IDENTIFICATION

PRODUCT CODE: MAINDEC-8E-D1EC-D

PRODUCT NAME: MEMORY ADDRESS TEST

DATE CREATED: JUNE 11, 1971

MAINTAINER: DIAGNOSTIC GROUP

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1.   ABSTRACT

     MEMORY ADDRESS TEST, A RELOCATABLE PROGRAM, CHECKS FOR PROPER
     MEMORY ADDRESS SELECTION ON THE PDP-8E.

2.   REQUIREMENTS

2.1 EQUIPMENT

     PDP-8E EQUIPPED WITH A TELETYPE

2.2 STORAGE

     MEMORY ADDRESS TEST OCCUPIES LOCATIONS 7200-7507.

     AFTER RELOCATING, THE TEST OCCUPIES LOCATIONS 0000-0307.

2.3 PRELIMINARY PROGRAMS

     NONE

3.   LOADING PROCEDURE

     USE STANDARD BINARY LOADER

4.   STARTING PROCEDURE

4.1 INITIAL SWITCH SETTINGS

     ALL SR'S = 0 RUN ADDRESS TEST HIGH AND RELOCATE PROGRAM AFTER
     1 PASS TO ADDRESS TEST LOW AND THEN RELOCATE PROGRAM TO ADDRESS
     TEST HIGH, REPEATEDLY.

     SR0(0)   HALT AFTER ERROR PRINTOUT
     SR1(1)   AND SR2(0)   RUN ADDRESS TEST HIGH ONLY
     SR1(1)   AND SR2(1)   RELOCATE PROGRAM AND RUN ADDRESS TEST LOW ONLY
     SR1(0)   PROGRAM WILL RELOCATE AFTER A PASS
     SR1(1)   PROGRAM WILL STAY IN TEST AND WILL NOT RELOCATE

4.2 SWITCH SETTINGS AFTER PROGRAM IS RUNNING
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     SR0(0)   HALT AFTER ERROR PRINTOUT
     SR1(0)   RUN TEST AND RELOCATE
     SR1(1)   RUN SAME TEST, DO NOT RELOCATE

4.3   STARTING ADDRESSES

        0200   INITIALLY

        RESTART ADDRESS: 0000,7200

4.4   OPERATOR ACTION

        A.   SET SR TO 0200 AND PRESS LOAD ADDRESS

        B.   SET SR FOR DESIRED OPERATION (SEE 4.1) PRESS CLEAR, THEN
             CONTINUE. FOR MOST CASES THE SWITCH REGISTER SHOULD EQUAL
             ZERO.

5.   OPERATING PROCEDURE

        ONCE THE PROGRAM IS RUNNING, THE STARTING ROUTINE IS GIVEN UP
        FOR A TEST AREA. SR0 AND SR1 ARE THE ONLY SWITCHES THAT HAVE
        ANY AFFECT ON THE PROGRAM. (SEE 4.2) IN ORDER TO RESTART THE
        PROGRAM, CERTAIN LOCATIONS MUST BE EXAMINED (SEE BELOW) TO
        DETERMINE WHERE THE PROGRAM IS, SINCE THE PROGRAM RELOCATES ITSELF
        FROM ADDRESS TEST HIGH TO ADDRESS TEST LOW AND ADDRESS TEST LOW
        TO ADDRESS TEST HIGH. IF ADDRESS 0000 CONTAINS A 7300 AND ADDRESS
        307 CONTAINS A 7200, START THE PROGRAM AT LOCATION 0000 FOR ADDRESS
        TEST LOW. IF 7200 AND 7507 HAS 7300 AND 7200 RESPECTIVELY, LOAD
        ADDRESS 7200 AND SET DESIRED SWITCHES AND HIT CLEAR AND THEN
        CONTINUE.

6.   ERRORS

6.1   ERROR PRINTOUTS

        A XXXX   C YYYY   (ERROR PRINTOUT FORMAT)

        A XXXX   (ADDRESS)   XXXX = ADDRESS CONTAINING WRONG DATA.

        C YYYY   (CONTENTS)   YYYY = CONTENTS OF LOCATION XXXX

        THE CONTENTS OF AN ADDRESS SHOULD EQUAL THE ADDRESS
        OR THE COMPLEMENT OF THE ADDRESS

6.2   ERROR RECOVERY

        ANALYSIS OF SEVERAL ERROR PRINTOUTS SHOULD ESTABLISH A MEAN-
        INGFUL PATTERN THAT WILL SINGLE OUT A PARTICULAR ADDRESS
        SELECTION.

        IF IT IS NECESSARY TO SCOPE THE PROBLEM, THE FOLLOWING TWO
        INSTRUCTIONS MAY BE ENTERED IN MEMORY:
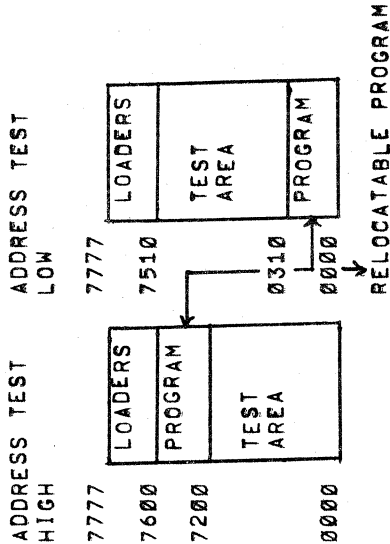
                TAD   (BAD LOCATION)

                JMP   .-1

7. MISCELLANEOUS

7.1 EXECUTION TIME

AFTER EVERY 96 COMPLETE PROGRAM LOOPS AN EC IS PRINTED OUT BEFORE
THE PROGRAM RELOCATES, EC IS TYPED OUT TWICE, ONCE AFTER ADDRESS
TEST HIGH AND THE SECOND TIME AFTER ADDRESS TEST LOW.

7.2 MEMORY MAPS

ADDRESS TEST   ADDRESS TEST
HIGH   LOW

7777	LOADERS		7777	LOADERS
7600	PROGRAM		7510	
				TEST
7200	TEST			AREA
	AREA		0310	
			0000	PROGRAM
0000	

RELOCATABLE PROGRAM

8. PROGRAM DESCRIPTION

THE PROGRAM CONSIST OF TWO PHASES WHICH OCCUR IN THE FOLLOWING
SEQUENCE:

PHASE 1 LOAD MEMORY SEQUENTIALLY IN THE FORWARD DIRECTION
        WITH EACH ADDRESS EQUAL TO ITS CONTENTS,THEN
        READ AND CHECK MEMORY FOR ERRORS.

PHASE 2 LOAD MEMORY SEQUENTIALLY IN THE REVERSE DIRECTION
        WITH ONE'S COMPLEMENT OF EACH ADDRESS,THEN READ
        AND CHECK MEMORY FOR ERRORS.

IN PHASE ONE,THE CONTENTS OF EVERY LOCATION IN THE TEST AREA
IS EQUAL TO ITS ADDRESS.IF AN ERROR OUCCURS,THE CONTENTS
WERE PROBABLY DEPOSITED INTO A WRONG ADDRESS OR MULTIBLE
ADDRESSES.IN PHASE 2 THE MEMORY IS LOADED WITH THE ONE'S
COMPLEMENT OF THE ADDRESS.IF THE ADDRESS OR ITS COMPLEMENT
IS WRONG,A ERROR MESSAGE WILL BE TYPED OUT GIVING THE
FAILING ADDRESS AND ITS CONTENTS.

BETWEEN PHASE 1 AND PHASE 2 EACH ADDRESS IS CHECKED WITH THE
ADDRESS EQUAL TO ITS ADDRESS WITH ALL OTHER BITS A ZERO,AND
THEN WITH THE ADDRESS BITS EQUAL TO A ZERO AND ALL OTHER
BITS SET TO A ONE.THIS CHECKS EACH ADDRESS FOR BIT DROPOUT
OR PICKUP OF ALL BITS OF AN ADDRESS.

SAMPLE ERROR PRINTOUT: