

RP11-C/RP02

RELIABILITY
MD-11-DZRPF-B

EP-DZRPF-B-DL-A

OCT 1976

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IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZRPB-B-D
PRODUCT NAME: RP11 DISK DATA AND ADDRESS TEST
DATE CREATED: JUNE 15, 1973
MAINTAINER: DIAGNOSTIC GROUP
AUTHOR: JOE STUBBLEBINE

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MAYNARD, MASS.

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1.0 ABSTRACT

THIS PROGRAM TESTS BOTH THE ADDRESSING CAPABILITY AND THE DATA RELIABILITY OF THE OF THE P11 AND THE RPO2. 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
RP11 DISK PACK CONTROLLER WITH UP TO EIGHT RPO2 DRIVES
ASR33 OR EQUIVELANT.

2.2 STORAGE

8K OF STORAGE IS REQUIRED TO RUN THIS PROGRAM.

2.3 PRELIMINARY PROGRAMS

DZRPE RP11 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 CARE TESTING-UNITO).

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4.2 STARTING ADDRESS

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THE PROGRAM MUST ALWAYS BE STARTED AT 200.

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.
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
- SW<08>=1....ENTER CONVERSATION MODE

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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 EACH 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
5	TEST5 - 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.

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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 RESET SW<14>.

5.2.2 HLT

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 INSTRUCTIONS TO PROVIDE WORSE CASE NPR TIMING 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

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 AND RPCS 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 |
| CYLINDER= | CYLINDER ADDRESS OF |
| | THE ERROR |
| HEAD= | HEAD ADDRESS OF THE |
| | ERROR |
| SECTOR= | SECTOR ADDRESS OF |
| | THE ERROR |
| 2. PC= | PC OF FAILURE |
| COMPARE ERROR | |
| EXPECTED= | DATA EXPECTED |
| RECEIVED= | DATA RECEIVED |
| CYLINDER= | CYLINDER ADDRESS OF |
| | THE ERROR |
| HEAD= | HEAD ADDRESS OF THE |
| | ERROR |
| SECTOR= | SECTOR ADDRESS OF |
| | THE ERROR |
| WORD COUNT INTO SECTOR= | DISTANCE INTO |
| | SECTOR. THE COUNT |
| | STARTS AT ONE. |
| READ NO. | INDICATES WHICH READ |
| | ATTEMPT IS IN |
| | PROGRESS. |
| 3. TOTAL REREADS ON ERROR= | TOTAL READS BEFORE |

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350
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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 SOC.

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 312. 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 THE SELECTED CYLINDER REGISTER ARE
CHECKED.

9.2 ADDRESS TEST 1

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WRITE 5000(OCTAL) WORDS IN THE TEN SECTORS ON EACH

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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 312 TO 0. THEN SEEK TO 311 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

THIS TEST 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)

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RELIC RELIABILITY TEST MACY11 27(732) 16-SEP-76 16:12 PAGE 14
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IS WRITTEN WITH ITS ADDRESS. THIS DATA IS WRITTEN
ON THE DISK. THE MEMORY IS CLEARED AND THE DATA IS

READ BACK AND VERIFIED. 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
 DRIVE. THE SEQUENCE IS WRITE THE PACK, WRITE CHECK,
 AND READ IT. 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.

NUMBER	DATA PATTERN	NUMBER	DATA PATTERN
0	163126	11	167356
1	052525	12	156735
2	125252	13	135673
3	031463	14	073567
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 400(OCTAL) WORDS IS
 WRITTEN ON RANDOM SECTORS. IT IS THEN WRITE CHECKED
 AND READ. THIS IS REPEATED 5000 TIMES. THE READ
 RECOVERY TECHNIQUE IS THE SAME AS DESCRIBED UNDER
 DATA TEST(9.4).

9.8 POWER FAIL TEST

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{
TESTS THE ABILITY OF THE RP11 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

CONVERSATION MODE MAY BE ENTERED BY SETTING SW<08> TO A 1. 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.

MULTI 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)

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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
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.

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.LIST ME
.NLIST MC,MD,CND
.ABS
.TITLE FRONT END

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;CONTAINS DEFINITIONS, REGISTER ASSIGNMENTS AND MACRO CALLS

;GENERAL REGISTER ASSIGNMENTS

000000
000001
000002
000003
000004
000005
000006
000007

R0=%0
R1=%1
R2=%2
R3=%3
R4=%4
R5=%5
SP=%6
PC=%7

;STATUS REGISTER (PSW) BIT ASSIGNMENTS

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

C=1
V=2
Z=4
N=10
T=20
PRI7=340
PRI6=300
PRI5=240
PRI4=200
PRI3=140
PRI2=100
PRI1=40

;C BIT
;V BIT
;Z BIT
;N BIT
;T BIT
;PRIORITY LEVEL 7
;PRIORITY LEVEL 6
;PRIORITY LEVEL 5
;PRIORITY LEVEL 4
;PRIORITY LEVEL 3
;PRIORITY LEVEL 2
;PRIORITY LEVEL 1

;VECTOR ADDRESSES

000004
000010
000014
000020
000024
000030
000034

ERRVEC=4
RESVEC=10
TBITVEC=14
IOTVEC=20
PFVEC=24
EMTVEC=30
TRAPVEC=34

;ERROR VECTOR
;RESERVED INST VECTOR
;T BIT VECTOR
;IOT TRAP VECTOR
;POWER FAIL VECTOR
;EMT VECTOR
;TRAP VECTOR

;REGISTER ADDRESSES

177776
177560
177562
177564
177566
177570
177570

PSW=177776
TKS=177560
TKB=177562
TPS=177564
TPB=177566
SWR=177570
DISPLAY=177570

;PROCESSOR STATUS REGISTER
;KEYBOARD CSR
;ADDR OF KEYBOARD BUFFER
;TELEPRINTER CSR
;TELEPRINTER BUFFER
;CONSOLE SWITCH REGISTER
;CONSOLE DISPLAY REGISTER

;INITIAL STACK POINTER

000500

STKPTR=500

;PROGRAM STACK POINTER

;BIT ASSIGNMENTS

100000
040000
020000
010000
004000
002000
001000

B15=100000
B14=40000
B13=20000
B12=10000
B11=4000
B10=2000
B9=1000

FRONT END
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696	000400	B8=400
697	000200	B7=200
698	000100	B6=100
699	000040	B5=40
700	000020	B4=20
701	000010	B3=10
702	000004	B2=4
703	000002	B1=2
704	000001	B0=1

;MEMORY MANAGEMENT REGISTER ASSIGNMENTS

705		
706		
707		
708	177572	SRO=177572
709	172340	KIPAR0=172340
710	172342	KIPAR1=172342
711	172344	KIPAR2=172344
712	172356	KIPAR7=172356
713	172300	KIPDR0=172300
714	172302	KIPDR1=172302
715	172304	KIPDR2=172304
716	172316	KIPDR7=172316
717	000006	RW=6
718	000000	UP=00
719		

;INSTRUCTION EQUATES

720		
721		
722	104400	HLT=TRAP
723		
724	104000	SCOPE=EMT
725		

;HLT IS A TRAP TO THE ERROR ROUTINE

;SCOPE IS AN EMT TRAP

;INDEX OF MACROS

726		
727		
728		.SCOPE
729		.SAVE
730		.REST
731		.ERROR
732		.PRINT
733		.DUMP
734		.RAND
735		.READ
736		.PACK

;INDEX OF CALLS

737		
738		
739		SCOPE
740		SAVE
741		REST
742		HLT
743		PRINT
744		DUMP
745		DUMPF
746		SDUMP
747		SDUMPF
748		RAND
749		READ
750		PACK
751		


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762
763
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766
767
768      000046      . = 46
769      000046      012060      MEXIT
770      000052      000052      . = 52
771      000052      040000      40000
772      000200      000200      . LIST      ME
773      000200      012707      . = 200
774      000200      001000      MOV      *START, PC      ; GO TO START OF TEST
775      001000      000000      . = 1000
776      001002      000000      ICNT:      0      ; CONTAINS PASS COUNT
777      001002      000000      LAD:      0      ; PROGRAM TRACE
778      ; SCOPE (EMT) SERVICE ROUTINE
779      ; THIS ROUTINE WILL LOOP IF AN ERROR OCCURED AND
780      ; LOOP ON ERROR SWITCH IS SET (BIT 14). IF LOOPING IS INDICATED
781      ; THE CONTENTS OF "LAD" EQUAL THE LOOP ADDRESS. IN ORDER
782      ; TO LOOP ON ERROR, BIT 14 OF THE SWITCH REGISTER MUST BE SET AND
783      ; LOCATION "ERRFLG" MUST BE NEGATIVE INDICATING AN ERROR. ONCE THE
784      ; LOOP IS INITIATED IT WILL CONTINUE UNTIL SWITCH 14 IS CLEARED.
785
786      001004      032737      040000      177570      SCOPES: BIT      *B14, 2*SWR      ; LOOP ON ERROR?
787      001012      001403      BEQ      2$      ; BRANCH IF NO
788      001014      005767      000220      TST      ERRFLG      ; IS THERE AN ERROR?
789      001020      100403      BMI      1$      ; BRANCH IF YES
790      001022      005067      000212      2$:      CLR      ERRFLG      ; RESET ERROR CONDITION
791      001026      000002      RTI      ; EXIT
792      001030      016716      177746      1$:      MOV      LAD, (SP)      ; MODIFY RETURN ADDRESS
793      001034      000002      RTI      ; EXIT
794      ; ROUTINE TO SAVE REGISTERS ON THE STACK.
795      ; CALLED BY SAVE MACRO
796      001036      012667      000020      SAVES:      MOV      (SP)+, 1$      ; SAVE RETURN PC
797      001042      010546      MOV      R5, -(SP)
798      001044      010446      MOV      R4, -(SP)
799      001046      010346      MOV      R3, -(SP)
800      001050      010246      MOV      R2, -(SP)
801      001052      010146      MOV      R1, -(SP)
802      001054      010046      MOV      R0, -(SP)
803      001056      016707      000000      MOV      1$, PC      ; RETURN
804      001062      000000      1$:      0      ; CONTAINS RETURN ADDRESS
805      ; ROUTINE TO RESTORE REGISTERS SAVED ON THE STACK
806      ; CALLED BY REST MACRO
807      001064      012667      000020      REST$:      MOV      (SP)+, 1$      ; SAVE RETURN PC

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808	001070	012600				MOV	(SP)+,R0	
809	001072	012601				MOV	(SP)+,R1	
810	001074	012602				MOV	(SP)+,R2	
811	001076	012603				MOV	(SP)+,R3	
812	001100	012604				MOV	(SP)+,R4	
813	001102	012605				MOV	(SP)+,R5	
814	001104	016707	000000			MOV	1\$,PC	;RETURN
815	001110	000000						;CONTAINS RETURN ADDR
816					1\$:	0		
817								;ERROR SERVICE ROUTINE CALLED BY HLT
818								;THIS ROUTINE WILL HALT ON ERROR, RING THE BELL, AND
819	001112	005737	177570					;TRANSFER CONTROL TO A USER SUPPLIED ROUTINE IF SPECIFIED
820	001116	100001			ERROR:	TST	2\$SWR	;HALT ON ERROR?
821	001120	000000				BPL	3\$	;BRANCH IF NO
822	001122	032737	004000	177570	3\$:	BIT	#B11,2\$SWR	;RING THE BELL?
823	001130	001403				BEQ	1\$	;BRANCH IF NO
824	001132	004567	000144			JSR	R5,PRNTF\$	;FORCE PRINT THE MESSAGE
825	001136	001250				BELL		
826	001140	032737	020000	177570	1\$:	BIT	#B13,2\$SWR	;SKIP TYPEOUT?
827	001146	001022				BNE	2\$	;BRANCH IF YES
828	001150	004567	000110			JSR	R5,PRINT\$	;PRINT MESSAGE
829	001154	001252				ERRPC		
830	001156	011667	000062			MOV	(6),HLTADS	;GET ERROR PC+2
831	001162	162767	000002	000054		SUB	#2,HLTADS	;MODIFY
832	001170	117767	000050	000044		MOVB	2\$HLTADS,HLTCTS	;SAVE HLT ARGUMENT
833	001176	016767	000042	000356		MOV	HLTADS,TTY	
834	001204	004767	000134			JSR	PC,PRINTR	;TYPE LOCATION WITH LEADING ZEROS
835	001210	004767	013146			JSR	PC,MSG	;GO TO USER ERROR ROUTINE
836	001214	005737	177570		2\$:	TST	2\$SWR	;HALT ON ERROR?
837	001220	100001				BPL	4\$	;BRANCH IF NO
838	001222	000000				HALT		
839	001224	052767	100000	000006	4\$:	BIS	#B15,ERRFLG	;SET ERROR FLAG
840	001232	005267	000010			INC	ERRORS	;UPDATE ERROR COUNTER
841	001236	000002				RTI		
842	001240	000000			ERRFLG:	0		
843	001242	000000			HLTCTS:	0		
844	001244	000000			HLTADS:	0		;PC OF ERROR
845	001246	000000			ERRORS:	0		;ERROR COUNT
846	001250	000007			BELL:	.ASCIZ	<7>	
847	001252	005015	005015	041520	ERRPC:	.ASCIZ	<15><12><15><12>'PC= '	
848	001260	020075	000					
849		001264						
850								
851								
852	001264	032737	020000	177570				
853	001272	001403						
854	001274	062705	000002					
855	001300	000205						
856	001302	105737	177564					
857	001306	100375						
858	001310	010546						
859	001312	062716	000002					
860	001316	011505						
861	001320	105715			1\$:	TSTB	(R5)	;CHECK FOR TERMINATOR
862	001322	001002				BNE	2\$	
863	001324	012605				MOV	(SP)+,R5	;GET RETURN ADDR

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864	001326	000205			RIS	R5	; RETURN
865	001330	112537	177556	2\$:	MOVB	(R5)+, 2*TPB	; PRINT CHARACTER
866	001334	105737	177564		TSTB	2*TPS	; WAIT TILL DONE
867	001340	100375			BPL	-4	
868	001342	000766			BR	IS	
869					; THIS ROUTINE TYPES A LOCATION IN OCTAL		
870	001344	032737	020000	177570	PRINTR:	BIT	; INHIBIT TYPEOUT?
871	001352	001406			BEQ	PRINTA	; BRANCH IF NO
872	001354	000207			RTS	PC	
873	001356	032737	020000	177570	PRINTS:	BIT	; INHIBIT TYPEOUT?
874	001364	001405			BEQ	PRINTB	; BRANCH IF NO
875	001366	000207			RTS	PC	
876	001370	112767	000001	000140	PRINTA:	MOVB	; SET ZERO FILL SWITCH
877	001376	000402			BR	+6	; SKIP
878	001400	005067	000132		PRINTB:	CLR	; SUPPRESS LEADING ZEROS
879	001404	112767	177772	000125	MOVB	-6, .PR+1	; SET COUNT
880	001412	010446			.PTIT:	MOV	; SAVE R4
881	001414	012704	001540		MOV	R4, -(SP)	; SET POINTER TO FIRST CHARACTER
882	001420	105014			CLRB	(R4)	; CLEAR FIRST BYTE
883	001422	000413			BR	.PRF	; ROTATE FIRST BIT
884	001424	105014			.PRL:	CLRB	; CLEAR BYTE OF CHAR
885	001426	032767	000100	000102	BIT	#100, .PR	; BIT TYPING MODE
886	001434	001006			BNE	.PRF	; YES SKIP 2 ROTATES
887	001436	006167	000120		ROL	TTY	; ROTATE BIT INTO C
888	001442	106114			ROLB	(4)	; PACK IT
889	001444	006167	000112		ROL	TTY	
890	001450	106114			ROLB	(4)	
891	001452	006167	000104		.PRF:	ROL	
892	001456	106114			ROLB	(4)	
893	001460	105714			TSTB	(4)	; IS IT ZERO
894	001462	001402			BEQ	+6	; SKIP INC
895	001464	105267	000046		INCB	.PR	; SET FILL SWITCH
896	001470	105767	000042		TSTB	.PR	; CHECK FILL SWITCH
897	001474	001402			BEQ	+6	; SKIP BITSET
898	001476	152724	000060		BISB	#'0, (4)+	; MAKE INTO ASCIZ CHAR
899	001502	105267	000031		INCB	.PR+1	; INC COUNT
900	001506	001346			BNE	.PRL	; REPEAT
901	001510	022704	001540		CMP	#.PR+2, R4	; EMPTY BUFFER
902	001514	001002			BNE	+6	; SKIP IF NOT
903	001516	112724	000060		MOVB	#'0, (4)+	; LOAD ONE ZERO
904	001522	105014			CLRB	(4)	; NULL TERMINATOR
905	001524	004567	177534		JSR	R5, PRINTS	; PRINT MESSAGE
906	001530	001540			.PR+2		
907	001532	012604			MOV	(SP)+, R4	; RESTORE R4
908	001534	000207			RTS	PC	
909	001536	000012			.PR:	.BLKW	
910	001562	000000			TTY:	0	
911	001564				RAND\$:		
912	001564	004767	177246		JSR	PC, SAVES	; SAVE THE REGISTERS
913	001570	016700	000106		MOV	LONUM, R0	; SET R0 WITH LOW
914	001574	016701	000100		MOV	HINUM, R1	; SET R1 WITH HIGH
915	001600	012703	177771		MOV	#-7, R3	; SET SHIFT COUNT
916	001604	005002			CLR	R2	
917	001606	006300			1\$:	ASL	; SHIFT R0 LEFT AND
918	001610	006101			ROL	R1	; ROTATE CARRY INTO R1 AND
919	001612	006102			ROL	R2	; ROTATE CARRY INTO R2

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920	001614	005203		INC	R3		;CHECK FOR DONE
921	001616	001373		BNE	1\$		
922	001620	066702	000056	ADD	LONUM,R2		;ADD # TO MAKE X 129
923	001624	005501		ADC	R1		;PROPOGATE CARRY
924	001626	066701	000046	ADD	HINUM,R1		;ADD # TO MAKE X 129
925	001632	005502		ADC	R2		;PROPOGATE CARRY
926	001634	062700	001057	ADD	#1057,R0		
927	001640	005501		ADC	R1		;PROPOGATE CARRY
928	001642	005502		ADC	R2		;PROPOGATE CARRY
929	001644	062701	047401	ADD	#47401,R1		
930	001650	005502		ADC	R2		
931	001652	062702	000006	ADD	#6,R2		
932	001656	060200		ADD	R2,R0		
933	001660	005501		ADC	R1		
934	001662	010067	000014	MOV	R0,LONUM		
935	001666	010167	000006	MOV	R1,HINUM		
936	001672	004767	177166	JSR	PC,REST\$		;RESTORE THE REGISTERS
937	001676	000207		RTS	PC		
938							
939	001700	000000		HINUM:	0		
940	001702	000000		LONUM:	0		
941	001704	010346		READS:	MOV	R3,-(6)	;SAVE R3
942	001706	012703	002014	1\$:	MOV	#INPUT\$,R3	;GET BUFFER ADDR
943	001712	022703	002034	2\$:	CMP	#INPUT\$+20,R3	;BUFFER FULL?
944	001716	001412			BEQ	4\$	;YES..TYPE ?
945	001720	105737	177560		TSTB	@#177560	;WAIT FOR A CHAR
946	001724	100375			BPL	-4	
947	001726	113713	177562		MOVB	@#177562,(3)	;GET CHAR
948	001732	142713	000200		BICB	#200,(3)	;GET RID OF JUNK
949	001736	122713	000177		CMPB	#177,(3)	;IS IT A RUBOUT?
950	001742	001004			BNE	3\$	;SKIP IF NO
951	001744			4\$:			
952	001744	004567	177314		JSR	R5,PRINT\$	;PRINT MESSAGE
953	001750	002054			READMS		
954	001752	000755			BR	1\$	;CLEAR BUFFER AND START OVER
955	001754	013737	177562	177566	3\$:	MOV	@#TKB,@#TPB
956	001762	105737	177564		TSTB	@#TPB	;ECHO THE CHAR
957	001766	100375			BPL	-4	;WAIT FOR READY
958	001770	122723	000015		CMPB	#15,(3)+	;CHECK FOR RETURN
959	001774	001346			BNE	2\$	;LOOP IF NOT RETURN
960	001776	105063	177777		CLRB	-1(3)	;REMOVE THE RETURN
961	002002	004567	177256		JSR	R5,PRINT\$	;PRINT MESSAGE
962	002006	002060			READLS		
963	002010	012603			MOV	(6)+,R3	;RESTORE R3
964	002012	000207			RTS	PC	;RETURN
965							
966	002014	000020		INPUT\$:	.BLKW	20	
967	002054	006477	000012	READMS:	.ASCIZ	'?'<15><12>	
968	002060	000012		READLS:	.ASCIZ	<12>	
969							
970							
971							
972							
973	002062						
974	002062	004767	176750	PACK\$:	JSR	PC,SAVE\$	;SAVE THE REGISTERS
975	002066	005067	000242		CLR	NUM\$	

;TAKE THE CONTENTS OF THE TTY INPUT BUFFER AND
;PACK THEM INTO ONE WORD TO CREATE AN OCTAL NUMBER

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976	002072	005000			CLR	RO	
977	002074	105760	002014	2\$:	TSTB	INPUT\$(RO)	
978	002100	001402			BEQ	1\$	
979	002102	005200			INC	RO	
980	002104	000773			BR	2\$	
981	002106	005300		1\$:	DEC	RO	
982	002110	004767	000166		JSR	PC,PAC\$	;GET OCTAL CHAR
983	002114	016767	000212	000212	MOV	PK\$,NUM\$	;PACK FIRST CHAR
984	002122	004767	000154		JSR	PC,PAC\$	;GET OCTAL CHAR
985	002126	000241			CLC		
986	002130	006167	000176		ROL	PK\$	
987	002134	006167	000172		ROL	PK\$	
988	002140	006167	000166		ROL	PK\$	
989	002144	056767	000162	000162	BIS	PK\$,NUM\$	;PACK SECOND CHAR
990	002152	004767	000124		JSR	PC,PAC\$	;GET OCTAL CHAR
991	002156	000241			CLC		
992	002160	000367	000146		SWAB	PK\$	
993	002164	006067	000142		ROR	PK\$	
994	002170	006067	000136		ROR	PK\$	
995	002174	056767	000132	000132	BIS	PK\$,NUM\$	;PACK THIRD CHAR
996	002202	004767	000074		JSR	PC,PAC\$	;GET OCTAL CHAR
997	002206	000367	000120		SWAB	PK\$	
998	002212	000241			CLC		
999	002214	006167	000112		ROL	PK\$	
1000	002220	056767	000106	000106	BIS	PK\$,NUM\$	;PACK FOURTH CHAR
1001	002226	004767	000050		JSR	PC,PAC\$	;GET OCTAL CHAR
1002	002232	000367	000074		SWAB	PK\$	
1003	002236	000241			CLC		
1004	002240	006167	000066		ROL	PK\$	
1005	002244	006167	000062		ROL	PK\$	
1006	002250	006167	000056		ROL	PK\$	
1007	002254	006167	000052		ROL	PK\$	
1008	002260	056767	000046	000046	BIS	PK\$,NUM\$	;PACK FIFTH CHAR
1009	002266	000402			BR	PKEX1\$	
1010	002270	062706	000002		ADD	#2,SP	;MODIFY STACK
1011	002274			PKEX1\$:			
1012	002274	004767	176564		JSR	PC,REST\$	;RESTORE THE REGISTERS
1013	002300	000207			RTS	PC	;EXIT
1014							
1015	002302	005700		PAC\$:	TST	RO	
1016	002304	100771			BMI	PKEX\$	
1017	002306	005067	000020		CLR	PK\$	
1018	002312	116067	002014	000012	MOVB	INPUT\$(RO),PK\$	;GET INPUT CHAR
1019	002320	005300			DEC	RO	
1020	002322	042767	177770	000002	BIC	#177770,PK\$	;CLEAR UNWANTED BITS
1021	002330	000207			RTS	PC	
1022							
1023	002332	000000		PK\$:	0		
1024	002334	000000		NUM\$:	0		
1025				.TITLE	RP11C RELIABILITY TEST		
1026							
1027		000254		VECTOR=254			;DISK INTERRUPT TRAP ASSIGNMENT
1028		000256		STATUS=256			;INTERRUPT PRIORITY ASSIGNMENT
1029							
1030							
1031	002336	000005		START:	RESET		;CLEAR THE WORLD

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1032	002340	012706	000500		MOV	#STKPTR, SP	: SETUP STACK
1033	002344	004767	011352		JSR	PC, INIT	: INITIALIZE VECTORS
1034	002350	004567	013102		JSR	RS, EXTMEN	: SET UP DATA BUFFERS
1035	002354	005067	176420		CLR	ICNT	: CLEAR THE PASS COUNTER
1036	002360	005067	015100		CLR	FLAG	: CLEAR PROGRAM FLAG
1037	002364	005067	015130		CLR	DSKNOR	: CLEAR UNIT FLAG
1038	002370	005067	015102		CLR	CYLINDER	: CLEAR THE CYLINDER ADDRESS
1039	002374	005067	015100		CLR	DMA	: CLEAR DAR REGISTERS
1040	002400	005067	015100		CLR	PATNU	: CLEAR PATTERN COUNT
1041	002404	032737	000400	177570	BIT	#B8, 2*SWR	: USE CONVERSATION MODE?
1042	002412	001005			BNE	LCONM	: BRANCH IF YES
1043	002414	052767	070000	015042	BIS	#70000, FLAG	
1044	002422	000167	000726		JMP	ADTST	
1045							: ENTER OPERATOR CONVERSATION MODE
1046	002426				LCONM:		
1047	002426	004567	176650		JSR	RS, PRNTFS	: FORCE PRINT THE MESSAGE
1048	002432	016630			SPECMES		
1049	002434	016767	015050	177120	MOV	SWRDT, TTY	
1050	002442	004767	176732		JSR	PC, PRINTB	: FORCE TYPE LOCATION - SUPPRESS ZEROS
1051	002446	004567	176630		JSR	RS, PRNTFS	: FORCE PRINT THE MESSAGE
1052	002452	016667			CON1		: ASK ABOUT DATA TEST ONLY
1053	002454	004767	177224		JSR	PC, READS	: INPUT MESSAGE
1054	002460	122767	000131	177326	CMPB	#131, INPUTS	: TEST FOR YES
1055	002466	001003			BNE	.+10	: BRANCH IF NO
1056	002470	052767	002000	014766	BIS	#B10, FLAG	: SET DATA TEST ONLY FLAG
1057	002476	004567	176600		JSR	RS, PRNTFS	: FORCE PRINT THE MESSAGE
1058	002502	016722			CON2		: ASK ABOUT MULTI DRIVE MODE
1059	002504	004767	177174		JSR	PC, READS	: INPUT MESSAGE
1060	002510	122767	000131	177276	CMPB	#131, INPUTS	: TEST FOR YES
1061	002516	001040			BNE	DATTES	: BRANCH IF NO
1062	002520	052767	004000	014736	BIS	#B11, FLAG	: SET MULTI UNIT FLAG
1063	002526				DSKDR:		
1064	002526	004567	176550		JSR	RS, PRNTFS	: FORCE PRINT THE MESSAGE
1065	002532	016756			CON3		: GET NO. OF UNITS
1066	002534	004767	177144		JSR	PC, READS	: INPUT MESSAGE
1067	002540	004767	177316		JSR	PC, PACKS	: CONVERT INPUT TO A NUMBER
1068	002544	005767	177564		TST	NUMS	: IS IT ZERO
1069	002550	001766			BEQ	DSKDR	
1070	002552	162767	000001	177554	SUB	#1, NUMS	
1071	002560	022767	000010	177546	CMP	#10, NUMS	: IS NO. TOO HIGH
1072	002566	101757			BLOS	DSKDR	
1073	002570	016767	177540	014722	MOV	NUMS, DSKNOR	: SAVE HIGHEST UNIT NO.
1074	002576	042767	177770	014714	BIC	#177770, DSKNOR	
1075	002604	000241			CLC		
1076	002606	006167	014706		ROL	DSKNOR	
1077	002612	006167	014702		ROL	DSKNOR	
1078	002616	000423			BR	ASKWC	
1079	002620				DATTES:		
1080	002620	004567	176456		JSR	RS, PRNTFS	: FORCE PRINT THE MESSAGE
1081	002624	017020			CON4		: ASK UNIT NUMBER
1082	002626	004767	177052		JSR	PC, READS	: INPUT MESSAGE
1083	002632	004767	177224		JSR	PC, PACKS	: CONVERT INPUT TO A NUMBER
1084	002636	022767	000010	177470	CMP	#10, NUMS	: IS NO = OR > 10
1085	002644	101765			BLOS	DATTES	: NO
1086	002646	000241			CLC		
1087	002650	006167	177460		ROL	NUMS	

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1088	002654	006167	177454			RUL	NUMS	
1089	002660	056767	177450	014576		BIS	NUMS, FLAG	;SAVE UNIT UNDER TEST
1090	002666				ASKWC:			
1091	002666	004567	176410			JSR	RS, PRNTFS	;FORCE PRINT THE MESSAGE
1092	002672	017037				CON5		;ASK ABOUT OPTIONAL WORD COUNT
1093	002674	004767	177004			JSR	PC, READS	;INPUT MESSAGE
1094	002700	122767	000131	177106		CMPB	#131, INPUTS	;TEST FOR YES
1095	002706	001031				BNE	TKSR	;ASK ABOUT OPTICNAL DAR
1096	002710				WCCON:			
1097	002710	004567	176366			JSR	RS, PRNTFS	;FORCE PRINT THE MESSAGE
1098	002714	017077				CON6		;ASK LENGTH OF WC
1099	002716	004767	176762			JSR	PC, READS	;INPUT MESSAGE
1100	002722	004767	177134			JSR	PC, PACKS	;CONVERT INPUT TO A NUMBER
1101	002726	005767	177402			TST	NUMS	
1102	002732	001766				BEQ	WCCON	
1103	002734	016767	014550	014600		MOV	SWRDC7, WORK	
1104	002742	005267	014574			INC	WORK	
1105	002746	026767	014570	177360		CMP	WORK, NUMS	;IS NO. GREATER THAN AVAILABLE CORE?
1106	002754	101755				BLOS	WCCON	;YES ASK FOR COUNT AGAIN
1107	002756	016767	177352	014524		MOV	NUMS, SWRDC7	;OPERATING WORD COUNT
1108	002764	016767	014520	014502		MOV	SWRDC7, WRDC7	
1109	002772				TKSR:			
1110	002772	004567	176304			JSR	RS, PRNTFS	;FORCE PRINT THE MESSAGE
1111	002776	017150				CON7A		;ASK ABOUT DISK ADDR
1112	003000	004767	176750			JSR	PC, READS	;INPUT MESSAGE
1113	003004	122767	000131	177002		CMPB	#131, INPUTS	;WILL OPERATOR SUPPLY ADDR?
1114	003012	001055				BNE	OPPAT	;BRANCH IF NO
1115	003014	052767	000040	014442		BIS	#BS, FLAG	
1116	003022				OPDAR:			
1117	003022	004567	176254			JSR	RS, PRNTFS	;FORCE PRINT THE MESSAGE
1118	003026	017257				CON7C		;GET CYLINDER ADDR
1119	003030	004767	176650			JSR	PC, READS	;INPUT MESSAGE
1120	003034	004767	177022			JSR	PC, PACKS	;CONVERT INPUT TO A NUMBER
1121	003040	022767	000313	177266		CMP	#313, NUMS	;IS CYLINDER LEGAL
1122	003046	101765				BLOS	OPDAR	
1123	003050	016767	177260	014410		MOV	NUMS, SCYL	;SAVE ADDR
1124	003056				OPDA1:			
1125	003056	004567	176220			JSR	RS, PRNTFS	;FORCE PRINT THE MESSAGE
1126	003062	017127				CON7		;GET HEAD ADDR
1127	003064	004767	176614			JSR	PC, READS	;INPUT MESSAGE
1128	003070	004767	176756			JSR	PC, PACKS	;CONVERT INPUT TO A NUMBER
1129	003074	022767	000024	177232		CMP	#24, NUMS	
1130	003102	101765				BLOS	OPDA1	;BRANCH IF HEAD ADDR TOO HIGH
1131	003104	016767	177224	014356		MOV	NUMS, SHED	;SAVE ADDR
1132	003112				OPDA2:			
1133	003112	004567	176164			JSR	RS, PRNTFS	;FORCE PRINT THE MESSAGE
1134	003116	017234				CON7B		;GET SECTOR ADDR
1135	003120	004767	176560			JSR	PC, READS	;INPUT MESSAGE
1136	003124	004767	176732			JSR	PC, PACKS	;CONVERT INPUT TO A NUMBER
1137	003130	022767	000012	177176		CMP	#12, NUMS	;IS SECTOR ADDR TOO HIGH?
1138	003136	101765				BLOS	OPDA2	
1139	003140	016767	177170	014324		MOV	NUMS, SSEC	;SAVE ADDR
1140								
1141	003146				OPPAT:			
1142	003146	004567	176130			JSR	RS, PRNTFS	;FORCE PRINT THE MESSAGE
1143	003152	017304				CON9		;ASK ABOUT DATA PATTERNS

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RP11C RELIABILITY TEST MACY11 27(732) 16-SEP-76 16:12 PAGE 29
 DZRPFB.P11

1144	003154	004767	176524			JSR	PC, READS	; INPUT MESSAGE
1145	003160	004767	176676			JSR	PC, PACKS	; CONVERT INPUT TO A NUMBER
1146	003164	022767	000020	177142		CMP	#20, NUMS	; TEST FOR CORRECT NO
1147	003172	101765				BLOS	OPPAT	; ASK AGAIN
1148	003174	022767	000017	177132		CMP	#17, NUMS	
1149	003202	001411				BEQ	OPWRT	; DATA PATTERN UNDER PROGRAM CONTROL
1150	003204	052767	100000	014252		BIS	#B15, FLAG	; SET PROGRAM FLAG
1151	003212	016767	177116	014264		MOV	NUMS, PATNU	; OPERATOR WANTS TO SELECT DATA
1152	003220	000241				CLC		
1153	003222	006167	014256			ROL	PATNU	
1154	003226	042767	070000	014230	OPWRT:	BIC	#70000, FLAG	; CLEAR OP MODE BITS IN FLAG
1155	003234	004567	176042			JSR	RS, PRNTRS	; FORCE PRINT THE MESSAGE
1156	003240	017341				CON9		; ASK ABOUT WRITE
1157	003242	004767	176436			JSR	PC, READS	; INPUT MESSAGE
1158	003246	122767	000131	176540		CMPB	#131, INPUTS	; TEST FOR YES
1159	003254	001003				BNE	OPRD	; ASK ABOUT WRITE CHECK
1160	003256	052767	040000	014200		BIS	#B14, FLAG	; YES SET FLAG BIT
1161	003264				OPRD:			
1162	003264	004567	176012			JSR	RS, PRNTRS	; FORCE PRINT THE MESSAGE
1163	003270	017411				CON11		; ASK ABOUT READ
1164	003272	004767	176406			JSR	PC, READS	; INPUT MESSAGE
1165	003276	122767	000131	176510		CMPB	#131, INPUTS	; TEST FOR YES ANSWER
1166	003304	001003				BNE	OPWCK	
1167	003306	052767	010000	014150		BIS	#B12, FLAG	; SET FLAG TO READ
1168	003314				OPWCK:			
1169	003314	004567	175762			JSR	RS, PRNTRS	; FORCE PRINT THE MESSAGE
1170	003320	017362				CON10		; ASK ABOUT WRITE CHECK
1171	003322	004767	176356			JSR	PC, READS	; INPUT MESSAGE
1172	003326	122767	000131	176460		CMPB	#131, INPUTS	
1173	003334	001003				BNE	CHKMOD	
1174	003336	052767	020000	014120		BIS	#B13, FLAG	; SET WRITE CHECK FLAG
1175	003344	032767	070000	014112	CHKMOD:	BIT	#70000, FLAG	; MAKE SURE SOME OPERATION WAS SELECTED
1176	003352	001725				BEQ	OPWRT	
1177								
1178								
1179	003354	005737	000042		ADTST:	TST	#42	; UNDER MONITOR CONTROL?
1180	003360	001444				BEQ	15	; BRANCH IF NO
1181	003362	005067	014132			CLR	DSKNOR	
1182	003366	012777	000001	014044	3\$:	MOV	#1, DRPCS	; CLEAR THE RP11C
1183	003374	116777	014120	014040		MOV8	DSKNOR, DRPCS1	; SELECT THE DRIVE
1184	003402	005777	014052			TST	DRPDS	; IS THE UNIT READY?
1185	003406	100003				BPL	2\$	; BRANCH IF NO
1186	003410	005267	014104			INC	DSKNOR	; UPDATE UNIT NUMBER
1187	003414	000764				BR	3\$	
1188	003416	005367	014076		2\$:	DEC	DSKNOR	; DSKNOR = NUMBER OF UNITS
1189	003422	000241				CLC		
1190	003424	006167	014070			ROL	DSKNOR	
1191	003430	006167	014064			ROL	DSKNOR	
1192	003434	052767	004000	014022		BIS	#B11, FLAG	; SET MULTI DRIVE FLAG
1193	003442	005767	014052			TST	DSKNOR	; WERE ANY UNITS AVAILABLE?
1194	003446	100011				BPL	15	; BRANCH IF YES
1195	003450	004567	175610			JSR	RS, PRINTS	; PRINT MESSAGE
1196	003454	016535				MES20		
1197	003456	013701	000042			MOV	#42, R1	; ABORT - NO UNITS AVAILABLE
1198	003462	005067	174354			CLR	42	; SET ABORT FLAG
1199	003466	000167	006366			JMP	MEXIT	

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 RP11C RELIABILITY TEST MACY11 27(732) 16-SEP-76 16:12 PAGE 30
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1200 003472 032767 004000 013764 1$: BIT      #B11,FLAG      ;ARE WE IN MULTI DRIVE MODE?
1201 003500 001422          BEQ      EXMFLG      ;BRANCH IF NO
1202 003502 004567 175574      JSR      RS,PRNTFS    ;FORCE PRINT THE MESSAGE
1203 003506 016370          MES:1
1204 003510 016767 013750 014014 MOV      FLAG,ACNVX    ;TELL OPERATOR THE UNIT UNDER TEST
1205 003516 006067 014010      ROR      ACNVX
1206 003522 006067 014004      ROR      ACNVX
1207 003526 042767 177770 013776 BIC      #177770,ACNVX
1208 003534 016767 013772 176020 MOV      ACNVX,TTY
1209 003542 004767 175632      JSR      PC,PRINTB    ;FORCE TYPE LOCATION - SUPPRESS ZEROS
1210 003546 032737 000010 177570 EXMFLG: BIT      #B3,2#SWR    ;RUN SELECTED TEST?
1211 003554 001410          BEQ      1$          ;BRANCH IF NO
1212 003556 013700 177570      MOV      2#SWR,RO      ;GET SWITCH SETTINGS
1213 003562 042700 177770      BIC      #177770,RO
1214 003566 000241          CLC
1215 003570 006100          ROL      RO
1216 003572 000170 003612      JMP      2TSTBL(RO)    ;GO TO SELECTED TEST
1217 003576 032767 002000 013660 1$: BIT      #B10,FLAG    ;DATA TEST ONLY?
1218 003604 001412          BEQ      ADT1          ;NO
1219 003606 000167 004520      JMP      DATAT      ;DO DATA TEST

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1220
1221 003612 003632          TSTBL: ADT1
1222 003614 004312          ADT2
1223 003616 005370          ADT3
1224 003620 006024          WRCK
1225 003622 007220          MEMTS
1226 003624 010332          DATAT
1227 003626 011166          RANEX
1228 003630 012074          PFTST

```

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

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;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 312
;DONE IS TIMED OUT, SELECTED UNIT CYLINDER ADDRESS IS TESTED. SEEK UNDERWAY
;IS CHECK, AND THE ATTENTION FLAG IS TESTED.

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1240 003632 005067 013700      ADT1: CLR      TESTNO
1241 003636 004567 175422      JSR      RS,PRNTFS    ;PRINT MESSAGE
1242 003642 016225          MES6
1243 003644 016767 013666 175710 MOV      TESTNO,TTY
1244 003652 004767 175500      JSR      PC,PRNTFS    ;TYPE LOCATION-SUPPRESS ZEROS
1245 003656 012737 004300 000254 RADT1: MOV      #INTCK,2#VECTOR ;SET UP DISK VECTOR
1246 003664 012737 000340 000256 MOV      #340,2#STATUS
1247 003672 004567 007752      JSR      RS,DSKNOS    ;SELECT UNIT
1248 003676 005067 013574      CLR      CYLINDER
1249 003702 005067 013640      CLR      WORK2        ;CYLINDER COUNTER
1250 003706 005067 013636      CLR      WORK3        ;POINTER
1251 003712 012737 000200 177776 MOV      #PRI4,2#PSW    ;ALLOW INTERRUPTS
1252 003720 047777 013534 013532 9$: BIC      2RPDS,2RPDS    ;CLEAR ATTENTION BITS
1253 003726 116777 013544 013514 MOV      CYLINDER,2RPCA ;SET CYLINDER REGISTER
1254 003734 052777 020011 013476 BIS      #20011,2RPCS   ;SEEK AND ENABLE ATTN INTERRUPT
1255 003742 005067 000342      CLR      INTFLG      ;CLEAR INTERRUPT FLAG

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RP110 RELIABILITY TEST MACY11 27(732) 16-SEP-76 16:12 PAGE 31
 DZRPFB.P11 ***** TEST 0 *****

1256	003746	012700	000025		MOV	#25,RO	
1257	003752	005300		1\$:	DEC	RO	;DELAY FOR DONE TO SET
1258	003754	001376			BNE	1\$	
1259	003756	105777	013456		TSTB	ARPCS	;TEST FOR DONE
1260	003762	100402			BMI	2\$	;BRANCH DONE SET
1261	003764	104400			HLT		;DONE DID NOT SET AFTER SEEK
1262	003766	000471			BR	8\$	
1263	003770	005767	013552	2\$:	TST	WORK2	;DON'T TEST SEEK UNDERWAY
1264	003774	001406			BEQ	3\$	;IF FIRST TIME THRU
1265	003776	032777	002000 013454		BIT	#810,ARPDS	;DID SEEK UNDERWAY SET?
1266	004004	001002			BNE	3\$	;BRANCH IF YES
1267	004006	104400			HLT		;SEEK UNDERWAY DID NOT SET
1268	004010	000460			BR	8\$	
1269	004012	005000		3\$:	CLR	RO	
1270	004014	005200		5\$:	INC	RO	;TIMEOUT UNIT READY
1271	004016	005777	013436		TST	ARPDS	;IS UNIT READY?
1272	004022	100414			BMI	6\$	;BRANCH IF YES
1273	004024	005237	017554		INC	ARCYLA	
1274	004030	005337	017554		DEC	ARCYLA	
1275	004034	005237	017554		INC	ARCYLA	
1276	004040	005337	017554		DEC	ARCYLA	
1277	004044	005700			TST	RO	;TIMEOUT?
1278	004046	001362			BNE	5\$	;BRANCH IF NO
1279	004050	104400			HLT		;READY DID NOT SET AFTER SEEK
1280	004052	000437			BR	8\$	
1281	004054	005767	000230	6\$:	TST	INTFLG	;DID INTERRUPT OCCUR?
1282	004060	001002			BNE	12\$	;BRANCH IF YES
1283	004062	104400			HLT		;INTERRUPT DID NOT OCCUR ON ATTENTION BIT
1284	004064	000432			BR	8\$	
1285	004066	004767	007764	12\$:	JSR	PC,GATTN	;DETERMINE ATTENTION BIT
1286	004072	036777	010010 013360		BIT	ATTN,ARPDS	;IS ATTENTION BIT SET?
1287	004100	001002			BNE	7\$	;BRANCH IF YES
1288	004102	104400			HLT		;ATTENTION BIT DID NOT SET
1289	004104	000422			BR	8\$	
1290	004106	126777	013364 013346	7\$:	CMPB	CYLINDER,ARPCA1	;IS SELECTED CYLINDER ADDRESS CORRECT?
1291	004114	001412			BEQ	11\$	
1292	004116	016767	013354 010426		MOV	CYLINDER,EXPS	;EXPECTED RESULTS
1293	004124	005067	010424		CLR	RECS	
1294	004130	117767	013326 010416		MOVB	ARPCA1,RECS	;RECEIVED RESULTS
1295	004136	104401			HLT	+1	;CONTENTS OF SELECTED CYLINDER ADDR REGISTER INCORRECT
1296	004140	000404			BR	8\$	
1297	004142	005777	013272	11\$:	TST	ARPCS	;ANY DEVICE ERRORS
1299	004146	100001			BPL	8\$	;BRANCH IF NO
1299	004150	104400			HLT		;DEVICE ERROR AFTER SEEK OPERATION
1300	004152	032777	004000 013300	8\$:	BIT	#811,ARPDS	;SEEK INCOMPLETE?
1301	004160	001411			BEQ	4\$	;BRANCH IF NO
1302	004162	112777	000015 013250		MOVB	#15,ARPCS	;ISSUE HOME COMMAND
1303	004170	105777	013244		TSTB	ARPCS	;WAIT FOR DONE
1304	004174	100375			BPL	-4	
1305	004176	005777	013256		TST	ARPDS	;WAIT FOR UNIT READY
1306	004202	100375			BPL	-4	
1307	004204	012767	003720 174570	4\$:	MOV	#9\$,LAD	;SET UP LOOP
1308	004212	104000			SCOPE		
1309	004214	005767	013330		TST	WORK3	;SEEK CYLINDER ZERO?
1310	004220	100411			BMI	10\$	;BRANCH IF YES
1311	004222	005267	013320		INC	WORK2	;UPDATE CYLINDER

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RP11C RELIABILITY TEST MACY11 27(732) 16-SEP-76 16:12 PAGE 32
 DZRPFB.P11 ***** TEST 0 *****

1312	004226	016767	013314	013242		MOV	WORK2,CYLINDER	
1313	004234	052767	100000	013306		BIS	#B15,WORK3	;SET SEEK ZERO FLAG
1314	004242	000626				BR	9\$	
1315	004244	005067	013226		10\$:	CLR	CYLINDER	
1316	004250	005067	013274			CLR	WORK3	;CLEAR SEEK ZERO FLAG
1317	004254	022767	000312	013264		CMP	#312,WORK2	;HAS LAST CYLINDER BEEN REACHED?
1318	004262	001216				SNE	9\$	;BRANCH IF NO
1319	004264	032737	002000	177570		BIT	#B10,2#SWR	;REPEAT TEST
1320	004272	001407				BEQ	ADT2	;NO-GO TO NEXT
1321	004274	000167	177356			JMP	RADT1	;YES
1322								
1323								
1324	004300	012767	000001	000002	INTCK:	MOV	#1,INTFLG	;SET INTERRUPT FLAG
1325	004306	000002				RTI		
1326	004310	000000			INTFLG:	0		

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RP11C RELIABILITY TEST MACY11 27(732) 16-SEP-76 16:12 PAGE 33
 DZRPFB.P11 ***** TEST 0 *****

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.SBTTL ***** TEST 1 *****

;WRITE 5000 (OCTAL) WORDS IN TEN SECTORS ON EACH TRACK. THE FIRST
 ;WORD OF EACH SECTOR IS THE CYLINDER NUMBER AND THE REMAINING WORDS CONTAIN
 ;THE HEAD AND SECTOR ADDRESS. THEN EACH SECTOR IS READ BACK TEN AT A TIME AND
 ;COMPARED. IF THE FIRST WORD OF A SECTOR DOES NOT COMPARE, THE WRONG
 ;CYLINDER WAS PROBABLY SELECTED. A NON COMPARE ON THE FIRST
 ;WORD IS INDICATED BY TYPING "CYL" AFTER THE ERRING DATA.
 ;IF ANY OTHER WORD FAILS THE WRONG HEAD OR SECTOR WAS
 ;SELECTED. THE RIGHT HALF OF THE DATA TYPED EQUALS THE SECTOR
 ;AND THE LEFT HALF INDICATES THE HEAD.

```

ADT2:  MOV    #1,TESTNO
      JSR     RS,PRINT$      ;PRINT MESSAGE
      MES6
      MOV     TESTNO,TTY
      JSR     PC,PRINT$      ;TYPE LOCATION-SUPRESS ZEROS
RADT2: JSR     RS,DSKNOS      ;SELECT THE DRIVE
1$:    BIS     #15,DRPCS      ;SEEK HOME
      MOV     #25,RO
      DEC     RO              ;GIVE DONE A CHANCE TO SET
      BNE     2$
      TSTB    DRPCS          ;IS DONE SET?
      BMI     3$             ;YES-BRANCH
      HLT
      BR      6$             ;DONE DID NOT SET AFTER A SEEK HOME
                                ;CHECK FOR LOOPING
3$:    CLR     RO
5$:    INC     RO
      TST     DRPDS          ;IS UNIT READY?
      BMI     4$             ;YES BRANCH
      INC     2*CYLA
      DEC     2*CYLA
      INC     2*CYLA
      DEC     2*CYLA
      TST     RO              ;HAS UNIT TIMED OUT
      BNE     5$             ;NO-BRANCH
      HLT
      BR      6$             ;READY DID NOT SET AFTER HOME SEEK
                                ;CHECK FOR LOOPING
4$:    TST     DRPCS          ;ANY ERRORS?
      BPL     6$             ;NO-BRANCH
      HLT
      HLT                    ;DRIVE ERRORS AFTER HOME SEEK
                                ;SETUP LOOP ADDRESS
6$:    MOV     #15,LAD
      SCOPE
      MOV     #5000,WRDCT     ;SETUP WORD COUNT FOR 10 SECTORS
      MOV     #OUTBUF,BUF     ;SETUP OUTPUT BUFFER ADDR
      CLR     DMA
      CLR     CYLINDER
SEABUF: MOV     #OUTBUF,RO     ;GET BUFFER STARTING ADDR
21$:   MOV     #400,R1         ;SECTOR COUNT
      MOV     CYLINDER,(RO)+   ;GENERATE PATTERN SO THAT THE
      DEC     R1               ;THE FIRST WORD OF EACH SECTOR
      MOV     DMA,(RO)+        ;EQUALS THE CYLINDER ADDR AND
      DEC     R1               ;THE REMAINDER EQUALS THE HEAD AND
      BNE     1$              ;SECTOR ADDR
1$:    MOV     DMA,(RO)+
      DEC     R1
      BNE     1$
      CMPB    #11,DMA
  
```

RP11C RELIABILITY TEST MACY11 27(732) 16-SEP-76 16:12 PAGE 34
 DZRPFB.P11 ***** TEST 1 *****

1383	004536	001403				BEQ	22\$	
1384	004540	005267	012734			INC	DMA	;UPDATE SECTOR COUNT
1385	004544	000760				BR	21\$	
1386	004546	105067	012726		22\$:	CLRB	DMA	
1387	004552	004567	005742		4\$:	JSR	RS,FUNCT	;WRITE TEN SECTORS
1388	004556	000003			.WORD	3		
1389	004560	005000				CLR	RO	
1390	004562	005200			3\$:	INC	RO	
1391	004564	105777	012650			TSTB	ARPCS	;IS DONE SET?
1392	004570	100404				BMI	2\$	;YES BRANCH
1393	004572	005700				TST	RO	;TEST FOR TIMEOUT
1394	004574	001372				BNE	3\$	;BRANCH IF NO
1395	004576	104400				HLT		;DONE DID NOT SET AFTER WRITE
1396	004600	000503				BR	5\$	
1397	004602	005777	012632		2\$:	TST	ARPCS	;ANY DEVICE ERRORS?
1398	004606	100002				BPL	6\$	;BRANCH IF NO
1399	004610	104400				HLT		;RP11C STATUS ERROR AFTER WRITE
1400	004612	000476				BR	5\$	
1401	004614	005067	012722		6\$:	CLR	WORK	;INCREMENT FLAG
1402	004620	017767	012626	007726		MOV	ARPD,RECS	;GET DISK ADDR
1403	004626	042767	177760	007720		BIC	#177760,RECS	;SAVE SECTOR ADDR
1404	004634	005767	007714			TST	RECS	
1405	004640	001404				BEQ	9\$	;BRANCH IF SECTOR = ZERO
1406	004642	005067	007704			CLR	EXPS	
1407	004646	104401				HLT	+1	;SECTOR ADDR IN RPDA DID NOT UPDATE
1408	004650	000457				BR	5\$	;PROPERLY AFTER A TEN SECTOR WRITE
1409	004652	117767	012576	007674	9\$:	MOVB	ARPD,RECS	;GET THE HEAD ADDR
1410	004660	116767	012615	007664		MOVB	DMA+1,EXPS	;SECTOR ADDR OUTPUTTED
1411	004666	122767	000023	007656		CMPB	#23,EXPS	;DID WE OUTPUT HEAD 23?
1412	004674	001005				BNE	7\$	;BRANCH IF NO
1413	004676	005067	007650			CLR	EXPS	;RESET HEAD ADDR
1414	004702	010667	012634			MOV	SP,WORK	;SET INCREMENT FLAG
1415	004706	000402				BR	8\$	
1416	004710	005267	007636		7\$:	INC	EXPS	
1417	004714	126767	007632	007632	9\$:	CMPB	EXPS,RECS	;IS DISK HEAD ADDR CORRECT?
1418	004722	001402				BEQ	12\$	;BRANCH IF YES
1419	004724	104401				HLT	+1	;HEAD ADDR IN RPDA WAS INCORRECT
1420	004726	000430				BR	5\$	;AFTER TEN SECTOR WRITE
1421	004730	005067	007620		12\$:	CLR	RECS	
1422	004734	117767	012510	007612		MOVB	ARPCA,RECS	;GET DISK CYLINDER ADDR
1423	004742	016767	012530	007602		MOV	CYLINDER,EXPS	
1424	004750	005767	012566			TST	WORK	;IS INCREMENT FLAG SET?
1425	004754	001410				BEQ	13\$	;BRANCH IF NO
1426	004756	005267	007570			INC	EXPS	
1427	004762	022767	000313	007562		CMP	#313,EXPS	;WAS IT LAST CYLINDER?
1428	004770	001002				BNE	13\$	;BRANCH IF NO
1429	004772	005067	007554			CLR	EXPS	
1430	004776	026767	007550	007550	13\$:	CMP	EXPS,RECS	;IS DISK CYLINDER ADDR CORRECT?
1431	005004	001401				BEQ	5\$	;BRANCH IF YES
1432	005006	104401				HLT	+1	;CYLINDER ADDR IN RPDA IS NOT
1433								;CORRECT AFTER TEN SECTOR WRITE
1434	005010	032777	004000	012442	5\$:	BIT	#B11,ARPD	;SEEK INCOMPLETE?
1435	005016	001411				BEQ	10\$	;BRANCH IF NO
1436	005020	112777	000015	012412		MOVB	#15,ARPCS	;ISSUE HOME COMMAND
1437	005026	105777	012406			TSTB	ARPCS	;WAIT FOR DONE
1438	005032	100375				BPL	.-4	

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RP11C RELIABILITY TEST MACY11 27(732) 16-SEP-76 16:12 PAGE 35
 DZRPFB.P11 ***** TEST 1 *****

1439	005034	005777	012420		TST	ARPD5		;WAIT FOR UNIT READY
1440	005040	100375			BPL	.-4		
1441	005042	012767	004552	173732	10\$:	MOV	#4\$,LAD	;SETUP LOOP ADDR
1442	005050	104000				SCOPE		
1443	005052	004767	006162			JSR	PC,DISBUF	;SETUP NEXT DISK ADDR
1444	005056	000611				BR	SEABUF	;WRITE NEXT SECTOR
1445	005060	012767	005000	012406		MOV	#5000,WRDCT	;RESTORE WORD COUNT
1446	005066	052777	000015	012344		BIS	#15,ARPCS	;SEEK HOME
1447	005074	105777	012340			TSTB	ARPCS	
1448	005100	100375				BPL	.-4	;WAIT FOR DONE AFTER SEEK HOME
1449	005102	005777	012352			TST	ARPD5	
1450	005106	100375				BPL	.-4	;WAIT FOR DRIVE READY AFTER SEEK HOME
1451	005110	012700	017556		RDSECT:	MOV	#OUTBUF,RO	
1452	005114	012701	005000			MOV	#5000,R1	
1453	005120	005020			23\$:	CLR	(R0)+	;CLEAR THE BUFFER
1454	005122	005301				DEC	R1	
1455	005124	001375				BNE	23\$	
1456	005126	004567	005366			JSR	R5,FUNCT	;READ TEN SECTORS
1457	005132	000005			.WORD	5		
1458	005134	105777	012300			TSTB	ARPCS	
1459	005140	100375				BPL	.-4	;WAIT FOR DONE AFTER READ
1460	005142	005777	012272			TST	ARPCS	;ANY ERRORS?
1461	005146	100006				BPL	ADHGT	;BRANCH NO ERRORS
1462	005150	104400				HLT		;STATUS ERROR AFTER A READ
1463	005152	032777	040000	012260		BIT	#B14,ARPCS	;WAS IT A DATA ERROR?
1464	005160	001401				BEQ	ADHGT	;IF YES GO COMPARE DATA
1465	005162	000446				BR	ADTER1	
1466	005164	012700	017556		ADHGT:	MOV	#OUTBUF,RO	
1467	005170	012701	000400		ADHGT1:	MOV	#400,R1	
1468	005174	026710	012276			CMP	CYLINDER,(0)	;IS CYLINDER WORD CORRECT?
1469	005200	001017				BNE	ADERC	;BRANCH IF NO
1470	005202	005720				TST	(0)+	
1471	005204	005301				DEC	R1	
1472	005206	026710	012266		SANHT:	CMP	DMA,(0)	;IS HEAD-SECTOR WORD CORRECT?
1473	005212	001016				BNE	ADERA	;BRANCH IF NO
1474	005214	005720				TST	(0)+	
1475	005216	005301				DEC	R1	
1476	005220	001372				BNE	SANHT	
1477	005222	122767	000011	012250		CMPB	#11,DMA	
1478	005230	001423				BEQ	ADTER1	
1479	005232	005267	012242			INC	DMA	
1480	005236	000754				BR	ADHGT1	
1481	005240	016767	012232	007304	ADERC:	MOV	CYLINDER,EXPS	;CORRECT DATA/ADDRESS
1482	005246	000403				BR	ADERC1	
1483	005250	016767	012224	007274	ADERA:	MOV	DMA,EXPS	;CORRECT DATA/ADDRESS
1484	005256	011067	007272		ADERC1:	MOV	(0),RECS	;INCORRECT DATA
1485	005262	104401				HLT	+1	;DATA COMPARE ERROR
1486	005264	022701	000400			CMP	#400,R1	;WAS FIRST WORD INCORRECT?
1487	005270	001003				BNE	ADTER1	;BRANCH IF NO
1488	005272	004567	173766			JSR	R5,PRINT\$	;PRINT MESSAGE
1489	005276	016404				MES12		;WRONG CYLINDER PROBABLY SELECTED
1490	005300	105067	012174		ADTER1:	CLRB	DMA	
1491	005304	032777	004000	012146		BIT	#B11,ARPD5	;SEEK INCOMPLETE?
1492	005312	001411				BEQ	1\$	;BRANCH IF NO
1493	005314	112777	000015	012116		MOVB	#15,ARPCS	;ISSUE HOME COMMAND
1494	005322	105777	012112			TSTB	ARPCS	;WAIT FOR DONE

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RP11C RELIABILITY TEST MACY11 27(732) 16-SEP-76 16:12 PAGE 36
DZRPFB.P11 ***** TEST 1 *****

1495	005326	100375		BPL	.-4	
1496	005330	005777	012124	TST	2RPDS	;WAIT FOR UNIT READY
1497	005334	100375		BPL	.-4	
1498	005336	012767	005110 173436 15:	MOV	#RDSECT,LAD	;SETUP LOOP
1499	005344	104000		SCOPE		
1500	005346	004767	005666	JSR	PC,DISBUF	;SETUP NEXT DISK ADDRESS
1501	005352	000656		BR	RDSECT	;CHECK NEXT SECTOR
1502	005354	032737	002000 177570	BIT	#B10,2#SWR	;LOOP ON TEST?
1503	005362	001402		BEQ	ADT3	;BRANCH IF NO
1504	005364	000167	176750	JMP	RADT2	

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RP11C RELIABILITY TEST MACY11 27(732) 16-SEP-76 16:12 PAGE 37
 DZRPFB.P11 ***** TEST 2 *****

.SBTTL ***** TEST 2 *****

;WRITE THE FIRST WORD OF EACH CYLINDER WITH THE CYLINDER ADDRESS.
 ;THEN SEEK FROM 312 TO 0. THEN SEEK TO 311 AND BACK TO 1
 ;UNTIL THE NUMBERS CROSS. AFTER EACH SEEK VERIFY THE POSITION
 ;BY READING THE FIRST WORD ON THE CYLINDER AND COMPARING
 ;AGAINST CYLINDER REQUESTED.

1505									
1506									
1507									
1508									
1509									
1510									
1511									
1512									
1513	005370	012767	000002	012140	ADT3:	MOV	#2,TESTNO		
1514	005376	004567	173662			JSR	R5,PRINT\$	;PRINT MESSAGE	
1515	005402	016225				MES6			
1516	005404	016767	012126	174150		MOV	TESTNO,TTY		
1517	005412	004767	173740			JSR	PC,PRINT\$	;TYPE LOCATION-SUPPRESS ZEROS	
1518	005416	004767	006300		RADT3:	JSR	PC,INIT	;INITIALIZE VECTORS	
1519	005422	004567	006222			JSR	R5,DSKNOS	;SELECT UNIT	
1520	005426	005067	012046			CLR	DMA		
1521	005432	005067	012040			CLR	CYLINDER		
1522	005436	012767	000001	012030		MOV	#1,WRDCT	;SET UP WORD COUNT	
1523	005444	012767	017556	012034		MOV	#OUTBUF,BUF	;SETUP BUFFER ADDR	
1524	005452	016737	012020	017556	WRCYL:	MOV	CYLINDER,#OUTBUF	;INSERT PATTERN	
1525	005460	004567	005034			JSR	R5,FUNCT	;WRITE PATTERN ON FIRST SECTOR	
1526	005464	000003			.WORD	3		;OF CYLINDER	
1527	005466	105777	011746			TSTB	ARPCS	;WAIT FOR DONE	
1528	005472	100375				BPL	-4		
1529	005474	005777	011740			TST	ARPCS	;AND ERRORS?	
1530	005500	100002				BPL	1\$	;BRANCH IF NO	
1531	005502	104400				HLT		;DEVICE ERROR WHILE WRITING	
1532	005504	000407				BR	2\$		
1533	005506	022767	000312	011762	1\$:	CMP	#312,CYLINDER	;ALL CYLINDERS WRITTEN?	
1534	005514	001403				BEQ	2\$	;BRANCH IF YES	
1535	005516	005267	011754			INC	CYLINDER		
1536	005522	000753				BR	WRCYL		
1537	005524	032777	004000	011726	2\$:	BIT	#B11,ARPCS	;SEEK INCOMPLETE?	
1538	005532	001411				BEQ	3\$	;BRANCH IF NO	
1539	005534	112777	000015	011676		MOVB	#15,ARPCS	;ISSUE HOME COMMAND	
1540	005542	105777	011672			TSTB	ARPCS	;WAIT FOR DONE	
1541	005546	100375				BPL	-4		
1542	005550	005777	011704			TST	ARPCS	;WAIT FOR UNIT READY	
1543	005554	100375				BPL	-4		
1544	005556	012767	005452	173216	3\$:	MOV	#WRCYL,LAD	;SETUP UP LOOP	
1545	005564	104000				SCOPE			
1546	005566	005067	011704			CLR	CYLINDER		
1547	005572	012767	000311	011746		MOV	#311,WORK2		
1548	005600	005067	011744			CLR	WORK3		
1549	005604	005067	011742			CLR	WORK4	;INC - DEC FLAG	
1550	005610	016767	011712	011670	ADT32:	MOV	INBUF,BUF		
1551	005616	004567	004676			JSR	R5,FUNCT	;READ THE FIRST WORD OF THE	
1552	005622	000005			.WORD	5		;CYLINDER	
1553	005624	105777	011610			TSTB	ARPCS	;WAIT FOR DONE AFTER READ	
1554	005630	100375				BPL	-4		
1555	005632	005777	011602			TST	ARPCS	;ANY ERRORS?	
1556	005636	100002				BPL	3\$	;BRANCH IF NO	
1557	005640	104400				HLT		;ERROR AFTER READING ONE WORD	
1558	005642	000413				BR	5\$		
1559	005644	027767	011656	011624	3\$:	CMP	INBUF,CYLINDER	;COMPARE DATA READ AGAINST CYLINDER	
1560	005652	001407				BEQ	5\$	;BRANCH IF EQUAL	

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RP11C RELIABILITY TEST MACY11 27(732) 16-SEP-76 16:12 PAGE 38
 DZRPFB.P11 ***** TEST 2 *****

1561	005654	016767	011616	006670		MOV	CYLINDER,EXPS	; CORRECT DATA
1562	005662	017767	011640	006664		MOV	INBUF,RECS	; INCORRECT DATA
1563	005670	104401				HLT	+1	; DATA COMPARE ERROR-PROBABLY WENT
1564								; TO THE WRONG CYLINDER
1565	005672	032777	004000	011560	5\$:	BIT	#B11,ARPD5	; SEEK INCOMPLETE?
1566	005700	001411				BEQ	2\$	; BRANCH IF NO
1567	005702	112777	000015	011530		MOVB	#15,ARPCS	; ISSUE HOME COMMAND
1568	005710	105777	011524			TSTB	ARPCS	; WAIT FOR DONE
1569	005714	100375				BPL	-4	
1570	005716	005777	011536			TST	ARPD5	; WAIT FOR UNIT READY
1571	005722	100375				BPL	-4	
1572	005724	012767	005610	173050	2\$:	MOV	#ADT32,LAD	; SETUP LOOP
1573	005732	104000				SCOPE		
1574	005734	005767	011612			TST	WORK4	; INC - DEC FLAG
1575	005740	100411				BMI	1\$	
1576	005742	005267	011602			INC	WORK3	; UPDATE LOW COUNT
1577	005746	016767	011574	011522		MOV	WORK2,CYLINDER	
1578	005754	052767	100000	011570		BIS	#B15,WORK4	; SET DECREMENT FLAG
1579	005762	000712				BR	ADT32	
1580	005764	005367	011556		1\$:	DEC	WORK2	; DECREMENT HIGH COUNT
1581	005770	005067	011556			CLR	WORK4	; CLEAR FLAG
1582	005774	016767	011550	011474		MOV	WORK3,CYLINDER	
1583	006002	005767	011540			TST	WORK2	; DONE YET
1584	006006	001300				BNE	ADT32	; BRANCH-NO
1585	006010	032737	002000	177570		BIT	#B10,#SWR	; LOOP ON TEST?
1586	006016	001402				BEQ	WRCK	; NO
1587	006020	000167	177372			JMP	RADT3	; YES

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RP11C RELIABILITY TEST MACY11 27(732) 16-SEP-76 16:12 PAGE 39
DZRPFB.P11 ***** TEST 2 *****

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1588
1589
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1598
1599 006024 012767 000003 011504 WRCK: MOV #3,TESTNO
1600 006032 004567 173226 JSR R5,PRINT$ ;PRINT MESSAGE
1601 006036 016225 MES6
1602 006040 016767 011472 173514 MOV TESTNO,TTY
1603 006046 004767 173304 JSR PC,PRINT$ ;TYPE LOCATION-SUPRESS ZEROS
1604 006052 004767 005644 RWRCK: JSR PC,INIT ;INITIALIZE
1605 006056 004567 005566 JSR R5,OSKNOS ;SELECT UNIT
1606 006062 005067 011410 CLR CYLINDER
1607 006066 005067 011406 CLR DMA
1608 006072 005000 CLR R0 ;PATTERN FLAG
1609 006074 012701 000001 MOV #1,R1 ;STARTING PATTERN
1610 006100 012767 017556 011400 MOV #OUTBUF,BUF ;SETUP OUTPUT BUFFER
1611 006106 012767 000400 011360 MOV #400,WRDCT ;SETUP WORDCOUNT
1612 006114 005002 23$: CLR R2
1613 006116 010162 017556 1$: MOV R1,OUTBUF(R2) ;GENERATE TEST PATTERN
1614 006122 005722 TST (R2)+ ;UPDATE MODIFIER
1615 006124 022702 000400 CMP #400,R2 ;HAS BUFFER BEEN FILLED?
1616 006130 001372 BNE 1$ ;BRANCH IF NO
1617 006132 004567 004362 JSR R5,FUNCT ;WRITE PATTERN
1618 006136 000003 .WORD 3
1619 006140 105777 011274 TSTB @RPCS ;WAIT FOR DONE
1620 006144 100375 BPL -4
1621 006146 005777 011266 TST @RPCS ;ANY DEVICE ERRORS?
1622 006152 100002 BPL 2$ ;BRANCH IF NO
1623 006154 104400 HLT ;ERROR AFTER WRITING ONE SECTOR
1624 006156 000475 BR 3$
1625 006160 004567 004334 2$: JSR R5,FUNCT ;WRITE CHECK THE DATA
1626 006164 000007 .WORD 7
1627 006166 105777 011246 TSTB @RPCS ;WAIT FOR DONE
1628 006172 100375 BPL -4
1629 006174 005777 011240 TST @RPCS ;ANY DEVICE ERRORS?
1630 006200 100012 BPL 4$ ;BRANCH IF NO
1631 006202 104400 HLT ;ERROR AFTER WRITE CHECK OPERATION
1632 006204 004567 173054 JSR R5,PRINT$ ;PRINT MESSAGE
1633 006210 016345 MES10
1634 006212 016767 011340 173342 MOV OUTBUF,TTY
1635 006220 004767 173120 JSR PC,PRINT$ ;TYPE LOCATION WITH LEADING ZEROS
1636 006224 000452 BR 3$
1637 006226 005700 4$: TST R0 ;ARE WE FLOATING A ONE?
1638 006230 001411 BEQ 20$ ;BRANCH IF YES
1639 006232 005002 CLR R2 ;FILL BUFFER WITH ONES
1640 006234 012762 177777 017556 21$: MOV #177777,OUTBUF(R2)
1641 006242 005722 TST (R2)+
1642 006244 022702 000400 CMP #400,R2
1643 006250 001371 BNE 21$

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1644	006252	000407			BR	225	
1645	006254	005002			CLR	R2	
1646	006256	005062	017556		SS: CLR	OUTBUF(R2)	:CLEAR OUTPUT BUFFER
1647	006262	005722			TST	(R2)+	
1648	006264	022702	000400		CMP	#400,R2	:ENTIRE BUFFER CLEAR?
1649	006270	001372			BNE	SS	:BRANCH IF NO
1650	006272	004567	004222		225: JSR	R5,FUNCT	:WRITE CHECK THE DATA AND
1651	006276	000007			.WORD 7		:EXPECT AN ERROR
1652	006300	105777	011134		TSTB	BRPCS	:WAIT FOR DONE
1653	006304	100375			BPL	-4	
1654	006306	032777	000010	011142	BIT	#B3,BRPER	:IS WRITE CHECK ERROR SET?
1655	006314	001011			BNE	65	:BRANCH IF YES
1656	006316	104400			HLT		:WRITE CHECK ERROR DID NOT SET
1657	006320	004567	172740		JSR	R5,PRINTS	:PRINT MESSAGE
1658	006324	016345			MES!0		
1659	006326	010167	173230		MOV	R1,TTY	
1660	006332	004767	173006		JSR	PC,PRINTR	:TYPE LOCATION WITH LEADING ZEROS
1661	006336	000425			BR	35	
1662	006340	005777	011074		65: TST	BRPCS	:DID ERROR FLAG SET?
1663	006344	100402			BMT	35	:BRANCH IF YES
1664	006346	104400			HLT		:ERROR FLAG DID NOT SET AFTER WRITE CHECK ERROR
1665	006350	000400			BR	35	
1666	006352	012767	006114	172422	35: MOV	#235,LAD	:SETUP LOOP ADDR
1667	006360	104000			SCOPE		
1668	006362	005700			TST	RC	:ARE WE FLOATING A ONE?
1669	006364	001013			BNE	95	:BRANCH IF NO
1670	006366	000241			CLC		
1671	006370	006101			ROL	R1	:ROTATE PATTERN
1672	006372	103402			BCS	105	:BRANCH IF COMPLETE
1673	006374	000167	177514		JMP	235	
1674	006400	012700	000001		105: MOV	#1,R0	:SET PATTERN FLAG
1675	006404	012701	077777		MOV	#077777,R1	:SET NEW PATTERN IN R1
1676	006410	000167	177500		JMP	235	
1677	006414	000241			95: CLC		
1678	006416	006201			ASR	R1	:ROTATE FLOATING ZERO PATTERN
1679	006420	052701	100000		BIS	#B15,R1	
1680	006424	103002			BCC	PATFIL	:HAS ZERO BEEN FLOATED
1681	006426	000167	177462		JMP	235	:JUMP IF NO

;CHECK THE ABILITY OF THE RP11C TO CLEAR THE REMAINDER OF A SECTOR
 ;ON A PARTIAL WRITE OPERATION. A SECTOR OF ALL ONES IS WRITTEN AND
 ;THEN A TWO WORD WRITE OPERATION IS PERFORMED. THE SECTOR IS THEN
 ;READ BACK AND VERIFIED. THE FIRST TWO WORDS SHOULD BE ONES AND
 ;THE REST SHOULD BE ZEROS.

1691	006432	012701	017556		PATFIL: MOV	#OUTBUF,R1	
1692	006436	012700	177777		MOV	#177777,R0	
1693	006442	012702	000400		MOV	#400,R2	
1694	006446	010021			15: MOV	R0,(R1)+	:GENERATE ALL ONES PATTERN
1695	006450	005302			DEC	R2	
1696	006452	001375			BNE	15	
1697	006454	004567	004040		JSR	R5,FUNCT	:WRITE SECTOR WITH ONES
1698	006460	000003			.WORD 3		
1699	006462	105777	010752		TSTB	BRPCS	:WAIT FOR DONE

1700	006466	100375				BPL	-4		
1701	006470	005777	010744			TST	2RPCS		;ANY DEVICE ERRORS
1702	006474	100002				BPL	25		;BRANCH IF NO
1703	006476	104400				HLT			;ERROR AFTER WRITING ONE SECTOR ALL 1'S
1704	006500	000473				BR	35		
1705	006502	012767	000002	010764	25:	MOV	#2,WRDCT		;SETUP FOR TWO WORD WRITE
1706	006510	004567	004004			JSR	RS,FUNCT		;WRITE TWO WORD
1707	006514	000003			.WORD	3			
1708	006516	105777	010716			TSTB	2RPCS		;WAIT FOR DONE
1709	006522	100375				BPL	-4		
1710	006524	005777	010710			TST	2RPCS		;ANY ERRORS?
1711	006530	100002				BPL	45		;BRANCH IF NO
1712	006532	104400				HLT			;ERROR ON ONE WORD WRITE
1713	006534	000455				BR	35		
1714	006536	012767	000400	010730	45:	MOV	#400,WRDCT		;SETUP WORD COUNT
1715	006544	004567	003750			JSR	RS,FUNCT		;READ SECTOR
1716	006550	000005			.WORD	5			
1717	006552	105777	010662			TSTB	2RPCS		;WAIT FOR DONE
1718	006556	100375				BPL	-4		
1719	006560	005777	010654			TST	2RPCS		;ANY ERRORS
1720	006564	100006				BPL	55		;BRANCH IF NO
1721	006566	104400				HLT			;ERROR AFTER READING ONE SECTOR
1722	006570	032777	040000	010642		BIT	#814,2RPCS		;WAS IT A DATA ERROR?
1723	006576	001401				BEQ	55		;BRANCH IF YES
1724	006600	000433				BR	35		
1725	006602	022767	177777	010746	55:	CMP	#177777,OUTBUF		;COMPARE FIRST WORD SHOULD BE ONES
1726	006610	001410				BEQ	65		;BRANCH IF OK
1727	006612	012767	177777	005732		MOV	#177777,EXPS		
1728	006620	016767	010732	005726		MOV	OUTBUF,RECS		
1729	006626	104401				HLT	+1		;DATA COMPARE ERROR ON FIRST
1730	006630	000417				BR	35		;WORD READ
1731	006632	012700	017562		65:	MOV	#OUTBUF+4,RO		
1732	006636	012701	000374			MOV	#374,R1		
1733	006642	005720			95:	TST	(R0)+		;REMAINDER OF SECTOR SHOULD BE CLEAR
1734	006644	001003				BNE	75		;BRANCH IF NO
1735	006646	005301				DEC	R1		
1736	006650	001374				BNE	85		
1737	006652	000406				BR	35		
1738	006654	016067	177776	005672	75:	MOV	-2(R0),RECS		
1739	006662	005067	005664			CLR	EXPS		
1740	006666	104401				HLT	+1		;DATA FOUND IN AREA OF SECTOR
1741									;WHICH SHOULD HAVE BEEN CLEARED
1742									;BY A ONE WORD WRITE
1743	006670	012767	006432	172104	35:	MOV	#PATFIL,LAD		;SET UP LOOP ADDR
1744	006676	104000				SCOPE			
1745									
1746									;CHECK THE SETTING OF EOP WHEN TRYING TO WRITE BEYOND
1747									;THE LIMITS OF THE PACK. THE FIRST SECTOR OF THE PACK IS
1748									;WRITTEN WITH ZEROS. THEN A TWO SECTOR WRITE OF ALL
1749									;ONE'S IS ISSUED FOR CYLINDER 312, HEAD 23, AND SECTOR 11.
1750									;EOP AND ERROR BITS SHOULD SET. THE FIRST SECTOR OF THE
1751									;PACK IS CHECKED TO MAKE SURE IT IS STILL ZERO.
1752									
1753	006700	005067	010574			EOPTEST: CLR	DMA		;CLEAR DISK ADDRESS
1754	006704	005067	010566			CLR	CYLINDER		
1755	006710	012767	000400	010556		MOV	#400,WRDCT		;SET WORDCOUNT TO ONE SECTOR

1756	006716	012767	017556	010562		MOV	#OUTBUF,BUF	:SETUP OUTPUT BUFFER
1757	006724	005001				CLR	R1	
1758	006726	005061	017556		15:	CLR	OUTBUF(R1)	:CLEAR THE OUTPUT BUFFER
1759	006732	005721				TST	(R1)+	
1760	006734	022701	000400			CMP	#400,R1	
1761	006740	001372				BNE	15	
1762	006742	004567	003552			JSR	R5,FUNCT	:WRITE SECTOR ZERO WITH ZEROS
1763	006746	000003			.WORD	3		
1764	006750	105777	010464			TSTB	2RPCS	:WAIT FOR DONE
1765	006754	100375				BPL	-4	
1766	006756	005777	010456			TST	2RPCS	:ANY DEVICE ERRORS
1767	006752	100002				BPL	25	:BRANCH IF NO
1768	006754	104400				HLT		:ERROR AFTER WRITING SECTOR ZERO WITH ZEROS
1769	006766	000502				BR	35	
1770	006770	012767	001000	010476	25:	MOV	#1000,WRDCT	:SET WORDCOUNT EQUAL TO TWO SECTORS
1771	006776	112767	000312	010472		MOVB	#312,CYLINDER	:SELECT CYLINDER 312
1772	007004	012767	000011	010466		MOV	#11,DMA	:SELECT RECTOR 11
1773	007012	112767	000023	010461		MOVB	#23,DMA+1	:SELECT HEAD 23
1774	007020	012702	177777			MOV	#177777,R2	
1775	007024	005001				CLR	R1	
1776	007026	010261	017556		45:	MOV	R2,OUTBUF(R1)	:SET OUTPUT BUFFER TO ONES
1777	007032	005721				TST	(R1)+	
1778	007034	022701	001000			CMP	#1000,R1	
1779	007040	001372				BNE	45	
1780	007042	004567	003452			JSR	R5,FUNCT	:ISSUE TWO SECTOR WRITE TO
1781	007046	000003			.WORD	3		:CYLINDER 312, HEAD 23, AND SECTOR 11
1782	007050	105777	010364			TSTB	2RPCS	:WAIT FOR DONE
1783	007054	100375				BPL	-4	
1784	007056	032777	000002	010372		BIT	#B1,2RPER	:DID EOP ERROR FLAG SET?
1785	007064	001002				BNE	55	:BRANCH IF SET
1786	007066	104400				HLT		:EOP ERROR FLAG DID NOT SET WHEN
1787	007070	000441				BR	35	:WRITE OPERATOR EXCEEDS THE PACK
1788	007072	032777	100000	010340	55:	BIT	#B15,2RPCS	:DID THE ERROR FLAG SET?
1789	007100	001002				BNE	65	:BRANCH IF SET
1790	007102	104400				HLT		:ERROR DID NOT SET AFTER GENERATING
1791	007104	000433				BR	35	:EOP
1792	007106	012767	000002	010360	65:	MOV	#2,WRDCT	
1793	007114	005067	010360			CLR	DMA	:CLEAR THE DISK ADDRESS
1794	007120	005067	010352			CLR	CYLINDER	
1795	007124	004567	003370			JSR	R5,FUNCT	:READ THE FIRST SECTOR OF THE PACK
1796	007130	000005			.WORD	5		:AND EXPECT TO FIND ZEROS
1797	007132	105777	010302			TSTB	2RPCS	:WAIT FOR READY
1798	007136	100375				BPL	-4	
1799	007140	005777	010274			TST	2RPCS	:WERE THERE ANY ERRORS?
1800	007144	100002				BPL	75	:BRANCH IF NO
1801	007146	104400				HLT		:ERROR ENCOUNTERED ON 2 WORD READ
1802	007150	000411				BR	35	:OF FIRST SECTOR ON THE PACK
1803	007152	016767	010400	005374	75:	MOV	OUTBUF,RECS	:GET FIRST WORD OF BUFFER
1804	007160	005767	005370			TST	RECS	:DOES 1ST SECTOR STILL CONTAIN ZEROS?
1805	007164	001403				BEQ	35	:BRANCH IF YES
1806	007166	005067	005360			CLR	EXPS	
1807	007172	104401				HLT	+1	:CONTENTS OF THE FIRST SECTOR OF THE
1808								:PACK CHANGED AFTER FORCING EOP
1809								:ERROR, OPERATION PROBABLY
1810								:WRAPPED AROUND.
1811	007174	012767	006700	171600	35:	MOV	#EOPTST,LAD	

E04

RP11C RELIABILITY TEST MACY11 27(732) 16-SEP-76 16:12 PAGE 43
DZRPFB.P11 ***** TEST 3 *****

1812	007202	104000		SCOPE		
1813	007204	032737	002000 177570	BIT	*B10.2*SWR	:LOOP ON TEST?
1814	007212	001402		BEQ	MEMTST	:BRANCH IF NO
1815	007214	000157	176632	JMP	RWRCK	


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1816 .SBTTL ***** TEST 4 *****
1817
1819 :THIS ROUTINE CONSIST OF TWO SEGMENTS. THE FIRST
1819 :PART TEST THE ACCESSIBILITY OF MEMORY WITHOUT
1820 :UTILIZING MEMORY MANAGEMENT. EACH LOCATION
1821 :FROM THE END OF THE PROGRAM TO THE TOP OF MEMORY
1822 : (NOT TO EXCEED 28K) IS WRITTEN WITH ITS ADDR. THIS
1823 :DATA IS THEN WRITTEN ON THE DISK. THE BUFFER IS
1824 :CLEARED AND THE DATA IS READ BACK AND VERIFIED.
1825 :IN PART TWO, THE EXTENDED ADDRESS BITS ARE TESTED.
1826
1827 007220 012767 000004 010310 MEMTST: MOV #4,TESTNO
1828 007226 004567 172032 JSR R5,PRINTS ;PRINT MESSAGE
1829 007232 016225 MES6
1830 007234 016767 010276 172320 MOV TESTNO,TTY
1831 007242 004767 172110 JSR PC,PRINTS ;TYPE LOCATION-SUPRESS ZEROS
1832 007246 012767 177700 010250 MOV #-100,PASSC ;SETUP ITERATION COUNT
1833 007254 004767 004442 RMENT: JSR PC,INIT ;INITIALIZE
1834 007260 016700 006416 MOV MEMSIZ,R0 ;GET TOP OF CORE
1835 007264 162700 017556 SUB #OUTBUF,R0 ;DETERMINE SIZE OF BUFFER IN BYTES
1836 007270 000241 CLC
1837 007272 006000 ROR R0 ;CONVERT TO WORDS
1838 007274 042700 000001 BIC #1,R0 ;KEEP NUMBER EVEN
1839 007300 010067 010170 MOV R0,WRDCT ;SAVE WORD COUNT OF TRANSFER
1840 007304 012702 017556 7$: MOV #OUTBUF,R2
1841 007310 012703 017556 1$: MOV #OUTBUF,R3 ;GENERATE A PATTERN SO THAT EACH
1842 007314 010322 TST (R3)+ ;LOCATION CONTAINS ITS ADDRESS
1843 007316 005723 CMP R2,MEMSIZ ;HAS ENTIRE PATTERN BEEN GENERATED?
1844 007320 020267 006356 BLOS 1$ ;BRANCH IF NO
1845 007324 101773 MOV #OUTBUF,BUF ;SET UP BUFFER ADDR
1846 007326 012767 017556 010152 CLR DMA
1847 007334 005067 010140 CLR CYLINDER
1848 007340 005067 010132 JSR R5,FUNCT ;WRITE ADDRESS PATTERN
1849 007344 004567 003150 .WORD 3
1850 007350 000003 TSTB @RPCS ;WAIT FOR DONE
1851 007352 105777 010062 BPL -4
1852 007356 100375 TST @RPCS ;ANY ERRORS?
1853 007360 005777 010054 BPL 2$ ;BRANCH IF NO
1854 007364 100002 HLT ;ERROR AFTER WRITING ADDR PATTERN
1855 007366 104400 BR 3$
1856 007370 000446 2$: MOV WRDCT,R0
1857 007372 016700 010076 MOV #OUTBUF,R1 ;CLEAR THE BUFFER
1858 007376 012701 017556 10$: CLR (R1)+
1859 007402 005021 DEC R0
1860 007404 005300 BNE 10$
1861 007406 001375 JSR R5,FUNCT ;READ ADDRESS PATTERN
1862 007410 004567 003104 .WORD 5
1863 007414 000005 TSTB @RPCS ;WAIT FOR DONE
1864 007416 105777 010016 BPL -4
1865 007422 100375 TST @RPCS ;ANY ERRORS?
1866 007424 005777 010010 BPL 4$ ;BRANCH IF NO
1867 007430 100006 HLT ;ERROR AFTER READING ADDR PATTERN
1868 007432 104400 BIT #B14,@RPCS ;IS THIS A DATA ERROR?
1869 007434 032777 040000 007776 BEQ 4$ ;BRANCH IF YES
1870 007442 001401 BR 3$
1871 007444 000420

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1872 007446 012702 017556 4$: MOV #OUTBUF,R2
1873 007452 010203 MOV R2,R3 ;COMPARE THE ADDR PATTERN
1874 007454 020322 6$: CMP R3,(R2)+ ;IS DATA CORRECT?
1875 007456 001005 BNE 5$ ;BRANCH IF NO
1876 007460 005723 TST (R3)+
1877 007462 020267 006214 CMP R2,MEMSIZ ;IS ENTIRE BUFFER VERIFIED
1878 007466 101772 BLOS 6$ ;BRANCH IF NO
1879 007470 000406 BR 3$
1880 007472 010367 005054 5$: MOV R3,EXPS
1881 007476 016267 177776 005050 MOV -2(R2),RECS
1882 007504 104401 HLT +1 ;COMPARE ERROR UTILIZING ADDR PATTERN
1883 007506 012767 007304 171266 3$: MOV #7$,LAD ;SETUP LOOP AND
1884 007514 104000 SCOPE
1885
1886 ;CHECK THE SETTING OF NON EXISTENT MEMORY FLAG IN RPER.
1887
1888 007516 012767 000001 007750 NONEX: MOV #1,WRDCT ;SETUP WORD COUNT
1889 007524 012767 160000 007754 MOV #160000,BUF ;LOAD ADDR TO FORCE NON EX MEMORY
1890 007532 004567 002762 JSR R5,FUNCT ;ISSUE A WRITE COMMAND AND
1891 007536 000063 .WORD 63 ;EXPECT NON EX MEMORY
1892 007540 105777 007674 TSTB @RPCS ;WAIT FOR READY
1893 007544 100375 BPL -4
1894 007546 032777 000004 007702 BIT #B2,@RPER ;DID NON EX MEMORY SET
1895 007554 001002 BNE 1$ ;BRANCH IF SET
1896 007556 104400 HLT ;NON EX MEMORY DID NOT SET
1897 007560 000413 BR 2$
1898 007562 032777 040000 007650 1$: BIT #B14,@RPCS ;DID HARD ERROR SET ON NON EX MEMORY
1899 007570 001002 BNE 3$ ;BRANCH IF SET
1900 007572 104400 HLT ;HARD ERROR DID NOT SET
1901 007574 000405 BR 2$
1902 007576 032777 100000 007634 3$: BIT #B15,@RPCS ;DID THE ERROR FLAG SET AFTER NON EX MEMORY
1903 007604 001001 BNE 2$ ;BRANCH IF SET
1904 007606 104400 HLT ;ERROR FLAG DID NOT SET
1905 007610 012767 007516 171164 2$: MOV #NONEX,LAD
1906 007616 104000 SCOPE
1907
1908 ;IF MEMORY MANAGEMENT IS AVAILABLE CHECK THE EXTENDED MEMORY ADDRESS
1909 ;BITS.
1910
1911 007620 012767 010312 170156 EXTST: MOV #EXTTRP,4 ;SETUP TIMEOUT TRAP
1912 007626 012767 000340 170152 MOV #PRI7,6
1913 007634 005737 177572 TST @#SRO ;IF MEMORY MANAGEMENT IS NOT
1914 ;AVAILABLE THE PROGRAM WILL TRAP
1915 ;AND TRANSFER TO END OF THE TEST
1916 007640 012767 010306 170136 MOV #EXTTRP,4
1917 007646 012737 007600 172356 MOV #7600,@#KIPAR7 ;OPEN I/O REGISTERS
1918 007654 005037 172340 CLR @#KIPAR0 ;FREE FIRST 4K
1919 007660 012737 002000 172342 MOV #2000,@#KIPAR1
1920 007666 012737 177406 172300 MOV #400*256.-400+UP+RW,@#KIPDR0 ;SET KIPDR0=RW UP 400 BLOCKS
1921 007674 012737 177406 172302 MOV #400*256.-400+UP+RW,@#KIPDR1 ;SET KIPDR1=RW UP 400 BLOCKS
1922 007702 012737 177406 172316 MOV #400*256.-400+UP+RW,@#KIPDR7 ;SET KIPDR7=RW UP 400 BLOCKS
1923 007710 012737 000001 177572 MOV #1,@#SRO ;TURN ON MEMORY MANAGEMENT
1924 007716 012702 020000 MOV #20000,R2 ;R2 EQUALS BASE ADDR
1925 007722 012712 177777 7$: MOV #177777(R2) ;INSERT PATTERN INTO 200000
1926 007726 012767 000002 007540 MOV #2,WRDCT ;SETUP WORDCOUNT
1927 007734 005067 007546 CLR BUF ;CLEAR BUFFER ADDR

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1928	007740	004567	002554		JSR	R5,FUNCT	;WRITE TWO WORDS ON DISK STARTING
1929	007744	000023		.WORD	23		;AT LOCATION 200000
1930							;TO SET MEXO
1931	007746	105777	007466		TSTB	ARPCS	;WAIT FOR READY
1932	007752	100375			BPL	-4	
1933	007754	005777	007460		TST	ARPCS	
1934	007760	100002			BPL	15	
1935	007762	104400			HLT		;STATUS ERROR AFTER 2 WORD WRITE
1936	007764	000441			BR	25	;USING MEXO
1937	007766	032777	000020	007444	15:	BIT	#84,ARPCS
1938	007774	001002			BNE	35	;MEXO SHOULD HAVE SET?
1939	007776	104400			HLT		;BRANCH IF SET
1940	010000	00043C			BR	25	;MEXO DID NOT SET
1941	010002	005012		35:	CLR	(R2)	;CLEAR LOCATION 200000
1942	010004	004567	002510		JSR	R5,FUNCT	;READ TWO WORDS INTO LOCATIONS
1943	010010	000025		.WORD	25		;200000 AND 200001.
1944	010012	105777	007422		TSTB	ARPCS	;WAIT FOR READY
1945	010016	100375			BPL	-4	
1946	010020	005777	007414		TST	ARPCS	;ANY ERRORS?
1947	010024	100002			BPL	45	;BRANCH IF NO
1948	010026	104400			HLT		;ERROR OFTER READING 2 WORDS
1949	010030	000417			BR	25	
1950	010032	032777	000020	007400	45:	BIT	#84,ARPCS
1951	010040	001002			BNE	55	;DID MEXO SET?
1952	010042	104400			HLT		;BRANCH IF YES
1953	010044	000411			BR	25	;MEXO DID NOT SET AFTER 2 WORD
1954	010046	022712	177777		55:	CMP	#177777,(R2)
1955	010052	001406			BEQ	25	;READ STARTING AT 200000
1956	010054	012767	177777	004470		MOV	#177777,EXPS
1957	010062	011267	004466		MOV	(R2),RECS	;WAS DATA READ INTO LOCATION
1958	010066	104401			HLT	+1	;200000 CORRECTLY? - BRANCH IF YES
1959	010070	012767	007722	170704	25:	MOV	#75,LAD
1960	010076	104000			SCOPE		;DATA COMPARE ERROR AT 200000
1961	010100	012737	004000	172342	EXTT1:	MOV	#4000,ARPCPAR1
1962	010106	012702	020000		MOV	#20000,R2	;R2 EQUALS THE BASE ADDR
1963	010112	012712	177777		75:	MOV	#177777,(R2)
1964	010116	004567	002376		JSR	R5,FUNCT	;INSERT PATTERN INTO 400000
1965	010122	000043		.WORD	43		
1966	010124	105777	007310		TSTB	ARPCS	;WAIT FOR READY
1967	010130	100375			BPL	-4	
1968	010132	005777	007302		TST	ARPCS	;ANY ERRORS?
1969	010136	100002			BPL	45	;BRANCH IF NO
1970	010140	104400			HLT		
1971	010142	000441			BR	25	;ERROR AFTER READING 2 WORDS
1972	010144	032777	000040	007266	45:	BIT	#85,ARPCS
1973	010152	001002			BNE	105	;DID MEX1 SET?
1974	010154	104400			HLT		;BRANCH IF YES
1975							;MEX1 DI NOT SET WITH A TWO WORD
1976	010156	000433			BR	25	;TRANSFER STARTING AT 400000
1977	010160	005012		105:	CLR	(R2)	;CLEAR LOCATION 400000
1978	010162	004567	002332		JSR	R5,FUNCT	;READ TWO WORDS STARTING AT 400000
1979	010166	000045		.WORD	45		
1980	010170	105777	007244		TSTB	ARPCS	;WAIT FOR READY
1981	010174	100375			BPL	-4	
1982	010176	005777	007236		TST	ARPCS	;ANY ERRORS?
1983	010202	100002			BPL	115	;BRANCH IF NO

Year	Address	Hex	Dec	Label	Op	Op2	Op3	Op4	Op5	Op6	Op7	Op8	Op9	Op10	Op11	Op12	Op13	Op14	Op15	Op16	Op17	Op18	Op19	Op20	Op21	Op22	Op23	Op24	Op25	Op26	Op27	Op28	Op29	Op30	Op31	Op32	Op33	Op34	Op35	Op36	Op37	Op38	Op39	Op40	Op41	Op42	Op43	Op44	Op45	Op46	Op47	Op48	Op49	Op50	Op51	Op52	Op53	Op54	Op55	Op56	Op57	Op58	Op59	Op60	Op61	Op62	Op63	Op64	Op65	Op66	Op67	Op68	Op69	Op70	Op71	Op72	Op73	Op74	Op75	Op76	Op77	Op78	Op79	Op80	Op81	Op82	Op83	Op84	Op85	Op86	Op87	Op88	Op89	Op90	Op91	Op92	Op93	Op94	Op95	Op96	Op97	Op98	Op99	Op100	Op101	Op102	Op103	Op104	Op105	Op106	Op107	Op108	Op109	Op110	Op111	Op112	Op113	Op114	Op115	Op116	Op117	Op118	Op119	Op120	Op121	Op122	Op123	Op124	Op125	Op126	Op127	Op128	Op129	Op130	Op131	Op132	Op133	Op134	Op135	Op136	Op137	Op138	Op139	Op140	Op141	Op142	Op143	Op144	Op145	Op146	Op147	Op148	Op149	Op150	Op151	Op152	Op153	Op154	Op155	Op156	Op157	Op158	Op159	Op160	Op161	Op162	Op163	Op164	Op165	Op166	Op167	Op168	Op169	Op170	Op171	Op172	Op173	Op174	Op175	Op176	Op177	Op178	Op179	Op180	Op181	Op182	Op183	Op184	Op185	Op186	Op187	Op188	Op189	Op190	Op191	Op192	Op193	Op194	Op195	Op196	Op197	Op198	Op199	Op200	Op201	Op202	Op203	Op204	Op205	Op206	Op207	Op208	Op209	Op210	Op211	Op212	Op213	Op214	Op215	Op216	Op217	Op218	Op219	Op220	Op221	Op222	Op223	Op224	Op225	Op226	Op227	Op228	Op229	Op230	Op231	Op232	Op233	Op234	Op235	Op236	Op237	Op238	Op239	Op240	Op241	Op242	Op243	Op244	Op245	Op246	Op247	Op248	Op249	Op250	Op251	Op252	Op253	Op254	Op255	Op256	Op257	Op258	Op259	Op260	Op261	Op262	Op263	Op264	Op265	Op266	Op267	Op268	Op269	Op270	Op271	Op272	Op273	Op274	Op275	Op276	Op277	Op278	Op279	Op280	Op281	Op282	Op283	Op284	Op285	Op286	Op287	Op288	Op289	Op290	Op291	Op292	Op293	Op294	Op295	Op296	Op297	Op298	Op299	Op300	Op301	Op302	Op303	Op304	Op305	Op306	Op307	Op308	Op309	Op310	Op311	Op312	Op313	Op314	Op315	Op316	Op317	Op318	Op319	Op320	Op321	Op322	Op323	Op324	Op325	Op326	Op327	Op328	Op329	Op330	Op331	Op332	Op333	Op334	Op335	Op336	Op337	Op338	Op339	Op340	Op341	Op342	Op343	Op344	Op345	Op346	Op347	Op348	Op349	Op350	Op351	Op352	Op353	Op354	Op355	Op356	Op357	Op358	Op359	Op360	Op361	Op362	Op363	Op364	Op365	Op366	Op367	Op368	Op369	Op370	Op371	Op372	Op373	Op374	Op375	Op376	Op377	Op378	Op379	Op380	Op381	Op382	Op383	Op384	Op385	Op386	Op387	Op388	Op389	Op390	Op391	Op392	Op393	Op394	Op395	Op396	Op397	Op398	Op399	Op400	Op401	Op402	Op403	Op404	Op405	Op406	Op407	Op408	Op409	Op410	Op411	Op412	Op413	Op414	Op415	Op416
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2011 .SBTTL ***** TEST 5 *****
2012
2013 ;WRITE, WRITE CHECK, AND READ OPERATIONS ARE PERFORMED ON THE DRIVE
2014 ;THE DATA IS FIRST WRITTEN AND THEN WRITE CHECKED, THEN THE DATA
2015 ;IS READ. IF THE DATA IS TO BE COMPARED, THE INPUT BUFFER IS CLEARED
2016 ;RIGHT AFTER READ IS ISSUED. THEN THE DATA IS COMPARED WHILE READ
2017 ;IS IN PROGRESS. THIS IS DONE TO IMPROVE EFFICIENCY. THIS SEQUENCE
2018 ;IS REPEATED FOR THE ENTIRE PACK SURFACE FOR EACH OF THE 22 PATTERNS.
2019
2020 010332 012767 000005 007176 DATAT: MOV #5,TESTNO
2021 010340 004567 170720 JSR R5,PRINT$ ;PRINT MESSAGE
2022 010344 016225 MES6
2023 010346 016767 007164 171206 MOV TESTNO,TTY
2024 010354 004767 170776 JSR PC,PRINT$ ;TYPE LOCATION-SUPPRESS ZEROS
2025 010360 016700 007120 RDATAT: MOV PATNU,R0 ;GET PATTERN NO.
2026 010364 000241 CLC
2027 010366 006000 ROR R0
2028 010370 010037 177570 MOV R0,2*SWR ;DISPLAY PATTERN NO. IN USE
2029 010374 005067 007076 CLR CYLINDER
2030 010400 005067 007074 CLR DMA
2031 010404 012737 000200 177776 MOV #PRI4,2*PSW ;ENABLE INT SYSTEM
2032 010412 016767 007072 007054 MOV SWRDCT,WRDCT
2033 010420 012737 012602 000254 MOV #DKINT,2*VECTOR ;SETUP DISK VECOTR
2034 010426 012737 000340 000256 MOV #340,2*STATUS
2035 010434 004767 003460 DATP: JSR PC,PASEL ;GENERATE PATTERN
2036 010440 012767 017556 007040 MOV #OUTBUF,BUF ;SETUP BUFFER ADDR
2037 010446 032767 040000 007010 BIT #B14,FLAG ;WRITE?
2038 010454 001424 BEQ WRICK ;BRANCH IF NO
2039 010456 004767 002520 LDAT: JSR PC,OPDSEL ;ANY OPERATOR ADDR PARAMETERS?
2040 010462 004567 002032 JSR R5,FUNCT ;WRITE WITH INTERRUPTS
2041 010466 000103 .WORD 103
2042 010470 032737 010000 177570 BIT #B12,2*SWR ;DETERMINE HOW TO WAIT FOR INT
2043 010476 001003 BNE 1$
2044 010500 004767 005200 JSR PC,NPR ;GENERATE WORSE CASE NPR CYCLES
2045 010504 000401 BR 2$
2046 010506 000001 1$: WAIT
2047 010510 012767 010456 170264 2$: MOV #LDAT,LAD ;SETUP LOOP ADDR
2048 010516 104000 SCOPE
2049 010520 004767 002514 JSR PC,DISBUF ;PREPARE NEW DISK ADDR
2050 010524 000754 BR LDAT
2051 010526 032767 020000 006730 WRICK: BIT #B13,FLAG ;WRITE CHECK?
2052 010534 001424 BEQ DREAD ;BRANCH IF NO
2053 010536 004767 002440 3$: JSR PC,OPDSEL ;ANY OPERATOR ADDR PARAMETERS?
2054 010542 004567 001752 JSR R5,FUNCT ;WRITE CHECK THE DATA
2055 010546 000107 .WORD 107
2056 010550 032737 010000 177570 BIT #B12,2*SWR ;DETERMINE HOW TO WAIT FOR INT
2057 010556 001003 BNE 1$
2058 010560 004767 005120 JSR PC,NPR ;GENERATE WORSE CASE NPR CYCLES
2059 010564 000401 BR 2$
2060 010566 000001 1$: WAIT
2061 010570 012767 010536 170204 2$: MOV #3$,LAD ;SETUP LOOP ADDR
2062 010576 104000 SCOPE
2063 010600 004767 002434 JSR PC,DISBUF ;PREPARE NEW DISK ADDR
2064 010604 000754 BR 3$
2065 010606 032767 010000 006650 DREAD: BIT #B12,FLAG ;READ?
2066 010614 001530 BEQ MSTR ;BRANCH IF NO

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 DZRPFB.P11 ***** TEST 5 *****

2067	010616	005067	006706	ESH:	CLR	RDERR	;CLEAR READ ERROR COUNT
2068	010622	004767	002354		JSR	PC,OPDSEL	;ANY OPERATOR ADDR PARAMETERS?
2069	010626	005067	173456	DSKRD:	CLR	INTFLG	;CLEAR THE INTERRUPT FLAG
2070	010632	004567	001662		JSR	RS,FUNCT	;READ THE DATA
2071	010636	000105		.WORD	105		
2072	010640	032737	001000 177570		BIT	#B9,2#SWR	;COMPARE DATA?
2073	010646	001411			SEQ	1\$	;BRANCH IF YES
2074	010650	032737	010000 177570		BIT	#B12,2#SWR	;DETERMINE HOW TO WAIT FOR INT
2075	010656	001003			BNE	2\$	
2076	010660	004767	005020		JSR	PC,NPR	;GENERATE WORSE CASE NPR CYCLES
2077	010664	000431			BR	3\$	
2078	010666	000001		2\$:	WAIT		
2079	010670	000427			BR	3\$	
2080	010672	016700	006576	1\$:	MOV	WRDCT,RO	;CLEAR THE INPUT BUFFER
2081	010676	012702	000012		MOV	#12,R2	
2082	010702	012701	017556		MOV	#OUTBUF,R1	
2083	010706	005021		4\$:	CLR	(R1)+	
2084	010710	005021			CLR	(R1)+	
2085	010712	005021			CLR	(R1)+	
2086	010714	005021			CLR	(R1)+	
2087	010716	005021			CLR	(R1)+	
2088	010720	005021			CLR	(R1)+	
2089	010722	005021			CLR	(R1)+	
2090	010724	005021			CLR	(R1)+	
2091	010726	005021			CLR	(R1)+	
2092	010730	005021			CLR	(R1)+	
2093	010732	160200			SUB	R2,RO	
2094	010734	100364			BPL	4\$	
2095	010736	004767	003650		JSR	PC,COMPAR	;COMPARE THE DATA
2096	010742	105777	006472		TSTB	2RPCS	;WAIT FOR READY
2097	010746	100375			BPL	-4	
2098	010750	005767	006560	3\$:	TST	INTERR	;WERE THERE ANY ERRORS
2099	010754	001424			BEQ	5\$	;BRANCH IF NO
2100	010756	005267	006546		INC	RDERR	;UPDATE ERROR COUNT
2101	010762	022767	000024 006540		CMP	#20.,RDERR	;MORE THAN 20 ERRORS?
2102	010770	001416			BEQ	5\$	;BRANCH IF YES
2103	010772	022767	000012 006530		CMP	#10.,RDERR	;IS THIS TENTH ERROR?
2104	011000	001312			BNE	DSKRD	;BRANCH IF NO
2105	011002	112777	000015 006430		MOVB	#15,2RPCS	;HOME THE HEADS
2106	011010	105777	006424		TSTB	2RPCS	;WAIT FOR DONE
2107	011014	100375			BPL	-4	
2108	011016	005777	006436		TST	2RPDS	
2109	011022	100375			BPL	-4	;WAIT FOR READY
2110	011024	000700			BR	DSKRD	
2111	011026	005767	006476	5\$:	TST	RDERR	
2112	011032	001410			BEQ	6\$	
2113	011034	004567	170224		JSR	RS,PRINT\$	;PRINT MESSAGE
2114	011040	016240			MES7		
2115	011042	016767	006462 170512		MOV	RDERR,TTY	
2116	011050	004767	170302		JSR	PC,PRINT\$	;TYPE LOCATION-SUPRESS ZEROS
2117	011054	005067	006450	6\$:	CLR	RDERR	;CLEAR READ ERROR COUNTER
2118	011060	012767	010616 167714		MOV	#ESH,LAD	;LOOP ADDR
2119	011066	104000			SCOPE		
2120	011070	004767	002144		JSR	PC,DISBUF	;GET NEW DISK ADDR
2121	011074	000650			BR	ESH	
2122	011076	032767	000040 006360	MSTR:	BIT	#B5,FLAG	;LOOPING ON AN OPERATOR ADDR?

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RP11C RELIABILITY TEST MACY11 27(732) 16-SEP-76 16:12 PAGE 50
 DZRPFB.P11 ***** TEST 5 *****

2123	011104	001402			BEQ	1\$	;NO CONTINUE
2124	011106	000167	177322		JMP	DATP	;YES
2125	011112	005767	006346	1\$:	TST	FLAG	
2126	011116	100002			BPL	2\$	;UNDER PROGRAM CONTROL
2127	011120	000167	000614		JMP	MULCHK	;OPERATOR SELECTED PATTERN
2128	011124	062767	000002	006352	2\$:	ADD	#2,PATNU
2129	011132	022767	000036	006344		CMP	#36,PATNU
2130	011140	001402			BEQ	3\$	;PATTERNS EXCEEDED?
2131	011142	000167	177212		JMP	RDATAT	;NOT YET
2132	011146	005067	006332		3\$:	CLR	PATNU
2133	011152	032737	002000	177570		BIT	#B10,2\$SWR
2134	011160	001402			BEQ	RANEX	;NO..GO TO RANDOM TEST
2135	011162	000167	177172		JMP	RDATAT	;YES

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2136          .SBTTL ***** TEST 6 *****
2137
2138          ;THIS IS A RANDOM ADDRESS AND DATA TEST.
2139
2140 011166 012767 000006 006342 RANEX: MOV    #6,TESTNO
2141 011174 004567 170064          JSR    R5,PRINT$      ;PRINT MESSAGE
2142 011200 016225          MES6
2143 011202 016767 006330 170352          MOV    TESTNO,TTY
2144 011210 004767 170142          JSR    PC,PRINT$      ;TYPE LOCATION-SUPRESS ZEROS
2145 011214 004767 002502          RANEX: JSR    PC,INIT
2146 011220 012767 000034 006256          MOV    #34,PATNU
2147 011226 012767 173000 006270          MOV    #-5000,PASSC      ;SET UP PASS COUNT
2148 011234 012737 000200 177776          MOV    #PRI4,#PSW
2149 011242 012767 000400 006224          WRLG: MOV    #400,WRDCT      ;SET UP WORD COUNT TO 1 SECTOR
2150 011250 016767 006220 006264          MOV    WRDCT,WORK
2151 011256 012701 017556          MOV    #OUTBUF,R1
2152 011262 004767 002724          JSR    PC,RANDOM      ;GENERATE RANDOM PATTERN
2153 011266          1$:
2154 011266 004767 170272          JSR    PC,RAND$      ;GENERATE TWO RANDOM NOS.
2155 011272 016767 170404 006242          MOV    LONUM,WORK
2156 011300 016767 170374 006236          MOV    HINUM,WORK1
2157 011306 042767 177400 006226          BIC    #177400,WORK
2158 011314 022767 000312 006220          CMP    #312,WORK      ;FORM RANDOM CYL ADDR
2159 011322 002761          BLT    1$
2160 011324 016767 006212 006144          MOV    WORK,CYLINDER      ;SAVE IT
2161 011332 042767 160360 006204          BIC    #160360,WORK1
2162 011340 122767 000011 006176          CMPB   #11,WORK1      ;FORM RANDOM SECTOR ADDR
2163 011346 101003          BHI    2$
2164 011350 042767 000010 006166          BIC    #10,WORK1
2165 011356 122767 000023 006161          2$: CMPB   #23,WORK1+1
2166 011364 101003          BHI    3$
2167 011366 142767 000014 006151          BICB   #14,WORK1+1
2168 011374 016767 006144 006076          3$: MOV    WORK1,DMA      ;SAVE DESK ADDR.
2169 011402 012767 017556 006076          RANLOP: MOV   #OUTBUF,BUF      ;SETUP OUTPUT BUFFER
2170 011410 004567 001104          JSR    R5,FUNCT      ;WRITE RANDOM DATA AND
2171 011414 000103          .WORD 103      ;ENABLE INTERRUPTS
2172 011416 032737 010000 177570          BIT    #B12,#SWR      ;DETERMINE HOW TO WAIT FOR INT
2173 011424 001003          BNE    2$
2174 011426 004767 004252          JSR    PC,NPR      ;TEST WORSE CASE NPR CYCLES
2175 011432 000401          BR     4$
2176 011434 000001          2$: WAIT
2177 011436 012767 011402 167336          4$: MOV    #RANLOP,LAD      ;SETUP LOOP ADDR
2178 011444 104000          SCOPE
2179 011446 004567 001046          7$: JSR    R5,FUNCT      ;WRITE CHECK THE DATA AND
2180 011452 000107          .WORD 107      ;ENABLE INTERRUPT
2181 011454 032737 010000 177570          BIT    #B12,#SWR      ;HOW TO WAIT FOR INT?
2182 011462 001003          BNE    1$
2183 011464 004767 004214          JSR    PC,NPR      ;TEST WORSE CASE NPR CYCLES
2184 011470 000401          BR     5$
2185 011472 000001          1$: WAIT
2186 011474 012767 011446 167300          5$: MOV    #7$,LAD      ;SETUP LOOP ADDR
2187 011502 104000          SCOPE
2188 011504 005067 006020          8$: CLR    RDERR      ;CLEAR READ ERROR COUNTER
2189 011510 005067 172574          11$: CLR   INTFLG
2190 011514 004567 001000          JSR    R5,FUNCT      ;READ RANDOM DATA AND
2191 011520 000105          .WORD 105      ;ENABLE INTERRUPT

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 DZRPFB.P11 ***** TEST 6 *****

2192	011522	032737	010000	177570	BIT	#B12,2#SWR	;HOW TO WAIT FOR INT?
2193	011530	001003			BNE	3\$	
2194	011532	004767	004146		JSR	PC,NPR	;TEST WORSE CASE NPR CYCLES
2195	011536	000401			BR	6\$	
2196	011540	000001			WAIT		
2197	011542	032737	001000	177570	3\$: BIT	#B9,2#SWR	;COMPARE FOR ERRORS?
2198	011550	001006			6\$: BNE	9\$	;BRANCH IF NO
2199	011552	032777	040000	005660	BIT	#B14,2RPCS	;HARD ERROR?
2200	011560	001002			BNE	9\$	;BRANCH IF YES
2201	011562	004767	003024		JSR	PC,COMPARE	;COMPARE DATA FOR ERRORS
2202	011566	005767	005742		9\$: TST	INTERR	;READ ERROR?
2203	011572	001424			BEQ	10\$	;BRANCH IF NO
2204	011574	005267	005730		INC	RDERR	;UPDATE ERROR COUNT
2205	011600	022767	000024	005722	CMP	#20.,RDERR	;20 ERRORS YET?
2206	011606	001416			BEQ	10\$	;BRANCH IF YES
2207	011610	022767	000012	005712	CMP	#10.,RDERR	;IS THIS TENTH ERROR?
2208	011616	001334			BNE	11\$	;BRANCH IF NO
2209	011620	112777	000015	005612	MOV	#15,2RPCS	;ISSUE HOME COMMAND
2210	011626	105777	005606		TST	2RPCS	;WAIT FOR DONE
2211	011632	100375			BPL	-4	
2212	011634	005777	005620		TST	2RPDS	;WAIT FOR READY
2213	011640	100375			BPL	-4	
2214	011642	000722			BR	11\$	
2215	011644	005767	005660		10\$: TST	RDERR	
2216	011650	001410			BEQ	21\$	
2217	011652	004567	167406		JSR	R5,PRINT\$	;PRINT MESSAGE
2218	011656	016240			MES7		
2219	011660	016767	005644	167674	MOV	RDERR,TTY	
2220	011666	004767	167464		JSR	PC,PRINTS	;TYPE LOCATION-SUPRESS ZEROS
2221	011672	005067	005632		21\$: CLR	RDERR	;CLEAR READ ERROR COUNTER
2222	011676	012767	011504	167076	MOV	#B\$,LAD	;SET UP LOOP ADDR
2223	011704	104000			SCOPE		
2224	011706	005267	005612		INC	PASSC	;INCREMENT PASS COUNT
2225	011712	001402			BEG	12\$	;BRANCH IF DONE
2226	011714	000167	177322		JMP	WRLG	;CONTINUE
2227	011720	005067	005560		12\$: CLR	PATNU	
2228	011724	032737	002000	177570	BIT	#B10,2#SWR	;LOOP ON TEST?
2229	011732	001402			BEQ	MULCHK	;NO
2230	011734	000167	177254		JMP	RRANEX	;LOOP
2231							
2232							
2233							
2234							
2235							
2236							
2237							
2238	011740	005067	005534		MULCHK: CLR	DMA	
2239	011744	005067	005526		CLR	CYLINDER	;CLEAR ADDRESS REGISTERS
2240	011750	032767	004000	005506	BIT	#B11,FLAG	;ARE WE IN MULTI DISK MODE
2241	011756	001422			BEQ	REPOEN	;REPORT "END"
2242	011760	016767	005500	005554	MOV	FLAG,WORK	;WHAT DISK ARE WE ON
2243	011766	042767	177743	005546	BIC	#177743,WORK	;IF LAST DISK ON SYSTEM
2244	011774	026767	005542	005516	CMP	WORK,DSKNOR	;REPORT END
2245	012002	001004			BNE	INDRVE	
2246	012004	042767	000034	005452	BIC	#34,FLAG	
2247	012012	000404			BR	REPOEN	;REPORT "END" LAST DISK

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 JCRPTB.P11 ***** TEST 6 *****

000000	012014	062767	000004	005442	INCRVE: ADD	#4, FLAG	: INC DISK NO.
000001	012022	000422			BR	EXTPP	: EXERCISE DISK
000002	012024	005267	166750		REPOEN: INC	ICNT	: INCREMENT PASS COUNTER
000003	012030	004567	167230		JSR	R5, PRINTS	: PRINT MESSAGE
000004	012034	016026			MES1		: REPORT END OF PASS
000005	012036	016767	166736	167516	MOV	ICNT, TTY	: TYPE LOCATION-SUPRESS ZEROS
000006	012044	004767	167306		JSR	PC, PRINTS	: GET MONITOR RETURN ADDRESS
000007	012050	013701	000042		MOV	#42, R1	: BRANCH IF NOT UNDER MONITOR
000008	012054	001405			SEQ	EXTPP	
000009	012056	000005			RESET		
000010	012060	004711			MEXIT: JSR	PC, (R1)	: EXIT TO THE MONITOR
000011	012062	000240			NOP		
000012	012064	000240			NOP		
000013	012066	000240			NOP		
000014	012070	000167	171260		EXTPP: JMP	ADTST	: RECYCLE

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

;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.

2265					PFTST:	MOV	#STKPTR, SP	
2266						MOV	#PFD, 24	;SET UP POWER FAIL VECTOR
2267						MOV	#PRI7, 26	;LOCKOUT INTERRUPTS
2268	012074	012706	000500			JSR	R5, DSKNOS	;SELECT THE UNIT
2269	012100	012767	012470	165716		MOV	#312, JRPCA	;SELECT CYLINDER 312
2270	012106	012767	000340	165712		BIS	#11, JRPCS	;ISSUE SEEK COMMAND
2271	012114	004567	001530			MOV	#OUTBUF, R0	
2272	012120	112777	000312	005322	1\$:	MOV	#25252, (R0)+	;FILL MEMORY WITH CHECKERBOARD
2273	012126	052777	000011	005304		CMP	R0, MEMSIZ	;PATTERN
2274	012134	012700	017556			BLOS	1\$	
2275	012140	012720	025252			MOV	#312, CYLINDER	
2276	012144	020067	003532			CLR	DMA	
2277	012150	101773				MOV	#400, WRDCT	
2278	012152	012767	000312	005316		MOV	#OUTBUF, BUF	
2279	012160	005067	005314			TSTB	JRPCS	;WAIT FOR DONE
2280	012164	012767	000400	005302		BPL	.-4	
2281	012172	012767	017556	005306		TST	JRPDS	;WAIT FOR UNIT READY
2282	012200	105777	005234			BPL	.-4	
2283	012204	100375				JSR	R5, FUNCT	;WRITE 1 SECTOR OF CHECKERBOARD
2284	012206	005777	005246		.WORD	3		
2285	012212	100375				TSTB	JRPCS	;WAIT FOR READY
2286	012214	004567	000300			BPL	.-4	
2287	012220	000003				BIT	#B15, JRPCS	;ANY ERRORS?
2288	012222	105777	005212			BEO	2\$	
2289	012226	100375				HLT		;DEVICE ERROR ON WRITE
2290	012230	032777	100000	005202	2\$:	MOV	#PFTST, LAD	
2291	012236	001401				SCOPE		
2292	012240	104400				JSR	R5, PRINT\$	;PRINT MESSAGE
2293	012242	012767	012074	166532		MESS		;HAVE POWER TURNED OFF
2294	012250	104000			3\$:	JSR	R5, FUNCT	;GO INTO A LOOP READING
2295	012252	004567	167006		.WORD	5		;THE DISK SURFACE
2296	012256	016152				TSTB	JRPCS	
2297	012260	004567	000234			BPL	.-4	
2298	012264	000005				BR	3\$	
2299	012266	105777	005146					
2300	012272	100375						
2301	012274	000771						
2302								
2303								
2304								
2305								
2306								
2307								
2308								
2309								
2310								
2311								
2312								
2313								
2314	012276	012777	000001	005134	PFT1:	MOV	#1, JRPCS	;CLEAR THE CONTROLLER
2315	012304	016767	005154	005230		MOV	FLAG, WORK	;GET UNIT NUMBER
2316	012312	000241				CLC		
2317	012314	006067	005222			ROR	WORK	
2318	012320	006067	005216			ROR	WORK	
2319	012324	000367	005212			SWAB	WORK	
2320	012330	042767	174377	005204		BIC	#174377, WORK	

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

2321	012336	016777	005200	005074	MOV	WORK,ARPC5	;SELECT THE UNIT
2322	012344	005777	005110		TST	ARPD5	
2323	012350	100352			BPL	PFT1	
2324	012352	105777	005104		TSTB	ARPCA1	;SELECTED CYLINDER SHOULD BE ZERO
2325	012356	001411			BEQ	15	
2326	012360	005067	002166		CLR	EXPS	
2327	012364	005067	002164		CLR	RECS	
2328	012370	117767	005066	002156	MOVB	ARPCA1,RECS	
2329	012376	104401			HLT	+1	;HEADS DID NOT RESTORE TO 0
2330	012400	000427			BR	25	;ON POWER FAILURE
2331	012402	012700	017556		15: MOV	#OUTBUF,RO	
2332	012406	022720	025252		45: CMP	#25252,(RO)+	;DID MEMORY RETAIN PATTERN ON PF
2333	012412	001004			SNE	35	;BRANCH IF NO
2334	012414	020067	003262		CMP	RO,MEMSIZ	
2335	012420	001372			BNE	45	
2336	012422	000416			BR	25	
2337	012424	012767	025252	002120	35: MOV	#25252,EXPS	
2338	012432	016067	177776	002114	MOV	-2(RO),RECS	
2339	012440	104403			HLT	+3	;CONTENTS OF MEMORY CHANGED AFTER PF
2340	012442	004567	166616		JSR	R5,PRINTS	;PRINT MESSAGE
2341	012446	016127			MES4		;PRINT MEMORY LOCATION
2342	012450	010067	167106		MOV	RO,TTY	
2343	012454	004767	166664		JSR	PC,PRINTR	;TYPE LOCATION WITH LEADING ZEROS
2344	012460				25:		
2345	012460	004567	166600		JSR	R5,PRINTS	;PRINT MESSAGE
2346	012464	017431			END		;END OF TEST
2347	012466	000000			HALT		
2348							
2349							
2350							
2351	012470	012767	012500	165326	PFD: MOV	#PFU,24	;SET UP POWER UP VECTOR
2352	012476	000774			BR	PFD	
2353							
2354							
2355							
2356	012500	012767	000026	165316	PFU: MOV	#26,24	;SETUP TRAP CATCHER
2357	012506	005067	165314		CLR	26	
2358	012512	012706	000500		MOV	#STKPTR,SP	;RESTORE STACK
2359	012516	000667			BR	PFT1	;VERIFY POWER DOWN SEQUENCE
2360							

```

2361 .SBTTL *** SUBROUTINES ***
2362
2363 ;THIS ROUTINE OUTPUTS THE FUNCTION FOUND AT
2364 ;THE CALL + 2.
2365
2366 012520 004567 001124 FUNCT: JSR R5,DSKNOS ;SELECT THE UNIT
2367 012524 016777 004750 004720 MOV DMA,DRPDA ;SETUP DISK ADDR REG
2368 012532 116777 004740 004710 MOVB CYLINDER,DRPCA ;SETUP CYLINDER ADDR REG
2369 012540 016777 004742 004700 MOV BUF,DRPBA ;SETUP BUS ADDR REG
2370 012546 016777 004722 004670 MOV WRDCT,DRPWC ;SETUP WORD COUNT
2371 012554 005477 004664 NEG DRPWC ;COMPLIMENT WORD COUNT
2372 012560 011567 000014 MOV (R5),FNCT ;GET RPCS FUNCTION
2373 012564 062705 000002 ADD #2,R5 ;UPDATE RETURN ADDR
2374 012570 116777 000004 004642 MOVB FNCT,DRPCS ;OUTPUT THE FUNCTION
2375 012576 000205 RTS R5
2376 012600 000000 FNCT: 0
2377
2378 ;RF11 DISK INTERRUPT HANDLER
2379
2380
2381 012602 005067 004726 DKINT: CLR INTERR ;CLEAR THE ERROR FLAG
2382 012606 005777 004626 TST DRPCS ;TEST FOR ERROR
2383 012612 100402 BMI 1$
2384 012614 000167 000322 JMP INTEXT ;JUMP IF NO ERRORS
2385 012620 010667 004710 1$: MOV SP,INTERR ;SET INTERRUPT ERROR FLAG
2386 012624 005767 004700 TST RDERR ;IS THIS THE FIRST ERROR ATTEMPT?
2387 012630 001404 BEQ 2$ ;BRANCH IF YES
2388 012632 032737 000020 177570 BIT #B4,DRSWR ;TYPE ALL ERROR ATTEMPTS?
2389 012640 001524 BEQ DK11 ;BRANCH IF NO
2390 012642 104400 2$: HLT ;STATUS ERROR AFTER INTERRUPT
2391 012644 032777 000002 004566 BIT #B1,DRPCS ;CHECK FOR READ
2392 012652 001012 BNE DELMES ;BRANCH IF WRITTING
2393 012654 004567 166404 JSR R5,PRINTS ;PRINT MESSAGE
2394 012660 016410 MES13 ;GIVE # OF READ ATTEMPT
2395 012662 016767 004642 166672 MOV RDERR,TTY
2396 012670 004767 166462 JSR PC,PRINTS ;TYPE LOCATION-SUPRESS ZEROS
2397 012674 010667 004634 3$: MOV SP,INTERR
2398
2399 012700 005067 000274 DELMES: CLR INT1
2400 012704 117767 004540 000266 MOVB DRPCA,INT1 ;GET CYLINDER ADDR
2401 012712 017767 004534 000256 MOV DRPDA,INT0 ;GET HEAD AND SECTOR ADDR
2402 012720 042767 160360 000250 BIC #160360,INT0 ;CLEAR UNWANTED BITS
2403 012726 032777 000001 004522 BIT #B0,DRPER ;WAS IT AN ADDR ERROR?
2404 012734 001026 BNE REDAC ;BRANCH IF YES
2405 012736 032767 000017 000232 BIT #17,INT0 ;IS SECTOR = TO 0
2406 012744 001473 BEQ DECTK ;YES - BRANCH
2407 012746 005367 000224 DEC INT0 ;BACK UP COUNT
2408 012752 000417 BR REDAC
2409 012754 132767 000037 000215 DECTK: BITB #37,INT0+1 ;IS HEAD = TO 0
2410 012762 001406 BEQ DECCY ;YES - BRANCH
2411 012764 105367 000207 DECB INT0+1 ;BACK UP HEAD
2412 012770 052767 000011 000200 BIS #11,INT0 ;SET UP SECTOR
2413 012776 000405 BR REDAC
2414 013000 012767 011411 000170 DECCY: MOV #11411,INT0
2415 013006 005367 000166 REDAC: DEC INT1
2416 013012

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2417 013012 004567 166246      JSR      R5,PRINT$      ;PRINT MESSAGE
2418 013016 016424      MES14      ;REPORT CYLINDER ADDR
2419 013020 016767 000154 166534  MOV      INT1,TTY
2420 013026 004767 166324      JSR      PC,PRINT$      ;TYPE LOCATION-SUPRESS ZEROS
2421 013032 005067 000142      CLR      INT1
2422 013036 116767 000135 000134  MOV      INTO+1,INT1
2423 013044 004567 166214      JSR      R5,PRINT$      ;PRINT MESSAGE
2424 013050 016441      MES15      ;REPORT HEAD ADDR OF FAILURE
2425 013052 016767 000122 166502  MOV      INT1,TTY
2426 013060 004767 166272      JSR      PC,PRINT$      ;TYPE LOCATION-SUPRESS ZEROS
2427 013064 116767 000106 000106  MOV      INTO,INT1
2428 013072 004567 166166      JSR      R5,PRINT$      ;PRINT MESSAGE
2429 013076 016452      MES16      ;REPORT SEC ADDR OF FAILURE
2430 013100 016767 000074 166454  MOV      INT1,TTY
2431 013106 004767 166244      JSR      PC,PRINT$      ;TYPE LOCATION-SUPRESS ZEROS
2432 013112 032777 001000 004340  OKI1:  BIT      #B9,DRPDS      ;IS DRIVE UNSAFE?
2433 013120 001401      BEQ      .+4
2434 013122 000000      HALT
2435 013124 032777 002000 004326  BIT      #B10,DRPDS      ;DRIVE UNSAFE
2436 013132 001403      BEQ      INTXT      ;SEEK INCOMPLETE?
2437 013134 112777 000015 004276  MOV      #15,DRPCS      ;BRANCH IF COMPLETE
2438 013142 105777 004272      INTXT: TST      DRPCS      ;RECALIBRATE
2439 013146 100375      BPL      .-4
2440 013150 005777 004304      TST      DRPDS      ;WAIT FOR DONE
2441 013154 100375      BPL      .-4
2442 013156 005767 002642      TST      BCKFLG      ;WAIT FOR READY
2443 013162 001402      BEQ      IS      ;DID WE COME FROM BACKGROUND TEST?
2444 013164 012716 016012      MOV      #NPRRET,(SP) ;BRANCH IF NO
2445 013170 010667 171114      MOV      SP,INTFLG      ;MODIFY RETURN ADDR
2446 013174 000002      RTI      ;SET INTERRUPT OCCURRED FLAG
2447
2448 013176 000000      INTO:  0
2449 013200 000000      INT1:  0
2450
2451
2452
2453      ;ROUTINE TO SET UP CYLINDER AND DISK ADDRESS FROM
2454      ;OPERATOR INPUTS DURING CONVERSATION MODE.
2455
2456 013202 032767 000040 004254  OPDSEL: BIT      #B5,FLAG      ;USE OPERATOR ADDR?
2457 013210 001001      BNE      .+4
2458 013212 000207      RTS      PC
2459 013214 016767 004246 004254  MOV      SCYL,CYLINDER ;NO
2460 013222 016767 004244 004250  MOV      SSEC,DMA      ;GET CYLINDER ADDR
2461 013230 116767 004234 004243  MOV      SHED,DMA+1    ;GET SECTOR ADDR
2462 013236 000207      RTS      PC      ;GET HEAD ADDR
2463
2464
2465
2466      ;ROUTINE TO SETUP DISK BUFFERS
2467      ;ADD WORD COUNT TO STARTING DISK ADDRESSES
2468      ;COMPARE CALCULATED ADDRESS TO TERMINATING ADDRESS
2469
2470 013240 032767 000040 004216  DISBUF: BIT      #B5,FLAG      ;DID OPERATOR SUPPLY ADDR?
2471 013246 001401      BEQ      .+4
2472 013250 000461      BR      BUFEXIT      ;OPERATOR DEFINED DISK ADDR

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 DZRPFB.P11 *** SUBROUTINES ***

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2473 013252 004767 000520      JSR      PC,BLSZ      ;DEFINE BLOCK SIZE
2474 013256 016767 004240 004260  MOV      BLOCK,WORK1
2475 013264 016767 004210 004250  INCSEC: MOV      DMA,WORK      ;GET DISK ADDR
2476 013272 042767 177760 004242  BIC      #177760,WORK      ;MASK OUT SECTOR COUNT
2477 013300 022767 000011 004234  CMP      #11,WORK      ;CHECK FOR LAST SECTOR
2478 013306 001406      BEQ      INCSUR      ;CHECK SURFACE
2479 013310 005267 004164      INC      DMA      ;+1 SECTOR COUNT
2480 013314 005367 004202      DECBLK: DEC      B,WORK      ;-1 FROM BLOCK COUNT
2481 013320 001432      BEQ      CMDAE      ;CMP DMA TO RPDA
2482 013322 000760      BR      INCSUR      ;RECYCLE
2483 013324 042767 000017 004146  INCSEC: BIC      #17,DMA      ;FETCH ADDRESS
2484 013332 016767 004142 004202  MOV      DMA,WORK
2485 013340 042767 160377 004174  BIC      #160377,WORK
2486 013346 122767 000023 004167  CMPB     #23,WORK+1
2487 013354 001403      BEQ      SWSUR      ;+1 SURFACE
2488 013356 105267 004117      INCB     DMA+1      ;INC HEAD NUMBER
2489 013362 000754      BR      DECBLK      ;RECYCLE
2490 013364 005067 004110      SWSUR: CLR      DMA      ;CLEAR THE DISK ADDRESS
2491 013370 005267 004102      INC      CYLINDER
2492 013374 022767 000313 004074  CMP      #313,CYLINDER      ;HAS LAST CYL BEEN EXCEEDED?
2493 013402 001404      BEQ      BUFEXIT      ;BRANCH IF YES
2494 013404 000743      BR      DECBLK
2495      ;COME HERE AFTER DETERMINING THE STARTING ADDR OF THE NEXT
2496      ;TRANSFER. NOW CHECK TO SEE THERE IS ENOUGH ROOM ON THE DISK
2497      ;TO MAKE THE TRANSFER. IF NOT MODIFY THE WORD COUNT FOR THE FINAL
2498      ;OUTPUT.
2499
2500
2501 013406 105767 004052      CMDAE: TSTB     FLAG      ;CHECK FOR LAST DISK BUFFER
2502 013412 100015      BPL      BUFINX
2503 013414 005067 004060      BUFINX: CLR      DMA      ;CLEAR ADDRESS BITS
2504 013420 005067 004052      CLR      CYLINDER      ;CLR CYLINDER REGISTER
2505 013424 062716 000002      ADD      #2,(6)      ;INC STOCK POINTER
2506 013430 042767 000200 004026  BIC      #200,FLAG
2507 013436 016767 004046 004030  MOV      SWRDC,WRDCT
2508 013444 000500      BR      EXTDR
2509 013446 005067 004074      BUFINX: CLR      WORK2      ;EXIT
2510 013452 016767 004022 004062  MOV      DMA,WORK      ;CLEAR BLOCK COUNTER
2511 013460 016767 004012 004062  MOV      CYLINDER,WORK3
2512 013466 042767 160360 004046  BIC      #160360,WORK
2513 013474 005267 004046      XINCSEC: INC      WORK2      ;INCREMENT BLOCK COUNT
2514 013500 005367 004040      DEC      WORK1      ;DECREMENT TOTAL BLOCKS REQUIRED
2515 013504 001460      BEQ      EXTDR      ;EXIT IF BLOCK COUNT SATISFIED
2516 013506 122767 000011 004026  CMPB     #11,WORK      ;CHECK THE DISK ADDRESS TO
2517 013514 001403      BEQ      XINCSUR      ;SEE IF THERE IS ENOUGH ROOM
2518 013516 005267 004020      INC      WORK      ;TO HANDLE THE OUTPUT REQUESTED
2519 013522 000764      BR      XINCSEC
2520 013524 105067 004012      XINCSUR: CLRB     WORK      ;
2521 013530 122767 000023 004005  CMPB     #23,WORK+1
2522 013536 001403      BEQ      1$
2523 013540 105267 003777      INCB     WORK+1
2524 013544 000753      BR      XINCSEC
2525 013546 005067 003770      1$:  CLR      WORK
2526 013552 022767 000312 003770  CMP      #312,WORK3      ;ARE WE ON THE LAST CYLINDER?
2527 013560 001403      BEQ      2$      ;BRANCH IF YES
2528 013562 005267 003762      INC      WORK3

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2529 013566 000742          BR      XINCSEC
2530 013570 016767 003752 003676 2$:  MOV      WORK2,WRDCT      ;COME HERE IF THERE IS NOT
2531 013576 000241          CLC                      ;ENOUGH ROOM TO HANDLE THE
2532 013600 006167 003670          ROL      WRDCT          ;REQUESTED OUTPUT. MODIFY THE
2533 013604 006167 003664          ROL      WRDCT          ;WORDCOUNT TO FILL THE REMAINING
2534 013610 006167 003660          ROL      WRDCT          ;SURFACE.
2535 013614 006167 003654          ROL      WRDCT
2536 013620 006167 003650          ROL      WRDCT
2537 013624 006167 003644          ROL      WRDCT
2538 013630 006167 003640          ROL      WRDCT
2539 013634 006167 003634          ROL      WRDCT
2540 013640 052767 000200 003616  EXTDR: BIS      #200,FLAG
2541 013646 000207          RTS      PC                      ;EXIT
2542
2543
2544 ;ROUTINE TO SELECT THE DISK UNIT
2545
2546 013650 016767 003610 003664 DSKNOS: MOV      FLAG,WORK      ;FETCH THE FLAG WORD
2547 013656 006067 003660          ROR      WORK
2548 013662 006067 003654          ROR      WORK
2549 013666 000241          CLC
2550 013670 000367 003646          SWAB     WORK
2551 013674 042767 174377 003640  BIC      #174377,WORK      ;MASK THE DISK NUMBER
2552 013702 016777 003634 003530  MOV      WORK,ARPCS      ;LOAD THE ADDRESS IN THE ADDRESS REG
2553 013710 005777 003544          TST      ARPCS          ;IS THE UNIT READY?
2554 013714 100401          BMI          IS                      ;BRANCH IF READY
2555 013716 104400          HLT
2556 013720 000205          IS:      RTS      RS              ;SELECTED UNIT NOT READY
2557                                     ;EXIT
2558
2559 ;INITIALIZE THE VECTORS
2560
2561 013722 012767 001112 164104 INIT:  MOV      #ERROR,34      ;SETUP TRAP VECTOR
2562 013730 012767 000340 164100      MOV      #PRI7,36
2563 013736 012767 001004 164064      MOV      #SCOPE$,30      ;SETUP EMT VECTOR
2564 013744 012767 000340 164060      MOV      #PRI7,32
2565 013752 012737 012602 000254      MOV      #DKINT,3#VECTOR ;SETUP DISK INTERRUPT VECTOR
2566 013760 012737 000340 000256      MOV      #PRI7,3#STATUS
2567 013766 012737 000340 177776      MOV      #PRI7,3#PSW      ;LOCKOUT INTERRUPTS
2568 013774 000207          RTS      PC
2569
2570
2571 ;THIS ROUTINE CONVERTS A WORD COUNT TO A BLOCK COUNT
2572
2573 013776 012767 000377 003516 BLSZ:  MOV      #377,BLOCK      ;DRIVE BLOCK SIZE
2574 014004 016767 003464 003530      MOV      WRDCT,WORK      ;FETCH WORD COUNT
2575 014012 036767 003504 003522      BIT      BLOCK,WORK
2576 014020 001410          BEQ      RORBLK
2577 014022 046767 003474 003512      BIC      BLOCK,WORK      ;SET UP BLOCK OVERFLOW
2578 014030 005267 003466          INC      BLOCK
2579 014034 066767 003462 003500      ADD      BLOCK,WORK
2580 014042 000367 003474          RORBLK: SWAB     WORK
2581 014046 016767 003470 003446      MOV      WORK,BLOCK      ;BLOCK COUNT
2582 014054 000207          RTS      PC                      ;EXIT
2583
2584

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2585                                     ; DETERMINE THE APPROPRIATE ATTENTION BIT FROM
2586                                     ; THE UNIT NUMBER.
2587
2588 014056 016701 003402      GATTN:  MOV    FLAG,R1
2589 014062 006001            ROR     R1
2590 014064 006001            ROR     R1                ; GET UNIT NUMBER
2591 014066 005067 000014    CLR     ATTN
2592 014072 042701 177770    BIC     #177770,R1        ; ISOLATE UNIT
2593 014076 116167 014110 000002  MOVB  ATTNB(R1),ATTN ; GET ATTENTION BIT
2594 014104 000207            RTS     PC
2595
2596
2597 014106 000000            ATTN:    0
2598 014110      001      002      004  ATTNB:  .BYTE  1,2,4,10,20,40,100,200
2599 014113      010      020      040
2600 014116      100      200
2601                                     .EVEN
2602
2603
2604
2605
2606                                     ; ROUTINE TO SELECT DATA PATTERNS FOR TEST
2607
2608
2609 014120 016700 003360      ; ENTER FROM JSR PC PASEL
2610 014124 016767 003344 003410 PASEL:  MOV    PATNU,R0                ; SET UP PATTERN NUMBER
2611 014132 012701 017556      MOV    WRDCT,WORK                ; SET UP WORK
2612 014136 022700 000034      MOV    #OUTBUF,R1                ; LOC. OF OUTBUFFER
2613 014142 001423            CMP     #34,R0                    ; TEST FOR RANDOM DATA NUMBER
2614 014144 022700 000032      BEQ     RANDOM                    ; GO GENERATE RANDOM DATA
2615 014150 001406            CMP     #32,R0                    ; IS THIS PATTERN 15
2616 014152 016021 014556      BEQ     PATT32
2617 014156 005367 003360      FILDAT: MOV    PAT0(0),(1)+        ; FILL BUFFER
2618 014162 001373            DEC     WORK                      ; DEC. WORK COUNT
2619 014164 000207            BNE     FILDAT                    ; LOAD NEXT WORD
2620 014166 012721 177777      RTS     PC                        ; BUFFER FULL
2621 014172 005367 003344      PATT32: MOV    #177777,(1)+        ; INSERT ALL ONES PATTERN
2622 014176 001404            DEC     WORK
2623 014200 005021            BEQ     1$
2624 014202 005367 003334      CLR     (1)+                    ; LOAD ZERO PATTERN
2625 014206 001367            DEC     WORK                      ; DECREMENT WORD COUNT
2626 014210 000207            BNE     PATT32                    ; LOOP IF NOT ZERO
2627                                     1$: RTS     PC            ; EXIT
2628                                     ; RANDOM DATA GENERATOR SUBROUTINE
2629 014212 016767 000134 000136 000132  RANDOM: MOV    LONUN,LOSAY
2630 014220 016767 000130      MOV    HINUN,HISAY
2631 014226 016700 000120      1$:  MOV    LONUN,R0                ; SET UP R0 WITH 5 DIGITS LOW
2632 014232 016704 000116      MOV    HINUN,R4                ; SET UP R1 WITH 5 DIGITS HIGH
2633 014236 012703 000007      MOV    #7,R3                    ; SET UP SHIFT COUNT
2634 014242 005002            CLR     R2                        ; CLEAR R2
2635 014244 006300            2$:  ASL     R0                    ; SHIFT R0 LEFT AND
2636 014246 006104            ROL     R4                        ; ROTATE CARRY INTO LSB OF R1 INTO
2637 014250 006102            ROL     R2                        ; ROTATE CARRY OUT OF R1 INTO R2
2638 014252 005303            DEC     R3                        ; DECREMENT R3
2639 014254 001373            BNE     2$                        ; CONTINUE SHIFT LOOP
2640 014256 066702 000070      ADD     LONUN,R2                ; ADDN IN NUMBER TO MAKE X 129
2640 014262 005504            ADC     R4                        ; PROPOGATE CARRY

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2641	014264	066704	000064		ADD	HINUN,R4	;ADDN IN NUMBER TO MAKE X 129
2642	014270	005502			ADC	R2	;PROPOGATE CARRY
2643	014272	062700	001057		ADD	#1057,R0	;ADDN LOW CONSTANT
2644	014276	005504			ADC	R4	;PROPOGATE CARRIES
2645	014300	005502			ADC	R2	;PROPOGATE AGAIN
2646	014302	062704	047401		ADD	#47401,R4	;ADDN HIGH CONSTANT
2647	014306	005502			ADC	R2	;PROPOGATE CARRY
2648	014310	062702	000006		ADD	#6,R2	;ADDN HIGHEST CONSTANT
2649	014314	060200			ADD	R2,R0	;REPRIME R0 WITH HIGH DIGIT
2650	014316	005504			ADC	R4	;PROPOGATE CARRY
2651	014320	010067	000026		MOV	R0,LONUN	;PUT R0 BACK IN LONUN
2652	014324	010021			MOV	R0,(1)+	;HOLD LONUN FOR PROGRAM
2653	014326	005367	003210		DEC	WORK	
2654	014332	001406			BEQ	EXGEN	
2655	014334	010467	000014		MOV	R4,HINUN	;PUT R1 BACK IN HINUN
2656	014340	010421			MOV	R4,(1)+	;HOLD HINUN FOR PROGRAM
2657	014342	005367	003174		DEC	WORK	
2658	014346	001327			BNE	IS	
2659	014350	000207		EXGEN:	RTS	PC	;RETURN TO PROGRAM
2660	014352	000000		LONUN:	0		
2661	014354	000000		HINUN:	0		
2662	014356	000000		LOSAY:	0		
2663	014360	000000		HISAY:	0		
2664							
2665							
2666	014362	032767	000002	164652	MSG:	BIT	#B1,HLTCT\$
2667	014370	001033			BNE	IS	;TYPE ENTIRE MESSAGE
2668	014372	004567	164666		JSR	R5,PRINT\$	;BRANCH IF NO
2669	014376	016273			MESB		;PRINT MESSAGE
2670	014400	004567	164660		JSR	R5,PRINT\$	;PRINT MESSAGE
2671	014404	016067			MES2A		
2672	014406	017767	003046	165146	MOV	DRPDS,TTY	
2673	014414	004767	164724		JSR	PC,PRINTR	;TYPE LOCATION WITH LEADING QEROS
2674	014420	004567	164640		JSR	R5,PRINT\$	;PRINT MESSAGE
2675	014424	016045			MES1A		
2676	014426	017767	003024	165126	MOV	DRPER,TTY	
2677	014434	004767	164704		JSR	PC,PRINTR	;TYPE LOCATION WITH LEADING QEROS
2678	014440	004567	164620		JSR	R5,PRINT\$	;PRINT MESSAGE
2679	014444	016056			MES2		
2680	014446	017767	002766	165106	MOV	DRPCS,TTY	
2681	014454	004767	164664		JSR	PC,PRINTR	;TYPE LOCATION WITH LEADING QEROS
2682	014460	032767	000001	164554	IS:	BIT	#B0,HLTCT\$
2683	014466	001001			BNE	2\$	;TYPE EXP-REC
2684	014470	000207			RTS	PC	;BRANCH IF YES
2685	014472	032767	000002	164542	2\$:	BIT	#B1,HLTCT\$
2686	014500	001403			BEQ	3\$	
2687	014502	004567	164556		JSR	R5,PRINT\$	;PRINT MESSAGE
2688	014506	016465			MES17		
2689	014510				3\$:		
2690	014510	004567	164550		JSR	R5,PRINT\$	;PRINT MESSAGE
2691	014514	016505			MES18		
2692	014516	016767	000030	165036	MOV	EXPS,TTY	
2693	014524	004767	164614		JSR	PC,PRINTR	;TYPE LOCATION WITH LEADING QEROS
2694	014530	004567	164530		JSR	R5,PRINT\$	;PRINT MESSAGE
2695	014534	016521			MES19		
2696	014536	016767	000012	165016	MOV	RECS,TTY	

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2697	014544	004767	164574		JSR	PC,PRINTR		;TYPE LOCATION WITH LEADING ZEROS
2698	014550	000207			RTS	PC		
2699	014552	000000		EXPS:	0			
2700	014554	000000		RECS:	0			
2701								
2702								
2703								
2704								
2705								
2706								
2707	014556	163126						
2708	014560	052525						
2709	014562	125252						
2710	014564	031463						
2711	014566	007417						
2712	014570	010421						
2713	014572	021042						
2714	014574	042104						
2715	014576	104210						
2716	014600	167356						
2717	014602	156735						
2718	014604	135673						
2719	014606	073567						
2720	014610	000001						
2721								
2722								
2723								
2724								
2725								
2726								
2727								
2728	014612	012767	177775	002720				
2729	014620	016767	002650	002720				
2730	014626	012767	017556	002656				
2731	014634	005067	002642					
2732	014640	016767	177512	165034				
2733	014646	016767	177506	165024				
2734	014654	022767	000034	002622				
2735	014662	001422						
2736	014664	022767	000032	002612				
2737	014672	001037						
2738	014674	005767	002602					
2739	014700	001006						
2740	014702	012767	177777	177642				
2741	014710	010667	002566					
2742	014714	000433						
2743	014716	005067	002560					
2744	014722	005067	177624					
2745	014726	000426						
2746	014730	005767	002546					
2747	014734	001010						
2748	014736	004767	164622					
2749	014742	016767	164734	177602				
2750	014750	010667	002526					
2751	014754	000413						
2752	014756	005067	002520					

;RF11 DATA PATTERNS
 PAT0: 163126
 PAT1: 052525
 PAT2: 125252
 PAT3: 031463
 PAT4: 007417
 PAT5: 010421
 PAT6: 021042
 PAT7: 042104
 PAT10: 104210
 PAT11: 167356
 PAT12: 156735
 PAT13: 135673
 PAT14: 073567
 PAT15: 000001
 ;PAT16 RANDOM DATA
 ;THIS ROUTINE COMPARES THE DATA READ AGAINST THE DATA EXPECTED.
 ;ALL ERRORS ARE REPORTED TO THE OPERATOR. IF BIT 5 OF THE SWITCH
 ;REGISTER IS SET, THIS ROUTINE WILL CONTINUE COMPARING AFTER AN
 ;ERROR HAS BEEN FOUND AND WILL REPORT UP TO 3 VERIFY ERRORS
 ;WITHIN THE SAME INPUT OPERATION.
 COMPAR: MOV #-3,ERCOUNT ;ERROR RETRY COUNTER
 MOV WRDCT,WORK2 ;GET THE WORD COUNT
 MOV #OUTBUF,SAVE ;SET UP OUTBUFFER POINTER
 CLR SWITCH ;CLEAR RANDOM PATTERN FLAG
 MOV LOSAV,LONUM ;GET RANDOM BASE NOS.
 MOV HISAV,HINUM
 CMP #34,PATNU ;IS THIS RANDOM PATTERN?
 BEQ CMPLP ;BRANCH IF YES
 CMP #32,PATNU ;IS THIS SPECIAL PATTERN?
 BNE CMPLP1 ;BRANCH IF NO
 CMPLP2: TST SWITCH
 BNE 1\$
 MOV #177777,EXPS ;EXPECT ALL ONES
 MOV SP,SWITCH ;SET THE FLAG
 BR WRDCMP ;GO COMPARE DATA
 1\$: CLR SWITCH ;EXPECT ALL ZEROS
 CLR EXPS ;GO COMPARE DATA
 BR WRDCMP
 CMPLP: TST SWITCH
 BNE 2\$
 JSR PC,RAND\$;GENERATE TWO RANDOM NOS.
 MOV LONUM,EXPS ;GET EVEN RANDOM WORD
 MOV SP,SWITCH ;SET RANDOM PATTERN FLAG
 BR WRDCMP
 2\$: CLR SWITCH

2753	014762	016767	164712	177562		MOV	HINUM,EXPS	
2754	014770	000405				BR	WRDCMP	
2755	014772	016700	002506		CMPLP1:	MOV	PATNU,RO	
2756	014776	016067	014556	177546		MOV	PAT0(RO),EXPS	
2757	015004	027767	002502	177540	WRDCMP:	CMP	QSAVE,EXPS	;COMPARE DATA
2758	015012	001021				BNE	WDERR	;WORD IN ERROR
2759	015014	005367	002526		WRDINC:	DEC	WORK2	;DECREMENT THE WORD COUNT
2760	015020	001415				BEQ	ADAM	;EXIT ROUTINE IF ZERO
2761	015022	062767	000002	002462	BLAD1:	ADD	#2,SAVE	;UPDATE PATTERN ADDRESS
2762	015030	022767	000032	002446		CMP	#32,PATNU	
2763	015036	101362				BHI	WRDCMP	;BRANCH IF STANDARD PATTERN
2764	015040	022767	000034	002436		CMP	#34,PATNU	;IS THIS RANDOM PATTERN
2765	015046	001730				BEQ	CMPLP	;BRANCH IF YES
2766	015050	000711				BR	CMPLP2	;BRANCH IF YES
2767	015052	000754				BR	WRDCMP	;COMPARE NEXT WORD
2768	015054	000207			ADAM:	RTS	PC	;EXIT THIS ROUTINE
2769	015056	005767	167226		WDERR:	TST	INTFLG	;DID INTERRUPT OCCUR YET?
2770	015062	001750				BEQ	WRDCMP	;BRANCH IF NO
2771	015064	017767	002422	177462		MOV	QSAVE,RECS	;GET GOOD DATA
2772	015072	010667	002436			MOV	SP,INTERR	;SET ERRORR FLAG
2773	015076	005767	002426			TST	RDERR	;IS THIS THE FIRST READ ERROR?
2774	015102	001404				BEQ	3\$	;BRANCH IF YES
2775	015104	032737	000020	177570		BIT	#B4,Q#SWR	;PRINT ALL RETRY ERRORS?
2776	015112	001550				BEQ	1\$	;BRANCH IF NO
2777	015114	104403			3\$:	HLT	+3	;DATA COMPARE ERROR
2778	015116	005067	002400			CLR	BLOCK	;CLEAR THE BLOCK COUNTER
2779	015122	016767	002346	002412		MOV	WRDCT,WORK	;GET THE WORD COUNT
2780	015130	166767	002412	002404		SUB	WORK2,WORK	;DETERMINE DISTANCE OF FAILURE INTO BUFFER
2781	015136	162767	000400	002376	2\$:	SUB	#400,WORK	
2782	015144	100403				BMI	8\$	
2783	015146	005267	002350			INC	BLOCK	;UPDATE BLOCK COUNT FOR EACH 400 WORDS
2784	015152	000771				BR	2\$	
2785	015154	062767	000400	002360	8\$:	ADD	#400,WORK	;RESTORE POSITIVE NUMBER
2786	015162	016767	002312	002354		MOV	DMA,WORK1	;GET HEAD AND SECTOR ADDRESS
2787	015170	016767	002302	002352		MOV	CYLINDER,WORK3	;GET CYLINDER ADDRESS
2788	015176	005767	002320		5\$:	TST	BLOCK	;IS THE BLOCK COUNT ZERO?
2789	015202	001427				BEQ	7\$	;BRANCH IF YES
2790	015204	005367	002312			DEC	BLOCK	;DECREMENT BLOCK COUNT
2791	015210	122767	000011	002326		CMPB	#11,WORK1	;DETERMINE THE CYLINDER, HEAD,
2792	015216	001403				BEQ	4\$	;AND SECTOR ADDRESSES OF THE
2793	015220	005267	002320			INC	WORK1	;COMPARE ERROR
2794	015224	000764				BR	5\$	
2795	015226	105067	002312		4\$:	CLRB	WORK1	
2796	015232	122767	000023	002305		CMPB	#23,WORK1+1	
2797	015240	001403				BEQ	6\$	
2798	015242	105267	002277			INCB	WORK1+1	
2799	015246	000753				BR	5\$	
2800	015250	005067	002270		6\$:	CLR	WORK1	
2801	015254	005267	002270			INC	WORK3	
2802	015260	000746				BR	5\$	
2803	015262				7\$:			
2804	015262	004567	163776			JSR	RS,PRINT\$	;PRINT MESSAGE
2805	015266	016424				MES14		;GIVE CYL ADDR
2806	015270	016767	002254	164264		MOV	WORK3,TTY	
2807	015276	004767	164054			JSR	PC,PRINT\$	;TYPE LOCATION-SUPRESS ZEROS
2808	015302	005067	002224			CLR	ACNVX	

2809	015306	116767	002233	002216	MOVW	WORK1+1,ACNVX	
2810	015314	004567	163744		JSR	RS,PRINT\$	;PRINT MESSAGE
2811	015320	016441			MES15		;GIVE HEAD ADDR
2812	015322	016767	002204	164232	MOV	ACNVX,TTY	
2813	015330	004767	164022		JSR	PC,PRINT\$	;TYPE LOCATION-SUPRESS ZEROS
2814	015334	116767	002204	002170	MOVW	WORK1,ACNVX	
2815	015342	004567	163716		JSR	RS,PRINT\$	;PRINT MESSAGE
2816	015346	016452			MES16		;GIVE SECTOR ADDR
2817	015350	016767	002156	164204	MOV	ACNVX,TTY	
2818	015356	004767	163714		JSR	PC,PRINT\$	;TYPE LOCATION-SUPRESS ZEROS
2819	015362	004567	163676		JSR	RS,PRINT\$	;PRINT MESSAGE
2820	015366	016312			MES9		
2821	015370	016767	002146	002134	MOV	WORK,ACNVX	;GET WORD COUNT INTO SECTOR
2822	015376	005267	002130		INC	ACNVX	
2823	015402	016767	002124	164152	MOV	ACNVX,TTY	
2824	015410	004767	163742		JSR	PC,PRINT\$	;TYPE LOCATION-SUPRESS ZEROS
2825	015414	004567	163644		JSR	RS,PRINT\$	;PRINT MESSAGE
2826	015420	016410			MES13		
2827	015422	016767	002102	164132	MOV	RDERR,TTY	
2828	015430	004767	163722		JSR	PC,PRINT\$	;TYPE LOCATION-SUPRESS ZEROS
2829	015434	032737	000040	177570	BIT	#B5,2#SWR	;CONTINUE COMPARING?
2830	015442	001604			BEQ	ADAM	;BRANCH IF NO
2831	015444	005267	002070		INC	ERCOUNT	;UPDATE ERROR COUNTER
2832	015450	001601			BEQ	ADAM	
2833	015452	000167	177336		JMP	WRDINC	
2834							
2835							
2836							
2837							
2838							
2839							
2840							
2841							
2842							
2843	015456	052777	000001	001754	EXTMEN: BIS	#B0,2RPCS	;CLEAR THE DISK
2844	015464	105777	001750		TSTB	2RPCS	
2845	015470	100375			BPL	-4	
2846	015472	012737	000340	177776	MOV	#PRI7,2#PSW	;LOCK UP PRIORITY LEVELS
2847	015500	012767	015550	162276	MOV	#MAXREF,4	;SET UP I/O BUS TRAP
2848	015506	012767	000340	162272	MOV	#PRI7,6	
2849	015514	012767	017446	001770	MOV	#17446,SAVE	;SET UP FOR 4K
2850	015522	005777	001764		EXREF: TST	2SAVE	;REFERENCE MEMORY
2851	015526	022767	157446	001756	CMP	#157446,SAVE	;TEST FOR 28K
2852	015534	001001			BNE	1\$	;BRANCH IF LESS THAN 28K
2853	015536	000407			BR	MAXRF1	;LAST REFERENCE MADE TO I/O REG.
2854	015540	062767	020000	001744	1\$: ADD	#20000,SAVE	;SET UP FOR NEXT MEMORY REF.
2855	015546	000765			BR	EXREF	;GO REFERENCE MEMORY
2856							
2857							
2858							
2859	015550	162767	020000	001734	MAXREF: SUB	#20000,SAVE	
2860	015556	012767	000006	162220	MAXRF1: MOV	#6,4	;RESTORE I/O BUS TRAP
2861	015564	005067	162216		CLR	6	
2862	015570	005737	000042		TST	2#42	;UNDER MONITOR CONTROL?
2863	015574	001403			BEQ	1\$	;BRANCH IF NO
2864	015576	162767	005670	001706	SUB	#3000.,SAVE	;ALLOW ROOM FOR THE MONITOR

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2865 015604 016767 001702 000070 1$: MOV SAVE, MEMSIZ ;SAVE THE MAXIMUM MEMORY ADDRESS
2866 015612 162767 017556 001672 SUB #OUTBUF, SAVE ;DETERMINE THE BUFFER SIZE
2867 015620 000241 CLC
2868 015622 006067 001664 ROR SAVE ;FORM WORD COUNT
2869 015626 016767 001660 001640 MOV SAVE, WRDCT ;SAVE IT
2870 015634 042767 000001 001650 BIC #80, SAVE ;MAKE ADDRESS EVEN
2871 015642 012767 017556 001656 MOV #OUTBUF, INBUF ;START OF INPUT BUFFER
2872 015650 066767 001636 001650 ADD SAVE, INBUF
2873 015656 000241 CLC
2874 015660 042767 000377 001606 BIC #377, WRDCT ;DETERMINE MAXIMUM WORD COUNT
2875 015666 016767 001602 001614 MOV WRDCT, SWRDC
2876 015674 012706 000476 MOV #STKPTR-2, SP
2877 015700 000205 RTS RS
2878
2879 015702 000000 MEMSIZ: 0
2880
2881 ;BACKGROUND TEST FOR INTERRUPTS
2882
2883 015704 010667 000114 NPR: MOV SP, BCKFLG ;SET BACKGROUND FLAG
2884 015710 012767 030000 000102 MOV #30000, NPRCNT ;SETUP TIMEOUT COUNTER
2885 015716 012701 016023 MOV #NPR1+1, R1
2886 015722 112711 000200 MOV #200, (R1)
2887 015726
2888 015726 105421 2$: NEGB (R1)+
2889 015730 105441 NEGB -(R1)
2890 015732 105421 NEGB (R1)+
2891 015734 105441 NEGB -(R1)
2892 015736 105421 NEGB (R1)+
2893 015740 105441 NEGB -(R1)
2894 015742 105421 NEGB (R1)+
2895 015744 105441 NEGB -(R1)
2896 015746 105421 NEGB (R1)+
2897 015750 105441 NEGB -(R1)
2898 015752 105421 NEGB (R1)+
2899 015754 105441 NEGB -(R1)
2900 015756 105421 NEGB (R1)+
2901 015760 105441 NEGB -(R1)
2902 015762 105421 NEGB (R1)+
2903 015764 105441 NEGB -(R1)
2904 015766 102401 BVS 1$
2905 015770 000000 HALT ;ARITHMETIC OPERATION FAILED RUN DIAG
2906 015772 005367 000022 1$: DEC NPRCNT
2907 015776 001353 BNE 2$
2908 016000 104400 HLT ;OPERATION TIMED OUT WAITING FOR INTERRUPT
2909 016002 004567 163256 JSR RS, PRINT$ ;PRINT MESSAGE
2910 016006 016562 TIMO
2911 016010 000000 HALT
2912
2913 016012 005067 000006 NPRRET: CLR BCKFLG
2914 016016 000207 RTS PC
2915 016020 000000 NPRCNT: 0
2916 016022 000000 NPR1: 0
2917 016024 000300 BCKFLG: 0
2918
2919
2920

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;ERROR MESSAGE HEADERS

2921						
2922						
2923						
2924						
2925						
2926	016026	005015	047105	020104	MES1:	.EVEN
2927	016034	043117	050040	051501		.ASCIZ (15)(12)/END OF PASS /
2928	016042	020123	000			
2929	016045	015	051012	042520	MES1A:	.ASCIZ (15)(12)/RPER= /
2930	016052	036522	000040			
2931						
2932	016056	005015	050122	051503	MES2:	.ASCIZ (15)(12)/RPCS= /
2933	016064	020075	000			
2934						
2935	016067	015	051012	042120	MES2A:	.ASCIZ (15)(12)/RPDS= /
2936	016074	036523	000040			
2937	016100	005015	047527	042122	MES3:	.ASCIZ (15)(12)/WORD COUNT ISSUED = /
2938	016106	041440	052517	052116		
2939	016114	044440	051523	042525		
2940	016122	020104	020075	000		
2941						
2942	016127	015	046412	046505	MES4:	.ASCIZ (15)(12)/MEMORY ADDRESS= /
2943	016134	051117	020131	042101		
2944	016142	051104	051505	036523		
2945	016150	000040				
2946						
2947	016152	005015	040527	052111	MES5:	.ASCIZ (15)(12)/WAIT 5 SECONDS AND TURN OFF PDP-11 POWER/
2948	016160	032440	051440	041505		
2949	016166	047117	051504	040440		
2950	016174	042116	052040	051125		
2951	016202	020116	043117	020106		
2952	016210	042120	026520	030461		
2953	016216	050040	053517	051105		
2954	016224	000				
2955						
2956	016225	015	052012	051505	MES6:	.ASCIZ (15)(12)/TEST NO /
2957	016232	020124	047516	000040		
2958						
2959	016240	005015	047524	040524	MES7:	.ASCIZ (15)(12)/TOTAL REREADS ON ERROR= /
2960	016246	020114	042522	042522		
2961	016254	042101	020123	047117		
2962	016262	042440	051122	051117		
2963	016270	020075	000			
2964						
2965	016273	015	051412	040524	MES8:	.ASCIZ (15)(12)/STATUS ERROR/
2966	016300	052524	020123	051105		
2967	016306	047522	000122			
2968						
2969	016312	005015	047527	042122	MES9:	.ASCIZ (15)(12)/WORD COUNT INTO SECTOR= /
2970	016320	041440	052517	052116		
2971	016326	044440	052116	020117		
2972	016334	042523	052103	051117		
2973	016342	020075	000			
2974						
2975	016345	015	050012	052101	MES10:	.ASCIZ (15)(12)/PATTERN IN USE= /
2976	016352	042524	047122	044440		

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2977	016360	020116	051525	036505	
2978	016366	000040			
2979					
2990	016370	005015	047125	052111	MES11: .ASCIZ <15><12>/UNIT NO. /
2991	016376	047040	027117	000040	
2992					
2993	016404	054503	000114		MES12: .ASCIZ /CYL/
2994					
2995	016410	005015	042522	042101	MES13: .ASCIZ <15><12>/READ NO. /
2996	016416	047040	027117	000040	
2997					
2998	016424	005015	054503	044514	MES14: .ASCIZ <15><12>/CYLINDER= /
2999	016432	042116	051105	020075	
2990	016440	000			
2991					
2992	016441	015	044012	040505	MES15: .ASCIZ <15><12>/HEAD= /
2993	016446	036504	000040		
2994					
2995	016452	005015	042523	052103	MES16: .ASCIZ <15><12>/SECTOR= /
2996	016460	051117	020075	000	
2997					
2998	016465	015	041412	046517	MES17: .ASCIZ <15><12>/COMPARE ERROR/
2999	016472	040520	042522	042440	
3000	016500	051122	051117	000	
3001					
3002	016505	015	042412	050130	MES18: .ASCIZ <15><12>/EXPECTED /
3003	016512	041505	042524	020104	
3004	016520	000			
3005					
3006	016521	015	051012	041505	MES19: .ASCIZ <15><12>/RECEIVED /
3007	016526	044505	042526	020104	
3008	016534	000			
3009	016535	015	047012	020117	MES20: .ASCIZ <15><12>/NO UNITS AVAILABLE/
3010	016542	047125	052111	020123	
3011	016550	053101	044501	040514	
3012	016556	046102	000105		
3013					
3014	016562	005015	051120	041517	TIMO: .ASCIZ <15><12>/PROCESSOR BACKGROUND TEST TIMED OUT/
3015	016570	051505	047523	020122	
3016	016576	040502	045503	051107	
3017	016604	052517	042116	052040	
3018	016612	051505	020124	044524	
3019	016620	042515	020104	052517	
3020	016626	000124			
3021					
3022					
3023					
3024					
3025	016630	005015	052123	047101	SPECMES: .ASCIZ <15><12>/STANDARD WORDS TRANSFERRED=
3026	016636	040504	042122	053440	
3027	016644	051117	051504	052040	
3028	016652	040522	051516	042506	
3029	016660	051122	042105	020075	
3030	016666	000			
3031					
3032	016667	015	042012	052101	CON1: .ASCIZ <15><12>/DATA TEST ONLY? (Y OR N) /

; CONVERSATION TEXT

3033	016674	020101	042524	052123	
3034	016702	047440	046116	037531	
3035	016710	024040	020131	051060	
3036	016716	047040	000051		
3037					
3038	016722	005015	052515	052114	CON2: .ASCIZ <15><12>/MULTI DRIVE MODE?(Y OR N)/
3039	016730	020111	051104	053111	
3040	016736	020105	047515	042504	
3041	016744	024077	020131	051117	
3042	016752	047040	000051		
3043					
3044	016756	005015	052516	041115	CON3: .ASCIZ <15><12>/NUMBER OF DRIVES 1 TO 10 OCTAL?/
3045	016764	051105	047440	020106	
3046	016772	051104	053111	051505	
3047	017000	030440	052040	020117	
3048	017006	030061	047440	052103	
3049	017014	046101	000077		
3050					
3051	017020	005015	044127	041511	CON4: .ASCIZ <15><12>/WHICH DRIVE?/
3052	017026	020110	051104	053111	
3053	017034	037505	000		
3054					
3055	017037	015	047412	052120	CON5: .ASCIZ <15><12>/OPTIONAL WORD COUNT? (Y OR N)/
3056	017044	047511	040516	020114	
3057	017052	047527	042122	041440	
3058	017060	052517	052116	020077	
3059	017066	054450	047440	020122	
3060	017074	024516	000		
3061					
3062	017077	015	046012	047105	CON6: .ASCIZ <15><12>/LENGTH? (1 TO SWRDCT)/
3063	017104	052107	037510	024040	
3064	017112	020061	047524	051440	
3065	017120	051127	041504	024524	
3066	017126	000			
3067					
3068	017127	015	051412	040524	CON7: .ASCIZ <15><12>/STARTING HEAD?/
3069	017134	052122	047111	020107	
3070	017142	042510	042101	000077	
3071					
3072	017150	005015	047504	054440	CON7A: .ASCIZ <15><12>/DO YOU WISH TO SELECT THE DISK TEST ADDR?(Y OR N)/
3073	017156	052517	053440	051511	
3074	017164	020110	047524	051440	
3075	017172	046105	041505	020124	
3076	017200	044124	020105	044504	
3077	017206	045523	052040	051505	
3078	017214	020124	042101	051104	
3079	017222	024077	020131	051117	
3080	017230	047040	000051		
3081					
3082	017234	005015	052123	051101	CON7B: .ASCIZ <15><12>/STARTING SECTOR?/
3083	017242	044524	043516	051440	
3084	017250	041505	047524	037522	
3085	017256	000			
3086					
3087	017257	015	051412	040524	CON7C: .ASCIZ <15><12>/STARTING CYLINDER?/
3088	017264	052122	047111	020107	

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3089	017272	054503	044514	042116	
3090	017300	051105	000077		
3091					
3092	017304	005015	050117	044524	CON8: .ASCIZ (15)<12>/OPTIONAL DATA PATTERN NO.7/
3093	017312	047117	046101	042040	
3094	017320	052101	020101	040520	
3095	017326	052124	051105	020116	
3096	017334	047516	037456	000	
3097					
3098	017341	015	053412	044522	CON9: .ASCIZ (15)<12>/WRITE?(Y OR N)/
3099	017346	042524	024077	020131	
3100	017354	051117	047040	000051	
3101					
3102	017362	005015	051127	052111	CON10: .ASCIZ (15)<12>/WRITE CHECK?(Y OR N)/
3103	017370	020105	044103	041505	
3104	017376	037513	054450	047440	
3105	017404	020122	024516	000	
3106					
3107	017411	015	051012	040505	CON11: .ASCIZ (15)<12>/READ?(Y OR N)/
3108	017416	037504	054450	047440	
3109	017424	020122	024516	000	
3110					
3111	017431	015	042412	042116	END: .ASCIZ (15)<12>/END/
3112	017436	000			
3113		017440			.EVEN

3114		:		
3115		:		
3116		:		
3117		:		
3118		:		
3119		:		
3120	017440	176714	:DISK I/O REGISTERS	
3121	017442	176715	RPCS:	176714 ;DISK CONTROL REGISTER
3122	017444	176716	RPCS1:	176715 ;UPPER BYTE OF CONTROL REGISTER
3123	017446	176720	RPWC:	176716 ;WORD COUNT REGISTER
3124	017450	176722	RPBA:	176720 ;CURRENT ADDR REGISTER
3125	017452	176724	RPCA:	176722 ;CYLINDER ADDR REGISTER
3126	017454	176725	RPDA:	176724 ;DISK ADDR REGISTER
3127	017456	176712	RPDA1:	176725 ;TRACK ADDRESS
3128	017460	176710	RPER:	176712 ;ERROR REGISTER
3129	017462	176723	RPDS:	176710 ;DEVICE STATUS REGISTER
3130			RPCA1:	176723
3131				
3132			;DEDICATED REGISTERS	
3133				
3134	017464	000000	FLAG:	0 ;INTERNAL PROGRAM FLAG WORD
3135	017466	000000	SCYL:	0 ;OPERATOR SELECTED CYLINDER
3136	017470	000000	SHED:	0 ;OPERATOR SELECTED HEAD
3137	017472	000000	SSEC:	0 ;OPERATOR SELECTED SECTOR
3138	017474	000000	WRDCT:	0 ;WORKING WORD COUNT
3139	017476	000000	CYLINDER:	0 ;WORKING CYLINDER ADDR
3140	017500	000000	DMA:	0 ;WORKING DISK ADDR
3141	017502	000000	SWITCH:	0
3142	017504	000000	PATNU:	0 ;DATA PATTERN INDEX
3143	017506	000000	BUF:	0 ;WORKING DATA BUFFER
3144	017510	000000	SWRDCT:	0 ;STANDARD WORD COUNT
3145	017512	000000	SAVE:	0
3146	017514	000000	SAV1:	0
3147	017516	000000	PASS:	0
3148	017520	000000	DSKNOR:	0 ;MAXIMUM UNIT NUMBER
3149	017522	000000	BLOCK:	0
3150	017524	000000	PASSC:	0
3151	017526	000000	INBUF:	0 ;CONTAINS START OF INPUT BUFFER
3152	017530	000000	RDERR:	0 ;READ RETRY COUNTER
3153	017532	000000	ACNVX:	0
3154	017534	000000	INTERR:	0
3155	017536	000000	TESTNO:	0
3156	017540	000000	ERCOUNT:	0
3157	017542	000000	WORK:	0
3158	017544	000000	WORK1:	0
3159	017546	000000	WORK2:	0
3160	017550	000000	WORK3:	0
3161	017552	000000	WORK4:	0
3162	017554	000000	CYLA:	0
3163				
3164				
3165	017556	000000	CUTBUF:	0
3166				
3167		000001	.END	

ACNVX	017532	1204*	1205*	1206*	1207*	1208.	2808*	2809*	2812	2814*	2817	2821*	2822*	2823
		3153#												
ADAM	015054	2760	2768#	2830	2832									
ADERC	005240	1469	1481#											
ADERC1	005256	1482	1484#											
ADERR	005250	1473	1483#											
ADHGT	005164	1461	1464	1466#										
ADHGT1	005170	1467#	1480											
ACTER1	005300	1465	1478	1487	1490#									
ACTST	003354	1044	1179#	2262										
ADT1	003632	1218	1221	1240#										
ADT2	004312	1222	1320	1340#										
ADT3	005370	1223	1503	1513#										
ADT32	005610	1550#	1572	1579	1584									
ASKWC	002666	1078	1090#											
ATTN	014106	1286	2591*	2593*	2597*									
ATTNB	014110	2593	2598#											
BCKFLG	016024	2442	2883*	2913*	2917*									
BELL	001250	825	846#											
BLAD1	015022	2761#												
BLOCK	017522	2474	2480*	2573*	2575	2577	2578*	2579	2581*	2778*	2783*	2788	2790*	3149#
BLSZ	013776	2473	2573#											
BUF	017506	1372*	1523*	1550*	1610*	1756*	1846*	1889*	1927*	2036*	2169*	2289*	2369	3143#
BUFEXI	013414	2472	2493	2503#										
BUFINX	013446	2502	2509#											
B0	= 000001	704#	2403	2682	2843	2870								
B1	= 000002	703#	1784	2391	2666	2685								
B10	= 002000	694#	1056	1217	1265	1319	1502	1585	1813	2002	2133	2228	2435	
B11	= 004000	693#	822	1062	1192	1200	1300	1434	1491	1537	1565	2240		
B12	= 010000	692#	1167	2042	2056	2065	2074	2172	2181	2192				
B13	= 020000	691#	826	852	870	873	1174	2051						
B14	= 040000	690#	786	1160	1463	1722	1869	1898	2037	2199				
B15	= 100000	689#	839	1150	1313	1578	1679	1788	1902	2298				
B2	= 000004	702#	1894											
B3	= 000010	701#	1210	1654										
B4	= 000020	700#	1937	1950	2388	2775								
B5	= 000040	699#	1115	1972	1992	2122	2456	2470	2829					
B6	= 000100	698#												
B7	= 000200	697#												
B8	= 000400	696#	1041											
B9	= 001000	695#	2072	2197	2432									
C	= 000001	654#												
CHKMOD	003344	1173	1175#											
CMCAE	013406	2481	2501#											
CMPLP	014730	2735	2746#	2765										
CMPLP1	014772	2737	2755#											
CMPLP2	014674	2738#	2766											
COMPAR	014612	2095	2201	2728#										
CON1	016667	1052	3032#											
CON10	017362	1170	3102#											
CON11	017411	1163	3107#											
CON2	016722	1058	3038#											
CON3	016756	1065	3044#											
CON4	017020	1081	3051#											
CON5	017037	1092	3055#											
CON6	017077	1098	3062#											

CON7	017127	1126	3068*															
CON7A	017150	1111	3072*															
CON7B	017234	1134	3082*															
CON7C	017257	1118	3087*															
CON8	017304	1143	3092*															
CON9	017341	1156	3098*															
CYLA	017554	1273*	1274*	1275*	1276*	1358*	1359*	1360*	1361*	3162*								
CYLIND	017476	1038*	1248*	1253	1290	1292	1312*	1315*	1374*	1377	1423	1468	1481	1521*				
		1524	1533	1535*	1546*	1559	1561	1577*	1582*	1606*	1754*	1771*	1794*	1848*				
		2029*	2160*	2239*	2286*	2368	2459*	2491*	2492	2504*	2511	2737	3139*					
		1219	1226	2003	2020*													
DATAT	010332	2035*	2124															
DATP	010434	1061	1079*	1085														
DATTES	002620	2480*	2489	2494														
DECBK	013314	2410	2414*															
DECCY	013000	2406	2409*															
DECTK	012754	2392	2399*															
DELMES	012700	1443	1500	2049	2063	2120	2470*											
DISBUF	013240	683*																
DISPLA=	177570	2033	2381*	2565														
DKINT	012602	2389	2432*															
DKI1	013112	1039*	1373*	1379	1382	1384*	1386*	1410	1472	1477	1479*	1483	1490*	1520*				
DMA	017500	1607*	1753*	1772*	1773*	1793*	1847*	2030*	2168*	2238*	2287*	2367	2460*	2461*				
		2475	2479*	2483*	2484	2488*	2490*	2503*	2510	2786	3140*							
DREAD	010606	2052	2065*															
DSKDR	002526	1063*	1069	1072														
DSKNOR	017520	1037*	1073*	1074*	1076*	1077*	1181*	1183	1186*	1188*	1190*	1191*	1193	2244				
		3148*																
DSKNOS	013650	1247	1345	1519	1605	2279	2366	2546*										
DSKRD	010626	2069*	2104	2110														
EMTVEC=	000030	673*																
END	017431	2346	3111*															
EOPST	006700	1753*	1811															
ERCOUN	017540	2728*	2831*	3156*														
ERRFLG	001240	788	790*	839*	842*													
ERROR	001112	819*	2561															
ERRORS	001246	840*	845*															
ERRPC	001252	829	847*															
ERRVEC=	000004	668*																
ESH	010616	2067*	2118	2121														
EXGEN	014350	2654	2659*															
EXMFLG	003546	1201	1210*															
EXPS	014552	1292*	1406*	1410*	1411	1413*	1416*	1417	1423*	1426*	1427	1429*	1430	1481*				
		1483*	1561*	1727*	1739*	1806*	1880*	1956*	1988*	2326*	2337*	2692	2699*	2740*				
		2744*	2749*	2753*	2756*	2757												
EXREF	015522	2850*	2855															
EXTDR	013646	2508	2515	2541*														
EXTEND	010260	1999*	2010															
EXTMEN	015456	1034	2843*															
EXTPP	012070	2249	2256	2262*														
EXTRP	010306	1916	1998	2006*														
EXTTRP	010312	1911	2007*															
EXTTST	007620	1911*																
EXTT1	010100	1961*																
FILDAT	014152	2616*	2618															
FLAG	017464	1036*	1043*	1056*	1062*	1089*	1115*	1150*	1154*	1160*	1167*	1174*	1175	1192*				

		1200	1204	1217	2037	2051	2065	2122	2125	2240	2242	2246*	2248*	2315
FNCT	012600	2456	2470	2501	2506*	2540*	2546	2588	3134*					
FNCT	012520	2372*	2374	2376*										
		1387	1456	1525	1551	1617	1625	1650	1697	1706	1715	1762	1780	1795
		1849	1862	1890	1928	1942	1964	1978	2040	2054	2070	2170	2179	2190
		2294	2305	2366*										
GATTN	014056	1285	2588*											
HINUM	001700	914	924	935*	939*	2156	2733*	2753						
HINUN	014354	2629	2631	2641	2655*	2661*								
HISAV	014360	2629*	2663*	2733										
HLT	= 104400	722*	1261	1267	1279	1283	1288	1295	1299	1352	1364	1368	1395	1399
		1407	1419	1432	1462	1485	1531	1557	1563	1623	1631	1656	1664	1703
		1712	1721	1729	1740	1768	1786	1790	1801	1807	1855	1868	1882	1896
		1900	1904	1935	1939	1948	1952	1958	1970	1974	1984	1990	1994	2300
		2329	2339	2390	2555	2777	2908							
HLTADS	001244	830*	831*	832	833	844*								
HLTCTS	001242	832*	843*	2666	2682	2685								
ICNT	001000	776*	1035*	2250*	2253									
INBUF	017526	1550	1559	1562	2871*	2872*	3151*							
INCSEC	013264	2475*	2482											
INCSUR	013324	2478	2483*											
INDRVE	012014	2245	2248*											
INIT	013722	1033	1518	1604	1833	2145	2561*							
INPUTS	002014	942	943	966*	977	1018	1054	1060	1094	1113	1158	1165	1172	
INTCK	004300	1245	1324*											
INTERR	017534	2098	2202	2381*	2385*	2397*	2772*	3154*						
INTEXT	013142	2384	2436	2438*										
INTFLG	004310	1255*	1281	1324*	1326*	2069*	2189*	2445*	2769					
INTO	013176	2401*	2402*	2405	2407*	2409	2411*	2412*	2414*	2422	2427	2448*		
INT1	013200	2394*	2400*	2415*	2419	2421*	2422*	2425	2427*	2430	2449*			
IOTVEC=	000020	671*												
KIPAR0=	172340	709*	1918*											
KIPAR1=	172342	710*	1919*	1961*										
KIPAR2=	172344	711*												
KIPAR7=	172356	712*	1917*											
KIPDR0=	172300	713*	1920*											
KIPDR1=	172302	714*	1921*											
KIPDR2=	172304	715*												
KIPDR7=	172316	716*	1922*											
LAD	001002	777*	792	1307*	1369*	1441*	1498*	1544*	1572*	1666*	1743*	1811*	1883*	1905*
		1959*	1996*	2047*	2061*	2118*	2177*	2186*	2222*	2301*				
LCONM	002426	1042	1046*											
LDAT	010456	2039*	2047	2050										
LONUM	001702	913	922	934*	940*	2155	2732*	2749						
LONUN	014352	2628	2630	2639	2651*	2660*								
LOSAY	014356	2628*	2662*	2732										
MAXREF	015550	2847	2859*											
MAXRF1	015556	2853	2860*											
MEMSIZ	015702	1834	1844	1877	2284	2334	2865*	2879*						
MEMTST	007220	1225	1814	1827*										
MES1	016026	2252	2925*											
MES1A	016045	2675	2928*											
MES10	016345	1633	1658	2975*										
MES11	016370	1203	2980*											
MES12	016404	1489	2983*											
MES13	016410	2394	2826	2985*										

[illegible]

PAT15	014610	2720*												
PAT2	014562	2709*												
PAT3	014564	2710*												
PAT4	014566	2711*												
PAT5	014570	2712*												
PAT6	014572	2713*												
PAT7	014574	2714*												
PC	=%000007	651*	774*	803*	814*	834*	835*	872*	875*	908*	912*	936*	937*	964*
		974*	982*	984*	990*	996*	1001*	1012*	1013*	1021*	1033*	1050*	1053*	1059*
		1066*	1067*	1082*	1083*	1093*	1099*	1100*	1112*	1119*	1120*	1127*	1128*	1135*
		1136*	1144*	1145*	1157*	1164*	1171*	1209*	1244*	1285*	1344*	1443*	1500*	1517*
		1518*	1603*	1604*	1635*	1660*	1831*	1833*	2024*	2035*	2039*	2044*	2049*	2053*
		2058*	2063*	2068*	2076*	2095*	2116*	2120*	2144*	2145*	2152*	2154*	2174*	2183*
		2194*	2201*	2220*	2254*	2258*	2343*	2396*	2420*	2426*	2431*	2458*	2462*	2473*
		2541*	2568*	2592*	2594*	2619*	2626*	2659*	2673*	2677*	2681*	2684*	2693*	2697*
		2698*	2748*	2768*	2807*	2813*	2819*	2824*	2828*	2914*				
PFD	012470	2277	2351*	2352										
PFTST	012074	1228	2276*	2301										
PFT1	012276	2314*	2323	2359										
PFU	012500	2351	2356*											
PFVEC =	000024	672*												
PKEX\$	002270	1010*	1016											
PKEX1\$	002274	1009	1011*											
PK\$	002332	983	986*	987*	988*	989	992*	993*	994*	995	997*	999*	1000	1002*
		1004*	1005*	1006*	1007*	1008	1017*	1018*	1020*	1023*				
PRINTA	001370	871	876*											
PRINTB	001400	874	878*	1050	1209									
PRINTR	001344	834	870*	1635	1660	2343	2673	2677	2681	2693	2697			
PRINTS	001356	873*	1244	1344	1517	1603	1831	2024	2116	2144	2220	2254	2396	2420
		2426	2431	2807	2813	2818	2824	2828						
PRINT\$	001264	828	852*	905	952	961	1195	1241	1341	1488	1514	1600	1632	1657
		1828	2021	2113	2141	2217	2251	2303	2340	2345	2393	2417	2423	2428
		2668	2670	2674	2678	2687	2690	2694	2804	2810	2815	2819	2825	2909
PRI1 =	000040	665*												
PRI2 =	000100	664*												
PRI3 =	000140	663*												
PRI4 =	000200	662*	1251	2031	2148									
PRI5 =	000240	661*												
PRI6 =	000300	660*												
PRI7 =	000340	659*	1912	2278	2562	2564	2566	2567	2846	2848				
PRNTF\$	001302	824	853											

READS	001704	941*	1053	1059	1066	1082	1093	1099	1112	1119	1127	1135	1144	1157
RECS	014554	1164	1171											
REDAC	013012	1293*	1294*	1402*	1403*	1404	1409*	1417	1421*	1422*	1430	1484*	1562*	1728*
REPOEN	012024	1738*	1803*	1804	1881*	1957*	1989*	2327*	2328*	2338*	2636	2700*	2771*	
RESTS	001064	2404	2408	2413	2416*									
RESVEC=	000010	2241	2247	2250*										
RMENT	007254	807*	936	1012										
RORBLK	014042	669*												
RPBA	017446	1833*	2001	2004										
RPCA	017450	2576	2580*											
RPCA1	017462	2369*	3123*											
RPCS	017440	1253*	1422	2280*	2368*	2400	3124*							
		1290	1294	2324	2328	3129*								
		1182*	1254*	1259	1297	1302*	1303	1346*	1350	1366	1391	1397	1436*	1437
		1446*	1447	1458	1460	1463	1493*	1494	1527	1529	1539*	1540	1553	1555
		1567*	1568	1619	1621	1627	1629	1652	1662	1699	1701	1708	1710	1717
		1719	1722	1764	1766	1782	1788	1797	1799	1851	1853	1864	1866	1869
		1892	1898	1902	1931	1933	1937	1944	1946	1950	1966	1968	1972	1980
		1982	1992	2096	2105*	2106	2199	2209*	2210	2281*	2290	2296	2298	2307
		2314*	2321*	2374*	2382	2391	2437*	2438	2552*	2680	2843*	2844	3120*	
RPCS1	017442	1183*	3121*											
RPDA	017452	1402	2367*	2401	3125*									
RPDA1	017454	1409	3126*											
RPDS	017460	1184	1252*	1265	1271	1286	1300	1305	1356	1434	1439	1449	1491	1496
		1537	1542	1565	1570	2108	2212	2292	2322	2432	2435	2440	2553	2672
		3128*												
RPER	017456	1654	1784	1894	2403	2676	3127*							
RPWC	017444	2370*	2371*	3122*										
RRANEX	011214	2145*	2230											
RW	= 000006	717*	1920	1921	1922									
RWRCK	006052	1604*	1815											
RO	=%000000	644*	802	908*	913*	917*	926*	932*	934	976*	977	979*	981*	1015
		1018	1019*	1212*	1213*	1215*	1216	1256*	1257*	1269*	1270*	1277	1347*	1348*
		1354*	1355*	1362	1375*	1377*	1379*	1389*	1390*	1393	1451*	1453*	1466*	1608*
		1637	1668	1674*	1692*	1694	1731*	1733	1738	1834*	1835*	1837*	1838*	1939
		1857*	1860*	2025*	2027*	2028	2080*	2093*	2282*	2283*	2284	2331*	2332	2334
		2338	2342	2609*	2612	2614	2630*	2634*	2643*	2649*	2651	2652	2755*	2756
R1	=%000001	645*	801	809*	914*	918*	923*	924*	927*	929*	933*	935	1197*	1376*
		1378*	1380*	1452*	1454*	1467*	1471*	1475*	1486	1609*	1613	1659	1671*	1675*
		1678*	1679*	1691*	1694*	1732*	1735*	1757*	1758*	1759	1760	1775*	1776*	1777
		1778	1858*	1859*	2082*	2083*	2084*	2085*	2086*	2087*	2088*	2089*	2090*	2091*
		2092*	2151*	2255*	2258	2588*	2589*	2590*	2592*	2593	2611*	2885*	2886*	2889*
		2889*	2890*	2891*	2892*	2893*	2894*	2895*	2896*	2897*	2898*	2899*	2900*	2901*
		2902*	2903*											
R2	=%000002	646*	800	810*	916*	919*	922*	925*	928*	930*	931*	932	1612*	1613*
		1614	1615	1639*	1640*	1641	1642	1645*	1646*	1647	1648	1693*	1695*	1774*
		1776	1840*	1842*	1844	1872*	1873	1874	1877	1881	1924*	1925*	1941*	1954
		1957	1962*	1963*	1977*	1986	1989	2081*	2093	2633*	2636*	2639*	2642*	2645*
		2647*	2648*	2649										
R3	=%000003	647*	799	811*	915*	920*	941	942*	943	963*	1841*	1842	1843	1873*
		1874	1876	1880	2632*	2637*								
R4	=%000004	648*	798	812*	880	881*	882*	884*	901	907*	2631*	2635*	2640*	2641*
		2644*	2646*	2650*	2655	2656								
R5	=%000005	649*	797	813*	824*	828*	854*	855*	858	860*	861	863*	864*	865
		905*	952*	961*	1034*	1047*	1051*	1057*	1064*	1080*	1091*	1097*	1110*	1117*
		1125*	1133*	1142*	1155*	1162*	1169*	1195*	1202*	1241*	1247*	1341*	1345*	1387*

		1456*	1489*	1514*	1519*	1525*	1551*	1600*	1605*	1617*	1625*	1632*	1650*	1657*
		1697*	1706*	1715*	1762*	1780*	1795*	1828*	1849*	1862*	1890*	1928*	1942*	1964*
		1978*	2021*	2040*	2054*	2070*	2113*	2141*	2170*	2179*	2190*	2217*	2251*	2279*
		2294*	2303*	2305*	2340*	2345*	2366*	2372	2373*	2375*	2393*	2417*	2423*	2428*
		2556*	2668*	2670*	2674*	2678*	2687*	2690*	2694*	2804*	2810*	2815*	2819*	2825*
		2877*	2909*											
SANHT	005206	1472*	1476											
SAVE	017512	2730*	2757	2761*	2771	2849*	2850	2851	2854*	2859*	2864*	2865	2866*	2868*
		2869	2870*	2872	3145*									
SAVES	001036	796*	912	974										
SAVI	017514	3146*												
SCCPE =	104000	724*	1308	1370	1442	1499	1545	1573	1667	1744	1812	1884	1906	1960
		1997	2048	2062	2119	2178	2187	2223	2302					
SCOPES	001004	786*	2563											
SCYL	017466	1123*	2459	3135*										
SEABUF	004502	1375*	1444											
SHED	017470	1131*	2461	3136*										
SP	=%000006	650*	792*	796	797*	798*	799*	800*	801*	802*	807	808	809	810
		811	812	813	858*	859*	863	880*	907	1010*	1032*	1414	2007*	2276*
		2358*	2385	2397	2444*	2445	2741	2750	2772	2876*	2883			
SPECME	016630	1048	3025*											
SRO =	177572	708*	1913	1923*	2006*									
SSEC	017472	1139*	2460	3137*										
START	002336	774	1031*											
STATUS=	000256	1028*	1246*	2034*	2566*									
STKPTR=	000500	686*	1032	2007	2276	2358	2876							
SWITCH	017502	2731*	2738	2741*	2743*	2746	275	2752*	3141*					
SWR =	177570	682*	786	819	822	826	836	852	870	873	1041	1210	1212	1319
		1502	1585	1813	2002	2028*	2042	2056	2072	2074	2133	2172	2181	2192
		2197	2228	2388	2775	2829								
SWRDC	017510	1049	1103	1107*	1108	2032	2507	2875*	3144*					
SWSUR	013364	2487	2490*											
T =	000020	658*												
TBITVE=	000014	670*												
TESTNO	017536	1240*	1243	1340*	1343	1513*	1516	1599*	1602	1827*	1830	2020*	2023	2140*
		2143	3155*											
TIMO	016562	2910	3014*											
TKE =	177562	679*	955											
TKS =	177560	678*												
TKSR	002772	1095	1109*											
TPB =	177566	681*	865*	955*										

[illegible]

AP11C RELIABILITY TEST MACY11 27(732) 16-SEP-76 16:12 PAGE 81
DZPF8.P11 CROSS REFERENCE TABLE -- MACRO NAMES

[illegible]

ADC	923	925	927	928	930	933	2640	2642	2644	2645	2647	2650	2505	2579	2639
ADD	854	859	922	924	926	929	931	932	1010	2128	2249	2373			
ASL	2541	2643	2646	2649	2649	2761	2785	2854	2872						
ASR	917	2634													
BCC	1678														
BDS	1672														
BEQ	787	823	853	871	874	894	897	944	978	1069	1102	1149	1176	1180	1201
	1211	1218	1264	1291	1301	1320	1383	1405	1418	1425	1431	1435	1464	1478	1492
	1503	1534	1538	1560	1566	1586	1638	1723	1726	1805	1814	1870	1955	1987	2000
	2003	2038	2052	2066	2073	2099	2102	2112	2123	2130	2134	2203	2206	2216	2225
	2229	2241	2256	2299	2325	2387	2389	2406	2410	2433	2436	2443	2471	2478	2481
	2497	2493	2515	2517	2522	2527	2576	2613	2615	2622	2654	2686	2735	2760	2765
	2770	2774	2776	2789	2792	2797	2830	2832	2863						
BHI	2163	2166	2763												
BIC	1020	1074	1154	1207	1213	1252	1403	1839	2157	2161	2164	2243	2246	2222	2402
	2476	2483	2485	2506	2512	2551	2577	2592	2870	2874					
BICB	948	2167													
BIS	839	989	995	1000	1008	1043	1056	1062	1089	1115	1150	1160	1167	1174	1192
	1254	1313	1346	1446	1578	1679	2281	2412	2540	2843					
BISB	898														
BIT	786	822	826	852	870	873	885	1041	1175	1200	1210	1217	1265	1296	1300
	1319	1434	1463	1491	1502	1537	1565	1585	1654	1722	1784	1788	1813	1869	1894
	1898	1902	1937	1950	1972	1992	2002	2037	2042	2051	2056	2065	2072	2074	2122
	2133	2172	2181	2192	2197	2199	2228	2240	2298	2388	2391	2403	2405	2432	2435
	2456	2470	2575	2666	2682	2685	2775	2829							
BITB	2409														
BLOS	1072	1085	1106	1122	1130	1138	1147	1845	1878	2285					
BLT	2159														
BMI	789	1016	1260	1272	1310	1351	1357	1392	1575	1663	2383	2554	2782		
BNE	827	862	886	900	902	921	950	959	1042	1055	1061	1095	1114	1159	1166
	1173	1258	1266	1278	1282	1287	1318	1349	1363	1381	1394	1412	1429	1455	1469
	1473	1476	1487	1584	1616	1643	1649	1655	1669	1696	1734	1736	1761	1779	1795
	1789	1861	1875	1895	1899	1903	1938	1951	1973	1993	2043	2057	2075	2104	2173
	2182	2193	2198	2200	2208	2245	2333	2335	2392	2404	2457	2618	2625	2638	2658
	2667	2683	2737	2739	2747	2758	2852	2907							
BPL	820	837	857	867	946	957	1185	1194	1298	1304	1306	1367	1398	1438	1440
	1448	1450	1459	1461	1495	1497	1528	1530	1541	1543	1554	1556	1569	1571	1620
	1622	1628	1630	1653	1700	1702	1709	1711	1718	1720	1765	1767	1783	1798	1800
	1852	1854	1865	1867	1893	1932	1934	1945	1947	1967	1969	1981	1983	2094	2097
	2107	2109	2126	2211	2213	2291	2293	2297	2308	2323	2439	2441	2502	2845	
BR	868	877	883	954	980	1009	1078	1187	1262	1268	1280	1284	1289	1296	1314
	1353	1365	1385	1396	1400	1408	1415	1420	1444	1465	1480	1482	1501	1532	1536
	1558	1579	1624	1636	1644	1661	1665	1704	1713	1724	1730	1737	1769	1787	1791
	1802	1856	1871	1879	1897	1901	1936	1940	1949	1953	1971	1976	1995	1991	1998
	2010	2045	2050	2059	2064	2077	2079	2110	2121	2175	2184	2195	2214	2247	2249
	2309	2330	2336	2352	2359	2408	2413	2472	2482	2489	2494	2509	2519	2524	2529
	2742	2745	2751	2754	2766	2767	2784	2794	2799	2802	2853	2855			
BVS	2904														
CLC	985	991	998	1003	1075	1086	1152	1189	1214	1670	1677	1836	2026	2316	2531
	2549	2867	2873												
CLR	790	878	916	975	976	1017	1035	1036	1037	1038	1039	1040	1181	1198	1240
	1248	1249	1250	1255	1269	1293	1315	1316	1354	1373	1374	1389	1401	1406	1413
	1421	1429	1453	1520	1521	1546	1548	1549	1581	1606	1607	1609	1612	1639	1645
	1646	1739	1753	1754	1757	1758	1775	1793	1794	1806	1847	1848	1859	1918	1927
	1941	1977	2006	2009	2029	2030	2067	2069	2083	2084	2085	2086	2087	2088	2089

	2090	2091	2092	2117	2132	2188	2189	2221	2227	2239	2239	2287	2326	2327	2357
	2361	2399	2421	2490	2503	2504	2509	2525	2591	2623	2633	2731	2743	2744	2752
CLRB	2778	2800	2808	2861	2913										
CMF	892	894	904	960	1386	1490	2520	2795							
	901	943	1071	1084	1105	1121	1129	1137	1146	1148	1317	1427	1430	1468	1472
	1486	1533	1559	1615	1642	1648	1725	1760	1778	1844	1874	1877	1954	1986	2101
	2103	2129	2158	2205	2207	2244	2284	2332	2334	2477	2492	2526	2612	2614	2734
CMFB	2736	2757	2762	2764	2851										
	949	958	1054	1060	1094	1113	1158	1165	1172	1290	1382	1411	1417	1477	2162
DEC	2165	2486	2516	2521	2791	2796									
	981	1019	1188	1257	1274	1276	1348	1359	1361	1378	1380	1454	1471	1475	1580
	1695	1735	1860	2407	2415	2480	2514	2617	2621	2624	2637	2653	2657	2759	2790
DECB	2906														
ENT	2411														
HALT	724														
INC	768	821	838	2347	2434	2905	2911								
	840	920	979	1104	1186	1270	1273	1275	1311	1355	1358	1360	1384	1390	1416
	1426	1479	1535	1576	1999	2100	2204	2224	2250	2479	2491	2513	2518	2528	2578
INCB	2783	2793	2801	2822	2831										
IMP	895	899	2488	2523	2798										
	1044	1199	1216	1219	1321	1504	1587	1673	1676	1681	1815	2001	2004	2124	2127
	2131	2135	2226	2230	2262	2384	2833								
JSR	824	828	834	835	905	912	936	952	961	974	982	984	990	996	1001
	1012	1032	1034	1047	1050	1051	1053	1057	1059	1064	1066	1067	1080	1082	1083
	1091	1093	1097	1099	1100	1110	1112	1117	1119	1120	1125	1127	1128	1133	1135
	1136	1142	1144	1145	1155	1157	1162	1164	1169	1171	1195	1202	1209	1241	1244
	1247	1285	1341	1344	1345	1387	1443	1456	1488	1500	1514	1517	1518	1519	1525
	1551	1600	1603	1604	1605	1617	1625	1632	1635	1650	1657	1660	1697	1706	1715
	1762	1780	1795	1828	1831	1833	1849	1862	1890	1928	1942	1964	1978	2021	2024
	2035	2039	2040	2044	2049	2053	2054	2058	2063	2068	2070	2076	2095	2113	2116
	2120	2141	2144	2145	2152	2154	2170	2174	2179	2183	2190	2194	2201	2217	2220
	2251	2254	2258	2279	2294	2303	2305	2340	2343	2345	2366	2393	2396	2417	2420
	2423	2426	2428	2431	2473	2668	2670	2673	2674	2677	2678	2681	2687	2690	2693
	2694	2697	2748	2804	2807	2810	2813	2815	2818	2819	2824	2825	2828	2909	
MOV	774	792	796	797	798	799	800	801	802	803	807	808	809	810	911
	812	813	814	830	833	858	860	863	880	881	907	913	914	915	934
	935	941	942	955	963	983	1032	1049	1073	1103	1107	1108	1123	1131	1139
	1151	1182	1197	1204	1208	1212	1243	1245	1246	1251	1256	1292	1307	1312	1324
	1340	1343	1347	1369	1371	1372	1375	1376	1377	1379	1402	1414	1423	1441	1445
	1451	1452	1466	1467	1481	1483	1484	1498	1513	1516	1522	1523	1524	1544	1547
	1550	1561	1562	1572	1577	1582	1599	1602	1609	1610	1611	1613	1634	1640	1659
	1666	1674	1675	1691	1692	1693	1694	1705	1714	1727	1728	1731	1732	1738	1743
	1755	1756	1770	1772	1774	1776	1792	1803	1811	1827	1830	1832	1834	1839	1840
	1841	1842	1846	1857	1858	1872	1873	1880	1881	1883	1888	1889	1905	1911	1912
	1916	1917	1919	1920	1921	1922	1923	1924	1925	1926	1956	1957	1959	1961	1962
	1963	1988	1989	1996	2007	2008	2020	2023	2025	2028	2031	2032	2033	2034	2036
	2047	2061	2080	2081	2082	2115	2118	2140	2143	2146	2147	2148	2149	2150	2151
	2153	2156	2160	2168	2169	2177	2186	2219	2222	2242	2253	2255	2276	2277	2278
	2282	2283	2286	2288	2289	2301	2314	2315	2321	2331	2337	2338	2342	2351	2356
	2358	2367	2369	2370	2372	2385	2395	2397	2401	2414	2419	2425	2430	2444	2445
	2459	2460	2474	2475	2484	2507	2510	2511	2530	2546	2552	2556	2562	2563	2564
	2565	2566	2567	2573	2574	2581	2588	2609	2610	2611	2616	2620	2628	2629	2630
	2631	2632	2651	2652	2655	2656	2672	2676	2680	2692	2696	2728	2729	2730	2732
	2733	2740	2741	2749	2750	2753	2755	2756	2771	2772	2779	2786	2787	2806	2812
	2817	2821	2823	2827	2846	2847	2848	2849	2860	2865	2869	2871	2875	2876	2883
	2884	2885													

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 RP11C RELIABILITY TEST MACY11 27(732) 16-SEP-76 16:12 PAGE 85
 DZRPFB.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

MOV8	832	865	876	879	903	947	1018	1183	1253	1294	1302	1409	1410	1422	1436
	1493	1539	1567	1771	1773	2105	2209	2280	2328	2368	2374	2400	2422	2427	2437
NEG	2461	2593	2809	2814	2886										
NEG8	2371														
	2898	2889	2890	2891	2892	2893	2894	2895	2896	2897	2898	2999	2900	2901	2902
	2903														
NOP	2259	2260	2261												
RESET	1031	2257													
ROL	887	889	891	918	919	986	987	989	999	1004	1005	1006	1007	1076	1077
	1087	1088	1153	1190	1191	1215	1671	2532	2533	2534	2535	2536	2537	2538	2539
	2635	2636													
ROLB	889	890	892												
ROR	993	994	1205	1206	1837	2027	2317	2318	2547	2548	2589	2590	2868		
RTI	791	793	841	1325	2446										
RTS	855	864	872	875	908	937	964	1013	1021	2375	2458	2462	2541	2556	2568
	2582	2594	2619	2626	2659	2684	2698	2768	2877	2914					
SUB	831	1070	1835	2093	2780	2781	2859	2864	2866						
SWAB	992	997	1002	2319	2550	2580									
TRAP	722														
TST	788	819	836	1015	1068	1101	1179	1184	1193	1263	1271	1277	1281	1297	1305
	1309	1356	1362	1366	1393	1397	1404	1424	1439	1449	1460	1470	1474	1496	1529
	1542	1555	1570	1574	1583	1614	1621	1629	1637	1641	1647	1662	1668	1701	1710
	1719	1733	1759	1766	1777	1799	1804	1843	1853	1866	1876	1913	1933	1946	1968
	1982	2098	2108	2111	2125	2202	2212	2215	2292	2322	2382	2386	2440	2442	2553
	2738	2746	2769	2773	2788	2850	2862								
TSTB	856	861	866	893	896	945	956	977	1259	1303	1350	1391	1437	1447	1458
	1494	1527	1540	1553	1568	1619	1627	1652	1699	1708	1717	1764	1782	1797	1851
	1804	1892	1931	1944	1966	1980	2096	2106	2210	2290	2296	2307	2324	2438	2501
	2844														
WAIT	2046	2060	2078	2176	2185	2196									
.ABS	637														
.ASCIZ	846	847	967	968	2925	2928	2931	2934	2936	2941	2946	2955	2958	2965	2969
	2975	2980	2993	2985	2988	2992	2995	2998	3002	3006	3009	3014	3025	3032	3038
	3044	3051	3055	3062	3068	3072	3082	3087	3092	3098	3102	3107	3111		
.BLKW	909	966													
.BYTE	2598														
.ENABL	1025														
.END	3167														
.ENDC	836														
.EVEN	849	2601	2704	2924	3113										
.IF	835														
.LIST	635	768	772	1025											
.MACR	720	751	752	753	754	755	756	757	758	759	760	762	763	764	765
	766														
.MACRO	761														
.MLIST	636	768	1025												
.PAGE	1816	2265	2361												
.REM	19														
.REPT	768	2887													
.SBTTL	1232	1328	1505	1589	1816	2011	2136	2265	2361						
.TITLE	638	1025													
.WORD	1388	1457	1526	1552	1618	1626	1651	1698	1707	1716	1763	1781	1796	1850	1863
	1891	1929	1943	1965	1979	2041	2055	2071	2171	2180	2191	2295	2306		

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RP11C RELIABILITY TEST MACY11 27(732) 16-SEP-76 16:12 PAGE 86
DZRPFB.P11 CROSS REFERENCE TABLE -- PERMANENT SYMBOLS

ERRORS DETECTED: 0
DEFAULT GLOBALS GENERATED: 0

*.DZRPFB.SEG/SOL/CRF/PAGNUM+DZRPFB
RUN-TIME: 10 20 4 SECONDS
RUN-TIME RATIO: 192/36=5.2
CORE USED: 10K (19 PAGES)

[illegible]