DataGeneral

TECHNICAL STATEMENT

TEXT LISTING

068-000519-02

PROGRAM

E130 FLOATING POINT
FIRMWARE EXERCISER

TEXT TAPE

097-000519-02

ABSTRACT

THIS PROGRAM PERFORMS A FUNCTIONAL TEST OF THE ECLIPSE MODEL 130 FLOATING POINT INSTRUCTION SET.

NOTICE

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 0001  .MAIN    AOS ASSEMBLER REV 03.01          16:26:44 01/10/80
01
02
03
04
05
06
07              ;*************************************************************
08              ;
09              ; NAME: E1FPUX.TX                          PART NUMBER: 097-000519
10              ;
11              ;
12              ; DESCRIPTION: E130 FLOATING POINT FIRMWARE EXERCISER
13              ;                TEXT FILE
14              ;
15              ;
16              ; REVISION HISTORY:
17              ;
18              ;       REV.            DATE
19              ;
20              ;       00              05/20/77
21              ;       01              01/27/78
22              ;       02              01/15/80
23              ;
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27              ;
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32              ;
33              ;               NOTICE
34              ;
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45              ; LICENSED MATERIAL - PROPERTY OF DATA GENERAL CORPORATION.
46              ;
47              ;*************************************************************
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 0002  .MAIN
01              ;       REVISION HISTORY:       REFER TO SOURCE CODE
02              ;
03              ;
04              ;
05              ; I.    MINIMUM MACHINE CONFIGURATION:
06              ;               ECLIPSE CPU MODEL 130
07              ;               FLOATING POINT FIRMWARE IN CPU.
08              ;               8K OR LARGER READ WRITE MEMORY.
09              ;               TELETYPE OR EQUIVALENT.
10              ;               LINE PRINTER (OPTIONAL).
11              ;
12              ; II.   MAXIMUM MACHINE CONFIGURATION:
13              ;               ECLIPSE CPU MODEL 130.
14              ;               FLOATING POINT FIRMWARE IN CPU.
15              ;               INPUT/OUTPUT TESTER OR DISK.
16              ;               TELETYPE OR EQUIVALENT.
17              ;               LINE PRINTER.
18              ;
19              ; III.  PROGRAM ABSTRACT:
20              ;               THIS PROGRAM PERFORMS A FUNCTIONAL TEST OF THE
21              ;               ECLIPSE MODEL 130 FLOATING POINT INSTRUCTION SET.
22              ;
23              ; IV.   RESTRICTIONS:
24              ;               THIS PROGRAM USES ONLY THE BOTTOM 8K.
25              ;               OF CORE AND DOES NOT RELOCATE.
26              ;
27              ;               THIS PROGRAM DOES NOT USE THE MAP.
28              ;
29              ; V.    TEST ALGORITHMS:
30              ;               THE TEST IS BROKEN UP INTO A SERIES OF SUBTESTS EACH
31              ;               OF WHICH IS EXECUTED UP TO 100 TIMES IN THE COURSE
32              ;               OF A SINGLE TEST EXECUTION.
33              ;
34              ;               THESE SUBTESTS EXECUTE FLOATING POINT INSTRUCTIONS
35              ;               WITH RANDOM DATA.  THE TESTS ARE DESIGNED TO
36              ;               GENERATE ONE OF THE ORIGINAL ARGUMENTS AS AN ANSWER.
37              ;               THIS ANSWER IS COMPARED WITH THE ORIGINAL ARGUMENT.
38              ;               IF THEY ARE NOT EQUAL THE TEST IS SIMULATED IN SOFT-
39              ;               WARE.  THE ORIGINAL ARGUMENT MAY NOT BE RETURNED FOR
40              ;               A NUMBER OF VALID REASONS, SUCH AS ROUNDOFF ERROR ETC.
41              ;               ONLY IF THE RESULT DOES NOT AGREE WITH THE
42              ;               SIMULATOR AS WELL, IS AN ERROR GENERATED.
43              ;
44              ;               IN THE EVENT OF AN ERROR THE RESULTS AND
45              ;               EXPECTED RESULTS ARE OUTPUT TO THE CONSOL
46              ;               I/O DEVICE AND/OR THE LINE PRINTER.
47              ;
48              ;               IN THE CASE OF SUBTESTS CHECKING SKIP OPERATIONS THE
49              ;               SKIP IS CHECKED TO MAKE SURE IT DOES NOT SKIP WHEN
50              ;               IT ISN'T SUPPOSED TO.  THE CONDITION REQUIRED FOR
51              ;               THE SKIP IS THEN GENERATED AND THE INSTRUCTION
52              ;               TRIED FOR THE PROPER RESPONSE.
53              ;               A SPECIAL MESSAGE IS PRINTED IN THE EVENT OF A
54              ;               SKIP ERROR.
55              ;
56              ;               LASTLY SKIPS ARE SOMETIMES USED TO CHECK THE RESULTS
57              ;               OF A COMPUTATION.  THIS VERIFIES THAT THE CALCULATION
58              ;               SET THE PROPER STATUS BITS AS WELL AS THE SKIPS
59              ;               OPERATION.
60              ;
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 0003  .MAIN
01              ; VI.   PROGRAM MODES:
02              ;               THE DIFFERENT MODES OF OPERATION OF THIS PROGRAM ARE
03              ;               SELECTED FROM THE SWITCH REGISTER AS FOLLOWS:
04              ;
05              ;                       SW0 = 1 USE THE CONSOLE SWITCHES.
06              ;                           = 0 USE THE SWITCHES PASSED FROM DTOS
07              ;                               OR AS STORED AT START.
08              ;                       SW1 = 1 CONTINUE AFTER ERROR.
09              ;                       SW2 = 1 INHIBIT OUTPUT TO TELETYPE.
10              ;                       SW3 = 1 PRINT FAILURE RATE.
11              ;                       SW4 = 1 INHIBIT PASS COUNT OUTPUT.
12              ;                       SW5 = 1 ENABLE OUTPUT TO LINE PRINTER.
13              ;
14              ;               IF SWITCH ZERO (SW0) IS SET TO ZERO AND THE PROGRAM
15              ;               IS LOADED FROM DTOS WITH A SELECT OR RUN COMMAND THE
16              ;               PROGRAM WILL USE THE SWITCHES PASSED FROM DTOS.
17              ;               (SEE SWREG COMMAND IN THE DTOS MANUAL.)
18              ;
19              ;               IF SW0 IS ONE DATA SWITCHES 6-15 MUST (1) BE ZERO.
20              ;
21              ; VII.  OPERATING PROCEDURES:
22              ;
23              ;               A. LOADING STAND ALONE.
24              ;                       LOAD THE PROGRAM USING THE BINARY LOADER.
25              ;                       THE PROGRAM SHOULD BE LOADED AT LOC-
26              ;                       ATION ZERO.
27              ;
28              ;                       IF THE DATA CHANNEL TESTER (CAT/KITTEN)
29              ;                       PROGRAMS HAVE BEEN LOADED ALSO, START AT
30              ;                       LOCATION 171.
31              ;
32              ;                       IF THE CAT/KITTEN PROGRAMS HAVE NOT BEEN
33              ;                       LOADED, START AT LOCATION 170.
34              ;
35              ;                       ONCE STARTED, THE PROGRAM WILL EXECUTE ALL
36              ;                       TESTS INDEFINATLY, LOOPING UNTIL MANUALLY
37              ;                       INTERUPTED.
38              ;
39              ;               B. LOADING FROM DTOS.
40              ;                       THIS DIAGNOSTIC MAY BE LOADED IN EITHER AUTO-
41              ;                       MODE OR MANUAL-MODE, USING THE NORMAL DTOS
42              ;                       COMMANDS.
43              ;
44              ;               C. NORMAL OPERATION.
45              ;                       WHEN THE PROGRAM IS RUN STAND-ALONE, OR IS
46              ;                       LOADED WITH A DTOS MANUAL MODE COMMAND, THE
47              ;                       PROGRAM WILL REQUEST THE OPERATOR TO SET THE
48              ;                       SWITCHES.  RESUME THE PROGRAM BY PRESSING
49              ;                       'CONTINUE' ON THE CPU CONSOLE.
50              ;                       DEFAULT SWITCHES ARE ALL ZERO.
51              ;
52              ;                       WHEN THE PROGRAM IS CONTINUED THE SWITCHES
53              ;                       ARE STORED.  SWITCH ZERO MAY NOW BE SET TO
54              ;                       ZERO SO OTHER CPU CONSOLE FEATURES (SUCH AS
55              ;                       MONITORING A LOCATION), MAY BE USED.
56              ;
```

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10004  .MAIN
01              ;
02              ;
03              ;
04              ;
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07              ;
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13              ;
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21              ;
22              ;
23              ;
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25              ;
26              ;
27              ;
```

D. NORMAL PROGRAM TERMINATION.

IN AUTO MODE THE PROGRAM WILL RUN FOR SEVEN PASSES. AT THE END OF EACH PASS THE WORD "PASS" AND THE FLOATING POINT ACCUMULATORS JUST TESTED WILL BE PRINTED. AFTER THE SEVENTH PASS THE PROGRAM RETURNS TO DTOS.

IN MANUAL MODE THE PROGRAM PRINTS THE SAME MESSAGE AS ABOVE AFTER EACH PASS, HOWEVER THE PROGRAM WILL NOT AUTOMATICALLY RETURN TO DTOS.

E. ERRORS.

WHEN THE PROGRAM IS IN AUTO MODE THE PROGRAM PRINTS AN ERROR MESSAGE AND RETURNS TO DTOS IMMEDIATLY ON AN ERROR.

WHEN IN MANUAL MODE, AND USING THE DFAULT SWITCHES, THE PROGRAM PRINTS OUT AN ERROR MESSAGE AND THEN LOOPS ON THE FAILING SUB-TEST. IF THE PROBLEM IS INTERMITTENT SW3 MAY BE SET. THE PROGRAM THEN PRINTS OUT THE RATIO OF TIMES THE SUBTEST FAILED TO THE NUMBER OF TIMES THE SUBTEST HAS BEEN EXECUTED AS A PERCENTAGE. IF SW1 IS SET THE PROGRAM CONTINUES WITH THE REST OF THE TEST.

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10005  .MAIN
01              ; VIII. PROGRAM DIAGNOSTIC OUTPUTS:
02              ;               IN THE EVENT OF AN ERROR THE PROGRAM MAY OUTPUT
03              ;               ONE OF SEVERAL MESSAGES.  THESE ARE LISTED
04              ;               BELOW.  A STRING OF "0" S  INDICATES A NUMBER
05              ;               PRINTED IN OCTAL FORMAT.  A STRING OF "H" S INDICATES
06              ;               A NUMBER IN HEXADECIMAL FORMAT.
07              ;
08              ;                       A. FLOATING POINT STATUS REGISTER TEST ERROR.
09              ;
10              ;                       ERROR IN TEST AT LOC. 000000
11              ;
12              ;                       EXPECTED STATUS 000000
13              ;                       STATUS READ     000000
14              ;
15              ;                       THE STATUS INFORMATION IS SELF EXPLANATORY
16              ;                       THE LOCATION GIVEN IS THE ADDRESS OF
17              ;                       THE START OF THE SUBTEST, NOT THE
18              ;                       ACTUAL LOCATION OF THE ERROR.
19              ;
20              ;                       B. FLOATING POINT SKIP  TEST ERROR.
21              ;
22              ;                       SKIP ERROR AT THE FOLLOWING LOCATION:
23              ;                       PC=     000000
24              ;
25              ;                       IN THE EVENT A SKIP INSTRUCTION DOES NOT
26              ;                       PERFORM AS EXPECTED THIS MESSAGE IS
27              ;                       OUTPUT.  THE PC LOCATION MENTIONED IS THAT
28              ;                       OF THE ERROR CALL.  THE FAILING INSTRUCTION
29              ;                       IS THE FIRST SKIP INSTRUCTION PRIOR TO
30              ;                       THE ERROR CALL.
31              ;
32              ;                       C. ARITHMETIC OPERATION TEST ERROR.
33              ;
34              ;                       ERROR IN TEST AT LOC. 000000
35              ;
36              ;                       CORRECT BUFF <A,B,C> HHHH HHHH [HHHH HHHH]
37              ;                               BUFF <A,B,C> HHHH HHHH [HHHH HHHH]
38              ;
39              ;                       THIS FORMAT IS USED WHEN TESTING INSTRUCTIONS
40              ;                       THAT STORE THEIR RESULTS INTO MEMORY.
41              ;
42              ;                       THE LOCATION GIVEN IS THE ADDRESS OF THE START
43              ;                       OF THE SUBTEST FAILING.  THIS IS FOLLOWED BY
44              ;                       THE NAME OF THE BUFFER CONTAINING THE EXPECTED
45              ;                       ANSWER AND THE VALUE EXPECTED (EXPRESSED IN
46              ;                       HEX.  THE LAST 8 DIGITS ARE DISPLAYED
47              ;                       ONLY FOR DOUBLE PRECISION).
48              ;                       THE NAME OF THE BUFFER CONTAINING
49              ;                       THE RESULTS OF THE OPERATION
50              ;                       FOLLOWS USING THE SAME FORMAT.
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10006  .MAIN
01              ;
02              ;               ANOTHER VARIATION OF THIS ERROR FORMAT
03              ;               IS SHOWN BELOW:
04              ;
05              ;               ERROR IN TEST AT LOC. 000000
06              ;
07              ;               CORRECT BUFF <A,B,C>    HHHH HHHH [HHHH HHHH]
08              ;                       (FPAC)          HHHH HHHH [HHHH HHHH]
09              ;
10              ;               THE LOCATION SPECIFIED IN THIS MESSAGE IS THE
11              ;               SAME AS IN THE LAST FORMAT.  THE TERM FPAC
12              ;               REFERS TO THE FLOATING POINT ACCUMULATOR UNDER
13              ;               TEST THIS PASS, AND CHANGES FROM PASS TO
14              ;               PASS.
15              ;
16              ;               LASTLY THERE IS A SPECIAL FORMAT TO DEAL WITH
17              ;               THOSE INSTRUCTIONS WHICH MODIFY THE CPU'S
18              ;               ACCUMULATORS  AS SHOWN BELOW:
19              ;
20              ;               ERROR IN TEST AT LOC. 000000
21              ;
22              ;                       OCTAL   HEX
23              ;               (AC0)   000000  HHHH
24              ;               (AC1)   000000  HHHH
25              ;               (AC2)   000000  HHHH
26              ;
27              ;               THE ERROR LOCATION INFORMATION IS THE SAME
28              ;               AS BEFORE.  THE SIGNIFICANCE OF THE
29              ;               ACCUMULATORS PRINTED OUT MUST BE DETERMINED
30              ;               BY EXAMINING THE SUBTEST.
31              ;
32              ;       D. FLOATING INTEGERIZE TEST ERROR.
33              ;
34              ;               000000  0       000000  000000  000000
35              ;
36              ;               000000  000000
37              ;
38              ;               HHHH HHHH HHHH HHHH
39              ;               HHHH HHHH HHHH HHHH
40              ;               HHHH HHHH HHHH HHHH
41              ;               HHHH HHHH HHHH HHHH
42              ;
43              ;               THIS IS ESSENTIALY A STATE DUMP OF THE CPU.
44              ;               THE FIRST LINE IN ORDER CONTAINS:
45              ;               THE PC OF THE ERROR CALL, THE STATE OF THE
46              ;               CARRY, AND THE CONTENTS OF THE CPU'S ACS.
47              ;
48              ;               THE TWO ENTRYS ON THE NEXT LINE DISPLAY THE
49              ;               STATE OF THE FLOATING POINT STATUS REGISTER.
50              ;
51              ;               THE NEXT FOUR LINES ARE THE CONTENTS OF
52              ;               FLOATING POINT ACCUMULATORS 0 -> 3.
```

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10007  .MAIN
01              ; IX.   HELPFUL HINTS:
02              ;               THE PROGRAM HAS A DATA BLOCK BEGINNING AT
03              ;               LOCATION 200 TO AID IN MONITORING THE PROGRAM
04              ;               FOR CORRECT FUNCTION.  THE MOST USEFUL OF
05              ;               THE ENTRYS IN THIS BLOCK IS AT LOCATION 201.
06              ;               THIS ENTRY ALWAYS CONTAINS THE ADDRESS OF
07              ;               THE SUBTEST CURRENTLY BEING EXECUTED.
08              ;
09              ;               ADDITIONAL INFORMATION MAY BE FOUND IN:
10              ;
11              ;               PROGRAMERS REFERENCE MANUAL FOR THE ECLIPSE S-130.
12              ;                               &
13              ;               DIANOSTIC TAPE OPERATING SYSTEM REFERENCE MANUAL.
14              ;
15              ;
16              ;###############################################################
17              ;               IN ORDER TO COMPLETELY TEST THE FLOATING POINT
18              ;               FIRMWARE IN THE ECLIPSE 130, BOTH THE FLOATING
19              ;               POINT DIAGNOSTIC, AND THE FLOATING POINT
20              ;               EXERCISER MUST BE RUN WITH CAT/KITTEN !
21              ;###############################################################
22              ;
```

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10008  .MAIN
01        000000          .TXTM   0

**00000 TOTAL ERRORS, 00000 FIRST PASS ERRORS
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