DataGeneral

TECHNICAL STATEMENT

TEXT LISTING

068-001084-03

PROGRAM

DUAL MODE
MAGNETIC TAPE DRIVE
DIAGNOSTIC

TEXT TAPE

097-001084-03

ABSTRACT

THIS PROGRAM IS A DIAGNOSTIC TEST TO DETECT AND ISOLATE FAULTS EXISITING IN THE DUAL MODE MAGNETIC TAPE CONTROL BOARD OR DRIVE.

```
 0001 .MAIN    MACRO REV 06.30          09:02:00 05/16/79
01
02
03
04
05
06
07
08              ;*******************************************************
09              ;
10              ; NAME: DMTPE.TX                 PART NUMBER: 097-001084
11              ;
12              ; DESCRIPTION: DUAL MODE MAGNETIC TAPE DRIVE DIAGNOSTIC
13              ;
14              ; REVISION HISTORY
15              ;
16              ;       REV.            DATE
17              ;
18              ;       01              08/04/78
19              ;       02              10/24/78
20              ;       03              12/29/78
21              ;
22              ; COPYRIGHT (C) DATA GENERAL CORPORATION, 1978.
23              ; ALL RIGHTS RESERVED.
24              ;*******************************************************
25
26
27
```

```
10002 .MAIN
01
02
03              ;1.  PROGRAM NAME:
04
05              ;       DMTPE.SR
06
07              ;2.  REVISION HISTORY:
08
09              ;       REV             REASON
10
11              ;       01              TO RUN ON A NOVA 3
12              ;       02              TO RUN ON DTOS
13              ;       03              TO AVOID DETERIORATION OF TAPE MEDIA
14
15              ;3.  MACHINE REQUIREMENTS:
16
17              ;       A.  ANY NOVA LINE OR ECLIPSE PROCESSOR.
18              ;       B.  8K READ/WRITE MEMORY.
19              ;       C.  TELETYPE OR CRT.
20              ;       D.  DUAL MODE MAGNETIC TAPE CONTROLLER.
21
22              ;4.  TEST REQUIREMENTS:
23
24              ;       A COMPLETE AND EXHAUSTIVE EXECUTION OF THIS TEST
25              ;       REQUIRES EVERYTHING DESCRIBED IN PART 3 PLUS
26              ;       A DUAL MODE DRIVE.
27
28              ;5.  SUMMARY:
29
30              ;       THIS PROGRAM IS A DIAGNOSTIC TEST TO DETECT AND
31              ;       ISOLATE FAULTS EXISTING IN THE DUAL MODE MAGNETIC
32              ;       TAPE CONTROL BOARD OR DRIVE.
33
34              ;6.  RESTRICTIONS
35
36              ;       THIS PROGRAM CAN BE RUN WITH ONLY ONE DRIVE ON LINE.
37
38              ;       IF A RTC IS NOT AVAILABLE THE TERMINAL BAUD RATE IS
39              ;       USED TO SET THE TIMING CONSTANTS. THE PROGRAM ASSUMES
40              ;       THAT ALL 110 BAUD TRANSMISSION CONSISTS OF 11 BITS/CHAR
41              ;       AND THAT ALL OTHER BAUD RATES HAVE 10 BITS/CHAR.
```

```
01
02
03              ;7.  PROGRAM DESCRIPTION/THEORY OF OPERATION
04
05              ;         THE PROGRAM IS DIVIDED INTO TWO PARTS.
06              ;       THE FIRST PART DEALS WITH THE CONTROLLER
07              ;     BOARD AND CAN BE RUN WITHOUT ANY DRIVE ON
08              ;     LINE.  IT CONSISTS OF A NUMBER OF INDEPEN-
09              ;     DENT TESTS MOST OF WHICH RUN IN CONJUNCTION
10              ;     WITH MICROCODE (FIRMWARE) DIAGNOSTICS.  IN
11              ;     GENERAL, TESTS THAT HAVE MICROCODE ASSOCIATED
12              ;     WITH THEM WILL ISSUE A DOA DIAGNOSTIC COMMAND
13              ;     WITH M.S. BYTE CONTAINING A UNIQUE DIAGNOSTIC
14              ;     CODE.  THEN WHEN THE HOST PROGRAM IS READY
15              ;     TO ACTIVATE THE DIAGNOSTIC MICROCODE IT ISSUES
16              ;     A START PULSE.  WHEN THE MICROCODE HAS COM-
17              ;     PLETED ITS OPERATION IT SIGNALS THIS TO THE
18              ;     HOST PROGRAM BY SETTING THE DONE FLOP.  THUS,
19              ;     THE MICROCODE DIAGNOSTIC WAITS FOR THE BUSY FLOP
20              ;     TO SET BEFORE IT DOES THE NEXT OPERATION; THE
21              ;     HOST PROGRAM WAITS FOR THE DONE FLOP TO SET
22              ;     BEFORE IT ANALYZES THE RESULTS OF THE MICROCODE
23              ;     OPERATION.
24              ;       THE SECOND PART DEALS MAINLY WITH THE DRIVE.
25              ;     IT ALSO CONSISTS OF INDEPENDENT TESTS.  HOWEVER,
26              ;     MOST OF THESE TESTS USE THE CONTROL MICROCODE
27              ;     RATHER THAN SPECIFIC DIAGNOSTIC MICROCODE. IF
28              ;     A DUAL MODE DRIVE IS BEING TESTED BOTH MODES ARE
29              ;     AUTOMATICALLY EXERCISED DURING EVERY PASS.
30              ;       WHEN LOOPING ON THE DIAGNOSTIC THE END OF A PASS IS
31              ;     NOTED WITH AN "END" DISPLAY.
```



```
01
02
03
04
05              ;8.     SWITCH SETTINGS
06              ;
07              ;       LOCATION "SWREG" IS USED TO SELECT THE PROGRAM OPTIONS
08              ;       (NOT SYSTEM CONFIGURATION). WHILE RUNNING UNDER DTOS,
09              ;       THIS LOCATION WILL BE LOADED BY THE MONITOR.
10              ;       HOWEVER UNDER STAND ALONE AND PROGRAM LOAD MODES THIS
11              ;       LOCATION WILL BE SET ACCORDING TO THE ANSWERS SUPPLIED
12              ;       BY THE OPERATOR. IN ANY CASE THE OPTIONS CAN BE CHANGED
13              ;       OR VERIFIED BY USING ONE OF THE COMMANDS GIVEN IN SEC.
14              ;       8.2
15              ;
16              ;
17              ;8.1    SWITCH OPTIONS
18              ;       DIFFERENT BITS AND THEIR INTERPRETATION AT LOCATION
19              ;       "SWREG" IS AS FOLLOWS:
20              ;
21              ;       BIT     OCTAL   BINARY  INERPRETATION
22              ;               VALUE   VALUE
23              ;
24              ;       1               0       LOOP ON ERROR
25              ;               40000   1       SKIP LOOPING ON ERROR
26              ;
27              ;       2               0       PRINT TO CONSOLE
28              ;               20000   1       ABORT PRINT OUT TO CONSOLE
29              ;
30              ;       3               0       DO NOT PRINT % FAILURE
31              ;               10000   1       PRINT % FAILURE
32              ;
33              ;       4               0       ALLOW END OF PASS PRINT OUT
34              ;               04000   1       SUPPRESS END OF PASS PRINT OUT
35              ;
36              ;       5               0       DO NOT PRINT ON THE LINE PRINTER
37              ;               02000   1       PRINT ON THE LINE PRINTER
38              ;
39              ;       6               0       DO NOT HALT ON ERROR
40              ;               01000   1       HALT ON ERROR
41              ;
42              ;       7               0       DO NOT PRINT SUMMARY AND/OR
43              ;                               PASSING OF EACH SUBTEST
44              ;               00400   1       PRINT SUMMARY AND/OR
45              ;                               PASSING OF EACH SUBTEST
46              ;       8               0       PRINT ONLY THE FIRST ERROR
47              ;               00200   1       PRINT EVERY ERROR
48
49              ;8.2    SWITCH COMMANDS
50              ;       ONCE THE PROGRAM STARTS EXECUTING THE STATE OF ANY OF
51              ;       THE BITS CAN BE CHANGED BY HITTING KEYS 1-9, A-F. THE
52              ;       PROGRAM WILL CONTINUE RUNNING AFTER UPDATING THE OPTIONS.
53              ;       EACH KEY WILL COMPLEMENT THE STATE OF THE BIT AFFILIAT-
54              ;       ED WITH IT, THUS BIT 4 CAN BE ALTERED BY HITTING KEY 4.
55              ;       SETTING OF ANY BIT OF LOCATION "SWREG" WILL SET BIT 0.
56              ;       (DEFAULT MODE IS DEFINED AS ALL BITS OF SWREG SET TO 0)
57              ;       THE PROGRAM CAN BE LOCKED INTO SWITCH MODIFICATION MODE
58              ;       BY TYPING A 0, IN WHICH CASE MORE THAN ONE BIT CAN BE
59              ;       CHANGED BEFORE  CONTROL IS ALLOWED TO RETURN TO THE
60              ;       MAIN PROGRAM.
```

```
0005 .MAIN
01              ;
02              ;8.2.1  OTHER COMMANDS
03              ;
04              ;       "CR"    A "RETURN" CAN BE TYPED TO CONTINUE THE PROGRAM
05              ;               AFTER ITS LOCKED IN A SWITCH MODIFICATION MODE
06              ;
07              ;       ^D      THIS COMMAND GIVEN AT ANY TIME WILL RESET "SWREG"
08              ;               TO DEFAULT MODE AND RESTART THE PROGRAM.
09              ;
10              ;       ^R      THIS COMMAND GIVEN AT ANY TIME WILL RESTART THE
11              ;               PROGRAM. SWITCHES ARE LEFT WITH THE VALUES THEY
12              ;               HAD BEFORE THE COMMAND WAS ISSUED.
13              ;
14              ;       ^O      THIS COMMAND GIVEN AT ANY TIME WILL CAUSE THE
15              ;               PROGRAM CONTROL TO GO TO ODT (NOTE: THIS IS AN
16              ;               OPTIONAL COMMAND AND IS AVAILBLE ONLY IF
17              ;               ODTPK IS PRESENT)
18              ;
19              ;       M       THIS COMMAND GIVEN AT ANY TIME WILL PRINT THE
20              ;               CURRENT OPERATING MODES.
21              ;
22
23              ;
24
25              ;        IN ADDITION TO THE SWITCH OPTIONS DESCRIBED IN 8.1
26              ;       THE USER HAS THE OPTION OF ELIMINATING ALL USER
27              ;       INTERACTION NORMALLY REQUIRED IN PASS 1 BY SETTING
28              ;       BIT 15 OF SWREG. THIS WILL NOT AFFECT THE LED TEST
29              ;       WHICH IS ALWAYS EXECUTED IN PASS 1. HOWEVER, AFTER
30              ;       THIS TEST, THE DIAGNOSTIC WILL LOOP INDEFINITELY
31              ;       WITH NO FURTHER USER ACTION NECESSARY.
32              ;         OTHER OPERATING MODES ARE DETERMINED BY
33              ;       THE USER'S RESPONSE TO REQUESTS OUTPUT ON THE
34              ;       CONSOLE AT THE BEGINNING OF PROGRAM EXECUTION.
35              ;       THESE ARE DESCRIBED IN THE NEXT SECTION.
```

```
0006 .MAIN
01
02
03              ;9.  OPERATING PROCEDURE/OPERATOR INPUT
04
05              ;       A.  LOAD USING THE BINARY LOADER (OR DTOS).
06
07              ;       B.  STARTING ADDRESSES:
08
09              ;               200 - START DIAGNOSTIC FOR FIRST PASS.
10              ;                     THIS IS THE DTOS DEFAULT START.
11
12              ;               374 - TO RESTART PROGRAM WITH MINIMUM
13              ;                     USER INPUT.  ALL DRIVE CONDITIONS EXCEPT
14              ;                     THE MODE MUST BE THE SAME AS THEY WERE
15              ;                     ORIGINALLY.
16
17              ;               376 - TO LOOP ON DRIVE SPEED TEST
18              ;                     WHEN DRIVE SPEED IS TO BE ADJUSTED. THE
19              ;                     SPEED WILL BE PRINTED ON EACH PASS.
20              ;                     THIS TEST CAN BE EXECUTED BY THE PROGRAM
21              ;                     IN NRZI(I.E. LOW DENSITY) MODE ONLY. IF
22              ;                     THE DRIVE IS IN PE MODE THE PROGRAM WILL
23              ;                     DO A SET DRIVE MODE INSTR. TO SWITCH TO
24              ;                     NRZI MODE BEFORE EXECUTING THIS TEST.
25
26              ;               500 - SAME AS 200.
27
28              ;       C.  WHEN EXECUTING THE FIRST PASS THE PROGRAM
29              ;           WILL IDENTIFY ITSELF AND THEN REQUEST THE
30              ;           FOLLOWING:
31              ;               "TTO BAUD RATE ?="  (THIS REQUEST IS MADE
32              ;                                    ONLY IF A RTC IS NOT PRESENT)
33              ;               "SWREG? (CR= 0): "  (SEE SECTION 8)
34              ;               "DEVICE CODE?:" (DEFAULT IS 22 OR LAST
35              ;                                DEVICE CODE USED)
36
37              ;               "IS A DRIVE ON LINE? (Y=CR, N=1 AND CR):"
38
39              ;           IF RESPONSE TO ABOVE IS NO THEN NO MORE
40              ;           REQUESTS ARE MADE.  OTHERWISE THE PROGRAM
41              ;           CONTINUES REQUESTING:
42              ;               "UNIT NUMBER?:" (DEFAULT IS ZERO)
43
44              ;               "TEST DRIVE ALSO? (N=CR,Y=1 AND CR):"
45
46              ;           IF RESPONSE TO ABOVE IS NO THEN NO MORE
47              ;           REQUESTS ARE MADE.  OTHERWISE THE PROGRAM
48              ;           CONTINUES REQUESTING:
49              ;               "MOUNT WRITE ENABLED SCRATCH TAPE,
50              ;               WHEN READY HIT ANY KEY."
51
52              ;               "DUAL MODE OR NRZI ONLY DRIVE? (CR OR
53              ;               1 AND CR):"
54
55              ;           IF RESPONSE TO ABOVE IS NRZI ONLY DRIVE
56              ;           NO MORE REQUESTS ARE MADE.  OTHERWISE THE
57              ;           PROGRAM REQUESTS:
58              ;               "HI OR LOW DENSITY? (1 AND CR OR CR):"
59
60              ;       D.  AFTER THE ABOVE SERIES OF REQUESTS THE LED LIGHT
```

```
0007 .MAIN
01              ;           ON THE CONTROLLER BOARD WILL BE TESTED. A
02              ;           MESSAGE WILL BE DISPLAYED:
03              ;                 "CHECK THAT LED ON CONTROLLER IS ON,
04              ;                  THEN HIT ANY KEY TO CONTINUE,
05              ;                  CHECK THAT LED TURNS OFF."
06              ;
07              ;           IF POSSIBLE, THE USER SHOULD CHECK THE LED
08              ;           BEFORE AND AFTER HITTING A KEY TO CONTINUE.
09              ;           ON THE FIRST PASS THE ABOVE WILL BE FOLLOWED
10              ;           WITH A DISPLAY OF THE 9 VFO LOCKUP TIMES.
11              ;
12              ;       E.  IF ONLY THE CONTROLLER IS BEING TESTED NO
13              ;           OTHER REQUESTS ARE MADE TO THE USER.  THE
14              ;           PROGRAM WILL LOOP INDEFINITELY DISPLAYING
15              ;           AN "END" MESSAGE AFTER EACH PASS.
16              ;
17              ;       F.  IF THE DRIVE IS ALSO BEING TESTED, ON THE
18              ;           FIRST PASS ONLY, THE FOLLOWING REQUEST WILL
19              ;           EVENTUALLY BE MADE TWICE:
20              ;               "RESET, TOGGLE DENSITY SWITCH, PUT ON
21              ;                LINE, THEN HIT ANY KEY."
22              ;
23              ;       G.   ON THE FIRST PASS, THE ABOVE WILL EVENTUALLY BE
24              ;            FOLLOWED BY A DISPLAY OF THE TIMING TESTS RESULTS
25              ;            AS FOLLOWS:
26              ;                "LOW      HIGH
27              ;
28              ;                  XXXX      XXXX         DRIVE SETTLING TIME 0.S.
29              ;                  XXXX      XXXX         ERASE TIME.
30              ;                  XXXX      XXXX         DRIVE FORWARD SPEED IN IPS.
31              ;                  XXXX      XXXX         FORWARD GAP TIME.
32              ;                  XXXX      XXXX         REVERSE GAP TIME.
33              ;                  XXXX      XXXX         REVERSE START TIME.
34              ;                  XXXX      XXXX         FORWARD WRITE CREEP".
35              ;
36              ;             THE ABOVE TIMES ARE IN MILLISECONDS.
37              ;             IF NO ERROR CONDITION IS DISPLAYED THE LOW AND HIGH
38              ;             VALUES MEASURED FALL WITHIN ACCEPTABLE MARGINS.
39              ;             THE ABOVE TIMING TESTS ARE EXECUTED IN NRZI MODE.
40              ;             IF THE DIAGNOSTIC IS STARTED IN PE MODE THE
41              ;             FOLLOWING MESSAGE IS DISPLAYED:
42              ;             "TIMING TESTS WILL BE RUN LATER IN NRZI MODE."
43              ;
44              ;       H.   THEN LATER, DURING THE FIRST PASS ONLY, THE FOL-
45              ;            LOWING REQUEST WILL BE MADE:
46              ;               "REMOVE WRITE RING, LOAD AND PUT BACK
47              ;                ON LINE, THEN HIT ANY KEY."
48              ;
49              ;           FINALLY, FOR THE FIRST PASS ONLY, THE PROGRAM WILL
50              ;           HALT AND DISPLAY:
51              ;               "END OF DIAGNOSTIC.
52              ;                TO LOOP: RESET, UNLOAD, REPLACE WRITE RING,
53              ;                LOAD AND THEN PRESS CONTINUE."
54              ;
55              ;         IF THE USER CHOOSES TO LOOP THE PROGRAM WILL
56              ;       LOOP INDEFINITELY DISPLAYING AN "END" MESSAGE
57              ;       AFTER EACH PASS. (IT IS NOT ADVISABLE
58              ;       TO LOOP ON THE ENTIRE DIAGNOSTIC OVERNIGHT
59              ;       BECAUSE OF TAPE DEGRADATION. MOST OF THE DIAGNOSTIC
60              ;       WRITING AND READING IS RESTRICTED TO THE SECTION
```

```
0008 .MAIN
01              ;       OF TAPE THAT IMMEDIATELY FOLLOWS THE BOT MARKER.)
02              ;       NO OPERATOR INTERVENTION IS REQUIRED AFTER THE
03              ;       THE FIRST PASS. IF BIT 15 OF SWREG IS SET THEN
04              ;       EVEN IN THE FIRST PASS NO USER ACTION IS REQUIRED
05              ;       EXCEPT FOR THE LED TEST DESCRIBED ABOVE IN PART D.
```

```
!0009 .MAIN
01
02
03              ;10.0  PROGRAM OUTPUT/ERROR DESCRIPTION
04
05              ;        PROGRAM OUTPUT ON SUCCESSFUL RUNS IS DESCRIBED
06              ;       IN SECTION 9 ABOVE.
07              ;        WHEN AN ERROR CONDITION OCCURS THE PROGRAM
08              ;       DISPLAYS THE FOUR ACCUMULATORS AND THE PC AT
09              ;       THE POINT OF ERROR.  THE SIGNIFICANCE OF THIS
10              ;       INFORMATION IS EXPLAINED IN THE LISTING.
11              ;       GENERALLY, WHERE EVER POSSIBLE, AC0 WILL CONTAIN
12              ;       THE RECEIVED DATA, AC1 WILL CONTAIN THE
13              ;       EXPECTED DATA, AC2 WILL BE THE LOOP COUNTER
14              ;       AND AC3 WILL CONTAIN THE ADDRESS FROM
15              ;       WHERE THE SUBROUTINE WAS CALLED.
16              ;        THE ACTION OF THE PROGRAM AFTER THE ERROR
17              ;       OCCURRENCE IS DICTATED BY THE SWITCH
18              ;       SETTINGS DESCRIBED ABOVE IN SECTION 8.
19
20
21              ;11.    OCTAL DEBUG TOOL (ODT)
22              ;
23              ;       THE DIAGNOSTIC IS EQUIPED WITH A BUILT IN ODT WHICH CAN
24              ;       BE ACCESSED BY HITTING CONTROL 0 (^O) AT ANY TIME DURING
25              ;       THE EXECUTION OF THE PROGRAM (AFTER SETTING THE PARA-
26              ;       METERS).
27              ;       ON ENTERING ODT THE ADDRESS OF THE LOCATION HAVING THE
28              ;       NEXT INSTRUCTION TO BE EXECUTED WILL BE TYPED-OUT.
29              ;
30              ;11.1   CONVENTIONS AND SYMBOLS
31              ;       THE FOLLOWING CONVENTIONS ARE USED BY THE ODT:
32              ;       ?       PRESSING ANY ILLEGAL KEY CAUSES THE ODT TO RES-
33              ;               POND WITH A "?".
34              ;       @       ODT IS READY AND AT YOUR SERVICE.
35              ;
36              ;11.2   COMMAND STRUCTURE
37              ;       AN ODT COMMAND HAS THE FOLLOWING FORMAT:
38              ;               [ARGUMENT][COMMAND]
39              ;       AN ARGUMENT MAY BE ONE OF THE FOLLOWING:
40              ;       "EXP"   AN OCTAL EXPRESSION CONSISTING OF OCTAL NUMBERS
41              ;               SEPARATED BY PLUS (+) OR MINUS (-) SIGNS. LEAD-
42              ;               ING ZEROS NEED NOT BE TYPED.
43              ;       "ADR"   AN ADDRESS IS THE SAME AS AN EXPRESSION EXCEPT
44              ;               THAT BIT 0 IS NEGLECTED.
45              ;       A COMMAND IS A SINGLE TELETYPE CHARACTER
46              ;
47              ;11.3   ODT COMMANDS
48              ;       THE LOCATIONS THAT CAN BE EXAMINED AND MODIFIED BY THE
49              ;       USER ARE CALLED CELLS. THESE CELLS ARE OF TWO TYPES:
50              ;       INTERNAL CPU CELLS AND MEMORY LOCATIONS.
51              ;
52              ;11.3.1 OPENING INTERNAL CELLS
53              ;       THE COMMAND TO OPEN ONE OF THE INTERNAL REGISTERS IS OF
54              ;       THE FORM "NA" WHERE N IS ANY OCTAL EXPRESSION BETWEEN
55              ;       0 AND 7
56              ;       0-3     FOR ACCUMULATORS 0-3
57              ;       4       FOR PC OF THE NEXT INSTRUCTION TO BE EXECUTED IN
58              ;               THE EVENT OF A "P" COMMAND.
59              ;       5       CPU AND TTO STATUS
60              ;               BIT     INTERPRETATION
```

```
 0010 .MAIN
01              ;               15      STATUS OF TTO DONE FLAG
02              ;               14      STATUS OF INTERRUPTS (ION FLAG)
03              ;               13      STATUS OF CARRY BIT
04              ;       6       ADDRESS OF THE LOCATION HAVING THE BREAK POINT (IF
05              ;               ANY)
06              ;       7       INSTRUCTION AT THE BREAK POINT LOCATION
07
08              ;       OTHER COMMANDS TO OPEN CELLS ARE:
09              ;
10              ;       "ADR"/  OPEN THE CELL AND PRINT ITS CONTENTS
11              ;       ./      OPEN THE CELL CURRENTLY POINTED TO BY THE POINTER
12              ;               AND PRINT ITS CONTENTS.
13              ;       .+"ADR"/        ADD "ADR" TO THE POINTER, OPEN THE CELL
14              ;               AND PRINT ITS CONTENTS.
15              ;       .-"ADR"/        SUBTRACT "ADR" FROM THE POINTER, OPEN
16              ;               THE CELL AND PRINT ITS CONTENTS.
17              ;       "CR"    THE RETURN KEY IS USED TO CLOSE THE OPEN CELL
18              ;               WITH OR WITHOUT MODIFICATION.
19              ;       "LF"    LINE FEED IS USED TO CLOSE THE OPEN CELL WITH OR
20              ;               WITHOUT MODIFICATION AND TO OPEN THE SUCCEEDING
21              ;               CELL.
22              ;       ^       CLOSE THE OPEN CELL WITH OR WITHOUT MODIFICATION
23              ;               AND OPEN THE PRECEDING CELL
24              ;       /       CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
25              ;               OPEN THE CELL POINTED TO BY ITS CONTENTS.
26              ;       +"ADR"/ CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
27              ;               OPEN THE CELL POINTED TO BY ITS CONTENTS + "ADDR".
28              ;       -"ADR"/ CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
29              ;               OPEN THE CELL POINTED TO BY ITS CONTENTS - "ADR".
30              ;
31              ;11.3.2 MODIFICATION OF A CELL
32              ;       ONCE A CELL HAS BEEN OPENED ITS CONTENTS CAN BE MODIFIED
33              ;       BY TYPING THE NEW VALUE THE CELL IS TO CONTAIN IN THE
34              ;       FORM OF AN OCTAL EXPRESSION FOLLOWED BY "CR" OR "LF".
35              ;       IF A + OR - IS TYPED AS THE FIRST CHARACTER OF THE EX-
36              ;       PRESSION THEN THE VALUE OF THE EXPRESSION IS ADDED TO OR
37              ;       SUBTRACTED FROM THE OLD CONTENTS OF THE CELL. THE
38              ;       ADDRESS ITSELF OR AN EXPRESION RELATIVE TO THE ADDRESS
39              ;       CAN BE DEPOSITED BY TYPING A "." OR ".+/-OCTAL EXPRESS-
40              ;       ION". A RUBOUT COMMAND GIVEN RIGHT AFTER OPENING A CELL
41              ;       ALLOWS THE MODIFICATION OF ITS CONTENTS AS IF THEY WERE
42              ;       TYPED IN JUST BEFORE THE COMMAND WAS ISSUED.
43              ;
44              ;11.3.3 OTHER ODT COMMANDS
45              ;       RUBOUT  THIS KEY IS USED TO DELETE ERRONEOUSLY TYPED
46              ;               DIGITS. EACH TIME THE KEY IS PRESSED THE RIGHT MOST
47              ;               DIGIT IS DELETED AND ECHOED ON THE TERMINAL. IF
48              ;               THE RUBOUT KEY IS PRESSED RIGHT AFTER OPENING A
49              ;               CELL THEN IT DELETES THE RIGHT MOST DIGIT OF THE CEL
50              ;               CONTENTS. THIS ALLOWS THE MODIFICATION OF THE CELL
51              ;               AS IF ITS CONTENTS WERE TYPED IN JUST BEFORE THE
52              ;               KEY WAS PRESSED.
53              ;       "ADR"B  INSERT A BREAK POINT AT LOCATION "ADR".
54              ;               ONLY ONE BREAK POINT CAN BE INSERTED AND ANY
55              ;               ENTRY TO ODT AFTER EXECUTING A BREAK POINT WILL
56              ;               CAUSE IT TO BE DELETED.
57              ;       D       DELETE THE BREAK POINT IF ANY.
58              ;       P       RESTART THE EXECUTION OF THE PROGRAM AT LOCATION
59              ;               POINTED BY 4A.
60              ;       "ADR"R  START EXECUTING THE PROGRAM AT "ADR" AFTER AN
```

0011 .MAIN

```
;               IO-RESET.
;       K       KILL THE STRING TYPED SO FAR. THE ODT 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
;
;
;       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.
;
;
```

0012 .MAIN

```
;11.4  CONTROL INSTRUCTIONS
;              DOA - CONTAINS THE DRIVE COMMAND IN BITS
;                    8,10,11,12, AND THE DRIVE SELECTED
;                    IN BITS 13,14,15.
;              DOB - CONTAINS THE HOST MEMORY ADDRESS
;                    FOR THE FIRST DATA TRANSFER.
;              DOC - CONTAINS THE WORD OR RECORD
;                    COUNT.

;       THE DOA DRIVE COMMAND CODES ARE:
;       A8      A10     A11     A12     FUNCTION

;       0       0       0       0       READ
;       0       0       0       1       REWIND
;       0       0       1       0       SET CONTROL MODE
;       0       0       1       1       SPACE FORWARD
;       0       1       0       0       SPACE REVERSE
;       0       1       0       1       WRITE
;       0       1       1       0       WRITE EOF
;       0       1       1       1       ERASE
;       1       0       0       0       READ NON-STOP
;       1       0       0       1       UNLOAD
;       1       0       1       0       SET DRIVE MODE
;       1       1       0       1       DIAGNOSTIC PE READ
;       1       1       1       0       DIAGNOSTIC
;       1       1       1       1       DIAGNOSTIC
```

```
10013 .MAIN
01
02
03              ;11.5  STATUS INSTRUCTIONS
04
05              ;       DIA = READS BASIC DRIVE STATUS AS
06              ;             DESCRIBED BELOW.
07              ;       DIB = READS THE HOST MEMORY ADDRESS FOR THE
08              ;             NEXT DATA TRANSFER.
09              ;       DIC = READS EXTENDED DRIVE STATUS AS
10              ;             DESCRIBED BELOW.
11
12              ;       THE DIA STATUS BITS ARE:
13              ;       BIT     STATUS CONDITION
14
15              ;        0      ERROR
16
17              ;        1      DATA LATE
18              ;        2      REWINDING
19              ;        3      ILLEGAL
20
21              ;        4      HIGH DENSITY
22              ;        5      PARITY ERROR
23              ;        6      END OF TAPE
24
25              ;        7      END OF FILE
26              ;        8      BEGINNING OF TAPE
27              ;        9      9-TRACK
28
29              ;       10      BAD TAPE
30              ;       11      SPARE
31              ;       12      POLLING INTERRUPT
32
33              ;       13      WRITE LOCK
34              ;       14      ODD CHARACTER
35              ;       15      UNIT READY
36
37              ;       THE DIC STATUS BITS ARE:
38              ;       BIT     STATUS CONDITION
39
40              ;        0      ERROR
41
42              ;        1      RUNAWAY TAPE
43              ;        2      FALSE GAP
44              ;        3      SPARE
45
46              ;        4      CORRECTED DATA LATE
47              ;       5,6,7   NUMBER OF RETRIES
48              ;        8      RECORD>WORD COUNT
49              ;        9      BAD SIGNAL
50
51              ;       10      OVERSKEW
52              ;       11      CHECK ERROR
53              ;       12      SINGLE TRACK ERROR
54
55              ;       13      FALSE POSTAMBLE
56              ;       14      FORMAT ERROR
57              ;       15      P.E. MODE
```

```
10014 .MAIN
01
02
03              ;11.6  TEST BYTE - DIA/DIC TRANSFORMATION
04
05              ;         IN THE CONTROLLER "INTERNAL REGISTER TEST"
06              ;       INTERNAL PATHS IN THE CONTROLLER BOARD ARE EXERCISED.
07              ;       THE TEST BYTES ARE RETURNED TO THE HOST FROM
08              ;       ONE DIA REGISTER AND 2 DIC REGISTERS. SUBROUTINE "CHECK"
09              ;       CALLS SUBROUTINES "SHIFT" AND "OR" TO RECONSTRUCT
10              ;       THE RECEIVED TEST BYTE AS FOLLOWS:
11
12              ;       ORIGINAL TEST BYTE BIT     CORRESPONDS TO     DIA BIT
13
14              ;                0                                       0
15              ;                1                                      14
16              ;                2                                       7
17              ;                3                                       3
18              ;                4                                       1
19              ;                5                                       5
20              ;                6                                      11
21              ;                7                                      10
22
23              ;       ORIGINAL TEST BYTE BIT    CORRESPONDS TO    DIC1 BIT
24
25              ;                0                                       0
26              ;                1                                       9
27              ;                2                                      13
28              ;                3                                      12
29              ;                4                                       4
30              ;                5                                      11
31              ;                6                                       3
32              ;                7                                      10
33
34              ;       ORIGINAL TEST BYTE BIT    CORRESPONDS TO    DIC2 BIT
35
36              ;                0                                       8
37              ;                1                                       1
38              ;                2                                       2
39              ;                3                                      14
40              ;                4                                    NONE
41              ;                5                                       5
42              ;                6                                       6
43              ;                7                                       7
```

```
!0015 .MAIN
01
02
03              ;12.  SPECIAL NOTES/SPECIAL FEATURES
04
05              ;       THE DIAGNOSTIC WILL WRITE ON THE ENTIRE TAPE.
06              ;     THEREFORE, ONLY A SCRATCH TAPE SHOULD BE USED.
07              ;       TO SAVE TIME WHEN RUNNING THE "END OF TAPE"
08              ;     TESTS OF PASS 1, A SHORT TAPE CAN BE USED.
09              ;       ALTHOUGH A DUAL MODE CONTROLLER BOARD CAN BE TESTED
10              ;     WITHOUT A TAPE DRIVE A COMPLETE CHECKOUT OF THE BOARD
11              ;     REQUIRES A DRIVE. THERE ARE CERTAIN CIRCUITS ON THE
12              ;     BOARD THAT ARE ONLY CHECKED BY RUNNING THE ENTIRE
13              ;     DIAGNOSTIC PROGRAM.
14
15              ;13.    RUN TIME
16
17              ;       THE RUNNING TIME FOR 2 PASSES OF THE CONTROLLER
18              ;     ONLY DIAGNOSTICS IS .25 MINUTES.
19              ;       THE RUNNING TIME FOR 2 PASSES OF THE ENTIRE
20              ;     DIAGNOSTIC IS APPROXIMATELY 8 MINUTES.
```

```
!0016 .MAIN

**00000 TOTAL ERRORS, 00000 PASS 1 ERRORS
```

```
0017 .MAIN

O?DTD 000524  MC     9/20
S?WPD 000050  MC     4/03
```