DataGeneral

TECHNICAL STATEMENT

TEXT LISTING

068-000059-03

PROGRAM

CASSETTE REAL TIME CLOCK TEST

TEXT TAPE

097-000059-03

ABSTRACT

CASSETTE REAL TIME CLOCK TEST IS A MAINTENANCE PROGRAM DESIGNED TO TEST THE CASSETTE BOARD REAL TIME CLOCK LOGIC. THE PROGRAM IS DESIGNED FOR USE WITH DEVICE CODE 14 OR 54, AND 50 OR 60 HERTZ LINE FREQUENCY.

```
 0001 .MAIN    MACRO REV 06.30          07:48:28 05/16/79
01
02
03
04
05
06
07              ;*****************************************************************
08              ;
09              ; NAME: CRTC.TX                          PART NUMBER: 097-000059
10              ;
11              ;
12              ; DESCRIPTION: CASSETTE REAL TIME CLOCK TEST
13              ;
14              ;
15              ; REVISION HISTORY:
16              ;
17              ;       REV.            DATE
18              ;
19              ;       00              05/30/72
20              ;       01              08/23/74
21              ;       02              05/28/76
22              ;       03              12/15/78
23              ;
24              ;
25              ; COPYRIGHT (C) DATA GENERAL CORPORATION, 1972, 1974, 1976, 1978
26              ; ALL RIGHTS RESERVED.
27              ;*****************************************************************
```

```
!0002 .MAIN
01
02              ;1. CRTC.SR-CASSETTE REAL TIME CLOCK TEST
03              ;   ------------------------------------
04
05              ;2.  REVISION HISTORY:
06              ;    ----------------
07              ;       REV. 03 WAS CREATED TO IMPLEMENT CHANGES
08              ;       NECESSARY FOR DGC COMPATIBLITY.THE STANDARD
09              ;       DIAGNOSTIC UTILITIES SWPAK AND ODT WERE
10              ;       INCLUDED.
11
12              ;2.1    TEXT FILE CHANGES
13              ;       TEXT FORMAT CHANGED TO REFLECT NEW STANDARDS.
14              ;       REVISION HISTORY SECTION WAS CREATED.
15
16              ;2.2    SOURCE FILE CHANGES
17              ;       ".TXTM  0" WAS ADDED TO ALLOW ASSEMBLY ON AOS.
18              ;       DLIB PAGE ZERO MACRO P?GOU WAS EXPANDED.
19              ;       DLIB PRE-MACRO P?REM WAS EXPANDED.
20              ;       THE MESSAGE "4079 D RUNNING" WILL BE PRINTED BEFORE
21              ;       ANY OTHER MESSAGE TO VERIFY THAT THE PROGRAM WAS LOADED
22              ;       PROPERLY.
23              ;       DLIB SETUP, LOOP, AND ERROR WERE INCLUDED.
24              ;       DLIB POST MACRO WAS EXPANDED.
25              ;       T?TY0,SWPAK,ODT WERE INCLUDED.
26              ;       HALTS WERE REPLACED WITH "JSR @IODT?".
27              ;       READS WERE REPLACED WITH "LDA X,@ISWR?EG".
28              ;       THE DIRT NAME WAS CHANGED TO "4079 D"
29
30              ;3.  MACHINE REQUIREMENTS
31              ;    --------------------
32              ;3.1    ANY NOVA(EXCEPT MICRO) OR ECLIPSE FAMILY PROCESSOR
33              ;3.2    CASSETTE BOARD WITH REAL TIME CLOCK OPTION
34              ;3.3    CONSOLE TELETYPE
35
36              ;4.  TEST REQUIREMENTS  N/A
37              ;    -----------------
38
39              ;5.  SUMMARY
40              ;    -------
41              ;       CASSETTE REAL TIME CLOCK TEST IS A MAINTENANCE
42              ;       PROGRAM DESIGNED TO TEST THE CASSETTE BOARD REAL
43              ;       TIME CLOCK LOGIC. THE PROGRAM IS DESIGNED FOR
44              ;       USE WITH DEVICE CODE 14 OR 54, AND 50 OR 60
45              ;       HERTZ LINE FREQUENCY.
46
47              ;6.  RESTRICTIONS       N/A
48              ;    ------------
49
50              ;7.  PROGRAM DECRIPTION/THEORY OF OPERATION
51              ;    -------------------------------------
52              ;       SEE SEC. 5 AND 12
53
54
```

```
!0003 .MAIN
01
02
03              ;8.     SWITCH SETTINGS
04              ;
05              ;       LOCATION "SWREG" IS USED TO SELECT THE PROGRAM OPTIONS
06              ;       (NOT SYSTEM CONFIGURATION). WHILE RUNNING UNDER DTOS,
07              ;       THIS LOCATION WILL BE LOADED BY THE MONITOR.
08              ;       HOWEVER UNDER STAND ALONE AND PROGRAM LOAD MODES THIS
09              ;       LOCATION WILL BE SET ACCORDING TO THE ANSWERS SUPPLIED
10              ;       BY THE OPERATOR. IN ANY CASE THE OPTIONS CAN BE CHANGED
11              ;       OR VERIFIED BY USING ONE OF THE COMMANDS GIVEN IN SEC.
12              ;       8.2
13              ;
14              ;
15              ;8.1    SWITCH OPTIONS
16              ;       DIFFERENT BITS AND THEIR INTERPRETATION AT LOCATION
17              ;       "SWREG" IS AS FOLLOWS:
18              ;
19              ;       BIT     OCTAL   BINARY  INERPRETATION
20              ;               VALUE   VALUE
21              ;
22              ;       1               0       LOOP ON ERROR
23              ;               40000   1       SKIP LOOPING ON ERROR
24              ;
25              ;       2               0       PRINT TO CONSOLE
26              ;               20000   1       ABORT PRINT OUT TO CONSOLE
27              ;
28              ;       3               0       DO NOT PRINT % FAILURE
29              ;               10000   1       PRINT % FAILURE
30              ;
31              ;       4               0       ALLOW END OF PASS PRINT OUT
32              ;               04000   1       SUPPRESS END OF PASS PRINT OUT
33              ;
34              ;       5               0       DO NOT PRINT ON THE LINE PRINTER
35              ;               02000   1       PRINT ON THE LINE PRINTER
36              ;
37              ;       6               0       DO NOT HALT ON ERROR
38              ;               01000   1       HALT ON ERROR
39              ;
40              ;       7               0       DO NOT PRINT SUMMARY AND/OR
41              ;                               PASSING OF EACH SUBTEST
42              ;               00400   1       PRINT SUMMARY AND/OR
43              ;                               PASSING OF EACH SUBTEST
44              ;       8               0       PRINT ONLY THE FIRST ERROR
45              ;               00200   1       PRINT EVERY ERROR
46
47              ;8.2    SWITCH COMMANDS
48              ;       ONCE THE PROGRAM STARTS EXECUTING THE STATE OF ANY OF
49              ;       THE BITS CAN BE CHANGED BY HITTING KEYS 1-9, A-F. THE
50              ;       PROGRAM WILL CONTINUE RUNNING AFTER UPDATING THE OPTIONS.
51              ;       EACH KEY WILL COMPLEMENT THE STATE OF THE BIT AFFILIAT-
52              ;       ED WITH IT, THUS BIT 4 CAN BE ALTERED BY HITTING KEY 4.
53              ;       SETTING OF ANY BIT OF LOCATION "SWREG" WILL SET BIT 0.
54              ;       (DEFAULT MODE IS DEFINED AS ALL BITS OF SWREG SET TO 0)
55              ;       THE PROGRAM CAN BE LOCKED INTO SWITCH MODIFICATION MODE
56              ;       BY TYPING A 0, IN WHICH CASE MORE THAN ONE BIT CAN BE
57              ;       CHANGED BEFORE  CONTROL IS ALLOWED TO RETURN TO THE
58              ;       MAIN PROGRAM.
59              ;
60              ;8.2.1  OTHER COMMANDS
```

```
 0004 .MAIN
01              ;
02              ;       "CR"    A "RETURN" CAN BE TYPED TO CONTINUE THE PROGRAM
03              ;               AFTER ITS LOCKED IN A SWITCH MODIFICATION MODE
04              ;
05              ;       ^D      THIS COMMAND GIVEN AT ANY TIME WILL RESET "SWREG"
06              ;               TO DEFAULT MODE AND RESTART THE PROGRAM.
07              ;
08              ;       ^R      THIS COMMAND GIVEN AT ANY TIME WILL RESTART THE
09              ;               PROGRAM. SWITCHES ARE LEFT WITH THE VALUES THEY
10              ;               HAD BEFORE THE COMMAND WAS ISSUED.
11              ;
12              ;       ^O      THIS COMMAND GIVEN AT ANY TIME WILL CAUSE THE
13              ;               PROGRAM CONTROL TO GO TO ODT (NOTE: THIS IS AN
14              ;               OPTIONAL COMMAND AND IS AVAILBLE ONLY IF
15              ;               ODTPK IS PRESENT)
16              ;
17              ;       M       THIS COMMAND GIVEN AT ANY TIME WILL PRINT THE
18              ;               CURRENT OPERATING MODES.
19              ;
20
21              ;
22              ;8.3    STARTING ADDRESS=       200
```

```
 0005 .MAIN
01
02              ;9.  OPERATING PROCEDURE
03              ;    ------------------
04              ;9.1    LOAD THE PROGRAM VIA THE BINARY LOADER
05              ;       OR DIAGNOSTIC OPERATING SYSTEM.
06              ;       SET SWITCHES TO 200
07              ;       PRESS START(DIAG. OP. SYS. AUTO STARTS AT 200).
08              ;9.4    THE PROGRAM WILL REQUEST THE DEVICE CODE TO BE
09              ;       PRINTED. THE OPERATOR SHOULD TYPE THE 2 DIGIT
10              ;       DEVICE CODE FOLLOWED BY A CARRIAGE RETURN. UPON
11              ;       RECEIPT OF A CARRIAGE, EXECUTION OF THE PROGRAM
12              ;       WILL BEGIN.
13
14              ;10.  ERROR DESCRIPTION
15              ;     -----------------
16              ;10.1   IF A MALFUNCTION IS DETECTED THE PROGRAM WILL
17              ;       HALT AT LOCATION "ERR1+1". THE OPERATOR MAY CHANGE
18              ;       SWITCH SETTINGS AT THIS TIME IF DESIRED. IF SWITHCES
19              ;       1 AND 2 ARE ZERO A PRINTOUT OF THE ERROR LOCATION
20              ;       AND AC'S WILL RESULT. THE ROUTINE WILL ENTER A
21              ;       LOOP SUITABLE FOR SCOPING.
22              ;10.2   WHEN THE PROGRAM IS IN A SCOPE LOOP, SETTING
23              ;       SWITCH 3(1) WILL CAUSE THE FAILURE RATE TO BE
24              ;       PRINTED. SETTING SWITCH 1(1) WILL CAUSE THE PRO-
25              ;       GRAM TO PROCEED TO THE NEXT TEST.
26              ;10.3   THE WORD "PASS" WILL BE PRINTED AT THE END OF EACH
27              ;       PROGRAM ITERATION.
28
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```
!0006 .MAIN
01
02              ;11.    OCTAL DEBUG TOOL (ODT)
03              ;
04              ;       THE DIAGNOSTIC IS EQUIPED WITH A BUILT IN ODT WHICH CAN
05              ;       BE ACCESSED BY HITTING CONTROL O (^O) AT ANY TIME DURING
06              ;       THE EXECUTION OF THE PROGRAM (AFTER SETTING THE PARA-
07              ;       METERS).
08              ;       ON ENTERING ODT THE ADDRESS OF THE LOCATION HAVING THE
09              ;       NEXT INSTRUCTION TO BE EXECUTED WILL BE TYPED-OUT.
10              ;
11              ;11.1   CONVENTIONS AND SYMBOLS
12              ;       THE FOLLOWING CONVENTIONS ARE USED BY THE ODT:
13              ;       ?       PRESSING ANY ILLEGAL KEY CAUSES THE ODT TO RES-
14              ;               POND WITH A "?".
15              ;       @       ODT IS READY AND AT YOUR SERVICE.
16              ;
17              ;11.2   COMMAND STRUCTURE
18              ;       AN ODT COMMAND HAS THE FOLLOWING FORMAT:
19              ;               [ARGUMENT] [COMMAND]
20              ;       AN ARGUMENT MAY BE ONE OF THE FOLLOWING:
21              ;       "EXP"   AN OCTAL EXPRESSION CONSISTING OF OCTAL NUMBERS
22              ;               SEPARATED BY PLUS (+) OR MINUS (-) SIGNS. LEAD-
23              ;               ING ZEROS NEED NOT BE TYPED.
24              ;       "ADR"   AN ADDRESS IS THE SAME AS AN EXPRESSION EXCEPT
25              ;               THAT BIT 0 IS NEGLECTED.
26              ;       A COMMAND IS A SINGLE TELETYPE CHARACTER
27              ;
28              ;11.3   ODT COMMANDS
29              ;       THE LOCATIONS THAT CAN BE EXAMINED AND MODIFIED BY THE
30              ;       USER ARE CALLED CELLS. THESE CELLS ARE OF TWO TYPES:
31              ;       INTERNAL CPU CELLS AND MEMORY LOCATIONS.
32              ;
33              ;11.3.1 OPENING INTERNAL CELLS
34              ;       THE COMMAND TO OPEN ONE OF THE INTERNAL REGISTERS IS OF
35              ;       THE FORM "NA" WHERE N IS ANY OCTAL EXPRESSION BETWEEN
36              ;       0 AND 7
37              ;       0-3     FOR ACCUMULATORS 0-3
38              ;       4       FOR PC OF THE NEXT INSTRUCTION TO BE EXECUTED IN
39              ;               THE EVENT OF A "P" COMMAND.
40              ;       5       CPU AND TTO STATUS
41              ;               BIT     INTERPRETATION
42              ;               15      STATUS OF TTO DONE FLAG
43              ;               14      STATUS OF INTERRUPTS (ION FLAG)
44              ;               13      STATUS OF CARRY BIT
45              ;       6       ADDRESS OF THE LOCATION HAVING THE BREAK POINT (IF
46              ;               ANY)
47              ;       7       INSTRUCTION AT THE BREAK POINT LOCATION
48
49              ;       OTHER COMMANDS TO OPEN CELLS ARE:
50              ;
51              ;       "ADR"/  OPEN THE CELL AND PRINT ITS CONTENTS
52              ;       ./      OPEN THE CELL CURRENTLY POINTED TO BY THE POINTER
53              ;               AND PRINT ITS CONTENTS.
54              ;       .+"ADR"/        ADD "ADR" TO THE POINTER, OPEN THE CELL
55              ;               AND PRINT ITS CONTENTS.
56              ;       .-"ADR"/        SUBTRACT "ADR" FROM THE POINTER, OPEN
57              ;               THE CELL AND PRINT ITS CONTENTS.
58              ;       "CR"    THE RETURN KEY IS USED TO CLOSE THE OPEN CELL
59              ;               WITH OR WITHOUT MODIFICATION.
60              ;       "LF"    LINE FEED IS USED TO CLOSE THE OPEN CELL WITH OR
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0007 .MAIN
01              ;               WITHOUT MODIFICATION AND TO OPEN THE SUCCEEDING
02              ;               CELL.
03              ;       ^       CLOSE THE OPEN CELL WITH OR WITHOUT MODIFICATION
04              ;               AND OPEN THE PRECEDING CELL
05              ;       /       CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
06              ;               OPEN THE CELL POINTED TO BY ITS CONTENTS.
07              ;       +"ADR"/ CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
08              ;               OPEN THE CELL POINTED TO BY ITS CONTENTS + "ADDR".
09              ;       -"ADR"/ CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
10              ;               OPEN THE CELL POINTED TO BY ITS CONTENTS - "ADR".
11              ;
12              ;11.3.2 MODIFICATION OF A CELL
13              ;       ONCE A CELL HAS BEEN OPENED ITS CONTENTS CAN BE MODIFIED
14              ;       BY TYPING THE NEW VALUE THE CELL IS TO CONTAIN IN THE
15              ;       FORM OF AN OCTAL EXPRESSION FOLLOWED BY "CR" OR "LF".
16              ;       IF A + OR - IS TYPED AS THE FIRST CHARACTER OF THE EX-
17              ;       PRESSION THEN THE VALUE OF THE EXPRESSION IS ADDED TO OR
18              ;       SUBTRACTED FROM THE OLD CONTENTS OF THE CELL. THE
19              ;       ADDRESS ITSELF OR AN EXPRESION RELATIVE TO THE ADDRESS
20              ;       CAN BE DEPOSITED BY TYPING A "." OR ".+/-OCTAL EXPRESS-
21              ;       ION". A RUBOUT COMMAND GIVEN RIGHT AFTER OPENING A CELL
22              ;       ALLOWS THE MODIFICATION OF ITS CONTENTS AS IF THEY WERE
23              ;       TYPED IN JUST BEFORE THE COMMAND WAS ISSUED.
24              ;
25              ;11.3.3 OTHER ODT COMMANDS
26              ;       RUBOUT  THIS KEY IS USED TO DELETE ERRONEOUSLY TYPED
27              ;               DIGITS. EACH TIME THE KEY IS PRESSED THE RIGHT MOST
28              ;               DIGIT IS DELETED AND ECHOED ON THE TERMINAL. IF
29              ;               THE RUBOUT KEY IS PRESSED RIGHT AFTER OPENING A
30              ;               CELL THEN IT DELETES THE RIGHT MOST DIGIT OF THE CELLS
31              ;               CONTENTS. THIS ALLOWS THE MODIFICATION OF THE CELL
32              ;               AS IF ITS CONTENTS WERE TYPED IN JUST BEFORE THE
33              ;               KEY WAS PRESSED.
34              ;       "ADR"B  INSERT A BREAK POINT AT LOCATION "ADR".
35              ;               ONLY ONE BREAK POINT CAN BE INSERTED AND ANY
36              ;               ENTRY TO ODT AFTER EXECUTING A BREAK POINT WILL
37              ;               CAUSE IT TO BE DELETED.
38              ;       D       DELETE THE BREAK POINT IF ANY.
39              ;       P       RESTART THE EXECUTION OF THE PROGRAM AT LOCATION
40              ;               POINTED BY 4A.
41              ;       "ADR"R  START EXECUTING THE PROGRAM AT "ADR" AFTER AN
42              ;               IO-RESET.
43              ;       K       KILL THE STRING TYPED SO FAR. THE ODT RESPONDS
44              ;               WITH A "?" AND THE OPEN CELL IS CLOSED WITHOUT
45              ;               MODIFICATION.
46              ;       =       PRINT THE OCTAL VALUE OF THE INPUT ONLY.
47              ;               THIS WILL CLOSE ANY OPEN CELLS WITHOUT
48              ;               MODIFICATION AND WILL NOT OPEN A CELL
49              ;
50              ;
51              ;       NOTE:   IN PROGRAMS WHICH RELOCATE THEMSELVES THE
52              ;               THE USER SHOULD PLACE BREAK POINTS ONLY IN THE
53              ;               THE ORIGINAL PROGRAM AREA. IF A BREAK POINT IS
54              ;               PLACED OUTSIDE THIS AREA THE RESULTS WILL
55              ;               BE UNPREDICTABLE.
56              ;
57              ;
58
59              ;12.  SPECIAL NOTES
60              ;     -------------
```

```
0008 .MAIN
01              ;       THE XTAL FREQUENCY IS CHECKED VIA THE 50/60 HERTZ
02              ;       LINE FREQUENCY TO BE LESS THEN 1% IN ERROR.
03
04              ;13.  RUN TIME.
05              ;     ---------
06              ;       EXECUTION TIME ON A NOVA 1200 IS ABOUT 1.5 MINS.
07              ;       FOR TWO PASSES.
08              ;
09                      .EOT
```

0009 .MAIN

**00000 TOTAL ERRORS, 00000 PASS 1 ERRORS

0010 .MAIN

```
O?DTD 000524  MC     6/01
S?WPD 000050  MC     3/01
```