

**DataGeneral**

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**TECHNICAL  
STATEMENT**

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TEXT LISTING

068-000170-06

PROGRAM

TAPE UNIT TIMING TEST

TEXT TAPE

097-000170-06

ABSTRACT

TAPE UNIT TIMING TEST IS A MAINTENANCE PROGRAM DESIGNED TO TEST THE TAPE MOTION DELAYS IN THE TAPE CONTROL AND THE TAPE MOTION PRODUCED BY THE TRANSPORT MECHANICS. ANY TRANSPORT THAT IS READY AND WRITE ENABLED WILL BE TESTED.

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0001 .MAIN MACRO REV 06.30 07:44:14 05/16/79 10002 .MAIN

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PROGRAM NAME - TUT.SR  
TAPE UNIT TIMING TEST  
REVISION HISTORY  
06 ADD DLIB I/O PACKAGE  
MACHINE REQUIREMENTS

1. NOVA(EXCEPT MICRO) OR ECLIPSE FAMILY PROCESSOR  
2. 4K READ/WRITE MEMORY  
3. NRZI MAGNETIC TAPE CONTROLLER TYPE 4030  
4. ALL APPROPRIATE NRZI DRIVES  
5. TELETYPE OR CRT AND 4010 CONTROL

TEST REQUIREMENTS - N.A.  
SUMMARY

TAPE UNIT TIMING TEST IS A MAINTENANCE PROGRAM DESIGNED TO TEST THE TAPE MOTION DELAYS IN THE TAPE CONTROL AND THE TAPE MOTION PRODUCED BY THE TRANSPORT MECHANICS. ANY TRANSPORT THAT IS READY AND WRITE ENABLED WILL BE TESTED.  
RESTRICTIONS/MISC  
CLEAN THE TRANSPORT BEFORE TESTING.

PROGRAM DESCRIPTION  
THE NUMBER OF ITERATIONS OF A SMALL ROUTINE DURING THE TIME REQUIRED TO TYPE A CHARACTER ON THE TELETYPE (TYPE 33-37) IS RECORDED. THIS IS TO DETERMINE THE SPEED OF THE PROCESSOR. THE TAPE UNIT TIMING ROUTINES COUNT ITERATIONS OF SIMILAR LOOPS UNTIL THE TESTED CONDITION IS FALSE. THE ITERATION COUNT MULTIPLIED BY THE LOOP TIME IS THE RECORDED TIME.  
THE DECISION TO TEST A UNIT IS A FUNCTION OF READY AND WRITE ENABLE WHEN THE UNIT IS SELECTED.

SWITCH SETTINGS  
LOCATION "SMREG" IS USED TO SELECT THE PROGRAM OPTIONS (NOT SYSTEM CONFIGURATION). WHILE RUNNING UNDER OTOS, THIS LOCATION WILL BE LOADED BY THE MONITOR. HOWEVER UNDER STAND ALONE AND PROGRAM LOAD MODES THIS LOCATION WILL BE SET ACCORDING TO THE ANSWERS SUPPLIED BY THE OPERATOR. IN ANY CASE THE OPTIONS CAN BE CHANGED OR VERIFIED BY USING ONE OF THE COMMANDS GIVEN IN SEC. 8.3

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NAME: TUT.TX PART NUMBER: 097-000170  
DESCRIPTION: TAPE UNIT TIMING TEST  
REVISION HISTORY:

REV. DATE  
00 09/15/70  
01 01/15/71  
02 08/31/72  
03 08/24/73  
04 05/03/74  
05 05/28/76  
06 01/05/79

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01 SWITCH OPTIONS
02 DIFFERENT BITS AND THEIR INTERPRETATION AT LOCATION
03 "SWREG" IS AS FOLLOWS:
04
05 BIT OCTAL BINARY INTERPRETATION
06 VALUE VALUE
07
08 2 20000 0 PRINT TO CONSOLE
09 3 20000 1 ABORT PRINT OUT TO CONSOLE
10
11 5 02000 0 DO NOT PRINT ON THE LINE PRINTER
12 6 02000 1 PRINT ON THE LINE PRINTER
13
14 SWITCH COMMANDS
15 ONCE THE PROGRAM STARTS EXECUTING THE STATE OF ANY OF
16 THE BITS CAN BE CHANGED BY HITTING KEYS 1-9, A-F. THE
17 PROGRAM WILL CONTINUE RUNNING AFTER UPDATING THE OPTIONS.
18 EACH KEY WILL COMPLEMENT THE STATE OF THE BIT AFFILIAT-
19 ED WITH IT, THUS BIT 4 CAN BE ALTERED BY HITTING KEY 4.
20 SETTING OF ANY BIT OF LOCATION "SWREG" WILL SET BIT 0.
21 (DEFAULT MODE IS DEFINED AS ALL BITS OF SWREG SET TO 0)
22
23 OTHER COMMANDS (* = CONTROL KEY)
24
25 "CR" A "RETURN" CAN BE TYPED TO CONTINUE THE PROGRAM
26 AFTER ITS LOCKED IN A SWITCH MODIFICATION MODE
27
28 "D THIS COMMAND GIVEN AT ANY TIME WILL RESET "SWREG"
29 TO DEFAULT MODE AND RESTART THE PROGRAM.
30
31 "R THIS COMMAND GIVEN AT ANY TIME WILL RESTART THE
32 PROGRAM. SWITCHES ARE LEFT WITH THE VALUES THEY
33 HAD BEFORE THE COMMAND WAS ISSUED.
34
35 "O THIS COMMAND GIVEN AT ANY TIME WILL CAUSE THE
36 PROGRAM CONTROL TO GO TO OCT (NOTE: THIS IS AN
37 OPTIONAL COMMAND AND IS AVAILABLE ONLY IF
38 OCTPK IS PRESENT)
39
40 M THIS COMMAND GIVEN AT ANY TIME WILL PRINT THE
41 CURRENT OPERATING MODES.
42
43 0 THIS COMMAND GIVEN AT ANY TIME WILL LOCK
44 THE PROGRAM INTO SWITCH MODIFICATION MODE
45 WHERE MORE THAN 1 BIT CAN BE CHANGED.

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01 OPERATING PROCEDURE
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19.0 OPERATING PROCEDURE

LOAD THE PROGRAM VIA THE BINARY LOADER OR DIAGNOSTIC OPERATING SYSTEM. SET ON LINE AND WRITE ENABLE FOR ALL UNITS TO BE TESTED. SET SWITCHES AND HIT ANY KEY TO CONTINUE. IF THE PROGRAM ASKS: :TTO BAUD RATE? TYPE IN THE BAUD RATE OF THE CONSOLE FOLLOWED BY A CAR. RETURN

19.1 THE PROGRAM WILL TYPE THE UNIT NUMBER, DENSITY, AND 7 OR 9 CHANNEL, FOR THE FIRST AVAILABLE UNIT. THE DELAY TIMES MEASURED WILL THEN BE TYPED. WHEN COMPLETE THE PROGRAM WILL SEARCH FOR THE NEXT AVAILABLE UNIT.

19.2 THE TIMES THUS RECORDED SHOULD BE CHECKED AGAINST THE STANDARD FOR THE TYPE UNIT BEING TESTED. SAVE THE PRINTOUT TO PROVIDE A HISTORY FOR EACH TRANSPORT. OBSERVE CHANGES FROM THE TIMES PREVIOUSLY RECORDED.

19.3 STARTING ADDRESSES:

200 - TIMING TEST  
250 - TO ADD 40 TO THE PRESENT DEVICE CODE. PROGRAM WILL HALT AFTER CHANGING DEVICE CODE. RESTART AT 200.

PROGRAM OUTPUT

THE TIMES PRINTED REPRESENT THE RANGE (HIGHEST-LOWEST), LOWEST, AND HIGHEST TIMES RECORDED. FOR EACH PARAMETER MEASURED. THE TIMES PRINTED HAVE LIMITED PRECISION AND HAVE SOME INACCURACYS (ADJUSTMENTS SHOULD BE MADE WITH A SCOPE ONLY).

THE TIMES PRINTED REPRESENT THE FOLLOWING PARAMETER MEASUREMENTS:

- WRITE START DELAY= SEND CLOCK FROM WRITE COMMAND TO ITS ZERO STATE.
- WRITE STOP DELAY= SEND CLOCK DURING WRITE SHUT DOWN PROCEEDURE.
- WRITE START DELAY FROM LOAD POINT= SEND CLOCK FROM WRITE COMMAND TO ITS ZERO STATE WHEN THE TAPE IS AT LOAD POINT.
- WRITE EOF START DELAY= SEND CLOCK FROM WRITE A FILE MARK COMMAND TO ITS ZERO STATE.

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- WRITE EOF STOP DELAY= SEND CLOCK DURING THE SHUT DOWN PROCEDURE FOR EOF.

- READ/WRITE HEAD SEPERATION= SEND CLOCK A ZERO AFTER THE START DELAY HAS ENDED ON A WRITE END OF FILE COMMAND.

- SETTLE DOWN DELAY= READY STATUS ZERO AFTER SEND CLOCK STOP DELAY.

- FWD READ START DELAY= SEND CLOCK FROM SPACE FORWARD COMMAND TO ITS ZERO STATE.

- RVS READ START DELAY=SEND CLOCK FROM SPACE BACKWARD COMMAND TO ITS ZERO STATE.

- FWD READ STOP DELAY= SEND CLOCK DURING THE FORWARD READ SHUT DOWN PROCESS.

- RVS READ STOP DELAY= SEND CLOCK DURING THE BACKWARD READ SHUT DOWN PROCESS.

- READ START DELAY FROM LOAD POINT= SEND CLOCK FROM A SPACE FORWARD COMMAND TO ITS ZERO STATE, WHEN THE TAPE IS AT LOAD POINT.

- ERASE TIME= SEND CLOCK FROM A ERASE COMMAND TO ITS ZERO STATE.

- ERASE HEAD GAP= THE AMOUNT OF BLANK TAPE PRODUCED BY THE ERASE HEAD.

- WRITE GAP AFTER FWD READ= THE TAPE IS SPACED FORWARD, THEN COMMANDED TO WRITE ANOTHER RECORD. THE INTER-RECORD GAP PRODUCED IS MEASURED.

- GAP TIME, MINIMUM DELAY= THE INTER-RECORD GAPS PRODUCED BY WRITING RECORDS AT THE MAXIMUM POSSIBLE RATE IS MEASURED.

- GAP TIME, 1-100 MS DELAY= THE INTER-RECORD GAPS PRODUCED BY WRITING RECORDS WITH A VARIABLE DELAY BETWEEN WRITE COMMANDS.

- FWD STOP-RVS START TIME= TAPE IS COMMANDED TO SPACE FORWARD OVER A RECORD. TAPE IS THEN COMMANDED TO SPACE BACKWARD WITH TIME RECORDED FROM THE BACKSPACE COMMAND TO THE END OF A TWO WORD RECORD. THE TIME IS A FUNCTION OF FORWARD READ STOP AND BACK START.

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- FORWARD WRITE CREEP= TWO RECORDS ARE WRITTEN AND THE GAP TIME MEASURED. THE SECOND RECORD IS SPACED OVER BACKWARD THEN WRITTEN FORWARD. THE NEW GAP PRODUCED IS MEASURED. THE NEW GAP MINUS THE OLD GAP IS THE AMOUNT OF SPACE THE RECORD HAS MOVED. IN PROPER OPERATION THIS MUST MOVE THE RECORD DOWN TAPE.

U?DTD 11

OCTAL DEBUG TOOL (ODT)

THE DIAGNOSTIC IS EQUIPED WITH A BUILT IN ODT WHICH CAN BE ACCESSED BY HITTING CONTROL 0 ("O") AT ANY TIME DURING THE EXECUTION OF THE PROGRAM (AFTER SETTING THE PARAMETERS).

ON ENTERING ODT THE ADDRESS OF THE LOCATION HAVING THE NEXT INSTRUCTION TO BE EXECUTED WILL BE TYPED-OUT.

CONVENTIONS AND SYMBOLS

THE FOLLOWING CONVENTIONS ARE USED BY THE ODT:

? POUND WITH A "?"

@ ODT IS READY AND AT YOUR SERVICE.

COMMAND STRUCTURE

AN ODT COMMAND HAS THE FOLLOWING FORMAT:

(ARGUMENT) (COMMAND)

AN ARGUMENT MAY BE ONE OF THE FOLLOWING:

"EXP" AN OCTAL EXPRESSION CONSISTING OF OCTAL NUMBERS SEPARATED BY PLUS (+) OR MINUS (-) SIGNS. LEADING ZEROS NEED NOT BE TYPED.

"ADR" AN ADDRESS IS THE SAME AS AN EXPRESSION EXCEPT THAT BIT 0 IS NEGLECTED.

A COMMAND IS A SINGLE TELETYPE CHARACTER

ODT COMMANDS

THE LOCATIONS THAT CAN BE EXAMINED AND MODIFIED BY THE USER ARE CALLED CELLS. THESE CELLS ARE OF TWO TYPES:

INTERNAL CPU CELLS AND MEMORY LOCATIONS.

OPENING INTERNAL CELLS

THE COMMAND TO OPEN ONE OF THE INTERNAL REGISTERS IS OF THE FORM "NA" WHERE N IS ANY OCTAL EXPRESSION BETWEEN 0 AND 7

0-3 FOR ACCUMULATORS 0-3

4 FOR PC OF THE NEXT INSTRUCTION TO BE EXECUTED IN THE EVENT OF A "P" COMMAND.

5 CPU AND TTD STATUS

BIT INTERPRETATION

15 STATUS OF TTD DONE FLAG

14 STATUS OF INTERRUPTS (ION FLAG)

13 STATUS OF CARRY BIT

6 ADDRESS OF THE LOCATION HAVING THE BREAK POINT (IF ANY)

7 INSTRUCTION AT THE BREAK POINT LOCATION

OTHER COMMANDS TO OPEN CELLS ARE:

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"ADR"/ OPEN THE CELL AND PRINT ITS CONTENTS  
 ./ OPEN THE CELL CURRENTLY POINTED TO BY THE POINTER  
 AND PRINT ITS CONTENTS.  
 \*-"ADR"/ ADD "ADR" TO THE POINTER, OPEN THE CELL  
 AND PRINT ITS CONTENTS.  
 --"ADR"/ SUBTRACT "ADR" FROM THE POINTER, OPEN  
 THE CELL AND PRINT ITS CONTENTS.  
 "CR" THE RETURN KEY IS USED TO CLOSE THE OPEN CELL  
 WITH OR WITHOUT MODIFICATION.  
 "LF" LINE FEED IS USED TO CLOSE THE OPEN CELL WITH OR  
 WITHOUT MODIFICATION AND TO OPEN THE SUCCEEDING  
 CELL.  
 . CLOSE THE OPEN CELL WITH OR WITHOUT MODIFICATION  
 AND OPEN THE PRECEDING CELL  
 / CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND  
 OPEN THE CELL POINTED TO BY ITS CONTENTS.  
 \*"ADR"/ CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND  
 OPEN THE CELL POINTED TO BY ITS CONTENTS + "ADR".  
 -"ADR"/ CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND  
 OPEN THE CELL POINTED TO BY ITS CONTENTS - "ADR".

11.3.2 MODIFICATION OF A CELL  
 ONCE A CELL HAS BEEN OPENED ITS CONTENTS CAN BE MODIFIED  
 BY TYPING THE NEW VALUE THE CELL IS TO CONTAIN IN THE  
 FORM OF AN OCTAL EXPRESSION FOLLOWED BY "CR" OR "LF".  
 IF A + OR - IS TYPED AS THE FIRST CHARACTER OF THE EX-  
 PRESSION THEN THE VALUE OF THE EXPRESSION IS ADDED TO OR  
 SUBTRACTED FROM THE OLD CONTENTS OF THE CELL. THE  
 ADDRESS ITSELF OR AN EXPRESSION RELATIVE TO THE ADDRESS  
 CAN BE DEPOSITED BY TYPING A "." OR "+/-OCTAL EXPRESS-  
 ION". A RUBOUT COMMAND GIVEN RIGHT AFTER OPENING A CELL  
 ALLOWS THE MODIFICATION OF ITS CONTENTS AS IF THEY WERE  
 TYPED IN JUST BEFORE THE COMMAND WAS ISSUED.

11.3.3 OTHER OOT COMMANDS  
 RUBOUT THIS KEY IS USED TO DELETE ERRONEOUSLY TYPED  
 DIGITS. EACH TIME THE KEY IS PRESSED THE RIGHT MOST  
 DIGIT IS DELETED AND ECHOED ON THE TERMINAL. IF  
 THE RUBOUT KEY IS PRESSED RIGHT AFTER OPENING A  
 CELL THEN IT DELETES THE RIGHT MOST DIGIT OF THE CELLS  
 CONTENTS. THIS ALLOWS THE MODIFICATION OF THE CELL  
 AS IF ITS CONTENTS WERE TYPED IN JUST BEFORE THE  
 KEY WAS PRESSED.  
 "ADR"8 INSERT A BREAK POINT AT LOCATION "ADR".  
 ONLY ONE BREAK POINT CAN BE INSERTED AND ANY  
 ENTRY TO OOT AFTER EXECUTING A BREAK POINT WILL  
 CAUSE IT TO BE DELETED.  
 D DELETE THE BREAK POINT IF ANY.  
 P RESTART THE EXECUTION OF THE PROGRAM AT LOCATION  
 POINTED BY 4A.  
 "ADR"R START EXECUTING THE PROGRAM AT "ADR" AFTER AN  
 IO-RESET.  
 K KILL THE STRING TYPED SO FAR. THE OOT RESPONDS  
 WITH A "?" AND THE OPEN CELL IS CLOSED WITHOUT  
 MODIFICATION.  
 = PRINT THE OCTAL VALUE OF THE INPUT ONLY.  
 THIS WILL CLOSE ANY OPEN CELLS WITHOUT  
 MODIFICATION AND WILL NOT OPEN A CELL

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NOTE: IN PROGRAMS WHICH RELOCATE THEMSELVES THE  
 THE USER SHOULD PLACE BREAK POINTS ONLY IN THE  
 THE ORIGINAL PROGRAM AREA. IF A BREAK POINT IS  
 PLACED OUTSIDE THIS AREA THE RESULTS WILL  
 BE UNPREDICTABLE.

SPECIAL NOTES - N.A.  
 RUN TIME - THE RUNNING TIME IS APPROXIMATELY  
 5 MINUTES FOR EACH TAPE DRIVE  
 .EOT

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\*\*00000 TOTAL ERRORS, 00000 PASS 1 ERRORS

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070TD 000524 MC 6/11