

**IDENTIFICATION**  
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**PRODUCT CODE:** AC-F362B-MA  
**PRODUCT NAME:** AJRLHBO RL8-A/RL02 DR PT1  
**PRODUCT DATE:** SEPT 1981  
**MAINTAINER:** DIAGNOSTIC ENGINEERING GROUP  
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#### S.1.1 PROGRAM PURPOSE (ABSTRACT)

THIS PROGRAM TESTS AN RL8A OR RL278 CONTROLLER AND UP TO FOUR RL02 DRIVES FOR ALL DRIVE FUNCTIONS EXCEPT FOR READ AND WRITE.

#### S.1.2 SYSTEM REQUIREMENTS

##### S.1.2.1 HARDWARE REQUIREMENTS

PDP8/E,F,M, OR A WITH 8K MEMORY  
 VT278 CPU WITH 16-32K OF MEMORY  
 CONSOLE DEVICE (ASR 33 OR EQUIVALENT)  
 RL8A CONTROLLER WITH ONE OR MORE RL02 DRIVES CONNECTED  
 RL278 CONTROLLER WITH ONE OR MORE RL02 DRIVES CONNECTED

##### S.1.2.2 SOFTWARE REQUIREMENTS

THIS PROGRAM IS FULLY COMPATIBLE WITH OS/8 AND APT8A.

#### S.1.3 RELATED DOCUMENTS AND STANDARDS

THIS PROGRAM ADHERES TO THE DIAGNOSTIC ENGINEERING STANDARDS AND CONVENTIONS DOCUMENT NO. 175-003-009-02.

#### S.1.4 DIAGNOSTIC HIERARCHY PREREQUISITES

AJRLA (DISKLESS CONTROLLER DIAGNOSTIC) SHOULD HAVE BEEN SUCCESSFULLY RUN ON THE CONTROLLER BEING USED PRIOR TO RUNNING THIS PROGRAM.

THIS PROGRAM IS NORMALLY THE SECOND PROGRAM RUN WHEN CHECKING OUT AN RL8A/RL02 OR RL278/RL02 SUBSYSTEM.

#### S.1.5 ASSUMPTIONS

THE CPU, CONSOLE DEVICE, AND THE FIRST 8K OF MEMORY ARE ASSUMED TO BE FAULT FREE. IF A FAULT IS SUSPECTED IN THESE UNITS, THE APPROPRIATE DIAGNOSTICS SHOULD BE RUN FIRST.

ANY USER ATTEMPTING TO DIAGNOSE THE HARDWARE (I.E. USE THE DIAGNOSTIC FOR OTHER THAN GO/NO-GO TESTING) IS ASSUMED TO HAVE SOME KNOWLEDGE OF THE CONTROLLER AND RL02 HARDWARE.

S.2.1 LOADING AND STARTING PROCEDURES  
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THE PROGRAM MAY BE LOADED BY PAPER TAPE, APT, OR STANDARD OS/8 LOADING PROCEDURES. THE STARTING ADDRESS IS 200. THERE IS NO OTHER START OR RESTART ADDRESS AND NO WAY TO SELECT A SUBSET OF THE TESTS TO BE EXECUTED.

S.2.2 SPECIAL ENVIRONMENTS  
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THE PROGRAM MAKES NO ATTEMPT TO USE THE CONSOLE DEVICE WHEN RUNNING UNDER APT (LOCATION 22, BIT 0=1). ALL ERRORS ARE FATAL AND REPORTED TO APT. APT IS NOTIFIED THAT THE PROGRAM IS STILL RUNNING IN THE STANDARD MANNER.

THE FOLLOWING BITS ARE RELEVANT IN THE HARDWARE CONFIGURATION WORDS:

LOC 21	BIT 0	=0	USE PSEUDO SWITCH REGISTER
		=1	USE HARDWARE SWITCH REGISTER
	BIT 1	=0	NO OPTION 1
		=1	OPTION 1 IS AVAILABLE
LOC 22	BIT 0	=0	NOT ON APT
		=1	ON APT 8A SYSTEM
	BITS 4,5	=0	BITS 10,11 SPECIFY HIGHEST UNIT NUMBER TO TEST. ALL UNITS FROM 0 TO THIS NUMBER ARE TESTED.
		=1	BITS 10,11 SPECIFY A SPECIFIC UNIT NUMBER. ONLY THAT UNIT IS TESTED.
	=2,3		RESERVED FOR FUTURE EXPANSION (THE PROGRAM WILL REPORT AN ERROR.)
	BITS 10,11		UNIT NUMBER AS DEFINED BY BITS 4,5.



### S.2.3.1 OPERATOR PROMPTS

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THE CONSOLE PACKAGE (DESCRIBED BELOW) IS ALWAYS ACTIVE AND CANNOT BE DISABLED. THE PROGRAM DEFAULTS TO USE OF THE PSEUDO SWITCH REGISTER (LOCATION 20). THE HARDWARE SWITCH REGISTER CAN BE USED BY CHANGING LOCATION 21 BIT 0 TO A 1. THE PSEUDO SWITCH REGISTER CAN BE MODIFIED BY USING THE CONSOLE PACKAGE.

IF THE PSEUDO SWITCH REGISTER IS BEING USED, THE PROGRAM WILL ALLOW THE OPERATOR TO ENTER THE SWITCH REGISTER VALUE AT PROGRAM STARTUP.

A YES/NO QUESTION IS ASKED FOR WHETHER TO TEST EACH DRIVE. "NO" IS THE DEFAULT ON ALL YES/NO QUESTIONS AND MAY BE GOTTEN BY TYPING "<CR>", AS WELL AS "N". "YES" IS GOTTEN BY TYPING "Y". NOTE THAT THE PROGRAM KNOWS ONLY ABOUT DRIVES 0-3. IF DRIVE ADDRESS PLUGS 4-7 ARE BEING USED, THEY ARE CONSIDERED EQUIVALENT TO DRIVES 0-3, RESPECTIVELY.

THE OPERATOR IS NEXT ASKED IF OPTION 1 IS AVAILABLE. THIS BOARD IS NEEDED FOR TIMING PURPOSES. ON A VT278 TYPE A "N" TO THIS QUESTION OR ERRORS WILL OCCUR DO TO THE SCREEN INTERRUPTS.

THE OPERATOR IS THEN ASKED IF HE WISHES TO SELECT NON-DEFAULT PARAMETERS. IF THE ANSWER IS "N" OR "<CR>", THE REMAINING QUESTIONS WILL NOT BE ASKED AND THE DEFAULTS FOR EACH OF THE QUESTIONS WILL BE USED. IF THE OPERATOR ANSWERS WITH "Y", THE QUESTIONS WILL BE ASKED. THE DEFAULT MAY BE GOTTEN BY TYPING "<CR>". "NO" IS THE DEFAULT TO ALL Y/N QUESTIONS. THE ANSWERS TO THE QUESTIONS APPLY TO ALL DRIVES UNDER TEST. THE QUESTIONS AND THEIR MEANINGS ARE LISTED BELOW:

"EXECUTE MANUAL INTERVENTION TESTS?"

IF NO, THE DRIVES MUST BE CYCLED UP AND WRITE ENABLED.  
IF YES, THE DRIVES MUST BE IN LOAD STATE WITH WRITE LOCK SET AND THE COVER OPEN. THESE TESTS WILL CYCLE THE DRIVES UP AND DOWN AND RUN A WRITE LOCK TEST.

"EXECUTE DRIVE SELECT TEST?"

IF YES, THIS TEST INVOLVES REMOVAL OF CERTAIN DRIVE ADDRESS PLUGS TO TEST THE DRIVE SELECT LOGIC.

"EXECUTE DRIVE SELECT ERROR TEST?"

IF YES, THE OPERATOR IS REQUIRED TO HAVE TWO IDENTICAL ADDRESS PLUGS. (NOTE THAT PLUG 4 IS IDENTICAL TO PLUG 0, ETC.)

"EXECUTE HEAD ALIGNMENT SUPPORT ROUTINE?"

IF YES, THIS TEST ALLOWS THE OPERATOR TO ALIGN THE HEADS ON THE DRIVE UNDER TEST. WHEN THE DRIVE IS WRITE ENABLED, HEAD 0 IS SELECTED. WHEN WRITE LOCK IS SET, HEAD 1 IS SELECTED. THE TEST IS EXITED BY TYPING "<CR>".

"EXECUTE TECH-MATE HEAD ALIGNMENT TEST?"

IF YES, THIS TEST ALLOWS THE OPERATOR TO ALIGN THE HEADS ON THE DRIVE UNDER TEST USING THE TECH-MATE ALIGNMENT BOX TO EXIT THIS PORTION TYPE A "<CR>" WHICH WILL THEN PLACE THE HEADS OVER CYLINDER 777 FOR THE HEAD GAIN TEST. THE TEST IS EXITED BY TYPING ANOTHER "<CR>".

"READ ALL HEADERS?"

IF YES, THE PROGRAM WILL READ AND TEST ALL HEADERS BETWEEN THE UPPER AND LOWER CYLINDER LIMITS ON EACH PASS.

"USE LOWER (UPPER) SEEK LIMIT?"

IF NO, THE LIMIT WILL BE THE DEFAULT OF 0 (377).  
IF YES, THE OPERATOR CAN ENTER THE DESIRED LIMIT IN OCTAL. THE PROGRAM WILL NOT SEEK BELOW (OR ABOVE) THE SEEK LIMIT EXCEPT FOR THE GUARD BAND TESTS.

"USE ONLY ONE SURFACE?"

IF NO, BOTH SURFACES OF THE DISK WILL BE USED.  
IF YES, THE OPERATOR WILL BE ASKED TO ENTER THE SURFACE NUMBER (0 OR 1). ONLY THIS SURFACE WILL BE USED.

"SPECIFY ERROR LIMIT IN OCTAL:"

THE DEFAULT IS 24 (OCTAL). ANY VALUE FROM 0 TO 777 MAY BE SELECTED. (0 IS EQUIVALENT TO 1.) IF SWITCH REGISTER BIT 8 IS SET, THE DRIVE UNDER TEST WILL BE DROPPED IF THIS ERROR LIMIT IS REACHED OR EXCEEDED.

THE SWITCH REGISTER BITS AND THEIR MEANINGS ARE DESCRIBED BELOW:

SR BIT SETTING MEANING

SR0 =0 HALT ON ERROR  
(4000) =1 INHIBIT ERROR HALT

SR1 =0 DO NOT LOOP IF ERROR (OVERRIDDEN IF SR2=1)  
(2000) =1 LOOP ON ERROR (HARD OR SOFT)

SR2 =0 MAKE NORMAL LOOP DECISIONS  
(1000) =1 LOOP ON CURRENT TEST

SR3 =0 CONTINUE AFTER END OF PASS  
(0400) =1 HALT AT END OF PASS

SR4 =0 REPORT ERROR ON CONSOLE DEVICE  
(0200) =1 INHIBIT ERROR REPORT

NOTE: CARE SHOULD BE TAKEN WHEN USING THE HARDWARE SWITCHES THAT THIS BIT IS NOT INADVERTENTLY LEFT SET WHEN STARTING THE PROGRAM.

SR5 =0 PROGRAM WILL PROMPT OPERATOR NORMALLY (AS  
(0100) =1 DESCRIBED IN S.2.3.1  
PROGRAM WILL USE CURRENT STATE ON A START OR RESTART.  
ON PROGRAM RESTART, THIS CORRESPONDS TO PREVIOUS  
RESPONSES, EXCEPT THAT ANY DRIVES THAT HAVE BEEN  
DROPPED WILL REMAIN UNSELECTED. ON FIRST PROGRAM  
START, NO DRIVES WILL BE SELECTED.

SR6 =0 REPORT END OF PASS  
(0040) =1 INHIBIT END OF PASS TYPEOUT

SR7 =0 TEST 27 (OSCILLATING SEEK TEST) WILL EXECUTE NORMALLY  
(0020) =1 TEST 27 WILL LOOP WITH A FIXED DISTANCE SEEK BETWEEN  
THE UPPER AND LOWER SEEK LIMITS.

SR8 =0 THE DRIVE WILL NOT BE DROPPED UNLESS IT IS NOT READY  
(0010) =1 THE DRIVE WILL BE DROPPED WHEN THE ERROR LIMIT IS  
REACHED.

S.2.3.3 CONSOLE PACKAGE COMMAND SUMMARY

A MORE COMPLETE DESCRIPTION OF THE CONSOLE PACKAGE MAY BE  
FOUND IN DOCUMENT NO. 175-003-009-02. BELOW IS A SUMMARY  
OF AVAILABLE CONTROL FUNCTIONS. A "CONTROL" CHARACTER IS TYPED  
BY HOLDING DOWN THE "CONTROL" KEY AND HITTING THE CHARACTER.

CNTRL-G OPEN THE PSEUDO SWITCH REGISTER FOR MODIFICATION.  
THE PROGRAM WILL TYPE "G" FOLLOWED BY:  
"SR=XXX ", WHERE XXX IS THE SWITCH REGISTER SETTING.  
THE VALUE MAY BE LEFT UNCHANGED OR A NEW VALUE MAY BE  
ENTERED. TYPING A <CR> WILL SAVE THE NEW VALUE (IF  
ONE WAS ENTERED) AND CONTINUE THE PROGRAM. TYPING A  
LINE FEED WILL SAVE THE NEW VALUE (IF ENTERED) AND  
RESTART THE PROGRAM AT LOCATION 200. TYPING ANY

RE-ISSUED.  
NOTE: IF THE HARDWARE SWITCHES ARE BEING USED, THEIR VALUE WILL BE TYPED OUT, BUT ANY NEW VALUE TYPED IN WILL BE SAVED IN LOCATION 20. THE HARDWARE SWITCHES WILL STILL CONTROL THE PROGRAM.

CNTRL-C RETURN TO OS/8 MONITOR (AT LOCATION 7600). IF THE MONITOR BOOT IS NOT PRESENT, THE RESULTS ARE INDETERMINATE.

CNTRL-S DISABLE ALL OUTPUT. THE PROGRAM WILL HANG WHEN IT ATTEMPTS TO OUTPUT TO THE CONSOLE DEVICE. AT THIS POINT, THE ONLY CHARACTERS THAT WILL BE RECOGNIZED ARE THE CONTROL-C AND CONTROL-Q.

CNTRL-Q REENABLE ALL OUTPUT (AFTER A 'S').

CNTRL-F THIS IS A NON-STANDARD CONTROL CHARACTER. THE CONSOLE FILL COUNT (LOCATION 23) IS OPENED FOR MODIFICATION. BEHAVIOR IS SIMILAR TO THAT FOR CONTROL-G, EXCEPT THAT A LINE FEED WILL NOT BE RECOGNIZED. THE DEFAULT FILL COUNT IS 1. A FILL COUNT OF 14 IS USUALLY REQUIRED FOR LA30'S.

ALL OTHER CHARACTERS WILL BE ECHOED, FOLLOWED BY A "?" AND <CR>.

#### S.2.4 EXECUTION TIMES -----

THERE IS NO QUICK VERIFY PASS. ALL PASSES REQUIRE APPROXIMATELY TWO AND A HALF MINUTES PER DRIVE. THIS WILL BE INCREASED BY APPROXIMATELY 30 SECONDS PER DRIVE IF READING ALL HEADERS, AND DECREASED PROPORTIONATELY IF ONLY ONE SURFACE IS SELECTED OR IF UPPER AND LOWER SEEK LIMITS ARE BEING USED.

#### S.3.0 ERROR INFORMATION -----

ALL ERRORS HAVE THE FOLLOWING FORMAT:

ERROR MESSAGE  
DATA HEADERS  
DATA

THE ERROR MESSAGE DESCRIBES THE FAILURE. DATA HEADERS VARY IN NUMBER AND IDENTIFY THE DATA TYPED BELOW EACH HEADER. ALL DATA ARE TYPED IN OCTAL. THE PC OF THE ERROR CALL IS ALWAYS INCLUDED.

THE FOLLOWING ABBREVIATIONS ARE USED:

CA COMMAND A REGISTER  
CB COMMAND B REGISTER  
SA SECTOR ADDRESS REGISTER  
WC WORD COUNT REGISTER  
ER ERROR REGISTER  
MA MEMORY ADDRESS REGISTER  
DRV NO. THE DRIVE NUMBER OF THE FAILING DRIVE (0-3 ONLY)  
EXPTD EXPECTED (I.E. THE CORRECT VALUE)  
ACTUAL THE ACTUAL (INCORRECT) VALUE  
CYL CYLINDER ADDRESS  
CYL(CB4) CYLINDER ADDRESS BEFORE THE FAILING OPERATION  
WD1-WD2 WORD1 AND WORD2 OF HEADERS OR DRIVE STATUS  
CALLPC ERRORS REPORTED WITHIN SUBROUTINES INCLUDE THE PC OF THE SUBROUTINE CALL

### S.3.2 ERROR HALTS -----

THE ONLY ACTUAL HALT INSTRUCTION IS WITHIN THE POWER FAIL ROUTINE. ALL OTHER "HALTS" ARE CALLS TO THE CONSOLE PACKAGE SWITCH REGISTER MODIFICATION ROUTINE. THIS IS TRUE EVEN IF THE HARDWARE SWITCHES ARE SELECTED. THE ONLY SUCH "HALTS" ARE AT THE SELECT FIRST DRIVE ROUTINE IF NO DRIVES ARE AVAILABLE, IN THE END OF PASS ROUTINE, AND THE ERROR REPORTING ROUTINE.

### S.4.0 PROGRESS REPORTS -----

ONLY ONE PROGRESS REPORT IS GIVEN; THAT IS GIVEN AT THE END OF PASS. IT HAS THE FOLLOWING FORMAT:

END PASS XXXX

WHERE XXXX IS THE PASS COUNT IN OCTAL. NO TOTAL ERROR COUNT IS REPORTED, SO WHEN RUNNING THE PROGRAM UNATTENDED, IT IS RECOMMENDED THAT EITHER ERROR HALTS, ERROR PRINTOUTS, OR LOOPING ON ERROR BE ENABLED TO AVOID PASSING A DEFECTIVE BOARD.

### S.5.0 DEVICE INFORMATION TABLES -----

TRANSFERS FROM THE AC TO REGISTER IN THE CONTROLLER  
CLEAR THE AC AFTER THE TRANSFER IS COMPLETE. TRANSFERS  
TO THE AC FROM REGISTERS IN THE CONTROLLER CLEAR THE AC  
FIRST THEN THE TRANSFER TAKES PLACE.

THE SKIP INSTRUCTIONS IN THIS INSTRUCTION SET ARE  
SKIP AND THEN CLEAR IOT'S. THIS MEANS THAT IF A  
GIVEN CONDITION IS TRUE, IE; "FUNCTION DONE" IS TRUE  
(SET TO A LOGIC ONE) THE FUNCTION DONE FLAG WILL  
BE CLEARED AT THE COMPLETION OF THE SKIP IOT.

THE DEVICE CODE IS JUMPER SELECTABLE FOR EITHER 60.61 OR 30.31.  
60.61 IS STANDARD. IOT CODES 30.31 MAY BE USED BY SETTING SWITCH  
REGISTER BIT 11 TO A 1.

OCTAL CODE	MNEMONIC	FUNCTION
6600	RLDC	CLEAR DEVICE, ALL REGISTERS, AC AND FLAGS.
6601	RLSD	SKIP ON FUNCTION DONE, THEN CLEAR IF SET TO A ONE.
6602	RLMA	LOAD BREAK MA REGISTER FROM AC 0:11
6603	RLCA	LOAD COMMAND REGISTER "A" FROM AC 0:11
6604	RLCB	LOAD COMMAND REGISTER "B" FROM AC 0:11, EXECUTE COMMAND
6605	RLSA	LOAD SECTOR ADDRESS FROM AC 0:5
6606	----	SPARE (WILL CLEAR THE AC)
6607	RLWC	LOAD WORD COUNT FROM AC 0:11
6610	RRER	READ ERROR REGISTER INTO AC 0:2,11.
6611	RRWC	READ WORD COUNT INTO AC 0:11
6612	RRCA	READ COMMAND REGISTER "A" INTO AC 0:11
6613	RRCB	READ COMMAND REGISTER "B" INTO AC 0:11
6614	RRSA	READ SECTOR ADDRESS INTO AC 0:5
6615	RRSI	READ SILO WORD (8 BIT) INTO AC 4:11
6616	RLSR	SPARE (AC NOT AFFECTED)
6617	RLSE	SKIP ON COMPOSITE ERROR, THEN CLEAR IF SET TO A ONE

# BREAK MA REGISTER

AC0- MSB

"

AC11-LSB

## COMMAND REGISTER "A"

AC0- DIRECTION; ZERO= MOVE HEADS AWAY  
FROM SPINDLE (LOWER CYL. ADD.)  
ONE= MOVE TOWARDS SPINDLE (HI ADD.)

AC1- HEAD SELECT- ZERO= UPPER HEAD  
ONE= LOWER HEAD

AC2- SPARE

AC3- RESERVED FOR DISK EXPANSION

AC4- CYLINDER ADDRESS/DIFFERENCE WORD; MSB

"

"

AC11- CYLINDER ADDRESS/DIFFERENCE WORD; LSB

## COMMAND REGISTER "B"

AC0- MAINT. INHIBIT. PREVENT THE FOLLOWING SIGNALS  
FROM GOING TO/FROM THE DRIVE;  
WRT GATE, WRT DATA, DRV CMND, DRV STAT., DRV RDY  
SEC PLS, READ DATA, STAT. CLK, DRV ERR.

AC1- MAINTENANCE- LOOP DAR TO SILO SERIAL IN

AC2- MODE; ZERO= TRUNCATED (128 12 BIT WORDS/SECTOR)  
ONE= BYTE (256 8 BIT WORDS/SECTOR)

MUST BE SET TO A 1 WHEN DOING

A "GET STATUS" OR "READ HEADER" COMMAND.

AC3- INTERRUPT ENABLE

AC4- DRIVE SELECT; MSB

AC5- DRIVE SELECT; LSB

AC6- EMA; MSB

"

AC7- EMA; LSB

AC8- FUNCTION BIT C

AC9- FUNCTION BIT B

AC10- FUNCTION BIT A

AC11- FUNCTION BIT A

## FUNCTION BIT DEFINITION

BIT C	BIT B	BIT A	COMMAND
-----	-----	-----	-----
0	0	0	MAINTENANCE
0	0	1	RESET
0	1	0	GET STATUS
0	1	1	SEEK
1	0	0	READ HEADER
1	0	1	WRITE DATA
1	1	0	READ DATA
1	1	1	READ DATA WITHOUT HEADER CHECK

AC5- SECTOR ADDRESS; LSB

DISK STATUS REGISTER

WORD #1

AC4- SPARE (0)  
AC5- HEAD SELECT  
AC6- COVER OPEN \*  
AC7- HEADS OUT  
AC8- BRUSH HOME  
AC9- STATE C  
AC10-STATE B  
AC11-STATE A

WORD #2

AC4- WRITE DATA ERROR \*  
AC5- HEAD CURRENT ERROR \*  
AC6- WRITE LOCK STATUS  
AC7- SEEK TIME OUT ERROR \*  
AC8- SPIN UP TIME OUT ERROR \*  
AC9- WRITE GATE ERROR \*  
AC10-VOLUME CHECK \*  
AC11-DRIVE SELECT ERROR \*

\*CAUSES DRIVE ERROR TO SET TO A ONE (1)

STATE BIT DEFINITION

BIT C	BIT B	BIT A	DEFINITION
0	0	0	LOAD STATE
0	0	1	SPIN-UP
0	1	0	LOAD HEADS
0	1	1	BRUSH CYCLE
1	0	0	SEEK-TRACK COUNTING
1	0	1	SEEK LINEAR MODE
1	1	0	UNLOAD HEADS
1	1	1	SPIN-DOWN

HEADER WORDS

WORD #1

AC4- CYLINDER ADDRESS 0 (LSB)  
AC5- HEAD SELECT  
AC6- SECTOR ADDRESS 5 (MSB)  
AC11-SECTOR ADDRESS 0 (LSB)

WORD #2

AC4- 0  
AC5- CYLINDER ADDRESS 7 (MSB)  
AC11-CYLINDER ADDRESS 1

WORDS #3 & #4  
ALL 0'S



AC1- OPERATION INCOMPLETE (OPI)  
 AC2- DATA LATE/HEADER NOT FOUND  
 AC10-DRIVE ERROR  
 AC11-DRIVE READY; A ONE= DRV RDY  
       A ZERO= DRV RDY(NOT)  
 NOTE:DRIVE ERROR AND DRIVE READY ARE ASSERTED WHEN  
       DRIVE INTERFACE IS DISABLED (CBO = 1).

WORD COUNT REGISTER; A 12 BIT WORD COUNT  
 REGISTER HAS BEEN PROVIDED TO ALLOW UP TO  
 4,096 DATA BREAKS (DMA'S) TO TAKE PLACE AT  
 ONE TIME. THIS REGISTER IS LOADED WITH  
 THE RLWC IOT FROM AC 0:11, WHICH MUST BE  
 THE 2'S COMPLIMENT OF THE NUMBER OF TRANSFERS  
 THAT ARE TO TAKE PLACE.

# S.6.0 SUBTEST SUMMARIES -----

## MANUAL INTERVENTION TESTS

DRIVE MUST HAVE POWER ON, CYCLED DOWN (HEADS UNLOADED), COVER  
 OPEN, AND WRITE LOCKED.

DRIVE NUMBER(S) MUST BE SPECIFIED BY THE OPERATOR. NO AUTO  
 SIZING WILL BE DONE.

## TEST 1 BASIC INTERFACE TEST (PART 1)

LOAD IN DRIVE NUMBER. DO GET STATUS WITH RESET. IF OPI SETS:  
       DRIVE INTERFACE IS DEAD  
       DRIVE INTERFACE DISABLED (STUCK MAINT BIT 0 LINE)  
       DRIVE COMMAND SHIFT REGISTER NOT LOADING/SHIFTING  
       MARKER DETECTION FAILED  
       DRIVE IS NOT SELECTING OR AC LOW IS SET  
       SYSTEM OR STATUS CLOCKS NOT OPERATIONAL  
       GET STATUS DETECTION FAILED.

IF INTERRUPT WITH NO OPI, CHECK STATUS RECEIVED. COVER OPEN  
 AND BRUSH HOME SHOULD BE SET. IF NOT:  
       BAD STATUS DATA LINE  
       BAD COVER SWITCH OR LOGIC  
       DRIVE COMMAND SHIFT REGISTER  
       BAD BRUSH HOME SWITCH OR LOGIC

CHECK WRITE LOCK STATUS BIT SET. IF NOT:  
       BAD SWITCH OR WRITE LOCK LOGIC  
       DRIVE COMMAND SHIFT REGISTER

CHECK STATE FOR 0. IF NOT:  
       BAD STATE ROM  
       DRIVE COMMAND SHIFT REGISTER

CHECK VOLUME CHECK RESET. IF NOT:  
       BAD RESET DETECTION  
       BAD VOLUME CHECK LOGIC  
       DRIVE COMMAND SHIFT REGISTER

BAD DRIVE ERROR INTERFACE  
SOME OTHER ERROR STUCK ON. REPORT WHICH ERROR.

NOTE: THIS TEST IS EXECUTED ONLY IF PROGRAM OPERATION MODE 2  
IS SELECTED. MANUAL INTERVENTION TESTING IS REQUESTED,  
AND IS RUN IN FIRST PASS ONLY.

## TEST 2 BASIC INTERFACE TEST (PART 2)

REQUEST OPERATOR TO CLOSE COVER AND RESET WRITE LOCK.

DO GET STATUS LOOP CHECKING IF COVER OPEN OR WRITE LOCK  
RESETS. WAIT 30 SECONDS FOR BOTH TO CHANGE. IF NO CHANGE,  
ASK OPERATOR TO TYPE CR IF PROCEDURE WAS FOLLOWED.

IF ONE CHANGED BUT NOT THE OTHER, REPORT WHICH FAILURE:

WRITE LOCK SWITCH OR LOGIC  
(OR) COVER OPEN SWITCH OR LOGIC  
DRIVE COMMAND SHIFT REGISTER

IF NEITHER CHANGED, REPORT BOTH FAILURES.

NOTE: THIS TEST IS EXECUTED ONLY IF PROGRAM OPERATION MODE 2  
IS SELECTED. MANUAL INTERVENTION TESTING IS REQUESTED,  
AND IS RUN IN FIRST PASS ONLY.

## TEST 3 HEAD LOADING TEST

REQUEST OPERATOR TO PRESS LOAD SWITCH.

DO GET STATUS LOOP CHECKING FOR STATE TO GO TO 1. WAIT 30  
SECONDS FOR CHANGE. IF NO CHANGE, ASK OPERATOR TO CONFIRM  
ACTION BY TYPING CR.

IF LOAD WAS PRESSED:

BAD STATE ROM  
BAD LOAD SWITCH OR LOGIC

CHECK THAT STATE 1 REMAINS FOR LESS THAN 30 SECONDS. IF NOT:

SPINDLE NOT TURNING OR TOO SLOW (AC SERVO)  
SECTOR PULSE DETECTION OR LOGIC BAD  
BAD CLOCK SHIFT REGISTER IN SPEED CONTROL  
BAD DISK ON SPEED LOGIC  
BAD STATE ROM

AND CHECK IF SPINUP TIMEOUT ERROR SET. IF NOT:

BAD STATE ROM  
BAD TIMEOUT DETECTION LOGIC

CHECK THAT STATE GOES TO 2. IF NOT:

BAD STATE ROM

BAD BRUSH HOME SWITCH OR LOGIC  
BAD BRUSH MOTOR (AC SERVO)

WAIT 30 SECONDS FOR BRUSH HOME TO SET. IF NOT:

BAD AC SERVO  
BAD SWITCH OR LATCH

CHECK THAT STATE HAS CHANGED TO 3. IF NOT:

BAD STATE ROM

AFTER STATE IS 3, CHECK HEADS OUT IS SET. IF NOT:

BAD SWITCH  
BAD SEEK CONTROL ROM  
BAD VELOCITY ROM  
BAD DC SERVO

CHECK VOLUME CHECK IS SET. IF NOT:

BAD VOLUME CHECK LOGIC

WAIT 300 MS FOR STATE TO CHANGE TO 4. IF IT DOESN'T CHANGE:

STATE ROM BAD  
SEEK ROM  
VEL ROM  
GUARD BAND DETECTION

WAIT 15 MS FOR STATE TO CHANGE TO 5.

8 MS AFTER STATE GOES TO 5, DRIVE READY SHOULD SET. IF NOT:

INTEGRATOR OR NULL DETECTION FAILURE  
READY ONE SHOT BAD  
ENABLE TIMEOUT H NOT SETTING OR COUNT LOGIC BAD

CHECK THAT HEAD 0 IS SELECTED. IF NOT:

DRIVE CYCLE UP DID NOT SELECT HEAD 0

NOTE: THIS TEST IS EXECUTED ONLY IF PROGRAM OPERATION MODE 2  
IS SELECTED, MANUAL INTERVENTION TESTING IS REQUESTED,  
AND IS RUN IN FIRST PASS ONLY.

CHECK DRIVE IS READY. IF NOT REPORT AND ASK OPERATOR TO MAKE DRIVE READY.

REQUEST OPERATOR TO UNLOAD DRIVE.

LOOP ON GET STATUS WAITING FOR STATE TO CHANGE TO 6. IF NO CHANGE WITHIN 15 SECONDS, ASK OPERATOR TO TYPE <CR> IF PROCEDURE WAS FOLLOWED. IF IT WAS:

BAD STATE ROM  
BAD SWITCH

WAIT 300 MS FOR STATE TO CHANGE TO 7. IF NO CHANGE:

BAD STATE ROM

AFTER STATE IS 7, WAIT 30 SEC FOR STATE TO CHANGE TO STATE 0. IF NO CHANGE:

NO BRAKING  
BAD AC SERVO

REQUEST OPERATOR TO LOAD DRIVE. WAIT UNTIL DRIVE BECOMES READY.

NOTE: THIS TEST IS EXECUTED ONLY IF PROGRAM OPERATION MODE 2 IS SELECTED. MANUAL INTERVENTION TESTING IS REQUESTED, AND IS RUN IN FIRST PASS ONLY.

#### TEST 5 DRIVE SELECT TEST

INSTRUCT THE OPERATOR TO REMOVE DRIVE ADDRESS PLUGS FROM ALL DRIVES EXCEPT THE DRIVE UNDER TEST. ASK THAT CARRIAGE RETURN BE TYPED WHEN DONE.

DO GET STATUS TO ADDRESS OF DRIVE UNDER TEST. CHECK THAT NO ERRORS ARE REPORTED. DO GET STATUS TO ALL OTHER ADDRESSES AND CHECK THAT OPI SETS FOR ALL OTHER ADDRESSES.

THAT NO ERRORS ARE REPORTED. DO GET STATUS TO ALL OTHER ADDRESSES AND CHECK THAT OPI SETS.

AFTER 3).

NOTE: THIS TEST IS EXECUTED ONLY IF PROGRAM OPERATION MODE 2 IS SELECTED. DRIVE SELECT TESTING IS REQUESTED, AND IS RUN IN FIRST PASS ONLY.

REQUEST OPERATOR INSERT IDENTICAL ADDRESS PLUGS IN TWO DRIVES.  
REQUEST OPERATOR TYPE DRIVE NUMBER AND CARRIAGE RETURN WHEN  
READY.

PROCEDURE WILL BE TO GET STATUS AND CHECK FOR DRIVE SELECT  
ERROR. THEN RESET THAT DRIVE AND VERIFY THAT DRIVE SELECT  
ERROR IS NOT REPORTED AGAIN. WAIT 1 SECOND, THEN CHANGE DRIVE  
SELECT TO A DIFFERENT NUMBER AND BACK AGAIN. DRIVE SELECT  
ERROR SHOULD SET AGAIN.  
OPERATOR SHOULD SEE THE FAULT LIGHT ON ON BOTH DRIVES. IF  
INDICATOR IS NOT SEEN ON A DRIVE:

DRIVE SELECT ERROR DETECTION IS BAD IN THAT DRIVE.

NOTE: THIS TEST IS EXECUTED ONLY IF PROGRAM OPERATION MODE 2  
IS SELECTED, DRIVE SELECT ERROR TESTING IS REQUESTED,  
AND IS RUN IN FIRST PASS ONLY.

#### STANDARD TESTS

IF THE PROGRAM OPERATION MODE 1 IS SELECTED, THIS WILL BE THE  
FIRST TEST EXECUTED. THE DRIVE(S) TO BE TESTED MUST BE  
POWERED UP, HEADS LOADED, AND WRITE LOCK RESET.

#### TEST 7 INITIAL STATE TEST

DO GET STATUS WITH RESET. WAIT FOR INTERRUPT.

IF OPI OCCURS:

DRIVE INTERFACE IS DEAD  
DRIVE INTERFACE DISABLED (STUCK MAINT BIT 0 LINE)  
DRIVE COMMAND SHIFT REGISTER NOT LOADING/SHIFTING  
DRIVE IS NOT SELECTING OR AC LOW IS SET  
SYSTEM OR STATUS CLOCKS NOT OPERATIONAL  
GET STATUS DETECTION FAILED.

IF INTERRUPT OCCURS WITHOUT OPI, CHECK DRIVE READY. READY SET  
INDICATES HEADS ARE LOADED AND ARE TRACKING (POSITION  
WORKING).

IF DRIVE READY IS SET, CHECK STATUS MESSAGE RECEIVED. HEADS  
OUT AND BRUSH HOME MUST BE SET. IF NOT:

DRIVE COMMAND SHIFT REGISTER NOT LOADING/SHIFTING  
HEADS OUT OR BRUSH HOME SWITCH OR ASSOCIATED  
CIRCUITRY BAD  
STATUS DATA BAD

CHECK ALL OTHER STATUS BITS EXCEPT STATE BITS ARE 0.

CHECK STATE IS 5. IF NOT:

DRIVE COMMAND SHIFT REGISTER BAD

DO SEEK WITH 0 DIFFERENCE, SIGN 0, HEAD 0. WAIT FOR INTERRUPT. GET STATUS. CHECK STATE IS 5. IF NOT:

DIFFERENCE COUNTER PICKING UP BITS  
COUNTER CIRCUITRY IS NOT INDICATING 0 DIFFERENCE

CHECK DRIVE READY IS RESET. IF NOT:

ENABLE TIMEOUT OR READY LATCH/ONE SHOT BAD

WAIT APPROX 10 MS FOR READY BIT TO SET. IF IT TAKES LONGER OR DOESN'T SET AT ALL:

HEADS MAY HAVE MOVED (INTEGRATOR OR NULL DETECTION)  
READY ONE SHOT FAILED

CHECK ERROR DID NOT SET. IF IT SET, DO GET STATUS AND REPORT WHICH ERROR.

CHECK THAT DRIVE READY FLAG IS SET. CHECK THAT IT CLEARED.

VERIFY HEAD SELECT IS ZERO.

TEST 10 (THIS FEATURE OF THE HARDWARE WAS ELEMINATED)

TEST 11 SEEK SIGN SWITCH TEST

DO SEEK WITH DIFFERENCE 0, SIGN 1, HEAD 0. WAIT FOR INTERRUPT. GET STATUS AND CHECK STATE IS 5. IF NOT:

COUNT ROM  
DIFFERENCE COUNTER PICKING UP BITS  
COUNTER CIRCUITRY IS NOT INDICATING 0 DIFFERENCE

VERIFY DRIVE IS NOT READY

WAIT APPROX 10 MS FOR READY TO SET. IF IT TAKES LONGER OR DOESN'T SET AT ALL:

HEADS ARE MOVING (INTEGRATOR OR NULL DETECTION)  
READY ONE SHOT FAILED  
COUNT ROM

VERIFY ERROR DID NOT SET

VERIFY HEAD SELECT IS ZERO.

DO SEEK WITH 0 DIFFERENCE, OPPOSITE SIGN, HEAD 0. REPEAT ABOVE TESTS.

DO SEEK WITH 0 DIFFERENCE, SIGN 0, HEAD 1. WAIT FOR  
INTERRUPT. GET STATUS AND CHECK STATE IS 5. IF NOT:  
DIFFERENCE COUNTER IS PICKING UP BITS  
ASSOCIATED CIRCUITRY IS BAD

VERIFY DRIVE READY RESET. IF NOT:

ENABLE TIMEOUT OR READY LATCH/ONE SHOT BAD

WAIT APPROX 10 MS FOR READY TO SET. IF IT TAKES LONGER OR  
DOESN'T SET AT ALL:

HEADS ARE MOVING (INTEGRATOR OR NULL DETECTION)  
READY ONE SHOT FAILED  
DRIVE CANNOT TRACK WITH THIS HEAD

VERIFY DRIVE ERROR DID NOT SET.

DO GET STATUS, CHECK HEAD SELECT IS CORRECT. IF NOT:

HEAD SELECT REGISTER BAD  
DRIVE COMMAND SHIFT REGISTER BAD

DO SEEK WITH 0 DIFFERENCE, SIGN 0, HEAD 0. REPEAT ABOVE  
TESTS.

#### TEST 13 HEAD ALIGNMENT SUPPORT ROUTINE

THIS TEST IS EXECUTED IN PROGRAM MODE 2, HEAD ALIGNMENT  
SUPPORT IS REQUESTED, AND IN THE FIRST PASS ONLY. IT IS

THIS TEST SELECTS THE DRIVE UNDER TEST AND LOOPS ON A GET  
STATUS WITH RESET. THE WRITE LOCK BIT IS MONITORED AND WHEN  
WRITE LOCK IS RESET HEAD 0 IS SELECTED AND WHEN WRITE LOCK IS  
SET HEAD 1 IS SELECTED. READ HEADERS ARE PERFORMED AND THE  
CYLINDER ADDRESS IS DISPLAYED IN THE MQ. THIS WILL PERMIT  
THE HEADS TO BE ALIGNED IN KEEPING WITH THE PRESENT HEAD  
ALIGNMENT PROCEDURE WITHOUT RETURNING TO THE CONSOLE.

TYPING A CARRIAGE RETURN ON THE CONSOLE WILL TERMINATE THIS  
TEST ON THE DRIVE UNDER TEST. BEFORE TERMINATING, THE TEST  
WILL CHECK THAT WRITE LOCK IS RESET. IF NOT, THE OPERATOR  
WILL BE REQUESTED TO RESET WRITE LOCK.

NOTE: THIS TEST SHOULD NOT BE PERFORMED UNTIL IT IS KNOWN  
THAT THE READ HEADER COMMAND FUNCTIONS PROPERLY.

#### TEST 14 READ HEADER TEST (PART 1)

DO SEEK WITH DIFFERENCE 0, HEAD 0, SIGN 0. WAIT FOR INTERRUPT  
AND WAIT FOR DRIVE READY.  
DO READ HEADER, WAIT FOR INTERRUPT.  
CHECK IF HEADER CRC ERROR SET. IF SET:  
READ/WRITE BOARD BAD  
READ DATA LINE BAD

HEADS ARE SWITCHED (CABLE)  
HEAD SELECT LOGIC

IF MANUAL INTERVENTION TESTS WERE RUN AND HEAD ALIGNMENT TESTS WERE NOT RUN, CHECK THAT HEADER WORD 0 INDICATES HEADS ARE POSITIONED OVER CYLINDER 0 (FIRST PASS ONLY). STORE HEADER WORD 1.

REPEAT TESTS USING HEAD 1.

CHECK THAT CYLINDER PORTION OF STORED HEADER WORD 1 IS THE SAME AS HEADER WORD 1 OF THIS HEADER. IF NOT:

HEADS ARE MISALIGNED

#### TEST 15 SPINDLE ROTATION TIMING TEST

READ HEADER AT CYLINDER 0, HEAD 0. WAIT FOR INTERRUPT. START TIMING.

DO 2560 READ HEADERS AT CYLINDER 0, HEAD 0 (64 REVOLUTIONS). STOP TIMING AFTER INTERRUPT FROM LAST READ HEADER.

DIVIDE TIME BY 64. REPORT RESULT IN OCTAL AS SPINDLE ROTATION TIME.

NOTE: THIS TEST WILL ONLY BE PERFORMED IF OPTION 1 IS AVAILABLE, AND IS EXECUTED IN THE FIRST PASS ONLY.

#### TEST 16 READ HEADER TEST (PART 2)

DO SEEK WITH DIFFERENCE 0, SIGN 0, HEAD 0. WAIT FOR INTERRUPT. WAIT FOR READY.

DO 40 CONSECUTIVE READ HEADER, STORE 3 HEADER WORDS AFTER EACH READ.

BIT 15 WORD 1 AND 3 IS 0, HS BIT WORD 1 IS 0). IF NOT:

BAD READ/WRITE BOARD  
BAD PACK

DO SEEK WITH DIFFERENCE 0, SIGN 0, HEAD 1. REPEAT ABOVE TEST FOR HEAD 1.



CHECK IF DRIVE IS WRITE LOCKED. IF NOT, ASK OPERATOR TO WRITE LOCK DRIVE.

CHECK THAT WRITE LOCK SETS. IF NOT, ASK OPERATOR TO CONFIRM ACTION.

DO WRITE DATA. CHECK ERROR SETS. IF NOT:

WRITE PROTECT ERROR DETECTION BAD  
BAD GATING TO DRIVE ERROR

CHECK THAT READY IS SET AND NO OTHER ERRORS ARE SET IN STATUS. IF ANY SET:

REPORT UNEXPECTED ERROR.

DO GET STATUS AND RESET. CHECK THAT ERROR RESETS. IF NOT:

BAD LATCH FOR WRITE PROTECT ERROR

NOTE: THIS TEST IS EXECUTED ONLY IF PROGRAM OPERATION MODE 2 IS SELECTED. MANUAL INTERVENTION TESTING IS REQUESTED, AND IS RUN IN FIRST PASS ONLY.

TEST 18 DIFFERENCE OF 1 SEEK TEST (PART 1)  
DO READ HEADER, WAIT FOR INTERRUPT. STORE WORD 1 OF HEADER.

DO SEEK WITH DIFFERENCE OF 1, HEAD 0. IF CYLINDER OF STORED HEADER WORD IS NOT 255 THEN SIGN BIT 1, ELSE SIGN BIT 0. WAIT FOR INTERRUPT.  
WAIT UP TO 10 MS FOR STATE TO CHANGE TO 4 AND BACK TO 5.  
IF STATE DID NOT GO TO 4:

DRIVE COMMAND SHIFT REGISTER BAD  
DIFFERENCE REGISTER DROPPED BIT  
STATE ROM FAILED  
IF STATE DID NOT GO TO 5:

DIFFERENCE REGISTER NOT COUNTING  
COUNT PULSE NOT GENERATED (COUNT LOGIC)  
SEEK ROM FAILED  
FAILURE IN DC SERVO  
NO TACH FEEDBACK  
WAIT APPROX 1 MS LONGER. TEST DRIVE READY. IF SET:  
FAILURE IN READY LATCH OR INTEGRATOR

FAILURE IN INTEGRATOR  
UNEXPECTED GUARD BAND DETECTED

DO SEEK WITH DIFFERENCE 1, OPPOSITE SIGN, HEAD 0. REPEAT ALL TESTS AS ABOVE.

REPEAT TEST USING HEAD 1.

NOTE: THIS TEST IS PERFORMED AT THE CYLINDER POSITION FOUND IN THE DRIVE WHEN THE TEST EXECUTES. CHOOSING A SINGLE SURFACE WILL LIMIT TESTING TO THAT SURFACE.

#### TEST 19 DIFFERENCE OF 1 SEEK TEST (PART 2)

DO READ HEADER, WAIT FOR INTERRUPT. STORE WORD 1 OF HEADER.

DO SEEK WITH DIFFERENCE OF 1, HEAD 0. IF CYLINDER OF STORED HEADER WORD IS NOT 255 THEN SIGN BIT 1, ELSE SIGN BIT 0. WAIT FOR INTERRUPT, WAIT FOR DRIVE READY.

DO READ HEADER, WAIT FOR INTERRUPT. COMPARE CYLINDER OF THIS HEADER WITH CYLINDER OF STORED HEADER FOR DIFFERENCE OF ONE. IF NOT:

COUNT LOGIC BAD  
INTEGRATOR FAILED

CHECK THAT HEADS MOVED FORWARD OR REVERSE AS EXPECTED. IF NOT:

SEEK ROM FAILED

DO SEEK WITH DIFFERENCE OF 1, OPPOSITE SIGN, HEAD 0. REPEAT ALL TESTS AS ABOVE.

REPEAT TEST USING HEAD 1.

NOTE: THIS TEST IS PERFORMED AT THE CYLINDER POSITION FOUND IN THE DRIVE WHEN THE TEST EXECUTES. CHOOSING A SINGLE SURFACE WILL LIMIT TESTING TO THAT SURFACE.

#### TEST 20 OUTER GUARD BAND DETECTION TEST

DO READ HEADER, WAIT FOR INTERRUPT. CHECK IF AT CYLINDER 0. IF NOT, SEEK REVERSE 1 CYLINDER AT A TIME UNTIL CYLINDER 0 IS REACHED. IF ANY REVERSE SEEK FAILS TO MOVE THE HEADS IN 10 TRIES:

DETECTION OF GUARD BAND PREMATURE.

WHEN AT CYLINDER 0, DO SEEK DIFFERENCE OF 1, SIGN 0, HEAD 0. WAIT FOR INTERRUPT, WAIT FOR READY. READY SHOULD SET IN 30MS. IF NOT:

FAILED TO DETECT GUARD BAND

DO READ HEADER. WAIT FOR INTERRUPT. CHECK FOR CYLINDER 0. IF NOT

FAILED TO SEEK BACK TO ZERO

DO SEEK WITH DIFFERENCE OF 1, SIGN 0, HEAD 1. DO SAME TESTS AS ABOVE WITH REGARD TO READY VS TIME AND CYLINDER FOUND IN HEADER.

NOTE: CHOOSING A SINGLE SURFACE WILL LIMIT TESTING TO THAT SURFACE.

# TEST 21 INCREMENTAL FORWARD SEEK HEAD 0 TEST

POSITION HEADS AT CYLINDER 0 USING SEEKS WITH DIFFERENCE OF ONE, HEAD 0.

DO SEEK WITH DIFFERENCE OF 1, SIGN 1, HEAD 0. WAIT FOR INTERRUPT, WAIT FOR DRIVE READY. CHECK READY IS SET IN 15 MS. IF NOT:

POSITIONING PROBLEM AT A SPECIFIC CYLINDER  
MECHANICAL OBSTRUCTION

DO READ HEADER. WAIT FOR INTERRUPT. CHECK THAT THIS CYLINDER IS OLD CYLINDER + 1. IF NOT:

DIFFERENCE REGISTER OR COUNT LOGIC FAILURE  
TRACK CROSSING DETECTION FAILURE

REPEAT SEEKS AND READS UNTIL CYLINDER READ IS 255.

NOTE: IF PROGRAM MODE 2 IS USED AND THE "HEAD ALL HEADERS" PARAMETER IS SPECIFIED AS "Y", THE TEST WILL READ AND TEST ALL 40 HEADERS (CARTRIDGE VERIFY).

NOTE: TESTING WILL BE DONE BETWEEN UPPER AND LOWER CYLINDER LIMITS. CHOOSING A SINGLE SURFACE WILL LIMIT TESTING TO THAT SURFACE. THIS TEST WILL BE BYPASSED IF SURFACE 1 IS CHOSEN.

POSITION HEADS AT CYLINDER 255 USING SEEKS WITH DIFFERENCE OF 1, HEAD 0.

DO SEEK WITH DIFFERENCE OF 1, SIGN 0, HEAD 0. WAIT FOR INTERRUPT, WAIT FOR DRIVE READY. CHECK READY SET IN 15 MS:

POSITIONING PROBLEM AT A SPECIFIC CYLINDER  
DO READ HEADER, WAIT FOR INTERRUPT. CHECK THAT THIS CYLINDER IS OLD CYLINDER - 1. IF NOT:

DIFFERENCE REGISTER OR COUNT LOGIC FAILURE  
TRACK CROSSING DETECTION FAILURE

REPEAT SEEK AND CHECKS UNTIL CYLINDER IS 0.

NOTE: IF PROGRAM MODE 2 IS USED AND THE "READ ALL HEADERS" PARAMETER IS SPECIFIED AS "Y", THE TEST WILL READ AND TEST ALL 40 HEADERS (CARTRIDGE VERIFY).

NOTE: TESTING WILL BE DONE BETWEEN UPPER AND LOWER CYLINDER LIMITS. CHOOSING A SINGLE SURFACE WILL LIMIT TESTING TO THAT SURFACE. THIS TEST WILL BE BYPASSED IF SURFACE 1 IS CHOSEN.

#### TEST 23 INCREMENTAL FORWARD SEEK HEAD 1 TEST

POSITION HEADS AT CYLINDER 0 USING SEEKS WITH DIFFERENCE OF ONE, HEAD 0.

DO SEEK WITH DIFFERENCE OF 1, SIGN 1, HEAD 1. WAIT FOR INTERRUPT, WAIT FOR DRIVE READY. CHECK READY IS SET IN 15 MS. IF NOT:

POSITIONING PROBLEM AT A SPECIFIC CYLINDER

DO READ HEADER, WAIT FOR INTERRUPT. CHECK THAT THIS CYLINDER IS OLD CYLINDER + 1. IF NOT:

DIFFERENCE REGISTER OR COUNT LOGIC FAILURE  
TRACK CROSSING DETECTION FAILURE

REPEAT SEEKS AND READS UNTIL CYLINDER READ IS 255.

NOTE: IF PROGRAM MODE 2 IS USED AND THE "READ ALL HEADERS" PARAMETER IS SPECIFIED AS "Y", THE TEST WILL READ AND TEST ALL 40 HEADERS (CARTRIDGE VERIFY).

NOTE: TESTING WILL BE DONE BETWEEN UPPER AND LOWER CYLINDER LIMITS. CHOOSING A SINGLE SURFACE WILL LIMIT TESTING TO THAT SURFACE. THIS TEST WILL BE BYPASSED IF SURFACE 0 IS CHOSEN.

POSITION HEADS AT CYLINDER 255 USING SEEK WITH DIFFERENCE OF 1, HEAD 0.

WHEN AT CYLINDER 255, DO SEEK WITH DIFFERENCE OF 1, SIGN 1, HEAD 0. WAIT FOR INTERRUPT, WAIT FOR DRIVE READY. READY SHOULD SET IN LESS THAN 30MS. IF NOT:

FAILED TO DETECT GUARD BAND

DO READ HEADER. WAIT FOR INTERRUPT. CHECK FOR CYLINDER 255. IF NOT:

FAILED TO SEEK BACK TO CYLINDER 255

DO SEEK WITH DIFFERENCE OF 1, SIGN 1, HEAD 1. DO SAME TESTS AS ABOVE.

NOTE: CHOOSING A SINGLE SURFACE WILL LIMIT TESTING TO THAT SURFACE.

# TEST 25 INCREMENTAL REVERSE SEEK HEAD 1 TEST

POSITION HEADS AT CYLINDER 255 USING SEEKS WITH DIFFERENCE OF 1, HEAD 0.

DO SEEK WITH DIFFERENCE OF 1, SIGN 0, HEAD 1. WAIT FOR INTERRUPT, WAIT FOR DRIVE READY. CHECK READY SET IN 15 MS:

POSITIONING PROBLEM AT A SPECIFIC CYLINDER

DO READ HEADER, WAIT FOR INTERRUPT. CHECK THAT THIS CYLINDER IS OLD CYLINDER - 1. IF NOT:

DIFFERENCE REGISTER OR COUNT LOGIC FAILURE  
TRACK CROSSING DETECTION FAILURE

REPEAT SEEK AND CHECKS UNTIL CYLINDER IS 0.

NOTE: IF PROGRAM MODE 2 IS USED AND THE "READ ALL HEADERS" PARAMETER IS SPECIFIED AS "Y", THE TEST WILL READ AND TEST ALL 40 HEADERS (CARTRIDGE VERIFY).

NOTE: TESTING WILL BE DONE BETWEEN UPPER AND LOWER CYLINDER LIMITS. CHOOSING A SINGLE SURFACE WILL LIMIT TESTING TO THAT SURFACE. THIS TEST WILL BE BYPASSED IF SURFACE 0 IS CHOSEN.

POSITION HEADS AT CYLINDER 0. IF NOT AT 0, MOVE HEADS USING 1 CYLINDER SEEKS.

DO READ HEADER, RECORD POSITION. DO SEEK WITH DIFFERENCE OF 2 (MAX DISTANCE AT 3 IPS), SIGN 1, HEAD 0. DO READ HEADER, CHECK NEW CYLINDER IS OLD CYLINDER + DISTANCE. IF NOT:

TRACK CROSSING DETECTION FAILURE  
DIFFERENCE COUNTER FAILURE  
COUNT PULSE GENERATION FAILURE  
VELOCITY ROM FAILURE

REPEAT ABOVE UNTIL OLD CYLINDER + DISTANCE > 255. POSITION AT 255.

DO READ HEADER, RECORD POSITION. DO SEEK WITH DIFFERENCE OF 2 (MAX DISTANCE AT 3 IPS), SIGN 0, HEAD 0. DO READ HEADER, CHECK NEW CYLINDER IS OLD CYLINDER - DISTANCE. IF NOT:

TRACK CROSSING DETECTION FAILURE

REPEAT UNTIL OLD CYLINDER - DISTANCE < 0. REPEAT ALL OF THE ABOVE USING HEAD 1.

REPEAT ALL OF THE ABOVE TESTS USING THE FOLLOWING DISTANCES: 6, 9, 12, 17, 22, 27, 34, 41, 128, 256. THESE DISTANCES ARE SPECIFIED BECAUSE THEY REPRESENT THE MAXIMUM DISTANCE FOR EACH VELOCITY LEVEL USED IN THE DRIVE.

NOTE: TESTING WILL BE DONE BETWEEN UPPER AND LOWER CYLINDER LIMITS. CHOOSING A SINGLE SURFACE WILL LIMIT TESTING TO THAT SURFACE.

#### TEST 27 FORWARD OSCILLATING SEEK TEST

POSITION HEADS AT CYLINDER 0.

DO OSCILLATING SEEK USING HEAD 0 (SEEK FROM 0 TO 1 TO 0, 0 TO 2 TO 0, 0 TO 3 TO 0, ....0 TO 255 TO 0). AFTER EACH SEEK READ HEADER AND VERIFY POSITION.

REPEAT TEST USING HEAD 1.

NOTE 1: CHOOSING A SINGLE SURFACE WILL LIMIT TESTING TO THAT SURFACE. SEEKS WILL BE WITHIN THE UPPER AND LOWER LIMITS SPECIFIED.

NOTE 2: A SWITCH REGISTER BIT WILL FORCE LOOPING ON THIS TEST AND SEEKS BETWEEN THE UPPER AND LOWER LIMITS. THIS WILL ALLOW A FIXED DISTANCE SEEK LOOP FOR ADJUSTMENTS.

#### TEST 28 REVERSE OSCILLATING SEEK TEST

POSITION HEADS AT CYLINDER 255. DO OSCILLATING SEEK USING HEAD 0. (SEEK FROM 255 TO 254 TO 255, 255 TO 253 TO

VERIFY POSITION.

REPEAT TEST USING HEAD 1.

NOTE 1: CHOOSING A SINGLE SURFACE WILL LIMIT TESTING TO THAT SURFACE. SEEKS WILL BE WITHIN THE UPPER AND LOWER LIMITS SPECIFIED.

S.7.0 PROGRAM, SYMBOL TABLE, AND CROSS REFERENCE LISTING  
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/AJRLH-B      RL8A/RL02 SEEK/FUNCTION DIAGNOSTIC
/ REVISION HISTORY
/ -----
/ ORIGINAL BY JACK RICH
/ MODIFICATIONS BY
/ -----
/ H. POULTER      FEBRUARY 1979
/ HP 001          CHANGES NEEDED TO RUN THE RL02.
/ HP 002          FIX TEST 3 BRUSH HOME RESET ROUTINE.
/ HP 003          ALLOW HEAD AND CYLINDER TO BE LOAD INTO MO.
/ HP 004          ALLOW ENOUGH TIME FOR READY TO SET IN
/                TEST 20 AND TEST 24 GUARD BAND TEST
/ HP 005          THE INNER GUARD BAND TESTS LOOKS FOR CYL 776.
/ HP 006          FIX ERROR MESSAGE FOR GUARD BAND ERROR
/ HP 007          CHANGE MESSAGE TO PRESS LOAD SWITCH IN TEST 3
/ HP 010          CHANGE DELAY WHEN WAITING FOR READY SHOWED UP IN TEST 11
/                CHANGED DELAY FROM 10 MS TO 20 MS.
/ M.LETENDRE      JANUARY 1981
/ ML 001          VERSION "D" CHANGES FOR THE VT278 COMPATABILITY
/                UPGRADE

0000 FIELD 0
0000 *0
0001 0302 "B
0002 5402 JMP I .+1
0003 5400 PWRFL
0003 5414 PWRUP

0010 *10
0010 0000 AUTO10, 0
0011 0000 AUTO11, 0
0020 0020 *20
0020 0000 PSWR, 0
0021 0000 HCW1, 0
0022 0000 HCW2, 0
0023 0001 FILLER, 1
0024 4424 RLDC= JMS I
0025 5272 XRLDC XRLDC
0026 4425 JMS I
0027 5275 XRLSD XRLSD
0028 4426 RLMA= JMS I
0029 5302 XRLMA XRLMA
0030 4427 RLCA= JMS I
0031 5305 XRLCA XRLCA
0032 4430 RLCB= JMS I
0033 5310 XRLCB XRLCB
0034 4431 RLSA= JMS I
0035 5313 XRLSA XRLSA
0036 4432 RLWC= JMS I
0037 5316 XRLWC XRLWC
0038 4433 RRER= JMS I
0039 5321 XRRER XRRER
0040 4434 RRWC= JMS I
0041 5324 XRRWC XRRWC
0042 4435 RRCA= JMS I

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/REVISION B ORIGINAL TEST FOR RL02  
/GO TO POWER FAIL ROUTINE  
/POINTER TO POWER FAIL ROUTINE  
/POINTER TO POWER UP ROUTINE (A JMP I 3  
/ INSTRUCTION IS PLACED AT 0)

/DEFAULT TO SOFTWARE SWITCHES--4000 FOR HARDWARE SWR  
/NUMBER OF FILLER CHARACTERS REQUIRED  
/DEVICE CLEAR IOT SUBROUTINE CALL  
/POINTERS TO IOT ROUTINES  
/SKIP ON DONE IOT SUBROUTINE CALL  
/LOAD BREAK MA IOT SUBROUTINE CALL  
/LOAD COMMAND REG A IOT SUBROUTINE CALL  
/LOAD COMMAND REG B IOT SUBROUTINE CALL  
/LOAD SECTOR ADDRESS IOT SUBROUTINE CALL  
/LOAD WORD COUNT REG SUBROUTINE CALL  
/READ ERROR REG IOT SUBROUTINE CALL  
/READ WORD COUNT IOT SUBROUTINE CALL  
/READ COMMAND REG A IOT SUBROUTINE CALL



0035	5327	XRRCA	/READ COMMAND REG B IOT SUBROUTINE CALL
0036	4436	JMS I	
0036	5332	XRRCB	/READ SECTOR ADDR IOT SUBROUTINE CALL
0037	4437	JMS I	
0037	5335	XRRSA	/READ SILO WORD IOT SUBROUTINE CALL
0040	4440	JMS I	
0040	5340	XRRSI	/SKIP ON DRIVE ERROR IOT SUBROUTINE CALL
0041	4441	JMS I	
0041	5343	XRLSE	/READ EITHER HARDWARE OR PSEUDO SWITCHES
0042	4442	JMS I	
0042	6537	GETSR	/SKIP IF NOT RUNNING UNDER APT
0043	4443	JMS I	
0043	7354	APTCHK	//GENERATE TIMING FOR APT
0043	4444	XAPTCH	
0044	4444	JMS I	
0044	5200	TICK	/LOOP CONTROL SUBROUTINE
0044	4445	JMS I	
0045	4400	SCOPE	/ERROR HANDLER
0046	4446	JMS I	
0046	4432	ERROR	/TELETYPE INPUT HANDLER
0047	4447	JMS I	
0047	4600	CONSOL	/TYPE "G" THEN CALL CNTRLG
0050	4450	JMS I	
0050	4675	UPARG	/CONTROL-G HANDLER--SWITCH REG MODIFY ROUTINE
0051	4451	JMS I	
0051	4705	CNTRLG	/CONTROL-F HANDLER (FILL COUNT ADJUSTMENT)
0052	4452	JMS I	
0052	4644	CNTRLF	/GET OPERATORS RESPONSE TO YES-NO QUES
0053	4453	JMS I	
0053	5643	GETRES	/ALLOW OPERATOR TO ENTER VALUE
0054	4454	JMS I	
0054	6000	ENTVAL	/GET OCTAL NUMBER
0055	4455	JMS I	
0055	5600	GETNUM	/CHECK IF LAST CHARACTER WAS 'F OR 'G
0056	4456	JMS I	
0056	4750	WZITFG	/RESET DRIVE AND WAIT FOR DONE
0057	4457	JMS I	
0057	5461	RESET	/GET STATUS AND WAIT FOR DONE
0060	4460	JMS I	
0060	5474	GETSTA	/COMPARE EXPECTED WITH ACTUAL STATUS (AS IN DATA1,2)
0061	4461	JMS I	
0061	5350	STACHK	/CHECK OF OPERATION OF ZERO DIFFERENCE SEEK
0062	4462	JMS I	
0062	6600	ZSEKCH	/ISSUE A SEEK AND WAIT FOR DONE (CA ALREADY SET UP)
0063	4463	JMS I	
0063	6113	SEEK	/ISSUE A READ HEADER AND WAIT FOR DONE. HEADER LEFT IN SILO
0064	4464	JMS I	
0064	6137	REDHDR	/SEEK TO CYLINDER ADDRESS CONTAINED IN LASTCY
0065	6240	XREDHD	
0066	4466	JMS I	
0066	6200	SEKBAK	/GET CURRENT CYLINDER ADDR INTO AC FROM HEADER WORDS IN SILO
0067	4467	JMS I	
0067	6157	GETCYL	/IF NECESSARY, REQUEST OPERATOR TO MAKE DRIVE READY AND WAIT
0070	4470	JMS I	
0070	6051	RQSTRY	
		XQSTR	

0071	4471	WRENWT=	JMS I	.	/WAIT FOR OPERATOR TO WRITE ENABLE DRIVE
	6072	XWRENW			
0072	4472	SEK1CH=	JMS I	.	/CHECK THE OPERATION OF DIFFERENCE OF 1 SEEK
	5667	XSEK1C			
0073	4473	SETTIM=	JMS I	.	/SET UP REAL TIME CLOCK
	5515	XSETI			
0074	4474	TIMCHK=	JMS I	.	/CHECK FOR REAL TIME PASSAGE
	5543	XTIMCH			
0075	4475	ERRCHK=	JMS I	.	/CHECK ERROR FLAG AND REPORT ERROR IF
	5441	XERRCH			
0076	4476	JMPPM1=	JMS I	.	/SET. SKIP IF NOT SET
	5364	XJMPPM			
0077	4477	RDYWAT=	JMS I	.	/JMP.-1 EXCEPT ALLOW CONSOLE INPUT
	7056	XRDYWA			
0100	4500	YNOTRY=	JMS I	.	/WAIT 3 SECONDS FOR DRIVE READY
	7200	XYNOTR			
0101	4501	SEEKV=	JMS I	.	/FIND OUT WHY DRIVE IS NOT READY AND ACT ACCORDINGLY
	6712	XSEEKV			
0102	4502	SEEK1V=	JMS I	.	/SEEK AND VERIFY CYLINDER
	7000	XSEEK1			
0103	4503	LISN=	JMS I	.	/SEEK 1 CYLINDER, TIME READY, AND VERIFY CYLINDER
	5075	XLISN			
0104	4504	MESAGE=	JMS I	.	
	5223	MESAGX			
0105	4505	PRNT1=	JMS I	.	
	5215	XPRNT1			
0106	4506	PRNT2=	JMS I	.	
	5000	XPRNT2			
0107	4507	PRNT4=	JMS I	.	
	4762	XPRNT4			
0110	4510	SPACE2=	JMS I	.	
	6024	SPACX2			
0111	4511	TYPE=	JMS I	.	
	5012	XTYPE			
0112	4512	CRLF=	JMS I	.	
	5056	XCRLF			
0113	4513	VT278=	JMS I	.	
	5770	XVT278			
0114	4514	SCNINT=	JMS I	.	
	7074	XSCNIN			
0115	4515	SETINT=	JMS I	.	
	7101	XSETIN			
0116	4516	VTCHK=	JMS I	.	
	7115	XVTCHK			

0117	0000	ERRPC,	0	////COMMON DATA BLOCK MUST BE LEFT IN CURRENT ORDER FOR ERROR DATA TYPEOUTS
0120	0000	DRVNUM,	0	/PC OF ERROR CALL STORED HERE
0121	0000	DATA1,	0	/DRIVE NUMBER IS STORED HERE FOR ERROR REPORT
0122	0000	DATA2,	0	/DATA FOR ERROR TYPEOUTS STORED HERE
0123	0000	DATA3,	0	
0124	0000	DATA4,	0	
0125	0000	DATA5,	0	
0126	0000	DATA6,	0	

## ///END COMMON BLOCK

0127	0000	LOOPPT, 0	/POINTER (SET FROM PREVIOUS SCOPE
0130	0000	ERRFLG, 0	/STATEMENT) USED FOR LOOPING
0131	0000	LPRQST, 0	/ERROR FLAG USED BY SCOPE AND ERROR
0132	0000	LASTCY, 0	/LOOP REQUEST FLAG FOR SUBTEST FLAG TO SCOPE
0133	0000	CURCYL, 0	/LAST CYLINDER ADDRESS DRIVE WAS AT
0134	0000	TEMP1, 0	/CURRENT CYLINDER SOMETIMES STORED HERE
0135	0000	TEMP2, 0	/TEMPORARY STORAGE ONLY!
0136	0000	TEMP3, 0	/TEMP3 NOT TO BE USED BY ANY SUBROUTINES!!
0137	0000	TEMP4, 0	/DITTO FOR TEMP 4
0140	0000	OSCIL, 0	/CYLINDER TO OSCILLATE TO
0141	0000	NOPRNT, 0	/FLAG TO ALLOW OUTPUT (USED W/ CNTRL-S)
0142	0000	PASCNT, 0	/NUMBER OF PASSES OF PROGRAM
0143	0000	LASTIN, 0	/LAST CHARACTER INPUT IS STORED HERE
0144	0000	OPT1, 0	/OPTION 1 AVAILABLE FLAG
0145	0000	DRVcnt, 0	/A COUNTER
0146	0000	DEVcod, 0	/0 IF DEVICE CODE 60.61 IS TO BE USED
0147	7777	SURFAC, -1	/20 IF DEVICE CODE 62.63 IS TO BE USED
0150	0024	ERRLIN, 24	/WHICH SURFACE TO USE FLAG (-1 = BOTH)
0151	0000	LOLIM, 0	/ERROR LIMIT (DRIVE WILL BE DROPPED IF REACHED)
0152	0777	HILIM, 777	/LOWER SEEK LIMIT
0153	0000	MANINT, 0	/UPPER SEEK LIMIT
0154	0000	HEDALN, 0	/EXECUTE MANUAL INTERVENTION TEST FLAG
0155	0000	EXDRSL, 0	/EXECUTE HEAD ALIGNMENT SUPPORT TEST FLAG
0156	0000	DRSLFL, 0	/EXECUTE DRIVE SELECT TEST FLAG
0157	0000	DSERFL, 0	/FLAG IS SET IF DRIVE SELECT TEST HAS BEEN EXECUTED
0160	0000	EXDSEER, 0	/DITTO FOR DRIVE SELECT ERROR TEST
0161	0000	ALLHED, 0	/EXECUTE DRIVE SELECT ERROR TEST FLAG
0162	0000	HEDBOX, 0	/READ ALL HEADERS FLAG
0163	0200	K200, 200	
0164	0400	K400, 400	
0165	0377	K377, 377	
0166	0777	K0777, 0777	
0167	1000	K1000, 1000	
0170	0007	K7, 7	
0171	0015	K15, 15	
0172	7774	M4, -4	
0173	7777	M1, -1	
0174	0100	K100, 100	
0175	4001	K4001, 4001	
0176	6001	K6001, 6001	
0177	2001	K2001, 2001	
6007		CAF=6007	/CLEAR ALL FLAGS
6003		SRQ=6003	/SKIP ON INTERRUPT REQUEST
6035		KIE=6035	/AC11 TO CONSOLE INTERRUPT ENABLE FF
6030		KCF=6030	/CLEAR KEYBOARD FLAG
6045		TIE=6045	
6030		KCF=6030	
6032		KCC=6032	
7002		BSW=7002	

HP 001

HP 001  
HP 001

6102 SPL=6102 /SKIP ON POWER LOW HP 003  
 7421 MQL=7421 /LOAD THE AC INTO THE MQ AND CLEAR THE AC.  
 6031 KSF=6031 /INTRPT ENA CRTC  
 6055 ESIA=6055  
 5200 BUFFER= 5200  
 5440 BADSEC= 5440

/DISK STATUS REGISTER BIT DEFINITIONS

/WORD1  
 0200 RL02ID= 200 /IDENTIFICATION FIELD; RL02=200 , RL01=0  
 0100 HDSLCT= 100 /HEAD SELECT  
 0040 COVERO= 40 /COVER OPEN  
 0020 HEDOUT= 20 /HEADS OUT (OVER DISK)  
 0010 BRUSHH= 10 /BRUSH HOME

/STATE DEFINITIONS

0001 SPINUP= 1  
 0002 LODHED= 2  
 0003 BRUSHC= 3  
 0004 SEKCNT= 4  
 0005 SEKLIN= 5  
 0006 UNLODH= 6  
 0007 SPINDN= 7  
 /WORD 2  
 0200 WRDERR= 200 /WRITE DATA ERROR  
 0100 HEDCUR= 100 /HEAD CURRENT ERROR  
 0040 WRLOCK= 40 /WRITE LOCK STATUS  
 0020 SEEKTO= 20 /SEEK TIME OUT  
 0010 SPUPTO= 10 /SPIN UP TIME OUT  
 0004 WRGATE= 4 /WRITE GATE ERROR  
 0002 VOLUME= 2 /VOLUME CHECK  
 0001 DRSLER= 1 /DRIVE SELECT ERROR

1000 MODE8= 1000 /8 BIT MODE IN CB  
 2000 HEAD1= 2000 /HEAD SELECT BIT IN CA  
 0200 \*200  
 0200 6007  
 0201 3127 CAF LOOPPT  
 DCA  
 KIE  
 TIE  
 DCA PASCNT  
 APTCHK  
 JMP APTSET  
 MESSAGE  
 MANDEC  
 DCA DRSLFL  
 DCA DSERFL  
 CONSOL  
 GETSR  
 AND K100  
 SZA CLA  
 JMP FRSTDR  
 TAD HCW1  
 0202 6035  
 0203 6045  
 0204 3142  
 0205 4443  
 0206 5777  
 0207 4504  
 0210 1000  
 0211 3156  
 0212 3157  
 0213 4447  
 0214 4442  
 0215 0174  
 0216 7640  
 0217 5776  
 0220 1021  
 /CLEAR ALL FLAGS  
 /FLAG THAT LOOP POINTER IS NOT VALID  
 /((IN CASE OF A RESTART)  
 /DISABLE CONSOLE INTERRUPTS  
 /CLEAR PASS COUNT  
 /SKIP IF NOT ON APT  
 /SKIP ALL OPENING DIALOG  
 /TYPE OUT MAINDEC NUMBER  
 /POINTER TO TEXT (LOCATED IN FIELD 1)  
 /FLAG THAT DRIVE SELECT TEST HAS NOT BEEN EXECUTED  
 /DITTO FOR DRIVE SELECT ERROR TEST  
 /CHECK FOR CONSOLE INPUT  
 /GET SWITCHES (HARD OR PSEUDO)  
 /MASK OUT ALL BUT BIT 5  
 /SKIP IF NOT USING PREVIOUS RESPONSES  
 /SKIP OVER OPERATOR PROMPTS  
 /GET HARDWARE CONFIGURATION WORD 1

0221	7700	SMA CLA	/SKIP IF USING HARDWARE SWITCH REGISTER
0222	4451	CNTRLG	/LET OPERATOR ENTER SWITCH REGISTER VALUE
0223	4442	GETSR	/GET SWITCHES (HARD OR PSEUDO)
0224	0174	AND K100	/MASK OUT ALL BUT BIT 5
0225	7640	SZA CLA	/SKIP IF NOT USING PREVIOUS RESPONSES
0226	5776	JMP	/SKIP OVER OPERATOR PROMPTS
0227	1172	TAD M4	/SET UP A COUNTER FOR FOUR DRIVES
0230	3145	DCA	/ZERO OUT DRIVE NUMBER
0231	3120	DRVNUM	/SET UP POINTER TO DRIVE ACTIVE TABLE
0232	1375	TAD (DRVACT-1	
0233	3011	DCA AUTO11	
0234	1374	TAD (DRVOER-1	/PICK UP POINTER TO DRIVE ERROR COUNTERS
0235	3010	DCA AUTO10	/SAVE POINTER IN AUTO INC REG
0236	3410	DRVNUM, DCA I	/CLEAR OUT ERROR COUNT FOR THIS DRIVE
0237	4504	MESSAGE	/*TEST DRIVE *
0240	1126	TSTDV	
0241	1120	TAD	/GET DRIVE NUMBER
0242	4505	PRNT1	/TYPE IT
0243	4504	MESSAGE	/* ? *
0244	1134	SQSP	
0245	4453	GETRES	/GET OPERATORS RESPONSE
0246	5237	JMP	/REMPROMPT IF NOT "Y", "N", OR "<CR>"
0247	3411	DCA I	/SET THE DRIVE ACTIVE FLAG BASED ON OPR'S RESPONSE
			/RETURN FROM GETRES WAS "1" IF ANSWER
			/WAS "Y", AND "0" IF ANSWER WAS "N" OR "<CR>"
			/GO TO NEXT DRIVE (FOR TYPEOUT)
			/ASKED FOR ALL DRIVES?
			/NO--GO PROMPT FOR NEXT DRIVE
			/YES--ISSUE NEXT PROMPT
			/IS 8/A OPTION 1 AVAILABLE?
			/GET OPERATOR'S RESPONSE
			/WAIT FOR VALID RESPONSE
			/SAVE FLAG
			/GET SWITCHES (HARD OR PSEUDO)
			/MASK OUT ALL BUT BIT 5
			/SKIP IF NOT USING PREVIOUS RESPONSES
			/SKIP OVER OPERATOR PROMPTS
			/DO YOU WISH TO SELECT NON-DEFAULT PARAMETERS?
			/GET OPERATORS RESPONSE
			/REMPROMPT IF NOT YES, NO, OR CR
			/SKIP IF ANSWER WAS YES
			/GO SET UP DEFAULTS
			/USE DEVICE CODES 62,63?
			/GET OPERATOR'S RESPONSE
			/WAIT FOR VALID RESPONSE
			/AC=1 IF RESPONSE WAS "Y" AND 0 IF "N" OR
			/"<CR>". MOVE BIT 11 OVER TO BIT 7
			/AND SAVE DEVICE CODE FLAG
			/EXECUTE MANUAL INTERVENTION TESTS
			/GET RESPONSE
			/TRY AGAIN FOR VALID RESPONSE
			/SAVE FLAG
0250	2120	ISZ	
0251	2145	ISZ	DRVNUM
0252	5236	JMP	DRVCNT
0253	4504	MESSAGE	DRVNUM
0254	1146	OPT1AV	
0255	4453	GETRES	
0256	5253	JMP	.-3
0257	3144	DCA	OPT1
0260	4442	GETSR	
0261	0174	AND	K100
0262	7640	SZA CLA	
0263	5776	JMP	FRSTDR
0264	4504	MESSAGE	
0265	1164	USEDEF	
0266	4453	GETRES	
0267	5260	JMP	.-7
0270	7650	SNA CLA	
0271	5773	JMP	DEFSET
0272	4504	MESSAGE	
0273	1214	USE62	
0274	4453	GETRES	
0275	5272	JMP	.-3
0276	7106	CLL RTL	
0277	7106	CLL RTL	
0300	3146	DCA	DEVCOD
0301	4504	MESSAGE	
0302	1325	EXMAIN	
0303	4453	GETRES	
0304	5301	JMP	.-3
0305	3153	DCA	MANINT

0306	4504	MESSAGE
0307	1266	XDSMES
0310	4453	GETRES
0311	5306	JMP
0312	3155	DCA
0313	4504	MESSAGE
0314	1304	XDSEME
0315	4453	GETRES
0316	5313	JMP
0317	3160	DCA
0320	4504	MESSAGE
0321	1243	EXHDAL
0322	4453	GETRES
0323	5320	JMP
0324	3154	DCA
0325	4504	MESSAGE
0326	5114	SPCALN
0327	4453	GETRES
0330	5325	JMP
0331	3162	DCA
0332	4504	MESSAGE
0333	1231	USALHD
0334	4453	GETRES
0335	5332	JMP
0336	3161	DCA
0337	4504	MESSAGE
0340	1347	USLOLM
0341	4453	GETRES
0342	5337	JMP
0343	7640	SZA CLA
0344	4454	ENTVAL
0345	3151	DCA
0346	4504	MESSAGE
0347	1377	USUPLM
0350	4453	GETRES
0351	5346	JMP
0352	7640	SZA CLA
0353	5356	JMP
0354	1166	TAD
0355	7410	SKP
0356	4454	ENTVAL
0357	3152	DCA
0360	1152	TAD
0361	7041	CIA
0362	1151	TAD
0363	7710	SPA CLA
0364	5772	JMP
0365	4504	MESSAGE
0366	1413	LLLTHL
0367	5337	JMP
0372	0400	LIMITS.
0373	0476	LIMITS.
0374	6166	LIMITS.
0375	3363	LIMITS.



HP 001

0464	TAD	(DRVACT-1	/SET UP A POINTER TO THE DRIVE ACTIVE TABLE
0465	DCA	AUTO10	
0466	CLA	IAC	/SET THE FLAG FOR THIS DRIVE ACTIVE
0467	DCA	I	
0470	ISZ	AUTO10	/REACHED HIGHEST UNIT TO BE USED YET?
0471	JMP	TEMP1	/NO--KEEP SETTING FLAGS
0472	JMP	.-3	/GET APT HARDWARE CONFIGURATION WORD 1
0473	TAD	HCW1	/PUT OPTION 1 BIT INTO THE LINK
0474	RTL		/PUT LINK INTO AC
0475	CLA	RAI	/SAVE OPTION 1 AVAILABLE FLAG
0476	DCA	ALLHED	/SET UP ALL DEFAULT PARAMETERS
0477	DCA	EXDRSL	
0500	DCA	EXDRSL	
0501	DCA	EXDSER	
0502	DCA	DEVCO	
0503	DCA	MANINT	
0504	DCA	LOLIM	
0505	TAD	K0777	
0506	DCA	HILIM	
0507	STA		
0510	DCA	SURFAC	
0511	TAD	K24	
0512	DCA	ERRLIM	
0513	TAD	PIOTS	
0514	DCA	AUTO10	/GET POINTER TO TABLE OF IOT POINTERS
0515	TAD	I	/PUT IN AUTO INDEX REGISTER
0516	SNA		/PICK UP POINTER TO AN IOT FROM TABLE
0517	JMP	FRSTDR	/SKIP IF NOT TABLE TERMINATOR
0520	DCA	TEMP1	/GO SELECT FIRST DRIVE
0521	TAD	I	/SAVE POINTER TO IOT
0522	AND	K7757	/PICK UP IOT THRU POINTER
0523	TAD	DEVCO	/MASK OUT BIT 7 OF CODE
0524	DCA	I	/ADD IN DESIRED CODE
0525	JMP	TEMP1	/SAVE IOT WITH NEW CODE
0526	CLA	IOTLUP	/CONTINUE DOWN IOT POINTER TABLE
0527	DCA	DRVNUM	
0530	TAD	M4	/ZERO DRIVE NUMBER
0531	DCA	DRVCNT	/SET UP A COUNTER FOR 4 DRIVES
0532	TAD	(DRVACT-1	/SET UP A POINTER TO THE DRIVE ACTIVE TABLE
0533	DCA	AUTO10	
0534	TAD	I	
0535	SZA	CLA	/PICK UP ACTIVE FLAG FOR DRIVE IN DRVNUM
0536	JMP	SCOPIN	/SKIP IF DRIVE NOT AVAILABLE FOR TESTING
0537	ISZ	DRVNUM	/GOT A DRIVE--GO INIT SCOPE ROUTINE
0540	ISZ	DRVCNT	/INCREMENT TO NEXT DRIVE
0541	JMP	.-5	/SKIP IF ALL DRIVES HAVE BEEN CHECKED
0542	APTCHK		/NO--GET FLAG FOR THIS DRIVE
0543	JMP	.-3	/SKIP IF NOT ON APT
0544	MESSAGE		/DON'T TYPE THE MESSAGE
0545	NODRVS		/NO DRIVES AVAILABLE FOR TESTING
0546	ERROR		/TYPE THE PC (DISSAPPEAR IF ON APT)
0547	PCONLY		
0550	CNTRLG		
0551	JMP	.-5	/HANG UP
0552	SCOPIN, DCA	ERRFLG	/NO ERRORS PRIOR TO TEST1



```

0553 4424 RLDC /CLEAR DEVICE
0554 1364 TAD /PICK UP POINTER TO FIRST TEST
0555 3127 DCA LOUPPT /MAKE FIRST SCOPE LOOP TO FIRST TEST
0556 7201 CLA IAC /FLAG ENTERING THE FIRST TEST FOR FIRST TIME
0557 3131 DCA LPRGST /(ALSO MAKE SURE FIRST TEST DOES NOT REQUEST A LOOP)
0560 4776 JMS GETBSF
0561 5764 JMP I FSTST /GO TO FIRST TEST

```

```

0562 7443 /DATA AREA FOR THIS PAGE
0563 0300 PLOTS. IOTTAB-1
0564 0600 K300, 300
0565 7757 FSTST, TEST1
0566 0024 K24, 24

```

/POINTER TO TABLE OF IOT POINTERS

PAGE

/MANUAL INTERVENTION TESTS

/DRIVE MUST BE WRITE LOCKED WITH COVER OPEN

/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*  
/TEST 1 BASIC INTERFACE TEST (PART 1)

/LOAD IN DRIVE NUMBER. DO GET STATUS WITH RESET. IF OPI SETS:  
/DRIVE INTERFACE IS DEAD  
/DRIVE INTERFACE DISABLED (STUCK MAINT BIT 0 LINE)  
/DRIVE COMMAND SHIFT REGISTER NOT LOADING/SHIFTING  
/MARKER DETECTION FAILED  
/DRIVE IS NOT SELECTING OR AC LOW IS SET  
/SYSTEM OR STATUS CLOCKS NOT OPERATIONAL  
/GET STATUS DETECTION FAILED.

/IF INTERRUPT WITH NO OPI, CHECK STATUS RECEIVED. COVER OPEN  
/AND BRUSH HOME SHOULD BE SET. IF NOT:  
/BAD STATUS DATA LINE  
/BAD COVER SWITCH OR LOGIC  
/DRIVE COMMAND SHIFT REGISTER  
/BAD BRUSH HOME SWITCH OR LOGIC

/CHECK WRITE LOCK STATUS BIT SET. IF NOT:  
/BAD SWITCH OR WRITE LOCK LOGIC  
/DRIVE COMMAND SHIFT REGISTER

/CHECK STATE FOR 0. IF NOT:  
/BAD STATE ROM  
/DRIVE COMMAND SHIFT REGISTER

/CHECK VOLUME CHECK RESET. IF NOT:  
/BAD RESET DETECTION  
/BAD VOLUME CHECK LOGIC  
/DRIVE COMMAND SHIFT REGISTER

```

/ /
/ / CHECK DRIVE ERROR RESET. IF NOT:
/ /
/ / BAD DRIVE ERROR INTERFACE
/ / SOME OTHER ERROR STUCK ON. REPORT WHICH ERROR.
/ /
/ / NOTE: THIS TEST IS EXECUTED ONLY IF PROGRAM OPERATION MODE 2
/ / IS SELECTED, MANUAL INTERVENTION TESTING IS REQUESTED,
/ / AND IS RUN IN FIRST PASS ONLY.
/ /
/ / TEST1. 0600 1142 TAD PASCNT /CHECK IF FIRST PASS
/ / 0601 7640 SZA CLA /SKIP IF IT IS
/ / 0602 5231 JMP END1 /BYPASS MANUAL INTERVENTION TESTS AFTER FIRST PASS
/ / 0603 1153 TAD MANINT /CHECK IF MANUAL INTERVENTION REQUESTED
/ / 0604 7650 SNA CLA /SKIP IF IT IS
/ / 0605 5231 JMP END1 /BYPASS MANUAL INTERVENTION TESTS
/ / 0606 4457 RESET /ISSUE GET STATUS W/ RESET TO DRIVE UNDER TEST
/ / 0607 4460 GETSTA /GET STATUS
/ / 0610 4475 ERRCHK /CHECK FOR ERROR--SKIP IF NONE
/ / 0611 5231 JMP /EXIT TEST
/ / 0612 1377 TAD (RL02ID+COVER0+BRUSHH /GET EXPECTED STATUS WORD 1 HP 001
/ / 0613 3123 DCA DATA3 /SAVE IT
/ / 0614 1376 TAD (CWRLOCK /GET EXPECTED WORD 2
/ / 0615 3124 DCA DATA4 /SAVE IT
/ / 0616 4461 STACHK /CHECK STATUS
/ / 0617 5223 JMP .+4
/ / 0620 4446 ERROR /BAD STATUS RECEIVED FROM DRIVE
/ / 0621 3177 BADSTA /PC DRV NO. WD1-ACTUAL-WD2 WD1-EXPCD-WD2
/ / 0622 5231 JMP END1 /EXIT TEST
/ / 0623 4433 RRER /GET ERROR REG
/ / 0624 7010 RAR /ROTATE DRIVE READY BIT INTO LINK
/ / 0625 7420 SNL /SKIP IF DRIVE READY SET
/ / 0626 5231 JMP END1 /EXIT TEST
/ / 0627 4446 ERROR /DRIVE READY BIT SET
/ / 0630 3230 DRDYST /PC DRV NO.
/ / 0631 4445 END1, SCOPE

/ / *****/***/***/***/***/***/***/***/***/***/***/***/***/***/
/ / TEST 2 BASIC INTERFACE TEST (PART 2)
/ /
/ / REQUEST OPERATOR TO CLOSE COVER AND RESET WRITE LOCK.
/ /
/ / DO 'GET STATUS LOOP CHECKING IF COVER OPEN OR WRITE LOCK
/ / RESETS. WAIT 30 SECONDS FOR BOTH TO CHANGE. IF NO CHANGE,
/ / ASK OPERATOR TO TYPE CR IF PROCEDURE WAS FOLLOWED.
/ /
/ / IF ONE CHANGED BUT NOT THE OTHER, REPORT WHICH FAILURE:
/ /
/ / WRITE LOCK SWITCH OR LOGIC
/ / (OR) COVER OPEN SWITCH OR LOGIC
/ / DRIVE COMMAND SHIFT REGISTER
/ /
/ / IF NEITHER CHANGED, REPORT BOTH FAILURES.
/ /
/ / NOTE: THIS TEST IS EXECUTED ONLY IF PROGRAM OPERATION MODE 2
/ / IS SELECTED, MANUAL INTERVENTION TESTING IS REQUESTED,

```

```

/ AND IS RUN IN FIRST PASS ONLY.
/
/TEST2, 1142 TAD PASCNT /CHECK IF FIRST PASS
/ 0633 7640 SZA CLA /SKIP IF IT IS
/ 0634 5276 JMP END2 /BYPASS MANUAL INTERVENTION TESTS AFTER FIRST PASS
/ 0635 1153 TAD MANINT /CHECK IF MANUAL INTERVENTION REQUESTED
/ 0636 7650 SNA CLA /SKIP IF IT IS
/ 0637 5276 JMP END2 /BYPASS MANUAL INTERVENTION TESTS
/ 0640 4504 MESSAGE /REQUEST COVER BE CLOSED AND
/ 0641 1025 OPR2 /WRITE LOCK RESET ON DRIVE
/ 0642 1120 TAD DRVNUM /GET DRIVE NUMBER
/ 0643 4505 PRNT1 /TYPE IT
/ 0644 4512 CRLF /TYPE <CR><LF>
/ 0645 4473 SETTIM /INIT TIMING ROUTINE

DECIMAL -3000 /30 SECOND WAIT
-100 /COMPENSATION IF NOT CLOCK

OCTAL (RL021D+BRUSHH /SETUP EXPECTED WORD1 HP 001
DATA3 /SETUP EXPECTED WORD2
DATA4 /GET STATUS
GETSTA /CHECK STATUS
STACHK /OK--EXIT TEST
JMP END2 /GO CHECK FOR TIME WAIT
TIMCHK /KEEP CHECKING STATUS
JMP -4 /ASK OPERATOR TO TYPE <CR> IF
MESSAGE /PROCEDURE WAS FOLLOWED
OPR1 /WAIT FOR INPUT
LISN /IF <CR>,
-215 /GO CHECK STATUS ONE LAST TIME
.+5 /IF NEITHER, CHECK FOR 'F OR 'G
0 /AND RESTART TEST
.+1 /HANDLE 'F OR 'G IF IT WAS
WZITFG /RESTART TEST
JMP TEST2 /GET STATUS
GETSTA /CHECK STATUS RECEIVED
STACHK /EXIT TEST
JMP END2 /BAD STATUS RECEIVED FROM DRIVE
ERROR /PC DRV NO. WD1-ACTUAL-WD2 WD1-EXPCTD-WD2
BADSTA
SCOPE
END2, 0676 4445

/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**
/TEST 3 HEAD LOADING TEST
/
/ REQUEST OPERATOR TO PRESS LOAD SWITCH.
/
/ DO GET STATUS LOOP CHECKING FOR STATE TO GO TO 1. WAIT 30
/ SECONDS FOR CHANGE. IF NO CHANGE, ASK OPERATOR TO CONFIRM
/ ACTION BY TYPING CR.
/
/ IF LOAD WAS PRESSED:
/
/ BAD STATE ROM
/ BAD LOAD SWITCH OR LOGIC

```

CHECK THAT STATE 1 REMAINS FOR LESS THAN 30 SECONDS. IF NOT:

SPINDLE NOT TURNING OR TOO SLOW (AC SERVO)  
SECTOR PULSE DETECTION OR LOGIC BAD  
BAD CLOCK SHIFT REGISTER IN SPEED CONTROL  
BAD DISK ON SPEED LOGIC  
BAD STATE ROM

AND CHECK IF SPINUP TIMEOUT ERROR SET. IF NOT:

BAD STATE ROM  
BAD TIMEOUT DETECTION LOGIC

CHECK THAT STATE GOES TO 2. IF NOT:

BAD STATE ROM

CHECK THAT BRUSH HOME IS RESET 5 SECONDS OR LESS AFTER STATE IS 2. IF NOT:

BAD BRUSH HOME SWITCH OR LOGIC  
BAD BRUSH MOTOR (AC SERVO)

WAIT 30 SECONDS FOR BRUSH HOME TO SET. IF NOT:

BAD AC SERVO  
BAD SWITCH OR LATCH

CHECK THAT STATE HAS CHANGED TO 3. IF NOT:

BAD STATE ROM

AFTER STATE IS 3, CHECK HEADS OUT IS SET. IF NOT:

BAD SWITCH  
BAD SEEK CONTROL ROM  
BAD VELOCITY ROM  
BAD DC SERVO

CHECK VOLUME CHECK IS SET. IF NOT:

BAD VOLUME CHECK LOGIC

WAIT 300 MS FOR STATE TO CHANGE TO 4. IF IT DOESN'T CHANGE:

STATE ROM BAD  
SEEK ROM  
VEL ROM  
GUARD BAND DETECTION

WAIT 150 MS FOR STATE TO CHANGE TO 5.

8 MS AFTER STATE GOES TO 5, DRIVE READY SHOULD SET. IF NOT:

INTEGRATOR OR NULL DETECTION FAILURE

READY ONE SHOT BAD  
ENABLE TIMEOUT H NOT SETTING OR COUNT LOGIC BAD

CHECK THAT HEAD 0 IS SELECTED. IF NOT:

DRIVE CYCLE UP DID NOT SELECT HEAD 0

NOTE: THIS TEST IS EXECUTED ONLY IF PROGRAM OPERATION MODE 2  
IS SELECTED, MANUAL INTERVENTION TESTING IS REQUESTED,  
AND IS RUN IN FIRST PASS ONLY.

0677	1142	TEST3,	TAD	PASCNT	/CHECK IF FIRST PASS
0700	7640		SZA CLA	/SKIP IF IT IS	
0701	5774'		JMP	END3	/BYPASS MANUAL INTERVENTION TESTS AFTER FIRST PASS
0702	1153		TAD	MANINT	/CHECK IF MANUAL INTERVENTION REQUESTED
0703	7650		SNA CLA	/SKIP IF IT IS	
0704	5774'		JMP	END3	/BYPASS MANUAL INTERVENTION TESTS
0705	4457		RESET		/ISSUE RESET COMMAND TO DRIVE
0706	4504		MESSAGE		/REQUEST OPERATOR TO LOAD DRIVE
0707	1076		OPR3		
0710	1120		TAD	DRVNUM	/TYPE DRIVE NUMBER
0711	4505		PRNT1		
0712	4512		CRLF		/TYPE <CR><LF>
0713	4473		SETTIM		/INIT TIMING ROUTINE

DECIMAL

-3000  
-100

OCTAL

HP 001

(RL02ID+BRUSHH+SPINUP /SETUP EXPECTED STATUS WORDS

0716	1373	TAD			
0717	3123	DCA			
0720	3124	DCA			
0721	4460	GETSTA			/GET STATUS
0722	4461	STACHK			/CHECK STATUS
0723	5345	JMP	CON3A		/CONTINUE TEST
0724	4474	TIMCHK			/WAIT FOR TIME UP
0725	5321	JMP	.-4		/KEEP CHECKING STATUS AND WAITING
0726	4504	MESSAGE			/ASK OPERATOR TO TYPE <CR> IF
0727	1053	OPR1			/PROCEDURE WAS FOLLOWED
0730	4503	LISN			/WAIT FOR INPUT
0731	7563	-215			
0732	0737	.*5,			
0733	0000	0			/IF NOT <CR>, CHECK IF IT WAS
0734	0735	.*1			/'F OR 'G IF SO, HANDLE IT.
0735	4456	WZITFG			/IN ANY CASE, RESTART TEST
0736	5277	JMP	TEST3		/PROCEDURE WAS NOT FOLLOWED, RESTART TEST

0737	4460	GETSTA			/GET STATUS
0740	4461	STACHK			/CHECK STATUS
0741	5345	JMP	CON3A		/CONTINUE TEST
0742	4446	ERROR			/BAD STATUS RECEIVED FROM DRIVE
0743	3177	BADSTA			
0744	5774'	JMP	END3		/EXIT TEST
0745	4473	SETTIM			

CON3A,

DECIMAL

-3000

0746 2110

```

0747 7634 OCTAL STAILP, GETSTA -100
0750 4460 AND TAD DATA1
0751 1121 AND K7
0752 0170 TAD M1
0753 1173 SZA CON3B
0754 7440 JMP STAILP
0755 5363 TIMCHK
0756 4474 JMP
0757 5350 ERROR
0760 4446 SPINTO
0761 3247 JMP
0762 5774 CON3B, TAD M1
0763 1173 SNA CLA
0764 7650 JMP
0765 5772 ERROR
0766 4446 NOTST2
0767 3366 JMP
0770 5774 END3

0772 1000
0773 0211
0774 1122
0775 0210
0776 0040
0777 0250 1000

PAGE
T3CON, SETTIM
DECIMAL
-500
-120

OCTAL BRHOML, GETSTA
BRHOML, TAD DATA1
AND (BRUSHH
SZA CLA .+6
JMP
TIMCHK BRHOML
JMP
ERROR BHNOTO
1013 3413 JMP
1014 5322 SETTIM
1015 4473
DECIMAL
-3000
-100

OCTAL TAD (RL02ID+HEDOUT+BRUSHH+BRUSHC /GET EXPECTED STATUS WORD 1 HP 001
DCA DATA3 /SAVE IT
TAD (VOLUME /GET EXPECTED STATUS WORD 2
DCA DATA4 /SAVE IT
GETSTA /GET STATUS
STACHK /COMPARE ACTUAL WITH EXPECTED STATUS
JMP CON3C /EQUAL--CONTINUE TEST

```

1027	4474	TIMCHK		/CHECK IF TIME IS UP		
1030	5224	JMP	.-4	/NO--GO WAIT FOR STATUS		
1031	4446	ERROR		/BAD STATUS RECEIVED FROM DRIVE		
1032	3177	BADSTA		/PC DRV NO. WDI-ACTUAL-WD2 WDI-EXPCD-WD2		
1033	5322	JMP	END3	/EXIT TEST		
1034	4433	CON3C,		/GET DRIVE ERROR BIT		
1035	7012	RRER		/ INTO LINK FOR TESTING		
1036	7430	RTR		/SKIP IF DRIVE ERROR BIT NOT SET		
1037	5245	JMP	..+6	/CONTINUE TEST		
1040	7006	RTL		/RESTORE ERROR REG		
1041	3123	DCA	DATA3	/SAVE ER FOR TYPEOUT		
1042	4446	ERROR		/DRIVE ERROR BIT NOT SET BY VOLUME CHECK		
1043	4270	DENSVO		/PC DRV NO. WDI-STATUS-WD2 ER		
1044	5322	JMP	END3			
1045	4473	SETTIM				
		DECIMAL		/300 MS		
1046	7742		-30			
1047	7634		-100			
		OCTAL				
1050	1374	TAD		(RL02ID+HEDOUT+BRUSHH+SEKCN	/GET EXPECTED WORD 1	HP 001
1051	3123	DCA	DATA3	/SAVE IT		
1052	4460	GETSTA		/GET STATUS		
1053	4461	STACHK		/COMPARE WITH EXPECTED		
1054	5262	JMP	CON3D	/CONTINUE TEST		
1055	4474	TIMCHK		/SKIP IF TIME IS UP		
1056	5252	JMP	.-4	/KEEP WAITING FOR STATUS TO CHANGE		
1057	4446	ERROR		/BAD STATUS RECEIVED FROM DRIVE		
1060	3177	BADSTA		/DID NOT GO TO STATE 4		
1061	5322	JMP	END3	/EXIT TEST		
1062	4473	SETTIM				
		CON3D,				
		DECIMAL		/150 MSEC /ORIGINAL WAS 100 MSEC		HP 001
1063	7761		-15	/20 MSEC		
1064	7560		-144			
		OCTAL				
1065	1373	TAD		(RL02ID+HEDOUT+BRUSHH+SEKLN	/GET EXPECTED STATUS	HP 001
1066	3123	DCA	DATA3	/SAVE IT		
1067	4460	GETSTA		/GET STATUS		
1070	4461	STACHK		/CHECK IT		
1071	5277	JMP	CON3E	/CONTINUE TEST		
1072	4474	TIMCHK		/SEE IF TIME IS UP		
1073	5267	JMP	.-4	/NOT UP		
1074	4446	ERROR		/BAD STATUS RECEIVED FROM DRIVE		
1075	3177	BADSTA		/STATE DID NOT GO TO 5		
1076	5322	JMP	END3	/EXIT TEST		
1077	4473	SETTIM				
		CON3E,				
		DECIMAL		/20MSEC		HP 001
1100	7776		-2			
1101	7160		-400			
		OCTAL				
1102	4433	RRER		/GET ERROR REG		
1103	7010	RAR		/ROTATE DRIVE READY BIT INTO LINK		
1104	7430	SZL		/SKIP IF DRIVE NOT READY		
1105	5313	JMP	..+6	/CONTINUE TEST		
1106	4474	TIMCHK		/CHECK IF TIME IS UP		
1107	5302	JMP	.-5	/KEEP WAITING		

```

1110 4446 /DRIVE READY BIT NOT SET
1111 3462 /PC DRV NO.
1112 5322 /EXIT TEST
1113 4460 /GET STATUS
1114 4440 /GET STATUS WORD 1
1115 0372 /SAVE HEAD SELECT BIT
1116 7450 /SKIP IF NOT HEAD 0
1117 5322 /EXIT TEST
1120 4446 /HEAD 0 NOT SELECTED ON CYCLE UP
1121 3503 /PC DRV NO.
1122 4445

END3,
SCOPE
/TEST 4 HEAD UNLOADING TEST
/

CHECK DRIVE IS READY. IF NOT REPORT AND ASK OPERATOR TO MAKE
DRIVE READY.

REQUEST OPERATOR TO UNLOAD DRIVE.

LOOP ON GET STATUS WAITING FOR STATE TO CHANGE TO 6. IF NO
CHANGE WITHIN 15 SECONDS, ASK OPERATOR TO TYPE <CR> IF
PROCEDURE WAS FOLLOWED. IF IT WAS:

BAD STATE ROM
BAD SWITCH

WAIT 300 MS FOR STATE TO CHANGE TO 7. IF NO CHANGE:

BAD STATE ROM

AFTER STATE IS 7, WAIT 30 SEC FOR STATE TO CHANGE TO STATE 0.
IF NO CHANGE:

NO BRAKING
BAD AC SERVO

REQUEST OPERATOR TO LOAD DRIVE. WAIT UNTIL DRIVE BECOMES
READY.

NOTE: THIS TEST IS EXECUTED ONLY IF PROGRAM OPERATION MODE 2
IS SELECTED, MANUAL INTERVENTION TESTING IS REQUESTED,
AND IS RUN IN FIRST PASS ONLY.

TEST4,
TAD PASCNT /CHECK IF FIRST PASS
SZA CLA /SKIP IF IT IS
JMP SCOP4 /BYPASS MANUAL INTERVENTION TESTS AFTER FIRST PASS
TAD MANINT /CHECK IF MANUAL INTERVENTION REQUESTED
SNA CLA /SKIP IF IT IS
JMP SCOP4 /BYPASS MANUAL INTERVENTION TESTS
RESET /RESET DRIVE
RQSTRY /WAIT FOR OPERATOR TO MAKE DRIVE READY
MESSAGE /"UNLOAD DRIVE "
UNLOAD /TYPE DRIVE NUMBER
TAD DRVNUM
PRNT1

```



CRLF				/INITIALIZE REAL TIME CLOCK
SETTIM				
DECIMAL				
-3000				/GET STATUS AND SAVE IN DATA 1 & 2
-100				/GET STATUS WORD 1
OCTAL				/SAVE STATE BITS
STALP4,	DATA1			/CHECK IF STATE IS STILL 5
GETSTA	K7			/SKIP IF STILL IS STATE 5
TAD	M5			/CONTINUE TEST
TAD	SZA			/SEE IF TIME IS UP
SZA	CON4B			/NOT YET
JMP	TIMCHK			/TYPE CR IF PROCEDURE WAS FOLLOWED
JMP	STALP4			/WAIT FOR A <CR>
MESAGE				/AND CONTINUE BELOW
OPR1				/IF NOT <CR>, CHECK
LISN				/IF IT WAS
-215				+/F OR ^G
T4CON				/RESTART TEST
0				
.+1				
WZITFG				
JMP	TEST4			
1163	5323			
1161	1162			
1160	0000			
1157	1200			
1156	7563			
1155	4503			
1154	1053			
1153	4504			
1152	5343			
1151	4474			
1150	5767			
1147	7440			
1146	1770			
1145	0170			
1144	1121			
1143	4460			
1142	7634			
1141	2110			
1137	4512			
1140	4473			

	1200	PAGE			
	1200		T4CON,	ERROR	/STATE 5 REMAINED AFTER UNLOADING DRIVE
	4446		STA5UN		/PC DRV NO. WD1-STATUS-WDZ
	1201		JMP	END4	/EXIT TEST
	5243		TAD	M1	/CHECK IF STATE WENT TO 6
	1203		SNA		/SKIP IF NOT
	1204			.+4	/CONTINUE TEST
	5211		JMP		/STATE 6 DID NOT FOLLOW STATE 5
	1205		ERROR		/PC DRV NO. WD1-STATUS-WDZ
	1206		NOTST6		/SET UP REAL TIME CLOCK
	1207		JMP	END4	/300 MS
	5243		SETTIM		
	1211				
	4473				
			DECIMAL		
	1212			-30	
	7742			-100	
	1213				
	7634				
			OCTAL		
	1214		TAD	(RL02ID+BRUSHH+SPINDN /GET EXPECTED STATUS WORD 1	
	1377		DCA	DATA3	/SAVE IT
	1215		DCA	DATA4	/SAVE EXPECTED STATUS WORD 2
	3123		GETSTA		/GET STATUS
	1216		STACHK		/CHECK STATUS RECEIVED WITH EXPECTED STA
	3124		JMP	CON4C	/EQUAL -- CONTINUE TEST
	1217				
	4460				
	1218				
	1219				
	4461				
	1220				
	5227				
	1221				
	5227				

```

1222 4474      TIMCHK
1223 5217      JMP      .-4
1224 4446      ERROR
1225 3177      BADSTA
1226 5243      JMP      END4
1227 4473      CON4C,
1230 2110      SETTIM
1231 7634      TAD
1232 1376      DCA
1233 3123      GETSTA
1234 4460      STACHK
1235 4461      JMP
1236 5243      TIMCHK
1237 4474      JMP
1240 5234      ERROR
1241 4446      BADSTA
1242 3177      RQSTRY
1243 4470      RLSE
1244 4441      SKP
1245 7410      JMP
1246 5251      ERROR
1247 4446      ERNSVO
1250 3433      SCOPE
1251 4445      SCOPE4,

          .-4
          END4
          (RL02ID+BRUSHH
          DATA3
          END4
          .-4
          .+3
          END4,
          SCOPE4,

```

HP 001

```

/CHECK UP ON REAL TIME PASSAGE
/KEEP WAITING OR STATUS
/BAD STATUS RECEIVED FROM DRIVE
/EXIT TEST
/SET UP REAL TIME CLOCK FOR
/30 SECOND WAIT
/COMPENSATION FOR NO CLOCK
/SET UP EXPECTED STATUS WORDS
/GET STATUS
/CHECK STATUS--SKIP IF NOT AS EXPECTED
/ALL OK--EXIT TEST
/CHECK IF REAL TIME IS UP
/KEEP WAITING FOR CHANGE
/BAD STATUS RECEIVED FROM DRIVE
/STATE 7 REMAINED TOO LONG OR OTHER PROBLEM
/REQUEST OPERATOR TO MAKE DRIVE READY
/CHECK IF VOLUME CHECK SET ERROR FLAG
/NOPE--REPORT ERROR
/ERROR FLAG NOT SET BY VOLUME CHECK
/PC DRV NO.

```

```

1252 7300      /THIS IS THE TECH-MATE HEAD ALIGNMENT TEST
1253 1142      TEST5, CLA CLL
1254 7640      TAD PASCNT
1255 5307      SZA CLA
1256 1162      JMP ENDS
1257 7650      TAD HEDBOX
1258 5307      SNA CLA
1259 5307      JMP ENDS
1260 4504      MESSAGE
1261 5141      HDALNT
1262 1120      TAD DRVNUM
1263 4505      PRNT1
1264 7240      STA
1265 3355      DCA
1266 4512      CRLF
1267 4321      TSTLUP, JMS
1268 5333      JMP
1269 4457      RESET
1270 3354      DCA
1271 3353      DCA
1272 4353      DCA
1273 4775      JMS
1274 4312      JMS
1275 4775      JMS
1276 4312      JMS
1277 4775      JMS
1278 1374      TAD
1279 3354      DCA
1280 3353      DCA
1281 4775      JMS
1282 4312      JMS
1283 4775      JMS
1284 4775      JMS
1285 4775      JMS

/CLEAR THE AC & LINK
/GET THE CURRENT PASS COUNT
/SKIP IF FIRST PASS
/SKIP THIS TEST NOT THE FIRST PASS
/GET THE TECH-MATE HED ALIGN FLAG
/SKIP IF SET
/ELSE SKIP OVER THIS TEST
/PRINT THE TECH-MATE HEAD ALIGN MESSAGE
/TECH-MATE HEAD ALIGNMENT TEST DRIVE:
/PRINT THE DRIVE #
/SET THE NO CONSOL FLAG
/GO CHECK FOR A <CR> FROM TTY
/A <CR> WAS TYPED GO DO HEAD GAIN
/RESET THE DRIVE
/SET HDSEL = 0
/SET CYL DIFF = 0
/SELECT HD 0
/GET DIFF CYL TO TRK 0
/SEEK HD 0 TO TRK 0
/SET UP HDSEL = 1
/SET CYL DIFF = 0
/SELECT HD 1
/GET DIFF CYL TO TRK 0
/SEEK HD 1 TO TRK 0

```

1306	5270	JMP	TSTLUP		
1307	3355	DCA	NOCONS		/CLEAR THE NO CONSOL FLAG
1310	4445	SCOPE			
1311	5773	JMP	TEST6		
1312	0000	RDHDT0, 0			/RESET THE DRIVE
1313	4457	RESET			/DO A READ HEADER
1314	4464	REDHDR			/GET THE CURRENT CYLINDER
1315	4467	GETCYL			/SAVE IT
1316	3353	DCA	SVECYL		/WAIT FOR DRIVE READY TO SET
1317	4772	JMS	DRVDRY		/RETURN CALL+1
1320	5712	JMP I	RDHDT0		
1321	0000	CRCHK, 0			/THIS ROUTINE WILL CHECK TTY INPUT FOR A <CR> ONLY
1322	6031	KSF			
1323	5331	JMP	.+6		
1324	6036	KRB			/READ IN THE TTY CHAR.
1325	0371	AND	(177		/MASK OUT UNUSED BITS
1326	1370	TAD	(200		/MAKE IT AN ASCII CHAR.
1327	1367	TAD	(-215		/CHECK FOR A <CR>
1330	7640	SZA CLA			
1331	2321	ISZ	CRCHK		/INCR CRCHK LOCATION
1332	5721	JMP I	CRCHK		/RETURN TO CALLING ROUTINE
1333	7300	HEDGAN, CLA CLL			
1334	4766	JMS	SETDFA		/CALCULATE THE CYLINDER DIFF
1335	1765	TAD	DIFADD		/GET THE DIFFERENCE
1336	0364	AND	(777		/MASK OUT UNNEEDED BITS
1337	1363	TAD	(4000		/ADD IN DIR & HD SEL BITS
1340	4427	RLCA			/LOAD THE CMD A REG.
1341	4431	RLSA			/CLEAR THE SECTOR ADDR. REG.
1342	1120	TAD	DRVNUM		
1343	7002	BSW			
1344	1362	TAD	(1003		/LOAD AND EXEC THE SEEK TO CYL 777
1345	4430	RLCB			
1346	4425	RLSD			
1347	5346	JMP	.-1		
1350	4321	JMS	CRCHK		/CHECK THE TTY FOR A <CR> TYPED
1351	5307	JMP	END5		/A <CR> WAS TYPED GO END TEST
1352	5350	JMP	.-2		/LOOP ON CRCHK WAIT FOR A <CR>
1353	0000	SVECYL, 0			
1354	0000	HDSEL, 0			
1355	0000	NOCONS, 0			
1362	1003				
1363	4000				
1364	0777				
1365	2772				
1366	2762				

1367 7563  
 1370 0200  
 1371 0177  
 1372 1557  
 1373 1400  
 1374 2000  
 1375 4200  
 1376 0210  
 1377 0217  
 1400

PAGE

```

/*****/
/TEST 6 DRIVE SELECT ERROR TEST
/
/ REQUEST OPERATOR INSERT IDENTICAL ADDRESS PLUGS IN TWO DRIVES.
/ REQUEST OPERATOR TYPE DRIVE NUMBER WHEN READY.
/
/ PROCEDURE WILL BE TO GET STATUS AND CHECK FOR DRIVE SELECT
/ ERROR. THEN RESET THAT DRIVE AND VERIFY THAT DRIVE SELECT
/ ERROR IS NOT REPORTED AGAIN. WAIT 1 MILLISECOND. DRIVE SELECT
/ ERROR SHOULD SET AGAIN. REPEAT THIS AT INTERVALS OF 10 MS FOR
/ 2 SECONDS TO GIVE OPERATOR TIME TO SEE THE FAULT LIGHT ON BOTH
/ DRIVES.
/
/ OPERATOR SHOULD SEE THE FAULT LIGHT FLICKERING BETWEEN BOTH
/ DRIVES. IF INDICATOR IS NOT SEEN ON A DRIVE:
/
/ DRIVE SELECT ERROR DETECTION IS BAD IN THAT DRIVE.
/
/ NOTE: THIS TEST IS EXECUTED ONLY IF PROGRAM OPERATION MODE 2
/ IS SELECTED, DRIVE SELECT ERROR TESTING IS REQUESTED,
/ AND IS RUN IN FIRST PASS ONLY.
/
/ TEST6. TAD PASCNT /GET PASS COUNT
/ SZA CLA /SKIP IF FIRST PASS
/ JMP END6 /SKIP TEST AFTER FIRST PASS
/ TAD EXDSER /EXECUTE DRIVE SELECT ERROR TEST?
/ SNA CLA /SKIP IF YES
/ JMP END6 /OMIT TEST IF NOT REQUESTED
/ TAD LPRQST /CHECK TO SEE HOW SCOPE ENTERED
/ SNA /SKIP IF FIRST ENTRY OR NORMAL SCOPE LOOP
/ JMP IREQ6 /I REQUESTED THIS LOOP
/ SPA CLA /SKIP IF FIRST ENTRY
/ JMP CON6A /SCOPE LOOP VIA SWRI OR SWR2
/ TAD DSERFL /PICK UP FLAG FOR TEST EXECUTION
/ SZA CLA /SKIP IF DRIVE SELECT ERROR TEST HAS NOT BEEN EXECUTED
/ JMP END6 /DON'T EXECUTE TWICE
/ IAC /SET FLAG THAT DRIVE SELECT ERROR
/ DCA /TEST HAS BEEN EXECUTED
/ TAD DRVNUM /SAVE DRIVE NUMBER FOR RESTORING ON EXIT
/ DCA TEMP3
/ MESSAGE /DRIVE SELECT ERROR TEST
/ SERTST /TO EXIT, RESTORE DRIVE ADDRESS PLUGS
/ MESSAGE / AND TYPE "<CR>" IN RESPONSE TO "TYPE
/ TOEXIT / DRIVE NUMBER" PROMPT

```

1400 1142  
 1401 7640  
 1402 5343  
 1403 1160  
 1404 7650  
 1405 5343  
 1406 1131  
 1407 7450  
 1410 5226  
 1411 7710  
 1412 5247  
 1413 1157  
 1414 7640  
 1415 5343  
 1416 7001  
 1417 3157  
 1420 1120  
 1421 3136  
 1422 4504  
 1423 2112  
 1424 4504  
 1425 2127



[illegible]

```

/ STATUS DATA BAD
/ CHECK ALL OTHER STATUS BITS EXCEPT STATE BITS ARE 0.
/ CHECK STATE IS 5, IF NOT:
/ DRIVE COMMAND SHIFT REGISTER BAD
/
1544 4457 TEST7, RESET /ISSUE RESET
1545 4460 GETSTA /GET STATUS
1546 4475 ERRCHK /CHECK THAT OPI DID NOT OCCUR
1547 5775 JUMP /ERROR--EXIT TEST
1550 4433 RRER /GET DRIVE READY BIT INTO LINK
1551 7010 RAR /SKIP IF DRIVE NOT READY
1552 7630 SZL CLA T7CON
1553 5774 JUMP /DRIVE READY BIT NOT SET
1554 4446 ERROR /PC DRV NO.
1555 3462 DRDYS /EXIT TEST
1556 5775 JUMP END7
/THIS ROUTINE WILL CHECK FOR SPECIAL CASE DRV RDY
DRVRDY, 0
1557 0000 CLA CLL
1560 7300 RRER /GET THE ERROR REG. CONTENTS
1561 4433 RAR /MOVE DRIVE READY BIT INTO LINK
1562 7010 SNL CLA /SKIP IF DRIVE READY SET
1563 7620 JUMP -4 /DRIVE READY NOT SET LOOP AGAIN
1564 5360 JUMP I DRV RDY /RETURN CALL+1
1565 5757
1566 0004 K4, 4
1567 7400 M400, -400
1574 1600
1575 1611
1576 6042
1577 6030
1600 1121 PAGE
1601 0377 T7CON, TAD DATA1 /PICK UP ACTUAL STATUS
1602 1376 AND (HDSLCT /SAVE THE HEAD SELECT BIT
TAD (RL02ID+HEDOUT+BRUSHH+SEKLIN /GET EXPECTED STATUS WORD 1 HP 001
/WITH HEAD SELECT
/SAVE EXPECTED STATUS WORDS
1603 3123 DCA DATA3 /CHECK THE STATUS THAT WAS RECEIVED
1604 3124 DCA DATA4 /BAD STATUS RECEIVED FROM DRIVE
1605 4461 STACHK /PC DRV NO. WD1-ACTUAL-WD2 WD1-EXPCTD-WD2
1606 5211 JUMP END7
1607 4446 ERROR
1610 3177 BADSTA
1611 4445 SCOPE END7,
/
/TEST 9 DRIVE READY TEST
/ DO SEEK WITH 0 DIFFERENCE, SIGN 0, HEAD 0. WAIT FOR
/ INTERRUPT. GET STATUS. CHECK STATE IS 5. IF NOT:

```

DIFFERENCE COUNTER PICKING UP BITS  
COUNTER CIRCUITY IS NOT INDICATING 0 DIFFERENCE

CHECK DRIVE READY IS RESET. IF NOT:

ENABLE TIMEOUT OR READY LATCH/ONE SHOT BAD

WAIT APPROX 10 MS FOR READY BIT TO SET. IF IT TAKES LONGER OR  
DOESN'T SET AT ALL:

HEADS MAY HAVE MOVED (INTEGRATOR OR NULL DETECTION)  
READY ONE SHOT FAILED

CHECK ERROR DID NOT SET. IF IT SET, DO GET STATUS AND REPORT  
WHICH ERROR.

CHECK THAT DRIVE READY FLAG IS SET. CHECK THAT IT CLEARED.

VERIFY HEAD SELECT IS ZERO.

1612 .4462  
1613 7000  
1614 4445

TEST9, ZSEKCH /VERIFY THE OPERATION OF THE ZERO  
NOP /DIFFERENCE SEEK  
SCOPE

/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*/\*\*  
/TEST 11 SEEK SIGN SWITCH TEST

DO SEEK WITH DIFFERENCE 0, SIGN 1, HEAD 0. WAIT FOR  
INTERRUPT. GET STATUS AND CHECK STATE IS 5. IF NOT:

COUNT ROM

DIFFERENCE COUNTER PICKING UP BITS  
COUNTER CIRCUITY IS NOT INDICATING 0 DIFFERENCE

VERIFY DRIVE IS NOT READY

WAIT APPROX 10 MS FOR READY TO SET. IF IT TAKES LONGER OR  
DOESN'T SET AT ALL:

HEADS ARE MOVING (INTEGRATOR OR NULL DETECTION)  
READY ONE SHOT FAILED  
COUNT ROM

VERIFY ERROR DID NOT SET

VERIFY HEAD SELECT IS ZERO.

DO SEEK WITH 0 DIFFERENCE, OPPOSITE SIGN, HEAD 0. REPEAT  
ABOVE TESTS.

1615 7330  
1616 4427  
1617 4462  
1620 5224  
1621 4427

TEST11, CLA STL RAR /4000 INTO AC FOR SIGN BIT  
RLCA /LOAD COMMAND A W/ SIGN BIT=1  
ZSEKCH /CHECK OUT THE ZERO DIFFERENCE SEEK  
JMP END11 /ERROR--EXIT TEST  
RLCA /LOAD CA WITH ZERO (OPPOSITE SIGN THAN BEFORE)



```

1622 4462 ZSEKCH /CHECK OUT THE SEEK
1623 7000 NOP /ERROR--EXIT TEST
1624 4445 END11, SCOPE

/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**
/TEST 12 HEAD SWITCHING TEST
/
/ DO SEEK WITH 0 DIFFERENCE, SIGN 0, HEAD 1. WAIT FOR
/ INTERRUPT. GET STATUS AND CHECK STATE IS 5. IF NOT:
/
/ DIFFERENCE COUNTER IS PICKING UP BITS
/ ASSOCIATED CIRCUITRY IS BAD
/
/ VERIFY DRIVE READY RESET. IF NOT:
/
/ ENABLE TIMEOUT OR READY LATCH/ONE SHOT BAD
/
/ WAIT APPROX 10 MS FOR READY TO SET. IF IT TAKES LONGER OR
/ DOESN'T SET AT ALL:
/
/ HEADS ARE MOVING (INTEGRATOR OR NULL DETECTION)
/ READY ONE SHOT FAILED
/ DRIVE CANNOT TRACK WITH THIS HEAD
/
/ VERIFY DRIVE ERROR DID NOT SET.
/
/ DO GET STATUS, CHECK HEAD SELECT IS CORRECT. IF NOT:
/
/ HEAD SELECT REGISTER BAD
/ DRIVE COMMAND SHIFT REGISTER BAD
/
/ DO SEEK WITH 0 DIFFERENCE, SIGN 0, HEAD 0. REPEAT ABOVE
/ TESTS.
/
TEST12, RESET /SET HEAD SELECT BIT IN CA
1625 4457 CLA STL RTR
1626 7332 RLCA
1627 4427 ZSEKCH /CHECK ZERO SEEK OPERATION
1630 4462 JMP END12 /ERROR--EXIT TEST
1631 5235 RLCA /OPPOSITE HEAD
1632 4427 ZSEKCH /CHECK THE SEEK OPERATION
1633 4462 NOP
1634 7000 END12, SCOPE
1635 4445 /**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**
/TEST 13 HEAD ALIGNMENT SUPPORT ROUTINE
/
/ THIS TEST IS EXECUTED IN PROGRAM MODE 2, HEAD ALIGNMENT
/ SUPPORT IS REQUESTED, AND IN THE FIRST PASS ONLY.
/
/ THIS TEST SELECTS THE DRIVE UNDER TEST AND LOOPS ON A RESET
/ AND GET STATUS. THE WRITE LOCK BIT IS MONITORED AND WHEN
/ WRITE LOCK IS RESET HEAD 0 IS SELECTED AND WHEN WRITE LOCK IS
/ SET HEAD 1 IS SELECTED. THE CYLINDER ADDRESS IS CONSTANTLY
/ DISPLAYED IN THE MO. THIS WILL PERMIT THE HEADS TO BE
/ ALIGNED IN KEEPING WITH THE PRESENT HEAD ALIGNMENT PROCEDURE

```

```

/ WITHOUT RETURNING TO THE CONSOLE.
/
/ TYPING A CARRIAGE RETURN ON THE CONSOLE WILL TERMINATE THIS
/ TEST ON THE DRIVE UNDER TEST. BEFORE TERMINATING, THE TEST
/ WILL CHECK THAT WRITE LOCK IS RESET. IF NOT, THE OPERATOR
/ WILL BE REQUESTED TO RESET WRITE LOCK.
/
/NOTE: THIS TEST SHOULD NOT BE RUN UNTIL IT IS VERIFIED THAT THE
/ READ HEADER COMMAND COMPLETES PROPERLY.
/
TEST13, TAD PASCNT /CHECK IF FIRST PASS
1636 1142 SZA CLA /SKIP IF YES
1637 7640 TAD HEDALN /PICK UP HEAD ALIGNMENT SUPPORT TEST FLAG
1641 1154 SNA CLA /SKIP IF TO EXECUTE THIS TEST
1642 7650 JMP SCOP13 /THIS TEST NOT REQUESTED
1643 5335 MESSAGE /HEAD ALIGNMENT SUPPORT TEST, DRIVE "
1644 4504 ALNSUP /GET DRIVE NUMBER AND TYPE IT.
1645 1574 TAD /WRITE LOCK RESET SELECTS HEAD 0
1646 1120 PRNT1 /WRITE LOCK SET SELECTS HEAD 1
1647 4505 MESSAGE /CYL ADDR IS IN MQ
1650 4504 WLKSEL /TYPE <CR> TO EXIT TEST
1651 1617 /SET UP A BOGUS PREVIOUS STATUS WORD TO
/ FORCE A SEEK THE FIRST TIME THROUGH LOOP
/ SKIP IF KEYBOARD INPUT
/
/ CHECK UP ON CHARACTER INPUT
/ ON <CR>,
/ EXIT TEST
/ ELSE CHECK FOR CONTROL-F OR G
/ BUT OTHERWISE IGNORE THE CHARACTER
/
/ SET UP TO READ A HEADER
/
/ ISSUE THE READ HEADER
/ WAIT FOR DONE
/
/ GET THE CYLINDER ADDRESS
/ MQL PUT AC INTO MQ THEN CLEAR AC
/ GET DRIVE SELECT BITS INTO POSITION
/
/ ISSUE A RESET COMMAND
/ (CAN'T USE "RESET" BECAUSE OF "JMPPM1")
/ WAIT FOR DONE
/ "JMPPM1" HAS CONSOLE CALL WHICH CAUSES
/ OPERATOR'S <CR> TO GET LOST
/ GET DRIVE SELECT BITS INTO POSITION
/
/ ISSUE A GET STATUS COMMAND
/ (CAN'T USE "GETSTA" BECAUSE OF "JMPPM1")
/ WAIT FOR DONE
/ "JMPPM1" HAS CONSOLE CALL WHICH CAUSES
/

```

1636	1142	STA	TEMP3	0
1637	7640	DCA		
1641	1154	KSF		
1642	7650	JMP		
1643	5335	LISN		
1644	4504	-215		
1645	1574	END13		
1646	1120	0		
1647	4505	0		
1650	4504	0		
1651	1617	0		
1652	7240	0		
1653	3136	0		
1654	6031	0		
1655	5264	0		
1656	4503	0		
1657	7563	0		
1660	1732	0		
1661	0000	0		
1662	1663	0		
1663	4456	0		
1664	1120	0		
1665	7002	0		
1666	1355	0		
1667	4430	0		
1670	4425	0		
1671	5270	0		
1672	4467	0		
1673	7421	0		
1674	1120	0		
1675	7002	0		
1676	1352	0		
1677	4430	0		
1700	4425	0		
1701	5300	0		
1702	1120	0		
1703	7002	0		
1704	1353	0		
1705	4430	0		
1706	4425	0		
1707	5306	0		

```

1710      4440      RRSI
1711      4440      RRSI
1712      3134      DCA
1713      1134      TAD
1714      1136      TAD
1715      7650      SNA CLA
1716      5254      JMP
1717      1134      TAD
1718      7041      CIA
1719      3136      DCA
1720      1134      TAD
1721      7002      BSW
1722      7710      SPA CLA
1723      7332      CLA STL RTR
1724      4427      RLCA
1725      4463      SEEK
1726      4427      RLCA
1727      5254      JMP
1728      4471      WRENWT
1729      4504      MESSAGE
1730      1657      EXIT
1731      4445      SCOP13, SCOPE

END13,

OPERATOR'S <CR> TO GET LOST
/THROW AWAY STATUS WORD 1
/GET AND SAVE STATUS WORD 2

/COMPARE CURRENT STATUS WORD 2 WITH
/PREVIOUS ONE
/SKIP IF THERE HAS BEEN A CHANGE (WRITE LOCK)
/CHECK FOR KEYBOARD AND STATUS CHANGE AGAIN
/GET NEW STATUS WORD
/NEGATE FOR COMPARISON LATER
/SAVE NEW PREVIOUS STATUS WORD 2
/GET THE CURRENT STATUS WORD 2
/PUT WRITE LOCK INTO SIGN BIT
/SKIP IF WRITE LOCK IS RESET (SELECT HEAD 0)
/PUT A 1 INTO HEAD SELECT BIT
/LOAD CA WITH CORRECT HEAD SELECT
/DO A SEEK TO SELECT THE HEAD
/CLEAR COMMAND A REG
/NO NEED TO WAIT FOR DRIVE READY--RESTART LOOP
/WAIT FOR OPERATOR TO WRITE ENABLE THE DRIVE
/TYPE "EXIT"

*****/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**
/TEST 14 READ HEADER TEST (PART 1)
/
// DO SEEK WITH DIFFERENCE 0, HEAD 0, SIGN 0. WAIT FOR INTERRUPT
// AND WAIT FOR DRIVE READY.
//
// DO READ HEADER, WAIT FOR INTERRUPT.
// CHECK IF HEADER CRC ERROR SET. IF SET:
//
// READ/WRITE BOARD BAD
// READ DATA LINE BAD
//
// CHECK IF BIT 6 OF WORD 1 IS SAME AS HEAD SELECT BIT IN STATUS.
// IF NOT:
//
// HEADS ARE SWITCHED (CABLE)
// HEAD SELECT LOGIC
//
// IF MANUAL INTERVENTION TESTS WERE RUN AND HEAD ALIGNMENT TESTS
// WERE NOT RUN, CHECK THAT HEADER WORD 0 INDICATES HEADS ARE
// POSITIONED OVER CYLINDER 0 (FIRST PASS ONLY). STORE HEADER
// WORD 1.
//
// REPEAT TESTS USING HEAD 1.
//
// CHECK THAT CYLINDER PORTION OF STORED HEADER WORD 1 IS THE
// SAME AS HEADER WORD 1 OF THIS HEADER. IF NOT:
//
// HEADS ARE MISALIGNED
//
TEST14, RESET /RESET THE DRIVE

```

1737	4463	SEEK	/DO SEEK WITH 0 IN CA
1740	4477	RDYWAT	/WAIT FOR DRIVE READY
1741	4500	YNOTRY	/SEE WHY IT DID NOT BECOME READY
1742	7000	NOP	
1743	4464	REDHDR	/DO A READ HEADER
1744	4475	ERRCHK	/CHECK IF ERROR FLAG SET AND REPORT
1745	5775	JMP	/GET HEADER WORD 1
1746	4440	RRSI	
1747	7002	BSW	
1750	7012	RTR	/PUT LSB OF CYL ADDR IN LINK; HEAD SELECT IN SIGN BIT
1751	5774	JMP	
1752	1001	K1001,	
1753	1002	K1002,	
1754	5002	K5002,	
1755	1004	K1004,	
/THIS ROUTINE WILL DO A SEEK TO THE BAD SECTOR FILE AT CYL 777			
1756	0000	SEKBSF, 0	
1757	1773	TAD	/LOAD DIFADD
1760	4427	RLCA	/INTO THE CMD A REG.
1761	4431	RLSA	/LOAD 0 INTO THE SEC. ADR. REG.
1762	1120	TAD	/GET DRV. # UNDER TEST
1763	7002	BSW	/PLACE DRV # INTO BITS 3:5
1764	1372	TAD	/LOAD 1003, MODE BITE & SEEK FUNC.
1765	4430	RLCB	/INTO CMD B REG. & XCT SEEK FUNC.
1766	4425	RLSD	
1767	5366	JMP	/WAIT FOR DONE
1770	5756	JMP I	
1772	1003		
1773	2772		
1774	2000		
1775	2067		
1776	0235		
1777	0100		
2000	2000		

PAGE

2000	7700	T14CON, SMA CLA	/SKIP IF HEAD 1 IS SELECTED
2001	5206	JMP	
2002	3121	DCA' DATA1	
2003	4446	ERROR	/HEADER WORD INDICATES WRONG HEAD SELECTED
2004	3643	WRNGHD	/PC DRV NO. CA
2005	5267	JMP	
2006	4440	RRSI	/GET REST OF CYL ADDRESS
2007	0165	AND	/MASK OUT GARBAGE BITS
2010	7004	RAL	/ROTATE IN LSB
2011	3121	DCA	/SAVE CYLINDER ADDRESS
2012	1142	TAD	/IF FIRST PASS
2013	7640	SZA CLA	/THEN (SKIP)
2014	5231	JMP	/DON'T CHECK IF OVER CYL 0
2015	1153	TAD	/AND IF MANUAL INTERVENTION TESTS WERE RUN
2016	7650	SNA CLA	/THEN (SKIP)
2017	5231	JMP	/DON'T CHECK IF OVER CYL 0

2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054	2055	2056	2057	2058	2059	2060	2061	2062	2063	2064	2065	2066	2067		
TAD	HEADLN																																																
SZA	CLA																																																
JMP	CON14A																																																
TAD	DATA1																																																
SNA	CLA																																																
JMP	CON14A																																																
ERROR																																																	
NOTCYO																																																	
JMP	END14																																																
CLA	STL																																																
RCL	RTR																																																
SEEK																																																	
RDYWAT																																																	
YNOTRY																																																	
NOP																																																	
REDHDR																																																	
ERRCHK																																																	
JMP	END14				</																																												

2070	1142	TEST15, TAD	PASCNT	/IF NOT THE FIRST PASS, THEN
2071	7640	SZA CLA		/SKIP THIS TEST
2072	5777	JMP	TEST16	
2073	4443	APCHK		/SKIP IF NOT ON APT
2074	5777	JMP	TEST16	/BYPASS TEST IF ON APT
2075	1144	TAD	OPT1	/IF OPTION 1 IS NOT AVAILABLE
2076	7650	SNA CLA		/THEN SKIP THIS TEST
2077	5777	JMP	TEST16	
2100	4442	GETSR		/GET SWITCHES
2101	7002	BSW		/PUT SW6 INTO SIGN BIT
2102	7710	SPA CLA		/SKIP IF TYPEOUT NOT INHIBITED
2103	5777	JMP	TEST16	/TYPEOUT INHIBITED--SKIP TEST
2104	4463	SEEK		/SELECT HEAD 0
2105	6136	6136		/CLEAR CLOCK FLAG
2106	6137	6137		/WAIT FOR CLOCK FLAG
2107	5306	JMP		
2110	6136	6136		/CLEAR CLOCK FLAG
2111	1372	TAD	K140	/-4000 (-7640 OCTAL) FOR COUNTER FOR
2112	3136	DCA	TEMP3	/NUMBER OF READ HEADERS
2113	3121	DCA	DATA1	/CLEAR OUT COUNT FOR NUMBER OF CLOCK TICKS
2114	4776	JMS	WAIT5	/GET INTO MIDDLE OF CLOCK TICK PERIOD
2115	4464	REDHDR		/SO RESULT WILL BE +- 0.05 MS.
2116	6137	6137		/ISSUE READ HEADER AND WAIT FOR DONE
2117	5322	JMP		/SKIP IF CLOCK HAS TICKED
2120	6136	6136		/DON'T COUNT A CLOCK
2121	2121	ISZ	DATA1	/CLEAR CLOCK FLAG
2122	2136	ISZ	TEMP3	/COUNT THE CLOCK
2123	5315	JMP		/DONE ENOUGH READ HEADERS?
2124	4504	MESSAGE		/NO--DO SOME MORE
2125	1776	SPNRPT		/"SPINDLE ROTATION TIME REPORT, DRIVE "
2126	1120	TAD	DRVNUM	/PICK UP DRIVE NUMBER AND TYPE IT
2127	4505	PRNT1		
2130	4504	MESSAGE		/" :
2131	2021	COLON		
2132	3122	DCA	DATA2	/SPECIAL PURPOSE DECIMAL TYPEOUT ROUTINE. THE FIRST DIGIT IS CHECKED FOR
2133	1172	TAD	M4	/BEING 0 AND OMITTED IF IT IS. A DECIMAL POINT IS TYPED PRIOR TO THE LEAST
2134	3136	DCA	TEMP3	/SIGNIFICANT DIGIT (LSD). THIS ACCOMPLISHES AUTOMATICALLY THE MULTIPLICATION
2135	1375	TAD	(PWR10	/OF THE NUMBER OF TICKS BY 10 TO GET THE RESULT IN MILLISECONDS, AND THE
2136	3137	DCA	TEMP4	/DIVISION OF THAT RESULT BY 100 TO GET THE TIME IN MS FOR ONE REVOLUTION.
2137	5342	JMP	DLUP15+2	/CLEAR OUT THE DIGIT TO BE TYPED
2140	2122	ISZ	DATA2	/SET UP COUNTER FOR THE FOUR
2141	3121	DCA	DATA1	/ DIGITS TO BE TYPED
2142	7100	CLL		/PICK UP POINTER TO TABLE OF POWERS OF 10
2143	1121	TAD	DATA1	/SAVE POINTER
2144	1537	TAD	I	/SKIP OVER SAVING NEW VALUE OF NUMBER AND COUNTING A DIGIT
2145	7430	SZL	TEMP4	/COUNT TO NEXT DIGIT TO BE TYPED
2146	5340	JMP	DLUP15	/SAVE NEW NUMBER (LESS THE POWER OF 10)
2147	7307	CLL	IAC RTL	/CLEAR THE LINK FOR OVERFLOW TESTING
				/PICK UP THE NUMBER BEING TYPED OUT
				/SUBTRACT A POWER OF TEN
				/SKIP IF THERE WAS OVERFLOW
				/SAVE THE NUMBER AND COUNT A DIGIT
				/4 INTO AC

```

2150 1136      TAD      TEMP3
2151 7640      SZA CLA
2152 5357      JMP      .+5
2153 1122      TAD      DATA2
2154 7650      SNA CLA
2155 5370      JMP      DNTP15
2156 5365      JMP      TYP15
2157 7201      CLA IAC
2160 1136      TAD      TEMP3
2161 7640      SZA CLA
2162 5365      JMP      TYP15
2163 4504      MESSAGE
2164 2024      PERIOD
2165 1122      TAD      DATA2
2166 1774      TAD      K260
2167 4511      TYPE
2170 3122      DNTP15, DCA
2171 5773      JMP      T15CON

2172 0140      K140, 140

2173 2200
2174 5222
2175 7152
2176 6042
2177 2206      PAGE

2200 2137      T15CON, ISZ
2201 2136      ISZ
2202 5777      JMP      DLUP15+2
2203 4504      MESSAGE
2204 2025      MILLIS
2205 4445      SCOPE

                /INCREMENT POINTER TO NEXT POWER OF TEN
                /INCREMENT DIGIT COUNTER
                /MORE DIGITS TO BE DONE
                /TYPE " MS" AFTER THE DIGITS

                /**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**
                /TEST 16 READ HEADER TEST (PART 2)
                /
                / DO SEEK WITH DIFFERENCE 0, SIGN 0, HEAD 0. WAIT FOR
                / INTERRUPT. WAIT FOR READY.
                /
                / DO 40 CONSECUTIVE READ HEADER, STORE 3 HEADER WORDS AFTER EACH
                / READ.
                /
                / BIT 15 WORD 1 AND 3 IS 0, HS BIT WORD 1 IS 0). IF NOT:
                /
                / BAD READ/WRITE BOARD
                / BAD PACK
                /
                / DO SEEK WITH DIFFERENCE 0, SIGN 0, HEAD 1. REPEAT ABOVE TEST
                / FOR HEAD 1.
                /
                / TEST16, SEEK
2206 4463      ROYWAT
2207 4477

```

2210	4500	YNTRY	/INVESTIGATE CAUSE OF DRIVE NOT BEING READY
2211	4447	CONSOL	/READ AND VERIFY FORTY HEADERS
2212	4465	HDRVY	
2213	4445	SCOPE	
2214	7332	T16HD1. CLA STL RTR	/SET HEAD BIT IN CA
2215	4427	RLCA	
2216	4463	SEEK	/SELECT HEAD 1
2217	4477	RDYWAT	/WAIT FOR DRIVE READY
2220	4500	YNTRY	/INVESTIGATE CAUSE OF DRIVE NOT BEING READY
2221	4447	CONSOL	
2222	4465	HDRVY	/READ AND VERIFY ALL FORTY HEADERS
2223	4445	SCOPE	
2224	1142	TEST17. TAD	PASCNT
2225	7640	SZA CLA	/IF NOT FIRST PASS THEN SKIP THIS TEST
2226	5343	JMP	SCOP17
2227	1153	TAD	MANINT
2230	7650	SNA CLA	/CHECK IF MANUAL INTERVENTION TESTING
2231	5343	JMP	' SCOP17
2232	4463	SEEK	/IS REQUESTED
2233	4477	RDYWAT	/NO--SKIP TEST
2234	4500	YNTRY	/SELECT HEAD 0
2235	7000	NOP	/WAIT FOR DRIVE READY
2236	1376	TAD	/SEE WHY IT DID NOT BECOME READY
2237	3123	DCA	(RL021D+SEKLIN+HEDOUT+BRUSHH
2240	1375	TAD	DATA3
2241	3124	DCA	(WRLOCK
2242	4457	RESET	DATA4
2243	4460	GETSTA	/SET UP EXPECTED STATUS WORD 2
2244	4461	STACHK	/RESET DRIVE
2245	5263	JMP	/GET STATUS
2246	5263	JMP	CON17A
2247	5263	JMP	/SKIP IF NOT WRITE LOCKED
2248	5263	JMP	/GO PERFORM TEST



2246	4504	MES17,	MESSAGE		/PLEASE WRITE LOCK DRIVE
2247	1662		PLWRLK		
2250	1120		TAD	DRVNUM	/TYPE DRIVE NUMBER
2251	4505		PRNT1		
2252	4473		SETTIM		/INIT WAIT LOOP FOR OPERATOR
		DECIMAL			
2253	2110		-3000		/30 SECONDS
2254	7634		-100		
		OCTAL			
2255	4460		GETSTA		/GET STATUS
2256	4461		STACHK		/SKIP IF WRITE LOCK NOT YET SET
2257	5263		JMP	CON17A	/SET--PERFORM TEST
2260	4474		TIMCHK		/TIME UP?
2261	5255		JMP	.-4	/NO
2262	5246		JMP	MES17	/YES--REISSUE PROMPT
2263	4512		CRLF		/TYPE A <CR>
2264	4464	CON17A,	REDHDR		/READ A HEADER
2265	4467		GETCYL		/GET THE CURRENT CYLINDER ADDRESS
2266	4427		RLCA		/WRITE CYLINDER ADDRESS TO CA
2267	7240		STA		/SET UP A WORD COUNT OF 1
2270	4432		RLWC		
2271	1120		TAD	DRVNUM	/GET DRIVE NUMBER INTO DRIVE SELECT POSITION
2272	7002		BSW		
2273	1171		TAD	K15	/ADD IN WRITE FROM FIELD 1
2274	4430		RLCB		/ISSUE COMMAND
2275	4425		RLSD		/WAIT FOR DONE
2276	4476		JMPPM1		
2277	4441		RLSE		/ERROR FLAG SHOULD BE SET
2300	5337		JMP	NOFL17	/REPORT NO ERROR FLAG
2301	4460		GETSTA		/GET STATUS
2302	1374		TAD	(WRLOCK+WRGATE	/SET UP EXPECTED STATUS WORD 2
2303	3124		DCA	DATA4	
2304	4461		STACHK		/CHECK STATUS RECEIVED
2305	5311		JMP	.-+4	/CONTINUE TEST BELOW
2306	4446		ERROR		/BAD STATUS RECEIVED FROM DRIVE
2307	3177		BADSTA		/PC DRV NO. WD1-ACTUAL-WD2 WD1-EXPCD-WD2
2310	5341		JMP	END17	
2311	4433		RRER		/MAKE SURE DRV ERR AND READY ARE SET
2312	7012		RTR		/ROTATE READY BIT INTO SIGN BIT/DRV ERR INTO LINK
2313	7500		SMA		/SKIP IF READY
2314	5332		JMP	RDY17	/GO REPORT ERROR
2315	7430		SZL		/SKIP IF DRIVE ERROR BIT NOT SET
2316	5322		JMP	.-+4	
2317	4446		ERROR		/DRIVE ERROR BIT NOT SET WHEN WRITE GATE ERROR ASSERTED
2320	4171		DENSWG		/PC DRV NO.
2321	5341		JMP	END17	
2322	4457		RESET		/ISSUE A RESET TO THE DRIVE
2323	1375		TAD	(WRLOCK	/PICK UP EXPECTED STATUS WORD 2 AND
2324	3124		DCA	DATA4	/SAVE IT
2325	4460		GETSTA		/GET THE DIRVE STATUS
2326	4461		STACHK		/SKIP IF STATUS NOT OK
2327	5341		JMP	END17	
2330	4446		ERROR		/RESET DID NOT RESET DRIVE
2331	4317		NORSE		/PC DRV NO. WD1-ACTUAL-WD2 WD1-EXPCD-WD2
2332	7006	RDY17,			/RESTORE ERROR REG FOR ERROR TYPEOUT

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2333 3123      DCA      DATA3
2334 4446      ERROR
2335 4224      DRDYGW
2336 5341      JMP      END17
2337 4446      NOFL17, ERROR
2340 3745      NEFWLK
2341 4457      END17,  RESET
2342 4471      WRENWT
2343 4445      SCOP17, SCOPE

/*****/
/TEST 18 DIFFERENCE OF 1 SEEK TEST (PART 1)
/
/ DO READ HEADER, WAIT FOR INTERRUPT.  STORE WORD 1 OF HEADER.
/
/ DO SEEK WITH DIFFERENCE OF 1, HEAD 0.  IF CYLINDER OF STORED
/ HEADER WORD IS NOT 777 THEN SIGN BIT 1, ELSE SIGN BIT 0.  WAIT
/ FOR INTERRUPT.
/
/ WAIT UP TO 10 MS FOR STATE TO CHANGE TO 4 AND BACK TO 5.
/ IF STATE DID NOT GO TO 4:
/
/ DRIVE COMMAND SHIFT REGISTER BAD
/ DIFFERENCE REGISTER DROPPED BIT
/ STATE ROM FAILED
/
/ IF STATE DID NOT GO TO 5:
/
/ DIFFERENCE REGISTER NOT COUNTING
/ COUNT PULSE NOT GENERATED (COUNT LOGIC)
/ SEEK ROM FAILED
/ FAILURE IN DC SERVO
/ NO TACH FEEDBACK
/
/ WAIT APPROX 1 MS LONGER.  TEST DRIVE READY.  IF SET:
/
/ FAILURE IN READY LATCH OR INTEGRATOR
/
/ WAIT UP TO 20 MS FROM START OF SEEK.  TEST READY.  IF RESET:
/
/ FAILURE IN INTEGRATOR
/ UNEXPECTED GUARD BAND DETECTED
/ DO SEEK WITH DIFFERENCE 1, OPPOSITE SIGN, HEAD 0.  REPEAT ALL
/ TESTS AS ABOVE.
/
/ REPEAT TEST USING HEAD 1.
/
/ NOTE:  THIS TEST IS PERFORMED AT THE CYLINDER POSITION FOUND
/ IN THE DRIVE WHEN THE TEST EXECUTES.  CHOOSING A
/ SINGLE SURFACE WILL LIMIT TESTING TO THAT SURFACE.
/
TEST18, TAD      SURFAC      /PICK UP WHICH SURFACE FLAG
SMA SZA CLA      /SKIP IF OK TO USE SURFACE 0
JMP      END18A   /GO TO HEAD 1 TEST
REDHDR          /READ HEADER AND WAIT FOR DONE
2344 1147
2345 7740
2346 5367
2347 4464

```

HP 001

```

2350 4467 GETCYL
2351 7001 IAC
2352 0167 AND K1000
2353 7650 SNA CLA
2354 7330 CLA STL RAR
2355 7001 IAC
2356 3136 DCA TEMP3
2357 1136 TAD TEMP3
2360 4472 SEK1CH
2361 5367 JMP END18A
2362 1136 TAD TEMP3
2363 7104 CLL RAL
2364 7030 CML RAR
2365 4472 SEK1CH
2366 7000 NOP
2367 4445 END18A, SCOPE
2370 5773 JMP T18HD1

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PAGE

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2400 1147 T18HD1, TAD SURFAC
2401 7650 SNA CLA
2402 5223 JMP END18B
2403 4464 REDHDR
2404 4467 GETCYL
2405 7001 IAC
2406 0167 AND K1000
2407 7650 SNA CLA
2410 7330 CLA STL RAR
2411 1377 TAD (HEAD1+1)
2412 3136 DCA TEMP3
2413 1136 TAD TEMP3
2414 4472 SEK1CH
2415 5223 JMP END18B
2416 1136 TAD TEMP3
2417 7104 CLL RAL
2420 7030 CML RAR
2421 4472 SEK1CH
2422 7000 NOP
2423 4445 END18B, SCOPE

```

HP 001

```

/CHECK IF OK TO USE HEAD 1
/SKIP IF OK
/SKIP TEST
/READ HEADER TO FIND OUT WHERE I AM
/COMPUTE THE CYLINDER THAT I'M AT
/CHECK IF AT CYLINDER 777 BY INCREMENTING
/AND SEEING IF BIT 2 IS SET
/SKIP IF SET--USE DIRECTION 0
/USE DIRECTION 1
/MAKE DIFFERENCE=1, HEAD 1
/SAVE COMMAND A WORD
/CHECK OUT THE DIFFERENCE OF 1 SEEK
/ERROR--EXIT
/COMPLEMENT THE DIRECTION BIT AND
/PERFORM THE DIFFERENCE OF 1 SEEK
/PERFORM CHECKS WITH OPPOSITE SIGN
/NO SPECIAL ERROR HANDLING

```

```

/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**
/TEST 19 DIFFERENCE OF 1 SEEK TEST (PART 2)
/
/ DO READ HEADER, WAIT FOR INTERRUPT. STORE WORD 1 OF HEADER.
/
/ DO SEEK WITH DIFFERENCE OF 1, HEAD 0. IF CYLINDER OF STORED
/ HEADER WORD IS NOT 777 THEN SIGN BIT 1, ELSE SIGN BIT 0. WAIT
/ FOR INTERRUPT, WAIT FOR DRIVE READY.
/

```

```

2424 1147 // DO READ HEADER, WAIT FOR INTERRUPT. COMPARE CYLINDER OF THIS
2425 7740 // HEADER WITH CYLINDER OF STORED HEADER FOR DIFFERENCE OF ONE.
2426 5322 // IF NOT:
2427 4464 //
2430 4467 // COUNT LOGIC BAD
2431 3121 // INTERGRATOR FAILED
2432 1121 //
2433 7001 // CHECK THAT HEADS MOVED FORWARD OR REVERSE AS EXPECTED. IF
2434 0167 // NOT:
2435 7650 //
2436 7330 // SEEK ROM FAILED
2437 7001 //
2440 3123 // DO SEEK WITH DIFFERENCE OF 1, OPPOSITE SIGN, HEAD 0. REPEAT
2441 1123 // ALL TESTS AS ABOVE.
2442 4427 // REPEAT TEST USING HEAD 1.
2443 4463 //
2444 4477 // NOTE: THIS TEST IS PERFORMED AT THE CYLINDER POSITION FOUND
2445 4500 // IN THE DRIVE WHEN THE TEST EXECUTES. CHOOSING A
2446 5265 // SINGLE SURFACE WILL LIMIT TESTING TO THAT SURFACE.
2447 4464 //
2450 4467 // ****//****//****//****//****//****//****//****//****//
2451 3122 // TEST19, TAD SURFAC /CHECK IF OK TO USE SURFACE 0
2452 1123 // SNA SZA CLA /SKIP IF YES
2453 7700 // JMP END19B /GO TO HEAD 1 TEST
2454 7344 // REDHDR /READ A HEADER
2455 7001 // GETCYL /COMPUTE CYLINDER ADDRESS FROM HEADER
2456 1121 // DCA /SAVE FOR LATER REFERENCE
2457 7041 // TAD DATA1
2460 1122 // IAC DATA1
2461 7650 // AND K1000
2462 5265 // SNA CLA
2463 4446 // CLA STL RAR
2464 4464 // IAC
2465 5265 // DCA DATA3
2466 4464 // TAD DATA3
2467 4464 // RLCA
2468 4464 // SEEK
2469 4464 // RDYMAT
2470 4464 // YNOTRY
2471 4464 // JMP END19A
2472 4464 // REDHDR
2473 4464 // GETCYL
2474 4464 // DCA DATA2
2475 4464 // TAD DATA3
2476 4464 // SNA CLA
2477 4464 // STA CLL RAL
2478 4464 // IAC
2479 4464 // TAD DATA1
2480 4464 // CIA
2481 4464 // TAD DATA2
2482 4464 // SNA CLA
2483 4464 // JMP END19A
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HP 001

2464	4341	SEKفال	/PC	DRV NO.	BEFORE-CYL-AFTER	CA
2465	4445	END19A, SCOPE				
/SAME TEST--OPPOSITE SIGN--HEAD 0						
2466	4464	REDHDR	/READ A HEADER			
2467	4467	GETCYL	/COMPUTE CYLINDER ADDRESS FROM HEADER			
2470	3121	DCA	/SAVE FOR LATER REFERENCE			
2471	1121	TAD	DATA1			
2472	7650	SNA CLA	DATA1			
2473	7330	CLA STL RAR	/SKIP IF NOT AT CYLINDER 0--USE DIRECTION 0			
2474	7001	IAC	/SET DIRECTION BIT FOR DIRECTION 1			
2475	3123	DCA	/DIFFERENCE OF 1			
2476	1123	TAD	/SAVE COMMAND A			
2477	4427	RLCA	/WRITE WORD TO COMMAND A			
2500	4463	SEEK	/ISSUE THE DIFFERENCE OF ONE SEEK			
2501	4477	RDYMAT	/WAIT FOR DRIVE READY			
2502	4500	YNOTRY	/INVESTIGATE REASONS FOR DRIVE NOT READY			
2503	5322	JMP	/EXIT TEST			
2504	4464	REDHDR	/READ A HEADER			
2505	4467	GETCYL	/COMPUTE THE CYLINDER ADDRESS			
2506	3122	DCA	/SAVE IT			
2507	1123	TAD	DATA2			
2510	7700	SMA CLA	DATA3			
2511	7344	STA CLL RAL	/GET COMMAND A TO TEST DIRECTION BIT			
2512	7001	IAC	/SKIP IF DIRECTION 1--ADD 1 TO PREVIOUS CYL			
2513	1121	TAD	/DIRECTION WAS 0; -2 INTO AC TO SUBTRACT			
2514	7041	CIA	/1 (AFTER -2 GOES TO -1) FROM PREVIOUS CYL			
2515	1122	TAD	/ADD 1 TO AC TO GET 1 OR -1 INTO AC			
2516	7650	SNA CLA	/ADD IN PREVIOUS CYLINDER TO GET EXPECTED CYLINDER			
2517	5322	JMP	/SUBTRACT IT FORM ACTUAL CYLINDER WE ARE AT			
2520	4446	ERROR	/TO CHECK IF THEY ARE EQUAL			
2521	4341	SEKفال	/SKIP IF NOT EQUAL			
2522	4445	END19B, SCOPE	/OK--EXIT TEST			
			/SEEK FAILURE			
			/PC DRV NO. BEFORE-CYL-AFTER CA			
END19B, SCOPE						
2523	1147	T19HD1, TAD	SURFAC			
2524	7650	SNA CLA	/CHECK IF OK TO USE SURFACE 1			
2525	5776	JMP	/SKIP IF YES			
2526	4464	REDHDR	/GO TO NEXT TEST			
2527	4467	GETCYL	/READ A HEADER			
2530	3121	DCA	/COMPUTE CYLINDER ADDRESS FROM HEADER			
2531	1121	TAD	/SAVE FOR LATER REFERENCE			
2532	7001	IAC	/CHECK IF AT CYL 777 BY INCREMENTING AND			
2533	0167	AND	/CHECKING IF BIT 2 IS SET			
2534	7650	SNA CLA	/SKIP IF AT CYLINDER 777--USE DIRECTION 0			
2535	7330	CLA STL RAR	/SET DIRECTION BIT FOR DIRECTION 1			
2536	1377	TAD	/SET HEAD BIT AND DIFFERENCE OF 1			
2537	3123	DCA	/SAVE COMMAND A			
2540	1123	TAD	DATA3			
2541	4427	RLCA	/WRITE WORD TO COMMAND A			
2542	4463	SEEK	/ISSUE THE DIFFERENCE OF ONE SEEK			
2543	4477	RDYMAT	/WAIT FOR DRIVE READY			
2544	4500	YNOTRY	/INVESTIGATE REASONS FOR DRIVE NOT READY			
2545	5364	JMP	/EXIT TEST			
			END19C			

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2546	4464	REDHDR	/READ A HEADER
2547	4467	GETCYL	/COMPUTE THE CYLINDER ADDRESS
2550	3122	DCA	/SAVE IT
2551	1123	TAD	/GET COMMAND A TO TEST DIRECTION BIT
2552	7700	SMA CLA	/SKIP IF DIRECTION 1--ADD 1 TO PREVIOUS CYL
2553	7344	STA CLL RAL	/DIRECTION WAS 0; -2 INTO AC TO SUBTRACT
			/1 (AFTER -2 GOES TO -1) FROM PREVIOUS CYL
2554	7001	IAC	/ADD 1 TO AC TO GET 1 OR -1 INTO AC
2555	1121	TAD	/ADD IN PREVIOUS CYLINDER TO GET EXPECTED CYLINDER
2556	7041	CIA	/SUBTRACT IT FORM ACTUAL CYLINDER WE ARE AT
2557	1122	TAD	/TO CHECK IF THEY ARE EQUAL
2557	7650	SNA CLA	/SKIP IF NOT EQUAL
2561	5364	JMP	/OK--EXIT TEST
2562	4446	ERROR	/SEEK FAILURE
2563	4341	SEKFAL	/PC DRV NO. BEFORE-CYL-AFTER CA
2564	4445	END19C, SCOPE	

## /SAME TEST--HEAD 1--OPPOSITE SIGN

2565	4464	REDHDR	/READ A HEADER
2566	4467	GETCYL	/COMPUTE CYLINDER ADDRESS FROM HEADER
2567	3121	DCA	/SAVE FOR LATER REFERENCE
2570	1121	TAD	
2571	7650	SNA CLA	/SKIP IF NOT AT CYLINDER 0--USE DIRECTION 0
2572	7330	CLA STL RAR	/SET DIRECTION BIT FOR DIRECTION 1
2573	5775	JMP	
			T19CON

## PAGE

2600	1377	T19CON, TAD	/HEAD 1 AND DIFFERENCE OF 1
2601	3123	DCA	/SAVE COMMAND A
2602	1123	TAD	
2603	4427	RLCA	/WRITE WORD TO COMMAND A
2604	4463	SEEK	/ISSUE THE DIFFERENCE OF ONE SEEK
2605	4477	RDYMAT	/WAIT FOR DRIVE READY
2606	4500	YNOTRY	/INVESTIGATE REASONS FOR DRIVE NOT READY
2607	5226	JMP	/EXIT TEST
2610	4464	REDHDR	/READ A HEADER
2611	4467	GETCYL	/COMPUTE THE CYLINDER ADDRESS
2612	3122	DCA	/SAVE IT
2613	1123	TAD	/GET COMMAND A TO TEST DIRECTION BIT
2614	7700	SMA CLA	/SKIP IF DIRECTION 1--ADD 1 TO PREVIOUS CYL
2615	7344	STA CLL RAL	/DIRECTION WAS 0; -2 INTO AC TO SUBTRACT
			/1 (AFTER -2 GOES TO -1) FROM PREVIOUS CYL
2616	7001	IAC	/ADD 1 TO AC TO GET 1 OR -1 INTO AC
2617	1121	TAD	/ADD IN PREVIOUS CYLINDER TO GET EXPECTED CYLINDER
2620	7041	CIA	/SUBTRACT IT FORM ACTUAL CYLINDER WE ARE AT
2621	1122	TAD	/TO CHECK IF THEY ARE EQUAL
2622	7650	SNA CLA	/SKIP IF NOT EQUAL
2623	5226	JMP	/OK--EXIT TEST
2624	4446	ERROR	/SEEK FAILURE
2625	4341	SEKFAL	/PC DRV NO. BEFORE-CYL-AFTER CA

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2626 4445      END19D, SCOPE
/*****/
/TEST 20 OUTER GUARD BAND DETECTION TEST
/
/ DO READ HEADER, WAIT FOR INTERRUPT. CHECK IF AT CYLINDER 0.
/ IF NOT, SEEK REVERSE 1 CYLINDER AT A TIME UNTIL CYLINDER 0 IS
/ REACHED. IF ANY REVERSE SEEK FAILS TO MOVE THE HEADS IN 10
/ TRIES:
/
/ DETECTION OF GUARD BAND PREMATURE.
/
/ WHEN AT CYLINDER 0, DO SEEK DIFFERENCE OF 1, SIGN 0, HEAD 0.
/ WAIT FOR INTERRUPT, WAIT FOR READY. READY SHOULD SET IN
/ 30MS. IF NOT:
/
/ FAILED TO DETECT GUARD BAND
/
/ DO READ HEADER. WAIT FOR INTERRUPT. CHECK FOR CYLINDER 0.
/ IF NOT
/
/ FAILED TO SEEK BACK TO ZERO
/
/ DO SEEK WITH DIFFERENCE OF 1, SIGN 0, HEAD 1. DO SAME TESTS
/ AS ABOVE WITH REGARD TO READY VS TIME AND CYLINDER FOUND IN
/ HEADER.
/
/ NOTE: CHOOSING A SINGLE SURFACE WILL LIMIT TESTING TO THAT
/ SURFACE.
/
2627 1147      TEST20, SURFAC /CHECK IF OK TO USE SURFACE 0
2630 7740      SMA SZA CLA /SKIP IF YES
2631 5303      JMP END20A /GO TO HEAD 1 TEST
2632 4464      REDHDR /READ A HEADER
2633 4467      GETCYL /COMPUTE THE CYLINDER ADDRESS
2634 7650      SNA CLA /SKIP IF NOT AT CYLINDER 0
2635 5245      JMP T20AT0 /AT CYL 0--CONTINUE TEST
2636 7001      IAC /SETUP A COMMAND A WORD--DIR, HD=0; DIF=1
2637 4501      SEEKV /SEEK AND VERIFY RESULTS
2640 4500      YNOTRY /INVESTIGATE REASON DRIVE NEVER BECAME READY
2641 5303      JMP END20A /ERROR--EXIT TEST
2642 1122      TAD DATA2 /PICK UP CYLINDER WE ARE AT (FROM SEEKV)
2643 7640      SZA CLA /SKIP IF AT CYLINDER 0
2644 5236      JMP -6 /CONTINUE SEEKING TO CYLINDER 0
2645 4473      T20AT0, SETTIM /SET UP REAL TIME CLOCK
DECIMAL -100 /100 CLOCK TICKS (1000MS)
-400 /-400 DECIMAL
OCTAL
IAC /SET UP A DIFFERENCE OF 1 SEEK TOWARD
RLCA /THE GUARD BAND
SEEK /ISSUE THE SEEK
RRER /GET READY BIT INTO LINK FOR TESTING
RAR
SZL /SKIP IF DRIVE NOT READY

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2656	5272	JMP	CON20A	/SET--CONTINUE TEST
2657	4474	TIMCHK		/CHECK REAL TIME CLOCK PASSAGE
2660	5253	JMP	.-5	/TIME NOT UP--GO CHECK DRIVE READY AGAIN
2661	7001	IAC		/SAVE THE COMMAND A FOR ERROR TYPEOUT
2662	3121	DCA	DATA1	
2663	4446	ERROR		/GUARD BAND NOT DETECTED (READY NOT SET IN TIME
2664	4361	GBAND		/PC DRV NO. CA
2665	4447	CONSOLE		/ALLOW CONSOLE INPUT
2666	4477	RDYWAT		/WAIT FOR DRIVE READY
2667	4500	YNOTRY		/FIND OUT WHY DRIVE NOT READY
2670	7000	NOP		
2671	5303	JMP	END20A	/EXIT TEST
2672	4464	REDHDR		/READ A HEADER
2673	4467	GETCYL		/COMPUTE CYLINDER ADDRESS
2674	7450	SNA		/SKIP IF NOT CYLINDER 0
2675	5303	JMP	END20A	/OK--EXIT TEST
2676	3121	DCA	DATA1	/SAVE BAD CYLINDER ADDRESS FOR ERROR TYPEOUT
2677	7001	IAC		/SAVE THE COMMAND A WORD THAT WAS USED
2700	3122	DCA	DATA2	
2701	4446	ERROR		/DRIVE DID NOT SEEK BACK TO 0 AFTER GUARD BAND DETECTED
2702	4416	NCAGB		/PC DRV NO. CYL CA
2703	4445	SCOPE	END20A,	
2704	1147	TAD	SURFAC	/CHECK IF OK TO USE SURFACE 1
2705	7650	SNA CLA		/SKIP IF YES
2706	5360	JMP	END20B	/GO TO NEXT TEST
2707	4464	REDHDR		/READ A HEADER
2710	4467	GETCYL		/COMPUTE THE CYLINDER ADDRESS
2711	7650	SNA CLA		/SKIP IF NOT AT CYLINDER 0
2712	5322	JMP	T20BTO	/AT CYL 0--CONTINUE TEST
2713	1177	TAD	K2001	/SETUP A COMMAND A WORD--DIR=0; HD=1; DIF=1
2714	4501	SEEKV		/SEEK AND VERIFY RESULTS
2715	4500	YNOTRY		/INVESTIGATE REASON DRIVE NEVER BECAME READY
2716	5360	JMP	END20B	/ERROR--EXIT TEST
2717	1122	TAD	DATA2	/PICK UP CYLINDER WE ARE AT (FROM SEEKV)
2720	7640	SZA CLA		/SKIP IF AT CYLINDER 0
2721	5313	JMP	.-6	/CONTINUE SEEKING TO CYLINDER 0
2722	4473	SETTIM		/SET UP REAL TIME CLOCK
2723	7634	-100		/100 CLOCK TICKS (1000MS)
2724	7160	-400		/--400 DECIMAL
2725	1177	TAD	K2001	/SET UP A DIFFERENCE OF 1 SEEK TOWARD
2726	4427	RLCA		/THE GUARD BAND
2727	4463	SEEK		/ISSUE THE SEEK
2730	4433	RRER		/GET READY BIT INTO LINK FOR TESTING
2731	7010	RAR		
2732	7430	SZL		/SKIP IF DRIVE NOT READY
2733	5347	JMP	CON20B	/SET--CONTINUE TEST
2734	4474	TIMCHK		/CHECK REAL TIME CLOCK PASSAGE
2735	5330	JMP	.-5	/TIME NOT UP--GO CHECK DRIVE READY AGAIN
2736	1177	TAD	K2001	/SAVE THE COMMAND A FOR ERROR TYPEOUT
2737	3121	DCA	DATA1	
2740	4446	ERROR		/GUARD BAND NOT DETECTED (READY NOT SET IN TIME
2741	4361	GBAND		/PC DRV NO. CA

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2742	4447	CONSOLE	/WAIT FOR DRIVE READY
2743	4477	RDYWAT	/FIND OUT WHY DRIVE NOT READY
2744	4500	YNOTRY	
2745	7000	NOP	
2746	5360	JMP	END20B
2747	4464	CON20B, REDHDR	
2750	4467	GETCYL	/READ A HEADER
2751	7450	SNA	/COMPUTE CYLINDER ADDRESS
2752	5360	JMP	/SKIP IF NOT CYLINDER 0
2753	3121	DCA	/OK--EXIT TEST
2754	7001	IAC	/SAVE BAD CYLINDER ADDRESS FOR ERROR TYPEOUT
2755	3122	DCA	/SAVE THE COMMAND A WORD THAT WAS USED
2756	4446	ERROR	
2757	4416	NCAGB	/DRIVE DID NOT SEEK BACK TO 0 AFTER GUARD BAND DETECTED
2760	4445	END20B, SCOPE	/PC DRV NO. CYL CA
2761	5776	JMP	TEST21

/THIS ROUTINE WILL CALCULATE THE DIFFERENCE FROM THE CURRENT CYL TO 777

2762	0000	SETDFA, 0	/DO A READ HEADER
2763	4464	REDHDR	/CALCULATE THE CURRENT CYLINDER
2764	4467	GETCYL	/NEGATE IT
2765	7041	CIA	/FIND THE DIFFERENCE FROM CYL 777
2766	1375	TAD	/MASK OUT UNUSED BITS
2767	0375	AND	
2770	3372	DCA	
2771	5762	JMP I	
2772	0000	SETDFA, 0	

PAGE

```

/*****
/TEST 21 INCREMENTAL FORWARD SEEK HEAD 0 TEST
/
/ POSITION HEADS AT CYLINDER 0 USING SEEKS WITH DIFFERENCE OF
/ ONE, HEAD 0.
/
/ DO SEEK WITH DIFFERENCE OF 1. SIGN 1, HEAD 0. WAIT FOR
/ INTERRUPT, WAIT FOR DRIVE READY. CHECK READY IS SET IN 15 MS.
/ IF NOT:
/
/ POSITIONING PROBLEM AT A SPECIFIC CYLINDER
/ MECHANICAL OBSTRUCTION
/
/ DO READ HEADER, WAIT FOR INTERRUPT. CHECK THAT THIS CYLINDER
/ IS OLD CYLINDER + 1. IF NOT:
/
/ DIFFERENCE REGISTER OR COUNT LOGIC FAILURE
/ TRACK CROSSING DETECTION FAILURE
/
/ REPEAT SEEKS AND READS UNTIL CYLINDER READ IS 777.
/

```



```

3056 3131 DCA LPROST /SAVE LOOP REQUEST FLAG
3057 1130 TAD ERRFLG /DID AN ERROR OCCUR ON THIS TEST?
3060 7640 SZA CLA /SKIP IF NOT
3061 5265 JMP +4 /DON'T VERIFY HEADERS
3062 1161 TAD ALLHED /READ ALL HEADERS?
3063 7640 SZA CLA /SKIP IF NO
3064 4465 HDRVYF /READ AND VERIFY ALL 40 HEADERS
3065 4445 SCOP21, SCOPE

//**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**
/TEST 22 INCREMENTAL REVERSE SEEK HEAD 0 TEST
//
// POSITION HEADS AT CYLINDER 777 USING SEEKS WITH DIFFERENCE OF
// 1, HEAD 0.
//
// DO SEEK WITH DIFFERENCE OF 1, SIGN 0, HEAD 0. WAIT FOR
// INTERRUPT, WAIT FOR DRIVE READY. CHECK READY SET IN 15 MS:
//
// POSITIONING PROBLEM AT A SPECIFIC CYLINDER
// DO READ HEADER, WAIT FOR INTERRUPT. CHECK THAT THIS CYLINDER
// IS OLD CYLINDER - 1. IF NOT:
//
// DIFFERENCE REGISTER OR COUNT LOGIC FAILURE
// TRACK CROSSING DETECTION FAILURE
//
// REPEAT SEEK AND CHECKS UNTIL CYLINDER IS 0.
//
// NOTE: IF PROGRAM MODE 2 IS USED AND THE "READ ALL HEADERS"
// PARAMETER IS SPECIFIED AS "Y", THE TEST WILL READ AND
// TEST ALL 40 HEADERS (CARTRIDGE VERIFY).
//
// NOTE: TESTING WILL BE DONE BETWEEN UPPER AND LOWER CYLINDER
// LIMITS. CHOOSING A SINGLE SURFACE WILL LIMIT TESTING
// TO THAT SURFACE. THIS TEST WILL BE BYPASSED IF
// SURFACE 1 IS CHOSEN.
//
// TEST22, TAD SURFAC /CHECK IF OK TO USE SURFACE 0
// SMA SZA CLA /SKIP IF YES
// JMP SCOP22 /GO TO NEXT TEST
// TAD LPROST /CHECK LOOP REQUEST FLAG TO SEE HOW WE GOT HERE
// SNA /SKIP IF HERE FIRST TIME OR BECAUSE OF SCOPE DECISION
// JMP CON22A /I REQUESTED LOOP--GO SEEK TO THE NEXT CYLINDER
// SMA CLA GOHI22 /SKIP IF HERE BECAUSE OF NORMAL SCOPE DECISION
// JMP SEKBK /ENTERING FIRST TIME--GO SEEK TO HIGH SEEK LIMIT
// YNOTRY /SEEK BACK TO CYLINDER USED LAST TIME
// JMP END22 /DRIVE DID NOT BECOME READY--FIND OUT WHY
// CON22A /ERROR--EXIT TEST
// GOHI22, REDHDR /HAVE SEEKED BACK--GO SEEK FORWARD TO NEXT CYLINDER
// 3102 4464 JMP /READ A HEADER
// 3103 4467 DCA LASTCY /COMPUTE THE CYLINDER WE ARE AT
// 3104 3132 TAD LASTCY /SAVE WHERE WE ARE AT FOR POSSIBLE USE BY
// 3105 1132 CTA /SEKBK ROUTINE
// 3106 7041 TAD HILIM /COMPARE TO UPPER SEEK LIMIT
// 3107 1152 SPA SNA CLA /SKIP IF BELOW THE UPPER SEEK LIMIT
// 3110 7750

```

```

3111 5317 JMP CON22A
3112 1175 TAD K4001
3113 4501 SEEKV
3114 4500 YNOTRY
3115 5333 JMP END22
3116 5302 JMP GOH122
3117 4464 CON22A, REDHDR
3120 4467 GETCYL
3121 3132 DCA LASTCY
3122 7201 CLA IAC
3123 4502 SEEK1V
3124 5327 JMP .+3
3125 5333 JMP END22
3126 5333 JMP END22
3127 4447 CONSOL
3130 4477 RDIWAT
3131 4500 YNOTRY
3132 5333 JMP END22
3133 4464 REDHDR
3134 4467 GETCYL
3135 7041 CIA
3136 1151 TAD LOLIM
3137 7710 SPA CLA
3140 5343 JMP .+3
3141 7324 CLA STL RAL
3142 7410 SKP
3143 7240 STA
3144 3131 DCA LPRQST
3145 4445 SCOP22, SCOPE
3146 5777 JMP TEST23

```

```

/THIS ROUTINE WILL HANDLE THE ERROR CONDITION OF NOT BEING ABLE
/TO READ THE BAD SECTOR FILE

```

```

3147 0000 BSFER1, 0
3150 4443 APTCHK
3151 4526 APTERR
3152 4504 MESSAGE
3153 5024 NORDBS
3154 1120 TAD DRVNUM
3155 1376 TAD (260)
3156 4505 PRNT1
3157 4512 CRLF
3160 5775 JMP NXTDRV

```

```

/CAN'T READ BAD SECTOR FILE ON DRIVE:

```

```

/TYPE DRIVE #

```

```

/GO DO NEXT DRIVE.

```

```

/THIS ROUTINE WILL CREATE THE NEW CYLINDER DIFFERENCE TO SEEK TO
/WHEN SEEKING TO BAD SECTOR FILE

```

```

3161 0000 MKNCYL, 0
3162 7104 CLL RAL
3163 7200 CLA
3164 1774 TAD SAVECA
3165 0373 AND (777)
3166 7420 SNL
3167 7041 CIA

```

```

/CLEAR THE LINK MOVE IN SIGN BIT
/CLEAR THE AC
/GET THE CONTENTS OF THE SAVED CMD A REG.
/MASK OUT UNUSED BITS
/SKIP ON LINK SET TO A ONE
/NEGATE THE AC IF LINK NOT SET

```

```

3170 1772'
3171 5761
3172 6362
3173 0777
3174 7553
3175 4324
3176 0260
3177 3200
3200

PAGE

/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**
/TEST 23 INCREMENTAL FORWARD SEEK HEAD 1 TEST
/
/ POSITION HEADS AT CYLINDER 0 USING SEEKS WITH DIFFERENCE OF
/ ONE, HEAD 0.
/
/ DO SEEK WITH DIFFERENCE OF 1, SIGN 1, HEAD 1. WAIT FOR
/ INTERRUPT, WAIT FOR DRIVE READY. CHECK READY IS SET IN 15 MS.
/ IF NOT:
/
/ POSITIONING PROBLEM AT A SPECIFIC CYLINDER
/
/ DO READ HEADER, WAIT FOR INTERRUPT. CHECK THAT THIS CYLINDER
/ IS OLD CYLINDER + 1. IF NOT:
/
/ DIFFERENCE REGISTER OR COUNT LOGIC FAILURE
/ TRACK CROSSING DETECTION FAILURE
/
/ REPEAT SEEKS AND READS UNTIL CYLINDER READ IS '777.
/
/ NOTE: IF PROGRAM MODE 2 IS USED AND THE "READ ALL HEADERS"
/ PARAMETER IS SPECIFIED AS "Y", THE TEST WILL READ AND
/ TEST ALL 40 HEADERS (CARTRIDGE VERIFY).
/
/ NOTE: TESTING WILL BE DONE BETWEEN UPPER AND LOWER CYLINDER
/ LIMITS. CHOOSING A SINGLE SURFACE WILL LIMIT TESTING
/ TO THAT SURFACE. THIS TEST WILL BE BYPASSED IF
/ SURFACE 0 IS CHOSEN.
/
/ TEST23, TAD SURFAC /CHECK IF OK TO USE SURFACE 1
/ SNA CLA /SKIP IF YES
/ JMP SCOP23 /GO TO NEXT TEST
/ TAD LPRQST /CHECK LOOP REQUEST FLAG TO SEE HOW WE GOT HERE
/ SNA /SKIP IF HERE FIRST TIME OR BECAUSE OF SCOPE DECISION
/ JMP CON23A /I REQUESTED LOOP--GO SEEK TO THE NEXT CYLINDER
/ SNA CLA /SKIP IF HERE BECAUSE OF NORMAL SCOPE DECISION
/ JMP GOL023 /ENTERING FIRST TIME--GO SEEK TO LOWER SEEK LIMIT
/ SEKBK /SEEK BACK TO CYLINDER USED LAST TIME
/ YNOTRY /DRIVE DID NOT BECOME READY--FIND OUT WHY
/ JMP END23 /ERROR--EXIT TEST
/ JMP CON23A /HAVE SEEKED BACK--GO SEEK FORWARD TO NEXT CYLINDER
/ GOL023, REDHDR /READ A HEADER
/ GETCYL /COMPUTE THE CYLINDER WE ARE AT
3200 1147
3201 7650
3202 5265
3203 1131
3204 7450
3205 5231
3206 7700
3207 5214
3210 4466
3211 4500
3212 5245
3213 5231
3214 4464
3215 4467

```

```

3216 3132 DCA LASTCY /SAVE WHERE WE ARE AT FOR POSSIBLE USE BY
3217 1132 TAD LASTCY /SEKBAK ROUTINE
3220 7041 CIA /COMPARE TO LOWER SEEK LIMIT
3221 1151 TAD LOLIM
3222 7700 SMA CLA /SKIP IF HIGHER THAN LOWER SEEK LIMIT
3223 5231 JMP CON23A /START SEEKING FORWARD
3224 1177 TAD K2001 /SET UP A COMMAND A WORD DIF=1, HD=1, DIR=0
3225 4501 SEEKV /ISSUE SEEK AND VERIFY IT
3226 4500 YNOTRY /DRIVE DID NOT BECOME READY--FIND OUT WHY
3227 5245 JMP END23 /ERROR--EXIT TEST
3230 5214 JMP GOL023 /CONTINUE SEEKING TOWARD LOWER SEEK LIMIT
3231 4464 CON23A, REDHDR /READ A HEADER
3232 4467 GETCYL /COMPUTE THE CYLINDER ADDRESS
3233 3132 DCA LASTCY /SAVE CYLINDER FOR POSSIBLE USE BY SEKBAK ROUTINE
3234 1176 TAD K6001 /SET UP COMMAND A WORD; DIR, DIR=1; HD=1
3235 4502 SEEK1V /VERIFY THE 1 TRACK SEEK
3236 5241 JMP .+3 /DRIVE DID NOT BECOME READY
3237 5245 JMP END23 /ERROR-EXIT TEST
3240 5245 JMP END23 /OK--EXIT TEST
3241 4477 CONSOL /ALLOW CONSOL INPUT
3242 4477 ROYWAT /ALLOW MORE TIME FOR DRIVE READY
3243 4500 YNOTRY /WHY DIDN'T DRIVE BECOME READY
3244 5245 JMP END23 /ERROR--EXIT TEST
3245 4464 REDHDR /READ A HEADER
3246 4467 GETCYL /COMPUTE THE CYLINDER ADDRESS
3247 7041 CIA /COMPARE WHERE WE AT TO THE UPPER
3250 1152 TAD HILIM /SEEK LIMIT
3251 7740 SMA SZA CLA /SKIP IF WE HAVE REACHED THE UPPER LIMIT
3252 5255 JMP .+3 /GO REQUEST A LOOP
3253 7324 CLA STL RAL /DON'T REQUEST A LOOP, BUT MAKE FLAG
3254 7410 SKP /NEGATIVE SO WE CAN TELL IF SCOPE LOOPS
3255 7240 STA /-1 WILL REQUEST A LOOP
3256 3131 DCA LPRQST /SAVE LOOP REQUEST FLAG
3257 1130 TAD ERRFLG /DID AN ERROR OCCUR ON THIS TEST?
3260 7640 SZA CLA /SKIP IF NOT
3261 5265 JMP .+4 /DON'T VERIFY HEADERS
3262 1161 TAD ALLHED /READ ALL HEADERS?
3263 7640 SZA CLA /SKIP IF NO
3264 4465 HORVY /READ AND VERIFY ALL 40 HEADERS
3265 4445 SCOP23, SCOPE

/*****/
/TEST 24 INNER GUARD BAND DETECTION TEST
/
/ POSITION HEADS AT CYLINDER 777 USING SEEK WITH DIFFERENCE OF
/ 1, HEAD 0.
/
/ WHEN AT CYLINDER 777, DO SEEK WITH DIFFERENCE OF 1, SIGN 1,
/ HEAD 0. WAIT FOR INTERRUPT, WAIT FOR DRIVE READY. READY
/ SHOULD SET IN LESS THAN 30MS. IF NOT:
/
/ FAILED TO DETECT GUARD BAND
/
/ DO READ HEADER. WAIT FOR INTERRUPT. CHECK FOR CYLINDER 776 (510 DECIMAL).
/ IF NOT:

```

FAILED TO SEEK BACK TO CYLINDER 776

DO SEEK WITH DIFFERENCE OF 1, SIGN 1, HEAD 1. DO SAME TESTS  
AS ABOVE.

NOTE: THE GUARD BAND REPOSITIONING FOR THE RL02 PERFORMS DIFFERENTIALLY  
THEN THE RL-01. THE RL02 WILL POSITION THE HEADS ABOVE  
CYLINDER 776 (510 DECIMAL) WHERE AS THE RL-01 WILL  
POSITION THE HEADS OVER CYLINDER 777 (DECIMAL).

NOTE: CHOOSING A SINGLE SURFACE WILL LIMIT TESTING TO THAT  
SURFACE.

3266	1147	TEST24.	TAD	SURFAC	/CHECK IF OK TO USE SURFACE 0	
3267	7740		SMA SZA	CLA	/SKIP IF YES	
3270	5345		JMP	END24A	/GO TO HEAD 1 TEST	
3271	4464		REDHDR		/READ A HEADER	
3272	4467		GETCYL		/COMPUTE THE CYLINDER ADDRESS	
3273	7001	GOHI24.	IAC		/CHECK IF AT CYL 777 BY INCREMENTING	
3274	0167		AND	K1000	/AND CHECKING IF BIT 2 IS SET	
3275	7640		SZA CLA		/SKIP IF NOT AT CYLINDER 777	
3276	5305		JMP	T24AT0	/AT CYL 777--CONTINUE TEST	
3277	1175		TAD	K4001	/SETUP A COMMAND A WORD--DIR=1, HD=0; DIF=1	
3300	4501		SEEKV		/SEEK AND VERIFY RESULTS	HP 005
3301	4500		YNOTRY		/INVESTIGATE REASON DRIVE NEVER BECAME READY	
3302	5345		JMP	END24A	/ERROR--EXIT TEST	
3303	1122		TAD	DATA2	/PICK UP CYLINDER WE ARE AT (FROM SEEKV)	
3304	5273		JMP	GOHI24	/CONTINUE SEEKING TO CYLINDER 777	
3305	4473	T24AT0, SETTIM			/SET UP REAL TIME CLOCK	
		DECIMAL				
3306	7634		-100		/100 CLOCK TICKS (1000MS)	HP 004
3307	7160		-400		/--400 DECIMAL	
		OCTAL				
3310	1175		TAD	K4001	/SET UP A DIFFERENCE OF 1 SEEK TOWARD	
3311	4427		RLCA		/THE GUARD BAND	
3312	4463		SEEK		/ISSUE THE SEEK	
3313	4433		RRER		/GET READY BIT INTO LINK FOR TESTING	
3314	7010		RAR			
3315	7430		SZL		/SKIP IF DRIVE NOT READY	
3316	5332		JMP	CON24A	/SET--CONTINUE TEST	
3317	4474		TIMCHK		/CHECK REAL TIME CLOCK PASSAGE	
3320	5313		JMP	.-5	/TIME NOT UP--GO CHECK DRIVE READY AGAIN	
3321	1175		TAD	K4001	/SAVE THE COMMAND A FOR ERROR TYPEOUT	
3322	3121		DCA	DATA1		
3323	4446		ERROR		/GUARD BAND NOT DETECTED (READY NOT SET IN TIME	
3324	4361		GBAND		/PC DRV NO. CA	
3325	4447		CONSOL		/ALLOW CONSOLE INPUT	
3326	4477		RDYWAT		/WAIT FOR DRIVE READY	
3327	4500		YNOTRY		/FIND OUT WHY DRIVE NOT READY	
3330	7000		NOP			
3331	5345		JMP	END24A	/EXIT TEST	
3332	4464	CON24A.	REDHDR		/READ A HEADER	
3333	4467		GETCYL		/COMPUTE CYLINDER ADDRESS	
3334	3121		DCA	DATA1	/SAVE CURRENT CYLINDER	
3335	1121		TAD	DATA1		

3336	1347	TAD	K7002	/CHECK FOR CYLINDER 776 BY ADDING 2'S COMPLEMENT HP 005
3337	7650	SNA CLA		/OF 776 TO CYLINDER ADDRESS.SKIP IF NOT 776 HP 005
3340	5345	JMP	END24A	/OK--EXIT TEST
3341	1175	TAD	K4001	/SAVE THE COMMAND A WORD THAT WAS USED
3342	3122	DCA	DATA2	
3343	4446	ERROR		/CYL NOT CORRECT AFTER SEEK INTO GUARD BAND
3344	4416	NCAGB		/PC DRV NO. CYL CA
3345	4445	END24A, SCOPE		
3346	5777	JMP	T24HD1	

3347	7002	K7002, 7002	/	HP 005
------	------	-------------	---	--------

/THIS ROUTINE WILL HANDLE ERRORS OF TOO MANY BAD SECTORS ON PACK!!!

3350	0000	BSFER2, 0	
3351	4443	APTCHK	/CHECK FOR ON APT
3352	4526	APTERR	
3353	4504	MESAGE	/TOO MANY BAD SECTORS ON DRIVE:
3354	5050	DRVMSG	
3355	1120	TAD	DRVNUM
3356	1376	TAD	(260
3357	4505	PRNT1	/PRINT DRIVE #
3360	4504	MESAGE	
3361	5071	PAKBAD	/PACK HAS MORE THAN 16 BAD SECTORS
3362	4512	CRLF	
3363	5775	JMP	NXTDRV

/DRIVE ACTIVE TABLE  
/ACCESS IS BY INDEX--EACH WORD SET TO 1 IF DRIVE IS ACTIVE AND 0 IF DRIVE  
/IS NOT AVAILABLE FOR TESTING

3364	0000	DRVACT, 0	/DRIVE 0
3365	0000	0	/1
3366	0000	0	/2
3367	0000	0	/3

3375	4324	
3376	0260	
3377	3400	
	3400	

PAGE

3400	1147	T24HD1, TAD	SURFAC	/CHECK IF OK TO USE SURFACE 1
3401	7650	SNA CLA		/SKIP IF YES
3402	5257	JMP	END24B	/GO TO NEXT TEST
3403	4464	REDHDR		/READ A HEADER
3404	4467	GETCYL		/COMPUTE THE CYLINDER ADDRESS
3405	7001	GOHB24, IAC		/CHECK IF AT CYL 777 BY INCREMENTING AND
3406	0167	AND	K1000	/CHECKING THAT BIT 2 IS SET
3407	7640	SZA CLA		/SKIP IF NOT AT CYLINDER 777
3410	5217	JMP	T24BT0	/AT CYL 777--CONTINUE TEST
3411	1176	TAD	K6001	/SETUP A COMMAND A WORD--DIR, HD, DIF=1
3412	4501	SEEKV		/SEEK AND VERIFY RESULTS
3413	4500	YNOTRY		/INVESTIGATE REASON DRIVE NEVER BECAME READY
3414	5257	JMP	END24B	/ERROR--EXIT TEST
3415	1122	TAD	DATA2	/PICK UP CYLINDER WE ARE AT (FROM SEEKV)

HP 005



3416	5205	JMP	GOHB24	/CONTINUE SEEKING TO CYLINDER 0	
3417	4473	T24BT0. SETTIM		/SET UP REAL TIME CLOCK	
		DECIMAL			
3420	7634	-100		/100 CLOCK TICKS (1000MS)	HP 004
3421	7160	-400		/~400 DECIMAL	
		OCTAL			
3422	1176	TAD	K6001	/SET UP A DIFFERENCE OF 1 SEEK TOWARD	
3423	4427	RLCA		/THE GUARD BAND	
3424	4463	SEEK		/ISSUE THE SEEK	
3425	4433	RRER		/GET READY BIT INTO LINK FOR TESTING	
3426	7010	RAR			
3427	7430	SZL		/SKIP IF DRIVE NOT READY	
3430	5244	JMP	CON24B	/SET--CONTINUE TEST	
3431	4474	TIMCHK		/CHECK REAL TIME CLOCK PASSAGE	
3432	5225	JMP	.-5	/TIME NOT UP--GO CLOCK DRIVE READY AGAIN	
3433	1176	TAD	K6001	/SAVE THE COMMAND A FOR ERROR TYPEOUT	
3434	3121	DCA	DATA1		
3435	4446	ERROR		/GUARD BAND NOT DETECTED (READY NOT SET IN TIME	
3436	4361	GBAND		/PC DRV NO. CA	
3437	4447	CONSOL			
3440	4477	RDYWAT		/WAIT FOR DRIVE READY	
3441	4500	YNOTRY		/FIND OUT WHY DRIVE NOT READY	
3442	7000	NOP			
3443	5257	JMP	END24B	/EXIT TEST	
3444	4464	REDHDR		/READ A HEADER	
3445	4467	GETCYL		/COMPUTE CYLINDER ADDRESS	
3446	3121	DCA	DATA1	/SAVE CURRENT CYLINDER	
3447	1121	TAD	DATA1	/GET THE CURRENT CYLINDER	
3450	1777	TAD	K7002	/CHECK IF IT IS AT CYL 776 BY ADDING	HP 005
3451	7650	SNA CLA		/2COMPLEMENT IF AT 776 DO NOT SKIP	HP 005
3452	5257	JMP	END24B	/OK--EXIT TEST	
3453	1176	TAD	K6001	/SAVE THE COMMAND A WORD THAT WAS USED	
3454	3122	DCA	DATA2		
3455	4446	ERROR		/CYL NOT CORRECT AFTER SEEK INTO GUARD BAND	
3456	4416	NCAGB		/PC DRV NO. CYL CA	
3457	4445	END24B. SCOPE			

/\*\*  
 /TEST 25 INCREMENTAL REVERSE SEEK HEAD 1 TEST  
 /  
 / POSITION HEADS AT CYLINDER 777 USING SEKS WITH DIFFERENCE OF  
 / 1. HEAD 0.  
 /  
 / DO SEEK WITH DIFFERENCE OF 1. SIGN 0. HEAD 1. WAIT FOR  
 / INTERRUPT, WAIT FOR DRIVE READY. CHECK READY SET IN 15 MS:  
 /  
 / POSITIONING PROBLEM AT A SPECIFIC CYLINDER  
 /  
 / DO READ HEADER, WAIT FOR INTERRUPT. CHECK THAT THIS CYLINDER  
 / IS OLD CYLINDER - 1. IF NOT:  
 /  
 / DIFFERENCE REGISTER OR COUNT LOGIC FAILURE  
 / TRACK CROSSING DETECTION FAILURE  
 /  
 / REPEAT SEEK AND CHECKS UNTIL CYLINDER IS 0.



```

3535 7240 STA          /-1 WILL REQUEST A LOOP
3536 3131 DCA          /SAVE LOOP REQUEST FLAG
3537 4445 SCOP25, LPRQST
3540 5776 JMP          TEST26

/THIS ROUTINE WILL SETUP AND CALL ALL THE ROUTINES NECESSARY TO READ
/AND PROCESS A BAD SECTOR FILE

3541 0000 GETBSF, 0
3542 7300 CLA CUL
3543 4775 JMS          SETDFA
3544 4774 JMS          SEKBSF
3545 3773 DCA          BSFNUM
3546 3772 DCA          OFFSET
3547 1371 TAD          (-5
3550 3770 DCA          BADCNT
3551 4767 JMS          RDBSF
3552 7300 CLA CUL
3553 1366 TAD          (24
3554 3773 DCA          BSFNUM
3555 1365 TAD          (120
3556 3772 DCA          OFFSET
3557 1371 TAD          (-5
3560 3770 DCA          BADCNT
3561 4767 JMS          RDBSF
3562 4764 JMS          BADPRO
3563 5741 JMP I          GETBSF

/CLEAR THE AC & LINK
/GO OBTAIN THE DIFFERENCE CALCULATION FOR SEEK
/DO A SEEK TO THE BSF (BAD SECTOR FILE)
/SET THE BSF NUM TO SECTOR 0
/SET THE OFFSET TO 0
/SET THE NUMBER OF READ TRIES
/TO THE BSF TO 5
/GOO READ THE FAC BSF

/SET THE BSF NUMBER TO 24
/THE FIRST FLD SECTOR

/SET OFFSET INTO FLD BSF

/GO READ THE FLD BSF
/PROCESS BSF
/RETURN NOW AFTER READING & PROCESSING BSF.

```

PAGE

```

/*****
/TEST 26 SEEK TESTS
/ PART 1
/ POSITION HEADS AT CYLINDER 0. IF NOT AT 0, MOVE HEADS USING 1
/ CYLINDER SEEKS.
/
/ DO READ HEADER, RECORD POSITION. DO SEEK WITH DIFFERENCE OF 2
/ (MAX DISTANCE AT 3 IPS), SIGN 1, HEAD 0. DO READ HEADER,
/ CHECK NEW CYLINDER IS OLD CYLINDER + DISTANCE. IF NOT:
/
/ TRACK CROSSING DETECTION FAILURE
/ DIFFERENCE COUNTER FAILURE
/

```

```

3564 7463
3565 0120
3566 0024
3567 4131
3570 4165
3571 7773
3572 4166
3573 4164
3574 1756
3575 2762
3576 3600
3577 3347
3600

```

```

COUNT PULSE GENERATION FAILURE
VELOCITY ROM FAILURE

REPEAT ABOVE UNTIL OLD CYLINDER + DISTANCE > 777.
PART 2
POSITION THE HEADS AT CYLINDER 777.

DO READ HEADER, RECORD POSITION. DO SEEK WITH DIFFERENCE OF 2
(MAX DISTANCE AT 3 IPS). SIGN 0, HEAD 0. DO READ HEADER,
CHECK NEW CYLINDER IS OLD CYLINDER - DISTANCE. IF NOT:

TRACK CROSSING DETECTION FAILURE

REPEAT UNTIL OLD CYLINDER - DISTANCE < 0. REPEAT ALL OF THE
ABOVE USING HEAD 1.

REPEAT ALL OF THE ABOVE TESTS USING THE FOLLOWING DISTANCES:
6, 9, 12, 17, 22, 27, 34, 41, 128, 256. THESE DISTANCES ARE
SPECIFIED BECAUSE THEY REPRESENT THE MAXIMUM DISTANCE FOR EACH
VELOCITY LEVEL USED IN THE DRIVE.

NOTE: TESTING WILL BE DONE BETWEEN UPPER AND LOWER CYLINDER
LIMITS. CHOOSING A SINGLE SURFACE WILL LIMIT TESTING
TO THAT SURFACE.

TEST26, REDHDR
3600 4464.
3601 4467
3602 3133
3603 1131
3604 7510
3605 5244
3606 7110

DCA GETCYL
TAD CURCYL
SPA LPRQST
JMP SKBA26
CLL RAR

TAD CURCYL
DCA LASTCY
CMA
DCA LPRQST
SNL
JMP CON26A
TAD (DIFTAB
DCA TEMP3
TAD SURFAC
SMA SZA CLA
STL RAL
STL RAL
DCA TEMP4
TAD LOLIM
DCA LASTCY
TAD CURCYL
GOL026, TAD
CIA
TAD LOLIM
SMA
JMP CON26A
SMA CLA
STL RAL

/READ A HEADER
/COMPUTE CYLINDER ADDRESS
/SAVE CURRENT CYLINDER
/PICK UP LOOP REQUEST FLAG
/SKIP IF FIRST TIME OR I REQUESTED LOOP
/SCOPE LOOPEED -- SEEK BACK TO CYL USED LAST TIME
/AC IS NOW CLEAR--IF LINK IS SET THEN TEST HAS BEEN ENTERED FOR
/THE FIRST TIME
/SAVE CURRENT CYLINDER AS LAST CYLINDER

/-1 INTO AC TO REQUEST A LOOP
/SAVE REQUEST FLAG
/SKIP IF ENTERING TEST FOR THE FIRST TIME
/I REQUESTED THIS LOOP -- START TEST
/PICK UP POINTER DIFFERENCE WORD TABLE
/SAVE POINTER
/PICK UP SURFACE FLAG
/SKIP IF OK TO USE SURFACE 0
/USE HEAD 1
/SET DIRECTION BIT = 1 (HEAD BIT NOW IN CORRECT POSITION).
/SAVE DIRECTION AND HEAD BITS
/SAVE LOWER SEEK LIMIT AS LAST CYLINDER
/COMPARE CURCYL TO LOWER SEEK LIMIT
/AM I AT THE LOWER SEEK LIMIT?
/SKIP IF NOT
/YES
/SKIP IF NEED TO SEEK IN DIRECTION 0
/SET DIRECTION BIT FOR DIRECTION 1

```

3635	7001	IAC	/DIFFERENCE OF 1
3636	4501	SEEKV	/VERIFY THE SEEK
3637	4500	YNTRY	/FIND OUT WHY DRIVE DID NOT BECOME READY
3640	5344	JMP	/ERROR -- EXIT TEST
3641	1122	TAD	/PICK UP CURRENT CYLINDER (FROM SEEKV)
3642	3133	DCA	/SAVE IT
3643	5226	JMP	/CHECK IF AT LOWER LIMIT YET
3644	4466	SKBA26.	/SEEK BACK TO CYLINDER CONTAINED IN LASTCY
3645	4500	YNTRY	/FIND OUT WHY DRIVE DID NOT BECOME READY
3646	5344	JMP	/ERROR -- EXIT TEST
3647	4464	REDHR	/READ A HEADER
3650	4467	GETCYL	/COMPUTE CYLINDER ADDRESS
3651	3133	DCA	/SAVE IT
3652	1137	TAD	/PICK UP DIRECTION AND HEAD FOR TESTING
3653	7710	SPA CLA	/SKIP IF DIRECTION 0
3654	5310	JMP	/CHECK IF I AM AT LOWER SEEK LIMIT
3655	1133	TAD	/SKIP IF AT OR BELOW LIMIT
3656	7041	CIA	/COMPUTE DIFFERENCE WITH DIRECTION 0
3657	1151	TAD	/PICK UP HEAD AND DIRECTION
3660	7710	SPA CLA	/GET HEAD BIT READY FOR TESTING
3661	5321	JMP	/SKIP IF USING HEAD 0
3662	1137	TAD	/CHECK IF OK TO USE HEAD 1
3663	7004	RAL	/SKIP IF OK TO USE HEAD 1
3664	7710	SPA CLA	/INCREMENT POINTER TO NEXT DIFFERENCE WORD
3665	5274	JMP	/SKIP IF NOT OK TO USE HEAD 1
3666	1147	TAD	/SET SIGN BIT TO SELECT HEAD 1
3667	7450	SNA	/GO SET DIRECTION BIT
3670	2136	ISZ	/CHECK IF OK TO USE HEAD 0
3671	7640	SZA CLA	/SKIP IF OK TO USE HEAD 0
3672	7130	STL RAR	/SET SIGN BIT TO SELECT HEAD 1 AGAIN
3673	5300	JMP	/INCREMENT POINTER TO NEXT DIFFERENCE
3674	1147	TAD	/ROTATE HEAD SELECT INTO POSITION AND SELECT DIRECTION 1
3675	7740	SMA SZA CLA	/SAVE NEW DIR, HEAD BITS
3676	7130	STL RAR	/PICK UP DIFFERENCE WORD
3677	2136	ISZ	/SKIP IF DIFFERENCE OF 0 (TABLE TERMINATOR)
3701	3137	STL RAR	/COMPUTE DIFFERENCE WITH DIRECTION 1
3702	1536	DCA	/MAKE LOOP REQUEST FLAG NEG, BUT DON'T REQUEST LOOP
3703	7640	SZA CLA	/EXIT TEST
3704	5331	JMP	/COMPARE CURRENT CYLINDER TO HIGHER LIMIT
3705	7330	CLA STL RAR	/SKIP IF AT OR ABOVE HIGH LIMIT
3706	3131	DCA	/GO COMPUTE DIFFERENCE WITH DIRECTION 1
3707	5344	JMP	/PICK UP DIRECTION AND HEAD
3710	1133	TAD	/PUT DIRECTION INTO LINK
3711	7041	CIA	/CLEAR DIRECTION BIT AND PUT BACK
3712	1152	TAD	/RESTORE HEAD WITH DIRECTION BIT CLEARED
3713	7740	SMA SZA CLA	/ADD IN DIFFERENCE WORD (AC=DIF+LOLIM)
3714	5331	JMP	/SUBTRACT FROM
3715	1137	TAD	
3716	7104	CLL RAL	
3717	7110	CLL RAR	
3720	3137	DCA	
3721	1151	TAD	
3722	1536	TAD I	
3723	7041	CIA	

3724	1133	TAD	CURCYL	/CURRENT CYLINDER (AC=CUR-(DIF+LOLIM))
				/
		SMA		/THE LOW LIMIT WITH WHERE I WILL WIND UP.
3725	7500	CLA		/SKIP IF SEEK WILL PUT ME BELOW LOWER LIMIT
3726	7200			/USE FULL DIFFERENCE VALUE
3727	1536	TAD I	TEMP3	/ADD IN DIFFERENCE (AC=CUR-LOLIM, WHICH
				/IS DIFFERENCE REQUIRED TO PUT ME AT LOLIM)
3730	5340	JMP	CON26B	/NOW HAVE DIFFERENCE -- CONTINUE TEST
3731	1133	DIRIDF, TAD	CURCYL	/ADD IN CURRENT CYL (AC = CUR)
3732	1536	TAD I	TEMP3	/ADD IN DIFFERENCE (AC=DIF+CUR) WHICH
3733	7041	CIA		/IS WHERE I WILL WIND UP AFTER SEEK
3734	1152	TAD	HILIM	/SUBTRACT FROM HILIM (AC=HILIM-(CUR+DIF))
3735	7500	SMA		/SKIP IF SEEK WILL PUT ME BEYOND LIMIT
3736	7200	CLA		/USE FULL DIFFERENCE
3737	1536	TAD I	TEMP3	/SUBTRACT DISTANCE SEEK WILL PUT ME BEYOND
				/HILIM (OR 0 IF N/A) FROM DIFFERENCE
3740	1137	TAD	TEMP4	/ADD IN HEAD AND DIRECTION BITS TO DIFFERENCE
3741	4501	SEEKV		/ISSUE THE SEEK AND VERIFY IT
3742	4500	YNOTRY		/WHY DIDN'T DRIVE BECOME READY
3743	7000	NOP		/NO SPECIAL ERROR HANDLING
3744	4445	END26,	SCOPE	
3745	5776	JMP	TEST27	
3746	0000	SETBPR,	0	
3747	7344	CLA CLL	CMA RAL	/SET UP FAC/FLD SWITCH
3750	3361	DCA	BADSWT	/SET UP A COUNTER TO ALLOW
3751	1375	TAD	(-21	/16 BAD SECTORS (BAD SECTOR COUNTER)
3752	3774	DCA	BADCNT	/SET UP A POINTER TO HD SEL. (TRACK)
3753	1373	TAD	(13	/OF 1ST. BAD SECTOR
3754	1772	TAD	BUFADR	/SAVE AS BUFFER POINTER
3755	3771	DCA	BUFPNT	/SET UP A POINTER TO THE BAD
3756	1770	TAD	BSECAD	/SECTOR TABLE
3757	3767	DCA	BADPNT	
3760	5746	JMP I	SETBPR	
3761	0000	BADSWT,	0	
3767	7551			
3770	7552			
3771	7554			
3772	4163			
3773	0013			
3774	4165			
3775	7757			
3776	4000			
3777	7157			
	4000			

PAGE

/\*\*  
 /TEST 27 FORWARD OSCILLATING SEEK HEAD 0 TEST  
 /

/  
 / POSITION HEADS AT CYLINDER 0.  
 /

/ DO OSCILLATING SEEK USING HEAD 0 (SEEK FROM 0 TO 1 TO 0, 0 TO  
 / 2 TO 0, 0 TO 3 TO 0, .....0 TO 777 TO 0). AFTER EACH SEEK  
 / READ HEADER AND VERIFY POSITION.  
 /

REPEAT TEST USING HEAD 1.

NOTE 1: CHOOSING A SINGLE SURFACE WILL LIMIT TESTING TO THAT SURFACE. SEEKS WILL BE WITHIN THE UPPER AND LOWER LIMITS SPECIFIED.

NOTE 2: A SWITCH REGISTER BIT WILL FORCE LOOPING ON THIS TEST AND SEEKS BETWEEN THE UPPER AND LOWER LIMITS. THIS WILL ALLOW A FIXED DISTANCE SEEK LOOP FOR ADJUSTMENTS.

4000	4464	TEST27,	REDHDR	/READ A HEADER
4001	4467		GETCYL	/COMPUTE CYLINDER ADDRESS
4002	3133		DCA	/SAVE CURRENT CYLINDER
4003	1131		TAD	
4004	7450		SNA	
4005	5242		JMP	/SKIP IF FIRST TIME INTO TEST OR SCOPE LOOPED
4006	7710		SPA CLA	/I REQUESTED LOOP -- GO BELOW
4007	5217		JMP	/SKIP IF FIRST TIME INTO TEST
4010	1151		TAD	/IT WAS A SCOPE DECISION TO LOOP -- GO BELOW
4011	3140		DCA	/SET UP CYLINDER TO OSCILLATE OUT TOWARD
4012	1147		TAD	/STARTING AT THE LOWER SEEK LIMIT
4013	7740		SMA SZA CLA	/PICK UP SURFACE FLAG
4014	7332		STL CLA RTR	/SKIP IF OK TO USE HEAD 0
4015	3136		DCA	/SET HEAD BIT -- USE HEAD 1
4016	5266		JMP	/SAVE HEAD BIT TO USE
4017	4466		SEKBAK	/GO REQUEST A LOOP
4020	4500	SLUP27,	YNOTRY	/SEEK BACK TO CYLINDER CONTAINED IN LASTCY
4021	5327		JMP	/DRIVE DID NOT BECOME READY
4022	4464		REDHDR	/ERROR -- EXIT TEST
4023	4467		GETCYL	/READ A HEADER
4024	3133		DCA	/COMPUTE CYLINDER ADDRESS
4025	1133		TAD	/SAVE IT
4026	7041		CIA	/COMPARE CURCYL TO LOWER SEEK LIMIT
4027	1151		TAD	
4030	7640		SZA CLA	/SKIP IF AT LOWER SEEK LIMIT
4031	5272		JMP	/CONTINUE WITH TEST
4032	4442		GETSR	/GET SWITCH REGISTER
4033	0777		AND	/SAVE BIT 7
4034	7640		SZA CLA	/SKIP IF NOT SET
4035	5272		JMP	/CONTINUE WITH TEST
4036	7240		STA	/SUBTRACT 1 FROM OSCIL
4037	1140		TAD	
4040	3140		DCA	
4041	5272		JMP	/CONTINUE WITH TEST
4042	1140	ILUP27,	TAD	/COMPARE CYLINDER WE ARE OSCILLATING
4043	7041		CIA	/TO WITH THE
4044	1152		TAD	/UPPER SEEK LIMIT
4045	7640		SZA CLA	/SKIP IF OSCIL = HILIM
4046	5266		JMP	/GO REQUEST A LOOP
4047	1133		TAD	/COMPARE CURRENT CYLINDER
4050	7041		CIA	/WITH
4051	1151		TAD	/THE LOWER SEEK LIMIT
4052	7640		SZA CLA	/SKIP IF EQUAL
4053	5266		JMP	/REQUEST A LOOP

4054	TEMP3	TAD	/CHECK HEAD SELECT BIT
4055	SZA CLA	JMP	/SKIP IF USING HEAD 0
4056	NOLP27	TAD	/DON'T REQUEST LOOP AND EXIT TEST
4057	SURFAC	TAD	/CHECK IF OK TO SELECT HEAD 1
4060	SNA CLA	JMP	/SKIP IF IT IS
4061	NOLP27	JMP	/DON'T REQUEST LOOP AND EXIT TEST
4062	RTR	STL CLA	/SET HEAD SELECT BIT
4063	TEMP3	DCA	/SAVE IT
4064	LLOLM	TAD	/RESET OSCIL TO ITS INITIAL VALUE
4065	OSCIL	DCA	/REQUEST A LOOP FROM SCOPE
4066	RQST27,	STA	
4067	3131	DCA	
4070	1133	TAD	/SAVE CURRENT CYLINDER AS LAST
4071	3132	DCA	/CYLINDER FOR POSSIBLE USE BY SEKBAK
4072	1151	TAD	/SUBTRACT LOWER SEEK LIMIT
4073	7041	CIA	/FROM
4074	1133	TAD	/CURRENT CYLINDER
4075	7450	SNA	/SKIP IF NOT AT LOWER LIMIT
4076	5303	JMP	/NEED TO SEEK OUTWARD TO OSCIL OR HILIM
4077	7500	SMA	/SKIP IF DIRECTION 1 IS REQUIRED
4100	5320	JMP	/WE HAVE DIFFERENCE WORD -- CONTINUE
4101	7041	CIA	/CHANGE TO A POSITIVE DIFFERENCE
4102	5317	JMP	/SET DIRECTION BIT TO 1 AND CONTINUE
4103	4442	JMP	/GET SWITCH REGISTER
4104	0777,	AND	/SAVE BIT 7 -- LOOP ON THIS TEST FROM LOW TO HIGH LIMITS
4105	7650	SNA CLA	/SKIP IF BIT 7 IS SET
4106	5313	JMP	/GO SEEK TO OSCIL VALUE
4107	1133	TAD	/SUBTRACT CURCUL FROM HILIM TO
4110	7041	CIA	/GET DIFFERENCE WORD THAT
4111	1152	TAD	/WILL PUT ME AT HILIM
4112	5317	JMP	/SET DIRECTION BIT TO 1 AND CONTINUE
4113	2140	ISZ	/INCREMENT OSCIL OUTWARDS
4114	1133	TAD	/SUBTRACT CURRENT CYL FROM OSCIL TO
4115	7041	CIA	/GET DIFFERENCE WORD THAT
4116	1140	TAD	/WILL PUT ME AT OSCIL
4117	1776,	TAD	/SET DIRECTION BIT
4120	1136	TAD	/SET HEAD BIT
4121	4501	SEEKV	/VERIFY THE SEEK
4122	4500	YNTRY	/DRIVE DID NOT BECOME READY
4123	5327	JMP	/OTHER SEEK FAILURE
4124	5327	JMP	/ALL DONE -- EXIT TEST
4125	7330	STL CLA	/MAKE LOOP REQUEST FLAG NEGATIVE BUT
4126	3131	DCA	/DON'T REQUEST A LOOP
4127	4445	SCOPE	
4130	5775,	JMP	
4131	0000	RDBSF,	
4132	1374	TAD	/THIS ROUTINE WILL DO THE ACTUAL READING OF THE BAD SECTOR FILE
4133	4432	RLWC	
4134	1364	TAD	/SET THE # OF WORDS TO BE READ
4135	7002	BSFNUM	/EQ 120 WORDS OCTAL
4136	4431	BSW	/GET THE SECTOR # FROM WHICH TO
4137	1363	RLSA	/READ THE BSF AND LOAD IT INTO
		TAD	/THE SECTOR ADDR. REG.
		BUFADR	/GET ADDR OF BUFFER



4140	1366	TAD	OFFSET	/MODIFY IT WITH OFFSET
4141	4426	RLMA	(2777	/LOAD IT INTO THE BRK MEM. ADDR. REG.
4142	1373	TAD		/LOAD 2777, HEAD 1 & CYL. 777
4143	4427	RLCA		/INTO THE CMD A REG.
4144	1120	TAD	DRVNUM	/GET THE DRIVE # UNDER TEST
4145	7002	BSW		/PLACE DRIVE # INTO BITS 3:5
4146	1372	TAD	(1416	/ADD 1416, MODE+INTRPT ENA +FLD 1
4147	4430	RLCB		/+FUNC. RD INTO CMD B REG./ XCT RD FUNC.
4150	4425	RLSD		/WAIT FOR DONE FLAG TO SET
4151	5350	JMP	.-1	/CHECK FOR DRIVE ERRORS
4152	4475	ERRCHK		
4153	5355	JMP	..+2	/CHECK IF FAC OR FLD BSF DONE
4154	5731	JMP I	RDBSF	/UPDATE POINTER TO BSF SECTOR #
4155	1371	TAD	(4	
4156	1364	TAD	BSFNUM	/UPDATE THE # OF READ ATTEMPTS ON BSF
4157	3364	DCA	BSFNUM	
4160	2365	ISZ	BADCNT	/GO PROCESS ERROR CAN'T READ BSF
4161	5332	JMP	RDBSF+1	
4162	4770	JMS	BSFER1	

BUFADR, BUFFER  
BSFNUM, 0  
BADCNT, 0  
OFFSET, 0

4170 3147  
4171 0004  
4172 1416  
4173 2777  
4174 7660  
4175 4207  
4176 6237  
4177 5055  
4200

PAGE /THIS TEST WILL DO SEEK FOR THE SPEC HD ALIGN TEST  
SEEKT, 0

4200	0000	TAD	HDSEL	/GET THE HEAD SELECTED
4201	1777	TAD	SVECYL	/ADD IN THE CYL DIFFERENCE
4202	1776	RLCA		/LOAD THIS INTO THE CMD A REG.
4203	4427	SEEK		/DO A SEEK
4204	4463	JMS	DRVRDY	/WAIT FOR DRIVE READY TO SET
4205	4775	JMP I	SEEK	/RETURN CALL+1
4206	5600			

\*\*\*//\*\*\*//\*\*\*//\*\*\*//\*\*\*//\*\*\*//\*\*\*//\*\*\*//\*\*\*//\*\*\*//\*\*\*//\*\*\*//\*\*\*//\*\*\*//\*\*\*//\*\*\*//  
/TEST 28 REVERSE OSCILLATING SEEK HEAD 0 TEST

/ POSITION HEADS AT CYLINDER 777. DO OSCILLATING SEEK USING  
/ HEAD 0. (SEEK FROM 777 TO 776 TO 777,777 TO 775 TO  
/ 777,....777 TO 0 TO 777.) AFTER EACH SEEK READ HEADER AND  
/ VERIFY POSITION.

/ REPEAT TEST USING HEAD 1.

/ NOTE 1: CHOOSING A SINGLE SURFACE WILL LIMIT TESTING TO THAT

```

/ SURFACE. SECKS WILL BE WITHIN THE UPPER AND LOWER
/ LIMITS SPECIFIED.
/
TEST28. REDHDR 4207 4464
GETCYL 4210 4467
DCA 4211 3133
TAD 4212 1131
SNA 4213 7450
JMP 4214 5243
SPA CLA 4215 7710
JMP 4216 5226
TAD 4217 1152
HILIM 4220 3140
DCA 4221 1147
SURFAC 4222 7740
SMA SZA CLA 4223 7332
STL CLA RTR 4224 3136
DCA 4225 5267
JMP 4226 4466
SEKBAK 4227 4500
YNTRY 4230 5323
JMP 4231 4464
REDHDR 4232 4467
GETCYL 4233 3133
DCA 4234 1133
TAD 4235 7041
CIA 4236 1152
TAD 4237 7640
SZA CLA 4240 5273
JMP 4241 2140
ISZ 4242 5273
JMP 4243 1140
TAD 4244 7041
CIA 4245 1151
TAD 4246 7640
SZA CLA 4247 5267
JMP 4250 1133
TAD 4251 7041
CIA 4252 1152
TAD 4253 7640
SZA CLA 4254 5267
JMP 4255 1136
TAD 4256 7640
SZA CLA 4257 5321
JMP 4260 1147
TAD 4261 7650
SNA CLA 4262 5321
JMP 4263 7332
STL CLA RTR 4264 3136
DCA 4265 1152
TAD 4266 3140
DCA 4267 7240
STA 4270 3131
DCA 4271 1133
DCA 4272 3132

ILUP28.
HILIM
CON28A
OSCIL
CON28A
OSCIL
LOLIM
RQST28
CURCYL
HILIM
RQST28
TEMP3
NOLP28
SURFAC
NOLP28
RTR
HILIM
OSCIL
LPRQST
CURCYL
LASTCY

/ READ A HEADER
/ COMPUTE CYLINDER ADDRESS
/ SAVE CURRENT CYLINDER
/ SKIP IF FIRST TIME INTO TEST OR SCOPE LOOPED
/ I REQUESTED LOOP -- GO BELOW
/ SKIP IF FIRST TIME INTO TEST
/ IT WAS A SCOPE DECISION TO LOOP -- GO BELOW
/ SET UP CYLINDER TO OSCILLATE INWARD TOWARD
/ STARTING AT THE UPPER SEEK LIMIT
/ PICK UP SURFACE FLAG
/ SKIP IF OK TO USE HEAD 0
/ SET HEAD BIT -- USE HEAD 1
/ SAVE HEAD BIT TO USE
/ GO REQUEST A LOOP
/ SEEK BACK TO CYLINDER CONTAINED IN LASTCY
/ DRIVE DID NOT BECOME READY
/ ERROR -- EXIT TEST
/ READ A HEADER
/ COMPUTE CYLINDER ADDRESS
/ SAVE IT
/ COMPARE CURCYL TO UPPER SEEK LIMIT
/ SKIP IF AT UPPER SEEK LIMIT
/ CONTINUE WITH TEST
/ MOVE OSCIL VALUE BACK TOWARD HILIM
/ CONTINUE WITH TEST
/ COMPARE CYLINDER WE ARE OSCILLATING
/ TO WITH THE
/ LOWER SEEK LIMIT
/ SKIP IF OSCIL = LOLIM
/ GO REQUEST A LOOP
/ COMPARE CURRENT CYLINDER
/ WITH
/ THE UPPER SEEK LIMIT
/ SKIP IF EQUAL
/ REQUEST A LOOP
/ CHECK HEAD SELECT BIT
/ SKIP IF USING HEAD 0
/ DON'T REQUEST LOOP AND EXIT TEST
/ CHECK IF OK TO SELECT HEAD 1
/ SKIP IF IT IS
/ DON'T REQUEST LOOP AND EXIT TEST
/ SET HEAD SELECT BIT
/ SAVE IT
/ RESET OSCIL TO ITS INITIAL VALUE
/ REQUEST A LOOP FROM SCOPE
/ SAVE CURRENT CYLINDER AS LAST
/ CYLINDER FOR POSSIBLE USE BY SEKBAK

```

```

4273 1152 CON28A, TAD HILIM /SUBTRACT UPPER SEEK LIMIT
4274 7041 / FROM
4275 1133 CURCYL / CURRENT CYLINDER
4276 7450 SNA /SKIP IF NOT AT UPPER LIMIT
4277 5304 JMP ATHI28 /NEED TO SEEK INWARD TO OSCIL
4300 7500 SMA /SKIP IF DIRECTION 1 IS REQUIRED
4301 5314 JMP CON28B /CONTINUE
4302 7041 CIA /CHANGE TO A POSITIVE DIFFERENCE
4303 5313 JMP DIR128 /WE HAVE DIFFERENCE WORD -- SET DIRECTION AND CONTINUE
4304 7240 ATHI28, STA /SUBTRACT 1 FROM OSCIL
4305 1140 TAD DCA /INCREMENT OSCIL TOWARD LOWER SEEK LIMIT)
4306 3140 OSCIL
4307 1140 TAD OSCIL
4310 7041 CIA /SUBTRACT OSCIL FROM CURRENT CYL TO
4311 1133 TAD / GET DIFFERENCE WORD THAT
4312 5314 JMP CON28B / WILL PUT ME AT OSCIL
4313 1774, TAD K4000 /USE DIRECTION 0 AND CONTINUE
4314 1136 CON28B, TAD TEMP3 /SET DIRECTION BIT
4315 4501 SEEKV /SET HEAD BIT
4316 4500 YNOTRY /VERIFY THE SEEK
4317 5323 JMP END28 /DRIVE DID NOT BECOME READY
4320 5323 JMP END28 /OTHER SEEK FAILURE
4321 7330 NOLP28, STL CLA RAR /ALL DONE -- EXIT TEST
4322 3131 DCA LPROST /MAKE LOOP REQUEST FLAG NEGATIVE BUT
4323 4445 END28, SCOPE / DON'T REQUEST A LOOP

```

```

/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**
/THIS ROUTINE SELECTS THE NEXT DRIVE THAT IS AVAILABLE FOR TESTING (AS
/INDICATED BY FLAGS IN DRIVE ACTIVE TABLE). CONTROL IS THEN PASSED BACK
/TO THE SCOPE INITIALIZATION ROUTINE WHICH RESTARTS AT TEST 1. IF NO MORE
/DRIVES ARE AVAILABLE, CONTROL IS PASSED TO THE END OF PASS ROUTINE.
/

```

```

4324 7200 NXTDRV, CLA /BUMP UP TO NEXT DRIVE
4325 2120 ISZ DRVNUM /4 INTO AC FOR MASK
4326 7307 CLA CLL IAC RTL /CHECK IF AT DRIVE "4"
4327 0120 AND DRVNUM /SKIP IF NOT
4330 7640 SZA CLA /NO MORE DRIVES--REPORT END OF PASS
4331 5342 JMP EOP /FORM OFFSET INTO DRIVE ACTIVE TABLE
4332 1120 TAD DRVNUM /TO TEST IF THIS DRIVE
4333 1373 TAD (DRVACT /IS ACTIVE
4334 3134 DCA TEMP1 /PICK UP DRIVE ACTIVE FLAG
4335 1534 TAD TEMP1 /SKIP IF DRIVE IS AVAILABLE FOR TESTING
4336 7650 SNA CLA /TRY THE NEXT DRIVE
4337 5324 JMP NXTDRV /RESART TESTS WITH THIS DRIVE ACTIVE
4340 4772, JMS GETBSF
4341 5771, JMP SCOPIN

```

```

/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**/**
/END OF PASS ROUTINE. CONTROL IS PASSED HERE FROM NEXT DRIVE ROUTINE
/WHEN NO MORE DRIVES ARE LEFT TO TEST ON THIS PASS. THE END PASS MESSAGE
/IS TYPED AND CONTROL IS PASSED TO THE SELECT FIRST DRIVE ROUTINE.
/SWITCH REGISTER BITS AFFECTING THIS ROUTINE ARE:
/
/ SR3 =0 LOOP PROGRAM
/ SR3 =1 HALT AT END OF PASS
/ SR6 =0 REPORT END OF PASS
/

```

```

4342 2142      /
4343 5346      /
4344 7240      /
4345 3142      /
4346 4443      /
4347 5770'      /
4350 4442      /
4351 7002      /
4352 7510      /
4353 5361      /
4354 4504      /
4355 1520      /
4356 1142      /
4357 4507      /
4360 4512      /
4361 4442      /
4362 0164      /
4363 7640      /
4364 4451      /
4365 5770'      /

4370 0526      /
4371 0552      /
4372 3541      /
4373 3364      /
4374 6237      /
4375 1557      /
4376 1353      /
4377 1354      /
4400

/
/
EOP.
/ISZ      PASCNT      /INCREMENT PASS COUNT
JMP      .+3
STA      PASCNT
DCA      APTCHK
APTCHK   FRSTDR
GETSR
BSW
SPA
JMP      .+6
MESSAGE
EOPMES
TAD
PRNT4
CRLF
GETSR
AND      K400
SZA CLA
CNTRLG
JMP      FRSTDR

=1      INHIBIT EOP MESSAGE
PASCNT
.+3
PASCNT
FRSTDR
.+6
PASCNT
PASCNT
PASCNT
CARRIAGE RETURN, LINE FEED
GET SWITCHES
/MASK ALL BUT SWITCH 3
/SKIP IF NO HALT DESIRED
"/HALT"--GO TO CONTROL-G ROUTINE
/GO SELECT FIRST DRIVE

```

PAGE

/AJRLH SUBROUTINES AND UTILITIES

/SCOPE

/THIS ROUTINE IS CALLED AT THE END OF EACH SUBTEST. APT TIMING  
 /IS GENERATED AND CONSOLE INPUT IS PROCESSED. A DECISION IS THEN  
 /MADE WHETHER TO LOOP ON THE SUBTEST OR CONTINUE AT THE NEXT ONE.  
 /SWITCH REGISTER BITS AFFECTING THIS ROUTINE ARE (IN ORDER OF PRIORITY):

```

/      SR2 =1      LOOP ON CURRENT TEST
/      SR1 =1      LOOP ON ERROR (HARD OR SOFT)
/

```

/THE PROGRAM MAY REQUEST A LOOP (E.G. FOR A READ/WRITE TEST TO TWO DIFFERENT  
 /CYLINDERS) BY SETTING LPRST TO -1. LPRST MAY BE SET TO ANYTHING ELSE TO NOT  
 /REQUEST A LOOP. UPON ENTRY TO THE TEST, LPRST WILL BE 0 IF ENTRY IS BECAUSE  
 /OF REQUESTED LOOP, UNCHANGED IF LOOPING BECAUSE OF A NORMAL SCOPE DECISION  
 /I.E. THE PROGRAM MUST REPEAT THE TEST AS PREVIOUSLY EXECUTED), AND 1  
 /IF ENTERING THE TEST FOR THE FIRST TIME.

```

/CALL TICK;
/IF CONSOLE-INPUT THEN CALL CONSOLE;
/IF SR2 = 1

```

```

4400 0000      / THEN RETURN POINTER = LOOPPT;
4401 4444      / ELSE IF (ERRFLG = 1) AND (SR1 = 1)
4402 6031      / THEN RETURN POINTER = LOOPPT;
4403 5206      / ELSE IF LOOP REQUEST FLAG = -1
4404 4513      / THEN DO;
4405 4447      /   CLEAR LOOPREQUEST FLAG;
4406 4442      /   RETURN POINTER = LOOPPT
4407 7006      /   END;
4410 7710      / ELSE DO;
4411 5220      /   LOOP REQUEST FLAG = 1;
4412 1130      /   LOOPPT = RETURN POINTER;
4413 7020      /   ERRFLG = 0;
4414 7660      /   END;
4415 5220      / RETURN VIA RETURN POINTER;
4416 2131      /
4417 5223      /
4420 1127      /
4421 3200      /
4422 5230      /
4423 1200      /
4424 3127      /
4425 3130      /
4426 7201      /
4427 3131      /
4430 4424      /
4431 5600      /

XSCOPE, 0      / GENERATE APT TIMING
TICK          / CONSOLE INPUT?
KSF           .+3
JMP VT278
CONSOL
GETSR
RTL
SPA CLA
JMP RETSET
TAD ERRFLG
CML
SZA SNL CLA
JMP RETSET
ISZ LPRGST
JMP LUPSET
TAD LOOPPT
DCA XSCOPE
JMP .+6
LUPSET, TAD XSCOPE
DCA XSCOPE
DCA LOOPPT
DCA ERRFLG
CLA IAC
DCA LPRGST
RLDC
JMP I XSCOPE

/ERROR
/
/THIS ROUTINE IS CALLED BY A SUBTEST WHEN AN ERROR HAS BEEN DETECTED.
/THE PC OF THE ERROR CALL IS STORED AT "ERRPC" FOR TYPE-OUT. IF ON APT,
/NOTIFY APT OF THE ERROR. THE ARGUMENT IN THE LOCATION FOLLOWING THE ERROR
/CALL IS A POINTER TO AN ENTRY IN THE ERROR TABLE. SEE FIELD 1 FOR ERROR TABLE FORMAT.
/
/SWITCH REGISTER BITS AFFECTING THIS ROUTINE ARE:
/ SR0 =0 HALT ON ERROR
/ SR4 =1 INHIBIT ERROR HALT
/ SR4 =0 TYPEOUT ERROR
/ SR8 =1 INHIBIT ERROR REPORT
/ SR8 =0 DON'T DROP DRIVE REGARDLESS OF ERROR COUNT

```

```

/ /
/ /      =1      DROP DRIVE ON REACHING ERROR LIMIT
/GET ERROR PC;
/IF ON-APT THEN GO TO UVPRM;
/IF SR4=0
/  THEN DO;
/    GET POINTER TO ERROR TABLE ENTRY;
/    GET ENTRY FROM ERROR TABLE;
/    IF ENTRY NOT= 0 THEN TYPE MESSAGE;
/    UPDATE POINTER TO TABLE;
/    GET ENTRY FROM ERROR TABLE;
/    IF ENTRY NOT= 0 THEN TYPE MESSAGE;
/    UPDATE POINTER TO TABLE;
/    GET ENTRY FROM ERROR TABLE;
/    SET POINTER TO DATA AREA (ERRPC-1);
/    DO I=(ENTRY FROM TABLE) TO 0;
/      INC POINTER TO DATA AREA;
/      GET DATUM;
/      TYPE IT (PRNT4);
/    END;
/  END;
/IF APTCODE NOT= 0
/  THEN DO;
/    INCREMENT ERROR COUNT FOR THIS DRIVE;
/    IF SR8=0
/      THEN DO;
/        DROP CURRENT DRIVE;
/        GO SELECT NEXT DRIVE;
/      END;
/    IF SR0=0 THEN HALT;
/SET ERRFLG;
/RETURN;
/
XERROR, 0
CLA CMA
TAD XERROR
DCA ERRPC
TAD I XERROR
DCA TABENT
CDF 10
TAD I TABENT
CDF 0
DCA PERNUM
GETSR
AND
SZA CLA
JMP
ISZ
JMS
JMS
CDF 10
TAD I TABENT
CDF 0
DCA DATCNT
TAD DATTAB

/ /
/ /      /SUBTRACT 1 FROM RETURN
/ /      /ADDRESS TO GET ERROR PC
/ /      /SAVE ERROR PC
/ /      /GET ARGUMENT
/ /      /SAVE POINTER TO TABLE ENTRY
/ /      /GET THE APT ERROR CODE
/ /      /SAVE IT FOR LATER TESTING
/ /      /GET (HARD OR PSEUDO) SWITCH REG
/ /      /MASK ALL BUT SR4
/ /      /SKIP IF OK TO TYPE
/ /      /INHIBIT ERROR REPORT
/ /      /SKIP OVER APT CODE INFO
/ /      /TYPE MESSAGE FROM TABLE ENTRY
/ /      /TYPE DATA HEADER FROM TABLE ENTRY
/ /      /DATA FIELD OF ERROR TABLE
/ /      /GET NUMBER OF DATA ITEMS
/ /      /BACK TO HERE
/ /      /SAVE COUNT
/ /      /PICK UP POINTER TO DATA TABLE

```

```

4432 0000
4433 7240
4434 1232
4435 3117
4436 1632
4437 3337
4440 6211
4441 1737
4442 6201
4443 3356
4444 4442
4445 0163
4446 7640
4447 5267
4450 2337
4451 4343
4452 4343
4453 6211
4454 1737
4455 6201
4456 3340
4457 1341

```



```

4543 0000 ERRTP, 0
4544 6211 CDF 10
4545 1737 TABENT
4546 6201 CDF 0
4547 7450 SNA
4550 5354 JMP .+4
4551 3353 DCA .+2
4552 4504 MESSAGE
4553 0000 0
4554 2337 ISZ TABENT
4555 5743 JMP I ERRTP

4556 0000 PERNUM, 0
4557 6167 PDV0E, DRV0ER
4560 0010 K10A, 10

/DROP DRIVE BY CLEARING THE BIT SET IN LOCATION "DRIVES"
DROPR, MESSAGE
TAD DROPR
PRNT1 DRVNUM
CRLF
TAD DRVNUM
TAD (DRVACT
DCA TEMP1
DCA I TEMP1
JMP NXTDRV

4561 4504
4562 1136
4563 1120
4564 4505
4565 4512
4566 1120
4567 1377
4570 3134
4571 3534
4572 5776,

4576 4324
4577 3364
4600

PAGE
/CONSOL
/THIS ROUTINE IS USED TO PROCESS KEYBOARD INPUT. IF OUTPUT IS DISABLED, THEN
/ONLY CNTRL-Q AND CNTRL-C ARE RECOGNIZED, IF OUTPUT IS ENABLED, THEN
/IN ADDITION, CNTRL-G AND CNTRL-S ARE RECOGNIZED. THESE CHARACTERS
/HAVE THE FOLLOWING CONTROL FEATURES:
/ CNTRL-G -- ENTER SWITCH REGISTER MODIFICATION ROUTINE
/ CNTRL-C -- RETURN TO OS/8 MONITOR
/ CNTRL-S -- INHIBIT ALL FURTHER OUTPUT. ONLY CNTRL-Q OR CNTRL-C
/ WILL BE RECOGNIZED. (IF THE PROGRAM ATTEMPTS TO
/ OUTPUT, IT WILL HANG WAITING FOR A CNTRL-Q OR C.)
/ CNTRL-Q -- ENABLE OUTPUT
/ CNTRL-F -- ADJUST FILLER CHARACTER COUNT
/ ALL OTHER CHARACTERS ARE ECHOED, FOLLOWED BY "?" AND CR/LF.
/IF NOT ON-APT OR NO INPUT
/ THEN IF OUTPUT-OFF
/ THEN DO:
/ GET CHARACTER;
/ IF CHARACTER = ^Q
/ THEN TURN OUTPUT ON;
/ ELSE IF CHARACTER = ^C
/ THEN DO;

```



```

4600 0000      TURN OUTPUT ON;
4601 6031      TYPE "C";
4602 5243      GOTO OS/8;

4603 4443      END;
4604 5243      ELSE DO;
4605 4513          GET CHARACTER;
4606 1141          IF CHARACTER = "G
4607 7650              THEN DO;
4608 5216                  TYPE "G";
4609 4503                  CALL CNTRLG;
4610 5216              END;
4611 4503              ELSE IF CHARACTER = "Q
4612 7557                  THEN DO;
4613 4642                      TYPE "Q";
4614 0000                      GOTO OS/8;
4615 4643              END;
4616 4503              ELSE IF CHARACTER = "S
4617 7571                  THEN TURN OUTPUT OFF;
4618 4620                  ELSE IF CHARACTER = "F
4619 4636                      THEN CALL CNTRLF;
4620 4636                      ELSE TYPE "<CR><LF>";
4621 7555
4622 4640
4623 7557
4624 4643
4625 7572
4626 4634
4627 0000
4630 4631
4631 4504
4632 1516
4633 5243

XCONSO, 0      /RETURN;
0              /
KSF            /SKIP IF KEYBOARD INPUT
JMP            /NO INPUT--RETURN
APTCHK         /SKIP IF NOT ON APT
JMP            /ON APT--IGNORE KEYBOARD
VT278         /PICK UP OUTPUT DISABLE FLAG
TAD            /OUTPUT DISABLED?
SNA CLA       /NO--GO TO ONLISN
JMP            /YES--GET CHARACTER FROM KEYBOARD
ONLISN,       /CNTRL-Q
M207,         /IF "Q GO TO CNTRLQ
0             /IF NOT "Q OR "C THEN
CONRET        /RETURN
LISN          /GET CHARACTER
-207          /CNTRL-G
CTLG          /CNTRL-S
-223          /GO DISABLE OUTPUT
CNTRL5        /CNTRL-Q
-221          /OUTPUT IS ALREADY ON, SO RETURN
CONRET        /IF CONTROL-F GO TO
-206          /CNTRL-Q
CTLF          /IF INVALID CHARACTER THEN
0             /TYPE OUT
+1            /"?" FOLLOWED BY
MESSAGE       /<CR><LF>
QESMRK        /AND RETURN
JMP           /CONRET

```

```

4634 4452 CTLF, CNTRLF /CALL CNTRL-F HANDLER
4635 5243 JMP CONRET /RETURN
4636 4450 CTLG, UPARG /RETURN
4637 5243 JMP CONRET /SET NOPRINT FLAG
4640 2141 CNTRLS, IS2 NOPRNT /RETURN
4641 5243 JMP CONRET /CLEAR NOPRINT FLAG
4642 3141 CNTRLQ, DCA NOPRNT /RETURN W/AC CLEAR
4643 5600 CONRET, JMP I XCONSO /

/CNTRLF
/CONTROL-F HANDLER. ALLOWS MODIFICATION OF FILL COUNT FROM CONSOLE.
/CNTRLF, 0
  MESSAGE
  FILLEQ
  TAD
  PRNT4
  GETNUM
  JMP
  JMP
  JMP
  JMP
  STA
  LISN
  XCNTRLF+1
  -206
  -207
  .+6
  0
  .+1
  MESSAGE
  QESMRK
  JMP
  UPARG
  JMP
  DCA
  CNTRFT, JMP I XCNTRLF
  UPARG
  /TYPE "G", THEN CALL CONTROL G HANDLER
  XUPARG, 0
  MESSAGE
  UPARRG
  CNTRLG
  JMP I XUPARG
  /CNTRLG
/CONTROL-G HANDLER. CALLED WITH "CNTRLG" WHENEVER CONTROL-G IS
/RECEIVED FROM CONSOLE, OR ON PROGRAM "HALT", OR AT BEGINNING OF PROGRAM
/IF SOFTWARE SWITCHES USED.
4644 0000
4645 4504
4646 1532
4647 1023
4650 4507
4651 4455
4652 5256
4653 5256
4654 5274
4655 5273
4656 7240
4657 4503
4660 7572
4661 4645
4662 7571
4663 4671
4664 0000
4665 4666
4666 4504
4667 1516
4670 5245
4671 4450
4672 5245
4673 3023
4674 5644
4675 0000
4676 4504
4677 1530
4700 4451
4701 5675

```

```

4702 4504      MESSAGE
4703 1530      UPARRG
4704 7410      SKP
4705 0000      XCTRLG, 0
4706 4504      MESSAGE
4707 1540      SHRMSG
4710 4442      GETSR
4711 4507      PRNT4
4712 4455      GETNUM
4713 5317      JMP      NOIN
4714 5323      JMP      YESIN
4715 5345      JMP      CNTGRT
4716 5344      JMP      CNTGRT-1
4717 7240      NOIN,
4720 3347      DCA      INFLG
4721 3346      DCA      DIGIN
4722 5325      JMP      +3
4723 3346      DCA      DIGIN
4724 3347      DCA      INFLG
4725 7240      STA
4726 4503      LISN
4727 7571      -207
4730 4702      XCTRLG-3
4731 7566      -212
4732 4740      LNFEED
4733 0000      LNFEED
4734 4735      +1
4735 4504      MESSAGE
4736 1516      QESMRK
4737 5306      JMP      XCTRLG+1
4740 1163      TAD      K200
4741 3305      DCA      XCTRLG
4742 1346      TAD      DIGIN
4743 2347      ISZ      INFLG
4744 3020      DCA      PSWR
4745 5705      CNTGRT, JMP I XCTRLG
4746 0000      /
4747 0000      DIGIN, 0
4748 0000      INFLG, 0
4749 0000      /WZITFG
4750 0000      /
4751 7300      /WAS IT F OR G? SUBROUTINE CHECKS IF LAST CHARACTER INPUT WAS CONTROL-F OR CONTROL-G,
4752 1143      /AND IF SO, CALLS THE APPROPRIATE HANDLER. AC IS CLEAR ON RETURN
4753 1217      /
4754 7450      XWZITF, 0
4755 4450      CLA CLL
4756 7001      TAD      LASTIN
4757 7650      TAD      M207
4758 4452      SNA
4759 4450      UPARG
4760 4452      IAC
4761 4450      SNA CLA
4762 4452      CNTRLF
4763 4452      /GET LAST CHARACTER INPUT
4764 4452      /CHECK IF ^G
4765 4452      /SKIP IF NOT
4766 4452      /HANDLE ^G
4767 4452      /CHECK IF ^F
4768 4452      /SKIP IF NOT
4769 4452      /HANDLE CONTROL F
4770 4452
4771 4452
4772 4452
4773 4452
4774 4452
4775 4452
4776 4452
4777 4452
4778 4452
4779 4452
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5000 4452

```

```

4761 5750      JMP I   XWZITF      /RETURN W/ AC CLEAR
                /PRINT FOUR OCTAL NUMBERS IN AC 11 THRU 0 FOLLOWED
                /BY TWO SPACES

4762 0000      XPRNT4, 0          /CALL BY "PRNT4"
4763 3373      DCA      P4SAVE
4764 1373      TAD      P4SAVE
4765 7002      BSW
4766 4506      PRNT2
4767 1373      TAD      P4SAVE
4770 4506      PRNT2
4771 4510      SPACE2
4772 5762      JMP I   XPRNT4
4773 0000      P4SAVE, 0

                PAGE      5000

                /PRINT THE TWO OCTAL NUMBERS IN THE AC 6 THRU 11

5000 0000      XPRNT2, 0          /CALL BY "PRNT2"
5001 3211      DCA      P2SAVE
5002 1211      TAD      P2SAVE
5003 7012      RTR
5004 7010      RAR
5005 4505      PRNT1
5006 1211      TAD      P2SAVE
5007 4505      PRNT1
5010 5600      JMP I   XPRNT2
5011 0000      P2SAVE, 0

                /TYPE
                /

                /TYPE THE ASCII CHARACTER IN THE AC

5012 0000      XTYPE, 0
5013 3253      DCA      CHARSV
5014 1141      TAD      NOPRNT
5015 7650      SNA CLA
5016 5221      JMP      .+3
5017 4447      CONSOL
5020 5214      JMP      .-4
5021 6031      KSF
5022 5240      JMP      OK2TYP
5023 4513      VT278
5024 6034      KRS
5025 1254      TAD
5026 7440      SZA
5027 5233      JMP      .+4
5030 6030      KCF
5031 2141      ISZ
5032 5214      JMP      NOPRNT
5033 1255      TAD      CHKOK
5034 7640      SZA CLA
5035 5240      JMP      K20
                    OK2TYP

                /READ KEYBOARD--LEAVE FLAG SET
                /ADD IN MINUS CONTROL-S
                /SKIP IF A CONTROL-S
                /GO CHECK FOR CNTRL-C
                /CLEAR KEYBOARD FLAG
                /SET NO PRINT FLAG
                /GO GET IN CONTROL-Q WAIT LOOP
                /CHECK FOR CONTROL-C
                /SKIP IF CONTROL-C
                /NOT 'C--TYPE THE CHARACTER

```

```

5036 6030      KCF      /CLEAR KEYBOARD FLAG
5037 5366      JMP      /HANDLE CONTROL-C
5040 1253      OK2TYP, TAD  /GET CHARACTER
5041 6046      TIS
5042 7200      CLA
5043 6041      TSF
5044 7410      SKP
5045 5251      JMP      .+4
5046 6102      SPL
5047 5243      JMP      .-4
5050 4000      JMS      0
5051 6042      TCF
5052 5612      JMP I  XTYPE
/
5053 0000      CHARSV, 0
5054 7555      M223, -223
5055 0020      K20, 20

```

```

/TYPE A CR AND LF WITH NUMBER OF FILLERS
/AS DETERMINED BY LOCATION "FILLER"

```

```

5056 0000      XCRLF, 0      /CALL BY "CRLF"
5057 7200      CLA
5060 1272      TAD      K215
5061 4511      TYPE
5062 1023      TAD      FILLER
5063 7040      CHA
5064 3274      DCA      CRLFVS
5065 1273      TAD      K212
5066 4511      TYPE
5067 2274      ISZ
5070 5266      JMP      .-2
5071 5656      JMP I  XCRLF
5072 0215      K215, 0215
5073 0212      K212, 0212
5074 0000      CRLFVS, 0

```

```

/COMPARE INPUT TO LIST FOLLOWING CALL
/INPUT ONE CHARACTER IF AC=0
/USE LAST INPUT IF AC NON ZERO

```

```

5075 0000      XLISN, 0      /CALL BY "LISN"
5076 7640      SZA CLA
5077 5330      JMP      LISN1
5100 6031      KSF
5101 5300      JMP      .-1
5102 6036      KRB
5103 0361      AND      K177
5104 1163      TAD      K200
5105 3143      DCA      LASTIN
5106 1364      TAD      M203
5107 1143      TAD      LASTIN
5110 7650      SNA CLA
/USE LAST INPUT SINCE AC NOT ZERO
/CHECK IF CHARACTER WAS A CONTROL-C
/SKIP IF NOT

```

5111	JMP	CNTRLC	/GO HANDLE CONTROL-C
5112	TAD	NOPRNT	/CHECK OUTPUT ENABLE FLAG
5113	SZA	CLA	/SKIP IF OK TO OUTPUT
5114	JMP	LISN1	/DON'T PRINT CHARACTER
5115	TAD	LASTIN	
5116	TAD	M212	
5117	SNA		
5120	JMP	.+4	/IS IT A LF?
5121	TAD	M3	/YES
5122	SZA	CLA	/IS IT A CR?
5123	JMP	.+3	/NO
5124	CRLF		
5125	JMP	LISN1	
5126	TAD	LASTIN	
5127	TYPE		/PRINT THE CHARACTER
5130	TAD I	XLISN	/GET COMPARE VALUE
5131	ISZ	XLISN	
5132	SNA		/EXIT?
5133	JMP	LISN3	/YES
5134	SMA		
5135	JMP	LISNUM	/LOOK FOR OCTAL NUMBER
5136	TAD	LASTIN	/COMPARE
5137	SNA	CLA	/EQUAL?
5140	JMP	LISN3	/YES
5141	CLA		
5142	ISZ	XLISN	
5143	JMP	LISN1	
5144	CLA		/LOOK FOR OCTAL NUMBER
5145	TAD	LASTIN	
5146	TAD	M270	
5147	SMA		
5150	JMP	LISN2	/IS IT LESS THAN 8?
5151	TAD	K10	/NO, SO NOT AN OCTAL NUMBER
5152	SPA		
5153	JMP	LISN2	/IS IT GREATER THAN ZERO?
5154	DCA	TEMP2	/NO, SO NOT A NUMBER
5155	TAD I	XLISN	
5156	DCA	XLISN	
5157	TAD	TEMP2	
5160	JMP I	XLISN	/AC IS ZERO UNLESS OCTAL NUMBER
5161	0177		
5162	7566		
5163	7775		
5164	-203		
5165	10		
5166	CNTRLC	CLA	
5167	DCA	NOPRNT	/TURN OUTPUT ON
5170	MESSAGE		/THEN TYPE "C<CR><LF>"
5171	UPARRC		
5172	JMP I	OS8	/GO TO OS/8 MONITOR
5173	OS8	7600	/POINTER TO OS/8 BOOT
5200	PAGE		

/TIMING GENERATOR FOR NOTIFYING APT SYSTEM. TICKS SHOULD BE  
 /SPACED AT LEAST ONCE EVERY 1 MS AND NOT MORE OFTEN THAN EVERY 40 US  
 /WHEN NOT CALLING SCOPE  
 /

5200	0000	XTICK,	0		/SKIP IF NOT ON APT
5201	4443	APTCHK			/ON APT -- GENERATE TIMING
5202	7410	SKP			/DON'T GENERATE TIMING
5203	5210	JMP		TIKRET	/COUNT A TIME UNIT
5204	2213	ISZ		TOCK	/NOT READY FOR APT NOTIFICATION
5205	5210	JMP		TIKRET	/FIELD OF UV-PROM
5206	6272	CIF		70	/NOTIFY APT
5207	4614	JMS I		PAPTIM	/SKIP ON POWER LOW
5210	6102	TIKRET, SPL			/RETURN
5211	5600	JMP I		XTICK	/POWER FAIL INTERRUPT
5212	4000	JMS		0	
5213	0000	TOCK,	0		/TIME UNIT COUNTER
5214	6500	PAPTIM,	6500		/POINTER TO APT'S TIMING ROUTINE

/PRINT THE OCTAL NUMBER IN AC 9 THRU 11  
 XPRNT1, 0 /CALL BY "JMS XPRNT1"

5215	0000	AND		K7
5216	0170	TAD		K260
5217	1222	TYPE		
5220	4511	JMP I		XPRNT1
5221	5615			
5222	0260	K260,	0260	

/PRINT PACKED ASCII TEXT TERMINATED BY  
 /SIX-BIT 00

5223	0000	MESAGX,	0		/CALL BY "MESSAGE"
5224	7344	CLA CLL		CMA RAL	/-2 INTO AC
5225	3266	DCA		MESCNT	/SET UP CHARACTER COUNTER
5226	1623	TAD I		MESAGX	
5227	3267	DCA		MESSAV	
5230	2223	ISZ		MESAGX	
5231	6211	MESLUP,	0	10	/SET UP RETURN
5232	1667	COF		I	/FIELD OF TEXT
5233	6201	TAD I		MESSAV	/BACK TO HERE
5234	2266	COF		0	/FIRST OR SECOND CHARACTER OF WORD
5235	5244	ISZ		MESCNT	/FIRST-PUT CHARACTER INTO LOW BYTE
5236	2267	JMP		MESBSW	/2ND--INCREMENT POINTER FOR NEXT TIME
5237	3135	ISZ		MESSAV	/SAVE AC
5240	7344	DCA		TEMP2	/RESTORE CHARACTER COUNTER
5241	3266	CLA CLL		CMA RAL	
5242	1135	DCA		MESCNT	
5243	7410	TAD		TEMP2	
5244	7002	SKP			
5245	0263	MESBSW,		BSW	/GET FIRST CHARACTER INTO POSITION
5246	7450	AND		K77	/TERMINATOR (00)?
5247	5623	SNA		I	/YES
5250	1264	JMP I		MESAGX	/CRLF?
5251	7450	TAD		M43	/YES
5252	5261	SNA			
5253	1270	JMP		+.7	
		TAD		K3A	

5254	7510	SPA		/200 OR 300
5255	1271	TAD	K100A	/300
5256	1265	TAD	K240	/200
5257	4511	TYPE		
5260	7410	SKP		
5261	4512	CRLF		
5262	5231	JMP	MESLUP	
5263	0077	K77,		
5264	7735	M43,		
5265	0240	K240,		
5266	0000	MESCNT,	0	
5267	0000	MESSAV,	0	
5270	0003	K3A,	3	
5271	0100	K100A,	100	
/IOT SUBROUTINES				
/CLEAR DEVICE, ALL REGISTERS, AC, AND FLAGS				
5272	0000	XRLDC,	0	
5273	6600	IOT0,	6600	/ISSUE DEVICE CLEAR
5274	5672	JMP I	XRLDC	/RETURN (AC CLEAR)
/SKIP ON FUNCTION DONE, THEN CLEAR IF SET TO A ONE				
5275	0000	XRLSD,	0	
5276	6601	IOT1,	6601	/SKIP IF DEVICE DONE
5277	7410	SKP		/NORMAL RETURN IF NO SKIP
5300	2275	ISZ	XRLSD	/INCREMENT RETURN ADDR FOR SKIP
5301	5675	JMP I	XRLSD	/RETURN (AC UNCHANGED)
/LOAD BREAK MA REG FROM AC				
5302	0000	XRLMA,	0	
5303	6602	IOT2,	6602	/LOAD MA REGISTER
5304	5702	JMP I	XRLMA	/RETURN (AC CLEAR)
/LOAD COMMAND REGISTER A FROM AC				
5305	0000	XRLCA,	0	
5306	6603	IOT3,	6603	/LOAD COMMAND REG A
5307	5705	JMP I	XRLCA	/RETURN (AC CLEAR)
/LOAD COMMAND REGISTER B FROM AC				
5310	0000	XRLCB,	0	
5311	6604	IOT4,	6604	/LOAD COMMAND REG B
5312	5710	JMP I	XRLCB	/RETURN (AC CLEAR)
/LOAD SECTOR ADDRESS REGISTER FROM AC 0:5				
5313	0000	XRLSA,	0	
5314	6605	IOT5,	6605	/LOAD SECTOR ADDRESS REG
5315	5713	JMP I	XRLSA	/RETURN (AC CLEAR)



```

5316 0000 /"SPARE/LOAD WORD COUNT FROM AC
5317 6607 /XRLWC, 0
5320 5716 /IOT7, 6607 /LOAD WORD COUNT
/RETURN (AC CLEAR)

/READ ERROR REGISTER INTO AC 0:2
/
XRRER, 0
IOT10, 6610 /READ ERROR REGISTER
/RETURN (AC=E000)

/READ WORD COUNT REG INTO AC
/
XRRWC, 0
IOT11, 6611 /READ WORD COUNT
/RETURN W/WC IN AC

/READ COMMAND REG A INTO AC
/
XRRCA, 0
IOT12, 6612 /READ COMMAND REG A INTO AC
/RETURN W/CA IN AC

/READ COMMAND REG B INTO AC
/
XRRCB, 0
IOT13, 6613 /READ COMMAND REG B
/RETURN W/ INFO IN AC

/READ SECTOR ADDRESS REGISTER INTO AC 0:5
/
XRRSA, 0
IOT14, 6614 /READ SECTOR ADDR
/RETURN (AC=SA00)

/READ SILO WORD INTO AC 4:11
/
XRRSI, 0
IOT15, 6615 /READ SILO
/RETURN (AC 0:3 CLEAR, 4:11=SILO)

/SKIP ON DRIVE ERROR, THEN CLEAR IF SET TO A ONE
/
XRLSE, 0
IOT17, 6617 /SKIP ON DRIVE ERROR
/NORMAL RETURN (NO SKIP)
ISZ XRLSE /INC RETURN ADDR FOR SKIP
JMP I XRLSE /RETURN (AC UNCHANGED)

/STACHK
/
/CHECK STATUS RECEIVED FROM DRIVE. SKIP IF STATUS IS NOT AS EXPECTED.
/ACTUAL STATUS IS IN DATA1 AND DATA2. EXPECTED STATUS IS IN
/ATA3 AND DATA4.

```

```

5350 0000 /XSTACH, 0
5351 1121 TAD DATA1
5352 7041 CIA
5353 1123 TAD DATA3
5354 7640 SZA CLA
5355 5362 JMP
5356 1122 TAD DATA2
5357 7041 CIA
5360 1124 TAD DATA4
5361 7640 SZA CLA
5362 2350 ISZ XSTACH
5363 5750 JMP I XSTACH

/COMPARE EXPECTED WORD 1
/(BY SUBTRACTION)
/WITH ACTUAL WORD 1
/SKIP IF EQUAL
/ERROR--EXIT WITH A SKIP
/COMPARE ACTUAL STATUS WORD 2
/WITH EXPECTED
/SKIP IF EQUAL
/ERROR--SKIP ON RETURN
/RETURN W/AC CLEAR

/JMPPM1
/THIS SUBROUTINE ACTS AS A "JMP --1" INSTRUCTION EXCEPT THAT THE AC IS
/CLEARED AND CONSOL INPUT CAN BE PROCESSED.
/JMPPM, 0
CLA CLL NOCONS
TAD SNA CLA
CONSOL
CLA CLL CMA RAL
TAD XJMPPM
DCA XJMPPM
SPL
JMP I XJMPPM
JMS 0

5364 0000
5365 7300 CLA CLL
5366 1777' TAD NOCONS
5367 7650 SNA CLA
5370 4447 CONSOL
5371 7344 CLA CLL CMA RAL
5372 1364 TAD XJMPPM
5373 3364 DCA XJMPPM
5374 6102 SPL
5375 5764 JMP I XJMPPM
5376 4000 JMS 0

5377 1355
5400 PAGE

/POWER FAIL ROUTINES
/
PWRFAIL, CLA
5401 1000 TAD 0
5402 3121 DCA DATA1
5403 6102 SPL
5404 5210 JMP IMPINT
5405 1213 TAD JMPUP
5406 3000 DCA 0
5407 7402 HLT

5410 4446 IMPINT, ERROR
5411 3300 FATAL
5412 5563 JMP I K200

5413 5403 JMPUP, JMP I 3

5414 6035 PWRUP, KIE
5415 3000 DCA 0
5416 4443 APTCHK
5417 5225 JMP NOPMES

```

5420	4504	MESSAGE	/POWER FAIL PC=
5421	3144	POWER	/GET PC OF POWER FAIL
5422	1121	TAD	/PRINT IT
5423	4507	PRINT4	
5424	4512	CRLF	
5425	4473	NOPMES, SETTIM	/SET UP A 40 SECOND WAIT FOR DRIVES TO SPIN UP
		DECIMAL	
5426	0140	-4000	
5427	7160	-400	
		OCTAL	
5430	4474	TIMCHK	/WAIT FOR THE TIMER TO GO OUT
5431	4476	JMPPM1	/RESET THE DRIVE
5432	4457	RESET	/GET LOOP POINTER
5433	1127	TAD LOOPPT	/SKIP IF POINTER IS VALID
5434	7650	SNA CLA	/RESTART PROGRAM FROM BEGINNING
5435	5563	JMP I K200	/FLAG THAT TEST IS ENTERED FOR FIRST TIME
5436	7201	CLA IAC	
5437	3131	DCA LPROST	/RESTART INTERRUPTED TEST
5440	5527	JMP I LOOPPT	
		/ERRCHK	
		/	
		/CHECK ERROR FLAG. REPORT ERROR IF SET. SKIP ON RETURN IF NOT SET.	
		/	
5441	0000	XERRCH, 0	/SKIP ON ERROR
5442	4441	RLSE	/MAKE NO ERROR RETURN
5443	5256	JMP NERRET	/READ ERROR REG
5444	4433	RRER	/SAVE FOR ERROR TYPEOUT
5445	3121	DCA DATA1	/READ COMMAND B
5446	4436	RRCB	/SAVE FOR ERROR TYPEOUT
5447	3122	DCA DATA2	/SUBTRACT 1 FROM RETURN
5450	7240	STA	/PC TO GET CALL PC
5451	1241	TAD XERRCH	/SAVE FOR ERROR TYPEOUT
5452	3123	DCA DATA3	/ERROR FLAG SET
5453	4446	ERROR	/PC ER CB CALLPC
5454	3351	ERFLGS	/MAKE ERROR RETURN
5455	5260	JMP .+3	/CLEAR AC PRIOR TO RETURN
5456	7200	NERRET, CLA	/SKIP ON RETURN
5457	2241	ISZ XERRCH	/RETURN W/AC CLEAR
5460	5641	JMP I XERRCH	
		/RESET	
		/EXECUTE RESET COMMAND TO DRIVE UNDER TEST. WAIT FOR DONE.	
		/	
5461	0000	XRESET, 0	/CLEAR OUT REGISTERS THAT LOAD DAR WITH GARBAGE
5462	7200	CLA	
5463	4427	RLCA	
5464	4431	RLSA	
5465	1120	TAD DRVNUM	/ADD IN DRIVE NUMBER
5466	7002	BSW	/PLACE INTO DRIVE SELECT BITS
5467	7001	IAC	/INCREMENT AC (FOR RESET COMMAND)
5470	4430	RLCB	/ISSUE COMMAND
5471	4425	RLSD	/WAIT FOR DONE
5472	4476	JMPPM1	

```

5473 5661      JMP I   XRESET      /RETURN W/AC CLEAR
/GETSTA
/
/ISSUE GET STATUS TO DRIVE UNDER TEST.  WAIT FOR DONE.  SAVE STATUS.
XGETST, 0
5474 0000      CLA
5475 7200      RLCA
5476 4431      RLCA
5477 4427      TAD
5500 1120      BSW
5501 7002      DRVNUM
5502 1377      TAD
5503 4430      (MODE8+2
5504 4425      RLSD
5505 4476      JMPPM1
5506 4440      RRSI
5507 0165      AND
5510 3121      DCA
5511 4440      RRSI
5512 0165      AND
5513 3122      DCA
5514 5674      JMP I   XGETST

/CLEAR SECTOR ADDRESS (LOADS DAR WITH GARBAGE)
/CLEAR COMMAND A
/GET DRIVE NUMBER INTO
/DRIVE SELECT BITS FOR USE IN CB
/SET 8 BIT MODE AND FUNCTION 2 (GET STATUS)
/ISSUE COMMAND
/WAIT FOR DONE

/GET THE STATUS WORDS AND SAVE THEM
/MASK OUT GARBAGE BITS

/RETURN W/AC CLEAR

/SETTIM
/-(#MS/10)
/-(10MS/(EXECUTION TIME OF LOOP))

/SUBROUTINE INITIALIZES REAL TIME CLOCK(IF ONE).  THE COUNT IS SET UP FOR THE
/AMOUNT OF TIME TO ELAPSE (ARG #1) BEFORE TIMCHK SUBROUTINE SKIPS.  IF NO CLOCK
/IS PRESENT, THEN ARG #2 IS USED TO SET UP COUNT FOR TIMCHK TO COUNT NUMBER
/OF CALLS BEFORE ESTIMATING THAT 10MS HAVE PASSED.
XSETTI, 0
5515 0000      CLA
5516 7200      SCNINT
5517 4514      TAD I
5520 1715      DCA
5521 3373      ISZ
5522 2315      XSETTI
5523 1144      TAD
5524 7650      SNA, CLA
5525 5333      JMP
5526 6136      .+6
5527 6137      6136
5530 4476      JMPPM1
5531 6136      6136
5532 5340      JMP
5533 4515      SETINT
5534 1715      TAD I
5535 3374      DCA
5536 1374      TAD
5537 3375      DCA
5540 4515      SETINT
5541 2315      ISZ
5542 5715      JMP I   XSETTI

/TURN OFF SCREEN INTRPT
/GET FIRST ARGUMENT AND SET
/COUNTER
/SKIP OVER ARGUMENT
/CHECK IF OPTION 1 IS PRESENT
/SKIP IF YES
/GO SET UP FOR GROSS TIMING
/CLEAR CLOCK FLAG AND WAIT FOR BEGINNING OF NEW CLOCK PERIOD
/SKIP ON CLOCK FLAG
/WAIT FOR FLAG
/CLEAR CLOCK FLAG
/EXIT
/TURN ON SCREEN INTRPT
/GET GROSS TIMING ADJUSTMENT
/SET COUNTER

/TURN ON SCREEN INTRPT
/SKIP OVER 2ND ARGUMENT

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```

5543 0000 /TIMCHK
5544 7200 /
5545 4514 /USED IN CONJUNCTION WITH SETTIM TO TIME WAIT LOOPS
5546 1144 / (15 USEC EXECUTION TIME WHEN USED FOR GROSS TIMING)
5547 7650 /RETURNS USED:
5550 5357 CALL+1 /TIME NOT UP
5551 6137 CALL+2 /TIME HAS ELAPSED
5552 5366 /
5553 6136 XTIMCH, 0
5554 2373 CLA
5555 5366 SCNINT
5556 5365 TAD OPT1
5557 2375 SNA CLA
5560 5366 JMP .+7
5561 1374 TIMRET
5562 3375 JMP TIMRET
5563 2373 JMP TIMRET-1
5564 7410 GRSCNT
5565 2343 TIMRET
5566 6102 SPL
5567 5371 JMP .+2
5570 4000 JMS 0
5571 4515 SETINT
5572 5743 JMP I XTIMCH

5573 0000 /TIMCNT, 0
5574 0000 GRSCNT, 0
5575 0000 GRSCNT, 0

5577 1002 PAGE
5578 5600

5600 0000 /GETNUM
5601 7200 /SUBROUTINE WAITS FOR OCTAL DIGITS TO BE INPUT FOLLOWED BY <CR>.
5602 1242 /THE FOLLOWING RETURNS ARE USED:
5603 3240 / CALL +1 /NON-OCTAL, NON-CR CHARACTER INPUT (AC CLEAR)
5604 3237 / CALL +2 /5 DIGITS OR DIGITS FOLLOWED BY NON-CR (AC CONTAINS FIRST VALID DIGITS)
5605 4503 / CALL +3 /NO DIGITS ENTERED (AC CLEAR)
/ CALL +4 /1 TO 4 DIGITS ENTERED (AC CONTAINS OCTAL INPUT)

5600 0000 XGETNU, 0
5601 7200 CLA
5602 1242 TAD M5
5603 3240 DCA DIGCNT
5604 3237 DCA DIGITS
5605 4503 GTNMLP, LISN

```

```

5606 7563      -215
5607 5627      CARRET
5610 0001      1
5611 5614      .+3
5612 0000      0
5613 5631      CARRET+2
5614 2240      ISZ DIGCNT
5615 5220      .+3-
5616 7200      JMP
5617 5234      CLA
5620 3134      DCA
5621 1237      TAD
5622 7104      CLL RAL
5623 7006      RTL
5624 1134      TAD
5625 3237      DCA
5626 5205      JMP
5627 2200      ISZ
5630 2200      ISZ
5631 1241      TAD
5632 1240      TAD
5633 7640      SZA CLA
5634 2200      ISZ
5635 1237      TAD
5636 5600      JMP I
5637 0000      DIGITS, 0
5640 0000      DIGCNT, 0
5641 0005      K5, 5
5642 7773      M5, -5

/GETRES
/
/ THIS SUBROUTINE WAITS FOR OPERATOR RESPONSE TO YES, NO QUESTIONS. A <CR> IS
/TREATED AS A NO RESPONSE. IF AN INVALID RESPONSE IS RECEIVED, A NORMAL
/RETURN IS MADE, ELSE THE PROGRAM SKIPS. IF THE RESPONSE WAS "Y", THE AC
/CONTAINS A "1" ON RETURN, ELSE 0.
/
XGETRE, 0
CLA
LISN,
-"Y
YES
5646 7447      YES
5647 5660      -"N
5650 7462      NO
5651 5661      -215
5652 7563

RESRET
0
.+1
WZITFG
JMP
5653 5664      RESRET+1
5654 0000      YES,
5655 5656      NO,
5656 4456      DCA
5657 5265      CRLF
5660 7001
5661 3266
5662 4512

/IF <CR>, RETURN
/IF OCTAL INPUT PROCESS BELOW
/IF NON-OCTAL INPUT, SKIP OVER CARRIAGE
/RETURN HANDLER
/SKIP IF TOO MANY DIGITS
/OK--CONTINUE
/GET RID OF LAST DIGIT ENTERED
/RETURN
/SAVE DIGIT JUST ENTERED
/GET PREVIOUS DIGITS
/ROTATE BITS OVER ONE OCTAL DIGIT
/ POSITION
/ADD IN NEW DIGIT
/SAVE DIGIT STRING
/GO WAIT FOR MORE INPUT
/ADD TWO TO RETURN ADDRESS SINCE
/CARRIAGE RETURN WAS TYPED
/ADD FIVE TO DIGITS COUNTER TO SEE IF
/ANY DIGITS WERE ENTERED
/SKIP IF NO DIGITS WERE ENTERED
/EXTRA SKIP ON RETURN
/GET DIGITS PRIOR TO RETURN
/RETURN--AC HAS DIGITS OR 0

```

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5663 1266      TAD      RESPON      /GET RETURN VALUE
5664 2243      RESRET, ISZ XGETRE     /SKIP ON RETURN IF VALID INPUT
5665 5643      JMP I   XGETRE     /RETURN WITH 0 OR 1 IN AC

5666 0000      RESPON, 0
/SEK1CH
/
/THIS SUBROUTINE CHECKS THE OPERATION OF A DIFFERENCE OF ONE SEEK. CHECKS ARE
/MADE FOR THE CORRECT STATES AND TIME INTERVALS. NO VERIFICATION OF CYLINDER
/ADDRESS IS MADE. COMMAND A SHOULD BE IN AC UPON TO ENTRY FOR DESIRED DIRECTION,
/HEAD, AND DIFFERENCE OF ONE SEEK.
/
XSEK1C, 0
5667 0000      CASAV1      /SAVE COMMAND A FOR POSSIBLE LATER TYPEOUT
5670 3367      TAD        CASAV1
5671 1367      AND        (HEAD1
5672 0377      CLL RTR
5673 7112      RTR
5674 7012      DCA        HEDSAV
5675 3366      STA
5676 7240      TAD        XSEK1C
5677 1267      DCA        DATA5
5700 3125      SETTIM
5701 4473      -2
5702 7776      -620
5703 7160

5704 1367      TAD        CASAV1
5705 4427      RLCA
5706 4463      SEEK
5707 1376      TAD        (RL02ID+HEDOUT+BRUSHH+SEKNT /GET EXPECTED STATUS
5710 1366      TAD        HEDSAV      /ADD IN CORRECT HEAD SELECT BIT
5711 3123      DATA3      /SAVE IT FOR COMPARISON
5712 3124      DATA4      /SAVE EXPECTED STATUS WORD 2
5713 4460      GETSTA      /GET STATUS
5714 4461      STACHK      /CHECK THE STATUS
5715 5323      JMP        .+6        /OK--CONTINUE
5716 4474      TIMCHK      /CHECK UP ON REAL TIME CLOCK
5717 5313      JMP        .-4        /TIME NOT UP YET
5720 4446      ERROR      /BAD STATUS RECEIVED FROM DRIVE
5721 3224      BADSTS      /PC DRV NO. WDI-ACTUAL-WD2 WDI-EXPCTD-WD2 CALLPC
5722 5365      JMP        SK1ERR     /MAKE ERROR RETURN
5723 2123      DATA3      /ADD 1 TO EXPECTED STATUS (STATE 5)
5724 4460      GETSTA      /GET STATUS
5725 4461      STACHK      /VERIFY STATUS IS AS EXPECTED
5726 5334      JMP        .+6        /OK--CONTINUE
5727 4474      TIMCHK      /CHECK UP ON REAL TIME CLOCK
5730 5324      JMP        .-4        /TIME IS NOT UP YET
5731 4446      ERROR      /BAD STATUS RECEIVED FROM DRIVE
5732 3224      BADSTS      /PC DRV NO. WDI-ACTUAL-WD2 WDI-EXPCTD-WD2 CALLPC
5733 5365      JMP        SK1ERR     /MAKE ERROR RETURN
5734 1125      TAD        DATA5      /MOVE CALL PC TO DATA2 FOR POSSIBLE TYPEOUT
5735 3122      DCA
5736 1367      TAD        CASAV1
5737 3121      DCA        DATA1

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HP 001

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5740 4775' JMS WAIT1
5741 4433 RRER
5742 7010 RAR
5743 7620 SNL CLA
5744 5350 JMP .+4
5745 4446 ERROR
5746 4005 RDY2SN
5747 5365 JMP SKIERR
5750 7240 STA
5751 1774' TAD TIMCNT
5752 3774' DCA TIMCNT
5753 4433 RRER
5754 7010 RAR
5755 7630 SZL CLA
5756 5364 JMP SKIERR-1
5757 4474 TIMCHK
5760 5353 JMP .-5
5761 4446 ERROR
5762 4031 RDYNS
5763 5365 JMP SKIERR
5764 2267 ISZ XSEK1C
5765 5667 SKIERR, JMP I XSEK1C
5766 0000 HEDSAV, 0
5767 0000 CASAV1, 0
5770 0000 XVT278, 0
5771 6031 KSF
5772 6030 KCF
5773 5770 JMP I XVT278

5774 5573
5775 6030
5776 0234
5777 2000
5778 6000

5779 0000
5780 4504
5781 1363
5782 4455
5783 5217
5784 5217
5785 7000
5786 3134
5787 1134
5788 0223
5789 7650
5790 5221
5791 4504
5792 1516

5793 0000
5794 4504
5795 1363
5796 4455
5797 5217
5798 5217
5799 7000
5800 3134
5801 1134
5802 0223
5803 7650
5804 5221
5805 4504
5806 1516

5807 0000
5808 4504
5809 1363
5810 4455
5811 5217
5812 5217
5813 7000
5814 3134
5815 1134
5816 0223
5817 7650
5818 5221
5819 4504
5820 1516

5821 0000
5822 4504
5823 1363
5824 4455
5825 5217
5826 5217
5827 7000
5828 3134
5829 1134
5830 0223
5831 7650
5832 5221
5833 4504
5834 1516

5835 0000
5836 4504
5837 1363
5838 4455
5839 5217
5840 5217
5841 7000
5842 3134
5843 1134
5844 0223
5845 7650
5846 5221
5847 4504
5848 1516

5849 0000
5850 4504
5851 1363
5852 4455
5853 5217
5854 5217
5855 7000
5856 3134
5857 1134
5858 0223
5859 7650
5860 5221
5861 4504
5862 1516

5863 0000
5864 4504
5865 1363
5866 4455
5867 5217
5868 5217
5869 7000
5870 3134
5871 1134
5872 0223
5873 7650
5874 5221
5875 4504
5876 1516

5877 0000
5878 4504
5879 1363
5880 4455
5881 5217
5882 5217
5883 7000
5884 3134
5885 1134
5886 0223
5887 7650
5888 5221
5889 4504
5890 1516

5891 0000
5892 4504
5893 1363
5894 4455
5895 5217
5896 5217
5897 7000
5898 3134
5899 1134
5900 0223
5901 7650
5902 5221
5903 4504
5904 1516

5905 0000
5906 4504
5907 1363
5908 4455
5909 5217
5910 5217
5911 7000
5912 3134
5913 1134
5914 0223
5915 7650
5916 5221
5917 4504
5918 1516

5919 0000
5920 4504
5921 1363
5922 4455
5923 5217
5924 5217
5925 7000
5926 3134
5927 1134
5928 0223
5929 7650
5930 5221
5931 4504
5932 1516

5933 0000
5934 4504
5935 1363
5936 4455
5937 5217
5938 5217
5939 7000
5940 3134
5941 1134
5942 0223
5943 7650
5944 5221
5945 4504
5946 1516

5947 0000
5948 4504
5949 1363
5950 4455
5951 5217
5952 5217
5953 7000
5954 3134
5955 1134
5956 0223
5957 7650
5958 5221
5959 4504
5960 1516

5961 0000
5962 4504
5963 1363
5964 4455
5965 5217
5966 5217
5967 7000
5968 3134
5969 1134
5970 0223
5971 7650
5972 5221
5973 4504
5974 1516

5975 0000
5976 4504
5977 1363
5978 4455
5979 5217
5980 5217
5981 7000
5982 3134
5983 1134
5984 0223
5985 7650
5986 5221
5987 4504
5988 1516

5989 0000
5990 4504
5991 1363
5992 4455
5993 5217
5994 5217
5995 7000
5996 3134
5997 1134
5998 0223
5999 7650
6000 5221
6001 4504
6002 1516

6003 0000
6004 4504
6005 1363
6006 4455
6007 5217
6008 5217
6009 7000
6010 3134
6011 1134
6012 0223
6013 7650
6014 5221
6015 4504
6016 1516

6017 0000
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HP 001

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6016 5201      JMP      XENTVA+1      /HANDLE CONTROL-G OR F IF IT WAS
6017 4456      ENTLIS, WZITFG          /REISSUE PROMPT
6020 5201      JMP      XENTVA+1      /GET NUMBER INPUT
6021 1134      ENTRET, TAD      TEMP1  /RETURN W/NUMBER IN AC
6022 5600      JMP      I      XENTVA
/
6023 7000      K7000, 7000          /
/PRINT 2 SPACES
6024 0000      SPACX2, 0      /CALL BY "SPACE2"
6025 4504      TWOSPA          /
6026 1544      JMP      I      SPACX2
6027 5624
/
6030 0000      WAIT1, 0
6031 7200      CLA
6032 1241      TAD      M404
6033 3134      DCA      TEMP1
6034 2134      ISZ      TEMP1
6035 5234      JMP      -1
6036 6102      SPL
6037 5630      JMP      I      WAIT1      /SKIP ON POWER LOW
6040 4000      JMS      0      /RETURN
/POWER FAIL INTERRUPT
/
6041 7374      M404, -404
/
6042 0000      JMS      0      /SUBROUTINE REQUIRES APPROXIMATELY 1 MS TO EXECUTE ON PDP8/E
6043 4230      WAIT5, 0
6044 4230      JMS      WAIT1
6045 4230      JMS      WAIT1
6046 4230      JMS      WAIT1
6047 4230      JMS      WAIT1
6050 5642      JMP      I      WAIT5
/
6051 0000      /RQSTRY
6052 4433      /IF NECESSARY, REQUEST OPERATOR TO MAKE DRIVE UNDER TEST READY AND WAIT FOR READY
6053 7010      /
6054 7630      XRGSTR, 0
6055 5271      RRER
6056 4504      RAR
6057 1552      SZL CLA      RQSRET
6060 1120      JMP      MESSAGE
6061 4505      PLSMDR
TAD      DRVNUM
PRNT1

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6062 4504      MESSAGE
6063 1546      READY
6064 4447      CONSOL
6065 4433      RRER
6066 7010      RAR
6067 7620      SNL CLA
6070 5264      JMP      -4
6071 5651      RQSRET, JMP I  XQSTR
                /WRENWT
                /
                /IF NECESSARY, REQUEST OPERATOR TO WRITE ENABLE THE DRIVE & WAIT FOR CHANGE
                /
                /WRENW, 0
6072 0000      /GET STATUS
6073 4460      TAD      DATA2
6074 1122      /PICK UP STATUS WORD 2
6075 7002      BSW
6076 7700      SMA CLA
6077 5312      JMP      WRERET
6100 4504      MESSAGE
6101 1677      RLWREN
6102 1120      TAD
6103 4505      PRNT1
6104 4460      GETSTA
6105 1122      TAD      DATA2
6106 7002      BSW
6107 7710      SPA CLA
6110 5304      JMP      -4
6111 4512      CRLF
6112 5672      WRERET, JMP I  XWRENW
                /SEEK
                /
                /THIS SUBROUTINE ISSUES A SEEK COMMAND TO THE DRIVE UNDER TEST AND WAITS
                /FOR DONE.  APT TIMING IS COMPENSATED FOR (FOR LONG SEEK TIME).
                /COMMAND A SHOULD ALREADY BE SET UP UPON ENTRY.
                /
                XSEEK, 0
6113 0000      CLA CLL
6114 7300      JMS      CHKSEK
6115 4777'
                /GO CHECK IF CYL OK TO SEEK TO & MAKE
                /ADJUSTMENTS IF NECESSARY.
                /CLEAR AC AND LINK
                /CLEAR SECTOR ADDR REG PRIOR TO SEEK
                /GET DRIVE SELECT BITS INTO POSITION
                /SET FUNCTION BITS FOR SEEK COMMAND
                /ISSUE COMMAND
                /COMPENSATE APT COUNTER FOR SEEK TIME
                /ADD 100
6116 7300      CLA CLL
6117 4431      RLSD
6120 1120      TAD      DRVNUM
6121 7002      BSW
6122 1335      TAD      K3
6123 4430      RLCB
6124 1776'      TAD      TOCK
6125 1334      TAD      K144
6126 7430      SZL
6127 7240      STA
6130 3776'      DCA      TOCK
                /SKIP IF NO OVERFLOW
                /BACK IT UP TO -1
                /SAVE NEW TOCK VALUE
                /MQL CLEARS THE AC
                /WAIT FOR DONE
6131 4425      RLSD
6132 4476      JMPPM1

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6200 PAGE

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/SEKBAK
/
/THIS SUBROUTINE SEEKS TO THE CYLINDER ADDRESS CONTAINED IN LASTCY, IF THE
/HEADS ARE NOT ALREADY POSITIONED THERE. IT IS USED PRIMARILY WHEN LOOPING ON A
/TEST TO REPEAT THE TEST AT THE SAME CYLINDER ADDRESS. NO CHECK IS MADE TO SEE
/IF THE SEEK WAS SUCCESSFUL. THE FOLLOWING RETURNS ARE USED:
/   CALL+1   DRIVE DID NOT BECOME READY (READY BIT NOT SET)
/   CALL+2   NOT USED ANYMORE
/   CALL+3   OTHERWISE OK
/
XSEKBA, 0
6200 0000 REDHDR
6201 4464 RRSI
6202 4440 BSW
6203 7002 RTR
6204 7012 AND K4000
6205 0237 DCA TEMP1
6206 3134 RRSI
6207 4440 AND K377
6210 0165 RAL
6211 7004 CIA
6212 7041 TAD
6213 1132 SNA LASTCY
6214 7450 JMP SEKBOK
6215 5234 SNA
6216 7500 JMP
6217 5222 SNA
6220 7041 CIA
6221 7410 SKP
6222 1237 TAD
6223 3135 DCA
6224 1134 TAD TEMP2
6225 7104 CLL RAL TEMP1
6226 1135 TAD TEMP2
6227 4427 RLCA
6230 4463 SEEK
6231 4477 ROYWAT
6232 5236 JMP
6233 7410 SKP
6234 2200 ISZ XSEKBA
6235 2200 ISZ XSEKBA
6236 5600 JMP I XSEKBAK
/
K4000, 4000
/HDRVFY
/
/IF AN ERROR IS FOUND, THE REMAINING HEADERS ARE NOT CHECKED
/
XHDRVF, 0
6240 0000 VTCHK
6241 4516 SKP
6242 7410 SCNINT
6243 4514 /TURN OFF INTRPT CRTC
/
/CHECK IF VT278
/TURN OFF INTRPT CRTC

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6244	7240	STA		/SUBTRACT 1 FROM RETURN ADDRESS
6245	1240	XDRVF		/TO GET THE CALL PC
6246	3121	DATA1		/SAVE IT FOR ERROR TYPEOUT
6247	1363	TAD	M50	/SET UP A COUNTER FOR 40 HEADERS
6250	3364	DCA	HDRCNT	
6251	7240	STA		/SET UP A POINTER IN AN AUTO INC REG
6252	3010	DCA	AUTO10	/TO THE AREA WHERE HEADERS WILL BE STORED
6253	4464	REDHDR		/READ A HEADER AND WAIT FOR DONE
6254	4441	RLSE		/SKIP IF ERROR
6255	7240	STA		/SET A FLAG
6256	6211	CFD	10	/STORE HEADERS IN FIELD 1
6257	3410	DCA I	AUTO10	/SAVE FLAG-- 0 IF ERROR; -1 IF NO ERROR
6260	4433	RRER		/READ THE ERROR REG
6261	3410	DCA I	AUTO10	/SAVE IT
6262	1172	TAD	M4	/SET UP A COUNTER FOR THE 4 HEADER WORDS
6263	3134	DCA	TEMP1	/TO READ AND SAVE FROM SILO
6264	4440	RRSI		/READ A HEADER WORD
6265	0165	AND	K377	/MASK OUT GARBAGE BITS
6266	3410	DCA I	AUTO10	/SAVE IT
6267	2134	ISZ	TEMP1	/READ ALL 4 WORDS?
6270	5264	JMP	.-4	/NO--GO BACK
6271	6201	CFD	0	
6272	2364	ISZ	HDRCNT	/YES--READ ALL 40 HEADERS YET?
6273	5253	JMP	HDRLUP	/NO--GO BACK
6274	7240	STA		/SET UP POINTER TO HEADER STORAGE
6275	3010	DCA	AUTO10	
				/FIRST HEADER IS HANDLED SEPEATELY
6276	6211	CFD	10	/FIELD WHERE HEADERS ARE STORED
6277	2410	ISZ I	AUTO10	/TEST THE ERROR FLAG
6300	5777	JMP	HDRER1	/ERROR--GO HANDLE IT
6301	7240	STA		/NO ERROR FLAG--SUBTRACT 1 FROM ERROR
6302	1410	TAD I	AUTO10	/REG (SHOULD BE 0001-1=0)
6303	7440	SZA		/SKIP IF AS EXPECTED
6304	5776	JMP	HDRER2	/REPORT ERROR BIT WITHOUT ERROR FLAG
6305	1410	TAD I	AUTO10	/PICK UP HEADER WORD 1
6306	3122	DCA	DATA2	/SAVE IT
6307	1410	TAD I	AUTO10	/SAVE HEADER WORD 2
6310	6201	CFD	0	
6311	3123	DCA	DATA3	
6312	1122	TAD	DATA2	/PICK UP HEADER WORD 1
6313	0775	AND	K77	/SAVE ONLY THE SECTOR ADDRESS
6314	3365	DCA	LASTSE	/SAVE IT
6315	1365	TAD	LASTSE	
6316	1366	TAD	M47	/CHECK IF SECTOR ADDRESS IS IN RANGE
6317	7750	TAD	SNA CLA	/SKIP IF NOT
6320	5324	JMP	.-4	
6321	4446	ERROR		/SECTOR ADDRESS OUT OF RANGE
6322	4453	RANGSE		/PC DRV NO. CALLPC WD1-HEADER-WD2
6323	5347	JMP	HDRRET	/RETURN
				/DELETE NEXT 7 LINES FOR RL02
				/THE RL02 USES ALL THE CYLINDER BIT SO THAT
				/IS NO WAY TO DETERMINE IF CYLINDER IS OUT

6324	1122	TAD	DATA2	/RANGE.	DATA3	/PICK UP HEADER WORD 2	HP 001
6325	0774	AND	K300	/TAD	K200	/	HP 001
6326	7041	CIA	WDIPOR	/AND		/	HP 001
6327	3367	DCA	10	/SNA CLA		/SKIP IF CYLINDER ADDRESS IS	HP 001
6330	6211	COF	0			/OUT OF RANGE	HP 001
6331	1410	TAD I	AUTO10	/JMP	+4	/	HP 001
6332	3124	DCA	DATA4	/ERROR		/CYLINDER ADDRESS OUT OF RANGE	HP 001
6333	1410	TAD I	AUTO10	/RANGCY		/PC DRV NO.CALLPC WD1-HEADER-WD2/HP 001	HP 001
6334	6201	COF	0	/JMP	HDRRET	/RETURN	HP 001
6335	3125	DCA	DATA5				
6336	1124	TAD	DATA4				
6337	7640	SZA CLA					
6340	5773	JMP	WD34N0				
6341	1125	TAD	DATA5				
6342	7640	SZA CLA					
6343	5773	JMP	WD34N0				
6344	1366	TAD	M47				
6345	3364	DCA	HDRCNT				
6346	5772	JMP	CHKLUP				
6347	5640	HDRRET.	JMP I XHDRV				
6350	0000	CHKCYL.	0				
6351	7300	CLA CLL					
6352	4435	RRCA					
6353	3771	DCA	SAVECA				
6354	4464	REDHPR					
6355	4467	GETCYL					
6356	0370	AND	(777				
6357	3362	DCA	SAVCYL				
6360	1771	TAD	SAVECA				
6361	5750	JMP I	CHKCYL				
6362	0000	SAVCYL.	0				
6363	7730	M50.	-50				
6364	0000	HDRCNT.	0				
6365	0000	LASTSE.	0				
6366	7731	M47.	-47				
6367	0000	WDIPOR.	0				

/PICK UP HEADER WORD 1  
 /MASK OUT SECTOR ADDRESS  
 /NEGATE THE WORD FOR EASY LATER REFERENCE  
 /SAVE PORTION OF WORD 1  
 /PICK UP HEADER WORD 3  
 /SAVE IT  
 /SAVE HEADER WORD 4  
 /CHECK THAT HEADER WORDS 3 AND 4 ARE ZERO  
 /REPORT WORDS 3 AND 4 NOT 0  
 /SET UP A COUNTER FOR REMAINING HEADERS  
 /CONTINUE SUBROUTINE ON NEXT PAGE  
 /RETURN  
 /THIS ROUTINE WILL GET AND SAVE THE CURRENT CMD A REG. CONTENTS AND  
 /AND THE CURRENT CYLINDER NUMBER TO BE USED TO CALCULATE THE NEW CYLINDER.  
 /CLEAR THE AC & LINK  
 /GET THE CONTENTS OF THE CMD A REG.  
 /SAVE FOR LATER USE  
 /DO A READ HEADER  
 /CALCULATE THE CURRENT CYL  
 /MASK OUT ALL UNUSED BITS  
 /SAVE THE RESULTS  
 /GET THE SAVED CMD A REG.  
 /RETURN TO CALLING ROUTINE

/THIS ROUTINE WILL SAVE THE CURRENT CYL AND THE CONTENTS OF THE CMD A REG.

6370 0777  
6371 7553  
6372 6400  
6373 6531  
6374 0563  
6375 5263  
6376 6513  
6377 6475  
6400

PAGE

/PROCESS REMAINING 37 HEADERS

CHKLUP, TAD DATA2 /MOVE PREVIOUS HEADER OVER FOR POSSIBLE  
DCA DATA4 /ERROR TYPEOUT  
TAD DATA3  
DCA DATA5

CDF 10 /TEST THE ERROR FLAG  
ISZ I AUTO10 /ERROR--GO HANDLE IT  
JMP HDRER1 /NO ERROR FLAG--SUBTRACT 1 FROM ERROR  
STA / REG (SHOULD BE 0001-1=0)  
TAD I AUTO10 /SKIP IF AS EXPECTED  
SZA HDRER2 /REPORT ERROR BIT WITHOUT ERROR FLAG  
JMP TAD I AUTO10 /PICK UP HEADER WORD 1  
DCA DATA2 /SAVE IT  
TAD I AUTO10 /SAVE HEADER WORD 2  
CDF 0

DCA DATA3 /PICK UP WORD 1  
TAD DATA2 /MASK OUT SECTOR ADDRESS  
AND K300 /SUBTRACT THE LSB CYL ADDR AND HEAD SELECT BIT  
TAD WDIPOR /FROM THE FIRST HEADER READ  
SZA CLA /SKIP IF EQUAL  
JMP NOTRIT /BITS WERE NOT RIGHT--REPORT ERROR  
TAD DATA3 /CHECK IF MSB'S OF CYL  
CIA / ADDR ARE THE SAME  
TAD DATA5 / AS THE PREVIOUS HEADER'S  
SZA CLA /SKIP IF THEY ARE  
JMP NOTRIT /REPORT ERROR  
ISZ LASTSE /INCREMENT TO SECTOR THAT WE SHOULD BE AT  
TAD LASTSE /CHECK IF AT SECTOR "50" (I.E. WE SHOULD  
TAD M50 / GO BACK TO 0)  
SNA CLA /SKIP IF NOT  
DCA LASTSE /BACK TO SECTOR 0  
TAD DATA2 /GET SECTOR ADDRESS FORM CURRENT  
AND K77 /HEADER WORD 1  
CIA /COMPARE TO  
TAD LASTSE /CORRECT VALUE  
SZA CLA /SKIP IF OK  
CDF 10

6423 7640  
6424 5267  
6425 1123  
6426 7041  
6427 1125  
6430 7640  
6431 5267  
6432 2775  
6433 1775  
6434 1774  
6435 7650  
6436 3775  
6437 1122  
6440 0773  
6441 7041  
6442 1775  
6443 7640  
6445 6211

```

6446 1410 TAD I AUTO10 /PICK UP HEADER WORDS 3 AND 4
6447 3124 DCA DATA4
6450 1410 TAD I AUTO10
6451 6201 CDF 0
6452 3125 DCA DATA5
6453 1124 TAD DATA4
6454 7640 SZA CLA
6455 5331 JMP WD34NO
6456 1125 TAD DATA5
6457 7640 SZA CLA
6460 5331 JMP WD34NO
6461 2772 ISZ HDRCNT
6462 5200 JMP CHKLUP
6463 4516 VTCHK
6464 7410 SKP
6465 4515 SETINT
6466 5771 JMP HDRRET
6467 4516 VTCHK
6470 7410 SKP
6471 4515 SETINT
6474 5771 JMP HDRRET
6475 4516 VTCHK
6476 7410 SKP
6477 4515 SETINT
6500 1410 TAD I AUTO10
6501 6201 CDF 0
6502 3123 DCA DATA3
6503 4436 RRCB
6504 3124 DCA DATA4
6505 1121 TAD DATA1
6506 3125 DCA DATA5
6507 4460 GETSTA
6510 4446 ERROR
6511 4521 EFSSTA
6512 5771 JMP HDRRET
6513 4516 VTCHK
6514 7410 SKP
6515 4515 SETINT
6516 6201 CDF 0
6517 7001 IAC
6520 3123 DCA DATA3
6521 4436 RRCB

6522 3124 DCA DATA4
6523 1121 TAD DATA1
6524 3125 DCA DATA5
6525 4460 GETSTA
6526 4446 ERROR
6527 4525 ERINC
6530 5771 JMP HDRRET
6531 4516 WD34NO, VTCHK
6532 7410 SKP
6533 4515 SETINT

/TURN ON INTRPT CRTC
/SAVE COMMAND B FOR ERROR TYPEOUT
/MOVE CALL PC OVER
/GET DRIVE STATUS AND SAVE IT
/ER NOT AS EXPECTED BUT ERROR FLAG NOT SET
/PC. DRV NO. WD1-STATUS-WD2 ER CB CALLPC
/CHECK IF VT278
/TURN ON INTRPT CRTC
/RESTORE ACTUAL ERROR REG

/SAVE COMMAND B FOR ERROR TYPEOUT
/MOVE CALL PC OVER
/GET DRIVE STATUS AND SAVE IT
/ERROR FLAG SET
/PC DRV NO. WD1-STATUS-WD2 ER CB CALLPC
/CHECK IF VT278
/TURN ON INTRPT CRTC
/SAVE FOR TYPEOUT
/SAVE COMMAND B FOR TYPEOUT
/MOVE CALL PC OVER AND SAVE IT
/GET DRIVE STATUS
/ERROR FLAG SET
/PC DRV NO. WD1-STATUS-WD2 ER CB CALLPC
/CHECK IF VT278
/TURN ON INTRPT CRTC
/PICK UP THE ERROR REG
/TURN ON INTRPT CRTC
/SAVE FOR TYPEOUT
/SAVE COMMAND B FOR TYPEOUT
/MOVE CALL PC OVER AND SAVE IT
/GET DRIVE STATUS
/ERROR FLAG SET
/PC DRV NO. WD1-STATUS-WD2 ER CB CALLPC
/CHECK IF VT278
/TURN ON INTRPT CRTC
/TURN ON INTRPT CRTC
/YES--RETURN
/CHECK IF VT278
/TURN ON INTRPT CRTC
/NO--GO BACK
/CHECK IF VT278
/CHECKED ALL HEADERS?
/NO--GO BACK
/CHECK IF VT278
/VERIFY THAT THEY ARE ZERO

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6534 4446      ERROR      /HEADER WORDS 3 & 4 NOT ZERO
6535 4557      BAD34      /PC DRV NO.  CALLPC WDI-HDR-WD2-HDR-WD3-HDR-WD4
6536 5771      JMP        HDRRET
/GETSR
/
/SUBROUTINE TO READ SWITCH REG OR PSEUDO-SR INTO AC, DEPENDING ON
/STATE OF BIT 0 IN LOCATION 21
/
XGETSR, 0
CLA
TAD      HCW1
SPA CLA
LAS SKP
TAD      PSWR
JMP I    XGETSR

6537 0000
6540 7200
6541 1021
6542 7710
6543 7614
6544 1020
6545 5737

CHKERR, 0
RLSE
JMP      NCHKR
RRER
DCA      DATA1
RRCB
DCA      DATA2
TAD I    AREDHD
STA
DCA      DATA3
ERROR
ERFLGS
NCHKR, JMP I    CHKERR
AREDHD, XREDHD

6546 0000
6547 4441
6550 5362
6551 4433
6552 3121
6553 4436
6554 3122
6555 1763
6556 7240
6557 3123
6560 4446
6561 3351
6562 5746
6563 6137
6571 6347
6572 6364
6573 5263
6574 6363
6575 6365
6576 6367
6577 0563
6600

PAGE

/ZSEKCH
/
/THIS SUBROUTINE VERIFIES THE OPERATION OF A ZERO DIFFERENCE SEEK.  COMMAND A
/SHOULD ALREADY BE SET UP UPON ENTRY WITH A ZERO DIFFERENCE WORD.  ERRORS
/ARE REPORTED WITHIN THE SUBROUTINE, IF ANY.  IF NO ERRORS, THE SUBROUTINE SKIPS
/ON RETURN.
/
XZSEKC, 0
RRCA
DCA      CASAVE
STA
XZSEKC
TAD      DATA3
DCA      SETTIM
DECIMAL

6600 0000
6601 4435
6602 3311
6603 7240
6604 1200
6605 3123
6606 4473

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6675	1134	TAD	TEMP1	/GET HEAD SELECT BIT FROM STATUS
6676	7450	SNA		/SKIP IF HEAD 1 SELECTED
6677	5307	JMP	ZSEKER-1	/MAKE GOOD EXIT
6700	5304	JMP	+4	/REPORT INCORRECT HEAD ERROR
6701	1134	HDCHK, TAD	TEMP1	/GET HEAD SELECT BIT FROM STATUS
6702	7640	SZA CLA		/SKIP IF HEAD 0 SELECTED
6703	5307	JMP	ZSEKER-1	/MAKE GOOD EXIT
6704	4446	ERROR		/INCORRECT HEAD SELECTED
6705	4150	INCHED		/PC DRV NO. WD1-STATUS-WD2 CALLPC
6706	7410	SKP		
6707	2200	ISZ	XZSEKC	/SKIP ON RETURN FOR GOOD EXIT
6710	5600	ZSEKER, JMP I	XZSEKC	
6711	0000	CASAVE, 0		
		/SEEKV		
		/		
		/THIS SUBROUTINE RECORDS THE CURRENT CYLINDER ADDRESS, ISSUES A SEEK, AND		
		/VERIFIES THE CYLINDER ADDRESS AFTER THE SEEK. THE DESIRED COMMAND A WORD		
		/SHOULD BE IN THE AC UPON ENTRY. THE FOLLOWING RETURNS ARE USED:		
		/		DRIVE DID NOT BECOME READY
		/		OTHER FAILURE
		/		SEEK SUCCESSFUL
		/		
6712	0000	XSEEKV, 0		
6713	3123	DCA	DATA3	/SAVE COMMAND A WORD
6714	4464	REDHDR		/READ A HEADER
6715	4467	GETCYL		/COMPUTE THE CYLINDER ADDRESS
6716	3121	DCA	DATA1	/SAVE IT
6717	1123	TAD	DATA3	/PICK UP COMMAND A WORD
6720	4427	RLCA		/WRITE IT TO COMMAND A
6721	4463	SEEK		/ISSUE THE SEEK AND WAIT FOR DONE
6722	4435	RRCA		/PICK UP COMMAND A
6723	7500	SMA		/SKIP IF DIRECTION 1--ADD CYLINDER DIFFERENCE
6724	7041	CIA		/DIRECTION 0--SUBTRACT CYLINDER DIFFERENCE
6725	1121	TAD		/ADD IN PREVIOUS CYLINDER
6726	0166	AND	DATA1	/MASK HIGH BITS
6727	3354	DCA	K0777	/SAVE EXPECTED CYLINDER
6730	4477	RDYMAT	EXPCYL	/WAIT FOR DRIVE READY
6731	5353	JMP	SKVRT	/DRIVE NOT READY--MAKE NORMAL RETURN
6732	7000	NOP		/THIS CRAZY RETURN FROM RDYMAT IS NOT USED
6733	4464	REDHDR		/READ A HEADER
6734	4467	GETCYL		/COMPUTE THE CYLINDER ADDRESS
6735	3122	DCA	DATA2	/SAVE IT
6736	1122	TAD	DATA2	/COMPARE ACTUAL CYLINDER
6737	7041	CIA		/
6740	1354	TAD	EXPCYL	/
6741	7650	SNA CLA		/
6742	5351	JMP	SKVRT-2	/EXPECTED CYLINDER
6743	7240	STA		/SKIP IF NOT EQUAL
6744	1312	TAD	XSEEKV	/ALL OK--SKIP TWICE AND RETURN
6745	3124	DCA	DATA4	/SUBTRACT ONE FROM
6746	4446	ERROR		/RETURN PC TO GET CALL PC
6747	4355	SKFALS		/SAVE IT FOR ERROR TYPEOUT
6750	7410	SKP		/SEEK FAILURE
				/PC DRV NO. BEFORE-CYL-AFTER CA CALLPC
				/SKIP ONCE ON RETURN

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6751 2312      ISZ      XSEK1V
6752 2312      ISZ      XSEK1V
6753 5712      SKVRT,  JMP I   XSEK1V
        /
6754 0000      EXPCYL,  0
6755 .0777      K777,   777

/THIS ROUTINE WILL RECALCULATE THE SEEK DIFFERENCE WHEN A BAD SECTOR HAS
/BEEN IDENTIFIED.
/
RECAL,  0
        TAD      SAVECA
        IAC
        DCA      SAVECA
        TAD      MKNCYL
        JMS      DCA      NEWCYL
        JMS      BADCHK
        JMS      RECAL+1
        TAD      SAVECA
        RLCA
        JMP I     RECAL

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6772 7400
6773 7443
6774 3161
6775 7553
6776 0100
6777 5642
        7000

```

PAGE

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/SEEK1V
/
/THIS SUBROUTINE RECORDS THE CURRENT CYLINDER ADDRESS, ISSUES A SEEK, AND
/VERIFIES THE CYLINDER ADDRESS AFTER THE SEEK. IT IS VERIFIED THAT READY SETS
/WITHIN 20 MS (IF NOT, AN ERROR IS REPORTED). THE DESIRED COMMAND A WORD
/SHOULD BE IN THE AC UPON ENTRY. THE FOLLOWING RETURNITS ARE USED:
/      CALL+1      DRIVE DID NOT BECOME READY WITHIN 20 MS
/      CALL+2      OTHER FAILURE
/      CALL+3      SEEK SUCCESSFUL
/
XSEK1,  0
        DCA      DATA3
        REDHDR
        GETCYL
        DCA      DATA1
        SETTIM
        -2
        -620
        TAD      DATA3
        RLCA
        SEEK
        RRCA
        SMA

```

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7000 0000
7001 3123
7002 4464
7003 4467
7004 3121
7005 4473
7006 7776
7007 7160
7010 1123
7011 4427
7012 4463
7013 4435
7014 7500

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/SKIP IF DIRECTION 1--ADD CYLINDER DIFFERENCE

7015	7041	CIA	/DIRECTION 0--SUBTRACT CYLINDER DIFFERENCE
7016	1121	TAD	/ADD IN PREVIOUS CYLINDER
7017	0777	AND	/MASK HIGH BITS
7020	3776	DCA	/SAVE EXPECTED CYLINDER
7021	4433	RRER	/GET DRIVE READY BIT INTO LINK
7022	7010	RAR	/SKIP IF NOT YET SET
7023	7430	SZL	/SET--CONTINUE WITH CYLINDER VERIFICATION
7024	5235	JMP	/CHECK UP ON TIME CLOCK
7025	4474	TIMCHK	/TIME NOT UP
7026	5221	JMP	/GET CALL PC FOR ERROR TYPEOUT
7027	7240	STA	/READY NOT SET IN TIME AFTER SEEK
7030	1200	TAD	/PC DRV NO. CYL(84) CALLPC CA
7031	3122	DCA	/READ A HEADER
7032	4446	ERROR	/COMPUTE THE CYLINDER ADDRESS
7033	4655	RNSAS2	/SAVE IT
7034	5255	JMP	/COMPARE ACTUAL CYLINDER
7035	4464	SKICON, REDHDR	/ TO
7036	4467	GETCYL	/ EXPECTED CYLINDER
7037	3122	DCA	/SKIP IF NOT EQUAL
7040	1122	TAD	/ALL OK--SKIP TWICE AND RETURN
7041	7041	CIA	/SUBTRACT ONE FROM
7042	1776	TAD	/ RETURN PC TO GET CALL PC
7043	7650	SNA CLA	/SAVE IT FOR ERROR TYPEOUT
7044	5253	JMP	/SEEK FAILURE
7045	7240	STA	/PC DRV NO. BEFORE-CYL-AFTER CA CALLPC
7046	1200	TAD	/SKIP ONCE ON RETURN
7047	3124	DCA	/THIS SUBROUTINE WAITS FOR DRIVE READY IN A 3 SECOND TIMEOUT LOOP.
7050	4446	ERROR	/IF THE DRIVE DID NOT BECOME READY, A NORMAL RETURN IS MADE (NO ERROR IS
7051	4355	SKFALS	/REPORTED. THE ROUTINE SKIPS TWICE IF THE DRIVE BECOMES READY. (THE RETURN
7052	7410	SKP	/TO CALLPC+2 USED TO BE USED BUT THAT FEATURE OF THE HARDWARE WAS ELEMENATED.)
7053	2200	ISZ	/
7054	2200	ISZ	XRDYWA, 0
7055	5600	SKVIRT, JMP I	/SET UP THE TIMER
			/3 SECONDS
			/COMPENSATION IN CASE OF NO CLOCK
			/GET ERROR REGISTER
			/ROTATE DRIVE READY BIT INTO LINK
			/SKIP IF DRIVE NOT READY
			/DRIVE READY--GET OUT OF LOOP
			/CHECK UP ON REAL TIME CLOCK
			/TIME IS NOT UP
			/TIME'S UP--RETURN
			/SKIP TWICE ON RETURN
			/RDYWAT
			/
			/THIS SUBROUTINE WAITS FOR DRIVE READY IN A 3 SECOND TIMEOUT LOOP.
			/IF THE DRIVE DID NOT BECOME READY, A NORMAL RETURN IS MADE (NO ERROR IS
			/REPORTED. THE ROUTINE SKIPS TWICE IF THE DRIVE BECOMES READY. (THE RETURN
			/TO CALLPC+2 USED TO BE USED BUT THAT FEATURE OF THE HARDWARE WAS ELEMENATED.)
			/
			XRDYWA, 0
			/SET UP THE TIMER
			/3 SECONDS
			/COMPENSATION IN CASE OF NO CLOCK
			/GET ERROR REGISTER
			/ROTATE DRIVE READY BIT INTO LINK
			/SKIP IF DRIVE NOT READY
			/DRIVE READY--GET OUT OF LOOP
			/CHECK UP ON REAL TIME CLOCK
			/TIME IS NOT UP
			/TIME'S UP--RETURN
			/SKIP TWICE ON RETURN
			/RDYWAT
			/
			/THIS SUBROUTINE WAITS FOR DRIVE READY IN A 3 SECOND TIMEOUT LOOP.
			/IF THE DRIVE DID NOT BECOME READY, A NORMAL RETURN IS MADE (NO ERROR IS
			/REPORTED. THE ROUTINE SKIPS TWICE IF THE DRIVE BECOMES READY. (THE RETURN
			/TO CALLPC+2 USED TO BE USED BUT THAT FEATURE OF THE HARDWARE WAS ELEMENATED.)
			/
			XRDYWA, 0
			/SET UP THE TIMER
			/3 SECONDS
			/COMPENSATION IN CASE OF NO CLOCK
			/GET ERROR REGISTER
			/ROTATE DRIVE READY BIT INTO LINK
			/SKIP IF DRIVE NOT READY
			/DRIVE READY--GET OUT OF LOOP
			/CHECK UP ON REAL TIME CLOCK
			/TIME IS NOT UP
			/TIME'S UP--RETURN
			/SKIP TWICE ON RETURN
			/RDYWAT
			/
			/THIS SUBROUTINE WAITS FOR DRIVE READY IN A 3 SECOND TIMEOUT LOOP.
			/IF THE DRIVE DID NOT BECOME READY, A NORMAL RETURN IS MADE (NO ERROR IS
			/REPORTED. THE ROUTINE SKIPS TWICE IF THE DRIVE BECOMES READY. (THE RETURN
			/TO CALLPC+2 USED TO BE USED BUT THAT FEATURE OF THE HARDWARE WAS ELEMENATED.)
			/
			XRDYWA, 0
			/SET UP THE TIMER
			/3 SECONDS
			/COMPENSATION IN CASE OF NO CLOCK
			/GET ERROR REGISTER
			/ROTATE DRIVE READY BIT INTO LINK
			/SKIP IF DRIVE NOT READY
			/DRIVE READY--GET OUT OF LOOP
			/CHECK UP ON REAL TIME CLOCK
			/TIME IS NOT UP
			/TIME'S UP--RETURN
			/SKIP TWICE ON RETURN
			/RDYWAT
			/
			/THIS SUBROUTINE WAITS FOR DRIVE READY IN A 3 SECOND TIMEOUT LOOP.
			/IF THE DRIVE DID NOT

7072	2256	ISZ	XRDYWA		
7073	5656	JMP I	XRDYWA		/RETURN
7074	0000	XSCNIN, 0			
7075	7300	CLA CLL			
7076	6055	ESIA			/TURN OF INTRPT CRTC
7077	6115	6115			/TURN OFF INTRPT TTY
7100	5674	JMP I	XSCNIN		
7101	0000	XSETIN, 0			
7102	6111	6111			
7103	7000	NOP			
7104	6051	6051			
7105	7000	NOP			
7106	6116	6116			
7107	7200	CLA			
7110	7201	CLA IAC			
7111	6115	6115			
7112	6055	6055			
7113	7200	CLA			
7114	5701	JMP I	XSETIN		
7115	0000	XVTCHK, 0			
7116	6030	KCF			
7117	6031	KSF			
7120	5715	JMP I	XVTCHK		
7121	2315	ISZ	XVTCHK		
7122	5715	JMP I	XVTCHK		
7123	4457	YNONE, RESET			/RESET DRIVE
7124	4775	JMS	WAIT1		/WAIT 1 MS AFTER RESET
7125	5774	JMP	YNEXIT		/"? FATAL ERROR -"
7126	4504	YNFATL, MESSAGE			/NON-STRUCTURED GOTO--DROP THIS DRIVE
7127	2273	FATLER			/"? CAN'T RESET ERROR--"
7130	5773	JMP	DROPDR		/"? DRIVE IN LOAD STATE--"
7131	4504	YNCNTR, MESSAGE			/"? CAN'T MAKE READY -"
7132	2304	CANTRS			
7133	5773	JMP	DROPDR		
7134	4504	YNLOAD, MESSAGE			
7135	2320	DRNLOD			
7136	5773	JMP	DROPDR		
7137	4504	YNCMRY, MESSAGE			
7140	2335	CHMRDY			
7141	5773	JMP	DROPDR		
7142	0000	/SUBROUTINE WAITS 300 MS			
7143	4473	WAT300, 0			
7144	7742	SETTIM			/SET UP TIMING ROUTINE FOR 300 MS
7145	7230	-36			
7146	4447	-550			
7147	4474	CONSOLE			/ALLOW KEYBOARD INPUT
7150	5346	TIMCHK			/SKIP IF TIME IS UP
7151	5742	JMP	.-2		
7152	6030	JMP I	WAT300		/RETURN
7153	7634	PWR10, -1750			/-1000
7154	7766	-144			/-100
7155	7777	-12			/-10
		-1			

7156	0000	0	/TABLE TERMINATOR
/DIFFERENCES ARE IN DECIMAL			
/DIFFERENCE WORD TABLE FOR SEEK TESTS			
7157	0002	DECIMAL	
7160	0006	DIFTAB, 2	
7161	0011	6	
7162	0014	9	
7163	0021	12	
7164	0026	17	
7165	0033	22	
7166	0042	27	
7167	0051	34	
7170	0200	41	
7171	0777	128	
7172	0000	511	
		0	/TABLE TERMINATOR
		OCTAL	

7173	4561		
7174	7345		
7175	6030		
7176	6754		
7177	6755		
7200	7200		

PAGE

/YNOTRY

/(WHY NOT READY?) THIS SUBROUTINE DOES A COMPLETE INVESTIGATION OF POSSIBLE

/CAUSES FOR THE DRIVE NOT BEING READY AFTER A FAILING "RDYHAT"

/RETURN. IT IS POSSIBLE THAT THE DRIVE WILL BE DROPPED IF THE ERROR IS

/FATAL OR WILL NOT RESET.

7200	0000	XYNOTR, 0	/READ AND STORE ERROR REG
7201	4433	RRER	/READ AND STORE COMMAND B
7202	3123	DCA	/READ AND STORE COMMAND A
7203	4436	RRCB	/COMPUTE CALL PC AND SAVE IT
7204	3124	DCA	/GET STATUS AND SAVE IT
7205	4435	RRCA	/READ ERROR REG
7206	3125	DCA	/GET OPI INTO SIGN BIT
7207	7240	STA	/SKIP IF OPI SET FROM GET STATUS
7210	1200	TAD	/OK--CONTINUE
7211	3126	DCA	/RESTORE ERROR REG
7212	4460	GETSTA	/SAVE IT FOR ERROR TYPEOUT
7213	4433	RRER	/NO CLOCK (OPI SET ON GET STATUS)
7214	7004	RAL	/PC DRV NO. ER
7215	7500	SMA	/PRINT FATAL MESSAGE AND DROP DRIVE
7216	5224	JMP	/READY NOT SET WITHIN 3 SECONDS
7217	7010	RAR	/PC DRVNO WD1-STATUS-WD2 ER CB CA CALPC
7220	3121	DCA	/CHECK THE STATUS FROM THE DRIVE
7221	4446	ERROR	
7222	4602	NOCLK	
7223	5777	JMP	
7224	4446	YNCONA, ERROR	
7225	4630	NORDY3	
7226	1122	TAD	

7227	0376	AND	(SEEKTO	/	FOR SEEK TIME-OUT ERROR
7230	7650	SNA CLA		/SKIP IF SEEK TIME-OUT ERROR	
7231	5242	JMP	YNCONB		
7232	4457	RESET		/RESET THE DRIVE	
7233	4775	JMS	WAT300	/WAIT 300 MILLISECONDS	
7234	4460	GETSTA		/GET DRIVE'S STATUS	
7235	1122	TAD	DATA2	/CHECK SEEK TIMEOUT	
7236	0376	AND	(SEEKTO		
7237	7640	SZA CLA		/SKIP IF CLEARED	
7240	5774	JMP	YNCNTR	/PRINT "CAN'T RESET" MESSAGE AND DROP DRIVE	
7241	5345	JMP	YNEXIT	/EXIT	
7242	1122	TAD	DATA2	/CHECK FOR SPEED ERROR	
7243	0373	AND	(SPUPTO		
7244	7650	SNA CLA		/SKIP IF SPEED ERROR	
7245	5304	JMP	YNCONC		
7246	4457	RESET		/RESET THE DRIVE	
7247	1121	TAD	DATA1	/CHECK THE STATE BITS	
7250	0170	AND	K7		
7251	7650	SNA CLA		/SKIP IF NOT LOAD STATE	
7252	5261	JMP	.+7		
7253	4772	JMS	WAIT1	/WAIT 1 MS	
7254	4433	RRER		/CHECK IF DRIVE ERROR STILL SET	
7255	7012	RTR			
7256	7630	SZL CLA		/SKIP IF STILL SET	
7257	5345	JMP	YNEXIT	/EXIT	
7260	5774	JMP	YNCNTR	/CAN'T RESET ERROR	
7261	4775	JMS	WAT300	/WAIT 300 MS	
7262	4460	GETSTA		/GET STATUS	
7263	1121	TAD	DATA1	/CHECK STATE BITS	
7264	0170	AND	K7		
7265	7650	SNA CLA		/SKIP IF NO LONGER IN LOAD STATE	
7266	5771	JMP	YNLOAD	/DROP DRIVE	
7267	4473	SETTIM		/INIT REAL TIME CLOCK ROUTINE	
7270	0140			/40 SECONDS	
7271	7014				
DECIMAL					
7272	4447	CONSOL		/CHECK FOR READY	
7273	4433	RRER			
7274	7010	RAR		/SKIP IF NOT READY	
7275	7630	SZL CLA	.+4	/GET OUT OF LOOP	
7276	5302	JMP		/CHECK TIME PASSAGE	
7277	4474	TINCHK		/CHECK TIME PASSAGE	
7300	5272	JMP	.-6	/WAIT FOR READY	
7301	5770	JMS	YNCHRY	/CAN'T MAKE READY--DROP DRIVE	
7302	4457	RESET		/RESET THE DRIVE	
7303	5345	JMP	YNEXIT	/LET'S EXIT	
7304	1122	TAD	DATA2	/CHECK FOR HEAD CURRENT ERROR	
7305	0367	AND	(HEDCUR		
7306	7640	SZA CLA		/SKIP IF NOT HEAD CURRENT ERROR	
7307	5777	JMP	YNFATL	/FATAL ERROR--DROP DRIVE	
7310	1122	TAD	DATA2	/CHECK FOR WRITE DATA ERROR	
7311	0366	AND	(WRDERR		
7312	7650	SNA CLA		/SKIP IF SET	
7313	5333	JMP	YNCONC		
OCTAL					



7314	4775'	JMS	WAT300	/WAIT 300 MS
7315	4457	RESET		/RESET THE DRIVE
7316	4473	SETTIM		/SETUP FOR 40 SECOND WAIT
DECIMAL				
7317	0140	-4000		
7320	7014	-500		
OCTAL				
7321	4447	CONSOL		/ALLOW CONSOL INPUT
7322	4433	RRER		/CHECK FOR READY
7323	7010	RAR		
7324	7630	SZL CLA		/SKIP IF NOT READY
7325	5331	JMP	+.4	/GET OUT OF LOOP
7326	4474	TIMCHK		/SKIP IF TIME IS UP
7327	5321	JMP	-.6	/KEEP WAITING
7330	5770'	JMP	YNCHRY	/DROP DRIVE
7331	4457	RESET		/RESET THE DRIVE
7332	5345	JMP	YNEXIT	/EXIT
7333	1122	TAD	DATA2	/CHECK FOR WRITE GATE ERROR
7334	0365	AND	(WRGATE	
7335	7650	SNA CLA		/SKIP IF SET
7336	5764'	JMP	YNONE	
7337	4457	RESET		/RESET THE DRIVE
7340	4460	GETSTA		/GET STATUS
7341	1122	TAD	DATA2	/CHECK IF WRITE GATE CLEARED
7342	0365	AND	(WRGATE	
7343	7640	SZA CLA		/SKIP IF IT DID
7344	5774'	JMP	YNCNTR	/CAN'T RESET--DROP DRIVE
7345	4433	RRER		/BEFORE LEAVING. CHECK DRIVE IS
7346	7012	RTR		/READY AND NO ERROR
7347	7500	SMA		/SKIP IF DRIVE IS READY
7350	5770'	JMP	YNCHRY	
7351	7630	SZL CLA		/SKIP IF NO DRIVE ERROR
7352	5774'	JMP	YNCNTR	
7353	5600	JMP I	XYNOTR	/RETURN
/APTCHK				
/SUBROUTINE SKIPS IF NOT RUNNING UNDER APT				
XAPTCH, 0				
7354	0000	CLA		/GET HARDWARE CONFIGURATION WORD 2
7355	7200	TAD	HCW2	/SKIP IF ON APT (NORMAL RETURN)
7356	1022	SMA CLA		/SKIP ON RETURN (NOT ON APT)
7357	7700	ISZ	XAPTCH	/RETURN W/AC CLEAR
7360	2354	JMP I	XAPTCH	
7361	5754			
7364 7123				
7365 0004				
7366 0200				
7367 0100				
7370 7137				
7371 7134				
7372 6030				
7373 0010				

7374 7131  
7375 7142  
7376 0020  
7377 7126  
7400

PAGE

/THIS ROUTINE WILL DO THE ACTUAL TESTING FOR THE BAD SECTOR IN THE  
/BAD SECTOR FILE

7400 0000	BADCHK, 0		/CLEAR THE AC & LINK
7401 7300	CLA CLL		/SET UP BAD SECTOR COUNTER
7402 1377	TAD (-20		/TO 16 BAD SECTORS MAX.
7403 3350	DCA SECCNT		/SET UP A POINTER INTO THE
7404 1352	TAD BSECAD		/BAD SECTOR TABLE
7405 3351	DCA BADPNT		
7406 6211	10		
7407 1751	CYLLP1, CDF		/GET A BAD CYL & HD
7410 6201	TAD I BADPNT		
7411 2351	CDF 00		/UPDATE THE POINTER TO BAD SECTOR TABLE
7412 2351	ISZ BADPNT		
7413 0376	ISZ BADPNT		
7414 7450	AND (777		/MASK OUT UNUSED BITS
7415 5224	SNA		/SKIP IF NOT EOTAB& BS EXIST
7416 7041	JMP EXTCHK		/EOT & NO OR NO BAD SECTORS
7417 1243	CIA		/NEGATE
7420 7650	TAD NEWCYL		/ADD CUR HD & CYL
7421 5226	SNA CLA		/SKP IF BAD CYL & HD (NEQ) CUR CYL & HD
7422 2350	JMP EXTCHK+2		
7423 5206	ISZ SECCNT		/UPDATE THE SECTOR COUNTER
7424 7300	JMP CYLLP1		/GO CHECK NEXT SECTOR
7425 2200	EXTCHK, CLA CLL		
7426 5600	ISZ BADCHK		/UPDATE FOR GOOD RETURN
	JMP I BADCHK		

/THIS ROUTINE DOES THE CHECK FOR A BAD SECTOR AND IS A SUBROUTINE TO THE  
/BADCHK ROUTINE

7427 0000	CHKSEK, 0		/GET CMD A REG. CONTENTS AND CURRENT CYLINDER
7430 4775	JMS CHKCYL		/GO COMPUTE THE NEW CYLINDER
7431 4774	JMS MKNCYL		/SAVE THE NEW CYLINDER
7432 3243	DCA NEWCYL		/GO CHK IF NEW CYLINDER IS IN THE BSF
7433 4200	JMS BADCHK		/NEWCYL IS IN BSF GO RECOMPUTE ANOTHER CYL.
7434 5241	JMP .+5		
7435 7300	CLA CLL		
7436 1353	TAD SAVECA		/GET THE SAVED CMD A REG. BACK
7437 4427	RLCA		/LOAD THE CMD A REG.
7440 5627	JMP I CHKSEK		/NEWCYL OK GO EXECUTE THE SEEK
7441 4773	JMS RECAL		/GET ANOTHER NEWCYL
7442 5230	JMP CHKSEK+1		/GO TO IT!!!
7443 0000	NEWCYL, 0		

/TABLE OF POINTERS TO THE IOT CODES FOR THE RL8A CONTROLLER

```

7444 5273 / IOTTAB, IOT0
7445 5276 IOT1
7446 5303 IOT2
7447 5306 IOT3
7450 5311 IOT4
7451 5314 IOT5
7452 5317 IOT7
7453 5322 IOT10
7454 5325 IOT11
7455 5330 IOT12
7456 5333 IOT13
7457 5336 IOT14
7460 5341 IOT15
7461 5344 IOT17
7462 0000 0

```

/TABLE TERMINATOR

/THIS ROUTINE DOES THE PROCESSING OF THE BAD SECTOR FILE BY MOVING  
/ALL THE BAD SECTOR ENTRIES INTO THE BAD SECTOR TABLE.

```

7463 0000 BADPRO, 0
7464 4772' JMS SETBPR
7465 6211 BSFLP1, CDF 10
7466 1754 TAD I BUFPNT
7467 6201 CDF 00
7470 0371 AND (377
7471 7041 CIA
7472 1371 TAD (377
7473 7650 SNA CLA
7474 5341 JMP FLDBAD
7475 2770' ISZ BADCNT
7476 7410 SKP
7477 5347 JMP T00BAD
7500 7301 CLA CLL IAC
7501 6211 CDF 10
7502 0754 AND I BUFPNT
7503 7112 CLL RTR
7504 7010 RAR
7505 3356 DCA BADTRK
7506 7344 CLA CLL CMA RAL
7507 1354 TAD BUFPNT
7510 3354 DCA BUFPNT
7511 1754 TAD I BUFPNT
7512 3355 DCA TEMPX
7513 7240 STA
7514 1354 TAD BUFPNT
7515 3354 DCA BUFPNT
7516 1355 TAD TEMPX
7517 7640 SZA CLA
7520 1367 TAD (400
7521 1754 TAD I BUFPNT
7522 0376 AND (777
7523 1356 TAD BADTRK
7524 3751 DCA I BADPNT
7525 2351 ISZ BADPNT

```

/GET BAD TRACK

/MASK OFF UNUSED BITS

/NEAGATE

/SKIP IF TRACK NOT ALL ONES

/TRACK ALL ONES,END OF BSF

/UPDATE BAD SECTOR COUNTER

/SKIP IF <16 BAD SECTORS

/MORE THAN 16 BAD SECTORS

/SET BIT 11

/MASK TRACK BIT

/MOVE TRACK BIT TO BIT 1 POSITION

/SAVE IT TEMPORARILY

/MOVE BUFFER POINTER BACK 2 LOC.'S

/TO THE CYL. EXTENSION BIT

/GET THE POSSIBLE CYL EXT. BIT

/SAVE IT TEMPORARILY

/MOVE BUFFER POINTER BACK 1 LOC.

/TO THE CYL. WORD

/SAVE IT AS THE BUFFER POINTER

/GET THE POSSIBLE CYL EXT. BIT

/SKIP IF NO CYL EXT. BIT

/SET BIT 3 IN AC IF CYL EXT.BIT=1

/GET REST OF CYL WORD

/MASK OUT UNUSED BITS

/ADD IN THE HEAD SEL BIT

/SAVE IT IN THE BAD SECTOR TABLE

/UPDATE THE BAD SECTOR TABLE POINTER

7526	2354	ISZ	BUFNT	/UPDATE THE BUFFER POINTER
7527	2354	ISZ	BUFNT	/UPDATE THE BUFFER POINTER
7530	1754	TAD I	BUFNT	/GET THE BAD SECTOR NUMBER
7531	0376	AND	(777	/MASK OFF UNUSED BITS
7532	3751	DCA I	BADPNT	/SAVE BAD SECTOR # IN THE BAD SECTOR TABLE
7533	2351	ISZ	BADPNT	/UPDATE BAD SECTOR TABLE POINTER
7534	1366	TAD	(5	/SET UP BUFFER POINTER
7535	1354	TAD	BUFNT	/TO POINT TO THE NEXT
7536	3354	DCA	BUFNT	/BAD TRACK
7537	6201	CDF	00	
7540	5265	JMP	BSFLP1	/GO DO LOOP1 AGAIN (CONTINUE TO PROCESS)
7541	1765	TAD	BUFADR	/GET BUFFER ADDR.
7542	1364	TAD	(133	/ADD 133 TO POINT TO FLD BSF
7543	3354	DCA	BUFNT	/SET UP BUFFER POINTER TO 1ST FLD BAD
7544	2763	ISZ	BADSWT	/UPDATE FLD BAD SECTOR LOOP SWITCH
7545	5265	JMP	BSFLP1	/GO PROCESS FLD BAD SECTORS
7546	5663	JMP I	BADPRO	
7547	4762	JMS	BSFER2	/GO PROCESS TOO MANY BAD SECTORS
7550	0000	TOOBAD.	SECCNT.	
7551	0000	BADPNT.	0	
7552	5440	BSECAD.	BADSEC	
7553	0000	SAVECA.	0	
7554	0000	BUFNT.	0	
7555	0000	TEMPX.	0	
7556	0000	BADTRK.	0	
7562	3350			
7563	3761			
7564	0133			
7565	4163			
7566	0005			
7567	0400			
7570	4165			
7571	0377			
7572	3746			
7573	6756			
7574	3161			
7575	6350			
7576	0777			
7577	7760			
	0001	FIELD	1	

[illegible]



0000	*0 NOPUNCH DECIMAL	ZBLOCK 512	/RESERVE 2 FULL SECTORS (8 BIT MODE) FOR A BUFFER AREA
0000 0000	OCTAL ENPUNCH *1000		
1000	MANDEC. TEXT	"#AJRLH-B RL8-A/RL02 DRIVE FUNCTION TESTS#"	HP 001
1000 4301			
1001 1222			
1002 1410			
1003 5502			
1004 4022			
1005 1470			
1006 5501			
1007 5722			
1010 1460			
1011 6240			
1012 0422			
1013 1126			
1014 0540			
1015 0625			
1016 1603			
1017 2411			
1020 1716			
1021 4024			
1022 0523			
1023 2423			
1024 4300			
1025 4303			
1026 1417			
1027 2305			
1030 4003			
1031 1726			
1032 0522			
1033 4001			
1034 1604			
1035 4022			
1036 0523			
1037 0524			
1040 4027			
1041 2211			
1042 2405			
1043 4014			
1044 1703			
1045 1340			
1046 1716			
1047 4004			
1050 2211			
1051 2605			
1052 4000			
1053 4324			
1054 3120			
1055 0540			
1056 7403			

  

OPR2.	TEXT	"#CLOSE COVER AND RESET WRITE LOCK ON DRIVE "
-------	------	---

  

OPR1.	TEXT	"#TYPE <CR> IF PROCEDURE WAS FOLLOWED:"
-------	------	---

HP 007

OPR3, TEXT "#PRESS LOAD SWITCH "

LIMEXC, TEXT "?? ERROR LIMIT EXCEEDED - "

TSTDV, TEXT "TEST DRIVE "

SPQSP, TEXT " ? "

DROPN, TEXT "DROPPING DRIVE "

1057 2276  
 1060 4011  
 1061 0640  
 1062 2022  
 1063 1703  
 1064 0504  
 1065 2522  
 1066 0540  
 1067 2701  
 1070 2340  
 1071 0617  
 1072 1414  
 1073 1727  
 1074 0504  
 1075 7200  
 1076 4320  
 1077 2205  
 1100 2323  
 1101 4014  
 1102 1701  
 1103 0440  
 1104 2327  
 1105 1124  
 1106 0310  
 1107 4000  
 1110 4377  
 1111 4005  
 1112 2222  
 1113 1722  
 1114 4014  
 1115 1115  
 1116 1124  
 1117 4005  
 1120 3003  
 1121 0505  
 1122 0405  
 1123 0440  
 1124 5540  
 1125 0000  
 1126 2405  
 1127 2324  
 1130 4004  
 1131 2211  
 1132 2605  
 1133 4000  
 1134 4077  
 1135 4000  
 1136 0422  
 1137 1720  
 1140 2011  
 1141 1607  
 1142 4004  
 1143 2211  
 1144 2605  
 1145 4000



1146 4311	OPT1AV, TEXT	"#IS OPTION 1 CLK ENABLED? "
1147 2340		
1150 4017		
1151 2024		
1152 1117		
1153 1640		
1154 6140		
1155 0314		
1156 1340		
1157 0516		
1160 0102		
1161 1405		
1162 0477		
1163 4000		
1164 4304		
1165 1740		
1166 3117		
1167 2540		
1170 2711		
1171 2310		
1172 4024		
1173 1740		
1174 2305		
1175 1405		
1176 0324		
1177 4016		
1200 1716		
1201 5504		
1202 0506		
1203 0125		
1204 1424		
1205 4020		
1206 0122		
1207 0115		
1210 0524		
1211 0522		
1212 2377		
1213 4000		
1214 2523		
1215 0540		
1216 0405		
1217 2611		
1220 0305		
1221 4003		
1222 1704		
1223 0523		
1224 4066		
1225 6254		
1226 6663		
1227 7740		
1230 0000		
1231 2205		
1232 0104		
1233 4001		
1234 1414		
	USEDEF, TEXT	"#DO YOU WISH TO SELECT NON-DEFAULT PARAMETERS? "
	USE62, TEXT	"USE DEVICE CODES 62,63? "
	USALHD, TEXT	"READ ALL HEADERS? "

## EXHDAL, TEXT "EXECUTE HEAD ALIGNMENT SUPPORT TEST? "

1235 4010  
1236 0501  
1237 0405  
1240 2223  
1241 7740  
1242 0000  
1243 0530  
1244 0503  
1245 2524  
1246 0540  
1247 1005  
1250 0104  
1251 4001  
1252 1411  
1253 0716  
1254 1505  
1255 1624  
1256 4023  
1257 2520  
1260 2017  
1261 2224  
1262 4024  
1263 0523  
1264 2477  
1265 4000  
1266 0530  
1267 0503  
1270 2524  
1271 0540  
1272 0422  
1273 1126  
1274 0540  
1275 2305  
1276 1405  
1277 0324  
1300 4024  
1301 0523  
1302 2477  
1303 4000  
1304 0530  
1305 0503  
1306 2524  
1307 0540  
1310 0422  
1311 1126  
1312 0540  
1313 2305  
1314 1405  
1315 0324  
1316 4005  
1317 2222  
1320 1722  
1321 4024  
1322 0523  
1323 2477

## XDSMES, TEXT "EXECUTE DRIVE SELECT TEST? "

## XDSEME, TEXT "EXECUTE DRIVE SELECT ERROR TEST? "

1324 4000	EXMAIN, TEXT	"EXECUTE MANUAL INTERVENTION TESTS? "
1325 0530		
1326 0503		
1327 2524		
1330 0540		
1331 1501		
1332 1625		
1333 0114		
1334 4011		
1335 1624		
1336 0522		
1337 2605		
1340 1624		
1341 1117		
1342 1640		
1343 2405		
1344 2324		
1345 2377		
1346 4000	USLOLM, TEXT	"USE LOWER SEEK LIMIT? "
1347 2523		
1350 0540		
1351 1417		
1352 2705		
1353 2240		
1354 2305		
1355 0513		
1356 4014		
1357 1115		
1360 1124		
1361 7740		
1362 0000	ENOVAL, TEXT	"ENTER VALUE IN OCTAL: "
1363 0516		
1364 2405		
1365 2240		
1366 2601		
1367 1425		
1370 0540		
1371 1116		
1372 4017		
1373 0324		
1374 0114		
1375 7240		
1376 0000		
1377 2523	USUPLM, TEXT	"USE UPPER SEEK LIMIT? "
1400 0540		
1401 2520		
1402 2005		
1403 2240		
1404 2305		
1405 0513		
1406 4014		
1407 1115		
1410 1124		
1411 7740		
1412 0000		

LLLLTHL, TEXT      "#LOW LIMIT MUST BE LESS THAN HI LIMIT#"

1413 4314  
1414 1727  
1415 4014  
1416 1115  
1417 1124  
1420 4015  
1421 2523  
1422 2440  
1423 0205  
1424 4014  
1425 0523  
1426 2340  
1427 2410  
1430 0116  
1431 4010  
1432 1140  
1433 1411  
1434 1511  
1435 2443  
1436 0000  
1437 2523  
1440 0540  
1441 1716  
1442 1431  
1443 4017  
1444 1605  
1445 4023  
1446 2522  
1447 0601  
1450 0305  
1451 7740  
1452 0000  
1453 2320  
1454 0503  
1455 1106  
1456 3140  
1457 2325  
1460 2206  
1461 0103  
1462 0540  
1463 5060  
1464 4017  
1465 2240  
1466 6151  
1467 7240  
1470 0000  
1471 0516  
1472 2405  
1473 2240  
1474 0522  
1475 2217  
1476 2240  
1477 1411  
1500 1511  
1501 2440

US1SUR, TEXT      "USE ONLY ONE SURFACE? "

SPCSUR, TEXT      "SPECIFY SURFACE (0 OR 1): "

SPERLM, TEXT      "ENTER ERROR LIMIT IN OCTAL (DEFAULT=24): "

1502	1116		
1503	4017	QESMRK, TEXT	"?#"
1504	0324		
1505	0114	EOPMES, TEXT	"#END PASS "
1506	4050		
1507	0405		
1510	0601		
1511	2514		
1512	2475		
1513	6264		
1514	5172		
1515	4000		
1516	7743		
1517	0000		
1520	4305		
1521	1604		
1522	4020		
1523	0123		
1524	2340		
1525	0000		
1526	3603	UPARRC, TEXT	"^C#"
1527	4300		
1530	3607	UPARRG, TEXT	"^G"
1531	0000		
1532	3606	FILLEQ, TEXT	"^F#FILL = "
1533	4306		
1534	1114		
1535	1440		
1536	7540		
1537	0000		
1540	4323	SWRMSG, TEXT	"#SR = "
1541	2240		
1542	7540		
1543	0000		
1544	4040	TWOSPA, TEXT	" "
1545	0000		
1546	4022	READY, TEXT	" READY#"
1547	0501		
1550	0431		
1551	4300		
1552	4320	PLSMDR, TEXT	"#PLEASE MAKE DRIVE "
1553	1405		
1554	0123		
1555	0540		
1556	1501		
1557	1305		
1560	4004		
1561	2211		
1562	2605		
1563	4000		
1564	4325	UNLOAD, TEXT	"#UNLOAD DRIVE "
1565	1614		
1566	1701		
1567	0440		
1570	0422		

1571	1126		
1572	0540		
1573	0000		
1574	4310	"#HEAD ALIGNMENT SUPPORT TEST, DRIVE "	
1575	0501		
1576	0440		
1577	0114		
1600	1107		
1601	1615		
1602	0516		
1603	2440		
1604	2325		
1605	2020		
1606	1722		
1607	2440		
1610	2405		
1611	2324		
1612	5440		
1613	0422		
1614	1126		
1615	0540		
1616	0000		
1617	4327		
1620	2214		
1621	1340		
1622	2205		
1623	2305		
1624	2440		
1625	0617		
1626	2240		
1627	1004		
1630	4060		
1631	7340		
1632	2305		
1633	2440		
1634	0617		
1635	2240		
1636	1004		
1637	4061		
1640	4303		
1641	3114		
1642	4001		
1643	0404		
1644	2240		
1645	1116		
1646	4015		
1647	2143		
1650	7403		
1651	2276		
1652	4024		
1653	1740		
1654	0530		
1655	1124		
1656	0000		
1657	0530		
		WLKSEL, TEXT	"#WRLK RESET FOR HD 0; SET FOR HD 1#CYL ADDR IN MQ#<CR> TO EXIT"
		EXIT, TEXT	"EXIT#"

1660	1124				
1661	4300				
1662	4320	PLWRLK, TEXT	"#PLEASE WRITE LOCK DRIVE "		
1663	1405				
1664	0123				
1665	0540				
1666	2722				
1667	1124				
1670	0540				
1671	1417				
1672	0313				
1673	4004				
1674	2211				
1675	2605				
1676	4000				
1677	4320	RLWREN, TEXT	"#PLEASE WRITE ENABLE DRIVE "		
1700	1405				
1701	0123				
1702	0540				
1703	2722				
1704	1124				
1705	0540				
1706	0516				
1707	0102				
1710	1405				
1711	4004				
1712	2211				
1713	2605				
1714	4000				
1715	4020				
1716	0340	CA, TEXT	" PC DRV NO. CA#"		
1717	4040				
1720	4004				
1721	2226				
1722	4016				
1723	1756				
1724	4040				
1725	4003				
1726	0143				
1727	0000				
1730	4020	CACALL, TEXT,	" PC DRV NO. CA CALLPC#"		
1731	0340				
1732	4040				
1733	4004				
1734	2226				
1735	4016				
1736	1756				
1737	4040				
1740	4003				
1741	0140				
1742	4040				
1743	4003				
1744	0114				
1745	1420				
1746	0343				

ER.	TEXT	" PC	DRV NO.	ER#"
1747	0000			
1750	4020			
1751	0340			
1752	4040			
1753	4004			
1754	2226			
1755	4016			
1756	1756			
1757	4040			
1760	4005			
1761	2243			
1762	0000			
1763	4020			
1764	0340			
1765	4040			
1766	4004			
1767	2226			
1770	4016			
1771	1756			
1772	4040			
1773	0331			
1774	1443			
1775	0000			
1776	4323			
1777	2011			
2000	1604			
2001	1405			
2002	4022			
2003	1724			
2004	0124			
2005	1117			
2006	1640			
2007	2411			
2010	1505			
2011	4022			
2012	0520			
2013	1722			
2014	2454			
2015	4004			
2016	2211			
2017	2605			
2020	4000			
2021	7240			
2022	4040			
2023	4000			
2024	5600			
2025	4015			
2026	2343			
2027	0000			
2030	4322			
2031	0515			
2032	1726			
2033	0540			
2034	0114			
2035	1440			

  

CYL.	TEXT	" PC	DRV NO.	CYL#"

  

SPNRPT, TEXT	"#SPINDLE ROTATION TIME REPORT, DRIVE "

  

COLON, TEXT	": "

  

PERIOD, TEXT	": "
MILLIS, TEXT	" MS#"

  

REMPUG, TEXT	"#REMOVE ALL DRIVE ADDRESS PLUGS EXCEPT FOR DRIVE "



2036 0422  
2037 1126  
2040 0540  
2041 0104  
2042 0422  
2043 0523  
2044 2340  
2045 2014  
2046 2507  
2047 2340  
2050 0530  
2051 0305  
2052 2024  
2053 4006  
2054 1722  
2055 4004  
2056 2211  
2057 2605  
2060 4000  
2061 4324  
2062 3120  
2063 0540  
2064 7403  
2065 2276  
2066 4027  
2067 1005  
2070 1640  
2071 0417  
2072 1605  
2073 4000  
2074 4322  
2075 0520  
2076 1401  
2077 0305  
2100 4001  
2101 1414  
2102 4001  
2103 0404  
2104 2205  
2105 2323  
2106 4020  
2107 1425  
2110 0723  
2111 0000  
2112 4304  
2113 2211  
2114 2605  
2115 4023  
2116 0514  
2117 0503  
2120 2440  
2121 0522  
2122 2217  
2123 2240  
2124 2405

TCRWDN, TEXT      "#TYPE <CR> WHEN DONE "

REPLPL, TEXT      "#REPLACE ALL ADDRESS PLUGS"

SERTST, TEXT      "#DRIVE SELECT ERROR TEST"

TOEXIT, TEXT      /#TO EXIT, RESTORE DRIVE ADDRESS PLUGS AND TYPE "<CR>" IN RESPONSE TO "TYPE DRIVE NUMBER" PR

2125 2324  
2126 0000  
2127 4324  
2130 1740  
2131 0530  
2132 1124  
2133 5440  
2134 2205  
2135 2324  
2136 1722  
2137 0540  
2140 0422  
2141 1126  
2142 0540  
2143 0104  
2144 0422  
2145 0523  
2146 2340  
2147 2014  
2150 2507  
2151 2340  
2152 0116  
2153 0440  
2154 2431  
2155 2005  
2156 4042  
2157 7403  
2160 2276  
2161 4240  
2162 1116  
2163 4022  
2164 0523  
2165 2017  
2166 1623  
2167 0543  
2170 2417  
2171 4042  
2172 2431  
2173 2005  
2174 4004  
2175 2211  
2176 2605  
2177 4016  
2200 2515  
2201 0205  
2202 2242  
2203 4020  
2204 2217  
2205 1520  
2206 2443  
2207 0000  
2210 4311  
2211 1623  
2212 0522  
2213 2440

INSIDN, TEXT      \*#INSERT IDENTICAL ADDRESS PLUGS IN 2 DRIVES AND TYPE DRIVE NUMBER (0-3): \*

2214 1104  
2215 0516  
2216 2411  
2217 0301  
2220 1440  
2221 0104  
2222 0422  
2223 0523  
2224 2340  
2225 2014  
2226 2507  
2227 2340  
2230 1116  
2231 4062  
2232 4004  
2233 2211  
2234 2605  
2235 2340  
2236 0116  
2237 0440  
2240 2431  
2241 2005  
2242 4004  
2243 2211  
2244 2605  
2245 4016  
2246 2515  
2247 0205  
2250 2240  
2251 5060  
2252 5563  
2253 5172  
2254 4000  
2255 4301  
2256 0404  
2257 2205  
2260 2323  
2261 4020  
2262 1425  
2263 0723  
2264 4016  
2265 1724  
2266 4022  
2267 0523  
2270 2417  
2271 2205  
2272 0400  
2273 7740  
2274 0601  
2275 2401  
2276 1440  
2277 0522  
2300 2217  
2301 2240  
2302 5540

PLUGNR, TEXT      "ADDRESS PLUGS NOT RESTORED"

FATLNR, TEXT      "? FATAL ERROR - "

2303 0000			
2304 7740			
2305 0301			
2306 1647			
2307 2440			
2310 2205			
2311 2305			
2312 2440			
2313 0522			
2314 2217			
2315 2240			
2316 5540			
2317 0000			
2320 7740			
2321 0422			
2322 1126			
2323 0540			
2324 1116			
2325 4014			
2326 1701			
2327 0440			
2330 2324			
2331 0124			
2332 0540			
2333 5540			
2334 0000			
2335 7740			
2336 0301			
2337 1647			
2340 2440			
2341 1501			
2342 1305			
2343 4022			
2344 0501			
2345 0431			
2346 4055			
2347 4000			
2350 4020			
2351 0343			
2352 0000			
2353 4020			
2354 0340			
2355 4040			
2356 4004			
2357 2226			
2360 4016			
2361 1756			
2362 4027			
2363 0461			
2364 5501			
2365 0324			
2366 2501			
2367 1455			
2370 2704			
2371 6240			

  

CANTRS, TEXT	"? CAN'T RESET ERROR - "

  

DRNLOD, TEXT	"? DRIVE IN LOAD STATE - "

  

CNMROY, TEXT	"? CAN'T MAKE READY - "

  

PC, TEXT	" PC#"

  

EXAC2, TEXT	" PC	DRV NO.	WD1-ACTUAL-WD2	WD1-EXPC2D-WD2#"

2372 4027  
2373 0461  
2374 5505  
2375 3020  
2376 0324  
2377 0455  
2400 2704  
2401 6243  
2402 0000  
2403 4020  
2404 0340  
2405 4040  
2406 4004  
2407 2226  
2410 4016  
2411 1756  
2412 4003  
2413 3114  
2414 5002  
2415 6451  
2416 4003  
2417 0114  
2420 1420  
2421 0340  
2422 4040  
2423 4003  
2424 0143  
2425 0000  
2426 4020  
2427 0340  
2430 4040  
2431 4004  
2432 2226  
2433 4016  
2434 1756  
2435 4027  
2436 0461  
2437 5501  
2440 0324  
2441 2501  
2442 1455  
2443 2704  
2444 6240  
2445 4027  
2446 0461  
2447 5505  
2450 3020  
2451 0324  
2452 0455  
2453 2704  
2454 6240  
2455 4003  
2456 0114  
2457 1420  
2460 0343

CYLB4, TEXT " PC DRV NO. CYL(B4) CALLPC CA#"

EXAC2S, TEXT " PC DRV NO. WD1-ACTUAL-WD2 WD1-EXPC2D-WD2 CALLPC#"

2461 0000  
 2462 4020  
 2463 0340  
 2464 4040  
 2465 4004  
 2466 2226  
 2467 4016  
 2470 1756  
 2471 4300  
 2472 4020  
 2473 0340  
 2474 4040  
 2475 4004  
 2476 2226  
 2477 4016  
 2500 1756  
 2501 4027  
 2502 0461  
 2503 5523  
 2504 2401  
 2505 2425  
 2506 2355  
 2507 2704  
 2510 6240  
 2511 4040  
 2512 4005  
 2513 2243  
 2514 0000  
 2515 4020  
 2516 0340  
 2517 4040  
 2520 4004  
 2521 2226  
 2522 4016  
 2523 1756  
 2524 4002  
 2525 0506  
 2526 1722  
 2527 5503  
 2530 3114  
 2531 4003  
 2532 0143  
 2533 0000  
 2534 4020  
 2535 0340  
 2536 4040  
 2537 4004  
 2540 2226  
 2541 4016  
 2542 1756  
 2543 4002  
 2544 0506  
 2545 1722  
 2546 5503  
 2547 3114

STATE, TEXT " PC DRV NO. WDI-STATUS-WD2 ER#

CYLMSG, TEXT " PC DRV NO. BEFOR-CYL CA# / HP 006

CYLCA, TEXT " PC DRV NO. BEFOR-CYL-AFTER CA#

	CYLCAS, TEXT	" PC	DRV NO. BEFOR-CYL-AFTER	CA	CALLPC#"
2550	5501				
2551	0624				
2552	0522				
2553	4040				
2554	4003				
2555	0143				
2556	0000				
2557	4020				
2560	0340				
2561	4040				
2562	4004				
2563	2226				
2564	4016				
2565	1756				
2566	4002				
2567	0506				
2570	1722				
2571	5503				
2572	3114				
2573	5501				
2574	0624				
2575	0522				
2576	4040				
2577	4003				
2600	0140				
2601	4040				
2602	4003				
2603	0114				
2604	1420				
2605	0343				
2606	0000				
2607	4020				
2610	0340				
2611	4040				
2612	4004				
2613	2226				
2614	4016				
2615	1756				
2616	4003				
2617	0114				
2620	1420				
2621	0340				
2622	4027				
2623	0461				
2624	5510				
2625	0501				
2626	0405				
2627	2255				
2630	2704				
2631	6243				
2632	0000				
2633	4020				
2634	0340				
2635	4040				
2636	4004				

  

	CALHDR, TEXT	" PC	DRV NO. CALLPC	WD1-HEADER-WD2#"
2607	4020			
2610	0340			
2611	4040			
2612	4004			
2613	2226			
2614	4016			
2615	1756			
2616	4003			
2617	0114			
2620	1420			
2621	0340			
2622	4027			
2623	0461			
2624	5510			
2625	0501			
2626	0405			
2627	2255			
2630	2704			
2631	6243			
2632	0000			
2633	4020			
2634	0340			
2635	4040			
2636	4004			

  

	CURPRE, TEXT	" PC	DRV NO. CALLPC	WD1-CURRENT-WD2	WD1-PREVIOUS-WD2#"
2607	4020				
2610	0340				
2611	4040				
2612	4004				
2613	2226				
2614	4016				
2615	1756				
2616	4003				
2617	0114				
2620	1420				
2621	0340				
2622	4027				
2623	0461				
2624	5510				
2625	0501				
2626	0405				
2627	2255				
2630	2704				
2631	6243				
2632	0000				
2633	4020				
2634	0340				
2635	4040				
2636	4004				

STA	ECC	TEXT	" PC	DRV NO.	WD1-STATUS-WD2	ER	CB	CALLPC#"
-----	-----	------	------	---------	----------------	----	----	----------

STEC	PC	DRV NO.	WD1-STATUS-WD2	ER	CB	CA	CALLPC#
STECCC, TEXT	"						



2726 4040  
 2727 4004  
 2730 2226  
 2731 4016  
 2732 1756  
 2733 4027  
 2734 0461  
 2735 5523  
 2736 2401  
 2737 2425  
 2740 2355  
 2741 2704  
 2742 6240  
 2743 4040  
 2744 4005  
 2745 2240  
 2746 4040  
 2747 4040  
 2750 4003  
 2751 0240  
 2752 4040  
 2753 4040  
 2754 4003  
 2755 0140  
 2756 4040  
 2757 4003  
 2760 0114  
 2761 1420  
 2762 0343  
 2763 0000  
 2764 4020  
 2765 0340  
 2766 4040  
 2767 4004  
 2770 2226  
 2771 4016  
 2772 1756  
 2773 4003  
 2774 0114  
 2775 1420  
 2776 0340  
 2777 4027  
 3000 0461  
 3001 5510  
 3002 0501  
 3003 0405  
 3004 2255  
 3005 2704  
 3006 6240  
 3007 4027  
 3010 0463  
 3011 5510  
 3012 0501  
 3013 0405  
 3014 2255

HDR4, TEXT " PC DRV NO. CALLPC WD1-HEADER-WD2 WD3-HEADER-WD4#"

STATUS, TEXT " PC DRV NO. WD1-STATUS-WD2#"

STATSS, TEXT " PC DRV NO. WD1-STATUS-WD2 CALLPC#"

PCINT, TEXT " PC DRV NO. INTPC#"

HDCYHD, TEXT " PC DRV NO. HD0-CYLNDR-HD1#"

3015 2704  
3016 6443  
3017 0000  
3020 4020  
3021 0340  
3022 4040  
3023 4004  
3024 2226  
3025 4016  
3026 1756  
3027 4027  
3030 0461  
3031 5523  
3032 2401  
3033 2425  
3034 2355  
3035 2704  
3036 6243  
3037 0000  
3040 4020  
3041 0340  
3042 4040  
3043 4004  
3044 2226  
3045 4016  
3046 1756  
3047 4027  
3050 0461  
3051 5523  
3052 2401  
3053 2425  
3054 2355  
3055 2704  
3056 6240  
3057 4003  
3060 0114  
3061 1420  
3062 0343  
3063 0000  
3064 4020  
3065 0340  
3066 4040  
3067 4004  
3070 2226  
3071 4016  
3072 1756  
3073 4040  
3074 1116  
3075 2420  
3076 0343  
3077 0000  
3100 4020  
3101 0340  
3102 4040  
3103 4004



3173 0523  
3174 2411  
3175 1607  
3176 4300

/ERROR TABLE  
/  
/EACH ENTRY IN THE ERROR TABLE CONSISTS OF FOUR WORDS:  
/ 1) ERROR CODE FOR APT USE WITH THE FOLLOWING MEANINGS:  
/ 6000 STATUS ERROR  
/ 6100 DATA ERROR  
/ 6300 READ ERROR  
/ 6500 WRITE ERROR  
/ 0000 REPORT PC, NOT ERROR CODE  
/ 2) POINTER TO ERROR MESSAGE (MAY BE 0 FOR NULL)  
/ 3) POINTER TO DATA HEADER (MAY BE 0 FOR NULL)  
/ 4) MINUS NUMBER OF DATA ITEMS (AT LEAST -1 (FOR PC))  
/THE ERROR CALL CONSISTS OF THE "ERROR" STATEMENT FOLLOWED BY A  
/ POINTER TO AN ENTRY IN THE ERROR TABLE  
/

BADSTA, 6000  
BDST  
EXAC2  
-6  
BDST, TEXT  
/PC DRV NO. WD1-ACTUAL-WD2 WD1-EXPCD-WD2  
"#BAD STATUS RECEIVED FROM DRIVE#"

3177 6000  
3200 3203  
3201 2353  
3202 7772  
3203 4302  
3204 0104  
3205 4023  
3206 2401  
3207 2425  
3210 2340  
3211 2205  
3212 0305  
3213 1126  
3214 0504  
3215 4006  
3216 2217  
3217 1540  
3220 0422  
3221 1126  
3222 0543  
3223 0000  
3224 6000  
3225 3203  
3226 2426  
3227 7771  
3230 0000  
3231 3234  
3232 2462  
3233 7776  
3234 4304  
3235 2211  
3236 2605  
3237 4022  
3240 0501

BADSTS, 6000  
BDST  
EXAC2S  
-7  
DRDYST, 0  
+3  
DRVNO  
-2  
TEXT  
/PC DRV NO.  
"#DRIVE READY BIT SET#"

3241 0431  
 3242 4002  
 3243 1124  
 3244 4023  
 3245 0524  
 3246 4300  
 3247 6000  
 3250 3253  
 3251 3020  
 3252 7774  
 3253 4323  
 3254 2401  
 3255 2405  
 3256 4061  
 3257 4022  
 3260 0515  
 3261 0111  
 3262 1605  
 3263 0440  
 3264 0617  
 3265 2240  
 3266 1517  
 3267 2205  
 3270 4024  
 3271 1001  
 3272 1640  
 3273 6360  
 3274 4023  
 3275 0503  
 3276 5643  
 3277 0000  
 3300 0000  
 3301 3304  
 3302 3064  
 3303 7775  
 3304 4377  
 3305 4023  
 3306 1706  
 3307 2427  
 3310 0122  
 3311 0540  
 3312 0522  
 3313 2217  
 3314 2240  
 3315 5012  
 3316 1520  
 3317 4024  
 3320 1740  
 3321 6040  
 3322 1722  
 3323 4011  
 3324 1624  
 3325 0522  
 3326 2225  
 3327 2024

SPINTO, 6000

.+3

STATUS

-4

/PC DRV NO. WD1-STATUS-WD2

TEXT "#STATE 1 REMAINED FOR MORE THAN 30 SEC.#"

FATAL, 0

.+3

PCINT

-3

/ PC DRV NO. INTPC

TEXT "#? SOFTWARE ERROR (JMP TO 0 OR INTERRUPT WHEN INTERRUPT SYSTEM S/B OFF)#"

3330 4027  
3331 1005  
3332 1640  
3333 1116  
3334 2405  
3335 2222  
3336 2520  
3337 2440  
3340 2331  
3341 2324  
3342 0515  
3343 4023  
3344 5702  
3345 4017  
3346 0606  
3347 5143  
3350 0000

ERFLGS, 6000  
EFSMES  
ERCBCL  
-5  
EFSMES, TEXT   "ERROR FLAG SET"

NOTST2, 6000  
+3  
STATUS  
-4  
TEXT

"STATE 2 DID NOT FOLLOW STATE 1"

BHNOT0, 6000  
+3  
STATUS

3401 1724  
3402 4006  
3403 1714  
3404 1417  
3405 2740  
3406 2324  
3407 0124  
3410 0540  
3411 6143  
3412 0000  
3413 6000  
3414 3417  
3415 3020

3416 7774  
3417 4302  
3420 2225  
3421 2310  
3422 4010  
3423 1715  
3424 0540  
3425 1617  
3426 2440  
3427 2205  
3430 2305  
3431 2443  
3432 0000  
3433 6000  
3434 3437  
3435 2462  
3436 7776  
3437 4305  
3440 2222  
3441 1722  
3442 4006  
3443 1401  
3444 0740  
3445 1617  
3446 2440  
3447 2305  
3450 2440  
3451 0231  
3452 4026  
3453 1714  
3454 2515  
3455 0540  
3456 0310  
3457 0503  
3460 1343  
3461 0000  
3462 6000  
3463 3466  
3464 2462  
3465 7776  
3466 4304  
3467 2211  
3470 2605  
3471 4022  
3472 0501  
3473 0431  
3474 4002  
3475 1124  
3476 4016  
3477 1724  
3500 4023  
3501 0524  
3502 4300  
3503 6000  
3504 3507

-4  
TEXT       "BRUSH HOME NOT RESET#"  
  
ERNSVO, 6000  
      .+3  
      DRVNO  
      -2  
TEXT       "ERROR FLAG NOT SET BY VOLUME CHECK#"  
  
DRDYS, 6000  
      .+3  
      DRVNO  
      -2  
TEXT       "DRIVE READY BIT NOT SET#"  
  
HDOSPU, 6000  
      .+3

3505	2462	DRVNO	
3506	7776	-2	
3507	4310	TEXT	"#HEAD 0 NOT SELECTED ON CYCLE UP#"
3510	0501		
3511	0440		
3512	6040		
3513	1617		
3514	2440		
3515	2305		
3516	1405		
3517	0324		
3520	0504		
3521	4017		
3522	1640		
3523	0331		
3524	0314		
3525	0540		
3526	2520		
3527	4300		
3530	6000	STASUN, 6000	
3531	3534	+.3	
3532	3020	STATUS	
3533	7774	-4	
3534	4323	TEXT	"#STATE 5 REMAINED AFTER UNLOADING DRIVE#"
3535	2401		
3536	2405		
3537	4065		
3540	4022		
3541	0515		
3542	0111		
3543	1605		
3544	0440		
3545	0106		
3546	2405		
3547	2240		
3550	2516		
3551	1417		
3552	0104		
3553	1116		
3554	0740		
3555	0422		
3556	1126		
3557	0543		
3560	0000	NOTST6, 6000	
3561	6000	+.3	
3562	3565	STATUS	
3563	3020	-4	
3564	7774	TEXT	"#STATE 6 DID NOT FOLLOW STATE 5#"
3565	4323		
3566	2401		
3567	2405		
3570	4066		
3571	4004		
3572	1104		
3573	4016		



3574 1724  
 3575 4006  
 3576 1714  
 3577 1417  
 3600 2740  
 3601 2324  
 3602 0124  
 3603 0540  
 3604 6543  
 3605 0000  
 3606 0000  
 3607 3612  
 3610 2462  
 3611 7776  
 3612 4317  
 3613 2011  
 3614 4016  
 3615 1724  
 3616 4023  
 3617 0524  
 3620 4017  
 3621 1640  
 3622 0705  
 3623 2440  
 3624 2324  
 3625 0124  
 3626 2523  
 3627 4027  
 3630 1124  
 3631 1040  
 3632 1501  
 3633 1116  
 3634 2440  
 3635 0211  
 3636 2440  
 3637 6040  
 3640 2305  
 3641 2443  
 3642 0000  
 3643 6000  
 3644 3647  
 3645 1715  
 3646 7775  
 3647 4310  
 3650 0501  
 3651 0405  
 3652 2240  
 3653 2717  
 3654 2204  
 3655 4011  
 3656 1604  
 3657 1103  
 3660 0124  
 3661 0523  
 3662 4027

OPINS0, 0  
 .+3  
 DRVNO  
 -2  
 TEXT

"#OPI NOT SET ON GET STATUS WITH MAINT BIT 0 SET#"

WRNGHD, 6000  
 .+3  
 CA  
 -3  
 TEXT

"#HEADER WORD INDICATES WRONG HEAD SELECTED#"

3663 2217  
 3664 1607  
 3665 4010  
 3666 0501  
 3667 0440  
 3670 2305  
 3671 1405  
 3672 0324  
 3673 0504  
 3674 4300  
 3675 6000  
 3676 3701  
 3677 1763  
 3700 7775  
 3701 4310  
 3702 0501  
 3703 0423  
 3704 4016  
 3705 1724  
 3706 4017  
 3707 2605  
 3710 2240  
 3711 0331  
 3712 1411  
 3713 1604  
 3714 0522  
 3715 4060  
 3716 4001  
 3717 0624  
 3720 0522  
 3721 4003  
 3722 3103  
 3723 1405  
 3724 4025  
 3725 2043  
 3726 0000  
 3727 6000  
 3730 3733  
 3731 3100  
 3732 7774  
 3733 4310  
 3734 0501  
 3735 0423  
 3736 4015  
 3737 1123  
 3740 0114  
 3741 1107  
 3742 1605  
 3743 0443  
 3744 0000  
 3745 6000  
 3746 3751  
 3747 2462  
 3750 7776  
 3751 4305

NOTCY0, 6000  
 .+3  
 CYL  
 -3  
 TEXT

##HEADS NOT OVER CYLINDER 0 AFTER CYCLE UP#

HDMALN, 6000  
 .+3  
 HDCYHD  
 -4  
 TEXT

##HEADS MISALIGNED#

NEFWLK, 6000  
 .+3  
 DRVNO  
 -2  
 TEXT

##ERROR FLAG NOT SET AFTER WRITE TO WRITE LOCKED DRIVE#

3752 2222  
 3753 1722  
 3754 4006  
 3755 1401  
 3756 0740  
 3757 1617  
 3760 2440  
 3761 2305  
 3762 2440  
 3763 0106  
 3764 2405  
 3765 2240  
 3766 2722  
 3767 1124  
 3770 0540  
 3771 2417  
 3772 4027  
 3773 2211  
 3774 2405  
 3775 4014  
 3776 1703  
 3777 1305  
 4000 0440  
 4001 0422  
 4002 1126  
 4003 0543  
 4004 0000  
 4005 6000  
 4006 4011  
 4007 1730  
 4010 7774  
 4011 4322  
 4012 0501  
 4013 0431  
 4014 4023  
 4015 0524  
 4016 4024  
 4017 1717  
 4020 4023  
 4021 1717  
 4022 1640  
 4023 0106  
 4024 2405  
 4025 2240  
 4026 2305  
 4027 0513  
 4030 4300  
 4031 6000  
 4032 4122  
 4033 1730  
 4034 7774  
 4035 6000  
 4036 4041  
 4037 3040  
 4040 7773

RDY2SN, 6000

.+3

CACALL

-4

TEXT

\*READY SET TOO SOON AFTER SEEK#

RDYNS, 6000

NOTSET

CACALL

-4

NS5ASK, 6000

.+3

STATSS

-5

TEXT       "STATE NOT. 5 AFTER SEEK WITH 0 DIFFERENCE#"

4041 4323  
4042 2401  
4043 2405  
4044 4016  
4045 1724  
4046 4065  
4047 4001  
4050 0624  
4051 0522  
4052 4023  
4053 0505  
4054 1340  
4055 2711  
4056 2410  
4057 4060  
4060 4004  
4061 1106  
4062 0605  
4063 2205  
4064 1603  
4065 0543  
4066 0000  
4067 6000  
4070 4073  
4071 2462  
4072 7776  
4073 4304  
4074 2211  
4075 2605  
4076 4022  
4077 0501  
4100 0431  
4101 4023  
4102 2401  
4103 3105  
4104 0440  
4105 2305  
4106 2440  
4107 0106  
4110 2405  
4111 2240  
4112 1123  
4113 2325  
4114 1116  
4115 0740  
4116 0140  
4117 2305  
4120 0513  
4121 4300  
4122 4322  
4123 0501  
4124 0431  
4125 4016  
4126 1724  
4127 4023

RDYSSK, 6000  
+3  
DRVNO  
-2

TEXT       "DRIVE READY STAYED SET AFTER ISSUING A SEEK#"

NOTSET, TEXT       "READY NOT SET IN TIME AFTER SEEK#"

4130 0524  
 4131 4011  
 4132 1640  
 4133 2411  
 4134 1505  
 4135 4001  
 4136 0624  
 4137 0522  
 4140 4023  
 4141 0505  
 4142 1343  
 4143 0000  
 4144 6000  
 4145 3355  
 4146 3120  
 4147 7771  
 4150 6000  
 4151 4154  
 4152 3040  
 4153 7773  
 4154 4311  
 4155 1603  
 4156 1722  
 4157 2205  
 4160 0324  
 4161 4010  
 4162 0501  
 4163 0440  
 4164 2305  
 4165 1405  
 4166 0324  
 4167 0504  
 4170 4300  
 4171 6000  
 4172 4175  
 4173 2462  
 4174 7776  
 4175 4304  
 4176 2211  
 4177 2605  
 4200 4005  
 4201 2222  
 4202 1722  
 4203 4002  
 4204 1124  
 4205 4016  
 4206 1724  
 4207 4023  
 4210 0524  
 4211 4002  
 4212 3140  
 4213 2722  
 4214 1124  
 4215 0540  
 4216 0701

EFLGS2, 6000  
 EFSMES  
 ERCBCL  
 -7  
 INCHED, 6000  
 .+3  
 STATSS  
 -5  
 TEXT

"#INCORRECT HEAD SELECTED#"

DENSG, 6000  
 .+3  
 DRVND  
 -2  
 TEXT

"#DRIVE ERROR BIT NOT SET BY WRITE GATE ERROR#"

4217 2405  
4220 4005  
4221 2222  
4222 1722  
4223 4300  
4224 6000  
4225 4230  
4226 2472  
4227 7773  
4230 4304  
4231 2211  
4232 2605  
4233 4022  
4234 0501  
4235 0431  
4236 4016  
4237 1724  
4240 4023  
4241 0524  
4242 4001  
4243 0624  
4244 0522  
4245 4027  
4246 2211  
4247 2405  
4250 4024  
4251 1740  
4252 2722  
4253 1124  
4254 0540  
4255 1417  
4256 0313  
4257 0504  
4260 4004  
4261 2211  
4262 2605  
4263 4300  
4264 0000  
4265 0000  
4266 2350  
4267 7777  
4270 6000  
4271 4274  
4272 2472  
4273 7773  
4274 4304  
4275 2211  
4276 2605  
4277 4005  
4300 2222  
4301 1722  
4302 4016  
4303 1724  
4304 4023  
4305 0524

DRDYG, 6000  
.+3  
STATR  
-5  
TEXT

"#DRIVE READY NOT SET AFTER WRITE TO WRITE LOCKED DRIVE#"

PCONLY, 0  
0  
PC  
-1  
/NULL ERROR MESSAGE

DENSVO, 6000  
.+3  
STATR  
-5  
TEXT

"#DRIVE ERROR NOT SET BY VOLUME CHECK#"

4306 4002  
 4307 3140  
 4310 2617  
 4311 1425  
 4312 1505  
 4313 4003  
 4314 1005  
 4315 0313  
 4316 4300  
 4317 6000  
 4320 4323  
 4321 2353  
 4322 7772  
 4323 4322  
 4324 0523  
 4325 0524  
 4326 4004  
 4327 1104  
 4330 4016  
 4331 1724  
 4332 4022  
 4333 0523  
 4334 0524  
 4335 4004  
 4336 2211  
 4337 2605  
 4340 4300  
 4341 6000  
 4342 4345  
 4343 2534  
 4344 7773  
 4345 4323  
 4346 0505  
 4347 1340  
 4350 0601  
 4351 1114  
 4352 2522  
 4353 0543  
 4354 0000  
 4355 6000  
 4356 4345  
 4357 2557  
 4360 7772  
 4361 6000  
 4362 4365  
 4363 1715  
 4364 7775  
 4365 4307  
 4366 2501  
 4367 2204  
 4370 4002  
 4371 0116  
 4372 0440  
 4373 1617  
 4374 2440

NORESE, 6000  
 .+3  
 EXAC2  
 -6  
 TEXT

"#RESET DID NOT RESET DRIVE#"

SEKFAL, 6000  
 SKFAIL  
 CYLCA  
 -5

SKFAIL, TEXT  
 "#SEEK FAILURE#"

SKFALS, 6000  
 SKFAIL  
 CYLCAS  
 -6  
 GBAND, 6000  
 .+3  
 CA  
 -3  
 TEXT

"#GUARD BAND NOT DETECTED (READY NOT SET IN TIME)!"

4375 0405  
 4376 2405  
 4377 0324  
 4400 0504  
 4401 4050  
 4402 2205  
 4403 0104  
 4404 3140  
 4405 1617  
 4406 2440  
 4407 2305  
 4410 2440  
 4411 1116  
 4412 4024  
 4413 1115  
 4414 0551  
 4415 4300  
 4416 6000  
 4417 4422  
 4420 2515  
 4421 7774  
 4422 4303  
 4423 3114  
 4424 1116  
 4425 0405  
 4426 2240  
 4427 1617  
 4430 2440  
 4431 0317  
 4432 2222  
 4433 0503  
 4434 2440  
 4435 0106  
 4436 2405  
 4437 2240  
 4440 2305  
 4441 0513  
 4442 4011  
 4443 1624  
 4444 1740  
 4445 0725  
 4446 0122  
 4447 0440  
 4450 0201  
 4451 1604  
 4452 4300  
 4453 6000  
 4454 4457  
 4455 2607  
 4456 7773  
 4457 4323  
 4460 0503  
 4461 2417  
 4462 2240  
 4463 1725

NCAGB, 6000

.+3

CYLMSG

-4

TEXT

HP 006

"#CYLINDER NOT CORRECT AFTER SEEK INTO GUARD BAND#"

RANGSE, 6000

.+3

CALHDR

-5

TEXT

"#SECTOR OUT OF RANGE#"



4464 2440  
4465 1706  
4466 4022  
4467 0116  
4470 0705  
4471 4300

HP 001  
/THIS TEXT IS NOT USED WITH THE RL02  
/ RANGCY, 6000  
/ .+3  
/ CALHDR  
/ -5  
/ TEXT \*CYLINDER OUT OF RANGE\*

4473 4476  
4474 2633  
4475 7771  
4477 0521  
4500 2505  
4501 1624  
4502 1101  
4503 1440  
4504 1005  
4505 0104  
4506 0522  
4507 2340  
4510 1617  
4511 2440  
4512 0123  
4513 4005  
4514 3020  
4515 0503  
4516 2405  
4517 0443  
4520 0000  
4521 6000  
4522 3355  
4523 2670  
4524 7771  
4525 6000  
4526 4531  
4527 2670  
4530 7771  
4531 4305  
4532 2240  
4533 1617  
4534 2440  
4535 0123  
4536 4005  
4537 3020  
4540 0503

ERFSSTA, 6000  
EFSMES  
STAECC  
-7  
ERINC, 6000  
-7  
STAECC  
-7  
TEXT

\*ER NOT AS EXPECTED BUT ERROR FLAG NOT SET\*

4541 2405  
 4542 0440  
 4543 0225  
 4544 2440  
 4545 0522  
 4546 2217  
 4547 2240  
 4550 0614  
 4551 0107  
 4552 4016  
 4553 1724  
 4554 4023  
 4555 0524  
 4556 4300  
 4557 6000  
 4560 4563  
 4561 2764  
 4562 7771  
 4563 4310  
 4564 0501  
 4565 0405  
 4566 2240  
 4567 2717  
 4570 2204  
 4571 2340  
 4572 6340  
 4573 4640  
 4574 6440  
 4575 1617  
 4576 2440  
 4577 3205  
 4600 2217  
 4601 4300  
 4602 6000  
 4603 4606  
 4604 1750  
 4605 7775  
 4606 4316  
 4607 1740  
 4610 0314  
 4611 1703  
 4612 1340  
 4613 5017  
 4614 2011  
 4615 4023  
 4616 0524  
 4617 4017  
 4620 1640  
 4621 0705  
 4622 2440  
 4623 2324  
 4624 0124  
 4625 2523  
 4626 5143  
 4627 0000

BAD34. 6000  
 .+3  
 HDR4  
 -7  
 TEXT

##HEADER WORDS 3 & 4 NOT ZERO##

NOCLK. 6000  
 .+3  
 ER  
 -3  
 TEXT

##NO CLOCK (OPI SET ON GET STATUS)##

4630 6000 NORDY3, 6000  
 4631 4634 .+3  
 4632 2724 STECCC  
 4633 7770 -10  
 4634 4322 TEXT  
 4635 0501  
 4636 0431  
 4637 4016  
 4640 1724  
 4641 4023  
 4642 0524  
 4643 4027  
 4644 1124  
 4645 1011  
 4646 1640  
 4647 6340  
 4650 2305  
 4651 0317  
 4652 1604  
 4653 2343  
 4654 0000  
 4655 6000  
 4656 4122  
 4657 2403  
 4660 7773  
 4661 6000  
 4662 4665  
 4663 1750  
 4664 7775  
 4665 4317  
 4666 2011  
 4667 4016  
 4670 1724  
 4671 4023  
 4672 0524  
 4673 4017  
 4674 1640  
 4675 0705  
 4676 2440  
 4677 2324  
 4700 0124  
 4701 2523  
 4702 4050  
 4703 0104  
 4704 0422  
 4705 0523  
 4706 2340  
 4707 2014  
 4710 2507  
 4711 4017  
 4712 2524  
 4713 5143  
 4714 0000  
 4715 6000  
 4716 4721

"#READY NOT SET WITHIN 3 SECONDS!"

RNSAS2, 6000  
 NOTSET  
 CYLB4  
 -5  
 OPINS, 6000  
 .+3  
 ER  
 -3  
 TEXT

"#OPI NOT SET ON GET STATUS (ADDRESS PLUG OUT)!"

NODSER, 6000  
 .+3

4717	3020	STATUS	
4720	7774	-4	
4721	4304	TEXT	"#DRIVE SELECT ERROR NOT SET#"
4722	2211		
4723	2605		
4724	4023		
4725	0514		
4726	0503		
4727	2440		
4730	0522		
4731	2217		
4732	2240		
4733	1617		
4734	2440		
4735	2305		
4736	2443		
4737	0000		
4740	6000	DSERES, 6000	
4741	4744	.+3	
4742	3020	STATUS	
4743	7774	-4	
4744	4304	TEXT	"#DRIVE SELECT ERROR WOULD NOT RESET#"
4745	2211		
4746	2605		
4747	4023		
4750	0514		
4751	0503		
4752	2440		
4753	0522		
4754	2217		
4755	2240		
4756	2717		
4757	2514		
4760	0440		
4761	1617		
4762	2440		
4763	2205		
4764	2305		
4765	2443		
4766	0000		
4767	6000	DENASE, 6000,	
4770	4773	.+3	
4771	2472	STATR	
4772	7773	-5	
4773	4304	TEXT	"#DRIVE ERROR NOT ASSERTED BY DRIVE SELECT ERROR#"
4774	2211		
4775	2605		
4776	4005		
4777	2222		
5000	1722		
5001	4016		
5002	1724		
5003	4001		
5004	2323		
5005	0522		

5006 2405  
5007 0440  
5010 0231  
5011 4004  
5012 2211  
5013 2605  
5014 4023  
5015 0514  
5016 0503  
5017 2440  
5020 0522  
5021 2217  
5022 2243  
5023 0000

NORDBS, TEXT      "#CAN'T READ BAD SECTOR FILE ON DRIVE: "

5024 4303  
5025 0116  
5026 4724  
5027 4022  
5030 0501  
5031 0440  
5032 0201  
5033 0440  
5034 2305  
5035 0324  
5036 1722  
5037 4006  
5040 1114  
5041 0540  
5042 1716  
5043 4004  
5044 2211  
5045 2605  
5046 7240  
5047 4000  
5050 4324  
5051 1717  
5052 4015  
5053 0116  
5054 3140  
5055 0201  
5056 0440  
5057 2305  
5060 0324  
5061 1722  
5062 2340  
5063 1716  
5064 4004  
5065 2211  
5066 2605  
5067 7240  
5070 4000  
5071 4320  
5072 0103  
5073 1340

DRVMSG, TEXT      "#TOO MANY BAD SECTORS ON DRIVE: "

PAKBAD, TEXT      "#PACK HAS MORE THAN 16 BAD SECTORS!!!"

5074	1001	
5075	2340	
5076	1517	
5077	2205	
5100	4024	
5101	1001	
5102	1640	
5103	6166	
5104	4002	
5105	0104	
5106	4023	
5107	0503	
5110	2417	
5111	2223	
5112	4141	
5113	4100	
5114	4305	
5115	3005	
5116	0325	
5117	2405	
5120	4024	
5121	0503	
5122	1055	
5123	1501	
5124	2405	
5125	4010	
5126	0501	
5127	0440	
5130	0114	
5131	1107	
5132	1615	
5133	0516	
5134	2440	
5135	2405	
5136	2324	
5137	4077	
5140	0000	
5141	4324	
5142	0503	
5143	1055	
5144	1501	
5145	2405	
5146	4010	
5147	0501	
5150	0440	
5151	0114	
5152	1107	
5153	1615	
5154	0516	
5155	2440	
5156	2405	
5157	2324	
5160	4004	
5161	2211	
5162	2605	

  

SPCALN, TEXT	"#EXECUTE TECH-MATE HEAD ALIGNMENT TEST ?"
5074	1001
5075	2340
5076	1517
5077	2205
5100	4024
5101	1001
5102	1640
5103	6166
5104	4002
5105	0104
5106	4023
5107	0503
5110	2417
5111	2223
5112	4141
5113	4100
5114	4305
5115	3005
5116	0325
5117	2405
5120	4024
5121	0503
5122	1055
5123	1501
5124	2405
5125	4010
5126	0501
5127	0440
5130	0114
5131	1107
5132	1615
5133	0516
5134	2440
5135	2405
5136	2324
5137	4077
5140	0000
5141	4324
5142	0503
5143	1055
5144	1501
5145	2405
5146	4010
5147	0501
5150	0440
5151	0114
5152	1107
5153	1615
5154	0516
5155	2440
5156	2405
5157	2324
5160	4004
5161	2211
5162	2605

  

HDALNT, TEXT	"#TECH-MATE HEAD ALIGNMENT TEST DRIVE: "
5074	1001
5075	2340
5076	1517
5077	2205
5100	4024
5101	1001
5102	1640
5103	6166
5104	4002
5105	0104
5106	4023
5107	0503
5110	2417
5111	2223
5112	4141
5113	4100
5114	4305
5115	3005
5116	0325
5117	2405
5120	4024
5121	0503
5122	1055
5123	1501
5124	2405
5125	4010
5126	0501
5127	0440
5130	0114
5131	1107
5132	1615
5133	0516
5134	2440
5135	2405
5136	2324
5137	4077
5140	0000
5141	4324
5142	0503
5143	1055
5144	1501
5145	2405
5146	4010
5147	0501
5150	0440
5151	0114
5152	1107
5153	1615
5154	0516
5155	2440
5156	2405
5157	2324
5160	4004
5161	2211
5162	2605

5163 7240  
5164 0000

5200 \*BUFFER  
5200 0000 ZBLOCK 240  
5440 \*BADSEC  
5440 0000 ZBLOCK 40

0000 FIELD 0





[illegible]

0200. \*200  
S

ALLHED	0161	CNTGRT	4745	DATA6	0126	END18B	2423
ALNSUP	1574	CNTRLC	5166	DATCNT	4540	END19A	2465
APCHK	4443	CNTRLF	4452	DATLUP	4461	END19B	2522
APTERR	4526	CNTRLG	4451	DATTAB	4541	END19C	2564
APTOP1	0472	CNTRLQ	4642	DEFSET	0476	END19D	2626
APTSET	0437	CNTRLS	4640	DENASE	4767	END2	0676
AREHD	6563	COLON	2021	DENSVO	4270	END20A	2703
ASKSUR	0400	CUN14A	2031	DENSWG	4171	END20B	2760
ATHI28	4304	CUN17A	2263	DEVCOU	0146	END21	3045
ATLO27	4103	CON20A	2672	DIFADD	2772	END22	3133
AUTO10	0010	CON20B	2747	DIFTAB	7157	END23	3245
AUTO11	0011	CON21A	3031	DIGCNT	5640	END24A	3345
BAD34	4557	CON22A	3117	DIGIN	4746	END24B	3457
BADCHK	7400	CON23A	3231	DIGITS	5637	END25	3525
BADCNT	4165	CON24A	3332	DIRODF	3721	END26	3744
BADPNT	7551	CON24B	3444	DIR126	3710	END27	4127
BADPRO	7463	CON25A	3511	DIR127	4117	END28	4323
BADSEC	5440	CON26A	3652	DIR128	4313	END3	1122
BADSTA	3177	CON26B	3740	DIRIC	3700	END4	1243
BADSTS	3224	CON27A	4072	DIRIDF	3731	END5	1307
BADSNT	3761	CON27B	4120	DLUP15	2140	END6	1543
BADTRK	7556	CON28A	4273	DNTP15	2170	END7	1611
BDS	3203	CON28B	4314	DONE6	1520	ENOVAL	1363
BHNOT0	3413	CON3A	0745	DRDINS	3462	ENTLIS	6017
BRHOML	1003	CON3B	0763	DRDYST	3230	ENTRET	6021
BRUSHC	0003	CON3C	1034	DRDYM	4224	ENTVAL	4454
BRUSHH	0010	CON3D	1062	DRNLOD	2320	EOP	4342
BSECAD	7552	CON3E	1077	DRODR	4561	EOPNES	1520
BSFER1	3147	CON4B	1203	DROPNG	1136	ER	1750
BSFER2	3350	CON4C	1227	DRPCHK	4467	ERCBCL	3120
BSFLP1	7465	CON6A	1447	DRSLER	0001	ERFLGS	3351
BSFNUM	4164	CONRET	4643	DRSLFL	0156	ERINC	4525
BSW	7002	CONSOLE	4447	DRVOER	6167	ERLMS	0425
BUFADR	4163	COVERO	0040	DRVACT	3364	ERNSVO	3433
BUFFER	5200	CRCHK	1321	DRVCNT	0145	ERRCHK	4475
BUFPNT	7554	CRLF	4512	DRVLUP	0236	ERRFLG	0130
CA	1715	CRLFSV	5074	DRVMSG	5050	ERRLIM	0150
CACALL	1730	CTLF	4634	DRVNO	2462	ERROR	4446
CAF	6007	CTLG	4636	DRVNUM	0120	ERRPC	0117
CALHDR	2607	CURCYL	0133	DRVRDY	1557	ERRTP	4543
CANTRS	2304	CURPRE	2633	DSERES	4740	ESIA	6055
CANRET	5627	CYL	1763	DSERFL	0157	EXAC2	2353
CASAV1	5767	CYLB4	2403	EFLGS2	4144	EXAC2S	2426
CASAVE	6711	CYLCA	2534	EFSMES	3355	EXDRSL	0155
CHARSV	\$053	CYLCAS	2557	EFSSTA	4521	EXDSER	0160
CHKCYL	6350	CYLLP1	7406	END1	0631	EXHDAL	1243
CHKERR	6546	CYLMMSG	2515	END11	1624	EXIT	1657
CHKLUP	6400	DATA1	0121	END12	1635	EXMAIN	1325
CHKOK	5014	DATA2	0122	END13	1732	EXPCYL	6754
CHKSEK	7427	DATA3	0123	END14	2067	EXTCHK	7424
CNMWDY	2335	DATA4	0124	END17	2341	FATAL	3300
CNTFRT	4674	DATA5	0125	END18A	2367	FATLER	2273

FILLEQ 1532	INCHED 4150	K4001 0175	MESCNT 5266
FILLER 0023	INFLG 4747	K5 5641	MESLUP 5231
FIDBAD 7541	INSIDN	K5002 1754	MESSAV 5267
FRSTDR 0526	IOT0 5273	K6001 0176	MILLIS 2025
FSTTST 0564	IOT1 5276	K7 0170	MKNCYL 3161
GBAND 4361	IOT10 5322	K7000 6023	MODE8 1000
GETBSF 3541	IOT11 5325	K7002 3347	MDL 7421
GETCYL 4467	IOT12 5330	K77 5263	NCAGB 4416
GETNUM 4455	IOT13 5333	K7757 0565	NCHKR 6562
GETRES 4453	IOT14 5336	K777 6755	NEFWLK 3745
GETSR 4442	IOT15 5341	KCC 6032	NERRET 5456
GETSTA 4460	IOT17 5344	KCF 6030	NEWCYL 7443
GOHB24 3405	IOT2 5303	KIE 6035	NO 5661
GOHI22 3102	IOT3 5306	KSF 6031	NOCLK 4602
GOHI24 3273	IOT4 5311	LASTCY 0132	NOCONS 1355
GOHI25 3474	IOT5 5314	LASTIN 0143	NODRVS 3156
GOL021 3014	IOT7 5317	LASTSE 6365	NODSER 4715
GOL023 3214	IOTCNG 0513	LIMEXC 1110	NOFL17 2337
GOL026 3626	IOTLUP 0515	LIMITS 0337	NOIN 4717
GOTDR6 1441	IOTTAB 7444	LISN 4503	NOLP27 4125
GROSCCT 5574	IREQ6 1426	LISN1 5130	NOLP28 4321
GRSCNT 5575	JMPPM1 4476	LISN2 5141	NOPMES 5425
GTNMLP 5605	JMPUP 5413	LISN3 5154	NOPRNT 0141
HCW1 0021	K0777 0166	LISNUM 5144	NORDBS 5024
HCW2 0022	K10 5165	LLLTHL 1413	NORDY3 4630
HD0SPU 3503	K100 0174	LNFEED 4740	NORESE 4317
HD126 3674	K1000 0167	LODHED 0002	NOTCYO 3675
HD1CHK 6701	K1001 1752	LOLIM 0151	NOTRIT 6467
HDALNT 5141	K1002 1753	LOOP6 1454	NOTSET 4122
HDCYHD 3100	K1004 1755	LOOPPT 0127	NOTST2 3366
HDNALN 3727	K100A 5271	LPRQST 0131	NOTST6 3561
HDR4 2764	K10A 4560	LUPSET 4423	NS5ASK 4035
HDRCNT 6364	K140 2172	M1 0173	NXTDRV 4324
HDRER1 6475	K144 6134	M203 5164	OFFSET 4166
HDRER2 6513	K15 0171	M207 4617	OK2TYP 5040
HDRLUP 6253	K177 5161	M212 5162	ONLISN 4616
HDRRET 6347	K20 5055	M223 5054	OPINS 4661
HDRVFI 4465	K200 0163	M270 5152	OPINSO 3606
HDEL 1354	K2001 0177	M3 5163	OPR1 1053
HDSLCT 0100	K212 5073	M4 0172	OPR2 1025
HEAD1 2000	K215 5072	M400 1567	OPR3 1076
HEDALN 0154	K24 0566	M404 6041	OPT1 0144
HEDBOX 0162	K240 5265	M43 5264	OPTIIV 1146
HEDCUR 0100	K260 5222	M47 6366	OS8 5173
HEDGAN 1333	K2777 6136	M5 5642	OSCIL 0140
HEDOUT 0020	K3 6135	M50 6363	P2SAVE 5011
HEDSAV 5766	K300 0563	MANDEC 1000	P4SAVE 4773
HILIM 0152	K377 0165	MANINT 0153	PAKBAD 5071
HLCHK 4515	K3A 5270	MES17 2246	PAPTIM 4542
ILUP27 4042	K4 1566	MESAGE 4504	PASCNT 0142
ILUP28 4243	K400 0164	MESAGX 5223	PC 2350
IMPINT 5410	K4000 6237	MESBSW 5244	

PCINT	3064	RRR	4433	SPL	6102	TEST20	2627
PCONLY	4264	RRSA	4437	SPNRPT	1776	TEST21	3000
PDRVOE	4557	RRSI	4440	SPQSP	1134	TEST22	3066
PERIOD	2024	RRWC	4434	SPUPTO	0010	TEST23	3200
PERNUM	4556	SAVECA	6362	SRQ	6003	TEST24	3266
PIOTS	0562	SAVECA	7553	STAILP	0750	TEST25	3460
PLSMNR	1552	SCNINT	4514	STASUN	3530	TEST26	3600
PLUGNR	2255	SCOP13	1735	STACHK	4461	TEST27	4000
PLWRLK	1662	SCOP17	2343	STAECC	2670	TEST28	4207
POWER	3144	SCOP21	3065	STALP4	1143	TEST3	0677
PRNT1	4505	SCOP22	3145	STAT4R	2472	TEST4	1123
PRNT2	4506	SCOP23	3265	STATSS	3040	TEST5	1252
PRNT4	4507	SCOP25	3537	STATUS	3020	TEST6	1400
PSWR	0020	SCOP4	1251	STAECC	2724	TEST7	1544
PWR10	7152	SCOPE	4445	SURFAC	0147	TEST9	1612
PWRFAL	5400	SCOPIN	0552	SURNES	0411	TICK	4444
PWRUP	5414	SECCNT	7550	SVECYL	1353	-TIE	6045
QESMRK	1516	SEK	4463	SWRMSG	1540	TIKRET	5210
RANGSE	4453	SEEK1V	4502	T13LUP	1654	TIMCHK	4474
RDBSF	4131	SEEK1V	4502	T14CON	2000	TIMCNT	5573
RHDTO	1312	SEEK1V	4502	T15CON	2200	TIMRET	5566
RDY17	2332	SEEK1V	4501	T16HDI	2214	TOCK	5213
RDY2SN	4005	SEEK1V	4501	T18HDI	2400	TOEXIT	2127
RDYNS	4031	SEKBAK	4466	T19CON	2600	TOOBAD	7547
RDYSSK	4067	SEKBOK	6234	T19HDI	2523	TOOMNY	5634
RDYWAT	4477	SEKBSF	1756	T20ATO	2645	TSTDV	1126
READY	1546	SEKBSF	1756	T20ATO	2645	TSTLUP	1270
RECAL	6756	SEKBSF	1756	T20HDI	2704	TWOSPA	1544
REDHDI	4464	SEKBSF	1756	T24ATO	3305	TYP15	2165
REDHDI	4464	SEKBSF	1756	T24HDI	3400	UNLOAD	1564
REPLPL	2074	SEKBSF	1756	T3CON	1000	UNLODH	0006
RESET	4457	SEKBSF	1756	T4CON	1200	UPARG	4450
RESPON	5666	SEKBSF	1756	T7CON	1600	UPARRC	1526
RESRET	5664	SEKBSF	1756	TABENT	4537	UPARRG	1530
RETSET	4420	SEKBSF	1756	TCRWDN	2061	US1SUR	1437
RL02ID	0200	SEKBSF	1756	TEMP1	0134	USALHD	1231
RLCA	4427	SEKBSF	1756	TEMP2	0135	USE62	1214
RLCB	4430	SEKBSF	1756	TEMP3	0136	USEALL	0461
RLDC	4424	SEKBSF	1756	TEMP4	0137	USEDEF	1164
RLMA	4426	SEKBSF	1756	TEMPX	7555	USLOLM	1347
RLSA	4431	SEKBSF	1756	TEST1	0600	USUPLM	1377
RLSD	4425	SEKBSF	1756	TEST11	1615	VOLUME	0002
RLSE	4441	SEKBSF	1756	TEST12	1625	VT278	4513
RLWC	4432	SEKBSF	1756	TEST13	1636	VTCHK	4516
RLWREN	1677	SEKBSF	1756	TEST14	1736	WAIT1	6030
RNSAS2	4655	SEKBSF	1756	TEST15	2070	WAIT5	6042
RQSRGT	6071	SEKBSF	1756	TEST16	2206	WAT300	7142
RQST27	4066	SEKBSF	1756	TEST17	2224	WD1POR	6367
RQST28	4267	SEKBSF	1756	TEST18	2344	WD34N0	6531
RQSTRY	4470	SEKBSF	1756	TEST19	2424	WLKSEL	1617
RRCA	4435	SEKBSF	1756	TEST2	0632	WRDERR	0200
RRCB	4436	SEKBSF	1756				

WRENWT 4471  
WRERET 6112  
WRGATE 0004  
WRLOCK 0040  
WRNGHD 3643  
WZITFG 4456  
XAPTCH 7354  
XCONSO 4600  
XCRLF 5056  
XCTRLF 4644  
XCTRLG 4705  
XDSEME 1304  
XDSMES 1266  
XENTVA 6000  
XERRCH 5441  
XERROR 4432  
XGETCY 6157  
XGETNU 5600  
XGETRE 5643  
XGETSR 6537  
XGETST 5474  
XHDRVF 6240  
XJMPPM 5364  
XLISN 5075  
XPRNT1 5215  
XPRNT2 5000  
XPRNT4 4762  
XRDYWA 7056  
XREDHD 6137  
XRESET 5461  
XRLCA 5305  
XRLCB 5310  
XRLDC 5272  
XRLMA 5302  
XRLSA 5313  
XRLSD 5275  
XRLSE 5343  
XRLWC 5316  
XRQSTR 6051  
XRRCA 5327  
XRRCB 5332  
XRRER 5321  
XRRSA 5335  
XRRSI 5340  
XRRWC 5324  
XSCNIN 7074  
XSCOPE 4400  
XSEEK 6113  
XSEEK1 7000  
XSEKV 6712  
XSEK1C 5667  
XSEKBA 6200

XSETIN 7101  
XSETTI 5515  
XSTACH 5350  
XTICK 5200  
XTIMCH 5543  
XTYPE 5012  
XUPARG 4675  
XVT278 5770  
XVCHK 7115  
XWRENW 6072  
XWZITF 4750  
XYNOTR 7200  
XZSEK 6600  
YES 5660  
YESIN 4723  
YNCMRY 7137  
YNCNTR 7131  
YNCONA 7224  
YNCONB 7242  
YNCONC 7304  
YNCOND 7333  
YNCONE 7123  
YNEXIT 7345  
YNFATL 7126  
YNLOAD 7134  
YNOTRY 4500  
ZSEKCH 4462  
ZSEKER 6710  
ZSKCOC 6665  
ZSKCON 6651