

IDENTIFICATION

Product Code: MAINDEC-12-DIEA-D  
Product Name: FLOAT 1'S & Ø'S THROUGH MEMORY  
Date Created: September 23, 1969  
Maintainer: Diagnostic Group  
Author: James Kelly

**MEMDATA**

8 MOAB

START 20

PSU 100 bank 10

be tested. Take

100 ul./bank.

with some microcode

except one (at least)

(f. 100)

WIRE OUT REM & PIN



1. ABSTRACT

This memory exerciser floats a word with a single bit set followed by a word with a single bit cleared thru each memory address. In bank 0 all memory locations not reserved for the program itself i.e., from address 0240 to 7777 are tested. In extended memory all addresses 0000 to 7777 inclusive are tested. In general the algorithm for testing is as follows: Set the accumulator to 4000; rotate the number right 4096 times. At the conclusion, test to see if the accumulator is 4000. This test ascertains that each core in all tested locations can store a one, and that relatively rapid access to each memory location does not disturb its contents.

The second major test is to set the accumulator 3777 I.E., all but one bit set to ones, and then rotating this number thru each memory location 4096 times prior to testing - any detected errors will be indicated by either a message type out or an error halt.

2. MACHINE REQUIREMENTS

- a. A standard PDP-5, 8 8/S, 8I, 8L, 12 or Linc-8.
- b. An ASR-33 teletype or equivalent.
- c. If the PDP-5 being tested has extended memory, the CIF and CDF instructions must be compatible with the PDP-8.

2.2 Preliminary Programs

All basic instruction and memory diagnostics must have been successfully run prior to attempting to run (FLOAT 1's & 0's TEST)

3. LOADING PROCEDURES

3.1 Method

This program must be loaded with the binary loader. If you are unfamiliar with the proper binary loading procedures, refer to the User Handbook for your computer, or appendix "A" of this write up.

- a. Set the teletype reader switch to FREE.
- b. Open the teletype reader and insert the program tape so that the arrows on the tape are visible to, and pointing toward the operator.
- c. Close the reader and set the reader switch to START.
- d. Set the teletype from panel switch to ON-LINE.
- e. Set the LEFT switches to 7777.
- f. Set the RIGHT switches to 4000.
- g. Set the MODE switch to 8 mode.
- h. Depress I/O preset.
- i. Depress START LS.
- j. When the program tape has been read in, the computer will halt.
- k. The ACCUMULATOR must be equal to 0000; if it is not, an error has occurred and one might try reloading the binary loader.

STARTING PROCEDURE

- a. Remove the paper tape from the teletype reader.
- b. Set the three right most switches SR9, 10, 11 to the number of the memory bank you wish to test. In a basic machine with no extended memory, this would be 000.
- c. Set the MODE switch to 8 mode.
- d. Depress I/O preset.
- e. Depress START 20.
- f. The program, when properly running, will cause the AC to flicker, and the MA to count up. One pass will take approximately 10 min.

4.1 Switch Settings

In general, switches 0, 1, 2 allow the test engineer to select the mode of error indication, I.E., type out or error halt. The normal mode with switches 0, 1, 2 on a zero is an error halt. To modify these circumstances proceed as follows:

SR00 = 1 Suppress halt  
 SR01 = 1 Suppress typing  
 SR02 = 1 Scope Loop on error

These designated switches have an order of precedence associated with them, which is designed for maximum flexibility.

In the event of an error, the first switch to be tested is switch 0; if it is 0 the computer will halt at address 0063. Depress continue to check switch 1 and obtain printout. If it is a 1, I.E., suppress halt, we test switch 1. If switch 1 is 0 the following "typical" error message will ensue:

```

FLOAT  I/O
ADDR   DATA
0241   6000
  
```

This message is interpreted as follows:

- 1) The "ADDR" address of the memory location under test. Indicates which memory address was being tested when the failure was detected.
- 2) "DATA" indicate the data in this memory location the correct data for the Float 1 test is 4000 the correct data for Float 0 test is 3777.

*1/2 hrs*  
*9-11 service on board*  
*each 4K*

## APPENDIX A

## PDP-8 MODE PERFORATED-TAPE LOADER

## READIN MODE LOADER

The readin mode (RIM) loader is a minimum length, basic, perforated-tape program for the 33 ASR. It is initially stored in memory by manual use of the operator console keys and switches. The loader is permanently stored in 18 locations of page 37.

The RIM loader can only be used in conjunction with the 33ASR reader (not the high-speed perforated-tape reader). Because a tape in RIM format is, in effect, twice as long as it need be, it is suggested that the RIM loader be used only to read the binary loader when using the 33 ASR. (NOTE: Some PDP-12 diagnostic program tapes are in RIM format).

The complete PDP-12 RIM loader (SA=7756 is as follows:

Absolute Address	Octal Content	Tag	Instruction I Z	Comments
7756	6032	BEG,	KCC	/CLEAR AC AND FLAG
7757	6031		KSF	/SKIP IF FLAG=1
7760	5357		JMP-1	/LOOKING FOR CHARACT
7761,	6036		KRB	/READ BUFFER
7762,	7106		CLL RTL	
7763,	7006		RTL	/CHANNEL 8 IN ACO
7764,	7510		SPA	/CHECKING FOR LEADER
7765,	5357		JMP BEG+1	/FOUND LEADER
7766,	7006		RTL	/OK, CHANNEL 7 IN LINK
7767,	6031		KSF	
7770,	5367		JMP-1	
7771,	6034		KRS	/READ, DO NOT CLEAR
7772,	7420		SNL	/CHECKING FOR ADDRESS
7773,	3776		DCA 1 TEMP	/STORE CONTENT
7774,	3376		DCA TEMP	/STORE ADDRESS
7775,	5356		JMP BEG	/NEXT WORD
7776,	0	TEMP,	0	/TEMP STORAGE
7777,	5XXX		JMP X	/JMP START OF BIN LOADER

Placing the RIM loader in core memory by way of the operator console keys and switches is accomplished as follows:

- a. Set the starting address 7756 in the LEFT switches.
- b. Set the first instruction (6032) in the RIGHT switches.
- c. Press the FILL switch.
- d. Set the next instruction (6031) in the RIGHT switches.
- e. Press the FILL STEP switch.
- f. Repeat steps d and e until all 16 instructions have been deposited.

To load a tape in RIM format, place the tape in the reader, set the LEFT switches to the starting address 7756 of the RIM loader (not of the program being read), press the START LS key, and start the Teletype reader.

sam

/FLOAT 1'S AND 0'S

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/THIS CORE MEMORY EXERCISER IS FULLY COMPATIBLE WITH A FAMILY OF 2 COMPUTERS INCLUDING POP-5, 8, 81, 81.5, 12 AND LINC-8

/SR02=1 INHIBIT ERROR HALT

/SR01=1 INHIBIT TYPEOUT

/SR02=1 SCOPE LOOP ON ERROR

/THIS MEMORY EXERCISER EVALUATES THE ENTIRE CORE MEMORY FROM ADDRESS 0240 TO 7777 IN BANK0 AND ALL ADDRESSES IN EXTENDED MEMORY FOR THE TENDENCY TO PICK UP OR DROP BITS. THE TEST FOR DROPPING BITS IS PERFORMED BY ROTATING A SINGLE 1 BIT THRU EACH MEMORY ADDRESS 4096 TIMES AND TESTING THE RESULT. THE TEST FOR PICKING UP BITS IS PERFORMED BY FLOATING A SINGLE 2 BIT THRU EACH MEMORY ADDRESS 4096 TIMES AND TESTING THE RESULT.

/TO ENSURE MAXIMUM TEST TIME AND MINIMUM BIT FIDDLING TIME THE DATA IS ONLY TESTED AT THE CONCLUSION OF THE TEST FOR EACH ADDRESS RATHER THAN AFTER EACH ROTATE.

/TO TEST ANY OR ALL EXTENDED MEMORY SET SWITCHES 9, 10, 11 TO THE EXTENDED BANK NUMBER.

/ SR09=EXTENDED MEMORY

/ SR10=EXTENDED MEMORY

/ SR11=EXTENDED MEMORY

0001	*1	
0001	K0070,	0070
0002	REGA,	0000
0003	K6201,	6201
0004	K0240,	0240
0005	TALLY,	0000
0006	K7774,	7774
0007	K1026,	1026

/EXTENDED MEMORY MASK  
/GENERAL STORAGE REGISTER  
/CHANGE DATA FIELDS  
/BOTTOM OF TEST

0010 \*10

0010	AUTO10,	0000
0011	DONVET,	0000
0012	MESSA,	K215=1
0013	REGB,	0000
0014	M4000,	=4000
0015	TEMP,	0000

```

0028 0028 SAS
0029 7614 CLL RTL
0030 7616 CLL RAL
0031 7114 AND K5672
0032 4104 ORG REGA
0033 3022 COA REGA
0034 3024 TAD REGA
0035 3026 TAD K6201
0036 3027 COA BEGIN0
/
/SET UP LOWER TEST ADDRESS 2230 FOR BANK 0 AND 002A FOR ALL OTHERS
/
0037 1022 TAD REGA
0038 7654 SNA CLA K0240
0039 1024 TAD
0040 3025 COA TALLY
0041 3026 COA CONYET
/
/FLOAT A SINGLE 1 BIT
/
BEGIN2, 0000
0042 0000 CLA CLL CML
0043 7010 RAR
0044 3405 DCA I TALLY
0045 1405 TAD I TALLY
0046 2011 ISZ DONYET
0047 5037 JMP *-4
0048 1014 TAD M4000
0049 7640 SZA CLA GOOF
0050 5063 JMP
/
/FLOAT A SINGLE 0 BIT
/
0051 7340 CLL CLA CMA
0052 7010 RAR
0053 3405 COA I TALLY
0054 1405 TAD I TALLY
0055 2011 ISZ DONYET
0056 5054 JMP *-4
0057 7040 CMA
0058 7700 SMA CLA
0059 5063 JMP
0060 2005 ISZ
0061 2005 JMP
0062 5020 JMP
/
/READ SWITCHES SW9, 17, 11
/MOVE 9, 17, 11 INTO 6, 7, 5
/NOPE
/SAVE EXTENDED MEMORY BITS
/STORE EXTENDED MEMORY DATA
/SET SELECTED EXTENDED BANK
/ADD CHANGE DATA FIELD (COP)
/STORE AS FIRST INSTRUCTION IN DATA HANDLE
/
/SET L=0 AC=7777
/SET L=1 AC=3777
/STORE IN TEST ADDRESS
/FETCH IT
/DONE 4096 TIMES YET
/NOPE
/TEST FAILED TELL OPERATOR
/UPDATE ADDRESS
/TEST NEW ADDRESS
/EXIT

```



/ERROR HANDLER

0063 7604  
0064 7500  
0065 7402  
0066 7004  
0067 7500  
0070 5075  
0071 7004  
0072 7700  
0073 5060  
0074 5061

LAS  
SMA  
HLT  
RAL  
SMA  
JMP  
RAL  
SMA CLA  
JMP  
JMP

/READ SWITCHES  
/SR02=?  
/ERROR HALT  
/MOVE SR01 TO AC0  
/SR1=?  
/TYPE  
/MOVE SR02 TO AC0  
/SR02=?  
/GO  
/SCOPE LOOP

/TYPE OUT ROUTINE

0075 7300  
0076 6201  
0077 1010  
0100 7640  
0101 5111  
0102 1012  
0103 3010  
0104 1410  
0105 7450  
0106 5111  
0107 4152  
0110 5104

CLA CLL  
6201  
TAD AUTO10  
SZA CLA  
JMP DATA  
TAD MESSA  
DCA AUTO10  
TAD I AUTO10  
SNA  
JMP  
JMS  
JMP

/CLEAR ACL  
/RESTORE DATA FIELD  
/GET AUTO10=200 NEVER TYPED  
/=?  
/NO TYPE NUMERICS  
/GET POINTER  
/STORE IN AUTO10  
/FETCH A CHARACTER  
/DONE YET  
/YES  
/TYPE IT  
/NO

/DATA TYPE OUT

0111 1005  
0112 4127  
0113 1035  
0114 3115  
0115 0000  
0116 1405  
0117 4127  
0120 1160  
0121 4152  
0122 1161  
0123 4152  
0124 7004  
0125 7006  
0126 5072  
0127 0000  
0130 3015  
0131 1006  
0132 3013  
0133 1007

TAD  
JMS  
TAD  
DCA  
0000  
TAD I  
JMS  
TAD  
JMS  
TAD  
JMS  
LAS  
RTL  
JMF  
0  
DCA  
TAD  
DCA  
TAD

TALLY  
OCTYP  
BEGIN0  
\*1  
TALLY  
OCTYP  
K215  
TYPE  
K212  
TYPE  
PNTB  
PNTB  
TEMP  
K7774  
REG8  
K1026

/GET ADDRESS  
/TYPE  
/GET DATA FIELD  
/STORE IT  
/SET DATA FIELD

OCTYP,

HERE,

