

RF11

MULTI DISK
MD-11-DZRFC-B

EP-DZRFC-B-DL
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FICHE 1 OF 1

JUN 1978
digital
MADE IN USA



IDENTIFICATION

PRODUCT CODE: MAINDEC-11-DZRFC-B-D
REPLACES: MAINDEC-11-05AA
PRODUCT NAME: PF11 MULTI DISK
DATE CREATED: 1 NOVEMBER 1970
MAINTAINER: DIAGNOSTIC GROUP
AUTHOR: E. HAIGHT/C. CASWELL

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DIGITAL EQUIPMENT CORPORATION

MAYNARD, MASS.

1. ABSTRACT

MULTI DISK IS A HIGH SPEED CONFIDENCE TEST THAT ASSURES THE USER THAT HE CAN TRANSFER DATA CORRECTLY, WITHOUT DESTROYING THE DATA ON THE DISK. MULTI DISK USES ALL EXISTING MEMORY ON THE SYSTEM AS BUFFER AREAS.

2. REQUIREMENTS

A. PDP-11 4K TO 28K OF MEMORY

TELETYPE

B. RF11 AND RS11 PLUS UP TO SEVEN ADDITIONAL RS11'S

2.2 STORAGE

THE MAIN BODY OF THE PROGRAM OCCUPIES THE FIRST 5K OCTAL (BYTES) OF MEMORY. THREE DATA BUFFERS OCCUPY THE REST OF EXISTING MEMORY.

BUFFER ORDER

OUT BUFFER = RANDOM DATA TO BE WRITTEN ON THE DISK.

IN BUFFER = AREA FOR RANDOM DATA WHEN READ FROM THE DISK.

SAVE BUFFER = AREA TO SAVE DISK WHEN EXERCISING.

3. LOADING PROCEDURE

3.1 METHOD

PROGRAM FORMAT ABSOLUTE

A. VERIFY THE BOOT LOADER IS IN MEMORY.

B. LOAD TAPE INTO READER.

C. SET SWITCH REGISTER EQUAL TO *750

MEMORY SIZE *

4K	17
8K	37
12K	57
16K	77
20K	117
24K	137
28K	157

D. DEPRESS LOAD ADDRESS.

E. DEPRESS START.

4. STARTING PROCEDURE

- A. SET SWITCH REGISTER EQUAL TO 200.
- B. DEPRESS LOAD ADDRESS.
- C. DEPRESS START.
- D. THE PROGRAM AT THIS POINT WILL DETERMINE THE AMOUNT OF EXISTING CORE MEMORY, AND SET UP THE WORD COUNT AND BUFFER AREAS FOR THE PROGRAM.
- E. THE PROGRAM WILL NEXT REPORT THE NUMBER OF EXISTING DISK(S) WHICH WHICH ARE ON THE SYSTEM. THE NUMBER WILL RANGE FROM 1 - 10 OCTAL. THE DISK SELECTION LINES MUST BE IN SEQUENTIAL ORDER RANGING FROM 0 TO 7.

06 EXISTENT DISK(S)

5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

THE SWITCH REGISTER HAS NO CONTROL OVER THE OPERATION OF THIS PROGRAM.

5.2 STOPPING THE PROGRAM

MULTI DISK MUST ONLY BE STOPPED BY TYPING CONTROL C. IF THE USER STOPS THE PROGRAM BY DEPRESSING CONSOLE HALT, THE DISK SURFACE MAY NOT BE RESTORED.

5.3 PROGRAM ABSTRACT

MULTI DISK WAS DESIGNED TO INSURE THE USER THAT THE DISK SYSTEM IS CAPABLE OF TRANSFERRING DATA CORRECTLY WHILE NOT DESTROYING THE USERS PROGRAMS ON THE DISK SURFACE. THE PROGRAM FIRST READS FROM THE DISK, THE LENGTH OF THE TRANSFER IS DETERMINED BY THE SIZE OF MEMORY. IF AN ERROR OCCURS WHILE READING, THE PROGRAM WILL MAKE UP TO THREE ATTEMPTS AT READING THE DATA. IF THE ERROR STILL EXISTS, THE PROGRAM WILL THEN HALT. IF THE PROGRAM SUCCESSFULLY READS FROM THE DISK WITHIN THE THREE ATTEMPTS, IT WILL THEN GENERATE A RANDOM BUFFER, WRITE IT ON THE DISK, AND READ IT BACK AND VERIFY IT. AFTER COMPARING THE DATA, THE PROGRAM THEN WRITES THE ORIGINAL DATA BACK ON THE DISK, MAKING UP TO THREE ATTEMPTS TO TRANSFER IF AN ERROR IS ENCOUNTERED, BEFORE HALTING. IF THE DATA WAS SUCCESSFULLY TRANSFERRED, THE PROGRAM WILL GO TO THE NEXT DISK BUFFER UNTIL THE COMPLETE DISK SYSTEM IS EXERCISED.

NOTE: EACH WRITE IS FOLLOWED BY A WRITE CHECK.

6. ERRORS

6.1 ERROR HALTS

THE PROCESSOR HALTED AT LOC. 1462. CAUSE OF HALT NO SELECTED DISK ON THE SYSTEM, OR DISKS NOT SELECTED IN SEQUENTIAL ORDER STARTING WITH DISK A.

THE PROCESSOR HALTED AT LOC. 2004. THE CAUSE OF THE HALT, UNABLE TO READ FROM THE DISK FOR THE SAVE BUFFER. THREE ATTEMPTS WERE MADE.

THE PROCESSOR HALTED AT LOC. 2256. THE CAUSE OF THE HALT, UNABLE TO RESTORE THE DISK SURFACE. THREE ATTEMPTS WERE MADE.

6.2 ERROR REPORTS

STATUS ERROR

STATUS ERROR XXDAE XXXXXXDAE XXXXXXDCS

A B C

A=THE DISK NUMBER AND EXTENDED DISK ADDRESS BITS.

B=THE DISK ADDRESS REGISTER

C=THE DISK CONTROL REGISTER

LAYOUT OF DISK ADDRESS BITS

DAE DAP
XXX XXX XXX XXX XXX XXX XXX

DISK NO. TRACK ADDRESS WORD ADDRESS

(6.2 CONT'D)

BIT LAYOUT OF DCS REGISTER

BIT15= ERROR
 BIT14= DISK FREEZE
 BIT13= WRITE CHECK ERROR
 BIT12= DATA PARITY ERROR
 BIT11= NON-EXISTENT DISK
 BIT10= WRITE LOCKOUT
 BIT9= MISSED TRANSFER
 BIT8= DISK CLEAR
 BIT7= READY
 BIT6= INTERRUPT ENABLE
 BIT5= EXTENDED MEMORY 1 (XM1)
 BIT4= EXTENDED MEMORY 0 (XM0)
 BIT3= MAINTENANCE
 BIT2-1= FUNCTION REGISTER

BIT 2	BIT 1	OPERATION
0	0	NOP
1	0	READ
0	1	WRITE
1	1	WRITE CHECK

BIT0= GO (WRITE ONLY BIT)

NOTE: WHEN A FREEZE ERROR OCCURS AN ADDITIONAL ERROR MESSAGE WILL BE REPORTED, AS FOLLOWS.

XXX HARD ERROR

LAYOUT OF BITS 0 - 7

BIT0= CMA INH. (NOT AN ERROR CONDITION)
 BIT1= UNUSED
 BIT2= NON-EXISTENT MEMORY ERROR
 BIT3= UNUSED
 BIT4= TRACK C TIMING ERROR
 BIT5= TRACK B TIMING ERROR
 BIT6= TRACK A TIMING ERROR
 BIT7= ADDRESS PARITY ERROR

6.3 DATA ERRORS

DATA ERROR XXDAE XXXXXDAP XXXXXGOOD DATA XXXXXBAD DATA

A B C D

A=THE DISK NUMBER AND EXTENDED DISK ADDRESS BITS
B=THE DISK ADDRESS REGISTER
C=THE DATA WRITTEN ON THE DISK
D=THE DATA READ FROM THE DISK

6.4 DISK ADDRESS ERROR

DISK ADDRESS ERROR XXDAEXXXXXDAP

THE TERMINATING DISK ADDRESS AFTER THE TRANSFER WAS NOT CORRECT
THE DAE AND DAP SHOULD EQUAL WHAT WAS REPORTED. CHECK THE
PF11 PANEL FOR THE ERROR ADDRESS.

6.5 PROCESSOR TIME OUT

PROCESSOR BACKGROUND TIMED OUT.

THIS MESSAGE WILL BE REPORTED IF THE DISK FAILS TO RAISE A BR
REQUEST AFTER EXTENDED PERIOD OF TIME.

6.6 MEMORY PARITY ERROR

THIS MESSAGE IS REPORTED IF THE PROGRAM DETECTS A MEMORY
PARITY ERROR DURING PROGRAM EXECUTION.

6.7 END

END

THIS MESSAGE IS REPORTED AT THE END OF ONE COMPLETE PASS OF
THE DISK SYSTEM.

7. RESTRICTIONS

THE DISKS MUST BE IN SEQUENTIAL ORDER RANGING FROM DISK
SELECT 0 - 7.

8. PROGRAM DESCRIPTION

MULTI DISK IS NOT A DIAGNOSTIC - IT IS MERELY A CONFIDENCE
TEST. IF THE USER ENCOUNTERS ANY PROBLEMS WITH THE SYSTEM
WHILE OPERATING MULTI DISK, HE SHOULD NOT TRY TO DIAGNOSE THE
PROBLEM USING THIS PROGRAM. IF PROBLEMS ARE ENCOUNTERED, IT
IS SUGGESTED THAT THE USER REVERTS TO DISK DATA AS A MEANS
OF DIAGNOSING HIS PROBLEM.

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1
2      .TITLE MAINDEC-11-DZRFCA-A RF11 MULTI DISK REPLACES D5AA
3
4      ;COPYRIGHT 1973 DIGITAL EQUIPMENT CORP., MAYNARD, MASS.
5      ;PROGRAM BY E. HAIGHT/C. CASWELL
6
7      .FNABL  ARS
8
9      000001  BIT0=1
10     000002  BIT1=2
11     000004  BIT2=4
12     000010  BIT3=10
13     000020  BIT4=20
14     000040  BIT5=40
15     000100  BIT6=100
16     000200  BIT7=200
17     000400  BIT8=400
18     001000  BIT9=1000
19     002000  BIT10=2000
20     004000  BIT11=4000
21     010000  BIT12=10000
22     020000  BIT13=20000
23     040000  BIT14=40000
24     100000  BIT15=100000
25
26     ;
27     ;
28     ;
29     ;
30     104403  WRITE=TRAP+3
31     104407  WRCHECK=TRAP+7
32     104405  READ=TRAP+5
33
34     .=0      ;TRAP CATCHER 0-776
35
36     .=704
37     000704  000167  003624      JMP      STAMP
38
39     .=200
40     000200  000167  000722      JMP      START
41
42     ;STATIC ROUTINES
43     .=300
44
45     ;
46     ;
47     ;
48     ;
49     ;
50     ;
51     ;
52     ;
53     ;
54     ;
55     ;
56     ;
57     ;RF11 MULTI DISK
58     ;VECTORS USED IN PROGRAM
59     ;#1 LOC 204 DISK INTERRUPT
60     ;#2 LOC 30 EMT (TELETYPE OUTPUT)
61     ;#3 LOC 34 TRAP (DISK HANDLERS)
62     ;#4 LOC 14 TRACE TRAP (USED IN BACKGROUND TEST)
63     ;#5 LOC 20 IOT TRAP (USED IN CALLING BACKGROUND TEST)
64

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MAINDEC-11-DZRECA-A RE11 MULTI DISK REPLACES D5AA
DZRECH.PIC

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65

001000

.=1000

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67                                     .EVEN
68                                     ;
69                                     ;I/O ADDRESS POINTERS
70 001000 177570 SWP: 177570 ;SWITCH REGISTER
71 001002 177776 FS: 177776 ;PROCESSOR STATUS REGISTER
72 001004 177566 TPF: 177566 ;TELETYPE REGISTERS
73 001006 177562 TRH: 177562
74 001010 177564 TPS: 177564
75 001012 177560 TKS: 177560
76                                     ;
77                                     ;DISK I/O REGISTERS
78                                     ;
79 001014 177460 DCS: 177460 ;DISK CONTROL REGISTER
80 001016 177462 WC: 177462 ;WORD COUNT REGISTER
81 001020 177464 CMA: 177464 ;CURRENT ADDRESS REGISTER
82 001022 177466 DAR: 177466 ;LOWER 16 BITS OF DISK ADDRESS
83 001024 177470 DAE: 177470 ;EXTENSION ADDRESS REGISTER
84 001026 177472 DBP: 177472 ;DATA BUFFER REGISTER
85 001030 177474 MA: 177474 ;MAINTENANCE REGISTER
86 001032 177476 ADS: 177476 ;LOOK AHEAD REGISTER
87 001034 000204 VECTOR: 204 ;INTERRUPT VECTOR ADDRESS
88 001036 000206 STATUS: 206 ;DISK INTERRUPT STATUS
89 001040 000200 PRIORITY:BIT7 ;DISK PRIORITY LEVEL
90                                     ;
91                                     ;
92                                     ;
93                                     ;
94                                     ;
95                                     ;
96                                     ;
97                                     ;RFI1 DEDICATE REGISTERS (MEMORY)
98                                     ;
99 001042 000000 FLAG: 0 ;INTERNAL PROGRAM FLAG
100 001044 146723 RANNU: 146723 ;RANDOM NUMBER PRIME
101 001046 000000 WRDCT: 0 ;WORKING WORD COUNT
102 001050 000000 TRACK: 0 ;WORKING DAE
103 001052 000000 DMA: 0 ;WORKING DATA BUFFER (OUT-IN)
104 001054 000000 PATNU: 0 ;DATA PATTERN INDEX
105 001056 000000 BUF: 0 ;WORKING DATA BUFFER (OUT-IN)
106 001060 000000 TWRDCT: 0 ;TEMP WORD COUNT
107 001062 000000 TDMA: 0 ;TEMP DAE
108 001064 000000 SWRDCT: 0 ;STANDARD WORD COUNT
109 001066 000000 ERCOUNT:0 ;ERROR COUNT FOR MESSAGES.
110 001070 000000 SAVE: 0
111 001072 000000 SAVI: 0
112 001074 000000 PASS: 0
113 001076 000000 DSKNOP: 0
114 001100 000000 HRDR: 0 ;POINTER FOR HARD ERROR
115 001102 000000 HIGH: 0
116 001104 000000 LIMIT: 0
117 001106 000000 TTRACK: 0 ;TEMP TRACK NO.
118 001110 000000 TDSKNO: 0 ;TEMP DISK NO.
119 001112 005360 OUTBUF: BUFFER
120 001114 000000 INBUF: 0

```

121	001116	000000	SAVR00:	0
122			:	
123			:RE11 WORK REGISTERS	
124			: (CAN BE CHANGED IN ANY ROUTINE)	
125	001120	000000	WORK:	0
126	001122	000000	WORK1:	0
127	001124	000000	WORK2:	0

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128
129 001126 000005          START: RESET          ;CLEAR THE WORLD
130 001130 012706 001000          MOV          #1000,86      ;SET UP STACK
131 001134 012767 000006 176642          MOV          #6,4
132 001142 005067 176640          CLR          6
133 001146 012777 002374 177660          MOV          #DINT,#VECTOR ;SET UP DISK POINTER
134 001154 012777 000340 177654          MOV          #340,#STATUS  ;LOCK UP INTERRUPTS
135 001162 012767 003760 176640          MOV          #EMTRP,30     ;SET UP ITY POINTER
136 001170 012767 000340 176634          MOV          #340,32      ;LOCK UP INTERRUPTS
137 001176 012767 002322 176630          MOV          #DISK,34     ;SET UP DISK HANDLER POINTER
138 001204 012767 000340 176624          MOV          #340,36      ;LOCK UP INTERRUPTS
139 001212 012777 000340 177562          MOV          #340,#PS     ;LOCK UP INTERRUPT LEVELS
140 001220 005067 177616          CLR          FLAG        ;CLEAR PROGRAM FLAG
141 001224 005067 177620          CLR          TRACK       ;CLEAR TRACK REGISTERS
142 001230 005067 177616          CLR          DMA         ;CLEAR DMA REGISTERS
143 001234 005067 177614          CLR          PATNU       ;CLEAR PATTERN COUNT
144 001240 012767 003572 176552          MOV          #XWAIT,20
145 001246 005067 176550          CLR          22
146 001252 012767 004454 176544          MOV          #DOWN,24     ;SET UP FOR POWER FAIL
147 001260 012767 000340 176640          MOV          #340,126    ;LOCK UP INTERRUPTS
148 001266 004767 003006          JSR          #7,#MAMP     ;SET UP PARITY SWITCHES
149
150          ;THIS ROUTINE DETERMINES HOW MUCH MEMORY IS ON THE SYSTEM
151          ;
152 001272 012777 000340 177502          EXTMEM: MOV          #340,#PS ;LOCK UP PRIORITY LEVELS
153 001300 013767 000042 177562          MOV          #042,SAVE   ;GET MONITOR ADDR
154 001306 001410          BEQ          18          ;SKIP IF ZERO
155 001310 100432          BMI          LGMEM       ;GREATER THAN 16K
156 001312 162767 000020 177550          SUB          #20,SAVE    ;DEC IT
157 001320 022767 005360 177542          CMP          #BUFFER,SAVE ;IS IT ACT 11?
158 001326 100444          BMI          GOTMEM      ;NO-SKIP
159 001330 012767 001406 176446          18: MOV          #MAXREF,4  ;SET UP PROCESSOR TRAP
160 001336 012767 000340 176442          MOV          #340,6
161 001344 012767 017446 177516          MOV          #17446,SAVE  ;SET UP REFERENCE TO 4K
162 001352 005777 177512          EXREF: TST          #SAVE ;REFERENCE MEMORY
163 001356 022767 177446 177504          CMP          #177446,SAVE ;TEST FOR GREATER THAN 20K
164 001364 001410          BEQ          MAXREF
165 001366 062767 020000 177474          ADD          #20000,SAVE  ;SET UP FOR NEXT REFERENCE
166 001374 000766          BR          EXREF       ;REFERENCE NEXT BANK
167 001376 162767 000020 177464          LGMEM: SUB          #20,SAVE ;DEC. IT
168 001404 000415          BR          GOTMEM
169
170          ;TRAPS HERE IF MEM TIMES OUT
171          ;
172 001406 012706 001000          MAXREF: MOV          #1000,86 ;RESET STACK
173 001412 012767 000006 176364          MOV          #6,4        ;RESET VECTOR
174 001420 005067 176362          CLR          6
175 001424 162767 020000 177436          SUB          #20000,SAVE  ;
176 001432 032767 002000 177402          BIT          #BIT10,FLAG
177          ;ROUTINE TO REPORT THE NUMBER OF EXISTENT DISK(S)
178          ;ON THE SYSTEM.
179 001440 005067 177454          GOTMEM: CLR          WORK
180 001444 016777 177450 177352          INDSK: MOV          WORK,#DAE ;LOAD DISK EXT. ADDR.BITS
181 001452 032777 004000 177334          BIT          #BIT11,#DCS ;TEST FOR NON-EXISTENT DISK

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182	001460	001010			RNE	NEDST	;BRANCH IF NON EXISTENT DISK SET
183	001462	062767	000004	177430	ADD	#4,WORK	;SET UP NEXT DISK NO.
184	001470	022767	000040	177422	CMP	#4,WORK	;CHECK FOR R DISKS
185	001476	001401			REG	.+4	;BRANCH IF R DISKS
186	001500	000761			BR	INDSK	

187								
188	001502	006067	177412		NEUPT:	POP	WORK	
189	001506	006067	177406			POP	WORK	
190	001512	032767	000017	177400		BIT	#17,WORK	
191	001520	001002				RNE	#+6	
192	001522	000000				HALT		
193	001524	000777				BR	.	
194	001526	004567	002466			JSH	\$5,CONV	
195	001532	001120				WORK		
196	001534	005213				MFS11		
197	001536	000002				2		
198	001540	104000				EXT	#+0	
199	001542	005031				HED5A		
200	001544	005213				MFS11		
201	001546	177777				-1		
202	001550	005367	177344			DEC	WORK	
203	001554	006167	177340			ROL	WORK	
204	001560	006167	177334			ROL	WORK	
205	001564	016767	177330	177304		MOV	WORK,DSKNOB	
206						;ROUTINE TO SET UP WRITE/READ BUFFERS		
207						;		
208						;		
209	001572	166767	177314	177270		SUB	OUTBUF,SAVE	
210	001600	005067	177314			CLP	WORK	
211	001604	162767	000003	177256	SETHUF:	SUB	#3,SAVE	;DIVIDE MEMORY BY 3
212	001612	022767	000003	177250		CMP	#3,SAVE	
213	001620	101003				BHI	OVERFLO	;BRANCH IF NO REMAINDER
214	001622	005267	177272			INC	WORK	;+1 COUNT
215	001626	000766				BR	SETHUF	
216	001630	042767	000001	177262	OVERFLO:	BIC	#RITE,WORK	
217	001636	016767	177250	177250		MOV	OUTBUF,INBUF	;SET UP IN-BUFFER
218	001644	066767	177250	177242		ADD	WORK,INBUF	;
219	001652	016767	177236	177236		MOV	INBUF,SAVBUF	;SET UP SAVE BUFFER
220	001660	066767	177234	177230		ADD	WORK,SAVBUF	
221	001666	016767	177226	177170		MOV	WORK,SWDCT	;SET UP WORD COUNT
222	001674	000241				CLC		
223	001676	006067	177162			ROR	SWDCT	;DIVIDE BYTESX2
224	001702	012767	003724	176150		MOV	#CNTLC,60	;SET UP TTY VECTOR
225	001710	012767	000340	176144		MOV	#340,62	
226	001716	052777	000100	177066		BIS	#RIT6,#TKS	;ENABLE TTY INTERRUPT
227						;		
228	001724	016767	177134	177114	DATAT:	MOV	SWDCT,WORDCT	;SET UP WORD COUNT
229	001732	012767	001724	177140		MOV	#DATAT,#EDER	;SET UP FOR HARD ERROR
230	001740	005067	177106			CLP	DMA	
231	001744	005067	177100			CLP	TRACK	
232	001750	012777	000340	177024	RDSAV:	MOV	#340,#PS	;LOCK UP PROCESSOR PRIORITY
233	001756	016767	177134	177072		MOV	SAVBUF,BUF	;SET UP CURRENT ADDR
234	001764	042767	000003	177050		BIC	#3,FLAG	

235											
236	001772	042767	001000	177042	LDAT:	RIC	%BIT9,FLAG				
237	002000	005267	177036			INC	FLAG				
238	002004	104505				READ	+100				
239	002006	000004				IOT					;WAIT FOR FLAG IN BACKGROUND TEST
240	002012	032767	001000	177024		RIT	%BIT9,FLAG				;CHECK FOR ERROR
241	002016	001414				REQ	WPDAT				;WRITE RANDOM DATE
242	002020	016767	177016	177072		MOV	FLAG,WORK				;TRY TO READ 3 TIMES
243	002026	042767	177774	177064		RIC	%177774,WORK				
244	002034	022767	000003	177056		CMP	%3,WORK				
245	002042	001353				BNE	LDAT				
246	002044	000000				HALT					;UNABLE TO READ FROM
247	002046	000777				BR	.				;DISK
248	002050	012767	002170	177022	WPDAT:	MOV	%WPSAV,WRDEF				;SET UP FOR HARD ERROR
249	002056	016767	177030	176772		MOV	OUTBUF,BUF				;SET UP RANDOM BUFFER
250	002064	104503				WRITE	+100				
251	002066	000004				IOT					;WAIT FOR FLAG IN BACK GROUND
252	002070	042767	000003	176744		RIC	%3,FLAG				
253	002076	016767	177012	176752		MOV	INBUF,BUF				;SET UP CURRENT ADDR
254	002104	042767	001000	176730	RANFD:	RIC	%BIT9,FLAG				
255	002112	005267	176724			INC	FLAG				
256	002116	104505				READ	+100				
257	002120	000004				IOT					;WAIT FOR FLAG IN BACKGROUND
258	002122	004567	001216			JSR	%5,COMPARE				;COMPARE DATA
259	002126	032767	001000	176706		RIT	%BIT9,FLAG				;CHECK FOR ERROR
260	002134	001415				REQ	WPSAV				;RESTORE DISK BUFFER
261	002136	016767	176700	176754		MOV	FLAG,WORK				;CHECK FOR 3 RE-READS
262	002144	042767	177774	176746		RIC	%177774,WORK				
263	002152	022767	000003	176740		CMP	%3,WORK				
264	002160	001351				BNE	RANFD				;GO RE-READ DATE
265	002162	042767	000003	176652		RIC	%3,FLAG				
266	002170	042767	001000	176644	WPSAV:	RIC	%BIT9,FLAG				;CLEAR PROGRAM ERROR FLAG
267	002176	016767	176714	176652		MOV	SAVBUF,BUF				;SET UP CURRENT ADDRESS
268	002204	104503				WRITE	+100				
269	002206	000004				IOT					;WAIT IN BACKGROUND TEST
270	002210	104507				WRCHECK	+100				
271	002212	000004				IOT					;WAIT FOR FLAG
272	002214	032767	001000	176620		RIT	%BIT9,FLAG				;CHECK FOR ERROR
273	002222	001413				REQ	STORBU				
274	002224	016767	176612	176666		MOV	FLAG,WORK				
275	002232	042767	177774	176660		RIC	%177774,WORK				
276	002240	022767	000003	176652		CMP	%3,WORK				
277	002246	001350				BNE	WPSAV				
278	002250	000000				HALT					
279	002252	005767	176564		STORBU:	TST	FLAG				
280	002256	100417				BMI	RESTORE				;RESTORE DISK AND EXIT
281	002260	004767	000362			JSP	%7,DISBUF				;SET UP NEXT DISK BUFFER
282	002264	000167	177460			JMP	RDSAV				;READ NEXT BUFFER
283	002270	104001				EMT	+1				;REPORT END.
284	002272	005352				END					
285	002274	013700	000042			MOV	%042,%0				;GET MONITOR ADDRESS
286	002300	001404				BEQ	LXIT				;SKIP IF NO HOOK
287	002302	004710			LOGICAL:	JSP	7,(0)				;GO TO MONITOR
288	002304	000240				NOP					

289 002306 000240
290 002310 000240
291 002312 000167 177406
292 002316 000000
293 002320 000777

NOP
NOP
LXIT: JMP DATAT
RESTORE: HALT
BR .

;RECYCLE TEST
;DO NOT RESTORE MEM


```

294
295
296
297
298
299
300 002322 016705 176500
301 002326 016745 176516
302 002332 016745 176514
303 002336 016745 176514
304 002342 016745 176500
305 002346 005115
306 002350 005215
307 002352 011604
308 002354 014467 176540
309 002360 042767 177600 176532
310 002366 016745 176526
311 002372 000002
312
313
314
315
316
317
318
319
320
321 002374 005046
322 002376 012746 002404
323 002402 000002
324 002404 005777 176404
325 002410 100113
326 002412 052767 001000 176422
327 002420 017767 176400 176472
328 002426 042767 177700 176464
329 002434 004567 001560
330 002440 001120
331 002442 005047
332 002444 000002
333 002446 104001
334 002450 004737
335 002452 017767 176344 176440 DELMES:
336 002460 005367 176434
337 002464 004567 001530
338 002470 001120
339 002472 005033
340 002474 000006
341 002476 104000
342 002500 005047
343 002502 005033
344 002504 177777
345 002506 017767 176302 176404
346 002514 004567 001500
347 002520 001120
;
;ENTER DISK HANDLER BY THE TRAP INSTRUCTION
;ARGUMENT TO TRAP INSTRUCTION IS TWO ORDER
;BYTE OF THE CONTROL REGISTER.
;
DISK:  MOV    DEF,85          ;SET UP TO LOAD DISK REG
      MOV    TRACK,-(5)     ;LOAD TRACK NUMBER
      MOV    DMA,-(5)       ;LOAD WORD ADDRESS
      MOV    BUF,-(5)       ;SET UP CURRENT ADDRESS
      MOV    WORDCT,-(5)    ;LOAD WORD COUNT
      COM    (5)           ;SET UP TWO'S COMPLEMENT
      INC    (5)
      MOV    (6),84
      MOV    -(4),WORK
      BIC    @177600,WORK   ;MASK FUNCTION BITS
      MOV    WORK,-(5)     ;LOAD FUNCTION REG.
      RTI                    ;RETURN FROM TRAP
;
;
;
;
;
;RF11 DISK INTERRUPT HANDLER
;ROUTINE CONTINUES ON ERRORS
DKINT: CLR    -(6)          ;CLEAR STACK
      MOV    @18,-(6)      ;SET RETURN
      RTI                    ;CLEAR TBIT
18:   TST    @DCS          ;TEST FOR ERROR
      BPL    INTEXT       ;BRANCH IF NO ERROR
      HIS    @BIT9,FLAG   ;SET ERROR BIT
      MOV    @DAF,WORK    ;REPORT ERROR
      BIC    @177700,WORK ;MASK ADDRESS EXT. BITS.
      JSP   @5,CONV       ;CONVERT TO ASCII
      WORK
      MES1A
      2
      EMT+1
      HED2
DELMES: MOV   @DAP,WORK    ;SET UP LOWER 16 BITS OF ADDR.
      DEC   WORK
      JSH  @5,CONV        ;CONVERT TO ASCII
      WORK
      MES1
      6
      EMT+0
      MES1A
      MES1
      -1
      MOV   @DCS,WORK     ;SET UP STATUS
      JSP  @5,CONV
      WORK

```

348	002522	005057			MES2	
349	002524	000006			6	
350	002526	104001			EMT+1	
351	002530	005057			MES2	
352	002532	032777	040000	176254	HIT	#BIT14,0DCS

```

353
354 002540 001430          BEQ      SOFTER          ;GO AND CONTINUE SOFT ERROR
355 002542 017767 176256 176350      MOV      @DAE,WORK        ;FETCH ERROR EXT. BITS
356 002550 000367 176344              SWAB     WORK
357 002554 042767 177400 176336      BIC      @177400,WORK
358 002562 004567 001432          JSR      @5,CONV         ;CONVERT TO ASCII
359 002566 001120          WORK
360 002570 005073          MES2A
361 002572 000003          3
362 002574 104000          EMT+0
363 002576 005031          HED5A
364 002600 005073          MES2A
365 002602 177777          -1
366 002604 052777 000400 176202      BIS      @BIT0,@DCS      ;CLEAR THE DISK
367 002612 012706 001000          MOV      @1000,@6
368 002616 000177 176256          JMP      @RDR
369 002622 005777 176170          SOFTER: TST     @WC      ;CHECK FOR X-FER DONE
370 002626 001404          BEQ      INTEXT        ;EXIT FROM ROUTINE
371 002630 052777 000001 176156      BIS      @BIT0,@DCS      ;SET GO AND CONTINUE
372 002636 000002          RTI
373 002640 012706 000774          INTEXT: MOV     @774,@6   ;RETURN TO WAIT INSTR.
374 002644 000002          RTI      ;RESET STACK
375                                     ;EXIT
376                                     ;
377                                     ;ROUTINE TO SETUP DISK BUFFERS
378                                     ;ADD WORD COUNT TO STARTING DISK ADDRESSES
379                                     ;COMPARE CALCULATED ADDRESS TO TERMINATING ADDRESS
380 002646 066767 176174 176176      DISBUF: ADD     @RDCT,DMA  ;ADD WORD COUNT TO LOWER 16 BITS
381 002654 103002          BCC
382 002656 005267 176166          INC     @RACK
383 002662 026777 176164 176132      COMDAR: CMP     @DMA,@DAP  ;OVERFLOW ADD ONE TO TRACK
384 002670 001403          BEQ
385 002672 052767 000100 176142      BIS      @BIT6,FLAG     ;COMPARE LOWER 16 BITS
386                                     ;
387 002700 017767 176120 176214      CMDAE: MOV     @DAE,WORK1  ;FETCH EXT. ADDR BITS
388 002706 042767 177740 176206      BIC      @177740,WORK1  ;MASK TRACK AND DISK ADDR
389 002714 042767 177740 176126      BIC      @177740,TRACK
390 002722 026767 176122 176172      CMP     @TRACK,WORK1    ;ARE THEY EQUAL
391 002730 001100          BNE
392 002732 105767 176104          TSTB   @FLAG           ;ERROR IN DAE REG
393 002736 100015          BPL
394 002740 005067 176106          CLR     @DMA           ;CHECK FOR LAST DISK BUFFER
395 002744 005067 176100          CLR     @TRACK
396 002750 042767 000200 176064      BIC      @200,FLAG      ;CLEAR LOWER 16 BITS
397 002756 062716 000004          ADD     @4,(6)         ;CLEAR EXT. ADDR. BITS.
398 002762 016767 176076 176056      MOV     @SRDCT,@RDCT   ;INC STACK POINTER
399 002770 000457          BR
                                     ;EXIT

```

400									
401	002772	042767	177774	176122	EXTOME:	BIC	#177774,WORK1		;MASK EXT. TRACK BITS
402	003000	022767	000003	176114		CMF	#3,WORK1		;COMPARE FOR LAST TRACK
403	003006	001033				BNE	AKH		;NOT LAST TRACK EXIT
404	003010	017767	176010	176102		MOV	#DAF,WORK		
405	003016	042767	177743	176074		BIC	#177743,WORK		
406	003024	026767	176070	176044		CMF	WORK,DSKNOF		
407	003032	001021				BNE	AKH		
408	003034	017767	175762	176056		MOV	#DAR,WORK		;FETCH LOWER 16 BITS OF ADDRESS
409	003042	066767	176000	176050		ADD	WRDCT,WORK		;WILL DISK OVERFLOW
410	003050	103012				BCC	AKH		
411	003052	052767	000200	175762		BIS	#200,FLAG		
412	003060	017767	175736	175760		MOV	#DAR,WRDCT		;DISK WILL OVERFLOW
413	003066	005167	175754			COM	WRDCT		;SET UP NEW WORD COUNT
414	003072	005267	175750			INC	WRDCT		;
415	003076	017767	175722	175744	AKH:	MOV	#DAE,TRACK		
416	003104	042767	177740	175736		BIC	#177740,TRACK		;MASK TRACK BITS
417	003112	017767	175704	175732		MOV	#DAR,DMA		;LOWER 16 BITS OF ADDRESS
418	003120	032767	000100	175714		BIT	#BIT6,FLAG		
419	003126	001001				BNE	..+4		
420	003130	000207			EXTDR:	RTS	#7		;EXIT
421	003132	004567	001062		EPADR:	JSP	#5,CONV		;CONVERT DMA REG COUNT TO ASCII
422	003136	001052				DMA			
423	003140	005033				MES1			
424	003142	000006				6			
425	003144	004567	001050			JSP	#5,CONV		;CONVERT TRACK REG COUNT TO ASCII
426	003150	001050				TRACK			
427	003152	005047				MES1A			
428	003154	000002				2			
429	003156	104000				EMT	+0		;REPORT ERROR
430	003160	005004				HED4			
431	003162	005047				MES1A			
432	003164	005033				MES1			
433	003166	177777				-1			
434	003170	005067	175656			CLK	DMA		;DISK ADDRESS ERROR RE-START PROG.
435	003174	005067	175650			CLP	TRACK		
436	003200	000000				HALT			

```

437
438
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440
441 ;ROUTINE TO FILL BUFFERS WITH RANDOM DATA
442
443
444
445 ;ENTER FROM JSR R7,RANEX
446
447 RANEX:
448 003202 016767 175640 175710      MOV      WRDCT,WORK      ;SET UP WORK
449 003210 012705 001112              MOV      OUTHUF,R5      ;LOC. OF OUTBUFFER
450
451
452
453 ;RANDOM DATA GENERATOR SUBROUTINE
454 003214 016700 000120 DAYGEN: MOV      LONUM,R0      ;SET UP R0 WITH 5 DIGITS LOW
455 003220 016701 000116              MOV      HINUM,R1      ;SET UP R1 WITH 5 DIGITS HIGH
456 003224 012703 000007              MOV      R7,R3         ;SET UP SHIFT COUNT
457 003230 005002                  CLR      R2            ;CLEAR R2
458 003232 006300 SHIFT: ASL     R0         ;SHIFT R0 LEFT AND
459 003234 006101                 ROL     R1            ;ROTATE CARRY INTO LSH OF R1 INTO
460 003236 006102                 ROL     R2            ;ROTATE CARRY OUT OF R1 INTO R2
461 003240 005303                 DEC     R3            ;DECREMENT R3
462 003242 001373                 BNE    SHIFT         ;CONTINUE SHIFT LOOP
463 003244 066700 000070 DAYGEN: ADD     LONUM,R0      ;ADDN IN NUMBER TO MAKE X 129
464 003250 005501                 ADC     R1            ;PROPOGATE CARRY
465 003252 066701 000064 DAYGEN: ADD     HINUM,R1      ;ADDN IN NUMBER TO MAKE X 129
466 003256 005502                 ADC     R2            ;PROPOGATE CARRY
467 003260 062700 001057 DAYGEN: ADD     R1057,R0      ;ADDN LOW CONSTANT
468 003264 005501                 ADC     R1            ;PROPOGATE CARRIES
469 003266 005502                 ADC     R2            ;PROPOGATE AGAIN
470 003270 062701 047401 DAYGEN: ADD     R47401,R1      ;ADDN HIGH CONSTANT
471 003274 005502                 ADC     R2            ;PROPOGATE CARRY
472 003276 062702 000006 DAYGEN: ADD     R6,R2         ;ADDN HIGHEST CONSTANT
473 003302 060200                 ADD     R2,R0         ;REPRIME R0 WITH HIGH DIGIT
474 003304 005501                 ADC     R1            ;PROPOGATE CARRY
475 003306 010067 000026 DAYGEN: MOV     R0,LONUM      ;PUT R0 BACK IN LONUM
  
```

```

476
477 003312 010025          MOV      00,(5)+      ;HOLD LONGM FOR PROGRAM
478 003314 005367 175600    DEC      WORK
479 003320 001406          BEQ      EXGEN
480 003322 010167 000014    MOV      01,HINUM    ;PUT P1 BACK IN HINUM
481 003326 010125          MOV      01,(5)+      ;HOLD HINUM FOR PROGRAM
482 003330 005367 175564    DEC      WORK
483 003334 001327          BNE      DAYGEN
484 003336 000207          EXGEN: RTS      07      ;RETURN TO PROGRAM
485 003340 000000          LONGM: 0
486 003342 000000          HINUM: 0
487
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495
496 003344 005067 175554    COMPARE: CLR      WORK2      ;WORD COUNT
497 003350 016767 175536 175512    MOV      OUTBUF,SAVE    ;SET UP OUTBUFFER POINTER
498 003356 016767 175532 175506    MOV      INBUF,SAV1     ;SET UP IN BUFFER POINTER
499 003364 027777 175500 175500    WRDCMP: CMP      @SAVE,@SAV1 ;COMPARE BUFFERS
500 003372 001016          BNE      WDERR         ;WORD IN ERROR
501 003374 005267 175524    WRDINC: INC      WORK2      ;+1 WORD COUNT
502 003400 026767 175442 175516    CMP      WRDCT,WORK2    ;IS COMPLETE BUFFER CHECKED
503 003406 001407          BEQ      ADAM         ;EXIT ROUTINE
504 003410 062767 000002 175452    ADD      02,SAVE
505 003416 062767 000002 175446    ADD      02,SAV1
506 003424 000757          BR      WRDCMP
507 003426 000205          ADAM:  RTS      05      ;COMPARE NEXT WORD
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525
526
527
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529
003430 052767 001000 175404    WDERR: BIS      @BIT9,FLAG ;SET ERROR BIT
003436 016767 175410 175454    MOV      DMA,WORK      ;FETCH STARTING DISK ADDR
003444 016767 175400 175450    MOV      TRACK,WORK1   ;
003452 066767 175446 175440    ADD      WORK2,WORK    ;CALCULATE FAILING ADDR
003460 103002          BCC      000         ;SHOULD DAE BE INCREMENTED
003462 005267 175434          INC      WORK1
003466 004567 000526          JSP      05,CONV      ;CONVERT WORD ADDR TO ASCII
003472 001120          WORK
003474 005033          MES1
003476 000006          6
003500 004567 000514          JSP      05,CONV      ;CONVERT TRACK ADDR TO ASCII
003504 001122          WORK1
003506 005047          MES1A
003510 000002          2
003512 017767 175352 175400    MOV      @SAVE,WORK    ;FETCH GOOD DATA
003520 004567 000474          JSP      05,CONV      ;CONVERT GOOD DATA TO ASCII
003524 001120          WORK
003526 005156          MES5
003530 000006          6
003532 017767 175334 175360    MOV      @SAV1,WORK    ;FETCH BAD DATA
003540 004567 000454          JSP      05,CONV      ;CONVERT TO ASCII

```

MAINDEC-11-DZPFCR-A RF11 MULTI DISK REPLACES D5AA
DZPFCR,RIC

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530 003544 001120
531 003546 005172
532 003550 000006

WORK
MFS6
6

```

533
534 003552 104000          EMT      +0          ;PRINT MESSAGE
535 003554 004722          HFD1
536 003556 005047          MES1A
537 003560 005033          MES1
538 003562 005156          MES5
539 003564 005172          MES6
540 003566 177777          -1
541 003570 000701          BP      WPDINC          ;GO COMPARE NEXT WORD
542
543
544
545
546
547
548
549
550 003572 012767 003722 174214 XWAIT:  MOV      @RTIX,14          ;SET UP TRACE TRAP
551 003600 005067 174212          CLP      16
552 003604 012737 003626 000010          MOV      @15,@010          ;SET ILLEGAL INST
553 003612 006727 000000          SXT      @0          ;TEST FOR 11/45
554 003616 012767 000006 000076          MOV      @6,PTIX          ;MAKE IT AN RTT
555 003624 000401          BR      28          ;SKIP JUNK
556 003626 022626          18:     CMP      (6)+,(6)+          ;CLEAR STACK
557 003630 012737 000012 000010          28:     MOV      @12,@010          ;RESET I/O
558 003636 005067 175232          CLP      PASS          ;SET UP TIME BASE
559 003642 052777 000020 175132          BIS      @BIT4,@PS          ;SET TRACE BIT
560 003650 005027 000000          CLP      @0
561 003654 005267 177772          XINCW:  INC      XINCW-2
562 003660 105767 177766          TSTB   XINCW-2
563 003664 100373          BPL     XINCW
564 003666 005267 175202          INC     PASS
565 003672 001401          BEQ     .+4
566 003674 000765          BR      XINCW-4
567
568 003676 042777 000020 175076          ;REPORT BACKGROUND TEST TIMED OUT
569 003704 005046          BIC     @BIT4,@PS          ;CLEAR TRACE BIT
570 003706 012746 003714          CLP     -(6)          ;CLEAR PS ON STACK
571 003712 000002          MOV     @15,-(6)          ;SET RETURN
572 003714 104001          RTI
573 003716 005243          18:     EMT+1          ;CLEAR TRACE BIT
574 003720 000000          TIMO
575 003722 000002          HALT
576
RTIX:  RTI
;

```



```

577
578
579
580
581
582 003724 017767 175056 175166 CNTLC: MOV @TKR,WORK ;FETCH KEYBOARD BUFFER
583 003732 042767 000200 175160 BIC @BIT7,WORK ;MASK FOR 33
584 003740 022767 000003 175152 CMP @3,WORK ;TEST FOR CNTLC
585 003746 001003 BNE .+10 ;NOT CNTLC EXIT
586 003750 052767 100000 175064 HIS @BIT15,FLAG ;SET FLAG BIT
587 003756 000002 RTI ;EXIT ROUTINE
588
589
590
591
592
593 003760 011600
594 003762 022740 104001
595 003766 001077
596 003770 000400
597
598 003772 011600
599 003774 062716 000002
600 004000 011000
601 004002 112067 000154
602 004006 122767 000100 000146
603 004014 001005
604 004016 005067 000140
605 004022 004767 000030
606 004026 000002
607 004030 122767 000045 000124
608 004036 001436
609 004040 122767 000042 000114
610 004046 001437
611 004050 004767 000002
612 004054 000752
613 004056 116777 000100 174720
614 004064 105777 174720
615 004070 100375
616 004072 122767 000015 000062
617 004100 001003
618 004102 012767 000011 000054
619 004110 005767 000050
620 004114 001406
621 004116 005367 000042
622 004122 112767 000000 000032
623 004130 000752
624 004132 000207
625 004134 112767 000015 000020
626 004142 004767 177710
627 004146 112767 000012 000006
628 004154 004767 177676
629 004160 000710
630 004162 000000
;
;
;TEST FOR CONTROL "C"
;UPON RECEIPT OF CNTLC SET FLAG BIT
;
CNTLC:
;ROUTINE TO DECODE EMT CALLS
;EMT+1=TYPE ONE LINE OF TEXT
;EMT+0=TYPE A SERIES OF LINES
EMTRP:
;SUBROUTINE TO OUTPUT ASCII MESSAGE ON TELETYPE PRINTER.
TYP:
;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS
;SET UP EXIT.
;ADDRESS OF MESSAGE TO PR.
TYPA:
;GET CHARACTER
;CHECK FOR "0" CHARACTER
;BRANCH IF NOT "0".
;OUTPUT NULL TO
;CLEAR BUFFER
;TERMINATOR CHAR. DONE. EXIT.
TYPB:
;CHECK FOR "8".
;BRANCH IF "8".
;NOT "8". CHECK FOR "0".
;BRANCH IF "0"
;TYPE CHAR IN TYPDAT
;OUTPUT CHARACTER TO PRINTER
;WAIT FOR DONE FLAG.
;CHECK FOR CR
;NO SKIP
;SET NULL COUNTER
;TEST COUNTER
;ZERO-EXIT
;DECREMENT
;ZERO OUTPUT
;OUTPUT NULL
;EXIT
;MOVE CARRIAGE RETURN CODE TO TYPDAT
;GO TYPE CHAR.
;MOVE LF CODE TO TYPDAT.
;GO TYPE CHAR.
TYPDAT: 0

```

631	004164	000000		NULL:	0	
632				;SUBROUTINE TO OUTPUT A SERIES OF ASCII MESSAGES ON TELETYPE PRINTER		
633	004166	011600		TYPS:	MOV	006,00
634	004170	062716	000002		ADD	02,006
635	004174	011067	000014		MOV	000,TYPSB
636	004200	022767	177777	000006	CMP	0-1,TYPSB
637	004206	001001			BNE	TYPSA
638	004210	000002			RTI	

;GET ADDRESS THAT CONTAINS MESSAGE ADDRESS
;UPDATE TO NEXT MESSAGE ADDRESS
;ADDRESS OF MESSAGE TO TYPSB
;CHECK FOR TERMINATOR
;BRANCH IF NOT TERMINATOR.
;TERMINATOR, EXIT

```

639
640 004212 104001          TYP5A:  EMT      +1          ;CALL ON TYP SUB TO TYPE MESSAGE
641 004214 000000          TYP5B:  0          ;ADDRESS OF MESSAGE GOES HERE
642 004216 000763          BP      TYP5          ;GO PROCESS NEXT MESSAGE
643          ;
644          ;
645          ;
646          ;
647          ;OCTAL TO ASCII CONVERT ROUTINE
648          ;
649          ;ENTER ROUTINE AS FOLLOWS
650          ;JSP%5,CONV
651          ;ADDR%ADDRESS OF NUMBER TO BE CONVERTED
652          ;ADDR BYTE=LSB OF WHERE ASCII IS GOING
653          ;ASCII%THE NUMBER OF ASCII CHAR. TO BE CONVERTED
654          ;
655          ;
656 004220 013567 000306    CONV:  MOV      0(5)+,ACNVX      ;VALUE OF % TO BE CONVERTED
657 004224 012501          MOV      (5)+,%1          ;ASCII ADDR
658 004226 012502          MOV      (5)+,%2          ;% OF ASCII CHAR
659 004230 060201          ADD      %2,%1
660 004232 016703 000274    ACVN:  MOV      ACNVX,%3
661 004236 042703 177770    BIC      %177770,%3      ;ISOLATE LEAST SIGNIFICANT OCTAL%
662 004242 062703 000060    ADD      %60,%3          ;SET UP ASCII%
663 004246 110341          MOVB     %3,-(1)         ;STORE ASCII CHAR
664 004250 042767 000007 000254  BIC      %7,ACNVX
665 004256 006067 000250    ROR      ACNVX          ;ROTATE OCTAL%
666 004262 006067 000244    ROR      ACNVX
667 004266 006067 000240    ROR      ACNVX
668 004272 005302          DEC      %2              ;-1 FROM ASCII CHAR COUNT
669 004274 001356          BNE      ACVN
670 004276 000205          RTS      %5              ;EXIT % CONVERTED
671          ;ROUTINE TO SET ACTION ENABLE ON MA/MF PARITY MEMORIES
672          ;CALL   JSR P, MAMF
673          172100          PARCSR=172100
674          000114          PARVEC=114
675          000004          ERRVEC=4
676          000006          SP=%6
677
678 004300 012737 004372 000114  MAMF:  MOV      %PARSRV,%PARVEC      ;SET PARITY INTERRUPT VECTOR
679 004306 012737 000340 000116  MOV      %340,%PARVEC+2 ;AND PRIORITY LEVEL 1 ON INTERRUPT
680 004314 013746 000004          MOV      %ERRVEC,-(SP) ;SAVE CURRENT ERROR VECTOR
681 004320 013746 000006          MOV      %ERRVEC+2,-(SP) ;AND PRIORITY LEVEL
682 004324 012737 000006 000004  MOV      %ERRVEC+2,%ERRVEC
683 004332 012737 000002 000006  MOV      %PI,%ERRVEC+2
684 004340 012700 172100          MOV      %PARCSR,%0      ;GET FIRST CSR ADDRESS
685 004344 012702 000001          MOV      %1,%2
686 004350 012720 000001  IS:   MOV      %1,(0)+      ;SET ACTION ENABLE IF AVAILABLE
687 004354 006302          ASL      %2              ;SHIFT AVAILABILITY INDICATOR
688 004356 103374          RCC      18
689 004360 012637 000006          MOV      (SP)+,%ERRVEC+2 ;RESTORE ERROR VECTOR
690 004364 012637 000004          MOV      (SP)+,%ERRVEC ;PRIORITY LEVEL AND INTERRUPT VECTOR
691 004370 000207          RTS      %7
692          ;PARITY ERROR SERVICE ROUTINE

```

```

693 ; WHEN A PARITY ERROR IS DETECTED THE ROUTINE SCANS
694 ; MEMORY FOR THE PARITY ERROR. WHEN THE ERROR
695 ; IS DETECTED THE PROGRAM HALTS WITH THE ADDRESS
696 ; CAUSING THE ERROR IN R2
697 ; TO CONTINUE PRESS CONTINUE
698 004372 104001 PARSRV: EMT+1
699 004374 005303 PAPERK
700 004376 012737 004422 000114 MOV #25, R#PARVEC ; REPOSITION PARITY ERROR INT
701 004404 012737 004450 000004 MOV #45, R#ERRVEC ; SET TIME OUT TRAP
702 004412 005037 000006 CLR #ERRVEC+2
703 004416 005720 1S: TST (R) ; SCAN MEMORY
704 004420 000776 BF 1S
705 004422 000000 2S: HALT ; PARITY ERROR = ADDRESS
706 ; CAUSING ERROR IS IN REGISTER R
707
708 004424 000005 3S: RESET
709 004426 012737 004372 000114 MOV #PARSRV, R#PARVEC ; RESTORE PARITY VECTOR
710 004434 012737 000006 000004 MOV #ERRVEC+2, R#ERRVEC ; RESTORE TIME OUT HALT
711 004442 004767 177632 JSP #7, R#R
712 004446 000002 RTI
713 004450 000000 4S: HALT ; ERROR = PARITY ERROR NOT DETECTED ON SCAN
714 004452 000764 BF 3S ; R (SP) CONTAINS PC WHERE
715 ; PARITY ERROR WAS ORIGINALLY DETECTED
716 ;
717 ; POWER DOWN ROUTINE
718 ; ABORT DISK AND HALT
719
720 004454 052777 000400 174332 DOWN: BIS #BIT8, #DCS ; ABORT DISK
721 004462 012767 004472 173334 MOV #UP, 24
722 004470 000000 HALT
723 ;
724 004472 012767 004454 173324 UP: MOV #DOWN, 24
725 004500 012706 001000 MOV #1000, #6
726 004504 012767 177324 174406 MOV #300, #WORK
727 004512 000005 TIMEOUT: RESET
728 004514 005267 174400 INC #WORK ; TIMEOUT
729 004520 001374 BNE TIMEOUT
730 004522 104001 EMT+1 ; PRINTOUT
731 004524 005330 PR#F
732 004526 000167 174374 JMP START
733 004532 000000 ACRVX: 0 ; WORK REGISTER
734 ;
735 ;
736 ;
737 ;
738 ;
739 ; THIS ROUTINE ENABLES THE OPERATOR TO SELECT A TRACK STATICLY
740 ; THE ROUTINE DOES A ONE WORD READ TO SELECT THE TRACK
741 ; THE OPERATOR MAY CHANGE THE SWITCH REGISTER AT ANY TIME
742 ; SWR6=0 EQUALS THE TRACK NUMBER
743 ; SWR9=7 EQUALS THE DISK NUMBER
744 ;
745 004534 052777 000400 174252 STAMP: BIS #BIT8, #DCS
746 004542 017767 174232 174352 MOV #SWR, #WORK1 ; FETCH SWR

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747	004550	016767	174346	174347	MOV	WORK1,WORK	
748	004556	042767	176000	174334	BIC	#170000,WORK	;MASK DISK AND TRACK NO.
749	004564	006067	174330		ROP	WORK	
750	004570	006067	174324		ROP	WORK	
751	004574	006067	174320		ROP	WORK	
752	004600	006067	174314		ROP	WORK	
753	004604	006067	174310		ROP	WORK	
754	004610	016777	174304	174206	MOV	WORK,#DAE	;DISK EXT. ADDR. REG. LOADED
755	004616	017767	174156	174274	MOV	#SWR,WORK	
756	004624	000367	174270		SWAB	WORK	
757	004630	006167	174264		ROL	WORK	
758	004634	006167	174260		ROL	WORK	
759	004640	006167	174254		ROL	WORK	
760	004644	042767	003777	174246	BIC	#3777,WORK	
761	004652	016777	174242	174142	MOV	WORK,#DAR	;DISK ADDRESS REG LOADED
762	004660	012777	001114	174132	MOV	#INBUF,#CMA	;LOAD CURRENT ADDRESS
763	004666	012777	177777	174122	MOV	#177777,#WC	;LOAD WORD COUNT
764	004674	052777	000005	174112	BIS	#5,#DCS	;GO AND READ
765	004702	105777	174106		CTBUSY: TSTB	#DCS	;TEST FOR CONTROL READY
766	004706	100375			BPL	CTBUSY	;WAIT FOR CONTROL READY
767	004710	026777	174206	174062	SRCHG: CMP	WORK1,#SWR	
768	004716	001306			BNE	STAMP	;SWR HAS CHANGED
769	004720	000773			BR	SRCHG	;SWR HAS NOT CHANGED
770							
771							
772							
773							
774							
775							
776							
777							
778							
779							
780							
781							
782							
783							
784							
785	004722	042045	052101	020101	HED1: .EVEN		
	004730	051105	047522	020122	.ASCII	/DATA ERROR #/	
	004736	100					
786							
787							
788	004737	045	052123	052101	HED2: .ASCII	/STATUS ERROR #/	
	004744	051525	042440	051122			
	004752	051117	040040				
789							
790							
791	004756	047445	042526	043122	HED3: .ASCII	/OVERFLOW X-FER ERROR #/	
	004764	047514	054040	043055			
	004772	051105	042440	051122			
	005000	051117	040040				
792							
793	005004	042045	051511	020113	HED4: .ASCII	/DISK ADDRESS ERROR #/	

	005012	042101	051104	051505	
	005020	020123	051105	047522	
	005026	020127	100		
794					;
795					;
796	005031	045	100		HED5A: .ASCII /R0/
797					;
798					;
799					;
800					;
801					;
802					;MESSAGE TRAILERS
803					;
804					;
805	005033	040	020040	020040	MES1: .ASCII / DAE #/
	005040	020040	040504	020122	
	005046	100			
806					;
807					;
808					;
809	005047	040	020040	040504	MES1A: .ASCII / DAE #/
	005054	020105	100		
810					;
811					;
812					;
813	005057	040	020040	020040	MES2: .ASCII / DCS #/
	005064	020040	041504	020123	
	005072	100			
814					;
815	005073	040	020040	020040	MES2A: .ASCII / HARD ERROR#/
	005100	020040	040510	042122	
	005106	042440	051122	051117	
	005114	100			
816					;
817					;
818	005115	040	020040	020040	MES3: .ASCII / WORD COUNT#/
	005122	047527	042122	041440	
	005130	052517	052116	100	
819					;
820					;
821					;
822	005135	040	020040	020040	MES4: .ASCII / WORD ADR.#/
	005142	020040	047527	042122	
	005150	040440	051104	040056	
823					;
824					;
825					;
826	005156	043411	047517	020104	MES5: .ASCII / GOOD DATA #/
	005164	040504	040524	040040	
827					;
828					;
829					;
830	005172	020040	020040	020040	MES6: .ASCII / BAD DATA #/
	005200	041040	042101	042040	

MAINDEC-11-DZRFCA-A RE11 MULTI DISK REPLACES DSAA
DZRFCA.BIC

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005206 052101 020101 100

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R31
R32
R33
R34 005213 040 020040 054105 MES11: .ASCII / EXISTENT DISK(S).#/
    005220 051511 042524 052116
    005226 042040 051511 024113
    005234 024523 040056
R35
R36
R37 005240 020040 100 MES12: .ASCII / #/
R38
R39
R40 005243 045 051120 041517 TIMO: .ASCII /%PROCESSOR BACKGROUND TIMED OUT%/
    005250 051505 047523 020122
    005256 040502 045503 051107
    005264 052517 042116 052040
    005272 046511 042105 047440
    005300 052125 100
R41
R42 005303 045 042515 047515 PARERR: .ASCII /%MEMORY PARITY ERROR%/
    005310 054522 050040 051101
    005316 052111 020131 051105
    005324 047522 040122
R43
R44 005330 050045 053517 051105 PRWF: .ASCII /%POWER HAS FAILED%/
    005336 044040 051501 043040
    005344 044501 042514 040104
R45
R46 005352 042445 042116 100 END: .ASCII /%END%/
R47 005360 .FVEN
R48 000000 BUFFER: 0
R49 000001 .END
```


ACNVX	004532	ACVN	004232	ADAV	003426	ADS	001032
AKH	003076	BIT0	= 000001	BIT1	= 000002	BIT10	= 002000
BIT11	= 004000	BIT12	= 010000	BIT13	= 020000	BIT14	= 040000
BIT15	= 100000	BIT2	= 000004	BIT3	= 000010	BIT4	= 000020
BIT5	= 000040	BIT6	= 000100	BIT7	= 000200	BIT8	= 000400
BIT9	= 001000	HUF	001056	BUFFER	005362	CMA	001020
CMDAE	002700	CNTLC	003724	COMDAP	002662	COMPAR	003344
CONV	004220	CTBUSY	004702	DAE	001024	DAP	001022
DATAT	001724	DAYGEN	003214	DBR	001026	DCS	001014
DFLMES	002452	DISBUF	002646	DISK	002322	DKINT	002374
DMA	001052	DOWN	004454	DSKNOR	001076	EMTPP	003760
END	005352	ERADR	003132	ERCOUN	001066	ERRVEC	= 000004
EXGEN	003336	EXREF	001352	EXTCME	002772	EXTDR	003130
EXTMEM	001272	FLAG	001042	GOTMEM	001440	HEDI	004722
HED2	004737	HED3	004756	HED4	005004	HEDSA	005031
HIGH	001102	HINUM	003342	HRDR	001100	INBUF	001114
INDSK	001444	INTEXT	002640	LDAT	001772	LGMEM	001376
LIMIT	001104	LOGICA	002302	LONUM	003340	LXIT	002312
MA	001030	MAMF	004300	MAXREF	001406	MES1	005033
MES1A	005047	MES11	005213	MES12	005240	MES2	005057
MES2A	005073	MES3	005115	MES4	005135	MES5	005156
MES6	005172	NEDST	001502	NULL	004164	OUTBUF	001112
OVERFL	001630	PARCSR	= 172100	PAPERH	005303	PARSRV	004372
PARVEC	= 000114	PASS	001074	PATNU	001054	PC	= 000007
PRIORI	001040	PRWF	005330	PS	001002	PANEX	003202
RANNU	001044	RANPD	002104	PDSAV	001750	READ	= 104405
RESTOP	002316	RTIX	003722	R0	= 0000000	R1	= 0000001
R2	= 0000002	R3	= 0000003	R4	= 0000004	R5	= 0000005
SAVBUF	001116	SAVE	001070	SAV1	001072	SEIBUF	001604
SHIFT	003232	SOFTER	002622	SP	= 0000006	SPCHG	004710
STAMP	004534	STAPT	001126	STATUS	001036	STOPBU	002252
SWP	001000	SWRDCT	001064	TDMA	001062	TDKNO	001110
TIMEOU	004512	TIMO	005243	TKB	001006	TKS	001012
TPB	001004	TPS	001010	TRACK	001050	TTRACK	001106
TWRDCT	001060	TYEXIT	004132	TYP	003772	TYPA	004002
TYPC	004030	TYPD	004056	TYPDAT	004162	TYPF	004134
TYPG	004146	TYPS	004166	TYPSA	004212	TYPSB	004214
UP	004472	VECTOR	001034	WC	001016	WDERR	003430
WORK	001120	WORK1	001122	WORK2	001124	WRCHEC	= 104407
WRDAT	002050	WRDCMP	003364	WRDCT	001046	WRDINC	003374
WRITE	= 104403	WRSVA	002170	XINCA	003654	XWAIT	003572
.	= 005362						

ERRORS DETECTED: 0

*,DZRFCA/N=DZRFCA.RIC
 RUN-TIME: 3 6 0 SECONDS
 CORE USED: 4K