DataGeneral

TECHNICAL STATEMENT

TEXT LISTING

068-000242-04

PROGRAM

EXERCISER FOR ECLIPSE
PART 4

TEXT TAPE

097-000242-04

ABSTRACT

'ECLIPSE21' IS AN EXERCISER PROGRAM USED TO TEST THE RELIABILITY OF THE CENTRAL PROCESSOR INSTRUCTIONS OF THE ECLIPSE COMPUTER. 'ECLIPSE21' EXERCISES THE EXTENDED INSTRUCTIONS OF THE ECLIPSE EXTENSIVELY AND ASSURES OF ITS RELIABLE OPERATION.

```
 0001 ECL21    MACRO REV 06.30          07:57:48 05/16/79
01
02
03
04
05
06
07              ;*****************************************************************
08              ;
09              ; NAME: ECLIPSE21.TX                        PART NUMBER: 097-000242
10              ;
11              ;
12              ; DESCRIPTION: ECLIPSE EXERCISER, PART 4
13              ;
14              ; REVISION HISTORY:
15              ;
16              ;       REV.            DATE
17              ;
18              ;       00              08/02/74
19              ;       01              12/20/74
20              ;       02              08/06/76
21              ;       03              10/06/78
22              ;       04              11/17/78
23              ;
24              ; COPYRIGHT (C) DATA GENERAL CORPORATION, 1974, 1976, 1978
25              ; ALL RIGHTS RESERVED.
26              ;*****************************************************************
27
```

```
!0002 ECL21
01
02
                .TITL ECL21
04              ;ECLIPSE21
05              ;
06              ;ECLIPSE21 - CONTINUATION OF ECLIPSE20
07              ;
08              ;PART 4 OF EXERCISER FOR ECLIPSE
09              ;
10
11              ;; 0.0  REVISION HISTORY
12              ;;
13              ;;      REV. 03 WAS CREATED TO
14              ;;      IMPLEMENT THE STANDARDS PROVIDED
15              ;;      BY DLIB.
16              ;;      THIS HAS NOT CHANGED THE PHILOSOPHY
17              ;;      OR TEST PROCEDURES IN THIS PROGRAM.
18              ;;      ALL UNNECESSARY "IORST" HAVE BEEN
19              ;;      DELETED FROM THIS FILE.
20              ;;
21              ;;      REV. 04 WAS CREATED TO CORRECT THE MMPU1
22              ;;      WRAP AROUND SIZING PROBLEM.
23              ;;      ALSO, TO CLEAR DTR # 244.
```

```
10003 ECL21
01
02              :EXERCISER FOR ECLIPSE: PART 4
03
04              :
05              :1.     PROGRAM NAME
06              :       ------------
07              :
08              :       ECLIPSE21
09              :
10              :2.     GENERAL DESCRIPTION
11              :       -------------------
12              :
13              :2.1    'ECLIPSE21' IS AN EXERCISER PROGRAM USED TO TEST THE
14              :       RELIABILITY OF THE CENTRAL PROCESSOR INSTRUCTIONS OF
15              :       THE ECLIPSE COMPUTER. 'ECLIPSE21' EXERCISES THE EXTENDED
16              :       INSTRUCTIONS OF THE ECLIPSE EXTENSIVELY AND ASSURES
17              :       OF ITS RELIABLE OPERATION.
18              :
19              :2.2    THE INSTRUCTIONS EXERCISED ARE AS FOLLOWS:
20              :
21              :       PSH,POP,PSHR,POPJ,SAVE,RTN AND POPR
22              :
23              :2.3    LOCATIONS 200 TO 205 IN PAGE 0 ARE FIXED FOR ECLIPSE21
24              :       PROGRAM.
25              :       LOCATION 203 KEEPS TRACK OF NUMBER OF PASSES RUN
26              :       THROUGH ECLIPSE21 PROGRAM.
27              :       LOCATION 201 KEEPS TRACK OF THE TEST RUNNING AT
28              :       PRESENT AND IS USEFUL FOR DEBUG WHEN LOOPING
29              :       OCCURS IN THE PROGRAM.
30              :       LOCATION 202 CONTAINS THE STARTING ADDRESS OF
31              :       ECLIPSE21 PROGRAM.
32              :       LOCATION 200 IS USED BY DTOS.
33              :       LOCATION 204 KEEPS TRACK OF INTERNAL PASS COUNT
34              :       WHICH IS FIXED BY LOCATION 205.
35              :
36              :2.4    FIRST PASS THROUGH ECLIPSE21 TEST WILL RUN SUPERFAST.
37              :       NEXT PASSES WILL RUN SLOWER AS EACH TEST IS RUN SEVERAL
38              :       TIMES TO RUN ALL RANDOM NUMBER COMBINATIONS.
39              :
40              :3.     MACHINE REQUIREMENTS
41              :       --------------------
42              :
43              :3.1    ECLIPSE PROCESSOR
44              :3.2    8K READ-WRITE MEMORY
45              :3.3    CONSOLE EQUIPMENT
46              :
```

```
10004 ECL21
01
02              S?WPD 4
03
04
05              :4.     SWITCH SETTINGS
06              :
07              :       LOCATION "SWREG" IS USED TO SELECT THE PROGRAM OPTIONS
08              :       (NOT SYSTEM CONFIGURATION). WHILE RUNNING UNDER DTOS,
09              :       THIS LOCATION WILL BE LOADED BY THE MONITOR.
10              :       HOWEVER UNDER STAND ALONE AND PROGRAM LOAD MODES THIS
11              :       LOCATION WILL BE SET ACCORDING TO THE ANSWERS SUPPLIED
12              :       BY THE OPERATOR. IN ANY CASE THE OPTIONS CAN BE CHANGED
13              :       OR VERIFIED BY USING ONE OF THE COMMANDS GIVEN IN SEC.
14              :       4.2
15              :
16              :
17              :4.1    SWITCH OPTIONS
18              :       DIFFERENT BITS AND THEIR INTERPRETATION AT LOCATION
19              :       "SWREG" IS AS FOLLOWS:
20              :
21              :       BIT     OCTAL   BINARY  INERPRETATION
22              :               VALUE   VALUE
23              :
24              :       1               0       LOOP ON ERROR
25              :               40000   1       SKIP LOOPING ON ERROR
26              :
27              :       2               0       PRINT TO CONSOLE
28              :               20000   1       ABORT PRINT OUT TO CONSOLE
29              :
30              :       3               0       DO NOT PRINT % FAILURE
31              :               10000   1       PRINT % FAILURE
32              :
33              :       4               0       ALLOW END OF PASS PRINT OUT
34              :               04000   1       SUPPRESS END OF PASS PRINT OUT
35              :
36              :       5               0       DO NOT PRINT ON THE LINE PRINTER
37              :               02000   1       PRINT ON THE LINE PRINTER
38              :
39              :       6               0       DO NOT HALT ON ERROR
40              :               01000   1       HALT ON ERROR
41              :
42              :       7               0       DO NOT PRINT SUMMARY AND/OR
43              :                               PASSING OF EACH SUBTEST
44              :               00400   1       PRINT SUMMARY AND/OR
45              :                               PASSING OF EACH SUBTEST
46              :       8               0       PRINT ONLY THE FIRST ERROR
47              :               00200   1       PRINT EVERY ERROR
48
49              :4.2    SWITCH COMMANDS
50              :       ONCE THE PROGRAM STARTS EXECUTING THE STATE OF ANY OF
51              :       THE BITS CAN BE CHANGED BY HITTING KEYS 1-9, A-F. THE
52              :       PROGRAM WILL CONTINUE RUNNING AFTER UPDATING THE OPTIONS.
53              :       EACH KEY WILL COMPLEMENT THE STATE OF THE BIT AFFILIAT-
54              :       ED WITH IT, THUS BIT 4 CAN BE ALTERED BY HITTING KEY 4.
55              :       SETTING OF ANY BIT OF LOCATION "SWREG" WILL SET BIT 0.
56              :       (DEFAULT MODE IS DEFINED AS ALL BITS OF SWREG SET TO 0)
57              :       THE PROGRAM CAN BE LOCKED INTO SWITCH MODIFICATION MODE
58              :       BY TYPING A 0, IN WHICH CASE MORE THAN ONE BIT CAN BE
59              :       CHANGED BEFORE  CONTROL IS ALLOWED TO RETURN TO THE
60              :       MAIN PROGRAM.
```

```
0005 ECL21
01              ;
02              ;4.2.1  OTHER COMMANDS
03              ;
04              ;       "CR"    A "RETURN" CAN BE TYPED TO CONTINUE THE PROGRAM
05              ;               AFTER ITS LOCKED IN A SWITCH MODIFICATION MODE
06              ;
07              ;       ^D      THIS COMMAND GIVEN AT ANY TIME WILL RESET "SWREG"
08              ;               TO DEFAULT MODE AND RESTART THE PROGRAM.
09              ;
10              ;       ^R      THIS COMMAND GIVEN AT ANY TIME WILL RESTART THE
11              ;               PROGRAM. SWITCHES ARE LEFT WITH THE VALUES THEY
12              ;               HAD BEFORE THE COMMAND WAS ISSUED.
13              ;
14              ;       ^O      THIS COMMAND GIVEN AT ANY TIME WILL CAUSE THE
15              ;               PROGRAM CONTROL TO GO TO ODT (NOTE: THIS IS AN
16              ;               OPTIONAL COMMAND AND IS AVAILBLE ONLY IF
17              ;               ODTPK IS PRESENT)
18              ;
19              ;       M       THIS COMMAND GIVEN AT ANY TIME WILL PRINT THE
20              ;               CURRENT OPERATING MODES.
21              ;
22
23              ;
```

```
10006 ECL21
01              ;
02              ;5.     OPERATING PROCEDURE/OPERATOR INPUT
03              ;       ----------------------------------
04              ;
05              ;5.1    LOAD THE PROGRAM VIA THE BINARY LOADER OR INSERT A
06              ;       PRELOADED MEMORY MODULE.
07              ;5.2    SET SWITCHES TO 200.
08              ;5.3    PRESS START.
09              ;       PROGRAM WILL HALT AFTER PRINTING THE MESSAGE
10              ;       'SET DATA SWITCHES AND PRESS CONTINUE'.
11              ;       SET REQUIRED SWITCH SETTINGS AND PRESS CONTINUE.
12              ;5.4    THE PROGRAM WILL RUN UNTIL MANUALLY STOPPED. IN CASE
13              ;       OF MALFUNCTIONING, THE PROGRAM WILL PRINT ERROR
14              ;       MESSAGE AND TAKE APPROPRIATE ACTION AS PER THE SW
15              ;       SETTINGS.
16              ;
17              ;6.     PROGRAM OUTPUT/ERROR DESCRIPTION
18              ;       --------------------------------
19              ;
20              ;6.1    FOR ANY ERRORS DETECTED, THE PROGRAM WILL PRINT ERROR
21              ;       REPORT OR % FAILURES DEPENDING UPON THE SW SETTINGS.
22              ;6.2    ERROR REPORT CONSISTS OF ALL ACCUMULATORS,CARRY,
23              ;       RELOCATED PROGRAM COUNTER OF THE TEST THAT IS FAILING
24              ;       AND PC IN THE LISTING AT THE TIME OF FAILURE.
25              ;6.3    THE PROGRAM WILL LOOP IN THE TEST THAT IS FAILING IF
26              ;       SW"1" IS 0.
27              ;6.4    THE PRINTING OF ERROR REPORT CAN BE ABORTED BY SETTING
28              ;       SW"2" TO 1.
29              ;6.5    IF LOOPING OCCURS IN THE PROGRAM, STOP THE COMPUTER
30              ;       AND CHECK LOCATION 201 TO FIND OUT THE TEST THAT WAS
31              ;       RUNNING BEFORE THE LOOPING OCCURRED.
32              ;
```

```
!0007 ECL21
01
02                ;
03                ;7.     PROGRAM DESCRIPTION/THEORY OF OPERATION
04                ;       ---------------------------------------
05                ;
06                ;7.1    EACH TEST IS COMPLETE IN ITSELF, SO THE PROGRAM CAN
07                ;       BE STARTED FROM ANY TEST WITHOUT CAUSING ANY
08                ;       INITIALIZATION ERRORS.
09                ;7.2    WHEN 'ECLIPSE21' IS STARTED AT LOCATION 200 OR BY
10                ;       DTOS, IT WILL SIZE UP THE MEMORY AND WILL PRINT
11                ;       THE TOP OF THE MEMORY.
12                ;       THE EXERCISER WILL RUN THE FIRST PASS VERY FAST. IN
13                ;       THE FIRST PASS EACH TEST IS RUN ONLY ONCE. ALL OTHER
14                ;       PASSES WILL TAKE MORE TIME AS EACH TEST IS RUN
15                ;       ACCORDING TO THE TEST COUNT SPECIFIED IN EACH TEST.
16                ;       REFER TO THE LISTING TO FIND OUT THE INFORMATION
17                ;       ABOUT EACH TEST.
18                ;
19                ;8.     RESTRICTIONS/MISC
20                ;       -----------------
21                ;
22                ;8.1    CERTAIN INSTRUCTIONS LIKE BLM, XCT, BAM, ETC.,
23                ;       DO ALLOW INTERRUPTS TO OCCUR DURING THEIR
24                ;       EXECUTION. THIS FEATURE OF THOSE INSTRUCTIONS IS
25                ;       NOT CHECKED IN THIS TEST.
26                ;
27                ;
28
29                0?DTD 9
30
31                ;9.     OCTAL DEBUG TOOL (ODT)
32                ;
33                ;       THE DIAGNOSTIC IS EQUIPED WITH A BUILT IN ODT WHICH CAN
34                ;       BE ACCESSED BY HITTING CONTROL O (^O) AT ANY TIME DURING
35                ;       THE EXECUTION OF THE PROGRAM (AFTER SETTING THE PARA-
36                ;       METERS).
37                ;       ON ENTERING ODT THE ADDRESS OF THE LOCATION HAVING THE
38                ;       NEXT INSTRUCTION TO BE EXECUTED WILL BE TYPED-OUT.
39                ;
40                ;9.1    CONVENTIONS AND SYMBOLS
41                ;       THE FOLLOWING CONVENTIONS ARE USED BY THE ODT:
42                ;       ?       PRESSING ANY ILLEGAL KEY CAUSES THE ODT TO RES-
43                ;               POND WITH A "?".
44                ;       @       ODT IS READY AND AT YOUR SERVICE.
45                ;
46                ;9.2    COMMAND STRUCTURE
47                ;       AN ODT COMMAND HAS THE FOLLOWING FORMAT:
48                ;               [ARGUMENT][COMMAND]
49                ;       AN ARGUMENT MAY BE ONE OF THE FOLLOWING:
50                ;       "EXP"   AN OCTAL EXPRESSION CONSISTING OF OCTAL NUMBERS
51                ;               SEPARATED BY PLUS (+) OR MINUS (-) SIGNS. LEAD-
52                ;               ING ZEROS NEED NOT BE TYPED.
53                ;       "ADR"   AN ADDRESS IS THE SAME AS AN EXPRESSION EXCEPT
54                ;               THAT BIT 0 IS NEGLECTED.
55                ;       A COMMAND IS A SINGLE TELETYPE CHARACTER
56                ;
57                ;9.3    ODT COMMANDS
58                ;       THE LOCATIONS THAT CAN BE EXAMINED AND MODIFIED BY THE
59                ;       USER ARE CALLED CELLS. THESE CELLS ARE OF TWO TYPES:
60                ;       INTERNAL CPU CELLS AND MEMORY LOCATIONS.
```

```
 0008 ECL21
01                ;
02                ;9.3.1  OPENING INTERNAL CELLS
03                ;       THE COMMAND TO OPEN ONE OF THE INTERNAL REGISTERS IS OF
04                ;       THE FORM "NA" WHERE N IS ANY OCTAL EXPRESSION BETWEEN
05                ;       0 AND 7
06                ;       0-3     FOR ACCUMULATORS 0-3
07                ;       4       FOR PC OF THE NEXT INSTRUCTION TO BE EXECUTED IN
08                ;               THE EVENT OF A "P" COMMAND.
09                ;       5       CPU AND TTO STATUS
10                ;               BIT     INTERPRETATION
11                ;               15      STATUS OF TTO DONE FLAG
12                ;               14      STATUS OF INTERRUPTS (ION FLAG)
13                ;               13      STATUS OF CARRY BIT
14                ;       6       ADDRESS OF THE LOCATION HAVING THE BREAK POINT (IF
15                ;               ANY)
16                ;       7       INSTRUCTION AT THE BREAK POINT LOCATION
17
18                ;       OTHER COMMANDS TO OPEN CELLS ARE:
19                ;
20                ;       "ADR"/  OPEN THE CELL AND PRINT ITS CONTENTS
21                ;       ./      OPEN THE CELL CURRENTLY POINTED TO BY THE POINTER
22                ;               AND PRINT ITS CONTENTS.
23                ;       .+"ADR"/        ADD "ADR" TO THE POINTER, OPEN THE CELL
24                ;               AND PRINT ITS CONTENTS.
25                ;       .-"ADR"/        SUBTRACT "ADR" FROM THE POINTER, OPEN
26                ;               THE CELL AND PRINT ITS CONTENTS.
27                ;       "CR"    THE RETURN KEY IS USED TO CLOSE THE OPEN CELL
28                ;               WITH OR WITHOUT MODIFICATION.
29                ;       "LF"    LINE FEED IS USED TO CLOSE THE OPEN CELL WITH OR
30                ;               WITHOUT MODIFICATION AND TO OPEN THE SUCCEEDING
31                ;               CELL.
32                ;       ^       CLOSE THE OPEN CELL WITH OR WITHOUT MODIFICATION
33                ;               AND OPEN THE PRECEDING CELL
34                ;       /       CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
35                ;               OPEN THE CELL POINTED TO BY ITS CONTENTS.
36                ;       +"ADR"/ CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
37                ;               OPEN THE CELL POINTED TO BY ITS CONTENTS + "ADDR".
38                ;       -"ADR"/ CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
39                ;               OPEN THE CELL POINTED TO BY ITS CONTENTS - "ADR".
40                ;
41                ;9.3.2  MODIFICATION OF A CELL
42                ;       ONCE A CELL HAS BEEN OPENED ITS CONTENTS CAN BE MODIFIED
43                ;       BY TYPING THE NEW VALUE THE CELL IS TO CONTAIN IN THE
44                ;       FORM OF AN OCTAL EXPRESSION FOLLOWED BY "CR" OR "LF".
45                ;       IF A + OR - IS TYPED AS THE FIRST CHARACTER OF THE EX-
46                ;       PRESSION THEN THE VALUE OF THE EXPRESSION IS ADDED TO OR
47                ;       SUBTRACTED FROM THE OLD CONTENTS OF THE CELL. THE
48                ;       ADDRESS ITSELF OR AN EXPRESION RELATIVE TO THE ADDRESS
49                ;       CAN BE DEPOSITED BY TYPING A "." OR ".+/-OCTAL EXPRESS-
50                ;       ION". A RUBOUT COMMAND GIVEN RIGHT AFTER OPENING A CELL
51                ;       ALLOWS THE MODIFICATION OF ITS CONTENTS AS IF THEY WERE
52                ;       TYPED IN JUST BEFORE THE COMMAND WAS ISSUED.
53                ;
54                ;9.3.3  OTHER ODT COMMANDS
55                ;       RUBOUT  THIS KEY IS USED TO DELETE ERRONEOUSLY TYPED
56                ;               DIGITS. EACH TIME THE KEY IS PRESSED THE RIGHT MOST
57                ;               DIGIT IS DELETED AND ECHOED ON THE TERMINAL. IF
58                ;               THE RUBOUT KEY IS PRESSED RIGHT AFTER OPENING A
59                ;               CELL THEN IT DELETES THE RIGHT MOST DIGIT OF THE CEL
60                ;               CONTENTS. THIS ALLOWS THE MODIFICATION OF THE CELL
```

```
0009 ECL21
01                ;                AS IF ITS CONTENTS WERE TYPED IN JUST BEFORE THE
02                ;                KEY WAS PRESSED.
03                ;        "ADR"B  INSERT A BREAK POINT AT LOCATION "ADR".
04                ;                ONLY ONE BREAK POINT CAN BE INSERTED AND ANY
05                ;                ENTRY TO ODT AFTER EXECUTING A BREAK POINT WILL
06                ;                CAUSE IT TO BE DELETED.
07                ;        D       DELETE THE BREAK POINT IF ANY.
08                ;        P       RESTART THE EXECUTION OF THE PROGRAM AT LOCATION
09                ;                POINTED BY 4A.
10                ;        "ADR"R  START EXECUTING THE PROGRAM AT "ADR" AFTER AN
11                ;                IO-RESET.
12                ;        K       KILL THE STRING TYPED SO FAR. THE ODT RESPONDS
13                ;                WITH A "?" AND THE OPEN CELL IS CLOSED WITHOUT
14                ;                MODIFICATION.
15                ;        =       PRINT THE OCTAL VALUE OF THE INPUT ONLY.
16                ;                THIS WILL CLOSE ANY OPEN CELLS WITHOUT
17                ;                MODIFICATION AND WILL NOT OPEN A CELL
18                ;
19                ;
20                ;        NOTE:   IN PROGRAMS WHICH RELOCATE THEMSELVES THE
21                ;                THE USER SHOULD PLACE BREAK POINTS ONLY IN THE
22                ;                THE ORIGINAL PROGRAM AREA. IF A BREAK POINT IS
23                ;                PLACED OUTSIDE THIS AREA THE RESULTS WILL
24                ;                BE UNPREDICTABLE.
25                ;
26                ;
27
28                .EOT
```

```
0010 ECL21

**00000 TOTAL ERRORS, 00000 PASS 1 ERRORS
```

0011 ECL21

O?DTD 000524 MC 7/29
S?WPD 000050 MC 4/02