IDENTIFICATION
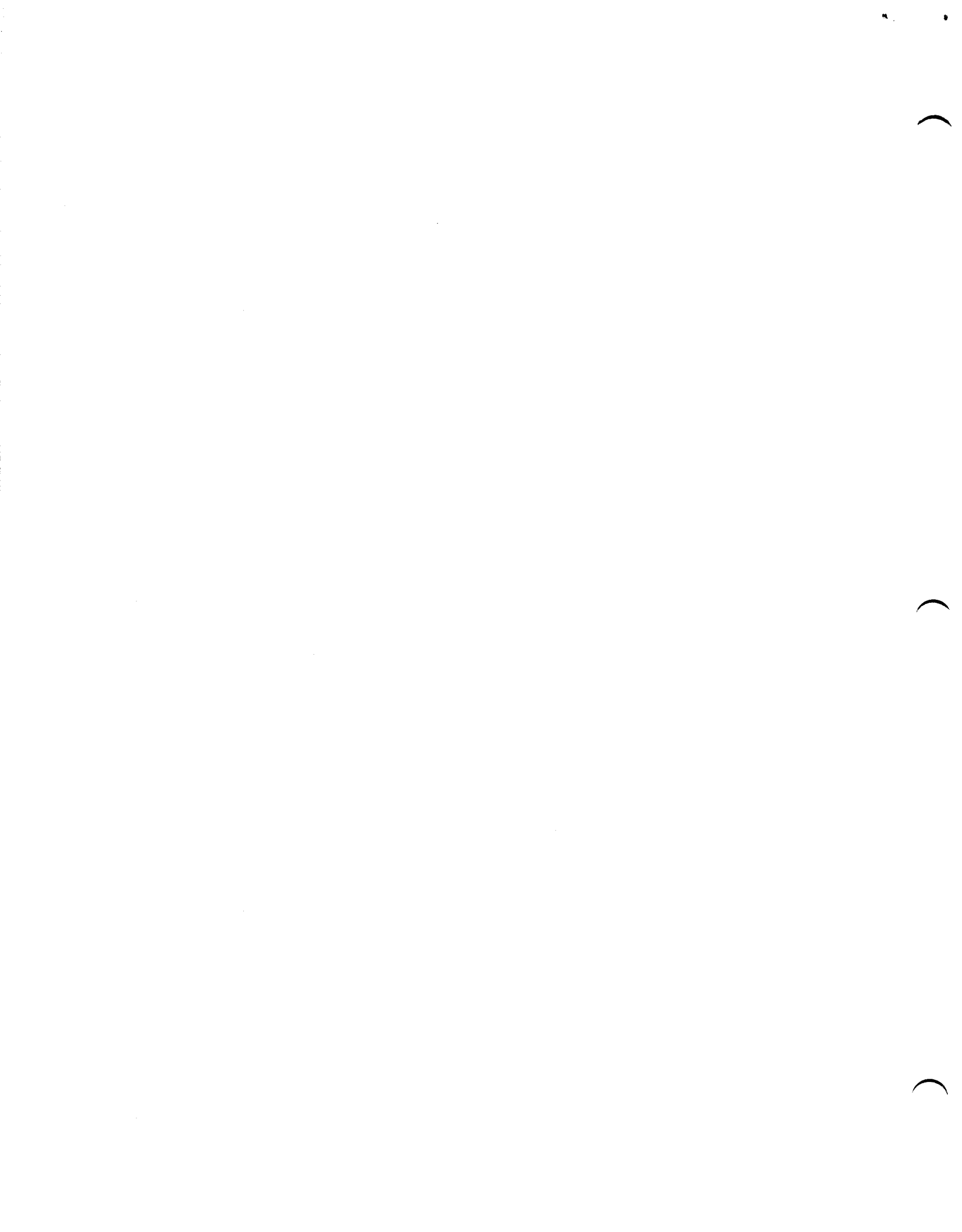
PRODUCT CODE: MAINDEC-8E-D0IB-D

PRODUCT NAME: BASIC JMP-JMS TEST

DATE CREATED: JUNE 11, 1971

MAINTAINER: DIAGNOSTICS GROUP

AUTHOR: BRUCE HANSEN

1. ABSTRACT

   THIS IS A DIAGNOSTIC PROGRAM FOR TESTING THE JMP AND JMS
   INSTRUCTIONS OF THE PDP-8E.

2. REQUIREMENTS

2.1 EQUIPMENT

    A PDP-8E EQUIPPED WITH TELETYPE.

2.2 STORAGE

    THIS PROGRAM USES MOST OF MEMORY.   THE BINARY LOADER MUST BE
    STORED IN THE LAST MEMORY PAGE.

2.3 PRELIMINARY PROGRAMS

    MAINDEC-8E-D0A(N) AND MAINDEC-8E-D0B(N)

3. LOADING PROCEDURE

3.1 METHOD

    THE STANDARD BINARY LOADER IS USED.

4. STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS   (NONE)
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4.2 STARTING ADDRESS
    -------- -------

    200

4.3 RESTART ADDRESSES
    ------- ---------

    600
    704

4.4 OPERATOR ACTION
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    A. SET SR TO 200 AND PRESS LOAD ADDRESS,

    B. PUSH CLEAR AND THEN CONTINUE.   THE PROGRAM WILL STORE
        PARTS OF THE RIM AND BINARY LOADERS THAT WILL BE
        DESTROYED, AND THEN JMP TO 4200 TO BEGIN TESTING.

5. OPERATING PROCEDURES

5.1 PROGRAM RESTARTS
    -------- --------

SINCE THE LOADERS ARE ALREADY STORED, A PROGRAM RESTART
SHOULD BEGIN AT 600 NOT 200.

5.2 PROGRAM END
    ------- ---

TO RESTORE THE LOADERS AT THE CONCLUSION OF THE TEST, START
AT 704. WHEN THE PROGRAM HALTS, RESTORATION IS COMPLETED
(PC=736).

6. ERRORS

6.1 ERROR HALTS AND DESCRIPTION
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SEE SECTION 9.

6.2 ERROR RECOVERY
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IN MOST CASES IT IS POSSIBLE TO INSERT A JMP INSTRUCTION IN
THE ERROR HALT POSITION TO RETURN THE PROGRAM TO THE FAILING
TEST. THIS FORMS A PROGRAM LOOP ON THE FAILING TEST AND
ALLOWS THE PROBLEM TO BE INVESTIGATED WITH AN OSCILLOSCOPE.
IN CASES WHERE A SCOPE MODE LOOP CANNOT BE MAINTAINED DUE TO
THE INSTABILITY OF THE JMP OR JMS INSTRUCTION AND ITS FAILING
CONDITION, IT WILL PROBABLY BE ADVANTAGEOUS TO SIMULATE
THIS SAME PROBLEM USING THE RANDOM JMP TEST, MAINDEC-8E-D0HC,
OR RANDOM JMP-JMS TEST, MAINDEC-8E-D0JC.

7. RESTRICTIONS (NONE)
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8. MISCELLANEOUS

8.1 EXECUTION TIME
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THREE HUNDRED AND FORTY-FIVE PROGRAM LOOPS PER SECOND. A BELL
IS SOUNDED EVERY 10 SECONDS, WHICH EQUALS 3456 PROGRAM LOOPS.

9.

PROGRAM DESCRIPTION

THE PROGRAM IS MADE UP OF 82 INDIVIDUAL TESTS FOR JMP AND
JMS. AN OCTAL COUNTER LOCATED AT MEMORY LOCATION 0136 ALWAYS
HOLDS THE NUMBER OF THE PRESENT TEST. FOR TEST 1 LOCATION,
0136 CONTAINS 0000 AND FOR TEST 82, 0136 CONTAINS 0121.
EACH TEST PERFORMS THE FOLLOWING FUNCTIONS:

A.   CHECK LOCATION 0136 FOR PROPER TEST NUMBER.

B.   PERFORMS ADDITIONAL CHECKING SUCH AS VERIFICATION OF THE
     STORED PC (PROGRAM COUNTER) ON A JMS.

C.   ADVANCES TEST COUNTER.

D.   SETS UP FOR NEXT TEST.

E.   JMP'S OR JMS'S TO THE NEXT TEST. THESE JMP AND JMS
     INSTRUCTIONS ARE THE ONES BEING TESTED.

IF THE PC DOES NOT ARRIVE AT THE PROPER PLACE AFTER PERFORMING
STEPS ABOVE, IT EITHER FALLS INTO THE BACKGROUND FIELD OF HLTS
OR INTO ANOTHER AREA OF THE PROGRAM. IF THE FIELD OF HLTS
IS ENCOUNTERED, THE PROGRAM HALTS IMMEDIATELY. IF A PROGRAM
FIELD IS ENTERED, IT IS MOST LIKELY THAT THE PROGRAM WILL
HALT WHEN THE TEST COUNTER CHECK IS MADE (LOCATION 136 EQUALS
THE TEST COUNT). IN A FEW REMOTE CASES IT IS POSSIBLE FOR THE
TEST COUNTER TO BE ADVANCED BY ONE, FOLLOWING THE ERRONEOUS
JMP OR JMS AND BEFORE THE HALT. IT IS ALSO POSSIBLE FOR THE
PROGRAM, ON A ERROR CONDITION, TO ENTER THE LOADERS STORED
IN THE LAST MEMORY PAGE. ALL OF THESE POSSIBILITIES SHOULD
BE KEPT IN MIND WHEN ANALYZING AN ERROR.

TEST 0 THROUGH 19 ARE TESTS FOR SAME PAGE JUMPING USING
DIRECT ADDRESSING. TESTS 20 THROUGH 45 TEST THE JMP
INSTRUCTION WITH INDIRECT ADDRESSING. IN THESE CASES, THE
ADDRESS THAT THE PROGRAM JUMPS TO IS ALWAYS THE COMPLEMENT
OF ITS PRESENT ADDRESS. JMS TESTS 1 THROUGH 12 ARE TESTS FOR
THE SAME PAGE USING DIRECT ADDRESSING. JMS TESTS 13 THROUGH 35
TEST JMS IN THE SAME MANNER AS JMP IS TESTED IN TEST 20 THROUGH
45.

THE TELETYPE BELL IS SOUNDED EVERY 10 SECONDS (3456 PROGRAM
CYCLES).