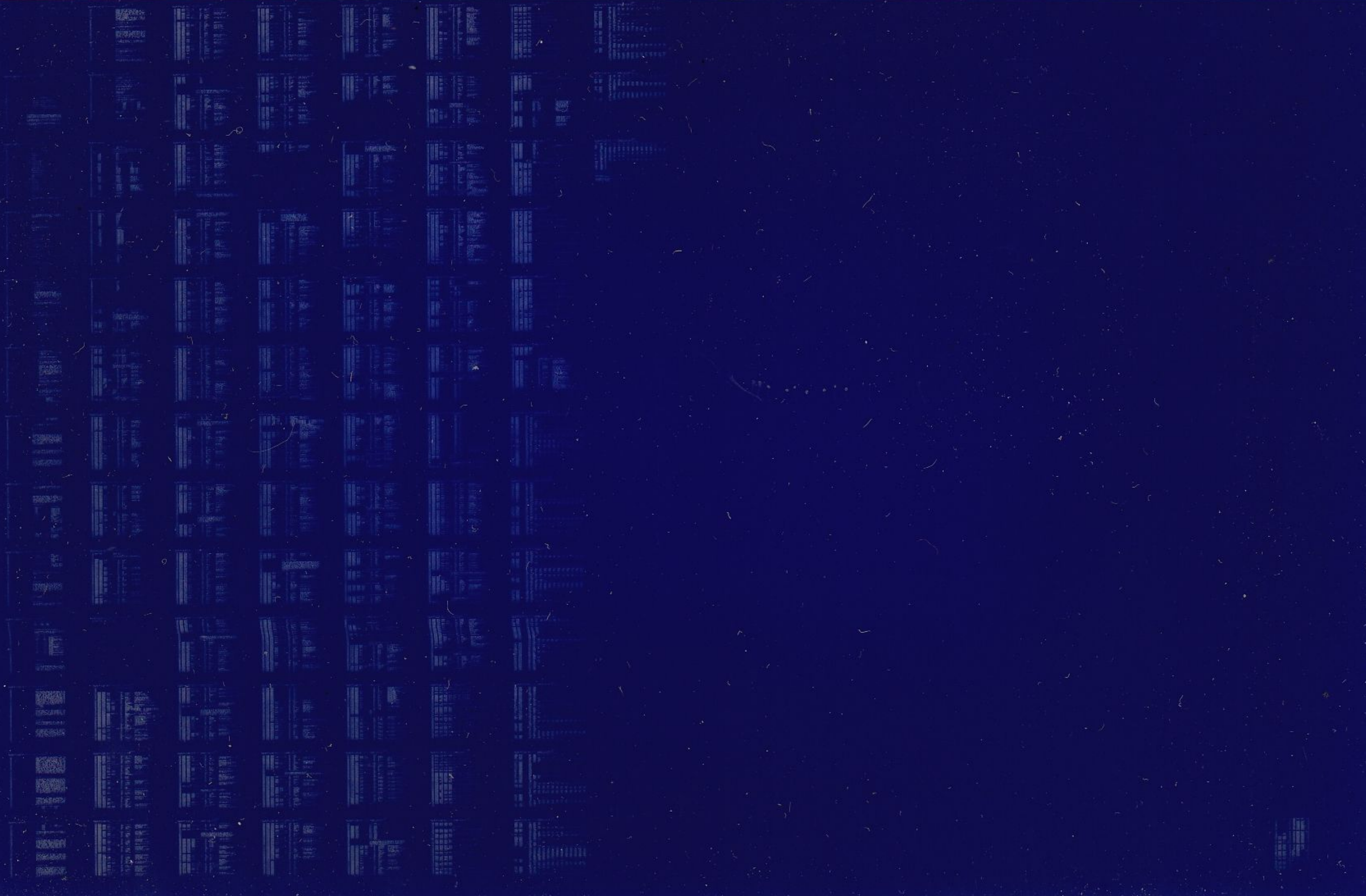


RP11C/RP03

RELIABILITY DIAG
MD-11-DZRPB-E

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RPO3. THE PROGRAM CONSIST OF SEVEN TESTS ANY ONE OF WHICH IS SELECTABLE BY THE OPERATOR. A CONVERSATION MODE EXISTS WHICH ALLOWS THE OPERATOR TO DEFINE TEST PARAMETERS.

2.0 REQUIREMENTS

2.1 EQUIPMENT

PDP11 STANDARD FAMILY PROCESSOR
RP11C DISK PACK CONTROLLER WITH UP TO EIGHT RPO3 DRIVES
ASR33 OR EQUIVALENT.

2.2 STORAGE

BK OF STORAGE IS REQUIRED TO RUN THIS PROGRAM.

2.3 PRELIMINARY PROGRAMS

DZRPA RP11C DISKLESS DIAGNOSTIC

3.0 LOADING PRODEDURE

USE STANDARD PROCEDURE FOR ABS TAPES

4.0 STARTING PROCEDURE

4.1 CONTROL SWITCH SETTINGS

SEE 5.1.1 (ALL SWITCHES DOWN FOR WORST CASE TESTING-UNITO).

4.2 STARTING ADDRESS

THE PROGRAM MUST ALWAYS BE STARTED AT 200.

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4.3 PROGRAM AND/OR OPERATOR ACTION

1. LOAD PROGRAM INTO MEMORY USING ABS LOADER.
2. LOAD ADDRESS 200.
3. SET SWITCHES. ALL DOWN FOR WORST CASE-UNIT 0.
4. PRESS START.

THE PROGRAM NAME AND A SUMMARIZED SWITCH TABLE IS TYPED AFTER INITIAL START OF PROGRAM. IF USING MEMORY MANAGEMENT ON A SYSTEM WITH MORE THEN 8K OF MEMORY ALL OF THE LOADERS ARE MOVED FROM THE HIGHEST (28K MAXIMUM) CORE LOCATION TO INSIDE 8K. A RELOAD THE LOADERS STARTING ADDRESS IS GIVEN AFTER THE LOADERS ARE RELOCATED.

5. THE PROGRAM WILL LOOP AND TYPE PASS COUNT.
6. WHILE IN TEST 5 (DATA RELIABILITY) THE DISPLAY WILL CONTAIN THE NUMBER OF THE PATTERN CURRENTLY IN USE IN ORDER TO SHOW THE PROGRESS OF THE TEST.

5.0 OPERATING PROCEDURES

5.1 OPERATIONAL SWITCH SETTINGS

AT SA 200 ALL SWITCHES DOWN IS WORST CASE TESTING FOR UNIT 0. PASS COUNT WILL BE TYPED OUT AT THE COMPLETION OF A PASS.

5.1.1 SWITCH SETTINGS ARE:

- SW<15>=1....HALT ON ERROR
- SW<14>=1....LOOP ON ERROR
- SW<13>=1....INHIBIT PRINTOUT
- SW<12>=1....INHIBIT BACKGROUND TEST
- SW<11>=1....RING BELL ON ERROR
- SW<10>=1....LOOP ON TEST
- SW<09>=1....INHIBIT DATA COMPARISON

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SW<08>=1....ENTER CONVERSATION MODE.
IF TEST 0-2 IS SELECTED USE ADDRESS
CONVERSATION.
IF TEST 3-7 IS SELECTED USE DATA
CONVERSATION.

SW<07>=1....INHIBIT SEEKS BETWEEN WRITE AND READ
DURING DATA TEST AND RANDOM TEST.

SW<06>=1....INHIBIT USE OF MEMORY MANAGEMENT

SW<05> USED TO CONTROL HOW MANY COMPARE ERRORS
WILL BE TYPED OUT AS A RESULT OF A READ
OPERATION IN THE DATA TEST.

SW<05>=1....CHECK FOR UP TO THREE COMPARE ERRORS
WITHIN THE READ BUFFER AND TYPE ALL
APPROPRIATE ERROR INFORMATION FOR EACH
ERROR. NOTE IF THE DISK DISCOVERS AN
ERROR, IT WILL FINISH READING THE
CURRENT SECTOR AND THEN STOP. SO IF A
VALID COMPARE ERROR IS ENCOUNTERED, AND
THE PROGRAM CONTINUES SCANNING THE
BUFFER, IT MAY GO BEYOND THE AREA WHERE
THE DISK TRANSFERRED DATA. IF THIS
HAPPENS, THE RECEIVED DATA WILL BE
ZEROS.

SW<05>=0....CHECK FOR ONLY ONE COMPARE ERROR WITHIN
THE READ BUFFER.

SW<04> USED TO CONTROL THE AMOUNT OF
INFORMATION TYPED ON REREAD ATTEMPTS
AFTER A READ FAILURE IN DATA TEST.

SW<04>=1....TYPE ALL ERROR INFORMATION ON
REREAD ATTEMPT

SW<04>=0....TYPE THE ERROR INFORMATION ON THE FIRST
READ ERROR ONLY. AFTER THE ERROR GOES
AWAY OR IS UNRECOVERABLE, THE NUMBER OF
REREADS IS THEN TYPED.

SW<03>=1....RUN TEST SELECTED BY SWITCH POSITIONS
SW0 THRU SW2

SW<00> THRU SW<02>	TEST SELECTED
0	ADDRESS TEST 0
1	ADDRESS TEST 1
2	ADDRESS TEST 2
3	TEST3 - WRITE CHECK TEST
4	TEST4 - MEMORY ADDRESS TEST

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- 5 TESTS - DATA RELIABILITY
- 6 TEST6 - RANDOM TEST
- 7 TEST7 - POWER FAIL TEST

NOTE

IF IT IS DESIRED TO SELECT AN INDIVIDUAL TEST, ALSO SET SW<10> LOOP ON TEST.

5.2 SUBROUTINE ABSTRACTS

5.2.1 SCOPE

THIS SUBROUTINE CALL IS PLACED AT THE END OF EACH SUBTEST AND PROVIDES THE ABILITY TO LOOP ON AN ERROR. WHENEVER AN ERROR IS DETECTED, AN ERROR FLAG IS SET. THIS FLAG IS TESTED BY THE SCOPE ROUTINE. IF SET, AND LOOP ON ERROR SW<14> IS SET, THE PROGRAM WILL LOOP BACK AND REPEAT THE CONDITIONS CAUSING THE ERROR. PRIOR TO EACH SCOPE CALL THE LOOP ADDRESS IS MOVED INTO LOCATION LAD. ONCE THE PROGRAM STARTS LOOPING ON AN ERROR, IT WILL CONTINUE LOOPING EVEN THOUGH THE ERROR MAY BE INTERMITTENT. TO GO OUT OF THE LOOP RESE* SW<14>.

5.2.2 HL*

THIS ROUTINE IS ENTERED UPON DETECTION OF AN ERROR. IT WILL TYPE THE PC OF THE ERROR AND ADDITIONAL ERROR INFORMATION. THIS ROUTINE TEST FOR HALT ON ERROR, INHIBIT TYPEOUTS, AND RING THE BELL. IT ALSO SETS THE ERROR FLAG USED BY THE SCOPE ROUTINE.

5.2.3 BACKGROUND TEST

THIS TEST IS ENTERED BY THE PROGRAM WHILE WAITTING FOR AN INTERRUPT. IT DOES A SERIES OF NEGATE BYTE AND ROTATE BYTE LEFT INSTRUCTIONS TO PROVIDE WORSE CASE NPR TIMING, AND BUS NOISE AND IT WILL TIMEOUT IF AN INTERRUPT FAILS TO OCCUR. THE BACKGROUND TEST MAY BE INHIBITED BY SETTING SW<12> WHICH CAUSE THE PROGRAM TO DO A WAIT INSTRUCTION.

5.2.4 TRAP CATCHER

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A".+2" - "HALT" SEQUENCE IS REPEATED FROM 0-776 TO CATCH ANY UNEXPECTED TRAPS. THUS ANY UNEXPECTED TRAPS OR INTERRUPTS WILL HALT AT THE VECTOR +2.

6.0 ERRORS

6.1 WHEN ERRORS ARE ENCOUNTERED, THE ADDRESS OF THE ERROR ALONG WITH THE CONTENTS OF RPDS, RPER, RPCS, RPCA, RPDA, AND SUCA ARE TYPED. BY REFERRING TO THE LISTING ADDITIONAL INFORMATION CAN BE FOUND REGARDING THE CAUSE OF THE ERROR IN THE COMMENTS. WHEN APPROPRIATE, ADDITIONAL INFORMATION IS TYPED OUT SUCH AS EXPECTED AND RECEIVED RESULTS OF AN OPERATION. ALL INFORMATION IS IN OCTAL.

ERROR MESSAGE FORMAT

1. PC= PC OF FAILURE
STATUS ERROR
RPDS= CONTENTS OF RPDS
RPER= CONTENTS OF RPER
RPCS= CONTENTS OF RPCS
RPCA= CONTENTS OF RPCA
RPDA= CONTENTS OF RPDA
SUCA= CONTENTS OF SUCA
CYLINDER= CYLINDER ADDRESS OF THE ERROR
HEAD= HEAD ADDRESS OF THE ERROR
SECTOR= SECTOR ADDRESS OF THE ERROR
READ COUNTER= A SPECIAL COUNTER USED IN DATA TEST AND RANDOM TEST. INDICATES THE NUMBER OF READS OF THAT BLOCK. 0 = FIRST READ. IF LOOPING ON ERROR THE FIRST READ COUNTER ONLY IS VALID.
2. PC= PC OF FAILURE
COMPARE ERROR
EXPECTED= DATA EXPECTED
RECEIVED= DATA RECEIVED
CYLINDER= CYLINDER ADDRESS OF THE ERROR
HEAD= HEAD ADDRESS OF THE

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SECTOR= ERROR
WORD COUNT INTO SECTOR= SECTOR ADDRESS OF
THE ERROR DISTANCE INTO
SECTOR. COUNT
READ NO. STARTS AT ONE.
INDICATES WHICH READ
ATTEMPT IS IN
PROGRESS.

3. TOTAL REREADS ON ERROR= TOTAL READS BEFORE
RECOVERY. TOTAL OF
24 INDICATES ERROR
WAS UNRECOVERABLE

7.0 RESTRICTIONS

TEST 7 (POWER FAIL) WILL BE EXECUTED ONLY IF
SELECTED BY THE SWITCHES. IT WILL HALT AT
COMPLETION.

8.0 MISCELLANEOUS

8.1 EXECUTION TIME

THE PASS COUNT WILL BE TYPED OUT AT THE END OF EACH
PASS THRU THE PROGRAM. DUE TO THE TIME NECESSARY TO
RUN ANY INDIVIDUAL TESTS, TESTS ARE NOT ITERATED.
IF YOU WISH TO LOOP ON ANY PARTICULAR TEST, SELECT
THE TEST IN SWITCH POSITIONS SW<00> THRU SW<02> AND
SET SW<03> AND SW<10>. WHEN IN TEST 5 (DATA
RELIABILITY) ITS PROGRESS CAN BE MONITORED BY
LOOKING AT THE DISPLAY. IT WILL CONTAIN THE NUMBER
OF THE PATTERN CURRENTLY IN USE.

8.2 STACK POINTER

STACK IS INITIALLY SET TO 500.

8.3 ERROR INFORMATION

IF IT IS DESIRED TO HAVE THE ERROR INFORMATION
OUTPUTTED TO THE PUNCH INSTEAD OF THE TELETYPE
CHANGE THE FOLLOWING THREE LOCATIONS.

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LOCATION	FROM	TO
1304	177564	177554
1332	177566	177556
1336	177564	177554

8.4 NON-STANDARD VECTOR AND REGISTER ADDRESSES

IF IT IS DESIRED TO CHANGE THE VECTOR OR REGISTER ADDRESSES IT CAN BE ACCOMPLISHED BY CHANGING THE CONTENTS OF THE FOLLOWING LOCATIONS:

LOCATION	FROM	TO
VECTOR	254	NEW DISK INTERRUPT TRAP LOCATION
STATUS	256	NEW INTERRUPT LOCATION
RPCS	176714	NEW DISK CONTROL ADDRESS
RPCS1	176715	NEW UPPER BYTE OF CONTROL REGISTER
RPWC	176716	NEW WORD COUNT REGISTER ADDRESS
RPBA	176720	NEW CURRENT ADDRESS REGISTER ADDRESS
RPCA	176722	NEW CYLINDER ADDRESS REGISTER ADDRESS
RPDA	176724	NEW DISK ADDRESS REGISTER ADDRESS
RPDA1	176725	NEW TRACK ADDRESS REGISTER ADDRESS
RPER	176712	NEW ERROR REGISTER ADDRESS
RPDS	176710	NEW DEVICE STATUS REGISTER ADDRESS
SUCA	176734	NEW SELECTED UNIT CYLINDER ADDRESS REGISTER ADDRESS

9.0 PROGRAM DISCRIPTION

9.1 ADDRESS TEST 0

IN THIS TEST THE PROGRAM SEEKS FROM 0 TO N AND BACK TO 0. N STARTS AT ZERO THEN INCREMENTS TO 1 AND UP THRU 625. DONE IS TIMED OUT, SEEK UNDERWAY IS TESTED, UNIT READY IS TIMED OUT. ATTENTION INTERRUPT AND THE INTERRUPT FLAG ARE TESTED, AND THE CONTENTS OF SUCA ARE CHECKED.

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9.2 ADDRESS TEST 1

WRITE 5000(OCTAL) WORDS IN THE TEN SECTORS ON EACH TRACK. THE FIRST WORD OF EACH SECTOR IS THE CYLINDER ADDRESS AND THE REMAINING WORDS CONTAIN THE HEAD AND SECTOR ADDRESS. AFTER EACH WRITE OPERATION, THE CONTENTS OF RPCA AND RPDA ARE EXAMINED TO SEE THAT THEY UPDATED CORRECTLY. AFTER WRITING THE ENTIRE PACK, THE DATA IS READ BACK TEN SECTORS AT A TIME AND VERIFIED. IF THE FIRST WORD OF A SECTOR DOES NOT COMPARE THE WRONG CYLINDER WAS PROBABLY SELECTED. AN ERROR ON THE FIRST WORD IS INDICATED BY TYPING "CYL" AFTER THE ERRING DATA. IF ANY OTHER WORD FAILS THE WRONG HEAD OR SECTOR WAS PROBABLY SELECTED. IN THIS CASE THE RIGHT HALF OF THE DATA TYPED EQUALS THE SECTOR ADDRESS AND THE LEFT HALF EQUALS THE TRACK ADDRESS.

9.3 ADDRESS TEST 2

WRITE THE FIRST WORD OF EACH CYLINDER WITH THE CYLINDER ADDRESS. THEN SEEK FROM 625 TO 0. THEN SEEK TO 624 AND BACK TO 1 UNTIL THE ADDRESSES CROSS AND GO BACK TO ZERO. AFTER EACH SEEK VERIFY THE POSITION OF THE HEAD BY READING THE FIRST WORD OF THE CYLINDER AND COMPARING IT WITH THE SELECTED CYLINDER.

9.4 WRITECHECK TEST

THIS TEST VERIFIES THE WRITE CHECK LOGIC AND THE ABILITY OF THE HARDWARE TO FILL THE REMAINDER OF A SECTOR WITH ZEROS WHEN A PARTIAL SECTOR IS WRITTEN. IN THE WRITE CHECK PORTION A FLOATING ONE AND A

FLOATING ZERO PATTERN ARE USED TO TEST THE WRITE CHECK COMPARE LOGIC. THE PATTERN IS WRITTEN AND WRITE CHECKED EXPECTING NO ERRORS. THE BUFFER IS THEN CLEARED AND THE DATA IS WRITE CHECKED AGAIN. AN ERROR IS EXPECTED. AFTER WRITE CHECK IS TESTED, A SECTOR IS WRITTEN WITH ALL ONES AND THEN A TWO WORD WRITE IS PERFORMED. THE ENTIRE SECTOR IS READ AND VERIFIED. THE FIRST TWO WORDS SHOULD BE ONES AND THE REMAINDER SHOULD BE ZERO.

9.5 MEMORY TEST

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THIS TEST CONSISTS OF TWO SEGMENTS. THE FIRST SEGMENT TESTS THE ACCESSIBILITY OF MEMORY. IF MEMORY MANAGEMENT IS NOT AVAILABLE, OR MEMORY MANAGEMENT IS DESELECTED, OR THE SYSTEM ONLY CONTAINS BK WITH MEMORY MANAGEMENT THEN EACH LOCATION FROM THE END OF THE PROGRAM TO THE TOP OF MEMORY (NOT TO EXCEED 28K) IS WRITTEN WITH ITS ADDRESS. THIS DATA IS WRITTEN ON THE DISK. THE MEMORY IS CLEARED AND THE DATA IS READ BACK AND VERIFIED. IF MEMORY MANAGEMENT IS AVAILABLE AND SELECTED WITH MORE THAN BK OF CORE, UP TO A 20K BUFFER IS WRITTEN WITH ITS ADDRESS. THE BUFFER IS THEN WRITTEN ON THE DISK. THE BUFFER IS THEN CLEARED AND THE DISK IS READ AND CHECKED. THE BUFFER IS THEN MOVED IN MEMORY BY 1K AND THE PROCESS CONTINUES UNTIL ALL AVAILABLE CORE HAS BEEN WRITTEN AND CHECKED. IN SEGMENT TWO, THE EXTENDED ADDRESS BITS ARE TESTED IF MEMORY MANAGEMENT IS AVAILABLE.

9.6 DATA TEST

DATA TEST VERIFIES THE DATA RELIABILITY OF THE DISK. THE SEQUENCE IS WRITE THE PACK, WRITE CHECK, AND READ IT 3 TIMES. IF SW<07>=0 THEN A SEEK OF 128 OR GREATER CYLINDERS IS PERFORMED BETWEEN EACH WRITE AND READ. ERRORS THAT OCCUR WITH THE RANDOM SEEKS ENABLED DURING WRITE CHECK AS STATUS ERRORS OR DURING READ BUT ARE RECOVERABLE AFTER FIRST RETRY, OR ARE ELIMINATED BY DISABLING RANDOM SEEKS ARE PROBABLY DUE TO VIBRATING HEADS AFTER A SEEK. THIS SEQUENCE CONTINUES FOR THE 15 PATTERNS DEFINED BELOW. IF A DATA ERROR IS ENCOUNTERED DURING A READ OPERATION, THE OPERATION IS REPEATED 20 TIMES OR UNTIL THE ERROR GOES AWAY. AFTER THE TENTH TIME THE HEADS ARE HOMED AND REPOSITIONED. WITH EACH READ ERROR THE READ RETRY NUMBER IS TYPED OUT ALONG WITH THE ERROR INFORMATION. THIS WAY IT CAN BE

DETERMINED IF AN ERROR IS RECOVERABLE OR NON-RECOVERABLE. IF A READ STATUS ERROR OCCURS AND IT IS A SOFT ERROR (PARITY ERROR), THE DATA IS COMPARED TO PROVIDE ADDITIONAL INFORMATION. WHEN USING MEMORY MANAGEMENT WITH MORE THAN BK OF MEMORY DURING THE READ THE BUFFER IS CONTINUALLY STEPPING THROUGH MEMORY AT 1K STEPS SO THAT ALL OF MEMORY IS CHECKED WITH THE DATA PATTERN.

NUMBER	DATA PATTERN	NUMBER	DATA PATTERN
0	163126	11	167356
1	052525	12	156735
2	125252	13	135673

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4	007417	15	177777 - 000000
5	010421	16	RANDOM DATA
6	021042		
7	042104		
10	104210		

THE LENGTH OF EACH DATA TRANSFER IS DETERMINED BY THE SIZE OF MEMORY AND IS INDICATED BY A TYPEOUT AT THE BEGINNING OF THE PROGRAM, IF IN CONVERSATION MODE.

9.7 RANDOM TEST

IN THIS TEST RANDOM DATA OF 700(OCTAL) WORDS IS WRITTEN ON RANDOM SECTORS. IT IS THEN WRITE CHECKED AND READ 10 TIMES. ACCORDING TO SW<07> THERE COULD BE A RANDOM SEEK OF 128 OR GREATER CYLINDERS BETWEEN EACH WRITE AND READ. ERRORS OCCURING DURING READ BUT ARE RECOVERABLE AFTER THE FIRST RETRY OR ARE GREATLY REDUCED BY DISABLING RANDOM SEEKS ARE PROBABLY DUE TO VIBRATING HEADS AFTER A SEEK. THIS IS REPEATED 2500 TIMES. THE READ RECOVERY TECHNIQUE IS THE SAME AS DESCRIBED UNDER DATA TEST(9.6).

9.8 POWER FAIL TEST

TESTS THE ABILITY OF THE RP11C TO SENSE POWER FAILURE AND TO HOME THE HEADS. AS SOON AS THE OPERATOR IS REQUESTED TO TURN OFF POWER, THE PROGRAM WILL LOOP READING A SECTOR FROM THE DISK. AFTER POWER IS RESTORED, THE PROGRAM CHECKS THAT THE HEADS ARE ON CYLINDER ZERO AND THAT THE CONTENTS OF MEMORY ABOVE THE PROGRAM HAS NOT BEEN AFFECTED BY THE POWER FAILURE.

9.9 CONVERSATION MODE

THERE ARE TWO CONVERSATION MODES AVAILABLE SELECTED BY SW<08>. IF TEST NUMBER 0-2 IS SELECTED IN SW<00-02> THEN THE PROGRAM WILL SELECT THE ADDRESS CONVERSATION MODE. THIS WILL ALLOW THE OPERATOR TO SPECIFY TWO CYLINDER ADDRESSES WHICH WILL SETUP A CONTINUOUS SEEK OPERATIONS FROM ONE TO THE OTHER. A SUB TEST SELECTION DURING ADDRESS CONVERSATION IS FOR A HEAD ALIGNMENT ROUTINE. DURING THIS ROUTINE THE SWITCH REGISTER DEFINATIONS ARE CHANGED AS FOLLOWS:
SW<00-04> SELECTS THE HEAD TO ALIGN.

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SW<08-10> SELECTS THE DRIVE TO ALIGN. TOGGING SW<07> WILL CAUSE THE HEAD AND DRIVE SWITCHES TO BE REREAD AND SELECTION DONE AGAIN. ANOTHER SUB TEST SELECTION DURING ADDRESS CONVERSATION MODE IS FOR CONTINUOUS HOME SEEKS. CAUTION MUST BE EXERCISED DURING THIS SUB TEST. CONTINUOUS UNNECESSARY USE OF HOME SEEKS COULD BE DSTRUCTIVE TO A DRIVE. DATA TEST CONVERSATION MODE MAY BE ENTERED BY SELECTING TEST NUMBER 3-7 IN SW<00-02>. IF SELECTED A NUMBER OF QUESTIONS WILL BE ASKED TO DETERMINE TEST PARAMETERS. ALL NUMBER RESPONSES SHOULD BE IN OCTAL FOLLOWED BY A CARRIAGE RETURN.

THE CONVERSATION IS AS FOLLOWS:

DATA TEST ONLY?(Y OR N)

IF THE OPERATOR RESPONDS YES, THE PROGRAM ENTERS THE DATA MODE ONLY, TEST 5 AND TEST 6.

MULT. DRIVE MODE?(Y OR N)

WITHIN THE MULTI DRIVE MODE, THE PROGRAM ALLOWS THE OPERATOR TO EXERCISE ALL SYSTEM DRIVES WITHOUT RESTARTING THE PROGRAM. A COMPLETE PASS IS MADE ON DRIVE ZERO AND THE PROGRAM THEN GOES TO THE NEXT DRIVE UNTIL ALL DRIVES ARE DONE. AT THIS TIME THE PASSCOUNT IS UPDATED AND TYPED OUT. THE PROGRAM CYCLES BACK TO UNIT ZERO AND CONTINUES. BEFORE TESTING STARTS ON A UNIT, THE UNIT NUMBER IS TYPED OUT.

IF THE OPERATOR RESPONDS YES - THE PROGRAM ASKS FOR THE NUMBER OF DRIVES. IF THE OPERATOR RESPONDS NO - THE PROGRAM ASKS FOR WHICH DRIVE TO EXERCISE.

NUMBER OF DRIVES 1 TO 10 (OCTAL)?

RESPOND WITH THE NUMBER OF DRIVES ON THE SYSTEM.

IF THE OPERATOR RESPONDS "NO" TO MULTI DRIVE MODE THE FOLLOWING QUESTION IS ASKED.

WHICH DRIVE?

RESPOND WITH UNIT NUMBER OF DRIVE TO TEST

OPTIONAL WORD COUNT?(Y OR N)

PROVIDES THE OPPORTUNITY TO SPECIFY YOUR OWN WORD COUNT WHICH MAY NOT EXCEED THE STANDARD WORD COUNT. THE STANDARD WORD COUNT IS TYPED OUT AT THE START OF

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THE PROGRAM. IF RESPONSE IS NO - THE NEXT QUESTION IS SKIPPED.

LENGTH (1 TO STANDARD WORD COUNT)?

SPECIFY WORD COUNT IN OCTAL.

DO YOU WISH TO SELECT THE DISK TEST ADDR?(Y OR N)

THIS WILL ALLOW THE OPERATOR TO SELECT A SPECIFIC AREA OF THE DISK FOR TESTING.

IF THE OPERATOR RESPONDS "YES" THE FOLLOWING QUESTIONS WILL BE ASKED.

STARTING CYLINDER
STARTING HEAD
STARTING TRACK

RESPOND WITH THE DESIRED ADDRESS IN OCTAL

OPTIONAL DATA PATTERN NO.?

YOU HAVE THE OPTION OF SELECTING ANY INDIVIDUAL PATTERN OR SELECTING ALL PATTERNS.

PATTERN NO.	PATTERN	PATTERN NO.	PATTERN
0	163126	10	404210
1	052525	11	167356
2	125252	12	156735
3	031463	13	135673
4	007417	14	073567
5	010421	15	177777 - 000000
6	021042	16	RANDOM PATTERN
7	042104	17	SELECTS ALL PATTERNS

WRITE? (Y OR N)
WRITE CHECK? (Y OR N)
READ? (Y OR N)

THESE QUESTIONS ALLOW YOU TO SELECT THE OPERATIONS TO BE PERFORMED IN THE DATA TESTS.
.ENDP

771
772
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000002
000003
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000005
000006
000007

000001
000002
000004
000010
000020
000340
000300
000240
000200
000140
000100
000040

000004
000010
000014
000020
000024
000030
000034

177776
177560
177562
177564
177566
177570
177570

000500

100000
040000

```
.LIST ME
.NLIST MC,MD,CND
.ABS
;COPYRIGHT 1972,1977, DIGITAL EQUIPMENT CORP., MAYNARD, MASS.
;CONTAINS DEFINITIONS, REGISTER ASSIGNMENTS AND MACRO CALLS
;GENERAL REGISTER ASSIGNMENTS
RO=%0
R1=%1
R2=%2
R3=%3
R4=%4
R5=%5
SP=%6
PC=%7

;STATUS REGISTER (PSW) BIT ASSIGNMENTS
C=1 ;C BIT
V=2 ;V BIT
Z=4 ;Z BIT
N=10 ;N BIT
T=20 ;T BIT
PRI7=340 ;PRIORITY LEVEL 7
PRI6=300 ;PRIORITY LEVEL 6
PRI5=240 ;PRIORITY LEVEL 5
PRI4=200 ;PRIORITY LEVEL 4
PRI3=140 ;PRIORITY LEVEL 3
PRI2=100 ;PRIORITY LEVEL 2
PRI1=40 ;PRIORITY LEVEL 1

;VECTOR ADDRESSES
ERRVEC=4 ;ERROR VECTOR
RESVEC=10 ;RESERVED INST VECTOR
TBITVEC=14 ;T BIT VECTOR
IOTVEC=20 ;IOT TRAP VECTOR
PFVEC=24 ;POWER FAIL VECTOR
EMTVEC=30 ;EMT VECTOR
TRAPVEC=34 ;TRAP VECTOR

;REGISTER ADDRESSES
PSW=177776 ;PROCESSOR STATUS REGISTER
TKS=177560 ;KEYBOARD CSR
TKB=177562 ;ADDR OF KEYBOARD BUFFER
TPS=177564 ;TELEPRINTER CSR
TPB=177566 ;TELEPRINTER BUFFER
SWR=177570 ;CONSOLE SWITCH REGISTER
DISPLAY=177570 ;CONSOLE DISPLAY REGISTER

;INITIAL STACK POINTER
STKPTR=500 ;PROGRAM STACK POINTER

;BIT ASSIGNMENTS
B15=100000
B14=40000
```

827	020000	813=20000
828	010000	812=10000
829	004000	811=4000
830	002000	810=2000
831	001000	89=1000
832	000400	88=400
833	000200	87=200
834	000100	86=100
835	000040	85=40
836	000020	84=20
837	000010	83=10
838	000004	82=4
839	000002	81=2
840	000001	80=1

:MEMORY MANAGEMENT REGISTER ASSIGNMENTS

841		SRC=177572
842		KIPAR0=172340
843		KIPAR1=172342
844	177572	KIPAR2=172344
845	172340	KIPAR3=172346
846	172342	KIPAR4=172350
847	172344	KIPAR5=172352
848	172346	KIPAR6=172354
849	172350	KIPAR7=172356
850	172352	KIPDR0=172300
851	172354	KIPDR1=172302
852	172356	KIPDR2=172304
853	172300	KIPDR3=172306
854	172302	KIPDR4=172310
855	172304	KIPDR5=172312
856	172306	KIPDR6=172314
857	172310	KIPDR7=172316
858	172312	RW=6
859	172314	UP=00
860	172316	
861	000006	
862	000000	

:INSTRUCTION EQUATES

863		HLT=TRAP	:HLT IS A TRAP TO THE ERROR ROUTINE
864		SCOPE=EMT	:SCOPE IS AN EMT TRAP
865			
866	104400		
867			
868	104000		
869			

:INDEX OF MACROS

870		.SCOPE
871		.SAVE
872		.REST
873		.ERROR
874		.PRINT
875		.DUMP
876		.RAND
877		.READ
878		.PACK
879		
880		
881		
882		

:INDEX OF CALLS

883
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: SCOPE
: SAVE
: REST
: HLT
: PRINT
: DUMP
: DUMPF
: SDUMP
: SDUMPF
: RAND
: READ
: PACK

912 .LIST ME
913 .=200
914 000200 012707 002336 MOV #START,PC ;GO TO START OF TEST
915 001000 001000 .=1000
916 001000 000000 ICNT: 0 ;CONTAINS PASS COUNT
917 001002 000000 LAD: 0 ;PROGRAM TRACE

:SCOPE (EMT) SERVICE ROUTINE
:THIS ROUTINE WILL LOOP IF AN ERROR OCCURED AND
:LOOP ON ERROR SWITCH IS SET (BIT 14). IF LOOPING IS INDICATED
:THE CONTENTS OF "LAD" EQUAL THE LOOP ADDRESS. IN ORDER
:TO LOOP ON ERROR, BIT 14 OF THE SWITCH REGISTER MUST BE SET AND
:LOCATION "ERRFLG" MUST BE NEGATIVE INDICATING AN ERROR. ONCE THE
:LOOP IS INITIATED IT WILL CONTINUE UNTIL SWITCH 14 IS CLEARED.

926 001004 032737 040000 177570 SCOPES: BIT #B14,2#SWR ;LOOP ON ERROR?
927 001012 001403 BEQ 2\$;BRANCH IF NO
928 001014 005767 000220 TST ERRFLG ;IS THERE AN ERROR?
929 001020 001003 BNE 1\$;BRANCH IF YES
930 001022 005067 000212 2\$: CLR ERRFLG ;RESET ERROR CONDITION
931 001026 000002 RTI ;EXIT
932 001030 016716 177746 1\$: MOV LAD,(SP) ;MODIFY RETURN ADDRESS
933 001034 000002 RTI ;EXIT
934 :ROUTINE TO SAVE REGISTERS ON THE STACK.
935 :CALLED BY SAVE MACRO
936 001036 012667 000020 SAVES: MOV (SP)+,1\$;SAVE RETURN PC
937 001042 01054E MOV R5,-(SP)
938 001044 01044E MOV R4,-(SP)

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939 001046 010346      MOV      R3,-(SP)
940 001050 010246      MOV      R2,-(SP)
941 001052 010146      MOV      R1,-(SP)
942 001054 010046      MOV      R0,-(SP)
943 001056 016707 000000  MOV      1$ ,PC          ;RETURN
944 001062 000000      1$: 0                    ;CONTAINS RETURN ADDRESS
945      ;ROUTINE TO RESTORE REGISTERS SAVED ON THE STACK
946      ;CALLED BY REST MACRO
947 001064 012667 000020  REST$: MOV      (SP)+,1$      ;SAVE RETURN PC
948 001070 012600      MOV      (SP)+,R0
949 001072 012601      MOV      (SP)+,R1
950 001074 012602      MOV      (SP)+,R2
951 001076 012603      MOV      (SP)+,R3
952 001100 012604      MOV      (SP)+,R4
953 001102 012605      MOV      (SP)+,R5
954 001104 016707 000000  MOV      1$ ,PC          ;RETURN
955 001110 000000      1$: 0                    ;CONTAINS RETURN ADDR
956      ;ERROR SERVICE ROUTINE CALLED BY HLT
957      ;THIS ROUTINE WILL HALT ON ERROR, RING THE BELL, AND
958      ;TRANSFER CONTROL TO A USER SUPPLIED ROUTINE IF SPECIFIED
959 001112 005737 177570  ERROR: TST      2$SWR      ;HALT ON ERROR?
960 001116 100001      BPL      3$              ;BRANCH IF NO
961 001120 000000      HALT
962 001122 032737 004000 177570  3$: BIT      #B11,2$SWR    ;RING THE BELL?
963 001130 001403      BEQ      1$              ;BRANCH IF NO
964 001132 004567 000144      JSR      R5,PRN1F$      ;FORCE PRINT THE MESSAGE
965 001136 001250      BELL
966 001140 032737 020000 177570  1$: BIT      #B13,2$SWR    ;SKIP TYPEOUT?
967 001146 001022      BNE      2$              ;BRANCH IF YES
968 001150 004567 000110      JSR      R5,PRN1S$      ;PRINT MESSAGE
969 001154 001252      ERRPC
970 001156 011667 000062      MOV      (6),HLTADS$     ;GET ERROR PC+2
971 001162 162767 000002 000054  SUB      #2,HLTADS$      ;MODIFY
972 001170 117767 000050 000044  MOVB     2$HLTADS,HLTCTS ;SAVE HLT ARGUMENT
973 001176 016767 000042 000356  MOV      HLTADS,1TY
974 001204 004767 000134      JSR      PC,PRN1R$
975 001210 004767 016150      JSR      PC,MSG
976 001214 005737 177570  2$: TST      2$SWR      ;HALT ON ERROR?
977 001220 100001      BPL      4$              ;BRANCH IF NO
978 001222 000000      HALT
979 001224 052767 100000 000006  4$: BIS      #B15,ERRFLG  ;SET ERROR FLAG
980 001232 005267 000010      INC      ERRORS         ;UPDATE ERROR COUNTER
981 001236 000002      RTI
982 001240 000000      ERRFLG: 0
983 001242 000000      HLTCTS: 0
984 001244 000000      HLTADS: 0              ;PC OF ERROR
985 001246 000000      ERRORS: 0              ;ERROR COUNT
986 001250 000007      BELL:  .ASCIZ  <7>
987 001252 005015 005015 041520  ERRPC:  .ASCIZ  <15><12>'15'<12>'PC= '
988 001260 020075 000      .EVEN
989 001264
990      ;THIS ROUTINE WILL PRINT AN ASCIZ MESSAGE.
991      ;THE MESSAGE MUST TERMINATE IN 0
992 001264 032737 020000 177570  PRINTS: BIT      #B13,2$SWR  ;INHIBIT TYPEOUTS?
993 001272 001403      BEQ      PRN1F$         ;BRANCH IF NO
994 001274 062705 000002      ADD      #2,R5          ;UPDATE RETURN ADDR

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995 001300 000205          RTS      R5
996 001302 105737 177564  PRNTPS: TSTB   2#TPS          ;WAIT FOR PRINTER TO FINISH
997 001306 100375          BPL     -4
998 001310 010546          MOV     R5, -(SP)
999 001312 062716 000002  ADD     #2, (SP)          ;ADJUST RETURN PC
1000 001316 011505          MOV     (R5), R5          ;GET MESSAGE ADDR
1001 001320 105715          1S:   TSTB   (R5)          ;CHECK FOR TERMINATOR
1002 001322 001002          BNE     2S
1003 001324 012605          MOV     (SP)+, R5        ;GET RETURN ADDR
1004 001326 000205          RTS     R5                ;RETURN
1005 001330 112537 177566  2S:   MOVB   (R5)+, 2#TPB    ;PRINT CHARACTER
1006 001334 105737 177564  TSTB   2#TPS          ;WAIT TILL DONE
1007 001340 100375          BPL     -4
1008 001342 000766          BR     1S
1009                                     ;THIS ROUTINE TYPES A LOCATION IN OCTAL
1010 001344 032737 G20000 177570  PRINTR: BIT    #B13, 2#SWR    ;INHIBIT TYPEOUT?
1011 001352 001406          BEQ     PRINTA          ;BRANCH IF NO
1012 001354 000207          RTS     PC
1013 001356 032737 G20000 177570  PRINTS: BIT    #B13, 2#SWR    ;INHIBIT TYPEOUT?
1014 001364 001405          BEQ     PRINTB          ;BRANCH IF NO
1015 001366 000207          RTS     PC
1016 001370 112767 000001 000140  PRINTA: MOVB   #1, .PR      ;SET ZERO FILL SWITCH
1017 001376 000402          BR     .+6              ;SKIP
1018 001400 005067 000132          PRINTB: CLR   .PR        ;SUPPRESS LEADING ZEROS
1019 001404 112767 177772 000125  MOVB   #-6, .PR+1       ;SET COUNT
1020 001412 010446          .PTIT: MOV    R4, -(SP)   ;SAVE R4
1021 001414 012704 001540          MOV    #.PR+2, R4      ;SET POINTER TO FIRST CHARACTER
1022 001420 105014          CLRB   (R4)            ;CLEAR FIRST BYTE
1023 001422 000413          BR     .PRF            ;ROTATE FIRST BIT
1024 001424 105014          .PRL: CLRB   (R4)       ;CLEAR BYTE OF CHAR
1025 001426 032767 00010C 000102  BIT    #100, .PR        ;BIT TYPING MODE
1026 001434 001006          BNE    .PRF            ;YES SKIP 2 ROTATES
1027 001436 006167 000120          ROL    TTY             ;ROTATE BIT INTO C
1028 001442 106114          ROLB   (4)             ;PACK IT
1029 001444 006167 000112          ROL    TTY
1030 001450 106114          ROLB   (4)
1031 001452 006167 000104          .PRF:  ROL    TTY
1032 001456 106114          ROLB   (4)
1033 001460 105714          TSTB   (4)             ;IS IT ZERO
1034 001462 001402          BEQ    .+6             ;SKIP INC
1035 001464 105267 000046          INCB   .PR             ;SET FILL SWITCH
1036 001470 105767 000042          TSTB   .PR             ;CHECK FILL SWITCH
1037 001474 001402          BEQ    .+6             ;SKIP BITSET
1038 001476 152724 000060          BISB   #'0, (4)+       ;MAKE INTO ASCII CHAR
1039 001502 105267 000031          INCB   .PR+1           ;INC COUNT
1040 001506 001346          BNE    .PRL            ;REPEAT
1041 001510 022704 001540          CMP    #.PR+2, R4      ;EMPTY BUFFER
1042 001514 001002          BNE    .+6             ;SKIP IF NOT
1043 001516 112724 000060          MOVB   #'0, (4)+       ;LOAD ONE ZERO
1044 001522 105014          CLRB   (4)             ;NULL TERMINATOR
1045 001524 004567 177534          JSR    R5, PRINTS      ;PRINT MESSAGE
1046 001530 001540          .PR+2
1047 001532 012604          MOV    (SP)+, R4       ;RESTORE R4
1048 001534 000207          RTS     PC
1049 001536 000012          .PR:   .BLKW 12
1050 001562 000000          TTY:   0

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1051	001564			RANDS:	JSR	PC,SAVE\$:SAVE THE REGISTERS
1052	001564	004767	177246		MOV	LONUM,R0		:SET R0 WITH LOW
1053	001570	016700	000106		MOV	HINUM,R1		:SET R1 WITH HIGH
1054	001574	016701	000100		MOV	#-7,R3		:SET SHIFT COUNT
1055	001600	012703	177771		CLR	R2		
1056	001604	005002		1\$:	ASL	R0		:SHIFT R0 LEFT AND
1057	001606	006300			ROL	R1		:ROTATE CARRY INTO R1 AND
1058	001610	006101			ROL	R2		:ROTATE CARRY INTO R2
1059	001612	006102			INC	R3		:CHECK FOR DONE
1060	001614	005203			BNE	1\$		
1061	001616	001373			ADD	LONUM,R2		:ADD # TO MAKE X 129
1062	001620	066702	000056		ADC	R1		:PROPOGATE CARRY
1063	001624	005501			ADD	HINUM,R1		:ADD # TO MAKE X 129
1064	001626	066701	000046		ADC	R2		:PROPOGATE CARRY
1065	001632	005502			ADD	#1057,R0		
1066	001634	062700	001057		ADC	R1		:PROPOGATE CARRY
1067	001640	005501			ADC	R2		:PROPOGATE CARRY
1068	001642	005502			ADD	#47401,R1		
1069	001644	062701	047401		ADC	R2		
1070	001650	005502			ADD	#6,R2		
1071	001652	062702	000006		ADD	R2,R0		
1072	001656	060200			ADC	R1		
1073	001660	005501			MOV	R0,LONUM		
1074	001662	010067	000014		MOV	R1,HINUM		
1075	001666	010167	000006		JSR	PC,REST\$:RESTORE THE REGISTERS
1076	001672	004767	177166		RTS	PC		
1077	001676	000207						
1078								
1079	001700	000000		HINUM:	0			
1080	001702	000000		LONUM:	0			
1081	001704	010346		READS:	MOV	R3,-(6)		:SAVE R3
1082	001706	012703	002014	1\$:	MOV	#INPUT\$,R3		:GET BUFFER ADDR
1083	001712	022703	002034	2\$:	CMP	#INPUT\$+20,R3		:BUFFER FULL?
1084	001716	001412			BEQ	4\$:YES..TYPE ?
1085	001720	105737	177560		TSTB	@#177560		:WAIT FOR A CHAR
1086	001724	100375			BPL	-4		
1087	001726	113713	177562		MOV#	@#177562,(3)		:GET CHAR
1088	001732	142713	000200		BICB	#200,(3)		:GET RID OF JUNK
1089	001736	122713	000177		CMPB	#177,(3)		:IS IT A RUBOUT?
1090	001742	001004			BNE	3\$:SKIP IF NO
1091	001744			4\$:				
1092	001744	004567	177314		JSR	R5,PRINT\$:PRINT MESSAGE
1093	001750	002054			READMS	1\$:CLEAR BUFFER AND START OVER
1094	001752	000755			BR	1\$:ECHO THE CHAR
1095	001754	013737	177562	177566	3\$:	MOV	@#TKB,@#TPB	
1096	001762	105737	177564		TSTB	@#TPS		
1097	001766	100375			BPL	-4		:WAIT FOR READY
1098	001770	122723	000015		CMPB	#15,(3)+		:CHECK FOR RETURN
1099	001774	001346			BNE	2\$:LOOP IF NOT RETURN
1100	001776	105063	177777		CLRB	-1(3)		:REMOVE THE RETURN
1101	002002	004567	177256		JSR	R5,PRINT\$:PRINT MESSAGE
1102	002006	002060			READL\$			
1103	002010	012603			MOV	(6)+,R3		:RESTORE R3
1104	002012	000207			RTS	PC		:RETRN
1105								
1106	002014	000020		INPUT\$:	.BLKW	20		


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1107 002054 006477 000012 READMS: .ASCIZ '?'(15)(12)
1108 002060 000012 READLS: .ASCIZ (12)
1109
1110 ;TAKE THE CONTENTS OF THE TTY INPUT BUFFER AND
1111 ;PACK THEM INTO ONE WORD TO CREATE AN OCTAL NUMBER
1112
1113 PACKS:
1114 002062 004767 176750 JSR PC,SAVES ;SAVE THE REGISTERS
1115 002066 005067 000242 CLR NUMS
1116 002072 005000 CLR RO
1117 002074 105760 002014 2S: TSTB INPUTS(RO)
1118 002100 001402 BEQ 1S
1119 002102 005200 INC RO
1120 002104 000773 BR 2S
1121 002106 005300 1S: DEC RO
1122 002110 004767 000166 JSR PC,PACS ;GET OCTAL CHAR
1123 002114 016767 000212 000212 MOV PK$,NUMS ;PACK FIRST CHAR
1124 002122 004767 000154 JSR PC,PACS ;GET OCTAL CHAR
1125 002126 000241 CLC
1126 002130 006167 000176 ROL PK$
1127 002134 006167 000172 ROL PK$
1128 002140 006167 000166 ROL PK$
1129 002144 056767 000162 000162 BIS PK$,NUMS ;PACK SECOND CHAR
1130 002152 004767 000124 JSR PC,PACS ;GET OCTAL CHAR
1131 002156 000241 CLC
1132 002160 000367 000146 SWAB PK$
1133 002164 006067 000142 ROR PK$
1134 002170 006067 000136 ROR PK$
1135 002174 056767 000132 000132 BIS PK$,NUMS ;PACK THIRD CHAR
1136 002202 004767 000074 JSR PC,PACS ;GET OCTAL CHAR
1137 002206 000367 000120 SWAB PK$
1138 002212 000241 CLC
1139 002214 006167 000112 ROL PK$
1140 002220 056767 000106 000106 BIS PK$,NUMS ;PACK FOURTH CHAR
1141 002226 004767 000050 JSR PC,PACS ;GET OCTAL CHAR
1142 002232 000367 000074 SWAB PK$
1143 002236 000241 CLC
1144 002240 006167 000066 ROL PK$
1145 002244 006167 000062 ROL PK$
1146 002250 006167 000056 ROL PK$
1147 002254 006167 000052 ROL PK$
1148 002260 056767 000046 000046 BIS PK$,NUMS ;PACK FIFTH CHAR
1149 002266 000402 BR PKEX1S
1150 002270 062706 000002 PKEXS: ADD #2,SP ;MODIFY STACK
1151 002274 PKEX1S:
1152 002274 004767 176564 JSR PC,RESTS ;RESTORE THE REGISTERS
1153 002300 000207 RTS PC ;EXIT
1154
1155 PACS: TST RO
1156 002304 100771 BMI PKEXS
1157 002306 005067 000020 CLR PK$
1158 002312 116067 002014 000012 MOVB INPUTS(RO),PK$ ;GET INPUT CHAR
1159 002320 005300 DEC RO
1160 002322 042767 177770 000002 BIC #177770,PK$ ;CLEAR UNWANTED BITS
1161 002330 000207 RTS PC
1162

```

K02

1163 002332 000000
1164 002334 000000
1165

PKS: 0
NUMS: 0

```

1166          .TITLE RPI1C RELIABILITY TEST
1167
1168
1169
1170 002336 000005          START: RESET          ;CLEAR THE WORLD
1171 002340 012706 000500      MOV          #STKPTR, SP          ;SETUP STACK
1172 002344 004767 014340      JSR          PC, INIT          ;INITIALIZE VECTORS
1173 002350 004567 176726      JSR          RS, PRNTRF$        ;FORCE PRINT THE MESSAGE
1174 002354 025760          HEADER
1175 002356 005767 023376      TST          HEADER          ;WAS RPO3(S) SIZED ALREADY?
1176 002362 001402          BEQ          RESTRT          ;IF YES, THEN DO NOT SIZE
1177 002364 004767 025140      JSR          PC, SUBSIZ        ;OTHERWISE, SIZE FOR RPO3(S).
1178 002370 005067 023270      RESTRT: CLR          FLAG          ;CLEAR PROGRAM FLAG
1179 002374 032737 000100 177570  BIT          #B6, @#SWR        ;WANT TO USE MEMORY MANAGEMENT?
1180 002402 001034          BNE          2$              ;BR IF NO
1181 002404 012737 002474 000004  MOV          #2$, @#ERRVEC      ;SETUP TRAP TEST FOR MEMORY MANAGEMENT
1182 002412 012737 000340 000006  MOV          #340, @#ERRVEC+2
1183 002420 005737 177572          TST          @#SR0            ;MEMORY MANAGEMENT?
1184 002424 005037 172340          CLR          @#KIPAR0        ;YES! SET UP TO USE MEMORY MANAGEMENT
1185 002430 012737 000200 172342  MOV          #200, @#KIPAR1    ;SECOND 4K PAGE
1186 002436 012737 007600 172356  MOV          #7600, @#KIPAR7   ;I/O PAGE
1187 002444 012737 177406 172300  MOV          #400*256.-400+UP+RW, @#KIPDR0 ;SET KIPDR0=RW UP 400 BLOCKS
1188 002452 012737 177406 172302  MOV          #400*256.-400+UP+RW, @#KIPDR1 ;SET KIPDR1=RW UP 400 BLOCKS
1189 002460 012737 177406 172316  MOV          #400*256.-400+UP+RW, @#KIPDR7 ;SET KIPDR7=RW UP 400 BLOCKS
1190 002466 005237 177572          INC          @#SR0            ;TURN ON MEMORY MANAGEMENT
1191 002472 000403          BR          7$
1192 002474 052767 000100 023162 2$: BIS          #B6, FLAG          ;BIT6 SET = NO MEMORY MANAGEMENT
1193 002502 012737 000006 000004 7$: MOV          #ERRVEC+2, @#ERRVEC ;RESTORE TRAP CATCHER
1194 002510 005037 000006          CLR          @#ERRVEC+2
1195 002514 005067 023240          CLR          HEADER          ;ASCII TERMINATOR SO ON RESTART THERE IS NO HEADER
1196 002520 004567 016242          JSR          RS, EXTMEN        ;SET UP DATA BUFFERS
1197 002524 005067 023222          CLR          SEEK1           ;INITALIZE SEEK RANDOM NUMBER GENERATOR
1198 002530 005067 176244          CLR          ICNT           ;CLEAR THE PASS COUNTER
1199 002534 005067 023154          CLR          DSKNOR         ;CLEAR UNIT FLAG
1200 002540 005067 023132          CLR          CYLINDER       ;CLEAR THE CYLINDER ADDRESS
1201 002544 005067 023130          CLR          DMA            ;CLEAR DAR REGISTERS
1202 002550 005067 023130          CLR          PATNU          ;CLEAR PATTERN COUNT
1203 002554 005067 023174          CLR          CNTA           ;CLEAR READ COUNTER FOR DATA AND RANDOM TEST
1204 002560 032737 000400 177570  BIT          #B8, @#SWR        ;USE CONVERSATION MODE?
1205 002566 001005          BNE          LCONM          ;BRANCH IF YES
1206 002570 052767 070000 023066  BIS          #70000, FLAG
1207 002576 000167 000756          JMP          ADTST
1208          ;ENTER OPERATOR CONVERSATION MODE
1209 002602 013746 177570      LCONM: MOV          @#SWR, -(SP) ;PUT SWR ONTO STACK
1210 002606 042716 177770      BIC          #-10, (SP)      ;CLEAN OUT UNWANTED SWITCHES
1211 002612 022726 000003      CMP          #3, (SP)+      ;TEST 3?
1212 002616 101402          BLOS        1$              ;BR IF YES
1213 002620 000167 017672      JMP          CYLSK          ;GO DO ADDRESS CONVERSATION
1214 002624
1215 002624 004567 176452          JSR          RS, PRNTRF$      ;FORCE PRINT THE MESSAGE
1216 002630 024532          SPECMES          ;STANDARD WORDS TRANSFERED =
1217 002632 016767 023052 176722  MOV          SWRDCT, TTY
1218 002640 004767 176534          JSR          PC, PRINTB      ;FORCE TYPE LOCATION - SUPPRESS ZEROS
1219 002644 004567 176432          JSR          RS, PRNTRF$    ;FORCE PRINT THE MESSAGE
1220 002650 024561          CON1            ;ASK ABOUT DATA TEST ONLY
1221 002652 004767 177026          JSR          PC, READ$      ;INPUT MESSAGE

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1222	002656	122767	000131	177130	CMPB	#131, INPUTS	; TEST FOR YES
1223	002664	001003			BNE	+10	; BRANCH IF NO
1224	002666	052767	002000	022770	BIS	#B10, FLAG	; SET DATA TEST ONLY FLAG
1225	002674	004567	176402		JSR	RS, PRNTRS	; FORCE PRINT THE MESSAGE
1226	002700	024614			CON2		; ASK ABOUT MULTI DRIVE MODE
1227	002702	004767	176776		JSR	PC, READS	; INPUT MESSAGE
1228	002706	122767	000131	177100	CMPB	#131, INPUTS	; TEST FOR YES
1229	002714	001040			BNE	DATTES	; BRANCH IF NO
1230	002716	052767	004000	022740	BIS	#B11, FLAG	; SET MULTI UNIT FLAG
1231	002724						
1232	002724	004567	176352		JSR	RS, PRNTRS	; FORCE PRINT THE MESSAGE
1233	002730	024650			CON3		; GET NO. OF UNITS
1234	002732	004767	176746		JSR	PC, READS	; INPUT MESSAGE
1235	002736	004767	177120		JSR	PC, PACKS	; CONVERT INPUT TO A NUMBER
1236	002742	005767	177366		TST	NUMS	; IS IT ZERO
1237	002746	001766			BEQ	DSKDR	
1238	002750	162767	000001	177356	SUB	#1, NUMS	
1239	002756	022767	000010	177350	CMP	#10, NUMS	; IS NO. TOO HIGH
1240	002764	101757			BLOS	DSKDR	
1241	002766	016767	177342	022720	MOV	NUMS, DSKNOR	; SAVE HIGHEST UNIT NO.
1242	002774	042767	177770	022712	BIC	#177770, DSKNOR	
1243	003002	000241			CLC		
1244	003004	006167	022704		ROL	DSKNOR	
1245	003010	006167	022700		ROL	DSKNOR	
1246	003014	000423			BR	ASKWC	
1247	003016						
1248	003016	004567	176260		JSR	RS, PRNTRS	; FORCE PRINT THE MESSAGE
1249	003022	024712			CON4		; ASK UNIT NUMBER
1250	003024	004767	176654		JSR	PC, READS	; INPUT MESSAGE
1251	003030	004767	177026		JSR	PC, PACKS	; CONVERT INPUT TO A NUMBER
1252	003034	022767	000010	177272	CMP	#10, NUMS	; IS NO = OR > 10
1253	003042	101765			BLOS	DATTES	; NO
1254	003044	000241			CLC		
1255	003046	006167	177262		ROL	NUMS	
1256	003052	006167	177256		ROL	NUMS	
1257	003056	056767	177252	022600	BIS	NUMS, FLAG	; SAVE UNIT UNDER TEST
1258	003064						
1259	003064	004567	176212		JSR	RS, PRNTRS	; FORCE PRINT THE MESSAGE
1260	003070	024731			CON5		; ASK ABOUT OPTIONAL WORD COUNT
1261	003072	004767	176606		JSR	PC, READS	; INPUT MESSAGE
1262	003076	122767	000131	176710	CMPB	#131, INPUTS	; TEST FOR YES
1263	003104	001034			BNE	TKSR	; ASK ABOUT OPTIONAL DAR
1264	003106						
1265	003106	004567	176170		JSR	RS, PRNTRS	; FORCE PRINT THE MESSAGE
1266	003112	024771			CON6		; ASK LENGTH OF WC
1267	003114	004767	176564		JSR	PC, READS	; INPUT MESSAGE
1268	003120	004767	176736		JSR	PC, PACKS	; CONVERT INPUT TO A NUMBER
1269	003124	005767	177204		TST	NUMS	
1270	003130	001766			BEQ	WCCON	
1271	003132	016767	022552	022574	MOV	SWRDC, WORK	
1272	003140	005267	022570		INC	WORK	
1273	003144	026767	022564	177162	CMP	WORK, NUMS	; IS NO. GREATER THAN AVAILABLE CORE?
1274	003152	101755			BLOS	WCCON	; YES ASK FOR COUNT AGAIN
1275	003154	016767	177154	022526	MOV	NUMS, SWRDC	; OPERATING WORD COUNT
1276	003162	016767	022522	022504	MOV	SWRDC, WRDCT	
1277	003170	052767	000002	022466	BIS	#B1, FLAG	; OPERATOR SELECTED WORD COUNT

1278	003176				TKSR:			
1279	003176	004567	176100			JSR	R5,PRNTF\$; FORCE PRINT THE MESSAGE
1280	003202	025042				CON7A		; ASK ABOUT DISK ADDR
1281	003204	004767	176474			JSR	PC,READ\$; INPUT MESSAGE
1282	003210	122767	000131	176576		CMPB	#131,INPUT\$; WILL OPERATOR SUPPLY ADDR?
1283	003216	001055				BNE	OPPAT	; BRANCH IF NO
1284	003220	052767	000040	022436		BIS	#B5,FLAG	
1285	003226				OPDAR:			
1286	003226	004567	176050			JSR	R5,PRNTF\$; FORCE PRINT THE MESSAGE
1287	003232	025147				CON7C		; GET CYLINDER ADDR
1288	003234	004767	176444			JSR	PC,READ\$; INPUT MESSAGE
1289	003240	004767	176616			JSR	PC,PACK\$; CONVERT INPUT TO A NUMBER
1290	003244	022767	000626	177062		CMP	#626,NUM\$; IS CYLINDER LEGAL
1291	003252	101765				BLOS	OPDAR	
1292	003254	016767	177054	022404		MOV	NUM\$,SCYL	; SAVE ADDR
1293	003262				OPDA1:			
1294	003262	004567	176014			JSR	R5,PRNTF\$; FORCE PRINT THE MESSAGE
1295	003266	025021				CON7		; GET HEAD ADDR
1296	003270	004767	176410			JSR	PC,READ\$; INPUT MESSAGE
1297	003274	004767	176562			JSR	PC,PACK\$; CONVERT INPUT TO A NUMBER
1298	003300	022767	000024	177026		CMP	#24,NUM\$	
1299	003306	101765				BLOS	OPDA1	; BRANCH IF HEAD ADDR TOO HIGH
1300	003310	016767	177020	022352		MOV	NUM\$,SHED	; SAVE ADDR
1301	003316				OPDA2:			
1302	003316	004567	175760			JSR	R5,PRNTF\$; FORCE PRINT THE MESSAGE
1303	003322	025126				CON7B		; GET SECTOR ADDR
1304	003324	004767	176354			JSR	PC,READ\$; INPUT MESSAGE
1305	003330	004767	176526			JSR	PC,PACK\$; CONVERT INPUT TO A NUMBER
1306	003334	022767	000012	176772		CMP	#12,NUM\$; IS SECTOR ADDR TOO HIGH?
1307	003342	101765				BLOS	OPDA2	
1308	003344	016767	176764	022320		MOV	NUM\$,SSEC	; SAVE ADDR
1309					OPPAT:			
1310	003352					JSR	R5,PRNTF\$; FORCE PRINT THE MESSAGE
1311	003352	004567	175724			CON8		; ASK ABOUT DATA PATTERNS
1312	003356	025167				JSR	PC,READ\$; INPUT MESSAGE
1313	003360	004767	176320			JSR	PC,PACK\$; CONVERT INPUT TO A NUMBER
1314	003364	004767	176472			CMP	#20,NUM\$; TEST FOR CORRECT NO
1315	003370	022767	000020	176736		BLOS	OPPAT	; ASK AGAIN
1316	003376	101765				CMP	#17,NUM\$	
1317	003400	022767	000017	176726		BEQ	OPWRT	; DATA PATTERN UNDER PROGRAM CONTROL
1318	003406	001411				BIS	#B15,FLAG	; SET PROGRAM FLAG
1319	003410	052767	100000	022246		MOV	NUM\$,PATNU	; OPERATOR WANTS TO SELECT DATA
1320	003416	016767	176712	022260		CLC		
1321	003424	000241				ROL	PATNU	
1322	003426	006167	022252			BIC	#70000,FLAG	; CLEAR OP MODE BITS IN FLAG
1323	003432	042767	070000	022224	OPWRT:			
1324	003440	004567	175636			JSR	R5,PRNTF\$; FORCE PRINT THE MESSAGE
1325	003444	025215				CON9		; ASK ABOUT WRITE
1326	003446	004767	176232			JSR	PC,READ\$; INPUT MESSAGE
1327	003452	122767	000131	176334		CMPB	#131,INPUT\$; TEST FOR YES
1328	003460	001003				BNE	OPRD	; ASK ABOUT WRITE CHECK
1329	003462	052767	040000	022174		BIS	#B14,FLAG	; YES SET FLAG BIT
1330	003470				OPRD:			
1331	003470	004567	175606			JSR	R5,PRNTF\$; FORCE PRINT THE MESSAGE
1332	003474	025265				CON11		; ASK ABOUT READ
1333	003476	004767	176202			JSR	PC,READ\$; INPUT MESSAGE

1334	003502	122767	000131	176304		CMPB	#131, INPUTS	: TEST FOR YES ANSWER
1335	003510	001003				BNE	OPWCK	
1336	003512	052767	010000	022144		BIS	#B12, FLAG	: SET FLAG TO READ
1337	003520				OPWCK:			
1338	003520	004567	175556			JSR	RS, PRNTFS	: FORCE PRINT THE MESSAGE
1339	003524	025236				CON10		: ASK ABOUT WRITE CHECK
1340	003526	004767	176152			JSR	PC, READS	: INPUT MESSAGE
1341	003532	122767	000131	176254		CMPB	#131, INPUTS	
1342	003540	001003				BNE	CHKMOD	
1343	003542	052767	020000	022114		BIS	#B13, FLAG	: SET WRITE CHECK FLAG
1344	003550	032767	070000	022106	CHKMOD:	BIT	#70000, FLAG	: MAKE SURE SOME OPERATION WAS SELECTED
1345	003556	001725				BEQ	OPWRT	
1346								
1347								
1348	003560	005737	000042		ADTST:	TST	#42	: UNDER MONITOR CONTROL?
1349	003564	001444				BEQ	1\$: BRANCH IF NO
1350	003566	005067	022122			CLR	DSKNOR	
1351	003572	012777	000001	022040	3\$:	MOV	#1, ARPCS	: CLEAR THE RP11C
1352	003600	116777	022110	022034		MOVB	DSKNOR, ARPCS1	: SELECT THE DRIVE
1353	003606	005777	022046			TST	ARPCS	: IS THE UNIT READY?
1354	003612	100003				BPL	2\$: BRANCH IF NO
1355	003614	005267	022074			INC	DSKNOR	: UPDATE UNIT NUMBER
1356	003620	000764				BR	3\$	
1357	003622	005367	022066		2\$:	DEC	DSKNOR	: DSKNOR = NUMBER OF UNITS
1358	003626	000241				CLC		
1359	003630	006167	022060			ROL	DSKNOR	
1360	003634	006167	022054			ROL	DSKNOR	
1361	003640	052767	004000	022016		BIS	#B11, FLAG	: SET MULTI DRIVE FLAG
1362	003646	005767	022042			TST	DSKNOR	: WERE ANY UNITS AVAILABLE?
1363	003652	100011				BPL	1\$: BRANCH IF YES
1364	003654	004567	175404			JSR	RS, PRINTS	: PRINT MESSAGE
1365	003660	024240				MES20		
1366	003662	013701	000042			MOV	#42, R1	: ABORT - NO UNITS AVAILABLE
1367	003666	005067	174150			CLR	42	: SET ABORT FLAG
1368	003672	000167	010650			JMP	MEXIT	
1369	003676	032767	004000	021760	1\$:	BIT	#B11, FLAG	: ARE WE IN MULTI DRIVE MODE?
1370	003704	001422				BEQ	EXMFLG	: BRANCH IF NO
1371	003706	004567	175370			JSR	RS, PRNTFS	: FORCE PRINT THE MESSAGE
1372	003712	024107				MES11		
1373	003714	016767	021744	022004		MOV	FLAG, ACNVX	: TELL OPERATOR THE UNIT UNDER TEST
1374	003722	006067	022000			ROR	ACNVX	
1375	003726	006067	021774			ROR	ACNVX	
1376	003732	042767	177770	021766		BIC	#177770, ACNVX	
1377	003740	016767	021762	175614		MOV	ACNVX, TTY	
1378	003746	004767	175426			JSR	PC, PRINTB	: FORCE TYPE LOCATION - SUPPRESS ZEROS
1379	003752	032737	000010	177570	EXMFLG:	BIT	#B3, #SWR	: RUN SELECTED TEST?
1380	003760	001410				BEQ	1\$: BRANCH IF NO
1381	003762	013700	177570			MOV	#SWR, RO	: GET SWITCH SETTINGS
1382	003766	042700	177770			BIC	#177770, RO	
1383	003772	000241				CLC		
1384	003774	006100				ROL	RO	
1385	003776	000170	004016			JMP	ADTSTBL(RO)	: GO TO SELECTED TEST
1386	004002	032767	002000	021654	1\$:	BIT	#B10, FLAG	: DATA TEST ONLY?
1387	004010	001412				BEQ	ADT1	: NO
1388	004012	000167	006312			JMP	DATAT	: DO DATA TEST

1390 004016 004036
1391 004020 004514
1392 004022 005576
1393 004024 006242
1394 004026 010554
1395 004030 012330
1396 004032 013424
1397 004034 014562

TSTTBL: ADT1
ADT2
ADT3
WRCK
MEMTST
DATAT
RANEX
PFTST

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004036 005067 021666
004042 004567 175216
004046 023766
004050 016767 021654 175504
004056 004767 175274
004062 012777 004502 021544
004070 012777 000340 021540
004076 004567 012534
004102 005067 021570
004106 005067 021626
004112 005067 021624
004116 012737 000200 177776
004124 117777 021530 021526
004132 016777 021540 021510
004140 005067 000346
004144 052777 020011 021466
004152 012700 000025
004156 005300
004160 001376
004162 105777 021452
004166 100402
004170 104400
004172 000467
004174 005767 021540
004200 001406
004202 032777 002000 021450
004210 001002
004212 104400
004214 000456
004216 005000
004220 005200
004222 005777 021432
004226 100414
004230 005237 025746
004234 005237 025746
004240 005337 025746
004244 005337 025746

.SBTTL ***** TEST 0 *****

: IN THIS TEST THE PROGRAM SEEKS FROM 0 TO N AND THEN BACK
: TO 0. N STARTS AT ZERO THEN INCREMENTS TO 1 AND UP THRU 625
: DONE IS TIMED OUT, SELECTED UNIT CYLINDER ADDRESS IS TESTED, SEEK UNDERWAY
: IS CHECK, AND THE ATTENTION FLAG IS TESTED.

ADT1: CLR TESTNO
JSR R5, PRINTS ;PRINT MESSAGE
MES6
MOV TESTNO, TTY
JSR PC, PRINTS ;TYPE LOCATION-SUPPRESS ZEROS
RADT1: MOV #INTCK, VECTOR ;SET UP DISK VECTOR
MOV #340, STATUS
JSR R5, DSKNOS ;SELECT UNIT
CLR CYLINDER
CLR WORK2 ;CYLINDER COUNTER
CLR WORK3 ;POINTER
MOV #PRI4, #PSW ;ALLOW INTERRUPTS
9\$: MOVB #RPS, #RPS ;CLEAR ATTENTION BITS
MOV CYLINDER, #RPS ;SET CYLINDER REGISTER
CLR INTFLG ;CLEAR INTERRUPT FLAG
BIS #20011, #RPS ;SEEK AND ENABLE ATTN INTERRUPT*
MOV #25, R0
1\$: DEC R0 ;DELAY FOR DONE TO SET
BNE 1\$
TSTB #RPS ;TEST FOR DONE
BMI 2\$;BRANCH DONE SET
HLT ;DONE DID NOT SET AFTER SEEK
BR 8\$
2\$: TST WORK2 ;DON'T TEST SEEK UNDERWAY
BEQ 3\$;IF FIRST TIME THRU
BIT #B10, #RPS ;DID SEEK UNDERWAY SET*
BNE 3\$;BRANCH IF YES
HLT ;SEEK UNDERWAY DID NOT SET*
BR 9\$
3\$: CLR R0
5\$: INC R0 ;TIMEOUT UNIT READY
TST #RPS ;IS UNIT READY?
BMI 6\$;BRANCH IF YES
INC #CYLA
INC #CYLA
DEC #CYLA
DEC #CYLA


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1446 004250 005700          TST      R0          :TIMEOUT?
1447 004252 001362          BNE     5$          :BRANCH IF NO
1448 004254 104400          HLT                    :READY DID NOT SET AFTER SEEK
1449 004256 000435          BR      8$          :
1450 004260 005767 000226 6$: TST      INTFLG      :DID INTERRUPT OCCUR?
1451 004264 001002          BNE     12$         :BRANCH IF YES
1452 004266 104400          HLT                    :INTERRUPT DID NOT OCCUR ON ATTENTION BIT
1453 004270 000430          BR      8$          :
1454 004272 004767 012546 12$: JSR     PC,GATTN     :DETERMINE ATTENTION BIT
1455 004276 036777 012572 021354 BIT     ATTN,ARPCS   :IS ATTENTION BIT SET?
1456 004304 001002          BNE     7$          :BRANCH IF YES
1457 004306 104400          HLT                    :ATTENTION BIT DID NOT SET
1458 004310 000420          BR      8$          :
1459 004312 026777 021360 021342 7$: CMP     CYLINDER,ASUCA :IS SUCA CORRECT?
1460 004320 001410          BEQ     11$         :
1461 004322 016767 021350 013474 MOV     CYLINDER,EXPS :EXPECTED RESULTS
1462 004330 017767 021326 013470 MOV     ASUCA,RECS   :RECEIVED RESULTS
1463 004336 104401          HLT     +1          :CONTENTS OF SUCA INCORRECT
1464 004340 000404          BR      8$          :
1465 004342 005777 021272 11$: TST     ARPCS       :ANY DEVICE ERRORS
1466 004346 100001          BPL     8$          :BRANCH IF NO
1467 004350 104400          HLT                    :DEVICE ERROR AFTER SEEK OPERATION
1468 004352 032777 004000 021300 8$: BIT     #B11,ARPCS  :SEEK INCOMPLETE ERROR?
1469 004360 001412          BEQ     4$          :BRANCH IF NO
1470 004362 112777 000015 021250 MOV     #15,ARPCS   :ISSUE HOME COMMAND
1471 004370 105777 021244          TST     ARPCS       :WAIT FOR DONE
1472 004374 100375          BPL     -4          :
1473 004376 032777 100000 021254 13$: BIT     #B15,ARPCS  :WAIT FOR UNIT READY
1474 004404 001774          BEQ     13$        :
1475 004406 012767 004124 174366 4$: MOV     #95,LAD    :SET UP LOOP
1476 004414 104000          SCOPE                :
1477 004416 005767 021320          TST     WORK3       :SEEK CYLINDER ZERO?
1478 004422 100411          BMI     10$        :BRANCH IF YES
1479 004424 005267 021310          INC     WORK2       :UPDATE CYLINDER
1480 004430 016767 021304 021240 MOV     WORK2,CYLINDER
1481 004436 052767 100000 021276 BIS     #B15,WORK3  :SET SEEK ZERO FLAG
1482 004444 000627          BR      9$          :
1483 004446 005067 021224 10$: CLR     CYLINDER    :CLEAR SEEK ZERO FLAG
1484 004452 005067 021264          CLR     WORK3       :HAS LAST CYLINDER BEEN REACHED?
1485 004456 022767 000625 021254 CMP     #625,WORK2  :BRANCH IF NO
1486 004464 001217          BNE     9$          :REPEAT TEST
1487 004466 032737 002000 177570 BIT     #B10,ASWP   :NO-GO TO NEXT
1488 004474 001407          BEQ     ADT2        :YES
1489 004476 000167 177360          JMP     RADT1       :
1490
1491
1492 004502 012767 000001 000002 INTCK: MOV     #1,INTFLG :SET INTERRUPT FLAG
1493 004510 000002          RTI                    :
1494 004512 000000          INTFLG: 0            :
1495
1496          .SBTTL ***** TEST 1 *****
1497
1498          :WRITE 5000 (OCTAL) WORDS IN TEN SECTORS ON EACH TRACK. THE FIRST
1499          :WORD OF EACH SECTOR IS THE CYLINDER NUMBER AND THE REMAINING WORDS CONTAIN
:500          :THE HEAD AND SECTOR ADDRESS. THEN EACH SECTOR IS READ BACK TEN AT A TIME AND
:501          :COMPARED. IF THE FIRST WORD OF A SECTOR DOES NOT COMPARE, THE WRONG

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1502 :CYLINDER WAS PROBABLY SELECTED. A NON COMPARE ON THE FIRST
1503 :WORD IS INDICATED BY TYPING "CYL" AFTER THE ERRING DATA.
1504 :IF ANY OTHER WORD FAILS THE WRONG HEAD OR SECTOR WAS
1505 :SELECTED. THE RIGHT HALF OF THE DATA TYPED EQUALS THE SECTOR
1506 :AND THE LEFT HALF INDICATES THE HEAD.
1507
1508 004514 012767 000001 021206 ADT2: MOV #1,TESTNO
1509 004522 004567 174536 JSR RS,PRINT$ :PRINT MESSAGE
1510 004526 023766 MES6
1511 004530 016767 021174 175024 MOV TESTNO,TTY
1512 004536 004767 174614 JSR PC,PRINTS ;TYPE LOCATION-SUPRESS ZEROS
1513 004542 005067 015202 CLR MEX ;CLEAR DRIVE EXTENDED MEMORY BITS
1514 004546 004567 012064 RADT2: JSR RS,DSKNOS ;SELECT THE DRIVE
1515 004552 052777 000015 021060 1$: BIS #15,DRPCS ;SEEK HOME
1516 004560 012700 000025 MOV #25,RO
1517 004564 005300 2$: DEC RO ;GIVE DONE A CHANCE TO SET
1518 004566 001376 BNE 2$
1519 004570 105777 021044 TSTB DRPCS ;IS DONE SET?
1520 004574 100402 BMI 3$ ;YES-BRANCH
1521 004576 104400 HLT ;DONE DID NOT SET AFTER A SEEK HOME
1522 004600 000425 BR 6$ ;CHECK FOR LOOPING
1523 004602 005000 3$: CLR RO
1524 004604 005200 5$: INC RO
1525 004606 005777 021046 TST DRPDS ;IS UNIT READY?
1526 004612 100414 BMI 4$ ;YES BRANCH
1527 004614 005237 025746 INC DRCYLA
1528 004620 005237 025746 INC DRCYLA
1529 004624 005337 025746 DEC DRCYLA
1530 004630 005337 025746 DEC DRCYLA
1531 004634 005700 TST RO ;HAS UNIT TIMED OUT
1532 004636 001362 BNE 5$ ;NO-BRANCH
1533 004640 104400 HLT ;READY DID NOT SET AFTER HOME SEEK
1534 004642 000404 BR 6$ ;CHECK FOR LOOPING
1535 004644 005777 020770 4$: TST DRPCS ;ANY ERRORS?
1536 004650 100001 BPL 6$ ;NO-BRANCH
1537 004652 104400 HLT ;DRIVE ERRORS AFTER HOME SEEK
1538 004654 012767 004552 174120 6$: MOV #1$,LAD ;SETUP LOOP ADDRESS
1539 004662 104000 SCOPE
1540 004664 012767 005000 021002 MOV #5000,WRDCT ;SETUP WORD COUNT FOR 10 SECTORS
1541 004672 012767 025752 021006 MOV #OUTBUF,BUF ;SETUP OUTPUT BUFFER ADDR
1542 004700 005067 020774 CLR DMA
1543 004704 005067 020766 CLR CYLINDER
1544 004710 012700 025762 SEABUF: MOV #OUTBUF,RO ;GET BUFFER STARTING ADDR
1545 004714 012701 000400 21$: MOV #400,R1 ;SECTOR COUNT
1546 004720 016720 020752 MOV CYLINDER,(RO)+ ;GENERATE PATTERN SO THAT THE
1547 004724 005301 DEC R1 ;THE FIRST WORD OF EACH SECTOR
1548 004726 016720 020746 1$: MOV DMA,(RO)+ ;EQUALS THE CYLINDER ADDR AND
1549 004732 005301 DEC R1 ;THE REMAINDER EQUALS THE HEAD AND
1550 004734 001374 BNE 1$ ;SECTOR ADDR
1551 004736 122767 000011 020734 CMPB #11,DMA
1552 004744 001403 BEQ 22$
1553 004746 005267 020726 INC DMA ;UPDATE SECTOR COUNT
1554 004752 000760 BR 21$
1555 004754 105067 020720 22$: CLRB DMA
1556 004760 004567 010216 4$: JSR RS,FUNCT ;WRITE TEN SECTORS
1557 004764 000003 .WORD 3

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1558	004766	005000				CLR	RO		
1559	004770	005200			3\$:	INC	RO		
1560	004772	105777	020642			TSTB	2RPCS	:	IS DONE SET?
1561	004776	100404				BMI	2\$:	YES BRANCH
1562	005000	005700				TST	RO	:	TEST FOR TIMEOUT
1563	005002	001372				BNE	3\$:	BRANCH IF NO
1564	005004	104400				HLT		:	DONE DID NOT SET AFTER WRITE
1565	005006	000501				BR	5\$		
1566	005010	005777	020624		2\$:	TST	2RPCS	:	ANY DEVICE ERRORS?
1567	005014	100002				BPL	6\$:	BRANCH IF NO
1568	005016	104400				HLT		:	RP11C STATUS ERROR AFTER WRITE
1569	005020	000474				BR	5\$		
1570	005022	005067	020706		6\$:	CLR	WORK	:	INCREMENT FLAG
1571	005026	017767	020620	012772		MOV	2RPDA,RECS	:	GET DISK ADDR
1572	005034	042767	177760	012764		BIC	#177760,RECS	:	SAVE SECTOR ADDR
1573	005042	005767	012760			TST	RECS		
1574	005046	001404				BEQ	9\$:	BRANCH IF SECTOR = ZERO
1575	005050	005067	012750			CLR	EXPS		
1576	005054	104401				HLT	+1	:	SECTOR ADDR IN RPDA DID NOT UPDATE
1577	005056	000455				BR	5\$:	PROPERLY AFTER A TEN SECTOR WRITE
1578	005060	117767	020570	012740	9\$:	MOV#	2RPDA1,RECS	:	GET THE HEAD ADDR
1579	005066	116767	020607	012730		MOV#	DMA+1,EXPS	:	SECTOR ADDR OUTPUTTED
1580	005074	122767	000023	012722		CMP#	23,EXPS	:	DID WE OUTPUT HEAD 23?
1581	005102	001005				BNE	7\$:	BRANCH IF NO
1582	005104	005067	012714			CLR	EXPS	:	RESET HEAD ADDR
1583	005110	010667	020620			MOV	SP,WORK	:	SET INCREMENT FLAG
1584	005114	000402				BR	8\$		
1585	005116	005267	012702		7\$:	INC	EXPS		
1586	005122	126767	012675	012676	8\$:	CMP#	EXPS,RECS	:	IS DISK HEAD ADDR CORRECT?
1587	005130	001402				BEQ	12\$:	BRANCH IF YES
1588	005132	104401				HLT	+1	:	HEAD ADDR IN RPDA WAS INCORRECT
1589	005134	000426				BR	5\$:	AFTER TEN SECTOR WRITE
1590	005136	017767	020506	012662	12\$:	MOV	2RPCA,RECS	:	GET DISK CYLINDER ADDR
1591	005144	016767	020526	012652		MOV	CYLINDER,EXPS		
1592	005152	005767	020556			TST	WORK	:	IS INCREMENT FLAG SET?
1593	005156	001410				BEQ	13\$:	BRANCH IF NO
1594	005160	005267	012640			INC	EXPS		
1595	005164	022767	000626	012632		CMP	#626,EXPS	:	WAS IT LAST CYLINDER?
1596	005172	001002				BNE	13\$:	BRANCH IF NO
1597	005174	005067	012624			CLR	EXPS		
1598	005200	026767	012620	012620	13\$:	CMP	EXPS,RECS	:	IS DISK CYLINDER ADDR CORRECT?
1599	005206	001401				BEQ	5\$:	BRANCH IF YES
1600	005210	104401				HLT	+1	:	CYLINDER ADDR IN RPDA IS NOT
1601								:	CORRECT AFTER TEN SECTOR WRITE
1602	005212	032777	004000	020440	5\$:	BIT	#811,2RPCS	:	SEEK INCOMPLETE ERROR?
1603	005220	001412				BEQ	10\$:	BRANCH IF NO
1604	005222	112777	000015	020410		MOV#	15,2RPCS	:	ISSUE HOME COMMAND
1605	005230	105777	020404			TSTB	2RPCS	:	WAIT FOR DONE
1606	005234	10C375				BPL	-4		
1607	005236	032777	100000	020414	11\$:	BIT	#815,2RPCS	:	WAIT FOR UNIT READY
1608	005244	001774				BEQ	11\$		
1609	005246	012767	004760	173526	10\$:	MOV	#4\$,LAC	:	SETUP LOOP ADDR
1610	005254	104C00				SCOPE			
1611	005256	004767	010744			JSR	PC,DISBUF	:	SETUP NEXT DISK ADDR
1612	005262	000612				BR	SEABUF	:	WRITE NEXT SECTOR
1613	005264	012767	005000	020402		MOV	#5000,WRDCT	:	RESTORE WORD COUNT

1614	005272	052777	000015	020340	BIS	#15,ARPCS	:SEEK HOME	
1615	005300	105777	020334		TSTB	ARPCS		
1616	005304	100375			BPL	.-4	:WAIT FOR DONE AFTER SEEK HOME	
1617	005306	005777	020346		TST	ARPCS		
1618	005312	100375			BPL	.-4	:WAIT FOR DRIVE READY AFTER SEEK HOME	
1619	005314	012700	025762	RDSECT:	MOV	#OUTBUF,RO		
1620	005320	012701	005000		MOV	#5000,R1		
1621	005324	005020		23\$:	CLR	(R0)+	:CLEAR THE BUFFER	
1622	005326	005301			DEC	R1		
1623	005330	001375			BNE	23\$		
1624	005332	004567	007644		JSR	RS,FUNCT	:READ TEN SECTORS	
1625	005336	000005		.WORD	5			
1626	005340	105777	020274		TSTB	ARPCS		
1627	005344	100375			BPL	.-4	:WAIT FOR DONE AFTER READ	
1628	005346	005777	020266		TST	ARPCS	:ANY ERRORS?	
1629	005352	100006			BPL	ADHGT	:BRANCH NO ERRORS	
1630	005354	104400			HLT		:STATUS ERROR AFTER A READ	
1631	005356	032777	040000	020254	BIT	#B14,ARPCS	:WAS IT A DATA ERROR?	
1632	005364	001401			BEQ	ADHGT	:IF YES GO COMPARE DATA	
1633	005366	000446			BR	ADTER1		
1634	005370	012700	025762	ADHGT:	MOV	#OUTBUF,RO		
1635	005374	012701	000400	ADHGT1:	MOV	#400,R1		
1636	005400	026710	020272		CMP	CYLINDER,(0)	:IS CYLINDER WORD CORRECT?	
1637	005404	001017			BNE	ADERC	:BRANCH IF NO	
1638	005406	005720			TST	(0)+		
1639	005410	005301			DEC	R1		
1640	005412	026710	020262	SANHT:	CMP	DMA,(0)	:IS HEAD-SECTOR WORD CORRECT?	
1641	005416	001016			BNE	ADERR	:BRANCH IF NO	
1642	005420	005720			TST	(0)+		
1643	005422	005301			DEC	R1		
1644	005424	001372			BNE	SANHT		
1645	005426	122767	000011	020244	CMPB	#11,DMA		
1646	005434	001423			BEQ	ADTER1		
1647	005436	005267	020236		INC	DMA		
1648	005442	000754			BR	ADHGT1		
1649	005444	016767	020226	012352	ADERC:	MOV	CYLINDER,EXPS	:CORRECT DATA/ADDRESS
1650	005452	000403			BR	ADERC1		
1651	005454	016767	020220	012342	ADERR:	MOV	DMA,EXPS	:CORRECT DATA/ADDRESS
1652	005462	011067	012340		ADERC1:	MOV	(0),RECS	:INCORRECT DATA
1653	005466	104401			HLT	+1	:DATA COMPARE ERROR	
1654	005470	022701	000400		CMP	#400,R1	:WAS FIRST WORD INCORRECT?	
1655	005474	001003			BNE	ADTER1	:BRANCH IF NO	
1656	005476	004567	173562		JSR	RS,PRINT\$:PRINT MESSAGE	
1657	005502	024123			MES12		:WRONG CYLINDER PROBABLY SELECTED	
1658	005504	105067	020170		ADTER1:	CLRB	DMA	
1659	005510	032777	004000	020142	BIT	#B11,ARPCS	:SEEK INCOMPLETE ERROR?	
1660	005516	001412			BEQ	1\$:BRANCH IF NO	
1661	005520	112777	000015	020112	MOVB	#15,ARPCS	:ISSUE HOME COMMAND	
1662	005526	105777	020106		TSTB	ARPCS	:WAIT FOR DONE	
1663	005532	100375			BPL	.-4		
1664	005534	032777	100000	020116	2\$:	BIT	#B15,ARPCS	:WAIT FOR UNIT READY
1665	005542	001774			BEQ	2\$		
1666	005544	012767	005314	173230	1\$:	MOV	#RDSECT,LAC	:SETUP LOOP
1667	005552	104000			SCOPE			
1668	005554	004767	010446		JSR	PC,DISBUF	:SETUP NEXT DISK ADDRESS	
1669	005560	000655			BR	RDSECT	:CHECK NEXT SECTOR	

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1670 005562 032737 002000 177570          BIT      #B10,2#SWR      ;LOOP ON TEST?
1671 005570 001402          BEQ      ADT3          ;BRANCH IF NC
1672 005572 000167 176750          JMP      RADT2
1673          .SBTTL ***** TEST 2 *****
1674
1675          ;WRITE THE FIRST WORD OF EACH CYLINDER WITH THE CYLINDER ADDRESS.
1676          ;THEN SEEK FROM 625 TO 0. THEN SEEK TO 624 AND BACK TO 1
1677          ;UNTIL THE NUMBERS CROSS. AFTER EACH SEEK VERIFY THE POSITION
1678          ;BY READING THE FIRST WORD ON THE CYLINDER AND COMPARING
1679          ;AGAINST CYLINDER REQUESTED.
1680
1681 005576 012767 000002 020124 ADT3:  MOV      #2,TESTNO
1682 005604 004567 173454          JSR      RS,PRINT$    ;PRINT MESSAGE
1683          MES6
1684 005612 016767 020112 173742          MOV      TESTNO,TTY
1685 005620 004767 173532          JSR      PC,PRINT$    ;TYPE LOCATION-SUPRESS ZEROS
1686 005624 005067 014120          CLR      MEX          ;CLEAR DRIVE EXTENDED MEMORY BITS
1687 005630 004767 011054 RADT3: JSR      PC,INIT      ;INITIALIZE VECTORS
1688 005634 004567 010776          JSR      RS,DSKNOS    ;SELECT UNIT
1689 005640 005067 020034          CLR      DMA
1690 005644 005067 020026          CLR      CYLINDER
1691 005650 012767 000001 020016          MOV      #1,WRDCT     ;SET UP WORD COUNT
1692 005656 012767 025762 020022          MOV      #OUTBUF,BUF  ;SETUP BUFFER ADDR
1693 005664 016737 020006 025762 WRCYL: MOV      CYLINDER,2#OUTBUF ;INSERT PATTERN
1694 005672 004567 007304          JSR      RS,FUNCT     ;WRITE PATTERN ON FIRST SECTOR
1695          .WORD 3      ;OF CYLINDER
1696 005700 105777 017734          TSTB     @RPCS        ;WAIT FOR DONE
1697 005704 100375          BPL      #-4
1698 005706 005777 017726          TST      @RPCS        ;AND ERRORS?
1699 005712 100002          BPL      1$          ;BRANCH IF NO
1700 005714 104400          HLT
1701 005716 000407          BR       2$
1702 005720 022767 000625 017750 1$:  CMP      #625,CYLINDER ;ALL CYLINDERS WRITTEN?
1703 005726 001403          BEQ      2$          ;BRANCH IF YES
1704 005730 005267 017742          INC      CYLINDER
1705 005734 000753          BR       WRCYL
1706 005736 032777 004000 017714 2$:  BIT      #B11,@RPOS    ;SEEK INCOMPLETE ERROR?
1707 005744 001412          BEQ      3$          ;BRANCH IF NO
1708 005746 112777 000015 017664          MOVB     #15,@RPCS    ;ISSUE HOME COMMAND
1709 005754 105777 017660          TSTB     @RPCS        ;WAIT FOR DONE
1710 005760 100375          BPL      #-4
1711 005762 032777 100000 017670 4$:  BIT      #B15,@RPOS    ;WAIT FOR UNIT READY
1712 005770 001774          BEQ      4$
1713 005772 012767 005664 173002 3$:  MOV      #WRCYL,LAD   ;SETUP UP LOOP
1714 006000 104000          SCOPE
1715 006002 005067 017670          CLR      CYLINDER
1716 006006 012767 000624 017724          MOV      #624,WORK2
1717 006014 005067 017722          CLR      WORK3
1718 006020 005067 017720          CLR      WORK4        ;INC - DEC FLAG
1719 006024 016767 017672 017654 ADT32: MOV      INBUF,BUF
1720 006032 004567 007144          JSR      RS,FUNCT     ;READ THE FIRST WORD OF THE
1721 006036 000005          .WORD 5      ;CYLINDER
1722 006040 105777 017574          TSTB     @RPCS        ;WAIT FOR DONE AFTER READ
1723 006044 100375          BPL      #-4
1724 006046 005777 017566          TST      @RPCS        ;ANY ERRORS?
1725 006052 100002          BPL      3$          ;BRANCH IF NC
  
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1726	006054	104400				HLT			; ERROR AFTER READING ONE WORD
1727	006056	000413				BR	5\$		
1728	006060	027767	017636	017610	3\$:	CMP	QINBUF,CYLINDER		; COMPARE DATA READ AGAINST CYLINDER
1729	006066	001407				BEQ	5\$; BRANCH IF EQUAL
1730	006070	016767	017602	011726		MOV	CYLINDER,EXPS		; CORRECT DATA
1731	006076	017767	017620	011722		MOV	QINBUF,RECS		; INCORRECT DATA
1732	006104	104401				HLT	+1		; DATA COMPARE ERROR-PROBABLY WENT
1733									; TO THE WRONG CYLINDER
1734	006106	032777	004000	017544	5\$:	BIT	#B11,QRPDS		; SEEK INCOMPLETE ERROR?
1735	006114	001412				BEQ	2\$; BRANCH IF NO
1736	006116	112777	000015	017514		MOVB	#15,QRPCS		; ISSUE A HOME COMMAND
1737	006124	105777	017510			TSTB	QRPCS		; WAIT FOR DONE
1738	006130	100375				BPL	-4		
1739	006132	032777	100000	017520	4\$:	BIT	#B15,QRPDS		; WAIT FOR UNIT READY
1740	006140	001774				BEQ	4\$		
1741	006142	012767	006024	172632	2\$:	MOV	#ADT32,LAD		; SETUP LOOP
1742	006150	104000				SCOPE			
1743	006152	005767	017566			TST	WORK4		; INC - DEC FLAG
1744	006156	100411				BMI	1\$		
1745	006160	005267	017556			INC	WORK3		; UPDATE LOW COUNT
1746	006164	016767	017550	017504		MOV	WORK2,CYLINDER		
1747	006172	052767	100000	017544		BIS	#B15,WORK4		; SET DECREMENT FLAG
1749	006200	000711				BR	ADT32		
1749	006202	005367	017532		1\$:	DEC	WORK2		; DECREMENT HIGH COUNT
1750	006206	005067	017532			CLR	WORK4		; CLEAR FLAG
1751	006212	016767	017524	017456		MOV	WORK3,CYLINDER		
1752	006220	005767	017514			TST	WORK2		; DONE YET
1753	006224	001277				BNE	ADT32		; BRANCH-NO
1754	006226	032737	002000	177570		BIT	#B10,Q#SWR		; LOOP ON TEST?
1755	006234	001402				BEQ	WRCK		; NO
1756	006236	000167	177366			JMP	RADT3		; YES
1757									
1758						.SBTTL	***** TEST 3 *****		
1759									
1760									; THIS ROUTINE VERIFIES THE WRITE CHECK LOGIC AND
1761									; THE ABILITY OF THE HARDWARE TO FILL THE REMAINDER
1762									; OF A SECTOR WITH ZEROS WHEN A PARTIAL SECTOR
1763									; IS WRITTEN. IN THE WRITE CHECK PORTION A
1764									; FLOATING ONE AND FLOATING ZERO PATTERNS ARE USED
1765									; TO TEST THE COMPARE LOGIC AND TO VERIFY THAT A
1766									; WRITE CHECK ERROR WILL OCCUR.
1767									
1768	006242	012767	000003	017460		WRCK:	MOV #3,TESTNO		
1769	006250	004567	173010				JSR R5,PRINT\$; PRINT MESSAGE
1770	006254	023766					MES6		
1771	006256	016767	017446	173276			MOV TESTNO,TTY		
1772	006264	004767	173066				JSR PC,PRINTS		; TYPE LOCATION-SUPPRESS ZEROS
1773	006270	005067	013454				CLR MEX		; CLEAR EXTENDED MEMORY BITS IN CONTROLER
1774	006274	004767	010410			RWRCK:	JSR PC,INIT		; INITIALIZE
1775	006300	004567	010332				JSR R5,DSKNOS		; SELECT UNIT
1776	006304	005067	017366				CLR CYLINDER		
1777	006310	005067	017364				CLR DMA		
1778	006314	005000					CLR RO		; PATTERN FLAG
1779	006316	012701	000001				MOV #1,R1		; STARTING PATTERN
1780	006322	012767	025762	017356			MOV #0,OUTBUF,BUF		; SETUP OUTPUT BUFFER
1781	006330	012767	000400	017336			MOV #400,WRDCT		; SETUP WORDCOUNT

1782	006336	005002		23\$:	CLR	R2	
1783	006340	010162	025762	1\$:	MOV	R1,OUTBUF,R2)	:GENERATE TEST PATTERN
1784	006344	005722			TST	(R2)+	:UPDATE MODIFIER
1785	006346	022702	000400		CMP	#400,R2	:HAS BUFFER BEEN FILLED?
1786	006352	001372			BNE	1\$:BRANCH IF NO
1787	006354	004567	006622		JSR	R5,FUNCT	:WRITE PATTERN
1788	006360	000003		.WORD	3		
1789	006362	105777	017252		TSTB	2RPCS	:WAIT FOR DONE
1790	006366	100375			BPL	-4	
1791	006370	005777	017244		TST	2RPCS	:ANY DEVICE ERRORS?
1792	006374	100002			BPL	2\$:BRANCH IF NO
1793	006376	104400			HLT		:ERROR AFTER WRITING ONE SECTOR
1794	006400	000475			BR	3\$	
1795	006402	004567	006574	2\$:	JSR	R5,FUNCT	:WRITE CHECK THE DATA
1796	006406	000007		.WORD	7		
1797	006410	105777	017224		TSTB	2RPCS	:WAIT FOR DONE
1798	006414	100375			BPL	-4	
1799	006416	005777	017216		TST	2RPCS	:ANY DEVICE ERRORS?
1800	006422	100012			BPL	4\$:BRANCH IF NO
1801	006424	104400			HLT		:ERROR AFTER WRITE CHECK OPERATION
1802	006426	004567	172632		JSR	R5,PRINT\$:PRINT MESSAGE
1803	006432	024070			MES10		
1804	006434	016767	017322	173120	MOV	OUTBUF,TTY	
1805	006442	004767	172676		JSR	PC,PRINTR	:TYPE LOCATION WITH LEADING ZEROS
1806	006446	000452			BR	3\$	
1807	006450	005700		4\$:	TST	R0	:ARE WE FLOATING A ONE?
1808	006452	001411			BEQ	20\$:BRANCH IF YES
1809	006454	005002			CLR	R2	:FILL BUFFER WITH ONES
1810	006456	012762	177777	025762	21\$:	MOV	#177777,OUTBUF(R2)
1811	006464	005722			TST	(R2)+	
1812	006466	022702	000400		CMP	#400,R2	
1813	006472	001371			BNE	21\$	
1814	006474	000407			BR	22\$	
1815	006476	005002		20\$:	CLR	R2	
1816	006500	005062	025762	5\$:	CLR	OUTBUF(R2)	:CLEAR OUTPUT BUFFER
1817	006504	005722			TST	(R2)+	
1818	006506	022702	000400		CMP	#400,R2	:ENTIRE BUFFER CLEAR?
1819	006512	001372			BNE	5\$:BRANCH IF NO
1820	006514	004567	006462	22\$:	JSR	R5,FUNCT	:WRITE CHECK THE DATA AND
1821	006520	000007		.WORD	7		:EXPECT AN ERROR
1822	006522	105777	017112		TSTB	2RPCS	:WAIT FOR DONE
1823	006526	100375			BPL	-4	
1824	006530	032777	000010	017120	BIT	#83,2RPER	:IS WRITE CHECK ERROR SET?
1825	006536	001011			BNE	6\$:BRANCH IF YES
1826	006540	104400			HLT		:WRITE CHECK ERROR DID NOT SET
1827	006542	004567	172516		JSR	R5.PRINT\$:PRINT MESSAGE
1828	006546	024070			MES10		
1829	006550	010167	173006		MOV	R1,TTY	
1830	006554	004767	172564		JSR	PC,PRINTR	:TYPE LOCATION WITH LEADING ZEROS
1831	006560	000405			BR	3\$	
1832	006562	005777	017052	6\$:	TST	2RPCS	:DID ERROR FLAG SET?
1833	006566	100402			BMI	3\$:BRANCH IF YES
1834	006570	104400			HLT		:ERROR FLAG DID NOT SET AFTER WRITE CHECK ERROR
1835	006572	000400			BR	3\$	
1836	006574	012767	006336	172200	3\$:	MOV	#23\$,LAD
1837	006602	104000			SCOPE		

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1838 006604 005700          TST      RO          ;ARE WE FLOATING A ONE?
1839 006606 001013          BNE     9$          ;BRANCH IF NO
1840 006610 000241          CLC
1841 006612 006101          ROL     R1          ;ROTATE PATTERN
1842 006614 103402          BCS     10$         ;BRANCH IF COMPLETE
1843 006616 000167 177514      JMP     23$
1844 006622 012700 000001      10$:   MOV     #1,RO    ;SET PATTERN FLAG
1845 006626 012701 077777      MOV     #077777,R1  ;SET NEW PATTERN IN R1
1846 006632 000167 177500      JMP     23$
1847 006636 000241          9$:   CLC
1848 006640 006201          ASR     R1          ;ROTATE FLOATING ZERO PATTERN
1849 006642 052701 100000      BIS     #B15,R1
1850 006646 103002          BCC     PATFIL     ;HAS ZERO BEEN FLOATED
1851 006650 000167 177462      JMP     23$        ;JUMP IF NO
1852
1853
1854
1855
1856
1857
1858
1859
1860
1861 006654 012701 025762      PATFIL: MOV    #OUTBUF,R1
1862 006660 012700 177777      MOV    #177777,RO
1863 006664 012702 000400      MOV    #400,R2
1864 006670 010021          1$:   MOV    RO,(R1)+   ;GENERATE ALL ONES PATTERN
1865 006672 005302          DEC    R2
1866 006674 001375          BNE    1$
1867 006676 004567 006300      JSR    R5,FUNCT    ;WRITE SECTOR WITH ONES
1868 006702 000003          .WORD 3
1869 006704 105777 016730      TSTB   @RPCS       ;WAIT FOR DONE
1870 006710 100375          BPL    -4
1871 006712 005777 016722      TST    @RPCS       ;ANY DEVICE ERRORS
1872 006716 100002          BPL    2$          ;BRANCH IF NO
1873 006720 104400          HLT
1874 006722 000473          BR     3$          ;ERROR AFTER WRITING ONE SECTOR ALL :S
1875 006724 012767 000002 016742 2$:   MOV    #2,WRDCT    ;SETUP FOR TWO WORD WRITE
1876 006732 004567 006244      JSR    R5,FUNCT    ;WRITE TWO WORD
1877 006736 000003          .WORD 3
1878 006740 105777 016674      TSTB   @RPCS       ;WAIT FOR DONE
1879 006744 100375          BPL    -4
1880 006746 005777 016666      TST    @RPCS       ;ANY ERRORS?
1881 006752 100002          BPL    4$          ;BRANCH IF NO
1882 006754 104400          HLT
1883 006756 000455          BR     3$          ;ERROR ON ONE WORD WRITE
1884 006760 012767 000400 016706 4$:   MOV    #400,WRDCT  ;SETUP WORD COUNT
1885 006766 004567 006210      JSR    R5,FUNCT    ;READ SECTOR
1886 006772 000005          .WORD 5
1887 006774 105777 016640      TSTB   @RPCS       ;WAIT FOR DONE
1888 007000 100375          BPL    -4
1889 007002 005777 016632      TST    @RPCS       ;ANY ERRORS
1890 007006 100006          BPL    5$          ;BRANCH IF NO
1891 007010 104400          HLT
1892 007012 032777 040000 016620  BIT    #B14,@RPCS  ;ERROR AFTER READING ONE SECTOR
1893 007020 001401          BEQ    5$          ;WAS IT A DATA ERROR?
                        ;BRANCH IF YES

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1894 007022 000433 BR 3$
1895 007024 022767 177777 016730 5$: CMP #177777,OUTBUF ;COMPARE FIRST WORD SHOULD BE ONES
1896 007032 001410 BEQ 6$ ;BRANCH IF OK
1897 007034 012767 177777 010762 MOV #177777,EXPS
1898 007042 016767 016714 010756 MOV OUTBUF,RECS
1899 007050 104401 HLT +1 ;DATA COMPARE ERROR ON FIRST
1900 007052 000417 BR 3$ ;WORD READ
1901 007054 012700 025766 6$: MOV #OUTBUF+4,R0
1902 007060 012701 000374 MOV #374,R1
1903 007064 005720 8$: TST (R0)+ ;REMAINDER OF SECTOR SHOULD BE CLEAR
1904 007066 001003 BNE 7$ ;BRANCH IF NO
1905 007070 005301 DEC R1
1906 007072 001374 BNE 8$
1907 007074 000406 BR 3$
1908 007076 016067 177776 010722 7$: MOV -2(R0),RECS
1909 007104 005067 010714 CLR EXPS
1910 007110 104401 HLT +1 ;DATA FOUND IN AREA OF SECTOR
1911 ;WHICH SHOULD HAVE BEEN CLEARED
1912 ;BY A ONE WORD WRITE
1913 007112 012767 006654 171662 3$: MOV #PATFIL,LAD ;SET UP LOOP ADDR
1914 007120 104000 SCOPE
1915
1916
1917 ;CHECK THE SETTING OF EOP WHEN TRYING TO WRITE BEYOND
1918 ;THE LIMITS OF THE PACK. THE FIRST SECTOR OF THE PACK IS
1919 ;WRITTEN WITH ZEROS. THEN A TWO SECTOR WRITE OF ALL
1920 ;ONE'S IS ISSUED FOR CYLINDER 625, HEAD 23, AND SECTOR 11.
1921 ;EOP AND ERROR BITS SHOULD SET. THE FIRST SECTOR OF THE
1922 ;PACK IS CHECKED TO MAKE SURE IT IS STILL ZERO.
1923
1924 007122 005067 016552 EOPTST: CLR DMA ;CLEAR DISK ADDRESS
1925 007126 005067 016544 CLR CYLINDER
1926 007132 012767 000400 016534 MOV #400,WRDCT ;SET WORDCOUNT TO ONE SECTOR
1927 007140 012767 025762 016540 MOV #OUTBUF,BUF ;SETUP OUTPUT BUFFER
1928 007146 005001 CLR R1
1929 007150 005061 025762 1$: CLR OUTBUF(R1) ;CLEAR THE OUTPUT BUFFER
1930 007154 005721 TST (R1)+
1931 007156 022701 000400 CMP #400,R1
1932 007162 001372 BNE 1$
1933 007164 004567 006012 JSR R5,FUNCT ;WRITE SECTOR ZERO WITH ZEROS
1934 007170 000003 .WORD 3
1935 007172 105777 016442 TSTB @RPCS ;WAIT FOR DONE
1936 007176 100375 BPL -4
1937 007200 005777 016434 TST @RPCS ;ANY DEVICE ERRORS
1938 007204 100002 BPL 2$ ;BRANCH IF NO
1939 007206 104400 HLT ;ERROR AFTER WRITING SECTOR ZERO WITH ZEROS
1940 007210 000502 BR 3$
1941 007212 012767 001000 016454 2$: MOV #1000,WRDCT ;SET WORDCOUNT EQUAL TO TWO SECTORS
1942 007220 012767 000625 016450 MOV #625,CYLINDER ;SELECT CYLINDER 625
1943 007226 012767 000011 016444 MOV #11,DMA ;SELECT RECTOR 11
1944 007234 112767 000023 016437 MOVB #23,DMA+1 ;SELECT HEAD 23
1945 007242 012702 177777 MOV #177777,R2
1946 007246 005001 CLR R1
1947 007250 010261 025762 4$: MOV R2,OUTBUF(R1) ;SET OUTPUT BUFFER TO ONES
1948 007254 005721 TST (R1)+
1949 007256 022701 001000 CMP #1000,R1

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1950	007262	001372			BNE	4\$		
1951	007264	004567	005712		JSR	RS,FUNCT		;ISSUE TWO SECTOR WRITE TO
1952	007270	000003		.WORD	3			;CYLINDER 625, HEAD 23, AND SECTOR 11
1953	007272	105777	016342		TSTB	DRPCS		;WAIT FOR DONE
1954	007276	100375			BPL	.-4		
1955	007300	032777	000002	016350	BIT	#B1,DRPER		;DID EOP ERROR FLAG SET?
1956	007306	001002			BNE	5\$;BRANCH IF SET
1957	007310	104400			HLT			;EOP ERROR FLAG DID NOT SET WHEN
1958	007312	000441			BR	3\$;WRITE OPERATOR EXCEEDS THE PACK
1959	007314	032777	100000	016316	5\$: BIT	#B15,DRPCS		;DID THE ERROR FLAG SET?
1960	007322	001002			BNE	6\$;BRANCH IF SET
1961	007324	104400			HLT			;ERROR DID NOT SET AFTER GENERATING
1962	007326	000433			BR	3\$;EOP
1963	007330	012767	000002	016336	6\$: MOV	#2 WRDCT		
1964	007336	005067	016336		CLR	DMA		;CLEAR THE DISK ADDRESS
1965	007342	005067	016330		CLR	CYLINDER		
1966	007346	004567	005630		JSR	RS,FUNCT		;READ THE FIRST SECTOR OF THE PACK
1967	007352	000005		.WORD	5			;AND EXPECT TO FIND ZEROS
1968	007354	105777	016260		TSTB	DRPCS		;WAIT FOR READY
1969	007360	100375			BPL	.-4		
1970	007362	005777	016252		TST	DRPCS		;WERE THERE ANY ERRORS?
1971	007366	100002			BPL	7\$;BRANCH IF NO
1972	007370	104400			HLT			;ERROR ENCOUNTERED ON 2 WORD READ
1973	007372	000411			BR	3\$;OF FIRST SECTOR ON THE PACK
1974	007374	016767	016362	010424	7\$: MOV	OUTBUF,RECS		;GET FIRST WORD OF BUFFER
1975	007402	005767	010420		TST	RECS		;DOES 1ST SECTOR STILL CONTAIN ZEROS?
1976	007406	001403			BEQ	3\$;BRANCH IF YES
1977	007410	005067	010410		CLR	EXPS		
1978	007414	104401			HLT	+1		;CONTENTS OF THE FIRST SECTOR OF THE
1979								;PACK CHANGED AFTER FORCING EOP
1980								;ERROR, OPERATION PROBABLY
1981								;WRAPPED AROUND.
1982	007416	012767	007122	171356	3\$: MOV	#EOPTST,LAD		
1983	007424	104000			SCOPE			
1984								
1985								
1986								;CHECK THE ABILITY OF THE RP11C TO GENERATE A
1987								;PROGRAM ERROR IF A COMMAND IS ISSUED WHILE THE
1988								;CONTROLLER IS BUSY.
1989								
1990	007426	012777	000001	016204	LOKOUT: MOV	#1,DRPCS		;CLEAR THE CONTROLLER
1991	007434	005067	016236		CLR	CYLINDER		;CLEAR THE DISK ADDRESS
1992	007440	005067	016234		CLR	DMA		
1993	007444	012767	002000	016222	MOV	#2000,WRDCT		;SETUP WORDCOUNT
1994	007452	004567	005524		JSR	RS,FUNCT		;ISSUE A READ COMMAND TO GET THE
1995	007456	000005		.WORD	5			;CONTROLLER BUSY
1996	007460	012700	000100		MOV	#100,RO		
1997	007464	005300		1\$:	DEC	RO		;ALLOW THE OPERATION TO PROCEED AWHILE
1998	007466	001376			BNE	1\$		
1999	007470	112777	000005	016142	MOV	#5 DRPCS		;ISSUE READ COMMAND WHILE BUSY
2000	007476	105777	016136		TSTB	DRPCS		;WAIT FOR DONE
2001	007502	100375			BPL	.-4		
2002	007504	032777	002000	016144	BIT	#B10,DRPER		;DID PROGRAM ERROR SET?
2003	007512	001002			BNE	2\$;BRANCH IF SET
2004	007514	104400			HLT			;PROGRAM ERROR DID NOT SET WHEN A
2005								;READ COMMAND WAS ISSUED WHILE

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2006                                     ;THE DEVICE WAS BUSY
2007 007516 000405                                     BR      3$
2008 007520 032777 100000 016112 2$: BIT      #B15,ARPCS ;DID THE ERROR FLAG SET?
2009 007526 001001                                     BNE     3$ ;BRANCH IF SET
2010 007530 104400                                     HLT
2011                                     ;ERROR FLAG DID NOT SET AFTER
2012 007532 012767 007426 171242 3$: MOV      #LOKOUT,LAD ;PROGRAM ERROR
2013 007540 104000                                     SCOPE
2014
2015
2016                                     ;UNFORMAT THE FIRST SECTOR ON THE PACK. THEN READ IT BACK
2017                                     ;AND VERIFY THAT READ AND WRITE HEADER OPERATIONS WILL
2018                                     ;TRANSFER DATA CORRECTLY. NOW THAT THE HEADER IS MIS FORMATTED.
2019                                     ;ISSUE A WRITE COMMAND TO SECTOR ZERO. THIS SHOULD RESULT
2020                                     ;IN SETTING HEADER NOT FOUND. THEN REFORMAT SECTOR ZERO.
2021
2022 007542 012777 000001 016070 HNFCK: MOV      #1,ARPCS ;CLEAR THE CONTROLLER
2023 007550 005067 016122                                     CLR     CYLINDER ;CLEAR DISK ADDR
2024 007554 005067 016120                                     CLR     DMA
2025 007560 012767 025762 016120 MOV      #OUTBUF,BUF ;SETUP BUFFER ADDR
2026 007566 012700 025762 MOV      #OUTBUF,RO
2027 007572 012720 000001 MOV      #1,(RO)+
2028 007576 012720 000001 MOV      #1,(RO)+
2029 007602 012720 000001 MOV      #1,(RO)+
2030 007606 012767 000003 016060 MOV      #3,WRDCT ;LOAD WORDCOUNT
2031 007614 004567 005362 JSR      RS,FUNCT ;ISSUE WRITE HEADER COMMAND
2032 007620 014003 .WORD 14003 ;TO MISFORMAT SECTOR ZERO
2033 007622 105777 016012 TSTB    ARPCS ;WAIT FOR READY
2034 007626 100375 BPL     -4
2035 007630 005777 016004 TST     ARPCS ;ANY ERRORS?
2036 007634 100002 BPL     1$ ;BRANCH IF NO
2037 007636 104400 HLT ;ERROR AFTER ISSUING A WRITE
2038                                     ;FORMAT COMMAND TO SECTOR ZERO
2039 007640 000440
2040 007642 004567 005334 1$: JSR      RS,FUNCT ;ISSUE READ HEADER COMMAND
2041 007646 014005 .WORD 14005 ;TO SECTOR ZERO
2042 007650 105777 015764 TSTB    ARPCS ;WAIT FOR READY
2043 007654 100375 BPL     -4
2044 007656 005777 015756 TST     ARPCS ;ANY ERRORS?
2045 007662 100005 BPL     3$ ;BRANCH IF NO
2046 007664 104400 HLT ;ERROR WHILE READING THE HEADER
2047                                     ;ON SECTOR ZERO
2048 007666 032777 040000 015744 BIT      #B14,ARPCS ;HARD ERROR?
2049 007674 001022 BNE     2$ ;BRANCH IF YES
2050 007676 012767 000001 010120 3$: MOV      #1,EXP$ ;EXPECTED RESULT
2051 007704 005000 CLR     RO
2052 007706 026760 010112 025762 5$: CMP     EXP$,OUTBUF(RO) ;CHECK DATA READ BACK
2053 007714 001006 BNE     4$ ;BRANCH ON NON COMPARE
2054 007716 062700 000002 ADD     #2,RO ;UPDATE MODIFIER
2055 007722 022700 000006 CMP     #6,RO ;END OF BUFFER?
2056 007726 001367 BNE     5$
2057 007730 000404 BR      2$
2058 007732 016067 025762 010066 4$: MOV      OUTBUF(RO),RECS ;GET BAD DATA
2059 007740 104403 HLT ;DATA DID NOT VERIFY AFTER READING
2060                                     ;THE HEADER OF SECTOR ZERO
2061 007742 012767 007542 171032 2$: MOV      #HNFCK,LAD

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2062	007750	104000				SCOPE			
2063	007752	004567	005224			HNF1: JSR	R5,FUNCT		:ISSUE WRITE TO SACTOR ZERO
2064	007756	000003				.WORD 3			
2065	007760	005000				CLR	RO		
2066	007762	005200				2\$: INC	RO		:TIMEOUT SETTING OF DONE
2067	007764	105777	015650			TSTB	2RPCS		:DID DONE SET
2068	007770	100414				BMI	1\$		
2069	007772	005237	025746			INC	2CYLA		
2070	007776	005237	025746			INC	2CYLA		
2071	010002	005337	025746			DEC	2CYLA		
2072	010006	005337	025746			DEC	2CYLA		
2073	010012	005700				TST	RO		:TIMEOUT?
2074	010014	001362				BNE	2\$:BRANCH IF NO
2075	010016	104400				HLT			:TIMED OUT WHILE WAITING FOR DONE
2076									:AFTER TRYING TO FORCE HEADER NOT FOUND
2077	010020	000427				BR	3\$		
2078	010022	032777	010000	015630	1\$:	BIT	#B12,2RPS		:DID HEADER NOT FOUND SET?
2079	010030	001002				BNE	6\$:BRANCH IF YES
2080	010032	104400				HLT			:HEADER NOT FOUND DID NOT SET
2081	010034	000421				BR	3\$		
2082	010036	032777	040000	015574	6\$:	BIT	#B14,2RPS		:DID HARD ERROR SET?
2083	010044	001002				BNE	4\$:BRANCH IF YES
2084	010046	104400				HLT			:HARD ERROR NOT SET AFTER HNF
2085	010050	000413				BR	3\$		
2086	010052	032777	100000	015560	4\$:	BIT	#B15,2RPS		:DID THE ERROR BIT SET?
2087	010060	001002				BNE	5\$:BRANCH IF YES
2088	010062	104400				HLT			:ERROR DID NOT SET AFTER HNF
2089	010064	000405				BR	3\$		
2090	010066	032777	000001	015562	5\$:	BIT	#B0,2RPER		:DID DISK ERROR SET?
2091	010074	001001				BNE	3\$:BRANCH IF YES
2092	010076	104400				HLT			:DISK ERROR DID NOT SET AFTER HNF
2093	010100	012767	007752	170674	3\$:	MOV	#HNF1,LAD		
2094	010106	104000				SCOPE			
2095	010110	005000				HNF2: CLR	RO		
2096	010112	005060	025762			1\$: CLR	OUTBUF(RO)		:CLEAR BUFFER
2097	010116	062700	000002			ADD	#2,RO		:UPDATE MODIFIER
2098	010122	022700	000006			CMP	#6,RO		:ENTIRE BUFFER CLEARED?
2099	010126	001371				BNE	1\$:BRANCH IF NO
2100	010130	012767	000003	015536		MOV	#3,WRDCT		:LOAD WORD COUNT
2101	010136	004567	005040			JSR	R5,FUNCT		:ISSUE WRITE HEADER COMMAND
2102	010142	014003				.WORD 14003			
2103	010144	105777	015470			TSTB	2RPCS		:WAIT FOR READY
2104	010150	100375				BPL	-4		
2105	010152	005777	015462			TST	2RPCS		:ANY ERRORS?
2106	010156	100001				BPL	2\$		
2107	010160	104400				HLT			:ERROR WHILE TRYING TO FORMAT SECTOR ZERO
2108	010162	012767	010110	170612	2\$:	MOV	#HNF2,LAD		
2109	010170	104000				SCOPE			
2110									
2111									:ISSUE A SEEK COMMAND AND WAIT FOR DONE TO SET. THEN ISSUE A WRITE
2112									:COMMAND WHILE THE HEADS ARE STILL MOVING. THE RP11C SHOULD
2113									:HOLD THE WRITE COMMAND TILL THE SEEK IS COMPLETE.
2114									
2115	010172	012777	000001	015440	SKTST:	MOV	#1,2RPCS		:CLEAR THE CONTROLLER
2116	010200	004567	006432			JSR	R5,DSKNOS		:SELECT THE UNIT
2117	010204	005077	015440			CLR	2RPSA		:CLEAR THE CYLINDER ADDR REGISTER

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2118 010210 005077 015436 CLR JRPDA ;CLEAR THE DISK ADDR REGISTER
2119 010214 112777 000011 015416 MOVB #11, JRPCS ;ISSUE A SEEK TO ZERO
2120 010222 105777 015412 TSTB JRPCS ;WAIT FOR DONE
2121 010226 100375 BPL .-4
2122 010230 032777 100000 015422 1$: BIT #B15, JRPDS ;WAIT FOR UNIT READY
2123 010236 001774 BEQ 1$
2124 010240 012777 000300 015402 MOV #300, JRPCA ;SELECT CYLINDER 300
2125 010246 112777 000011 015364 MOVB #11, JRPCS ;ISSUE SEEK TO CYLINDER 300
2126 010254 105777 015360 TSTB JRPCS ;WAIT FOR DONE
2127 010260 100375 BPL .-4
2128 010262 012777 177777 015354 MOV #1, JRPWC ;SETUP WORD COUNT
2129 010270 112777 000003 015342 MOVB #3, JRPCS ;ISSUE A WRITE WHILE HEADS ARE MOVING
2130 010276 105777 015336 TSTB JRPCS ;WAIT FOR DONE
2131 010302 100375 BPL .-4
2132 010304 005777 015330 TST JRPCS ;ANY ERRORS?
2133 010310 100001 BPL 2$ ;BRANCH IF NO
2134 010312 104400 HLT ;ERROR FOUND AFTER ISSUING A WRITE
2135 ;COMMAND WHILE THE HEADS ARE STILL
2136 ;MOVING AFTER A SEEK.
2137 010314 032777 004000 015336 2$: BIT #B11, JRPDS ;SEEK INCOMPLETE ERROR?
2138 010322 001412 BEQ 3$ ;BRANCH IF NO
2139 010324 112777 000015 015306 MOVB #15, JRPCS ;ISSUE A HOME COMMAND
2140 010332 105777 015302 TSTB JRPCS ;WAIT FOR DONE
2141 010336 100375 BPL .-4
2142 010340 032777 100000 015312 4$: BIT #B15, JRPDS ;WAIT FOR UNIT READY
2143 010346 001774 BEQ 4$
2144 010350 012767 010172 170424 3$: MOV #SKTST, LAD
2145 010356 104000 SCOPE
2146
2147 ;CHECK THE ABILITY OF CLEAR TO TERMINATE AN OPERATION
2148 ;AND SET READY.
2149
2150 010360 004567 006252 CLRTST: JSR R5, DSKNOS ;SELECT THE UNIT
2151 010364 005067 015310 CLR DMA ;CLEAR DISK ADDR
2152 010370 005067 015302 CLR CYLINDER
2153 010374 012767 000001 015272 MOV #1, WRDCT ;SETUP WORD COUNT
2154 010402 012767 025762 015276 MOV #OUTBUF, BUF ;SETUP BUFFER ADDR
2155 010410 004567 004566 JSR R5, FUNCT ;ISSUE A WRITE COMMAND
2156 010414 000003 .WORD 3
2157 010416 012700 000100 MOV #100, R0
2158 010422 005300 1$: DEC R0 ;WAIT A WHILE THEN ISSUE A
2159 010424 001376 BNE 1$ ;CLEAR COMMAND
2160 010426 112777 000001 015204 MOVB #1, JRPCS ;CLEAR THE CONTROLLER
2161 010434 105777 015200 TSTB JRPCS ;IS READY SET?
2162 010440 100401 BMI 2$ ;BRANCH IF YES
2163 010442 104400 HLT ;READY DID NOT SET AFTER ISSUING
2164 ;A CLEAR COMMAND DURING A WRITE.
2165 010444 000005 2$: RESET
2166 010446 032767 000100 015210 BIT #B6, FLAG ;TEST FOR MEM. MGR.
2167 010454 001002 BNE 3$ ;BRANCH MEM. MGR IS OFF
2168 010456 005237 177572 INC #SRO ;TURN ON MEM. MGR.
2169 010462 012767 010360 170312 3$: MOV #CLRTST, LAD
2170 010470 104000 SCOPE
2171 010472 016767 015166 015234 MOV FLAG, WORK ;GET UNIT NUMBER
2172 010500 000241 CLC
2173 010502 006067 015226 ROR WORK

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2174	010506	006067	015222		ROR	WORK	
2175	010512	000367	015216		SWAB	WORK	:JUSTIFY UNIT NUMBER
2176	010516	042767	174377	015210	BIC	#174377,WORK	:CLEAR UNWANTED BITS
2177	010524	016777	015204	015106	MOV	WORK, @RPCS	:LOAD UNIT NUMBER
2178	010532	005777	015122		TST	@RPS	:WAIT FOR UNIT READY
2179	010535	100375			BPL	.-4	
2180	010540	032737	002000	177570	BIT	#B10, @SWR	:LOOP ON TEST?
2181	010546	001402			BEG	MEMTST	:BRANCH IF NO
2182	010550	000167	175520		JMP	RWRCK	

.SBTTL ***** TEST 4 *****

: THIS ROUTINE CONSIST OF TWO SEGMENTS. THE FIRST
: PART TEST THE ACCESSIBILITY OF MEMORY WITHOUT
: UTILIZING MEMORY MANAGEMENT. EACH LOCATION
: FROM THE END OF THE PROGRAM TO THE TOP OF MEMORY
: (NOT TO EXCEED 28K) IS WRITTEN WITH ITS ADDR. THIS
: DATA IS THEN WRITTEN ON THE DISK. THE BUFFER IS
: CLEARED AND THE DATA IS READ BACK AND VERIFIED.
: IN PART TWO, THE EXTENDED ADDRESS BITS ARE TESTED.

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010554 012767 000004 015146
010562 004567 170476
010566 023766
010570 016767 015134 170764
010576 004767 170554
010602 012767 177700 015110
010610 032767 000500 015076
010616 001003
010620 012767 177750 015072
010626 005067 011116
010632 004767 006052
010636 032767 000100 015020
010644 001520
010646 016700 011074
010652 162700 025762
010656 000241
010660 006000
010662 042700 000001
010666 010067 015002
010672 012702 025762
010676 012703 025762
010702 010322
010704 005723
010706 020267 011034
010712 101773
010714 012767 025762 014764
010722 005067 014752
010726 005067 014744
010732 004567 004244
010736 000003
010740 105777 014674
010744 100375
010746 005777 014666
010752 100002
010754 104400
010756 000446
010760 016700 014710
010764 012701 025762
010770 005021
010772 005300
010774 001375
010776 004567 004200
011002 000005
011004 105777 014630
011010 100375

MEMTST: MOV #4,TESTNO
JSR RS,PRINT\$;PRINT MESSAGE
MES6
MOV TESTNO,TTY
JSR PC,PRINT\$;TYPE LOCATION-SUPPRESS ZEROS
MOV #100,PASSC ;SETUP ITERATION COUNT NO MEM. MANAG.
BIT #500,FLAG ;BK WITH MEM. MANAG. OR NO MEM. MANAG.?
BNE IS ;BR IF TRUE
MOV #30,PASSC ;IF MEMORY MANAGEMENT DO ONLY 24 PASSES
IS: CLR MEX ;CLEAR DRIVE EXTENDED MEMORY BITS
RMENT: JSR PC,INIT ;INITIALIZE
BIT #86,FLAG ;MEMORY MANAGEMENT?
BEQ RMMEMT ;YES GO DO MEMORY MANAGEMENT TEST
MEM9K: MOV MEMSIZ,R0 ;GET TOP OF CORE
SUB #OUTBUF,R0 ;DETERMINE SIZE OF BUFFER IN BYTES
CLC
ROR R0 ;CONVERT TO WORDS
BIC #1,R0 ;KEEP NUMBER EVEN
MOV R0,WRDCT ;SAVE WORD COUNT OF TRANSFER
7\$: MOV #OUTBUF,R2
MOV #OUTBUF,R3 ;GENERATE A PATTERN SO THAT EACH
IS: MOV R3,(R2)+ ;LOCATION CONTAINS ITS ADDRESS
TST (R3)+
CMP R2,MEMSIZ ;HAS ENTIRE PATTERN BEEN GENERATED?
BLOS IS ;BRANCH IF NO
MOV #OUTBUF,BUF ;SET UP BUFFER ADDR
CLR DMA
CLR CYLINDER
JSR RS,FUNCT ;WRITE ADDRESS PATTERN
.WORD 3
TSTB #RPCS ;WAIT FOR DONE
BPL -4
TST #RPCS ;ANY ERRORS?
BPL 2\$;BRANCH IF NO
HLT ;ERROR AFTER WRITING ADDR PATTERN
BR 3\$
2\$: MOV WRDCT,R0
MOV #OUTBUF,R1
10\$: CLR (R1)+ ;CLEAR THE BUFFER
DEC R0
BNE 10\$
JSR RS,FUNCT ;READ ADDRESS PATTERN
.WORD 5
TSTB #RPCS ;WAIT FOR DONE
BPL -4

2239	011012	005777	014622		TST	DRPCS		: ANY ERRORS?
2240	011016	100006			BPL	4S		: BRANCH IF NO
2241	011020	104400			HLT			: ERROR AFTER READING ADDR PATTERN
2242	011022	032777	040000	014610	BIT	#B14, DRPCS		: IS THIS A DATA ERROR?
2243	011030	001401			BEQ	4S		: BRANCH IF YES
2244	011032	000420			BR	3S		
2245	011034	012702	025762	4S:	MOV	#OUTBUF, R2		
2246	011040	010203			MOV	R2, R3		: COMPARE THE ADDR PATTERN
2247	011042	020322		6S:	CMP	R3, (R2)+		: IS DATA CORRECT?
2248	011044	001005			BNE	5S		: BRANCH IF NO
2249	011046	005723			TST	(R3)+		
2250	011050	020267	010672		CMP	R2, MEMSIZ		: IS ENTIRE BUFFER VERIFIED?
2251	011054	101772			BLOS	6S		: BRANCH IF NO
2252	011056	000406			BR	3S		
2253	011060	010367	006740	5S:	MOV	R3, EXPS		
2254	011064	016267	17777E	006734	MOV	-2(R2), RECS		
2255	011072	104401			HLT	+1		: COMPARE ERROR UTILIZING ADDR PATTERN
2256	011074	012767	010672	167700	MOV	#7S, LAD	3S:	: SETUP LOOP ADDR
2257	011102	104000			SCOPE			
2258	011104	000527			BR	NONEX		: GO DO REST OF TEST
2259								
2260								: THIS PORTION IS FOR MEMORY MANAGEMENT
2261								
2262	011106	032767	000400	014550	RMMEMT: BIT	#B8, FLAG		: BK MACHINE?
2263	011114	001254			BNE	MEMBK		: BR IF YES
2264	011116	004767	010660		JSR	PC, PARINT		: INITIALIZE KIPARS
2265	011122	004767	010744	1S:	JSR	PC, PARINC		: INCREMENT KIPARS
2266	011126	004767	010770		JSR	PC, PARREG		: GENERATE "MEX" "BUF" "WRDCT"
2267	011132	012700	040000	5S:	MOV	#40000, R0		: STARTING ADDRESS OF BUFFER
2268	011136	016701	014532		MOV	WRDCT, R1		: GET BUFFER SIZE
2269	011142	010010		2S:	MOV	R0, (R0)		: MOVE ADDRESS TO LOCATION
2270	011144	005720			TST	(R0)+		: BUMP LOCATION
2271	011146	005301			DEC	R1		: DONE?
2272	011150	001374			BNE	2S		: BR IF NO
2273	011152	005067	014522		CLR	DMA		
2274	011156	005067	014514		CLR	CYLINDER		
2275	011162	004567	004014		JSR	R5, FUNCT		: WRITER ADDRESS PATTERN
2276	011166	000003		.WORD	3			
2277	011170	105777	014444		TSTB	DRPCS		: WAIT FOR DONE
2278	011174	100375			BPL	-4		
2279	011176	005777	014436		TST	DRPCS		: ANY ERRORS?
2280	011202	100005			BPL	3S		: BR IF NO
2281	011204	104400			HLT			: ERROR WRITTING ADDRESS PATTERN
2282	011206	012767	011132	167566	MOV	#5S, LAD		: SETUP LOOP ADDRESS
2283	011214	104000			SCOPE			
2284	011216	012700	040000	3S:	MOV	#40000, R0		: START OF BUFFER
2285	011222	016701	014446		MOV	WRDCT, R1		: BUFFER SIZE
2286	011226	005020		4S:	CLR	(R0)+		: CLEAR BUFFER
2287	011230	005301			DEC	R1		: DONE?
2288	011232	001375			BNE	4S		: BR IF NO
2289	011234	004567	003742	6S:	JSR	R5, FUNCT		: READ THE ADDRESS PATTERN
2290	011240	000005		.WORD	5			
2291	011242	105777	014372		TSTB	DRPCS		: WAIT FOR DONE
2292	011246	100375			BPL	-4		
2293	011250	005777	014364		TST	DRPCS		: ANY ERRORS
2294	011254	100011			BPL	7S		: BR IF NO


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2295 011256 104400          HLT          ;DISK ERROR
2296 011260 032777 040000 014352  BIT          #B14,DRPCS ;DATA ERROR?
2297 011266 001404          BEQ          7$      ;BR IF YES
2298 011270 012767 011234 167504  MOV          #B$,LAD ;SETUP LOOP ADDRESS
2299 011276 104000          SCOPE
2300 011300 012700 040000      7$: MOV          #40000,R0 ;START OF BUFFER
2301 011304 016701 014364      MOV          WRDCT,R1 ;BUFFER SIZE
2302 011310 010002      9$: MOV          R0,R2
2303 011312 022002          CMP          (R0)+,R2 ;DATA GOOD?
2304 011314 001004          BNE          8$      ;BR IF DATA NO GOOD
2305 011316 005722          TST          (R2)+
2306 011320 005301          DEC          R1      ;DONE?
2307 011322 001372          BNE          9$      ;BR IF NO
2308 011324 000413          BR          10$     ;CONTINUE THE TST
2309 011326 010267 006472      8$: MOV          R2,EXPS
2310 011332 014067 006470      MOV          -(R0),RECS
2311 011336 104405          HLT          +$      ;DATA COMPARE ERROR
2312 011340 012767 011310 167434  MOV          #9$,LAD ;SETUP LOOP ADDRESS
2313 011346 104000          SCOPE
2314 011350 005720          TST          (R0)+ ;TEST REST OF BUFFER
2315 011352 000756          BR          9$      ;TEST MORE
2316 011354 032767 001000 014302 10$: BIT          #B9,FLAG ;LAST PAGE?
2317 011362 001657          BEQ          1$      ;BR IF NO
2318          ;CHECK THE SETTING OF NON EXISTENT MEMORY FLAG IN RPER.
2319
2320 011364 032767 000100 014272  NONEX: BIT          #B6,FLAG ;IS MEMORY MANAGEMENT ON?
2321 011372 001002          BNE          4$      ;BR IF NOT ON
2322 011374 005037 177572          CLR          #SR0   ;IF ON TURN OFF
2323 011400 012767 000001 014266  4$: MOV          #1,WRDCT ;SETUP WORD COUNT
2324 011406 012767 160000 014272  MOV          #160000,BUF ;LOAD ADDR TO FORCE NON EX MEMORY
2325 011414 004567 003562          JSR          R5,FUNCT ;ISSUE A WRITE COMMAND AND
2326 011420 000063          .WORD      63      ;EXPECT NON EX MEMORY
2327 011422 105777 014212          TSTB         DRPCS  ;WAIT FOR READY
2328 011426 100375          BPL          -4
2329 011430 032777 000004 014220  BIT          #B2,DRPER ;DID NON EX MEMORY SET
2330 011436 001002          BNE          1$      ;BRANCH IF SET
2331 011440 104400          HLT          ;NON EX MEMORY DID NOT SET
2332 011442 000413          BR          2$
2333 011444 032777 040000 014166 1$: BIT          #B14,DRPCS ;DID HARD ERROR SET ON NON EX MEMORY
2334 011452 001002          BNE          3$      ;BRANCH IF SET
2335 011454 104400          HLT          ;HARD ERROR DID NOT SET
2336 011456 000405          BR          2$
2337 011460 032777 100000 014152 3$: BIT          #B15,DRPCS ;DID THE ERROR FLAG SET AFTER NON EX MEMORY
2338 011466 001001          BNE          2$      ;BRANCH IF SET
2339 011470 104400          HLT          ;ERROR FLAG DID NOT SET
2340 011472 012767 011400 167302 2$: MOV          #4$,LAD
2341 011500 104000          SCOPE
2342
2343          ;IF MEMORY MANAGEMENT IS AVAILABLE CHECK THE EXTENDED MEMORY ADDRESS
2344          ;BITS.
2345
2346 011502 012737 012310 000004  EXTST: MOV          #EXTTRP,#ERRVEC ;SETUP TIMEOUT TRAP
2347 011510 012737 000340 000006  MOV          #PRI7,#ERRVEC+2
2348 011516 005737 177572          TST          #SR0   ;IF MEMORY MANAGEMENT IS NOT
2349          ;AVAILABLE THE PROGRAM WILL TRAP
2350          ;AND TRANSFER TO END OF THE TEST

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2351	011522	012737	007600	172356	MOV	#7600,2#KIPAR7	:OPEN I/O REGISTERS
2352	011530	005037	172340	CLR	2#KIPAR0	:FREE FIRST 4K	
2353	011534	012737	000200	172342	MOV	#200,2#KIPAR1	:ENABLE SECOND 4K
2354	011542	012737	004000	172344	MOV	#4000,2#KIPAR2	
2355	011550	012737	177406	172300	MOV	#400*256.-400+UP+RW,2#KIPDR0	:SET KIPDR0=RW UP 400 BLOCKS
2356	011556	012737	177406	172302	MOV	#400*256.-400+UP+RW,2#KIPDR1	:SET KIPDR1=RW UP 400 BLOCKS
2357	011564	012737	177406	172304	MOV	#400*256.-400+UP+RW,2#KIPDR2	:SET KIPDR2=RW UP 400 BLOCKS
2358	011572	012737	177406	172316	MOV	#400*256.-400+UP+RW,2#KIPDR7	:SET KIPDR7=RW UP 400 BLOCKS
2359	011600	012702	040000	MOV	#40000,R2	:R2 GETS BASE ADDRESS	
2360	011604	012737	000001	177572	MOV	#1,2#SRO	:TURN ON MEMORY MANAGEMENT
2361	011612	005712		TST	(R2)	:CHECK IF ENOUGH MEMORY EXISTS TO ALLOW	
2362						:TESTING OF THE EXTENDED ADDRESS BITS	
2363						:IN THE RP11C. IF NOT ENOUGH MEMORY	
2364						:EXISTS, A TIME-OUT TRAP WILL OCCUR AND	
2365						:TRANSFER CONTROL TO THE END OF THIS	
2366						:TEST.	
2367	011614	012737	002000	172344	MOV	#2000,2#KIPAR2	:SET UP FOR THE EXTENDED ADDRESS TESTS
2368	011622	012737	012274	000004	MOV	#EXTRP,2#ERRVEC	:RESTORE TIME-OUT TRAP VECTOR
2369	011630	012712	177777	7\$:	MOV	#177777,(R2)	:INSERT PATTERN INTO 200000
2370	011634	012767	000002	014032	MOV	#2,WORDCT	:SETUP WORDCOUNT
2371	011642	005067	010102		CLR	MEX	:CLEAR EXTENDED MEMORY BITS FOR CONTROLER
2372	011646	012767	177777	014032	MOV	#177777,BJF	:SETUP BUS ADDR
2373	011654	004567	003322		JSR	RS,FUNCT	:WRITE TWO WORDS ON DISK. RPBA
2374	011660	000003		.WORD	3		:STARTS AT 177777 TO FORCE CARRY
2375							:TO SET MEX0
2376	011662	105777	013752		TSTB	2RPCS	:WAIT FOR READY
2377	011666	100375			BPL	.-4	
2378	011670	005777	013744		TST	2RPCS	
2379	011674	100002			BPL	1\$	
2380	011676	104400			HLT		:STATUS ERROR AFTER 2 WORD WRITE
2381	011700	000447			BR	2\$:USING MEX0
2382	011702	032777	000020	013730	1\$:	BIT #B4,2RPCS	:MEX0 SHOULD HAVE SET?
2383	011710	001002			BNE	3\$:BRANCH IF SET
2384	011712	104400			HLT		:MEX0 DID NOT SET
2385	011714	000441			BR	2\$	
2386	011716	005012		3\$:	CLR	(R2)	:CLEAR LOCATION 200000
2387	011720	004567	003256		JSR	RS,FUNCT	:READ TWO WORDS INTO LOCATIONS
2388	011724	000005		.WORD	5		:177777 AND 200000.
2389	011726	105777	013706		TSTB	2RPCS	:WAIT FOR READY
2390	011732	100375			BPL	.-4	
2391	011734	005777	013700		TST	2RPCS	:ANY ERRORS?
2392	011740	100002			BPL	4\$:BRANCH IF NO
2393	011742	104400			HLT		:ERROR OFTER READING 2 WORDS
2394	011744	000425			BR	2\$	
2395	011746	032777	000020	013664	4\$:	BIT #B4,2RPCS	:DID MEX0 SET?
2396	011754	001002			BNE	5\$:BRANCH IF YES
2397	011756	104400			HLT		:MEX0 DID NOT SET AFTER 2 WORD
2398	011760	000417			BR	2\$:READ STARTING AT 177777
2399	011762	022712	177777	5\$:	CMP	#177777,(R2)	:WAS DATA READ INTO LOCATION
2400	011766	001407			BEQ	6\$:200000 CORRECTLY? - BRANCH IF YES
2401	011770	012767	177777	006026	MOV	#177777,EXPS	
2402	011776	011267	006024		MOV	(R2),RECS	
2403	012002	104401			HLT	+1	:DATA COMPARE ERROR AT 200000
2404	012004	000405			BR	2\$:IF RECEIVED=0 - LOCATION WASN'T ACCESSED
2405	012006	032777	000040	013624	6\$:	BIT #B5,2RPCS	:MEX1 SHOULD BE CLEAR
2406	012014	001401			BEQ	2\$:BRANCH IF CLEAR

2407	012016	104400				HLT			:MEX1 IS SET - SHOULD NOT BE
2408	012020	012767	011630	166754	2\$:	MOV	#7\$,LAD		:SETUP ERROR LOOP
2409	012026	104000				SCOPE			
2410	012030	012737	004000	172344	EXTT1:	MOV	#4000, @#KIPAR2		
2411	012036	012702	040000			MOV	#40000, R2		:R2 EQUALS THE BASE ADDR
2412	012042	012712	177777		7\$:	MOV	#177777, (R2)		:INSERT PATTERN INTO 400000
2413	012046	012767	177777	013632		MOV	#177777, BUF		:SETUP BUS ADDR
2414	012054	004567	003122			JSR	R5, FUNCT		
2415	012060	000023			.WORD	23			
2416	012062	105777	013552			TSTB	@RPCS		:WAIT FOR READY
2417	012066	100375				BPL	-4		
2418	012070	005777	013544			TST	@RPCS		:ANY ERRORS?
2419	012074	100002				BPL	4\$:BRANCH IF NO
2420	012076	104400				HLT			
2421	012100	000455				BR	2\$:ERROR AFTER READING 2 WORDS
2422	012102	032777	000020	013530	4\$:	BIT	#B4, @RPCS		:DID MEX0 CLEAR?
2423	012110	001402				BEQ	5\$:BRANCH IF YES
2424	012112	104400				HLT			:MEX0 DID NOT CLEAR AFTER 2 WORD
2425	012114	000447				BR	2\$:READ STARTING AT 377777
2426	012116	032777	000040	013514	5\$:	BIT	#B5, @RPCS		:DID MEX1 SET?
2427	012124	001002				BNE	10\$:BRANCH IF YES
2428	012126	104400				HLT			:MEX1 DID NOT SET WITH A TWO WORD
2429									:TRANSFER STARTING AT 377777
2430	012130	000441				BR	2\$		
2431	012132	005012			10\$:	CLR	(R2)		:CLEAR LOCATION 400000
2432	012134	004567	003042			JSR	R5, FUNCT		:READ TWO WORDS STARTING AT 377777
2433	012140	000025			.WORD	25			
2434	012142	105777	013472			TSTB	@RPCS		:WAIT FOR READY
2435	012146	100375				BPL	-4		
2436	012150	005777	013464			TST	@RPCS		:ANY ERRORS?
2437	012154	100002				BPL	11\$:BRANCH IF NO
2438	012156	104400				HLT			:ERROR WHILE READING TWO WORDS
2439	012160	000425				BR	2\$		
2440	012162	032777	000020	013450	11\$:	BIT	#B4, @RPCS		:DID MEX0 CLEAR?
2441	012170	001402				BEQ	12\$:BRANCH IF YES
2442	012172	104400				HLT			:MEX0 DID NOT CLEAR AFTER 2 WORD
2443	012174	000417				BR	2\$:READ STARTING AT 377777
2444	012176	022712	177777		12\$:	CMP	#177777, (R2)		:WAS DATA READ INTO LOCATION 400000
2445	012202	001407				BEQ	6\$:CORRECTLY? - BRANCH IF YES
2446	012204	012767	177777	005612		MOV	#177777, EXPS		
2447	012212	011267	005610			MOV	(R2), RECS		
2448	012216	104401				HLT	+1		:DATA COMPARE ERROR AT 400000 IF
2449	012220	000405				BR	2\$:RECEIVED=0 - LOCATION WASN'T ACCESSED
2450	012222	032777	000040	013410	6\$:	BIT	#B5, @RPCS		:DID MEX1 SET?
2451	012230	001001				BNE	2\$		
2452	012232	104400				HLT			:MEX1 DID NOT SET AFTER 2 WORD TRANSFER
2453									:STARTING AT 377777
2454	012234	012767	012042	166540	2\$:	MOV	#7\$,LAD		:SETUP ERROR LOOP
2455	012242	104000				SCOPE			
2456	012244	000413				BR	EXTRP		:CLEAR MEMORY MANAGEMENT
2457	012246	005267	013446		EXTEND:	INC	PASSC		:INCREMENT ITERATION COUNT
2458	012252	001402				BEQ	1\$		
2459	012254	000167	176352			JMP	RMENT		
2460	012260	032737	002000	177570	1\$:	BIT	#B10, @#SWR		:LOOP ON TEST?
2461	012266	001420				BEQ	DATA		
2462	012270	000167	176336			JMP	RMENT		

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2463
2464 012274 032767 000100 013362 EXTRP: BIT #B6,FLAG ;USING MEMORY MANAGEMENT?
2465 012302 001402 BEQ EXTRP ;BR IF YES
2466 012304 005037 177572 CLR #SRO ;NO TURN IT OFF
2467 012310 012706 000500 EXTTRP: MOV #STKPTR,SP ;RESTORE STACK
2468 012314 012767 000006 165462 MOV #6,4
2469 012322 005067 165460 CLR 6
2470 012326 000747 BR EXTEND
2471 .SBTTL ***** TEST 5 *****
2472
2473 ;WRITE WRITE CHECK, AND READ OPERATIONS ARE PERFORMED ON THE DRIVE
2474 ;THE DATA IS FIRST WRITTEN AND THEN WRITE CHECKED. THEN THE DATA
2475 ;IS READ. IF THE DATA IS TO BE COMPARED, THE INPUT BUFFER IS CLEARED
2476 ;RIGHT AFTER READ IS ISSUED. THEN THE DATA IS COMPARED WHILE READ
2477 ;IS IN PROGRESS. THIS IS DONE TO IMPROVE EFFICIENCY. THIS SEQUENCE
2478 ;IS REPEATED FOR THE ENTIRE PACK SURFACE FOR EACH OF THE 22 PATTERNS.
2479 ;ERRORS OCCURING USING RANDOM SEEKS DURING THE WRITE CHECK OR ARE
2480 ;RECOVERABLE AFTER FIRST RETRY DURING READ OR ARE ELIMINATED BY
2481 ;DISABLING RANDOM SEEKS ARE PROBABLY DUE TO VIBRATING HEADS
2482 ;AFTER A SEEK.
2483
2484 012330 012767 000005 013372 DATAT: MOV #5,TESTNO
2485 012336 004567 166722 JSR RS,PRINT$ ;PRINT MESSAGE
2486 012342 023766 MES6
2487 012344 016767 013360 167210 MOV TESTNO,TTY
2488 012352 004767 167000 JSR PC,PRINT$ ;TYPE LOCATION-SUPPRESS ZEROS
2489 012356 005067 013372 CLR CNTA ;INITIALIZE READ COUNTER
2490 012362 005067 007362 CLR MEX ;CLEAR EXTENDED MEMORY BITS IN CONTROLLER
2491 012366 016700 013312 RDATAT: MOV PATNU,RO ;GET PATTERN NO.
2492 012372 000241 CLC
2493 012374 006000 ROR RO
2494 012376 010037 177570 MOV RO,#SWR ;DISPLAY PATTERN NO. IN USE
2495 012402 005067 013270 CLR CYLINDER
2496 012406 005067 013266 CLR DMA
2497 012412 012737 000200 177776 MOV #PRI4,#PSW ;ENABLE INT SYSTEM
2498 012420 016767 013264 013246 MOV SWRDCT,WRDCT
2499 012426 012777 015272 013200 MOV #DKINT,#VECTOR ;SETUP DISK VECTOR
2500 012434 012777 000340 013174 MOV #340,#STATUS
2501 012442 032767 000500 013214 BIT #500,FLAG ;BK WITH MEM. MANAG. OR NO MEM. MANAG
2502 012450 001006 BNE DATP ;BR IF TRUE
2503 012452 004767 007324 JSR PC,PARINT ;INITIALIZE KIPARS
2504 012456 000240 NOP
2505 012460 000240 NOP ;NEEDED FOR CONFORMITY
2506 012462 004767 007434 JSR PC,PARREG ;SETUP "MEX","WRDCT","BUF"
2507 012466 004767 004414 DATP: JSR PC,PASEL ;GENERATE PATTERN
2508 012472 032767 000500 013164 BIT #500,FLAG ;BK MEM. MANAG. OR NO MEM. MANAG?
2509 012500 001403 BEQ 1$ ;BR IF NOT TRUE
2510 012502 012767 025762 013176 MOV #OUTBUF,BUF ;SETUP BUFFER ADDR
2511 012510 032767 040000 013146 1$: BIT #B14,FLAG ;WRITE?
2512 012516 001426 BEQ WRICK ;BRANCH IF NO
2513 012520 004767 003444 LDAT: JSR PC,OPSEL ;ANY OPERATOR ADDR PARAMETERS?
2514 012524 004767 003136 JSR PC,SEEK ;GO DO A RANDOM SEEK
2515 012530 004567 002446 JSR RS,FUNCT ;WRITE WITH INTERRUPTS
2516 012534 000103 .WORD 103
2517 012536 032737 010000 177570 BIT #B12,#SWR ;DETERMINE HOW TO WAIT FOR INT
2518 012544 001003 BNE 1$

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2519 012546 004767 007514 JSR PC,NPR ;GENERATE WORSE CASE NPR CYCLES
2520 012552 000401 BR 2$
2521 012554 000001 1$: WAIT
2522 012556 012767 012520 166216 2$: MOV #LDAT,LAD ;SETUP LOOP ADDR
2523 012564 104000 SCOPE
2524 012566 004767 003434 JSR PC,DISBUF ;PREPARE NEW DISK ADDR
2525 012572 000752 BR LDAT
2526 012574 032767 020000 013062 WRICK: BIT #B13,FLAG ;WRITE CHECK?
2527 012602 001424 BEQ DREAD ;BRANCH IF NO
2528 012604 004767 003360 3$: JSR PC,OPDSEL ;ANY OPERATOR ADDR PARAMETERS?
2529 012610 004567 002366 JSR RS,FUNCT ;WRITE CHECK THE DATA
2530 012614 000107 .WORD 107
2531 012616 032737 010000 177570 BIT #B12,2$SWR ;DETERMINE HOW TO WAIT FOR INT
2532 012624 001003 BNE 1$
2533 012626 004767 007434 JSR PC,NPR ;GENERATE WORSE CASE NPR CYCLES
2534 012632 000401 BR 2$
2535 012634 000001 1$: WAIT
2536 012636 012767 012604 166136 2$: MOV #3$,LAD ;SETUP LOOP ADDR
2537 012644 104000 SCOPE
2538 012646 004767 003354 JSR PC,DISBUF ;PREPARE NEW DISK ADDR
2539 012652 000754 BR 3$
2540 012654 032767 010000 013002 DREAD: BIT #B12,FLAG ;READ?
2541 012662 001002 BNE 1$ ;BRANCH IF YES
2542 012664 000167 000444 JMP MSTR ;GET AROUND READ
2543 012670 032767 000500 012766 1$: BIT #500,FLAG ;BK WITH MEM MANAG. OR NO MEM MANAG.
2544 012676 001006 BNE READ1 ;BR IF TRUE
2545 012700 004767 007076 JSR PC,PARINT ;INITALIZE KIPARS NEEDED
2546 012704 000240 NOP ;FOR CONFORMITY
2547 012706 000240 NOP
2548 012710 004767 007206 JSR PC,PARREG ;SETUP "BUF" WRDCT" "MEX"
2549 012714 005067 013034 READ1: CLR CNTA ;INITALIZE READ COUNTER
2550 012720 005067 013000 ESH: CLR RDERR ;CLEAR READ ERROR COUNT
2551 012724 004767 003240 JSR PC,OPDSEL ;ANY OPERATOR ADDR PARAMETERS?
2552 012730 004767 002732 JSR PC,SEEK ;GO DO A RANDOM SEEK
2553 012734 005067 171552 DSKRD: CLR INTFLG ;CLEAR THE INTERRUPT FLAG
2554 012740 004567 002236 JSR RS,FUNCT ;READ THE DATA
2555 012744 000105 .WORD 105
2556 012746 032737 001000 177570 BIT #B9,2$SWR ;COMPARE DATA?
2557 012754 001411 BEQ 1$ ;BRANCH IF YES
2558 012756 032737 010000 177570 BIT #B12,2$SWR ;DETERMINE HOW TO WAIT FOR INT
2559 012764 001003 BNE 2$
2560 012766 004767 007274 JSR PC,NPR ;GENERATE WORSE CASE NPR CYCLES
2561 012772 000447 BR 3$
2562 012774 000001 2$: WAIT
2563 012776 000445 BR 3$
2564 013000 016700 012670 1$: MOV WRDCT,R0 ;CLEAR THE INPUT BUFFER
2565 013004 012702 000020 MOV #16,R2
2566 013010 012701 025762 MOV #OUTBUF,R1
2567 013014 032767 000500 012642 BIT #500,FLAG ;BK WITH MEM. MANAG. OR NO MEM. MANAG.
2568 013022 001002 BNE 4$ ;BR IF TRUE
2569 013024 012701 040000 MOV #40000,R1 ;START OF MEM. MANAG. OUT BUFF
2570 013030 005700 4$: TST R0 ;TEST WORD COUNT IS IT AT ZERO?
2571 013032 100422 BMI 10$ ;BR IF CLEAR IS FINISHED
2572 013034 005021 CLR (R1)+
2573 013036 005021 CLR (R1)+
2574 013040 005021 CLR (R1)+

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2575	013042	005021			CLR	(R1)+	
2576	013044	005021			CLR	(R1)+	
2577	013046	005021			CLR	(R1)+	
2578	013050	005021			CLR	(R1)+	
2579	013052	005021			CLR	(R1)+	
2580	013054	005021			CLR	(R1)+	
2581	013056	005021			CLR	(R1)+	
2582	013060	005021			CLR	(R1)+	
2583	013062	005021			CLR	(R1)+	
2584	013064	005021			CLR	(R1)+	
2585	013066	005021			CLR	(R1)+	
2586	013070	005021			CLR	(R1)+	
2587	013072	005021			CLR	(R1)+	
2588	013074	160200			SUB	R2,R0	:DECREMENT WORD COUNT
2589	013076	001354			BNE	4\$	
2590	013100	004767	004760	10\$:	JSR	PC,PCOMP	:COMPARE THE DATA
2591	013104	105777	012530		TSTB	DRPCS	:WAIT FOR READY
2592	013110	100375			BPL	.-4	
2593	013112	005767	166122	3\$:	TST	ERRFLG	:WERE THERE ANY ERRORS
2594	013116	001424			BEQ	5\$:BRANCH IF NO
2595	013120	005267	012600		INC	RDERR	:UPDATE ERROR COUNT
2596	013124	022767	000024	012572	CMP	#20.,RDERR	:MORE THAN 20 ERRORS?
2597	013132	001416			BEQ	5\$:BRANCH IF YES
2598	013134	022767	000012	012562	CMP	#10.,RDERR	:IS THIS TENTH ERROR?
2599	013142	001274			BNE	DSKRD	:BRANCH IF NO
2600	013144	112777	000015	012466	MOVB	#15,DRPCS	:HOME THE HEADS
2601	013152	105777	012462		TSTB	DRPCS	:WAIT FOR DONE
2602	013156	100375			BPL	.-4	
2603	013160	005777	012474		TST	DRPDS	
2604	013164	100375			BPL	.-4	:WAIT FOR READY
2605	013166	000662			BR	DSKRD	
2606	013170	005767	012530	5\$:	TST	RDERR	
2607	013174	001417			BEQ	6\$	
2608	013176	022767	000013	012520	CMP	#11.,RDERR	:WAS READ ERROR STILL THERE AFTER A RECALL
2609	013204	002003			BGE	9\$:BR IF NO
2610	013206	012767	000002	012540	MOV	#2,CNTA	:YES DON'T TRY TO READ AGAIN UNLESS LOOPING
2611	013214			9\$:			
2612	013214	004567	166044		JSR	R5,PRINT\$:PRINT MESSAGE
2613	013220	024001			MES7		
2614	013222	016767	012476	166332	MOV	RDERR,TTY	
2615	013230	004767	166122		JSR	PC,PRINTS	:TYPE LOCATION-SUPRESS ZEROS
2616	013234	005067	012464	6\$:	CLR	RDERR	:CLEAR READ ERROR COUNTER
2617	013240	012767	012720	165534	MOV	#ESH,LAD	:LOOP ADDR
2618	013246	104000			SCOPE		
2619	013250	005267	012500		INC	CNTA	:INCREMENT READ COUNTER
2620	013254	022767	000003	012472	CMP	#3,CNTA	:DONE 3 READS?
2621	013262	001216			BNE	ESH	:BR IF NO
2622	013264	032767	000500	012372	BIT	#500,FLAG	:BK MEM. MANAG. OR NO MEM. MANAG.
2623	013272	001012			BNE	8\$:BR IF TRUE
2624	013274	032767	001000	012362	BIT	#89,FLAG	:LAST PAGE TRANSFERED?
2625	013302	001402			BEQ	7\$:BR IF NO
2626	013304	004767	006472		JSR	PC,PARINT	:GO REINITIALIZE KIPARS
2627	013310	004767	006556	7\$:	JSR	PC,PARINC	:GO INCREMENT KIPARS BY 1K
2628	013314	004767	006602		JSR	PC,PARREG	:GO SETUP "MEX" "WRDCT" "BUF"
2629	013320	004767	002702	8\$:	JSR	PC,DISBUF	:GET NEW DISK ADDR
2630	013324	000401			BR	11\$	

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2631 013326 000402          BR      MSTR
2632 013330 000167 177360    11$:   JMP     READ1
2633 013334 032767 000040 012322 MSTR:  BIT     #B5,FLAG      ;LOOPING ON AN OPERATOR ADDR?
2634 013342 001402          BEQ     1$             ;NO CONTINUE
2635 013344 000167 177116          JMP     DATP           ;YES
2636 013350 005767 012310    1$:   TST     FLAG
2637 013354 100002          BPL     2$             ;UNDER PROGRAM CONTROL
2638 013356 000167 001034          JMP     MULCHK         ;OPERATOR SELECTED PATTERN
2639 013362 062767 000002 012314 2$:   ADD     #2,PATNU      ;INC PATTERN INDEX
2640 013370 022767 009036 012306    CMP     #36,PATNU     ;PATTERNS EXCEEDED?
2641 013376 001402          BEQ     3$
2642 013400 000167 176762          JMP     RDATA         ;NOT YET
2643 013404 005067 012274    3$:   CLR     PATNU        ;LAST PATTERN USED
2644 013410 032737 002000 177570    BIT     #B10,#SWR     ;LOOP ON TEST?
2645 013416 001402          BEQ     RANEX         ;NO..GO TO RANDOM TEST
2646 013420 000167 176742          JMP     RDATA         ;YES
2647          .SBTTL ***** TEST 6 *****
2648
2649          ;THIS IS A RANDOM ADDRESS AND DATA TEST.
2650          ;ERRORS OCCURING WHICH ARE RECOVERABLE AFTER THE FIRST RETRY ARE PROBABLY
2651          ;DUE TO VIBRATING HEADS AFTER A SEEK, TRY DISABLEING RANDOM SEEKS.
2652
2653 013424 012767 000006 012276 RANEX: MOV     #6,TESTNO
2654 013432 004567 165626          JSR     RS,PRINT$     ;PRINT MESSAGE
2655 013436 023766          MES6
2656 013440 016767 012264 166114    MOV     TESTNO,TTY
2657 013446 004767 165704          JSR     PC,PRINTS     ;TYPE LOCATION-SUPRESS ZEROS
2658 013452 005067 006272          CLR     MEX           ;CLEAR EXTENDED MEMORY BITS IN CONTROLER
2659 013456 004767 003226          RRANEX: JSR     PC,INIT
2660 013462 032767 000500 012174    BIT     #500,FLAG     ;BK WITH MEM. MANAG. OR NO MEM. MANAG.
2661 013470 001004          BNE     1$           ;BR IF TRUE
2662 013472 004767 006304          JSR     PC,PARINT     ;INITALIZE ALL KIPARS
2663 013476 000240          NOP
2664 013500 000240          NOP
2665 013502 012767 000034 012174 1$:   MOV     #34,PATNU
2666 013510 012767 175300 012202    MOV     #-2500,PASSC  ;SET UP PASS COUNT
2667 013516 012737 000200 177776    MOV     #PRI4,#PSW
2668 013524 012767 000700 012142 WRLG:  MOV     #700,WRDCT   ;SET UP WORD COUNT TO 1+ SECTOR
2669 013532 016767 012136 012174    MOV     WRDCT,WORK
2670 013540 012701 025762          MOV     #OUTBUF,R1
2671 013544 032767 000500 012112    BIT     #500,FLAG     ;BK WITH MEM. MANAG. OR NO MEM. MANAG.?
2672 013552 001002          BNE     4$           ;BR IF TRUE
2673 013554 012701 040000          MOV     #40000,R1    ;START OF OUTBUFF WITH MEMORY MANAG.
2674 013560 004767 003430    4$:   JSR     PC,RANDOM     ;GENERATE RANDOM PATTERN
2675 013564          1$:
2676 013564 004767 165774          JSR     PC,RAND$     ;GENERATE TWO RANDOM NOS.
2677 013570 016767 166106 012136    MOV     LONUM,WORK
2678 013576 016767 166076 012132    MOV     HINUM,WORK1
2679 013604 042767 177000 012122    BIC     #17000,WORK
2680 013612 022767 000625 012114    CMP     #625,WORK    ;FORM RANDOM CYL ADDR
2681 013620 002761          BLT     1$
2682 013622 016767 012106 012046    MOV     WORK,CYLINDER ;SAVE IT
2683 013630 042767 160360 012100    BIC     #160360,WORK1
2684 013636 122767 000010 012072    CMPB   #10,WORK1    ;FORM RANDOM SECTOR ADDR
2685 013644 101003          BHI     2$
2686 013646 042767 000010 012062    BIC     #10,WORK1

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2687	013654	122767	000023	012055	2\$:	CMPB	#23,WORK1+1	
2688	013662	101003				BHI	3\$;FORM RANDOM HEAD ADDR
2689	013664	142767	000014	012045		BICB	#14,WORK1+1	
2690	013672	016767	012040	012000	3\$:	MOV	WORK1,DMA	;SAVE DESK ADDR.
2691	013700	012767	025762	012000	RANLOP:	MOV	#OUTBUF,BUF	;SETUP OUTPUT BUFFER
2692	013706	032767	000500	011750		BIT	#500,FLAG	;BK WITH MEM. MANAG. OR NO MEM. MANAG.?
2693	013714	001003				BNE	13\$;BR IF TRUE
2694	013716	012767	040000	011762		MOV	#40000,BUF	;START OF OUTBUFFER WITH MEMORY MANAG.
2695	013724	004767	001736		13\$:	JSR	PC,SEEK	;DO A RANDOM SEEK
2696	013730	004567	001246			JSR	RS,FUNCT	;WRITE RANDOM DATA AND
2697	013734	000103			.WORD	103		;ENABLE INTERRUPTS
2698	013736	032737	010000	177570		BIT	#B12,2#SWR	;DETERMINE HOW TO WAIT FOR INT
2699	013744	001003				BNE	2\$	
2700	013746	004767	006314			JSR	PC,NPR	;TEST WORSE CASE NPR CYCLES
2701	013752	000401				BR	4\$	
2702	013754	000001			2\$:	WAIT		
2703	013756	012767	013700	165016	4\$:	MOV	#RANLOP,LAD	;SETUP LOOP ADDR
2704	013764	104000				SCOPE		
2705	013766	004567	001210		7\$:	JSR	RS,FUNCT	;WRITE CHECK THE DATA AND
2706	013772	000107			.WORD	107		;ENABLE INTERRUPT
2707	013774	032737	010000	177570		BIT	#B12,2#SWR	;HOW TO WAIT FOR INT?
2708	014002	001003				BNE	1\$	
2709	014004	004767	006256			JSR	PC,NPR	;TEST WORSE CASE NPR CYCLES
2710	014010	000401				BR	5\$	
2711	014012	000001			1\$:	WAIT		
2712	014014	012767	013766	164760	5\$:	MOV	#7\$,LAD	;SETUP LOOP ADDR
2713	014022	104000				SCOPE		
2714	014024	005067	011724			CLR	CNTA	;INITALIZE READ COUNTER
2715	014030	005067	011670		8\$:	CLR	RDERR	;CLEAR READ ERROR COUNTER
2716	014034	004767	001626			JSR	PC,SEEK	;DO A RANDOM SEEK
2717	014040	005067	170446		11\$:	CLR	INTFLG	
2718	014044	004567	001132			JSR	RS,FUNCT	;READ RANDOM DATA AND
2719	014050	000105			.WORD	105		;ENABLE INTERRUPT
2720	014052	012700	000700			MOV	#700,R0	;SET UP TO CLEAR INPUT BUFFER
2721	014056	012702	000020			MOV	#16,R2	
2722	014062	012701	025762			MOV	#OUTBUF,R1	;START OF INPUT BUFFER
2723	014066	032767	000500	011570		BIT	#500,FLAG	;BK WITH MEM. MANAG. OR NO MEM MANAG.?
2724	014074	001002				BNE	15\$;BR IF TRUE
2725	014076	012701	040000			MOV	#40000,R1	;START OF OUTBUF WITH MEM. MANAG.
2726	014102				15\$:			
2727	014102	005021				CLR	(R1)+	
2728	014104	005021				CLR	(R1)+	
2729	014106	005021				CLR	(R1)+	
2730	014110	005021				CLR	(R1)+	
2731	014112	005021				CLR	(R1)+	
2732	014114	005021				CLR	(R1)+	
2733	014116	005021				CLR	(R1)+	
2734	014120	005021				CLR	(R1)+	
2735	014122	005021				CLR	(R1)+	
2736	014124	005021				CLR	(R1)+	
2737	014126	005021				CLR	(R1)+	
2738	014130	005021				CLR	(R1)+	
2739	014132	005021				CLR	(R1)+	
2740	014134	005021				CLR	(R1)+	
2741	014136	005021				CLR	(R1)+	
2742	014140	005021				CLR	(R1)+	

2743	014142	160200			SUB	R2,PC		:DECREMENT THE WORD COUNT
2744	014144	001356			BNE	15\$:GO CLR MORE
2745	014146	032737	010000	177570	BIT	#B12,2#SWR		:HOW TO WAIT FOR INT?
2746	014154	001003			BNE	3\$		
2747	014156	004767	006104		JSR	PC,NPR		:TEST WORSE CASE NPR CYCLES
2748	014162	000401			BR	6\$		
2749	014164	000001			WAIT		3\$:	
2750	014166	032737	001000	177570	BIT	#B9,2#SWR	6\$:	:COMPARE FOR ERRORS?
2751	014174	001006			BNE	9\$:BRANCH IF NO
2752	014176	032777	040000	011434	BIT	#B14,2RPCS		:HARD ERROR?
2753	014204	001002			BNE	9\$:BRANCH IF YES
2754	014206	004767	003652		JSR	PC,COMPARE		:COMPARE DATA FOR ERRORS
2755	014212	005767	165022		TST	ERRFLG	9\$:	:READ ERROR?
2756	014216	001424			BEQ	10\$:BRANCH IF NO
2757	014220	005267	011500		INC	RDERR		:UPDATE ERROR COUNT
2758	014224	022767	000024	011472	CMP	#20.,RDERR		:20 ERRORS YET?
2759	014232	001416			BEQ	10\$:BRANCH IF YES
2760	014234	022767	000012	011462	CMP	#10.,RDERR		:IS THIS TENTH ERROR?
2761	014242	001276			BNE	11\$:BRANCH IF NO
2762	014244	112777	000015	011366	MOVB	#15,2RPCS		:ISSUE HOME COMMAND
2763	014252	105777	011362		TSTB	2RPCS		:WAIT FOR DONE
2764	014256	100375			BPL	-4		
2765	014260	005777	011374		TST	2RPOS		:WAIT FOR READT
2766	014264	100375			BPL	-4		
2767	014266	000664			BR	11\$		
2768	014270	005767	011430		TST	RDERR	10\$:	
2769	014274	001417			BEQ	21\$		
2770	014276	022767	000013	011420	CMP	#11.,RDERR		:DID RECALL HELP RECOVERY
2771	014304	002003			BGE	14\$:BR IF YES
2772	014306	012767	000011	011440	MOV	#9.,CNTA		:NO, DON'T TRY READING AGAIN
2773	014314						14\$:	
2774	014314	004567	164744		JSR	R5,PRINT\$:PRINT MESSAGE
2775	014320	024001			MES7			
2776	014322	016767	011376	165232	MOV	RDERR,TTY		
2777	014330	004767	165022		JSR	PC,PRINTS		:TYPE LOCATION-SUPRESS ZEROS
2778	014334	005067	011364		CLR	RDERR	21\$:	:CLEAR READ ERROR COUNTER
2779	014340	012767	014030	164434	MOV	#8\$,LAD		:SET UP LOOP ADDR
2780	014346	104000			SCOPE			
2781	014350	005267	011400		INC	CNTA		:INCREMENT READ COUNTER
2782	014354	022767	000012	011372	CMP	#10.,CNTA		:DONE 10 DISK READS?
2783	014362	001222			BNE	8\$:BR IF NO
2784	014364	005267	011330		INC	PASSC		:INCREMENT PASS COUNT
2785	014370	001402			BEQ	12\$:BRANCH IF DONE
2786	014372	000167	177126		JMP	WRLG		:CONTINUE
2787	014376	005067	011302		CLR	PATNU	12\$:	
2788	014402	032737	002000	177570	BIT	#B10,2#SWR		:LOOP ON TEST?
2789	014410	001402			BEQ	MULCHK		:NC
2790	014412	000167	177040		JMP	RRANEX		:LOOP
2791								
2792								:CHECK FOR MULTI DISK MODE
2793								:IF IN MULTI DISK MODE REPORT "END"
2794								:IF LAST DISK ON SYSTEM HAS BEEN
2795								:EXERCISED.
2796								
2797								
2798	014416	005067	011256		MULCHK: CLR	DMA		

2799	014422	005067	011250		CLR	CYLINDER	: CLEAR ADDRESS REGISTERS
2800	014426	032767	004000	011230	BIT	#B11 FLAG	: ARE WE IN MULTI DISK MODE
2801	014434	001422			BEQ	REPOEN	: REPORT "END"
2802	014436	016767	011222	011270	MOV	FLAG, WORK	: WHAT DISK ARE WE ON
2803	014444	042767	177743	011262	BIC	#177743, WORK	: IF LAST DISK ON SYSTEM
2804	014452	026767	011256	011234	CMP	WORK, DSKNOR	: REPORT END
2805	014460	001004			BNE	INDRVE	
2806	014462	042767	000034	011174	BIC	#34 FLAG	
2807	014470	000404			BR	REPOEN	: REPORT "END" LAST DISK
2808	014472	062767	000004	011164	INDRVE: ADD	#4 FLAG	: INC. DISK NO.
2809	014500	000426			BR	EXTPP	: EXERCISE DISK
2810	014502	005267	164272		REPOEN: INC	ICNT	: INCREMENT PASS COUNTER
2811	014506	004567	164552		JSR	R5, PRINTS	: PRINT MESSAGE
2812	014512	023576			MESI		: REPORT END OF PASS
2813	014514	016767	164260	165040	MOV	ICNT, TTY	
2814	014522	004767	164630		JSR	PC, PRINTS	: TYPE LOCATION-SUPRESS ZERCS
2815	014526	013701	000042		MOV	#42, R1	: GET MONITOR RETURN ADDRESS
2816	014532	001411			BEQ	EXTPP	: BRANCH IF NOT UNDER MONITOR
2817	014534	032767	000100	011122	BIT	#86 FLAG	: IS MEM. MGR. ON
2818	014542	001401			BEQ	MEXIT	: YES , BY PASS RESET
2819	014544	000005			RESET		
2820	014546	004711			MEXIT: JSR	PC, (R1)	: EXIT TO THE MONITOR
2821	014550	000240			NOP		
2822	014552	000240			NOP		
2823	014554	000240			NOP		
2824	014556	000167	166776		EXTPP: JMP	ACTST	: RECYCLE
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2826							

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2838 014562 012706 000500
2839 014566 012767 015152 163230
2840 014574 012767 000340 163224
2841 014602 004567 002030
2842 014606 012777 000625 011034
2843 014614 052777 000011 011016
2844 014622 012700 025762
2845 014626 012720 025252
2846 014632 020067 005110
2847 014636 101773
2848 014640 012767 000625 011030
2849 014646 005067 011026
2850 014652 012767 000400 011014
2851 014660 012767 025762 011020
2852 014666 105777 010746
2853 014672 100375
2854 014674 005777 010760
2855 014700 100375
2856 014702 004567 000274
2857 014706 000003
2858 014710 105777 010724
2859 014714 100375
2860 014716 032777 100000 010714
2861 014724 001401
2862 014726 104400
2863 014730 012767 014562 164044
2864 014736 104000
2865 014740 004567 164320
2866 014744 023720
2867 014746 004567 000230
2868 014752 000005
2869 014754 105777 010660
2870 014760 100375
2871 014762 000771
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2876 014764 012777 000001 010646
2877 014772 016767 010666 010734
2878 015000 000241
2879 015002 006067 010726
2880 015006 006067 010722
2881 015012 000367 010716
2882 015016 042767 174377 010710

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.SBTTL ***** TEST 7 *****

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:TEST THE ABILITY OF THE RP11C TO SENSE POWER FAILURE
:AND TO HOME THE HEADS. WHEN POWER IS RESTORED
:THE CYLINDER ADDRESS IS TESTED FOR ZERO. AFTER TYPING THE MESSAGE
:REQUESTING POWER TO BE TURNED OFF THE PROGRAM GOES INTO
:A LOOP READING FROM THE DISK. AFTER POWER IS RESTORED,
:MEMORY IS CHECKED TO SEE THAT THE DISK DID NOT PUT ANY
:JUNK INTO MEMORY WHILE POWER WAS GOING DOWN.

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PFTST: MOV #STKPTR, SP
MOV #PFD, 24 ;SET UP POWER FAIL VECTOR
MOV #PRI7, 26 ;LOCKOUT INTERRUPTS
JSR RS, DSKNOS ;SELECT THE UNIT
MOV #625, DRPCA ;SELECT CYLINDER 625
BIS #11, DRPCS ;ISSUE SEEK COMMAND
MOV #OUTBUF, RO
1$: MOV #25252, (RO)+ ;FILL MEMORY WITH CHECKERBOARD
CMP RO, MEMSIZ ;PATTERN
BLJS 1$
MOV #625, CYLINDER
CLR DMA
MOV #400, WRDCT
MOV #OUTBUF, BUF
TSTB DRPCS ;WAIT FOR DONE
BPL -4
TST DRPDS ;WAIT FOR UNIT READY
BPL -4
JSR RS, FUNCT ;WRITE 1 SECTOR OF CHECKERBOARD
.WORD 3
TSTB DRPCS ;WAIT FOR READY
BPL -4
BIT #B15, DRPCS ;ANY ERRORS?
HLT 2$ ;DEVICE ERROR ON WRITE
2$: MOV #PFTST, LAD
SCOPE
JSR RS, PRINT$ ;PRINT MESSAGE
MESS ;HAVE POWER TURNED OFF
3$: JSR RS, FUNCT ;GO INTO A LOOP READING
.WORD 5 ;THE DISK SURFACE
TSTB DRPCS
BPL -4
BR 3$

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: AFTER MACHINE IS POWERED DOWN AND UP CONTROL
: IS TRANSFERRED HERE.

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PFT1: MOV #1, DRPCS ;CLEAR THE CONTROLLER
MOV FLAG, WORK ;GET UNIT NUMBER
CLC
ROR WORK
ROR WORK
SWAB WORK
BIC #174377, WORK

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2883	015024	016777	010704	010606		MOV	WORK,ARPCS	:SELECT THE UNIT
2884	015032	005777	010622			TST	ARPOS	
2885	015036	100352				BPL	PFT1	
2886	015040	005777	010616			TST	ASUCA	:SELECTED CYLINDER SHOULD BE ZERO
2887	015044	001407				BEQ	1\$	
2888	015046	005067	002752			CLR	EXPS	
2889	015052	017767	010604	002746		MOV	ASUCA,RECS	
2890	015060	104401				HLT	+1	:HEADS DID NOT RESTORE TO 0
2891	015062	000427				BR	2\$:ON POWER FAILURE
2892	015064	012700	025762		1\$:	MOV	#OUTBUF,RO	
2893	015070	022720	025252		4\$:	CMP	#25252,(RO)+	:DID MEMORY RETAIN PATTERN ON PF
2894	015074	001004				BNE	3\$:BRANCH IF NO
2895	015076	020067	004644			CMP	RO,MEMSIZ	
2896	015102	001372				BNE	4\$	
2897	015104	000416				BR	2\$	
2898	015106	012767	025252	002710	3\$:	MOV	#25252,EXPS	
2899	015114	016067	177776	002704		MOV	-2(RO),RECS	
2900	015122	104403				HLT	+3	:CONTENTS OF MEMORY CHANGED AFTER PF
2901	015124	004567	164134			JSR	R5,PRINTS	:PRINT MESSAGE
2902	015130	023703				MES4		:PRINT MEMORY LOCATION
2903	015132	010067	164424			MOV	RO,TTY	
2904	015136	004767	164202			JSR	PC,PRINTR	:TYPE LOCATION WITH LEADING ZEROS
2905	015142				2\$:			
2906	015142	004567	164116			JSR	R5,PRINTS	:PRINT MESSAGE
2907	015146	025625				END		:END OF TEST
2908	015150	000000				HALT		
2909								
2910								:POWER FAIL TRAP HANDLER
2911								
2912	015152	012767	015162	162644	PFD:	MOV	#PFU,24	:SET UP POWER UP VECTOR
2913	015160	000774				BR	PFD	
2914								:POWER UP TRAP HANDLER
2915								
2916								
2917	015162	012767	000026	162634	PFU:	MOV	#26,24	:SETUP TRAP CATCHER
2918	015170	005067	162632			CLR	26	
2919	015174	012706	000500			MOV	#STKPTR,SP	:RESTORE STACK
2920	015200	000671				BR	PFT1	:VERIFY POWER DOWN SEQUENCE
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015202 004567 001430
015206 016777 010466 010436
015214 016777 010456 010426
015222 016777 010460 010416
015230 016777 010440 010406
015236 005477 010402
015242 011567 000022
015246 062705 000002
015252 056767 004472 000010
015260 056777 000004 010352
015266 000205
015270 000000

015272 005067 163742
015276 005777 010336
015302 100402
015304 000167 000316
015310 010667 163724
015314 005767 010404
015320 001404
015322 032737 000020 177570
015330 001522
015332 104400
015334 032777 000002 010276
015342 001012
015344 004567 163714
015350 024127
015352 016767 010346 164202
015360 004767 163772
015364 010667 163650

015370 017767 010254 000266
015376 017767 010250 000256
015404 042767 160360 000250
015412 032777 000001 010236
015420 001026
015422 032767 000017 000232
015430 001403
015432 005367 000224
015436 000417
015440 132767 000037 000215
015446 001406
015450 105367 000207
015454 052767 000011 000200
015462 000405
015464 012767 011411 000170
015472 005367 000166
015476

.SBTTL *** SUBROUTINES ***
;THIS ROUTINE OUTPUTS THE FUNCTION FOUND AT
;THE CALL + 2.
FUNCT: JSR R5,DSKNOS ;SELECT THE UNIT
MOV DMA,DRPDA ;SETUP DISK ADDR REG
MOV CYLINDER,DRPCA ;SETUP CYLINDER ADDR REG
MOV BUF,DRPBA ;SETUP BUS ADDR REG
MOV WRDCT,DRPWC ;SETUP WORD COUNT
NEG DRPWC ;COMPLIMENT WORD COUNT
MOV (R5),FNCT ;GET RPCS FUNCTION
ADD #2,R5 ;UPDATE RETURN ADDR
BIS MEX,FNCT ;ADD EXTENDED MEMORY BITS
BIS FNCT,DRPCS ;OUTPLT THE FUNCTION
RTS R5
FNCT: 0

;RP11 DISK INTERRUPT HANDLER
DKINT: CLR ERRFLG ;CLEAR THE ERROR FLAG
TST DRPCS ;TEST FOR ERROR
BMI 1\$
JMP INTEXT ;JUMP IF NO ERRORS
1\$: MOV SP,ERRFLG ;SET INTERRUPT ERROR FLAG
TST RDERR ;IS THIS THE FIRST ERROR ATTEMPT?
BEQ 2\$;BRANCH IF YES
BIT #B4,DRSWR ;TYPE ALL ERROR ATTEMPTS?
BEQ DKII ;BRANCH IF NO
2\$: HLT ;STATUS ERROR AFTER INTERRUPT
BIT #B1,DRPCS ;CHECK FOR READ
BNE DELMES ;BRANCH IF WRITTING
JSR R5,PRINTS ;PRINT MESSAGE
MES13 ;GIVE # OF READ ATTEMPT
MOV RDERR,TTY
JSR PC,PRINTS ;TYPE LOCATION-SUPRESS ZEROS
3\$: MOV SP,ERRFLG

DELMES: MOV DRPCA,INT1 ;GET CYLINDER ADDR
MOV DRPDA,INT0 ;GET HEAD AND SECTOR ADDR
BIC #160360,INT0 ;CLEAR UNWANTED BITS
BIT #B0,DRPER ;WAS IT AN ADDR ERROR?
BNE REDAC ;BRANCH IF YES
BIT #17,INT0 ;IS SECTOR = TO 0
BEQ DECTK ;YES - BRANCH
DEC INTO ;BACK UP COUNT
BR REDAC
DECTK: BITB #37,INT0+1 ;IS HEAD = TO 0
BEQ DECCY ;YES - BRANCH
DECB INTO+1 ;BACK UP HEAD
BIS #11,INT0 ;SET JP SECTOR
BR REDAC
DECCY: MOV #11411,INT0
DEC INT1
REDAC:

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2978 015476 004567 163562      JSR    RS,PRINT$      ;PRINT MESSAGE
2979 015502 024143          MES14                ;REPORT CYLINDER ADDR
2980 015504 016767 000154 164050  MOV    INT1,TTY
2981 015512 004767 163640      JSR    PC,PRINT$      ;TYPE LOCATION-SUPRESS ZEROS
2982 015516 005067 000142      CLR    INT1
2983 015522 116767 000135 000134  MOVB   INTO+1,INT1
2984 015530 004567 163530      JSR    RS,PRINT$      ;PRINT MESSAGE
2985 015534 024153          MES15                ;REPORT HEAD ADDR OF FAILURE
2986 015536 016767 000122 164016  MOV    INT1,TTY
2987 015544 004767 163606      JSR    PC,PRINT$      ;TYPE LOCATION-SUPRESS ZEROS
2988 015550 116767 000106 000106  MOVB   INTO,INT1
2989 015556 004567 163502      JSR    RS,PRINT$      ;PRINT MESSAGE
2990 015562 024164          MES16                ;REPORT SEC ADDR OF FAILURE
2991 015564 016767 000074 163770  MOV    INT1,TTY
2992 015572 004767 163560      JSR    PC,PRINT$      ;TYPE LOCATION-SUPRESS ZEROS
2993 015576 032777 001000 010054  DK11:  BIT    #89,DRPDS      ;IS DRIVE UNSAFE?
2994 015604 001401          BEQ    .+4
2995 015606 000000          HALT
2996 015610 032777 002000 010042  BIT    #810,DRPDS     ;SEEK INCOMPLETE?
2997 015616 001403          BEQ    INTEXT        ;BRANCH IF COMPLETE
2998 015620 112777 000015 010012  MOVB   #15,DRPCS      ;RECALIBRATE
2999 015626 105777 010006      INTEXT: TSTB   DRPCS
3000 015632 100375          BPL    .-4            ;WAIT FOR DONE
3001 015634 005777 010020      TST   DRPDS
3002 015640 100375          BPL    .-4            ;WAIT FOR READY
3003 015642 005767 004646      TST   BCKFLG         ;DID WE COME FROM BACKGROUND TEST?
3004 015646 001402          BEQ    IS            ;BRANCH IF NO
3005 015650 012716 022502      MOV   #NPRRET,(SP)   ;MODIFY RETURN ADDR
3006 015654 010667 166632      IS:    MOV   SP,INTFLG ;SET INTERRUPT OCCURRED FLAG
3007 015660 000002      RTI
3008
3009 015662 000000          INTO:  0
3010 015664 000000          INT1:  0
3011
3012          ;THIS ROUTINE IF SWITCH 07 OFF ISSUES A SEEK RANDOM YET NOT DESTROYING
3013          ;THE CYLINDER UNDER TEST
3014
3015 015666 105737 177570      SEEK:  TSTB   @#SWR      ;ISSUE A RANDOM SEEK?
3016 015672 100534          BMI   SEEND          ;BR IF NO
3017 015674 004567 000736      JSR   RS,DSKNOS      ;SELECT THE UNIT
3018 015700 005767 163334      TST   ERFLG         ;ARE WE LOOPING ON ERROR?
3019 015704 001031          BNE   2$            ;BR IF YES-DO SAME SEEK AS THE ERROR
3020 015706 062767 123455 010036  IS:    ADD   #123455,SEEK1 ;GET A RANDOM NUMBER
3021 015714 042767 177000 010030  BIC   #177000,SEEK1  ;CLEAR OUT UNWANTED CYLINDER BITS
3022 015722 022767 000625 010022  CMP   #625,SEEK1    ;VALID CYLINDER NUMBER
3023 015730 002766          BLT   1$            ;BR IF TOO BIG
3024 015732 016745 010014      MOV   SEEK1,-(SP)    ;PUT NEW CYLINDER ON STACK
3025 015736 166716 007734      SUB   CYLINDER,(SP) ;CREAT A DIFFERANCE ON STACK
3026 015742 100405          BMI   7$            ;BR IF DIFFERANCE IS -
3027 015744 021627 000200      CMP   (SP),#200     ;IS DIFFERANCE BETWEEN CYLINDER AND RANDOM CYL
3028          ;GREATER THAN 200 CYLINDERS
3029 015750 100006          BPL   8$            ;YES, CLEANUP STACK AND CONTINUE
3030 015752 005726          9$:    TST   (SP)+     ;NO, CLEAN OFF STACK
3031 015754 000754          BR    1$            ;GET NEW CYLINDER RANDOM NUMBER
3032 015756 021627 177600      7$:    CMP   (SP),#-200
3033 015762 100401          BMI   8$            ;BR IF DIFFERANCE GRATER THAN 200 CYLINDERS

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3034 015764 000772          BR      9$          ;DIFFERANCE LESS THAN 200 GET ANOTHER CYL NO
3035 015766 005726          9$:   TST      (SP)+      ;CLEANOFF STACK
3036 015770 017746 007640  2$:   MOV      @VECTOR,-(SP) ;SAVE VECTOR
3037 015774 017746 007636          MOV      @STATUS,-(SP)  ;SAVE PRIORITY
3038 016000 012777 016166 007626          MOV      @SEKDON,@VECTOR ;SETUP TRAP FOR RANDOM SEEK
3039 016006 012777 000340 007622          MOV      #340,@STATUS
3040 016014 016777 007732 007626 3$:   MOV      SEEK1,@RPCA    ;SET RANDOM CYLINDER
3041 016022 012777 177777 007630          MOV      #-1,@RPDS     ;CLEAR ATTENTIONS
3042 016030 042777 000100 007602          BIC      #86,@RPCS     ;CLEAR INTERRUPT DONE
3043 016036 052777 020011 007574          BIS      #20011,@RPCS  ;SEEK INTERRUPT ON ATTENTION
3044 016044 000001          WAIT
3045 016046 005777 007566          TST      @RPCS        ;ERROR?
3046 016052 100035          BPL      4$          ;BR IF NO ERROR
3047 016054 104400          HLT
3048 016056 032777 004000 007554          BIT      #811,@RPCS   ;DISK ERROR DURING RANDOM SEEK
3049 016064 001006          BNE      5$          ;SEEK INCOMPLETE?
3050 016066 032777 001000 007564          BNE      5$          ;BR IF SEEK INCOMPLETE
3051 016074 001402          BIT      #89,@RPDS    ;FILE UNSAFE?
3052 016076 000000          BEQ      5$          ;BR IF NOT UNSAFE
3053 016100 000410          HALT
3054 016102          BR      6$          ;FILE UNSAFE
3055 016102 004567 163156 5$:   JSR      RS,PRINT$    ;GO DO A HOME SEEK
3056 016106 024143          MES14             ;PRINT MESSAGE
3057 016110 016767 007636 163444          MOV      SEEK1,TTY    ;CYLINDER =
3058 016116 004767 163234          JSR      PC,PRINT$   ;TYPE LOCATION-SUPRESS ZEROS
3059 016122 012777 000015 007510 6$:   MOV      #15,@RPCS   ;DO A HOME SEEK
3060 016130 105777 007504          TSTB     @RPCS
3061 016134 100375          BPL      -4         ;WAIT FOR DONE
3062 016136 005777 007516          TST      @RPDS
3063 016142 100375          BPL      -4         ;WAIT FOR READY
3064 016144 000723          BR      3$          ;TRY SEEK AGAIN
3065 016146 005777 007506 4$:   TST      @RPDS
3066 016152 100375          BPL      -4         ;WAIT FOR READY
3067 016154 012677 007456          MOV      (SP)+,@STATUS ;RESTORE TRAPS
3068 016160 012677 007450          MOV      (SP)+,@VECTOR
3069 016164 000207          SEEND:  RTS      PC  ;RETURN FROM RANDOM SEEK
3070 016166 000002          SEKDON: RTI         ;RANDOM SEEK DONE
3071
3072
3073          ;ROUTINE TO SET UP CYLINDER AND DISK ADDRESS FROM
3074          ;OPERATOR INPUTS DURING CONVERSATION MODE.
3075
3076 016170 032767 000040 007466 OPDSEL: BIT      #85,FLAG ;USE OPERATOR ADDR?
3077 016176 001001          BNE      +4
3078 016200 000207          RTS      PC         ;NO
3079 016202 016767 007460 007466          MOV      SCYL,CYLINDER ;GET CYLINDER ADDR
3080 016210 016767 007456 007462          MOV      SSEC,DMA    ;GET SECTOR ADDR
3081 016216 116767 007446 007455          MOV      SHED,DMA+1  ;GET HEAD ADDR
3082 016224 000207          RTS      PC
3083
3084
3085
3086          ;ROUTINE TO SETUP DISK BUFFERS
3087          ;ADD WORD COUNT TO STARTING DISK ADDRESSES
3088          ;COMPARE CALCULATED ADDRESS TO TERMINATING ADDRESS
3089

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3090 016226 032767 000040 007430 DISBUF: BIT #85,FLAG ;DID OPERATOR SUPPLY ADDR?
3091 016234 001401 BEQ .+4
3092 016236 000461 BR BUFEXIT ;OPERATOR DEFINED DISK ADDR
3093 016240 004767 000520 JSR PC,BLSZ ;DEFINE BLOCK SIZE
3094 016244 016767 007446 007464 MOV BLOCK,WORK1
3095 016252 016767 007422 007454 INCSEC: MOV DMA,WORK ;GET DISK ADDR
3096 016260 042767 177760 007446 BIC #177760,WORK ;MASK OUT SECTOR COUNT
3097 016266 022767 000011 007440 CMP #11,WORK ;CHECK FOR LAST SECTOR
3098 016274 001406 BEQ INCSUR ;CHECK SURFACE
3099 016276 005267 007376 INC DMA ;+1 SECTOR COUNT
3100 016302 005367 007410 DECBLK: DEC BLOCK ;-1 FROM BLOCK COUNT
3101 016306 001432 BEQ CMDAE ;CMP DMA TO RPDA
3102 016310 000760 BR INCSEC ;RECYCLE
3103 016312 042767 000017 007360 INCSUR: BIC #17,DMA ;FETCH ADDRESS
3104 016320 016767 007354 007406 MOV DMA,WORK
3105 016326 042767 160377 007400 BIC #160377,WORK
3106 016334 122767 000023 007373 CMPB #23,WORK+1
3107 016342 001403 BEQ SWSUR ;+1 SURFACE
3108 016344 105267 007331 INCB DMA+1 ;INC HEAD NUMBER
3109 016350 000754 BR DECBLK ;RECYCLE
3110 016352 005067 007322 SWSUR: CLR DMA ;CLEAR THE DISK ADDRESS
3111 016356 005267 007314 INC CYLINDER
3112 016362 022767 000626 007306 CMP #626,CYLINDER ;HAS LAST CYL BEEN EXCEEDED?
3113 016370 001404 BEQ BUFEXIT ;BRANCH IF YES
3114 016372 000743 BR DECBLK
3115 :COME HERE AFTER DETERMINING THE STARTING ADDR OF THE NEXT
3116 :TRANSFER. NOW CHECK TO SEE THERE IS ENOUGH ROOM ON THE DISK
3117 :TO MAKE THE TRANSFER. IF NOT MODIFY THE WORD COUNT FOR THE FINAL
3118 :OUTPUT.
3119
3120
3121 016374 105767 007264 CMDAE: TSTB FLAG ;CHECK FOR LAST DISK BUFFER
3122 016400 100015 BPL BUFINX
3123 016402 005067 007272 BUFEXIT: CLR DMA ;CLEAR ADDRESS BITS
3124 016406 005067 007264 CLR CYLINDER ;CLR CYLINDER REGISTER
3125 016412 062716 000002 ADD #2,(6) ;INC STACK POINTER
3126 016416 042767 000200 007240 BIC #200,FLAG
3127 016424 016767 007260 007242 MOV SWRDCT,WRDCT
3128 016432 000500 BR EXTDR ;EXIT
3129 016434 005067 007300 BUFINX: CLR WORK2 ;CLEAR BLOCK COUNTER
3130 016440 016767 007234 007266 MOV DMA,WORK
3131 016446 016767 007224 007266 MOV CYLINDER,WORK.3
3132 016454 042767 160360 007252 BIC #160360,WORK
3133 016462 005267 007252 XINCSEC: INC WORK2 ;INCREMENT BLOCK COUNT
3134 016466 005367 007244 DEC WORK1 ;DECREMENT TOTAL BLOCKS REQUIRED
3135 016472 001460 BEQ EXTDR ;EXIT IF BLOCK COUNT SATISFIED
3136 016474 122767 000011 007232 CMPB #11,WORK ;CHECK THE DISK ADDRESS TO
3137 016502 001403 BEQ XINCSUR ;SEE IF THERE IS ENOUGH ROOM
3138 016504 005267 007224 INC WORK ;TO HANDLE THE OUTPUT REQUESTED
3139 016510 000764 BR XINCSEC
3140 016512 105067 007216 XINCSUR: CLRB WORK
3141 016516 122767 000023 007211 CMPB #23,WORK+1
3142 016524 001403 BEQ IS
3143 016526 105267 007203 INCB WORK+1
3144 016532 000753 BR XINCSEC
3145 016534 005067 007174 IS: CLR WORK
  
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3146 016540 022767 000625 007174      CMP      #25,WORK3      ;ARE WE ON THE LAST CYLINDER?
3147 016546 001403          BEQ      2$            ;BRANCH IF YES
3148 016550 005267 007166          INC      WORK3
3149 016554 000742          BR      XINCSEC
3150 016556 016767 007156 007110 2$:  MOV      WORK2,WRDCT    ;COME HERE IF THERE IS NOT
3151 016564 000241          CLC
3152 016566 006167 007102          ROL      WRDCT          ;ENOUGH ROOM TO HANDLE THE
3153 016572 006167 007076          ROL      WRDCT          ;REQUESTED OUTPUT. MODIFY THE
3154 016576 006167 007072          ROL      WRDCT          ;WORDCOUNT TO FILL THE REMAINING
3155 016602 006167 007066          ROL      WRDCT          ;SURFACE.
3156 016606 006167 007062          ROL      WRDCT
3157 016612 006167 007056          ROL      WRDCT
3158 016616 006167 007052          ROL      WRDCT
3159 016622 006167 007046          ROL      WRDCT
3160 016626 052767 000200 007030  EXTDR:  BIS      #200,FLAG
3161 016634 000207          RTS      PC            ;EXIT
3162
3163
3164          ;ROUTINE TO SELECT THE DISK UNIT
3165
3166 016636 016767 007022 007070  DSKNOS:  MOV      FLAG,WORK    ;FETCH THE FLAG WORD
3167 016644 006067 007064          ROR      WORK
3168 016650 006067 007060          ROR      WORK
3169 016654 000241          CLC
3170 016656 000367 007052          SWAB     WORK
3171 016662 042767 174377 007044  BIC      #174377,WORK    ;MASK THE DISK NUMBER
3172 016670 016777 007040 006742  MOV      WORK,ARPCS    ;LOAD THE ADDRESS IN THE ADDRESS REG
3173 016676 005777 006756          TST      ARPCS        ;IS THE UNIT READY?
3174 016702 100401          BMI      1$          ;BRANCH IF READY
3175 016704 104400          HLT
3176 016706 000205 1$:  RTS      R5            ;SELECTED UNIT NOT READY
3177
3178
3179          ;INITIALIZE THE VECTORS
3180
3181 016710 012767 001112 161116  INIT:  MOV      #ERROR,34    ;SETUP TRAP VECTOR
3182 016716 012767 000340 161112          MOV      #FRI7,36
3183 016724 012767 001004 161076          MOV      #SCOPE$,30    ;SETUP EMT VECTOR
3184 016732 012767 000340 161072          MOV      #PRI7,32
3185 016740 012777 015272 006666          MOV      #DKINT,VECTOR ;SETUP DISK INTERRUPT VECTOR
3186 016746 012777 000340 006662          MOV      #PRI7,STATUS
3187 016754 012737 000340 177776          MOV      #PRI7,#PSW    ;LOCKOUT INTERRUPTS
3188 016762 000207          RTS      PC
3189
3190
3191          ;THIS ROUTINE CONVERTS A WORD COUNT TO A BLOCK COUNT
3192
3193 016764 012767 000377 006724  BLSZ:  MOV      #377,BLOCK ;DRIVE BLOCK SIZE
3194 016772 016767 006676 006734          MOV      WRDCT,WORK    ;FETCH WORD COUNT
3195 017000 036767 006712 006726          BIT      BLOCK,WORK
3196 017006 001410          BEQ      RORBLK
3197 017010 046767 006702 006716          BIC      BLOCK,WORK    ;SET UP BLOCK OVERFLOW
3198 017016 005267 006674          INC      BLOCK
3199 017022 066767 006670 006704          ADD      BLOCK,WORK
3200 017030 000367 006700  RORBLK:  SWAB     WORK
3201 017034 016767 006674 006654          MOV      WORK,BLOCK    ;BLOCK COUNT

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3202 017042 000207          RTS      PC          ;EXIT
3203
3204
3205          ; DETERMINE THE APPROPRIATE ATTENTION BIT FROM
3206          ; THE UNIT NUMBER.
3207
3208 017044 016701 006614    GATTN:  MOV     FLAG,R1
3209 017050 006001          ROR     R1
3210 017052 006001          ROR     R1          ;GET UNIT NUMBER
3211 017054 005067 000014    CLR     ATTN
3212 017060 042701 177770    BIC     #177770,R1 ;ISOLATE UNIT
3213 017064 116167 017076 000002  MOVB   ATTNB(R1),ATTN ;GET ATTENTION BIT
3214 017072 000207          RTS      PC
3215
3216
3217 017074 000000          ATTN:   0
3218 017076      001      002      004  ATTNB:  .BYTE  1,2,4,10,20,40,100,200
3219 017101      010      020      040
3220 017104      100      200
3221
3222          .EVEN
3223
3224
3225
3226          ;ROUTINE TO SELECT DATA PATTERNS FOR TEST
3227
3228          ;ENTER FROM JSR PC PASEL
3229 017106 016700 006572    PASEL:  MOV     PATNU,RO          ;SET UP PATTERN NUMBER
3230 017112 016767 006556 006614  MOV     WRDCT,WORK          ;SET UP WORK
3231 017120 012701 025762    MOV     #OUTBUF,R1         ;LOC. OF OUT BUFFER
3232 017124 032767 000500 006532  BIT     #500,FLAG          ;BK WITH MEM. MANAG. OR NO MEM.MANAG.
3233 017132 001002          BNE     1$                 ;BR IF TRUE
3234 017134 012701 040000    MOV     #40000,R1         ;START OF MEM. MANAG. BUFFER
3235 017140 022700 000034    1$:    CMP     #34,RO          ;TEST FOR RANDOM DATA NUMBER
3236 017144 001423          BEQ     RANDOM            ;GO GENERATE RANDOM DATA
3237 017146 022700 000032    CMP     #32,RO          ;IS THIS PATTERN 15
3238 017152 001406          BEQ     PATT32
3239 017154 016021 020030    FILDAT: MOV    PATO(0),(1)+ ;FILL BUFFER
3240 017160 005367 006550    DEC     WORK             ;DEC. WORK COUNT
3241 017164 001373          BNE     FILDAT           ;LOAD NEXT WORD
3242 017166 000207          RTS      PC             ;BUFFER FULL
3243 017170 012721 177777    PATT32: MOV    #177777,(1)+ ;INSERT ALL ONES PATTERN
3244 017174 005367 006534    DEC     WORK
3245 017200 001404          BEQ     1$
3246 017202 005021          CLR     (1)+            ;LOAD ZERO PATTERN
3247 017204 005367 006524    DEC     WORK             ;DECREMENT WORD COUNT
3248 017210 001367          BNE     PATT32          ;LOOP IF NOT ZERO
3249 017212 000207          1$:    RTS      PC          ;EXIT
3250          ;RANDOM DATA GENERATOR SUBROUTINE
3251 017214 016767 000134 000136  RANDOM: MOV    LONUN,LOSAV
3252 017222 016767 000130 000132  MOV    HINUN,HISAV
3253 017230 016700 000120    1$:    MOV    LONUN,RO          ;SET UP RO WITH 5 DIGITS LOW
3254 017234 016704 000116    MOV    HINUN,R4         ;SET UP R1 WITH 5 DIGITS HIGH
3255 017240 012703 000007    MOV    #7,R3           ;SET UP SHIFT COUNT
3256 017244 005002          CLR     R2             ;CLEAR R2
3257 017246 006300    2$:    ASL    RC             ;SHIFT RO LEFT AND

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3258	017250	006104				ROL	R4	: ROTATE CARRY INTO LSB OF R1 INTO
3259	017252	006102				ROL	R2	: ROTATE CARRY OUT OF R1 INTO R2
3260	017254	005303				DEC	R3	: DECREMENT R3
3261	017256	001373				BNE	2\$: CONTINUE SHIFT LOOP
3262	017260	066702	000070			ADD	LONUN,R2	: ADDN IN NUMBER TO MAKE X 129
3263	017264	005504				ADC	R4	: PROPOGATE CARRY
3264	017266	066704	000064			ADD	HINUN,R4	: ADDN IN NUMBER TO MAKE X 129
3265	017272	005502				ADC	R2	: PROPOGATE CARRY
3266	017274	062700	001057			ADD	#1057,R0	: ADDN LOW CONSTANT
3267	017300	005504				ADC	R4	: PROPOGATE CARRIES
3268	017302	005502				ADC	R2	: PROPOGATE AGAIN
3269	017304	062704	047401			ADD	#47401,R4	: ADDN HIGH CONSTANT
3270	017310	005502				ADC	R2	: PROPOGATE CARRY
3271	017312	062702	000006			ADD	#6,R2	: ADDN HIGHEST CONSTANT
3272	017316	060200				ADD	R2,R0	: REPRIME R0 WITH HIGH DIGIT
3273	017320	005504				ADC	R4	: PROPOGATE CARRY
3274	017322	010067	000026			MOV	R0,LONUN	: PUT R0 BACK IN LONUM
3275	017326	010021				MOV	R0,(1)+	: HOLD LONUM FOR PROGRAM
3276	017330	005367	006400			DEC	WORK	
3277	017334	001406				BEQ	EXGEN	
3278	017336	010467	000014			MOV	R4,HINUN	: PUT R1 BACK IN HINUM
3279	017342	010421				MOV	R4,(1)+	: HOLD HINUM FOR PROGRAM
3280	017344	005367	006364			DEC	WORK	
3281	017350	001327				BNE	1\$	
3282	017352	000207			EXGEN:	RTS	PC	: RETURN TO PROGRAM
3283	017354	000000			LONUN:	0		
3284	017356	000000			HINUN:	0		
3285	017360	000000			LOSAY:	0		
3286	017362	000000			HISAY:	0		
3287								
3288								
3289	017364	032767	000002	161650	MSG:	BIT	#B1,HLTCT\$: TYPE ENTIRE MESSAGE
3290	017372	001103				BNE	1\$: BRANCH IF NO
3291	017374	004567	161664			JSR	R5,PRINT\$: PRINT MESSAGE
3292	017400	024030				MESB		
3293	017402	004567	161656			JSR	R5,PRINT\$: PRINT MESSAGE
3294	017406	023637				MES2A		
3295	017410	017767	006244	162144		MOV	@RPDS,TTY	
3296	017416	004767	161722			JSR	PC,PRINTR	: TYPE LOCATION WITH LEADING ZEROS
3297	017422	004567	161636			JSR	R5,PRINT\$: PRINT MESSAGE
3298	017426	023615				MES1A		
3299	017430	017767	006222	162124		MOV	@RPER,TTY	
3300	017436	004767	161702			JSR	PC,PRINTR	: TYPE LOCATION WITH LEADING ZEROS
3301	017442	004567	161616			JSR	R5,PRINT\$: PRINT MESSAGE
3302	017446	023626				MES2		
3303	017450	017767	006164	162104		MOV	@RPCS,TTY	
3304	017456	004767	161662			JSR	PC,PRINTR	: TYPE LOCATION WITH LEADING ZEROS
3305	017462	004567	161576			JSR	R5,PRINT\$: PRINT MESSAGE
3306	017466	023650				MES2B		
3307	017470	017767	006154	162064		MOV	@RPCA,TTY	
3308	017476	004767	161642			JSR	PC,PRINTR	: TYPE LOCATION WITH LEADING ZEROS
3309	017502	004567	161556			JSR	R5,PRINT\$: PRINT MESSAGE
3310	017506	023661				MES2C		
3311	017510	017767	006136	162044		MOV	@RPDA,TTY	
3312	017516	004767	161622			JSR	PC,PRINTR	: TYPE LOCATION WITH LEADING ZEROS
3313	017522	004567	161536			JSR	R5,PRINT\$: PRINT MESSAGE

3314	017526	023672				MES20		
3315	017530	017767	006126	162024		MOV	JSUCA,TTY	
3316	017536	004767	161602			JSR	PC,PRINTR	;TYPE LOCATION WITH LEADING ZEROS
3317	017542	022767	000005	006160		CMP	#5,TESTNO	;TEST 5?
3318	017550	001404				BEQ	4\$;BR IF YES
3319	017552	022767	000006	006150		CMP	#6,TESTNO	;TEST 6?
3320	017560	001010				BNE	1\$;BR IF NO
3321	017562				4\$:			
3322	017562	004567	161476			JSR	R5,PRINT\$;PRINT MESSAGE
3323	017566	024261				MES21		;READ COUNTER =
3324	017570	016767	006160	161764		MOV	CNTA,TTY	
3325	017576	004767	161554			JSR	PC,PRINT\$;TYPE LOCATION-SUPRESS ZEROS
3326	017602	032767	000001	161432	1\$:	BIT	#80,HLTCT\$;TYPE EXP-REC
3327	017610	001001				BNE	2\$;BRANCH IF YES
3328	017612	000207				RTS	PC	
3329	017614	032767	000002	161420	2\$:	BIT	#81,HLTCT\$	
3330	017622	001403				BEQ	3\$	
3331	017624	004567	161434			JSR	R5,PRINT\$;PRINT MESSAGE
3332	017630	024175				MES17		
3333	017632	032767	000004	161402	3\$:	BIT	#82,HLTCT\$;TYPE MEMORY MANAGEMENT REGISTERS?
3334	017640	001450				BEQ	5\$;BR IF NO
3335	017642	004567	161416			JSR	R5,PRINT\$;PRINT MESSAGE
3336	017646	024360				MES23		
3337	017650	013767	172344	161704		MOV	2#KIPAR2,TTY	
3338	017656	004767	161474			JSR	PC,PRINT\$;TYPE LOCATION-SUPRESS ZEROS
3339	017662	004567	161376			JSR	R5,PRINT\$;PRINT MESSAGE
3340	017666	024375				MES24		
3341	017670	013767	172346	161664		MOV	2#KIPAR3,TTY	
3342	017676	004767	161454			JSR	PC,PRINT\$;TYPE LOCATION-SUPRESS ZEROS
3343	017702	004567	161356			JSR	R5,PRINT\$;PRINT MESSAGE
3344	017706	024420				MES25		
3345	017710	013767	172350	161644		MOV	2#KIPAR4,TTY	
3346	017716	004767	161434			JSR	PC,PRINT\$;TYPE LOCATION-SUPRESS ZEROS
3347	017722	004567	161536			JSR	R5,PRINT\$;PRINT MESSAGE
3348	017726	024435				MES26		
3349	017730	013767	172352	161624		MOV	2#KIPAR5,TTY	
3350	017736	004767	161414			JSR	PC,PRINT\$;TYPE LOCATION-SUPRESS ZEROS
3351	017742	004567	161316			JSR	R5,PRINT\$;PRINT MESSAGE
3352	017746	024460				MES27		
3353	017750	013767	172354	161604		MOV	2#KIPAR6,TTY	
3354	017756	004767	161374			JSR	PC,PRINT\$;TYPE LOCATION-SUPRESS ZEROS
3355	017762				5\$:			
3356	017762	004567	161276			JSR	R5,PRINT\$;PRINT MESSAGE
3357	017766	024210				MES18		
3358	017770	016767	000030	161564		MOV	EXPS,TTY	
3359	017776	004767	161342			JSR	PC,PRINTR	;TYPE LOCATION WITH LEADING ZEROS
3360	020002	004567	161256			JSR	R5,PRINT\$;PRINT MESSAGE
3361	020006	024224				MES19		
3362	020010	016767	000012	161544		MOV	RECS,TTY	
3363	020016	004767	161322			JSR	PC,PRINTR	;TYPE LOCATION WITH LEADING ZEROS
3364	020022	000207				RTS	PC	
3365	020024	000000				EXPS:	0	
3366	020026	000000				RECS:	0	
3367								
3368								
3369								

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3370          .EVEN
3371          ;RP11 DATA PATTERNS
3372
3373 020030 163126 PAT0: 163126
3374 020032 052525 PAT1: 052525
3375 020034 125252 PAT2: 125252
3376 020036 031463 PAT3: 031463
3377 020040 007417 PAT4: 007417
3378 020042 010421 PAT5: 010421
3379 020044 021042 PAT6: 021042
3380 020046 042104 PAT7: 042104
3381 020050 104210 PAT10: 104210
3382 020052 167356 PAT11: 167356
3383 020054 156735 PAT12: 156735
3384 020056 135673 PAT13: 135673
3385 020060 073567 PAT14: 073567
3386 020062 000001 PAT15: 000001
3387          ;PAT16 RANDOM DATA

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3388
3389          ; THIS ROUTINE COMPARES THE DATA READ AGAINST THE DATA EXPECTED.
3390          ; ALL ERRORS ARE REPORTED TO THE OPERATOR. IF BIT 5 OF THE SWITCH
3391          ; REGISTER IS SET, THIS ROUTINE WILL CONTINUE COMPARING AFTER AN
3392          ; ERROR HAS BEEN FOUND AND WILL REPORT UP TO 3 VERIFY ERRORS
3393          ; WITHIN THE SAME INPUT OPERATION.
3394 020064 012767 177775 005640 COMPAR: MOV # -3, ERRCOUNT ; ERROR RETRY COUNTER
3395 020072 016767 005576 005640          MOV WRDCT, WORK2 ; GET THE WORD COUNT
3396 020100 012767 025762 005604          MOV #OUTBUF, SAVE ; SET UP OUTBUFFER POINTER
3397 020106 032767 000500 005550          BIT #500, FLAG ; BK WITH MEM. MANAG. OR NO MEM. MANAG
3398 020114 001003          BNE 1$ ; BR IF TRUE
3399 020116 012767 040000 005566          MOV #40000, SAVE ; START OF MEM. MANAG. OUT BUFFER
3400 020124 005067 005552 1$: CLR SWITCH ; CLEAR RANDOM PATTERN FLAG
3401 020130 016767 177224 161544          MOV LOSAV, LONUM ; GET RANDOM BASE NOS.
3402 020136 016767 177220 161534          MOV HISAV, HINUM
3403 020144 022767 000034 005532          CMP #34, PATNU ; IS THIS RANDOM PATTERN?
3404 020152 001422          BEQ CMPLP ; BRANCH IF YES
3405 020154 022767 000032 005522          CMP #32, PATNU ; IS THIS SPECIAL PATTERN?
3406 020162 001037          BNE CMPLP1 ; BRANCH IF NO
3407 020164 005767 005512          CMPLP2: TST SWITCH
3408 020170 001006          BNE 1$
3409 020172 012767 177777 177624          MOV #177777, EXP$ ; EXPECT ALL ONES
3410 020200 010667 005476          MOV SP, SWITCH ; SET THE FLAG
3411 020204 000433          BR WRDCMP ; GO COMPARE DATA
3412 020206 005067 005470 1$: CLR SWITCH
3413 020212 005067 177606          CLR EXP$ ; EXPECT ALL ZEROS
3414 020216 000426          BR WRDCMP ; GO COMPARE DATA
3415 020220 005767 005456          CMPLP: TST SWITCH
3416 020224 001010          BNE 2$
3417 020226 004767 161332          JSR PC, RAND$ ; GENERATE TWO RANDOM NOS.
3418 020232 016767 161444 177564          MOV LONUM, EXP$ ; GET EVEN RANDOM WORD
3419 020240 010667 005436          MOV SP, SWITCH ; SET RANDOM PATTERN FLAG
3420 020244 000413          BR WRDCMP
3421 020246 005067 005430 2$: CLR SWITCH
3422 020252 016767 161422 177544          MOV HINUM, EXP$
3423 020260 000405          BR WRDCMP
3424 020262 016700 005416          CMPLP1: MOV PATNU, RO
3425 020266 016067 020030 177530          MOV PAT0(RO), EXP$

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3426	020274	027767	005412	177522	WRDCMP:	CMP	2SAVE,EXPS	;COMPARE DATA
3427	020302	001021				BNE	WDERR	;WORD IN ERROR
3428	020304	005367	005430		WRDINC:	DEC	WORK2	;DECREMENT THE WORD COUNT
3429	020310	001415				BEQ	ADAM	;EXIT ROUTINE IF ZERO
3430	020312	062767	000002	005372	BLAD1:	ADD	#2,SAVE	;UPDATE PATTERN ADDRESS
3431	020320	022767	000032	005356		CMP	#32,PATNU	
3432	020326	101362				BHI	WRDCMP	;BRANCH IF STANDARD PATTERN
3433	020330	022767	000034	005346		CMP	#34,PATNU	;IS THIS RANDOM PATTERN
3434	020336	001730				BEQ	CMPLP	;BRANCH IF YES
3435	020340	000711				BR	CMPLP2	;BRANCH IF YES
3436	020342	000754				BR	WRDCMP	;COMPARE NEXT WORD
3437	020344	000207			ADAM:	RTS	PC	;EXIT THIS ROUTINE
3438	020346	005767	164140		WDERR:	TST	INTFLG	;DID INTERRUPT OCCUR YET?
3439	020352	001750				BEQ	WRDCMP	;BRANCH IF NO
3440	020354	017767	005332	177444		MOV	2SAVE,RECS	;GET GOOD DATA
3441	020362	010667	160652			MOV	SP,ERRFLG	;SET ERROR FLAG
3442	020366	005767	005332			TST	RDERR	;IS THIS THE FIRST READ ERROR?
3443	020372	001404				BEQ	3\$;BRANCH IF YES
3444	020374	032737	000020	177570		BIT	#84,2\$SWR	;PRINT ALL RETRY ERRORS?
3445	020402	001556				BEQ	1\$;BRANCH IF NO
3446	020404	032767	000100	005252	3\$:	BIT	#86,FLAG	;MEMORY MANAGEMENT?
3447	020412	001002				BNE	10\$;BR IF NO
3448	020414	104405				HLT	+5	;DATA COMPARE ERROR USING MEM. MANAG.
3449	020416	000401				BR	9\$;GET AROUND HLT+3
3450	020420	104403			10\$:	HLT	+3	;DATA COMPARE ERROR
3451	020422	005067	005270		9\$:	CLR	BLOCK	;CLEAR THE BLOCK COUNTER
3452	020426	016767	005242	005300		MOV	WRDCT,WORK	;GET THE WORD COUNT
3453	020434	166767	005300	005272		SUB	WORK2,WORK	;DETERMINE DISTANCE OF FAILURE INTO BUFFER
3454	020442	162767	000400	005264	2\$:	SUB	#400,WORK	
3455	020450	100403				BMI	8\$	
3456	020452	005267	005240			INC	BLOCK	;UPDATE BLOCK COUNT FOR EACH 400 WORDS
3457	020456	000771				BR	2\$	
3458	020460	062767	000400	005246	8\$:	ADD	#400,WORK	;RESTORE POSITIVE NUMBER
3459	020466	016767	005206	005242		MOV	DMA,WORK1	;GET HEAD AND SECTOR ADDRESS
3460	020474	016767	005176	005240		MOV	CYLINDER,WORK3	;GET CYLINDER ADDRESS
3461	020502	005767	005210		5\$:	TST	BLOCK	;IS THE BLOCK COUNT ZERO?
3462	020506	001427				BEQ	7\$;BRANCH IF YES
3463	020510	005367	005202			DEC	BLOCK	;DECREMENT BLOCK COUNT
3464	020514	122767	000011	005214		CMPB	#11,WORK1	;DETERMINE THE CYLINDER, HEAD,
3465	020522	001403				BEQ	4\$;AND SECTOR ADDRESSES OF THE
3466	020524	005267	005206			INC	WORK1	;COMPARE ERROR
3467	020530	000764				BR	5\$	
3468	020532	105067	005200		4\$:	CLRB	WORK1	
3469	020536	122767	000023	005173		CMPB	#23,WORK1+1	
3470	020544	001403				BEQ	6\$	
3471	020546	105267	005165			INCB	WORK1+1	
3472	020552	000753				BR	5\$	
3473	020554	005067	005156		6\$:	CLR	WORK1	
3474	020560	005267	005156			INC	WORK3	
3475	020564	000746				BR	5\$	
3476	020566				7\$:			
3477	020566	004567	160472			JSR	RS,PRINTS	;PRINT MESSAGE
3478	020572	024143				MES14		;GIVE CYL ADDR
3479	020574	016767	005142	160760		MOV	WORK3,TTY	
3480	020602	004767	160550			JSR	PC,PRINTS	;TYPE LOCATION-SUPPRESS ZEROS
3481	020606	005067	005114			CLR	ACNVX	

3482	020612	116767	005121	005106	MOV	WORK1+1,ACNVX	
3483	020620	004567	160440		JSR	RS,PRINTS	:PRINT MESSAGE
3484	020624	024153			MES15		:GIVE HEAD ADDR
3485	020626	016767	005074	160726	MOV	ACNVX,TTY	
3486	020634	004767	160516		JSR	PC,PRINTS	:TYPE LOCATION-SUPRESS ZEROS
3487	020640	116767	005072	005060	MOV	WORK1,ACNVX	
3488	020646	004567	160412		JSR	RS,PRINTS	:PRINT MESSAGE
3489	020652	024164			MES16		:GIVE SECTOR ADDR
3490	020654	016767	005046	160700	MOV	ACNVX,TTY	
3491	020662	004767	160470		JSR	PC,PRINTS	:TYPE LOCATION-SUPRESS ZEROS
3492	020666	004567	160372		JSR	RS,PRINTS	:PRINT MESSAGE
3493	020672	024043			MES9		
3494	020674	016767	005034	005024	MOV	WORK,ACNVX	:GET WORD COUNT INTO SECTOR
3495	020702	005267	005020		INC	ACNVX	
3496	020706	016767	005014	160646	MOV	ACNVX,TTY	
3497	020714	004767	160436		JSR	PC,PRINTS	:TYPE LOCATION-SUPRESS ZEROS
3498	020720	004567	160340		JSR	RS,PRINTS	:PRINT MESSAGE
3499	020724	024127			MES13		
3500	020726	016767	004772	160626	MOV	RDERR,TTY	
3501	020734	004767	160416		JSR	PC,PRINTS	:TYPE LOCATION-SUPRESS ZEROS
3502	020740	032737	000040	177570	1\$: BIT	#B5,#SWR	:CONTINUE COMPARING?
3503	020746	001405			BEQ	11\$:BRANCH IF NO
3504	020750	005267	004756		INC	ERCOUNT	:UPDATE ERROR COUNTER
3505	020754	001402			BEQ	11\$	
3506	020756	000167	177322		JMP	WRDINC	
3507	020762	000167	177356		11\$: JMP	ADAM	
3508							
3509							
3510							
3511							
3512							
3513							
3514							
3515							
3516							
3517	020766	032767	000100	004670	EXTMEN: BIT	#B6,FLAG	:MEMORY MANAGEMENT IN USE?
3518	020774	001002			BNE	1\$:BR IF NO
3519	020776	005037	177572		CLR	#SRO	:TURN IT OFF
3520	021002	052777	000001	004630	1\$: BIS	#B0,#RPCS	:CLEAR THE DISK
3521	021010	105777	004624		TSTB	#RPCS	
3522	021014	100375			BPL	.-4	
3523	021016	012737	000340	177776	MOV	#PRI7,#PSW	:LOCK UP PRIORITY LEVELS
3524	021024	012767	021074	156752	MOV	#MAXREF,4	:SET UP I/O BUS TRAP
3525	021032	012767	000340	156746	MOV	#PRI7,6	
3526	021040	012767	017446	004644	MOV	#17446,SAVE	:SET UP FOR 4K
3527	021046	005777	004640		EXREF: TST	#SAVE	:REFERENCE MEMORY
3528	021052	022767	157446	004632	CMP	#157446,SAVE	:TEST FOR 28K
3529	021060	001001			BNE	1\$:BRANCH IF LESS THAN 28K
3530	021062	000407			BR	MAXRF1	:LAST REFERENCE MADE TO I/O REG.
3531	021064	062767	020000	004620	1\$: ADD	#20000,SAVE	:SET UP FOR NEXT MEMORY REF.
3532	021072	000765			BR	EXREF	:GO REFERENCE MEMORY
3533							
3534							
3535							
3536	021074	162767	020000	004610	MAXREF: SUB	#20000,SAVE	
3537	021102	012767	000006	156674	MAXRF1: MOV	#E.4	:RESTORE I/O BUS TRAP

:EXTENDED MEMORY EXERCISER
 :THE PROGRAM DETERMINES HOW MUCH MEMORY
 :IS ON THE SYSTEM THEN IT
 :GENERATES A RANDOM BUFFER THAT SIZE
 :AND WRITES AND WRITE CHECKS THE DATA

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3538 021110 005067 156672          CLR      6
3539 021114 005737 000042          TST     @#42          ;UNDER MONITOR CONTROL?
3540 021120 001403          BEQ     1$          ;BRANCH IF NO
3541 021122 162767 005670 004562          SUB     #3000,SAVE   ;ALLOW ROOM FOR THE MONITOR
3542 021130 016767 004556 000610 1$: MOV     SAVE,MEMSIZ  ;SAVE THE MAXIMUM MEMORY ADDRESS
3543 021136 000434          BR      MMSIZE      ;GO SIZE WITH MEMORY MANAGEMENT
3544 021140 162767 025762 004544 MM8K:  SUB     #OUTBUF,SAVE ;DETERMINE THE BUFFER SIZE
3545 021146 000241          CLC
3546 021150 006067 004536          ROR     SAVE        ;FORM WORD COUNT
3547 021154 016767 004532 004512          MOV     SAVE,WRDCT  ;SAVE IT
3548 021162 042767 000001 004522          BIC     #80,SAVE    ;MAKE ADDRESS EVEN
3549 021170 012767 025762 004524          MOV     #OUTBUF,INBUF ;START OF INPUT BUFFER
3550 021176 066767 004510 004516          ADD     SAVE,!NBUF
3551 021204 000241          CLC
3552 021206 042767 000377 004460          BIC     #377,WRDCT  ;DETERMINE MAXIMUM WORD COUNT
3553 021214 016767 004454 004466          MOV     WRDCT,SWRDCT
3554 021222 012706 000476          EXIT:  MOV     #STKPTR-2,SP
3555 021226 000205          RTS      R5
3556
3557          ;THIS SUB-ROUTINE MAPS FOR MEMORY MANAGEMENT AND SETS UP
3558          ;BUFFER SIZES WITH MEMORY MANAGEMENT
3559
3560 021230 032767 000100 004426 MMSIZE: BIT     #86,FLAG   ;USING MEMORY MANAGEMENT?
3561 021236 001340          BNE     MM8K        ;BR IF NO
3562 021240 005237 177572          INC     @#SRO       ;TURN MEMORY MANAGEMENT BACK ON
3563 021244 012737 021312 000004          MOV     #NXM,@#ERRVEC ;SET UP FOR TRAP
3564 021252 012737 000340 000006          MOV     #340,@#ERRVEC+2
3565 021260 012737 000400 172344          MOV     #400,@#KIPAR2 ;SETUP FOR NEXT 4K PAGE
3566 021266 012737 177406 172304          MOV     #400*256.-400+UP,RW,@#KIPDR2 ;SET KIPDR2=RW UP 400 BLOCKS
3567 021274 012700 040000          MOV     #40000,RO   ;SET UP FOR TEST
3568 021300 005710          1$: TST     (RO)
3569 021302 062737 000040 172344          ADD     #40,@#KIPAR2 ;JUMP PAGE BY 1K
3570 021310 000773          BR      1$          ;TEST NEXT PAGE
3571 021312 022737 000400 172344 NXM:  CMP     #400,@#KIPAR2 ;8K MACHINE?
3572 021320 001013          BNE     1$          ;BR IF MORE THAN 8K
3573 021322 052767 000400 004334          BIS     #88,FLAG    ;8K MACHINE WITH MEMORY MANAGEMENT
3574 021330 005037 172304          CLR     @#KIPDR2   ;SET KIPDR2 TO BE NON EXISTANT
3575 021334 012737 000006 000004          MOV     #6,@#4     ;RESTORE TRAP CATCHER
3576 021342 005037 000006          CLR     @#6
3577 021346 000674          BR      MM8K
3578 021350 013767 172344 000400 1$: MOV     @#KIPAR2,PARMAX ;FINISH MAPPING AS IF NO MEMORY MANAGEMENT
3579 021356 162767 000040 000372          SUB     #40,PARMAX  ;PUT KIPAR2 INTO WORK LOCATION
3580 021364 016700 000366          MOV     PARMAX,RO   ;ADJUST MAXIMUM RELOCATION CONSTANT
3581
3582 021370 042700 177637          BIC     #177637,RO  ;GET WORKING COPY OF THE RELOCATION
3583 021374 006200          ASR     RO          ;CONSTANT AND
3584 021376 006200          ASR     RO          ;FORM AN
3585 021400 006200          ASR     RO          ;INDEX INTO
3586 021402 006200          ASR     RO          ;THE TABLES FOR
3587 021404 166067 021760 000344          SUB     PARTAB(RO),PARMAX ;RELOCATION CONSTANT
3588          ;AND FOR THE SIZE OF THE LAST PAGE
3589 021412 016067 021770 000332          MOV     MMTAB(RO),MMSIZ ;CALCULATE THE MAXIMUM RELOCATION
3590          ;CONSTANT FOR MEMORY MANAGEMENT
3591 021420 022767 001600 000330 MMFIN: CMP     #1600,PARMAX ;GET THE SIZE OF THE LAST PAGE AND
3592 021426 003441          BLE     5$          ;GO CREATE BUFFER SIZES AND WORD COUNTS
3593 02143C 005001          CLR     R1          ;PARMAX >OR= 28K
                       ;BR IF YES, ELSE PROCEED ONWARD
                       ;RESET FULL 4K BUFFER COUNTER

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3594	021432	005067	004236		CLR	WRDCT	; CLEAR WORD COUNT	
3595	021436	012700	000400		MOV	#400,RO	; SET UP TO EXTRACT THE NUMBER OF	
3596							; FULL 4K BUFFERS FOR A PARTIAL WRDCT	
3597	021442	020067	000310	1\$:	CMP	RO,PARMAX	; DO WE HAVE THE NUMBER OF FULL 4K PAGES?	
3598	021446	001404			BEQ	2\$; BR IF YES, ELSE REPEAT	
3599	021450	062700	000200		ADD	#200,RO	; UPDATE TO NEXT 4K BUFFER	
3600	021454	005201			INC	R1	; UPDATE FULL 4K BUFFER COUNTER	
3601	021456	000771			BR	1\$; AND REPEAT	
3602	021460	010167	000270	2\$:	MOV	R1,PDRS	; STORE NUMBER OF FULL 4K BUFFERS	
3603	021464	005701		3\$:	TST	R1	; FINISHED CALCULATING PARTIAL WORD COUNT?	
3604	021466	001405			BEQ	4\$; BR IF YES, ELSE PROCEED ON	
3605	021470	062767	010000	004176	ADD	#10000,WRDCT	; USING THE NUMBER OF FULL 4K PAGES	
3606	021476	005301			DEC	R1	; CALCULATE A PARTIAL WORD COUNT	
3607	021500	000771			BR	3\$		
3608	021502	005267	000246	4\$:	INC	PDRS	; ADJUST FOR MEMORY MANAGEMENT MAPPING	
3609	021506	066767	000240	004160	ADD	MMSIZ,WRDCT	; ADD SIZE OF LAST PAGE	
3610	021514	016767	004154	004166	MOV	WRDCT,SWRDC	; AND SAVE TOTAL BUFFER SIZE AND	
3611	021522	016767	004146	000250	MOV	WRDCT,MAXWC	; SAVE AGAIN FOR CONFORMITY	
3612	021530	000414			BR	SALDR	; GO SAVE THE LOADERS	
3613	021532	012767	050000	000240	5\$:	MOV	#50000,MAXWC	; 20K TRANSFERS
3614	021540	012767	040000	004142	MOV	#40000,SWRDC	; SET UP HIGHEST TRANSFER SIZE	
3615	021546	066767	000200	004134	ADD	MMSIZ,SWRDC	; ADD LAST PAGE SIZE	
3616	021554	012767	000005	000172	MOV	#5,PDRS	; SET UP COUNT FOR KIPDRS	
3617	021562	005767	004170		SALDR:	TST	LDRFLG	; ARE THE LOADERS ALREADY RELOCATED?
3618	021566	001017			BNE	1\$; BR IF YES	
3619	021570	005037	177572		CLR	#SRO	; TURN OFF MEMORY MANAGEMENT	
3620	021574	005167	004156		COM	LDRFLG	; ADJUST LOADER RELOCATED FLAG	
3621	021600	016700	000142		MOV	MEMSIZ,RO		
3622	021604	042700	003777		BIC	#3777,RO	; SET UP FOR 1K WORD	
3623	021610	012737	021626	000004	MOV	#1\$,#ERRVEC	; SETUP TRAP CATCHER	
3624	021616	012701	034000		MOV	#34000,R1	; BK START ADDRESS FOR LOADERS	
3625	021622	012021		2\$:	MOV	(RO)+,(R1)+	; MOVE LOADER	
3626	021624	000776			BR	2\$		
3627	021626	012737	000006	000004	1\$:	MOV	#6,#ERRVEC	; RESTORE TRAPCATCHER
3628	021634	005037	000006		CLR	#ERRVEC+2		
3629	021640	052737	000001	177572	BIS	#80,#SRO	; TURN MEMORY MANAGEMENT BACK ON IF OFF	
3630	021646	016700	000102		MOV	PDRS,RO	; PUT NUMBER OF KIPDRS INTO WORK REGISTER	
3631	021652	005300			DEC	RO	; SETUP FOR PROPER NUMBER OF KIPDRS	
3632	021654	001422			BEQ	3\$; BR IF NO KIPDRS NEED SETTING UP	
3633	021656	012737	177406	172306	MOV	#400*256.-400+UP,RO	; SET KIPDR3=RW UP 400 BLOCKS	
3634	021664	005300			DEC	RO	; ENOUGH KIPDRS?	
3635	021666	001415			BEQ	3\$; BR IF ENOUGH	
3636	021670	012737	177406	172310	MOV	#400*256.-400+UP,RO	; SET KIPDR4=RW UP 400 BLOCKS	
3637	021676	005300			DEC	RO	; ENOUGH KIPDRS?	
3638	021700	001410			BEQ	3\$; BR IF YES	
3639	021702	012737	177406	172312	MOV	#400*256.-400+UP,RO	; SET KIPDR5=RW UP 400 BLOCKS	
3640	021710	005300			DEC	RO	; ENOUGH KIPDRS?	
3641	021712	001403			BEQ	3\$; BR IF YES	
3642	021714	012737	177406	172314	MOV	#400*256.-400+UP,RO	; SET KIPDR6=RW UP 400 BLOCKS	
3643	021722			3\$:				
3644	021722	004567	157354		JSR	RS,PRNTR\$; FORCE PRINT THE MESSAGE	
3645	021726	024301			MES22		; LOADERS HAVE BEEN RELOCATED TO BK	
3646							; TO RESTORE LOADERS START AT LOCATION	
3647	021730	012767	023514	157624	MOV	#RELOAD,TTY		
3648	021736	004767	157436		JSR	PC,PRINTB	; FORCE TYPE LOCATION - SUPPRESS ZEROS	
3649	021742	000167	177254		JMP	EXIT	; MEMORY MANAGEMENT DONE	

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3650
3651 021746 000000 MEMSIZ: 0
3652 021750 000000 MEX: 0 ;CONTROLLER EXTENDED MEMORY ADDRESS
3653 021752 000000 MMSIZ: 0 ;THE LAST PAGE SIZE
3654 021754 000000 PDRS: 0 ;THE NUMBER OF PAGES IN THE BUFFER
3655 021756 000000 PARMAX: 0 ;THE MAXIMUM KIPAR VALUE
3656
3657 ;TABLE OF OFFSETS FOR CORRECTING PARMAX RELOCATION CONSTANT
3658 021760 000000 PARTAB: .WORD 0
3659 021762 000040 .WORD 40
3660 021764 000100 .WORD 100
3661 021766 000140 .WORD 140
3662
3663 ;TABLE OF LAST PAGE SIZES
3664 021770 002000 MMTAB: .WORD 1024.
3665 021772 004000 .WORD 2048.
3666 021774 006000 .WORD 3072.
3667 021776 010000 .WORD 4096.
3668
3669 022000 000000 MAXWC: 0
3670
3671 ;SUB-ROUTINE TO INITIALIZE KIPAR2-6
3672
3673 022002 016700 177746 PARINT: MOV PDRS,RO ;GET NUMBER OF KIPARS
3674 022006 012737 000400 172344 MOV #400,2#KIPAR2 ;SETUP FIRST PAGE
3675 022014 005300 DEC RO ;DONE?
3676 022016 001422 BEQ 1$ ;BR IF YES
3677 022020 012737 000600 172346 MOV #600,2#KIPAR3 ;SET UP SECOND PAGE
3678 022026 005300 DEC RO ;DONE?
3679 022030 001415 BEQ 1$ ;BR IF YES
3680 022032 012737 001000 172350 MOV #1000,2#KIPAR4 ;SETUP THIRD PAGE
3681 022040 005300 DEC RO ;DONE?
3682 022042 001410 BEQ 1$ ;BR IF YES
3683 022044 012737 001200 172352 MOV #1200,2#KIPAR5 ;SETUP FOURTH PAGE
3684 022052 005300 DEC RO ;DONE?
3685 022054 001403 BEQ 1$ ;BR IF YES
3686 022056 012737 001400 172354 MOV #1400,2#KIPAR6 ;SETUP FIFTH PAGE
3687 022064 062716 000004 1$: ADD #4,(SP)
3688 022070 000207 RTS PC
3689
3690 ;SUB-ROUTINE TO INCREMENT EACH KIPAR USED BY 1K
3691
3692 022072 005000 PARINC: CLR RO ;SETUP INDEX
3693 022074 016746 177654 MOV PDRS,-(SP) ;GET NUMBER OF KIPARS
3694 022100 006316 ASL (SP) ;DOUBLE IT
3695 022102 062760 000040 172344 1$: ADD #40,KIPAR2(RO) ;INCREMENT KIPAR BY 1K
3696 022110 005720 TST (RO)+ ;BUMP INDEX
3697 022112 020016 CMP RO,(SP) ;DONE?
3698 022114 001372 BNE 1$ ;BR IF NO
3699 022116 005726 TST (SP)+ ;CLEAN UP STACK
3700 022120 000207 RTS PC ;RETURN
3701
3702 ;SUB-ROUTINE TO GENERATE "MEX", "WRDCT", "BUF" USING MEMORY MANAGEMENT
3703
3704 022122 013700 172344 PARREG: MOV 2#KIPAR2,RO ;GET THE LOW REGISTER
3705 022126 042700 171770 BIC #171770,RO ;CLEAR ALL BUT ADDRESS BITS 17319
  
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3706 022132 006300 ASL RO ;PROPERLY POSITION MEX BITS
3707 022134 006300 ASL RO
3708 022136 000300 SWAB RO
3709 022140 010067 177604 MOV RO,MEX ;STORE FOR DRIVE EXTENDED MEMORY BITS
3710 022144 013700 172344 MOV #KIPAR2,RO ;GET THE LOW REGISTER AGAIN
3711 022150 042700 006000 BIC #6000,RO ;CLEAR ADDRESS BITS 17&18
3712 022154 006200 ASR RO ;PROPERLY POSITION AS RPBA
3713 022156 006200 ASR RO
3714 022160 000300 SWAB RO
3715 022162 010067 003520 MOV RO,BUF ;STORE AS BUS ADDRESS
3716 022166 042767 001000 003470 BIC #B9,FLAG ;CLEAR LAST PAGE FLAG
3717 022174 005000 CLR RO ;INITIALIZE INDEX
3718 022176 016700 177552 MOV PDRS,RO ;GET NUMBER OF KIPARS
3719 022202 005300 DEC RO
3720 022204 006300 ASL RO ;FINAL INDEX VALUE
3721 022206 016046 172344 MOV KIPAR2(RO),-(SP) ;PUT VALUE OF LAST KIPAR ON STACK
3722 022212 022667 177540 CMP (SP)+,PARMAX ;WORKING WITH LAST PAGE?
3723 022216 001003 BNE 1$ ;BR IF NOT LAST PAGE
3724 022220 052767 001000 003436 BIS #B9,FLAG ;SET LAST PAGE BIT
3725 022226 032767 000002 003430 1$: BIT #B1,FLAG ;OPERATOR SELECTING TRANSFER SIZE
3726 022234 001010 BNE 2$ ;BR IF OPERATOR SELECTING TRANSFER SIZE
3727 022236 032767 001000 003420 BIT #B9,FLAG ;LAST TRANSFER?
3728 022244 001004 BNE 2$ ;BR IF YES
3729 022246 016767 177526 003420 MOV MAXWC,WRDCT ;SETUP WORD COUNT
3730 022254 000403 BR 3$ ;EXIT FROM SUB-ROUTINE
3731 022256 016767 003426 003410 2$: MOV SWRDCT,WRDCT ;SETUP OPERATOR OR LAST PAGE WORD COUNT
3732 022264 000207 3$: RTS PC ;RETURN

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3733
3734
3735
3736 ;BACKGROUND TEST FOR INTERRUPTS - WORST CASE NPRS AND BUS PATTERN
3737

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3738 022266 010667 00C222 NPR: MOV SP,BCKFLG ;SET BACKGROUND FLAG
3739 022272 012767 030000 000210 MOV #30000,NPRCNT ;SETUP TIMEOUT COUNTER
3740 022300 012701 022512 MOV #NPR1,R1
3741 022304 005011 CLR (R1) ;SETUP BUS PATTERN
3742 022306 000261 SEC
3743 022310 000010 2$:
3744 022310 106111 ROLB (R1)
3745 022312 105421 NEGB (R1)+
3746 022314 105441 NEGB -(R1)
3747 022316 106111 ROLB (R1)
3748 022320 105421 NEGB (R1)+
3749 022322 105441 NEGB -(R1)
3750 022324 106111 ROLB (R1)
3751 022326 105421 NEGB (R1)+
3752 022330 105441 NEGB -(R1)
3753 022332 106111 ROLB (R1)
3754 022334 105421 NEGB (R1)+
3755 022336 105441 NEGB -(R1)
3756 022340 106111 ROLB (R1)
3757 022342 105421 NEGB (R1)+
3758 022344 105441 NEGB -(R1)
3759 022346 106111 ROLB (R1)
3760 022350 105421 NEGB (R1)+
3761 022352 105441 NEGB -(R1)

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3762	022354	106111			ROLB	(R1)	
3763	022356	105421			NEGB	(R1)+	
3764	022360	105441			NEGB	-(R1)	
3765	022362	106111			ROLB	(R1)	
3766	022364	105421			NEGB	(R1)+	
3767	022366	105441			NEGB	-(R1)	
3768	022370	005201			INC	R1	
3769	022372	106111			ROLB	(R1)	
3770	022374	105421			NEGB	(R1)+	
3771	022376	105441			NEGB	-(R1)	
3772	022400	106111			ROLB	(R1)	
3773	022402	105421			NEGB	(R1)+	
3774	022404	105441			NEGB	-(R1)	
3775	022406	106111			ROLB	(R1)	
3776	022410	105421			NEGB	(R1)+	
3777	022412	105441			NEGB	-(R1)	
3778	022414	106111			ROLB	(R1)	
3779	022416	105421			NEGB	(R1)+	
3780	022420	105441			NEGB	-(R1)	
3781	022422	106111			ROLB	(R1)	
3782	022424	105421			NEGB	(R1)+	
3783	022426	105441			NEGB	-(R1)	
3784	022430	106111			ROLB	(R1)	
3785	022432	105421			NEGB	(R1)+	
3786	022434	105441			NEGB	-(R1)	
3787	022436	106111			ROLB	(R1)	
3788	022440	105421			NEGB	(R1)+	
3789	022442	105441			NEGB	-(R1)	
3790	022444	106111			ROLB	(R1)	
3791	022446	105421			NEGB	(R1)+	
3792	022450	105441			NEGB	-(R1)	
3793	022452	106111			ROLB	(R1)	
3794	022454	005301			DEC	R1	
3795	022456	103401			BCS	1\$	
3796	022460	000000			HALT		: ARITHMETIC OPERATION FAILED RUN DIAG
3797	022462	005367	000022	1\$:	DEC	NPRCNT	
3798	022466	001310			BNE	2\$	
3799	022470	104400			HLT		: OPERATION TIMED OUT WAITING FOR INTERRUPT
3800	022472	004567	156566		JSR	R5, PRINT\$: PRINT MESSAGE
3801	022476	024475			TIMO		
3802	022500	000000			HALT		
3803							
3804	022502	005067	000006		NPRET: CLR	BCKFLG	
3805	022506	000207			RTS	PC	
3806	022510	000000			NPRCNT: 0		
3807	022512	000000			NPRI: 0		
3808	022514	000000			BCKFLG: 0		
3809							
3810							
3811							
3812							: THIS TEST ALLOWS THE OPERATOR TO SPECIFY TWO CYLINDER ADDRESSES
3813							: AND THE PROGRAM WILL THEN SEEK BETWEEN THEM. THE ROUTINE DOES
3814							: NOT CHECK FOR ERRORS.
3815	022516	000005			CYLSK: RESET		
3816	022520	004567	156556		JSR	R5, PRINT\$: FORCE PRINT THE MESSAGE
3817	022524	025333			CON17		

3818	022526	004767	157152		JSR	PC,READS		: INPUT MESSAGE
3819	022532	022767	000131	157254	CMP	#131,INPUTS		: DOES HE WANT HEAD ALIGNMENT ROUTINE
3820	022540	001002			BNE	4S		: BR IF NO
3821	022542	000167	000424		JMP	HEAD		: GO DO HEAD ALIGNMENT ROUTINE
3822	022546						4S:	
3823	022546	004567	156530		JSR	RS,PRINTFS		: FORCE PRINT THE MESSAGE
3824	022552	025566			CON19			
3825	022554	004767	157124		JSR	PC,READS		: INPUT MESSAGE
3826	022560	022767	000131	157226	CMP	#131,INPUTS		: DOES HE WANT HOME SEEKS?
3827	022566	001002			BNE	1S		: BR IF NO
3828	022570	000167	000526		JMP	HOMERS		: GO DO HOME SEEK ROUTINE
3829	022574						1S:	
3830	022574	004567	156502		JSR	RS,PRINTFS		: FORCE PRINT THE MESSAGE
3831	022600	025305			CON15			: CYLINDER A
3832	022602	004767	157076		JSR	PC,READS		: INPUT MESSAGE
3833	022606	004767	157250		JSR	PC,PACKS		: CONVERT INPUT TO A NUMBER
3834	022612	022767	000626	157514	CMP	#626,NUMS		: IS CYL ADDR TOO HIGH?
3835	022620	101765			BLOS	1S		: BRANCH IF YES
3836	022622	016767	157506	003116	MOV	NUMS,CYLA		: SAVE FIRST ADDR
3837	022630						2S:	
3838	022630	004567	156446		JSR	RS,PRINTFS		: FORCE PRINT THE MESSAGE
3839	022634	025320			CON16			: CYLINDER B
3840	022636	004767	157042		JSR	PC,READS		: INPUT MESSAGE
3841	022642	004767	157214		JSR	PC,PACKS		: CONVERT INPUT TO A NUMBER
3842	022646	022767	000626	157460	CMP	#626,NUMS		: IS CYL ADDR TOO HIGH?
3843	022654	101765			BLOS	2S		: BRANCH IF YES
3844	022656	016767	157452	003064	MOV	NUMS,CYLB		: SAVE SECOND ADDR
3845	022664						3S:	
3846	022664	004567	156412		JSR	RS,PRINTFS		: FORCE PRINT THE MESSAGE
3847	022670	024712			CON4			: DRIVE?
3848	022672	004767	157006		JSR	PC,READS		: INPUT MESSAGE
3849	022676	004767	157160		JSR	PC,PACKS		: CONVERT INPUT TO A NUMBER
3850	022702	022767	000010	157424	CMP	#10,NUMS		: IS UNIT # TOO HIGH?
3851	022710	101765			BLOS	3S		: BRANCH IF YES
3852	022712	000241			CLC			
3853	022714	006167	157414		ROL	NUMS		
3854	022720	006167	157410		ROL	NUMS		
3855	022724	016767	157404	002732	MOV	NUMS,FLAG		: SAVE UNIT NO.
3856	022732	004767	174106		JSR	PC,GATTN		: DETERMINE ATTENTION BIT
3857	022736	004567	173674		JSR	RS,DSKNOS		: SELECT THE UNIT
3858	022742	016777	003000	002700	MOV	CYLA,ARPC		: LOAD THE CYLINDER ADDR
3859	022750	052777	000011	002662	BIS	#11,ARPCS		: ISSUE SEEK COMMAND
3860	022756	105777	002656		TSTB	ARPCS		: WAIT FOR READY
3861	022762	100375			BPL	20S		
3862	022764	036777	174104	002666	BIT	ATTN,ARPCS		: WAIT FOR ATTENTION
3863	022772	001774			BEQ	1S		
3864	022774	016777	174074	002656	MOV	ATTN,ARPCS		: CLEAR ATTENTION BIT
3865	023002	005777	002632		TST	ARPCS		: ANY ERRORS?
3866	023006	100022			BPL	2S		
3867	023010	104400			HLT			: ERROR AFTER SEEK COMMAND
3868	023012	032777	004000	002640	BIT	#811,ARPCS		: SEEK INCOMPLETE?
3869	023020	001415			BEQ	2S		: BRANCH IF NO
3870	023022	112777	000015	002610	MOVB	#15,ARPCS		: ISSUE HOME COMMAND
3871	023030	105777	002604		TSTB	ARPCS		: WAIT FOR READY
3872	023034	100375			BPL	21S		
3873	023036	036777	174032	002614	BIT	ATTN,ARPCS		: WAIT FOR ATTENTION BIT

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3874 023044 001774 BEQ 3$
3875 023046 016777 174022 002604 MOV ATTN,ARPCD
3876 023054 016777 002670 002566 2$: MOV CYLB,ARPCA ;LOAD CYLINDER ADDR
3877 023062 052777 000011 002550 BIS #11,ARPCS ;ISSUE SEEK COMMAND
3878 023070 105777 002544 22$: TSTB ARPCS ;WAIT FOR READY
3879 023074 100375 BPL 22$
3880 023076 036777 173772 002554 4$: BIT ATTN,ARPCD ;WAIT FOR ATTENTION
3881 023104 001774 BEQ 4$
3882 023106 016777 173762 002544 MOV ATTN,ARPCD ;CLEAR ATTENTION
3883 023114 005777 002520 TST ARPCS ;ANY ERRORS?
3884 023120 100022 BPL 5$
3885 023122 104400 HLT
3886 023124 032777 004000 002526 BIT #B11,ARPCD ;SEEK INCOMPLETE?
3887 023132 001415 BEQ 5$
3888 023134 112777 000015 002476 MOVB #15,ARPCS ;ISSUE HOME COMMAND
3889 023142 105777 002472 23$: TSTB ARPCS ;WAIT FOR READY
3890 023146 100375 BPL 23$
3891 023150 036777 173720 002502 6$: BIT ATTN,ARPCD ;WAIT FOR ATTENTION
3892 023156 001774 BEQ 6$
3893 023160 016777 173710 002472 MOV ATTN,ARPCD ;CLEAR ATTENTION
3894 023166 000167 177544 5$: JMP CYLS1
3895
3896 ;THIS ROUTINE IS USED FOR HEAD ALIGNMENT - SWITCHES 00-04 IS THE
3897 ;HEAD TO BE SELECTED, SWITCHES 08-10 IS THE DRIVE TO BE SELECTED -
3898 ;WHEN SWITCH 07 IS TOGGLED A NEW HEAD AND DRIVE WILL BE SELECTED.
3899
3900 023172 000005 HEAD: RESET
3901 023174 004567 156102 JSR R5,PRNTF$ ;FORCE PRINT THE MESSAGE
3902 023200 025400 CON18
3903 023202 000000 HALT
3904 023204 005067 002230 CLR CON18A ;CLEAR OUT SWITCH DEFINATIONS PRINTOUT
3905 023210 012777 000001 002442 1$: MOV #1,ARPCD ;RESET RPIIC CONTROLLER
3906 023216 012777 000222 002424 MOV #222,ARPCA ;SETUP FOR CYLINDER 146
3907 023224 013746 177570 MOV #SWR,-(SP)
3908 023230 011667 002500 MOV (SP),WORK
3909 023234 042767 177600 002472 BIC #177600,WORK ;CLEAR OUT DRIVE NUMBER
3910 023242 000367 002466 SWAB WORK ;PUT HEAD IN PROPER POSITION
3911 023246 016777 002462 002376 MOV WORK,ARPCD ;LOAD HEAD NUMBER INTO DISK ADDRESS
3912 023254 012667 002454 MOV (SP)+,WORK ;GET DRIVE NUMBER
3913 023260 042767 000377 002446 BIC #377,WORK ;GET RID OF HEAD ADDRESS
3914 023266 052767 000011 002440 BIS #11,WORK ;SET A SEEK GO TO DRIVE NUMBER
3915 023274 016777 002434 002336 MOV WORK,ARPCS ;SET SEEK
3916 023302 032777 110000 002350 2$: BIT #B15!B12,ARPCD ;
3917 023310 001774 BEQ 2$
3918 023312 105737 177570 3$: TSTB #SWR ;NEW HEAD AND/OR DRIVE
3919 023316 100375 BPL 3$ ;BR IF NO
3920 023320 000733 BR 1$ ;GO TO NEW DRIVE AND HEAD
3921
3922
3923 ;THIS ROUTINE DOES A HOME SEEK AND THEN TRIES TO DO
3924 ;A TWO WORD READ FROM CYLINDER 000 WITH OUT A SEEK TO CYLINDER 000
3925 ;LOOPING BACK TO HOME SEEK
3926
3927 023322 HOMERS:
3928 023322 004567 155754 JSR R5,PRNTF$ ;FORCE PRINT THE MESSAGE
3929 023326 024712 CON4 ;WHAT DRIVE?

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3930 023330 004767 156350 JSR PC,READS ; INPUT MESSAGE
3931 023334 004767 156522 JSR PC,PACKS ; CONVERT INPUT TO A NUMBER
3932 023340 022767 000010 156766 CMP #10,NUMS ; TOO LARGE?
3933 023346 101765 BLOS HOMERS ; BR IF YES
3934 023350 116777 156760 002264 MOVB NUMS,ARPCSI ; LOAD UNIT NUMBER INTO CONTROLER
3935 023356 112777 000015 002254 1$: MOVB #15,ARPCS ; ISSUE A HOME SEEK AND GO
3936 023364 105777 002250 2$: TSTB ARPCS ; CONTROLER READY?
3937 023370 100375 BPL 2$ ; BR IF NO
3938 023372 005777 002262 3$: TST ARPDS ; DRIVE READY?
3939 023376 100375 BPL 3$ ; BR IF NO
3940 023400 005777 002234 TST ARPCS ; ERRORS?
3941 023404 100012 BPL 4$ ; BR IF NO ERRORS
3942 023406 104400 HLT ; ERROR WITH HOME SEEKS
3943 023410 032777 001000 002242 BIT #89,ARPDS ; FILE UNSAFE?
3944 023416 001401 BEQ 5$ ; BR IF NO
3945 023420 000000 HALT ; FILE UNSAFE
3946 023422 012767 023356 155352 5$: MOV #1$,LAD ; SETUP SCOPE LOOP
3947 023430 104000 SCOPE
3948 023432 005077 002212 4$: CLR ARPCA ; SETUP FOR CYLINDER 000
3949 023436 005077 002210 CLR ARPDA ; SETUP FOR TRACK 00, SECTOR 00
3950 023442 012777 177776 002174 MOV #-2,ARPCW ; SETUP 2 WORD TRANSFER
3951 023450 012777 025762 002170 MOV #OUTBUF,ARPBA ; INTO OUTPUT BUFFER
3952 023456 052777 000017 002154 BIS #17,ARPCS ; READ WITH NO IMPLIED SEEK
3953 023464 105777 002150 6$: TSTB ARPCS ; DONE?
3954 023470 100375 BPL 6$ ; BR IF NO
3955 023472 005777 002142 TST ARPCS ; ERRORS?
3956 023476 100327 BPL 1$ ; BR IF NO ERRORS TO MORE HOME SEEKS
3957 023500 104400 HLT ; HOME SEEK DID NOT RETURN TO CYLINDER 000
3958 ; FOR A READ OF ONE WORD
3959 023502 012767 023356 155272 MOV #1$,LAD ; SETUP FOR SCOPE LOOP
3960 023510 104000 SCOPE
3961 023512 000703 BR HOMERS ; TRY TEST AGAIN WITH NEW DRIVE
3962
3963
3964
3965
3966 ; THIS ROUTINE RESTORES THE LOADERS FROM BK TO HIGHEST NON MEMOR:
3967 ; MANAGEMENT CORE
3968
3969 023514 012700 034000 RELOAD: MOV #34000,R0 ; START OF LOADERS
3970 023520 016701 176222 MOV MEMSIZ,R1 ; TOP OF MEMORY
3971 023524 042701 003777 BIC #3777,R1 ; MAKE IT A 1K TRANSFER
3972 023530 012737 023550 000004 MOV #1$,ERRVEC ; SET UP FOR TRAP
3973 023536 012737 000340 000006 MOV #340,ERRVEC+2
3974 023544 012021 000776 2$: MOV (R0)+,(R1)+ ; RESTORE LOADER
3975 023546 000776 BR 2$
3976 023550 012737 000006 000004 1$: MOV #6,ERRVEC ; RESTORE TRAPCATCHER
3977 023556 005037 000006 CLR ERRVEC+2
3978 023562 005037 000176 CLR #176
3979 023566 005067 002164 CLR LDRFLG ; SET LOADER FLAG TO LOADERS AT TOP OF MEMORY
3980 023572 012707 000176 MOV #176,PC ; FINISHED
3981
3982 ; ERROR MESSAGE HEADERS
3983
3984
3985 023576 005015 047105 020104 MES1: .EVEN
; .ASCIIZ <15><12>.END OF PASS

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4042	024127	015	051012	040505	MES13: .ASCIZ <15><12>/READ NO. /
4043	024134	020104	047516	020056	
4044	024142	000			
4045					
4046	024143	015	041412	046131	MES14: .ASCIZ <15><12>/CYL= /
4047	024150	020075	000		
4048					
4049	024153	015	044012	040505	MES15: .ASCIZ <15><12>/HEAD= /
4050	024160	036504	000040		
4051					
4052	024164	005015	042523	052103	MES16: .ASCIZ <15><12>/SECT= /
4053	024172	020075	000		
4054					
4055	024175	015	041412	046517	MES17: .ASCIZ <15><12>/COMP ERR/
4056	024202	020120	051105	000122	
4057					
4058	024210	005015	054105	042520	MES18: .ASCIZ <15><12>/EXPECTED /
4059	024216	052103	042105	000040	
4060					
4061	024224	005015	042522	053103	MES19: .ASCIZ <15><12>/RECVD /
4062	024232	020104	020040	000040	
4063	024240	005015	047516	052440	MES20: .ASCIZ <15><12>/NO UNITS AVAIL/
4064	024246	044516	051524	040440	
4065	024254	040526	046111	000	
4066	024261	015	051012	040505	MES21: .ASCIZ <15><12>/READ CNTR = /
4067	024266	020104	047103	051124	
4068	024274	036440	020040	000	
4069	024301	015	046012	051104	MES22: .ASCII <15><12>/LDRS MOVED TO BK/
4070	024306	020123	047515	042526	
4071	024314	020104	047524	034040	
4072	024322	113			
4073	024323	015	052012	020117	.ASCIZ <15><12>/TO REST LDR START AT LOC /
4074	024330	042522	052123	046040	
4075	024336	051104	051440	040524	
4076	024344	052122	040440	020124	
4077	024352	047514	020103	000040	
4078	024360	005015	044513	040520	MES23: .ASCIZ <15><12>/KIPAR2 = /
4079	024366	031122	036440	020040	
4080	024374	000			
4081	024375	040	020040	020040	MES24: .ASCIZ / KIPAR3 = /
4082	024402	020040	045440	050111	
4083	024410	051101	020063	020075	
4084	024416	000040			
4085	024420	005015	044513	040520	MES25: .ASCIZ <15><12>/KIPAR4 = /
4086	024426	032122	036440	020040	
4087	024434	000			
4088	024435	040	020040	020040	MES26: .ASCIZ / KIPAR5 = /
4089	024442	020040	045440	050111	
4090	024450	051101	020065	020075	
4091	024456	000040			
4092	024460	005015	044513	040520	MES27: .ASCIZ <15><12>/KIPAR6 = /
4093	024466	033122	036440	020040	
4094	024474	000			
4095					
4096					
4097	024475	015	050012	047522	TIMO: .ASCIZ <15><12>/PROC BCKGRD TEST TIMED OUT/

4098	024502	020103	041502	043513	
4099	024510	042122	052040	051505	
4100	024516	020124	044524	042515	
4101	024524	020104	052517	000124	
4102					: CONVERSATION TEXT
4103					:
4104					:
4105	024532	005015	052123	040504	SPECMES: .ASCIZ <15><12>/STANDARD WDS XFERRED= /
4106	024540	042122	053440	051504	
4107	024546	054040	042506	051122	
4108	024554	042105	020075	000	
4109					
4110	024561	015	042012	052101	CON1: .ASCIZ <15><12>/DATA TEST ONLY? (Y OR N)/
4111	024566	020101	042524	052123	
4112	024574	047440	046116	037531	
4113	024602	024040	020131	051060	
4114	024610	047040	000051		
4115					
4116	024614	005015	052515	052114	CON2: .ASCIZ <15><12>/MULTI DRIVE MODE?(Y OR N)/
4117	024622	020111	051104	053111	
4118	024630	020105	047515	042504	
4119	024636	024077	020131	051117	
4120	024644	047040	000051		
4121					
4122	024650	005015	052516	041115	CON3: .ASCIZ <15><12>/NUMBER OF DRIVES 1 TO 10 OCTAL?/
4123	024656	051105	047440	020106	
4124	024664	051104	053111	051505	
4125	024672	030440	052040	020117	
4126	024700	030061	047440	052103	
4127	024706	046101	000077		
4128					
4129	024712	005015	044127	041511	CON4: .ASCIZ <15><12>/WHICH DRIVE?/
4130	024720	020110	051104	053111	
4131	024726	037505	000		
4132					
4133	024731	015	047412	052120	CON5: .ASCIZ <15><12>/OPTIONAL WORD COUNT? (Y OR N)/
4134	024736	047511	040516	020114	
4135	024744	047527	042122	041440	
4136	024752	052517	052116	020077	
4137	024760	054450	047440	020122	
4138	024766	024516	000		
4139					
4140	024771	015	046012	047105	CON6: .ASCIZ <15><12>/LENGTH? (1 TO SWRDCT)/
4141	024776	052107	037510	024040	
4142	025004	020061	047524	051440	
4143	025012	051127	041504	024524	
4144	025020	000			
4145					
4146	025021	015	051412	040524	CON7: .ASCIZ <15><12>/STARTING HEAD?/
4147	025026	052122	047111	020107	
4148	025034	042510	042101	000077	
4149					
4150	025042	005015	047504	054440	CON7A: .ASCIZ <15><12>/DO YOU WISH TO SELECT THE DISK TEST ADDR?(Y OR N)/
4151	025050	052517	053440	051511	
4152	025056	020110	047524	051440	
4153	025064	046105	041505	020124	

4154	025072	044124	020105	044504	
4155	025100	045523	052040	051505	
4156	025106	020124	042101	051104	
4157	025114	024077	020131	051117	
4158	025122	047040	000051		
4159					
4160	025126	005015	052123	051101	CON7B: .ASCIZ (15)<(12)/STARTING SECT?/
4161	025134	044524	043516	051440	
4162	025142	041505	037524	000	
4163					
4164	025147	015	051412	040524	CON7C: .ASCIZ (15)<(12)/STARTING CYL?/
4165	025154	052122	047111	020107	
4166	025162	054503	037514	000	
4167					
4168	025167	015	047412	052120	CON8: .ASCIZ (15)<(12)/OPTAL DATA PAN NO.?/
4169	025174	046101	042040	052101	
4170	025202	020101	040520	020116	
4171	025210	047516	037456	000	
4172					
4173	025215	015	053412	044522	CON9: .ASCIZ (15)<(12)/WRITE?(Y OR N)/
4174	025222	042524	024077	020131	
4175	025230	051117	047040	000051	
4176					
4177	025236	005015	051127	052111	CON10: .ASCIZ (15)<(12)/WRITE CHECK?(Y OR N)/
4178	025244	020105	044103	041505	
4179	025252	037513	054450	047440	
4180	025260	020122	024516	000	
4181					
4182	025265	015	051012	040505	CON11: .ASCIZ (15)<(12)/READ?(Y OR N)/
4183	025272	037504	054450	047440	
4184	025300	020122	024516	000	
4185					
4186	025305	015	041412	046131	CON15: .ASCIZ (15)<(12)/CYL "A"?/
4187	025312	021040	021101	000077	
4188					
4189	025320	005015	054503	020114	CON16: .ASCIZ (15)<(12)/CYL "B"?/
4190	025326	041042	037442	000	
4191	025333	015	053412	047101	CON17: .ASCIZ (15)<(12)/WANT HEAD ALIGN ROUTINE?(Y OR N) /
4192	025340	020124	042510	042101	
4193	025346	040440	044514	047107	
4194	025354	051040	052517	044524	
4195	025362	042516	024077	020131	
4196	025370	051117	047040	020051	
4197	025376	000040			
4198	025400	005015	042523	020124	CON18: .ASCII (15)<(12)/SET SWCH THEN PRESS CONTINUE./
4199	025406	053523	044103	052040	
4200	025414	042510	020116	051120	
4201	025422	051505	020123	047503	
4202	025430	052116	047111	042525	
4203	025436	056			
4204		025440			.EVEN
4205	025440	005015	053523	044103	CON18A: .ASCII (15)<(12)/SWCH 00-04 = HEAD/
4206	025446	030040	026460	032060	
4207	025454	036440	044040	040505	
4208	025462	104			
4209	025463	015	051412	041527	.ASCII (15)<(12)/SWCH 08-10 = DRIVE/

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4210 025470 020110 034060 030455
4211 025476 020060 020075 051104
4212 025504 053111 105
4213 025507 015 052012 043517
4214 025514 046107 020105 053523
4215 025522 030040 020067 047524
4216 025530 051440 046105 041505
4217 025536 020124 042516 020127
4218 025544 042510 042101 040440
4219 025552 042116 047457 020122
4220 025560 051104 053111 000105
4221 025566 005015 040527 052116
4222 025574 041440 047117 044524
4223 025602 052516 052517 020123
4224 025610 047510 042515 051440
4225 025616 042505 051513 020077
4226 025624 000
4227
4228 025625 015 042412 042116
4229 025632 000
4230 025634
4231
4232
4233
4234
4235
4236
4237 025634 000254
4238 025636 000256
4239 025640 176714
4240 025642 176715
4241 025644 176716
4242 025646 176720
4243 025650 176722
4244 025652 176724
4245 025654 176725
4246 025656 176712
4247 025660 176710
4248 025662 176734
4249
4250
4251
4252
4253 025664 000000
4254 025666 000000
4255 025670 000000
4256 025672 000000
4257 025674 000000
4258 025676 000000
4259 025700 000000
4260 025702 000000
4261 025704 000000
4262 025706 000000
4263 025710 000000
4264 025712 000000
4265 025714 000000

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.ASCIZ <15><12>'TOGGLE SW 07 TO SELECT NEW HEAD AND/OR DRIVE'

CON19: .ASCIZ <15><12>'WANT CONTINUOUS HOME SEEKS? '

END: .ASCIZ <15><12>'END'

.EVEN

:DISK I/O REGISTERS

```

VECTOR: 254 ;DISK INTERRUPT TRAP LOCATION
STATUS: 256 ;INTERUPT PRIORITY ASSIGNMENT
RPCS: 176714 ;DISK CONTROL REGISTER
RPCS1: 176715 ;UPPER BYTE OF CONTROL REGISTER
RPWC: 176716 ;WORD COUNT REGISTER
RPBA: 176720 ;CURRENT ADDR REGISTER
RPCA: 176722 ;CYLINDER ADDR REGISTER
RPDA: 176724 ;DISK ADDR REGISTER
RPDA1: 176725 ;TRACK ADDRESS
RPER: 176712 ;ERROR REGISTER
RPDS: 176710 ;DEVICE STATUS REGISTER
SUCA: 176734 ;SELECTED UNIT CYLINDER ADDR REG

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:DEDICATED REGISTERS

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FLAG: 0 ;INTERNAL PROGRAM FLAG WORD
SCYL: 0 ;OPERATOR SELECTED CYLINDER
SHED: 0 ;OPERATOR SELECTED HEAD
SSEC: 0 ;OPERATOR SELECTED SECTOR
WRDCT: 0 ;WORKING WORD COUNT
CYLINDER: 0 ;WORKING CYLINDER ADDR
DMA: 0 ;WORKING DISK ADDR
SWITCH: 0
PATNU: 0 ;DATA PATTERN INDEX
BUF: 0 ;WORKING DATA BUFFER
SWRDCT: 0 ;STANDARD WORD COUNT
SAVE: 0
DSKNOP: 0 ;MAXIMUM UNIT NUMBER

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4266	025716	000000		
4267	025720	000000		
4268	025722	000000		
4269	025724	000000		
4270	025726	000000		
4271	025730	000000		
4272	025732	000000		
4273	025734	000000		
4274	025736	000000		
4275	025740	000000		
4276	025742	000000		
4277	025744	000000		
4278	025746	000000		
4279	025750	000000		
4280	025752	000000		
4281	025754	000000		
4282	025756	000000		
4283				
4284				
4285				
4286	025760	005015		
4287	025762	042115	030455	026461
4288	025770	055104	050122	026502
4289	025776	020105	020040	044504
4290	026004	045523	051040	046105
4291	026012	040511	044502	044514
4292	026020	054524	052040	051505
4293	026026	124		
4294	026027	015	005012	053523
4295	026034	052111	044103	047440
4296	026042	052120	047511	051516
4297	026050	005015	053523	036040
4298	026056	032461	020076	030475
4299	026064	027056	027056	040510
4300	026072	052114	047440	020116
4301	026100	051105	047522	122
4302	026105	015	051412	020127
4303	026112	030474	037064	036440
4304	026120	027061	027056	046056
4305	026126	047517	020120	047117
4306	026134	042440	051122	051117
4307	026142	005015	053523	036040
4308	026150	031461	020076	030475
4309	026156	027056	027056	047111
4310	026164	044510	044502	020124
4311	026172	051120	047111	047524
4312	026200	052125	123	
4313	026203	015	051412	020127
4314	026210	030474	037062	036440
4315	026216	027061	027056	044456
4316	026224	044116	041111	052111
4317	026232	041040	041501	051113
4318	026240	052517	042116	052040
4319	026246	051505	124	
4320	026251	015	051412	020127
4321	026256	030474	037061	036440

```

BLOCK: 0
PASSC: 0
INBUF: 0
RDERR: 0
ACNVX: 0
TESTNO: 0
ERCOUNT: 0
WORK: 0
WORK1: 0
WORK2: 0
WORK3: 0
WORK4: 0
CYLA: 0
CYLB: 0
SEEK1: 0
CNTA: 0
LDRFLG: 0

```

:CONTAINS START OF INPUT BUFFER
;READ RETRY COUNTER

;WHEN =0 LOADERS ARE AT TOP OF MEMORY

```

.EVEN
HEADER: .ASCII <15><12>
OUTBUF: .ASCII 'MD-11-DZRPB-E DISK RELIABILITY TEST'

```

```
.ASCII <15><12><12>'SWITCH OPTIONS'
```

```
.ASCII <15><12>'SW <15> =1....HALT ON ERROR'
```

```
.ASCII <15><12>'SW <14> =1....LOOP ON ERROR'
```

```
.ASCII <15><12>'SW <13> =1....INHIBIT PRINTOUTS'
```

```
.ASCII <15><12>'SW <12> =1....INHIBIT BACKGROUND TEST'
```

```
.ASCII <15><12>'SW <11> =1....RING BELL ON ERROR'
```

4322	026264	027061	027056	051056	
4323	026272	047111	020107	042502	
4324	026300	046114	047440	020116	
4325	026306	051105	047522	122	
4326	026313	015	051412	020127	.ASCII (15)(12)'SW (10) =1....LOOP ON TEST'
4327	026320	030474	037060	036440	
4328	026326	027061	027056	046056	
4329	026334	047517	020120	047117	
4330	026342	052040	051505	124	
4331	026347	015	051412	020127	.ASCII (15)(12)'SW (09) =1....INHIBIT DATA COMPARISON'
4332	026354	030074	037071	036440	
4333	026362	027061	027056	044456	
4334	026370	044116	041111	052111	
4335	026376	042040	052101	020101	
4336	026404	047503	050115	051101	
4337	026412	051511	047511	116	
4338	026417	015	051412	020127	.ASCII (15)(12)'SW (08) =1....ENTER CONVERSATION MODE'
4339	026424	030074	037070	036440	
4340	026432	027061	027056	042456	
4341	026440	052116	051105	041440	
4342	026446	047117	042526	051522	
4343	026454	052101	047511	020116	
4344	026462	047515	042504		
4345	026466	005015	020040	020040	.ASCII (15)(12)' TEST SELECTED 0 - 2 GIVES ADDRESS CONVERSATION'
4346	026474	020040	020040	020040	
4347	026502	020040	020040	042524	
4348	026510	052123	051440	046105	
4349	026516	041505	042524	020104	
4350	026524	020060	020055	020062	
4351	026532	044507	042526	020123	
4352	026540	042101	051104	051505	
4353	026546	020123	047503	053116	
4354	026554	051105	040523	044524	
4355	026562	047117			
4356	026564	005015	020040	020040	.ASCII (15)(12)' TEST SELECTED 3 - 7 GIVES DATA CONVERSATION'
4357	026572	020040	020040	020040	
4358	026600	020040	020040	042524	
4359	026606	052123	051440	046105	
4360	026614	041505	042524	020104	
4361	026622	020063	020055	020067	
4362	026630	044507	042526	020123	
4363	026636	040504	040524	041440	
4364	026644	047117	042526	051522	
4365	026652	052101	047511	116	
4366	026657	015	051412	020127	.ASCII (15)(12)'SW (07) =1....INHIBIT RANDOM SEEKS DURING DATA TEST'
4367	026664	030074	037067	036440	
4368	026672	027061	027056	044456	
4369	026700	044116	041111	052111	
4370	026706	051040	047101	047504	
4371	026714	020115	042523	045505	
4372	026722	020123	052504	044522	
4373	026730	043516	042040	052101	
4374	026736	020101	042524	052123	
4375	026744	005015	053523	036040	.ASCII (15)(12)'SW (06) =1....INHIBIT USE OF MEMORY MANAGEMENT'
4376	026752	033060	020076	030475	
4377	026760	027056	027056	047111	

4378	026766	044510	044502	020124	
4379	026774	051525	020105	043117	
4380	027002	046440	046505	051117	
4381	027010	020131	040515	040516	
4382	027016	042507	042515	052116	
4383	027024	005015	053523	036040	.ASCII <15><12>'SW <05>.....COMPARISION ERRORS PRINTOUT'
4384	027032	032460	027076	027056	
4385	027040	027056	027056	047503	
4386	027046	050115	051101	051511	
4387	027054	047511	020116	051105	
4388	027062	047522	051522	050040	
4389	027070	044522	052116	052517	
4390	027076	124			
4391	027077	015	051412	020127	.ASCII <15><12>'SW <04>.....REREAD INFORMATION'
4392	027104	030074	037064	027056	
4393	027112	027056	027056	051056	
4394	027120	051105	040505	020104	
4395	027126	047111	047506	046522	
4396	027134	052101	047511	116	
4397	027141	015	051412	020127	.ASCIZ <15><12>'SW <03> =1....SELECT TEST IN SWCH 00 TO 02'
4398	027146	030074	037063	036440	
4399	027154	027061	027056	051456	
4400	027162	046105	041505	020124	
4401	027170	042524	052123	044440	
4402	027176	020116	053523	044103	
4403	027204	030040	020060	047524	
4404	027212	030040	000062		
4405	027216	005015	025012	020052	MES28: .ASCIZ <15><12><12>'** MAP OF RP DRIVES **/<15><12>
4406	027224	040515	020120	043117	
4407	027232	051040	020120	051104	
4408	027240	053111	051505	025040	
4409	027246	006452	000012		
4410	027252	020072	050122	031060	MES29: .ASCIZ /: RP02/
4411	027260	000			
4412	027261	072	051040	030120	MES30: .ASCIZ /: RP03/
4413	027266	000063			
4414	027270	020072	043117	026506	MES31: .ASCIZ /: OFF-LINE/
4415	027276	044514	042516	000	
4416	027303	072	047040	052117	MES32: .ASCIZ /: NOT READY/
4417	027310	051040	040505	054504	
4418	027316	000			
4419	027317	015	005012	043111	MES33: .ASCII <15><12><12>'IF THE DRIVE TYPES SEEN BY THE SYSTEM/
4420	027324	052040	042510	042040	
4421	027332	044522	042526	052040	
4422	027340	050131	051505	051440	
4423	027346	042505	020116	054502	
4424	027354	052040	042510	051440	
4425	027362	051531	042524	115	
4426	027367	015	040412	042522	.ASCII <15><12>'ARE INCORRECT, THEN BIT 13 (SU RP03)/
4427	027374	044440	041516	051117	
4428	027402	042522	052103	020054	
4429	027410	044124	047105	041040	
4430	027416	052111	030440	020063	
4431	027424	051450	020125	050122	
4432	027432	031460	051		
4433	027435	015	047412	020106	.ASCII <15><12>'OF THE RP11C'S DEVICE STATUS REGISTER/

```

4434 027442 044124 020105 050122
4435 027450 030461 023503 020123
4436 027456 042504 044526 042503
4437 027464 051440 040524 052524
4438 027472 020123 042522 044507
4439 027500 052123 051105
4440 027504 005015 040515 020131 .ASCII <15><12>MAY BE FAULTY./
4441 027512 042502 043040 052501
4442 027520 052114 027131
4443 027524 005015 000012 .ASCIIZ <15><12><12>
4444
4445
4446 ;ROUTINE TO CHECK FOR DRIVE STATUS AND REPORT TO
4447 ;PROCESSOR CONSOLE TTY.
4448 027530 004567 151546 SUBSIZ: JSR R5,PRNTFS ;FORCE PRINT THE MESSAGE
4449 027534 027216 MES28 ;(** MAP OF RP DRIVES **).
4450 027536 005000 CLR R0 ;CLEAR COUNTER FOR UNIT NO.
4451 027540 004567 151536 1$: JSR R5,PRNTFS ;FORCE PRINT THE MESSAGE
4452 027544 024107 MES11 ;<UNIT NO.>
4453 027546 010067 152010 MOV R0,TTY
4454 027552 004767 151622 JSR PC,PRINTB ;FORCE TYPE LOCATION - SUPPRESS ZEROS
4455 027556 110077 176060 MOVB R0,RPCSI ;CHECK THE UNIT SELCECTED BY R3
4456 027562 032777 040000 176070 BIT #B14,RPDS ;IS IT ON-LINE?
4457 027570 001004 9NE 3$ ;IF YES THEN PROCEED ON, ELSE
4458 027572 004567 151504 JSR R5,PRNTFS ;REPORT THAT THE SELECTED DRIVE
4459 027576 027270 MES31 ;IS OFF-LINE.
4460 027600 000423 BR 6$ ;GO CHECK THE NEXT DRIVE.
4461 027602 032777 100000 176050 3$: BIT #B15,RPDS ;IS THE SELECTED DRIVE READY?
4462 027610 001004 4$ ;IF YES THEN PROCEED ON, ELSE
4463 027612 004567 151464 JSR R5,PRNTFS ;REPORT THAT THE SELECTED DRIVE IS
4464 027616 027303 MES32 ;NOT READY!
4465 027620 000413 BR 6$ ;GO CHECK THE NEXT DRIVE.
4466 027622 032777 020000 176030 4$: BIT #B13,RPDS ;IS THE SELECTED DRIVE AN RPO3?
4467 027630 001004 5$ ;IF YES THEN PROCEED ON, ELSE
4468 027632 004567 151444 JSR R5,PRNTFS ;REPORT THAT THE SELECTED DRIVE
4469 027636 027252 MES29 ;IS AN RPO2.
4470 027640 000403 BR 6$ ;GO CHECK THE NEXT DRIVE.
4471 027642 004567 151434 5$: JSR R5,PRNTFS ;REPORT THAT THE SELECTED DRIVE
4472 027646 027261 MES30 ;IS AN RPO3.
4473 027650 005200 6$: INC R0 ;UPDATE DRIVE UNIT NO.
4474 027652 032700 000010 BIT #B3,R0 ;CHECKED ALL THE DRIVE(S) YET?
4475 027656 001730 BEQ 1$ ;BRANCH IF NO, ELSE PROCEED ONWARD
4476 027660 004567 151416 JSR R5,PRNTFS ;FORCE PRINT THE MESSAGE
4477 027664 027317 MES33 ;<IF THE DRIVE TYPES SEEN BY THE SYSTEM
4478 ;<ARE INCORRECT, THEN RPDS BIT 13 MAY BE FAULTY.
4479 027666 000207 RTS R0 ;RETURN TO CALLER.
4480
4481
4482 000001 .END

```


CON15	025305	3831	4186*												
CON16	025320	3839	4189*												
CON17	025333	3817	4191*												
CON18	025400	3902	4198*												
CON18A	025440	3904*	4205*												
CON19	025566	3824	4221*												
CON2	024614	1226	4116*												
CON3	024650	1233	4122*												
CON4	024712	1249	3847	3929	4123*										
CON5	024731	1260	4133*												
CON6	024771	1266	4140*												
CON7	025021	1295	4146*												
CON7A	025042	1280	4150*												
CON7B	025126	1303	4160*												
CON7C	025147	1287	4164*												
CON8	025167	1312	4168*												
CON9	025215	1325	4173*												
CYLA	025746	1442*	1443*	1444*	1445*	1527*	1528*	1529*	1530*	2069*	2070*	2071*	2072*	3836*	
		3858	4278*												
CYLB	025750	3844*	3876	4279*											
CYLIND	025676	1200*	1417*	1422	1459	1461	1480*	1483*	1543*	1546	1591	1636	1649	1690*	
		1693	1702	1704*	1715*	1728	1730	1746*	1751*	1776*	1925*	1942*	1965*	1991*	
		2023*	2152*	2221*	2274*	2495*	2682*	2799*	2848*	2929	3025	3079*	3111*	3112	
		3124*	3131	3460	4258*										
CYLSK	022516	1213	3815*												
CYLSI	022736	3857*	3894												
DATAT	012330	1388	1395	2461	2484*										
DATP	012466	2502	2507*	2635											
DATTE5	003016	1229	1247*	1253											
D-CBLK	016302	3100*	3109	3114											
DECCY	015464	2971	2975*												
DECTK	015440	2967	2970*												
DELMES	015370	2954	2961*												
DISBUF	016226	1611	1668	2524	2538	2629	3090*								
DISPLA=	177570	819*													
DKINT	015272	2499	2943*	3185											
DKI1	015576	2951	2993*												
DMA	025700	1201*	1542*	1548	1551	1553*	1555*	1579	1640	1645	1647*	1651	1658*	1689*	
		1777*	1924*	1943*	1944*	1964*	1992*	2024*	2151*	2220*	2273*	2496*	2630*	2739*	
		2849*	2928	3080*	3081*	3095	3099*	3103*	3104	3108*	3110*	3123*	3130	3459	
		4259*													
DREAD	012654	2527	2540*												
DSKDR	002724	1231*	1237	1240											
DSKNOR	025714	1199*	1241*	1242*	1244*	1245*	1350*	1352	1355*	1357*	1359*	1360*	1362	2804	
		4265*													
DSKNOS	016636	1416	1514	1688	1775	2116	2150	2941	2927	3017	3166*	3857			
DSKRD	012734	2553*	2599	2605											
EMTVEC=	000030	809*													
END	025625	2907	4228*												
EOPTST	007122	1924*	1982												
ERCOUN	025732	3394*	3504*	4272*											
ERRFLG	001240	928	930*	979*	982*	2593	2755	2943*	2947*	2959*	3018	3441*			
ERROR	001112	959*	3181												
ERRORS	001246	980*	985*												
ERRPC	001252	969	987*												
ERRVEC=	000004	804*	1181*	1182*	1193*	1194*	2346*	2347*	2368*	3563*	3564*	3623*	3627*	3629*	

BLS*ST	3734#	3744	3747	3750	3753	3756	3759	3762	3765	3769	3772	3775	3778	3781	3784
	3787	3790													
DUMP	904#	973	1804	1829	2903	3295	3299	3303	3307	3311	3315	3358	3362		
DUMPF	902#														
LDPOR	864#	1187	1188	1189	2355	2356	2357	2358	3566	3633	3636	3639	3642		
PACK	910#	1235	1251	1268	1289	1297	1305	1314	3833	3841	3849	3931			
PRINT	899#	968	1045	1091	1101	1364	1410	1509	1656	1682	1769	1802	1827	2195	2495
	2611	2654	2773	2811	2865	2901	2905	2955	2977	2984	2989	3054	3291	3293	3297
	3301	3305	3309	3313	3321	3331	3335	3339	3343	3347	3351	3355	3360	3476	3483
	3488	3492	3498	3800											
PRINTF	900#	964	1173	1214	1219	1225	1231	1247	1258	1264	1278	1285	1293	1301	1310
	1324	1330	1337	1371	3643	3816	3822	3829	3837	3845	3901	3927			
RAND	907#	2675	3417												
READ	908#	1221	1227	1234	1250	1261	1267	1281	1288	1296	1304	1313	1326	1333	1340
	3818	3825	3832	3840	3848	3930									
REST	896#	1076	1151												
SAVE	895#	1051	1113												
SDUMP	905#	1412	1511	1684	1771	2197	2487	2614	2656	2776	2813	2957	2980	2996	2991
	3057	3324	3337	3341	3345	3349	3353	3479	3485	3490	3496	3500			
SDUMPF	903#	1217	1377	3647											
.DUMP	901#	1009													
.ERROR	897#	956													
.PACK	909#	1110													
.PRINT	898#	990													
.RAND	906#	1051													
.READ	907#	1081													
.REST	895#	945													
.SAVE	895#	934													
.SCOPE	895#	918													

. ABS. 027670 000

ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

DSKZ:DZRPBE.BIN, DSKZ:DZRPBE.SEG/CRF/SOL/NL:TOC=DSKM:DZRPBE.P11
RUN-TIME: 4 9 1 SECONDS
RUN-TIME RATIO: 166/15=10.4
CORE USED: 15K (29 PAGES)