

IDENTIFICATION

Product Code: MAINDEC-8L-D0AA-D (D)

Product Name: 8L Memory Protect Test

Date Created: October 10, 1968

Maintainer: Diagnostic Group

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1. ABSTRACT

This program tests the basic operation of the memory protect hardware of the PDP-8/L computer by attempting to access memory locations on the last page of computer memory. Access by the instructions ISZ Y, DCA Y and JMS Y to the last page of memory is illegal if the PROTECT switch is set to 1.

2. REQUIREMENTS

2.1 Equipment

PDP-8/L

2.2 Storage

The program occupies locations 0202 to 0261 and locations 7600 and 7601 of the current memory bank and tests the first two locations of each memory page and location 7777 in the current memory bank.

2.3 Preliminary Programs

PDP-8/L Instruction Tests

3. LOADING PROCEDURE

The program is loaded into the memory bank being tested by the standard binary loader with the PROTECT switch set to 0. If 8K of memory is available, load the program into both memory banks.

4. STARTING PROCEDURE

4.1 Control Switch Settings

None

4.2 Starting Address

0202

4.3 Program and/or Operator Action

See Section 5.3.

5. OPERATING PROCEDURE

5.1 Operational Switch Settings

None

5.2 Subroutine Abstracts

None

5.3 Program and/or Operator Action

5.3.1 PDP-8/L with 4K of Memory

- a. With the PROTECT switch set to 0, start the computer at 0202. It should stop at location 0000 with the following indications: MA=0000, MB=7402, AC=0002, FETCH, OPR. Any other indication is an error (consult the listing).
- b. With the PROTECT switch still set to 0, start the computer at 0230. It should stop at location 0252 with the following indications: MA=0252, MB=7402, AC=0000, FETCH, OPR. Any other indication is an error.
- c. With the PROTECT switch set to 1, start the computer at location 0202. It should "hang" at location 0214 with the following indications: MA=7777, MB=???? (unimportant), AC=0000, EXECUTE, DCA, PROT.
- d. With the PROTECT switch set to 1, depress CONTINUE. Computer should "hang" at location 0220 with the following indications: MA=7777, MB=????, AC=0001, EXECUTE, ISZ, PROT.
- e. With the PROTECT switch set to 1, depress CONTINUE. Computer should "hang" at location 0227 with the following indications: MA=7777, MB=????, AC=0002, EXECUTE, JMS, PROT.
- f. With the PROTECT switch set to 1, depress CONTINUE. Computer should halt at location 0252 with the following indications: MA=0252, MB=7402, AC=0000, FETCH, OPR.

5.3.2 PDP-8/L with 8K of Memory

- a. With the PROTECT switch set to 0, start the computer at 0202 of bank 0 (DF=0). It should stop at location 0000 of bank 0 with the following indications: MA=0000, MB=7402, AC=0002, FETCH, OPR. Any other indication is an error.
- b. With the PROTECT switch still set to 0, start the computer at location 0230 of bank 0 (DF=0). It should stop at location 0252 of bank 0 with the following indications: MA=0252, MB=7402, AC=0000, FETCH, OPR. Any other indication is an error.

c. With the PROTECT switch set to 1, start the computer at location 0202 of bank 0 (DF=0). It should stop at location 0000 of bank 0 with the following indications: MA=0000, MB=7402, AC=0002, FETCH, OPR. Any other indication is an error.

d. With the PROTECT switch set to 1, start the computer at location 0230 of bank 0 (DF=0). It should stop at location 0252 of bank 0, with the following indications: MA=0252, MB=7402, AC=0000, FETCH, OPR. Any other indication is an error.

e. With the PROTECT switch set to 0, start the computer at location 0202 of bank 1 (DF=1). It should stop at location 0000 of bank 1 with the following indications: MA=0000, MB=7402, AC=0002, FETCH, OPR. Any other indication is an error.

f. With the PROTECT switch set to 0, start the computer at location 0230 of bank 1 (DF=1). It should stop at location 0252 of bank 1 with the following indications: MA=0252, MB=7402, AC=0000, FETCH, OPR. Any other indication is an error.

g. With the PROTECT switch set to 1, start the computer at location 0202 of bank 1 (DF=1). It should "hang" at location 0214 of bank 1 with the following indications: MA=7777, MB=???? (unimportant), AC=0000, EXECUTE, DCA, PROT.

h. With the PROTECT switch set to 1, depress CONTINUE. Computer should "hang" at location 0220 of bank 1 with the following indications: MA=7777, MB=????, AC=0001, EXECUTE, ISZ, PROT.

i. With the PROTECT switch set to 1, depress CONTINUE. Computer should "hang" at location 0227 of bank 1 with the following indications: MA=7777, MB=????, AC=0002, EXECUTE, JMS, PROT.

j. With the PROTECT switch set to 1, depress CONTINUE. Computer should halt at location 0252 of bank 1 with the following indications: MA=0252, MB=7402, AC=0000, FETCH, OPR.

After running this test, restore location 7777 of the memory bank(s) to 5301 for the binary loader program.

6. ERRORS

See Section 5 for description of errors.

7. RESTRICTIONS

None

8. MISCELLANEOUS

8.1 Execution Time

Execution time is dependent upon operator response time.

/8-L MEMORY PROTECT TEST
 /THERE ARE NO ERROR TYPEOUTS
 /AND ONLY 1 ERROR HALT AT LOCATION 0
 /THE COMPUTER SHOULD STOP (HANG) AFTER
 /CERTAIN INSTRUCTIONS ARE ATTEMPTED
 /THESE PLACES ARE CLEARLY MARKED IN
 /THIS LISTING
 /

0202

*202
 /THE FOLLOWING INSTRUCTIONS SHOULD
 /OPERATE PROPERLY AND NOT CAUSE THE
 /COMPUTER TO STOP.

0202	0560	AND I K777
0203	7000	NOP
0204	7000	NOP
0205	1600	LD I K777
0206	7000	NOP
0207	7000	NOP
0210	0507	JMP I K7600
0211	7000	NOP
0212	7000	NOP

/THE FOLLOWING INSTRUCTIONS SHOULD
 /NOT OPERATE PROPERLY AND THE
 /COMPUTER SHOULD STOP

0213	7200	CLA
0214	3600	DCA I K777 /HANG
		/MA=7777,MB=????,AC=0000,EXECUTE,DCA, PROT,
0215	7000	NOP
0216	7000	NOP
0217	7201	CLA IAC
0220	2600	ISZ I K777 /HANG
		/MA=7777,MB=????,AC=0001,EXECUTE,ISZ, PROT
0221	7000	NOP
0222	7000	NOP
0223	7200	CLA
0224	1252	LD HALT
0225	3000	DCA 0
0226	7326	CLA CLL CML RTL
0227	4660	JMS I K777 /HANG
		/MA=7777,MB=????,AC=0002,EXECUTE,JMS, PROT
		/IF MA=0000,MB=7402,AC=0002,FETCH,OPR; THEN THE
		/JMS INSTRUCTION WORKED (DID NOT FAIL AS IT SHOULD HAVE)
0230	7000	NOP
0231	7000	NOP

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/TEST DCA,ISZ,JMS, ON ALL PAGES BUT 37
/NONE OF THE FOLLOWING INSTRUCTIONS SHOULD--EVER--FAIL
0232 7200          CLA
0233 1261          TAD M0031
0234 3253          DCA CNTR
0235 3254          DCA PNTR
0236 1254          TAD PNTR
0237 7001          IAC
0240 3255          DCA PNTR1
0241 1256          TAD K5600
0242 3655          DCA I PNTR1
0243 2654          ISZ I PNTR
0244 7000          NOP
0245 4654          JMS I PNTR
0246 7000          NOP
0247 2254          ISZ PNTR
0250 2253          ISZ CNTR
0251 5236          JMP ,=13
0252 7402          HALT, HLT

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/THIS IS THE ONLY LEGITIMATE
/HLT INSTRUCTION THE PROGRAM
/SHOULD EXECUTE

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/CONSTANTS AND VARIABLES

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0253 0000          CNTR, 0
0254 0000          PNTR, 0
0255 0000          PNTR1, 0
0256 5600          K5600, 5600          /JMP I ZERO OF THIS PAGE
0257 7600          K7600, 7600
0260 7777          K7777, 7777
0261 7741          M0031, -3/          /TEST 31 PAGES

          7600          *7600
7600 5601          JMP I ,+1
7601 0211          211

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THERE ARE NO ERRORS