

**HP 3000 SERIES II
COMPUTER SYSTEM
MANUAL OF STAND-ALONE DIAGNOSTICS**

**STAND-ALONE HP 30129A (7905A)
DISC CARTRIDGE DIAGNOSTIC**

Diagnostic No. D419A



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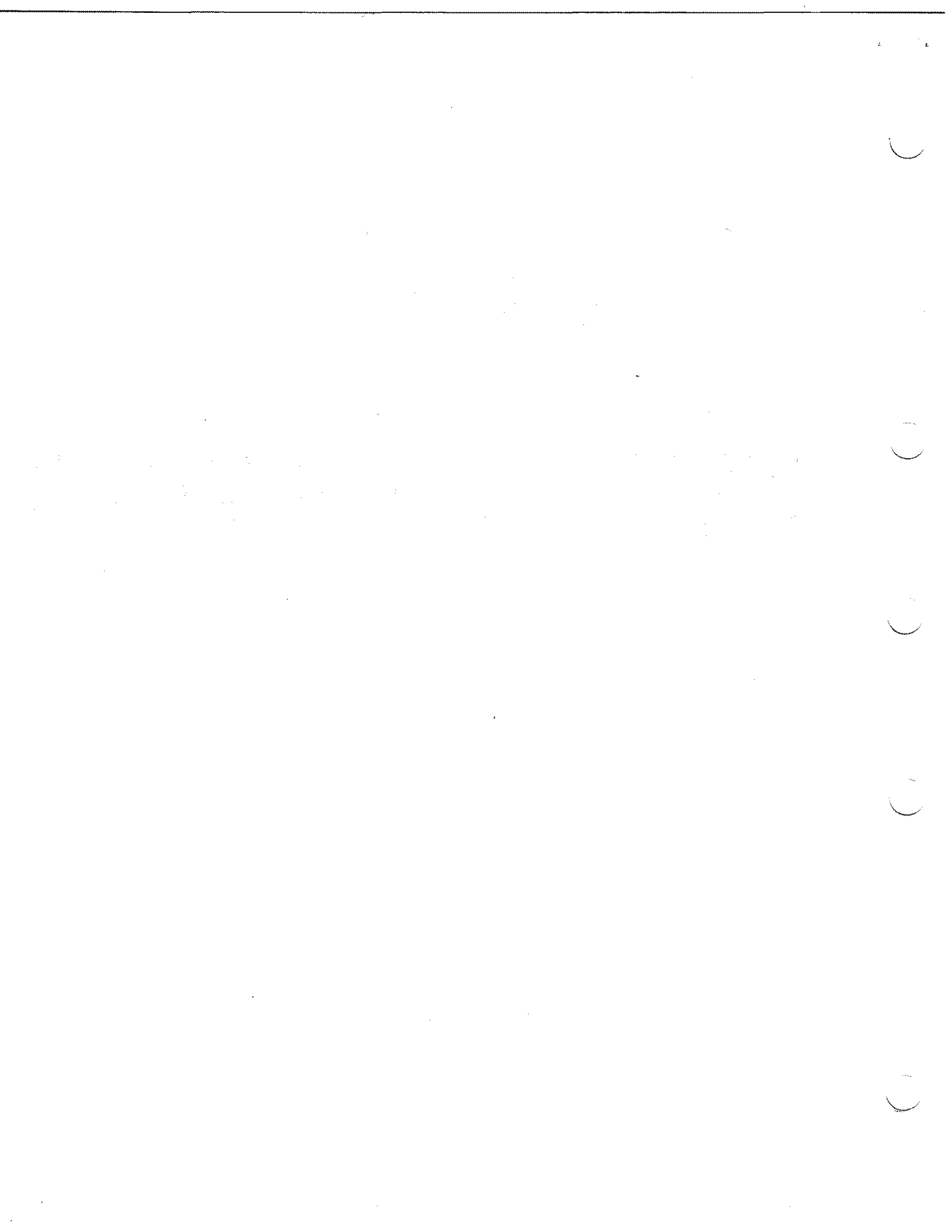
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STAND-ALONE HP 30129A CARTRIDGE DISC DIAGNOSTIC
HP PRODUCT NO: D419A
DESIGNED: SEPTEMBER 24, 1975
UPDATED:
FIXED:

I. I N T R O D U C T I O N

THE STAND-ALONE HP 30129A CARTRIDGE DISC DIAGNOSTIC VERIFIES THE INPUT, OUTPUT AND CONTROL FUNCTIONS OF THE HP 30129A CARTRIDGE DISC. THE DIAGNOSTIC IS USED BY FIELD SERVICE, MANUFACTURING AND SYSTEM TEST PERSONNEL TO DETECT AND ISOLATE (AT THE FUNCTIONAL LEVEL) CONTROLLER, DISC OR DISC DRIVE FAILURES.

II. MINI-OPERATING INSTRUCTIONS

1. COLD LOAD DIAG FILE # FROM NON-CPU COLD LOAD TAPE
2. D99 01 CARTRIDGE DISC (30129A) DIAGNOSTIC CONFIGURATION (D419A.XX.Y)
Q99 02 DECIMAL DEVICE NUMBER? (DRT #)
3. Q99 03 MAXIMUM ERROR PRINT COUNT?
4. P99 55 UPDATE SWITCH REGISTER
(SET SWITCH OPTIONS FOLLOWED BY CR TO START DIAGNOSTIC)
5. Q99 61 RESTART?(YES/NO)
6. Q99 06 PRESENT SECTION REGISTER: \$177000 DO YOU WISH TO CHANGE?(YS/NO)
7. P99 05 RESET BOTH PROT. DATA SWITCHES, SET SWITCH FORMAT AND UNIT TO 0
8. Q99 42 WISH TO EXECUTE INTERACTIVE PORTION IN SECTION 1 (YES/NO)

BIT SWITCH REGISTER OPTIONS:

- | | |
|----|---|
| 0 | SELECT EXTERNAL REGISTER |
| 1 | SET TO CHANGE SECTION REGISTER |
| 2 | SKIP CLEAR IN ENDSTEP WHEN DISC DRIVE ERROR (STATUS2) APPEARS |
| 3 | NOT USED |
| 4 | NOT USED |
| 5 | NOT USED |
| 6 | NOT USED |
| 7 | D,E-CLASS MESSAGES TO LINE PRINTER |
| 8 | NOT USED |
| 9 | SUPPRESS E-CLASS MESSAGES |
| 10 | SUPPRESS D-CLASS MESSAGES |
| 11 | LOOP ON CURRENT STEP |
| 12 | PAUSE ON ERROR |
| 13 | PAUSE AT END OF CURRENT STEP |
| 14 | PAUSE AFTER CURRENT SECTION |
| 15 | PAUSE AFTER PASS THROUGH DIAGNOSTIC |

BIT SECTION REGISTER OPTIONS:

- | | |
|----|--|
| 0 | EXECUTE SECTION 0 (VERIFYING OF BASIC FUNCTIONS) |
| 1 | EXECUTE SECTION 1 (VERIFYING ALL FUNCTIONS) |
| 2 | EXECUTE SECTION 2 (WRITE/READ TO ALL OR LIMITED ADDRESSES) |
| 3 | EXECUTE SECTION 3 (RANDOM WRITE/READ WITH RANDOM BLOCK SIZE) |
| 4 | EXECUTE SECTION 4 (RANDOM ONE BLOCK READ UNIQUE DATAS) |
| 5 | EXECUTE SECTION 5 (MULTI-UNIT TEST SAME AS IN SECTION 4) |
| 6 | EXECUTE SECTION 6 (INTERFACE TEST IN TEST MODE) |
| 7 | CHANGE UNIT TABLE |
| 8 | CHANGE CYLINDER TABLE |
| 9 | CHANGE HEAD TABLE |
| 10 | CHANGE PATTERN DATA TABLE |
| 11 | LOOP ON CURRENT SECTION |
| 12 | NOT USED |
| 13 | SHORTEN TEST SOMEWHAT |
| 14 | SHORTEN TEST SEVERELY |
| 15 | RESTRICT CYLINDERS ARE NOT USED |

III. R E Q U I R E M E N T S

A. H A R D W A R E

1. MINIMUM SYSTEM HP 3000 SERIES II CPU
2. HP 30129A CARTRIDGE DISC (7905A)

B. S O F T W A R E

1. NON CPU COLD LOAD TAPE # 30000-10017/11017.

IV. DETAILED OPERATING INSTRUCTION

A. OPERATING INSTRUCTIONS

1. LOADING

TO LOAD THE DIAGNOSTIC REFER TO LOADING PROCEDURE IN THE SDUP30 MOD 03000-90125

2. RUNNING - TEST SEQUENCE

A. UPON COMPLETION OF A SUCCESSFUL LOAD, THE FOLLOWING MESSAGES ARE PRINTED AT THE CONTROL TERMINAL:

D99 01 CARTRIDGE DISC (30129A) DIAGNOSTIC
CONFIGURATION (D419A.XX.Y)

Q99 02 DECIMAL DEVICE NUMBER?

B. THE TEST OPERATOR NOW INPUTS THE DECIMAL NUMBER OF THE CONTROLLER TO BE TESTED AND TERMINATES BY A CARRIAGE RETURN. THE FOLLOWING MESSAGE IS PRINTED:

Q99 03 MAXIMUM ERROR PRINT COUNT?

C. THE TEST OPERATOR NOW INPUTS THE DECIMAL NUMBER OF THE FULL LISTED ERRORS AND TERMINATES BY A CARRIAGE RETURN. THE FOLLOWING MESSAGE IS:

P99 55 UPDATE SWITCH REGISTER

D. SWITCH REGISTER IS INITIALIZED=8100000 AND THE TEST OPERATOR CAN MANUALLY CHANGE SWITCH REGISTER AND THEN TERMINATES BY CARRIAGE RETURN. THE FOLLOWING REQUEST MESSAGE IS PRINTED:

P99 05 RESET BOTH PROT.DATA SWITCHES,SET
SWITCH FORMAT AND SET UNIT TO 0

E. THE TEST OPERATOR SHOULD SET/RESET ALL FOUR SWITCHES TO PROPER POSITIONS UPON REQUEST OR CHECK THEM TO BE SURE AND TERMINATES BY CARRIAGE RETURN. FOLLOWING QUESTION IS PRINTED.

Q99 42 WISH TO EXECUTE INTERACTIVE PORTION
IN SECTION 1 (YES/NO)

F. THE TEST OPERATOR ANSWERS YES OR NO WITH CARRIAGE RETURN. THE INTERACTIVE SEGMENT (STEP 6 TO 20) INCLUDES FORMAT DISC PROCESS OPTIONALLY EXECUTED IN STEP 18.

2. RUNNING - TEST SEQUENCE
(CONT.)

G. THE PROGRAM TITLE IS PRINTED AND THE PROGRAM IS INITIALIZED

D99 07 CARTRIDGE DISC (30129) DIAGNOSTIC
OFF-LINE (D419A,XX,Y)

H. IF A CARTRIDGE DISC NEEDS TO BE FORMATTED, THE TEST OPERATOR
USES SECTION 1 (WITH SWITCH 15 SET) AND ANSWERS YES TO
EXECUTE INTERACTIVE SEGMENT. THE QUESTION COMES AFTER EACH
PASS.

NOTE: ANY NEW DISC PACK MUST BE FORMATTED BEFORE TEST CAN BE RUN.
SLEUTH CAN DO IT.

I. FOLLOWING EACH SECTION, SWITCH REGISTER BITS ARE CHECKED IN
THE FOLLOWING ORDER: 2, 14 AND 1. FOLLOWING EACH STEP, SWITCH
REGISTER BITS 13, 6 AND 11 ARE CHECKED.

J. THE PROGRAM EXECUTES SECTIONS 1 THROUGH 6 ACCORDING TO THE
PROGRAM OPTION BITS SELECTED. IF MULTIPLE DRIVE UNITS HAVE
BEEN SELECTED (SEE PROGRAM OPTION BITS), SECTIONS 1 TO 4 AND
6 IS EXECUTED FOR EACH DRIVE UNIT; SECTION 5 IS EXECUTED IF
AT LEAST TWO UNITS ARE USED.

K. FOLLOWING SECTION 6, THE PASS NUMBER IS INCREMENTED. THE PASS
NUMBER IS REPORTED ON THE CONTROL TERMINAL OR LINE PRINTER
DEPENDING ON BIT 7 SET OF SWITCH REGISTER (OUTPUT TO LP) BY
MESSAGES 56, 57 AND 58, DEPENDING ON BITS 14 AND 15 OF THE
SWITCH REGISTER.

3. RUNNING - CHANGE SEQUENCE (SWITCHES 1 AND 2 SET)

A. ANYTIME IF SWITCHES 1 AND 2 SET, THE FOLLOWING QUESTION IS
PRINTED:

QXX 61 RESTARTED?(YES/NO)

B. THE TEST OPERATOR CAN RESTART THE PROGRAM BY 'YES' OR
CONTINUE IT BY 'NO' AND TERMINATES BY CARRIAGE RETURN.

D. THE TEST OPERATOR CAN GET SEVERAL QUESTIONS ABOUT CHANGING
OF THE UNIT, CYLINDER, HEAD OR DATA PATTERN TABLES DEPENDING
ON BIT SETTING OF THE SECTION REGISTER (BITS 7 TO 10).

E. THE LAST PRINTED MESSAGE UNLESS SWITCH 1 IS STILL SET IS:

PXX 51 RESET SWITCH 1 (CHANGE)

B. O P T I O N S

THE INTERNAL SWITCH REGISTER IS USED TO SPECIFY PROGRAM OPTIONS DURING EXECUTION OF THE TEST. THE INTERNAL SWITCH REGISTER IS LOADED FROM THE EXTERNAL SWITCH REGISTER WHENEVER SWITCH ZERO OF THE EXTERNAL SWITCH REGISTER IS SET. THIS MEANS THAT THE EXTERNAL REGISTER IS FREE FOR OTHER USES DURING THE TEST, E.G., BREAKPOINT HALTS.

ANOTHER SWITCH SETTING THAT REQUIRES EXPLANATION IS SWITCH 1. IF SWITCHES 0 AND 1 ARE SET, THE PROGRAM ASKS THE TEST OPERATOR FOR THE NEXT PROCESS (RESTART OR CONTINUE) IF THE ANSWER IS 'NO' (CONTINUE) THE PROGRAM PRINTS THE EXISTING SECTION REGISTER ON THE CONTROL TERMINAL AND ASKS TEST OPERATOR TO ALTER ITS VALUE. THEN IF ANY ALTER SUCH AS A CHANGE OF UNIT TABLE, CYLINDER TABLE, HEAD OR DATA PATTERN TABLE ARE REQUIRED, THE PROGRAM INITIATES A DIALOG WITH TEST OPERATOR (MESSAGES 9 TO 16 AND 21 TO 22). THE OBJECT OF THIS DIALOGUE IS TO INFORM TEST OPERATOR ABOUT CURRENT AND ALTER SETTINGS. TABLE 2 LISTS SWITCH REGISTER SETTING AND TABLE 3 LISTS THE SECTION REGISTER SETTING.

SET SWITCH 2 AVOIDS THE EXECUTION OF CLEAR COMMAND AT THE END OF EACH TEST STEP WHEN 'DISC DRIVE ERROR' (STATUS 2 BITS 3 TO 7 =%23) APPEARS.

SET SWITCH 12 (PAUSE ON ERROR) PROVIDES A LISTING OF ALL EXISTING INFORMATIONS (ERROR, NON-ERROR AND EXTRA MESSAGES) WHEN AN ERROR APPEARS.

R E C O M M E N D A T I O N S

SECTION 0 CREATES SEVERAL CONTROL TABLES SUCH AS UNIT TABLE, CYLINDER TABLE, RECALIBRATES ALL AVAILABLE UNITS AND INITIALIZES ALL VARIABLES AND PARAMETERS. BECAUSE OF THIS SECTION 0 SHOULD NOT BE OMITTED IN EXECUTION. THE EXECUTION TAKES LESS THEN 10 SECONDS.

TABLE 2 SWITCH REGISTER SETTING

BIT	FUNCTION IF SET
0	SELECT EXTERNAL REGISTER
1	SET TO CHANGE SECTION REGISTER
2	SKIP CLEAR IN ENDSTEP WHEN DISC DRIVE ERROR (STATUS2) APPEARS
3	NOT USED
4	NOT USED
5	NOT USED
6	NOT USED
7	D,E-CLASS MESSAGES TO LINE PRINTER
8	NOT USED
9	SUPPRESS E-CLASS MESSAGES
10	SUPPRESS D-CLASS MESSAGES
11	LOOP ON CURRENT STEP
12	PAUSE ON ERROR
13	PAUSE AT END OF CURRENT STEP
14	PAUSE AFTER CURRENT SECTION
15	PAUSE AFTER PASS THROUGH DIAGNOSTIC

TABLE 3 SECTION REGISTER SETTING

BIT	FUNCTION IF SET
0	EXECUTE SECTION 0 (VERIFYING OF BASIC FUNCTIONS)
1	EXECUTE SECTION 1 (VERIFYING ALL FUNCTIONS)
2	EXECUTE SECTION 2 (WRITE/READ TO ALL OR LIMITED ADDRESSES)
3	EXECUTE SECTION 3 (RANDOM WRITE/READ WITH RANDOM BLOCK SIZE)
4	EXECUTE SECTION 4 (RANDOM ONE BLOCK READ UNIQUE DATAS)
5	EXECUTE SECTION 5 (MULTI-UNIT TEST SAME AS IN SECTION 4)
6	EXECUTE SECTION 6 (INTERFACE TEST IN TEST MODE)
7	CHANGE UNIT TABLE
8	CHANGE CYLINDER TABLE
9	CHANGE HEAD TABLE
10	CHANGE PATTERN DATA TABLE
11	LOOP ON CURRENT SECTION
12	NOT USED
13	SHORTEN TEST SOMEWHAT
14	SHORTEN TEST SEVERELY
15	RESTRICT CYLINDERS ARE NOT USED

C. H A L T A N D M E S S A G E T A B L E S

THE GENERAL FORMAT OF A DIAGNOSTIC MESSAGE TO THE OPERATOR IS THE FOLLOWING: A LETTER PREFIX; DECIMAL STEP NUMBER; DECIMAL MESSAGE NUMBER; TEXT. TABLE 4 LISTS MESSAGES.

THE LETTER PREFIX IDENTIFIES THE CLASS OF THE MESSAGE. THERE ARE FIVE MESSAGE CLASSES:

MESSAGE CLASS	CONTENT
D	DATA INFORMATION WHICH REQUIRES NO OPERATOR RESPONSE.
E	ERROR MESSAGE WHICH INDICATES THAT DISC FILE FAILED SOME PORTION OF THE DIAGNOSTIC TEST.
P	DIAGNOSTIC PROGRAM HAS PAUSED, WAITING FOR OPERATOR ACTION. ENTER CARRIAGE RETURN AT TERMINAL TO CONTINUE TEST. IF MESSAGE HAVE BEEN SUPRESSED, PRESS RUN ON SOFTWARE CONTROL PANEL TO CONTINUE.
Q	INPUT FROM OPERATOR AT CONTROL TERMINAL IS REQUIRED. CARRIAGE RETURN FOLLOWING INPUT CONTINUES TEST.
X	EXTRA D-CLASS MESSAGE ARE LISTED.

EXAMPLE:

EXAMPLE OF PRINTOUT FROM STEP 70 WITH READING ERROR AND PROGRAM AFTER ERROR ON UNIT ZERO:

```
D70 46 END OF STEP 70
E01 24 STATUS IS 0 000 111 100 000 000
      SHOULD BE 0 01D DDD 000 000 000
E70 40 DATA WORD 0006 IS 155515 SHOULD BE 166666
P01 25 CYL 0378 HEAD 02 SECTOR 32 WORD COUNT 2048 UNIT 00
```

NOTE: STATUS CHECKING IS PROVIDED BY COMPARING THE HARDWARE STATUS BIT BY BIT AGAINST THE EXPECTED STATUS. ANY BIT OF THE EXPECTED STATUS MAY BE IN A DON'T CARE STATE (EXPRESSED AS D).

TABLE 4. MESSAGES

CLASS	MESSAGE NUMBER	MESSAGE	COMMENTS
D	01	CARTRIDGE DISC (30129A) DIAGNOSTIC CONFIGURATION (D419A.UU.F)	CONFIGURATION SECTION PREAMBLE.
Q	02	DECIMAL DEVICE NUMBER?	INPUT DECIMAL DEVICE NUMBER.
Q	03	MAXIMUM ERROR PRINT COUNT?	INPUT DECIMAL NUMBER.
D	04	CL	CURRENT OPERATION IS CLEAR CONTROLLER.
P	05	RESET BOTH PROT. DATA SWITCHES, SET SWITCH FORMAT AND SET UNIT TO 0	MAKE SURE.
D	06	PRESENT SECTION REGISTER: %XXXXXX DO YOU WISH TO CHANGE?(YES/NO)	ENTER YES OR NO.
D	07	CARTRIDGE DISC (30129A) DIAGNOSTIC OFF-LINE (D419A.UU.F)	SECTION ZERO PREAMBLE.
D	08	UNIT NUMBER TABLE X DRIVE(S) A,B...	X=NUMBER OF DRIVES. A,B=DRIVE NUMBERS.
Q	09	WISH TO ALTER TABLE?	ANSWER Y OR N.
Q	10	ENTER UNIT NUMBERS SEPARATED BY COMMAS	ALL ON ONE LINE.
D	11	CYLINDER TABLE XXXX,XXXX,XXXX,XXXX, XXXX,XXXX,XXXX,XXXX, XXXX,XXXX,XXXX,XXXX	CONTENTS OF CYLINDER TABLE.
Q	12	ENTER CYLINDERS SEPARATED BY COMMAS	ALL ON ONE LINE.
D	13	PATTERN TABLE XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX XXXXXX	CONTENTS OF PATTERN TABLE. (XXXXXX=PATTERN IN OCTAL).

TABLE 4. MESSAGES
(CONT.)

CLASS	MESSAGE NUMBER	MESSAGE	COMMENTS
Q	14	ENTER PATTERNS SEPARATED BY COMMAS	ALL ON ONE LINE.
Q	15	TYPE U FOR HEADS 0,1 L FOR 1 AND A FOR ALTERNATELY 0,1 THEN 2	SELECT HEADS. (U=DISC PACK, L=FIXED PLATTER, A=ALL).
Q	16	WISH TO SELECT HEADS?	ANSWER YES OR NO.
P	17	PAUSE ON ERROR	PUSH 'CR' TO CONTINUE.
P	18	NOT USED	
P	19	SET(RESET) UPPER DATA PROTECT SWITCH	SWITCH ON THE FRONT PANEL.
P	20	SET(RESET) LOWER DATA PROTECT SWITCH	SWITCH ON THE FRONT PANEL.
D	21	SPARE TRACK CYL:XXXX HEAD:YY UNIT:ZZ	WARNING TO OPER. FOR TO CHANGE CYL.TABLE (OVERRUNNING S-FLAG)
D	22	DEFECTIVE TRACK CYL:XXXX HEAD:YY UNIT:ZZ	WARNING TO OPER. FOR TO CHANGE CYL.TABLE (OVERRUNNING D-FLAG)
E	23	SIO BUSY (>)	CONDITION CODE=CCG ON SIO
E	24	STATUS(TIO,SENSE,END) IS: X XXX XXX XXX XXX XXX SHOULD BE: Y YYY YYY YYY YYY YYY	HARDWARE STATUS DOES NOT EQUAL EXPECTED STATUS. VALUES ARE IN TERNARY (D=DON'T CARE).
D OR P	25	CYL XXX HEAD XX SECTOR XX WORD COUNT XXXX UNIT XX	CONTENTS OF CURRENT SOFTWARE VARIABLES.
P	26	SET SWITCH FORMAT	SWITCH ON THE FRONT PANEL.
P	27	RESET SWITCH FORMAT	SWITCH ON THE FRONT PANEL.
D	28	INPUT ERROR	BAD INPUT FROM OPERATOR I/O DEVICE.
E	29	XXXX WORDS TRANSFERRED YYYY EXPECTED	TRANSFER DID NOT COMPLETE.

TABLE 4. MESSAGES
(CONT.)

CLASS	MESSAGE NUMBER	MESSAGE	COMMENTS
E	30	SPARE AND DEFECTIVE TRACKS ALSO? (YES/NO)	TYPE: YES (TO FORMAT ALL TRACKS) NO (TO SKIP SPARE/DEF. TRACKS).
E	31	NO RESPONSE (<) TO SIO	CONDITION CODE=CCL ON SIO.
	32	NOT USED	
D	33	CB	CURR.OP.VERIF.PREV.READ DATA.
E	34	STATUS1 X XXX XXX XXX XXX XXX STATUS2 X XXX XXX XXX XXX XXX SHLD BE Y YYY YYY YYY YYY YYY SHLD BE Y YYY YYY YYY YYY YYY	STATUS 1 OR STATUS 2 OR BOTH DO NOT EQUAL EXPECTED STATUS (STATUSES). VALUES ARE IN TERNARY (D=DON'T CARE).
E	35	NO RESPONSE (<) TO CIO	CONDITION CODE=CCL ON CIO.
E	36	ILLEGAL RESPONSE TO CIO	COND.CODE=CC6 OR NONE ON CIO.
E(X)	37	SIO PROGRAM BEFORE - AFTER EXECUTION	TITLE OF SIO LISTING.
E(X)	38	NN XXXXXX YYYYYY	NN-SIO POIT., XXXXXX-BEFORE, YYYYYY-AFTER EXEC. OF IOCW/IOAW.
(X)	39	EXIT NN XXXXXX YYYYYY ----> SHOULD BE (EE)	INDICATES ACTUAL EXIT. MESSAGE FORMAT IS THE SAME AS PREVIOUS(38). EE IS EXPECTED EXIT POINTER FROM SIO.
E	40	DATA WORD XXXX IS YYYYYY SHOULD BE ZZZZZZ	THE DATA RETURNED ON A READ DID NOT MATCH THE EXPECTED DATA, ONLY GIVEN FOR 1ST ERROR, AND WHEN VERIFYING ADDRESS.
E	41	BUFFER CHECKSUM XXXXXX CYL XXXXXX (YYYY) HD/S XXXXXX (H=YY S=YY)	THE CHECKSUM SHOULD BE ZERO AND THE ADDRESS IN PARENTHESES (DECIMAL) SHOULD MATCH THE ONE TYPED OUT IN THE NEXT MESSAGE 25. (XXXXXX=VALUE IN OCTAL). EITHER THE WRONG SECTOR WAS READ OR A DATA ERROR OCCURRED.

TABLE 4. MESSAGES
(CONT.)

CLASS	MESSAGE NUMBER	MESSAGE	COMMENTS
<p>NOTE: EACH SECTOR IS CHECKSUMMED SEPARATELY. THE ENTIRE SECTOR SUMS TO ZERO. THIS SIX-DIGIT OCTAL SUM IS REPORTED AS THE BUFFER CHECKSUM. THE FIRST TWO WORDS SUM TO THE CYLINDER NUMBER AND THE SIX-DIGIT OCTAL SUM IS REPORTED AS THE CYL. THE FOUR-DIGIT DECIMAL EQUIVALENT IS SHOWN IN PARENTHESIS. THIS EQUIVALENT MAY BE MEANINGLESS IF THE SUM IS AN INVALID CYLINDER NUMBER.</p> <p>WORDS TWO AND THREE SUM TO THE HEAD/SECTOR NUMBER; THE HEAD IS IN THE LEFT HALF OF THE WORD AND THE SECTOR IS IN THE RIGHT HALF. THE SIX-DIGIT OCTAL SUM IS REPORTED AS THE HD/S. THE TWO-DIGIT DECIMAL EQUIVALENT MAY BE MEANINGLESS FOR AN INVALID HEAD OR SECTOR.</p>			
Q	42	WISH TO EXECUTE INTERACTIVE PORTION IN SECTION 1 (YES/NO)	STEP 6 TO 20 REQUIRING THE MANIPULATION WITH THE CONTROL SWITCHES ON THE FRONT PANEL. ANSWER YES OR NO.
E	43	NO RESPONSE (<) TO TIO	CONDITION CODE=CCL ON TIO.
E	44	ILLEGAL RESPONSE TO TIO	COND.CODE=CCG OR NONE ON TIO.
P	45	END OF SECTION X	PAUSE AFTER SECTION X.
P	46	END OF STEP	PAUSE AFTER STEP.
P	47	END OF PASS XXXXXX	PAUSE AFTER XXXXXXTH PASS.
E	48	MISSING INTERRUPT	NO INTERRUPT FOLLOWING CURRENT OPERATION.
E	49	LATE INTERRUPT	MISSING INTERRUPT OCCURRED DURING REPORT OF THIS ERROR.
E	50	NO RESIDUE RETURNED	UNABLE TO CHECK WORD COUNT.
P	51	RESET SWITCH 1(CHANGE)	PROGRAM WILL CONTINUE WHEN CLEAR.
D	52	READ WITH OFFSET COUNTER A XXX (D XXX)	A-CLOCK IN ADVANCE ABOUT XXX. D-CLOCK DELAYED ABOUT XXX.
D	53	INCR.(DECR) TO NEXT CYL (SURF) DOES NOT WORK	WRONG FILE MASK CONTROL.

TABLE 4. MESSAGES
(CONT.)

CLASS	MESSAGE NUMBER	MESSAGE	COMMENTS
E	54	EOC WAS IGNORED BY CYL (SURF) MODE	WRONG FILE MASK CONTROL.
P	55	UPDATE SWITCH REGISTER	PUSH 'CR' AFTER SETTING
D	56	LONG PASS XXXX	XXXX=NUMBER OF CYCLES COMPLETED. LONG IMPLIES BITS 13, 14 AND 15 OF SECTION REGISTER WERE CLEAR FOR ENTIRE PASS.
D	57	SHORT PASS XXXX	XXXX=NUMBER OF CYCLES COMPLETED.
P	58	SET RUN SWITCH AND WAIT UNTIL READY	SWITCH ON THE FRONT PANEL.
E	59	ILLEGAL RESPONSE TO SIO	NO CONDITION CODE.
P	60	SET UNIT SWITCH TO X	SWITCH ON THE FRONT PANEL.
Q	61	RESTART? (YES/NO)	TYPE YES OR NO.
E	62	NO RESPONSE (<) TO SIN	CONDITION CODE=CCL TO SIN.
E	63	ILLEGAL RESPONSE TO SIN	COND.CODE=CCG OR NONE TO SIN
E	64	WRITE/READ/INIT. NO EXECUTED AT HEAD XX WHEN UPPER/LOWER PROTECT SWITCH SET/NO SET	CHECK SWITCH SETTING ON THE FRONT PANEL.
E	65	MISSING ATTENTION STATUS	ATTENTION STATUS (%37) DID NOT FOLLOW A SEEK OR RECALIBRATE.
E	66	UNIT(S) NOT READY OR BUSY	PAUSES FOR TO CHECK UNIT TABLE 'CR' CONTINUES EXECUTION.
E	67	CONDITIONAL JUMP WAS NOT EXECUTED	CONDITIONAL JUMP WAS IGNORED DURING EXECUTION.
Q	68	DO YOU WISH FORMAT DISC? (YES/NO)	PART OF INTERACTIVE SEGMENT ANSWER YES OR NO.

TABLE 4. MESSAGES
(CONT.)

CLASS	MESSAGE NUMBER	MESSAGE	COMMENTS
E	69	SPARE (PROTECT/DEFECT) TRACK (YES/NO)	S/P/D BIT OF HEAD WORD WAS ANSWER YES OR NO.
D	70	CR	CURRENT OPERATION IS COLD LOAD READ.
D	71	RC	CURRENT OPERATION IS RECALIBRATION
D	72	SK	CURRENT OPERATION IS SEEK
D	73	RS	CURRENT OPERATION IS REQUEST SECTOR ADDRESS
D	74	RA	CURRENT OPERATION IS REQUEST SECTOR ADDRESS
D	75	RD	CURRENT ADDRESS IS READ DATA
D	76	RF	CURRENT OPERATION IS READ FULL SECTOR
D	77	VF	CURRENT OPERATION IS VERIFY
D	78	WD	CURRENT OPERATION IS WRITE DATA
D	79	WF	CURRENT OPERATION IS WRITE FULL SECTOR
D	80	CL	CURRENT OPERATION IS CLEAR
D	81	ID	CURRENT OPERATION IS INITIALIZE
D	82	AR	CURRENT OPERATION IS ADDRESS RECORD
D	83	SY	CURRENT OPERATION IS REQUEST SYNDROME
D	84	RO	CURRENT OPERATION IS READ WITH OFFSET

TABLE 4. MESSAGES
(CONT.)

CLASS	MESSAGE NUMBER	MESSAGE	COMMENTS
D	85	SM	CURRENT OPERATION IS SET FILE MASK
D	86	ES	CURRENT SIO PROGRAM GETS STATUS BY END COMMAND
D	87	IS	CURRENT SIO PROGRAM GETS STATUS BY INTERRUPT
D	88	RW	CURRENT OPERATION IS READ WITHOUT VERIFICATION
D	89	LT	CURRENT OPERATION IS LOAD TIO REGISTER
D	90	DA	CURRENT OPERATION IS REQUEST DISC ADDRESS
D	91	NO	CURRENT OPERATION IS NO-OPERATION AND CONTROL GOES BACK TO POOL
D	92	MC	CURRENT OPERATION IS MASTER CLEAR
D	93	IL	CURRENT OPERATION IS ILLEGAL OP-CODE
D	94	WU	CURRENT OPERATION IS WAKE-UP
D	95	READ DATA AT (AAAA) IS XXXXXX SHOULD BE YYYYYY	AAAA IS POINTER IN DATA ARRAY XXXXXX IS ITS CONTENTS
D	96	OBTAINED SYNDROME	SEVEN OBTAINED WORDS MEANS: STATUS1 (WITHOUT UNIT NO.), CYLINDER ADDRESS, HEAD/SECTOR ADDRESS, DISPLACEMENT AND THREE PATTERNS.
D	97	FULL SECTOR BEFORE CORRECTION	LISTED ONLY WHEN EXTRA D-MESSAGE REQUIRED.
	98	NOT USED	

TABLE 4. MESSAGES
(CONT.)

CLASS	MESSAGE NUMBER	MESSAGE	COMMENTS
E	99	UNEXPECTED INTERRUPT FROM DRT %CCC	USED IF ANY UNEXPECTED INTERRUPT COMING FROM ANY DEVICE BUT CARTRIDGE DISC APPEARED.
E/D	00		SPACE

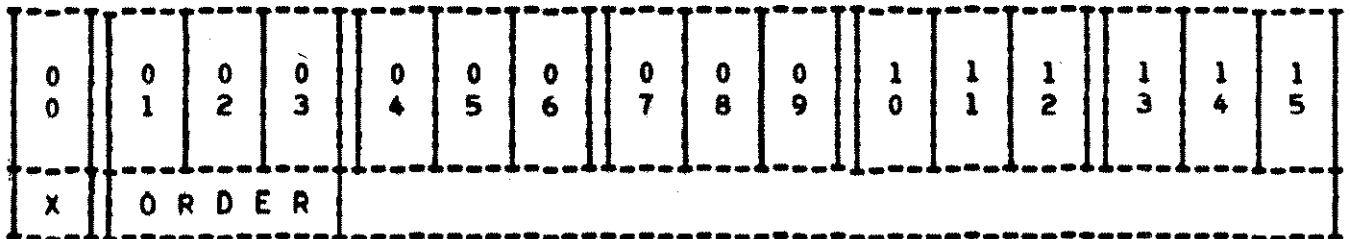
D. PRE-CONFIGURATION OPTIONS

THE DIAGNOSTIC PROGRAM HAS BEEN PRECONFIGURED IN THE BEST LOAD AND GO CONFIGURATION USING THE OPTIONS AVAILABLE FROM THE SWITCH AND SECTION REGISTER (CHAPTER III B). THE SWITCH REGISTER=%100000 AND SECTION REGISTER=%177000 MEANS THE RUN OF THE LONG CYCLE WITH ALL CYLINDERS. THE EXECUTION OF ONE CYCLE (ALL 7 SECTIONS) WITHOUT THE INTERACTIVE SEGMENT IN SECTION 1 TAKES APROX. 1 HOUR.

THE PROGRAMMED PRE-CONFIGURATION (DRT OF CONSOLE AND LINE PRINTER) CAN BE ALTERED WHEN THE DIAGNOSTIC COLD LOAD TAPE IS BEING CREATED UNDER SDUP30 (SYSTEM DIAGNOSTIC UTILITY PROGRAM FOR HP 3000/30).

E. CONTROL AND STATUS WORD FORMATS

1. IOCW - FORMAT



	0	0	0		0	JUMP
	0	0	0	*	0	CONDITIONAL JUMP
	0	0	1		1	RETURN RESIDUE
	0	1	0		2	INTERRUPT
	0	1	1		3	END
	0	1	1	*	3	END WITH INTERRUPT
	1	0	0		4	CONTROL
	1	0	1		5	SENSE
	1	1	0		6	WRITE
	1	1	1		7	READ



DATA CHAIN

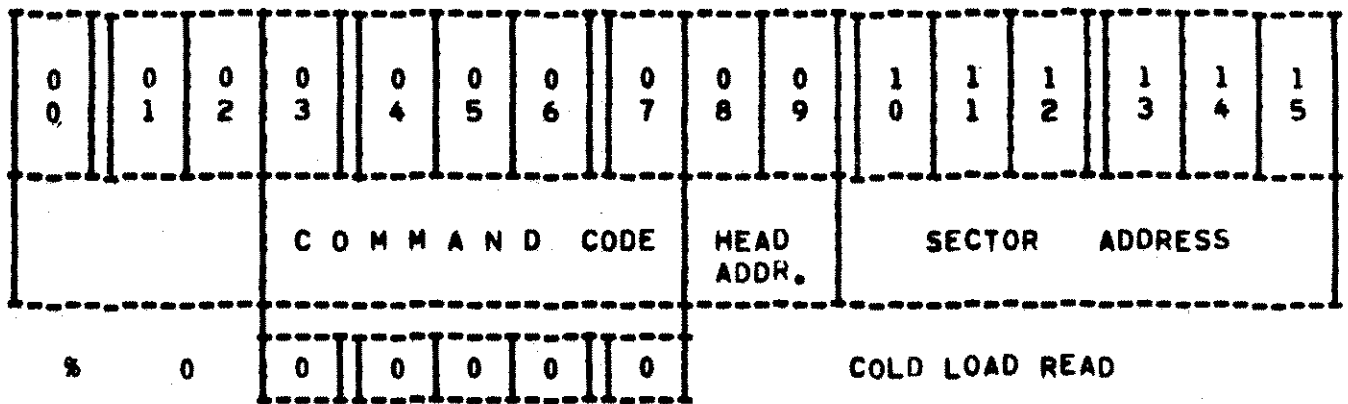
*) MEANS BIT 4 SET.

2. I O A W - FORMAT (GENERAL COMMANDS)

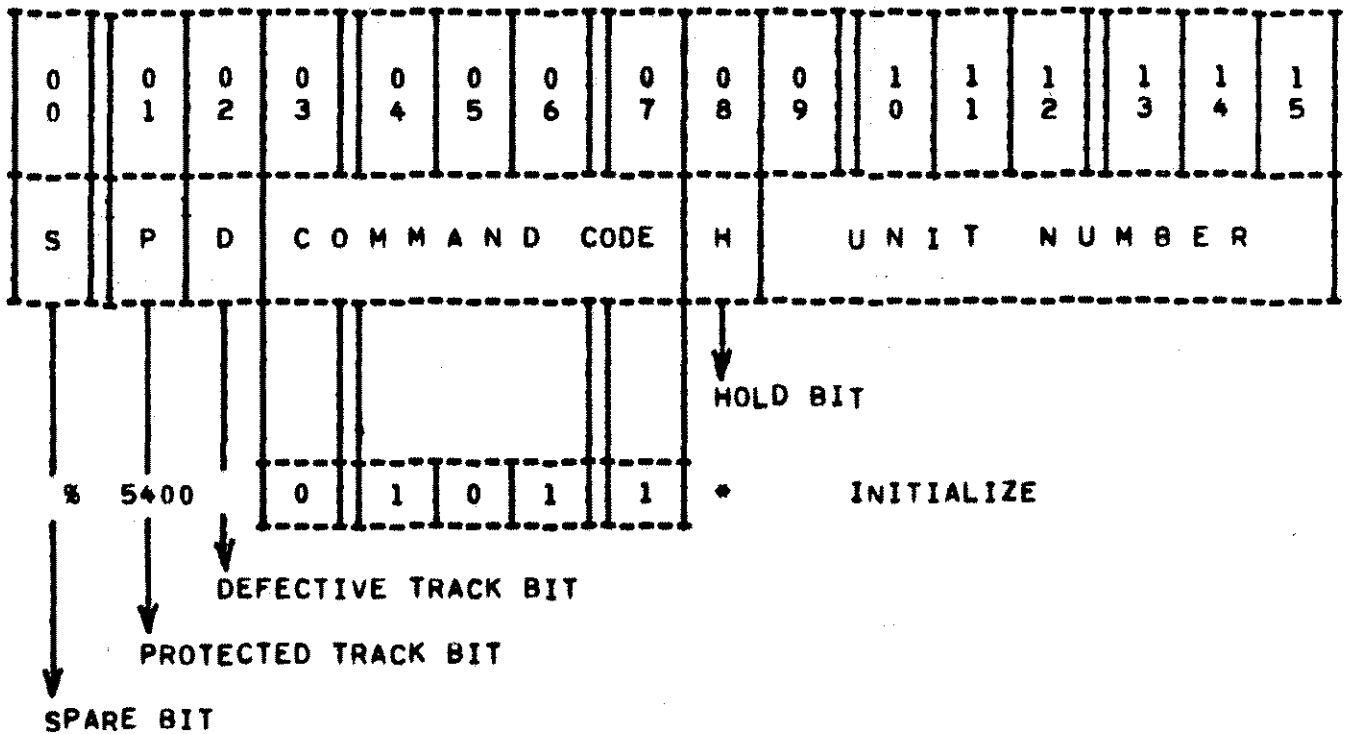
	0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
	0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
	C O M M A N D C O D E									H	U N I T N U M B E R					
% 400	0	0	0	0	0	0	0	0	1	*	R E C A L I B R A T E					
% 1000	0	0	0	0	1	0	0	0	0	*	S E E K					
% 1400	0	0	0	0	1	1	0	0	0		R E Q U E S T S T A T U S					
% 2000	0	0	1	0	0	0	0	0	0		R E Q U E S T S E C T O R A D D R E S S					
% 2400	0	0	1	0	0	1	0	0	1	*	R E A D D A T A					
% 3000	0	0	1	1	0	0	0	0	0	*	R E A D F U L L S E C T O R					
% 3400	0	0	1	1	1	0	0	0	1	*	V E R I F Y					
% 4000	0	1	0	0	0	0	0	0	0	*	W R I T E D A T A					
% 4400	0	1	0	0	0	1	0	0	1	*	W R I T E F U L L S E C T O R					
% 5000	0	1	0	1	0	0	0	0	0		C L E A R					
% 6000	0	1	1	0	0	0	0	0	0		A D D R E S S R E C O R D					
% 6400	0	1	1	0	0	1	0	0	1		R E Q U E S T S Y N D R O M E					
% 7000	0	1	1	1	0	0	0	0	0	*	R E A D W I T H O F F S E T					
% 11000	1	0	0	1	0	0	0	0	0	*	R E A D W I T H O U T V E R I F Y					
% 11400	1	0	0	1	1	0	0	0	1		L O A D T I O R E G I S T E R					
% 12000	1	0	1	0	0	0	0	0	0		R E Q U E S T D I S C A D D R E S S					
% 12400	1	0	1	0	0	1	0	0	1		E N D (N O - O P E R A T I O N)					
% 13000	1	0	1	1	0	0	0	0	0		W A K E - U P					

*) MEANS THE COMMAND USES HOLD BIT (BIT 8)

3. I O A W - FORMAT (COLD LOAD READ)

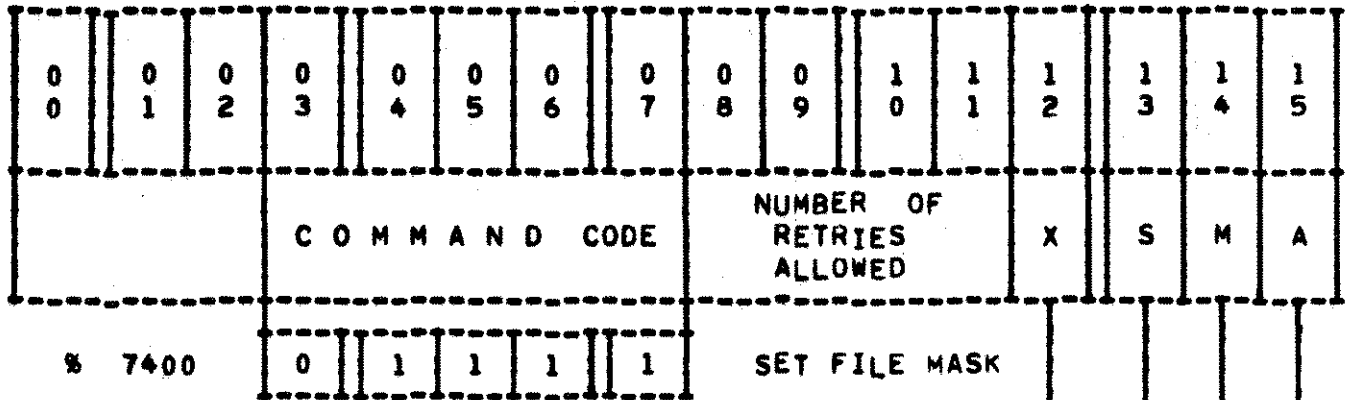


4. I O A W - FORMAT (INITIALIZE)



*) MEANS THE COMMAND USES HOLD BIT (BIT 8)

5. I O A W - FORMAT (SET FILE MASK)



- BIT 12 - SET MEANS DECREMENTAL SEEK
 - RESET MEANS INCREMENTAL SEEK
 - IF BIT 15 RESET, BIT 12 IS IGNORED.
- BIT 13 - SET MEANS ALLOW AUTOMATIC SEEK TO SPARE TRACK.
- BIT 14 - SET MEANS INCR./DECR IN CYLINDER MODE
 - RESET MEANS THE SAME IN SURFACE MODE
- BIT 15 - SET MEANS TO ALLOW OF AUTOMATIC SEEK UPON BIT 12.
 - RESET MEANS BIT 12 IS IGNORED.

6. STATUS WORD - FORMAT
(GOTTEN BY TIO, END OR SENSE)

0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
S	T	I	TERMINATION STATUS					UNIT NUMBER							
0	0	0													
			0	0	0	0	0			0	NORMAL				
			0	0	0	0	1			400	ILLEGAL COMMAND				
			0	0	1	1	1			3400	CYLINDER COMPARE ERROR				
			0	1	0	0	0			4000	UNCORRECTABLE ERROR				
			0	1	0	0	1			4400	HEAD/SECTOR COMPARE ERROR				
			0	1	0	1	0			5000	SIO PROGRAM ERROR				
			0	1	1	0	0			6000	EOC (END OF CYLINDER)				
			0	1	1	1	0			7000	OVERRUN				
			0	1	1	1	1			7400	POSSIBLE CORRECTABLE ERROR				
			1	0	0	0	0			10000	ILLEG. ACCES TO SPARE TRACK				
			1	0	0	0	1			10400	DEFECTIVE TRACK				
			1	1	0	0	0			11000	HEAD MOVING DURING OPERAT.				
			1	0	0	1	1			11400	DISC DRIVE ERROR				
			1	1	1	0	0			13000	ATTEMPT TO PROT./DEF. TRACK				
			1	0	1	1	1			13400	DRIVE UNAVAILABLE				
			1	1	1	1	1			17400	DRIVE ATTENTION				

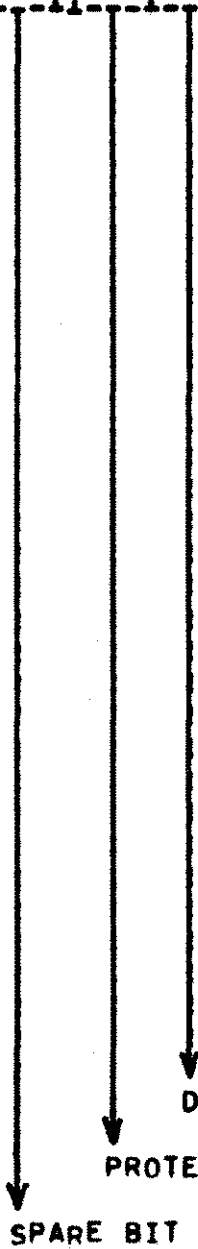
↓ SIO OK
 ↓ TEST MODE
 ↓ INTERRUPT REQUEST

6. STATUS 1 WORD - FORMAT
(GOTTEN BY REQUEST STATUS)

0	0	0	0	0	0	0	0	0	0	1	1	1	1	1	1
0	1	2	3	4	5	6	7	8	9	0	1	2	3	4	5
S	P	D	TERMINATION STATUS					UNIT NUMBER							

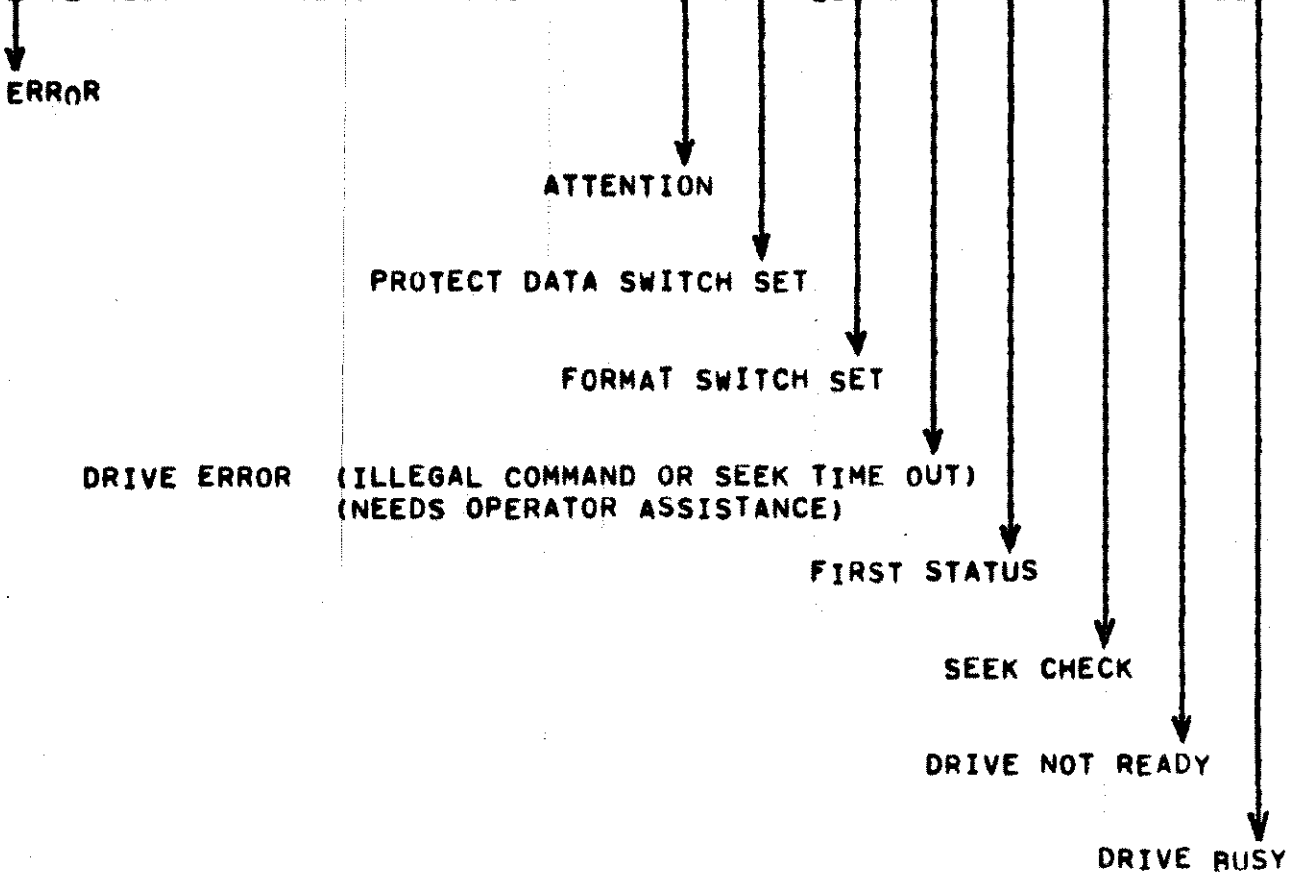
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
0	1	0	1	0	0	0	0	0	0	0	0	0	0	0	0
0	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1

- 0 NORMAL
- 400 ILLEGAL COMMAND
- 3400 CYLINDER COMPARE ERROR
- 4000 UNCORRECTABLE ERROR
- 4400 HEAD/SECTOR COMPARE ERROR
- 5000 SIO PROGRAM ERROR
- 6000 EOC (END OF CYLINDER)
- 7000 OVERRUN
- 7400 POSSIBLE CORRECTABLE ERROR
- 10000 ILLEG. ACCES TO SPARE TRACK
- 10400 DEFECTIVE TRACK
- 11000 HEAD MOVING DURING OPERAT.
- 11400 DISC DRIVE ERROR
- 13000 ATTEMPT TO PROT./DEF. TRACK
- 13400 DRIVE UNAVAILABLE
- 17400 DRIVE ATTENTION



6. STATUS 2 WORD - FORMAT
(GOTTEN BY REQUEST STATUS)

00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	
ERR	ADDRESS OF LAST AVAILABLE SURFACE						ATT	PR	FO	FA	FS	SE	DNR	DR		



V. DETAILED DESCRIPTION OF TESTS

SECTION NAME	STEP NUMBER	FUNCTION
S1	1	RECALIBRATES AND CHECKS THE STATUS WORD. STATUS 1 SHOULD BE %1740U, U IS UNIT NUMBER.
	2	FORMATS FIRST CYLINDER IN CYLINDER TABLE AT HEAD 0 AND READS BACK ADDRESSES TO VERIFY THAT ADDRESSES WERE WRITTEN PROPERLY.
	3	WRITES ON FIRST CYLINDER IN CYLINDER TABLE AT HEAD ZERO. STATUS 1 SHOULD BE %0U. U IS UNIT NO.
	4	READS FIRST CYLINDER IN CYLINDER TABLE AT HEAD ZERO. STATUS 1 SHOULD BE %0U. U IS UNIT NUMBER.
	5	TEST 5 IS SKIPPED IF UNIT 0 IS NOT SET. SEEKS AND WRITES 10 WORDS AT ADDRESS (CYLINDER 0, UNIT 0, HEAD 0, SECTOR 20). THEN EXECUTES LONG SIO PROGRAM AT UNIT 0, READS PREVIOUS WRITING BY COLD LOAD READ AND CHECKS FOR CORRECT DATA AND IGNORANCE OF UNIT BUSY.
NOTE: STEP 6 TO 20 IS OPTIONALLY EXECUTED AS THE INTERACTIVE SEGMENT.		
	6	PLACES THE DEFECTIVE TRACK BIT ON THE FIRST CYLINDER IN THE CYLINDER TABLE.
	7	TRIES TO WRITE ONE BLOCK ON FIRST CYLINDER IN THE CYLINDER TABLE, SECTOR 0 AT HEAD 0 AND CHECKS FOR ABORTION. STATUS 1 SHOULD BE %3040U. U IS UNIT NUMBER.
	8	TRIES TO READ ONE BLOCK FROM THE SAME ADDRESS (STEP 7) AND CHECKS FOR ABORTION. STATUS 1 SHOULD BE %3040U. U IS UNIT NUMBER.
	9	DUPLICATES STEP 2 (RESETS DEFECTIVE TRACK BIT).
	10	PLACES THE SPARE TRACK BIT ON THE FIRST CYLINDER IN CYLINDER TABLE AND READS BACK THE ADDRESS TO VERIFY THE ADDRESS WRITING CAPABILITY.
	11	DUPLICATE STEP 7. STATUS 1 SHOULD BE %10000U. U IS UNIT NUMBER.

DETAILED DESCRIPTION OF TESTS
(CONT.)

SECTION NAME	STEP NUMBER	FUNCTION
S1 (CONT.)	11	DUPLICATE STEP 7. STATUS 1 SHOULD BE %10000U. U IS UNIT NUMBER.
	12	DUPLICATE STEP 8. STATUS 1 SHOULD BE %10000U. U IS UNIT NUMBER.
	13	DUPLICATES STEP 2. (RESETS SPARE TRACK BIT)
	14	PLACES THE PROTECTED TRACK BIT ON THE FIRST CYL. IN THE CYLINDER TABLE AND READS BACK THE ADDRESS TO VERIFY THE ADDRESS WRITING CAPABILITY.
	15	DUPLICATE STEP 7. STATUS 1 SHOULD BE %4000U. U IS UNIT NUMBER.
	16	DUPLICATES STEP 8. STATUS 1 SHOULD BE %4000U. U IS UNIT NUMBER.
	17	DUPLICATES STEP 2. (RESETS PROTECTED TRACK BIT).
	18	FORMATS THE ENTIRE DISC PACK AND READS EACH ADDRESS WRITTEN FOR VERIFICATION (OPTIONALLY).
	19	VERIFIES FUNCTIONS OF THE FORMAT SWITCH, UPPER DATA PROTECT SWITCH AND LOWER DATA PROTECT SWITCH.
	20	VERIFIES FUNCTIONS OF THE RUN SWITCH AND UNIT SWITCH.
	21	ISSUES ILLEGAL COMMANDS. STATUS 1 SHOULD BE %40U. U IS UNIT NUMBER.
	22	WRITES 128 WORDS IN SECTOR 47 OF THE LAST CYLINDER IN THE CYLINDER TABLE AT HEAD 1, READS THEM BACK AND CHECKS FOR CORRECT VALUE. THEN READS FULL SECTOR (SAME) INTO BUFFER TO MAKE CHANGE IN THE 3RD HEAD WORD (-1) AND WRITES FULL SECTOR FROM BUFFER BACK TO SECTOR 47. STATUS 1 SHOULD BE %0U. U IS UNIT NUMBER.

DETAILED DESCRIPTION OF TESTS
(CONT.)

SECTION NAME	STEP NUMBER	FUNCTION
S1 (CONT.)	23	EXECUTES REQUEST DISC ADDRESS AND CHECKS THE PROPER ADDRESS.
	24	EXECUTES REQUEST SYNDROME AND CHECKS SYNDROME STATUS. IT SHOULD BE %7400.
	25	CORRECTS ADDRESS EXECUTED IN STEP 22 BY WRITE FULL SECTOR AND VERIFIES THE CORRECTION BY READ COMMAND.
	26	REPEATS STEP 22 AT SECTOR 30 TO MAKE THE CHANGE IN THE LAST TWO 'ERROR CORRECTION CODE' WORDS. STATUS 1 SHOULD BE %0U. U IS UNIT NUMBER.
	27	READS SECTOR 30 TO CHECK STATUS. IT SHOULD BE %7400.
	28	REPEATS STEP 25. (CORRECTS ADDRESS)
	29	REPEATS STEP 22 AT SECTOR 25 TO MAKE THE CHANGE BETWEEN DATA WORDS 4 TO 8.
	30	NOT USED
	31	READS SECTOR 25 TO CHECK SYNDROME STATUS. IT SHOULD BE = %7400.
	32	EXECUTES TIO TO GET STATUS FROM UNIT 0. LOADS TIO WITH %25252 (UNUSUAL CODE) AND CHECKS ITS SETTING.
	33	EXECUTES CLEAR TO CLEAN UP.
	34	EXECUTES SEEK TO FIND SECTOR 10 ON THE LOWEST AVAILABLE CYLINDER IN THE CYLINDER TABLE AT HEAD ZERO.
35	EXECUTES SIO PROGRAM WITH SEEK TO FIND SECTOR 12 ON THE HIGHEST AVAILABLE CYLINDER IN THE CYLINDER TABLE AT HEAD ZERO.	
36	NOT USED	

DETAILED DESCRIPTION OF TESTS
(CONT.)

SECTION NAME	STEP NUMBER	FUNCTION
S1 (CONT.)	37	EXECUTES REQUEST SECTOR ADDRESS AND CHECKS FOR NORMAL STATUS.
	38	EXECUTES SIO PROGRAM WITH IMPROPER MODE AFTER 'READ' AND 'WRITE' RESPECTIVELY AND CHECKS FOR STATUS 1. IT SHOULD BE %1^500U. U IS UNIT NUMBER.
	39	SETS CYLINDER 0 FROM CYLINDER TABLE IF RESTRICT CYLINDER BIT SET, ELSE SETS CYLINDER=0.
	40	WRITES ONES ON SELECTED CYLINDER (48 SECTORS).
	41	READS WITH OFFSET SECTOR BY SECTOR INTO BUFFER WITH ADVANCE INCREASING CYLINDER-OFF COUNTER UP TO 47.
	42	NOT USED.
	43	READS WITH OFFSET SECTOR BY SECTOR INTO BUFFER WITH ADVANCE DECREASING CYLINDER-OFF COUNTER UP TO -47.
	44	EXECUTES SEEK WITH 9TH CYLINDER IN THE CYLINDER TABLE, SECTOR 47 AT HEAD 3 AND CHECKS FOR ERROR AND SEEK CHECK BITS IN STATUS 2.
	45	EXECUTES SEEK WITH CYLINDER 412, SECTOR 47 AT HEAD 0 AND CHECKS THE ERROR AND SEEK CHECK BITS SET IN STATUS 2.
	46	EXECUTES SEEK WITH EXISTING CYLINDER, SECTOR 48 AT HEAD 0 AND CHECKS FOR ERROR AND SEEK CHECK BITS SET IN STATUS 2.
47	EXECUTES SEEK FOR THE FIRST CYLINDER IN THE CYLINDER TABLE, SECTOR 47, HEAD 2, SET FILE MASK (INCREASING CYLINDER MODE ALLOW) AND CHECKS FOR ADDRESS OF LAST SURFACE. STATUS 2 SHOULD BE %2040.	

DETAILED DESCRIPTION OF TESTS
(CONT.)

SECTION NAME	STEP NUMBER	FUNCTION
S1 (CONT.)	48	READS FULL SECTOR FROM SECTOR 32 OF THE THIRD CYLINDER IN THE CYLINDER TABLE AT HEAD 1 AND INCREASES SECTOR ADDRESS BY 1. THEN WRITE FULL SECTOR BACK AND ISSUES READ (SAME ADDRESS). STATUS 1 SHOULD BE %740U (POSSIBLE CORRECTABLE ERROR). U IS UNIT NUMBER.
	49	CORRECTS EXECUTED SECTOR IN STEP 48.
	50	READS FULL SECTOR 32 OF THE THIRD CYLINDER TABLE AT HEAD 1 AND CHANGES HEAD ADDRESS TO ZERO. THEN WRITES FULL SECTOR BACK AND ISSUES SEEK AND READ (SAME ADDRESS). STATUS 1 SHOULD BE %740U. (POSSIBLE CORRECTABLE ERROR) U IS UNIT NUMBER.
	51	REPEATS STEP 49.
	52	READS FULL SECTOR 32 OF THE 3RD CYLINDER IN THE CYLINDER TABLE AT HEAD 1 AND CHANGES CYLINDER BY 1. THEN WRITES FULL SECTOR BACK (SAME ADDRESS) AND ISSUES SEEK AND READ (SAME ADDRESS). STATUS 1 SHOULD BE %740U. (POSSIBLE CORRECTABLE ERROR). U IS UNIT NUMBER.
	53	REPEATS STEP 49.
	54	EXECUTES SIO PROGRAM WITH 6 READ COMMANDS (ONE WORD PER EACH) WITH DATA CHAIN TO SIMULATE OVERRUN. STATUS 1 SHOULD BE %10700U.U IS UNIT NO.
	55	WRITES 500 WORDS (4 SECTORS) BY WRITE ADDRESS (INITIALIZE) ON THE 4TH CYLINDER IN THE CYLINDER TABLE AT HEAD 0 WITH STARTING SECTOR 41. EACH WORD CONTAINS ITS SERIAL NUMBER (0 TO 500). THEN VERIFIES CONTAINS OF SECTORS 41 TO 44. LAST 12 WORDS OF SECTOR 44 SHOULD HAVE THE SAME WORD (500TH WORD).
	56	TRIES TO FIND 3 NEIGHBOUR CYLINDERS. THE CONTROL SKIPS TO STEP 66 WHEN NO SUCCESS TO FIND IT.
	57	WRITES 8 BLOCKS WITH "WORD" ON SECTORS 42 OF EACH NEIGHBOUR CYLINDER AND HEAD.

DETAILED DESCRIPTION OF TESTS
(CONT.)

SECTION NAME	STEP NUMBER	FUNCTION																			
S1 (CONT.)	57 (CONT.)	<table border="1"> <thead> <tr> <th rowspan="2">HEADS</th> <th colspan="3">"WORD" IN NEIGHBOUR TRACKS:</th> </tr> <tr> <th>LOWER CYL.</th> <th>MIDD. CYL.</th> <th>HIGH. CYL.</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>%055555</td> <td>%077777</td> <td>%033333</td> </tr> <tr> <td>1</td> <td>%066666</td> <td>%111111</td> <td>%044444</td> </tr> <tr> <td>2</td> <td>0</td> <td>%022222</td> <td>%123456</td> </tr> </tbody> </table>	HEADS	"WORD" IN NEIGHBOUR TRACKS:			LOWER CYL.	MIDD. CYL.	HIGH. CYL.	0	%055555	%077777	%033333	1	%066666	%111111	%044444	2	0	%022222	%123456
HEADS	"WORD" IN NEIGHBOUR TRACKS:																				
	LOWER CYL.	MIDD. CYL.	HIGH. CYL.																		
0	%055555	%077777	%033333																		
1	%066666	%111111	%044444																		
2	0	%022222	%123456																		
	58	VERIFIES THE SELECT CONTROL OF THE NEXT SECTOR WHEN EOC IS CROSSED AND FILE MASK ALLOWS TO INCREASE SECTOR ADDRESS IN THE CYLINDER/SURFACE MODE RESPECTIVELY.																			
	59	VERIFIES THE SELECT CONTROL OF THE NEXT SECTOR WHEN EOC IS CROSSED AND FILE MASK ALLOWS TO DECREASE SECTOR ADDRESS IN CYLINDER/SURFACE MODE RESPECTIVELY.																			
	60	VERIFIES CONTROL OF SET FILE MASK FOR TO REJECT SIO PROGRAM WHEN 'INCREMENT ALLOW' RESET TO THE NEXT CYLINDER/SURFACE MODE WHEN EOC IS CROSSED. STATUS 1 SHOULD BE %10600U. U IS UNIT NUMBER.																			
	61	VERIFIES THE SAME AS STEP 60 FOR DECREMENTING.																			
	62	SETS SPARE, PROTECTED AND DEFECTIVE TRACK BITS TO VERIFY AVAILABLE READING IF SPARE AND PROTECTED CYLINDERS ARE UNAVAILABLE FOR DEFECTIVE CYLINDERS.																			
	63	NOT USED.																			
	64	EXECUTES WAKE-UP FOR TO CHECK NORMAL STATUS.																			
	65	NOT USED.																			
	66	EXECUTES SIO PROGRAM WITH LOOP INCLUDING READING OF WRONGLY WRITTEN DATAS AND INTERRUPT DIRECT ORDER TO VERIFY 10 RETRIES BY INTERRUPT COUNTER.																			
	67	ISSUES SIO PROGRAM WITH END FOR TO CHECK NO INTERRUPT OCCURS.																			

DETAILED DESCRIPTION OF TESTS
(CONT.)

SECTION NAME	STEP NUMBER	FUNCTION
S1 (CONT.)	68	NOT USED.
	69	NOT USED.
	70	NOT USED.
	71	NOT USED.
	72	NOT USED.
	73	NOT USED.
	74	NOT USED.
	75	NOT USED.
	76	READS FULL SECTOR 37 OF THE 3RD CYLINDER IN THE CYLINDER TABLE AT HEAD 0 AND INCREASE 99TH WORD BY 1. THEN WRITES FULL SECTOR BACK.
	77	EXECUTES SIO PROGRAM WITH CONDITIONAL JUMP TO PROVE ITS PROPER FUNCTION. STATUS 1 SHOULD BE %10740U, U IS UNIT NUMBER.
	78	NOT USED.
	79	NOT USED.

DETAILED DESCRIPTION OF TESTS
(CONT.)

SECTION NAME	STEP NUMBER	FUNCTION
S2	80	SELECTS A CYLINDER ACCORDING TO THE SETTING OF SECTION REGISTER BIT 8 BY STARTING AT ONE END OF THOSE CYLINDERS AVAILABLE AND CHOOSING THEM ONE AT A TIME UNTIL THE OTHER END IS REACHED. THEN SEEKS TO THE SELECTED CYLINDER.
	81	WRITES THE ENTIRE CYLINDER USING DATA CHAINING. DATAS ARE LOADED FROM THE PATTERN TABLE (0), (1) AND (2) INITIATED BY %155555,%133333,%066666 AND CAN BE CHANGED UPON REQUEST (SET SWITCHES 0 AND 1 OF SWITCH REGISTER, THEN SETTING BIT 10 OF SECTION REGISTER).
	82	READS A TRACK AND VERIFIES THE DATA READ.

NOTE: THE FOLLOWING STEPS 83,84 AND 85 ARE REPEATED AS A GROUP ACCORDING TO BIT 14 OF THE SECTION REGISTER.

BIT 14	REPETITION
SET	100
CLEAR	1024

S3	83	GENERATES A RANDOM CYLINDER, HEAD, SECTOR AND WORD COUNT. REDUCES THE WORD COUNT (IF NECESSARY) TO PREVENT CYLINDER OVERFLOW. GENERATES A BUFFER OF RANDOM DATA DUPLICATING THE LAST WORD IN THE FIRST UNUSED WORD OF THE BUFFER. SEEKS TO THE RANDOM ADDRESS AND READS NEXT FULL SECTOR CHECKING FOR SLOW HEAD SETTING.
	84	WRITES THE RANDOM DATA GENERATED IN STEP 83.
	85	READS BACK WRITTEN DATA TO VERIFY THEM.

DETAILED DESCRIPTION OF TESTS
(CONT.)

SECTION NAME	STEP NUMBER	FUNCTION
S4	86	REPEATS STEP 80.
	87	WRITES PATTERN DATA ON THE FIRST, LAST AND THEN MIDDLE THIRD OF TRACK AT HEAD 0,1 AND 2 RESPECTIVELY.

NOTE: THE NEXT TWO STEPS 88 AND 89 ARE REPEATED AS A GROUP ACCORDING TO BIT 14 SETTING OF THE SECTION REGISTER.

BIT 14	REPETITION
SET	1000
CLEAR	10000

88	SEEKS TO NEXT ADDRESS AND VERIFIES PREVIOUSLY READ DATA.
89	READS SELECTED SECTOR.

NOTE: THE NEXT SECTION 5 EXECUTES WRITE/READ/VERIFY DATA BETWEEN SELECTED UNITS. IF ONLY ONE UNIT IS AVAILABLE, SECTION 5 IS SKIPPED.

S5	90	SEEKS TO THE NEXT RANDOM ADDRESS ON ALL SELECTED UNITS AND VERIFIES DATA FROM THE PREVIOUS READ.
	91	READS ONE SECTOR FROM EACH SELECTED UNIT AFTER THEY BECOME AVAILABLE (SEEKING IS FINISHED). THE DATA IS VERIFIED BEFORE THE NEXT READ IS PERFORMED.

DETAILED DESCRIPTION OF TESTS
(CONT.)

SECTION NAME	STEP NUMBER	FUNCTION
S6	92	EXECUTES WIO AND RIO RESPECTIVELY AND CHECKS FOR REJECTIONS.
	93	EXECUTES CIO WITH CONTROL WORD = %20000 (TEST MODE) AND CHECKS FOR SPROPER STATUS 1. IT SHOULD BE %4000U WHERE U IS UNIT NUMBER.
	94	NOT USED.
	95	EXECUTES WIO WITH DATA WORD = %123456 AND CHECKS FOR RESPONSE.
	96	EXECUTES RIO AND CHECKS FOR RESPONSE. OBTAINED STATUS 1 SHOULD BE %6000U WHERE U IS UNIT NUMBER.
	97	EXECUTES SIO PROGRAM WITH SINGLE READ AND CHECKS FOR HANGING UP. THEN ISSUES NOP (END) AND CHECKS FOR NORMAL STATUS 1. IT SHOULD BE %6000U WHERE U IS UNIT NUMBER.
	98	ISSUES CIO WITH CONTROL WORD = 0 TO RESET TEST MODE AND CHECKS IT.
S0	99	ALL STEPS IN SECTION 0 HAVE STEP NUMBER = 99.

SUMMATION: STEPS WHICH SELECT MORE ELEMENTS (HEAD, UNIT, SECTOR OR CYLINDER) ARE EXECUTED FOR ALL POSSIBLE COMBINATIONS OF ALL ELEMENTS RESPECTIVELY. TEST A TEST IS NOT EXECUTED FOR THAT COMBINATION ANYTIME, IF SELECTED ELEMENT IS NOT AVAILABLE (BY CONTROL TABLES). HOWEVER, IF AN ILLEGAL COMBINATION IS REQUIRED, TEST IS EXECUTED. THE MULTI-DRIVE TESTS ARE NOT EXECUTED WHEN LESS THEN TWO UNITS ARE SET IN THE UNIT TABLE.



A P P E N D I X - A

S Y N D R O M E F O R M A T
(SAMPLE)

E13 96 OBTAINED SYNDROME:

D13	004000	(1 - OBTAINED STATUS)
D13	000601	(2 - CYLINDER NUMBER)
D13	000457	(3 - HEAD/SECTOR NUMBER)
D13	000000	(4 - WORD ADDRESS)
D13	003067	(5 - PATT 1)
D13	004347	(6 - PATT 2)
D13	171377	(7 - PATT 3)

D13 25 CYL 0385 HEAD 00 SECTOR 00 WORD COUNT 6144 UNIT 00NG.

- WORD 1 OBTAINED STATUS - DOES NOT INCLUDE THE UNIT NUMBER AT BITS (13 TO 15) AND HAS TWO VALUES ONLY %004000 (UNCORRECTABLE ERROR) AND %007400 (CORRECTABLE ERROR).
- WORD 2 CYLINDER NUMBER - IN OCTAL FORM.
- WORD 3 HEAD/SEC.NUMBER - IN OCTAL FORM HEAD (BITS 0 TO 7) AND SECTOR (BITS 8 TO 15).
- WORD 4 WORD ADDRESS - ADDRESS LOCATION IN OCTAL FORM.THE FULL BLOCK HAS ADDRESSES SINCE -3 (%177775) TO +134 (%000207). THE FULL BLOCK CONSISTS OF 3 WORDS (-3 TO -1),128 DATA WORDS(0 TO 127<%200>), CRC WORD (128<%201>) AND 6 ECC WORDS (129<%202> TO 134<%207>).
- WORD 5 PATT 1 - PATTERN WORD 1 *)
- WORD 6 PATT 2 - PATTERN WORD 2 *)
- WORD 7 PATT 3 - PATTERN WORD 3 *)

*) MEANS THAT PATTERN WORDS MUST BE XOR'ED WITH THE CORRESPONDING READ WORDS (1-1,2-2,3-3) FOR TO OBTAIN CORRECT DATAS. THIS CAN BE EXECUTED ONLY WHEN OBTAINED STATUS (WORD 1) IS %007400 (CORRECTABLE ERROR).

