

### TEXT LISTING

068-001142-01

### PROGRAM

6098, 6099, 6100, 6103 MOVING HEAD  
DISK/DISKETTE DIAGNOSTIC PROGRAM

### TEXT TAPE

097-001142-01

### ABSTRACT

THIS PROGRAM IS A LOGIC LEVEL TEST OF THE 6098-9,  
6100, 6103 SERIES MOVING HEAD DISK SUB-SYSTEMS.

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SUMMARY:  
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5.1 THIS PROGRAM IS A LOGIC LEVEL TEST OF THE FOLLOWING  
6098-9, 6100, 6103 SERIES MOVING HEAD DISK SUB-SYSTEMS:

6098: DISK CONTROLLER BOARD  
POWER SUPPLY  
1-12.5 MB NON-REMOVABLE (RIGID) DRIVE  
1 DISKETTE (FLEXIBLE) DRIVE  
1 OR 2 ADD-ON DISKETTE DRIVES

6099: DISK CONTROLLER BOARD  
POWER SUPPLY  
1-12.5 MB NON-REMOVABLE (RIGID) DRIVE

6100: DISK CONTROLLER BOARD  
POWER SUPPLY  
1-25.0 MB NON-REMOVABLE (RIGID) DRIVE  
1 DISKETTE (FLEXIBLE) DRIVE  
1 OR 2 ADD-ON DISKETTE DRIVES

6103: DISK CONTROLLER BOARD  
POWER SUPPLY  
1-25.0 MB NON-REMOVABLE (RIGID) DRIVE

NOTES: 1) THE DISK CONTROLLER BOARD RESIDES IN THE CPU  
CHASSIS AND IS CONNECTED TO THE DRIVE(S) VIA  
RIBBON CABLE(S).  
2) THE ADD-ON DISKETTE DRIVES ARE MODEL 6096C  
(1 ADD-ON DRIVE) OR 6096D (2 ADD-ON DRIVES).

5.2 A SECONDARY FEATURE OF THIS PROGRAM IS TO PROVIDE THE  
CAPABILITY AND PROCEDURES TO PERFORM THE HOME TRANSJUCER  
ALIGNMENT FOR THE NON-REMOVABLE (RIGID) DISK DRIVE. THE  
INSTRUCTIONS FOR INVOKING THIS PROCEDURE ARE PRINTED  
DURING DIAGNOSTIC INITIALIZATION. THE STARTING ADDRESS  
FOR RE-STARTING PURPOSES IS 4. NOTE THAT THE INITIALI-  
ZATION SEQUENCE MUST BE PERFORMED BEFORE THIS PROCEDURE  
IS ATTEMPTED SO AS TO GIVE THE PROGRAM THE CORRECT INFOR-  
MATION ABOUT THE NON-REMOVABLE DRIVE.

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RESTRICTIONS:  
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1. NO DISK WRITES CAN BE PERFORMED IF THE WRITE PROTECT  
SWITCH IS ON FOR NON-REMOVABLE DRIVES, OR IF THE DISK  
DISKETTE IS WRITE-PROTECTED (NOTCH NOT COVERED). THIS  
WILL SERIOUSLY DECREASE THE TESTABILITY OF THE DISK  
BY THIS PROGRAM. THE ONLY TIME THAT DISKETTES SHOULD  
BE WRITE-PROTECTED IS WHEN THE OPERATOR IS CHECKING  
FOR NON-REMOVABLE DRIVES, IF YOU ARE CONCERNED.  
ABOUT DATA LOSS FROM DIAGNOSTIC TESTING, SPECIFY THAT  
ALL READ/WRITE OPERATIONS BE PERFORMED ON THE DIAGNOS-  
TIC TRACK ONLY. IF THE DRIVE IS SUSPECTED OF SEEKING  
ERRORS AND YOU WISH TO PROTECT ANY DATA LOSS, THEN  
PUT THE WRITE-PROTECT SWITCH ON BEFORE TESTING.

2. FOR THE NON-REMOVABLE DISK DRIVES, IF ALLOWED TO  
ACCESS (WRITE/READ) THE USER DATA TRACKS (0-277),  
THE DIAGNOSTIC ASSUMES THAT THESE AREAS ARE ALREADY  
FORMATTED. NO FORMAT OPERATIONS ARE EVER PERFORMED ON  
THESE AREAS. IF THIS AREA IS NOT PROPERLY FORMATTED,  
THIS DIAGNOSTIC CAN STILL BE RUN BY SPECIFYING THAT  
ONLY DIAGNOSTIC TRACKS CAN BE WRITTEN TO (UNLESS OF  
COURSE THE DISK IS IN WRITE-PROTECT MODE, IN WHICH  
CASE NO DISK WRITE OPERATIONS WILL BE PERFORMED).  
FORMATTING FOR BOTH NON-REMOVABLE DRIVE SURFACES AND  
GUAD-DENSITY DISKETTES (DGC MODE) CAN BE ACCOMPLISHED  
BY USING THE FOLLOWING PROGRAM:  
"6098, 6099, 6100, 6103 MHD FORMATTER PROGRAM"  
- LISTING PART # 096 - 0001140  
- PROGRAM PART # 095 - 0001140

3. THIS IS PRIMARILY A LOGIC, FUNCTION AND CONTROL  
TEST. IT DOES NOT TEST THE DISKS FOR MAXIMUM DATA  
THROUGHPUT AND/OR SPEED, AS IS NOT INTENDED TO BE  
USED FOR LONG TERM SYSTEM ANALYSIS (I.E. DATA ERROR  
RATES ETC). THIS CAN BE ACCOMPLISHED BY USING THE  
FOLLOWING PROGRAM:  
"6098, 6099, 6100, 6103 MHD RELIABILITY PROGRAM"  
- LISTING PART # 096 - 0001141  
- PROGRAM PART # 095 - 0001141

4. DRIVES MUST HAVE A UNIQUE UNIT # (0-3). FOR EXAMPLE  
TWO DISKETTES CANNOT BOTH BE UNIT 1. THIS WILL CAUSE  
ERRORS IN STATUS AND OPERATION TO OCCUR.

5. THERE MUST BE NO DEVICES WITH DEVICE CODE 0 IN THE  
SYSTEM (USED AS DUMMY DEVICE CODE). REMOVE ANY I/O  
TESTER BOARDS IF THEY EXIST. THIS PROGRAM DOES NOT  
RUN WITH THE CATS/KITTEN DCH EXERCISER PROGRAM.

6. THE INITIALIZATION (QUESTION) SEQUENCE MUST BE  
PERFORMED AT LEAST ONCE ON INITIAL PROGRAM LOAD.  
THIS SEQUENCE CAN BE SKIPPED ON PROGRAM RE-START  
ONLY. THIS IS HANDLED BY OPERATOR QUERY (SECTION 9).

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PROGRAM DESCRIPTION/THEORY OF OPERATION:
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NON-REMOVABLE DISK PRODUCT DESCRIPTION:
17.1
THE NON-REMOVABLE (OR RIGID) DISK DRIVE HAS A TOTAL STORAGE CAPACITY OF 12.5 OR 25.0 MEGABYTES. THE DISK(S) IS FORMATTED AND NON-REMOVABLE. THE DRIVE UNIT, WHICH IS BASED ON WINCHESTER TECHNOLOGY, HAS 4 OR 8 HEADS, 192 TRACKS PER HEAD, AND 32 SECTORS PER TRACK. EACH SECTOR CONTAINS 4096 BITS OR 256 WORDS (16 BITS EACH) OF DATA STORAGE. THE DISK CONTROLLER USES AN 8-BIT MICROCOMPUTER FOR A MAJOR PORTION OF THE CONTROLLER'S LOGIC FUNCTIONS. ITS PURPOSE IS TO HANDLE SEEKING ACTIVITIES, INITIAL COMMAND DECODING, MULTIPLE SECTOR READ/WRITE DATA TRANSFERS, FAULT MONITORING AND POWER SEQUENCING. THE CONTROLLER ALSO HAS A MICRO-CODED TTL MICROPROCESSOR USING 8-1K PROMS. ITS FUNCTIONS INCLUDE FINAL COMMAND DECODING, DISK READ/WRITE LOGIC CONTROL (INCLUDING SERIAL DATA TRANSFERS TO AND FROM THE DISK), TIMING, DISK ADDRESS AND CYCLIC REDUNDANCY CHECK (CRC) OPERATIONS. THE CONTROLLER HAS A 256 WORD DATA BUFFER (RAM) THAT IS USED FOR DATA CHANNEL TRANSFERS TO/FROM THE HOST COMPUTER AND FOR READ/WRITE OPERATIONS ON THE DISK. THE BUFFER ELIMINATES DATA LATE ERRORS. IT ALLOWS THE DISK TO BE WIRED TO THE LOWEST DATA CHANNEL PRIORITY IF DESIRED. THE STRUCTURE OF THE SYSTEM DOES NOT ALLOW RD/WR OPERATIONS TO BE PERFORMED ON PHYSICALLY CONTIGUOUS SECTORS. HOWEVER, MULTIPLE SECTOR TRANSFERS ARE POSSIBLE. THE MICROCOMPUTER HANDLES LOGICAL TO PHYSICAL SECTOR MAPPING FOR MAXIMUM THROUGHPUT. IT WILL PERFORM THE FOLLOWING NORMAL MODE OPERATIONS: READ, WRITE, SEEK, RECALIBRATE AND FORMAT. THERE IS ALSO AN EXTENSIVE DIAGNOSTIC COMMAND SET THAT ALLOWS THE ABILITY TO SINGLE-STEP DISK OPERATIONS (COMMAND SIMULATION), TO STEP THE HEAD ASSEMBLY IN OR OUT AND TO READ CERTAIN REGISTERS INTERNAL TO THE MICROPROCESSOR. SEE SECTION 11.4 FOR THE COMPLETE INSTRUCTION SET.

17.2
QUAD-DENSITY DISKETTE PRODUCT DESCRIPTION:
THE MODEL 6096C/D SUB-SYSTEMS ARE QUAD-DENSITY (1.2 MB) DISKETTE DRIVES. EACH DRIVE HAS 2 HEADS, 77 TRACKS AND 16 SECTORS PER TRACK (EACH SECTOR IS 256 16-BIT WORDS). THE DISKETTES ARE CONTROLLED BY A QUAD-DENSITY DISKETTE CONTROLLER CHIP THAT IS RESIDENT ON THE DISK CONTROLLER BOARD (IN THE CPU). THE DISKETTES ALSO USE THE 8-BIT (TMS) MICROPROCESSOR AND OTHER HARDWARE ON THE CONTROLLER BOARD (I/O SIGNALS, PHASE-LOCK LOOPS ETC). NORMAL MODE COMMANDS ARE THE SAME AS FOR NON-REMOVABLE DRIVES (SEE 7.1). THERE ARE SEVERAL DIAGNOSTIC COMMANDS THAT ALLOW OPERATIONS SUCH AS WRITE/READ OPERATIONS TO THE DISKETTE CONTROLLER CHIP INTERNAL REGISTERS, STEPPING IN AND OUT OF THE HEAD ASSEMBLY ETC. SEE SECTION 11.4 FOR THE COMPLETE INSTRUCTION SET.

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OTHER INFORMATION:
17.3
THE READ/WRITE BOARD HAS TWO SWITCHES ON IT THAT DEFINE THE CONFIGURATION. THE LEFT HAND SWITCH IS THE WRITE-PROTECT SWITCH FOR THE NON-REMOVABLE DISK DRIVE. THE RIGHT HAND SWITCH DEFINES THE NON-REMOVABLE DISK DRIVE UNIT # AS EITHER 0 OR 1. IF IT IS UNIT 0, THE INITIAL PROGRAM LOAD SEQUENCE (IPL) WILL BE PERFORMED FROM THE NON-REMOVABLE DRIVE. IF IT IS UNIT 1, THE IPL CAN OCCUR FROM A DISKETTE DRIVE WITH UNIT # 0. SEE SECTION 11.5 FOR MORE INFORMATION ON JUMPERS AND SWITCHES. IF THE TEST CONFIGURATION ALLOWS IT, THE OPERATOR WILL BE ASKED TO CHANGE THE POSITION OF THE UNIT SELECT SWITCH ON THE FIRST PASS OF THE DIAGNOSTIC (SEE SECTION 12). THERE IS A JUMPER ON THE CONTROLLER BOARD THAT DEFINES WHETHER OR NOT A NON-REMOVABLE DRIVE IS ATTACHED. IF THERE IS NO NON-REMOVABLE DRIVE, THEN UP TO 4 DISKETTES CAN BE IN THE SYSTEM, OTHERWISE 1-3 DISKETTE DRIVES ARE POSSIBLE.

17.4
SUB-SYSTEM MODULE BREAKDOWN:
NON-REMOVABLE DRIVE/DISKETTE DRIVE COMMON MODULES:
- DISK CONTROLLER BOARD (IN CPU CHASSIS)
- POWER SUPPLY BOARD (TOP BACK IN NON-REMOVABLE DRIVE OR IN BACK OF DISKETTE CABINET IF NO NON-REMOVABLE DRIVE IN SYSTEM)
NON-REMOVABLE DRIVE ONLY MODULES (IN DRIVE):
- READ/WRITE HEAD CURRENT DRIVER/CLOCK BOARD (UNDER FRONT PANNEL)
- DRIVE ASSEMBLY: A SEALED MODULE WHICH CONTAINS:
  - 1 OR 2 FIRED DISK PLATTERS (2 OR 4 SURFACES)
  - READ/WRITE HEADS (4 OR 8)
  - HEAD POSITIONER, DRIVE CAM, STEPPING MOTOR, SPINDLE, DRIVE MOTOR W/DAMPER, SECTOR DISK, HOME INDICATOR, BLOWERS, FILTERS ETC. NOTE THAT SOME OF THESE ARE INSIDE THE SEALED PLASTIC UNIT AND SOME ARE ATTACHED TO THE OUTSIDE OF IT.
DISKETTE DRIVE ONLY MODULES (IN DRIVE):
- READ/WRITE/HEAD STEPPER BOARD
- DRIVE ASSEMBLY
- READ/WRITE HEADS (2) AND HEAD POSITIONING MECHANISM (INCLUDING STEPPING MOTOR)
- DISKETTE DRIVE MOTOR ETC

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10007 .MAIN
?7.5: PROGRAM OPERATION:
? THIS DIAGNOSTIC PROGRAM IS USED TO TEST LOGIC, CONTROL,
? FIRMWARE ETC ON THE DISK CONTROLLER BOARD AND PROPER
? FUNCTIONING (SEEK, READ, WRITE/FORMAT, RECAL) OF ANY
? DRIVES) ATTACHED TO IT. (SEE SECTION 5) AND CONFIGURED
? FOR DURING DIAGNOSTIC INITIALIZATION (SEE SECTION 9).
? IT IS A PROGRESSIVE SERIES OF INDIVIDUAL SUB-TESTS.
? IN GENERAL, EACH TEST ASSUMES THAT PREVIOUS LOGIC
? AND FUNCTION SUB-TESTS PASSED WITHOUT ERROR. THE
? TEST COMPLEXITY USUALLY INCREASES WITH THE TEST
? PROGRESSION. THE SUB-TESTS THEMSELVES, CONSIST OF
? A SERIES OF SUB-ROUTINES THAT PERFORM VARIOUS
? FUNCTIONS AND OTHER INSTRUCTIONS THAT SET FLAGS,
? POINTERS, ADDRESSES, PARAMETERS ETC. MANY OF THE
? SUB-ROUTINES PERFORM COMPLICATED DATA, STATUS AND/OR
? REGISTER CHECKS. DETAILED ERROR AND COMMAND SUMMARY
? INFORMATION IS PRINTED ON DETECTION OF AN ERROR. ALSO
? CONTAINED IN SUB-ROUTINES THAT PERFORM ERROR CHECKING
? IS A "PROBABLE FAILING MODULE" REPORT THAT TELLS THE
? OPERATOR WHAT THE FIRST AND SECOND MOST LIKELY CAUSES
? FOR THE DETECTED ERROR ARE. THE "CAUSES" ARE USUALLY
? A MODULE SUCH AS THE DISK CONTROLLER BOARD. REFER TO
? SECTION 10 FOR MORE ERROR INFORMATION. THE SUB-TESTS
? ARE SEPARATED INTO SEVERAL DIFFERENT CLASSES:
?
? 1) DISK CONTROLLER ONLY BASIC FUNCTION TESTS
? (INCLUDING NOVA/ECLIPSE I/O INTERFACE TESTS)
? 2) DIAGNOSTIC MODE TESTS
? (COMMON, DISKETTE ONLY & NON-REMOVABLE ONLY)
? 3) DRIVE UNIT FUNCTION TESTS
? (COMMON, DISKETTE ONLY & NON-REMOVABLE ONLY)
?
? THE FIRST CLASS OF TESTS ARE THE DISK CONTROLLER
? BASIC LOGIC & CONTROL FUNCTION TESTS. THESE TESTS
? CHECK THE FOLLOWING: BUSY DONE, START, CLEAR, IOPLS,
? IORST, DISK COMMAND REGISTER (DCR), DISK ADDRESS
? REGISTER (DOR), DISK STATUS REGISTER (DISA), DEVICE
? SELECTION, LOAD/READ MEMORY ADDRESS REGISTER (DOB/DIO),
? INTERRUPT REQUEST LOGIC, INTERRUPT DISABLE (MSKO),
? DCH RANDOM ADDRESS EXERCISERS, I/O COMMANDS WITH NO
? DEVICE SELECTION AND MISCELLANEOUS FUNCTIONS.
?
? THE SECOND CLASS OF TESTS ARE THOSE THAT MAKE USE
? OF THE DIAGNOSTIC COMMANDS AND STATUS (1, 4, 2). THESE
? COMMANDS ENABLE THE PROGRAM TO HELP DETECT & ISOLATE
? FAULTS, MAINLY TO THE DISK CONTROLLER. ALL DIAGNOSTIC
? TESTS ARE PERFORMED BEFORE ANY ACTUAL DISK WRITE
? OPERATIONS ARE ATTEMPTED. NON-REMOVABLE DRIVES ALSO
? HAVE A DIAGNOSTIC TRACK AREA TO CHECK DISK WRITE/READ
? OPERATIONS WITHOUT AFFECTING USER DATA AREAS. NOTE
? THAT WRITE-PROTECT IS ENABLED ON THE RIGID DRIVE WHEN
? DIAGNOSTIC MODE IS SET (DIAG CMND 0). THESE FEATURES
? WILL HELP PROTECT ANY DATA THAT EXISTS ON THE DISK.
? EXAMPLES OF FUNCTIONS AND OPERATIONS TESTED FOLLOWS:
? COMMON TESTS: SET/RESET DIAGNOSTIC MODE, CHECK DIA
? AND DDA REGISTER BITS (STATIC), READ CERTAIN MICRO-
? PROCESSOR INTERNAL REGISTERS (TRACK ADDRESS, PROGRAM
10008 .MAIN
? REVISION #); NON-REMOVABLE ONLY: READ/WRITE COMMAND
? SIMULATION (DISK SURFACES NOT AFFECTED), CHECK DATA
? BUFFER AND DATA CHANNELING, CHECK SECTOR COUNTER AND
? STEPPER MOTOR PHASES AND READ HEADER; DISKETTE ONLY:
? SET/RESET FORMAT MODES, WRITE/READ DISKETTE CONTROLLER;
? CHIP INTERNAL REGISTERS AND READ HEADER. IN ADDITION,
? BOTH DRIVE TYPES CAN HAVE THEIR HEAD ASSEMBLIES MOVED
? EITHER IN OR OUT ONE TRACK.
?
? ACTUAL DISK SEEK, READ, AND WRITE OPERATIONS ARE
? CHECKED IN THE THIRD CLASS OF TESTS. SEEK COMMANDS
? ARE CHECKED FIRST. SEVERAL DIAGNOSTIC COMMANDS ARE
? USED DURING THIS TIME TO CHECK THE TRACK ADDRESSES,
? STEPPER PHASES (RIGID DRIVE ONLY) AND PERFORM READ
? HEADER OPERATIONS TO INSURE PROPER HEAD POSITIONING.
? FOR THE NON-REMOVABLE DRIVE, A CHECK IS MADE TO
? INSURE THAT THE HEADS CAN STEP INTO THE HOME AREA
? FOR WRITE/READ OPERATIONS ON THE DIAGNOSTIC TRACK.
? THE WRITE/READ TESTS FOLLOW THE SEEK EXERCISERS. IF
? NO TEST RESTRICTIONS EXIST (SEE SECTION 6), THEN THE
? FOLLOWING TESTS WILL BE PERFORMED: NON-REMOVABLE ONLY
? (ALL ARE PERFORMED ON TRACK 30) (DIAG TRACKS ONLY):
? FORMAT HEAD 0/SECTOR 0, FORMAT ALL SECTORS, READ
? HEADER ALL SECTORS, FORMAT ALL HEADS, READ HEADER FROM
? ERROR AND FORCE BAD SECTOR ERROR. THE STATUS, DISK
? ADDRESS AND MEMORY ADDRESS REGISTERS ARE ALL CHECKED
? DURING THESE OPERATIONS. DISKETTE/NON-REMOVABLE TESTS:
? DATA CHANNEL EXERCISER, WRITE/READ TO HEAD 0/SECTOR 0,
? WRITE/READ TO ALL SECTORS, READ ALL SECTORS, READ/WRITE
? ALL HEADS, READ ALL HEADS, WRITE/READ PATTERNS ON ALL
? HEADS, WRITE/READ MULTIPLE SECTORS (WITH AND WITHOUT
? CROSSING A HEAD BOUNDARY), FORCE END OF CYLINDER ERROR,
? WRITE/READ ALL TRACKS, READ ALL TRACKS, RANDOM WRITE/
? READ EXERCISER AND PERFORM IPL SEQUENCE ON UNIT 0 ONLY
? OR ON UNITS 0 & 1 (SWAPPED: 0->1, 1->0), IF APPLICABLE.
? THE STATUS, DISK ADDRESS AND MEMORY ADDRESS REGISTERS
? ARE ALL MONITORED FOR CORRECT OPERATION DURING THESE
? TESTS. NO WRITE OPERATIONS ARE PERFORMED IF A DRIVE IS
? WRITE-PROTECTED. THIS SERIOUSLY CUTS DOWN THE TEST-
? ABILITY OF A DRIVE AND SHOULD ONLY BE DONE IF DATA ON
? A NON-REMOVABLE DRIVE IS TO BE PRESERVED. NO FORMAT
? OPERATIONS ARE PERFORMED ON DISKETTE DRIVES OR ON THE
? USER TRACKS OF THE NON-REMOVABLE DRIVE IN THIS PROGRAM.
?
? THE PROGRAM CHECKS THE ABOVE THROUGH A SERIES OF SUB-
? TESTS. IF NO ERROR IS FOUND, THE PROGRAM WILL PERFORM
? THE TESTS IN A LOGICAL PROGRESSION, UNTIL THE LAST
? TEST. THE PROGRAM WILL THEN TEST THE NEXT CONFIGURED
? DRIVE (IF ANY). AN END OF PASS MESSAGE IS PRINTED
? AFTER ALL OF THE CONFIGURED DRIVES HAVE BEEN TESTED.
? IF ANY ERROR(S) ARE DETECTED, THE OPERATOR WILL BE
? INFORMED OF IT. TO FIND THE PROBLEM, REFER TO THE
? REPORTED ERROR ADDRESS (CONTENTS OF PROGRAM COUNTER=1)
? IN THE DIAGNOSTIC LISTING. TO FIND THE ACTUAL HARDWARE
? FAILURE, SET UP A SCOPE LOOP (SEE SECTION 8) AND TRACE
? THE FAILURE WITH AN OSCILLOSCOPE. THE COMMENTS IN THE
? LISTING WILL GIVE THE OPERATOR INFORMATION ABOUT THE
? PROBLEM AS WELL AS INFORMATION CONCERNING THE ACCUMU-
? LATOR CONTENTS.

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OPERATING PROCEDURE/OPERATOR INPUT
*****
* PROGRAM STARTING ADDRESS = 500 (OCTAL) *
*****
* NON-REMOVABLE HOME TRANSDUCER ALIGNMENT *
* PROCEDURE STARTING ADDRESS = 4 *
*****
TO RUN THIS DIAGNOSTIC:
1. ALL DRIVES TO BE TESTED MUST BE CONNECTED TO
THE CONTROLLER BOARD BY THE APPROPRIATE RIBBON
CABLE WHICH RUNS FROM THE DRIVE TO THE STANDARD
I/O CONNECTOR ON THE CPU CHASSIS. EACH DRIVE
MUST HAVE A UNIQUE UNIT # AND ALL MUST HAVE THE
POWER ON AND THE UNIT MUST BE READY (NON-REMOVABLE).
SCRATCH DISKETTE(S) MUST BE INSERTED IN ORDER TO
TEST DISKETTE DRIVES. THE CONTROLLER MUST HAVE
ITS INTERRUPT PRIORITY (/INTP/) AND DATA CHANNEL
PRIORITY (/DCHP/) I/O LINES PROPERLY JUMPED.
2. SIGNAL BACKPANNEL I/O PIN #
*****
/DCHP OUT/ 93
/DCHP IN/ 94
/INTR OUT/ 95
/INTR IN/ 96
3. LOAD THE DIAGNOSTIC. THIS CAN BE DONE MANUALLY
VIA PAPER TAPE. AUTOMATIC LOADING AND STARTING
IS ACCOMPLISHED BY LOADING THE PROGRAM FROM A
DIAGNOSTIC TAPE OPERATING SYSTEM (DTOS) MODEL
3 OR 4 MAGNETIC TAPE THAT HAS THE PROGRAM NAME
"6098 DIAG" IN ITS DIRECTORY (COMMAND = "DIR").
ITS COULD ALSO BE LOADED FROM A DDOS DISK OR
DISKETTE. FOR DTOS; MOUNT TAPE, LOAD AND PUT
"ON-LINE". PROGRAM LOAD FROM ITS DEVICE CODE
(USUALLY 22). THE FOLLOWING SHOULD BE TYPED:
"TOP OF MEMORY = XXXXXX
DTOS REV NEW=YYY
*LOAD 6098 DIAG"
*****
"#" IS THE DTOS/DDOS PROMPT, WHICH INDICATES IT
IS READY FOR A COMMAND. THE COMMAND TYPED IN TO
TO LOAD THE PROGRAM IS UNDERLINED. ONCE ENTERED
(A "CR" FOLLOWS ANY COMMAND), THE PROGRAM IS THEN
LOADED (IF IN THE DIRECTORY) AND THE DIAGNOSTIC
INITIALIZATION SEQUENCE IS STARTED. THE FOLLOWING
TEXT IS PRINTED DURING THIS TIME:

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"LOAD:
6098 DIAG REV. ZZ
TOP OF MEMORY = XXXXXX
*** 6098, 6099, 6100, 6103 MHD DIAGNOSTIC ***"
ON INITIAL DIAGNOSTIC PROGRAM LOADING, THE FOLLOWING
TEST INITIALIZATION SEQUENCE MUST BE PERFORMED. ON
PROGRAM RESTART (I.E. CNTRL-R, CNTRL-D), THE OPERATOR
IS ASKED THE FOLLOWING QUESTION:
"DO YOU WANT TO SKIP THE DIAGNOSTIC INITIALIZATION
(C=NO, I=YES)?"
IF YES IS THE RESPONSE, THE DIAGNOSTIC GOES DIRECTLY
TO K) IN STEP 3. OTHERWISE START WITH A) IN STEP 3.
3. ANSWER THE FOLLOWING INITIALIZATION QUESTIONS:
A) "DEVICE CODE (PRIMARY=33, SECONDARY=73)?"
B) "IS THERE A NON-REMOVABLE DISK (CR OR 0=NO, 1=YES)?"
IF YES, CONTINUE SEQUENCE, OTHERWISE GO TO "I)".
C) "NON-REMOVABLE UNIT # (0 (CR) OR 1)?"
D) "NON-REMOVABLE DISK CAPACITY (0 OR CR=12.5 MB)?"
E) "IS THE DISK WRITE PROTECTED? (0 OR CR=NO, 1=YES)?"
IF NO, CONTINUE SEQUENCE, OTHERWISE GO TO "I)".
F) "WHERE CAN WRITE OPERATIONS BE PERFORMED?
(O OR CR=DIAGNOSTIC TRACK ONLY, 1=ENTIRE DISK)"
CONTINUE IF ENTIRE DISK, OTHERWISE GO TO "I)".
G) "*** CAUTION *** EXISTING DATA WILL BE DESTROYED BY
WRITING TO THE ENTIRE DISK. TYPE 0 TO ABORT OR 1
TO CONTINUE = "
IF CONTINUED, TYPE FOLLOWING OTHERWISE GO TO "B)".
H) "DIAGNOSTIC ASSUMES USER DATA TRACKS ARE FORMATTED"
I) "RESPONSES FOR THE FOLLOWING UNIT NUMBERS ARE:
CR OR 0=NO DISKETTE, 1=DISKETTE, 2= DISKETTE-WRITE
PROTECTED"
J) "UNIT #: X?"
K) "NON-REMOVABLE TRANSDUCER ALIGNMENT PROCEDURE IS
STARTING ADDRESS 4. ENTER FROM ODT (CNTRL-O, & AR).
SELECT SWREG/ODT, THEN RETURN TO START DIAGNOSTIC".
THE DIAGNOSTIC WILL THEN BEGIN OPERATION ACCORDING TO
THE MODES SELECTED BY THE "SWREG" SWITCHES.

```

10013 .MAIN

```

01 ?
02 ?
03 ?
04 ?
05 ?
06 ?
07 ?
08 ?
09 ?
10 ?
11 ?

```

NOTES:

- 1) DEVICE CODE (QUESTION A) ENTERED IN OCTAL AND IN THE RANGE: 20 < DEV CODE < 77.
- 2) QUESTIONS RE-ASKED IF INCORRECT RESPONSES ARE MADE.
- 3) QUESTION "J" (DISKETTE UNIT INFO) IS ASKED FOR ALL UNIT #'S (0-3) THAT ARE NOT ALREADY TAKEN BY A NON-REMOVABLE DRIVE (UNIT 0 OR 1 ONLY).
- 4) SEE SECTION 6 FOR RESPONSES FOR QUESTION "K".
- 5) IF NO UNITS ARE SPECIFIED FOR TESTING, AN ERROR MESSAGE IS PRINTED AND THE SEQUENCE RE-STARTS FROM QUESTION "B".

10014 .MAIN

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58 ?
59 ?
60 ?

```

PROGRAM OUTPUT/ERROR DESCRIPTION:

ALL PROGRAM OUTPUTS, BOTH MESSAGES AND ERROR REPORTS, ARE CONTROLLED BY THE VALUE OF "SWREG" (SEE SECTION 8) SWITCHES 2 AND 5 AS FOLLOWS:

| SWITCH | PRINTOUT TO TTY/CRT | LPT |
|--------|---------------------|-----|
| 2      | YES                 | NO  |
| 5      | NO                  | YES |
| 0      | YES                 | YES |
| 1      | NO                  | NO  |
| 1      | NO                  | YES |

IF TTY AND/OR LPT OUTPUTS ARE ENABLED AND IF AN ERROR IS ENCOUNTERED DURING DIAGNOSTIC TESTING, AN ERROR REPORT IS GIVEN ON THE SELECTED OUTPUT DEVICE. THE ERROR INFORMATION PRINTED DEPENDS ON THE ERROR. HOWEVER, ALL ERROR REPORTS CONTAINS AT LEAST THE FOLLOWING INFORMATION:

CRY AC0 AC1 AC2 AC3 PC  
X XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX

WHERE: CRY = CARRY  
PC = PROGRAM COUNTER (FAILING ADDRESS+1)  
AC0, AC1, AC2, AC3 = ACCUMULATOR CONTENTS (CONTENTS DEPEND ON SPECIFIC TEST - TESTS THAT COMPARE TWO VALUES FOR EQUIVALENCE RETURN AC0/AC1 = GOOD/BAD VALUES).

ALL NUMERIC VALUES ARE IN OCTAL. THE ACTION TAKEN AFTER ERROR MESSAGE PRINTOUT DEPENDS ON THE VALUE OF "SWREG" (SEE SECTION 8). IF SWITCH 6 = 1 THEN THE PROGRAM WILL EXIT TO ODT AFTER THE MESSAGE "HALTED ON ERROR" IS PRINTED. IF SWITCH 1 = 0 THEN THE PROGRAM WILL LOOP ON THE ERROR AFTER THE MESSAGE "LOOPING ON ERROR" IS PRINTED. THIS FORMS A TEST SCOPE LOOP FOR FAILURE TRACING WITH AN OSCILLOSCOPE. IF SWITCH 1 = 0 AND SWITCH 6 = 1 THE PROGRAM WILL EXIT TO ODT, THEN LOOP ON THE ERROR ON PROCEED FROM ODT ("OP"). IF SWITCH 8 = 0 THEN ONLY THE FIRST ERROR WILL BE REPORTED. IF THE PROGRAM IS LOOPING ON AN ERROR AND "SWREG" SWITCH 3 = 1, A SUBTEST FAILURE RATE IS REPORTED. THE ERROR RATE IS REPORTED AS A DECIMAL PERCENTAGE. (NOTE: WHEN LOOPING ON A TEST THAT HAS MORE THAN ONE ERROR BEING DETECTED, AND A % FAILURE RATE IS BEING REPORTED, THE FAILURE RATE WILL APPEAR AS XXX% WHERE X IS THE # OF ERRORS OCCURRING. FOR EXAMPLE, A SCOPE LOOP WITH 2 ERRORS WOULD REPORT "SUBTEST (#) FAILED 200%").

IN ADDITION TO THE ABOVE INFORMATION, A DETAILED ERROR REPORT IS GIVEN IN MOST CASES ON DETECTION OF AN ERROR. THE INFORMATION CONTENT VARIES WITH THE TYPE OF ERROR. THE INTENT IS TO GIVE THE OPERATOR INFORMATION SUCH AS THE LAST COMMAND/ADDRESS ISSUED BEFORE THE FAILURE WAS DETECTED, OR TO BREAK STATUS INFORMATION DOWN TO THE BIT LEVEL ETC. THE FOLLOWING ARE SOME EXAMPLES:





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10017 .MAIN
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OTHER COMMANDS TO OPEN CELLS ARE:
"ADR"/ OPEN THE CELL AND PRINT ITS CONTENTS
./ OPEN THE CELL CURRENTLY POINTED TO BY THE POINTER
AND PRINT ITS CONTENTS.
*+ADR"/ ADD "ADR" TO THE POINTER, OPEN THE CELL AND PR*NT 06
ITS CONTENTS.
*+ADR"/ SUBTRACT "ADR" FROM THE POINTER, OPEN THE CELL AN 08
PRINT ITS CONTENTS.
"CR" THE RETURN KEY IS USED TO CLOSE THE OPEN CELL
WITH OR WITHOUT MODIFICATION.
"LF" LINE FEED IS USED TO CLOSE THE OPEN CELL WITH OR
WITHOUT MODIFICATION AND TO OPEN THE SUCCEEDING
CELL.
* CLOSE THE OPEN CELL WITH OR WITHOUT MODIFICATION
AND OPEN THE PRECEDING CELL
/ CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
OPEN THE CELL POINTED TO BY ITS CONTENTS,
*+ADR"/ CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
*+ADR"/ OPEN THE CELL POINTED TO BY ITS CONTENTS + "ADR"
-ADR"/ CLOSE THE OPEN CELL WITHOUT MODIFICATION, AND
-ADR"/ OPEN THE CELL POINTED TO BY ITS CONTENTS - "ADR".

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

10018 .MAIN
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11.3.3 OTHER ODT COMMANDS
RUBOUT
THIS KEY IS USED TO DELETE ERRONEOUSLY TYPED
DIGITS. EACH TIME THE KEY IS PRESSED THE RIGHT MOST
DIGIT IS DELETED AND ECHOED ON THE TERMINAL. IF
THE RUBOUT KEY IS PRESSED RIGHT AFTER OPENING A
CELL THEN IT DELETES THE RIGHT MOST DIGIT OF THE CELLS
CONTENTS. THIS ALLOWS THE MODIFICATION OF THE CELL
AS IF ITS CONTENTS WERE TYPED IN JUST BEFORE THE
KEY WAS PRESSED.
"ADR"B
INSERT A BREAK POINT AT LOCATION "ADR".
ONLY ONE BREAK POINT CAN BE INSERTED AND ANY
ENTRY TO ODT AFTER EXECUTING A BREAK POINT WILL
CAUSE IT TO BE DELETED.
D
DELETE THE BREAK POINT IF ANY.
P
RESTART THE EXECUTION OF THE PROGRAM AT LOCATION
POINTED BY 4A.
"ADR"R
START EXECUTING THE PROGRAM AT "ADR" AFTER AN
IO-RESET.
K
KILL THE STRING TYPED SO FAR. THE 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
USER SHOULD PLACE BREAK POINTS ONLY IN THE
ORIGINAL PROGRAM AREA. IF A BREAK POINT IS
PLACED OUTSIDE THIS AREA THE RESULTS WILL
BE UNPREDICTABLE.

```

```

10019 .MAIN
01 ;11.4 INSTRUCTION SET:
02 ;11.4.1 NORMAL MODE INSTRUCTIONS:
03 ;
04 ;
05 ;
06 ; DOA: SPECIFY COMMAND AND CYLINDER
07 ;
08 ;
09 ; BITS NAME
10 ; 0-4 CLEAR
11 ;
12 ; ANY OF THESE BITS = 1 WILL SET
13 ; THE FOLLOWING = 0 FOR ANY AND
14 ; ALL DEVICES CONNECTED TO THE
15 ; CONTROLLER: R/W (DEVICE) DONE,
16 ; SEEK DONE, DIA ERROR STATUS
17 ; BITS 7, 8, 10-15.
18 ;
19 ;
20 ; 5-6 COMMAND
21 ; SPECIFY THE DISK COMMAND FOR
22 ; THE SELECTED DRIVE AS FOLLOWS:
23 ;
24 ; 5 6 NORMAL MODE COMMAND
25 ; 0 0 READ
26 ; 0 1 WRITE
27 ; 1 0 SEEK
28 ; 1 1 RECALIBRATE
29 ;
30 ; 7-15 CYLINDER
31 ; SPECIFY DESIRED CYLINDER FOR
32 ; A SEEK OR READ/WRITE OPERATION.
33 ; CYLINDER #'S ARE AS FOLLOWS:
34 ;
35 ; NON-REMOVABLE: 0-277 (OCTAL)
36 ; (12.5/25.0 MB)
37 ; DISKETTE: 0-114 "
38 ;
39 ;
40 ; DOB: SPECIFY MEMORY ADDRESS
41 ;
42 ;
43 ; BITS 1-15 SPECIFY THE STARTING MEMORY ADDRESS FOR A
44 ; DATA CHANNEL OPERATION. BIT 0 IS THE MAP SELECT BIT
45 ; (0 = MAP A, 1 = MAP B).
46 ;
47 ;
48 ; DOC: SPECIFY DISK ADDRESS AND SECTOR COUNT
49 ;
50 ;
51 ; BITS NAME
52 ; 0-1 DRIVE
53 ; 2 FORMAT
54 ; 3 DIAGNOSTIC
55 ; COMMAND
56 ; ENABLE
57 ;
58 ;
59 ;
10020 .MAIN
01 ;
02 ; STARTING HEAD # FOR READ/WRITE
03 ; OPERATION. VALID HEAD #'S ARE:
04 ; 12.5 MB NON-REMOVABLE: 0-3
05 ; 25.0 MB NON-REMOVABLE: 0-7
06 ; DISKETTE: 0-1
07 ;
08 ; SELECT STARTING SECTOR FOR A
09 ; READ/WRITE OPERATION. VALID
10 ; SECTOR NUMBERS ARE:
11 ;
12 ; NON-REMOVABLE: 0-37
13 ; (12.5/25.0 MB)
14 ; DISKETTE: 0-17
15 ;
16 ; 4-6 START HEAD
17 ;
18 ; 7-11 START SECTOR
19 ;
20 ; SECTOR COUNT # OF SECTORS TO READ/WRITE
21 ; (TWO'S COMPLEMENT).
22 ;
23 ; DIA: READ DISK STATUS
24 ;
25 ; BIT(S) FUNCTION/DESCRIPTION
26 ; 0 READ/WRITE DONE:
27 ; IF = 1, READ OR WRITE OPERATION COMPLETED.
28 ; THIS IS THE DISK DEVICE DONE FLAG, AND IS
29 ; TESTABLE VIA AN I/O SKIP INSTRUCTION. IT WILL
30 ; BE SET ONLY AFTER A READ/WRITE OPERATION. AN
31 ; IOPLS, START, IORST AND/OR CLEAR WILL RESET.
32 ;
33 ; 1-4 SEEK DONE:
34 ; IF = 1, SEEK/RECALIBRATE COMPLETED FOR DRIVES
35 ; 0-3. ONLY SEEK DONE FOR THE SELECTED DRIVE CAN
36 ; BE SET. IOPLS, START, IORST OR CLEAR WILL RESET.
37 ;
38 ; 5 DISKETTE:
39 ; = 0 IF NON-REMOVABLE IS SELECTED
40 ; = 1 IF DISKETTE IS SELECTED
41 ;
42 ; 6 WRITE-PROTECT:
43 ; IF = 1, THE SELECTED DRIVE IS WRITE-PROTECTED.
44 ; FOR THE NON-REMOVE, WRITE-PROTECT = 1 IF THE
45 ; DRIVE IS IN DIAGNOSTIC MODE (PAGE 0 "DIAGM"=1).
46 ;
47 ; 7 BAD SECTOR/DATA FIELD ERROR:
48 ; IF = 1, THE LAST DATA TRANSFER ATTEMPTED TO
49 ; READ OR WRITE A SECTOR PREVIOUSLY DESIGNATED
50 ; AS BAD FOR NON-REMOVABLE DRIVES OR AN ERROR
51 ; DETECTED IN THE DATA FIELD FOR DISKETTES.
52 ;
53 ; 8 UNSAFE:
54 ; IF = 1, THE SELECTED DRIVE IS IN AN UNSAFE CON-
55 ; DITION. FOR NON-REMOVABLE, A READ/WRITE ERROR
56 ; IS INDICATED (NO HEAD SELECT, MULTIPLE HEAD
57 ; SELECT, NO WRITE CURRENT, WRITE CURRENT WITH
58 ; NO WRITE COMMAND OR CLOCK FAULT). STATUS WILL
59 ; RESET WITH START, CLEAR, IOPLS OR IORST, BUT
60 ; THIS WILL NOT REMOVE THE DISK'S UNSAFE CON-
61 ; DITION. TRY POWER DOWN/UP.

```



0023 .MAIN

```

01 11-15 DIAGNOSTIC COMMAND NOTES
02 -----
03 00 SET DIAGNOSTIC MODE N D <1>
04 01 SIMULATE R/W CLOCK N <1>
05 02 START PROM OPERATION N <1>
06 03 SIMULATE SECTOR PULSE N <1>
07 04 WRITE DIA N D <2>
08 05 STEP IN ONE TRACK N D <13>
09 06 STEP OUT ONE TRACK N D <13>
10 07 START DATA CHANNEL N D <3>
11 08 TEST SECTOR COUNT VALID N <4>
12 09 TEST SECTOR COUNTER N <4>
13 10 READ DISK CAPACITY N <4>
14 11 READ REVISION NUMBER N D <14>
15 12 READ CYLINDER ADDRESS N D <5>
16 13 READ STEPPER PHASES N <5>
17 14 RESERVED FOR FUTURE USE
18 15 NO-OPERATION N D <6>
19 16 READ HEADER OPERATION N D <7>
20 17 READ TRACK OPERATION D *
21 18 SET IBM FORMAT MODE D
22 19 SET FM FORMAT MODE D
23 20 SET DSC FORMAT MODE D
24 21 WRITE "DC" TRACK REG D <8>
25 22 WRITE "DC" SECTOR REG D <8>
26 23 WRITE "DC" DATA REG D <8>
27 24 READ "DC" STATUS REG D <9>
28 25 READ "DC" TRACK REG D <9>
29 26 READ "DC" SECTOR REG D <9>
30 27 READ "DC" DATA REG D <9>
31 28 READ DDA BITS 8-15 N D <10>
32 29 READ SHIFT REGISTER N <11>
33 30 RESET DIAGNOSTIC MODE N D
34 31 READ MICRO INTERNAL RAM N D <12> *
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WHERE:
N = NON-REMOVABLE
D = DISKETTE
"DC" = DISKETTE CONTROL CHIP
* = NOT USED IN THIS PROGRAM

THESE 4 DIAGNOSTIC COMMANDS ARE USED FOR
NON-REMOVABLE COMMAND SIMULATION. THE COMMAND UNDER
SIMULATION IS SPECIFIED BY DDA AS FOLLOWS:

COMMAND DOA BIT
-----
READ 0 0 0 0
WRITE 0 1 0 1
READ HEADER 0 0 1 0
FORMAT 0 1 1 1

```

10024 .MAIN

```

01 SERIAL READ DATA IS SIMULATED BY DOA BIT 10 FOR
02 READ AND READ HEADER COMMAND SIMULATION. SERIAL
03 WRITE DATA IS OBTAINED FROM DIA BIT 7 (LOW ACTIVE)
04 FOR WRITE AND FORMAT COMMAND SIMULATION. DOC BIT
05 2 MUST BE = 1 FOR FORMAT SIMULATION.
06
07 THE NON-REMOVABLE MUST BE SELECTED IN DOC BITS 0-1 &
08 BIT 3 = 1 (DIAG). DIAGNOSTIC COMMANDS 1-3, 5-6, & 20
09 ARE THE ONLY COMMANDS THAT RETURN DIAGNOSTIC STATUS
10 INFORMATION (DIA). ALL OTHERS RETURN NORMAL STATUS.
11 THE DIC REGISTER IS NOT AFFECTED BY DIAGNOSTIC
12 COMMANDS 0-3. A DOC SHOULD BE ISSUED ONLY AT THE
13 BEGINNING OF A COMMAND SIMULATION. SUBSEQUENT
14 DIAGNOSTIC COMMANDS (0-3) SHOULD BE SPECIFIED AND
15 STARTED VIA "DDAS". SERIAL DATA HANDLING IS ALWAYS
16 TO/FROM THE NON-REMOVABLE 256. WORD DATA BUFFER. DISK
17 SURFACES ARE NOT AFFECTED BY COMMAND SIMULATION.
18 FOR THE START PROM OPERATION COMMAND (#2), THE
19 CONTENTS OF DOC 8-15 ARE LOADED INTO BITS 0-7 AND
20 8-15 OF THE HEADER REGISTER. DIAGNOSTIC MODE CAN
21 BE RESET BY ISSUING DIAGNOSTIC COMMAND #38 OR ANY
22 NORMAL MODE COMMAND. ISSUE DIAG COMMAND #35 TO READ
23 THE HEADER OR CHECKWORD FROM THE NON-REMOVABLE SHIFT
24 REGISTER.
25
26 DOC BITS 8-15 TRANSFERRED TO DIA BITS 7,8,10-15.
27
28 DATA CHANNEL DIRECTION CONTROLLED BY DOA BIT 6:
29 = 0: DATA CHANNEL IN (READ)
30 = 1: DATA CHANNEL OUT (WRITE)
31
32 FOR NON-R THE TRANSFER IS BETWEEN HOST MEMORY & THE
33 256. WORD DATA BUFFER. FOR DISKETTES, ON A READ (DCH
34 INPUT) THE DISKETTE CONTROLLER DATA REGISTER (8-BITS)
35 IS CHANNELLED IN SUCCESSIVELY UNTIL 256. WORDS (512.
36 BYTES ARE DONE). ON A WRITE (DCH OUTPUT) THE SPECIFIED
37 DATA IN MEMORY IS CHANNELLED OUT TO THE DISKETTE CONT-
38 ROLLER DATA REGISTER UNTIL 256. WORDS (512. BYTES) ARE
39 DONE. AT THE END, THE DISKETTE CONTROLLER DATA REGISTER
40 WILL CONTAIN THE LAST BYTE SENT.
41
42 RESULTS REPORTED BY ERROR (DIA BIT 15): 0=PASS, 1=FAIL.
43 IN ADDITION, IF "TEST SECTOR COUNTER" FAILS, FAILING
44 SECTOR LINES (XSC16, 8, 4, 2, 1) ARE LOADED AND
45 READABLE BY DIC (RETURNED IN BITS 11-15).
46
47 RETURNED IN DIC REGISTER (BITS 12-15 FOR STEPPER
48 PHASE, BITS 11-15 FOR CYLINDER ADDRESS).
49
50 DOC BIT 0-15 TRANSFERRED TO DIC BITS 0-15.
51
52

```

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10025 .MAIN
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NON-REMOVE: THE HEADER TO BE READ IS SPECIFIED BY THE
DOC WORD (HEAD/SECTOR ONLY; SECTOR COUNT IS IGNORED):
DIC 0-15 = HEADER HEAD FROM DISK
0-7 = TRACK, 8-10 = HEAD, 11-15 = SECTOR
DIA 0-15 = DIAGNOSTIC STATUS.
FOR DISKETTE, HEADS THE HEADER FOR THE NEXT SECTOR
ENCOUNTERED AFTER THE COMMAND IS ISSUED (HEAD # IS
SPECIFIED BY THE DOC WORD). THE 3 WORD HEADER IS DATA
CHANNELED INTO HOST MEMORY STARTING AT THE ADDRESS
IN THE DCH MEMORY ADDRESS REGISTER (DOB).
WORD 1: 0-7 = TRACK, 8-15 = SIDE NUMBER
WORD 2: 0-7 = SECTOR, 8-15 = SECTOR LENGTH (2)
WORD 3: 0-15 = CRC
DIA 0-15 = DISKETTE STATUS.
DOC BITS 8-15 TRANSFERRED TO SELECTED DISKETTE
CONTROLLER INTERNAL REGISTER (ALL ARE 8-BITS).
SELECTED DISKETTE CONTROLLER INTERNAL REGISTER
TRANSFERRED TO DIC BITS 8-15.
DOA BITS 8-15 TRANSFERRED TO DIC 8-15. BITS 8-10
ONLY WILL VARY.
NON-REMOVE SHIFT REGISTER MOVED TO DIC 0-15. THIS
REGISTER CONTAINS THE FOLLOWING INFORMATION:
- AFTER READ/WRITE OPERATION WITH ADDRESS ERROR OR
- AFTER A HEAD HEADER = HEADER WORD.
- AFTER A READ (NO ERRORS) OR AFTER A READ WITH
CHECK WORD ERROR = CRC WORD.
- AFTER A WRITE = CRC WORD (MIRROR IMAGE)
THE SPECIFIED 8048 INTERNAL REGISTER IS MOVED TO
DIC BITS 8-15. VALID REGISTER ADDRESS RANGE IS
0-77 AND IS SPECIFIED BY DOC BITS 8-15.
IF NON-REMOVE DRIVE, DIAGNOSTIC STATUS RETURNED IN
DIA REGISTER BITS 7, 8 & 10-15.
BITS 14/15 RETURN RIGID DISK CAPACITY AS FOLLOWS:
14 15 RIGID DRIVE
DISK CAPACITY
1 0 12.5 MEGABYTES
1 1 25.0 MEGABYTES

10026 .MAIN
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DIAGNOSTIC MODE STATUS:
-----
DIAGNOSTIC STATUS IS RETURNED IN THE DIA REGISTER ONLY
IF THE UNIT UNDER TEST IS A NON-REMOVABLE DRIVE, AND
ONLY ON EXECUTION OF DIAGNOSTIC COMMANDS 1-3, 5-6 & 20.
DIA STATUS BITS 0-6 AND 9 ARE THE SAME AS THE NORMAL
DIA STATUS INFORMATION. BITS 7-8 & 10-15 ARE REDEFINED
AS FOLLOWS:
BIT FUNCTION/DESCRIPTION
---
7 /WRITE DATA/ (LOW ACTIVE):
SERIAL DATA COMING OUT OF THE READ/WRITE
SHIFT REGISTER ON A WRITE OR FORMAT OPERA=
TION. USED FOR COMMAND SIMULATION ONLY.
8 WRITE GATE:
IF = 1, SERIAL WRITE DATA IS ENABLED AND
VALID. USED FOR COMMAND SIMULATION. THIS IS
ONE OF THE MAIN CONTROL SIGNALS.
10 HEAD GATE:
IF = 1, SERIAL READ DATA IS ENABLED AND
VALID. USED FOR COMMAND SIMULATION. THIS
IS ONE OF THE MAIN CONTROL SIGNALS.
11 PROM OPERATION:
IF = 1, THE PROM SEQUENCER IS ENABLED. USED
FOR COMMAND SIMULATION.
12 SECTOR FAULT:
IF = 1, A SECTOR PULSE OCCURED WHEN EITHER
READ GATE OR WRITE GATE WAS ACTIVE AND IS
AN OPERATION TIME OUT TYPE ERROR.
13 CHECKWORD (CRC) ERROR:
IF = 1, A CHECKWORD ERROR IS INDICATED ON A
SIMULATED OPERATION JUST PERFORMED.
14 ADDRESS (HEADER ERROR):
IF = 1, A HEADER ERROR ENCOUNTERED (SEE ABOVE).
15 HOME:
IF = 1, THE HEADS ARE LOCATED IN THE HOME
AREA (TRACKS > 301 OCTAL).

```



10029 .MAIN

\*\*00000 TOTAL ERRORS, 00000 FIRST PASS ERRORS