DataGeneral

TECHNICAL STATEMENT

TEXT LISTING

068-000165-01

PROGRAM

PHASE ENCODED TAPE DIAGNOSTIC

TEXT TAPE

097-000165-01

ABSTRACT

THIS DIAGNOSTIC IS NOT TO BE USED AS AN INSTRUMENT FOR DEMONSTRATING SYSTEM RELIABILITY UNDER LONG TERM TESTING (I.E. OVERNIGHT). FOR LONG TERM TESTING (GREATER THAN 4 HRS.) USE THE PHASE ENCODED TAPE (PE) RELIABILITY PROGRAM.

```
 0001 .MAIN    MACRO REV 06.30          11:47:56 02/15/79
01
02
03
04
05
06
07              ;*****************************************************************
08              ;
09              ; NAME: PET.TX                              PART NUMBER: 097-000165
10              ;
11              ;
12              ; DESCRIPTION: PHASE ENCODED TAPE DIAGNOSTIC
13              ;
14              ;
15              ; REVISION HISTORY:
16              ;
17              ;       REV.            DATE
18              ;
19              ;       00              09/06/74
20              ;       01              08/06/76
21              ;
22              ;
23              ; COPYRIGHT (C) DATA GENERAL CORPORATION, 1974,1976
24              ; ALL RIGHTS RESERVED.
25              ;*****************************************************************
```

```
10002 .MAIN
01              ;       ***********PHASE ENCODED TAPE DIAGNOSTIC************
02
03
04              ;1.     MACHINE REQUIREMENTS
05              ;1.1            NOVA(EXCEPT MICRO)/ECLIPSE FAMILY PROCESSOR
06              ;1.2            8K READ/WRITE MEMORY
07              ;1.3    PHASE ENCODED TAPE CONTROLLER #4196
08              ;1.4    PHASE ENCODED TAPE DRIVE & ADAPTER UNIT #4196A,
09              ;               INCLUDING ANY ADDITIONAL DRIVES (#4196B).
10              ;1.5    RESTRICTIONS
11              ;               THIS DIAGNOSTIC IS NOT TO BE USED AS
12              ;               AN INSTRUMENT FOR DEMONSTRATING SYSTEM
13              ;               RELIABILITY UNDER LONG TERM TESTING (I.E.
14              ;               OVERNIGHT). FOR LONG TERM TESTING (> 4
15              ;               HOURS) USE THE PHASE ENCODED TAPE (PE)
16              ;               RELIABILITY PROGRAM.
17
18
19              ;2.     STARTING LOCATIONS
20              ;2.1    200     ALL DIAGNOSTIC TESTS
21              ;               501     WRITE LOCK TEST ONLY
22              ;               502     DEAD TRACK TEST ONLY
23              ;               503     2 WORD WRITE TEST LOOP
24              ;               504     2 WORD READ TEST LOOP
25              ;               505     PEAK SHIFT WRITE TEST LOOP
26
27              ;3.     SWITCH SETTINGS
28              ;               SWITCH 1(1) = PROCEED FROM ERROR
29              ;               SWITCH 2(1) = INHIBIT TTY OUTPUT
30              ;               SWITCH 3(1) = PRINT FAILURE RATE
31              ;               SWITCH 5(1) = OUTPUT TO LPT
32              ;               SWITCH 7(1) = INHIBIT PRINTING
33              ;                             ERROR BIT STATUS.
34              ;3.5    TO CHANGE DEVICE CODES
35              ;               LOAD 000040 IN SWITCHES AND START.
36              ;               PROGRAM WILL PRINT OUT PRESENT DEVICE CODE
37              ;               AND THEN WAIT FOR NEW DEVICE CODE.
38              ;               A CARRIAGE RETURN PRESERVES PRESENT DEVICE
39              ;               CODE, AND TYPING NEW CODE WITH CARRIAGE
40              ;               RETURN CHANGES CODE TO THAT SPECIFIED.
41              ;               PROGRAM WILL PRINT MESSAGE VERIFYING THAT
42              ;               THE DEVICE CODE HAS BEEN SET TO THE NEW
43              ;               VALUE, AND THEN WILL HALT. RESTART PROGRAM
44              ;               AT ONE OF THE TEST ADDRESSES ABOVE TO
45              ;               CONTINUE TESTING.
46
47
48              ;4.     OPERATING PROCEDURE
49
50
51              ;NOTE:  WHEN IT IS DESIRED TO START THE PROGRAM AT A GIVEN
52              ;       ADDRESS AND ALSO HAVE A GIVEN CONFIGURATION OF DATA
53              ;       SWITCHES SET UPON STARTING,DO THE FOLLOWING:
54
55              ;       ENTER STARTING ADDRESS IN DATA SWITCHES,PRESS "EXAMINE",
56              ;       RESET ALL DATA SWITCHES EXCEPT THOSE DESIRED TO BE ON,
57              ;       PRESS "CONTINUE"
58              ;4.1    ALL DIAGNOSTIC TESTS
59              ;       VERIFY POWER IS APPLIED TO PROCESSOR AND PE TAPE
60              ;       DRIVES. VERIFY A REEL OF TAPE IS PROPERLY
```

```
 0003 .MAIN
01              ;       MOUNTED IN EACH DRIVE, WITH THE WRITE RING
02              ;       IN PLACE ON THE BACK OF THE REEL.  VERIFY DRIVES
03              ;       ARE ALL ON-LINE AND WITH TAPE AT LOAD POINT.
04              ;       VERIFY THAT NO TWO DRIVES ARE
05              ;       ARE SET TO THE SAME UNIT NUMBER. LOAD
06              ;       PROGRAM INTO THE PROCESSOR WITH THE BINARY LOADER
07              ;       OR DTOS(AUTO STARTS AT 200)
08              ;       AND START AT THE PROPER LOCATION FOR THE TEST TO BE
09              ;       RUN.
```

```
!0004 .MAIN
01              ;       PRIOR TO STARTING THE PROGRAM REMOVE THE TOP
02              ;       COVER FROM THE ADAPTER UNIT, AND POSITION THE
03              ;       UNIT SO THAT THE ETCH RUNS ON THE ADAPTER BOARD
04              ;       ARE EASILY ACCESSABLE FOR THE CONNECTING OF SPECIAL
05              ;       TEST JUMPERS OR SCOPE PROBES. SEVERAL TESTS REQUIRE
06              ;       OPERATOR INTERVENTION TO INSERT SPECIAL TEST
07              ;       JUMPERS EITHER ONTO THE ADAPTER BOARD OR ONTO
08              ;       THE CONTROL BOARD. THEREFORE THE OPERATOR SHOULD
09              ;       MAKE SURE BOTH BOARDS ARE ACCESSABLE BEFORE
10              ;       STARTING THE PROGRAM.
11
12
13
14              ;       THE PROGRAM WILL AUTOMATICALLY SELECT THE
15              ;       UNIT WITH THE LOWEST ADDRESS FOR
16              ;       TESTING AND WILL SO INDICATE BY AN OUTPUT MESSAGE
17              ;       IDENTIFYING THE UNIT SELECTED. THEREFORE TO TEST A
18              ;       GROUP OF DRIVES IN SEQUENCE, MAKE SURE ALL DRIVES
19              ;       HAVE CARTRIDGES MOUNTED, AND SET THE ADDRESS OF THE
20              ;       DRIVE TO BE TESTED TO THE LOWEST ADDRESS IN THE SYSTEM.
21              ;       AFTER THE DIAGNOSTIC HAS BEEN RUN ON THIS
22              ;       PARTICULAR DRIVE, THE PROCESSOR WILL TYPE
23              ;       "PASS" AND THEN HALT. SWITCH TEST DRIVE OFF-
24              ;       LINE SO THAT THE NEXT LOWEST NUMBERED DRIVE
25              ;       IN THE SYSTEM WILL BE TESTED NEXT.
26              ;       RESTART PROGRAM AT LOCATION
27              ;       200. ***CAUTION*** DO NOT SWITCH DRIVE UNIT
28              ;       ADDRESSES WHILE THE PROGRAM IS RUNNING !!!
29
```

```
!0005 .MAIN
01
02
03              ;       ALL TESTS MUST BE RUN ON ALL DRIVES .....
04              ;       WHEN TESTING SINGLE DRIVE SYSTEMS, IT IS SUGGESTED
05              ;       THAT AT LEAST ONE DIAGNOSTIC PASS BE PERFORMED
06              ;       WITH THE UNIT ADDRESS SET TO OTHER THAN 0.
07              ;       THIS PROVIDES THE MOST THOROUGH TEST OF THE
08              ;       UNIT ADDRESS REGISTER IN THE CONTROL LOGIC.
09              ;        IF A HALT OCCURS CONSULT THE PROGRAM LISTING
10              ;       FOR DIRECTIONS. THERE ARE TWO TYPES OF HALTS, A
11              ;       HALT THAT INTERFERS WITH THE PROPER EXECUTION OF
12              ;       THE TEST PROGRAM,SUCH AS FAILING TO FIND ANY
13              ;       UNIT AVAILABLE FOR TESTING,AND AN ERROR HALT (WHERE
14              ;       THE TEST PROGRAM DETECTED SOME MALFUNCTION). IF THE
15              ;       PROGRAM COMES TO A HALT , THE LISTING WILL INDICATE
16              ;       WHETHER IT IS A INTERFERENCE HALT, OR A HALT IN THE
17              ;       ERROR SUBROUTINE.
18              ;       IF IT IS AN INTERFERENCE HALT , OPERATOR INTERVENTION
19              ;       WILL BE REQUIRED BEFORE TESTING CAN CONTINUE. IF IT
20              ;       IS AN ERROR HALT FOLLOW THE PROCEDURES BELOW.
21
22              ;       IF A MALFUNCTION IS DETECTED THE PROGRAM WILL
23              ;       COME TO AN ERROR HALT AND AC3 WILL CONTAIN THE
24              ;       LOCATION (IN THE PROGRAM) OF THE ERROR +1.
25              ;       CONSULT THE LISTING , THE ACCUMULATORS AND
26              ;       OTHER PERTINANT SOFTWARE REGISTERS. IF SWITCHES
27              ;       1 AND 2 ARE DOWN, PRESSING CONTINUE WILL CAUSE TTY
28              ;       PRINTOUT OF THE ERROR LOCATION AND A SCOPE LOOP
29              ;       WILL BE ENTERED. WHILE IN THE SCOPE LOOP
30              ;       SETTING SWITCH 3 UP WILL PRINTOUT THE FAILURE
31              ;       RATE IN %. SETTING SWITCH 1 UP WILL CAUSE THE
32              ;       PROGRAM TO LEAVE THE SCOPE LOOP AND GO ON TO THE
33              ;       NEXT TEST.
```

```
!0006 .MAIN
01
02
03
04              ;       SETTING SWITCH 7 UP ANY TIME PRIOR OR DURING
05              ;       TESTING PREVENTS THE ERROR STATUS BITS FROM BEING
06              ;       PRINTED AFTER AN ERROR HAS BEEN DETECTED.
07              ;       THE ERROR STATUS BITS PROVIDE AN OPERATIONAL
08              ;       PROFILE OF THE PE TAPE AT THE TIME OF THE ERROR
09              ;       AND PROVIDE USEFUL INFORMATION POINTING TO THE
10              ;       CAUSE OF THE MALFUNCTION.
11
12              ;       EACH SUCCESIVE TEST ASSUMES THAT ALL PREVIOUS
13              ;       TESTS HAVE BEEN RUN SUCCESSFULLY. BYPASSING
14              ;       ANY FAILING TEST MAY LEAD TO OR COMPLICATE OTHER
15              ;       ERROR SITUATIONS.
16
17
18              ;       STATUS  BIT SIGNIFICANCE
19              ;       ********************************
20              ;       0 = ERROR, 1 = DATA LATE,
21              ;       2 = REWINDING, 3 = ILLEGAL, 4 = FALSE POSTAMB*,
22              ;       5 = PARITY ERROR, 6 = END OF TAPE, 7 = END OF FILE,
23              ;       8 = LOAD POINT(BOT), 10 = BAD TAPE, 11 = SEND DLY**,
24              ;       12 = 1ST DATA STROBE (GAP DET. 1)**,
25              ;       13 = FILE PROT.(WL), 14 = ODD CHAR, 15 = UNIT READY.
26
27
28              ;       *WHEN JUMPER W7 IS INSTALLED BIT 4 IS FALSE ,
29              ;       POSTAMBLE, OTHERWISE BIT 4 IS HIGH DENSITY.
30              ;       **BITS 11 & 12 ARE SPECIAL SIGNAL BITS USED
31              ;       IN THE PE TAPE UNIT TIMING TEST, & ARE NOT
32              ;       MONITORED BY THIS DIAGNOSTIC PROGRAM.
33
```

```
!0007 .MAIN
01
02              ;4.2    WRITE LOCK TEST
03              ;       PRIOR TO STARTING THE WRITE LOCK TEST, REMOVE THE
04              ;       WRITING RING FROM THE TAPE REEL MOUNTED ON THE
05              ;       UNIT UNDER TEST.  REMOUNT THE REEL OF TAPE AND
06              ;       SWITCH THE TEST BACK ON-LINE.
07              ;       THE PROGRAM WILL PRINT OUT THE # OF THE UNIT THAT
08              ;       IS WRITE LOCKED AND THEN HALT.
09              ;       THE SECOND HALF OF THIS TEST CHECKS THE OPERATION
10              ;       OF THE ILLEGAL FLIP-FLOP SETTING DONE WHEN
11              ;       WRITE LOCK IS A "1" AND AN ERASE COMMAND IS ISSUED.
12              ;       PRESS CONTINUE TO PERFORM THIS SECTION OF THE
13              ;       TEST. IF THIS SECTION PASSES THE PROGRAM WILL HALT
14              ;       AGAIN. SWITCH THE WRITE LOCKED TAPE REEL TO THE NEXT
15              ;       UNIT TO BE TESTED AND PRESS CONTINUE TO RERUN THE
16              ;       COMPLETE TEST. IF THE TEST FAILS A MESSAGE WILL BE
17              ;       PRINTED AND THE PROGRAM WILL ENTER A SCOPE LOOP ON
18              ;       THIS SECTION OF THE TEST. THE LOOP WILL CONTINUE
19              ;       UNTIL STOPPED MANUALLY BY THE OPERATOR. AFTER THE
20              ;       MALFUNCTION HAS BEEN REPAIRED RESTART THE PROGRAM
21              ;       AT 501.
22
23              ;4.4    DEAD TRACK, ERROR CORRECTION LOGIC TEST
24              ;       THIS TEST HAS A SPECIAL ENTRANCE AND MAY
25              ;       BE RUN AS AN INDIVIDUAL TEST. THIS TEST IS
26              ;       ALSO REQUIRED FOR AT LEAST ONE  PASS OF THE
27              ;       DIAGNOSTIC, AND IS BYPASSED ON SUBSEQUENT
28              ;       TEST LOOP AFTER THE FIRST COMPLETE SUCCESSFUL
29              ;       PASS THROUGH THE DIAGNOSTIC. THIS TEST REQUIRES
30              ;       OPERATOR INTERVEMNTION TO MOVE VARIOUS JUMPER
31              ;       WIRES ABOUT ON THE ADAPTER BOARD. THE PROGRAM
32              ;       WRITES 2 BLOCK OF DATA PATTERN WORDS, THE 1ST
33              ;       OF WHICH IS 180 WORDS OF 177400 PATTERNS. THE
34              ;       2ND BLOCK IS COMPOSED OF RANDOM DATA.
35              ;       THE PROGRAM PRINTS OUT A MESSAGE TO THE OPERATOR
36              ;       TO IMNSTALL A JUMPER BETWEEN A GROUND EYELET
37              ;       AND ONE OF THE RD (RD0 THRU RDP) ETCH
38              ;       LINES FROM THE DRIVE INPUT CONNECTOR. AFTER
39              ;       THE JUMPER HAS BEEN INSTALLED ,THE PROGRAM WILL
40              ;       READ THE BLOCKS WITH THE SELECTED CHANNEL GROUNDED.
41              ;       IF THE DATA IS READ AND CHECKED SUCCESSFULLY THE
42              ;       PROGRAM WILL CONTINUE  TESTING UNTIL ALL 9
43              ;       CHANNELS HAVE BEEN TESTED. UPON COMPLETION
44              ;       THE PROGRAM WILL PRINT "END OF TEST" IF TESTING
45              ;       IS NOT IN THE DIAGNOSTIC PROGRAM MODE.
46
```

```
!0008 .MAIN
01
02              ;4.5    SPECIAL 2 WORD WRITE/READ & PEAK SHIFT TEST LOOPS
03              ;       BOTH THE 2WORD WRITE/READ & PEAK SHIFT TEST LOOPS
04              ;       REQUIRE THE OPERATOR TO TYPE IN THE TEST DATA
05              ;       PATTERNS TO BE USED IN THE TEST LOOP. THE INPUT
06              ;       DATA STRING IS TYPED IN RESPONSE TO A MESSAGE FROM
07              ;       THE PROGRAM, AND IS TERMINATED BY TYPING ANY LETTER
08              ;       CHARACTER. THE MAIN DIFFERENCE IS THAT THE
09              ;       PEAK SHIFT TEST CAN ACCEPT N DATA WORDS, WHILE
10              ;       THE OTHER TESTS ARE LIMITED TO TWO WORDS. EXECUTION
11              ;       IS AUTOMATIC AFTER THE DATA HAS BEEN TERMINATED.
12              ;       TO CONTINUE THE LOOP AFTER A HALT, SET SWITCH 1 = 1
13              ;       AND CONTINUE. THE LOOP WILL RUN CONTINUOUSLY EXCEPT
14              ;       FOR REWINDING FROM THE END OF TAPE.
15              ;       ADDRESSES.....2 WORD WRITE LOC. 503,
16              ;       2 WORD READ LOC. 504, PEAK SHIFT WRITE LOC. 505.
17
18
19
```

```
!0009 .MAIN
01              ;4.5    DESCRIPTION OF TEST SUBROUTINES
02              ;       THE DIAGNOSTIC TESTS USE SUBROUTINES
03              ;       (OR SUBPROGRAMS) WHICH ARE MAINLY GROUPED TOGETHER
04              ;       (ON TAPE 5 IN THE LISTING). BRIEFLY, THE PROGRAM
05              ;       SWITCHES TO EACH SUBROUTINE BY A JSR INSTRUCTION
06              ;       WHICH IS DEFINED AS A "SUBROUTINE CALL". SOME
07              ;       OF THE SUBROUTINES TEST FOR SPECIFIC OPERATING
08              ;       CONDITIONS AND WILL BE RETURNED (VIA A JUMP INST-
09              ;       RUCTION) TO THE MAIN TEST PROGRAM VIA EITHER OF TWO
10              ;       PATHS:  A) ENTERING AT THE NEXT INSTRUCTION(AFTER
11              ;       THE JSR TO THE SUBROUTINE),     OR B) ENTERING AT
12              ;       THE SECOND INSTRUCTION(AFTER THE JSR TO THE SUBROUTINE).
13              ;       IF THE TEST IS SUCCESSFUL, THE PROGRAM WILL RESUME WITH
14              ;       THE SECOND INSTRUCTION AFTER THE SUBROUTINE CALL.
15              ;       IF THE TEST  FAILS, THE MAIN PROGRAM WILL
16              ;       RESUME WITH THE FIRST INSTRUCTION AFTER THE SUBROUTINE
17              ;       CALL. THIS EXIT SCHEME IS STANDARD FOR ALL TESTING
18              ;       SUBROUTINES IN THIS DIAGNOSTIC, THUS AN EHALT
19              ;       (ERROR HALT) INSTRUCTION IS ALWAYS PLACED
20              ;       IN THE NEXT LOCATION AFTER THE SUBROUTINE CALL (OR
21              ;       CALL+1 AS DEFINED IN THE LISTING).
22
```

```
!0010 .MAIN
01
02
03              ;       A COMMON PROBLEM THAT OFTEN OCCURS IS HOW TO FIND THE
04              ;       ACTUAL CODE FOR A SUBROUTINE FROM THE POINT OF THE JSR
05              ;       INSTRUCTION. FIRST OF ALL A SUBROUTINE CALL IS ALWAYS
06              ;       AN INDIRECT REFERENCE, GENERALLY THROUGH SOME LOCATION
07              ;       ON PAGE 0. THE PAGE 0 CONSTANTS ARE LISTED AT THE END OF
08              ;       THIS PARAGRAPH. LOOK UP THE NAME OF THE SUBROUTINE BEING
09              ;       CALLED AND ITS INDIRECT REFERENCED ADDRESS, THEN LOOK
10              ;       UP THE SPECIFIED ADDRESS TO FIND THE LOCATION OF THE
11              ;       START OF THE SUBROUTINE. FOR EXAMPLE IN TEST PE47B, THE
12              ;       FOLLOWING SUBROUTINE CALLS APPEAR:  WRITE
13              ;                                           WAIT
14              ;                                           20.
15              ;                                           EHALT
16              ;       CONSULTING PAGE 12 OF THE LISTING, FIND WRITE LISTED
17              ;       AS      WRITE=JSR@IWRIT         AND
18              ;               IWRIT:  WRT. ASSUME THE ADDRESS LISTED FOR WRT
19              ;       IS 3642, SO LOOK UP 3642 TO FIND THE START OF THE
20              ;       WRITE SUBROUTINE. WE LEAVE THE WRITE SUBROUTINE VIA
21              ;       AC3 SO THE NEXT INSTRUCTION IS WAIT. CONSULTING
22              ;       PAGE 12 OF THE LISTING FIND WAIT LISTED AS:
23              ;               WAIT=JSR@IWAIT          AND
24              ;               IWAIT:  CWAIT. ASSUME THE ADDRESS OF CWAIT
25              ;       IS 4132, SO LOOK UP 4132 IN THE LISTING TO FIND
26              ;       THE WAIT SUBROUTINE. WAIT IS A TIMING SUBROUTINE
27              ;       WHICH WAITS FOR EACH OPERATION TO GET DONE. THE WAIT
28              ;       TIME IS SPECIFIED IN THE NX LOCATION AFTER THE
29              ;       WAIT INSTRUCTION, IN THIS CASE 20 (DECIMAL) MILLISECS.
30              ;       IF WAIT TIMES OUT (BEFORE DONE OCCURS) THE SUBROUTINE
31              ;       WILL RETURN TO THE MAIN PROGRAM BY A JUMP 1,3,
32              ;       WHICH RETURNS TO THE 2ND LOCATION AFTER THE WAIT INSTR-
33              ;       UCTION. IT IS NOTED AN EHALT INSTRUCTION IS CODED
34              ;       HERE TO INDICATE THAT THE SELECTED OPERATION (SUCH
35              ;       AS A WRITE OR READ) IS RUNNING AWAY.
36              ;       ANOTHER COMMON TIMING SUBROUTINE USED IN THIS PROGRAM
37              ;       IS THE RWAIT(FOR REWIND WAIT) SUBROUTINE AND WORKS IN
38              ;       THE MANNER DESCRIBED ABOVE. THIS CALL IS ALWAYS CODED
39              ;                       RWAIT
40              ;                       EHALT
41              ;       TO RETURN TO THE EHALT IF RUN AWAY OCCURS IN THE
42              ;       REWIND MODE. A BRIEF DESCRIPTION OF THE SUBROUTINE
43              ;       IS INCLUDED AT THE HEADING OF EACH SUBROUTINE.
44
45
46                      .EOT
```

```
0011 .MAIN
**00000 TOTAL ERRORS, 00000 PASS 1 ERRORS
```