

# TU10-TE10

TM,A,B-11/TU10,N,W/TE10N,W  
MD-11-DZTME-D  
DRIVE FUNCTION TIMER

EP-DZTME-D-DL-D  
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FICHE 1 OF 1

OCT 1977  
**digital**  
MADE IN USA

This microfiche card contains 40 frames of technical data, arranged in a 10x4 grid. Each frame contains a small table or diagram, likely representing timing or drive function data for the TU10-TE10 device. The data is too small to read clearly but appears to be organized into columns and rows, possibly representing different test conditions or parameters.

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MAINDEC-11-DZTME-D-D TM,A,B-11/TU10,N,W/TE10N,W DRIVE FUNCTION TIMER MACY11 30(1046) 19-AUG-77 08:33 PAGE 2 SEQ 0001  
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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZTME-D-D  
PRODUCT NAME: TM,A,B-11/TU10,N,W/TE10N,W DRIVE FUNCTION TIMER  
DATE : AUGUST 1977  
MAINTAINER: DIAGNOSTIC ENGINEERING  
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001

MAINDEC-11-DZTME-D-D  
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19-AUG-77 08:33

TM,A,B-11/TU10,N,W/TE10N,W DRIVE FUNCTION TIMER MACY11 30(1046)

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## 1. ABSTRACT

THE DRIVE FUNCTION TIMER ASSISTS IN THE TESTING OF THE TM-11 OR TMA,B-11 CONTROL UNIT AND TU10 OR TU10W OR TU10N OR TE10N OR TE10W TAPE UNITS.

OPERATIONS ARE EXECUTED, TIMED, AND THE TIMES ARE THEN PRINTED (IN MILLISECONDS). THERE IS NO LIMIT OR ERROR TESTING FACILITIES IN THE PROGRAM, THE DECISION ON THE VALIDITY OF TIMES MEASURED MUST BE MADE BY THE OPERATOR. ANY CONFIGURATION OF UP TO 8 TU10,N,W/TE10N,W TAPE UNITS (7 AND 9 CHANNEL) MAY BE SELECTED.

## 2. REQUIREMENTS

### 2.1 EQUIPMENT

PDP-11; TM,A,B-11 TAPE CONTROL UNIT AND 1 TO 8 TAPE DRIVES.  
(TU10,N,W/TE10N,W AND ANY CONFIGURATION OF 7 OR 9 CHANNEL DRIVES)  
\*NOTE: TU10W/TE10W TAPE UNITS WILL GO IN COMBINATION W/TMA,B-11 CONTROL UNITS ONLY.

### 2.2 STORAGE

#### 2.2.1 PROGRAM STORAGE

THE PROGRAM REQUIRES 4K OF MEMORY.

## 3. LOADING PROCEDURE

### 3.1 METHOD

- A. PROCEDURE FOR NORMAL BINARY TAPES SHOULD BE FOLLOWED
- B. PROGRAM IS LOADABLE AND CHAINABLE IN 8K OF MEMORY.  
DEFAULT IS DRIVE 0 9TRK ONLY.

# FO1

4.    STARTING PROCEDURE

4.1    BEFORE STARTING PROGRAM SET LOC. 176 WITH DESIRED CONTROL SETTINGS. (DEFAULT=200:DRIVE 0;9 TRK)

BITS 15-0 ARE USED TO INDICATE THE TAPE UNIT CONFIGURATION.

15=1	HAVE UNIT 0	SELECTED,	7 TRACK
14=1	"	"	"
13=1	"	"	"
12=1	"	"	"
11=1	"	"	"
10=1	"	"	"
9=1	"	"	"
8=1	"	"	"
7=1	HAVE UNIT 0	SELECTED,	9 TRACK
6=1	"	"	"
5=1	"	"	"
4=1	"	"	"
3=1	"	"	"
2=1	"	"	"
1=1	"	"	"
0=1	"	"	"

4.2    STARTING ADDRESS

200

4.3    PROGRAM AND/OR OPERATOR ACTION

LOAD PROGRAM INTO MEMORY.  
 SET DESIRED TAPE UNITS ON-LINE.  
 LOAD LOC. 176 WITH CONTROL SETTINGS (SEE 4.1)  
 LOAD STARTING ADDRESS.  
 PRESS START.  
 THE PROGRAM WILL BEGIN TIMING FUNCTIONS.  
 ON COMPLETION OF ALL TESTS "END OF TIMING" WILL BE PRINTED AND  
 THE PROCESSOR WILL HALT.  
 TO REPEAT TEST: IF SAME CONTROL SETTINGS ARE DESIRED SIMPLY PRESS CONTINUE.  
 IF DIFFERENT SETTINGS ARE NECESSARY RELOAD LOC.176 AND LOAD ADDRESS 200-START.

5.    OPERATING PROCEDURE

5.1    OPERATIONAL SWITCH SETTINGS

NONE

## 6. ERRORS

THE PROGRAM HAS NO INTERNAL ERROR DETECTION FACILITIES AND, THEREFORE, NO ACTUAL ERROR TYPEOUTS. THE VALIDITY OF THE TIMES MEASURED MUST BE DETERMINED BY THE OPERATOR.

## 6.1 TIME RELATIONSHIPS

- A. "READ SHUTDOWN" MUST BE < "WRITE SHUTDOWN".
- B. GAPS MUST = 8>7>6>5>4>3, 3=2=1 (1.5).
- C. "WRITE EOF" SHOULD BE SLIGHTLY > "WRITE XIRG".

## \*NOTE:

- 1. TU10 TIMING INFO REFERENCE 6.2
- 2. TE10W (M8926) TIMING INFO REFERENCE 6.3
- 3. TU10W (M9826) TIMING INFO REFERENCE 6.4
- 4. TU10N/TE10N (M8927) TIMING INFO REFERENCE 6.5

# H01

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6.2 TIME LIMITS AND PRINTOUT FORMAT \*\*\*\*\*  
 \*\*\* TU10 ONLY \*\*\*  
 \*\*\*\*\*

TIMES INDICATED UNDER "UNIT A" ARE STANDARD FOR A 9 CHANNEL UNIT AND "UNIT B" FOR A 7 CHANNEL UNIT. TIMES ARE IN MILLISECONDS. TOLERANCES INDICATED WITHIN "()" ARE PLUS OR MINUS.

FUNCTION	UNIT A (9 CHANNEL)	UNIT B (7 CHANNEL)
WRITE FROM BOT DELAY	180.0 (15.0)	SAME
WRITE SHUTDOWN	7.1 (1.0)	10.4 (1.0)
WRITE START	8.9 (0.4)	12.6 (0.5)
SETTLE DOWN DELAY	12.0 (4.0)	SAME
WRITE TO ERASE HEAD	11.0 (4.0)	SAME
BACKSPACE SHUTDOWN	2.2 (0.3)	6.5 (0.5)
READ SHUTDOWN	2.2 (0.3)	SAME
GAPS SHOULD = 8>7>6>5>4>3 3=2=1 (1.5).		
GAP 1	13.4	SEE
GAP 2	13.4	NOTE
GAP 3	13.4	ABOVE
GAP 4	16.8	26.7
GAP 5	20.2	33.3
GAP 6	23.4	39.9
GAP 7	26.5	46.5
GAP 8	30.2	53.1
WRITE START	8.9 (0.4)	12.6 (0.5)
WRITE XIRG	95.0 (10.0)	SAME
READ FROM BOT DELAY	90.0 (10.0)	SAME
WRITE EOF	114.0 (10.0)	118.0 (10.0)
EOF TO EOF SP TIME	100.0 (10.0)	SAME
SPACE SHUTDOWN	2.2 (0.3)	SAME
ONE INCH DATA TIME	22.3 (1.0)	SAME
*FUNCTIONS AT 556 BPI		
WRITE FROM BOT	.0	185.0 (15.0)
ONE INCH DATA TIME	.0	22.0 (0.8)
WRITE SHUTDOWN	.0	10.4 (1.0)
BACKSPACE SHUTDOWN	.0	6.7 (0.5)
READ SHUTDOWN	.0	2.3 (0.3)
*FUNCTIONS AT 200 BPI		
WRITE FROM BOT	.0	185.0 (15.0)
ONE INCH DATA TIME	.0	22.0 (1.0)
WRITE SHUTDOWN	.0	10.4 (1.0)
BACKSPACE SHUTDOWN	.0	7.5 (0.5)
READ SHUTDOWN	.0	3.1 (0.3)
END OF TIMING		

\* NOTE: THESE TIMES ONLY PRINTED WHEN ONE OR MORE 7 CHANNEL TAPE UNITS ARE SELECTED.



6.3 TIME LIMITS AND PRINTOUT FORMAT \*\*\*\*\*  
 \*\*\* TE10W (M8926) ONLY \*\*\*  
 \*\*\*\*\*

TIMES INDICATED UNDER "UNIT A" ARE STANDARD FOR A 9 CHANNEL UNIT AND "UNIT B" FOR A 7 CHANNEL UNIT. TIMES ARE IN MILLISECONDS. TOLERANCES INDICATED WITHIN "()" ARE PLUS OR MINUS.

FUNCTION	UNIT A (9 CHANNEL)	UNIT B (7 CHANNEL)
WRITE FROM BOT DELAY	151.5 (15.0)	200.7 (15.0)
WRITE SHUTDOWN	6.5 (0.6)	6.8 (0.6)
WRITE START	8.9 (0.8)	15.1 (1.3)
SETTLE DOWN DELAY	12.0 (4.0)	SAME
WRITE TO ERASE HEAD	11.0 (5.0)	SAME
BACKSPACE SHUTDOWN	2.2 (0.2)	6.6 (0.6)
READ SHUTDOWN	2.2 (0.2)	SAME
GAPS SHOULD = 8>7>6>5>4>3	3=2=1 (1.5)	(1.6)
GAP 1	13.2	SEE
GAP 2	13.2	NOTE
GAP 3	13.2	ABOVE
GAP 4	16.8	26.7
GAP 5	20.2	33.3
GAP 6	23.4	39.9
GAP 7	26.5	46.5
GAP 8	30.2	53.1
WRITE START	8.9 (0.8)	15.1 (1.3)
WRITE XIRG	95.0 (9.0)	98.6 (9.0)
READ FROM BOT DELAY	35.0 (5.0)	87.0 (9.0)
WRITE EOF	114.0 (15.0)	117.2 (15.0)
EOF TO EOF SP TIME	100.9 (9.0)	104.4 (9.0)
SPACE SHUTDOWN	2.2 (0.2)	SAME
ONE INCH DATA TIME	22.3 (1.0)	SAME
*FUNCTIONS AT 556 BPI		
WRITE FROM BOT	.0	200.7 (15.0)
ONE INCH DATA TIME	.0	22.3 (1.0)
WRITE SHUTDOWN	.0	7.2 (0.7)
BACKSPACE SHUTDOWN	.0	6.9 (0.6)
READ SHUTDOWN	.0	2.3 (0.2)
*FUNCTIONS AT 200 BPI		
WRITE FROM BOT	.0	200.7 (15.0)
ONE INCH DATA TIME	.0	22.3 (1.0)
WRITE SHUTDOWN	.0	9.4 (1.0)
BACKSPACE SHUTDOWN	.0	7.9 (0.7)
READ SHUTDOWN	.0	3.3 (0.3)
END OF TIMING		

\* NOTE: THESE TIMES ONLY PRINTED WHEN ONE OR MORE 7 CHANNEL TAPE UNITS ARE SELECTED.

6.4

TIME LIMITS AND PRINTOUT FORMAT \*\*\* TU10W (M8926) ONLY \*\*\*

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TIMES INDICATED UNDER "UNIT A" ARE STANDARD FOR A 9 CHANNEL UNIT AND "UNIT B" FOR A 7 CHANNEL UNIT. TIMES ARE IN MILLISECONDS. TOLERANCES INDICATED WITHIN "()" ARE PLUS OR MINUS.

FUNCTION	UNIT A (9 CHANNEL)	UNIT B (7 CHANNEL)
WRITE FROM BOT DELAY	184.6 (15.0)	200.7 (15.0)
WRITE SHUTDOWN	6.5 (0.6)	6.8 (0.6)
WRITE START	8.9 (0.8)	15.1 (1.3)
SETTLE DOWN DELAY	12.0 (4.0)	SAME
WRITE TO ERASE HEAD	11.0 (5.0)	SAME
BACKSPACE SHUTDOWN	2.2 (0.2)	6.6 (0.6)
READ SHUTDOWN	2.2 (0.2)	SAME
GAPS SHOULD = 8>7>6>5>4>3, 3=2=1	(1.5)	(1.6)
GAP 1	13.2	SEE NOTE ABOVE
GAP 2	13.2	
GAP 3	13.2	
GAP 4	16.8	
GAP 5	20.2	
GAP 6	23.4	
GAP 7	26.5	
GAP 8	30.2	
WRITE START	8.9 (0.8)	15.1 (1.3)
WRITE XIRG	95.0 (9.0)	98.6 (9.0)
READ FROM BOT DELAY	150.6 (13.0)	90.0 (9.0)
WRITE EOF	114.0 (15.0)	117.2 (15.0)
EOR TO EOF SP TIME	100.9 (9.0)	104.4 (9.0)
SPACE SHUTDOWN	2.2 (0.2)	SAME
ONE INCH DATA TIME	22.3 (1.0)	SAME
*FUNCTIONS AT 556 BPI		
WRITE FROM BOT	.0	200.7 (15.0)
ONE INCH DATA TIME	.0	22.3 (1.0)
WRITE SHUTDOWN	.0	7.2 (0.7)
BACKSPACE SHUTDOWN	.0	6.9 (0.6)
READ SHUTDOWN	.0	2.3 (0.2)
*FUNCTIONS AT 200 BPI		
WRITE FROM BOT	.0	200.7 (15.0)
ONE INCH DATA TIME	.0	22.3 (1.0)
WRITE SHUTDOWN	.0	9.4 (1.0)
BACKSPACE SHUTDOWN	.0	7.9 (0.7)
READ SHUTDOWN	.0	3.3 (0.3)
END OF TIMING		

\* NOTE: THESE TIMES ONLY PRINTED WHEN ONE OR MORE 7 CHANNEL TAPE UNITS ARE SELECTED.

6.5 TIME LIMITS AND PRINTOUT FORMAT \*\*\*\*\*  
 \*\*\* TU10N/TE10N (M8927) \*\*\*  
 \*\*\*\*\*

TIMES INDICATED UNDER "UNIT A" ARE STANDARD FOR A 9 CHANNEL UNIT AND "UNIT B" FOR A 7 CHANNEL UNIT. TIMES ARE IN MILLISECONDS. TOLERANCES INDICATED WITHIN "()" ARE PLUS OR MINUS.

FUNCTION	UNIT A (9 CHANNEL)	UNIT B (7 CHANNEL)
WRITE FROM BOT DELAY	180.0 (15.0)	SAME
WRITE SHUTDOWN	7.1 (1.0)	7.1 (1.0)
WRITE START	8.9 (0.4)	15.3 (0.5)
SETTLE DOWN DELAY	12.0 (4.0)	SAME
WRITE TO ERASE HEAD	11.0 (4.0)	SAME
BACKSPACE SHUTDOWN	2.2 (0.3)	6.5 (0.5)
READ SHUTDOWN	2.2 (0.3)	SAME
GAPS SHOULD = 8>7>6>5>4>3 3=2=1 (1.5).		
GAP 1	13.4	SEE
GAP 2	13.4	NOTE
GAP 3	13.4	ABOVE
GAP 4	16.8	26.7
GAP 5	20.2	33.3
GAP 6	23.4	39.9
GAP 7	26.5	46.5
GAP 8	30.2	53.1
WRITE START	8.9 (0.4)	15.3 (0.5)
WRITE XIRG	95.0 (10.0)	SAME
READ FROM BOT DELAY	90.0 (10.0)	SAME
WRITE EOF	114.0 (10.0)	118.0 (10.0)
EOF TO EOF SP TIME	100.0 (10.0)	SAME
SPACE SHUTDOWN	2.2 (0.3)	SAME
ONE INCH DATA TIME	22.3 (1.0)	SAME
*FUNCTIONS AT 556 BPI		
WRITE FROM BOT	.0	185.0 (15.0)
ONE INCH DATA TIME	.0	22.0 (0.8)
WRITE SHUTDOWN	.0	7.1 (1.0)
BACKSPACE SHUTDOWN	.0	6.7 (0.5)
READ SHUTDOWN	.0	2.3 (0.3)
*FUNCTIONS AT 200 BPI		
WRITE FROM BOT	.0	185.0 (15.0)
ONE INCH DATA TIME	.0	22.0 (1.0)
WRITE SHUTDOWN	.0	7.1 (1.0)
BACKSPACE SHUTDOWN	.0	7.5 (0.5)
READ SHUTDOWN	.0	3.1 (0.3)
END OF TIMING		

\* NOTE: THESE TIMES ONLY PRINTED WHEN ONE OR MORE 7 CHANNEL TAPE UNITS ARE SELECTED.

## 7. RESTRICTIONS

## 7.1 STARTING RESTRICTIONS

AT LEAST ONE TU10/TE10 TAPE UNIT MUST BE "ON-LINE" AND SELECTED BY SWITCHES PER 4.1. ALSO MAKE CERTAIN THAT EACH TM10 THAT IS "ON-LINE" HAS A UNIQUE UNIT NUMBER SELECTED.

## 7.2 OPERATING RESTRICTIONS

THE INSTRUCTION TEST MUST RUN WITHOUT ERRORS BEFORE ATTEMPTING TO OPERATE THIS PROGRAM. (DZTMA)

## 8. MISCELLANEOUS

## 8.1 EXECUTION TIME

NOT APPLICABLE

# M01

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SEQ 0011

## 9.0 PROGRAM DESCRIPTION

### 9.1 WRITE FROM BOT DELAY

WRITE FROM BOT DELAY IS THE TIME NECESSARY TO MOVE THE BEGINNING OF THE (BOT) MARKER APPROXIMATELY 6 INCHES PAST THE WRITE HEAD. THE FIRST RECORD ON TAPE MUST BE WRITTEN AT LEAST 3 INCHES AWAY FROM THE BOT MARKER.

#### PROCEDURE TO MEASURE TIME:

- A. IF TU10 IS NOT AT BOT IT IS REWOUND TO BOT.
- B. INITIALIZE BYTE RECORD COUNTER AND CURRENT MEMORY ADDRESS REGISTER.
- C. ISSUE WRITE FUNCTION, 800 BPI, SET "GO".
- D. MONITOR CURRENT MEMORY ADDRESS REGISTER TO DETERMINE WHEN 2ND BYTE IS OUTPUT.
- E. THE TIME FROM "GO" UNTIL 2ND BYTE IS OUTPUT IS APPROXIMATELY EQUAL TO "WRITE FROM BOT DELAY".

### 9.2 WRITE SHUTDOWN

WRITE SHUTDOWN IS THE AMOUNT OF TIME NECESSARY TO CONTINUE MOVING TAPE AFTER A RECORD IS WRITTEN SO THAT THE PROPER INTERRECORD GAP WILL EXIST BETWEEN RECORDS.

#### PROCEDURE TO MEASURE TIME:

- A. THE PROGRAM USES THE SAME RECORD THAT WAS WRITTEN TO TIME "WRITE FROM BOT DELAY".
- B. AFTER THE LAST BYTE (BC=0), INDICATING THE END OF THE RECORD, MONITOR "SETTLEDOWN" UNTIL IT BECOMES A 1.
- C. THE TIME FROM "BC=0" UNTIL "SETTLEDOWN" IS "WRITE SHUTDOWN".

## 9.3 WRITE START

WRITE START IS THE TIME NECESSARY FOR TAPE TO ACCELERATE TO FULL SPEED AND GUARANTEE A 1/2 INCH INTERRECORD GAP.

PROCEDURE TO MEASURE TIME:

SAME AS "WRITE FROM BOT" EXCEPT NOW WE ARE NOT AT BOT.

- A. INITIALIZE BYTE RECORD COUNTER AND CURRENT MEMORY ADDRESS REGISTER.
- B. ISSUE WRITE FUNCTION, 800 BPI, SET "GO".
- C. MONITOR CURRENT MEMORY ADDRESS REGISTER TO DETERMINE WHEN 2ND BYTE IS OUTPUT.
- D. THE TIME FROM "GO" UNTIL 2ND BYTE IS OUTPUT IS APPROXIMATELY EQUAL TO "WRITE START".

## 9.4 SETTLEDOWN DELAY

TAPE DOES NOT ACTUALLY COME TO A COMPLETE STOP UNTIL SOME PERIOD OF TIME AFTER SHUTDOWN HAS ENDED. ALSO, AFTER TAPE HAS FULLY STOPPED, AN ADDITIONAL PERIOD OF TIME IS NECESSARY FOR THE TAPE AND HARDWARE TO "SETTLEDOWN" AND BECOME STABLE. THE "SETTLEDOWN DELAY" IS THE PERIOD OF TIME NECESSARY FOR THE TAPE AND MECHANICAL CHARACTERISTICS OF THE TU10 TO BECOME STABLE, SO THAT THE UNIT CANNOT BE OPERATED, START/STOP, AT A FREQUENCY WHERE IT IS MECHANICALLY RESONANT.

PROCEDURE TO MEASURE TIME:

- A. THE PROGRAM USES THE SAME RECORD THAT WAS WRITTEN TO TIME "WRITE START".
- B. AFTER "SETTLEDOWN" BECOMES A 1, INDICATING THE START OF SETTLEDOWN, MONITOR "TU READY" UNTIL IT BECOMES A 1.
- C. THE TIME FROM "SETTLEDOWN" UNTIL "TU READY" IS "SETTLEDOWN".

## 9.5 WRITE TO ERASE HEAD

THE PURPOSE OF THE ERASE HEAD IS TO INSURE THAT THE TAPE IS IN THE SAME FLUX STATE AS THE WRITE HEADS. THIS IS NECESSARY FOR SEVERAL REASONS.

1. START/STOP CHARACTERISTICS VARY AMONG TAPE UNITS AND IT WOULD BE POSSIBLE TO LEAVE OLD DATA IN THE INTERRECORD GAPS WHEN USING A TAPE ON MORE THAN ONE UNIT.
2. A TAPE PREVIOUSLY USED AT ONE RECORDING DENSITY COULD NOT BE USED LATER AT ANOTHER DENSITY.
3. TRACK ALIGNMENT AND HEAD WIDTH VARY FROM TAPE UNIT TO TAPE UNIT AND IT WOULD BE POSSIBLE FOR DATA TO BE LEFT ON THE TRACK EDGES FROM OLD RECORDS.

THE "WRITE TO ERASE HEAD" TEST INSURES THAT THE TAPE IN FRONT OF THE WRITE HEAD IS ERASED DURING A WRITE OPERATION.

PROCEDURE TO MEASURE TIME:

- A. A LONG RECORD HAS BEEN WRITTEN FROM BOT. SAME RECORD THAT WAS USED TO TIME "WRITE FROM BOT DELAY".
- B. TAPE IS REWOUND TO BOT.
- C. BYTE RECORD COUNTER IS INITIALIZED FOR A 3 BYTE RECORD AND CURRENT MEMORY ADDRESS REGISTER IS INITIALIZED.
- D. ISSUE WRITE FUNCTION, 800 BPI, SET "GO".
- E. MONITOR BYTE RECORD COUNTER UNTIL IT = 0 INDICATING THAT 2 BYTES ARE WRITTEN IMMEDIATELY ISSUE A POWER CLEAR WHICH STOPS ALL DATA TRANSFERS AND CAUSES THE DRIVE TO SHUTDOWN.
- F. TAPE IS REWOUND TO BOT
- G. INITIALIZE BYTE RECORD COUNTER (3 BYTES) AND CURRENT MEMORY ADDRESS REGISTER.
- H. ISSUE READ FUNCTION, 800 BPI, SET GO
- I. MONITOR BYTE RECORD COUNTER UNTIL IT = -1 AND THEN TIME UNTIL IT = 0. THIS TIME WILL INDICATE THE DISTANCE BETWEEN THE 2ND BYTE AND THE 3RD BYTE WHICH IS ALSO THE AMOUNT OF TAPE THAT WAS ERASED BY THE ERASE HEAD DURING THE WRITE OPERATION OR "WRITE TO ERASE HEAD".

## 9.6 BACKSPACE SHUTDOWN

"BACKSPACE SHUTDOWN" IS THE LENGTH OF TIME NECESSARY TO GUARANTEE THAT IF A WRITE OPERATION FOLLOWS A BACKSPACE THE TAPE WILL BE POSITIONED SUCH THAT ALL PREVIOUS DATA IS IN FRONT OF THE WRITE AND ERASE HEADS AND WILL BE ERASED. "BACKSPACE SHUTDOWN" MUST BE LESS THAN "WRITE START" SO THAT INTERRECORD GAPS WILL INCREASE IF A BACKSPACE/REWRITE OPERATION IS INITIATED.

## PROCEDURE TO MEASURE TIME:

- A. INITIALIZE BYTE RECORD COUNTER AND CURRENT MEMORY ADDRESS REGISTER.
- B. ISSUE WRITE EOF FUNCTION, 800 BPI, SET "GO"
- C. AFTER EOF RECORD IS WRITTEN WAIT FOR "TU READY".
- D. SET BYTE RECORD COUNTER TO BACKSPACE 1 RECORD.
- E. ISSUE BACKSPACE FUNCTION, SET "GO".
- F. AFTER "EOF" BECOMES A 1, INDICATING THE RECOGNITION OF THE "EOF" RECORD, MONITOR "SETTLEDOWN" UNTIL IT BECOMES A 1.
- G. THE TIME FROM "EOF" UNTIL "SETTLEDOWN" IS "BACKSPACE SHUTDOWN".

## 9.7 READ SHUTDOWN

READ SHUTDOWN IS THE AMOUNT OF TIME NECESSARY TO CONTINUE MOVING TAPE AFTER A RECORD IS READ SO THAT THERE IS ENOUGH GAP FOR TAPE TO BE FULLY ACCELERATED IF A READ IS FOLLOWED BY A BACKSPACE. "READ SHUTDOWN" MUST ALSO BE LESS THAN "WRITE SHUTDOWN" TO GUARANTEE THAT THE WRITE AND ERASE HEADS WILL BE POSITIONED SUCH THAT ALL PREVIOUS DATA IS IN FRONT OF THE HEADS AND WILL BE ERASED IF A WRITE FOLLOWS A READ. IN ADDITION, WHEN A WRITE FOLLOWS A READ THE INTERRECORD GAP MUST STILL BE AT LEAST 1/2 OF AN INCH.

## PROCEDURE TO MEASURE TIME:

- A. RECORD PREVIOUSLY USED IN "BACKSPACE SHUTDOWN" IS READ.
- B. INITIALIZE BYTE RECORD COUNTER AND CURRENT MEMORY ADDRESS REGISTER
- C. ISSUE READ FUNCTION, 800 BPI, SET "GO".
- D. AFTER "EOF" BECOMES A 1, INDICATING THE END OF THE RECORD, MONITOR "SETTLEDOWN" UNTIL IT BECOMES A 1.
- E. THE TIME FROM "EOF" UNTIL "SETTLEDOWN" IS "READ SHUTDOWN"



## 9.8 GAP CONSISTENCY

FOR PROPER OPERATION, THE INTERRECORD GAPS ON TAPE MUST ALWAYS BE AT LEAST 1/2 OF AN INCH. THIS WILL ALLOW DATA WRITTEN USING ONE TAPE UNIT TO BE READ ON ANOTHER TAPE UNIT WHEN THE START/STOP CHARACTERISTICS OF EACH UNIT ARE DIFFERENT. THE MINIMUM GAP SIZE OF 1/2 INCH IS GENERATED WHEN A WRITE FOLLOWS A READ. ALL OTHER GAPS SHOULD BE LARGER DEPENDING ON HOW THEY WERE WRITTEN.

## PROCEDURE TO MEASURE TIME:

- A. A TOTAL OF NINE RECORDS ARE WRITTEN ON TAPE (FROM BOT) UTILIZING DIFFERENT SEQUENCES TO GENERATE THE INTERRECORD GAPS.
- B. THE TAPE IS REWOUND TO BOT.
- C. INITIALIZE BYTE RECORD COUNTER AND CURRENT MEMORY ADDRESS REGISTER.
- D. ISSUE READ FUNCTION, 800 BPI, SET "GO".
- E. WAIT FOR "CU READY" TO BECOME A 1, THEN REPEAT STEP C AND RESET "GO" TO CONTINUE.
- F. MONITOR CURRENT MEMORY ADDRESS TO DETERMINE WHEN 2ND BYTE IS INPUT.
- G. THE TIME FROM WHEN "GO" IS RESET UNTIL THE 2ND BYTE IS INPUT WILL REFLECT THE SIZE OF THE GAP.
- H. STEPS E, F ARE REPEATED UNTIL ALL 8 GAPS ARE MEASURED.

## PROGRAM SEQUENCE FOR EACH GAP:

- |       |  |
|-------|--|
| GAP 1 | WRITE FOLLOWED BY A WRITE (START/STOP).                |
| GAP 2 | WRITE FOLLOWED BY A WRITE (START/STOP).                |
| GAP 3 | READ FOLLOWED BY A WRITE (START/STOP).                 |
| GAP 4 | WRITE-BACKSPACE FOLLOWED BY A WRITE (START/STOP).      |
| GAP 5 | SAME AS GAP 4 EXCEPT WRITE-BACKSPACE REPEATED 2 TIMES. |
| GAP 6 | SAME AS GAP 4 EXCEPT WRITE-BACKSPACE REPEATED 3 TIMES. |
| GAP 7 | SAME AS GAP 4 EXCEPT WRITE-BACKSPACE REPEATED 4 TIMES. |
| GAP 8 | SAME AS GAP 4 EXCEPT WRITE-BACKSPACE REPEATED 5 TIMES. |

## GAP LENGTHS SHOULD REFLECT THE FOLLOWING RELATIONSHIP:

8>7>6>5>4>3, 3=2=1 (1.5).

## 9.9 WRITE START

THIS IS A REPEAT OF THE "WRITE START" TEST PREVIOUSLY COMPLETED (REFERENCE 9.3). IT'S PURPOSE IS TO DETERMINE IF TAPE WILL DRIFT BACKWARDS TO BOT IF A "POWER CLEAR" IS ISSUED AS SOON AS BOT DISAPPEARS WHEN MOVING FORWARD FROM BOT. TIME SHOULD EQUAL "WRITE START" AS MEASURED IN 9.3.

## 9.10 WRITE XIRG

WRITE WITH AN EXTENDED INTERRECORD GAP IS A FUNCTION THAT CAUSES THE GENERATION OF AN INTERRECORD GAP THAT IS AT LEAST 3 INCH LONG AS COMPARED WITH THE NORMAL 3/5 INCH GAP. THE PURPOSE IS TO ELIMINATE WRITE ERRORS THAT MAY BE CAUSED BY A DEFECTIVE AREA ON TAPE. NORMALLY ONE REWRITE WITH XIRG WOULD BE SUFFICIENT TO MOVE PAST THE BAD SPOT, HOWEVER IF IT ISN'T, THE PROCEDURE WOULD BE TO REPEAT THE "BACKSPACE-REWRITE WITH XIRG" SEQUENCE UNTIL A RECORD IS WRITTEN WITHOUT ERRORS. EACH SUCCESSIVE REWRITE WOULD ADD 3 INCHES TO THE INTERRECORD GAP UNTIL "GOOD" TAPE WAS REACHED.

## PROCEDURE TO MEASURE TIME:

- A. TAPE IS NOT AT BOT
- B. INITIALIZE BYTE RECORD COUNTER AND CURRENT MEMORY ADDRESS REGISTER.
- C. ISSUE WRITE WITH XIRG FUNCTION, 800 BPI, SET "GO".
- D. MONITOR CURRENT MEMORY ADDRESS REGISTER TO DETERMINE WHEN 2ND BYTE IS OUTPUT.
- E. THE TIME FROM "GO" UNIT 2ND BYTE IS OUTPUT IS "WRITE WITH XIRG".

## 9.11 READ FROM BOT

THE FIRST RECORD WRITTEN ON TAPE IS SUPPOSED TO BE AT LEAST 6 INCHES FROM THE BOT MARKER. IN THE EVENT THAT THIS CONDITION WASN'T MET IT IS STILL DESIREABLE TO READ THE RECORD. READ FROM BOT IS THE TIME FROM WHEN A READ FUNCTION IS ISSUED UNTIL THE 2ND BYTE IS INPUT.

## PROCEDURE TO MEASURE TIME:

- A. THE RECORD THAT WAS WRITTEN JUST OFF BOT DURING "WRITE START" (REFERENCE 9.10) IS USED.
- B. TAPE IS REWOUND TO BOT
- C. INITIALIZE BYTE RECORD COUNTER AND CURRENT MEMORY ADDRESS REGISTER.
- D. ISSUE READ FUNCTION, 800 BPI, SET "GO".
- E. MONITOR CURRENT MEMORY ADDRESS REGISTER TO DETERMINE WHEN 2ND BYTE IS INPUT.
- F. THE TIME FROM "GO" UNTIL 2ND BYTE IS INPUT IS "READ FROM BOT".

## 9.12 WRITE EOF.

TO WRITE AN END OF FILE MARK IT IS NECESSARY FOR TAPE TO MOVE 3 INCHES BEFORE WRITING. IN THAT RESPECT IT IS SIMILAR TO WRITING A RECORD WITH EXTENDED INTERRECORD GAP. HOWEVER, AN EOF MARK CORRESPONDS TO A 1 BYTE RECORD. THE TIME SHOULD BE SLIGHTLY LARGER THAN "WRITE XIRG".

## PROCEDURE TO MEASURE TIME:

- A. TAPE UNIT IS REWOUND TO BOT.
- B. INITIALIZE BYTE RECORD COUNTER AND CURRENT MEMORY ADDRESS REGISTER.
- C. ISSUE WRITE FUNCTION, 800 BPI, SET "GO".
- D. WAIT FOR "CU READY" AND THEN "TU READY" TO BECOME A 1.
- E. ISSUE WRITE EOF FUNCTION, 800 BPI, SET "GO".
- F. WAIT FOR "TU READY" TO BECOME A 1.
- G. THE TIME FROM "GO" UNTIL "TU READY" IS "WRITE EOF".

## 9.13 EOR TO EOF SPACE TIME

EOB TO EOF SPACE TIME IS THE TIME NEEDED TO MOVE TAPE FROM THE END OF A RECORD TO AN END OF FILE MARK WRITTEN AFTER IT. THE PROCEDURE USED TURNS OUT TO BE A TEST OF THE WRITE AND ERASE HEAD POLARITIES. IF THE TIME PRINTED IS EQUAL TO ZERO IT IS AN INDICATION THAT THE EOF WAS NOT FOUND WHEN "TU READY" BECAME A 1.

## THIS COULD INDICATE ONE OR MORE OF THE FOLLOWING PROBLEMS:

1. ERASE HEAD POLARITY REVERSED.
2. ERASE HEAD CURRENT NOT SUFFICIENT TO FULLY SATURATE TAPE.
3. ONE OR MORE OF WRITE HEAD TRACKS POLARITY REVERSED.
4. ONE OR MORE SENSITIVE READ AMPLIFIERS.
5. WRITE EOF FUNCTION DIDN'T REALLY WRITE AN EOF MARK. OTHERWISE "EOB TO EOF SPACE TIME" SHOULD BE SLIGHTLY LARGER THAN "WRITE EOF".

## PROCEDURE TO MEASURE TIME:

- A. A RECORD AND EOF WAS PREVIOUSLY WRITTEN FROM BOT FOR "WRITE EOF" (REFERENCE 9.14).
- B. TAPE IS REWOUND TO BOT.
- C. REWRITE RECORD OVER PREVIOUSLY WRITTEN RECORD.
- D. BACKSPACE OVER RECORD JUST WRITTEN.
- E. SET BYTE RECORD COUNTER TO SPACE 2 RECORDS.
- F. ISSUE SPACE FORWARD FUNCTION, SET "GO".
- G. WAIT FOR BYTE RECORD COUNTER TO INDICATE THAT 1ST RECORD HAS BEEN SPACED OVER THEN MONITOR "TU READY" UNTIL IT BECOMES A 1. AFTER "TU READY" CHECK TO SEE IF "EOF" IS A 1 IN STATUS REGISTER. IF "EOF" NOT SET THEN ZERO TIME COUNTER.
- H. TIME FROM BYTE RECORD COUNTER =-1 UNTIL "TU READY" IS "EOB TO EOF SPACE TIME".

## 9.14 SPACE SHUTDOWN

SPACE SHUTDOWN IS THE AMOUNT OF TIME NECESSARY TO CONTINUE MOVING TAPE AFTER A RECORD IS SPACED OVER IN THE FORWARD DIRECTION FOR THE SAME REASONS AS "READ SHUTDOWN"

## PROCEDURE TO MEASURE TIME:

- A. SPACE FORWARD FUNCTION USED TO TIME "EOR TO EOF SPACE TIME" IS USED.
- B. AFTER "EOF" BECOMES A 1, INDICATING THE END OF THE RECORD (EOF), MONITOR "SETTLEDOWN" UNTIL IT BECOMES A 1.
- C. THE TIME FROM "EOF" UNTIL "SETTLEDOWN" IS "SPACE SHUTDOWN".

## 9.15 ONE INCH DATA TIME

ONE INCH OF DATA, 800 BYTES (ALSO 556 AND 200 IF 7 CHANNEL UNIT) IS WRITTEN AND TIMED TO DETERMINE IF TAPE IS MOVING AT PROPER SPEED.

## PROCEDURE TO MEASURE TIME:

- A. INITIALIZE BYTE RECORD COUNTER AND CURRENT MEMORY ADDRESS.
- B. ISSUE WRITE FUNCTION, 800 BPI (OR 556, OR 200), SET "GO".
- C. WAIT FOR CURRENT MEMORY ADDRESS REGISTER TO INDICATE 2ND BYTE IS OUTPUT AND THEN MONITOR BYTE RECORD COUNTER UNTIL EQUAL TO ZERO.
- D. TIME FROM 2ND BYTE OUTPUT UNTIL BYTE RECORD COUNTER = 0 IS "ONE INCH DATA TIME"

## 9.16 FUNCTIONS AT 556 BPI

ALL OF THE PREVIOUS TESTS USED THE DENSITY OF 800 BPI. IF A 7 CHANNEL DRIVE IS SELECTED IT IS USEFUL TO RUN SEVERAL OF THE TESTS AGAIN USING DENSITY OF 556 BPI. REFERENCE THE PROPER PARAGRAPHS FOR A DESCRIPTION OF EACH TEST.

## 9.17 FUNCTIONS AT 200 BPI

SAME AS ABOVE. REFERENCE 9.17, "FUNCTIONS AT 556 BPI"

## 10. STATUS AND COMMAND REGISTER BIT ASSIGNMENTS

## COMMAND REGISTER

15	ERROR		
14	DEN 8	00 = 200 BPI 7 TRACK	10 = 800 BPI 7 TRACK
13	DEN 5	01 = 556 BPI 7 TRACK	11 = 800 BPI 9 TRACK
12	POWER CLEAR		
11	PARITY	0 = ODD	1 = EVEN
10	UNIT SEL. BIT 2		
9	UNIT SEL. BIT 1		
8	UNIT SEL. BIT 0		
7	CONTROL UNIT READY		
6	INTERRUPT ENABLE		
5	ADDRESS BIT 17		
4	ADDRESS BIT 16		
3	FUNCTION BIT 2	000 = OFF LINE	100 = SPACE FORWARD
		001 = READ	101 = SPACE REVERSE
2	FUNCTION BIT 1	010 = WRITE	110 = WRITE XIRG
1	FUNCTION BIT 0	011 = WRITE EOF	111 = REWIND
0	GO		

## STATUS REGISTER

15	ILLEGAL COMMAND (ILC)
14	END OF FILE (EOF)
13	CYCLICAL REDUNDANCY ERROR (CRE)
12	PARITY ERROR (PAE)
11	BUS GRANT LATE (BGL)
10	END OF TAPE (EOT)
9	RECORD LENGTH ERROR (RLE)
8	BAD TAPE ERROR (BTE)
7	NON EXISTENT MEMORY (NXM)
6	SELECT REMOTE (SELR)
5	BEGINNING OF TAPE (BOT)
4	7 CHANNEL (7CH)
3	SETTLE DOWN (SDWN)
2	WRITE LOCK (WRL)
1	REWIND STATUS (RWS)
0	TAPE UNIT READY (TUR)

.ENDR

J02

```

798 .TITLE MAINDEC-11-DZTME-D-D TM,A,B-11/TU10,N,W/TE10N,W DRIVE FUNCTION TIMER
799 ;COPYRIGHT: (C) 1974,1977 DIGITAL EQUIPMENT CORP., MAYNARD, MASS. 01754
800 ;
801 ;
802 ;SET LOC 176 WITH DESIRED CONTROL SETTINGS
803 ;LOAD ADDRESS 200, PRESS START
804 ;
805 001000 STACK=1000
806 005670 BLENTH=3000.
807 .ENABL ABS,AMA
808 ;
809 ;TRAP CATCHER FROM 0 TO 1000
810 000000 .=0
811 ;
812 ;
813 000042 .SBTTL .=42
814 ACT11 HOOKS
815 ;
816 ;*****
817 ;HOOKS REQUIRED BY ACT11
818 000042 $SVPC=. ;SAVE PC
819 000046 .=46
820 000046 SENDAD ;;1)SET LOC.46 TO ADDRESS OF SENDAD IN .SEOP
821 000052 .=52
822 000052 .WORD 0 ;;2)SET LOC.52 TO ZERO
823 000042 .=$SVPC ;; RESTORE PC
824 ;
825 ;*****
826 ;NOTE:PROGRAM HAS BEEN MODIFIED TO RUN WITHOUT SWITCH REGISTER
827 ;
828 ;*****
829 ;
830 ;
831 ;
832 ;
833 000176 SWITCH: .=176
834 000176 000200 ;DRIVE SELECT MAP(DEFAULT=DRIVE 0;9 TRK)
835 ;
836 000200 .=200
837 000200 000137 001046 JMP START
838 001000 .=1000
839 001000 172520 MTS: 172520
840 001002 172522 MTC: 172522
841 001004 172524 BC: 172524
842 001006 172526 CA: 172526
843 001010 172530 MTD: 172530
844 001012 172532 MTRD: 172532
845 001014 177570 SWR: 177570
846 001016 177560 TKS: 177560
847 001020 177562 TKB: 177562
848 001022 177564 TPS: 177564
849 001024 177566 TPB: 177566
850 001026 000224 MTV: 224
851 001030 177776 CC: 177776
852 001032 000000 R10: 0
853 001034 000000 R11: 0
    
```

K02

MAINDEC-11-DZTME-D-D TM,A,B-11/TU10,N,W/TE10N,W DRIVE FUNCTION TIMER MACY11 30(1046) 19-AUG-77 08:33 PAGE 23  
DZTMED.SRC 19-AUG-77 08:33 ACT11 HOOKS

SEQ 0022

854 001036 000000  
855 001040 000000  
856 001042 000000  
857 001044 000000  
858

R12: 0  
R13: 0  
TSDRV: 0  
T11T: 0



```

859 001046 012706 001000          START:  MOV    #STACK,%6      ;INITIALIZE STACK
860 001052 012777 000340 177750    MOV    #340,%CC      ;SET PRIORITY LEVEL 7
861 001060 012737 011412 010406    MOV    #MSG28,MESAGE
862 001066 004737 010266          JSR    %7, TOP      ;PRINT TITLE
863 001072 122737 000004 000041    CMPB  #4,%41        ;SEE IF LOAD MEDIUM
864 001100 001007          BNE    ST0          ;IF NOT: BR
865 001102 012737 012101 010406    MOV    #MSG31,MESAGE
866 001110 004737 010266          JSR    %7, TOP      ;PRINT NO TEST
867 001114 000137 007142          JMP    T13         ;END TEST
868 001120 013737 000176 007320    ST0:   MOV    SWITCH,DRIVES ;SAVE DRIVES SELECTED
869 001126 001006          BNE    %S
870 001130 012737 012015 010406    MOV    #MSG30,MESAGE
871 001136 004737 010266          JSR    %7, TOP
872 001142 000000          HALT
873 001144 004737 007204          %S:   JSR    %7,RSFDRV   ;RESET DRIVES
874 001150 004737 007422          ST1:  JSR    %7,STRREW  ;START REWIND
875 001154 004737 007250          JSR    %7,CHGDRV   ;DONE ALL DRIVES?
876 001160 000773          BR     ST1         ;NO
877 001162 004737 007462          ST2:  JSR    %7,WATREW  ;WAIT FOR BOT
878 001166 004737 007250          JSR    %7,CHGDRV  ;DONE ALL DRIVES?
879 001172 000773          BR     ST2         ;NO
880
881          ;PRINT HEADER
882
883 001174 012737 010410 010406    MOV    #MSG2,MESAGE
884 001202 004737 010266          JSR    %7, TOP      ;PRINT "FUNCTION"
885 001206 012737 010434 010406    ST3:  MOV    #MSG2A,MESAGE
886 001214 004737 010266          JSR    %7, TOP      ;PRINT "UNIT"
887 001220 013737 007322 010250    MOV    FDRIVE,DIGIT
888 001226 000337 010250          SWAB  DIGIT
889 001232 042737 177770 010250    BIC   #177770,DIGIT
890 001240 052737 000060 010250    BIS   #60,DIGIT
891 001246 105777 177550          TSTB  %TPS
892 001252 100375          BPL   .-4
893 001254 013777 010250 177542    MOV    DIGIT,%TPB  ;PRINT DRIVE "NUMBER"
894 001262 004737 007250          JSR    %7,CHGDRV   ;DONE ALL DRIVES?
895 001266 000747          BR     ST3         ;NO
896 001270 004737 007402          JSR    %7,ST1S    ;STORE ONES IN WRITE BUFFER

```

M02

```

;TIME WRITE FROM BOT DELAY, AND WRITE SHUTDOWN
897
898
899 001274 012700 007550 T1: MOV #TM1,%0 ;INITIALIZE TIME BUFFERS
900 001300 012701 007574 MOV #TM2,%1
901 001304 004737 007364 T1A: JSR %7,WRINT
902 001310 013777 007322 177464 MOV FDRIVE,%MTC ;SELECT DRIVE
903 001316 052777 040005 177456 BIS #40005,%MTC ;BOO BPI, WRITE, GO
904 001324 005037 007546 CLR TIME
905 001330 022777 012140 177450 T1B: CMP #WBUF+2,%CA ;IS 2ND WORD OUTPUT?
906 001336 003403 BLE TIC ;YES
907 001340 004737 007524 JSR %7,TIMER ;NO, COUNT TIME
908 001344 000771 BR TIC
909 001346 013720 007546 T1C: MOV TIME,(0)+ ;SAVE "WRITE FROM BOT DELAY" TIME
910 001352 005037 007546 CLR TIME
911 001356 005777 177422 TST %BC ;SEE IF WORD COUNT DONE
912 001362 001375 BNE .-4 ;IF NOT: BR
913 001364 032777 000010 177406 T1D: BIT #10,%MTC ;HAS SETTLEDOWN SET?
914 001372 001003 BNE T1E ;YES
915 001374 004737 007524 JSR %7,TIMER ;NO, COUNT TIME
916 001400 000771 BR T1D
917 001402 013721 007546 T1E: MOV TIME,(1)+ ;SAVE "WRITE SHUTDOWN" TIME
918 001406 004737 007250 JSR %7,CHGDRV ;DONE ALL DRIVES
919 001412 000734 BR T1A ;NO
920 001414 012720 177777 MOV #-1,(0)+ ;TERMINATE TIMES
921 001420 012721 177777 MOV #-1,(1)+ ;TERMINATE TIMES
922 001424 012737 010450 010406 MOV #MSG3,MESSAGE
923 001432 012700 007550 MOV #TM1,%0
924 001436 004737 010010 JSR %7,TYPTIM ;PRINT "WRITE FROM BOT DELAY" TIMES
925 001442 012737 010476 010406 MOV #MSG4,MESSAGE
926 001450 012700 007574 MOV #TM2,%0
927 001454 004737 010010 JSR %7,TYPTIM ;PRINT "WRITE SHUTDOWN" TIMES
    
```

```

928 ;TIME WRITE START AND SETTLEDOWN DELAY
929
930 001460 004737 007204 T2: JSR %7,RSFDRV ;RESET DRIVE SELECTION
931 001464 012700 007550 MOV #TM1,%0
932 001470 012701 007574 MOV #TM2,%1
933 001474 004737 007364 T2A: JSR %7,WRINT
934 001500 013777 007322 177274 MOV FDRIVE,%MTC ;SELECT DRIVE
935 001506 052777 040005 177266 BIS #40005,%MTC ;800 BPI, WRITE, GO
936 001514 005037 007546 CLR TIME
937 001520 022777 012140 177260 T2B: CMP #WBUF+2,%CA ;IS 2ND WORD OUTPUT
938 001526 003403 BLE T2C ;YES
939 001530 004737 007524 JSR %7,TIMER ;NO, COUNT TIME
940 001534 000771 BR T2B
941 001536 013720 007546 T2C: MOV TIME,(0)+ ;SAVE "WRITE START" TIME
942 001542 005037 007546 CLR TIME
943 001546 005777 177232 TST @BC
944 001552 001375 BNE .-4
945 001554 032777 000010 177216 BIT #10,%MTC
946 001562 001774 BEQ .-6 ;WAIT FOR SETTLEDOWN TO SET
947 001564 006077 177210 T2D: ROR %MTC
948 001570 103403 BCS T2E ;WAIT FOR TU READY
949 001572 004737 007524 JSR %7,TIMER
950 001576 000772 BR T2D
951 001600 013721 007546 T2E: MOV TIME,(1)+ ;SAVE "SETTLEDOWN" TIME
952 001604 004737 007250 JSR %7,CHGDRV
953 001610 000731 BR T2A
954 001612 012720 177777 MOV #-1,(0)+ ;TERMINATE TIMES
955 001616 012721 177777 MOV #-1,(1)+ ;TERMINATE TIMES
956 001622 012737 010524 010406 MOV #MSG5,MESSAGE
957 001630 012700 007550 MOV #TM1,%0
958 001634 004737 010010 JSR %7,TYPTIM ;PRINT "WRITE START" TIMES
959 001640 012737 010552 010406 MOV #MSG6,MESSAGE
960 001646 012700 007574 MOV #TM2,%0
961 001652 004737 010010 JSR %7,TYPTIM ;PRINT "SETTLEDOWN" TIMES
    
```

```

962 ; TIME WRITE TO ERASE HEAD
963 ; LONG RECORD WAS PREVIOUSLY WRITTEN
964 ; WRITE A 3 BYTE RECORD AND POWER CLEAR
965 ; DISTANCE FROM NEW DATA TO OLD IS
966 ; ERASE HEAD DISTANCE
967
968 001656 004737 007422 T3: JSR %7, STREW ; START REWIND
969 001662 004737 007250 JSR %7, CHGDRV ; DONE ALL DRIVES?
970 001666 000773 BR T3 ; NO
971 001670 004737 007462 T3A: JSR %7, WATREW ; IS DRIVE AT BOT?
972 001674 004737 007250 JSR %7, CHGDRV ; DONE ALL DRIVES?
973 001700 000773 BR T3A ; NO
974 001702 012777 177775 177074 T3B: MOV #-3, @BC ; 3 BYTE RECORD
975 001710 012777 012136 177070 MOV #WBUF, @CA ; INITIALIZE CURRENT ADDRESS
976 001716 013777 007322 177056 MOV FDRIVE, @MTC ; SELECT DRIVE
977 001724 052777 040005 177050 BIS #40005, @MTC ; BOOBPI, WRITE, GO
978 001732 005777 177046 TST @BC
979 001736 001375 BNE .-4
980 001740 052777 010000 177034 BIS #10000, @MTC ; POWER CLEAR
981 001746 004737 007422 JSR %7, STREW ; START REWIND
982 001752 004737 007250 JSR %7, CHGDRV ; DONE ALL DRIVES
983 001756 000751 BR T3B ; NO
984 001760 004737 007462 T3C: JSR %7, WATREW ; DRIVE AT BOT
985 001764 004737 007250 JSR %7, CHGDRV ; DONE ALL DRIVES
986 001770 000773 BR T3C ; NO
987
988 ; NOW THAT ALL DRIVES ARE AT BOT AGAIN
989 ; READ OVER PARTIAL RECORD
990
991 001772 012700 007550 MOV #TM1, %D
992 001776 012777 177775 177000 T3D: MOV #-3, @BC
993 002004 012777 012136 176774 MOV #WBUF, @CA
994 002012 013777 007322 176762 MOV FDRIVE, @MTC ; SELECT DRIVE
995 002020 052777 040003 176754 BIS #40003, @MTC ; BOOBPI, READ, GO
996 002026 005037 007546 CLR TIME ; CLEAR TIME
997 002032 022777 177777 176744 CMP #-1, @BC
998 002040 001374 BNE .-6
999 002042 005777 176736 T3E: TST @BC ; WAIT FOR NEXT WORD IN
1000 002046 001403 BEQ T3F ; HAVE IT
1001 002050 004737 007524 JSR %7, TIMER ; NO, COUNT TIME
1002 002054 000772 BR T3E
1003 002056 013720 007546 T3F: MOV TIME, (0)+ ; SAVE "WRITE TO ERASE HEAD TIME"
1004 002062 006077 176712 ROR @MTC
1005 002066 103375 BCC .-4 ; AWAIT TUR
1006 002070 004737 007250 JSR %7, CHGDRV ; DONE ALL DRIVES
1007 002074 000740 BR T3D ; NO
1008 002076 012720 177777 MOV #-1, (0)+ ; TERMINATE TIMES
1009 002102 012737 010600 010406 MOV #MSG7, MESSAGE
1010 002110 012700 007550 MOV #TM1, %D
1011 002114 004737 010010 JSR %7, TYPTIM ; PRINT "WRITE TO ERASE HEAD TIMES"
1012 002120 004737 007422 T3G: JSR %7, STREW ; START REWIND
1013 002124 004737 007250 JSR %7, CHGDRV ; DONE ALL DRIVES
1014 002130 000773 BR T3G ; NO
1015 002132 004737 007462 T3H: JSR %7, WATREW ; DRIVE AT BOT
1016 002136 004737 007250 JSR %7, CHGDRV ; DONE ALL DRIVES
1017 002142 000773 BR T3H ; NO
    
```

```

1018 ; TIME WRITE NONSTOP GAP, BACKSPACE SHUTDOWN AND READ SHUTDOWN
1019 ; WRITE ONE RECORD, FOLLOW WITH ONE RECORD NONSTOP
1020 ; FOLLOWED BY ONE RECORD START-STOP
1021 ; FOLLOWED BY WRITE-BACKSPACE-READ-WRITE
1022 ; FOLLOWED BY WRITE-BACKSPACE-WRITE
1023
1024 002144 004737 007402 T4: JSR %7,ST15
1025 002150 012700 007550 MOV #TM1,%0 ;INITIALIZE TIME BUFFERS
1026 002154 012701 007574 MOV #TM2,%1
1027 002160 012702 007620 MOV #TM3,%2
1028 002164 005037 007546 T4AA: CLR TIME
1029 002170 004737 007364 JSR %7,WRINT
1030 002174 013777 007322 176500 MOV FDRIVE,%MTC ;TRACK AND DRIVE NUMBERS
1031 002202 052777 040005 176572 BIS #40005,%MTC ;800 BPI, WRITE, GO
1032 002210 000240 NOP
1033 002212 032777 000001 176560 BIT #1,%MTC
1034 002220 001774 BEQ .-6 ;AWAIT TUR
1035
1036 ;HAVE FIRST RECORD WRITTEN, GO NONSTOP
1037
1038 002222 004737 007364 JSR %7,WRINT
1039 002226 005277 176550 INC %MTC ;GO
1040 002232 022777 012140 176546 T4A: CMP #WBUF+2,%CA ;IS 2ND WORD OUTPUT?
1041 002240 003403 BLE T4B ;YES
1042 002242 004737 007524 JSR %7,TIMER ;NO, COUNT TIME
1043 002246 000771 BR T4A
1044 002250 013720 007546 T4B: MOV TIME,(D)+ ;SAVE "WRITE NONSTOP GAP" TIME
1045 002254 005037 007546 CLR TIME
1046 002260 105777 176516 TSTB %MTC
1047 002264 100375 BPL .-4 ;WAIT FOR CU READY
1048 002266 006077 176506 ROR %MTC
1049 002272 103375 BCC .-4 ;WAIT FOR TU READY
1050
1051 ;WRITE-BACKSPACE-READ-WRITE
1052
1053 002274 004737 007364 JSR %7,WRINT
1054 002300 013777 007322 176474 MOV FDRIVE,%MTC ;DRIVE SELECT
1055 002306 052777 040007 176466 BIS #40007,%MTC ;800 BPI, WRITE EOF, GO
1056 002314 105777 176462 TSTB %MTC
1057 002320 100375 BPL .-4 ;WAIT FOR CU READY
1058 002322 006077 176452 ROR %MTC
1059 002326 103375 BCC .-4 ;AWAIT TUR
1060 002330 012777 177777 176446 MOV #-1,%BC ;BACKSPACE 1 RECORD
1061 002336 042777 000016 176436 BIC #16,%MTC
1062 002344 052777 000013 176430 BIS #13,%MTC ;SPACE REVERSE, GO
1063 002352 000240 NOP
1064 002354 032777 040000 176416 T4BA: BIT #40000,%MTC ;SEE IF EOF
1065 002362 001774 BEQ T4BA ;IF NOT: BR
1066 002364 000240 NOP
1067 002366 000240 NOP
1068 002370 032777 000010 176402 T4C: BIT #10,%MTC ;HAS SETTLEDOWN SET?
1069 002376 001003 BNE T4D ;YES
1070 002400 004737 007524 JSR %7,TIMER ;NO, COUNT TIME
1071 002404 000771 BR T4C
1072 002406 006077 176366 T4D: ROR %MTC
1073 002412 103375 BCC .-4 ;WAIT FOR TU READY

```

1074	002414	013721	007546		MOV	TIME,(1)+	;SAVE "BACKSPACE SHUTDOWN" TIME
1075	002420	004737	007364		JSR	%7,WRINT	
1076	002424	005037	007546		CLR	TIME	
1077	002430	013777	007322	176344	MOV	FDRIVE,%MTC	;SELECT DRIVE
1078	002436	052777	040003	176336	BIS	#40003,%MTC	;800 BPI, READ, GO
1079	002444	032777	040000	176326	T4DA: BIT	#40000,%MTC	
1080	002452	001774			BEQ	T4DA	;AWAIT EOF
1081	002454	032777	000010	176316	T4E: BIT	#10,%MTC	;HAS SETTLEDOWN SET?
1082	002462	001003			BNE	T4F	;YES
1083	002464	004737	007524		JSR	%7,TIMER	;NO, COUNT TIME
1084	002470	000771			BR	T4E	
1085	002472	006077	176302		T4F: ROR	%MTC	
1086	002476	103375			BCC	.-4	;WAIT FOR TU READY
1087	002500	013722	007546		MOV	TIME,(2)+	;SAVE "READ SHUTDOWN" TIME
1088	002504	004737	007250		JSR	%7,CHGDRV	
1089	002510	000625			BR	T4AA	
1090	002512	012720	177777		MOV	#-1,(0)+	;TERMINATE TIMES
1091	002516	012721	177777		MOV	#-1,(1)+	;TERMINATE TIMES
1092	002522	012722	177777		MOV	#-1,(2)+	;TERMINATE TIMES
1093	002526	012737	010654	010406	MOV	#MSG9,MESSAGE	
1094	002534	012700	007574		MOV	#TM2,%D	
1095	002540	004737	010010		JSR	%7,TYPTIM	;PRINT "BACKSPACE SHUTDOWN" TIMES
1096	002544	012737	010702	010406	MOV	#MSG10,MESSAGE	
1097	002552	012700	007620		MOV	#TM3,%D	
1098	002556	004737	010010		JSR	%7,TYPTIM	;PRINT "READ SHUTDOWN" TIMES
1099	002562	004737	007402		JSR	%7,STIS	
1100	002566	004737	007422		T4FA: JSR	%7,STRREW	;START REWIND
1101	002572	004737	007250		JSR	%7,CHGDRV	;CHANGE DRIVE
1102	002576	000773			BR	T4FA	
1103	002580	004737	007462		T4FB: JSR	%7,WATREW	;AWAIT BOT
1104	002584	004737	007250		JSR	%7,CHGDRV	;CHANGE DRIVE
1105	002610	000773			BR	T4FB	
1106	002612	000240			NOP		
1107	002614	004737	007364		T4FC: JSR	%7,WRINT	;SET UP FOR WRITE
1108	002620	013777	007322	176154	MOV	FDRIVE,%MTC	;SET DRIVE NUMBER
1109	002626	052777	040005	176146	BIS	#40005,%MTC	;SET 800 BPI, WRITE, GO
1110	002634	105777	176142		TSTB	%MTC	
1111	002640	100375			BPL	.-4	;AWAIT CUR
1112	002642	006077	176132		ROR	%MTC	
1113	002646	103375			BCC	.-4	;AWAIT TUR
1114	002650	000240			NOP		
1115	002652	004737	007364		JSR	%7,WRINT	;SET UP FOR NEXT WRITE
1116	002656	005277	176120		INC	%MTC	;SET GO
1117	002662	105777	176114		TSTB	%MTC	
1118	002666	100375			BPL	.-4	;AWAIT CUR
1119	002670	006077	176104		ROR	%MTC	
1120	002674	103375			BCC	.-4	;AWAIT TUR
1121	002676	004737	007364		JSR	%7,WRINT	;SET UP FOR NEXT WRITE
1122	002702	005277	176074		INC	%MTC	;SET GO
1123	002706	105777	176070		TSTB	%MTC	
1124	002712	100375			BPL	.-4	;AWAIT CUR
1125	002714	006077	176060		ROR	%MTC	
1126	002720	103375			BCC	.-4	;AWAIT TUR
1127	002722	004737	007250		JSR	%7,CHGDRV	;CHANGE DRIVE
1128	002726	000732			BR	T4FC	
1129	002730	000240			NOP		

E03

MAINDEC-11-DZTME-D-D TM, A, B-11/TU10, N, W/TE10N, W DRIVE FUNCTION TIMER MACY11 30(1046) 19-AUG-77 08:33 PAGE 30 SEQ 0029  
DZTMED.SRC 19-AUG-77 08:33 ACT11 HOOKS

1130

# F03

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1131
1132
1133           ;WRITE RECORDS TO BE USED IN GAP TEST
1134 002732 004737 007364          T4G: JSR      %7,WRINT
1135 002736 013777 007322 175036  MOV     FDRIVE,%MTC      ;SELECT DRIVE
1136 002744 052777 040005 175030  BIS     #40005,%MTC      ;800 BPI, WRITE, GO
1137 002752 105777 176024          TSTB   %MTC
1138 002756 100375          BPL     .-4              ;WAIT FOR CU READY
1139 002760 006077 176014          ROR     %MTC
1140 002764 103375          BCC     .-4              ;AWAIT TUR
1141 002766 004737 007364          JSR     %7,WRINT
1142 002772 005277 176004          INC     %MTC              ;GO NONSTOP
1143 002776 105777 176000          TSTB   %MTC
1144 003002 100375          BPL     .-4              ;WAIT FOR CU READY
1145 003004 006077 175770          ROR     %MTC
1146 003010 103375          BCC     .-4              ;AWAIT TUR
1147 003012 012777 177777 175764  MOV     #-1,%B0
1148 003020 013777 007322 175754  MOV     FDRIVE,%MTC      ;SELECT DRIVE
1149 003026 052777 040013 175746  BIS     #40013,%MTC      ;800 BPI, BACKSPACE, GO
1150 003034 105777 175742          TSTB   %MTC
1151 003040 100375          BPL     .-4              ;WAIT FOR CU READY
1152 003042 006077 175732          ROR     %MTC
1153 003046 103375          BCC     .-4              ;AWAIT TUR
1154 003050 004737 007364          JSR     %7,WRINT
1155 003054 013777 007322 175720  MOV     FDRIVE,%MTC
1156 003062 052777 040005 175712  BIS     #40005,%MTC      ;800 BPI, WRITE, GO
1157 003070 105777 175706          TSTB   %MTC
1158 003074 100375          BPL     .-4
1159 003076 006077 175676          ROR     %MTC
1160 003102 103375          BCC     .-4              ;AWAIT TUR
1161 003104 012737 177777 001034  MOV     #-1,R11          ;INDICATES BACK 3 COMPLETE
1162 003112 012737 177777 001036  MOV     #-1,R12          ;INDICATES BACK 4 COMPLETE
1163 003120 012737 177777 001040  MOV     #-1,R13          ;INDICATES BACK 5 COMPLETE
1164 003126 012737 177776 001032  MOV     #-2,R10          ;FIRST SEQUENCE BACK 2 TIMES
  
```



G03

```

1165 ;NOW WRITE, BACKSPACE, WRITE, BACKSPACE, WRITE
1166 ;GAP SHOULD GET LARGER
1167
1168 003134 004737 007364 MULWRT: JSR %7,WRINT
1169 003140 005277 175636 INC @MTC ;GO NONSTOP
1170 003144 105777 175632 TSTB @MTC
1171 003150 100375 BPL .-4 ;WAIT FOR DONE
1172 003152 006077 175622 ROR @MTC
1173 003156 103375 BCC .-4 ;AWAIT TUR
1174 003160 012777 177777 175616 MULBAK: MOV #-1,@BC ;BACKSPACE 1 RECORD
1175 003166 042777 000016 175606 BIC #16,@MTC
1176 003174 052777 000013 175600 BIS #13,@MTC ;SET BACKSPACE, GO
1177 003202 105777 175574 TSTB @MTC
1178 003206 100375 BPL .-4 ;WAIT FOR BACKSPACE DONE
1179 003210 006077 175564 ROR @MTC
1180 003214 103375 BCC .-4 ;AWAIT TUR
1181 003216 004737 007364 JSR %7,WRINT
1182 003222 042777 000016 175552 BIC #16,@MTC
1183 003230 052777 000005 175544 BIS #5,@MTC ;SET WRITE, GO
1184 003236 105777 175540 TSTB @MTC
1185 003242 100375 BPL .-4 ;WAIT FOR WRITE DONE
1186 003244 006077 175530 ROR @MTC
1187 003250 103375 BCC .-4 ;AWAIT TUR
1188 003252 005237 001032 INC R10 ;BACKSPACED ENOUGH TIMES?
1189 003256 001340 BNE MULBAK ;NO BACKSPACE AND WRITE AGAIN
1190 003260 005237 001034 INC R11 ;DONE 3 BACKSPACE SEQUENCES?
1191 003264 001004 BNE MUL1 ;YES
1192 003266 012737 177775 001032 MOV #-3,R10
1193 003274 000717 BR MULWRT
1194 003276 005237 001036 MUL1: INC R12 ;DONE 4 BACKSPACE SEQUENCES?
1195 003302 001004 BNE MUL2 ;YES
1196 003304 012737 177774 001032 MOV #-4,R10
1197 003312 000710 BR MULWRT
1198 003314 005237 001040 MUL2: INC R13 ;DONE 5 BACKSPACE SEQUENCES?
1199 003320 001004 BNE MUL3 ;YES
1200 003322 012737 177773 001032 MOV #-5,R10
1201 003330 000701 BR MULWRT
1202 003332 006077 175442 MUL3: ROR @MTC
1203 003336 103375 BCC .-4 ;WAIT FOR TU READY
1204 003340 004737 007422 JSR %7,STRREW ;START REWIND
1205 003344 004737 007250 JSR %7,CHGDRV
1206 003350 000137 002732 JMP T4G
    
```

# H03

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1207      ;NOW READ NONSTOP
1208      ;ACCUMULATE GAP TIMES ON READ
1209      ;TYPE ACCUMULATED TIMES AT END OF READ
1210      ;GAP1 SHOULD = GAP2, GAP3 < GAP1 AND GAP2
1211      ;GAP4 THRU GAP8 SHOULD GET INCREASINGLY LONGER
1212      CLR          TSDRV
1213
1214      TS:   JSR      %7, WATREW
1215           JSR      %7, WRINT
1216           MOV      #TM1, %0
1217           ADD      TSDRV, %0
1218           MOV      FDRIVE, %MTC      ;SELECT DRIVE
1219           BIS      #40003, %MTC      ;800 BPI, READ, GO
1220           MOV      #8, R10           ;COUNT 8 GAPS
1221           TSA:   TSTB   %MTC
1222           BPL      .-4              ;WAIT FOR CU READY
1223           ROR      %MTC
1224           BCC      .-4              ;AWAIT TUR
1225           JSR      %7, WRINT
1226           CLR      TIME
1227           INC      %MTC
1228           T5B:   CMP      #BUF+2, %CA      ;GO NONSTOP
1229           BLE      T5C              ;IS 2ND WORD OUTPUT
1230           JSR      %7, TIMER         ;YES
1231           BR       T5B              ;NO, COUNT TIME
1232           T5C:   MOV      TIME, (0)+      ;SAVE GAP TIME
1233           MOV      #-1, (0)         ;TERMINATE, JUST IN CASE AT END
1234           ADD      #22, %0          ;STEP GAP POINTER
1235           INC      R10              ;DONE ALL 8 GAPS?
1236           BNE      TSA              ;NO
1237           ROR      %MTC
1238           BCC      .-4              ;WAIT FOR TU READY
1239           JSR      %7, STRREW        ;START REWIND
1240           ADD      #2, TSDRV         ;+2 TO DRIVE TIME POINTER
1241           JSR      %7, CHGDRV
1242           BR       T5
1243           MOVB   #'1, MSG11A+6
1244           MOV      #MSG11, MESSAGE
1245           JSR      %7, TOP
1246           MOV      #MSG11A, MESSAGE
1247           MOV      #TM1, %0
1248           JSR      %7, TYPTIM        ;PRINT "GAP 1"
1249           INCB   MSG11A+6
1250           MOV      #MSG11A, MESSAGE
1251           MOV      #TM2, %0
1252           JSR      %7, TYPTIM        ;PRINT "GAP 2"
1253           INCB   MSG11A+6
1254           MOV      #MSG11A, MESSAGE
1255           MOV      #TM3, %0
1256           JSR      %7, TYPTIM        ;PRINT "GAP 3"
1257           INCB   MSG11A+6
1258           MOV      #MSG11A, MESSAGE
1259           MOV      #TM4, %0
1260           JSR      %7, TYPTIM        ;PRINT "GAP 4"
1261           INCB   MSG11A+6
1262           MOV      #MSG11A, MESSAGE
  
```

```

1263 003676 012700 007670      MOV      #TMS,%D
1264 003702 004737 010010      JSR      %7,TYPTIM      ;PRINT "GAP 5"
1265 003706 105237 011007      INCB    MSG11A+6
1266 003712 012737 011001 010406      MOV      #MSG11A,MESSAGE
1267 003720 012700 007714      MOV      #TMS,%D
1268 003724 004737 010010      JSR      %7,TYPTIM      ;PRINT "GAP 6"
1269 003730 105237 011007      INCB    MSG11A+6
1270 003734 012737 011001 010406      MOV      #MSG11A,MESSAGE
1271 003742 012700 007740      MOV      #TMS,%D
1272 003746 004737 010010      JSR      %7,TYPTIM      ;PRINT "GAP 7"
1273 003752 105237 011007      INCB    MSG11A+6
1274 003756 012737 011001 010406      MOV      #MSG11A,MESSAGE
1275 003764 012700 007764      MOV      #TMS,%D
1276 003770 004737 010010      JSR      %7,TYPTIM      ;PRINT "GAP 8"
1277 003774 004737 007402      JSR      %7,ST15
1278
1279      ;TIME WRITE START NOT AT BOT
1280
1281 004000 012700 007550      T6:     MOV      #TM1,%D
1282 004004 012701 007574      MOV      #TM2,%1
1283 004010 004737 007364      T6A:    JSR      %7,WRINT
1284 004014 013777 007322 174760      MOV      FDRIVE,%MTC      ;SELECT DRIVE
1285 004022 105777 174754      TSTB    %MTC
1286 004026 100375      BPL     .-4
1287 004030 006077 174744      ROR     %MTC
1288 004034 103375      BCC     .-4      ;WAIT FOR TU READY
1289 004036 052777 040005 174736      BIS     #40005,%MTC      ;BOO BPI, WRITE, GO
1290 004044 032777 000040 174726      BIT     #40,%MTC
1291 004052 001374      BNE     .-6      ;WAIT FOR BOT TO CLEAR
1292 004054 052777 010000 174720      BIS     #10000,%MTC      ;POWER CLEAR
1293 004062 013777 007322 174712      MOV      FDRIVE,%MTC
1294 004070 004737 007364      JSR      %7,WRINT
1295 004074 006077 174700      ROR     %MTC
1296 004100 103375      BCC     .-4      ;WAIT FOR TU READY
1297 004102 005037 007546      CLR     TIME
1298 004106 013777 007322 174666      MOV      FDRIVE,%MTC      ;SELECT DRIVE
1299 004114 012777 160000 174662      MOV      #160000,%BC      ;SET FOR VERY LONG RECORD
1300 004122 052777 040005 174652      BIS     #40005,%MTC      ;BOO BPI, WRITE, GO
1301 004130 022777 012140 174650      T6B:    CMP     #WBUF+2,%CA      ;IS 2ND WORD OUTPUT?
1302 004136 003403      BLE     T6C      ;YES
1303 004140 004737 007524      JSR      %7,TIMER      ;NO, COUNT TIME
1304 004144 000771      BR     T6B
1305 004146 006077 174626      T6C:    ROR     %MTC
1306 004152 103375      BCC     .-4      ;WAIT FOR TU READY
1307 004154 013720 007546      MOV      TIME,(0)+      ;SAVE "WRITE START" TIME
1308 004160 005037 007546      CLR     TIME
1309 004164 004737 007364      JSR      %7,WRINT
1310 004170 013777 007322 174604      MOV      FDRIVE,%MTC      ;SELECT DRIVE
1311 004176 052777 040015 174576      BIS     #40015,%MTC      ;BOO BPI, WRITE XIRG, GO
1312 004204 022777 012140 174574      T6D:    CMP     #WBUF+2,%CA      ;IS 2ND WORD OUTPUT?
1313 004212 003403      BLE     T6E      ;YES
1314 004214 004737 007524      JSR      %7,TIMER      ;NO COUNT TIME
1315 004220 000771      BR     T6D
1316 004222 006077 174552      T6E:    ROR     %MTC
1317 004226 103375      BCC     .-4      ;WAIT FOR TU READY
1318 004230 013721 007546      MOV      TIME,(1)+      ;SAVE "WRITE XIRG" TIME
    
```

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1319 004234 004737 007422 JSR %7,STRREW
1320 004240 004737 007250 JSR %7,CHGDRV
1321 004244 000661 BR T6A
1322 004246 012720 177777 MOV #-1,(0)+ ;TERMINATE TIMES
1323 004252 012721 177777 MOV #-1,(1)+ ;TERMINATE TIMES
1324 004256 012737 010524 010406 MOV #MSG5,MESSAGE
1325 004264 012700 007550 MOV #TM1,%0
1326 004270 004737 010010 JSR %7,TYPTIM ;TYPE "WRITE START" TIME
1327 004274 012737 011027 010406 MOV #MSG12,MESSAGE
1328 004302 012700 007574 MOV #TM2,%0
1329 004306 004737 010010 JSR %7,TYPTIM ;TYPE "WRITE XIRG" TIME
1330 004312 004737 007462 T6F: JSR %7,WATREW
1331 004316 004737 007250 JSR %7,CHGDRV
1332 004322 000773 BR T6F ;WAIT FOR ALL DRIVES AT BOT.
1333
1334 ;NOW TIME "READ FROM BOT DELAY
1335
1336 004324 012700 007550 T7: MOV #TM1,%0
1337 004330 005037 007546 T7A: CLR TIME
1338 004334 004737 007364 JSR %7,WRINT
1339 004340 013777 007322 174434 MOV #DRIVE,%MTC ;SELECT DRIVE
1340 004346 052777 040003 174426 BIS #40003,%MTC ;800 BPI, READ GO
1341 004354 022777 012140 174424 T7B: CMP #WBUF+2,%CA ;IS 2ND WORD INPUT?
1342 004362 003403 BLE T7C ;YES
1343 004364 004737 007524 JSR %7,TIMER ;NO COUNT TIME
1344 004370 000771 BR T7B
1345 004372 013720 007546 T7C: MOV TIME,(0)+ ;SAVE "READ FROM BOT" TIME
1346 004376 105777 174400 TSTB %MTC
1347 004402 100375 BPL #-4 ;WAIT FOR CU READY.
1348 004404 006077 174370 ROR %MTC
1349 004410 103375 BCC #-4 ;AWAIT TUR
1350 004412 004737 007250 JSR %7,CHGDRV ;DONE ALL DRIVES?
1351 004416 000744 BR T7A ;NO
1352 004420 006077 174354 ROR %MTC
1353 004424 103375 BCC #-4
1354 004426 012720 177777 MOV #-1,(0)+ ;TERMINATE TIMES
1355 004432 012737 011055 010 .6 MOV #MSG13,MESSAGE
1356 004440 012700 007550 MOV #TM1,%0
1357 004444 004737 010010 JSR %7,TYPTIM ;PRINT "READ FROM BOT" TIME
1358 004450 004737 007402 JSR %7,STIS
1359
1360 004454 004737 007422 T8: JSR %7,STRREW ;REWIND
1361 004460 004737 007250 JSR %7,CHGDRV ;ANYMORE DRIVES?
1362 004464 000773 BR T8 ;YES
1363 004466 012720 177777 MCV #-1,(0)+ ;TERMINATE TIMES
1364 004472 004737 007462 T8A: JSR %7,WATREW
1365 004476 004737 007250 JSR %7,CHGDRV
1366 004502 000773 BR T8A
1367
1368 ;TIME "WRITE EOF"
1369 ;WRITE A 3 BYTE RECORD FROM BOT FOLLOWED BY AN EOF.
1370
1371 004504 012700 007550 T9: MOV #TM1,%0
1372 004510 005037 007546 T9A: CLR TIME
1373 004514 012777 177775 174262 MOV #-3,%BCC ;WRITE 3 BYTES
1374 004522 012777 012136 174256 MOV #WBUF,%CA
    
```

K03

1375	004530	013777	007322	174244		MOV	FDRIVE,AMTC	;SELECT DRIVE
1376	004536	052777	040005	174236		BIS	#40005,AMTC	;800 BPI, WRITE, GO
1377	004544	105777	174232			TSTB	AMTC	
1378	004550	100375				BPL	-4	
1379	004552	006077	174222			ROR	AMTS	
1380	004556	103375				BCC	-4	;WAIT FOR TU READY
1381	004560	042777	000016	174214		BIC	#16,AMTC	
1382	004566	052777	000007	174206		BIS	#7,AMTC	;WRITE EOF, GO
1383	004574	105777	174202		T98:	TSTB	AMTC	;IS CU READY SET?
1384	004600	100403				BMI	1\$	;YES
1385	004602	004737	007524			JSR	%7,TIMER	;NO, COUNT TIME
1386	004606	000772				BR	T98	
1387	004610	006077	174164		1\$:	ROR	AMTS	
1388	004614	103403				BCS	T9C	;IF TUR: BR
1389	004616	004737	007524			JSR	%7,TIMER	;ELSE CONTINUE TIMER
1390	004622	000772				BR	1\$	
1391	004624	013720	007546		T9C:	MOV	TIME (0)+	;SAVE "WRITE EOF" TIME
1392	004630	004737	007422			JSR	%7,STRREW	;REWIND
1393	004634	004737	007250			JSR	%7,CHGDRV	;ANYMORE DRIVES?
1394	004640	000723				BR	T9A	;YES
1395	004642	012720	177777			MOV	#-1 (0)+	;TERMINATE TIMES
1396	004646	012737	011131	010406		MOV	#MSG15,MESSAGE	
1397	004654	012700	007550			MOV	#TMI,%0	
1398	004660	004737	010010			JSR	%7,TYPTIM	;PRINT "WRITE EOF" TIMES
1399	004664	004737	007462		T9D:	JSR	%7,WATREW	
1400	004670	004737	007250			JSR	%7,CHGDRV	
1401	004674	000773				BR	T9D	

L03

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1402 ;TIME "EOR TO EOF SPACE TIME", "SPACE SHUTDOWN" AND "ONE INCH DATA TIME".
1403 ;WRITE A 3 BYTE RECORD OVER ONE PREVIOUSLY WRITTEN
1404 ;BACKSPACE 1 RECORD AND THEN SPACE FORWARD 2 RECORDS
1405 ;TIME FROM THE END OF FIRST RECORD UNTIL EOF IS REACHED
1406
1407 004676 012700 007550 T10: MOV #TM1,%0
1408 004702 012701 007574 MOV #TM2,%1
1409 004706 012702 007620 MOV #TM3,%2
1410 004712 005037 007546 T10A: CLR TIME
1411 004716 012777 177775 174060 MOV #-3,%BC ;3 BYTE RECORD
1412 004724 012777 012136 174054 MOV #WBUF,%CA
1413 004732 013777 007322 174042 MOV FDRIVE,%MTC ;SELECT DRIVE
1414 004740 052777 040005 174034 BIS #40005,%MTC ;800 BPI, WRITE, GO
1415 004746 105777 174030 TSTB %MTC
1416 004752 100375 BPL .-4 ;WAIT FOR CU READY
1417 004754 006077 17402C ROR %MTC
1418 004760 103375 BCC .-4 ;AWAIT TUR
1419 004762 012777 177777 174014 MOV #-1,%BC ;BACKSPACE 1 RECORD
1420 004770 042777 000016 174004 BIC #16,%MTC ;SELECT DRIVE
1421 004776 052777 000013 173776 BIS #13,%MTC ;BACKSPACE, GO
1422 004784 105777 173772 TSTB %MTC
1423 004790 100375 BPL .-4 ;WAIT FOR CU READY
1424 004796 006077 173762 ROR %MTC
1425 004802 103375 BCC .-4 ;AWAIT TUR
1426 004808 012777 177776 173756 MOV #-2,%BC ;SPACE FORWARD 2 RECORDS
1427 005026 042777 000016 173746 BIC #16,%MTC
1428 005034 052777 000011 173740 BIS #11,%MTC ;SPACE FORWARD, GO
1429 005042 022777 177777 173734 T10B: CMP #-1,%BC
1430 005050 001374 T10C: BNE T10B ;WAIT FOR 1ST RECORD TO BE SPACED OVER
1431 005052 032777 040000 173720 T10C: BIT #40000,%MTC ;IS EOF SET?
1432 005060 001014 BNE T10C ;YES
1433 005062 006077 173712 ROR %MTC
1434 005066 103403 BCS T10CC ;AWAIT TUR
1435 005070 004737 007524 JSR %7,TIMER ;NO, COUNT TIME
1436 005074 000766 BR T10C
1437 005076 032777 040000 173674 T10CC: BIT #40000,%MTC ;HAVE TU READY
1438 005104 001002 BNE T10C ;IS EOF SET?
1439 005106 005037 007546 CLR TIME ;NO, SET ERROR
1440 005112 013720 007546 T10D: MOV TIME,(0)+ ;SAVE "EOR TO EOF SPACE TIME"
1441 005116 005037 007546 CLR TIME
1442 005122 000240 NOP
1443 005124 000240 NOP
1444 005126 000240 NOP
1445 005130 032777 000010 173642 T10E: BIT #10,%MTC ;IS SETTLEDOWN SET?
1446 005136 001003 BNE T10F ;YES
1447 005140 004737 007524 JSR %7,TIMER ;NO, COUNT TIME
1448 005144 000771 BR T10E
1449 005146 013721 007546 T10F: MOV TIME,(1)+ ;SAVE "SPACE SHUTDOWN" TIME
1450 005152 006077 173622 ROR %MTC
1451 005156 103375 BCC .-4 ;AWAIT TUR
1452 005160 012777 176340 173616 MOV #-800,%BC ;1 INCH OF DATA
1453 005166 012777 012136 173612 MOV #WBUF,%CA
1454 005174 005037 007546 CLR TIME
1455 005200 013777 007322 173574 MOV FDRIVE,%MTC ;SELECT DRIVE
1456 005206 006077 173566 ROR %MTC
1457 005212 103375 BCC .-4 ;AWAIT TUR
    
```

## M03

MAINDEC-11-DZTME-D-D TM,A,B-11/TU10,N,W/TE10N,W DRIVE FUNCTION TIMER MACY11 30(1046) 19-AUG-77 08:33 PAGE 38 SEQ 0037  
 DZTMED.SRC 19-AUG-77 08:33 ACT11 HOOKS

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1458 005214 052777 040005 173560      BIS      #40005, @MTC      ;800 BPI, WRITE, GO
1459 005222 022777 012140 173556      CMP      #WBUF+2, @CA ;IS 2ND BYTE OUTPUT
1460 005230 003374          BGT      -6          ;NO
1461 005232 005777 173546      T10G:   TST      @BC      ;YES IS LAST BYTE OUT
1462 005236 001403          BEQ      T10H         ;YES
1463 005240 004737 007524      JSR      %7, TIMER   ;NO, COUNT TIME
1464 005244 000772          BR       T10G
1465
1466 005246 013722 007546      T10H:   MOV      TIME, (2)+ ;SAVE "ONE INCH DATA TIME"
1467 005252 004737 007422      JSR      %7, STRREW  ;REWIND
1468 005256 004737 007250      JSR      %7, CHGDRV  ;ANYMORE DRIVES?
1469 005262 000613          BR       T10A         ;YES
1470 005264 012720 177777      MOV      #-1, (0)+   ;TERMINATE TIMES
1471 005270 012721 177777      MOV      #-1, (1)+
1472 005274 012722 177777      MOV      #-1, (2)+
1473 005300 012737 011157 010406      MOV      #MSG16, MESSAGE
1474 005306 012700 007550      MOV      #TM1, %0
1475 005312 004737 010010      JSR      %7, TYPTIM  ;PRINT "EOR TO EOF SPACE TIME"
1476
1477 005316 012737 011205 010406      MOV      #MSG18, MESSAGE
1478 005324 012700 007574      MOV      #TM2, %0
1479 005330 004737 010010      JSR      %7, TYPTIM  ;PRINT "SPACE SHUTDOWN" TIME
1480 005334 012737 011264 010406      MOV      #MSG20, MESSAGE
1481 005342 012700 007620      MOV      #TM3, %0
1482 005346 004737 010010      JSR      %7, TYPTIM  ;PRINT "ONE INCH DATA TIME"
1483
1484 ;TIME SOME OF PREVIOUS OPERATIONS AT 200 BPI AND 556 BPI
1485
1486 005352 012700 007550      T11:    MOV      #TM1, %0      ;INITIALIZE TIME BUFFERS
1487 005356 012701 007574      MOV      #TM2, %1
1488 005362 012702 007620      MOV      #TM3, %2
1489 005366 012703 007644      MOV      #TM4, %3
1490 005372 012704 007670      MOV      #TM5, %4
1491 005376 012705 007714      MOV      #TM6, %5
1492 005402 005037 001044      CLR      T11T
1493 005406 004737 007462      T11A:   JSR      %7, WATREW  ;WAIT FOR REWIND
1494 005412 032737 020000 007322      BIT      #20000, FDRIVE ;IS DRIVE 9 TRACK?
1495 005420 001403          BEQ      T11AA        ;NO: BR
1496 005422 000137 006032      JMP      T11P         ;ELSE GET NEXT DRIVE
1497 005426 012737 177777 001044      T11AA:  MOV      #-1, T11T    ;INDICATE 7 TRACK
1498 005434 012777 176724 173342      MOV      #-556, @BC   ;556 BYTES = ONE INCH
1499 005442 012777 012136 173336      MOV      #WBUF, @CA
1500 005450 005037 007546      CLR      TIME
1501 005454 013777 007322 173320      MOV      FDRIVE, @MTC ;SELECT DRIVE
1502 005462 052777 020005 173312      BIS      #20005, @MTC ;556 BPI, WRITE, GO
1503
1504 ;TIME "WRITE FROM BOT DELAY" AT 556 BPI
1505
1506 005470 022777 012140 173310      T11B:   CMP      #WBUF+2, @CA ;IS 2ND WORD OUT?
1507 005476 003403          BLE      T11C         ;YES
1508 005500 004737 007524      JSR      %7, TIMER   ;NO, COUNT TIME
1509 005504 000771          BR       T11B
1510 005506 013720 007546      T11C:   MOV      TIME, (0)+   ;SAVE "WRITE FROM BOT DELAY"
1511 005512 005037 007546      CLR      TIME
1512

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005516 005777 173262  
005522 001403  
005524 004737 007524  
005530 000772  
005532 013721 007546  
005536 005037 007546  
  
005542 000240  
005544 000240  
005546 000240  
005550 032777 000010 173222  
005556 001003  
005560 004737 007524  
005564 000771  
005566 013722 007546  
005572 005037 007546  
  
005576 006077 173176  
005602 103375  
005604 042777 000016 173170  
005612 052777 000007 173162  
005620 105777 173156  
005624 100375  
005626 006077 173146  
005632 103375  
005634 012777 177777 173142  
005642 042777 000016 173132  
005650 052777 000013 173124  
005660 032777 040000 173112  
005666 001774  
005670 000240  
005672 000240  
005674 032777 000010 173076  
005702 001003  
005704 004737 007524  
005710 000771  
005712 013723 007546  
005716 005037 007546  
  
005722 105777 173054  
005726 100375  
005730 006077 173044  
005734 103375  
005736 012777 176724 173040  
005744 012777 012136 173034  
005752 013777 007322 173022

;TIME "ONE INCH DATA" AT 556 BPI  
T11D: TST @BC ;IS BC=0  
BEQ T11E ;YES  
JSR %7 TIMER ;NO, COUNT TIME  
BR T11D  
T11E: MOV TIME,(1)+ ;SAVE "1 INCH DATA" TIME  
CLR TIME  
  
;TIME "WRITE SHUTDOWN" AT 556 BPI  
NOP  
NOP  
NOP  
T11F: BIT #10,@MTC ;IS SETTLEDOWN SET?  
BNE T11G ;YES  
JSR %7 TIMER ;NO, COUNT TIME  
BR T11F  
T11G: MOV TIME,(2)+ ;SAVE "WRITE SHUTDOWN"  
CLR TIME  
  
;TIME "BACKSPACE SHUTDOWN" AT 556 BPI  
ROR @MTC  
BCC .-4 ;AWAIT TUR  
BIC #16,@MTC  
BIS #7,@MTC ;SET WRITE EOF+GO  
TSTB @MTC  
BPL .-4 ;AWAIT CUR  
ROR @MTC  
BCC .-4 ;AWAIT TUR  
MOV #-1,@BC  
BIC #16,@MTC  
BIS #13,@MTC ;BACKSPACE 1 RECORD, GO  
NOP  
T11GA: BIT #40000,@MTC  
BEQ T11GA ;AWAIT EOF  
NOP  
NOP  
T11H: BIT #10,@MTC ;IS SETTLEDOWN SET?  
BNE T11J ;YES  
JSR %7 TIMER ;NO COUNT TIME  
BR T11H  
T11J: MOV TIME,(3)+ ;SAVE "BACKSPACE SHUTDOWN"  
CLR TIME  
  
;TIME "LAST CHAR IN TO MTF" AT 556 BPI  
TSTB @MTC ;SEE IF CUR  
BPL .-4 ;IF NOT: BR  
ROR @MTC  
BCC .-4 ;WAIT FOR TU READY  
MOV #-556,@BC ;556 BYTES  
MOV #BUF,@CA  
MOV FDRIVE,@MTC ;SELECT DRIVE



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1569 005760 052777 020003 173014          BIS      #20003,2MTC      ;556 BPI, READ, GO
1570 005766 032777 040000 173004 T11JA:  BIT      #40000,2MTC
1571 005774 001774          BEQ      T11JA      ;AWAIT EOF
1572 005776 032777 000010 172774 T11K:  BIT      #10,2MTC    ;SEE IF SOWN
1573 006004 001003          BNE      T11L      ;YES
1574 006006 004737 007524          JSR      %7,TIMER  ;NO COUNT TIME
1575 006012 000771          BR      T11K
1576 006014 013724 007546          T11L:  MOV      TIME,(4)+
1577 006020 013725 007546          MOV      TIME,(5)+ ;SAVE "READ SHUTDOWN"
1578 006024 005037 007546          CLR      TIME
1579 006030 000406          BR      T11R
1580 006032 005020          T11P:  CLR      (0)+ ;CLEAR TIMES FOR 9 TRACK DRIVES
1581 006034 005021          CLR      (1)+
1582 006036 005022          CLR      (2)+
1583 006040 005023          CLR      (3)+
1584 006042 005024          CLR      (4)+
1585 006044 005025          CLR      (5)+
1586 006046 004737 007422          T11R:  JSR      %7,STRREW
1587 006052 004737 007250          JSR      %7,CHGDRV
1588 006056 000401          BR      .+4
1589 006060 000402          BR      .+6
1590 006062 000137 005406          JMP      T11A
1591
1592 006066 012720 177777          MOV      #-1,(0)+ ;TERMINATE DRIVES
1593 006072 012721 177777          MOV      #-1,(1)+
1594 006076 012722 177777          MOV      #-1,(2)+
1595 006102 012723 177777          MOV      #-1,(3)+
1596 006106 012724 177777          MOV      #-1,(4)+
1597 006112 012725 177777          MOV      #-1,(5)+
1598 006116 005737 001044          TST      T11T      ;HAVE TESTED ANY 7 TRACKS
1599 006122 001452          BEQ      T12      ;NO
1600 006124 012737 011233 010406          MOV      #MSG19,MESSAGE ;PRINT "FUNCTIONS AT 55E"
1601 006132 004737 010266          JSR      %7,TOP
1602 006136 012737 010450 010406          MOV      #MSG3,MESSAGE
1603 006144 012700 007550          MOV      #TM1,%0
1604 006150 004737 010010          JSR      %7,TYPTIM ;PRINT "WRITE FROM BOT DELAY"
1605 006154 012737 011264 010406          MOV      #MSG20,MESSAGE
1606 006162 012700 007574          MOV      #TM2,%0
1607 006166 004737 010010          JSR      %7,TYPTIM ;PRINT "ONE INCH DATA TIME"
1608 006172 012737 010476 010406          MOV      #MSG4,MESSAGE
1609 006200 012700 007620          MOV      #TM3,%0
1610 006204 004737 010010          JSR      %7,TYPTIM ;PRINT "WRITE SHUTDOWN"
1611 006210 012737 010654 010406          MOV      #MSG9,MESSAGE
1612 006216 012700 007644          MOV      #TM4,%0
1613 006222 004737 010010          JSR      %7,TYPTIM ;PRINT "BACKSPACE SHUTDOWN"
1614 006226 012737 010702 010406          MOV      #MSG10,MESSAGE
1615 006234 012700 007714          MOV      #TM5,%0
1616 006240 004737 010010          JSR      %7,TYPTIM ;PRINT "READ SHUTDOWN"
1617 006244 004737 007402          JSR      %7,STIS
1618
1619          ;TIME OPERATIONS AT 200 BPI
1620
1621 006250 012700 007550          T12:  MOV      #TM1,%0 ;INITIALIZE TIME BUFFERS
1622 006254 012701 007574          MOV      #TM2,%1
1623 006260 012702 007620          MOV      #TM3,%2
1624 006264 012703 007644          MOV      #TM4,%3
    
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1625 006270 012704 007670          MOV      #TMS,%4
1626 006274 012705 007714          MOV      #TMS,%5
1627 006300 005037 001044          CLR      T11T
1628 006304 004737 007462          T12A:   JSR      %7,WATREW      ;WAIT FOR REWIND
1629 006310 032737 020000 007322          BIT      #20000,FDRIVE      ;IS DRIVE 9 TRACK?
1630 006316 001402          BEQ      .+6                ;NO
1631 006320 000137 006730          JMP      T12P              ;YES, GET NEXT DRIVE
1632 006324 012737 177777 001044          MOV      #-1,T11T
1633 006332 012777 177470 172444          MOV      #-200,%BC         ;566 BYTES = ONE INCH
1634 006340 012777 012136 172440          MOV      #WBUF,%CA
1635 006346 005037 007546          CLR      TIME
1636 006352 013777 007322 172422          MOV      FDRIVE,%MTC       ;SELECT DRIVE
1637 006360 052777 000005 172414          BIS      #00005,%MTC       ;200 BPI, WRITE, GO
1638
1639          ;TIME "WRITE FROM BOT DELAY" AT 556 BPI
1640
1641 006366 022777 012140 172412          T12B:   CMP      #WBUF+2,%CA   ;IS 2ND WORD OUT?
1642 006374 001403          BEQ      T12C              ;YES
1643 006376 004737 007524          JSR      %7,TIMER          ;NO, COUNT TIME
1644 006402 000771          BR       T12B
1645 006404 013720 007546          T12C:   MOV      TIME,(0)+    ;SAVE "WRITE FROM BOT DELAY"
1646 006410 005037 007546          CLR      TIME
1647
1648          ;TIME "ONE INCH DATA" AT 200 BPI
1649
1650 006414 005777 172364          T12D:   TST      %BC           ;IS BC=0
1651 006420 001403          BEQ      T12E              ;YES
1652 006422 004737 007524          JSR      %7,TIMER          ;NO, COUNT TIME
1653 006426 000772          BR       T12D
1654 006430 013721 007546          T12E:   MOV      TIME,(1)+    ;SAVE "1 INCH DATA" TIME
1655 006434 005037 007546          CLR      TIME
1656
1657          ;TIME "WRITE SHUTDOWN" AT 200 BPI
1658
1659 006440 005777 172340          TST      %BC           ;SEE IF WORD COUNT DONE
1660 006444 001375          BNE      .-4              ;IF NOT: BR
1661 006446 032777 000010 172324          T12F:   BIT      #10,%MTC     ;IS SETTLEDOWN SET?
1662 006454 001003          BNE      T12G              ;YES
1663 006456 004737 007524          JSR      %7,TIMER          ;NO, COUNT TIME
1664 006462 000771          BR       T12F
1665 006464 013722 007546          T12G:   MOV      TIME,(2)+    ;SAVE "WRITE SHUTDOWN"
1666 006470 005037 007546          CLR      TIME
1667
1668          ;TIME "BACKSPACE SHUTDOWN" AT 200 BPI
1669
1670 006474 006077 172300          ROR      %MTC
1671 006500 103375          BCC      .-4              ;AWAIT TUR
1672 006502 042777 000016 172272          BIC      #16,%MTC
1673 006510 052777 000007 172264          BIS      #7,%MTC
1674 006516 105777 172260          TSTB    %MTC
1675 006522 100375          BPL      .-4              ;AWAIT CUR
1676 006524 006077 172250          ROR      %MTC
1677 006530 103375          BCC      .-4              ;AWAIT TUR
1678 006532 012777 177777 172244          MOV      #-1,%BC
1679 006540 042777 000016 172234          BIC      #16,%MTC
1680 006546 052777 000013 172226          BIS      #13,%MTC
;BACKSPACE 1 RECORD, GO
    
```

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1681 006554 000240      NOP
1682 006556 000240      NOP
1683 006560 000240      NOP
1684 006552 032777 040000 172210 T12GA: BIT      #40000, @MTC
1685 006570 001774      BEQ      T12GA          ;AWAIT EOF
1686 006572 032777 000010 172200 T12H:  BIT      #10, @MTC      ;IS SETTLEDOWN SET?
1687 006600 001003      BNE      T12J          ;YES
1688 006602 004737 007524      JSR      %7, TIMER     ;NO COUNT TIME
1689 006606 000771      BR       T12H
1690 006610 013723 007546      T12J:  MOV      TIME, (3)+ ;SAVE "BACKSPACE SHUTDOWN"
1691 006614 005037 007546      CLR      TIME
1692
1693          ;TIME "LAST CHAR IN TO MTF" AT 200 BPI
1694
1695 006620 006077 172154      ROR      @MTC
1696 006624 103375      BCC      .-4          ;WAIT FOR TU READY
1697 006626 012777 177470 172150  MOV      #-200, @BC   ;556 BYTES
1698 006634 012777 012136 172144  MOV      #@BUF, @CA
1699 006642 013777 007322 172132  MOV      @DRIVE, @MTC ;SELECT DRIVE
1700 006650 052777 000003 172124  BIS      #00003, @MTC ;556 BPI, READ, GO
1701 006656 032777 040000 172114 T12JA: BIT      #40000, @MTC
1702 006664 001774      BEQ      T12JA        ;AWAIT EOF
1703 006666 000240      NOP
1704 006670 000240      NOP
1705 006672 000240      NOP
1706 006674 013724 007546      T12L:  MOV      TIME, (4)+ ;SAVE "LAST CHAR IN TO MTF"
1707 006700 005037 007546      CLR      TIME
1708 006704 032777 000010 172066 T12M:  BIT      #10, @MTC
1709 006712 001003      BNE      T12N
1710 006714 004737 007524      JSR      %7, TIMER
1711 006720 000771      BR       T12M
1712 006722 013725 007546      T12N:  MOV      TIME, (5)+ ;SAVE "READ SHUTDOWN"
1713 006726 000406      BR       T12R
1714
1715 006730 005020      T12P:  CLR      (0)+
1716 006732 005021      CLR      (1)+
1717 006734 005022      CLR      (2)+
1718 006736 005023      CLR      (3)+
1719 006740 005024      CLR      (4)+
1720 006742 005025      CLR      (5)+
1721 006744 004737 007250 T12R:  JSR      %7, CHGDRV
1722 006750 000401      BR       .+4
1723 006752 000402      BR       .+6
1724 006754 000137 006304      JMP      T12A
1725 006760 012720 177777      MOV      #-1, (0)+   ;TERMINATE DRIVES
1726 006764 012721 177777      MOV      #-1, (1)+
1727 006770 012722 177777      MOV      #-1, (2)+
1728 006774 012723 177777      MOV      #-1, (3)+
1729 007000 012724 177777      MOV      #-1, (4)+
1730 007004 012725 177777      MOV      #-1, (5)+
1731 007010 005737 001044      TST      T11         ;HAVE TESTED ANY 7 TRACKS?
1732 007014 001452      BEQ      T13         ;NO
1733 007016 012737 011312 010406  MOV      #MSG21, MESSAGE ;PRINT "FUNCTIONS AT 200"
1734 007024 004737 010266      JSR      %7, TOP
1735 007030 012737 010450 010406  MOV      #MSG3, MESSAGE
1736 007036 012700 007550      MOV      #TMI, %0
    
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E04

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1737 007042 004737 010010 JSR %7, TYPTIM ;PRINT "WRITE FROM BOT DELAY"
1738 007046 012737 011264 010406 MOV #MSG20, MESSAGE
1739 007054 012700 007574 MOV #TM2, %0
1740 007060 004737 010010 JSR %7, TYPTIM ;PRINT "ONE INCH DATA TIME"
1741 007064 012737 010476 010406 MOV #MSG4, MESSAGE
1742 007072 012700 007620 MOV #TM3, %0
1743 007076 004737 010010 JSR %7, TYPTIM ;PRINT "WRITE SHUTDOWN"
1744 007102 012737 010654 010406 MOV #MSG9, MESSAGE
1745 007110 012700 007644 MOV #TM4, %0
1746 007114 004737 010010 JSR %7, TYPTIM ;PRINT "BACKSPACE SHUTDOWN"
1747 007120 012737 010702 010406 MOV #MSG10, MESSAGE
1748 007126 012700 007714 MOV #TM6, %0
1749 007132 004737 010010 JSR %7, TYPTIM ;PRINT "READ SHUTDOWN"
1750 007136 004737 007402 JSR %7, ST15
1751 007142 012737 011343 010406 T13: MOV #MSG27, MESSAGE
1752 007150 004737 010266 JSR %7, TOP ;PRINT "END OF TIMING"
1753 007154 013700 000042 MOV #42, %0
1754 007160 001405 BEQ HERE
1755 007162 000005 RESET
1756 007164 004710 SENDAD: JSR %7, (%0)
1757 007166 000240 NOP
1758 007170 000240 NOP
1759 007172 000240 NOP
1760 007174 000240 HERE: NOP
1761 007176 000000 HALT
1762 007200 000137 001120 JMP STO
1763
1764 ;RESET DRIVE SELECTION TO LOWEST NUMBER
1765
1766 007204 005037 007314 RSFDRV: CLR CDRIVE ;START WITH DRIVE 0
1767 007210 012737 100000 007316 MOV #100000, CDRVBT ;INITIALIZE FOR 0
1768 007216 033737 007316 007320 RSF1: BIT CDRVBT, DRIVES ;MASK WITH SELECTED DRIVES
1769 007224 001006 BNE RSF2
1770 007226 005237 007314 INC CDRIVE ;+1 TO DRIVE NUMBER
1771 007232 000241 CLC
1772 007234 006037 007316 ROR CDRVBT ;MOVE MASK BIT TO NEXT DRIVE
1773 007240 000766 BR RSF1
1774 007242 004737 007324 RSF2: JSR %7, GTNINE ;CHECK 9 TRACK
1775 007246 000207 RTS %7
  
```

F04

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1776 ;SELECT NEXT DRIVE IN SEQUENCE
1777 ;SKIP FIRST EXIT ADDRESS IF LAST DRIVE SELECTED
1778
1779 007250 005237 007314 CHGDRV: INC CDRIVE ;+1 TO DRIVE
1780 007254 000241 CLC
1781 007256 006037 007316 ROR CDRVBT ;MOVE MASK BIT TO NEXT DRIVE
1782 007262 001005 BNE CHG1
1783 007264 004737 007204 JSR %7,RSFDRV ;RESET TO LOWEST DRIVE
1784 007270 062716 000002 ADD #2,(6) ;+2 TO SKIP FIRST EXIT
1785 007274 000207 RTS %7 ;EXIT
1786 007276 033737 007316 007320 CHG1: BIT CDRVBT,DRIVES ;MASK WITH SELECTED DRIVES
1787 007304 001761 BEQ CHGDRV ;CHECK FOR NEXT DRIVE
1788 007306 004737 007324 JSR %7,GTNINE ;CHECK 9 TRACK
1789 007312 000207 RTS %7
1790 007314 000000 CDRIVE: 0
1791 007316 000000 CDRVBT: 0
1792 007320 000000 DRIVES: 0
1793 007322 000000 FDRIVE: 0
1794
1795 ;CHECK FOR NINE TRACK DRIVES
1796
1797 007324 013737 007314 007322 GTNINE: MOV CDRIVE,FDRIVE
1798 007332 000337 007322 SWAB FDRIVE ;POSITION UNIT SELECT BITS
1799 007336 042737 174377 007322 BIC #174377,FDRIVE ;CLEAR ALL OTHER BITS
1800 007344 032737 000010 007314 BIT #10,CDRIVE ;TEST FOR 9 TRACK
1801 007352 001403 BEQ GNT1 ;NO
1802 007354 052737 020000 007322 BIS #20000,FDRIVE ;YES SET 9 TRACK BIT
1803 007362 000207 GNT1: RTS %7
1804
1805 ;INITIALIZE BYTE COUNT AND CURRENT ADDRESS FOR WRITE
1806
1807 007364 012777 172110 171412 WRINT: MOV #BLENTH,ABC
1808 007372 012777 012136 171406 MOV #WBUF,ACA
1809 007400 000207 RTS %7
1810
1811 ;STORE 1'S IN WRITE BUFFER
1812
1813 007402 012700 012136 STIS: MOV #WBUF,%0
1814 007406 012720 177777 STISA: MOV #-1,(0)+
1815 007412 022700 020030 CMP #WBUF+BLENTH+2,%0
1816 007416 001373 BNE STISA
1817 007420 000207 RTS %7
1818
1819 ;START REWIND OPERATIONS
1820
1821 007422 013777 007322 171352 STRREW: MOV FDRIVE,@MTC ;SELECT DRIVE
1822 007430 105777 171346 TSTB @MTC
1823 007434 100375 BPL .-4 ;WAIT FOR CU READY
1824 007436 006077 171336 ROR @MTC
1825 007442 103375 BCC .-4 ;WAIT FOR TAPE UNIT READY
1826 007444 052777 000017 171330 BIS #17,@MTC ;GO REWIND
1827 007452 105777 171324 TSTB @MTC
1828 007456 100375 BPL .-4 ;WAIT FOR CONTROL UNIT READY
1829 007460 000207 RTS %7
1830
1831 ;WAIT FOR REWIND TO FINISH
    
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G04

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1832
1833 007462 013777 007322 171312 WATREW: MOV FDRIVE,@MTC
1834 007470 006077 171304 ROR @MTC
1835 007474 103375 BCC .-4
1836 007476 032777 000040 171274 BIT @40,@MTC ;IS BOT SET?
1837 007504 001006 BNE IS ;YES
1838 007506 012737 011745 010406 MOV @MSG29,MESSAGE
1839 007514 004737 010266 JSR %7,TOP
1840 007520 000000 HALT ;ERROR, NOT AT BOT AFTER REWIND
1841 007522 000207 IS: RTS %7
1842
1843 ;KEEP COUNT OF ELAPSED TIME
1844 ;EXIT EVERY 100 USEC
1845
1846 007524 005777 171262 TIMER: TST @MTRD
1847 007530 100375 BPL .-4
1848 007532 005777 171254 TST @MTRD
1849 007536 100775 BMI .-4
1850 007540 005237 007546 INC TIME ;+1 TO 100 USEC COUNT
1851 007544 000207 RTS %7
1852 007546 000000 TIME: 0
1853 007550 000000 TM1: 0
1854 007574 000000 . =TM1+20.
1855 007620 000000 TM2: 0
1856 007644 000000 . =TM2+20.
1857 007670 000000 TM3: 0
1858 007714 000000 . =TM3+20.
1859 007740 000000 TM4: 0
1860 007764 000000 . =TM4+20.
1861 007774 000000 TM5: 0
1862 007784 000000 . =TM5+20.
1863 007794 000000 TM6: 0
1864 007804 000000 . =TM6+20.
1865 007814 000000 TM7: 0
1866 007824 000000 . =TM7+20.
1867 007834 000000 TM8: 0
1868 010010 . =TM8+20.

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# H04

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1869                                     ;PRINT TITLE OF TEST EXECUTED AND THE DRIVE TIMES
1870
1871 010010 004737 010266 TYPTIM: JSR %7, TOP ;PRINT TITLE
1872 010014 012037 010244 TYPT0: MOV (0)+, VALUE ;GET TIME
1873 010020 022737 177777 010244 CMP #-1, VALUE ;FINISHED TIME BUFFER
1874 010026 001001 BNE .+4
1875 010030 000207 RTS %7
1876 010032 012737 010256 010254 MOV #DECPNT+2, DECPNT ;INITIALIZE DECIMAL VALUE POINTER
1877 010040 012737 000040 010252 MOV #40, ZERO ;INITIALIZE SPACE
1878 010046 012737 177774 010246 MOV #-4, DIGCNT ;DIGIT COUNT
1879 010054 012737 177777 010250 TYPT1: MOV #-1, DIGIT ;INITIAL VALUE
1880 010062 005237 010250 TYPT2: INC DIGIT ;+1 TO VALUE
1881 010066 167737 000162 010244 SUB @DECPNT, VALUE ;SUBTRACT CONSTANT
1882 010074 100372 BPL TYPT2 ;NOT NEGATIVE YET
1883 010076 067737 000152 010244 ADD @DECPNT, VALUE ;RESTORE LAST POSITIVE VALUE
1884 010104 004737 010174 JSR %7, DECOUT ;PRINT DECIMAL DIGIT
1885 010110 005237 010246 INC DIGCNT ;+1 TO DIGIT COUNT
1886 010114 001006 BNE TYP2A
1887 010116 012737 010444 010406 MOV #MSG28, MESSAGE
1888 010124 004737 010266 JSR %7, TOP
1889 010130 000731 BR TYPT0
1890 010132 022737 177777 010246 TYP2A: CMP #-1, DIGCNT ;CHECK FOR DECIMAL PLACE
1891 010140 001011 BNE TYPT3 ;NO
1892 010142 105777 170654 TSTB @TPS
1893 010146 100375 BPL .-4
1894 010150 012777 000056 170646 MOV #'., @TPB ;PRINT DECIMAL POINT
1895 010156 012737 000060 010252 MOV #60, ZERO
1896 010164 062737 000002 010254 TYPT3: ADD #2, DECPNT ;+2 TO DECIMAL VALUE POINTER
1897 010172 000730 BR TYPT1 ;DO AGAIN
1898
1899 010174 005737 010250 DECOUT: TST DIGIT ;IS DIGIT 0
1900 010200 001004 BNE DEC1 ;NO
1901 010202 013737 010252 010250 MOV ZERO, DIGIT ;SUPPRESS LEADING ZEROS
1902 010210 000406 BR DEC2
1903 010212 012737 000060 010252 DEC1: MOV #60, ZERO ;INITIALIZE ZERO AFTER SOME VALUE FOUND
1904 010220 052737 000060 010250 BIS #60, DIGIT ;CONVERT TO ANSCII
1905 010226 105777 170570 DEC2: TSTB @TPS
1906 010232 100375 BPL .-4
1907 010234 013777 010250 170562 MOV DIGIT, @TPB ;PRINT
1908 010242 000207 RTS %7
1909 010244 000000 VALUE: 0
1910 010246 000000 DIGCNT: 0
1911 010250 000000 DIGIT: 0
1912 010252 000040 ZERO: 40 ;CONTAINS ZERO OR SPACE
1913 010254 010256 DECPNT: .+2
1914 010256 001750 1000.
1915 010260 000144 100.
1916 010262 000012 10.
1917 010264 000001 1.

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1918                                     ;TELETYPE OUTPUT PACKAGE
1919
1920 010266 142777 000177 170526 TOP:   BICB   #177,@TPS      ;CLEAR FLAGS
1921 010274 117737 000106 010404      MOVB   @MESSAGE,EOMK ;SAVE MESSAGE DELIMITER
1922 010302 005237 010406                INC    MESSAGE        ;+2 TO POINTER
1923 010306 127737 000074 010404 TOP1:  CMPB   @MESSAGE,EOMK ;IS CHARACTER THE 2ND DELIMITER
1924 010314 001001                BNE    .+4            ;NO
1925 010316 000207                RTS    %7             ;YES ENT
1926 010320 127727 000062 000100      CMPB   @MESSAGE,#'@  ;IS CHARACTER AN @ INDICATING A CARRIAGE RETURN
1927 010326 001411                BEQ    TOP3           ;YES
1928 010330 105777 170466                TSTB   @TPS
1929 010334 100375                BPL    .-4
1930 010336 117777 000044 170460      MOVB   @MESSAGE,@TPB ;PRINT CHARACTER
1931 010344 005237 010406 TOP2:  INC    MESSAGE    ;+2 TO POINTER
1932 010350 000756                BR     TOP1           ;LOOP
1933
1934                                     ;CARRIAGE RETURN, LINE FEED
1935
1936 010352 105777 170444 TOP3:  TSTB   @TPS
1937 010356 100375                BPL    .-4
1938 010360 112777 000215 170436      MOVB   #215,@TPB
1939 010366 105777 170430                TSTB   @TPS
1940 010372 100375                BPL    .-4
1941 010374 112777 000212 170422      MOVB   #212,@TPB
1942 010402 000760                BR     TOP2
1943 010404 000000 EOMK:  D
    
```



# J04

1944	010406	000007			MESSAGE: 0
1945	010410	040057	052506	041516	MSG2: .ASCII ;/FUNCTION /;
1946	010416	044524	047117	020040	
1947	010424	020040	020040	020040	
1948	010432	027440			
1949	010434	020057	047125	052111	MSG2A: .ASCII ;/ UNIT /;
1950	010442	027440			
1951	010444	020057	027440		MSG2B: .ASCII ;/ /;
1952	010450	040057	051127	052111	MSG3: .ASCII ;/WRITE FROM BOT /;
1953	010456	020105	051106	046517	
1954	010464	041040	052117	020040	
1955	010472	020040	027440		
1956	010476	040057	051127	052111	MSG4: .ASCII ;/WRITE SHUTDOWN /;
1957	010504	020105	044123	052125	
1958	010512	047504	047127	020040	
1959	010520	020040	027440		
1960	010524	040057	051127	052111	MSG5: .ASCII ;/WRITE START /;
1961	010532	020105	052123	051101	
1962	010540	020124	020040	020040	
1963	010546	020040	027440		
1964	010552	040057	042523	052124	MSG6: .ASCII ;/SETTLE DOWN DELAY /;
1965	010560	042514	042040	053517	
1966	010566	020116	042504	040514	
1967	010574	020131	027440		
1968	010600	040057	051127	052111	MSG7: .ASCII ;/WRITE TO ERASE HEAD/;
1969	010606	020105	047524	042440	
1970	010614	040522	042523	044040	
1971	010622	040505	027504		
1972	010626	040057	051127	052111	MSG8: .ASCII ;/WRITE NONSTOP GAP /;
1973	010634	020105	047516	051516	
1974	010642	047524	020120	040507	
1975	010650	020120	027440		
1976	010654	040057	040502	045503	MSG9: .ASCII ;/BACKSPACE SHUTDOWN /;
1977	010662	050123	041501	020105	
1978	010670	044123	052125	047504	
1979	010676	047127	027440		
1980	010702	040057	042522	042101	MSG10: .ASCII ;/AREAD SHUTDOWN /;
1981	010710	051440	052510	042124	
1982	010716	053517	020116	020040	
1983	010724	020040	027440		
1984	010730	040057	040507	051520	MSG11: .ASCII ;/GAPS SHOULD = 8>7>6>5>4>3, 3=2=1 (1.5)/;
1985	010736	051440	047510	046125	
1986	010744	020104	020075	037070	
1987	010752	037067	037066	037065	
1988	010760	037064	026063	031440	
1989	010766	031075	030475	024040	
1990	010774	027061	024465	057	
1991	011001	057	043500	050101	MSG11A: .ASCII ;/GAP 1 /;
1992	011006	030440	020040	020040	
1993	011014	020040	020040	020040	
1994	011022	020040	020040	057	
1995	011027	057	053500	044522	MSG12: .ASCII ;/WRITE XIRG /;
1996	011034	042524	054040	051111	
1997	011042	020107	020040	020040	
1998	011050	020040	020040	057	
1999	011055	057	051100	040505	MSG13: .ASCII ;/AREAD FROM BOT DELAY/;

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2000	0111062	020104	051106	046517	
2001	0111070	041040	052117	042040	
2002	0111076	046105	054501	057	
2003	0111103	057	046100	051501	MSG14: .ASCII ;/2LAST CHAR TO CU RDY/;
2004	0111110	020124	044103	051101	
2005	0111116	020104	020117	052503	
2006	0111124	051040	054504	057	
2007	0111131	057	053500	044522	MSG15: .ASCII ;/2WRITE EOF /;
2008	0111136	042524	042440	043117	
2009	0111144	020040	020040	020040	
2010	0111152	020040	020040	057	
2011	0111157	057	042500	051117	MSG16: .ASCII ;/2EOR TO EOF SP TIME /;
2012	0111164	052040	020117	047505	
2013	0111172	020106	050123	052040	
2014	0111200	046511	020105	057	
2015	0111205	057	051500	040520	MSG18: .ASCII ;/2SPACE SHUTDOWN /;
2016	0111212	042503	051440	052510	
2017	0111220	042124	053517	020116	
2018	0111226	020040	020040	057	
2019	0111233	057	025100	043052	MSG19: .ASCII ;/2**FUNCTIONS AT 556 BPI/;
2020	0111240	047125	052103	047511	
2021	0111246	051516	040440	020124	
2022	0111254	032465	020065	050102	
2023	0111262	027511			
2024	0111264	040057	047117	020105	MSG20: .ASCII ;/2ONE INCH DATA TIME /;
2025	0111272	047111	044103	042040	
2026	0111300	052101	020101	044524	
2027	0111306	042515	027440		
2028	0111312	040057	025052	052506	MSG21: .ASCII ;/2**FUNCTIONS AT 200 BPI/;
2029	0111320	041516	044524	047117	
2030	0111326	020123	052101	031040	
2031	0111334	030060	041040	044520	
2032	0111342	057			
2033	0111343	057	025100	025052	MSG27: .ASCII ;/2*****END OF TIMING*****2/;
2034	0111350	025052	025052	025052	
2035	0111356	025052	047105	020104	
2036	0111364	043117	052040	046511	
2037	0111372	047111	025107	025052	
2038	0111400	025052	025052	025052	
2039	0111406	025052	027500		
2040	0111412	040057	052100	026115	MSG28: .ASCII ;/22TH,A,B-11:TU10,N,W/TE10N,W DRIVE FUNCTION TIMER (DZTME-D);
2041	0111420	026101	026502	030461	
2042	0111426	052072	030525	026060	
2043	0111434	026116	027527	042524	
2044	0111442	030061	026116	020127	
2045	0111450	051104	053111	020105	
2046	0111456	052506	041516	044524	
2047	0111464	047117	052040	046511	
2048	0111472	051105	024040	055104	
2049	0111500	046524	026505	024504	
2050	0111506	052100	030525	020060	.ASCII ;/2TU10 TIMING INFO REFERENCE 6.2;
2051	0111514	044524	044515	043516	
2052	0111522	044440	043116	020117	
2053	0111530	042522	042506	042522	
2054	0111536	041516	020105	027066	
2055	0111544	062			

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2056	011545	100	042524	030061	.ASCII ;@TE10W (M8926) TIMING INFO REFERENCE 6.3;
2057	011552	020127	046450	034470	
2058	011560	033062	020051	044524	
2059	011566	044515	043516	044440	
2060	011574	043116	020117	042522	
2061	011602	042506	042522	041516	
2062	011610	020105	027066	063	
2063	011615	100	052524	030061	.ASCII ;@TU10W (M8926) TIMING INFO REFERENCE 6.4;
2064	011622	020127	046450	034470	
2065	011630	033062	020051	044524	
2066	011636	044515	043516	044440	
2067	011644	043116	020117	042522	
2068	011652	042506	042522	041516	
2069	011660	020105	027066	064	
2070	011665	100	052524	030061	.ASCII ;@TU10N/TE10N (M8927) TIMING INFO REFERENCE 6.5@/;
2071	011672	027516	042524	030061	
2072	011700	020116	046450	034470	
2073	011706	033462	020051	044524	
2074	011714	044515	043516	044440	
2075	011722	043116	020117	042522	
2076	011730	042506	042522	041516	
2077	011736	020105	027066	040065	
2078	011744	057			
2079	011745	057	040100	051105	MSG29: .ASCII ;/@@ERROR-NOT AT BOT AFTER REWIND-HALT@@/;
2080	011752	047522	026522	047516	
2081	011760	020124	052101	041040	
2082	011766	052117	040440	052106	
2083	011774	051105	051040	053505	
2084	012002	047111	026504	040510	
2085	012010	052114	040100	057	
2086	012015	057	040100	047514	MSG30: .ASCII ;/@@LOC.176 MUST BE LOADED PRIOR TO EXECUTION-HALT@@/;
2087	012022	027103	033461	020066	
2088	012030	052515	052123	041040	
2089	012036	020105	047514	042101	
2090	012044	042105	050040	044522	
2091	012052	051117	052040	020117	
2092	012060	054105	041505	052125	
2093	012066	047511	026516	040510	
2094	012074	052114	040100	057	
2095	012101	057	040100	040503	MSG31: .ASCII ;/@@CANNOT TEST LOAD MEDIUM@@/;
2096	012106	047116	052117	052040	
2097	012114	051505	020124	047514	
2098	012122	042101	046440	042105	
2099	012130	052511	040115	027500	
2100					.EVEN
2101	012136	000000			WBUF: 0
2102		000001			.END







T12B	006366	1641#	1644		
T12C	006404	1642	1645#		
T12D	006414	1650#	1653		
T12E	006430	1651	1654#		
T12F	006446	1661#	1664		
T12G	006464	1662	1665#		
T12GA	006562	1684#	1685		
T12H	006572	1686#	1689		
T12J	006610	1687	1690#		
T12JA	006656	1701#	1702		
T12K	006666	1703#			
T12L	006674	1706#			
T12M	006704	1708#	1711		
T12N	006722	1709	1712#		
T12P	006730	1631	1715#		
T12R	006744	1713	1721#		
T13	007142	867	1732	1751#	
T2	001460	930#			
T2A	001474	933#	953		
T2B	001520	937#	940		
T2C	001536	938	941#		
T2D	001564	947#	950		
T2E	001600	948	951#		
T3	001656	968#	970		
T3A	001670	971#	973		
T3B	001702	974#	983		
T3C	001760	984#	986		
T3D	001776	992#	1007		
T3E	002042	999#	1002		
T3F	002056	1000	1003#		
T3G	002120	1012#	1014		
T3H	002132	1015#	1017		
T4	002144	1024#			
T4A	002232	1040#	1043		
T4AB	002164	1028#	1089		
T4B	002250	1041	1044#		
T4BA	002354	1064#	1065		
T4C	002370	1068#	1071		
T4D	002406	1069	1072#		
T4DA	002444	1079#	1080		
T4E	002454	1081#	1084		
T4F	002472	1082	1085#		
T4FA	002566	1100#	1102		
T4FB	002600	1103#	1105		
T4FC	002614	1107#	1128		
T4G	002732	1134#	1206		
T5	003360	1214#	1242		
T5A	003422	1221#	1236		
T5B	003452	1228#	1231		
T5C	003470	1229	1232#		
T5ORV	001042	856#	1212#	1217	1240#
T6	004000	1281#			
T6A	004010	1283#	1321		
T6B	004130	1301#	1304		
T6C	004146	1302	1305#		
T6D	004204	1312#	1315		

D05

T6E	004222	1313	1316#																
T6F	004312	1330#	1332																
T7	004324	1336#																	
T7A	004330	1337#	1351																
T7B	004354	1341#	1344																
T7C	004372	1342	1345#																
T8	004454	1360#	1362																
T8A	004472	1364#	1366																
T9	004504	1371#																	
T9A	004510	1372#	1394																
T9B	004574	1383#	1386																
T9C	004624	1388	1391#																
T9D	004664	1399#	1401																
VALUE	010244	1872*	1873	1881*	1883*	1909#													
WATREM	007462	877	971	984	1015	1103	1214	1330	1364	1399	1493	1628	1833#						
WBUF	012136	905	937	975	993	1040	1228	1301	1312	1341	1374	1412	1453	1459					
		1499	1506	1567	1634	1641	1698	1808	1813	1815	2101#								
WRINT	007364	901	933	1029	1038	1053	1075	1107	1115	1121	1134	1141	1154	1168					
		1181	1215	1225	1283	1294	1309	1338	1807#										
ZERO	010252	1877*	1895*	1901	1903*	1912#													
SENDAD	007164	820	1756#																
SSVPC =	000042	818#	823																
.	= 012140	810#	811	813#	818	819#	821#	823#	833#	836#	838#	892	912	944					
		946	979	998	1005	1034	1047	1049	1057	1059	1073	1086	1111	1113					
		1118	1120	1124	1126	1138	1140	1144	1146	1151	1153	1158	1160	1171					
		1173	1178	1180	1185	1187	1203	1222	1224	1238	1286	1288	1291	1296					
		1306	1317	1347	1349	1353	1378	1380	1416	1418	1423	1425	1451	1457					
		1460	1538	1542	1544	1563	1565	1588	1589	1630	1660	1671	1675	1677					
		1696	1722	1723	1823	1825	1828	1835	1847	1849	1854#	1856#	1858#	1860#					
		1862#	1864#	1866#	1868#	1874	1893	1906	1913	1924	1929	1937	1940						



E05

MAINDEC-11-DZTME-D-D TM,A,B-11/TU10,N,W/TE10N,W DRIVE FUNCTION TIMER MACY11 30(1046) 19-AUG-77 08:33 PAGE 58  
DZTMED.SRC 19-AUG-77 08:33 CROSS REFERENCE TABLE -- MACRO NAMES

SEQ 0055

COMMEN 1#  
ENDCOM 1#  
ESCAPE 1#  
GETPRI 1#  
GETSWR 1#  
MULT 1#  
NEWTST 1#  
POP 1#  
PUSH 1#  
REPORT 1#  
SETPRI 1#  
SETUP 1#  
SKIP 1#  
SLASH 1#  
STARS 1#  
SWRSU 1#  
TYPBIN 1#  
TYPDEC 1#  
TYPNAM 1#  
TYPNUM 1#  
TYPOCS 1#  
TYPOCT 1#  
TYPTXT 1#  
SSESCA 1#  
SSNEWT 1#  
SSSKIP 1#  
.EQUAT 1#  
.HEQDE 1#  
.KT11 1#  
.SETUP 1#  
.SWRHI 1#  
.SACT1 1#  
.SAPT8 1#  
.SAPTH 1#  
.SAPTY 1#  
.SASTA 1#  
.SCATC 1#  
.SCHTA 1#  
.SOB2D 1#  
.SOB2O 1#  
.SDIV 1#  
.SEOP 1#  
.SERRO 1#  
.SERRT 1#  
.SMULT 1#  
.SPOME 1#  
.SRAND 1#  
.SRDEE 1#  
.SRDOC 1#  
.SREAO 1#  
.SR2AZ 1#  
.SSAVE 1#  
.SSB2D 1#  
.SSB2O 1#  
.SSCOP 1#  
.SSIZE 1#

816

808# 814

F05

MAINDEC-11-DZTME-D-D TM, A, B-11/TU10, N, W/TE10N, W DRIVE FUNCTION TIMER MACY11 30(1046) 19-AUG-77 08:33 PAGE 59  
DZTMED.SRC 19-AUG-77 08:33 CROSS REFERENCE TABLE -- MACRO NAMES

SEQ 0056

.SSUPR 10  
.STRAP 10  
.STYPB 10  
.STYPD 10  
.STYPE 10  
.STYPO 10  
.S4OCA 10  
.1170 10

. ABS. 012140 000

ERRORS DETECTED: 0

DZTMED, DZTMED/CRF/SOL/DOC=DZTMED.SML, DZTMED.SRC

RUN-TIME: 8 10 .6 SECONDS

RUN-TIME RATIO: 77/19=3.9

CORE USED: 38K (75 PAGES)

DOCUMENT PAGES: 56