

TEXT LISTING

068-000221-02

PROGRAM

4231 DISK FORMATTER PROGRAM

TEXT TAPE

097-000221-02

ABSTRACT

THE HIGH DENSITY DISK FORMATTER PROGRAM IS USED TO FORMAT THE SURFACE OF DISK PACKS USED ON 3330 TYPE DISK DRIVES. THE PROGRAM PERFORMS THREE DISTINCT TASKS:

- A. FORMATS THE DISK PACK SURFACE AND WRITES TEST PATTERN
- B. READS THE TEST PATTERN AND VERIFIES
- C. FLAGS ANY SECTOR DETERMINED TO HAVE DISCONTINUITY

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4231 DISK FORMATTER PROGRAM  
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DL-7  
  
ABSTRACT  
THE HIGH DENSITY DISK FORMATTER PROGRAM  
IS USED TO FORMAT THE SURFACE OF DISK  
PACKS USED ON 330 TYPE DISK DRIVES. THE  
PROGRAM PERFORMS THREE DISTINCT TASKS:  
A) FORMATS THE DISK PACK SURFACE AND THEN  
WRITES A SPECIAL TEST PATTERN INTO EACH  
256 WORD DATA FIELD TO VERIFY THE SECTOR  
IS FORMATTED PROPERLY AND NO ADDRESS ERRORS  
RESULT FROM WRITING,  
B) READS THE SELECTED TEST PATTERN TO VERIFY  
CONTINUITY OF EACH 256 WORD DATA FIELD.  
(THE TEST PATTERNS USED IN THIS SECTION OF  
THE TEST ARE CHOSEN TO VALIDATE SURFACE  
CONTINUITY)  
C) FLAGS ANY SECTOR DETERMINED TO HAVE SOME  
FORM OF DISCONTINUITY ON THE SURFACE OF  
ITS DATA FIELD. (IN THE NORMAL MODE OF  
OPERATION A BAD SECTOR FLAG BIT PRESENT  
IN THE ADDRESS FIELD OF THE SECTOR CAUSES  
THE CONTROLLER TO TERMINATE THE OPERATION  
AND SET BIT 0 OF THE CORE ADDRESS REGISTER.)  
  
THE FIRST BLOCK OF DATA AFTER THE SECTOR MARKS  
IS THE ADDRESS FIELD. THIS FIELD, WHEN  
FORMATTED, CONTAINS THE ADDRESS OF THE CYLINDER  
IN WHICH THE SECTOR RESIDES. FOR EXAMPLE ALL  
SECTORS IN CYLINDER 77 CONTAIN ADDRESS FIELDS  
WRITTEN WITH DATA ADDRESSING CYLINDER 77, WITH  
EACH SECTOR ADDRESS FIELD LOCATED BETWEEN THE  
SECTOR MARK AND THE DATA FIELD FOR THAT SECTOR.  
  
WHEREAS THESE DATA ARE USED BY THE ADDRESS  
CHECK LOGIC, THE PROGRAM TESTS THE OPERATION  
OF THIS SECTION OF THE CONTROL BY WRITING  
DATA AFTER ALL SECTORS HAVE BEEN INCORRECTLY  
FORMATTED. UPON VERIFICATION THAT THE ADDRESS  
CHECK LOGIC IS WORKING PROPERLY THE PROGRAM  
WRITES THE CORRECT ADDRESS FORMAT DATA INTO  
EACH SECTOR. THE TEST CONCLUDES BY PERFORMING  
A BASIC DISK ADDRESS TEST AND PATTERN TEST.  
  
APPROX. 2.8 HOURS FOR 19 SURFACES.  
  
1.1 RUNTIME
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*****  
NAME: 4231DF.TX PART NUMBER: 097-000221  
*****  
DESCRIPTION: 4231 DISK FORMATTER PROGRAM  
*****  
REVISION HISTORY:  
REV. DATE  
00 05/02/75  
01 12/19/75  
02 07/16/76  
*****  
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10004 .MAIN

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MACHINE REQUIREMENTS
NOVA(EXCEPT MICRO) OR ECLIPSE FAMILY PROCESSOR
8K READ/WRITE MEMORY
DGC DISK CONTROL TYPE 4231
DGC ADAPTER & 1ST DRIVE, TYPE 4231A,
  (OR ANYONE OF 4 ADDITIONAL DRIVES, TYPE 4231B)
DGC 20 SURFACE DISK PACK TYPE 4231C

STARTING LOCATIONS
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200 COMPLETE FORMATTER PROGRAM(OTOS START)
505 COMMAND MODE, COMMAND STRING, INITIAL
  (FIRST PASS) OPERATIONS - STANDARD
  FORMAT COMMANDS.
506 COMMAND MODE, COMMAND STRING, TO CHANGE
  COMMANDS & DATA ON SUBSEQUENT PASSES.
507 COMMAND MODE, COMMAND STRING, INITIAL
  (FIRST PASS) OPERATIONS - ENABLE BAD
  SECTOR FLAG WRITE FOR FORMAT COMMANDS.

SWITCH SETTINGS
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SWITCH 1 (1) = PROCEED FROM ERROR
SWITCH 2 (1) = INHIBIT I/O OUTPUT
SWITCH 3 (1) = PRINT FAILURE RATE
SWITCH 4 (1) = OUTPUT TO LPT
SWITCH 5 (1) = INHIBIT ERROR STATUS REPORTS
SWITCH 6 (1) = FORMAT ONE SECTOR & HALT
SWITCH 7 (1) = FORMAT ONE CYLINDER & HALT
SWITCH 8 (1) = FORMAT ONE SECTOR & HALT
SWITCH 9 (1) = FORMAT ONE CYLINDER & HALT

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TO CHANGE DEVICE CODES
LOAD 202 IN SWITCHES AND START. THE PROGRAM
WILL PRINT OUT PRESENT DEVICE CODE AND
WAIT FOR A NEW DEVICE CODE. A CARRIAGE
RETURN PRESERVES PRESENT DEVICE CODE, AND
TYPING NEW CODE WITH CARRIAGE RETURN
CHANGES CODE TO THAT SPECIFIED. PROGRAM
WILL PRINT MESSAGE VERIFYING THAT THE
DEVICE CODE HAS BEEN SET TO THE NEW VALUE,
AND THEN WILL HALT. RESTART PROGRAM AT EITHER
LOCATION 200 OR 505 TO CONTINUE FORMATTING
OPERATIONS.

PROGRAM DESCRIPTION
FORMATTER PROGRAM
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WHEN STARTED THE PROGRAM WILL REQUEST
DATA AS TO THE DISK DRIVE UNIT NUMBER, AND THE
NUMBER OF TIMES THE PROGRAM SHOULD REREAD A
SECTOR WITH A POSSIBLE DEFECTIVE SURFACE. FOR
EXAMPLE, IF 0 IS TYPED IN RESPONSE TO THIS
INQUIRY, THE BAD SECTOR FLAG WILL BE SET IN
ANY SECTOR WHICH PRODUCES A CHECKWORD OR DATA
ERROR UPON THE FIRST ATTEMPT TO READ THAT SECTOR.
IF 8 IS TYPED IN RESPONSE TO THIS INQUIRY, THE
BAD SECTOR FLAG WILL BE SET IN ANY SECTOR WHICH
FALLS TO READ AT LEAST ONCE OUT OF 8 TRIES. 1 READ
OUT OF 8 TRIES = 12.5% WORKABILITY, OR 87.5%
VIOLABILITY TOLERANCE.

(CIF THE PROGRAM RECEIVES BAD DATA FROM THE DISK
SURFACE UNDER TEST IT WILL ATTEMPT TO REREAD
THE SAME SECTOR N TIMES (AS SPECIFIED BY THE
OPERATOR AS THE # OF REREAD ATTEMPTS). IF THE
ERROR PERSISTS, THE PROGRAM WILL SAVE THE DISK
ADDRESS OF THE BAD SECTOR AND REENTER THE FORMAT
MODE AND REWRITE THE FORMAT DATA, THIS TIME
INSERTING THE CODE FOR THE BAD SECTOR FLAG.)

THE PROGRAM WILL REQUEST DATA AS TO WHETHER
THE OPERATOR HAS SELECTED THE PROGRAM MONITOR
OPTION. THE OPTION IS SELECTED BY TYPING A 1
IN RESPONSE TO THE MESSAGE. THE PROGRAM
MONITOR OPTION TYPES OUT THE PRESENT PC
LOCATION WHILE PROGRAM EXECUTION IS IN
PROGRESS. THIS PERIODIC REPORTING ON THE
PROGRESS OF THE PROGRAM LETS THE OPERATOR
KNOW THE PROGRAM IS NOT IN A LOOP.

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DELAY #MS (WHERE #MS IS THE # OF
MILLISECONDS IN OCTAL. DELAY
MAY BE INSERTED ANYWHERE EXCEPT
INTO COMMAND ARGUMENT FIELDS.)
AN EXAMPLE OF THE COMMAND STATEMENT INTER-
PRETED IN ENGLISH FORM IS
FORMAT WRITE (N) NUMBER OF SECTORS, STARTING
WITH HEAD (NJ), SECTOR (N) USING (M) AS THE
CYLINDER ADDRESS TO BE WRITTEN. READ AND
WRITE COMMANDS ARE IN THE SAME FORMAT EXCEPT
NO CYLINDER ADDRESS ARGUMENT IS TYPED WITH
THESE COMMANDS.

THE RECALIBRATE COMMAND AS USED HERE NOT
ONLY RESTORES THE HEAD POSITIONS BUT ALSO
CLEARS OUT THE CONTROL.

***** BAD SECTOR FLAG TEST WRITING *****
IF THE COMMAND MODE IS STARTED FROM SA 505,
DISK LOCATIONS WILL BE FORMATTED ON COMMAND
WITH THE OPERATOR SPECIFIED ADDRESS AND NO
BAD SECTOR FLAG.
IF THE COMMAND MODE IS STARTED FROM SA 507,
DISK LOCATIONS WILL BE FORMATTED ON COMMAND
WITH THE OPERATOR SPECIFIED ADDRESS AND A
BAD SECTOR FLAG AFTER THE SYNC BIT IN THE
ADDRESS FIELD.

***** NOTE *****
CAUTION IS ADVISED WHEN USING STARTING ADDRESS
507. RESTART AT 505 AS SOON AS THE TEST BAD
SECTOR FLAGS HAVE BEEN SET AND VERIFIED. IT IS
ALSO RECOMMENDED THAT ALL TEST BAD SECTOR FLAGS
(BE CLEARED (BY FORMATTING AT SA 505) AND
ADDRESSES PROPERLY REWRITTEN BEFORE USING THE
TEST DISK PACK AS AN OPERATIONAL DATA FILE.

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ANY FORMAT, WRITE, OR READ COMMAND MAY ALSO
BE GIVEN THE SINGULAR ARGUMENT "ALL". THIS
ARGUMENT WILL CAUSE THE FUNCTION TO BE
PERFORMED ON ALL SECTORS OF ALL HEADS IN THE
CYLINDER DOMAIN. NO OTHER NUMERICAL ARGUM-
ENTS ARE PERMITTED WHEN "ALL" IS TYPED AFTER
THE COMMAND. ALL IS NOT A VALID ARGUMENT
WITH A SEEK COMMAND.

SAMPLE COMMAND STRING

SEEK 121 FORMAT 4,0,1,121 WRITE 4,0,1
READ 4,0,1 LOOP

THIS STRING WILL CAUSE THE UNIT TO SEEK
CYLINDER 121, FORMAT WRITE 4 SECTOR 1
USING HEAD 0, STARTING WITH SECTOR 1
(FORMATTING SECTORS 1 THRU 4), WITH
THE CYLINDER ADDRESS 121. THE STRING
THEN WRITES THE SPECIFIED DATA PATTERN INTO
THE SAME 4 SECTORS, READS THE SAME 4
SECTORS AND THEN LOOPS BACK TO THE SEEK.

USING THE SAME STRING WITH THE * LOOP
COMMAND.....

SEEK 121 * FORMAT 4,0,1,121 WRITE 4,0,1
READ 4,0,1 LOOP

THE ASTERISK MAY BE PLACED BETWEEN ANY
DELIMITERS (EITHER SPACES OR COMMAS) ANYWHERE
IN THE COMMAND STRING. THE ASTERISK USED
IN THE STRING ABOVE WILL CAUSE THE UNIT
TO SEEK CYLINDER 121 ONCE AND THEN LOOP
ON THE REMAINING THREE (FORMAT,WRITE & READ)
COMMANDS.

IT IS NOTED HERE ONCE AGAIN THAT SPACES CAN
BE USED AS COMMAND DELIMITERS ALONG WITH
COMMAS.

NOTE: ALL LOOP COMMAND STRINGS ONCE SET INTO
OPERATION, ARE STOPPED BY EITHER
BRINGING THE COMPUTER TO A HALT,
AND RESTARTING AT LOCATION 506,
OR BY HITTING ANY TERMINAL KEY.
EITHER PROCEDURE MAY BE USED TO
INPUT DATA AND COMMANDS FOR THE
NEXT TEST LOOP.

