IDENTIFICATION

PRODUCT CODE:	MAINDEC-08-DHRKB-E-D
PRODUCT NAME:	RK8E DRIVE CONTROL TEST
DATE CREATED:	JANUARY 15, 1975
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	JOHN WROBEL

COPYRIGHT (C) 1972,1973,1974, DIGITAL EQUIPMENT CORP., MAYNARD, MASS.

THIS SOFTWARE IS FURNISHED TO PURCHASER UNDER A LICENSE FOR USE ON A SINGLE COMPUTER SYSTEM AND CAN BE COPIED (WITH INCLUSION OF DEC'S COPYRIGHT NOTICE) ONLY FOR USE IN SUCH SYSTEM, EXCEPT AS MAY OTHERWISE BE PROVIDED IN WRITING BY DEC.

THE INFORMATION IN THIS DOCUMENT IS SUBJECT TO CHANGE WITHOUT NOTICE AND SHOULD NOT BE CONSTRUED AS A COMMITMENT BY DIGITAL EQUIPMENT CORPORATION.

DEC ASSUMES NO RESPONSIBILITY FOR THE USE OR RELIABILITY OF ITS SOFTWARE ON EQUIPMENT WHICH IS NOT SUPPLIED BY DEC.

TABLE OF CONTENTS

1. ABSTRACT

2. REQUIREMENTS

2.1 HARDWARE

2.2 STORAGE

3. PRELIMINARY PROGRAMS

4. SWITCH REGISTER SETTINGS

5. OPERATOR AND/OR PROGRAM ACTION

5.1 STANDARD TEST PROCEDURE

5.2 RK05 DRIVE CARTRIDGE MOUNTING PROCEDURE

5.3 DRIVE CONTROL TEST (SINGLE DRIVE TESTING)

5.4 DRIVE CONTROL TEST (MULTI DRIVE TESTING)

5.5 CHECK WRITE PROTECT (MANUAL)

5.6 CHECK WRITE PROTECT (PROGRAM CONTROL)

5.7 MANUAL FUNCTIONS (FOR TROUBLE SHOOTING ONLY)

5.8 CHANGE PROGRAM IOT CODES

5.9 SETH FROM SWITCHES (FOR RK05 ALIGNMENT)

6. ERRORS

6.1 USEFUL ERROR INFORMATION

6.2 NON-RECOVERABLE ERROR HALTS

6.3 RECOVERABLE ERROR HALT

6.4 ERROR TYPEOUTS

6.5 SCOPE LOOPS

6.6 TYPICAL ERROR TYPEOUTS

7. RESTRICTIONS

8. TROUBLE SHOOTING INFORMATION

9. PROGRAM DESCRIPTION

10. PROGRAM LISTING

1. ABSTRACT

THE RK8E DRIVE CONTROL TEST IS DESIGNED FOR THE PURPOSE OF CHECKOUT OF THE RK8E DISK CONTROL LOGIC REQUIRING THE USE OF THE DISK DRIVE(S).

IN GENERAL, THE TEST IS AN INSTRUCTION TEST TO VERIFY BASIC OPERATION OF THE SEEK ONLY, SEEKS+R/W DATA, READ DATA, WRITE ALL, AND READ ALL FUNCTIONS WITH ALL DRIVES ON THE CONTROL. STATIC COMPLEMENT DATA PATTERNS OF 2525 + 5252, 5257 + 2525, AND 0000 + 7777 ARE USED TO VERIFY ADDRESSING AND DATA TRANSFERS TO AND FROM EACH INDIVIDUAL DRIVE.

A MANUAL INTERVENTION TEST IS ALSO INCLUDED (SEE SECTION 3.7), TO ALLOW THE OPERATOR TO SELECT DATA PATTERNS AND COMMAND FUNCTIONS VIA THE SWITCH REGISTER.

CONSIDERING NO ERROR CONDITIONS, THE DRIVES THAT HAVE RUN THIS TEST ARE FORMATTED, IF THE PROGRAM HAS STOPPED AT END OF PROGRAM PASS COMPLETION BY SWR8=1.

2. REQUIREMENTS

2.1 HARDWARE

A. PDP-8/A, 8/E, 8/F, OR 8/M COMPUTER OR OTHER FAMILY OF 8 COMPATIBLE COMPUTER WITH NECESSARY DWRC BUS ADAPTER.

B. AT LEAST 4K OF READ/WRITE MEMORY

C. ASR-33 TELETYPE OR EQUIVALENT

D. RK8E DISK CONTROL

E. RK05 DISK DRIVE(S)

F. UNFORMATTED OR FORMATTED 2200 BPI-1600 SECTOR PACK(S)

2.2 STORAGE

THE PROGRAM OCCUPIES OR UTILIZES LOCATION 0000 TO LOCATION 7400 OF THE CURRENT FIELD. IF THE CURRENT FIELD IS AN EXTENDED MEMORY FIELD, LOCATIONS 0000 TO 0063 OF FIELD 0, WILL BE USED FOR PROGRAM INTERRUPT SERVICE.

3. PRELIMINARY PROGRAMS

ALL BASIC AND EXTENDED MEMORY DIAGNOSTICS AND THE RK8E DISKLESS CONTROL TEST SHOULD BE RUN PRIOR TO THIS TEST.

4. SWITCH REGISTER SETTINGS

SWR0=1 — SCOPE LOOP ON ERROR. AFTER AN ERROR HALT AT LOCATION PERHLTR, RAISING THIS SWITCH AND PRESSING KEY CONTINUE WILL RESULT IN A SCOPE LOOP ON ANY CURRENT FAILING TEST. IF THE TEST CONTINUES TO FAIL, THE ERROR TYPEOUT AND THE ERROR HALT AT LOCATION PERHLTR WILL BE INHIBITED. ONLY THE BELL WILL RING INDICATING AN ERROR OF SWR2=1.

SWR1=1 — SCOPE LOOP ON CURRENT NON-FAILING TEST. RAISING THIS SWITCH CAUSES THE PROGRAM TO LOOP ON THE CURRENT TEST IF THE TEST IS RUNNING CORRECTLY. MAY BE USED IN CONJUNCTION WITH SWR0=1 FOR INTERMITTENT PROBLEMS.

SWR2=1 — INHIBIT BELL ON SCOPE LOOP. WHEN IN A SCOPE LOOP DUE TO SWR0=1, RAISING THIS SWITCH INHIBITS THE SCOPE LOOP ERROR BELL.

SWR3=1 — TEST ON CURRENT DRIVE. UPON INITIAL START IN PROGRAM, WHEN "SINGLE DRIVE" TOG IDON, RAISING THIS SWITCH ENABLES THE PROGRAM TO TEST THE DISK DRIVE IN SWITCH-11. WHEN RUNNING THE PROGRAM AND MULTI-DRIVE TESTING, RAISING THIS SWITCH INDICATES TO THE PROGRAM TO CONTINUE TO TEST THE CURRENT DRIVE UNDER TEST.

SWR4=1 — STOP PROGRAM OR HALT SWITCH. RAISING THIS SWITCH WILL RESULT IN A PROGRAM STOP UPON COMPLETION OF THE NEXT FOLLOWING TEST. IF PROGRAM, THIS SWITCH SHOULD ALWAYS BE USED TO STOP THE PROGRAM.

SWR5=1 — INHIBIT THE RECOVERABLE ERROR HALT AFTER A RECOVERABLE ERROR TYPEOUT. AFTER AN ERROR HALT AT LOCATION PERHLTR, RAISING THIS SWITCH AND PRESSING KEY CONTINUE WILL INHIBIT ALL FUTURE RECOVERABLE ERROR HALTS. IF SWR1=0 THE PROGRAM WILL PROCEED TO NEXT TEST AFTER EACH ERROR TYPEOUT. IF SWR1=1 THE PROGRAM WILL PROCEED BACK TO THE SAME OR CURRENT FAILING TEST.

14. CONTD.)

SWR6=1	RECALIBRATE IN SCORE LOOPS. RAISING THIS SWITCH WILL RESULT IN A DISK RECALIBRATION WHEN THE SCORE LOOP DIE IS SWR6=1, SWR5=1, OR WHEN SWR5=1.
SWR7=1	PROGRAM WAIT LOOP FOR DISK IN SCORE LOOPS. RAISING THIS SWITCH WILL RESULT IN A PROGRAM WAIT LOOP FOR DISK. THE JOB WILL WAIT IN A SCORE LOOP DIE IF SWR5=1, SWR6=1, OR WHEN SWR5=1, IN SOME CASES. THIS MAY BE USEFUL FOR WAITING FOR THE DISK MOVEMENT TO COMPLETE IF CONTROL OR DRIVE ERRORS OCCUR, BEFORE RETRYING THE TEST AGAIN. IN SOME CASES, FAILURE TO WAIT MAY CAUSE ADDITIONAL ERRORS.
SWR8=1	GET ALL REGISTERS AFTER THE RECOVERABLE ERROR HALT TERMINATES. AFTER AN ERROR HALT AT LOCATION 000017, INCREMENT THE SWITCH AND PRESSING KEY CONTINUE RESULTS IN AN ERROR TYPEOUT OF THE ACTUAL CONTENTS OF THE CRC, STATUS, COMMAND, LOWER DATA, AND SURFACE AND SECTOR REGISTERS.
SWR9=1	PROGRAM HALT OR STOP AT END OF PROGRAM PASS COMPLETION.
SWR10-11	DISK DRIVE(S) TO TEST. IN MULTI-DRIVE TESTING, INDICATES TO THE PROGRAM THE ACTUAL AMOUNT OF NON-EXISTING DRIVES AND THE AMOUNT OF DRIVES NUMBERED SEQUENTIALLY FROM DRIVE 0 TO TEST. IN SINGLE DRIVE TESTING, UPON INITIAL START OF PROGRAM, AND IF SWR8=1, INDICATES TO THE PROGRAM THE DRIVE TO TEST.

[illegible]

[illegible]

A. START AS PROCEDURE [illegible] DOCUMENTS [illegible] [illegible] AND [illegible]

B. LOAD THE PROGRAM [illegible] [illegible] [illegible] [illegible]

C. [illegible] PROGRAM, FOLLOW THE PROCEDURE [illegible]

D. RUN THE DRIVE CONTROL [illegible] METHOD, [illegible]

E. THE PROGRAM [illegible] DISK [illegible]

F. RUN THE [illegible] ON ALL [illegible] AND [illegible]

G. NORMAL FUNCTIONS, SOLUTION [illegible] WAY OF [illegible] UNPOSING [illegible]

H. SEEN FROM [illegible] POSSIBLE SHOT[illegible]

I. IF THE PROGRAM WAS STOPPED BY SUPPORT OR BY [illegible], [illegible] LAST SUPPORT EXECUTED, [illegible]

5.0 SKED DRIVE CARTRIDGE MOUNTING PROCEDURE

THE FOLLOWING IS THE CORRECT CARTRIDGE MOUNTING PROCEDURE FOR THE PRAM DISK DRIVE. ALL DISKETTE MOUNTING PROCEDURES WILL BE CONSIDERED AS AN ERROR UNTIL THIS PROCEDURE HAS BEEN COMPLETED.

A. SET SWITCH LABELED "RUN/LOAD" TO THE "LOAD" POSITION.

B. TURN AC POWER TO DISK DRIVE ON.

C. VERIFY THAT LIGHT LABELED "READY" IS ON.

D. WAIT FOR LIGHT LABELED "LOAD" TO GO OFF.

E. VERIFY THAT LIGHTS LABELED "READY", "WRITE PROT", "FAULT", "WRITE", AND "ROD" ARE OFF.

F. OPEN ACCESS DOOR.

G. INSERT CARTRIDGE.

H. CLOSE ACCESS DOOR.

I. SET SWITCH LABELED "RUN/LOAD" TO THE "RUN" POSITION.

J. WAIT FOR THE LIGHTS LABELED "READY" AND "ROD" ONLY TO COME ON.

K. TOGGLE SWITCH LABELED "WT PROT" AND VERIFY THAT THE LIGHT LABELED "WT PROT" GOES ON AND OFF.

L. TOGGLE SWITCH LABELED "WT PROT" UNTIL THE LIGHT LABELED "WT PROT" GOES OFF.

M. VERIFY THAT LIGHTS LABELED "READY", "WRITE PROT", AND "ROD" ARE ON.

5.3 DRIVE CONTROL TEST (SINGLE DRIVE TESTING)

A. MAKE READY THE DISK DRIVE TO BE TESTED USING THE FREE DRIVE CARTRIDGE MOUNTING PROCEDURE SECTION 5.2.

B. SET SWITCH LABELED "RUN/LOAD" TO THE "LOAD" POSITION ON ALL DRIVES NOT BEING TESTED.

C. VERIFY THAT AC POWER TO ALL DRIVES IS ON.

[illegible]

C. SET THE SWITCH POSITION TO "RUN" AND PRESS LOAD ANDGO.

E. SET THE SWITCH REGISTERS TO ZERO

F. SET SW>0=1 TO INDICATE "SINGLE DRIVE TESTING".

G. SET SWREG=N TO THE DISK DRIVE TO BE TESTED AND START THE COMPUTER RUNNING.

H. THE PROGRAM WOULD TRIGGER THE FOLLOWING MESSAGE AT THE COMPLETION OF EACH PASS.

"RK05 DRIVE CONTROL TEST PASS COMPLETE"

I. ALWAYS USE SWREG FOR STOPPING THE TEST.

J. IF IT IS DESIRED TO HAVE THE PROGRAM HALT UP ITSELF AT END OF PROGRAM PASS COMPLETION TEST SWREG.

K. ANY HALTS OR TYPEOUTS OTHER THAN THE PASS COMPLETE TYPEOUT OR END OF TEST HALT MENTIONED ABOVE WILL BE CONSIDERED AN ERROR CONDITION. IN ALL CASES ADDRESS "ERROR" SECTION A IN THIS DOCUMENTATION.

L. FOR ABSOLUTE LOCATIONS OF ALL KNOWN HALTS ACCESS PAGE 1 OF THE PROGRAM LISTING.

5.4 DRIVE CONTROL TEST (MULTI-DRIVE TESTING)

A. MAKE READY ALL DISK DRIVES NUMBERED SEQUENTIALLY FROM DRIVE 0 TO BE TESTED USING THE RK05 DRIVE CARTRIDGE MOUNTING PROCEDURE SECTION 5.1.

B. SET SWITCH LABELED "RUN/LOAD" TO THE "LOAD" POSITION ON ALL DISK DRIVES NOT BEING TESTED.

5.4 CONT'D.)

C. VERIFY THAT AC POWER TO ALL DRIVES IS ON

D. SET THE SWITCH REGISTER TO 0001 AND PRESS LOAD ADDRESS.

E. SET THE SWITCH REGISTER TO 5000.

F. SET SWR8-11 TO THE AMOUNT OF DATA DISK DRIVES HANDLING SEQUENTIALLY FROM DISK # TO BE TESTED AND START THE COMPUTER RUNNING.

SWR8-11=1	2 DISK SYSTEM
SWR8-11=2	3 DISK SYSTEM
SWR8-11=3	4 DISK SYSTEM

G. THE PROGRAM SHOULD PRINT THE FOLLOWING MESSAGE AT THE COMPLETION OF EACH PASS.

PASS PRIM CONTROL TEST HAS COMPLETED

H. ALWAYS USE SWR4=1 FOR STOPPING ON TEST.

I. IF IT IS DESIRED TO HAVE THE PROGRAM HALT OR STOP AT THE END OF PROGRAM PASS COMPLETION SET SWR9=1.

J. ANY HALTS OR TYPEOUTS OTHER THAN THE PASS COMPLETE TYPEOUT AND THE END OF TEST HALT MENTIONED ABOVE WILL BE CONSIDERED AN ERROR CONDITION. IN ALL CASES ACCESS "ERRORS" SECTION 6 IN THIS DOCUMENTATION.

K. FOR ABSOLUTE LOCATIONS OF ALL KNOWN HALTS ACCESS PAGE 1 OF THE PROGRAM LISTING.

5.5 CHECK WRITE PROTECT (MANUAL)

A. RUN THE REGULAR DRIVE CONTROL TEST WITH ALL DRIVES ON THE CONTROL USING THE SINGLE OR MULTI DRIVE TESTING METHOD. BEFORE RUNNING THIS "WRITE PROTECT" PROCEDURE

B. MAKE READY A DRIVE TO TEST USING THE DATA DRIVE CARTRIDGE MOUNTING PROCEDURE SECTION 5.3.

C. SET SWITCH LABELED "RUN/LOAD" TO THE "LOAD" POSITION ON ALL OTHER DRIVES.

D. VERIFY THAT AC POWER TO ALL DRIVES IS ON.

E. VERIFY THAT THE LIGHT LABELED "WT PROT" IS OFF ON THE CURRENT DRIVE UNDER TEST.

[illegible]

1. [illegible] IS REQUIRED TO LOAD AND WRITE LOAD AN [illegible].

2. SET [illegible] TO [illegible].

3. [illegible] THE FIRMWARE DRIVE ADAPTER UNDER TEST.

4. MOUNT SCRATCH [illegible] CONNECTED BACKUP [illegible] ON UNIT [illegible].

5. [illegible] THE [illegible] TO [illegible] DRIVE PROTECTION IN THE [illegible] WRITE PROTECT ON.

6. [illegible] THE [illegible] AND THE [illegible] DRIVE [illegible] PROTECTED INDICATOR INDICATING A SUCCESSFUL READ.

7. FOR ALL [illegible] DRIVE IN THE [illegible] DRIVES FROM [illegible] POSITION [illegible].

8. IF ANY ERRORS ARE ENCOUNTERED [illegible] IT IS DESIRED TO [illegible] THE TEST [illegible] ALWAYS STOP [illegible].

9. FOR PERSONAL [illegible] SOLVER TESTING [illegible] IN THIS STEP [illegible] NOTE [illegible] ARE AVAILABLE [illegible] TEST.

10. THE MONITOR WRITE PROTECT PROCEDURE AS DESCRIBED ABOVE SHOULD BE RUN [illegible] WITH ALL TYPES OF THE CONTROL.

3.6 [illegible] DRIVE CONTROL

1. RUN THE REGULAR DRIVE CONTROL TEST WITH ALL DRIVES [illegible] CONTROL USING THE SINGLE OR MULTI DRIVE TESTING METHOD [illegible] OF 3 [illegible] VERSION.

2. MAKE READY A DRIVE TO TEST USING THE NEW DRIVE [illegible] MOUNTING PROCEDURE SECTION [illegible].

3. SET SWITCH [illegible] PROCEDURE TO THE [illegible] ON ALL OTHER DRIVES.

4. VERIFY THAT NO POWER TO ALL DRIVES IS ON.

5. VERIFY THAT THE LIGHT LABELED "NT PROT" IS [illegible] ON THE CURRENT DRIVE UNDER TEST.

6. SET THE SWITCH REGISTER TO 7004 AND PRESS LOAD ADDRESS.

7. SET THE SWITCH REGISTER TO 0030.

8. SET [illegible] TO THE CURRENT DRIVE NUMBER UNDER TEST.

(RUN STARTED)

I. PRESS START AND THE COMPUTER SHOULD HALT IF NOT THE "ARBITRARY INDICATION" A SUCCESSFUL TEST.

J. VERIFY THAT THE DISK PROBE LIGHT SHOULD BE ON BUT IS ON THE CURRENT DISK.

K. FOR ALL NORMAL HALTS OR TRAP PROBLEMS, CONSULT PART 6 OF THE PROGRAM LISTING.

L. IF ANY ERRORS ARE ENCOUNTERED GO TO THE DIAGNOSTIC MODE THE TEST AGAIN. REPEAT STEP A.

M. FOR POSSIBLE ERROR TYPEOUTS ACCESS SECTION 6 IN THIS CODE DOCUMENTATION. (NOTE: NO SCOPE LOOPS ARE AVAILABLE FOR THIS TEST.)

N. THE "CHECK WRITE PROTECT" PROCEDURE AS DESCRIBED ABOVE SHOULD BE RUN TWICE WITH ALL DRIVES ON THE CHANNEL.

5.7 MANUAL FUNCTIONS FOR TROUBLE SHOOTING ONLY

THE MANUAL FUNCTIONS ENABLES THE OPERATOR TO SELECT FUNCTIONS, DISK ADDRESS, AND DATA PATTERNS VIA THE SWITCH REGISTER. THIS IS NOT PART OF THE REGULAR TEST AND SHOULD ONLY BE USED FOR TROUBLE SHOOTING IF DESIRED.

A. SET THE SWITCH REGISTER TO 7204 AND PRESS LOAD ADDRESS.

B. SET THE SWITCH REGISTER TO THE DESIRED FUNCTION TO BE LOADED INTO THE COMMAND REGISTER. (SEE SECTION 4.) (NOTE: THE EXTENDED MODE USED, THE CHANGE INTERRUPT BIT 3A AND THE ENABLE SET DONE BIT ON SEEK COMPLETE BIT 4. ARE NOT RECOGNIZED. THIS MANUAL PORTION IS ONLY ALLOW DRIVES AND ALL DATA TRANSFERS ARE TO THE CURRENT FIELD.)

C. PRESS START AND THE COMPUTER SHOULD HALT.

D. SET THE SWITCH REGISTER TO THE DESIRED DISK ADDRESS TO BE LOADED INTO THE CYLINDER, SURFACE, AND SECTOR REGISTER. (SEE SECTION 4.)

E. PRESS START AND THE COMPUTER SHOULD HALT

F. SET THE SWITCH REGISTER TO THE COMPLEMENT TYPE DATA PATTERN TO BE WRITTEN ON OR READ FROM THE DISK DEPENDING ON THE FUNCTION PREVIOUSLY LOADED INTO THE COMMAND REGISTER. (NOTE: A SETTING OF 0000 WILL RESULT IN A COMPLEMENT DATA PATTERN OF 0000 + 7777. A SETTING OF 2525 WILL RESULT IN A COMPLEMENT DATA PATTERN OF 2525 + 5252.)

G. PRESS START AND THE COMPUTER SHOULD HALT.

[illegible]

[illegible] SET THE SWITCH REGISTER TO [illegible] AND PRESS LOAD ADDRESS. THE [illegible] FUNCTION SELECTED WILL BE EXECUTED.

[illegible] IF POSSIBLE, [illegible] USE [illegible] TO STOP-PING PROGRAM.

[illegible] IN LIEU OF [illegible] OF DEFINED [illegible], USE [illegible] SWITCH REGISTER [illegible] [illegible].

[illegible] IF A WRITE [illegible] THE WRITE DATA FUNCTION WAS SELECTED, THE DATA PATTERN DESIRED [illegible] TYPED DISK ADDRESS [illegible].

[illegible] IF A READ [illegible] READ DATA FUNCTION WAS SELECTED, THE DATA WILL BE READ BACK TO THE DISK ADDRESS GIVEN AND COMPARED AGAINST THE DATA PATTERN SELECTED.

[illegible] IF A SEEK ONLY FUNCTION WAS SELECTED, A SEEK ONLY WILL BE EXECUTED TO THE DISK ADDRESS GIVEN.

[illegible] IF A WRITE DATA FUNCTION WAS THE SELECTED, ALL DISK DRIVES SELECTED [illegible] BE DRIVE [illegible].

3.0 CHANGE PROGRAM DEVICE OR ORDER

THE PROGRAM NORMALLY PROCESSES DEVICE 107 CODE FIRST, TO CHANGE THE DEVICE 107 CODES WITHIN THE PROGRAM:

A. SET THE SWITCH REGISTER TO 0200 AND PRESS LOAD ADDRESS.

B. SET THE SWITCH REGISTER TO 0201, SET SWITCH REGISTER [illegible] BIT TO THE DESIRED DEVICE 107 CODE, AND PRESS START.

C. THE PROGRAM WILL CHANGE THE DEVICE 107 CODES WITHIN THE PROGRAM AND THEN HALT.

D. THE REGULAR TESTS CAN THEN BE RUN USING SETTING [illegible], 5,6, [illegible] OR [illegible].

3.1 SEEK FROM SWITCHES (FOR 2K00 ALIGNMENT)

THE FOLLOWING SUBTEST WAS DESIGNED AN FIELD SERVICE TO AID IN 2K00 ALIGNMENT. THE PROGRAM WILL SEEK ONLY REFERENCE ADDRESSES FROM SWITCH REGISTER.

A. SET THE SWITCH REGISTER TO 4000 AND PRESS LOAD ADDRESS.

B. SET THE SWITCH REGISTER TO 0000.

C. SET SWR0-12 TO THE DRIVE NUMBER AND EXTENDED CYLINDER BIT OF THE FIRST SEEK ADDRESS (BITS 9-10 TO DRIVE NUMBER AND BIT 11 TO EXTENDED CYLINDER).

[illegible] CONTINUED

A. SET [illegible] TO THE CYLINDER OF THE [illegible] AND THE SURFACE OF THE FIRST SEEK ADDRESS.

B. [illegible]

C. SET THE SWITCH REGISTER TO [illegible]

D. SET [illegible] TO THE [illegible]

E. SET SWITCH [illegible] TO THE CYLINDER [illegible] OF THE SECOND SEEK ADDRESS.

F. PRESS START AND THE DRIVE SHOULD SEEK BETWEEN THE ADDRESSES SPECIFIED [illegible]

G. THE SECOND SEEK ADDRESS CAN BE CHANGED AT ANY TIME BY [illegible] TO SELECT A NEW ADDRESS.

H. CARE SHOULD BE TAKEN TO NOT SELECT A NON-EXISTENT [illegible] OR NON-EXISTENT CYLINDER.

I. NO ERROR CHECKING IS DONE DURING THIS ROUTINE.

J. IT IS POSSIBLE TO SEEK TO A CONSTANT ADDRESS BY MAKING THE FIRST AND SECOND ADDRESS EQUAL.

4. ERRORS

4.1 [illegible] ERROR INTERPRETATION

IN THE REGULAR TEST, THE SKIP [illegible] IS FIRST CHECKED AND TIMED-OUT [illegible] IF THE SKIP [illegible] FAILS, AN ERROR [illegible] SHOULD OCCUR. ONCE PROVEN TO WORK, THE [illegible] IS NOT TIMED-OUT. THE PROGRAM MAY HANG-UP IF THE SKIP [illegible] FAILS INTERMITTENTLY. (NOTE: THE MANUAL FUNCTIONS, SECTION [illegible], ALWAYS TIMES OUT THE SKIP [illegible] TO PREVENT HANGING UP.)

ALL ERRORS FOUND WHEN RUNNING THIS TEST SHOULD BE CORRECTED BEFORE PROCEEDING ON IN THE TEST.

[illegible]

[illegible]

THE ABSOLUTE [illegible] OF THE [illegible] CAN BE FOUND ON PAGE [illegible] OF THE PROGRAM.

A CONTINUOUS [illegible] DATA [illegible] FIVE [illegible] BASIC DATA [illegible] IS ALWAYS USED IN THE [illegible] WITH [illegible] AND THEN CHECKED IN SOME [illegible] ALL OF [illegible] IN CHECKING THE [illegible] STATUS [illegible] DATA IS [illegible] ERROR.

THE PROGRAM [illegible] IN SAME [illegible] BUFFER AND ONLY DO [illegible] DATA. THE OUTPUT IS [illegible] BETWEEN A [illegible] FUNCTION AND A [illegible] WHICH THE DISK IS READ AND [illegible]. THE [illegible] INTERCEPTS THE CONTROL FIELD FROM THE [illegible] OF THE [illegible] [illegible] STATIONS.

BEFORE DATA IS WRITTEN ON THE DISK, THE [illegible] TWO [illegible] OF THE SECTOR ARE SENT TO THE [illegible] ERROR [illegible]. THE [illegible] WHICH IS [illegible] SENTS FROM THE DRIVE [illegible] AND THE [illegible] TO THE [illegible] WORD [illegible] PART OF [illegible] BUFFER. THE [illegible] DATA, AND THE [illegible] IS SENT TO THE DATA [illegible] IN [illegible] ORDER THE WRITE [illegible] BUSY. THE WORDS ARE CHECKED FOR CORRECT VALUES, INDICATING THAT THE INFORMATION WAS WRITTEN ON AND READ FROM THE SAME BLOCK OF THE DISK AND THAT THE DATA [illegible] STORED [illegible]. WHEN AN ERROR EXISTS WITH THE [illegible] [illegible] THE [illegible] SHOULD [illegible] [illegible] ACTIVITIES AND SUBSEQUENT DATA ERROR.

WHEN DATA IS [illegible] FROM THE DISK AND A CRC ERROR OCCURS THE PROGRAM WILL [illegible] CHECK THE DATA READ FOR [illegible] ERRORS. IF NO DATA ERRORS EXIST THE CRC ERROR FOUND WILL BE REPORTED AS [illegible] STATUS REGISTER ERROR. IF DATA ERRORS ARE FOUND THE DATA ERRORS WILL BE REPORTED AS DISK DATA ERRORS AND THE CRC STATUS ERROR INDICATED IN THE [illegible] (SEE SECTION 9.4 FOR ERROR MEASURES AND IMPLICATIONS).

THE ABSOLUTE ADDRESS LOCATIONS OF THE DATA BUFFER CAN BE FOUND ON PAGE 1 OF THE PROGRAM LISTING.

5 NON-RECOVERABLE ERROR HALTS

NON-RECOVERABLE ERROR HALTS FOR WHICH THERE ARE NO TYPEOUTS OR SCORE LOOPS ARE LISTED AND DEFINED AS FOLLOWS.

ERHLT0	UNDEFINED INTERRUPT
ERHLT2	SKIP TRAP FOR 10T "DCLEA"
ERHLT3	SKIP TRAP FOR 20T "DLAGR"
ERHLT4	SKIP TRAP FOR 10T "DLCAR"
ERHLT5	SKIP TRAP FOR 10T "DRSTA"
ERHLT6	SKIP TRAP FOR 10T "DLDCR"
ERHLT7	SKIP TRAP FOR 10T "DMAN"

5.3 RECOVERABLE ERROR HALT

ALL RECOVERABLE ERRORS, FOR WHICH THERE ARE SCORE LOOPS AND ERROR TYPEOUTS, SHOULD RESULT IN AN ERROR HALT AT LOCATION "ERHLT2".

ERHLT2	RECOVERABLE ERROR HALT. READ INFORMATION TYPEOUT ON TTY AND ACCESS PROGRAM LISTING AND DOCUMENTATION.

5.4 ERROR TYPEOUTS

WHEN A RECOVERABLE ERROR OCCURRES THE PROGRAM WILL PRINT AN "ERROR HEADER" WHICH WILL SPECIFY THE PARTICULAR REGISTER OR TYPE OF ERROR FOUND AT THE TIME OF THE FAILURE.

POSSIBLE "ERROR HEADERS" ARE AS FOLLOWS.

STATUS REGISTER ERROR
COMMAND REGISTER ERROR
DISK ADDRESS REGISTER ERROR
DISK DATA ERROR
CRC REGISTER ERROR
DATA REGISTER ERROR
DISK SKIP ERROR
DISK INTERRUPT ERROR

AFTER THE "ERROR HEADER" MENTIONED ABOVE IS TYPED, THE PROGRAM WILL HALT. THE FOLLOWING ERROR INFORMATION FOUND AT THE TIME OF THE FAILURE, RELATIVE TO THE FAILURE, POSSIBLE TYPEOUTS ARE AS FOLLOWS

CSA — PROGRAM LOCATION OF THE ACTUAL FAILURE.

[illegible] — REFERS TO THE DATA EXPECTED IN THE REGISTER OR TYPE OF TEST SPECIFIED IN THE "ERROR HEADER".

CRC — CONTENTS OF THE CRC REGISTER

STA — CONTENTS OF THE STATUS REGISTER.

CRA — CONTENTS OF THE LOWER DATA REGISTER.

CMD — CONTENTS OF THE COMMAND REGISTER.

DAS — CONTENTS OF THE DISK ADDRESS REGISTER OF THE CYLINDER, SURFACE, AND SECTOR BITS.

CAS — CONTENTS OF THE INITIAL OUTPUT ADDRESS

ADR — BREAK ADDRESS OF DATA BREAK IN COMPUTER.

DTA — DATA FOUND DURING DATA BREAK.

THE "ERROR" INFORMATION TYPED OUT POINTS TO THE DATA EXPECTED IN THE REGISTER OR TYPE OF ERROR TYPED OUT IN THE "ERROR HEADER".

THE ERROR INFORMATION INDICATOR SUGGESTED BY THE "ERROR HEADER" (I.E. DAS FOR DISK ADDRESS ERROR, CMD FOR COMMAND REGISTER ERROR, CRC FOR CRC REGISTER ERROR, ETC.), IS THE ACTUAL CONTENTS OF THAT PARTICULAR REGISTER. ERROR INFORMATION OTHER THAN THAT SUGGESTED BY THE ERROR HEADER IS THE SOFTWARE VALUE LOADED INTO THAT REGISTER PRIOR TO THE FAILURE.

TO TYPE THE ACTUAL CONTENTS OF THE REGISTERS, SET SWR0=1 AFTER AN ERROR HALT AT LOCATION PERFLTOK, AND PRESS KEY CONTINUE. THE CONTENTS OF THE CRC, STATUS, LOWER DATA, COMMAND, AND SURFACE AND SECTOR REGISTERS WILL THEN BE TYPED.

5.5 SCOPE LOOPS

THERE ARE SCOPE LOOPS AVAILABLE FOR ALL ERRORS RESULTING IN AN ERROR HALT AT LOCATION "ERHLT9".

TO ENTER SCOPE LOOP, INHIBIT ERROR TYPEOUT, AND INHIBIT ERROR HALT, AFTER AN ERROR HALT AT "ERHLT9", SET SWR8=1 TO INDICATE SCOPE LOOP AND PRESS KEY CONTINUE

IF THE SCOPE LOOP IS WORKING CORRECTLY AND THE TEST IS STILL FAILING, THE TTY BELL SHOULD RING INDICATING AN ERROR, THEN SET SWR2=1 TO INHIBIT THE TTY ERROR BELL.

SWR1=1 MAY HAVE TO BE USED IN SCOPE LOOPS IN CONJUNCTION WITH SWR8=1, IF THE CURRENT TEST IS WORKING INTERMITTENTLY.

5.6 TYPICAL ERROR TYPEOUTS

THE FOLLOWING IS AN EXAMPLE OF AN "ERROR HEADER" AND TYPEOUT THAT COULD HAVE OCCURRED IF THE DISK SKIP IOT FAILED TO SKIP.

```
DISK SKIP ERROR
PC:0267
```

THE FOLLOWING IS AN EXAMPLE OF AN "ERROR HEADER" AND ERROR TYPEOUT THAT COULD HAVE OCCURRED ON A DATA BREAK ERROR, (NOTE CRC IN THE STATUS INDICATOR "ST:")

```
DISK DATA ERROR
PC:1161 GD:5252 ST:4010 CM:1000 DA:0001 CA:7002 AD:7712 DT:5202
```

THE FOLLOWING IS A TYPICAL ERROR THAT COULD HAVE OCCURED WHILE READING THE CRC REGISTER.

```
CRC REGISTER ERROR
PC:2246 GD:116047 CR:116246 CM:1000 DA:7777
```

THE FOLLOWING IS AM EXAMPLE OF AN ERROR TYPEOUT THAT COULD HAVE OCCURRED IF THE STATUS REGISTER FAILED. (NOTE: IN THIS CASE THE OPERATOR INDICATED TO THE PROGRAM TO TYPE THE ACTUAL CONTENTS OF THE REGISTERS BY SETTING SWR8=1 AFTER THE ERROR HALT AT LOCATION "ERHLT9" AND PRESSING KEY CONTINUE).

```
STATUS REGISTER ERROR
PC:1100 GD:4000 ST:2000 CM:5002 DA:0000
CR:000000 ST:2000 DB:0000 CM:5002 DA:0000
```

7. RESTRICTIONS

ALL DISK DRIVES SHOULD BE SET TO THE LOAD POSITION THAT ARE NOT BEING TESTED.

ALL ERRORS SHOULD BE CORRECTED BEFORE PROCEDING ON IN THE PROGRAM.

8. TROUBLE SHOOTING INFORMATION

INT		FUNCTION
6741 DSKP		"SKIP" SKIP IF TRANSFER DONE FLAG OR ERROR FLAG IS SET.
6742 DCLR		"CLEAR" FUNCTION IS REGULATED BY AC BITS 10 AND 11. THE AC IS THEN CLEARED.
AC10	AC11	
0	0	CLEAR THE AC AND STATUS REGISTER.
0	1	CLEAR THE AC, CONTROL, AND MAJOR REGISTERS. THIS INSTRUCTION WILL STOP THE CONTROL EVEN IF IT IS WRITING A HEADER. THIS IS THE ONLY INSTRUCTION THAT CLEARS MAINTENANCE MODE.
1	0	CLEAR AC, RECALIBRATE DISK DRIVE, AND CLEAR STATUS REGISTER.
6743 DLAG		"LOAD DISK ADDRESS AND GO" LOAD THE DISK CYLINDER, SURFACE, AND SECTOR FROM THE AC; CLEAR THE AC, AND DO THE COMMAND IN THE COMMAND REGISTER

/8. CONT'D)

AC
--

X=6 CYLINDER

7 SURFACE (1=UPPER) (0=LOWER)

8=11 SECTOR

6744 DLCA "LOAD CURRENT ADDRESS" LOAD THE CURRENT ADDRESS FROM AC. THE AC IS THEN CLEARED.

AC
--

.=11 CURRENT ADDRESS

6745 DRST "READ STATUS" CLEAR THE AC AND READ THE CONTENTS OF THE STATUS REGISTER INTO THE AC.

AC
--

. TRANSFER DONE
1 READY TO SEEK, READ, OR WRITE.
2 NOT USED
3 SEEK FAIL
4 DISK FILE READY
5 CONTROL BUSY ERROR
6 TIME OUT ERROR
7 WRITE LOCK ERROR
8 CRC ERROR
9 DATA RATE ERROR
10 DRIVE STATUS ERROR
11 CYLINDER ADDRESS ERROR

6746 DLDC "LOAD COMMAND" LOAD THE COMMAND REGISTER FROM AC, CLEAR THE AC. AND CLEAR THE STATUS REGISTER.

(8. CONT'D)

AC	
*2*0	READ DATA
*2*1	READ ALL
*2*2	WRITE LOCK
*2*3	SEEK ONLY
*2*4	WRITE DATA
*2*5	WRITE ALL
*2*6	NOT USED
*2*7	NOT USED
3	ENABLE INTERRUPT
4	ENABLE SET TRANSFER DONE ON DISK DONE
5	HALF BLOCK 128 WORDS
6	EXTENDED MEMORY ADDRESS
7	EXTENDED MEMORY ADDRESS
8	EXTENDED MEMORY ADDRESS
9	UNIT SELECT
10	UNIT SELECT
11	EXTENDED CYLINDER ADDRESS

6747 DMAN "MAINTENANCE IOTT LOAD THE MAINTENANCE REGISTER FROM THE AC. THIS FUNCTION IS REGULATED BY THE AC BITS. MAINTENANCE MODE CAN ONLY BE CLEARED BY DCLR "CLEAR CONTROL".

AC	
0	ENTER MAINTENANCE MODE
1	ENABLE SHIFT TO LOWER BUFFER
2	AC BIT 10, CRC REGISTER, AND THE LOWER DATA BUFFER ARE CONNECTED AS A SHIFT REGISTER. AC BIT 10 DATA SHIFTS TO THE CRC, THE CRC SHIFTS TO THE LOWER DATA BUFFER.
3	SHIFT COMMAND REGISTER TO THE LOWER DATA BUFFER.
4	SHIFT THE SURFACE AND SECTOR REGISTER TO THE LOWER DATA BUFFER.
5	SHIFT AC 10 DATA TO THE UPPER DATA BUFFER. THE UPPER BUFFER SHOULD SINK IN THE SILO WHEN FULL.
6	ONE SINGLE CYCLE BREAK REQUEST. DIRECTION IS REGULATED BY FUNCTION IN THE COMMAND REGISTER.
7	CLEAR AC THEN READ THE LOWER DATA BUFFER TO THE AC.
8	NOT USED.
9	NOT USED.
10	USED AS DATA WITH OTHER BITS IN THE MAINTENANCE MODE.
11	NOT USED

9. PROGRAM DESCRIPTION

THE RK8E DRIVE CONTROL TEST VERIFIES BASIC FUNCTIONAL OPERATION OF THE RK8E CONTROL LOGIC WITH THE RK05 DISK DRIVE(S). THE PROGRAM IS COMPRISED OF MANY INDIVIDUAL SUBTESTS WHICH ARE AUTOMATICALLY RUN IN A SEQUENCIAL FLOW. ABOVE EACH SUBTEST IN THE LISTING, IS A BRIEF DESCRIPTION OF EACH SUBTEST.

WHEN SINGLE DRIVE TESTING, ONE PASS THROUGH ALL SUBTESTS (TST0-TST45) RESULTS IN A PASS COMPLETION. WHEN MULTI-DRIVE TESTING, ONE PASS THROUGH ALL SUBTESTS(TST0-TST45) ON ALL DRIVES AND THE RUNNING OF THE OVERLAP SEEK TESTS(OVRLAP, GRONK, AND OVRRED) RESULTS IN A PASS COMPLETION.

CONSIDERING NO ERROR CONDITIONS, THE DRIVES THAT HAVE RUN THIS TEST ARE FORMATTED, IF THE PROGRAM WAS STOPPED AT END OF PROGRAM PASS COMPLETION BY SWR9=1.

10. PROGRAM LISTING

[illegible]

[illegible]

[illegible]

```
0230  0251   KSAVAT,  SAVAT
0231  0252   KMTSE,   MTSE
0232  0253   KMTSE2,  MTSE2
0233  0254   KPRFLD,  PRFLD
0234  0255   KPRINT,  PRINT
0235  0256   KNERRT,  NERRT
0236  0257   KRPRO,   RPRO
0237  0260   KTCNAT,  TCNAT
0240  0261   KCOMP1,  COMP1
0241  0262   KCOMP2,  COMP2
0242  0263   KRDST,   RDST
0243  0264   KRDCM,   RDCM
0244  0265   KRDAD,   RDAD
0245  0266   KSBRF,   SBRF
0246  0267   KLDCM,   LDCM
0247  0270   KLDSA,   LDSA
0250  0271   KLDLH,   LDLH
0251  0272   KRDCR,   RDCR
0252  0273   KLDMA,   LDMA
0253  0274   KRDBF,   RDBF
0254  0275   KRPN,    RPN
0255  0276   KPRDST,  PRDST
0256  0277   KTDST,   TDST
0257  0300   KPEKE,   PEKE
0260  0301   KLDTRK,  LDTRK
0261  0302   KWTRK,   WTRK
0262  0303   KMLRSE,  MLRSE
0263  0304   KMSRSE,  MSRSE
0264  0305   KRPN,    RPN
0265  0306   KPRDST,  PRDST
0266  0307   KTDST,   TDST
0267  0310   KPEKE,   PEKE
0270  0311   KLDTRK,  LDTRK
0271  0312   KWTRK,   WTRK
0272  0313   KMLRSE,  MLRSE
0273  0314   KMSRSE,  MSRSE
0274  0315   KDELRD,  DELRD.  /
0275  0316   KDELWD,  DELWD.  /
0276  0317   KDSKSV,  DSKSV.  0
0277  0320   KD001,   D001,   0001
0278  0321   KD002,   D002,   0002
0279  0322   KD003,   D003,   0003
0280  0323   KD004,   D004,   0004
0281  0324   KD005,   D005,   0005
0282  0325   KD006,   D006,   0006
0283  0326   KD007,   D007,   0007
0284  0327   K1234,   1234,   1234
0285  0330   K2000,   2000,   2000
0286  0331   K3000,   3000,   3000
0287  0332   K4000,   4000,   4000
0288  0333   K5000,   5000,   5000
0289  0334   K7000,   7000,   7000
0290  0335   K7760,   7760,   7760
0291  0336   K7770,   7770,   7770
0292  0337   K3077,   3077,   3077
0293  0340   K2525,   2525,   2525
0294  0341   K5252,   5252,   5252
0295  0342   K3030,   3030,   3030
0296  0343   K7771,   7771,   7771
0297  0344   K2017,   2017,   2017
0298  0345   K2037,   2037,   2037
0299  0346   KCDF,    CDF
```



```
0300  0347   KPMF,    PMF
0301  0350   K7742,   7742
0302  0351   K7743,   7743
0303  0352   K2400,   2400
0304  0353   K2403,   2403
0305  0354   K7770,   7770
0306  0355   K7007,   7007
                      /
                      DECIMAL
                      /
0307  0356   K12,     -12
                      /
                      OCTAL
                      /
0308  0357   K4,      -4
0309  0360   REG0,    0
0310  0361   REG1,    0
0311  0362   BRCNT1,  0
0312  0363   TCNTR1,  0
0313  0364   TCNTR2,  0
0314  0365   TCNTR3,  0
0315  0366   TCNTR4,  0
0316  0367   TCNTR5,  0
0317  0370   TCNTR6,  0
                      /
0320  0371   DPREG1,  0
0321  0372   DPREG2,  0
0322  0373   DPREG3,  0
0323  0374   DPREG4,  0
0324  0375   DPREG5,  0
0325  0376   DPREG6,  0
0326  0377   DMREG,   0
0327  0400   DAREG,   0
0328  0401   DARES,   0
0329  0402   ADREG,   0
0330  0403   DIREG,   0
0331  0404   ACREG,   0
0332  0405   HOMEMA,  0
0333  0406   RAPCNT,  0
0334  0407   STCOM,   2200
0335  0410   DRWRD1,  2011
0336  0411   DRWRD2,  6047
0337  0412   DATCNT,  0
0338  0413   SAVDAT,  0
0339  0414   K2306,   2306
0340  0415   K5373,   5373
0341  0416   K5326,   5326
0342  0417   K6324,   6324
0343  0420   ENTRK,   3240
0344  0421   SOFERR,  7777
0345  0422   SAVPCT,  0
0346  0423   RESTMT,  2220
0347  0424   KTIME,   5617
                      /
      0425   *200
```

```
/SKIP ON READY TEST
/
/VERIFY THAT THE DISK IS NOT READY [illegible]
/READY TO SEEK, READ, OR WRITE [illegible]
/RESULT [illegible]

[illegible]    [illegible]    T7,      [illegible]                    /[illegible]
[illegible]    [illegible]             [illegible]  [illegible]       /[illegible] COMMAND REGISTER
[illegible]    [illegible]             TAD      [illegible]           /[illegible] BIT
[illegible]    [illegible]             TAD      [illegible]           /GET CURRENT DRIVE NUMBER
[illegible]    [illegible]             [illegible]                    /LOAD COMMAND REGISTER
[illegible]    [illegible]             [illegible]                    /READ STATUS
[illegible]    [illegible]             [illegible]                    /SAVE RESULTS
[illegible]    [illegible]             [illegible] CLA                /[illegible]
[illegible]    [illegible]             [illegible]  [illegible]       /[illegible] STATUS
[illegible]    [illegible]             [illegible]  [illegible]       /[illegible] COMPARE [illegible]
[illegible]    [illegible]             [illegible]                    /[illegible] STATUS
[illegible]    [illegible]             [illegible]                    /[illegible] STATUS
[illegible]    [illegible]             [illegible] CLA                /[illegible] OF [illegible]
[illegible]    [illegible]             [illegible]                    /[illegible] LOOPS
[illegible]    [illegible]    [illegible]  ERROR                      /ERROR, STATUS
[illegible]    [illegible]             TST8                           /SCOPE LOOP POINTER
[illegible]    [illegible]             TST9                           /NEXT POINTER
```

```
[illegible]    [illegible]    [illegible]    [illegible]    PAGE [illegible]

/
/SKIP [illegible] TEST
/
/VERIFY THAT [illegible] TRANSFER DONE [illegible]
/[illegible]
/
[illegible]    [illegible]    TST8,    [illegible]  [illegible]   /ENABLE SET DONE BIT
[illegible]    [illegible]             TAD      [illegible]       /CURRENT DRIVE
[illegible]    [illegible]             [illegible]                /LOAD COMMAND
[illegible]    [illegible]             [illegible]                /[illegible]
[illegible]    [illegible]             JMP      T[illegible]      /ERROR, NO SKIP
[illegible]    [illegible]             CLRALL                     /[illegible] FLAG [illegible]
[illegible]    [illegible]             [illegible]                /[illegible] SKIP [illegible]
[illegible]    [illegible]             NTDRNR                     /[illegible] LOOPS
[illegible]    [illegible]    T[illegible]  ERROR                 /ERROR, [illegible]
[illegible]    [illegible]             TST[illegible]             /SCOPE LOOP POINTER
[illegible]    [illegible]             [illegible]                /NEXT POINTER
/
/INTERRUPT TEST
/
/VERIFY THAT [illegible] OCCURS EACH
/TIME TRANSFER DONE FLAG AND DISK
/[illegible] THAT IS READY TO SEEK,
/READ, OR WRITE.
/
[illegible]    [illegible]    TST9,    TAD      K[illegible]      /ENABLE SET DONE BIT
[illegible]    [illegible]             TAD      K[illegible]      /ENABLE [illegible] INT.
[illegible]    [illegible]             TAD      DRIVNO            /GET CURRENT DRIVE
[illegible]    [illegible]             [illegible]                /[illegible] COMMAND REGISTER
[illegible]    [illegible]             CLA CMA                    /SOFTWARE FLAG
[illegible]    [illegible]             IONWAT                     /WAIT FOR DISK INTERRUPT
[illegible]    [illegible]             JMP      T[illegible]      /ERROR, NO INT.
[illegible]    [illegible]             CLRALL                     /CLEAR [illegible] OUT
[illegible]    [illegible]             CLA CMA                    /SOFTWARE FLAG
[illegible]    [illegible]             IONWAT                     /WAIT FOR DISK INTERRUPT
[illegible]    [illegible]             [illegible] CLA            /[illegible] INT.
[illegible]    [illegible]             JMP      [illegible]       /ERROR, [illegible]
[illegible]    [illegible]             TAD      K[illegible]      /ENABLE SET DONE BIT
[illegible]    [illegible]             TAD      DRIVNO            /CURRENT DRIVE
[illegible]    [illegible]             LDCMR                      /LOAD COMMAND
[illegible]    [illegible]             CLA CLL CMA                /SOFTWARE FLAG
[illegible]    [illegible]             IONWAT                     /WAIT FOR DISK INTERRUPT
[illegible]    [illegible]             NTDRNR                     /O.K., [illegible] LOOPS
[illegible]    [illegible]    T[illegible]  ERROR                 /ERROR, DISK INT.
[illegible]    [illegible]             TST9                       /SCOPE LOOP POINTER
[illegible]    [illegible]             TST7                       /NEXT POINTER
/
/FORCE TIMING ERROR
/
/VERIFY [illegible] TIMING ERROR DOES OCCUR IN STATUS REGISTER
/[illegible] IS ISSUED WITH THE COMMAND REGISTER IS SET TO
/A FUNCTION OF [illegible]
/
[illegible]    [illegible]             [illegible]  [illegible]
[illegible]    [illegible]    TST[illegible]  TAD  K[illegible]
```

```
0370  3150          TSF     DCMPSA
0371  6001          JMP     .-1                     /WAIT DUMPSET DRIVE
0372  4451          ISZ     .+1                     /SKIP ON DUMPSET READY
0373  1077          TAD     K2024
0374  3041          DCA     TEM                     /SETUP SET ADDRESS
0375  4052          JMS     .+1                     /SELECT LOAD TEST ADDRESS
0376  4712          WCMWAT                          /WAIT UP TO WORD TIME
0377  5146          JMP     .+2                     /WORD, BY SKIP RECEIVED
0400  1037          TAD     K5324
0401  3040          DCA     TEM                     /SETUP EXT ADDRESS
0402  7431          CLA CLL CML RAR
0403  1040          TAD     TEM
0404  3140          DCA     SYSEXT
0405  4024          JMS     SYSEXT                  /SETUP SY-SECTOR STATUS
0406  4024          JMS     SYSEXT                  /READ STATUS REGISTER
0407  7402          HLT                             /CHECK MODEL 5
0410  7610          SKP CLA                         /STATUS - D.R.P.
0411  5046          JMP     T3E                     /ERROR, SKIP ON "DONE"
0412  4023          JMS     .+1                     /WAIT FOR TIME
0413  4014          JMS     GDREQ                   /GO UP TO ACTIVE STATUS
0414  4044          JMS     ERROR                   /READ STATUS
0415  4045          JMS     ERROR                   /CHECK STATUS
0416  4437          JMS     ERROR                   /ALL IS OK
0417  4400  .TSC,   ERROR                           /ERROR - WRITE BACK OF STATUS
0420  1010          TSTS                            /SCOPE LOOP POINTER
0421  5146  TST,    SCOP                            /TEST POINTER
                    /
                    /PRINTERS TEST
                    /
                    /VERIFY THAT PRECALIBRATE SETS TRANSFER
                    /DONE THEN DRIVE READY OF SELECTED DRIVE.
                    /
0422  4024  STA,    PRECAL                          /PRECALIBRATE
0423  0057          TAD     .                       /TEST POINTER
0424  5059          JMP     T4E                     /ERROR, WRITE OR STATUS
0425  4437          NERROR                          /O.K. TO NEXT TEST
0426  7402  T4C,    HLT                             /ERROR, DISK SKIP OR STATUS
0427  6001          TSTS                            /SCOPE LOOP POINTER
0430  5146  T4T,    SCOP                            /TEST POINTER
                    /
                    /PRECAL POTION AND STATUS TEST
                    /
                    /VERIFY THAT PSEEK ONLY TRACK 342 SETS
                    /TRANSFER DONE THEN DRIVE IS READY.
                    /
0431  7201  T5T4,   CLA CLL IAC                     /SETUP
0432  3030          DCA     DMPES                   /SETUP EXTENDED BIT
0433  1066          TAD     TR4012                  /SET LOWER DISK ADDRESS
0434  4423          SEEK                            /SEEK ONLY 342
0435  0077          TST                             /TEST POINTER
0436  5060          JMP     T5E                     /ERROR, SKIP ON STATUS
0437  4437          NERROR                          /O.K. TO NEXT TEST
0440  4400  T5F,    ERROR                           /ERROR, DISK SKIP OR STATUS
0441  0057          TSTS                            /SCOPE LOOP POINTER
0442  5046  T5T,    SCOP                            /TEST POINTER
                    /
```



```
0443  5443          JMP .-1                         /TO NEXT TEST
0444  0442          TSTS
                    /
0445  0017
0446  0121
0447  0535
0450  0401
0451  0400          PAGE
                    /
                    /VERIFY RESTORE CLEARS ADDRESS BITS
                    /
                    /SOMETHING IS WORKING, NOW SEEK ONLY TRACK 342
                    /THEN RECALIBRATE AND CHECK FOR NO ERRORS IN STATUS.
                    /
0452  7201  T5T6,   CLA CLL IAC
0453  3101          DCA     DMPES                   /SETUP EXTENDED BIT
0454  1066          TAD     TR4012
0455  4423          SEEK                            /SEEK ONLY 342
0456  0077          TST                             /TEST POINTER
0457  5212          JMP     T6F                     /ERROR, SKIP ON STATUS
0460  4024          RECAL                           /PRECALIBRATE
0461  0077          TST                             /TEST POINTER
0462  5212          JMP     T6F                     /ERROR, SKIP ON STATUS
0463  4437          NERROR                          /O.K. TO NEXT TEST
0464  4400  T6C,    ERROR                           /ERROR, STATUS
0465  0042          TSTS                            /SCOPE LOOP POINTER
0466  5307  T6T,    SCOP                            /TEST POINTER
                    /
                    /
                    /VERIFY RESTORE CLEARS ADDRESS BITS.
                    /
                    /VERIFY A PRECALIBRATE FROM CYLINDER,
                    /SURFACE, AND SECTOR 07777.
                    /
0467  3101  T5T7,   DCA     DMPES                   /CLEAR EXTENDED BIT
0470  7340          CLA CLL CMA
0471  4423          SEEK                            /SEEK ONLY
0472  0077          TST                             /TEST POINTER
0473  5226          JMP     T7F                     /ERROR, SEEK ONLY
0474  4024          RECAL                           /PRECALIBRATE
0475  0077          TST                             /TEST POINTER
0476  5226          JMP     T7E                     /ERROR, SKIP ON STATUS
0477  4437          NERROR                          /O.K. TO NEXT TEST
0500  4400  T7E,    ERROR                           /ERROR, STATUS
0501  0042          TSTS                            /SCOPE LOOP POINTER
0502  5307  T7T,    SCOP                            /TEST POINTER
                    /
                    /FIND AND SELECT ALL ADDRESSES
                    /
                    /VERIFY A SEEK ONLY AND FIND ALL ADDRESSES
                    /(INCREMENTING SEEK TEST, SEEK 0, 1, 2, 3, ETC.
                    /CHECK TIMING AND NO ERRORS IN STATUS.
                    /
0503  3135  T5T8,   DCA     TCNTRL
0504  3136          DCA     TCNTRH
```

```
[illegible]

/VERIFY RECALIBRATE FROM ALL
/CYLINDERS. CHECK ALL CYLINDERS
/TO VERIFY [illegible]

[illegible]

                                        /GO TO NEXT TEST

/SINGLE DRIVE VIBRATION TEST//
/
/SEEK ONLY SEEMS TO BE WORKING, NOW DO
/A FEW RANDOM SEEKS TO REALLY SHAKE THE
/DISK DRIVE UNDER TEST.
/
[illegible]   TSTL[illegible]   TAD   K7742          /AMOUNT OF PAUSES
[illegible]                     DCA   TCNTR1         /SETUP COUNTER
[illegible]                     RANDOM               /GENERATE A RANDOM ADDRESS
[illegible]                                          /SAVE IT
[illegible]                                          /LINK IS EXTENDED BIT
[illegible]                                          /SAVE IT
[illegible]                     RANDOM               /GENERATE A RANDOM ADDRESS
[illegible]                                          /SAVE IT
[illegible]                                          /LINK IS EXTENDED BIT
```

```
[illegible]

/[illegible] TEST

[illegible]

[illegible]
```

```
              [illegible]         PAGE [illegible]

     [illegible]                 TAD    DRIVSW              /START WITH THIS DRIVE
     [illegible]                 DCA    [illegible]
     [illegible]      [illegible] [illegible]
     [illegible]                 [illegible]
     [illegible]                 TAD    [illegible]          /ENABLE [illegible]
     [illegible]                 [illegible]
     [illegible]                 [illegible]
     [illegible]                 [illegible]
     [illegible]                 [illegible]
     [illegible]                 JMP    [illegible]          /ERROR [illegible]
     [illegible]                 CLRALL                     /[illegible]
     [illegible]                 ISZ    [illegible]
     [illegible]                 TAD    [illegible]          /[illegible] LAST DRIVE
     [illegible]                 JMP    [illegible]          /[illegible] TO [illegible]
     [illegible]                 [illegible]
     [illegible]      [illegible] ERROR                      /ERROR; [illegible]
     [illegible]                 [illegible]
     [illegible]                 [illegible]
             /SELECT ERROR TEST
             /
             /VERIFY A DRIVE STATUS ERROR ON ALL DRIVES
             /NOT ON THE CONTROL. ACTUALLY A SELECT ERROR.
             /
0712  7301   TST13, CLA CLL IAC
0713  4452          CLRALL                    /CLEAR CONTROL
0714  7346          CLA CLL CMA RTL
0715  1071          TAD    DRIVSW              /AMOUNT OF DRIVES
0716  3135          DCA    TCNTR1              /SETUP COUNTER
0717  7301          CLA CLL IAC
0720  1071          TAD    DRIVSW              /START WITH THIS DRIVE
0721  3136          DCA    TCNTR2
0722  1073   T13B,  TAD    K0702
0723  3141          TAD    STCON               /EXPECTED STATUS
0724  3144          DCA    CORES2              /SETUP COMPARE REGISTER
0725  1136          TAD    TCNTR2              /GET DRIVE NO.
0726  7104          CLL RAL                    /PUT IN UNIT BITS
0727  1015          TAD    K0200               /ENABLE SET DONE
0730  1003          TAD    K3200               /RECALIBRATE SEEK ONLY
0731  446           LDCMD                      /LOAD COMMAND
0732  4452          LDLDS                      /[illegible]
0733  4444          RDSTAT                     /READ STATUS
0734  4442          SCOMP1                     /CHECK RESULTS
0735  7640          SKP CLA                    /O.K.
0736  5306          JMP    T13T                /ERROR; STATUS
0737  4453          CLRALL                     /CLEAR STATUS
0740  1141          TAD    STCON               /EXPECTED STATUS
0741  3144          DCA    CORES2              /SETUP COMPARE
0742  4444          RDSTAT                     /READ STATUS
0743  4442          SCOMP1                     /CHECK RESULTS
0744  7640          SKP CLA                    /O.K.
0745  5306          JMP    T13T                /ERROR; STATUS
0746  7301          CLA CLL IAC
0747  4452          CLRALL                     /CLEAR [illegible]
0750  3144          DCA    CORES2              /SETUP COMPARE
0751  4444          RDSTAT                     /READ STATUS
```

```
[illegible]

[illegible]

/TEST 1
/
/VERIFY THAT SKIP AND STATUS BOTH DECODE AFTER
/WRITE ALL AND READ ALL PROKAS.
/THIS SHOULD WRITE ALL ZEROS ON DISK
/AND ALL ZEROS OFF THE DISK DESTROY PROGR.
/
[illegible]  ZERO UNTIL BUSY
[illegible]  WRITE ALL FUNCTION
[illegible]  SET UP COMPARE
[illegible]  DISK WRITE ALL
[illegible]  TEST POINTER
[illegible]  SKIP ON BUSY,S
[illegible]  READ ALL
[illegible]  READ ALL
[illegible]  TEST POINTER
[illegible]  SKIP ON STATUS
[illegible]  TO NEXT TEST
[illegible]  WRITE ALL
[illegible]  DISK READ FOLLOW
[illegible]  TEST POINTER
[illegible]  TEST.  [illegible]

/TEST 2
/
/VERIFY THAT SKIP AND STATUS BOTH DECODE AFTER
/WRITE ALL AND READ ALL PROKAS.
/THIS SHOULD WRITE ALL ZEROS ON AND READ ALL
/ALL PROGS OFF THE DISK DESTROY PROGR.
/
[illegible]  FUNCTION WRITE ALL
[illegible]  SET UP
[illegible]  COMPARE
[illegible]  DISK WRITE ALL
[illegible]  PROCEED
[illegible]  DISK SKIP ON STATUS
[illegible]  FUNCTION READ ALL
[illegible]  SET
[illegible]  TEST POINTER
```

```
/ [illegible]
      [illegible listing lines]
            /
            /VERIFY ALL [illegible] CAN BE ACCESSED
            /
            /[illegible]
            /[illegible] 0204 [illegible]
            /[illegible] THE BUFFER
            /EQUAL THE DISK ADDRESS, [illegible] THE DATA [illegible]
            /[illegible]
            /
      [illegible listing lines]
            /
            [illegible]
            /
      [illegible]  PAGE
```

```
/     [illegible]            PAGE [illegible]

            /
            /
            /VERIFY ALL [illegible] CAN BE ACCESSED.
            /
            /VERIFY [illegible] DATA [illegible]
            /AND USE DATA [illegible] 0240 [illegible] 0207.
            /[illegible] THE BUFFER
            /EQUAL THE DISK ADDR [illegible]
            /DATA WITH READ DATA.
            /
1200  [illegible]  TST[illegible],  TAD    [illegible]
1201  [illegible]          DCA    [illegible]          /[illegible] COUNTER
1202  [illegible]  T[illegible],   TAD    [illegible]
1203  [illegible]          [illegible]                 /[illegible]
1204  [illegible]          TAD    [illegible]          /[illegible]
1205  [illegible]          DCA    [illegible]          /[illegible]
1206  [illegible]          TAD    [illegible]
1207  [illegible]          AND    [illegible]          /[illegible]
1210  [illegible]          DCA I  BUFTRA             /[illegible] ADDRESS [illegible]
1211  [illegible]          TAD    [illegible]          /[illegible]
1212  [illegible]          DCA I  [illegible]          /[illegible] ADDRESS WORD IN BUFFER
1213  [illegible]          TAD    [illegible]          /[illegible] ADDRESS
1214  4[illegible]25       DISKGO                      /[illegible]
1215  4[illegible]         TIBF                        /[illegible]
1216  5[illegible]         JMP    [illegible]          /ERROR, STATUS OR SKIP
1217  4[illegible]         KILBUF                      /CLEAR DATA BUFFER
1220  [illegible]          DCA    [illegible]          /SETUP COMMAND
1221  [illegible]          TAD    [illegible]
1222  [illegible]          AND    K[illegible]         /[illegible]
1223  4[illegible]         DISKGO                      /[illegible] DATA
1224  [illegible]          TIBF                        /TEST [illegible]
1225  [illegible]          JMP    T[illegible]         /ERROR, STATUS OR SKIP
1226  [illegible]          TAD    K[illegible]
1227  [illegible]          FIGURE                      /WORD BY WORD COMPARE OF DATA
1230  [illegible]          SZA CLA                     /[illegible]
1231  [illegible]          JMP    T[illegible]         /[illegible] DATA
1232  [illegible]          ISZ    [illegible]          /[illegible] COUNTER
1233  [illegible]          JMP    T[illegible]         /[illegible]
1234  [illegible]          [illegible]                 /[illegible]
1235  [illegible]  T[illegible],   ERROR                       /[illegible] DATA [illegible]
1236  [illegible]          TSTAB                       /[illegible] POINTER
1237  [illegible]  T[illegible],   [illegible]                 /[illegible]
            /
            /VERIFY HALF BLOCK TRANSFERS.
            /
            /VERIFY THAT DISK [illegible] AFTER [illegible]
            /IF THE HALF BIT IS SET, THE REMAINDER OF THE
            /[illegible] BUFFER SHOULD BE [illegible].
            /THE FIRST TWO WORDS OF THE BUFFER SHOULD
            /EQUAL THE ABSOLUTE DISK ADDRESS.
            /THE DATA PATTERN [illegible] IS [illegible]
            /
1240  [illegible]  T[illegible],   TAD    K2525
1241  [illegible]          FILBUF                      /FILL BUFFER WITH DATA
1242  [illegible]          TAD    [illegible]
```

[illegible]

```
[illegible]
```

```
[illegible]
```

```
[illegible]

        /VERIFY ALL CYLINDERS CAN BE ADDRESSED INDIVIDUALLY
        /
        /VERIFY A WRITE ALL TO ALL OF CYLINDER [illegible]
        /USE DATA PATTERN [illegible]
        /CHECK FOR NO ERRORS IN STAT S
        /ALSO FIRST TWO WORDS OF EVERY SECTOR
        /EQUAL TO NUMBER OF SECTOR
        /
                                        /SETUP SECTOR COUNTER
                                        /FILL BUFFER WITH DATA
                                        /MASK SECTOR BITS
                                        /SETUP ADDRESS WORD IN BUFFER
                                        /GET DRIVE NUMBER
                                        /SETUP ADDRESS WORD IN BUFFER
                                        /SETUP COMMAND
                                        /GET TRACK AND SECTOR
        /
        /VERIFY THAT THE DATA WRITTEN ABOVE
        /ON CYL [illegible] WAS O.K. CHECK WITH READ ALL
        /
[illegible]
```

```
[illegible]  [illegible]          AND     [illegible]
1740  3343          JMP     DYL.5B
1741  4425                                          /G.S. [illegible]
1742  3736          [illegible]                     /[illegible]
1743  [illegible]   JMP     [illegible]             /[illegible]
1744  [illegible]   TAD     [illegible]
1745  [illegible]   [illegible]                     /[illegible]
1746  4497          [illegible]                     /[illegible]
1747  7621          [illegible]                     /[illegible]
1748  [illegible]   JMP     [illegible]             /[illegible]
1749  3535          ISZ     [illegible]             /[illegible]
1750  3770          JMP     [illegible]             /[illegible]
1751  1117          [illegible]
1752  4447    [illegible]  CPRGA                    /[illegible]
1753  1045          [illegible]                     /[illegible]
1754  5543    [illegible]  [illegible]              /[illegible]

                /VERIFY ALL [illegible] [illegible]
                /
                /[illegible] [illegible] [illegible]
                /[illegible] [illegible]
                /CHECK FOR [illegible]
                /[illegible]
                /[illegible]
1755  1132    [illegible]  TAD     K7749
1756  1176          DCA     TCNTR1                  /[illegible]
1757  1112          TAD     K3525
1758  4425          [illegible]                     /[illegible]
1759  1135    [illegible]  TAD     TCNTR1
1760  4117          AND     K7037                   /[illegible]
1761  1035          TAD     [illegible]
1762  [illegible]   DCA     [illegible]             /[illegible]
1763  7421          CLA CLL CMA
1764  4071          TAD     [illegible]             /[illegible]
1765  7104          DCA     [illegible]             /[illegible]
1766  [illegible]   CLA CLL TAD
1767  [illegible]   TAD     [illegible]             /[illegible]
1768  [illegible]   DCA     [illegible]             /[illegible]
1769  [illegible]   TAD     [illegible]             /[illegible]
1770  [illegible]   [illegible]                     /[illegible]
1771  [illegible]   JMP     [illegible]             /[illegible]
1772  [illegible]   ISZ     [illegible]             /[illegible]
1773  [illegible]   JMP     [illegible]             /[illegible]

                /VERIFY THAT THE DATA WRITTEN ABOVE
                /[illegible] [illegible] [illegible] [illegible] [illegible] [illegible] [illegible]
                /
1774  [illegible]   TAD     [illegible]
1775  [illegible]   DCA     TCNTR1                  /[illegible]
1776  [illegible]  [illegible]  [illegible]          /[illegible]
1777  [illegible]   CLA CLL TAD                     /[illegible]
2000  [illegible]   TAD     [illegible]             /[illegible]
2001  [illegible]   DCA     [illegible]             /[illegible]
2002  [illegible]   JMP     [illegible]             /[illegible]
2003  [illegible]   JMP     [illegible]             /[illegible]
```



```
2004  [illegible]   TAD     [illegible]
2005  [illegible]   [illegible]                     /[illegible]
2006  [illegible]   [illegible]                     /[illegible]
2007  [illegible]   [illegible]                     /[illegible]
2010  [illegible]   JMP     [illegible]             /[illegible]
2011  [illegible]   [illegible]                     /[illegible]
2012  [illegible]   [illegible]                     /[illegible]
2013  [illegible]   [illegible]                     /[illegible]
2014  [illegible]   [illegible]                     /[illegible]
2015  [illegible]   [illegible]                     /[illegible]
2016  [illegible]   [illegible]                     /[illegible]
2017  [illegible]   [illegible]                     /[illegible]
2018  [illegible]   [illegible]                     /[illegible]
2019  [illegible]   [illegible]                     /[illegible]
2020  [illegible]   [illegible]                     /[illegible]
2021  [illegible]   [illegible]                     /[illegible]
2022  [illegible]   [illegible]                     /[illegible]
2023  [illegible]   [illegible]                     /[illegible]
2024  [illegible]   [illegible]                     /[illegible]
2025  [illegible]   [illegible]                     /[illegible]
2026  [illegible]   [illegible]                     /[illegible]
2027  [illegible]   [illegible]                     /[illegible]
2028  [illegible]   [illegible]                     /[illegible]
2029  [illegible]   [illegible]                     /[illegible]
2030  [illegible]   [illegible]                     /[illegible]
2031  [illegible]   [illegible]                     /[illegible]
2032  [illegible]   [illegible]                     /[illegible]
2033  [illegible]   [illegible]                     /[illegible]
2034  [illegible]   [illegible]                     /[illegible]
2035  [illegible]   [illegible]                     /[illegible]
2036  [illegible]   [illegible]                     /[illegible]
2037  [illegible]   [illegible]                     /[illegible]
2038  [illegible]   [illegible]                     /[illegible]
2039  [illegible]   [illegible]                     /[illegible]
2040  [illegible]   [illegible]                     /[illegible]
2041  [illegible]   [illegible]                     /[illegible]
2042  [illegible]   [illegible]                     /[illegible]
2043  [illegible]   [illegible]                     /[illegible]
2044  [illegible]   [illegible]                     /[illegible]
2045  [illegible]   [illegible]                     /[illegible]
2046  [illegible]   [illegible]                     /[illegible]
2047  [illegible]   [illegible]                     /[illegible]
2048  [illegible]   [illegible]                     /[illegible]
2049  [illegible]   [illegible]                     /[illegible]
2050  [illegible]   [illegible]                     /[illegible]
2051  [illegible]   [illegible]                     /[illegible]
2052  [illegible]   [illegible]                     /[illegible]
2053  [illegible]   [illegible]                     /[illegible]
2054  [illegible]   [illegible]                     /[illegible]
2055  [illegible]   [illegible]                     /[illegible]
2056  [illegible]   [illegible]                     /[illegible]
2057  [illegible]   [illegible]                     /[illegible]
2058  [illegible]   [illegible]                     /[illegible]
2059  [illegible]   [illegible]                     /[illegible]
2060  [illegible]   [illegible]                     /[illegible]
2061  [illegible]   [illegible]                     /[illegible]
2062  [illegible]   [illegible]                     /[illegible]
2063  [illegible]   [illegible]                     /[illegible]
2064  [illegible]   [illegible]                     /[illegible]
2065  [illegible]   [illegible]                     /[illegible]
2066  [illegible]   [illegible]                     /[illegible]
2067  [illegible]   [illegible]                     /[illegible]
2068  [illegible]   [illegible]                     /[illegible]
2069  [illegible]   [illegible]                     /[illegible]
2070  [illegible]   [illegible]                     /[illegible]
2071  [illegible]   [illegible]                     /[illegible]
2072  [illegible]   [illegible]                     /[illegible]
2073  [illegible]   [illegible]                     /[illegible]
2074  [illegible]   [illegible]                     /[illegible]
2075  [illegible]   [illegible]                     /[illegible]
2076  [illegible]   [illegible]                     /[illegible]
2077  [illegible]   [illegible]                     /[illegible]
2078  [illegible]   [illegible]                     /[illegible]
2079  [illegible]   [illegible]                     /[illegible]
2080  [illegible]   [illegible]                     /[illegible]
2081  [illegible]   [illegible]                     /[illegible]
2082  [illegible]   [illegible]                     /[illegible]
2083  [illegible]   [illegible]                     /[illegible]
2084  [illegible]   [illegible]                     /[illegible]
2085  [illegible]   [illegible]                     /[illegible]
2086  [illegible]   [illegible]                     /[illegible]
2087  [illegible]   [illegible]                     /[illegible]
2088  [illegible]   [illegible]                     /[illegible]
2089  [illegible]   [illegible]                     /[illegible]
2090  [illegible]   [illegible]                     /[illegible]
2091  [illegible]   [illegible]                     /[illegible]
2092  [illegible]   [illegible]                     /[illegible]
2093  [illegible]   [illegible]                     /[illegible]
2094  [illegible]   [illegible]                     /[illegible]
2095  [illegible]   [illegible]                     /[illegible]
2096  [illegible]   [illegible]                     /[illegible]
2097  [illegible]   [illegible]                     /[illegible]
2098  [illegible]   [illegible]                     /[illegible]
2099  [illegible]   [illegible]                     /[illegible]
2100  [illegible]   [illegible]                     /[illegible]
2101  [illegible]   [illegible]                     /[illegible]
2102  [illegible]   [illegible]                     /[illegible]
2103  [illegible]   [illegible]                     /[illegible]
2104  [illegible]   [illegible]                     /[illegible]
2105  [illegible]   [illegible]                     /[illegible]
2106  [illegible]   [illegible]                     /[illegible]
2107  [illegible]   [illegible]                     /[illegible]
2108  [illegible]   [illegible]                     /[illegible]
2109  [illegible]   [illegible]                     /[illegible]
2110  [illegible]   [illegible]                     /[illegible]
2111  [illegible]   [illegible]                     /[illegible]
2112  [illegible]   [illegible]                     /[illegible]
2113  [illegible]   [illegible]                     /[illegible]
2114  [illegible]   [illegible]                     /[illegible]
2115  [illegible]   [illegible]                     /[illegible]
2116  [illegible]   [illegible]                     /[illegible]
2117  [illegible]   [illegible]                     /[illegible]
2118  [illegible]   [illegible]                     /[illegible]
2119  [illegible]   [illegible]                     /[illegible]
2120  [illegible]   [illegible]                     /[illegible]
2121  [illegible]   [illegible]                     /[illegible]
2122  [illegible]   [illegible]                     /[illegible]
2123  [illegible]   [illegible]                     /[illegible]
2124  [illegible]   [illegible]                     /[illegible]
2125  [illegible]   [illegible]                     /[illegible]
2126  [illegible]   [illegible]                     /[illegible]
2127  [illegible]   [illegible]                     /[illegible]
2128  [illegible]   [illegible]                     /[illegible]
2129  [illegible]   [illegible]                     /[illegible]
2130  [illegible]   [illegible]                     /[illegible]
2131  [illegible]   [illegible]                     /[illegible]
2132  [illegible]   [illegible]                     /[illegible]
2133  [illegible]   [illegible]                     /[illegible]
2134  [illegible]   [illegible]                     /[illegible]
2135  [illegible]   [illegible]                     /[illegible]
2136  [illegible]   [illegible]                     /[illegible]
2137  [illegible]   [illegible]                     /[illegible]
2138  [illegible]   [illegible]                     /[illegible]
2139  [illegible]   [illegible]                     /[illegible]
2140  [illegible]   [illegible]                     /[illegible]
2141  [illegible]   [illegible]                     /[illegible]
2142  [illegible]   [illegible]                     /[illegible]
2143  [illegible]   [illegible]                     /[illegible]
2144  [illegible]   [illegible]                     /[illegible]
2145  [illegible]   [illegible]                     /[illegible]
2146  [illegible]   [illegible]                     /[illegible]
2147  [illegible]   [illegible]                     /[illegible]
2148  [illegible]   [illegible]                     /[illegible]
2149  [illegible]   [illegible]                     /[illegible]
2150  [illegible]   [illegible]                     /[illegible]
2151  [illegible]   [illegible]                     /[illegible]
2152  [illegible]   [illegible]                     /[illegible]
2153  [illegible]   [illegible]                     /[illegible]
2154  [illegible]   [illegible]                     /[illegible]
2155  [illegible]   [illegible]                     /[illegible]
2156  [illegible]   [illegible]                     /[illegible]
2157  [illegible]   [illegible]                     /[illegible]
2158  [illegible]   [illegible]                     /[illegible]
2159  [illegible]   [illegible]                     /[illegible]
2160  [illegible]   [illegible]                     /[illegible]
2161  [illegible]   [illegible]                     /[illegible]
2162  [illegible]   [illegible]                     /[illegible]
2163  [illegible]   [illegible]                     /[illegible]
2164  [illegible]   [illegible]                     /[illegible]
2165  [illegible]   [illegible]                     /[illegible]
2166  [illegible]   [illegible]                     /[illegible]
2167  [illegible]   [illegible]                     /[illegible]
2168  [illegible]   [illegible]                     /[illegible]
2169  [illegible]   [illegible]                     /[illegible]
2170  [illegible]   [illegible]                     /[illegible]
2171  [illegible]   [illegible]                     /[illegible]
2172  [illegible]   [illegible]                     /[illegible]
2173  [illegible]   [illegible]                     /[illegible]
2174  [illegible]   [illegible]                     /[illegible]
2175  [illegible]   [illegible]                     /[illegible]
2176  [illegible]   [illegible]                     /[illegible]
2177  [illegible]   [illegible]                     /[illegible]
2178  [illegible]   [illegible]                     /[illegible]
2179  [illegible]   [illegible]                     /[illegible]
2180  [illegible]   [illegible]                     /[illegible]
2181  [illegible]   [illegible]                     /[illegible]
2182  [illegible]   [illegible]                     /[illegible]
2183  [illegible]   [illegible]                     /[illegible]
2184  [illegible]   [illegible]                     /[illegible]
2185  [illegible]   [illegible]                     /[illegible]
2186  [illegible]   [illegible]                     /[illegible]
2187  [illegible]   [illegible]                     /[illegible]
2188  [illegible]   [illegible]                     /[illegible]
2189  [illegible]   [illegible]                     /[illegible]
2190  [illegible]   [illegible]                     /[illegible]
2191  [illegible]   [illegible]                     /[illegible]
2192  [illegible]   [illegible]                     /[illegible]
2193  [illegible]   [illegible]                     /[illegible]
2194  [illegible]   [illegible]                     /[illegible]
2195  [illegible]   [illegible]                     /[illegible]
2196  [illegible]   [illegible]                     /[illegible]
2197  [illegible]   [illegible]                     /[illegible]
2198  [illegible]   [illegible]                     /[illegible]
2199  [illegible]   [illegible]                     /[illegible]
2200  [illegible]   [illegible]                     /[illegible]
2201  [illegible]   [illegible]                     /[illegible]
2202  [illegible]   [illegible]                     /[illegible]
2203  [illegible]   [illegible]                     /[illegible]
2204  [illegible]   [illegible]                     /[illegible]
2205  [illegible]   [illegible]                     /[illegible]
2206  [illegible]   [illegible]                     /[illegible]
2207  [illegible]   [illegible]                     /[illegible]
2208  [illegible]   [illegible]                     /[illegible]
2209  [illegible]   [illegible]                     /[illegible]
2210  [illegible]   [illegible]                     /[illegible]
2211  [illegible]   [illegible]                     /[illegible]
2212  [illegible]   [illegible]                     /[illegible]
2213  [illegible]   [illegible]                     /[illegible]
2214  [illegible]   [illegible]                     /[illegible]
2215  [illegible]   [illegible]                     /[illegible]
2216  [illegible]   [illegible]                     /[illegible]
2217  [illegible]   [illegible]                     /[illegible]
2218  [illegible]   [illegible]                     /[illegible]
2219  [illegible]   [illegible]                     /[illegible]
2220  [illegible]   [illegible]                     /[illegible]
2221  [illegible]   [illegible]                     /[illegible]
2222  [illegible]   [illegible]                     /[illegible]
2223  [illegible]   [illegible]                     /[illegible]
2224  [illegible]   [illegible]                     /[illegible]
2225  [illegible]   [illegible]                     /[illegible]
2226  [illegible]   [illegible]                     /[illegible]
2227  [illegible]   [illegible]                     /[illegible]
2228  [illegible]   [illegible]                     /[illegible]
2229  [illegible]   [illegible]                     /[illegible]
2230  [illegible]   [illegible]                     /[illegible]
2231  [illegible]   [illegible]                     /[illegible]
2232  [illegible]   [illegible]                     /[illegible]
2233  [illegible]   [illegible]                     /[illegible]
2234  [illegible]   [illegible]                     /[illegible]
2235  [illegible]   [illegible]                     /[illegible]
2236  [illegible]   [illegible]                     /[illegible]
2237  [illegible]   [illegible]                     /[illegible]
2238  [illegible]   [illegible]                     /[illegible]
2239  [illegible]   [illegible]                     /[illegible]
2240  [illegible]   [illegible]                     /[illegible]
2241  [illegible]   [illegible]                     /[illegible]
2242  [illegible]   [illegible]                     /[illegible]
2243  [illegible]   [illegible]                     /[illegible]
2244  [illegible]   [illegible]                     /[illegible]
2245  [illegible]   [illegible]                     /[illegible]
2246  [illegible]   [illegible]                     /[illegible]
2247  [illegible]   [illegible]                     /[illegible]
2248  [illegible]   [illegible]                     /[illegible]
2249  [illegible]   [illegible]                     /[illegible]
2250  [illegible]   [illegible]                     /[illegible]
2251  [illegible]   [illegible]                     /[illegible]
2252  [illegible]   [illegible]                     /[illegible]
2253  [illegible]   [illegible]                     /[illegible]
2254  [illegible]   [illegible]                     /[illegible]
2255  [illegible]   [illegible]                     /[illegible]
2256  [illegible]   [illegible]                     /[illegible]
2257  [illegible]   [illegible]                     /[illegible]
2258  [illegible]   [illegible]                     /[illegible]
2259  [illegible]   [illegible]                     /[illegible]
2260  [illegible]   [illegible]                     /[illegible]
2261  [illegible]   [illegible]                     /[illegible]
2262  [illegible]   [illegible]                     /[illegible]
2263  [illegible]   [illegible]                     /[illegible]
2264  [illegible]   [illegible]                     /[illegible]
2265  [illegible]   [illegible]                     /[illegible]
2266  [illegible]   [illegible]                     /[illegible]
2267  [illegible]   [illegible]                     /[illegible]
2268  [illegible]   [illegible]                     /[illegible]
2269  [illegible]   [illegible]                     /[illegible]
2270  [illegible]   [illegible]                     /[illegible]
2271  [illegible]   [illegible]                     /[illegible]
2272  [illegible]   [illegible]                     /[illegible]
2273  [illegible]   [illegible]                     /[illegible]
2274  [illegible]   [illegible]                     /[illegible]
2275  [illegible]   [illegible]                     /[illegible]
2276  [illegible]   [illegible]                     /[illegible]
2277  [illegible]   [illegible]                     /[illegible]
2278  [illegible]   [illegible]                     /[illegible]
2279  [illegible]   [illegible]                     /[illegible]
2280  [illegible]   [illegible]                     /[illegible]
2281  [illegible]   [illegible]                     /[illegible]
2282  [illegible]   [illegible]                     /[illegible]
2283  [illegible]   [illegible]                     /[illegible]
2284  [illegible]   [illegible]                     /[illegible]
2285  [illegible]   [illegible]                     /[illegible]
2286  [illegible]   [illegible]                     /[illegible]
2287  [illegible]   [illegible]                     /[illegible]
2288  [illegible]   [illegible]                     /[illegible]
2289  [illegible]   [illegible]                     /[illegible]
2290  [illegible]   [illegible]                     /[illegible]
2291  [illegible]   [illegible]                     /[illegible]
2292  [illegible]   [illegible]                     /[illegible]
2293  [illegible]   [illegible]                     /[illegible]
2294  [illegible]   [illegible]                     /[illegible]
2295  [illegible]   [illegible]                     /[illegible]
2296  [illegible]   [illegible]                     /[illegible]
2297  [illegible]   [illegible]                     /[illegible]
2298  [illegible]   [illegible]                     /[illegible]
2299  [illegible]   [illegible]                     /[illegible]
2300  [illegible]   [illegible]                     /[illegible]
2301  [illegible]   [illegible]                     /[illegible]
2302  [illegible]   [illegible]                     /[illegible]
2303  [illegible]   [illegible]                     /[illegible]
2304  [illegible]   [illegible]                     /[illegible]
2305  [illegible]   [illegible]                     /[illegible]
2306  [illegible]   [illegible]                     /[illegible]
2307  [illegible]   [illegible]                     /[illegible]
2308  [illegible]   [illegible]                     /[illegible]
2309  [illegible]   [illegible]                     /[illegible]
2310  [illegible]   [illegible]                     /[illegible]
2311  [illegible]   [illegible]                     /[illegible]
2312  [illegible]   [illegible]                     /[illegible]
2313  [illegible]   [illegible]                     /[illegible]
2314  [illegible]   [illegible]                     /[illegible]
2315  [illegible]   [illegible]                     /[illegible]
2316  [illegible]   [illegible]                     /[illegible]
2317  [illegible]   [illegible]                     /[illegible]
2318  [illegible]   [illegible]                     /[illegible]
2319  [illegible]   [illegible]                     /[illegible]
2320  [illegible]   [illegible]                     /[illegible]
2321  [illegible]   [illegible]                     /[illegible]
2322  [illegible]   [illegible]                     /[illegible]
2323  [illegible]   [illegible]                     /[illegible]
2324  [illegible]   [illegible]                     /[illegible]
2325  [illegible]   [illegible]                     /[illegible]
2326  [illegible]   [illegible]                     /[illegible]
2327  [illegible]   [illegible]                     /[illegible]
2328  [illegible]   [illegible]                     /[illegible]
2329  [illegible]   [illegible]                     /[illegible]
2330  [illegible]   [illegible]                     /[illegible]
2331  [illegible]   [illegible]                     /[illegible]
2332  [illegible]   [illegible]                     /[illegible]
2333  [illegible]   [illegible]                     /[illegible]
2334  [illegible]   [illegible]                     /[illegible]
2335  [illegible]   [illegible]                     /[illegible]
2336  [illegible]   [illegible]                     /[illegible]
2337  [illegible]   [illegible]                     /[illegible]
2338  [illegible]   [illegible]                     /[illegible]
2339  [illegible]   [illegible]                     /[illegible]
2340  [illegible]   [illegible]                     /[illegible]
2341  [illegible]   [illegible]                     /[illegible]
2342  [illegible]   [illegible]                     /[illegible]
2343  [illegible]   [illegible]                     /[illegible]
2344  [illegible]   [illegible]                     /[illegible]
2345  [illegible]   [illegible]                     /[illegible]
2346  [illegible]   [illegible]                     /[illegible]
2347  [illegible]   [illegible]                     /[illegible]
2348  [illegible]   [illegible]                     /[illegible]
2349  [illegible]   [illegible]                     /[illegible]
2350  [illegible]   [illegible]                     /[illegible]
2351  [illegible]   [illegible]                     /[illegible]
2352  [illegible]   [illegible]                     /[illegible]
2353  [illegible]   [illegible]                     /[illegible]
2354  [illegible]   [illegible]                     /[illegible]
2355  [illegible]   [illegible]                     /[illegible]
2356  [illegible]   [illegible]                     /[illegible]
2357  [illegible]   [illegible]                     /[illegible]
2358  [illegible]   [illegible]                     /[illegible]
2359  [illegible]   [illegible]                     /[illegible]
2360  [illegible]   [illegible]                     /[illegible]
2361  [illegible]   [illegible]                     /[illegible]
2362  [illegible]   [illegible]                     /[illegible]
2363  [illegible]   [illegible]                     /[illegible]
2364  [illegible]   [illegible]                     /[illegible]
2365  [illegible]   [illegible]                     /[illegible]
2366  [illegible]   [illegible]                     /[illegible]
2367  [illegible]   [illegible]                     /[illegible]
2368  [illegible]   [illegible]                     /[illegible]
2369  [illegible]   [illegible]                     /[illegible]
2370  [illegible]   [illegible]                     /[illegible]
2371  [illegible]   [illegible]                     /[illegible]
2372  [illegible]   [illegible]                     /[illegible]
2373  [illegible]   [illegible]                     /[illegible]
2374  [illegible]   [illegible]                     /[illegible]
2375  [illegible]   [illegible]                     /[illegible]
2376  [illegible]   [illegible]                     /[illegible]
2377  [illegible]   [illegible]                     /[illegible]
```

[illegible]

[illegible]

[illegible]

```
[illegible]

                              /[illegible]
                               TOTAL                              /SCOPE LOOP [illegible]
        [illegible]    TULL,   A[illegible]                       /[illegible]
                       /
                       /[illegible]
                       /[illegible] SELECTING [illegible]
                       /
                       /[illegible] WRITE [illegible] TO ALL OF CYLINDER [illegible]
                       /[illegible]
                       /[illegible] AND 2[illegible] [illegible]
                       /[illegible]
                       /[illegible] FIRST [illegible]
                       /[illegible] EQUAL TO ADDRESS OF SECTOR.
                       /
                       /FIRST WRITE CYLINDER [illegible]
                       /
        [illegible]    [illegible]  TAD     K7740
                               DCA     TCNTR1                     /[illegible]
                               TAD     K[illegible]
                               FILBUF                             /FILL [illegible] WITH DATA
                               CLA CLL TAD
                               TAD     DRIVNO                     /GET DRIVE NUMBER
                               DCA     [illegible]                /[illegible] WORD IN BUFFER
                       T32R1,  TAD     TCNTR1
                               AND     K[illegible]               /MASK SECTOR BITS
                               TAD     [illegible]                /[illegible] CYLINDER
                               DCA I   [illegible]                /SECTOR [illegible]
                               CLA CLL [illegible]
                               TAD     K[illegible]               /[illegible]
                               DCA     CMRTG                      /SETUP COMMAND
                               TAD I   [illegible]                /SECTOR TO [illegible]
                               DISKIO                             /[illegible]
                               TEST                               /[illegible] POINTER
                               JMP     T32E                       /ERROR, STATUS OR SKIP
                               ISZ     TCNTR1                     /[illegible]
                               JMP     T32R1                      /[illegible]
                       /
                       /WRITE ALL [illegible] ALL OF CYLINDER [illegible]
                       /
        [illegible]                TAD     K7740
                               DCA     TCNTR1                     /SETUP [illegible]
                               TAD     K2525
                               FILBUF                             /FILL BUFFER WITH DATA
                       T32R2,  TAD     TCNTR1
                               AND     K[illegible]               /MASK SECTOR BITS
                               DCA I   [illegible]                /SETUP ADDRESS WORD IN BUFFER
                               TAD     DRIVNO                     /GET DRIVE NUMBER
                               DCA I   [illegible]                /SETUP ADDRESS WORD IN BUFFER
                               TAD     [illegible]                /[illegible] WRITE [illegible]
                               DCA     CMRTG                      /SETUP COMMAND
                               TAD I   [illegible]                /[illegible]
                               DISKIO                             /DISK WRITE ALL
                               TEST                               /[illegible]
                               JMP     T32E                       /ERROR, [illegible] OR STATUS
                               ISZ     TCNTR1                     /[illegible]
                               JMP     T32R2                      /[illegible]
```

```
/VERIFY ... THE DATA WRITTEN ABOVE
[illegible]

/FORCE CYLINDER ADDRESS ERROR
/
/VERIFY ... CYLINDER ADDRESS ERROR ...
[illegible]
[illegible]
[illegible]

[illegible]
        2522  [illegible]          [illegible]
        [illegible]
        2567  [illegible]  TSKE,   [illegible]
                           /
                           PAGE
/
/FORCE CRC ERROR
/
/VERIFY A CRC ERROR BY ENTERING MAINTENANCE
/AND SHIFTING ... IN WRITE ALL MODE.
/
              TSTB5,  CLA CLL IAC
[illegible]
```

```
[illegible]
[illegible]
[illegible]
```

```
PAGE   [illegible]    [illegible]        [illegible]    PAGE [illegible]

[illegible]  [illegible]  [illegible]                    /[illegible]
[illegible]  [illegible]  [illegible]  [illegible]       /[illegible]
[illegible]  [illegible]  [illegible]                    /[illegible]
[illegible]  [illegible]  [illegible]  -1                /[illegible]
[illegible]  [illegible]  [illegible]                    /[illegible]
[illegible]  [illegible]  [illegible]  [illegible]       
```

```
                /THE DATA ON THE COMPLETE DISK SHOULD BE 4525 + 3288
                /HOWEVER, THE TWO FIRST WORDS OF EVERY SECTOR
                /SHOULD EQUAL THE ABSOLUTE DISK ADDRESS.
                /
3253  7200  TST40.  TAD     K7200                    /LENGTH OF LINE FOR THIS TEST
3254  3141          DCA     TCNTR6                   /GET AN ADDRESS FOR SEEK/READ
3255  4422  T40R.   RANADD                           /SAVE IT
3256  3137          DCA     TCNTR3                   /LINK IS EXTENDED
3257  7024          RAL                              /SAVE IT
3258  3140          DCA     TCNTR4                   /SETUP COMMAND
3261  3141  T40S.   TAD     TCNTR4
3262  3491          DCA     DMREG                    /DISK READ DATA
3263  3137          TAD     TCNTR3
3264  4425          DISKRD                           /TEST RECEIVER
3265  5276          JMP     T40E                     /ERROR: SKIP OR STATUS
3266  4142          TAD     K2525                    /WORD BY WORD COMPARE ON DATA
3267  4437          FIGURE
3270  7412          SKP CLA                          /DATA O.K.
3271  5276          JMP     T40E                     /DATA ERROR
3272  2141          ISZ     TCNTR6
3273  5255          JMP     T40R                     /LOOP
3274  4437          NERROR                           /O.K. TO NEXT TEST
3275  4442  T40E.   ERROR                            /ERROR: READ
3276  5253          TSTAD                            /SCOPE LOOP POINTER
3277  3200  T40T.   ZERO                             /NEXT POINTER
                /
                /RANDOM SEEK THEN WRITE THEN SEEK THEN READ TEST
                /THE DATA WRITTEN IS 2525 + 3288  AND THE TWO
                /FIRST WORDS OF THE SECTOR ARE SET TO THE DISK ADDRESS.
                /
3301  7110  TST41.  TAD     K7700
3302  3141          DCA     TCNTR6                   /RESS COUNTER
3303  4422  T41R.   RANADD                           /GENERATE RANDOM NUMBER
3304  4016          ENT     K8857
3305  1177          TAD     K7760
3306  3160          DCA     DATCNT                   /SAVE COUNTER
3307  4422          RANADD                           /RANDOM SEEK DISK ADDRESS
3310  3135          DCA     TCNTR2                   /SAVE
3311  7024          RAL                              /LINK IS EXTENDED BIT
3312  3136          DCA     TCNTR2                   /SAVE
3313  4422          RANADD                           /RANDOM SEEK/WRITE DISK ADDRESS
3314  3137          DCA     TCNTR3                   /SAVE
3315  7024          RAL                              /LINK IS EXTENDED BIT
3316  3140          DCA     TCNTR4                   /SAVE IT
3317  4112  T41S.   TAD     K2525
3320  4436          FILBUF                           /FILL BUFFER
3321  3140          TAD     TCNTR4                   /GET EXTENDED BIT
3322  1076          TAD     DRIVNO                   /GET DRIVE NUMBER
3323  3461          DCA I   ARCTRW                   /SEEK ADDRESS ADDD IN BUFFER
3324  3137          TAD     TCNTR3                   /LOWER DISK ADDRESS
3325  3463          DCA I   XLCTRW                   /DISK ADDRESS ADDD IN BUFFER
3326  3136          TAD     TCNTR2                   /GET EXTENDED BIT
3327  3491          DCA     DMREG                    /SETUP COMMAND
3330  3135          TAD     TCNTR1                   /DISK ADDRESS
```

```
[illegible]  [illegible]          SKPK                          /[illegible]
[illegible]  [illegible]          TAD                           /[illegible]
[illegible]  [illegible]          JMP     [illegible]           /[illegible] IF [illegible]
[illegible]  [illegible]          TAD     [illegible]           /[illegible]
[illegible]  [illegible]          TAD     [illegible]           /[illegible]
[illegible]  [illegible]          DCA     [illegible]           /[illegible]
[illegible]  [illegible]          TAD     [illegible]           /[illegible]
[illegible]  [illegible]          DCA     [illegible]           /[illegible]
[illegible]  [illegible]          JMS     [illegible]           /[illegible]
[illegible]  [illegible]          TAD     [illegible]           /[illegible]
[illegible]  [illegible]          JMS     [illegible]           /[illegible]
[illegible]  [illegible]          JMP     [illegible]           /[illegible] & [illegible]
[illegible]  [illegible]          TAD     [illegible]           /[illegible]
[illegible]  [illegible]          DCA     [illegible]           /[illegible]
[illegible]  [illegible]          TAD     [illegible]           /[illegible]
[illegible]  [illegible]          SNA     [illegible]           /[illegible]
[illegible]  [illegible]          SZA     [illegible]           /[illegible]
[illegible]  [illegible]          JMP     [illegible]           /[illegible]
[illegible]  [illegible]          TAD     [illegible]           /[illegible]
[illegible]  [illegible]          DCA     [illegible]           /[illegible]
[illegible]  [illegible]          TAD     [illegible]           /[illegible]
[illegible]  [illegible]          JMS     [illegible]           /[illegible]
[illegible]  [illegible]          TAD     [illegible]           /[illegible]
[illegible]  [illegible]          JMS     [illegible]           /[illegible]
[illegible]  [illegible]          JMP     [illegible]           /[illegible]
[illegible]  [illegible]          JMS     [illegible]           /[illegible]
[illegible]  [illegible]          SKP CLA                       /[illegible]
[illegible]  [illegible]          JMP     [illegible]           /[illegible]
[illegible]  [illegible]          JMP     [illegible]           /[illegible]
[illegible]  [illegible]          JMP     [illegible]           /[illegible]
[illegible]  [illegible]          JMS     [illegible]           /[illegible]
[illegible]  [illegible]          JMS     [illegible]           /[illegible]
[illegible]  [illegible]          JMS     [illegible]           /[illegible]
[illegible]  [illegible]          JMP     [illegible]           /[illegible]
[illegible]  [illegible]          JMS     [illegible]           /[illegible]
[illegible]  [illegible]          JMS     [illegible]           /[illegible]
[illegible]  [illegible]          JMS
```

```
[illegible]

[illegible]

[illegible]
```

```
/       PAGE  0140    18-DEC-74        0148    PAGE 1-43

        3716  2465          TAD     CRREG1                  /GET FIRST TIME POINTER
        3717  7327          CLA CLL                         /CLEAR POINTER
        3720  1375          TAD     K0003                   /AW
        3721  7512          RTR     K2003                   /CHECK DATA READ
        3722  7427          SNL CLA                         /DATA [illegible]
        3723  7005          RAR CLA                         /ERROR, DATA
        3724  7345          JMP     .+5E                    /
        3725  3142          TAD     PCNTR6
        3726  1076          TAD     K0700                   /UPDATE SECTOR POINTER
        3727  3142          DCA     PCNTR6
        3730  1036          TAD     PCNTR3                  /UPDATE SECTOR COUNTER
        3731  5331          JMP     .+4RR4                  /DO REST OF SURFACE
        3732  3365          DCA     CRREG1                  /CLEAR FIRST TIME FLAG
        3733  6742          ISZ     PCNTR4                  /UPDATE TRACK COUNTER
        3734  5267          JMP     .+4R3                   /DO 20-ED TRACKS
        3735  1139          TAD     PCNTR2                  /GET CURRENT TRACK POINTER
        3736  1011          TAD     K0712                   /UPDATE
        3737  3139          DCA     PCNTR2                  /VALIDITY
        3740  6141          ISZ     PCNTR5                  /UPDATE TOTAL AMOUNT TO DO
        3741  5234          JMP     .+4E5C                  /MORE TO DO
        3742  4437          SFRROR                          /ALL DONE, TO END OF TEST
        3743  4447    T4EF, SFRRDR                    /ERROR, TRIED REPEATED
        3744  3667          TSTAS                           /RESET LOOP POINTER
        3745  7167    T4EF, DCRD                            /MODIFIED TEST POINTER
                      /
        3746  5743          JMP     .+1                     /TO END OF TEST
        3747  4000          ENDTST
                      /
        3752  7056    K7156, 7156
                      /
              4400    PAGE
                      /
                      /PROGRAM TO AID IN HEAD ALIGNMENT.
                      /GET TWO SEPARATE SEEK ADDRESS FROM
                      /THE SWITCH REGISTER AND SEEK ONLY BETWEEN
                      /THEM. SECOND ADDRESS MAY BE CHANGED AT ANY TIME.
                      /
        4400  7604    SKSEK,  LAS                             /GET FIRST ADDRESS
        4401  3135          DCA     TCNTR1                  /SAVE IT
        4402  7407    WETHLT, HLT                             /WAIT FOR SECOND ADDRESS
        4403  7604    RESEK,  LAS                             /GET SECOND ADDRESS
        4404  3136          DCA     TCNTR2                  /SAVE IT
        4405  1135          TAD     TCNTR1
        4406  4427          AND     K3800                   /MASK DRIVE + EXT. BIT
        4407  1137          TAD     K3002                   /SET SEEK FUNCTION
        4410  4457          LOCMD                           /LOAD COMMAND REGISTER
        4411  1136          TAD     TCNTR2
        4412  7127          AND     K7777                   /MASK OFF CYLINDER + SURFACE
        4413  3452          LOADD                           /GO SEEK ONLY
        4414  4447          WSKEWP                          /SKIP WHEN DONE
        4415  5414          JMP     .-1
        4416  4455          CLEAR                           /CLEAR STATUS
        4417  4444          RDSTAT                          /READ STATUS
        4420  7441          SZA CLA                         /DRIVE READY
        4421  5416          JMP     .+3                     /NO, WAIT
```

```
/       [illegible]   [illegible]   [illegible]

[illegible]                                     [illegible]
[illegible]                                     [illegible]
[illegible]                                     [illegible]
```

```
4253  7041          SKP CLA                          /WAIT FOR DONE
4254  5041          JMP     OVPERR                   /DRIVE ERROR
4255  2037          TAD     POINTR
4256  2037          ISZ     POINTR                   /WAS DRIVE DONE YET
4257  5254          JMP     ALLBAK                   /WAIT FOR DONE
4258  4483          DCRRAD                           /OLD, TO NEXT
4259  7441  OVERRP, ERROR                            /ERROR, OVERLAP SEEKS
4260  4213          OVPLAP AL                        /SIO-E LOOP POINTER
4261  5321          JMP     .+1                      /TEST POINTER
4262  3637          JMP I   OVPLAP                   /IS NEXT TEST
                    /
                    /SYSTEM VIBRATION TEST
                    /
                    /ROUTINE TO DO OVERLAP SEEKS AND
                    /REALLY SHAKE THE DRIVES
                    /ALL DRIVES PERFORM "SEEK ONLY" BETWEEN TRACK
                    /312 AND SOME RANDOM TRACK.
                    /
4265  7000  DRONE,  0
4266  1235          TAD     K6000
4267  3141          DCA     TCNTR8                   /CLEAR PASS COUNTER
4270  1071          TAD     DRIVSV                   /AMOUNT OF DRIVES
4271  7041          CMA
4272  3140          DCA     TCNTR4                   /SETUP POINTER
4273  3137          DCA     TCNTR3                   /START WITH 0
4274  1137  DRNXN1, TAD     TCNTR3
4275  7004          CLL RAL
4276  3071          DCA     DRIVNO                   /SETUP DRIVE NO. POINTER
4277  1137          TAD     TCNTR3
4300  37771         TAD     DSKCDT                   /GET ADDRESS POINTER
4301  3136          DCA     TCNTR2                   /SAVE IT
4302  1036          TAD I   TCNTR2                   /GET LAST VALUE
4303  7100          CLL RAR
4304  7009          RTL CLA                          /EXT. BIT SIZE
4305  5311          JMP     .+4                      /+5, GO TO 0 IF TWO BIT
4306  1066          TAD     TRK312
4307  7121          CLL CML IAC                      /SET INDICATORS
4310  5315          JMP     .+3                      /SAVE AND SEND DRIVE OUT
4311  1137          TAD     TCNTR3                   /GET RAND POINTER
4312  4422          RANACD                           /GET RANDOM ADDRESS
4313  1070          AND     77775                    /CLEAR BIT, IF
4314  7100          CLL
4315  3036          DCA I   TCNTR2                   /RESET IT
4316  1036          TAD I   TCNTR2                   /GET ADDRESS
4317  4427          DSKOUT                           /SEND DRIVE OUT
4320  4453          CLEALL                           /CLEAR STATUS
4321  2137          ISZ     TCNTR3                   /UPDATE POINTER
4322  2140          ISZ     TCNTR4                   /UPDATE COUNTER
4323  5274          JMP     DRNXR1                   /MORE TO SEND OUT
4324  3137          DCA     TCNTR3                   /START CHECK AT 0
4325  1071          TAD     DRIVSV
4326  7041          CMA
4327  3140          DCA     TCNTR4                   /SETUP AMOUNT COUNTER
4330  1137  DRNXR2, TAD     TCNTR3                   /CHECK FOR DRIVE DONE
4331  4423          DSKIN                            /
```



```
4253  7041          SKP CLA                          /WAIT FOR DONE
4254  5041          JMP     OVPERR                   /DRIVE ERROR
4255  2037          TAD     POINTR
4256  2037          ISZ     POINTR                   /WAS DRIVE DONE YET
4257  5254          JMP     ALLBAK                   /WAIT FOR DONE
4258  4483          DCRRAD                           /OLD, TO NEXT
4259  7441  OVERRP, ERROR                            /ERROR, OVERLAP SEEKS
4260  4213          OVPLAP AL                        /SIO-E LOOP POINTER
4261  5321          JMP     .+1                      /TEST POINTER
4262  3637          JMP I   OVPLAP                   /IS NEXT TEST
                    /
                    /SYSTEM VIBRATION TEST
                    /
                    /ROUTINE TO DO OVERLAP SEEKS AND
                    /REALLY SHAKE THE DRIVES
                    /ALL DRIVES PERFORM "SEEK ONLY" BETWEEN TRACK
                    /312 AND SOME RANDOM TRACK.
                    /
4265  7000  DRONE,  0
4266  1235          TAD     K6000
4267  3141          DCA     TCNTR8                   /CLEAR PASS COUNTER
4270  1071          TAD     DRIVSV                   /AMOUNT OF DRIVES
4271  7041          CMA
4272  3140          DCA     TCNTR4                   /SETUP POINTER
4273  3137          DCA     TCNTR3                   /START WITH 0
4274  1137  DRNXN1, TAD     TCNTR3
4275  7004          CLL RAL
4276  3071          DCA     DRIVNO                   /SETUP DRIVE NO. POINTER
4277  1137          TAD     TCNTR3
4300  37771         TAD     DSKCDT                   /GET ADDRESS POINTER
4301  3136          DCA     TCNTR2                   /SAVE IT
4302  1036          TAD I   TCNTR2                   /GET LAST VALUE
4303  7100          CLL RAR
4304  7009          RTL CLA                          /EXT. BIT SIZE
4305  5311          JMP     .+4                      /+5, GO TO 0 IF TWO BIT
4306  1066          TAD     TRK312
4307  7121          CLL CML IAC                      /SET INDICATORS
4310  5315          JMP     .+3                      /SAVE AND SEND DRIVE OUT
4311  1137          TAD     TCNTR3                   /GET RAND POINTER
4312  4422          RANACD                           /GET RANDOM ADDRESS
4313  1070          AND     77775                    /CLEAR BIT, IF
4314  7100          CLL
4315  3036          DCA I   TCNTR2                   /RESET IT
4316  1036          TAD I   TCNTR2                   /GET ADDRESS
4317  4427          DSKOUT                           /SEND DRIVE OUT
4320  4453          CLEALL                           /CLEAR STATUS
4321  2137          ISZ     TCNTR3                   /UPDATE POINTER
4322  2140          ISZ     TCNTR4                   /UPDATE COUNTER
4323  5274          JMP     DRNXR1                   /MORE TO SEND OUT
4324  3137          DCA     TCNTR3                   /START CHECK AT 0
4325  1071          TAD     DRIVSV
4326  7041          CMA
4327  3140          DCA     TCNTR4                   /SETUP AMOUNT COUNTER
4330  1137  DRNXR2, TAD     TCNTR3                   /CHECK FOR DRIVE DONE
4331  4423          DSKIN                            /
```

```
[illegible]

[illegible]

[illegible]
```

```
[illegible]    [illegible]    [illegible]    [illegible]    [illegible]

[illegible]    [illegible]    [illegible]    [illegible]    [illegible]
```

```
[illegible]  [illegible]  [illegible]                    /[illegible]
[illegible]  [illegible]  [illegible]                    /SET UP ADDR OF NEXT TO [illegible]
[illegible]  [illegible]  [illegible]                    /[illegible]
[illegible]  [illegible]  [illegible]                    /[illegible]
[illegible]  [illegible]  [illegible]                    /[illegible] ADDRESS
[illegible]  [illegible]  [illegible]                    /[illegible] ADDRESS [illegible] TO BLOCK
[illegible]  [illegible]  [illegible]                    /[illegible]
[illegible]  [illegible]  [illegible]                    /[illegible]
[illegible]  [illegible]  [illegible]                    /[illegible]
[illegible]  [illegible]  [illegible]                    /[illegible] CLEAR BUFFER
[illegible]  [illegible]  [illegible]                    /[illegible] DISK ADDRESS
[illegible]  [illegible]  [illegible]                    /[illegible] SD
[illegible]  [illegible]  [illegible]                    /[illegible] POINTER
[illegible]  [illegible]  [illegible]                    /[illegible]
[illegible]  [illegible]  [illegible]                    /[illegible] READ [illegible]
[illegible]  [illegible]  [illegible]                    /WAIT [illegible] A READ
[illegible]  [illegible]  [illegible]                    /WAS A [illegible] A HANDLER
[illegible]  [illegible]  [illegible]                    /[illegible] LAST COMMAND
[illegible]  [illegible]  [illegible]                    /[illegible] BUT [illegible]
[illegible]  [illegible]  [illegible]                    /WAS IT BAD BLOCK TRANSFER
[illegible]  [illegible]  [illegible]                    /[illegible] COMPARE W OLD BLOCK
[illegible]  [illegible]  [illegible]                    /[illegible] GOOD READ POINTER
[illegible]  [illegible]  [illegible]                    /[illegible] FOR BAD BLOCK
[illegible]  [illegible]  [illegible]                    /[illegible] NO ERRORS
[illegible]  [illegible]  [illegible]                    /[illegible] ERROR
[illegible]  [illegible]  [illegible]                    /[illegible] A READ
[illegible]  [illegible]  [illegible]                    /[illegible] BY WORD COMPARE OF DATA
[illegible]  [illegible]  THABCK, ERROR                  /NO ERRORS
[illegible]  [illegible]  [illegible]  ERROR             /ERROR IN FUNCTION SELECTED
[illegible]  [illegible]  [illegible]                    /[illegible] LOOP POINTER
[illegible]  [illegible]  [illegible], [illegible]       /CLEAR POINTER
                          /
[illegible]  [illegible]  [illegible]                    / [illegible]
                          /
[illegible]  [illegible]  [illegible], [illegible]
                          /
                          /[illegible] IN [illegible] TYPE WRITE PROTECT FUNCTION
                          /[illegible] IT IS SET [illegible] PROGRAM COMPARE
                          /NOTE: 10 SCOPE LOOPS ARE AVAILABLE FOR THIS TEST
                          /
[illegible]  [illegible]  [illegible]                    /SET TAG [illegible]
[illegible]  [illegible]  [illegible]                    /
[illegible]  [illegible]  [illegible]                    /MASK DRIVE NUMBER
[illegible]  [illegible]  [illegible]                    /START DRIVE NUMBER
[illegible]  [illegible]  [illegible]                    /
[illegible]  [illegible]  [illegible]                    /SET UP REPEAT POINTER
[illegible]  [illegible]  [illegible]                    /
[illegible]  [illegible]  [illegible]                    /DATA PATTERN TO WRITE
[illegible]  [illegible]  [illegible]                    / [illegible] BUFFER
[illegible]  [illegible]  [illegible]                    /
[illegible]  [illegible]  [illegible]                    /SETUP ADDRESS WORD IN BUFFER
[illegible]  [illegible]  [illegible]                    /SETUP ADDRESS WORD IN BUFFER
[illegible]  [illegible]  [illegible]                    /WRITE ALL FUNCTION
[illegible]  [illegible]  [illegible]                    /SETUP COMMAND
[illegible]  [illegible]  [illegible]                    /WRITE ALL TO SECTOR 0
[illegible]  [illegible]  [illegible]                    /TEST POINTER
```

```
/        PAGE 1-58   V042    17-DEC-73        8140    PAGE 1-58

[illegible]  [illegible]  [illegible]  APERR             /ERROR, STATUS
[illegible]  [illegible]  [illegible]  TAD     K0002     /SELECTED DRIVE PROTECT
[illegible]  [illegible]  [illegible]  TAD     DRIVND    /CURRENT DRIVE
[illegible]  [illegible]  [illegible]  DCMD              /LOAD COMMAND REGISTER
[illegible]  [illegible]  [illegible]  JMSCT             /SCAN AND GO
[illegible]  [illegible]  [illegible]  RDSTAT            /READ STAT 0 REGISTER
[illegible]  [illegible]  [illegible]  SPA CLA           /SKIP IF NO ERR [illegible]
[illegible]  [illegible]  [illegible]  JMP     APER      /ERROR, STATUS
[illegible]  [illegible]  [illegible]  KILBUF            /CLEAR DATA BUFFER
[illegible]  [illegible]  [illegible]  TAD     DRIVND    /SETUP ADDRESS WORD IN BUFFER
[illegible]  [illegible]  [illegible]  DCA I   XWITRK    /WRITE ALL FUNCTION
[illegible]  [illegible]  [illegible]  TAD     K5000     /SETUP COMMAND REGISTER
[illegible]  [illegible]  [illegible]  DCA     CMREG     /WRITE ALL TO SECTOR 0
[illegible]  [illegible]  [illegible]  DIRSEC            /TEST POINTER
[illegible]  [illegible]  [illegible]  TAPRST
[illegible]  [illegible]  [illegible]  NOP
[illegible]  [illegible]  [illegible]  CLA CLL CML RTL   /MAKE EXPECTED STATUS
[illegible]  [illegible]  [illegible]  TAD     K0020     /SETUP COMPARE REGISTER
[illegible]  [illegible]  [illegible]  DCA     CMPREP
[illegible]  [illegible]  [illegible]  TAD     K5000     /SETUP TEST POINTER
[illegible]  [illegible]  [illegible]  DCA     TAPRST    /GET STATUS READ
[illegible]  [illegible]  [illegible]  TAD     STREG     /CHECK RESULTS
[illegible]  [illegible]  [illegible]  ACCSP1            /STATUS O.K.
[illegible]  [illegible]  [illegible]  SNA CLA           /ERROR, WRITE PROTECT
[illegible]  [illegible]  [illegible]  JMP     APERR     /ENABLE CLEAR CONTROL
[illegible]  [illegible]  [illegible]  CLA CLL IAC       /CLEAR CONTROL
[illegible]  [illegible]  [illegible]  CLRALL            /FUNCTION READ ALL
[illegible]  [illegible]  [illegible]  TAD     K1000     /SETUP COMMAND
[illegible]  [illegible]  [illegible]  DCA     CMREG     /READ ALL SECTOR 0
[illegible]  [illegible]  [illegible]  DIRSEC            /TEST POINTER
[illegible]  [illegible]  [illegible]  TAPRST
[illegible]  [illegible]  [illegible]  JMP     APERR     /ERROR
[illegible]  [illegible]  [illegible]  TAD     K2525     /INVERTED PATTERN
[illegible]  [illegible]  [illegible]  FIGURE            /CHECK DATA READ
[illegible]  [illegible]  [illegible]  ILERRR            /ALL O.K. GO ONE MORE TIME
[illegible]  [illegible]  APERR:  ERROR                  /ERROR, WRITE PROTECT
[illegible]  [illegible]  [illegible]  JMP
[illegible]  [illegible]  TAPRST, [illegible]            /TEST POINTER
[illegible]  [illegible]  APRITE, HLT                    /SUCCESSFUL WRITE PROTECT
[illegible]  [illegible]  [illegible]  JMP     JUMPRE    /REPEAT
                          /
                5000      PAGE
                          /
                          /SUBROUTINE FOR PERFORMING SCOPE LOOPS, AND
                          /ERROR TYPEOUTS
                          /
5000  [illegible]  ERROR:  0
5001  [illegible]         CLA CLL
5002  [illegible]         TAD I   ERRC                   /GET RESTART ADDRESS
5003  [illegible]         DCA     RESTRT                 /STORE
5004  [illegible]         IAC                            /GET SWITCH 0
5005  [illegible]         SMA CLA                        /IS IT ADDRESS LOOP
5006  [illegible]         JMP     ERRAL                  /NO, CONTINUE
5007  [illegible]         IAC                            /GET SWR2
5010  [illegible]         SZA
```

```
[illegible]  [illegible]   [illegible]        [illegible]    [illegible]

[illegible]  [illegible]          [illegible]                    /[illegible]
[illegible]  [illegible]          [illegible]    [illegible]     [illegible]
[illegible]  [illegible]          [illegible]    [illegible]
[illegible]  [illegible]          [illegible]
[illegible]  [illegible]          [illegible]    [illegible]     [illegible]
[illegible]  [illegible]          [illegible]    [illegible]     [illegible]
[illegible]  [illegible]  [illegible]  [illegible]    [illegible]
[illegible]  [illegible]          [illegible]    [illegible]     /[
```

```
[illegible]

[illegible]

[illegible]
```

```
/       [illegible]   [illegible]    [illegible]        [illegible]    [illegible]

        [illegible]   [illegible]          TAD      [illegible]
        [illegible]   [illegible]    [illegible]   [illegible]                    /LOAD [illegible] ADDRESS IN
        [illegible]   [illegible]          JMP I    1[illegible]                    /[illegible]

        [illegible]   [illegible]    [illegible]  HLT                        /SKIP TRAP
                                     /
                                     /
                                     /SUBROUTINE TO LOAD [illegible] ADDRESS REGISTER

        [illegible]   [illegible]    [illegible]   [illegible]
        [illegible]   [illegible]          [illegible]     [illegible]                    /SAVE [illegible] DATA
        [illegible]   [illegible]          TAD      [illegible]
        [illegible]   [illegible]    [illegible]   [illegible]                    /[illegible] [illegible] [illegible] [illegible]
        [illegible]   [illegible]          JMP I    [illegible]                    /[illegible]
        [illegible]   [illegible]    [illegible]  HLT                        /SKIP TRAP
                                     /
                                     /SUBROUTINE TO LOAD [illegible] ADDRESS REGISTER
                                     /
        [illegible]   [illegible]    [illegible]   [illegible]
        [illegible]   [illegible]          [illegible]     [illegible]                    /SAVE [illegible] DATA
        [illegible]   [illegible]          TAD      [illegible]
        [illegible]   [illegible]    [illegible]   [illegible]                    / [illegible] [illegible] [illegible]
        [illegible]   [illegible]          JMP I    [illegible]                    /EXIT
        [illegible]   [illegible]    [illegible]  HLT                        /SKIP TRAP
                                     /SUBROUTINE TO ISSUE [illegible] CLEAR [illegible]
                                     /
        [illegible]   [illegible]    [illegible]   [illegible]
        [illegible]   [illegible]    [illegible]   [illegible]                    /[illegible] [illegible] [illegible]
        [illegible]   [illegible]          JMP I    [illegible]                    /EXIT
        [illegible]   [illegible]    [illegible]  HLT                        /SKIP TRAP

                                     /
                                     /SUBROUTINE TO ISS[illegible] [illegible] MAINTENANCE [illegible]
                                     /
        [illegible]   [illegible]    [illegible]   [illegible]
        [illegible]   [illegible]    [illegible]   [illegible]                    /[illegible] MAINTENANCE [illegible]
        [illegible]   [illegible]          JMP I    LOMM                    /EXIT
        [illegible]   [illegible]    [illegible]  HLT                        /SKIP TRAP
                                     /
                                     /SUBROUTINE TO SHIFT, THEN READ DISK ADDRESS
                                     /INTO DATA BUFFER, 12 SHIFTS
                                     /
        [illegible]   [illegible]    [illegible]   0
        [illegible]   [illegible]          CLA CLL
        [illegible]   [illegible]          TAD      M12
```

```
/       [illegible]   [illegible]    [illegible]        [illegible]    PAGE 1-69

        [illegible]   [illegible]          DCA      [illegible]
        [illegible]   [illegible]          CLA CLL CML RAR                  /SET MAINTEN[illegible] ENABLE BIT
        [illegible]   [illegible]          LOMAN                            /LOAD MAINTENANCE
        [illegible]   [illegible]          RAR
        [illegible]   [illegible]          LOMAN                            /LOAD MAINTENANCE
        [illegible]   [illegible]          CLA CLL
        [illegible]   [illegible]          TAD      [illegible]                    /SHIFT TWOM ADDRESS BIT
        [illegible]   [illegible]          LOMAN                            /LOAD MAINTENANCE [illegible]
        [illegible]   [illegible]          ISZ      [illegible]
        [illegible]   [illegible]          JMP      [illegible]                    /SHIFT 12 BITS
        [illegible]   [illegible]          CLA CLL
        [illegible]   [illegible]          TAD      [illegible]
        [illegible]   [illegible]          LOMAN                            /READ DATA BUFFER
        [illegible]   [illegible]          DCA      [illegible]                    /SAVE RESULTS
        [illegible]   [illegible]          TAD      [illegible]
        [illegible]   [illegible]          JMP I    [illegible]                    /EXIT

                 [illegible]   PAGE
                                     /
                                     /SUBROUTINE TO READ DATA BUFFER TO AC
                                     /
        [illegible]   [illegible]    [illegible]   0
        [illegible]   [illegible]          CLA CLL CML RAR
        [illegible]   [illegible]          LOMAN
        [illegible]   [illegible]          TAD      [illegible]
        [illegible]   [illegible]          LOMAN                            /LOAD MAINTENANCE
        [illegible]   [illegible]          DCA      [illegible]
        [illegible]   [illegible]          TAD      [illegible]
        [illegible]   [illegible]          DCA      [illegible]
        [illegible]   [illegible]          TAD      [illegible]
        [illegible]   [illegible]          JMP I    [illegible]                    /EXIT
                                     /
                                     /SUBROUTINE TO SHIFT COMMAND    REGISTER TO
                                     /DATA BUFFER THEN READ DATA BUFFER
                                     /
        [illegible]   [illegible]    [illegible]   0
        [illegible]   [illegible]          CLA CLL
        [illegible]   [illegible]          TAD      M12
        [illegible]   [illegible]          DCA      [illegible]                    /12 BIT SHIFT
        [illegible]   [illegible]          CLA CLL CML RAR
        [illegible]   [illegible]          LOMAN                            /LOAD MAINTENANCE
        [illegible]   [illegible]          RAR
        [illegible]   [illegible]          LOMAN                            /LOAD MAINTENANCE
        [illegible]   [illegible]          CLA CLL
        [illegible]   [illegible]          TAD      [illegible]                    /ENABLE BIT FOR SHIFT COMMAND
        [illegible]   [illegible]          LOMAN                            /LOAD AND GO
        [illegible]   [illegible]          ISZ      [illegible]
        [illegible]   [illegible]          JMP      [illegible]                    /SHIFT 12
        [illegible]   [illegible]          CLA CLL
        [illegible]   [illegible]          TAD      [illegible]                    /ENABLE READ BUFFER
        [illegible]   [illegible]          LOMAN                            /LOAD AND GO
        [illegible]   [illegible]          DCA      [illegible]                    /SAVE IT
        [illegible]   [illegible]          TAD      [illegible]
        [illegible]   [illegible]          JMP I    [illegible]                    /EXIT
                                     /
```

```
[illegible]

/[illegible]

[illegible]
[illegible]
[illegible]
```

```
9547  5761          JMP I   S.17                    /TERM TO DOS
                    /
      9548          .ASR
                    /
                    /ROUTINE TO READ OR WRITE ON DISK
                    /AC(15) = 1 MEAN ON STATUS ERROR
                    /AC(0) = 0 IF OK.
                    /
9549  1471  ATSEG,  .
9550  6254          TCA     SAVTWK                  /SAVE TRACK ADDRESS
9551  7341          CLA CLL CMA
9552  3174          DCA     DOFLAG                  /SET ONE ERROR FLAG
9553  5347          JMP I   .+1                     /GET NEXT INSTR
9554  1174          DCA     SAVPNT                  /SAVE I
9555  3270          ISZ     SLTNO                   /UPDATE POINTER
9556  2451          TAD     CMASK                   /GET COMMAND
9557  1352          AND     K7500                   /MASK OFF
9558  3257          DCA     WORDCT                  /CLEAR WORD COUNT
9559  1350          TAD     WORDCT                  /GET WORD COUNT
9560  7450          SNA     CLA                     /SKIP IF ZERO
9561  5344          JMP     .+3
9562  1353          TAD     CPRTS                   /GET COMPLEMENT WORD
9563  7450          SNA     CLA                     /ZERO COMPLEMENT
9564  5347          JMP     .+3
9565  1354          TAD     BSAR F                  /GET BUSINESS NO OF BUFFER
9566  4452          JSR     SAVTWK                  /SAVE CURRENT WORD-POS
9567  1354          TAD     SAVTWK                  /GET TRACK & SECTOR
9570  4452          JSR     SAVTWK                  /SAVE THIS WORD
9571  4432          SKP+AT                          /WAIT FOR DISK SKIP
9572  5224          JMP     SKPERR                  /SKIPPED, GO SKIP
9573  7337          CLA CLL CML RAR                 /EXPECTED STATUS
9574  3144          DCA     SCPERR                  /SETUP COMPARE REGISTER
9575  4444          SDSTAT                          /READ STATUS
9576  1144          TAD     K4000                   /
9577  764           RTL CLA                         /WAIT STATUS RDY
9600  5236          JMP     STAERR                  /ERROR; STATUS
9601  2367          TAD     XSTA                    /TEST POINTER
9602  6217          ISZ     TISKS                   /UPDA I FOR PROG RETURN
9603  3574  SCTRL,  DCA I   SAVPNT                  /STORE IN TEST POINTER
9604  5600          JMP     DISKS                   /EXIT
9605  1166  TAPERR, TAD     K0332                   /SKIP TEST POINTER
9606  5600          JMP     ATTNS                   /EXIT
9607  1367  STATRD, TAD     STRCD                   /GET STATUS JUST READ
9610  4711          AND     K0710                   /MASK OUT OTHER BITS
9611  7650          SZA CLA                         /ARE THERE ANY
9612  5252          JMP     HRDTAR                  /NO, OTHERS
9613  7341          CLA CLL
9614  1351          TAD     CMPTS                   /GET LAST COMMAND
9615  2116          ISZ     KCOMD                   /MASK FUNCTION
9616  1116          TAD     KCOMD                   /AND IN PUDGE FACTOR
9617  7650          SZA CLA                         /WAS IT A READ OR WRITE
9620  5232          JMP     WRDTAR                  /NO, MUST BE A WRITE
9621  6272          TSF     SCPERR                  /GET CMD ERROR FLAG
9622  5224          JMP     SKTRK -2                /DO CHECK DATA OR RETURN
9623  117   WRDERR, TAD     KEOM                    /
9624  5232          JMP     RITS.                   /EXIT
                    /
9625  .25   SAVTWK, 2
9626  7741  SLTNO,  7741
```



```
                    /
                    /ROUTINE TO COMPARE WORDS IN BUFFER TO
                    /KNOWN DATA PATTERN  % THE WORD
                    /
9630  .0L   TOLRP,  2
9631  3144          DCA     GOREG2                  /SAVE FOR ERROR PRINTER
9632  1767          TAD     BGMBUF                  /GET START OF BUFFER
9633  3164          DCA     ADREG                   /SAVE FOR ERROR PRINTER
9634  1151          TAD     CMREG                   /GET DISK NO. AND EXT. BIT
9635  .117          AND     K0007                   /MASK THEM
9636  7741          CIA
9637  1554          TAD I   ADREG                   /GET FIRST TRACK WORD
9640  7650          SNA CLA                         /WAS IT 0.K.?
9641  5273          JMP     .+4                     /YES, CHECK NEXT TRACK WORD
9642  1151          TAD     CMREG                   /GET DISK NO. AND EXT. BIT
9643  .117          AND     K0007                   /MASK THEM
9644  5343          JMP     DTERR                   /DISK ERROR
9645  2154          ISZ     ADREG                   /UPDATE ADDRESS
9646  1554          TAD I   ADREG                   /GET SECOND WORD
9647  7241          CIA
9650  1152          TAD     CMREG                   /COMPARE TO ADDRESS
9651  7650          SNA CLA                         /WAS SECOND TRACK WORD O.K.
9652  5303          JMP     .+3                     /YES, NOW CHECK DATA
9653  1152          TAD     CMREG                   /GET GOOD INFO
9654  5343          JMP     DTERR                   /DATA ERROR
9655  7326          CLA CLL CML RTL
9656  1155          TAD     K7400
9657  3164          DCA     DATCNT                  /SETUP COUNTER
9660  2154  LRFIG,  ISZ     ADREG                   /UPDATE ADDRESS
9661  1554          TAD I   ADREG                   /GET DATA WORD
9662  7041          CIA
9663  1144          TAD     GOREG2                  /COMPARE TO GOOD ONE
9664  7650          SZA CLA                         /WAS WORD O.K.?
9665  5344          JMP     DTERR +1                /NO, DATA ERROR
9666  1144          TAD     GOREG2                  /GET GOOD DATA
9667  7041          CIA
9670  3144          DCA     GOREG2                  /IT IS A COMPLEMENT DATA PATTERN
9671  2164          ISZ     DATCNT                  /UPDATE BUFFER COUNTER
9672  5306          JMP     LRFIG                   /MORE TO CHECK
9673  2154          ISZ     ADREG                   /UPDATE ADDRESS
9674  1155          TAD     K1234
9675  7041          CIA
9676  1554          TAD I   ADREG                   /GET WORD IN BUFFER #1
9677  7650          SNA CLA                         /WAS IT O.K.
9700  5331          JMP     .+3                     /YES ALL DATA O.K.
9701  1155          TAD     K1234
9702  5343          JMP     DTERR                   /WORD LOST IN BUFFER #1
9703  7337          CLA CLL CML RAR                 /EXPECTED STATUS
9704  3144          DCA     SCPERR                  /SETUP COMPARE REGISTER
9705  1173          TAD     SCPERR                  /GET CMD ERROR FLAG
9706  7650          SZA CLA                         /WAS IT SET
9707  5688          JMP I   TOLRP                   /NO THE BUFFER IS O.K.
9710  7041          CLA CLL CMA                     /SETUP CMD FLAG
9711  3173          DCA     SCPERR                  /CMD ERR FLAG
9712  1171          TAD     ATSEG                   /GET ERROR
```

```
[illegible]  [illegible]          [illegible]  [illegible]          /[illegible] EXIT TO [illegible]
[illegible]  [illegible]          [illegible]  [illegible]          /[illegible]
[illegible]  [illegible]  [illegible]  [illegible]  [illegible]     /[illegible]
[illegible]  [illegible]          [illegible]  [illegible]          /[illegible] HAS [illegible]
[illegible]  [illegible]          [illegible]  [illegible]          /[illegible] FOR [illegible]
[illegible]  [illegible]          [illegible]  [illegible]          /[illegible] [illegible] [illegible] [illegible]
[illegible]  [illegible]          [illegible]  [illegible]
                    /
[illegible]  [illegible]  [illegible]  [illegible]  [illegible]
[illegible]  [illegible]
```

```
[illegible]  [illegible]  [illegible]
[illegible]  [illegible]  [illegible]
[illegible]  [illegible]  [illegible]
```

```
/       [illegible]     [illegible]     [illegible]     PAGE 1-[illegible]

        [illegible]     [illegible]     [illegible]     [illegible]             /[illegible]
        [illegible]     [illegible]     [illegible]                             /[illegible]
        [illegible]     [illegible]     [illegible]     [illegible]
```

```
                  DISK DATA CHECK ROUTINE

6421  5226              JMP     [illegible]        /[illegible]
6422  2422              ISZ     TEST               /UPDATE [illegible]
6423  5232              JMP     REST               /BACK TO [illegible]
6424  7200      EXIST,  CLA CLL RAL                /CHANGE [illegible] CONTROL
6425  3473              TCHALE                     /[illegible] CONTROL
6426  2211              ISZ     NEXT               /UPDATE TO STORE
6427  7[illegible]      ISZ     STORE              /UPDATE TO STORE
6430  [illegible]       JMP     [illegible]        /[illegible]
                  /
6431  [illegible]       STORE,  [illegible]
                  /
                  /ROUTINE TO DO THE DISK DATA CHECKS
                  /
6432  [illegible]       [illegible],
6433  [illegible]              DCA     [illegible]        /SETUP [illegible] [illegible] POINTER
6434  [illegible]              TAD     [illegible]        /GET START OF BUFFER
6435  [illegible]              DCA     [illegible]        /[illegible] ERROR POINTER
6436  [illegible]              TAD     [illegible]
6437  [illegible]              AND     [illegible]
6440  [illegible]              CIA
6441  [illegible]              TAD I   ADRES              /COMPARE TO DISK [illegible] WORD
6442  7650              SNA CLA                    /[illegible]
6443  [illegible]              JMP     [illegible]        /YES
6444  1[illegible]              TAD     CMASK
6445  [illegible]              AND     K0777
6446  [illegible]              JMP     [illegible]        /NO
6447  [illegible]              ISZ     ADRES              /UPDATE ADDRESS
6450  [illegible]              TAD I   ADRES
6451  7041              CIA
6452  1252              TAD     DARGA              /COMPARE TO DISK ADDRESS
6453  7650              SNA CLA                    /[illegible]
6454  5257              JMP     [illegible]        /YES
6455  [illegible]              JMS     DARGS
6456  [illegible]              JMP     NFERR              /NO
6457  [illegible]              ISZ     ADRES              /UPDATE ADDRESS
6460  7[illegible]              CLA CLL CML RTL
6461  [illegible]              TAD     K[illegible]
6462  [illegible]              DCA     DATCNT             /SETUP COUNTER FOR FIRST HALF
6463  1[illegible]      [illegible],  TAD I   ADRES
6464  7041              CIA
6465  1[illegible]              TAD     CORE[illegible]    /COMPARE TO GOOD VALUE
6466  7[illegible]              SZA CLA                    /[illegible] THEY THE SAME
6467  5[illegible]              JMP     [illegible] +1     /ERROR, DATA [illegible]
6470  2[illegible]              ISZ     ADRES              /UPDATE ADDRESS POINTER
6471  1[illegible]              TAD     CORE[illegible]
6472  7[illegible]              CMA
6473  [illegible]              DCA     CORE[illegible]    /NEXT WORD IS COMPLEMENT
6474  2[illegible]              ISZ     DATCNT             /DONE TO TEST IN FIRST HALF
6475  5[illegible]              JMP     [illegible]
6476  [illegible]              TAD     K[illegible]
6477  [illegible]              DCA     DATCNT             /SETUP COUNTER
6500  [illegible]              DCA     CORE[illegible]    /REST OF BUFFER SHOULD BE ZERO
6501  1[illegible]      [illegible],  TAD I   ADRES
6502  7[illegible]              SZA CLA                    /WAS IT 0
6503  [illegible]              JMP     NFERR              /ERROR
```

```
PAL10   [illegible]   [illegible]   PAGE [illegible]

6504  2[illegible]              ISZ     ADRES
6505  2[illegible]              ISZ     DATCNT
6506  5[illegible]              JMP     [illegible]        /MORE TO CHECK
6507  1[illegible]              TAD I   ADRES              /GET WORD IN BUFFER [illegible]
6510  [illegible]              CIA
6511  1[illegible]              TAD     K[illegible]
6512  7[illegible]              SNA CLA                    /WAS IT [illegible]
6513  5[illegible]              JMP     [illegible]        /[illegible]
6514  1[illegible]              TAD     K1234
6515  [illegible]              JMP     NFERR              /ERROR [illegible]
6516  7[illegible]              CLA CLL CML RAR            /EXPECTED STATUS
6517  3[illegible]              DCA     CORREG             /SETUP COMPARE REGISTER
6520  1[illegible]              TAD     SCRERR             /GET CRC ERROR FLAG
6521  7[illegible]              SNA CLA                    /WAS IT SET
6522  5632              JMP I   NFCHK              /NO ERRORS
6523  7[illegible]              CLA CLL CMA                /RESET CRC ERROR FLAG
6524  3[illegible]              DCA     SCRERR             /TEXT
6525  1[illegible]              TAD     K[illegible]       /SET UP POINTER
6526  3[illegible]              DCA I   SAVPOI             /EXPECTED STATUS
6527  7[illegible]              CLA CLL CML RAR            /SETUP COMPARE
6530  3[illegible]      NFERR,  DCA     CORREG2            /GET BAD WORD
6531  1[illegible]              TAD I   ADREG              /SAVE FOR PRINTER
6532  3[illegible]              DCA     CTREG
6533  2[illegible]              ISZ     NFCHK
6534  5[illegible]              JMP I   NFCHK
                  /
                  /ROUTINE TO CHANGE PROGRAM DEVICE CODES
                  /
6535  7[illegible]      CHANG,  LAS
6536  [illegible]              AND     K0770
6537  3[illegible]              DCA     NFCHK              /SAVE DESIRED CODE
6540  1[illegible]              TAD     CONTRL
6541  3[illegible]              DCA     AERRO
6542  1[illegible]              TAD     CHNPOI
6543  3[illegible]              DCA     CNGSAV
6544  1[illegible]      CHANGR, TAD I   CNGSAV             /GET ADDRESS POINTER
6545  3[illegible]              DCA     [illegible]        /SAVE IT
6546  1[illegible]              TAD I   [illegible]        /GET OLD IOT CODE
6547  [illegible]              AND     K7007              /MASK
6550  1[illegible]              TAD     NFCHK              /ADD IN DESIRED
6551  3[illegible]              DCA I   [illegible]        /CHANGE CODE
6552  2[illegible]              ISZ     CNGSAV             /UPDATE ADDRESS POINTER
6553  2[illegible]              ISZ     AERRO              /UPDATE CHANGE COUNTER
6554  5[illegible]              JMP     CHANGR
6555  7402      CHNHLT, HLT                        /DEVICE CODES CHANGED
6556  5[illegible]              JMP     .-1
                  /
6557  [illegible]       CNGSAV, 0
6560  7746      CONTRL, 7746
6561  [illegible]       CHNPOI, CHNPOI +1
6562  [illegible]              [illegible]
6563  [illegible]              [illegible]
6564  [illegible]              [illegible]
6565  [illegible]              [illegible]
6566  [illegible]              [illegible]
```

```
/       PAGE    [illegible]     [illegible]     [illegible]     PAGE [illegible]

        [illegible]
        [illegible]
        [illegible]
```

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]