCRHI.
28 ;
29 ; AT COMPLETION, THE ABOVE SEQUENCE IS
30 ; REPEATED USING A COMPLEMENTED PATTERN.
31 ;
32 ; FOR SAKE OF TYPEOUTS:
33 ; LOC(X) = TEST WORD LOCATION
34 ; LOC(Y) = BACKGROUND LOCATION
35 ;
36 ; 7.7 GALWREC (SEGMENT MAX = 1)
37 ;
38 ; THIS TEST DOESN'T RUN ON AN AUTOSTART.
39 ;
40 ; THIS TEST CHECKS ALL POSSIBLE WRITES
41 ; FOLLOWED BY READS AT DIFFERENT LOCATIONS
42 ;
43 ; THIS TEST EITHER USES RANDOM DATA OR ALL ONES
44 ; (SEE KEY OPTION "Q")
45 ;
46 ; A BACKGROUND PATTERN(B) IS WRITTEN THRU-
47 ; OUT MEMORY. EVERY PAIR OF ADDRESSES ARE
48 ; THEN CHECKED IN THE FOLLOWING MANNER,
49 ; STARTING WITH THE FIRST LOCATION, LOC(X):
50 ; WRITE T (INVERTED B) IN LOC(Y)=(X+1), READ
51 ; B IN LOC(X), WRITE B IN LOC(Y),
52 ; READ B IN LOC(X), WRITE T IN LOC(Y)=(Y+1)
53 ; READ B IN LOC(X), ETC.
54 ;
55 ; AFTER ALL LOC. HAVE BEEN CHECKED IN
56 ; RELATION TO LOCATION ONE(X), THE SEQUENCE IS
57 ; REPEATED WITH RESPECT TO LOC(X)=(X+1), ETC.
58 ;
59 ; AT COMPLETION , THE ABOVE SEQUENCE IS
60 ; REPEATED USING A COMPLEMENTED PATTERN.

```

LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION

LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION