

IDENTIFICATION

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

Product Name: 8L Memory Protect Test

Date Created: October 10, 1968

Maintainer: Diagnostic Group

Author: Edward P. Steinberger

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.

/0-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	7200	NOP
0204	7200	NOP
0205	1660	IAD I K777
0206	7200	NOP
0207	7200	NOP
0210	5557	JMP I K7600
0211	7200	NOP
0212	7200	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	7200	NOP
0216	7200	NOP
0217	7201	CLA IAC
0220	2660	ISZ I K777 /HANG
/MA=7777,MB=????,AC=0001,EXECUTE,ISZ, PROT		
0221	7200	NOP
0222	7200	NOP
0223	7200	CLA
0224	1252	IAD HALT
0225	3200	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	7200	NOP
0231	7200	NOP

/TEST DCA,ISZ,JMS, ON ALL PAGES BUT 37
/NONE OF THE FOLLOWING INSTRUCTIONS SHOULD--EVER--FAIL

0232	7200	CLA
0233	1261	TAU M0031
0234	3253	DCA CNTR
0235	3254	DCA PNTR
0236	1254	TAU PNTR
0237	7001	IAC
0240	3255	DCA PNTR1
0241	1256	TAU 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

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

/CONSTANTS AND VARIABLES

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	
7602	5601	JMP I ,+1	
7601	0211	211	

\$

THERE ARE NO ERRORS