IDENTIFICATION

PRODUCT CODE:	MAINDEC-08-DHRKC-E-D
PRODUCT NAME:	RK8E DATA RELIABILITY PROGRAM
DATE CREATED:	APRIL 15, 1975
MAINTAINER:	DIAGNOSTIC GROUP
AUTHOR:	JOHN VROBEL

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1. ABSTRACT

THE RK8E DATA RELIABILITY PROGRAM IS DESIGNED PRIMARILY AS AN ACCEPTANCE TEST TO VERIFY DISK DATA TRANSFERS WITHIN THE DISK SYSTEM.

THE "ACCEPT MODE" OF OPERATION VERIFIES THE CAPABILITY OF TRANSFERRING A TOTAL 3 X 10(9) BITS OF DATA TO AND FROM EACH INDIVIDUAL DISK DRIVE ON THE DISK SYSTEM.

THE "MANUAL INTERVENTION MODE" IS AVAILABLE AS A HARDWARE DEBUGGING AID TO ALLOW THE OPERATOR TO SELECT DATA PATTERNS, TRANSFER LENGTHS, AND ADDRESSING.

(NOTE: LOCATION 0 CONTAINS REVSION LEVEL (IN ASCII) OF PROGRAM ON PROGRAM LOAD).

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 NECCESSARY DW8E 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. FORMATTED 2200 BPI-16 SECTOR PACK(S).

2.2 PROGRAM STORAGE

THE PROGRAM OCCUPIES OR UTILIZES LOCATION 0000 TO LOCATION 7577 OF FIELD 0. ALL EXTENDED MEMORY LOCATIONS, IF AVAILABLE, ARE UTILIZED FOR TESTING.

2.3 PRELIMINARY PROGRAMS

THIS PROGRAM REQUIRES A FORMATTED CARTRIDGE ON ALL DRIVES TO BE TESTED.

ALL BASIC AND EXTENDED MEMORY DIAGNOSTICS, THE RK8E DISKLESS CONTROL TEST, THE RK8E DRIVE CONTROL TEST, AND THE RK8E DISK FORMATTER PROGRAM SHOULD BE RUN IF THIS TEST FAILS TO OPERATE CORRECTLY.

2.4 EXECUTION TIME

THE PROGRAM EXECUTION TIME (I.E. PASSING 3 X 10(9) BITS OF DATA ON A DISK DRIVE), IS APROX. 3 HOURS PER DISK DRIVE ON A 4K MEMORY SYSTEM OR APROX. 2.5 HOURS PER DISK DRIVE ON SYSTEMS WITH EXTENDED MEMORY.

3. SWITCH REGISTER SETTINGS

SWR0=1	LOOP ON WRITE SEQUENCE.
SWR1=1	LOOP ON READ SEQUENCE.
SWR2=1	INHIBIT ALL ERROR TYPEOUTS
SWR3=1	TYPE "STATUS=COMPLETE" REPORT.
SWR4=1	PROGRAM STOP OR HALT.
SWR5=1	DRIVE DISCONNECT AFTER PASS COMPLETION.
SWR6=1	PERFORM ONLY "OVERLAP SEEKS", DO NOT EXECUTE DATA BREAKS.

4. OPERATOR AND/OR PROGRAM ACTION

4.1 STANDARD TEST PROCEDURE

A. START AS SPECIFIED THROUGH OUT THIS DOCUMENTATION IS KEY CLEAR AND THEN KEY CONTINUE ON PDP8/E, PDP8/M, AND PDP8/F COMPUTERS.

B. LOAD THE PROGRAM INTO MEMORY FIELD 0 USING THE STANDARD BINARY LOADER TECHNIQUE.

C. IF IT IS DESIRED TO CHANGE THE IOT CODES WITHIN THE PROGRAM, FOLLOW THE PROCEDURE IN SECTION 4.5.

D. RUN THE ACCEPTANCE MODE OF DATA RELIABILITY WITH ALL DRIVES AND MEMORY AVAILABLE BY FOLLOWING THE PROCEDURE IN SECTION 4.3.

E. THE MANUAL INTERVENTION MODE, SECTION 4.4, MAY BE USED FOR TROUBLE SHOOTING, IF DESIRED.

F. IF POSSIBLE SWR4=1 SHOULD ALWAYS BE USED TO STOP THE PROGRAM.

G. IF THE PROGRAM HAS BEEN STOPPED DUE TO SWR4=1, THE PROGRAM CAN BE RESTARTED, AND THE INITIAL STARTUP QUESTIONS BYPASSED, BY USING 0202 AS THE RESTART ADDRESS.

H. FOR THE ABSOLUTE LOCATIONS OF ALL KNOWN HALTS IN THIS PROGRAM, ACCESS PAGE 1 OF THE PROGRAM LISTING.

4.2 RK05 DRIVE CARTRIDGE MOUNTING PROCEDURE

THE FOLLOWING IS THE CORRECT CARTRIDGE MOUNTING PROCEDURE FOR THE RK05 DISK DRIVE. ANY DEVIATION ENCOUNTERED DURING THIS PROCEDURE WILL BE CONSIDERED AN ERROR CONDITION.

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

B. TURN AC POWER TO DISK DRIVE ON.

C. VERIFY THAT THE LIGHT LABELED "PWR" IS ON.

D. WAIT FOR THE LIGHT LABELED "LOAD" TO COME ON.

E. VERIFY THAT THE LIGHTS LABELED "RDY", "ON CYL", "FAULT", "WT", AND "RD" 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 "RDY" AND "ON CYL" 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" IS OFF.

M. VERIFY THAT LIGHTS LABELED "FAULT", "WT", "RD", AND "LOAD" ARE OFF.

4.3 RK8E DATA RELIABILITY (ACCEPT MODE)

A. MAKE READY ALL DRIVES TO BE TESTED USING THE RK05 DRIVE CARTRIDGE MOUNTING PROCEDURE SECTION 4.2.

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

C. VERIFY THAT AC POWER IS ON, ON ALL DRIVES NOT BEING TESTED.

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

E. SET THE SWITCH REGISTER TO 0000 AND PRESS START.

F. THE OPERATOR MAY SET SWR5=1 IF IT IS DESIRED TO HAVE THE PROGRAM AUTOMATICALLY DISCONNECT EACH DISK DRIVE AS EACH MAKE THEIR PASS COMPLETION. (NOTE: IF SWR5=0, ALL DISK DRIVES WILL CONTINUE TO RUN AFTER THEIR PASS COMPLETION)

G. THE TTY WILL PRINT THE FOLLOWING PROGRAM NAME AND QUESTION.

```
RK8E DATA RELIABILITY
AMOUNT OF EXTENDED R/W MEMORY (0-7)?
```

THE OPERATOR SHOULD THEN TYPE THE AMOUNT OF EXTENDED READ/WRITE MEMORY BANKS NUMBERED SEQUENCIALLY FROM BANK 0, AS INDICATED BY THE TTY QUESTION.

H. THE TTY WILL PRINT THE FOLLOWING QUESTION(S), ASKING THE DESIRED DISK DRIVE(S) TO BE USED IN TESTING.

```
EXERCISE DISK0?  DISK1?  DISK2?  DISK3?
```

FOR THE QUESTION(S) ABOVE, TYPE Y FOR YES, IF IT IS DESIRED TO TEST THE DISK DRIVE IN QUESTION, OTHERWISE, TYPE N FOR NO.

I. THE TTY WILL PRINT THE FOLLOWING QUESTION.

```
ACCEPT MODE?
```

THE OPERATOR SHOULD THEN TYPE Y FOR YES TO RUN THE ACCEPTANCE MODE OF OPERATION.

J. THE TTY WILL PRINT THE FOLLOWING QUESTION.

```
ARE YOU SURE?
```

IF THE OPERATOR IS CERTAIN OF THE AMOUNT OF MEMORY, THE DISK DRIVE(S) SELECTED, AND THE MODE OF OPERATION, TYPE Y FOR YES. TYPING N FOR NO WILL RESULT IN A REPEAT OF ALL MESSAGES AND QUESTIONS ENCOUNTERED THUS FAR.

K. THE PROGRAM SHOULD START TESTING THE DISK DRIVE(S) AND MEMORY SELECTED.

L. THE "STATUS=COMPLETE" TYPEOUT SHOULD OCCUR UPON PASS COMPLETION OF EACH DISK DRIVE. ALL OTHER TYPEOUTS OR HALTS WILL BE CONSIDERED AS AN ERROR CONDITION. SEE SECTION 5.5 FOR "STATUS=COMPLETE" TYPEOUT.

M. A SUCCESSFUL PASS COMPLETE ON A DISK DRIVE WILL BE CONSIDERED AS NO "HARD" ERRORS AND NO MORE THAN ONE (1) "SOFT" ERROR PER PASS COMPLETE.

N. IF ANY ERRORS DO OCCUR, THE OPERATOR SHOULD ACCESS SECTION 5 IN THIS DOCUMENTATION.

4.4 RK8E DATA RELIBILITY (MANUAL INTERVENTION MODE)

THE MANUAL INTERVENTION MODE IS AVAILABLE AS A TROUBLE SHOOTING AID AND SHOULD ONLY BE USED FOR SUCH PURPOSES, IF DESIRED.

A. MAKE READY ALL DISK DRIVES TO BE TESTED USING THE RK05 DRIVE CARTRIDGE MOUNTING PROCEDURE SETION 4.2.

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

C. VERIFY THAT AC POWER IS ON, ON ALL DRIVES NOT BEING TESTED.

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

E. SET THE SWITCH REGISTER TO 0000 AND PRESS START.

F. THE TTY WILL PRINT THE FOLLOWING PROGRAM NAME AND QUESTION.

```
RK8E DATA RELIABILITY
AMOUNT OF EXTENDED R/W MEMORY (0-7)?
```

THE OPERATOR SHOULD THEN TYPE THE AMOUNT OF EXTENDED READ/WRITE MEMORY BANKS NUMBERED SEQUENCIALLY FROM BANK 0, AS INDICATED BY THE TTY QUESTION.

G. THE TTY WILL PRINT THE FOLLOWING QUESTION(S), ASKING THE DESIRED DISK DRIVE(S) TO BE USED IN TESTING.

```
EXERCISE DISK0?  DISK1?  DISK2?  DISK3?
```

FOR THE QUESTION(S) ABOVE, TYPE Y FOR YES, IF IT IS DESIRED TO TEST THE DISK DRIVE IN QUESTION, OTHERWISE, TYPE N FOR NO.

H. THE TTY WILL PRINT THE FOLLOWING QUESTION.

ACCEPT MODE?

THE OPERATOR SHOULD THEN TYPE N FOR NO TO RUN THE MANUAL INTERVENTION MODE OF OPERATION.

I. THE TTY WILL THEN PRINT THE FOLLOWING QUESTION, ASKING IF THE OPERATOR DESIRES TO SELECT A CONSTANT MEMORY FIELD, RATHER THAN THE NORMAL RANDOM FIELD SELECTION.

FIELD?

IF THE OPERATOR DESIRES TO SELECT A CONSTANT FIELD, TYPE Y FOR YES, OTHERWISE, TYPE N FOR NO. IF Y WAS TYPED THE TTY WILL SPACE OUT ONCE AND WAIT FOR THE OPERATOR TO TYPE THE DESIRED FIELD IN OCTAL (0-7).

J. THE TTY WILL PRINT THE FOLLOWING QUESTION, ASKING IF THE OPERATOR DESIRES TO SELECT A CONSTANT TRACK, RATHER THAN THE NORMAL RANDOM TRACK SELECTION.

TRACK?

IF THE OPERATOR DESIRES TO SELECT A CONSTANT TRACK, TYPE Y FOR YES, OTHERWISE, N FOR NO. IF Y WAS TYPED, THE TTY WILL SPACE OUT ONCE AND WAIT FOR THE OPERATOR TO INPUT THE DESIRED TRACK ADDRESS (00000-14537).

K. THE TTY WILL PRINT THE FOLLOWING QUESTION, ASKING IF THE OPERATOR DESIRES TO SELECT HALF BLOCK OR FULL BLOCK TRANSFERS, RATHER THAN THE NORMAL RANDOM SELECTION.

BLOCK LENGTH?

IF THE OPERATOR DESIRES TO CHANGE THE BLOCK LENGTH, TYPE Y FOR YES, OTHERWISE, N FOR NO. IF Y WAS TYPED THE TTY WILL SPACE OUT ONCE AND WAIT FOR THE OPERATOR TO TYPE THE BLOCK LENGTH DESIRED (0=256 WORD BLOCK OR 1=128 WORD BLOCK).

L. THE TTY WILL PRINT THE FOLLOWING QUESTION, ASKING IF THE OPERATOR DESIRES TO SELECT A CONSTANT NUMBER OF SECTORS TO BE TRANSFERED, RATHER THAN THE NORMAL RANDOM SECTOR SELECTION.

EXTRA SECTORS?

IF THE OPERATOR DESIRES TO SELECT A CONSTANT AMOUNT OF SECTORS, TYPE Y FOR YES, OTHERWISE, N FOR NO. IF Y WAS TYPED THE TTY WILL SPACE OUT ONCE, AND WAIT FOR THE OPERATOR TO TYPE IN THE EXTRA SECTORS DESIRED (00-17). (NOTE: IF THE FIELD AND THE BLOCK LENGTH PREVIOUSLY SELECTED WAS 0, THE AMOUNT OF EXTRA SECTORS WILL BE LIMITED TO 07. OTHERWISE THE MAX-IMUM AMOUNT IS LIMITED TO 17.)

M. IF A CONSTANT TRACK WAS NOT SELECTED, AS MENTION ABOVE, THE TTY WILL PRINT THE FOLLOWING QUESTION, ASKING IF THE OPERATOR DESIRES TO SELECT AN INCREMENT SEEK SEQUENCE, RATHER THAN THE NORMAL RANDOM SEQUENCE.

SEQUENCE?

IF THE OPERATOR DESIRES TO SELECT SEQUENCIAL SEEK SEQUENCE, TYPE Y FOR YES, OTHERWISE, N FOR NO.

N. THE TTY WILL PRINT THE FOLLOWING QUESTION, ASKING IF THE OPERATOR DESIRES TO SELECT A DATA PATTERN, RATHER THAN NORMAL RANDOM DATA SELECTION.

DATA?

IF THE OPERATOR DESIRES TO SELECT A DATA PATTERN, TYPE Y FOR YES, OTHERWISE, N FOR NO. IF Y WAS TYPED, THE TTY WILL DO A "CRLF" AND WAIT FOR THE OPERATOR TO TYPE IN 12 OCTAL DATA WORDS TO BE USED IN TESTING.

P. THE TTY WILL PRINT THE FOLLOWING QUESTION.

ARE YOU SURE?

IF THE OPERATOR IS CERTAIN OF THE INFORMATION SELECTED, TYPE Y FOR YES, TYPING N FOR NO WILL RESULT IN A REPEAT OF ALL MESSAGES AND QUESTIONS ENCOUNTERED THUS FAR.

R. THE PROGRAM SHOULD START EXECUTING THE OPERATIONS SELECTED.

S. IF ERRORS ARE ENCOUNTERED, ACCESS SECTION 5 IN THIS DOCUMENTATION.

4.5 CHANGE PROGRAM DEVICE IOT CODES

THE PROGRAM NORMALLY RECOGNIZES DEVICE IOT CODE X74X, TO CHANGE THE DEVICE IOT CODES WITHIN THE PROGRAM:

A. SET THE SWITCH REGISTER TO 0201 AND PRESS LOAD ADDRESS.

B. SET THE SWITCH REGISTER TO 0000, SET SWITCH REGISTER BITS 3-8 TO THE DESIRED DEVICE IOT CODE, AND PRESS START.

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

D. THE REGULAR TESTS CAN THEN BE RUN (SEE SECTIONS 4.3 OR 4.4)

5. ERRORS

5.1 USEFUL INFORMATION

ALL STATUS ERRORS WILL BE REPORTED AS STATUS ERRORS. ALL DATA ERRORS WILL BE REPORTED AS DISK DATA ERRORS.

WHEN DATA IS BEING READ OFF THE DISK AND A CRC ERROR OCCURRES THE PROGRAM WILL REPORT THE ERROR AS A READ STATUS ERROR. THE PROGRAM WILL THEN CHECK THE DATA READ FOR DATA ERRORS. IF DATA ERRORS EXIST THEY WILL BE REPORTED AS DISK DATA ERRORS.

5.2 ERROR HALTS

ERROR HALTS FOR WHICH THERE ARE NO ERROR TYPEOUTS ARE LISTED AND DEFINED AS FOLLOWS.

INTER1	NO DISK INTERRUPT
INTER2	UNDEFINED INTERRUPT
ERHLT2	SKIP TRAP FOR IOT "DCLR"
ERHLT3	SKIP TRAP FOR IOT "DLAG"
ERHLT4	SKIP TRAP FOR IOT "DLCA"
ERHLT5	SKIP TRAP FOR IOT "DRST"
ERHLT6	SKIP TRAP FOR IOT "DLDC"
BADHLT	CHECKSUM FAILED BUT WORD-BY-WORD COMPARE WORKED
NODSKS	NO DISKS AVAILABLE TO RUN
KHLT	PROGRAM WILL ONLY RUN IN FIELD Ø

FOR THE ABSOLUTE LOCATIONS OF THE HALTS LISTED ABOVE, ACCESS PAGE 1 OF THE PROGRAM LISTING.

5.3 ERROR TYPEOUTS

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

POSSIBLE "ERROR HEADERS" ARE AS FOLLOWS.

SEEK STATUS ERROR
WRITE STATUS ERROR
READ STATUS ERROR
DISK DATA ERROR
RECALIBRATE STATUS ERROR

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

PC: PROGRAM LOCATION OF THE ACTUAL FAILURE.

ST: CONTENTS OF THE STATUS REGISTER.

CM: SOFTWARE COMMAND REGISTER.

IA: INITIAL SOFTWARE DISK ADDRESS REGISTER OR THE CYLINDER, SURFACE, AND SECTOR BITS.

DA: FINAL SOFTWARE DISK ADDRESS REGISTER OR THE CYLINDER, SURFACE, AND SECTOR BITS.

CA: SOFTWARE INITIAL CURRENT ADDRESS

WC: SOFTWARE INITIAL WORD COUNT

FW: SOFTWARE FINAL WORD COUNT

AS: SECTOR IN ERROR ON THE PARTICULAR CYLINDER AND SURFACE IN QUESTION.

WA: WORD ADDRESS WITHIN THE SECTOR IN ERROR

AD: BREAK ADDRESS OF DATA BREAK IN COMPUTER.

DG: EXPECTED DATA

DB: DATA FOUND DURING DATA BREAK.

5.4 ERROR RECOVERY AND ERROR DISCONNECT

WHEN A READ, WRITE, OR DISK DATA ERROR OCCURRES(SEE SECTION 5.3), THE PROGRAM WILL TRY TO REPEAT THE FAILING SEQUENCE FOUR (4) TIMES. IF THE ERROR HAS OCCURRED FOUR (4) TIMES SIMULTAINIOUSLY, THE ERROR WILL BE CONSIDERED AS A NON-RECOVERABLE ERROR, THE "ERROR HEADER" WILL BE CHANGED TO INDICATE "NON-RECOVERABLE" ERROR, ANOTHER DISK ADDRESS WILL BE SELECTED FOR TESTING, AND THE CURRENT DRIVE WILL BE SENT ON A "SEEK" TO THE ADDRESS SELECTED. IF A "SOFT" ERROR SHOULD OCCUR ON A TRACK, THE PROGRAM WILL RETRY THE READ SEQUENCE (64) TIMES BEFORE SELECTING ANOTHER TRACK FOR TESTING.(NOTE:THIS 64 RETRYS ON "SOFT" ERRORS WILL BE TERMINATED ON A "HARD" ERROR).

POSSIBLE NON-RECOVERALBLE ERROR HEADERS ARE AS FOLLOWS.

```
NON-RECOVERABLE READ STATUS ERROR
NON-RECOVERABLE WRITE STATUS ERROR
NON-RECOVERABLE DISK DATA ERROR
```

IF A "SEEK" ERROR SHOULD OCCUR TO THE NEW ADDRESS, THE DISK IN QUESTION WILL THEN BE RECALIBRATED (RESTORED TO CYLINDER 0). IF THE RECALIBRATE SEQUENCE FAILS, THE DISK DRIVE IN ERROR WILL BE DISCONNECTED BY THE PROGRAM AND NO LONGER BE TESTED.

THE FOLLOWING "DISCONNECT" AND "STATUS-COMPLETE" TYPEOUTS SHOULD OCCUR.

```
RECALIBRATE ERROR DISCONNECT!
DISK X DISCONNECTED!
DSK HARD SOFT COMP
 X  0030 0010 0001
 X  0240 5670 0001
```

IF ALL DISKS ON THE SYSTEM HAVE BEEN DISCONNECTED DO TO RECALIBRATE ERRORS THE FOLLOWING TYPEOUT WILL OCCUR AND THE PROGRAM WILL HALT.

```
DISK SYSTEM SHUT DOWN, NO DISKS TO RUN!
```

5.5 STATUS-COMPLETE TYPEOUT AND PASS COMPLETE DISCONNECT

ALL ERRORS AND PASS COMPLETES ARE TALLIED BY THE PROGRAM PER DISK DRIVE.

THE FOLLOWING IS AN EXAMPLE OF THE "STATUS-COMPLETE" TYPEOUT THAT WILL OCCUR WHEN SWR3=1 INDICATING TYPE THIS REPORT, A PASS COMPLETE OCCURRES ON A DRIVE UNDER TEST, OR A DRIVE IS DISCONNECTED DO TO A RECALIBRATE ERROR.

```
DSK HARD SOFT COMP
 X  XXXX XXXX XXXX
 X  XXXX XXXX XXXX
 X  XXXX XXXX XXXX
 X  XXXX XXXX XXXX
```

THE TYPEOUT AS MENTIONED ABOVE IS DESCRIBED AS FOLLOWS.

DSK — DISK DRIVE IN QUESTION.

HARD — ALL ERRORS OTHER THAN THAT DEFINED AS A SOFT ERROR.

SOFT — A READ CRC STATUS ERROR WITH BAD DATA PER TRANSFER WITH RECOVERY POSSIBLE WITHIN FOUR (4) RETRYS. (NOTE: FOUR (4) CONSECUTIVE RETRYS WILL BE CONSIDERED AS A NON-RECOVERABLE ERROR OR A "HARD" ERROR).

COMP — PASS COMPLETES. <3 X 10(9) BITS>

IF SWR5=1 INDICATING "DISCONNECT ON PASS COMPLETION", AND A DISK DRIVE UNDER TEST MAKES A PASS COMPLETION, THE FOLLOWING TYPEOUT WILL OCCUR AND THE DRIVE WILL BE DISCONNECTED.

```
DISK X PASS COMPLETE!
DISK X DISCONNECTED!
DSK HARD SOFT COMP
 X  XXXX XXXX XXXX
 X  XXXX XXXX XXXX
```

IF SWR5=0 INDICATING DON'T "DISCONNECT ON PASS COMPLETION", AND A DISK DRIVE UNDER TEST MAKES A PASS COMPLETION, THE FOLLOWING TYPEOUT WILL OCCUR AND THE DRIVE WILL CONTINUE TO RUN.

```
DISK X PASS COMPLETE!
DSK HARD SOFT COMP
 X  XXXX XXXX XXXX
 X  XXXX XXXX XXXX
```

IF SWR5=1 AND ALL DRIVES HAVE MADE THEIR PASS COMPLETION AND HAVE BEEN DISCONNECTED, THE FOLLOWING TYPEOUT WILL OCCUR AND THE COMPUTER WILL HALT.

```
DISK SYSTEM SHUT DOWN, NO DISKS TO RUN!
```

5.6 TYPICAL ERROR TYPEOUTS

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

```
WRITE STATUS ERROR
PC:2371 ST:4010 CM:4000 IA:0001 DA:0002
CA:3600 WC:7000 FW:0000
```

THE FOLLOWING IS AN EXAMPLE OF AN ERROR TYPEOUT THAT COULD HAVE OCCURRED IF THE STATUS REGISTER FAILED ON A SEEK ONLY FUNCTION.

```
SEEK STATUS ERROR
PC:2076 ST:4002 CM:3000 DA:4007
```

THE FOLLOWING IS A TYPICAL EXAMPLE OF AN "ERROR HEADER" AND ERROR TYPEOUT THAT COULD HAVE OCCURRED ON A DISK DATA ERROR. (NOTE: ADDITION DATA ERRORS IN BUFFER)

```
DISK DATA ERROR
PC:1674 ST:4010 CM:1432 IA:1035 DA:1021
CA:0001 WC:5000 FW:7400
AS:0015 WA:0007 AD:0010 DG:0537 DB:0536
AS:0015 WA:0077 AD:0100 DG:7777 DB:7776
AS:0016 WA:0002 AD:0403 DG:6167 DB:6166
```

6. RESTRICTIONS

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

7. TROUBLE SHOOTING INFORMATION

IOT	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.

AC	
0-6	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	
0-11	CURRENT ADDRESS

6745 DRST

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

AC	
0	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.

AC	
0-2=0	READ DATA
0-2=1	READ ALL
0-2=2	WRITE LOCK
0-2=3	SEEK ONLY
0-2=4	WRITE DATA
0-2=5	WRITE ALL
0-2=6	NOT USED
0-2=7	NOT USED
3	ENABLE INTERRUPT
4	ENABLE SET TRANSFER DONE ON SEEK 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 IOT" LOAD THE MAINTENANCE REGISTER FROM THE AC. THE 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

8. PROGRAM DESCRIPTION (ACCEPT MODE)

THE FOLLOWING IS BRIEF DESCRIPTION OF THE STEPS TAKEN BY THE PROGRAM WHEN RUNNING THE ACCEPT MODE.

A. ALL DISKS SELECTED ARE FIRST RECALIBRATED, THEN SENT ON AN OVERLAP SEEK TO A RANDOM TRACK. THE TRACKS SELECTED ARE SAVED BY THE PROGRAM FOR FUTURE USE.

B. A RANDOM FIELD IS GENERATED. IF FIELD GENERATED IS A NON-EXISTING FIELD, THE MAXIMUM FIELD AVAILABLE WILL BE USED.

C. A RANDOM BLOCK LENGTH IS GENERATED (128 OR 256 WORD SECTORS).

D. A RANDOM AMOUNT OF SEQUENCIAL SECTORS TO TRANSFER IS GENERATED. IF THE FIELD PREVIOUSLY SELECTED WAS AN EXTENDED FIELD OR IF HALF BLOCK TRANSFERS WERE SELECTED (128 WORD SECTORS), THE AMOUNT OF SECTORS WILL BE LIMITED TO 17(8). IF THE FIELD SELECTED WAS FIELD 0 AND IF FULL BLOCK TRANSFERS WERE SELECTED(256 WORD SECTORS), THE AMOUNT OF SECTORS WILL BE LIMITED TO 7(8).

E. A RANDOM STARTING SECTOR WILL BE GENERATED. THE RANDOM AMOUNT OF EXTRA SECTORS PREVIOUSLY GENERATED WILL BE ADDED TO THIS STARTING SECTOR, DETERMINING THE ACTUAL LENGTH OF THE DATA TRANSFER. IF THE STARTING SECTOR WAS 14 AND THE AMOUNT OF EXTRA SECTORS WAS 6, SECTORS 14, 15, 16, 17, 00, 01, AND 02 WILL BE USED FOR TRANSFERING DATA.

F. AN INITIAL SOFTWARE WORD COUNT WILL BE CALCULATED.

G. AN INITIAL RANDOM CURRENT ADDRESS WILL BE GENERATED. IF THE FIELD PREVIOUSLY GENERATED WAS FIELD 0, THE CURRENT ADDRESS WILL BE LIMITED WITHIN THE END OF THE PROGRAM +4000 LOCATIONS.

H. THE BUFFER SELECTED WILL BE FILLED WITH RANDOM DATA, CHECKSUMMED, AND THE CHECKSUM SAVED. (NOTE: BUFFER IS DEPENDENT ON FIELD, WORD COUNT, BLOCK LENGTH, AND CURRENT ADDRESS PREVIOUSLY SELECTED.)

I. THE PROGRAM WILL THEN POLE THE DISK DRIVES PREVIOUSLY SENT ON OVERLAP SEEK OPERATIONS.

J. DATA WILL BE WRITTEN ON THE FIRST DISK DRIVE TO COMPLETE THE SEEK OPERATION USING THE RANDOM PARAMETERS GENERATED ABOVE. AS DATA IS WRITTEN, A BACK GROUND PROGRAM WILL CLEAR THE BUFFER AREA ALREADY WRITTEN ON THE DISK.

K. WHEN THE WRITE AND CLEAR IS COMPLETE, DATA WILL BE READ OFF THE CURRENT DRIVE INTO THE BUFFER AREA. AS DATA IS READ, A BACK GROUND PROGRAM WILL CHECKSUM THE BUFFER INFORMATION ALREADY READ OFF THE DISK.

L. WHEN THE READ AND CHECKSUM IS COMPLETE, THE CHECKSUM FOUND WILL BE COMPARED TO THE CHECKSUM SAVED PREVIOUS TO THE WRITE OPERATION. IF CHECKSUMS DO NOT COMPARE OR IF A CRC ERROR HAS OCCURRED, A WORD BY WORD COMPARE WILL BE MADE TO DETERMINE AND TYPE OUT THE BAD DATA FOUND.

M. THE CURRENT DRIVE WILL BE SENT OUT ON AN OVERLAP SEEK OPERATION AND THE TRACK SAVED.

N. STEPS B-H WILL BE REPEATED AND THE DRIVE POLE WILL BE STARTED AT THE CURRENT DRIVE +1.

O. FOR ALL POSSIBLE ERRORS, SEE SECTION 5 IN THIS DOCUMENT.

9. PROGRAM LISTING

```
                    /
                    /RK8E DATA RELIABILITY PROGRAM
                    /
                    /MAINDEC-08-DHRKC-E-L
                    /
                    /COPYRIGHT (C) 1972-1973-1974-1975, DIGITAL EQUIP. CORP., MAYNARD, MASS.
                    /
                    /NOTE:LOCATION 0 CONTAINS THE REVSION
                    /LEVEL (IN ASCII) ON PROGRAM LOAD.
                    /
                    /ALL KNOWN HALTS
                    /
0200  1410          ERHLT2                          /SKIP TRAP DCLR
0201  2563          ERHLT3                          /SKIP TRAP DLAG
0202  2555          ERHLT4                          /SKIP TRAP DLCA
0203  2546          ERHLT5                          /SKIP TRAP DRST
0204  2732          ERHLT6                          /SKIP TRAP DLDC
0205  3126          INTER1                          /NO DISK INTERRUPT
0206  2357          INTER2                          /UNDEFINED INTERRUPT
0207  0206          KHLT                            /PROGRAM WILL ONLY RUN IN FIELD 0
0210  2671          NODSKS                          /NO DISKS AVAILABLE TO RUN
0211  2006          STPHLT                          /PROGRAM STOP FROM SWR4=1
0212  2753          CHNHLT                          /IOT CHANGE HALT
0213  1707          BADHLT                          /COMPUTER MUST BE DOWN, CHECKSUM FAILED
                                                    /BUT WORD-BY-WORD COMPARE WORKED.
                    /
      6741          DSKP=6741                       /SKIP ON TRANSFER DONE OR ERROR
      6742          DCLR=6742                       /CLEAR DISK CONTROL LOGIC
      6743          DLAG=6743                       /LOAD ADDRESS AND GO
      6744          DLCA=6744                       /LOAD CURRENT ADDRESS
      6745          DRST=6745                       /READ STATUS REGISTER
      6746          DLDC=6746                       /LOAD COMMAND REGISTER
                    /
      4421          RANDAT=JMS I    XRNWRD
      4422          DISCON=JMS I    XDUMP
      4423          SPACE=JMS I     XSPAC
      4424          ONEIN=JMS I     XOCT1
      4425          FORIN=JMS I     XOCT4
      4426          SETGEN=JMS I    XSTGEN
      4427          SETFLD=JMS I    XSTFLD
      4431          YESNO=JMS I     XCHKYN
      4430          SELCHK=JMS I    XCKPOT
      4432          SEEK=JMS I      XSKOUT
      4433          RANGEN=JMS I    XRNDOM
      4435          RESRAN=JMS I    XRSRAN
      4434          DISKGO=JMS I    XDSKGO
      4436          RECAL=JMS I     XRESTR
      4437          RECEIV=JMS I    XWAIT
      4441          ERROR=JMS I     XERRO
      4442          RDSTAT=JMS I    XRDST
      4446          LDADD=JMS I     XLDAD
      4443          DSKSKP=JMS I    XSDKP
      4444          LDCMD=JMS I     XLDCM
      4445          LDCUR=JMS I     XLDCA
```



```
      4447          CLRALL=JMS I    XCLDR
      4450          PRNTER=JMS I    XPRN
      4451          OCTEL=JMS I     XFROCT
      4440          TYPE=JMS I      XPRINT
      4452          CRLF=JMS I      XCRLF
      4420          GENDAT=JMS I    XGNDAT
                    /
      0000          *0
                    /
0000  0305                0305                    /REVISION "E";INTERRUPT SERVICE RETURN
0001  5001                5001                    /DCA SAVAC  SAVE AC AT INT.
0002  0002                0002                    /RAL  SHIFT LINK AT TIME OF INT.
0003  0003                0003                    /DCA SVLNK  SAVE LINK AT TIME OF INT.
0004  0004                0004                    /JMP I 5   RETURN TO INT. SERVICE
0005  0005                0005                    /RETURN POINTER
                    /
      0010          *10
                    /
0010  0000          AUTO10, 0
                    /
0011  0000          AUTO11, 0
                    /
0012  0000          AUTO12, 0
                    /
                    /
0013  0020          K0020,  0020
0014  0070          K0070,  0070
0015  0100          K0100,  0100
0016  0200          K0200,  0200
                    /
      0020          *20
                    /
0020  1740          XGNDAT, GNDAT
0021  2600          XRNWRD, RNWRD
0022  2627          XDUMP,  DUMP
0023  1503          XSPAC,  SPAC
0024  2400          XOCT1,  OCT1
0025  2430          XOCT4,  OCT4
0026  1754          XSTGEN, STGEN
0027  2673          XSTFLD, STFLD
0030  2143          XCKPOT, CHKPOT
0031  2122          XCHKYN, CHKYN
0032  2000          XSKOUT, SEKOUT
0033  1716          XRNDOM, RANDOM
0034  2200          XDSKGO, DSKGO
0035  1762          XRSRAN, RSRAN
0036  3047          XRESTR, RESTOR
0037  2102          XWAIT,  WAIT
0040  2620          XPRINT, PRINT
0041  1200          XERRO,  ERRO
0042  2543          XRDST,  RDST
0043  2720          XSDKP,  SDKP
0044  2725          XLDCM,  LDCM
0045  2552          XLDCA,  LDCA
0046  2556          XLDAD,  LDAD
```

```
0047  1405    XCLDR,  CLDR
0050  1445    XPRN,   PRN
0051  1423    XFROCT, FROCT
0052  1411    XCRLF,  UPONE
0053  0000    AMOUNT, 0
0054  0003    K0003,  0003
0055  0006    K0006,  0006
0056  0007    K0007,  0007
0057  0010    K0010,  0010
0060  0017    K0017,  0017
0061  0260    K0260,  0260
0062  0240    K0240,  0240
0063  0316    K0316,  0316
0064  0331    K0331,  0331
0065  0277    K0277,  0277
0066  0400    K0400,  0400
0067  2000    K2000,  2000
0070  4000    K4000,  4000
0071  6000    K6000,  6000
0072  1000    K1000,  1000
0073  1777    K1777,  1777
0074  7700    K7700,  7700
0075  7760    K7760,  7760
0076  7761    K7761,  7761
0077  7772    K7772,  7772
0100  7775    K7775,  7775
0101  7777    K7777,  7777
0102  0077    K0077,  0077
0103  6201    KCDF,   CDF
0104  7400    K7400,  7400
              /
              DECIMAL
              /
0105  7764    M12,    -12
              /
              OCTAL
              /
0106  7774    M4,     -4
0107  7773    M5,     -5
              /
0110  0000    TRASH1, 0
0111  0000    TRASH2, 0
0112  0000    TRASH3, 0
0113  0000    UPDATE, 0
0114  0000    POLDSK, 0
0115  0000    OPRTAL, 0
0116  0000    BUFTAL, 0
0117  0000    PCREG,  0
0120  0000    STREG,  0
0121  0000    CMREG,  0
0122  0000    INTDA,  0
0123  0000    DAREG,  0
0124  0000    CAREG,  0
0125  0000    WCREG,  0
0126  0000    FWREG,  0
```



```
0127  0000    ASREG,  0
0130  0000    WAREG,  0
0131  0000    ADREG,  0
0132  0000    DGREG,  0
0133  0000    DBREG,  0
0134  0000    INTCM,  0
0135  0000    STATRY, 0
0136  0000    DATTRY, 0
0137  0000    CHKSAV, 0
0140  0000    FNDSUM, 0
0141  0000    MAXFLD, 0
0142  7607    MAXTIM, 7607
0143  3240    MAXTRK, 3240
0144  3600    BGNBUF, STRBUF
0145  0000    CONSEC, 0
              /
0146  3556    DATPOT, DAT1
0147  3515    TIMPOT, D0TM1
0150  3522    STAPOT, D0HRD -3
0151  3546    DSKPOT, DSK0A
0152  3552    RUNPOT, DSK0B
              /
0153  0000    CRCCNT, 0
0154  0000    CRCFLG, 0
0155  0000    DATFLG, 0
0156  0000    SPFLD,  0
0157  0000    SPTRK1, 0
0160  0000    SPTRK2, 0
0161  0000    SPSEC,  0
0162  0000    SPBLK,  0
0163  0000    ERFLG,  0
0164  0000    SEKSW,  0
0165  0000    SAVAC,  0
0166  0000    SVLNK,  0
0167  0000    FIRTIM, 0
0170  0000    TRYCNT, 0
0171  3203    XTEXT,  TEXPC
0172  3132    PRNDAT, TYPDAT
0173  0000    SAVCM,  0
0174  0000    CLRBAK, 0
              /
      0200    *200
              /
              /
              /START OF PROGRAM BY OPERATOR!
              /AT 0200, TTY INTERIGATION!
              /AT 0201, CHANGE IOT DEVICE CODES!
              /AT 0202, RESTART AT SEEK ROUTINE!
              /
0200  5203    BGN,    JMP     .+3             /TO REGULAR TEST
0201  5777*           JMP     CHANG           /CHANGE IOT ROUTINE
0202  5776*           JMP     STRSTP          /RESTART
0203  3154            DCA     CRCFLG          /CLEAR CRC FLAG
0204  6224            RIF
0205  7440            SZA                     /FIELD 0????
```

```
0206  7402  KHLT,   HLT                          /WILL ONLY RUN IN FIELD 0????
0207  1103          TAD     KCDF
0210  3211          DCA     .+1
0211  7402          HLT                          /MAKE DF=IF
                    /
                    /SETUP INTERRUPT SERVICE!
                    /
0212  1366          TAD     ACDCA
0213  3001          DCA     1                    /SETUP AC DCA
0214  1247          TAD     KROT
0215  3002          DCA     2                    /SETUP ROTATE LINK
0216  1365          TAD     LNKDCA
0217  3003          DCA     3                    /SETUP SAVE LINK
0220  1364          TAD     K5405
0221  3004          DCA     4                    /SETUP JMP RETURN
0222  1367          TAD     BRKRET
0223  3005          DCA     5                    /RETURN POINTER
                    /
                    /CLEAR DATA INFORMATION TABLE
                    /AT END OF PROGRAM!
                    /
0224  1074  STRTEX, TAD     K7700
0225  3110          DCA     TRASH1               /CLEAR COUNTER
0226  1775' RANJMS  TAD     RANJMS
0227  3774' SWDAT   DCA     SWDAT          /SET INSTRUCTION SWITCH
0230  7340          CLA CLL CMA
0231  1147          TAD     TIMPOT
0232  3010          DCA     AUTO10               /LOCATION POINTER
0233  3410          DCA I   AUTO10               /CLEAR
0234  2110          ISZ     TRASH1
0235  5233          JMP     .-2                  /MORE TO CLEAR
0236  3155          DCA     DATFLG
                    /
                    /
                    /PRINT PROGRAM NAME AND
                    /ASK OPERATOR ABOUT AMOUNT
                    /OF MEMORY!
                    /
0237  4452          CRLF
0240  4450          PRNTER                       /PRINT "RK8E DATA RELIABILITY"
0241  3303          MES1
0242  4450          PRNTER                       /PRINT "AMOUNT OF MEMORY"
0243  3337          MES5
0244  4424          ONEIN                        /RECEIVE ONE OCTAL
0245  0070          0070                         /LIMITS
0246  5242          JMP     .-4                  /INPUT ERROR
0247  7004  KROT,   RAL
0250  7006          RTL
0251  7040          CMA                          /COMPLEMENT
0252  3141          DCA     MAXFLD               /MAXIMUM FIELD POINTER
0253  4450  ALLAGN, PRNTER                       /PRINT "EXERCISE"
0254  3316          MES2
0255  3110          DCA     TRASH1
0256  1106          TAD     M4
0257  3111          DCA     TRASH2
```



```
0260  3053          DCA     AMOUNT               /A FEW POINTERS
                    /
                    /ASK OPERATOR ABOUT DISK(S) TO TEST!
                    /
0261  1110  NEXT,   TAD     TRASH1
0262  1152          TAD     RUNPOT
0263  3112          DCA     TRASH3               /SAVE RUN POINTER
0264  7340          CLA CLL CMA
0265  4450          PRNTER                       /PRINT " DISK"
0266  3323          MES3
0267  1061          TAD     K0260
0270  1110          TAD     TRASH1               /ADD IN DISK NUMBER
0271  4440          TYPE                         /TYPE DISK NUMBER
0272  1065          TAD     K0277
0273  4440          TYPE                         /TYPE ?
0274  4437          RECEIV                       /RECEIVE KEY INPUT
0275  4431          YESNO                        /WAS IT YES OR NO
0276  5253          JMP     ALLAGN               /NEITHER
0277  5302          JMP     .+3                  /WAS A NO
0300  2053          ISZ     AMOUNT               /AMOUNT OF DISK FOUND
0301  7340          CLA CLL CMA                  /AC TO 7777 FOR EXISTING DISK
0302  3512          DCA I   TRASH3               /SETUP RUN POINTER
0303  2110          ISZ     TRASH1
0304  2111          ISZ     TRASH2
0305  5261          JMP     NEXT                 /ASK ABOUT NEXT DISK
                    /
                    /
                    /ASK IF ACCEPT MODE!
                    /
0306  1053          TAD     AMOUNT               /GET AMOUNT FOUND
0307  7650          SNA CLA                      /WERE ANY FOUND
0310  5224          JMP     STRTEX               /OPERATOR ERROR NO DISK INPUT
0311  4450          PRNTER                       /PRINT "ACCEPT MODE?"
0312  3361          MES6
0313  4437          RECEIV                       /RECEIVE INPUT
0314  4431          YESNO                        /YES OR NO????
0315  5311          JMP     .-4                  /NEITHER ALL AGAIN
0316  7610          SKP CLA                      /MANUAL TEST
0317  5773' ASKSUR  JMP     ASKSUR               /ASK "ARE YOU SURE"
                    /
                    /
                    /IF ACCEPT MODE, INTERAGATE
                    /ABOUT CONSTANT FIELD!
                    /
0320  4450  MANUAL, PRNTER                       /PRINT "FIELD?"
0321  3402          MES8
0322  4437          RECEIV                       /RECEIVE Y OR N
0323  4431          YESNO                        /CHECK FOR Y OR N
0324  5320          JMP     MANUAL               /NEITHER Y OR N
0325  5343          JMP     ASKNX1               /WAS A N, ASK ABOUT NEXT
0326  4423          SPACE                        /SPACE OUT ONE
0327  4424          ONEIN                        /GET 1 OCTAL
0330  0070          0070                         /LIMITS
0331  5320          JMP     MANUAL               /INPUT ERROR ASK AGAIN
0332  7104          CLL RAL
```

```
0333  7006          RTL
0334  3156          DCA     SPFLD                   /SAVE INPUT
0335  1156          TAD     SPFLD
0336  1141          TAD     MAXFLD                  /COMPARE TO MAXIMUM
0337  7700          SMA CLA                         /O.K.?
0340  5320          JMP     MANUAL                  /INPUT ERROR
0341  7340          CLA CLL CMA
0342  3772'         DCA     FLDFLG                  /SETUP FIELD FLAG
                    /
                    /
                    /INTERAGATE ABOUT CONSTANT TRACK!
                    /
0343  4450    ASKNX1, PRNTER                        /PRINT "TRACK?"
0344  3406          MES9
0345  4437          RECEIV                          /RECEIVE Y OR N
0346  4431          YESNO                           /CHECK FOR Y OR N
0347  5343          JMP     ASKNX1                  /ERROR, ASK AGAIN
0350  5771'         JMP     ASKNX2                  /N, ASK ABOUT NEXT
0351  4423          SPACE
0352  4424          ONEIN                           /RECEIVE 1 IN OCTAL
0353  0010          0010                            /LIMITS
0354  5343          JMP     ASKNX1                  /ERROR, ASK AGAIN
0355  3157          DCA     SPTRK1                  /SAVE EXTENDED TRACK BIT
0356  4425          FORIN                           /RECEIVE FOUR IN OCTAL
0357  5343          JMP     ASKNX1                  /ERROR, ASK AGAIN
0360  3160          DCA     SPTRK2                  /SAVE CYL., SURFACE, AND SECTOR
0361  7340          CLA CLL CMA
0362  3770'         DCA     TRKFLG                  /SETUP TRACK FLAG
0363  5771'         JMP     ASKNX2                  /ASK ABOUT NEXT
                    /
0364  5405    K5405,  5405
0365  3166    LNKDCA, DCA     SVLNK
0366  3165    ACDCA,  DCA     SAVAC
0367  2304    BRKRET, RETURN
                    /
0370  3542
0371  0400
0372  3541
0373  0520
0374  2601
0375  0554
0376  2003
0377  2733
      0400          PAGE
                    /
                    /
                    /INTERIGATE ABOUT CONSTANT
                    /BLOCK LENGTH!
                    /
0400  4450    ASKNX2, PRNTER                        /PRINT "BLOCK LENGTH?"
0401  3422          MES11
0402  4437          RECEIV                          /RECEIVE INPUT
0403  4431          YESNO                           /CHECK FOR Y OR N
0404  5200          JMP     ASKNX2                  /ERROR, ASK AGAIN
0405  5217          JMP     ASKNX3                  /N, ASK ABOUT NEXT
```



```
0406  4423          SPACE                           /Y, SPACE OUT 1
0407  4424          ONEIN                           /RECEIVE 1 IN OCTAL
0410  0010          0010                            /LIMITS
0411  5200          JMP     ASKNX2                  /ERROR, ASK AGAIN
0412  7640          SZA CLA                         /SET HALF BLOCK?
0413  7340          CLA CLL CMA                     /YES
0414  3162          DCA     SPBLK                   /SETUP BLOCK NUMBER
0415  7340          CLA CLL CMA
0416  3777'         DCA     HLFFLG                  /SETUP BLOCK FLAG
                    /
                    /
                    /INTERIGATE ABOUT CONSTANT
                    /SECTORS!
                    /
0417  4450    ASKNX3, PRNTER                        /PRINT "EXTRA SECTORS?
0420  3412          MES10
0421  4437          RECEIV                          /RECEIVE INPUT
0422  4431          YESNO                           /CHECK FOR Y OR N
0423  5217          JMP     ASKNX3                  /INPUT ERROR
0424  5256          JMP     ASKNX4                  /N, ASK ABOUT NEXT
0425  4423          SPACE                           /SPACE OUT 1
0426  4424          ONEIN                           /REVEIVE 1 IN OCTAL
0427  0010          0010                            /LIMITS
0430  5217          JMP     ASKNX3                  /ERROR, ASK AGAIN
0431  7104          CLL RAL
0432  7006          RTL
0433  3161          DCA     SPSEC                   /SAVE IT
0434  4424          ONEIN                           /RECEIVE 1 IN OCTAL
0435  0070          0070                            /LIMITS
0436  5217          JMP     ASKNX3                  /INPUT ERROR, ASK AGAIN
0437  1161          TAD     SPSEC                   /ADD IN LAST
0440  3161          DCA     SPSEC                   /SAVE ALL
0441  1162          TAD     SPBLK
0442  7640          SZA CLA                         /BLOCK LENGTH 0????
0443  5246          JMP     .+3                     /NO LIMIT IS 17.
0444  1156          TAD     SPFLD
0445  7640          SZA CLA                         /FIELD 0?????
0446  1057          TAD     K0010                   /LIMIT IS 17.
0447  1056          TAD     K0007
0450  7140          CLL CMA
0451  1161          TAD     SPSEC                   /COMPARE SECTOR INPUT!
0452  7630          SZL CLA                         /IN LIMITS???
0453  5217          JMP     ASKNX3                  /NO, INPUT ERROR
0454  7340          CLA CLL CMA
0455  3776'         DCA     SECFLG                  /SETUP SECTOR FLAG
                    /
                    /
                    /INTERIGATE ABOUT SEQUENCE!
                    /
0456  1775'  ASKNX4, TAD     TRKFLG                  /GET TRACK FLAG
0457  7640          SZA CLA                         /WAS IT SET?
0460  5271          JMP     ASKNX5                  /YES, DON'T ASK SEQUENCE
0461  4450          PRNTER                          /PRINT "SEQUENCE?"
0462  3431          MES12
0463  4437          RECEIV                          /RECEIVE INPUT
```

```
0464  4431          YESNO                           /Y OR N
0465  5256          JMP     ASKNX4                  /ERROR, ASK AGAIN
0466  5271          JMP     ASKNX5                  /N, ASK ABOUT NEXT
0467  7340          CLA CLL CMA
0470  3774'         DCA     SEQFLG                  /SETUP SEQUENCE FLAG
                    /
                    /
                    /INTERIGATE ABOUT "OPERATOR
                    /SELECT DATA"!
                    /
0471  4450  ASKNX5, PRNTER                          /PRINT "DATA?"
0472  3436          MES13
0473  1354          TAD     RANJMS
0474  3773'         DCA     SWDAT                   /SET INSTRUCTION SWITCH
0475  4437          RECEIV                          /RECEIVE INPUT
0476  4431          YESNO                           /Y OR N
0477  5271          JMP     ASKNX5                  /ERROR, ASK AGAIN
0500  5320          JMP     ASKSUR                  /ASK "ARE YOU SURE"
0501  1340          TAD     KSKP
0502  3773'         DCA     SWDAT                   /SET INSTRUCTION SWITCH
0503  1105          TAD     M12
0504  3110          DCA     TRASH1                  /SETUP WORD COUNTER
0505  7340          CLA CLL CMA
0506  1146          TAD     DATPOT                  /GET POT POINTER
0507  3010          DCA     AUTO10
0510  4452          CRLF
0511  4425          FORIN                           /RECEIVE 4 IN OCTAL
0512  5271          JMP     ASKNX5                  /INPUT ERROR, ASK AGAIN
0513  3410          DCA I   AUTO10                  /SAVE DATA
0514  2110          ISZ     TRASH1                  /UPDATE COUNTER
0515  5310          JMP     .-5                     /GET NEXT
0516  7340          CLA CLL CMA
0517  3155          DCA     DATFLG                  /SETUP DATA FLAG
                    /
                    /ASK IF HE'S SURE!
                    /
0520  4450  ASKSUR, PRNTER                          /PRINT "ARE YOU SURE"
0521  3441          MES14
0522  4437          RECEIV                          /GET INPUT
0523  4431          YESNO                           /Y OR N
0524  5320          JMP     ASKSUR                  /INPUT ERROR
0525  5772'         JMP     STRTEX                  /ALL AGAIN
                    /
                    /
                    /SEND EXISTING DRIVES TO A RANDOM TRACK
                    /AND SAVE THE TRACK ADDRESS
                    /
0526  3110  STRSEK, DCA     TRASH1
0527  1053          TAD     AMOUNT
0530  7041          CIA
0531  3111          DCA     TRASH2                  /SOME POINTERS
0532  1110  NXTSEK, TAD     TRASH1
0533  4430          SELCHK                          /CHECK RUN POINTER
0534  5352          JMP     NTSEK                   /WAS A ZERO DON'T RUN
0535  1110  RESET,  TAD     TRASH1
```



```
0536  7104          CLL RAL
0537  4436          RECAL                           /RECALIBRATE DRIVE
0540  7610  KSKP,   SKP CLA                         /RECALIBRATE IS O.K.
0541  5347          JMP     NTSEK +3                /DUMPED BUT MORE AVAILABLE
0542  1110          TAD     TRASH1
0543  7104          CLL RAL
0544  4432          SEEK                            /SEEK ONLY A RANDOM TRACK
0545  7610          SKP CLA
0546  5335          JMP     RESET                   /ERROR, TRY TO RECALIBRATE
0547  2111          ISZ     TRASH2                  /UPDATE POINTER
0550  7610          SKP CLA                         /MORE TO SEND OUT
0551  5771'         JMP     RUN                     /START RANDOM DATA
0552  2110  NTSEK,  ISZ     TRASH1
0553  5332          JMP     NXTSEK                  /SEND OUT NEXT EXISTING DISK
                    /
0554  4420  RANJMS, GENDAT
                    /
0571  0600
0572  0224
0573  2601
0574  3545
0575  3542
0576  3543
0577  3544
      0600          PAGE
                    /
                    /
                    /SETUP ADDRESSING, COMMAND,
                    /AND DATA PARAMETERS!
                    /IF SW6 IS SET, INHIBIT DATA
                    /TESTING!
                    /
0600  3163  RUN,    DCA     ERFLG                   /CLEAR ERROR POINTER
0601  7604          LAS
0602  0360          AND     K0040                   /MASK SWITCH 6
0603  3164          DCA     SEKSW                   /LATCH
0604  1164          TAD     SEKSW
0605  7640          SZA CLA                         /SEEK ONLY SET????
0606  5777'         JMP     POLNEX                  /YES, SEEK ONLY
                    /
                    /MAKE FIELD!
                    /
0607  1776'         TAD     FLDFLG                  /GET FIELD FLAG
0610  7650          SNA CLA                         /WAS IT SET?
0611  5214          JMP     .+3                     /NO, USE RANDOM FIELD
0612  1156          TAD     SPFLD                   /YES, GET OPERATOR FIELD
0613  5233          JMP     RNFLD                   /GO
0614  7301          CLA CLL IAC
0615  1141          TAD     MAXFLD                  /GET MAXIMUM FIELD POINTER
0616  7650          SNA CLA                         /ANY FIELDS THERE
0617  5233          JMP     RNFLD                   /NO EXTENDED FIELDS TO USE
0620  4433          RANGEN                          /YES, GET A RANDOM FIELD
0621  0014          AND     K0070                   /MASK
0622  7450          SNA                             /COULD BE 0
0623  5233          JMP     RNFLD                   /WAS DON'T HAVE TO CHECK LIMITS
```

```
0624  3134            DCA     INTCM                   /SAVE FIELD FOUND
0625  1134            TAD     INTCM
0626  1141            TAD     MAXFLD                  /ADD IN MAXIMUM FIELD POINTER
0627  7710            SPA CLA                         /IN LIMITS????
0630  5234            JMP     RNFLD +1                /YES, USE IT
0631  1141            TAD     MAXFLD                  /NO, USE MAXIMUM IN THE MACHINE
0632  7040            CMA
0633  3134  RNFLD,    DCA     INTCM
                      /
                      /MAKE BLOCK LENGTH!
                      /
0634  1775'           TAD     HLFFLG                  /GET BLOCK FLAG
0635  7650            SNA CLA                         /WAS IT SET????
0636  4433            RANGEN                          /NO, USE RANDOM
0637  1162            TAD     SPBLK
0640  0015            AND     K0100                           /MASK
0641  1134            TAD     INTCM
0642  3134            DCA     INTCM                   /INITIAL HALF BLOCK BIT ****
0643  1134            TAD     INTCM
0644  0015            AND     K0100                   /MASK
0645  7640            SZA CLA                         /HALF BLOCK SET????
0646  1016            TAD     K0200                   /YES, SETUP WC POINTER
0647  1104            TAD     K7400
0650  3111            DCA     TRASH2                  /WC BUILDER
0651  1111            TAD     TRASH2
0652  7041            CIA
0653  3113            DCA     UPDATE                  /UPDATER FOR FWREG
0654  1134            TAD     INTCM
0655  0361            AND     A0170                   /MASK FIELD BITS
0656  7640            SZA CLA                         /WERE THERE ANY
0657  1057            TAD     K0010                   /YES
0660  1056            TAD     K0007                   /MAKE MAXIMUM SECTOR POINTER
0661  3110            DCA     TRASH1                  /SAVE IT
                      /
                      /MAKE AMOUNT OF SECTORS
                      /TO TRANSFER!
                      /
0662  1774'           TAD     SECFLG                  /GET SECTOR FLAG
0663  7650            SNA CLA                         /WAS IT SET????
0664  4433            RANGEN                          /USE RANDOM
0665  1161            TAD     SPSEC                   /GET OPERATOR INPUT
0666  0110            AND     TRASH1                  /MASK OUT
0667  3145            DCA     CONSEC                  /SAVE
0670  1145            TAD     CONSEC
0671  7040            CMA
0672  3110            DCA     TRASH1                  /CONSECUTIVE TO DO
                      /
                      /MAKE CYLINDER, SURFACE, AND
                      /STARTING SECTOR!
                      /
0673  1773'           TAD     TRKFLG                  /GET TRACK FLAG
0674  7650            SNA CLA                         /WAS IT SET????
0675  4433            RANGEN                          /USE RANDOM
0676  1160            TAD     SPTRK2                  /GET INPUT
0677  0060            AND     K0017                   /MASK
```



```
0700  3112            DCA     TRASH3                  /STARTING SECTOR
0701  1111            TAD     TRASH2                  /COMPUTE INITIAL WC
0702  2110            ISZ     TRASH1
0703  5301            JMP     .-2                     /UPDATE BY BUILDER
0704  3125            DCA     WCREG                   /INITIAL WORD COUNT ****
                      /
                      /MAKE CURRENT ADDRESS!
                      /
0705  4433            RANGEN                          /GENERATE RANDOM CA
0706  3124            DCA     CAREG                   /SAVE IT
0707  1134            TAD     INTCM
0710  0014            AND     K0070                   /MASK FIELD BITS
0711  7640            SZA CLA                         /EXTENDED FIELD????
0712  5330            JMP     FILLER                  /INITIAL CA O.K.****
0713  1144            TAD     BGNBUF
0714  7140            CMA CLL
0715  1124            TAD     CAREG
0716  7620            SNL CLA                         /GREATER THAN PROGRAM +1
0717  5326            JMP     CONCUR                  /NO, USE CONSTANT VALUE
0720  1125            TAD     WCREG                   /GET WORD COUNT
0721  7041            CIA
0722  1124            TAD     CAREG                   /ADD IN CA
0723  1016            TAD     K0200
0724  7630            SZL CLA                         /WITHIN BOUNDS????
0725  5330            JMP     FILLER                  /YES, INITIAL CA O.K.****
0726  1144  CONCUR,   TAD     BGNBUF                  /NO, USE PROGRAM +1
0727  3124            DCA     CAREG                   /SAVE IT
                      /
                      /ROUTINE TO FILL AND CHECK SUM BUFFER
                      /
0730  4426  FILLER,   SETGEN                          /SETUP AND SAVE GENERATER
0731  1106            TAD     M4
0732  3135            DCA     STATRY                  /SETUP TRY COUNTER
0733  4427  REFILL,   SETFLD                          /FIELD + BUFTAL + AUTO 11 + 12
0734  3335            DCA     .+1                     /FIELD TO BUFFER IN AC
0735  7402            HLT                             /CDF TO BUFFER
0736  3137            DCA     CHKSAV                  /START WITH 0
0737  4421  NEWRD,    RANDAT                          /GENERATE DATA
0740  3110            DCA     TRASH1                  /SAVE OUTPUT WORD
0741  1110            TAD     TRASH1                  /GET BACK WORD
0742  3411            DCA I   AUTO11                  /STORE IN BUFFER
0743  7100            CLL
0744  1110            TAD     TRASH1                  /GET BACK WORD
0745  1137            TAD     CHKSAV                  /ADD IN LAST
0746  7430            SZL                             /LINK SET??
0747  7001            IAC                             /ADD IT IN
0750  3137            DCA     CHKSAV                  /SAVE FOR NEXT
0751  2116            ISZ     BUFTAL                  /UPDATE BUFFER TALLY
0752  5337            JMP     NEWRD                   /MORE WORDS TO GO
0753  6201            CDF     0
0754  1163            TAD     ERFLG
0755  7650            SNA CLA                         /ERROR FLAG SET????
0756  5777'           JMP     POLNEX                  /POLE DRIVES
0757  5772'           JMP     REWRT                   /YES, MUST BE A WRITE ERROR
                      /
```

```
/       PAL10   V142A   19-MAR-75        15:21   PAGE 1-12

  0760  0040    K0040,  0040
  0761  0170    A0170,  0170
                /
  0772  1054
  0773  3542
  0774  3543
  0775  3544
  0776  3541
  0777  1000
        1000    PAGE
                /
                /ROUTINE TO POLE DRIVES; WAIT FOR FIRST DRIVE COMPLETION,
                /THEN START WRITE SEQUENCE!
                /
  1000  2114    POLNEX, ISZ     POLDSK                  /UPDATE POLE POINTER
  1001  7000            NOP
  1002  1114    SAMPOL, TAD     POLDSK                  /GET POINTER
  1003  4430            SELCHK                          /CHECK RUN POINTER
  1004  5200            JMP     POLNEX                  /TRY NEXT DRIVE
  1005  1114            TAD     POLDSK                  /GET POINTER
  1006  0054            AND     K0003                   /MASK
  1007  7104            CLL RAL                         /MAKE DRIVE NUMBER
  1010  4444            LDCMD                           /LOAD COMMAND REGISTER
  1011  4442            RDSTAT                          /READ STATUS REGISTER
  1012  1071            TAD     K6000
  1013  7450            SNA                             /WAS DRIVE BUSY
  1014  5200            JMP     POLNEX                  /YES, TRY NEXT DRIVE
  1015  1067            TAD     K2000                   /NO, THEN IT MUST BE DONE
  1016  7650            SNA CLA                         /WAS IT DONE ?
  1017  5235            JMP     GOTIT                   /YES, DONE
  1020  4441            ERROR                           /ERROR ON DRIVE POLE
  1021  0003            0003                            /HEADER POINTER
  1022  7200            7200                            /MESSAGE POINTER
  1023  1114    BDREC,  TAD     POLDSK                  /LAST DRIVE USED
  1024  7104            CLL RAL
  1025  4436            RECAL                           /RECALIBRATE DISK
  1026  7610            SKP CLA                         /RECALIBRATE O.K.
  1027  5200            JMP     POLNEX                  /DUMPED, BUT MORE AVAILABLE
  1030  1114            TAD     POLDSK                  /GET DISK NO.
  1031  7104            CLL RAL
  1032  4432            SEEK                            /SEEK A RANDOM TRACK
  1033  5200            JMP     POLNEX                  /ENTER POLE DISKS
  1034  5223            JMP     BDREC                   /ERROR, RECALIBRATE
                /
                /
                /DRIVE COMPLETED, START
                /WRITE SEQUENCE!
                /
  1035  1114    GOTIT,  TAD     POLDSK                  /GET POINTER
  1036  0054            AND     K0003                   /MASK
  1037  1151            TAD     DSKPOT                  /GET DISK ADDRESS POINTER
  1040  3110            DCA     TRASH1
  1041  1510            TAD I   TRASH1                  /GET DISK ADDRESS
  1042  0056            AND     K0007                   /MASK DRIVE + EXTENDED BIT
  1043  1134            TAD     INTCM                   /ADD IN COMMAND
```

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/       PAL10   V142A   19-MAR-75        15:21   PAGE 1-13

  1044  3134            DCA     INTCM                   /DRIVE NUMBER + EXTENDED BIT ***
  1045  1164            TAD     SEKSW                   /GET SEEK SWITCH LATCH
  1046  7640            SZA CLA                         /LOOP ON SEEK ONLYS????
  1047  5354            JMP     RESEEK                  /YES!!!!
  1050  1510            TAD I   TRASH1                  /GET DISK ADDRESS
  1051  0075            AND     K7760                   /MASK OFF TRACK
  1052  1112            TAD     TRASH3                  /ADD IN STARTING SECTOR
  1053  3122            DCA     INTDA                   /INITIAL DISK ADDRESS ****
                /
                /WRITE INFORMATION!
                /CLEAR BUFFER ON THE FLY!
                /
  1054  4434    REWRT,  DISKGO                          /GO WRITE
  1055  4400            4400                            /WRITE DATA POINTER
  1056  5270            JMP     GOREAD                  /WRITE O.K.
  1057  7340            CLA CLL CMA
  1060  3163            DCA     ERFLG                   /SET WRITE ERROR FLAG
  1061  4435            RESRAN                          /RESET GENERATOR
  1062  2135            ISZ     STATRY                  /UPDATE WRITE RE-TRY
  1063  5777'           JMP     REFILL                  /TRY AGAIN
                /
                /CHECK FOR LOOP ON WRITE!
                /
  1064  7604            LAS                             /GET SWITCH 0
  1065  7700    TRYTIM, SMA CLA                         /LOOP ON WRITE????
  1066  5354            JMP     RESEEK                  /NO, TRY TO SEEK IT
  1067  5776'           JMP     REFILL -2               /TRY WRITE AGAIN
  1070  7604    GOREAD, LAS                     /GET SWITCH 0
  1071  7700            SMA CLA                 /       /LOOP SWITCH SET????
  1072  5277            JMP     REREAD                  /NO
  1073  7340            CLA CLL CMA
  1074  3163            DCA     ERFLG                   /SET ERROR FLAG
  1075  4435            RESRAN                          /RESET DATA GENERATOR
  1076  5776'           JMP     REFILL -2
  1077  1265    REREAD, TAD     TRYTIM
  1100  3170            DCA     TRYCNT                  /SETUP FOR SOFT ERROR RETRY
  1101  3163            DCA     ERFLG                   /CLEAR ERROR FLAG
  1102  1106            TAD     M4
  1103  3135            DCA     STATRY                  /SETUP TRY COUNTER
  1104  1106            TAD     M4
  1105  3136            DCA     DATTRY                  /SETUP TRY COUNTER
  1106  3153            DCA     CRCCNT                  /CLEAR CRC COUNTER!!!!
                /
                /READ INFORMATION!
                /CHECK BUFFER ON THE FLY!
                /
  1107  4434    RDTRY,  DISKGO                          /READ DATA
  1110  0400            0400                            /READ DATA POINTER
  1111  7610            SKP CLA                         /DATA READ O.K.
  1112  5321            JMP     RDSTA                   /STATUS ERROR
  1113  3153            DCA     CRCCNT                  /CLEAR CRC COUNTER!
                /
                /CHECK DATA ON NO STATUS ERRORS!
                /
  1114  4775'           JMS     DTCHK                   /CHECK DATA
```

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1115  5340            JMP     SEKGO                   /DATA O.K.
1116  2136            ISZ     DATTRY                  /UPDATE READ RE-TRY
1117  5307            JMP     RDTRY                   /TRY AGAIN
1120  5337            JMP     SEKGO -1                /TRY TO SEEK IT
1121  1120  RDSTA,    TAD     STREG                   /GET STATUS READ
1122  0057            AND     K0010                   /MASK CRC
1123  7450            SNA                             /CRC ERROR????
1124  5334            JMP     UPTRY                   /NO, TRY READ AGAIN
1125  3154            DCA     CRCFLG                  /YES, SET FLAG
1126  2153            ISZ     CRCCNT                  /UPDATE CRC POINTER
                      /
                      /CHECK DATA AFTER CRC ERROR!
                      /
1127  4775'           JMS     DTCHK                   /CHECK DATA
1130  7610            SKP CLA                         /IS A HARD ERROR!
1131  7340            CLA CLL CMA                     /SET RETRY COUNTER!
1132  3163            DCA     ERFLG                   /SETUP FOR 64 RETRYS IF AC=7777
1133  7410            SKP                             /CHECK ON RETRY!!!!
1134  3153  UPTRY,    DCA     CRCCNT
1135  2135            ISZ     STATRY                  /UPDATE TRY POINTER
1136  5307            JMP     RDTRY                   /TRY AGAIN
1137  3163            DCA     ERFLG                   /IS A HARD ERROR
1140  3153  SEKGO,    DCA     CRCCNT                  /CLEAR CRC COUNT
1141  3154            DCA     CRCFLG                  /CLEAR CRC FLAG
1142  4774'           JMS     CKTIM                   /CHECK TIME POINTERS
1143  1163            TAD     ERFLG
1144  7650            SNA CLA                         /IS IT 64 RETRYS FOR SOFT ERROR?
1145  5350            JMP     .+3                     /NO DON'T BOTHER
1146  2170            ISZ     TRYCNT                  /YES, UPDATE RETRY COUNTER
1147  5302            JMP     REREAD +3               /TRY AGAIN
                      /
                      /CHECK FOR LOOP ON READ!
                      /
1150  7604            LAS                             /GET SWITCH 1
1151  7104            CLL RAL
1152  7710            SPA CLA                         /LOOP????
1153  5277            JMP     REREAD                  /YES, LOOP
1154  3163  RESEEK,   DCA     ERFLG                   /CLEAR ERROR FLAG
                      /
                      /CHECK FOR TYPE STATUS
                      /REPORT!
                      /
1155  7604            LAS
1156  0066            AND     K0400                   /MASK
1157  7650            SNA CLA                         /TYPE STATUS REPORT????
1160  5363            JMP     .+3                     /NO
1161  4452            CRLF
1162  4773'           JMS     TPSTA                   /YES
1163  1121            TAD     CMREG                   /GET  DRIVE NUMBER
1164  4432            SEEK                            /SEEK A RANDOM TRACK
1165  5772'           JMP     RUN                     /DO NEXT DRIVE
1166  1121            TAD     CMREG
1167  4436            RECAL                           /RECALIBRATE DRIVE
1170  5363            JMP     .-5                     /TRY, SEEK AGAIN
1171  5772'           JMP     RUN                     /DUMPED, BUT MORE AVAILABLE
```



```
                      /
1172  0600
1173  3000
1174  2450
1175  1600
1176  0731
1177  0733
      1200    PAGE
                      /
                      /ERROR HANDLER!
                      /UPDATE "SOFT" OR "HARD" TALLYS!
                      /PRINT ERROR TEXT AND DATA!
                      /CHECK INHIBIT ERROR SW!
                      /
1200  0000  ERRO,    0
1201  7001            IAC                             /UPDATE AC FLAG
1202  3373            DCA     PCNTR2                  /SAVE NON-RECOVERABLE POINTER!
                      /
                      /COMPUTE WAY TO "HARD"/"SOFT" TALLYS!
                      /
1203  1077            TAD     K7772
1204  3374            DCA     PCNTR3                  /LINE COUNTER
1205  1121            TAD     CMREG                   /GET LAST COMMAND
1206  0055            AND     K0006                   /MASK DRIVE NUMBER
1207  7170            CLL CML CMA RAR
1210  3372            DCA     PCNTR1                  /SETUP COUNTER
1211  1054            TAD     K0003
1212  2372            ISZ     PCNTR1
1213  5211            JMP     .-2                     /COMPUTE WAY TO BUFFER
1214  1150            TAD     STAPOT
1215  3372            DCA     PCNTR1                  /POINTER TO BUFFER
                      /
                      /DETERMINE IF ERROR IS "HARD" OR "SOFT"!
                      /
1216  1154            TAD     CRCFLG                  /GET CRC FLAG
1217  7650            SNA CLA                         /CRC ERROR????
1220  5251            JMP     NTSOFT                  /NO, WAS DEFINITLY A HARD ERROR!
1221  1600            TAD I   ERRO                    /GET ERROR POINTER!
1222  7650            SNA CLA                         /WAS IT FIRST TIME?
1223  5255            JMP     NTERR                   /NO ERROR, ADDITIONAL CRC DATA!
1224  1123            TAD     DAREG                   /COMPARE FAILING SECTOR TO
1225  0060            AND     K0017                   /SECTOR WHERE DATA ERROR
1226  7041            CIA                             /OCCURRED!
1227  1127            TAD     ASREG
1230  7640            SZA CLA                         /SAME SECTOR?
1231  5251            JMP     NTSOFT                  /NO, "HARD" ERROR
1232  7340            CLA CLL CMA
1233  1153            TAD     CRCCNT                  /GET CRC COUNTER
1234  7450            SNA                             /WAS THIS FIRST POSSIBLE "SOFT"?
1235  5245            JMP     SOFT                    /YES, UPDATE "SOFT" TALLY!
1236  1100            TAD     K7775                   /CHECK IF NONRECOVERABLE "SOFT"!
1237  7650            SNA CLA                         /WAS IT?
1240  2372            ISZ     PCNTR1                  /NO, DUMP "SOFT" TALLY!
1241  1772            TAD I   PCNTR1                  /OTHERWISE DUMP "HARD" TALLY!
1242  7440            SZA                             /DONT GO BACK WARDS!!!!!!!
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1243  1101            TAD     K7777                   /DUMP APPROPRIATE TALLY!!
1244  5254            JMP     NTERR -1                /DUMP IT!
1245  1101    SOFT,   TAD     K7777
1246  1772            TAD I   PCNTR1                  /REDUCE HARD ERROR COUNT
1247  3772            DCA I   PCNTR1
1250  2372            ISZ     PCNTR1                  /YES, UPDATE POINTER
1251  1101    NTSOFT, TAD     K7777
1252  2772            ISZ I   PCNTR1                  /UPDATE ERROR COUNT
1253  7610            SKP CLA
1254  3772            DCA I   PCNTR1                  /HOLD AT 7777
                      /
                      /CHECK INHIBIT SW!
                      /
1255  7604    NTERR,  LAS
1256  7106            CLL RTL
1257  7710            SPA CLA                         /INHIBIT ERRORS????
1260  5355            JMP     ERROEX +1               /YES
                      /
                      /CHECK FOR NO HEADER ON SECOND DATA ERROR!
                      /
1261  1600    DOHEAD, TAD I   ERRO                    /GET TEXT POINTER
1262  7650            SNA CLA                         /DATA ERROR?
1263  5354            JMP     ERROEX                  /EXIT
                      /
                      /TYPE ERROR MESSAGE!
                      /
1264  4452            CRLF
1265  4452            CRLF
1266  1373            TAD     PCNTR2                  /GET NON-RECOV. FLAG
1267  7640            SZA CLA                         /WAS IT SET
1270  5274            JMP     .+4                     /NO DON'T TYPE IT
1271  7340            CLA CLL CMA
1272  4450            PRNTER                          /PRINT "NON-RECOVERABLE "
1273  3326            MES4
1274  1600            TAD I   ERRO                    /GET TEXT POINTER!
1275  1375            TAD     HEDTAD                  /MAKE ERROR HEADER POINTER!
1276  3117            DCA     PCREG                   /SAVE POINTER!
1277  1517            TAD I   PCREG                   /GET CORRECT TEXT!
1300  3303            DCA     .+3
1301  7340            CLA CLL CMA
1302  4450            PRNTER                          /PRINT HEADER
1303  7402            HLT
1304  7340            CLA CLL CMA
1305  4450            PRNTER                          /PRINT "ERROR"
1306  3277            MES0
1307  4452            CRLF
1310  1200            TAD     ERRO
1311  3117            DCA     PCREG                   /SAVE PC
1312  2200            ISZ     ERRO
1313  1600            TAD I   ERRO
1314  3370            DCA     ESAVE
1315  2200            ISZ     ERRO                    /UPDATE FOR RETURN
1316  1171            TAD     XTEXT
1317  3373            DCA     PCNTR2
1320  1371            TAD     XREG
```



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1321  3010            DCA     AUTO10
1322  1105            TAD     M12
1323  3372            DCA     PCNTR1                  /COUNTER FOR    # OF HEADS
1324  1370    STRAUT, TAD     ESAVE                    /GET TEXT POINTER
1325  7500            SMA
1326  5362            JMP     NOTEX                   /NOT THIS ONE
1327  7104            CLL RAL
1330  3370            DCA     ESAVE
1331  2374            ISZ     PCNTR3                  /UPDATE LINE FILL COUNTER
1332  7610            SKP CLA                         /NO CRLF
1333  4452            CRLF
1334  1373            TAD     PCNTR2                  /GET TEXT MESSAGE POINTER
1335  2373            ISZ     PCNTR2
1336  2373            ISZ     PCNTR2
1337  3342            DCA     .+3                     /STORE FOR PRNTER
1340  7340            CLA CLL CMA
1341  4450            PRNTER                          /PRINT XX!
1342  7402            HLT                             /MODIFIED TEXT POINTER
1343  1410            TAD I   AUTO10
1344  4451            OCTEL                           /PRINT FOUR OCTAL
1345  2372    AGAIN,  ISZ     PCNTR1
1346  5324            JMP     STRAUT                  /CHECK FOR NEXT XX!
1347  1517            TAD I   PCREG                   /GET ERROR POINTER!
1350  1107            TAD     M5
1351  7650            SNA CLA                         /FIRST DATA ERROR?
1352  4572            JMS I   PRNDAT                  /YES, PRINT DATA
1353  5357            JMP     .+4
1354  4572    ERROEX, JMS I   PRNDAT                  /PRINT ONLY DATA!
1355  2200            ISZ     ERRO
1356  2200            ISZ     ERRO                    /UPDATE FOR RETURN
1357  7301            CLA CLL IAC                     /ENABLE CLEAR CONTROL
1360  4447            CLRALL                          /CLEAR CONTROL
1361  5600            JMP I   ERRO                    /EXIT
1362  7104    NOTEX,  CLL RAL
1363  3370            DCA     ESAVE
1364  2373            ISZ     PCNTR2
1365  2373            ISZ     PCNTR2
1366  2010            ISZ     AUTO10
1367  5345            JMP     AGAIN
                      /
1370  0000    ESAVE,  0
1371  0116    XREG,   PCREG -1
1372  0000    PCNTR1, 0
1373  0000    PCNTR2, 0
1374  0000    PCNTR3, 0
1375  1377    HEDTAD, BUFPNT -1
                      /
      1400            PAGE
                      /
                      /POINTERS FOR TEXT INFORMATION!
                      /
1400  3235    BUFPNT, ERTX1
1401  3243            ERTX2
1402  3252            ERTX3
1403  3260            ERTX4
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```
1404  3272            ERTX5
                      /
                      /SUBROUTINE TO ISSUE "DCLR" CLEAR IOT
                      /
1405  0000  CLDR,    0
1406  6742  IOT2,    DCLR                          /DCLR "CLEAR IOT"
1407  5605            JMP I   CLDR                  /EXIT
1410  7402  ERHLT2,  HLT                           /SKIP TRAP
                      /
                      /ROUTINE TO DO CRLF
                      /
1411  0000  UPONE,   0
1412  7300            CLA CLL
1413  1221            TAD     K0215
1414  4440            TYPE
1415  1222            TAD     K0212
1416  4440            TYPE
1417  4440            TYPE
1420  5611            JMP I   UPONE
                      /
1421  0215  K0215,   0215
1422  0212  K0212,   0212
                      /
                      /ROUTINE TO PRINT FOUR OCTAL
                      /
1423  0000  FROCT,   0
1424  7006            RTL
1425  7006            RTL
1426  3211            DCA     UPONE
1427  1106            TAD     M4
1430  3245            DCA     PRN
1431  1211            TAD     UPONE
1432  0056            AND     K0007
1433  1061            TAD     K0260
1434  4440            TYPE
1435  1211            TAD     UPONE
1436  7006            RTL
1437  7004            RAL
1440  3211            DCA     UPONE
1441  2245            ISZ     PRN
1442  5231            JMP     .-11
1443  4423            SPACE
1444  5623            JMP I   FROCT
                      /
                      /SUBROUTINE TO PRINT TEXT
                      /
1445  0000  PRN,     0
1446  7650            SNA CLA                       /TYPE CRLF
1447  4452            CRLF                          /YES!!!!
1450  1645            TAD I   PRN                   /GET POINTER
1451  2245            ISZ     PRN
1452  3223            DCA     FROCT
1453  7300  MRPRN,   CLA CLL
1454  1623            TAD I   FROCT
1455  0074            AND     K7700
```



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1456  7450            SNA
1457  5301            JMP     EXIT
1460  7500            SMA
1461  7020            CML
1462  7001            IAC
1463  7012            RTR
1464  7012            RTR
1465  7012            RTR
1466  4440            TYPE
1467  1623            TAD I   FROCT
1470  0102            AND     K0077
1471  7450            SNA
1472  5301            JMP     EXIT
1473  1310            TAD     K3740
1474  7500            SMA
1475  1307            TAD     K4100
1476  4423            SPACE                         /SPACE OUT 1
1477  2223            ISZ     FROCT
1500  5253            JMP     MRPRN                 /MORE TO PRINT
1501  7300  EXIT,    CLA CLL
1502  5645            JMP I   PRN
                      /
                      /ROUTINE TO SPACE OUT 1
                      /
1503  0000  SPAC,    0
1504  1062            TAD     K0240

1505  4440            TYPE
1506  5703            JMP I   SPAC
                      /
1507  4100  K4100,   4100
1510  3740  K3740,   3740
                      /
      1600  PAGE
                      /
                      /ROUTINE TO CHECK DATA READ
                      /
1600  0000  DTCHK,   0
1601  1154            TAD     CRCFLG                /GET CRC FLAG
1602  7640            SZA CLA                       /WAS IT SET?
1603  5212            JMP     WRDCHK                /YES, THEN WORD BYB WORD CHECK!!!
1604  1140            TAD     FNDSUM                /GET CHECK SUM FOUND
1605  7041            CIA
1606  1137            TAD     CHKSAV                /COMPARE TO GOOD VALUE SAVED
1607  7650            SNA CLA                       /WERE THEY THE SAME
1610  5600            JMP I   DTCHK                 /YES, DATA O.K.
1611  7340            CLA CLL CMA
1612  3441  WRDCHK,  DCA I   XERRO                  /SETUP CHECKSUM ERROR FLAG
1613  1121            TAD     CMREG

1614  0015            AND     K0100
1615  7640            SZA CLA                       /HALF BLOCK SET??
1616  1016            TAD     K0200                 /YES!
1617  1104            TAD     K7400
1620  3111            DCA     TRASH2
```

```
1621  1111            TAD     TRASH2
1622  7040            CMA
1623  3315            DCA     MSKER
1624  7340            CLA CLL CMA
1625  3140            DCA     FNDSUM          /SET FIRST TIME FLAG
1626  4435            RESRAN                  /NO, SETUP RANDOM GENERATOR
1627  1126            TAD     FWREG           /GET FINAL WC
1630  4427            SETFLD                  /GET AUTO11 + BUFTAL + FIELD
1631  3246            DCA     GOCDF           /SAVE FIELD CDF
1632  1111            TAD     TRASH2
1633  3362            DCA     RSRAN
1634  1122            TAD     INTDA
1635  3354            DCA     STGEN
1636  1362  DTR1,     TAD     RSRAN
1637  0315            AND     MSKER
1640  3130            DCA     WAREG
1641  1354            TAD     STGEN
1642  0060            AND     K0017
1643  3127            DCA     ASREG
1644  4421            RANDAT                  /GENERATE DATA
1645  3132            DCA     DGREG           /SAVE GOOD DATA POINTER
1646  7402  GOCDF,    HLT/CDF                 /CDF TO BUFFER FIELD
1647  1411            TAD I   AUTO11          /GET BAD DATA WORD
1650  6201            CDF     0               /HOME DF
1651  3133            DCA     DBREG           /SAVE BAD WORD
1652  1011            TAD     AUTO11          /GET ADDRESS
1653  3131            DCA     ADREG           /SAVE FOR PRINTER
1654  1133            TAD     DBREG           /GET DATA READ
1655  7041            CIA
1656  1132            TAD     DGREG           /COMPARE TO GOOD VALUE
1657  7650            SNA CLA                 /WERE THEY THE SAME
1660  5272            JMP     NOERR           /YES, NO ERROR
1661  2140            ISZ     FNDSUM          /FIRST TIME PRINT????
1662  5311            JMP     NTWRKS          /NO, JUST ADDRESS AND DATA
1663  1154            TAD     CRCFLG          /GET CRC FLAG
1664  7650            SNA CLA                 /IF SET NO NON-RECOVERABLE,
1665  1136            TAD     DATTRY          /NO, GET NON-RECOVERABLE FLAG.
1666  2200            ISZ     DTCHK           /UPDATE FOR ERROR RETURN
1667  4441            ERROR                   /ERROR DATA
1670  0005            0005                    /POINTER
1671  7760            7760                    /POINTER
1672  2362  NOERR,    ISZ     RSRAN
1673  5300            JMP     .+5
1674  2354            ISZ     STGEN
1675  7000            NOP
1676  1111            TAD     TRASH2
1677  3362            DCA     RSRAN
1700  2116            ISZ     BUFTAL          /UPDATE BUFFER TALLY
1701  5236            JMP     DTR1            /MORE WORDS TO CHECK
1702  1441            TAD I   XERRO           /GET ERROR INDICATOR!
1703  7650            SNA CLA                 /WAS THERE AN ERROR?
1704  3153            DCA     CRCCNT          /NO, CLEAR CRC COUNTER
1705  2441            ISZ I   XERRO           /CHECK FOR COMPUTER ERROR?
1706  5600            JMP I   DTCHK           /ALL O.K.
1707  7402  BADHLT,   HLT                     /COMPUTER MUST BE DOWN, CHECKSUM
```



```
1710  5307            JMP     .-1             /FAILED WORD-BY-WORD COMPARE WORKED,
1711  4441  NTWRKS,   ERROR                   /OTHER ERRORS IN BUFFER
1712  0000            0000
1713  0000            0000
1714  5272            JMP     NOERR           /CHECK REST OF BUFFER
                      /
1715  0000  MSKER,     0
                      /
                      /ROUTINE TO GENERATE RANDOM NUMBERS
                      /
1716  0000  RANDOM,    0
1717  7301            CLA CLL IAC
1720  1374            TAD     RAD1
1721  1375            TAD     RAD2
1722  1376            TAD     RAD3
1723  3374            DCA     RAD1
1724  7004            RAL
1725  1374            TAD     RAD1
1726  1375            TAD     RAD2
1727  1376            TAD     RAD3
1730  3375            DCA     RAD2
1731  7004            RAL
1732  1374            TAD     RAD1
1733  1375            TAD     RAD2
1734  1376            TAD     RAD3
1735  3376            DCA     RAD3
1736  1376            TAD     RAD3
1737  5716            JMP I   RANDOM          /EXIT, RANDOM NUMBER IN AC
                      /
                      /GENERATOR FOR RANDOM DATA
                      /
1740  0000  GNDAT,     0
1741  7301            CLA CLL IAC
1742  1370            TAD     RAN1
1743  1371            TAD     RAN2
1744  7106            CLL RTL
1745  3370            DCA     RAN1
1746  1371            TAD     RAN2
1747  7012            RTR
1750  1370            TAD     RAN1
1751  3371            DCA     RAN2
1752  1371            TAD     RAN2
1753  5740            JMP I   GNDAT
                      /
                      /ROUTINE TO SAVE RANDOM GENERATOR
                      /
1754  0000  STGEN,     0
1755  1370            TAD     RAN1
1756  3372            DCA     SAV1
1757  1371            TAD     RAN2
1760  3373            DCA     SAV2
1761  5754            JMP I   STGEN
                      /
                      /ROUTINE TO RESET RANDOM GENERATOR
                      /
```

```
1762  0000  RSRAN,  0
1763  1372        TAD     SAV1
1764  3370        DCA     RAN1
1765  1373        TAD     SAV2
1766  3371        DCA     RAN2
1767  5762        JMP I   RSRAN
                  /
1770  1234  RAN1,   1234
1771  5670  RAN2,   5670
                  /
1772  0000  SAV1,   0
1773  0000  SAV2,   0
1774  1234  RAD1,   1234
1775  5670  RAD2,   5670
1776  4321  RAD3,   4321
                  /
                  /
      2000  PAGE
                  /
                  /ROUTINE TO SEND A DRIVE TO A RANDOM TRACK
                  /AND SAVE THE TRACK
                  /
2000  0000  SEKOUT, 0
2001  0055        AND     K0006                   /MASK DRIVE NUMBER
2002  3302        DCA     WAIT                    /SAVE POINTER
2003  7604  STRSTP, LAS
2004  0016        AND     K0200                   /MASK
2005  7640        SZA CLA                         /PROGRAM STOP????
2006  7402  STPHLT, HLT                           /PROGRAM STOP ON SWITCH 4
2007  1302  RESEK,  TAD     WAIT
2010  7110        CLL RAR
2011  1151        TAD     DSKPOT                  /GET ADDRESS SAVE POINTER
2012  3322        DCA     CHKYN                   /SAVE MADE POINTER
2013  1777'       TAD     TRKFLG                  /GET TRACK FLAG
2014  7650        SNA CLA                         /WAS IT SET??
2015  5222        JMP     .+5                     /NO, USE OTHER
2016  1160        TAD     SPTRK2                  /GET OPERATOR TRACK
2017  0075        AND     K7760                   /MASK
2020  1157        TAD     SPTRK1                  /GET OPERATOR TRACK
2021  5253        JMP     DSKOUT -2               /DO IT
2022  1776'       TAD     SEQFLG                  /GET SEQUENCE FLAG
2023  7650        SNA CLA                         /WAS IT SET??
2024  5232        JMP     .+6                     /NO, USE RANDOM
2025  1722        TAD I   CHKYN                   /GET LAST USED
2026  1013        TAD     K0020                   /UPDATE
2027  7430        SZL                             /LINK SET?
2030  7001        IAC                             /YES, SET EXTENDED BIT
2031  7410        SKP                             /UPDATE AND CHECK BOUNDARIES
2032  4433        RANGEN                          /GENERATE RANDOM ADDRESS
2033  0076        AND     K7761                   /MASK OFF
2034  1302        TAD     WAIT                    /ADD IN DRIVE NUMBER
2035  3722        DCA I   CHKYN                   /SAVE MADE ADDRESS
2036  1722        TAD I   CHKYN
2037  7110        CLL RAR
2040  7620        SNL CLA                         /WAS IT SET
```



```
2041  5255        JMP     DSKOUT                  /NO, DON'T CHECK LIMITS
2042  1143        TAD     MAXTRK                  /ADD IN FUDGE FACTOR
2043  1722        TAD I   CHKYN                   /GET ADDRESS FOUND
2044  7630        SZL CLA                         /IN LIMITS?
2045  5255        JMP     DSKOUT                  /YES, O.K.
2046  1776'       TAD     SEQFLG                  /GET SEQUENCE FLAG
2047  7640        SZA CLA                         /WAS IT SET????
2050  5253        JMP     DSKOUT -2               /DO
2051  1722        TAD I   CHKYN                   /NO
2052  0075        AND     K7760                   /MASK
2053  1302        TAD     WAIT                    /ADD IN DRIVE NUMBER
2054  3722        DCA I   CHKYN                   /SAVE IT NOW
2055  1722  DSKOUT, TAD I   CHKYN                 /GET ADDRESS
2056  0056        AND     K0007                   /MASK DRIVE NUMBER + EXTENDED
2057  1317        TAD     K3000                   /FUNCTION SEEK ONLY
2060  4444        LDCMD                           /LOAD COMMAND
2061  1722        TAD I   CHKYN                   /GET ADDRESS
2062  0075        AND     K7760
2063  4446        LDADD                           /LOAD DISK ADDRESS + GO
2064  4443        DSKSKP                          /WAIT FOR DONE FLAG
2065  5264        JMP     .-1
2066  4442        RDSTAT                          /READ STATUS
2067  7500        SMA                             /DONE FLAG SET????
2070  5274        JMP     SEKER                   /SEEK ERROR, NO DONE FLAG
2071  0073        AND     K1777                   /MASK OTHER ERROR BITS
2072  7650        SNA CLA                         /ANY SET????
2073  5300        JMP     SEKEX                   /NO, EXIT
2074  4441  SEKER,  ERROR                         /PRINT ERROR
2075  0003        0003                            /HEADER POINTER
2076  7200        7200                            /MESSAGE POINTER
2077  2200        ISZ     SEKOUT                  /UPDATE FOR RETURN
2100  4447  SEKEX,  CLRALL                        /CLEAR STATUS
2101  5600        JMP I   SEKOUT
                  /
                  /ROUTINE TO WAIT FOR KEY FROM OPERATOR
                  /
2102  0000  WAIT,   0
2103  7300        CLA CLL
2104  6032        KCC
2105  6031        KSF
2106  5305        JMP .-1
2107  6036        KRB
2110  0320        AND     K177
2111  1321        TAD     K200
2112  6046        TLS
2113  6041        TSF
2114  5313        JMP .-1
2115  6042        TCF
2116  5702        JMP I   WAIT                    /EXIT
                  /
2117  3000  K3000,  3000
2120  0177  K177,   0177
2121  0200  K200,   0200
                  /
                  /ROUTINE TO CHECK FOR YES OR NO
```

```
                        /
2122  0000    CHKYN,  0
2123  3302            DCA     WAIT                    /SAVE POINTER
2124  1322            TAD     CHKYN                   /GET PC STORED
2125  3343            DCA     CHKPOT                  /SAVE IT
2126  1302            TAD     WAIT
2127  2322            ISZ     CHKYN
2130  7041            CIA
2131  1063            TAD     K0316
2132  7650            SNA CLA                         /WAS IT A NO
2133  5722            JMP I   CHKYN                   /YES
2134  1302            TAD     WAIT
2135  2322            ISZ     CHKYN
2136  7041            CIA
2137  1064            TAD     K0331
2140  7650            SNA CLA                         /WAS IT A YES
2141  5722            JMP I   CHKYN                   /YES
2142  5743            JMP I   CHKPOT                  /WAS NEITHER
                        /
                        /ROUTINE TO CHECK DISK RUN POINTERS
                        /
2143  0000    CHKPOT, 0
2144  0054            AND     K0003
2145  1152            TAD     RUNPOT
2146  3302            DCA     WAIT
2147  1702            TAD I   WAIT                    /GET RUN POINTER
2150  7640            SZA CLA                         /RUN THIS DRIVE
2151  2343            ISZ     CHKPOT                  /NO
2152  5743            JMP I   CHKPOT                  /EXIT
                        /
                        /ROUTINE TO RESET REGISTERS FOR ERROR PRINTER
                        /
2153  0000    SETREG, 0
2154  1070            TAD     K4000                   /GET STATUS
2155  3120            DCA     STREG                   /SAVE FOR ERROR PRINTER
2156  7340            CLA CLL CMA                     /DECREASE BY 1
2157  1110            TAD     TRASH1                  /GET SECTOR POINTER
2160  0060            AND     K0017
2161  1111            TAD     TRASH2                  /ADD IN ADDRESS
2162  3123            DCA     DAREG                   /SAVE FOR ERROR PRINTER
2163  1167            TAD     FIRTIM                  /CHECK IF FIRST SECTOR?
2164  7640            SZA CLA                         /IF SO, DON'T UPDATE COMMAND!
2165  5753            JMP I   SETREG                  /NO, DON'T!
2166  1173            TAD     SAVCM                   /GET COMMAND REG.
2167  3121            DCA     CMREG                   /SAVE FOR ERROR PRINTER
2170  5753            JMP I   SETREG                  /RETURN
                        /
2176  3545
2177  3542
      2200      PAGE
                        /
                        /ROUTINE TO WRITE OR READ SECTORS SELECTED
                        /
2200  0000    DSKGO,  0
2201  7340            CLA CLL CMA
```



```
2202  3167            DCA     FIRTIM                  /SETUP FIRST TIME POINTER
2203  3154            DCA     CRCFLG                  /CLEAR CRC FLAG!
2204  1124            TAD     CAREG                   /GET INITIAL CURRENT ADDRESS
2205  4445            LDCUR                           /LOAD CURRENT ADDRESS
2206  1125            TAD     WCREG
2207  3126            DCA     FWREG                   /SETUP FINAL WC
2210  1122            TAD     INTDA                   /GET INITIAL STARTING SECTOR
2211  3110            DCA     TRASH1                  /SAVE
2212  1122            TAD     INTDA                   /GET DISK ADDRESS
2213  0075            AND     K7760                   /MASK
2214  3111            DCA     TRASH2                  /SAVE
2215  1134            TAD     INTCM                   /GET INITIAL COMMAND
2216  1600            TAD I   DSKGO                   /GET READ OR WRITE
2217  4444            LDCMD                           /LOAD COMMAND
2220  1121            TAD     CMREG
2221  1072            TAD     K1000                   /MAKE READ ALL OR WRITE ALL
2222  3173            DCA     SAVCM                   /SAVE FOR SWITCH TO CONSECUTIVE MODE
2223  1110            TAD     TRASH1                  /SECTOR TO DO
2224  0060            AND     K0017                   /MASK
2225  1111            TAD     TRASH2                  /ADD TO TRACK
2226  4446            LDADD                           /LOAD AND GO
2227  6001            ION                             /TURN INTERRUPT ON
                        /
                        /ROUTINE TO CLEAR OR CHECK SUM BUFFER ON THE FLY!
                        /
2230  3777'   GOBAK,  DCA     TIMER2                  /CLEAR LONG TIMER
2231  3140            DCA     FNDSUM                  /CLEAR SUM CHECK
2232  4427            SETFLD                          /GET FIELD TO BUFFER
2233  3254            DCA     CHNCDF                  /SAVE CDF
2234  1167            TAD     FIRTIM
2235  7650            SNA CLA                         /TIME TO GO
2236  5241            JMP     STRWRK                  /YES!!!!
2237  4776'           JMS     TIME                    /WAIT FOR FIRST INTERRUPT
2240  5234            JMP     .-4                     /NOT HERE YET
2241  1116    STRWRK, TAD     BUFTAL
2242  7041            CIA
2243  1126            TAD     FWREG                   /COMPARE TO SOFTWARE FINAL
2244  7450            SNA                             /WAIT FOR DISK????
2245  5274            JMP     WRKDON                  /YES!!!!
2246  7041            CIA
2247  3174            DCA     CLRBAK                  /SAVE DIFFERENCE
2250  1174            TAD     CLRBAK
2251  7041            CIA
2252  1116            TAD     BUFTAL
2253  3116            DCA     BUFTAL                  /UPDATE BUFFER TALLY
2254  7402    CHNCDF, HLT                             /CDF TO BUFFER FIELD
2255  1121            TAD     CMREG
2256  7700            SMA CLA                         /READ OR WRITE
2257  5264            JMP     WASRD                   /WAS A READ!!
2260  3411    GOCLR,  DCA I   AUTO11                  /WAS A WRITE, CLEAR BUFFER
2261  2174            ISZ     CLRBAK                  /UPDATE TALLY
2262  5260            JMP     GOCLR                   /MORE TO CLEAR
2263  5274            JMP     WRKDON                  /DONE WITH SOME
2264  1140    WASRD,  TAD     FNDSUM
2265  7100    GOCHK,  CLL
```

```
2266  1411          TAD I   AUTO11                  /GET WORD
2267  7430          SZL
2270  7001          IAC
2271  2174          ISZ     CLRBAK                  /UPDATE CLEAR POINTER
2272  5265          JMP     GOCHK                   /MORE TO CHECKSUM
2273  3140          DCA     FNDSUM                  /SAVE IT
2274  6201  WRKDON, CDF     0
2275  1116          TAD     BUFTAL
2276  7650          SNA CLA                         /LAST WORD DONE????
2277  5302          JMP     DSKEX                   /EXIT
2300  4776'         JMS     TIME                    /TIME AND WAIT
2301  5241          JMP     STRWRK                  /WAIT FOR INT, OR DONE!!!!
2302  2200  DSKEX,  ISZ     DSKGO
2303  5600          JMP I   DSKGO                   /EXIT
                    /
                    /INTERRUPT SERVICE
                    /
2304  6741  RETURN, DSKP                           /DISK SKIP IOT
2305  5353          JMP     NODSKP                  /NOT THE DISK
2306  2110          ISZ     TRASH1                  /UPDATE SECTOR NUMBER
2307  7000          NOP                             /IT WON'T WORK WITHOUT IT!
2310  1113          TAD     UPDATE
2311  1126          TAD     FWREG                   /UPDATE WORD COUNT
2312  3126          DCA     FWREG
2313  6745  STATUS, DRST                            /READ STATUS
2314  1070          TAD     K4000
2315  7440          SZA                             /ONLY DONE FLAG?
2316  5337          JMP     STATER                  /STATUS ERROR
2317  1126          TAD     FWREG
2320  7650          SNA CLA                         /LAST TRANSFER?
2321  5366          JMP     TRDONE                  /TRANSFER IS DONE
2322  3167          DCA     FIRTIM                  /CLEAR FIRST TIME POINTER!
2323  1173          TAD SAVCM                       /GET READ OR WRITE COMMAND
2324  6746  RDLWRL, DLDC                            /LOAD COMMAND REGISTER
2325  1110          TAD     TRASH1                  /GET SECTOR TO DO
2326  0060          AND     K0017                   /MASK OFF
2327  1111          TAD     TRASH2                  /ADD IN TRACK
2330  6743  LODGO,  DLAG                            /LOAD DISK ANFD GO
2331  1166  RETRN,  TAD     SVLNK                   /GET LINK
2332  7110          CLL RAR
2333  1165          TAD     SAVAC                   /GET AC
2334  6244          RMF                             /RESTORE FIELDS
2335  6001          ION                             /TURN INTERRUPT ON
2336  5400          JMP I   0                       /EXIT
2337  4775' STATER, JMS     SETREG                  /SETUP REGISTERS!
2340  1121          TAD     CMREG
2341  7710          SPA CLA                         /WRITE OR READ
2342  7001          IAC                             /WRITE
2343  7001          IAC
2344  3347          DCA     .+3                     /MODIFY HEADER POINTER
2345  1135          TAD     STATRY                  /GET TRY POINTER
2346  4441          ERROR                           /PRINT MESSAGE
2347  0000          0000                            /MODIFIED HEADER POINTER
2350  7760          7760                            /MESSAGE POINTER
2351  2200          ISZ     DSKGO                   /UPDATE FOR ERROR
```



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2352  5302          JMP     DSKEX                   /EXIT
2353  6031  NODSKP, KSF                            /CHECK READER FLAG
2354  7610          SKP CLA                         /NOT READER
2355  5362          JMP     KEYRET                  /WAS THE READER
2356  6041          TSF                             /CHECK PUNCH FLAG
2357  7402  INTER2, HLT                     /UNDEFINED INTERRUPT
2360  6042          TCF                             /WAS THE PUNCH, CLEAR FLAG
2361  5331          JMP     RETRN                   /RETURN
2362  6034  KEYRET, KRS                     /GET INPUT
2363  6046          TLS                             /PRINT
2364  6032          KCC                             /CLEAR READER FLAG
2365  5331          JMP     RETRN                   /RETURN TO DISK ROUTINE
2366  4775' TRDONE, JMS     SETREG                  /SETUP REGISTERS!
2367  3167          DCA     FIRTIM                  /CLEAR FIRST TIME POINTER!
2370  1166          TAD     SVLNK
2371  7110          CLL RAR                         /REPLACE LINK
2372  1165          TAD     SAVAC                   /REPLACE AC
2373  6244          RMF                             /RESTORE MEMORY FIELDS + FLAGS
2374  5400          JMP I   0                       /RETURN TO BACK GROUND
                    /
2375  2153
2376  3121
2377  3131
      2400          PAGE
                    /
                    /ROUTINE TO GET ONE IN OCTAL
                    /
2400  0000  OCT1,   0
2401  4437          RECEIV                          /RECEIVE
2402  3365          DCA     ISAVE1                  /SAVE IT
2403  1600          TAD I   OCT1                    /GET LIMITS
2404  0056          AND     K0007                   /MASK
2405  1061          TAD     K0260
2406  7141          CLL CIA
2407  1365          TAD     ISAVE1                  /GET INPUT
2410  7620          SNL CLA                         /IN LIMITS????
2411  5226          JMP     INERR                   /NO, ERROR EXIT
2412  1600          TAD I   OCT1                    /GET LIMITS
2413  0014          AND     K0070                   /MASK
2414  7110          CLL RAR
2415  7012          RTR
2416  1061          TAD     K0260
2417  7040          CMA
2420  1365          TAD     ISAVE1                  /GET INPUT
2421  7630          SZL CLA                         /IN LIMITS????
2422  5226          JMP     INERR                   /NO, ERROR
2423  1365          TAD     ISAVE1                  /GET INPUT
2424  0056          AND     K0007                   /MASK
2425  2200          ISZ     OCT1
2426  2200  INERR,  ISZ     OCT1
2427  5600          JMP I   OCT1                    /GOOD EXIT
                    /
                    /ROUTINE TO RECEIVE FOUR OCTAL
                    /
2430  0000  OCT4,   0
```

```
2431  1106          TAD     M4
2432  3366          DCA     ISAVE2                  /SETUP COUNTER
2433  3367          DCA     ISAVE3                  /START WITH 0
2434  4424          ONEIN                           /RECEIVE ONE OCTAL
2435  0070          0070                            /LIMITS
2436  5630          JMP I   OCT4                    /ERROR EXIT
2437  1367          TAD     ISAVE3                  /GET LAST
2440  2366          ISZ     ISAVE2                  /UPDATE COUNTER
2441  7410          SKP
2442  5246          JMP     .+4                     /EXIT
2443  7004          RAL
2444  7006          RTL
2445  5233          JMP     OCT4 +3
2446  2230          ISZ     OCT4
2447  5630          JMP I   OCT4                    /EXIT OCTAL IN AC
                    /
                    /ROUTINE TO UPDATE AND CHECK FOR PASS COMPLETE
                    /
2450  0000    CKTIM,  0
2451  1121          TAD     CMREG                   /GET CURRENT DRIVE NUMBER
2452  0055          AND     K0006                   /MASK
2453  7110          CLL RAR
2454  3366          DCA     ISAVE2                  /POINTER
2455  1366          TAD     ISAVE2
2456  1147          TAD     TIMPOT                  /GET TIME POINTER
2457  3365          DCA     ISAVE1                  /SAVE IT
2460  7301          CLA CLL IAC                     /ONE FOR 0
2461  1145          TAD     CONSEC                  /GET AMOUNT DONE
2462  1765          TAD I   ISAVE1                  /ADD IN AMOUNT COMPLETED SO FAR
2463  3765          DCA I   ISAVE1                  /SAVE IT
2464  7620          SNL CLA                         /LINK UP????
2465  5650          JMP I   CKTIM                   /NO, EXIT
2466  4433          RANGEN                          /GET RANDOM NUMBER
2467  3777'         DCA     RAN1                    /RE-PRIME GENERATOR
2470  4433          RANGEN                          /GET RANDOM NUMBER
2471  3776'         DCA     RAN2                    /RE-PRIME GENERATOR
2472  7100          CLL
2473  1365          TAD     ISAVE1
2474  1370          TAD     K0004
2475  3365          DCA     ISAVE1                  /SECOND TIME POINTER
2476  2765          ISZ I   ISAVE1                  /UPDATE IT
2477  1765          TAD I   ISAVE1                  /GET COUNT
2500  1142          TAD     MAXTIM                  /ADD IN FUDGE FACTOR
2501  7620          SNL CLA                         /PASS COMPLETE????
2502  5650          JMP I   CKTIM                   /NO, EXIT
2503  3765          DCA I   ISAVE1                  /ZERO SECOUND COUNTER
2504  1366          TAD     ISAVE2
2505  7040          CMA
2506  3366          DCA     ISAVE2                  /SETUP COUNTER
2507  1364          TAD     CMPPOT                  /ADD IN POINTER
2510  1054          TAD     K0003
2511  2366          ISZ     ISAVE2                  /COMPUTE BUFFER
2512  5310          JMP     .-2
2513  3366          DCA     ISAVE2                  /SAVE ADDRESS POINTER
2514  7340          CLA CLL CMA
```



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2515  2766          ISZ I   ISAVE2                  /UPDATE PASS COMPLETE POINTER
2516  7610          SKP CLA
2517  3766          DCA I   ISAVE2                  /HOLD AT 7777
2520  4452          CRLF
2521  4450          PRNTER                          /PRINT "DISK"
2522  3502          MES17
2523  1121          TAD     CMREG                   /GET LAST COMMAND
2524  0055          AND     K0006                   /MASK
2525  7110          CLL RAR
2526  1061          TAD     K0260
2527  4440          TYPE                            /TYPE DISK NO.
2530  7340          CLA CLL CMA
2531  4450          PRNTER                          /PRINT "PASS COMPLETE"
2532  3505          MES18
2533  7604          LAS
2534  0015          AND     K0100                   /MASK
2535  7650          SNA CLA                         /PASS COMPLETE DISCONNECT????
2536  5341          JMP     .+3                     /NO WAY!!!!
2537  4422          DISCON                          /DUMP DRIVE
2540  5775'         JMP     RUN                     /MORE TO TEST!!!!
2541  4774'         JMS     TPSTA                   /STATUS-COMPLETE TYPEOUT
2542  5650          JMP I   CKTIM                   /EXIT
                    /
                    /SUBROUTINE TO READ STATUS REGISTER
                    /
2543  0000    RDST,   0
2544  6745    IOT5,   DRST                          /READ STATUS IOT
2545  7410            SKP
2546  7402    ERHLT5, HLT                         /SKIP TRAP
2547  3120            DCA     STREG                 /SAVE RESULTS
2550  1120            TAD     STREG
2551  5743            JMP I   RDST                  /EXIT
                    /
                    /SUBROUTINE TO LOAD CURRENT ADDRESS REGISTER
                    /
2552  0000    LDCA,   0
2553  6744    IOT4,   DLCA                          /LOAD CURRENT ADDRESS IOT
2554  5752            JMP I   LDCA                  /EXIT

2555  7402    ERHLT4, HLT                         /SKIP TRAP
                    /
                    /SUBROUTINE TO LOAD TRACK ADDRESS REGISTER
                    /
2556  0000    LDAD,   0
2557  3123            DCA     DAREG
2560  1123            TAD     DAREG
2561  6743    IOT3,   DLAG                          /LOAD DISK ADDRESS REGISTER
2562  5756            JMP I   LDAD                  /EXIT
2563  7402    ERHLT3, HLT                           /SKIP TRAP
                    /
2564  3524    CMPPOT, D0CMP -3
2565  0000    ISAVE1, 0
2566  0000    ISAVE2, 0
2567  0000    ISAVE3, 0
2570  0004    K0004,  0004
```

```
                    /
  2574  3000
  2575  0600
  2576  1771
  2577  1770
        2600        PAGE
                    /
                    /ROUTINE TO GET RANDOM OR OPERATOR DATA
                    /
  2600  0000        RNWRD,  0
  2601  7402        SWDAT,  HLT                             /MODIFIED SWITCH
  2602  5600                JMP I   RNWRD                   /EXIT
  2603  6201                CDF     0                       /HOME CDF
  2604  1412                TAD I   AUTO12                  /GET DATA
  2605  7402        RECDF,  HLT                             /BUFFER CDF
  2606  2115                ISZ     OPRTAL                  /UPDATE TALLY
  2607  5600                JMP I   RNWRD                   /EXIT
  2610  3220                DCA     PRINT                   /SAVE WORD
  2611  1105                TAD     M12
  2612  3115                DCA     OPRTAL                  /REPLACE TALLY
  2613  7340                CLA CLL CMA
  2614  1146                TAD     DATPOT
  2615  3012                DCA     AUTO12                  /REPLACE AUTO INDEX
  2616  1220                TAD     PRINT                   /GET SAVED WORD
  2617  5600                JMP I   RNWRD                   /EXIT
                    /
                    /ROUTINE TO TYPE
                    /
  2620  0000        PRINT,  0
  2621  6046                TLS
  2622  6041                TSF
  2623  5222                JMP     .-1
  2624  6042                TCF
  2625  7200                CLA
  2626  5620                JMP I   PRINT
                    /
                    /ROUTINE TO DUMP AND REPORT DISK STATUS
                    /
  2627  0000        DUMP,   0
  2630  4450                PRNTER                          /PRINT "DISK "
  2631  3502                MES17
  2632  1121                TAD     CMREG                   /GET LAST COMMAND
  2633  0055                AND     K0006
  2634  7110                CLL RAR
  2635  3200                DCA     RNWRD                   /SAVE
  2636  1200                TAD     RNWRD                   /GET DISK NUMBER
  2637  1061                TAD     K0260
  2640  4440                TYPE                            /TYPE DISK NUMBER
  2641  7340                CLA CLL CMA
  2642  4450                PRNTER                          /PRINT "DISCONNECTED!"
  2643  3450                MES15
  2644  4777'               JMS     TPSTA                   /TYPE STATUS REPORT
  2645  1200                TAD     RNWRD
  2646  1152                TAD     RUNPOT
  2647  3200                DCA     RNWRD                   /SAVE POINTER ADDRESS
```



```
  2650  3600                DCA I   RNWRD                   /CLEAR RUN POINTER
  2651  3200                DCA     RNWRD
  2652  1106                TAD     M4
  2653  3220                DCA     PRINT                   /CHECK FOR MORE POINTER
  2654  1200                TAD     RNWRD
  2655  4430                SELCHK                          /CHECK SELECT POINTERS
  2656  7610                SKP CLA                         /DISK NOT HERE
  2657  5627                JMP I   DUMP                    /MORE AVAILABLE
  2660  2200                ISZ     RNWRD
  2661  2220                ISZ     PRINT                   /UPDATE POINTERS
  2662  5254                JMP     .-6
  2663  4452                CRLF
  2664  4450                PRNTER                          /PRINT "DISK"
  2665  3502                MES17
  2666  7340                CLA CLL CMA
  2667  4450                PRNTER                          /PRINT "SYSTEM DOWN"
  2670  3460                MES16
  2671  7402        NODSKS, HLT                             /ERROR, NO DISK AVAILABLE
  2672  5271                JMP     .-1
                    /
                    /ROUTINE TO SETUP FIELD TO BUFFER + AUTO11 + BUFFER TALLY
                    /
  2673  0000        STFLD,  0
  2674  7041                CIA
  2675  1125                TAD     WCREG
  2676  3116                DCA     BUFTAL
  2677  7340                CLA CLL CMA
  2700  1124                TAD     CAREG                   /GET INITIAL CA
  2701  3011                DCA     AUTO11                  /SAVE
  2702  1155                TAD     DATFLG                  /GET DATA FLAG
  2703  7650                SNA CLA                         /WAS IT SET????
  2704  5312                JMP     .+6                     /NO, USE REGULAR
  2705  1105                TAD     M12
  2706  3115                DCA     OPRTAL                  /SETUP SPECIAL TALLY
  2707  7340                CLA CLL CMA
  2710  1146                TAD     DATPOT
  2711  3012                DCA     AUTO12                  /SETUP SPECIAL AUTO INDEX
  2712  1134                TAD     INTCM                   /GET LAST COMMAND
  2713  0014                AND     K0070                   /MASK FIELD BITS
  2714  1103                TAD     KCDF                    /MAKE BUFFER CDF
  2715  3205                DCA     RECDF                   /SETUP SPECIAL CDF
  2716  1205                TAD     RECDF                   /GET BACK CDF
  2717  5673                JMP I   STFLD                   /EXIT, FIELD IN AC
                    /
                    /SUBROUTINE TO ISSUE "DSKP" DISK SKIP IOT
                    /
  2720  0000        SDKP,   0
  2721  6741        IOT1,   DSKP                           /DISK SKIP IOT
  2722  7410                SKP                             /DID NOT SKIP
  2723  2320                ISZ     SDKP
  2724  5720                JMP I   SDKP                    /EXIT
                    /
                    /SUBROUTINE TO LOAD COMMAND REGISTER
                    /
  2725  0000        LDCM,   0
```

```
2726  3121          DCA     CMREG
2727  1121          TAD     CMREG
2730  6746  IOT6,   DLDC                    /LOAD COMMAND REGISTER
2731  5725          JMP I   LDCM             /EXIT
2732  7402  ERHLT6, HLT                     /SKIP TRAP
                    /
                    /ROUTINE TO CHANGE DEVICE IOT CODES
                    /
2733  7604  CHANG,  LAS                     /GET SWITCHES
2734  0355          AND     A0770            /MASK 3-8
2735  3325          DCA     LDCM             /SAVE DESIRED CODE
2736  1360          TAD     CHNPOT           /POINTER
2737  3110          DCA     TRASH1           /ADDRESS POINTER
2740  1357          TAD     CCNTR1           /AMOUNT TO DO
2741  3111          DCA     TRASH2           /SETUP COUNTER
2742  1510  CHANGR, TAD I   TRASH1           /GET ADDRESS POINTER
2743  3112          DCA     TRASH3           /SAVE ADDRESS
2744  1512          TAD I   TRASH3           /GET OLD CODE
2745  0356          AND     A7007            /MASK OFF OLD CODE
2746  1325          TAD     LDCM             /ADD IN DESIRED CODE
2747  3512          DCA I   TRASH3           /RESTORE
2750  2110          ISZ     TRASH1           /UPDATE POINTER
2751  2111          ISZ     TRASH2           /UPDATE CHANGE COUNTER
2752  5342          JMP     CHANGR           /MORE TO CHANGE
2753  7402  CHNHLT, HLT                     /ALL DEVICE IOT CODES CHANGED
2754  5353          JMP     .-1
                    /
2755  0770  A0770,  0770
2756  7007  A7007,  7007
2757  7766  CCNTR1, 7766
                    /
2760  2761  CHNPOT, CHNPOT +1
2761  2304          RETURN
2762  2313          STATUS
2763  2324          RDLWRL
2764  2330          LODGO
2765  2721          IOT1
2766  1406          IOT2
2767  2561          IOT3
2770  2553          IOT4
2771  2544          IOT5
2772  2730          IOT6
                    /
2777  3000
      3000  PAGE
                    /
                    /ROUTINE TO TYPE STATUS REPORT
                    /
3000  0000  TPSTA,  0
3001  4450          PRNTER                   /PRINT "DSK HARD SOFT COMP"
3002  3370          MES7
3003  1106          TAD     M4
3004  3242          DCA     TSAVE1           /MAXIMUM TO DO
3005  3243          DCA     TSAVE2
3006  3244          DCA     TSAVE3           /CLEAR SOME COUNTERS
```



```
3007  1243  CHKRES, TAD     TSAVE2
3010  1054          TAD     K0003
3011  3243          DCA     TSAVE2
3012  1243          TAD     TSAVE2
3013  1150          TAD     STAPOT
3014  3246          DCA     TSAVE5           /LOCATION OF DISK STATUS
3015  1244          TAD     TSAVE3
3016  4430          SELCHK                   /CHECK RUN POINTER
3017  5236          JMP     NOTSTA           /DISK NOT RUNNING
3020  4452          CRLF
3021  4423          SPACE                    /SPACE OUT ONE
3022  1244          TAD     TSAVE3           /GET DISK NO.
3023  1061          TAD     K0260
3024  4440          TYPE
3025  4423          SPACE                    /SPACE OUT ONE
3026  4423          SPACE                    /SPACE OUT ONE
3027  7346          CLA CLL CMA RTL
3030  3245          DCA     TSAVE4           /COUNTER FOR FOUR WORDS
3031  1646          TAD I   TSAVE5           /GET STATUS
3032  4451          OCTEL                    /TYPE IT
3033  2246          ISZ     TSAVE5
3034  2245          ISZ     TSAVE4
3035  5231          JMP     .-4
3036  2244  NOTSTA, ISZ     TSAVE3           /UPDATE DRIVE NUMBER
3037  2242          ISZ     TSAVE1
3040  5207          JMP     CHKRES           /MORE TO REPORT
3041  5600          JMP I   TPSTA            /EXIT
                    /
3042  0000  TSAVE1, 0
3043  0000  TSAVE2, 0
3044  0000  TSAVE3, 0
3045  0000  TSAVE4, 0
3046  0000  TSAVE5, 0
                    /
                    /ROUTINE TO RECALIBRATE SELECTED DRIVE
                    /DISCONNECT DRIVE ON ERROR!
                    /
3047  0000  RESTOR, 0
3050  0055          AND     K0006
3051  3200          DCA     TPSTA            /SAVE DRIVE NUMBER
3052  1074          TAD     K7700
3053  3331          DCA     TIMER2           /SETUP COUNTER
3054  2330          ISZ     TIMER1
3055  5254          JMP     .-1
3056  2331          ISZ     TIMER2           /WAIT FOR DISK TO COOL OFF!
3057  5254          JMP     .-3
3060  1200          TAD     TPSTA            /CURRENT DRIVE
3061  4444          LDCMD                    /LOAD COMMAND
3062  7326          CLA CLL CML RTL          /ENABLE RECALIBRATE BIT
3063  4447          CLRALL                   /"RECALIBRATE"
3064  4443          DSKSKP                   /DISK SKIP IOT
3065  5264          JMP     .-1              /WAIT FOR FIRST DONE FLAG
3066  4442          RDSTAT                   /READ STATUS
3067  7500          SMA                      /DONE FLAG SET????
3070  5306          JMP     RESERR           /NO, ERROR
```

```
3071  0073            AND     K1777                   /MASK OTHER ERROR BITS
3072  7640            SZA CLA                         /ANY SET????
3073  5306            JMP     RESERR                  /YES, ERROR
3074  4447  RESTA,    CLRALL                          /CLEAR STATUS
3075  1016            TAD     K0200                   /ENABLE SET SECOND DONE FLAG
3076  1200            TAD     TPSTA                   /ORIGINAL COMMAND
3077  4444            LDCMD                           /LOAD COMMAND
3100  4443            DSKSKP                          /DISK SKIP IOT
3101  5300            JMP     .-1                     /WAIT FOR SECOND DONE
3102  4442            RDSTAT                          /READ STATUS
3103  1070            TAD     K4000
3104  7650            SNA CLA                         /WAS IT ONLY DONE FLAG
3105  5647            JMP I   RESTOR                  /YES, RETURN
3106  7300  RESERR,   CLA CLL
3107  4441            ERROR                           /ERROR
3110  0004            0004
3111  7200            7200
3112  4452            CRLF
3113  4452            CRLF
3114  4450            PRNTER                  /PRINT"RECALIBRATE ERROR DISCONNECT"
3115  3164            MES19
3116  4422            DISCON                          /DISCONNECT DISK
3117  2247            ISZ     RESTOR
3120  5647            JMP I   RESTOR                  /MORE DISK AVAILABLE
                      /
                      /ROUTINE TO TIME AND WAIT
                      /
3121  0000  TIME,     0
3122  2330            ISZ     TIMER1
3123  5721            JMP I   TIME                    /EXIT
3124  2331            ISZ     TIMER2
3125  5721            JMP I   TIME                    /EXIT
3126  7402  INTER1,   HLT                             /NO INTERRUPT OCCURRED, I GUESS!
3127  5326            JMP     .-1
                      /
3130  0000  TIMER1,   0
3131  0000  TIMER2,   0
                      /
                      /ROUTINE TO TYPE OUT DATA INFORMATION
                      /
3132  0000  TYPDAT,   0
3133  4450            PRNTER                          /PRINT "AS:"
3134  3223            TEXAS
3135  1127            TAD     ASREG
3136  4451            OCTEL
3137  7340            CLA CLL CMA
3140  4450            PRNTER                          /PRINT "WA:"
3141  3225            TEXWA
3142  1130            TAD     WAREG
3143  4451            OCTEL
3144  7340            CLA CLL CMA
3145  4450            PRNTER                          /PRINT "AD:"
3146  3227            TEXAD
3147  1131            TAD     ADREG
3150  4451            OCTEL
```



```
3151  7340            CLA CLL CMA
3152  4450            PRNTER                          /PRINT "DG:"
3153  3231            TEXDG
3154  1132            TAD     DGREG
3155  4451            OCTEL
3156  7340            CLA CLL CMA
3157  4450            PRNTER                          /PRINT "DB:"
3160  3233            TEXDB
3161  1133            TAD     DBREG
3162  4451            OCTEL
3163  5732            JMP I   TYPDAT
                      /
3164  2205  MES19,    TEXT    "RECALIBRATE ERROR DISCONNECT!"
3165  0301
3166  1411
3167  0222
3170  0124
3171  0540
3172  0522
3173  2217
3174  2240
3175  0411
3176  2303
3177  1716
3200  1605
3201  0324
3202  4100
                      /
3203  2003  TEXPC,    TEXT    "PC:"
3204  7200
3205  2324  TEXST,    TEXT    "ST:"
3206  7200
3207  0315  TEXCM,    TEXT    "CM:"
3210  7200
3211  1101  TEXIA,    TEXT    "IA:"
3212  7200
3213  0401  TEXDA,    TEXT    "DA:"
3214  7200
3215  0301  TEXCA,    TEXT    "CA:"
3216  7200
3217  2703  TEXWC,    TEXT    "WC:"
3220  7200
3221  0627  TEXFW,    TEXT    "FW:"
3222  7200
3223  0123  TEXAS,    TEXT    "AS:"
3224  7200
3225  2701  TEXWA,    TEXT    "WA:"
3226  7200
3227  0104  TEXAD,    TEXT    "AD:"
3230  7200
3231  0407  TEXDG,    TEXT    "DG:"
3232  7200
3233  0402  TEXDB,    TEXT    "DB:"
3234  7200
                      /
```

```
3235  2205    ERTX1,  TEXT    "READ STATUS"
3236  0104
3237  4023
3240  2401
3241  2425
3242  2300
3243  2722    ERTX2,  TEXT    "WRITE STATUS"
3244  1124
3245  0540
3246  2324
3247  0124
3250  2523
3251  0000
3252  2305    ERTX3,  TEXT    "SEEK STATUS"
3253  0513
3254  4023
3255  2401
3256  2425
3257  2300
3260  2205    ERTX4,  TEXT    "RECALIBRATE STATUS"
3261  0301
3262  1411
3263  0222
3264  0124
3265  0540
3266  2324
3267  0124
3270  2523
3271  0000
3272  0411    ERTX5,  TEXT    "DISK DATA"
3273  2313
3274  4004
3275  0124
3276  0100
                /
3277  4005    MES0,   TEXT    " ERROR"
3300  2222
3301  1722
3302  0000
3303  2213    MES1,   TEXT "RK8E DATA RELIABILITY"
3304  7005
3305  4004
3306  0124
3307  0140
3310  2205
3311  1411
3312  0102
3313  1114
3314  1124
3315  3100
3316  0530    MES2,   TEXT "EXERCISE"
3317  0522
3320  0311
3321  2305
3322  0000
```



```
3323  4004    MES3,   TEXT " DISK"
3324  1123
3325  1300
3326  1617    MES4,   TEXT    "NON-RECOVERABLE "
3327  1655
3330  2205
3331  0317
3332  2605
3333  2201
3334  0214
3335  0540
3336  0000
3337  0115    MES5,   TEXT    "AMOUNT OF EXTENDED R/W MEMORY(0-7)?"
3340  1725
3341  1624
3342  4017
3343  0640
3344  0530
3345  2405
3346  1604
3347  0504
3350  4022
3351  5727
3352  4013
3353  0515
3354  1722
3355  3150
3356  6055
3357  6751
3360  7700
3361  0103    MES6,   TEXT    "ACCEPT MODE?"
3362  0305
3363  2024
3364  4015
3365  1704
3366  0577
3367  0000
3370  0423    MES7,   TEXT    "DSK HARD SOFT COMP"
3371  1340
3372  1001
3373  2204
3374  4023
3375  1706
3376  2440
3377  0317
3400  1520
3401  0000
3402  0611    MES8,   TEXT    "FIELD?"
3403  0514
3404  0477
3405  0000
3406  2422    MES9,   TEXT    "TRACK?"
3407  0103
3410  1377
3411  0000
```

```
3412  0530    MES10,  TEXT    "EXTRA SECTORS?"
3413  2422
3414  0140
3415  2305
3416  0324
3417  1722
3420  2377
3421  0000
3422  0214    MES11,  TEXT    "BLOCK LENGTH?"
3423  1703
3424  1340
3425  1405
3426  1607
3427  2410
3430  7700
3431  2305    MES12,  TEXT    "SEQUENCE?"
3432  2125
3433  0516
3434  0305
3435  7700
3436  0401    MES13,  TEXT    "DATA?"
3437  2401
3440  7700
3441  0122    MES14,  TEXT    "ARE YOU SURE?"
3442  0540
3443  3117
3444  2540
3445  2325
3446  2205
3447  7700
3450  4004    MES15,  TEXT    " DISCONNECTED!"
3451  1123
3452  0317
3453  1616
3454  0503
3455  2405
3456  0441
3457  0000
3460  2331    MES16,  TEXT    "SYSTEM SHUT DOWN, NO DISKS TO RUN!"
3461  2324
3462  0515
3463  4023
3464  1025
3465  2440
3466  0417
3467  2716
3470  5440
3471  1617
3472  4004
3473  1123
3474  1323
3475  4024
3476  1740
3477  2225
3500  1641
```



```
3501  0000
3502  0411    MES17,  TEXT    "DISK "
3503  2313
3504  4000
3505  4020    MES18,  TEXT    " PASS COMPLETE!"
3506  0123
3507  2340
3510  0317
3511  1520
3512  1405
3513  2405
3514  4100
                /
3515  0000    D0TM1,  0
3516  0000    D1TM1,  0
3517  0000    D2TM1,  0
3520  0000    D3TM1,  0
3521  0000    D0TM2,  0
3522  0000    D1TM2,  0
3523  0000    D2TM2,  0
3524  0000    D3TM2,  0
                /
3525  0000    D0HRD,  0
3526  0000    D0SOF,  0
3527  0000    D0CMP,  0
3530  0000    D1HRD,  0
3531  0000    D1SOF,  0
3532  0000    D1CMP,  0
3533  0000    D2HRD,  0
3534  0000    D2SOF,  0
3535  0000    D2CMP,  0
3536  0000    D3HRD,  0
3537  0000    D3SOF,  0
3540  0000    D3CMP,  0
                /
3541  0000    FLDFLG, 0
3542  0000    TRKFLG, 0
3543  0000    SECFLG, 0
3544  0000    HLFFLG, 0
3545  0000    SEQFLG, 0
                /
3546  0000    DSK0A,  0
3547  0000    DSK1A,  0
3550  0000    DSK2A,  0
3551  0000    DSK3A,  0
                /
3552  0000    DSK0B,  0
3553  0000    DSK1B,  0
3554  0000    DSK2B,  0
3555  0000    DSK3B,  0
                /
                /PLACE FOR DATA IN MANUAL MODE
                /
3556  0000    DAT1,   0000
3557  0000    DAT2,   0000
```

```
3560  0000    DAT3,   0000
3561  0000    DAT4,   0000
3562  0000    DAT5,   0000
3563  0000    DAT6,   0000
3564  0000    DAT7,   0000
3565  0000    DAT8,   0000
3566  0000    DAT9,   0000
3567  0000    DAT10,  0000
3570  0000    DAT11,  0000
3571  0000    DAT12,  0000
            /
      3600  PAGE
            /
      3600  STRBUF=.
            /
                    $$$$
```



```
0000  11111100  11111110  11111111  11111111  11111111  11111111  11111111  11111111
0100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111000

0200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

0400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0500  11111111  11111111  11111111  11111111  11111111  11111000  00000000  01111111

0600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
0700  11111111  11111111  11111111  11111111  11111111  11111111  11000000  00111111


1000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

1200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111100

1400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1500  11111111  10000000  00000000  00000000  00000000  00000000  00000000  00000000

1600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
1700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111110


2000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  10000011

2200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

2400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  10001111

2600  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
2700  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11100001


3000  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3100  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

3200  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3300  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111

3400  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11111111
3500  11111111  11111111  11111111  11111111  11111111  11111111  11111111  11000000

3600
3700
```

```
4000
4100

4200
4300

4400
4500

4600
4700


5000
5100

5200
5300

5400
5500

5600
5700


6000
6100

6200
6300

6400
6500

6600
6700


7000
7100
```

```
200
7300

7400
7500

7600
7700
```

A0170	0761	D1CMP	3532	DSKP	6741	ISAVE3	2567
A0770	2755	D1HRD	3530	DSKPOT	0151	K0003	0054
A7007	2756	D1SOF	3531	DSKSKP	4443	K0004	2570
ACDCA	0366	D1TM1	3516	DTCHK	1600	K0006	0055
ADREG	0131	D1TM2	3522	DTR1	1636	K0007	0056
AGAIN	1345	D2CMP	3535	DUMP	2627	K0010	0057
ALLAGN	0253	D2HRD	3533	ERFLG	0163	K0017	0060
AMOUNT	0053	D2SOF	3534	ERHLT2	1410	K0020	0013
ASKNX1	0343	D2TM1	3517	ERHLT3	2563	K0040	0700
ASKNX2	0400	D2TM2	3523	ERHLT4	2555	K0070	0014
ASKNX3	0417	D3CMP	3540	ERHLT5	2546	K0077	0102
ASKNX4	0456	D3HRD	3536	ERHLT6	2732	K0100	0015
ASKNX5	0471	D3SOF	3537	ERRO	1200	K0200	0016
ASKSUR	0520	D3TM1	3520	ERROEX	1354	K0212	1422
ASREG	0127	D3TM2	3524	ERROR	4441	K0215	1421
AUTO10	0010	DAREG	0123	ERTX1	3235	K0240	0062
AUTO11	0011	DAT1	3556	ERTX2	3243	K0260	0061
AUTO12	0012	DAT10	3567	ERTX3	3252	K0277	0065
BADHLT	1707	DAT11	3570	ERTX4	3260	K0316	0063
BDREC	1023	DAT12	3571	ERTX5	3272	K0331	0064
BGN	0200	DAT2	3557	ESAVE	1370	K0400	0066
BGNBUF	0144	DAT3	3560	EXIT	1501	K1000	0072
BRKRET	0367	DAT4	3561	FILLER	0730	K177	2120
BUFPNT	1400	DAT5	3562	FIRTIM	0167	K1777	0073
BUFTAL	0116	DAT6	3563	FLDFLG	3541	K200	2121
CAREG	0124	DAT7	3564	FNDSUM	0140	K2000	0067
CCNTR1	2757	DAT8	3565	FORIN	4425	K3000	2117
CHANG	2733	DAT9	3566	FROCT	1423	K3740	1510
CHANGR	2742	DATFLG	0155	FWREG	0126	K4000	0070
CHKPOT	2143	DATPOT	0146	GENDAT	4420	K4100	1507
CHKRES	3007	DATTRY	0136	GNDAT	1740	K5405	0364
CHKSAV	0137	DBREG	0133	GOBAK	2230	K6000	0071
CHKYN	2122	DCLR	6742	GOCDF	1646	K7400	0104
CHNCDF	2254	DGREG	0132	GOCHK	2265	K7700	0074
CHNHLT	2753	DISCON	4422	GOCLR	2260	K7760	0075
CHNPOT	2760	DISKGO	4434	GOREAD	1070	K7761	0076
CKTIM	2450	DLAG	6743	GOTIT	1035	K7772	0077
CLDR	1405	DLCA	6744	HEDTAD	1375	K7775	0100
CLRALL	4447	DLDC	6746	HLFFLG	3544	K7777	0101
CLRBAK	0174	DOHEAD	1261	INERR	2426	KCDF	0103
CMPPOT	2564	DRST	6745	INTCM	0134	KEYRET	2362
CMREG	0121	DSK0A	3546	INTDA	0122	KHLT	0206
CONCUR	0726	DSK0B	3552	INTER1	3126	KROT	0247
CONSEC	0145	DSK1A	3547	INTER2	2357	KSKP	0540
CRCCNT	0153	DSK1B	3553	IOT1	2721	LDAD	2556
CRCFLG	0154	DSK2A	3550	IOT2	1406	LDADD	4446
CRLF	4452	DSK2B	3554	IOT3	2561	LDCA	2552
D0CMP	3527	DSK3A	3551	IOT4	2553	LDCM	2725
D0HRD	3525	DSK3B	3555	IOT5	2544	LDCMD	4444
D0SOF	3526	DSKEX	2302	IOT6	2730	LDCUR	4445
D0TM1	3515	DSKGO	2200	ISAVE1	2565	LNKDCA	0365
D0TM2	3521	DSKOUT	2055	ISAVE2	2566	LODGO	2330

M12	0105	PRINT	2620	SEQFLG	3545	TRYTIM	1065
M4	0106	PRN	1445	SETFLD	4427	TSAVE1	3042
M5	0107	PRNDAT	0172	SETGEN	4426	TSAVE2	3043
MANUAL	0320	PRNTER	4450	SETREG	2153	TSAVE3	3044
MAXFLD	0141	RAD1	1774	SOFT	1245	TSAVE4	3045
MAXTIM	0142	RAD2	1775	SPAC	1503	TSAVE5	3046
MAXTRK	0143	RAD3	1776	SPACE	4423	TYPDAT	3132
MES0	3277	RAN1	1770	SPBLK	0162	TYPE	4440
MES1	3303	RAN2	1771	SPFLD	0156	UPDATE	0113
MES10	3412	RANDAT	4421	SPSEC	0161	UPONE	1411
MES11	3422	RANDOM	1716	SPTRK1	0157	UPTRY	1134
MES12	3431	RANGEN	4433	SPTRK2	0160	WAIT	2102
MES13	3436	RANJMS	0554	STAPOT	0150	WAREG	0130
MES14	3441	RDLWRL	2324	STATER	2337	WASRD	2264
MES15	3450	RDST	2543	STATRY	0135	WCREG	0125
MES16	3460	RDSTA	1121	STATUS	2313	WRDCHK	1612
MES17	3502	RDSTAT	4442	STFLD	2673	WRKDON	2274
MES18	3505	RDTRY	1107	STGEN	1754	XCHKYN	0031
MES19	3164	RECAL	4436	STPHLT	2006	XCKPOT	0030
MES2	3316	RECDF	2605	STRAUT	1324	XCLDR	0047
MES3	3323	RECEIV	4437	STRBUF	3600	XCRLF	0052
MES4	3326	REFILL	0733	STREG	0120	XDSKGO	0034
MES5	3337	REREAD	1077	STRSEK	0526	XDUMP	0022
MES6	3361	RESEEK	1154	STRSTP	2003	XERRO	0041
MES7	3370	RESEK	2007	STRTEX	0224	XFROCT	0051
MES8	3402	RESERR	3106	STRWRK	2241	XGNDAT	0020
MES9	3406	RESET	0535	SVLNK	0166	XLDAD	0046
MRPRN	1453	RESRAN	4435	SWDAT	2601	XLDCA	0045
MSKER	1715	RESTA	3074	TEXAD	3227	XLDCM	0044
NEWRD	0737	RESTOR	3047	TEXAS	3223	XOCT1	0024
NEXT	0261	RETRN	2331	TEXCA	3215	XOCT4	0025
NODSKP	2353	RETURN	2304	TEXCM	3207	XPRINT	0040
NODSKS	2671	REWRT	1054	TEXDA	3213	XPRN	0050
NOERR	1672	RNFLD	0633	TEXDB	3233	XRDST	0042
NOTEX	1362	RNWRD	2600	TEXDG	3231	XREG	1371
NOTSTA	3036	RSRAN	1762	TEXFW	3221	XRESTR	0036
NTERR	1255	RUN	0600	TEXIA	3211	XRNDOM	0033
NTSEK	0552	RUNPOT	0152	TEXPC	3203	XRNWRD	0021

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NTSOFT  1251        SAMPOL  1002        TEXST   3205        XRSRAN  0035
NTWRKS  1711        SAV1    1772        TEXWA   3225        XSDKP   0043
NXTSEK  0532        SAV2    1773        TEXWC   3217        XSKOUT  0032
OCT1    2400        SAVAC   0165        TIME    3121        XSPAC   0023
OCT4    2430        SAVCM   0173        TIMER1  3130        XSTFLD  0027
OCTEL   4451        SDKP    2720        TIMER2  3131        XSTGEN  0026
ONEIN   4424        SECFLG  3543        TIMPOT  0147        XTEXT   0171
OPRTAL  0115        SEEK    4432        TPSTA   3000        XWAIT   0037
PCNTR1  1372        SEKER   2074        TRASH1  0110        YESNO   4431
PCNTR2  1373        SEKEX   2100        TRASH2  0111
PCNTR3  1374        SEKGO   1140        TRASH3  0112
PCREG   0117        SEKOUT  2000        TRDONE  2366
POLDSK  0114        SEKSW   0164        TRKFLG  3542
POLNEX  1000        SELCHK  4430        TRYCNT  0170
```

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/       PAL10   V142A   19-MAR-75        15:21   PAGE 1-45

ERRORS DETECTED: 0

LINKS GENERATED: 46

RUN-TIME:  11 SECONDS

3K CORE USED
```