

IDENTIFICATION

PRODUCT CODE: MAINDEC-08-DIGD-D
PRODUCT NAME: PDP-8, 81, 8S EXTENDED MEMORY CONTROL
DATE CREATED: JULY 27, 1970
MAINTAINER: DIAGNOSTIC PROGRAMMING GROUP
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M. C. N. REQUIRED
THIS PROGRAM REQUIRES MCN(S)
IN ORDER TO WORK PROPERLY

1. ABSTRACT

THIS PROGRAM TESTS THE EXTENDED MEMORY CONTROL LOGIC FOR PROPER OPERATION; IT MAY BE USED WITH A PDP-8, 81, OR 8S EQUIPPED WITH A MINIMUM OF 4K OF EXTENDED MEMORY. THE PROGRAM EXERCISES AND TESTS THE CONTROL IOT'S; THE ABILITY TO REFERENCE ALL FIELDS FROM 0; PROGRAM INTERRUPT AND INTERRUPT INHIBIT; AUTO-INDEXING IN EACH FIELD, AND A SPECIAL TEST FOR THE PDP-81 WHICH TESTS THE PRESENCE OF A FALSE MEMORY PULSE WHEN A NON-EXISTENT MEMORY FIELD IS REFERENCED.

ERRORS ENCOUNTERED DURING RUNNING WILL RESULT IN A PROGRAM HALT. THE HALT LOCATIONS ARE LABELED, AND THE ERROR MAY BE IDENTIFIED BY REFERENCING THE PROGRAM LISTING OR TABLE OF ERROR HALTS.

2. REQUIREMENTS

2.1 EQUIPMENT

A STANDARD PDP-8, 81 OR 8S EQUIPPED WITH AN EXTENDED MEMORY CONTROL, AND AT LEAST 4K OF EXTENDED MEMORY.

2.2 STORAGE

THE PROGRAM REQUIRES 2400(8) LOCATIONS OF CORE MEMORY. THE PROGRAM MUST RESIDE IN MEMORY FIELD 0 ONLY.

2.3 PRELIMINARY PROGRAMS

ALL PROGRAMS FOR A BASIC PDP-8, 81 OR 8S MUST HAVE BEEN PREVIOUSLY RUN SUCCESSFULLY.

3. LOADING PROCEDURE

3.1 METHOD

THE PROGRAM IS LOADED WITH THE BINARY LOADER.

4. STARTING PROCEDURE

4.1 STARTING ADDRESSES

THE STARTING ADDRESS IS 0200(8).

4.2 CONTROL SWITCH SETTINGS

SR 8 MUST BE ON A 1 IF A PDP-8I IS BEING USED. OTHERWISE, ON A 0 FOR A PDP-8 OR 8S. SR 9, 10 AND 11 MUST CONTAIN AN OCTAL VALUE EQUAL TO THE NUMBER OF EXTENDED MEMORY FIELDS AVAILABLE (1 TO 7 OCTAL). NOTE THAT FIELD 0 IS NOT TO BE INCLUDED IN THIS VALUE.

4.3 OPERATOR ACTION

WITH THE PROGRAM IN MEMORY, SET THE SWITCH REGISTER TO 0200 OCTAL. PRESS LOAD ADDRESS.

SET SR 8 TO A 1 IF A PDP-8I IS BEING USED. OTHERWISE, SET SR 8 TO A 0.

PLACE THE OCTAL NUMBER OF EXTENDED MEMORY FIELDS AVAILABLE IN SR 9, 10 AND 11. THIS VALUE MAY VARY FROM 1 TO 7 ONLY.

PRESS START.

THE PROGRAM WILL RUN UNTIL AN ERROR IS DETECTED, OR STOPPED BY THE OPERATOR. THE TTY BELL IS RUNG ONCE AFTER ONE COMPLETE PASS OF THE PROGRAM.

5. OPERATING PROCEDURE

SEE SECTION 4.2

5.1 SUBROUTINE ABSTRACTS

REFER TO THE PROGRAM LISTING FOR DESCRIPTIONS OF EACH TEST, AND THE METHOD OF TESTING.

5.2 OPERATOR ACTION

SEE SECTION 4.3

6. ERRORS

6.1 ERROR HALTS AND DESCRIPTIONS

TABLE OF ERROR HALTS

C (MA)	TAG	DESCRIPTIONS
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CDF AND RDF TESTS

206	E1	CDF 0 OR RDF FAILED.
217	E2	CDF 7 OR RDF FAILED.
234	E3	CDF 1 OR RDF FAILED.
245	E4	CDF 2 OR RDF FAILED.
262	E5	CDF 3 OR RDF FAILED.
273	E6	CDF 4 OR RDF FAILED.
310	E7	CDF 5 OR RDF FAILED.
321	E8	CDF 6 OR RDF FAILED.

DF, IB AND SR TESTS

341	E9	RIB OR ION FAILED.
351	E10	DF NOT CLEARED, OR NO INTERRUPT.
360	E11	RIB OR SF FAILED. (DF 1)
410	E12	DF NOT CLEARED, OR NO INTERRUPT.
417	E13	RIB OR SF FAILED. (DF 2)
427	E14	DF NOT CLEARED, OR NO INTERRUPT.
436	E15	RIB OR SF FAILED. (DF 3)
452	E16	DF NOT CLEARED, OR NO INTERRUPT.
461	E17	RIM OR SF FAILED. (DF 4)
471	E18	DF NOT CLEARED, OR NO INTERRUPT.
500	E19	RIB OR SF FAILED. (DF 5)
514	E20	DF NOT CLEARED, OR NO INTERRUPT.
523	E21	RIB OR SF FAILED. (DF 6)
533	E22	DF NOT CLEARED, OR NO INTERRUPT.
542	E23	RIB OR SF FAILED. (DF 7)

DCA I AND TAD I TESTS

653	E24	DCA I OR TAD I TO AN EXTENDED FIELD FAILED; THE DF INDICATORS EQUAL THE CURRENT FIELD UNDER TEST. THE AC CONTAINS THE DATA AS READ FROM LOCATION 7000 OF THE EXTENDED FIELD. THE HALT OCCURRED DUE TO THE DATA READ AND THE CURRENT DATA FIELD NOT BEING EQUAL. EACH EXTENDED FIELD SHOULD CONTAIN ITS FIELD NUMBER IN LOCATION 7000.
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C (MA)	TAG	DESCRIPTION
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1132	E40	CIF OR INTERRUPT FAILED, THE DF AND IF SHOULD EQUAL AN EXTENDED FIELD, THE DF WAS NOT CLEARED AFTER THE INTERRUPT, ALL OTHER FUNCTIONS WORKED PROPERLY, RMF OR SF FAILED, THE SF REGISTER SHOULD HAVE SAVED, THE EXTENDED FIELD NUMBER AFTER INTERRUPT, THE AC=C (I.B.) AFTER AN RMF?
1203	E41	ALL FUNCTIONS WORKED, BUT THE PC DID NOT EQUAL LOCATION E40+1 AFTER THE INTERRUPT IN THE EXTENDED FIELD FAILED, THE AC=CONTENTS OF LOCATION 0, FIELD 0,
1235	E43	LOCATION 4 IN THE EXTENDED FIELD, THE INTERRUPT WENT TO THIS FIELD INSTEAD OF FIELD 0, OR THE JMP 12 AT LOCATION 7777 WAS ENABLED IN LOCATION E40 IN THE EXTENDED FIELD,
4	E44	LOCATION 10 IN THE EXTENDED FIELD, THE JMP 12 AT LOCATION 7777 WAS NOT EXECUTED, OR INTERRUPT FAILED.
10	E45	
1420	E45A	NO PROGRAM INTERRUPT OCCURRED, PRESS CONTINUE TO TRY AGAIN, MEMORY FIELD 1 HALT, AN INTERRUPT IN FIELD 0 WAS FOLLOWED BY A CIF 10 IOT, AND THEN AN RMF, THE RMF SHOULD HAVE RESTORED THE IB TO FIELD 0, THE SF AND IB WERE OR'D TOGETHER RESULTING IN THE IF BEING SET TO FIELD 1, AFTER THE JMP INSTRUCTION AT LOCATION 1430, RESTART FROM 1400 TO REPEAT THE TEST.
7000	"	

(6.1 CONT'D.)

CIF TESTS (JMP AND JMS ENABLING)

PROGRAM INTERRUPT IS ENABLED FOR THESE TESTS. A CIF IS ISSUED FOLLOWED BY AN ION AND A JMP OR JMS. AN INTERRUPT SHOULD OCCUR AFTER THE JMP OR JMS AND CONTROL TRANSFERRED TO FIELD 0. THE SAVE FIELD SHOULD CONTAIN THE FIELD COMMANDED BY THE CIF. A HLT IS PLACED IN LOCATION 1 OF EACH EXTENDED FIELD IN CASE THE IF IS NOT CLEARED AT THE TIME OF THE INTERRUPT.

C (MA)	TAG	DESCRIPTION
727	E25	NO INTERRUPT OR INTERRUPT INHIBIT FAILED.
741	E26	I.B. TO I.F. TRANSFER FAILED AFTER CIF=JMP; FAILING I.F. IN AC6=8, GOOD I.F. IN AC9=11.
1024	E27	NO INTERRUPT OR INTERRUPT INHIBIT FAILED.
1036	E30	I.B. TO I.F. TRANSFER FAILED AFTER CIF=JMS; FAILING I.F. IN AC6=8, GOOD I.F. IN AC9=11.
724	E31	I.F. CHANGED AFTER CIF BUT BEFORE JMP, HALT IS IN EXTENDED FIELD.
1020	E32	I.F. CHANGED AFTER CIF BUT BEFORE JMS, HALT IS IN EXTENDED FIELD.

INTERRUPT INHIBIT TEST

A SUBROUTINE IS PLACED IN EACH EXTENDED FIELD TO INSURE THAT PROGRAM INTERRUPT IS INHIBITED AFTER A CIF IOT, AND IS ENABLED AFTER A JMP INSTRUCTION. THE ROUTINE IS IN ONE FIELD AT A TIME! THE CONTENTS OF ALL OTHER EXTENDED FIELDS WILL EQUAL 0000. THE ROUTINE IS DESCRIBED ON THE PROGRAM LISTING AS THE "EXTENDED FIELD TEST ROUTINE", AND IS TAGGED EXFLD.

THE TEST ROUTINE IS ENTERED AT LOCATION E40-1 IN THE EXTENDED FIELD. THIS LOCATION CONTAINS A CIF XX IOT, WHERE XX EQUALS THE EXTENDED FIELD NUMBER. LOCATION E40 CONTAINS AN ION IOT. LOCATIONS E40+1 THROUGH 7776 CONTAIN ALL 0'S. LOCATION 7777 CONTAINS A JMP I 12. THE ROUTINE, THEREFORE, ISSUES A CIF, ION, AND JMP I 12 SEQUENCE. PROGRAM INTERRUPT SHOULD BE INHIBITED UNTIL AFTER THE JMP I 12 AT LOCATION 7777. AN ERROR HALT OCCURS IN FIELD 0 IF AN INTERRUPT OCCURS BETWEEN LOCATIONS E40+1 AND 7777. LOCATION 12 CONTAINS THE LOCATION OF E40 AND WILL AUTO-INDEX TO E40+1.

AUTO-INDEX TEST

THE SUBROUTINE LABELED "AUTO-INDEX TEST" ON THE LISTING IS PLACED IN EACH EXTENDED FIELD, AUTO-INDEX REGISTERS 10 THROUGH 17 IN EACH FIELD ARE TESTED, ALL OF MEMORY NOT OCCUPIED BY THE SUB-ROUTINE IS SET TO 0, THE ERROR HALTS TAGGED E46 THROUGH E53 WILL OCCUR IN THE EXTENDED FIELD IF AN AUTO-INDEX REGISTER FAILS, THE DF AND IF INDICATORS WILL DISPLAY THE CURRENT FIELD BEING TESTED.

C (MA)	TAG	DESCRIPTION
1523	E46	INDEX REGISTER 10 FAILED.
1526	E47	INDEX REGISTER 11 FAILED.
1531	E48	INDEX REGISTER 12 FAILED.
1534	E49	INDEX REGISTER 13 FAILED.
1537	E50	INDEX REGISTER 14 FAILED.
1542	E51	INDEX REGISTER 15 FAILED.
1545	E52	INDEX REGISTER 16 FAILED.
1550	E53	INDEX REGISTER 17 FAILED.

DYNAMIC RMF TEST

THIS TEST IS PERFORMED UNCONDITIONALLY JUST PRIOR TO THE NON-EXISTENT MEMORY TEST, IT CHECKS ALL SAVE FIELD TO DATA FIELD REGISTER TRANSFERS AND THOSE SAVE FIELD TO INSTRUCTION BUFFER REGISTER TRANSFERS AS APPLICABLE TO THE NUMBER OF EXTENDED FIELDS PRESENT.

THE GENERAL METHOD IS TO INTERRUPT FROM EACH EXTENDED FIELD WITH THE DF SET FROM 0 THROUGH 7, AN RMF INSTRUCTION IS THEN ISSUED AND CONTROL IS TRANSFERRED TO AN EXTENDED FIELD, THE "RMFDY" ROUTINE IN THAT FIELD THEN CHECKS THAT THE RESTORED IF AND DF ARE CORRECT. IF NOT, THE PROGRAM HALTS WITH THE FAILING IF OR DF IN THE IF OR DF REGISTER, AND THE CORRECT FIELD NUMBER IN AC BITS 6 THROUGH 8.

1706	E60	NO INTERRUPT OCCURRED,
1716	E61	SF TO DF TRANSFER FAILED AFTER RMF, BAD DF IN DF REGISTER) CORRECT DF IN AC6=8.
1725	E62	SF TO IB TRANSFER FAILED AFTER RMF, BAD IF IN IF REGISTER) CORRECT IF IN AC6=8.

NON-EXISTENT MEMORY TEST

THIS IS THE LAST TEST PERFORMED, AND IS INCLUDED FOR PDP-81'S ONLY. THE TEST MAKES SURE THAT A FALSE MEMORY DONE PULSE IS GENERATED WHEN THE DF IS SET TO A NON-EXISTENT MEMORY FIELD. IF THE PDP-81 BEING USED IS EQUIPPED WITH THE MAXIMUM OF 32K OF CORE MEMORY, THE PROGRAM AUTOMATICALLY SKIPS THIS TEST AND RESTARTS AT LOCATION 200. SR 8 ON A 0 WILL CAUSE THE PROGRAM TO ALWAYS SKIP THIS TEST.

THE TEST ALSO MAKES CERTAIN THAT THE CORRECT DATA IS DEPOSITED IN THE AC WHEN A NON-EXISTENT FIELD IS REFERENCED. THIS DATA MUST ALWAYS EQUAL 0000 OR 7777 OCTAL, DEPENDING ON THE NUMBER OF EXTENDED FIELDS EXISTING, FOR EXAMPLE, IF THE PDP-81 IS EQUIPPED WITH FIELDS 0,1,2 AND 3, ANY REFERENCE WITH A TAD 1 TO FIELDS 4 THROUGH 7 SHOULD RESULT WITH 7777 OCTAL IN THE AC. IF EQUIPPED WITH FIELDS 0,1, AND 2, A TAD 1 TO FIELD 3 SHOULD RESULT WITH 0000 OCTAL IN THE AC, AND REFERENCING 4 THROUGH 7 WILL RESULT WITH 7777 OCTAL IN THE AC. IN OTHER WORDS, REFERENCING THE LOWEST ORDER NON-EXISTENT FIELD, WHEN THE TOTAL NUMBER AVAILABLE IS ODD, WILL RESULT WITH 0000 IN THE AC. REFERENCING ALL OTHER NON-EXISTENT FIELDS WILL RESULT WITH 7777 IN THE AC. WHEN THE TOTAL NUMBER AVAILABLE IS EVEN, REFERENCING ANY NON-EXISTENT FIELD WILL RESULT WITH 7777 IN THE AC.

THE ONLY LEGAL HALTS IN THIS TEST, ARE AT LOCATIONS 2300 AND 2325. IF THE COMPUTER HALTS AT ANY OTHER LOCATION, THE FALSE MEMORY DONE PULSE PROBABLY WAS NOT GENERATED.

THE FALSE MEMORY DONE PULSE IS NOT GENERATED WHEN A CIF TO A NON-EXISTENT FIELD IS ATTEMPTED.

C(MA)	TAG	DESCRIPTION
2300	E54	ALL 0'S SHOULD HAVE BEEN DEPOSITED IN THE AC, OR AN EXISTING FIELD WAS REFERENCED. MAKE SURE THE PROPER VALUE IS IN SR 9-11. THE NUMBER OF EXTENDED FIELDS AVAILABLE MUST BE IN SR 9-11.
2325	E57	ALL 1'S SHOULD HAVE BEEN DEPOSITED IN THE AC, OR AN EXISTING FIELD WAS REFERENCED. MAKE SURE THE PROPER VALUE IS IN SR 9-11.

6.2 ERROR RECOVERY

PRESS CONTINUE TO REPEAT THE FAILING TEST. PLACE A NOP IN THE ERROR HALT LOCATION TO LOOP ON A FAILING TEST. RESTART FROM 1400 AFTER A HALT AT 7000 IN FIELD 1.

7. RESTRICTIONS

7.1 STARTING RESTRICTIONS

NONE

7.2 OPERATING RESTRICTIONS

THE NUMBER OF EXTENDED MEMORY FIELDS AVAILABLE MUST BE IN
SR 9-11 BEFORE STARTING FROM LOCATION 200.

8. MISCELLANEOUS

8.1 EXECUTION TIME

RUNNING TIME IS DEPENDENT ON THE AMOUNT OF EXTENDED MEMORY FOR
TESTING, AND ON WHETHER THE PROCESSOR BEING USED IS A PDP-8,
OR 8S. THE TTY BELL WILL RING ONCE FOR EACH PASS OF THE PROGRAM.

9. PROGRAM DESCRIPTION

THE PROGRAM EXERCISES ALL IOT'S ASSOCIATED WITH THE EXTENDED MEMORY
CONTROL LOGIC, PLUS THE ABILITY TO REFERENCE EXTENDED FIELDS
FROM FIELD 0, AND VICE-VERSA. EACH TEST IS LOOPED 4096 TIMES
BEFORE INITIATING THE NEXT TEST. A SWITCH OPTION IS PROVIDED
TO SKIP OR EXECUTE A NON-EXISTENT MEMORY TEST FOR THE PDP-8I.

THE INDIVIDUAL TEST ROUTINES AND ERROR HALTS ARE COMMENTED
ON THE PROGRAM LISTING AS AN AID TO TROUBLE-SHOOTING. SECTION
6 CONTAINS A TABLE OF ERROR HALTS WHICH ALSO MAY BE REFERENCED.

10. LISTING

/PDP-8, 81, 8S EXTENDED MEMORY CONTROL TEST,
/COPYRIGHT 1969-1970, DIGITAL EQUIPMENT CORP., MAYNARD, MASS.
/PLACE NUMBER OF EXTENDED 4K FIELDS AVAILABLE IN SR9 TO 11: (UP TO 7)
/IF USING AN 81, PLACE SR8 ON A 1, OTHERWISE LEAVE 0.
/START PROGRAM AT 200

/CONSTANTS

6201 CDF=6201
6202 CIF=6202
6214 RDF=6214
6224 RIF=6224
6244 RMF=6244
6234 RIB=6234
*1

0001 JMP 1
0002
0003

*20

JMP10: JMP 1 0
ISE0: 100 0
XTPLG: TPLG
XSTKS: NSTKS
XRMF: TRMF
XTRANS: TRANS
XAUTO: TAUTO
LOOP: 0
NDF: 0 0
STKS: 0 0
DAT: 0 0
NOSTAK: 0
NOFLD: 0
KE40M: E40=1
KE40: E40
KHLT: HLT
KCDF: 6201
KCIF: 6202
XFD: EXPD
K1: 1
K7: 7
K10: 10
K7777: 7777
K7000: 7000
K7707: 7707
K7767: 7767
K7757: 7757
K7747: 7747
K7737: 7737
K7727: 7727
K7717: 7717

0020 3400
0021 2000
0022 2342
0023 2334
0024 1047
0025 1321
0026 1432
0027 0000
0030 0000
0031 0000
0032 0000
0033 0000
0034 0000
0035 1131
0036 1132
0037 7402
0040 6201
0041 6202
0042 1316
0043 0001
0044 0007
0045 0010
0046 7777
0047 7000
0050 7707
0051 7767
0052 7757
0053 7747
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0055 7727
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56	0057	7776	K7776,	7776
57	0060	7775	K7775,	7775
58	0061	7774	K7774,	7774
59	0062	7773	K7773,	7773
60	0063	7772	K7772,	7772
61	0064	7771	K7771,	7771
62	0065	7770	K7770,	7770
63	0066	0070	POINT,	.02

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0067	0070	K78,	001
0070	7766	K7766,	7766
0071	7755		7755
0072	7744	K7744,	7744
0073	7733		7733
0074	7722		7722
0075	7711		7711
0076	7700		7700
0077	1126	XTDF,	XTDF
0100	1127	XTDF1,	XTDF+1
0101	1302	KXFLD,	KXFLD
0102	5402	KJMP,	JMP I 2
0103	1200	KNTR,	ENTER
0104	0020	K20,	20
0105	5506	JMP2,	JMP I KFLD0
0106	1427	KFLD0,	RTRN
0107	1422	KRTN,	E49A*2
0110	1400	XFI0,	SF10

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85 /TEST CDF AND RDF
86 /
87 *200
88
89 /BEGIN, CLA LOOP /LOOP COUNTER
90 0200 7200
91 0201 3027
92
93 /DF0, CDF 00 /DF 0
94 0203 6214 RDF /SHOULD NOT SKIP
95 0204 7450 SNA DF7 /ERROR, CDF OR RDF FAILED
96 0205 5211 JMP DF7 /REPEAT
97 0206 7402 HLT
98 0207 7200 CLA
99 0210 5202 JMP DF0
100
101 /DF7, TAD K7707 /7707
102 0211 1050 CDF 70 /DF 7
103 0212 6271 RDF /AC 00
104 0213 6214 CHA /SHOULD NOT SKIP
105 0214 7040 SNA OK1 /CDF OR RDF FAILED
106 0215 7450 JMP OK1
107 0216 5222 HLT
108 0217 7402 CLA
109 0220 7200 JMP DF7
110 0221 5211
111
112 /OK1, ISB LOOP /CHECK DONE
113 0222 2027 JMP DF0
114 0223 5202
115
116 / /
117 CLA DGA LOOP /LOOP COUNTER
118 0224 7200
119 0225 3027
120
121 /DF1, TAD K7767 /7767
122 0226 1051 CDF 10 /DF 10
123 0227 6211 RDF /AC=0
124 0230 6214 CHA
125 0231 7040 SNA DF2 /CDF1 OR RDF FAILED
126 0232 7450 JMP DF2
127 0233 5237 HLT
128 0234 7402 CLA
129 0235 7200 JMP DF1
130 0236 5226
131
132 /DF2, TAD K7757 /7757
133 0237 1052 CDF 20 /DF2
134 0240 6221 RDF /AC=0
135 0241 6214 CHA
136 0242 7040 SNA OK2
137 0243 7450 JMP OK2
138 0244 5250

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133									
134	E4,	0245	7402	HLT					
135		0246	7200	CLA				/GDF 2 OR RDF FAILED	
136		0247	5237	JMP	DF2				
137									
138	/OK2,	0250	2027	ISE	LOOP			/DONE IF SKIP	
139		0251	5226	JMP	DF1				
140		0252	7200	CLA					
141		0253	3027	DCA	LOOP				
142									
143	/DF3,	0254	1053	TAD	K7747			/7747	
144		0255	6231	GDF	30			/DF 3	
145		0256	6214	RDF				/AC=0	
146		0257	7040	CMA					
147		0260	7450	SNA	DF4				
148		0261	5205	JMP	DF4				
149	E5,	0262	7402	HLT				/GDF 3 OR RDF FAILED	
150		0263	7200	CLA					
151		0264	5234	JMP	DF3				
152									
153	/DF4,	0265	1054	TAD	K7737			/7737	
154		0266	6241	GDF	40			/DF 4	
155		0267	6214	RDF				/AC=0	
156		0270	7040	CMA					
157		0271	7450	SNA	OK3				
158		0272	5276	JMP	OK3				
159	E6,	0273	7402	HLT				/GDF 4 OR RDF FAILED	
160		0274	7200	CLA					
161		0275	5265	JMP	DF4				
162									
163	/OK3,	0276	2027	ISE	LOOP			/DONE IF SKIP	
164		0277	5234	JMP	DF3				
165									
166		0300	7200	CLA					
167		0301	3027	DCA	LOOP				
168									
169	/DF5,	0302	1055	TAD	K7727			/7727	
170		0303	6251	GDF	50			/DFS	
171		0304	6214	RDF				/AC=0	
172		0305	7040	CMA					
173		0306	7450	SNA	DF6				
174		0307	5313	JMP	DF6				
175	E7,	0310	7402	HLT				/GDF 5 OR RDF FAILED.	
176		0311	7200	CLA					
177		0312	5302	JMP	DF5				
178									
179	/DF6,	0313	1056	TAD	K7717			/7717	
180		0314	6261	GDF	60			/DF 6	
181		0315	6214	RDF				/AC=0	
182		0316	7040	CMA					
183		0317	7450	SNA					
184		0320	5324	JMP	OK4				

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185 0321 7402      HLT
186 0322 7200      CLA
187 0323 5313      JMP DF6
188
189 0324 2027      /OK4, ISE LOOP /DONE WHEN SKIP
190 0325 5302      JMP DF5
191
192
193 /NOW TEST INTERRUPT BUFFER (IB) BITS 9-11 WITH
194 /RIB. PI IS ENABLED. TELEPRINTER FLAG IS
195 /USED FOR INTERRUPT.
196
197 0326 6201      /DF0
198 0327 1020      TAD JMP10 /JMP I0=JMP I 0
199 0330 3001      DCA I /C(1)=JMP I 0
200 0331 3027      DCA LOOP
201 0332 6041      TSP /TEST TTY FLAG
202 0333 4422      JMS I XTFLG /SET FLAG
203
204 0334 6001      /IB0, ION /ENABLE PI
205 0335 7200      CLA /READ SF
206 0336 6234      RIB
207 0337 7450      SNA JMP IB1
208 0340 5343      JMP IB1
209 0341 7402      HLT /RIB FAILED
210 0342 5334      JMP IB0
211
212 0343 6211      /IB1, CDF IB /DF 1
213 0344 6001      ION
214 0345 7200      CLA
215 0346 6214      RDF /DF SHOULD BE 0 AFTER A PI
216 0347 7450      SNA JMP I03
217 0350 5353      JMP I03
218 0351 7402      HLT /DF NOT CLEARED, OR NO PI
219 0352 5343      JMP IB0
220
221 0353 1057      /E10, TAD K7776
222 0354 6234      RIB /READ SF
223 0355 7040      CHA /AC00
224 0356 7450      SNA JMP OK5
225 0357 5362      JMP OK5
226 0360 7402      HLT /RIB OR SP FAILED
227 0361 5343      JMP IB1
228 0362 2027      /IB LOOP /DONE WHEN SKIP
229 0363 5334      JMP IB0
230 0364 5765      JMP I .+1
231 0365 0400      102-2

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231	0400	*400			
232	0400	7200	CLA		
233	0401	3027	DCA	LOOP	
234					
235					
236	0402	6221	ODF	20	/DF 2
237	0403	6001	ION		
238	0404	7200	CLA		
239	0405	6214	ODF		/SHOULD BE 0 AFTER PI
240	0406	7450	SNA	.+3	
241	0407	5212	JMP		
242	0410	7402	HLT		/DF NOT CLEARED, OR NO PI
243	0411	5202	JMP	1B2	
244					
245	0412	1060	TAD	K7775	
246	0413	6234	RIB		/ACB7777
247	0414	7040	CMA		/B0
248	0415	7450	SNA		
249	0416	5221	JMP	1B3	
250	0417	7402	HLT		/RIB OR SF FAILED
251	0420	5202	JMP	1B2	
252					
253	0421	6231	ODF	30	/DF3
254	0422	6001	ION		
255	0423	7200	CLA		
256	0424	6214	ODF		/DF SHOULD BE CLEARED
257	0425	7450	SNA	.+3	
258	0426	5231	JMP		
259	0427	7402	HLT		/DF NOT CLEARED
260	0430	5221	JMP	1B3	
261					
262	0431	1061	TAD	K7774	
263	0432	6234	RIB		/ACB7777
264	0433	7040	CMA		/ACB0
265	0434	7450	SNA		
266	0435	5240	JMP	OK6	
267	0436	7402	HLT		/RIB OR SF FAILED
268	0437	5221	JMP	1B3	
269					
270	0440	2027	ISE	LOOP	/DONE IF SKIP
271	0441	5202	JMP	1B2	
272					
273	0442	7200	CLA		
274	0443	3027	DCA	LOOP	
275					
276	0444	6241	ODF	40	/DF 3
277	0445	6001	ION		
278	0446	7200	CLA		
279	0447	6214	ODF		/DF MUST BE 000 AFTER A PI
280	0450	7450	SNA		/ERROR IF SKIP
281	0451	5254	JMP	.+3	

282	0452	7402	E16,	HLT		/DF NOT 0 AFTER PI
283	0453	5244	/	JMP I84		
284						
285	0454	1062	/	TAD K7773	/AC=7773	
286	0455	6234		RIB	/AC=7777	
287	0456	7040		CMA	/AC=0	
288	0457	7490		SNA		
289	0460	5263		JMP I85		
290	0461	7402	E17,	HLT I84	/RIB OR SF FAILED	
291	0462	5244	/	JMP I84		
292						
293	0463	6251	/	COF 50	/DFS	
294	0464	6001	E18,	ION		
295	0465	7200	/	CLA	/DF SHOULD=000	
296	0466	6214		ROF		
297	0467	7490		SNA		
298	0470	5273		JMP I+3		
299	0471	7402	E18,	HLT	/DF NOT 0 AFTER PI	
300	0472	5263	/	JMP I85		
301						
302	0473	1063	/	TAD K7772	/AC= 7772	
303	0474	6234		RIB	/ 7777	
304	0475	7040		CMA	/ 0	
305	0476	7490		SNA		
306	0477	5302		JMP OK7		
307	0500	7402	E19,	HLT I85	/RIB OR SF FAILED	
308	0501	5263	/	JMP I85		
309						
310	0502	2027	/	I83 LOOP	/DONE IF 0 AND SKIP	
311	0503	5244	OK7,	JMP I84		
312			/			
313	0504	7200	/	CLA		
314	0505	3027		DCA LOOP		
315						
316	0506	6261	/	COF 60	/DF6	
317	0507	6001	E18,	ION		
318	0510	7200	/	CLA	/DF MUST=0 AFTER PI	
319	0511	6214		ROF		
320	0512	7490		SNA		
321	0513	5316		JMP I+3		
322	0514	7402	E20,	HLT I84	/DF NOT 0 AFTER PI	
323	0515	5306	/	JMP I84		
324						

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0516 1064
0517 6234
0520 7840
0521 7450
0522 5325
0523 7402
0524 5306

0525 6271
0526 6001
0527 7208
0530 6214
0531 7450
0532 5335
0533 7402
0534 5325

0535 1065
0536 6234
0537 7840
0540 7450
0541 5344
0542 7402
0543 5325

0544 2027
0545 5306
0546 5747
0547 0600

TAD K7771
RIB
CMA
SNA
JMP 107
HLT
JMP 106

COP 70
ION
CLA
RDP
SNA
JMP 103
HLT
JMP 107

TAD K7770
RIB
CMA
SNA
JMP OK0
HLT
JMP 107

ISS LOOP
JMP 106
JMP 103
000

/AC=7777
/RIB OR SF FAILED
/DF 7
/DF MUST = 0 AFTER PJ
/DF NOT 0
/AC=7777
/RIB OR SF FAILED
/NEW PAGE
/DONE IF 0

/.7771

E21.

/ 107.

E22.

/

E23.

/ OK0.

```

356 0600
357 0601 DCA LOOP
358 0602 JMS I XSTKS /READ SR 9=11
359 0603 IAC /DF NUMBER = 1 TO START
360 0604 DCA NDF /6201
361 0605 TAD KCDF
362 0606 TAD K10
363 0607 DCA :+1 /DF 001 TO START WITH
364 0608 CDF 00 /WILL BE INCREMENTED
365 0609 TAD NDF /DF#
366 0610 DCA I K7000 /PUT IN 7000 OF STACK
367 0611 ISZ STKS /ALL STACKS WHEN 0
368 0612 SKP /TEST TAD I
369 0613 JMP TAD I /INCR. CDF IOT
370 0614 TAD K10
371 0615 TAD DFLO
372 0616 DCA DFLO
373 0617 ISZ NDF
374 0618 JMP DFLO /%
375 0619
376 0620
377 0621
378 0622
379 0623
380 0624
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393 0641
394 0642
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396 0644
397 0645
398 0646
399 0647
400 0650
401 0651
402 0652
403 0653
404 0654
405 0655
406 0656
407 0657
408 0658
409 0659
410 0660

```

*600 /NOW TEST DCA I AND TAD I TO ALL STACKS. NUMBER OF EXTENDED STACKS SHOULD BE IN SR9 TO 11. EACH STACK WILL CONTAIN ITS DF# IN LOCATION 7000.

DCAI: /READ SR 9=11 /DF NUMBER = 1 TO START /6201

DFLO: /DF 001 TO START WITH /WILL BE INCREMENTED /DF# /PUT IN 7000 OF STACK /ALL STACKS WHEN 0

TADI: /SR9=11 AGAIN /DF#01 AGAIN /6201

TFLO: /ADD CONTENTS NOW /SAVE TEMP /2'S COMP /BETTER BE EQUAL

/ERROR PATH /ALL WHEN 0 /DONE WHEN 0 /NEXT TEST /CDF IOT + 10

/DATA AS READ /AGDATA READ. DF INDICATORS /EQUAL FIELD WHERE GOT DATA. /BOTH SHOULD BE EQUAL

E24. HLT

CLA

412 /CIF TEST, CHECKS THE ABILITY OF A CIF=ION=NOP=JMP OR
 413 /CIF=ION=NOP=JMS SEQUENCE TO DO THE FOLLOWING:
 414 /1: CIF ENABLE MB TO IB TRANSFER;
 415 /2: INHIBIT INTERRUPT TILL JMP OR JMS EXECUTED.
 416 /3: INTERRUPT AFTER JMP OR JMS EXECUTED;
 417 /4: JMP OR JMS ENABLES IB TO IF TRANSFER;
 418 /5: INTERRUPT ENABLES IF TO SP TRANSFER;

```

0656 6201 /SET UP FOR CIF=ION=NOP=JMP CHECK.
0657 1021 IBSF,
0660 3001 TAD DCA
0661 1352 TAD DCA
0662 3002 DCA
0663 1020 TAD DCA
0664 3003 DCA
  
```

```

/NOV STORE HALTS IN LOC1, CIFJMP+1,
/AND CIFJMS+1 OF ALL EXTENDED FIELDS.
  
```

```

4423 JMS I XSTKS
4424 TAD KCDP
4425 TAD K10
4426 DCA +1
4427 CDF 10
4428 TAD KHLT
4429 DCA I K1
4430 TAD KHLT
4431 DCA I E31
4432 DCA I E32
4433 ISE STKS
4434 SKP +3
4435 JMP HLTS
4436 TAD HLTS=2
4437 CDF 00
4438 TSP
  
```

```

/ENSURE ITO FLAG SET.
/SET COUNTER FOR 4096 PASSES.
/INITIALIZE TO CIF 00.
/INITIALIZE I.P. CHECK TO 0.
/READ SR9=11.
  
```

```

XTELG
LOOP
KCIF
CIFJMP
CIFCK
XSTKS
CIFJMP
K10
CIFJMP
CIFCK
K10
CIFCK
00
  
```

```

/NOV STORE HALTS IN LOC1, CIFJMP+1,
/AND CIFJMS+1 OF ALL EXTENDED FIELDS.
  
```

```

0656 6201
0657 1021
0660 3001
0661 1352
0662 3002
0663 1020
0664 3003
4423 4423
4424 1040
4425 1045
4426 3271
4427 0211
4428 1037
4429 3443
4430 1037
4431 3790
4432 1037
4433 3795
4434 2031
4435 7410
4436 5305
4437 1271
4438 5267
4439 6201
4440 6041
4441 4422
4442 3027
4443 1041
4444 3323
4445 3353
4446 4423
4447 1045
4448 3323
4449 1045
4450 4422
4451 3027
4452 1041
4453 3323
4454 3353
4455 4423
4456 1045
4457 3323
4458 1045
4459 3353
4460 1045
4461 3353
4462 6202
4463 6202
  
```

```

AGAIN1:
CIFJPL:
CIFJMP: CIF
  
```

```

/NOV STORE HALTS IN LOC1, CIFJMP+1,
/AND CIFJMS+1 OF ALL EXTENDED FIELDS.
  
```

464	0724	6001	ION			
465	0725	7000	NOP			
466	0726	5327	JMP			
467	0727	7402	HLT			
468	0727	7402	RIB			
469	0730	6234	CIA			
470	0731	7041	TAD			
471	0732	1353	SNA	CLA		
472	0733	7650	JMP	E26+3		
473	0734	5344	TAD	CIFCK		
474	0735	1353	CLL	RAR		
475	0736	7110	RTR			
476	0737	7012	RIB			
477	0740	6234	HLT			
478	0741	7402	CLA			
479	0742	7200	JMP			
480	0743	5323	ISZ			
481	0744	2031	JMP	CIFJPL		
482	0745	5315	ISZ	LOOP		
483	0746	2027	JMP	AGAIN		
484	0747	5311	JMP	I		
485	0747	5311	JMP	I		
486	0750	5751	ISZF1			
487	0751	1000	NOP			
488	0752	7000	0			
489	0753	0000	CIFCK,			
490	0754	0724	E31,			
491	0755	1020	E32,			

/ERROR, NO PI OR INHIBIT PI.

/ERROR: I.B. TO I.F. TRANSFER
 /FAILED AFTER CIF-JMP; BAD
 /I.F. IN AC6-0; GOOD I.F. IN
 /AC9-11. REPEAT UPON CONTINUE.
 /DONE?
 /NO. DO NEXT FIELD
 /4096 TIMES?
 /NO. DO IT ALL AGAIN.
 /YES. GO TEST CIF-JMS.

KNOP:
 CIFCK,
 E31,
 E32.

492	1000	*1000									
493	1000	10SF1,	CLA	00							
494	7200		GDF								
495	1001		T8F								
496	1002		JMS I	XTELG							
497	1003		DCA	LOOP							
498	1004		TAD	KCIF							
499	1005	AGAIN2,	DCA	CIFJMS							
500	1006		DCA	CIFCK1							
501	1007		DCA	XSTKS							
502	1010		JMS I	CIFJMS							
503	1011	CIFJSL:	TAD	K10							
504	1012		TAD	CIFJMS							
505	1013		DCA	CIFCK1							
506	1014		TAD	K10							
507	1015		TAD	CIFCK1							
508	1016		DCA	00							
509	1017	CIFJMS:	CIF								
510											
511	1020	6001	ION								
512	1021	7000	NOP								
513	1022	4223	JMS								
514	1023	0000	0								
515	1024	7402	HLT								
516	1025	6234	R10								
517	1026	7041	CIA								
518	1027	1246	TAD	CIFCK1							
519	1030	7050	SNA	CLA							
520	1031	5241	JMP	E30+3							
521	1032	1246	TAD	CIFCK1							
522	1033	7110	CLL								
523	1034	7012	RTR								
524	1035	6234	R10								
525	1036	7402	HLT								
526	1037	7200	CLA								
527	1040	5217	JMP	CIFJMS							
528											
529	1041	2031	ISE	STKS							
530	1042	5211	JMP	CIFJSL							
531	1043	2027	ISE	LOOP							
532	1044	5205	JMP	AGAIN2							
533	1045	5247	JMP	TRMF							
534	1046	0000									

/ENSURE T10 FLAG SET.

/SET UP FOR 4096 PASSES.

/INIT. TO CIF 00.

/INIT. I.F. CHECK TO 0.

/READ SR9=11.

/MODIFIED TO CURRENT FIELD

/UNDER TEST.

/ERROR. NO PI OR INHIBIT PI.

/ERROR. I.F. TO I.F. TRANSFER
 /FAILED AFTER CIF-JMS. BAD
 /I.F. IN AC6-0. GOOD I.F.
 /IN AC9-11. REPEAT UPON CONTINUE
 /DONE?

/NO. DO NEXT FIELD.

/4096 TIMES?

/NO. DO IT ALL AGAIN.

/YES. GO ON TO NEXT TEST


```

535 /TEST INTERRUPT INHIBIT
536 /FROM EACH FIELD; REFER TO HEADING TITLED "EXTENDED
537 /FIELD TEST ROUTINE". THIS ROUTINE IS PLACED IN
538 /EACH TESTED FIELD AT THE ADDRESSES SPECIFIED. THE
539 /INDICATED ERROR HALTS WILL BE IN THE EXTENDED
540 /FIELD. PRESS CONT. TO RECOVER. ONLY 1 FIELD WILL
541 /CONTAIN THE ROUTINE AT ANY ONE TIME. OTHER FIELDS
542 /WILL CONTAIN ALLOIS. THE ROUTINE IS REPLACED WITH
543 /HALTS AFTER COMPLETION. THE PORTIONS OF THE FIELD
544 /WHICH DO NOT CONTAIN THE ROUTINE ARE SET TO 0000
545 /BEFOREHAND.
546
547
548
549
550

```

/SETUP FIELDS TO TEST; POINTERS, ETC.:

```

551 TRMF: JMS I XSTKS /READ SR9=11
552 TAD KODP /6201
553 DCA :+6
554 TAD :+9
555 TAD K10
556 DCA :+3
557 CMA
558 DCA 10
559 DCP 00
560 DCA I 10
561 TAD 10
562 CMA CLA
563 SZA :24
564 JMP :24
565 ISB STKS
566 JMP TRMF=3

```

/PLACE 0'S IN EACH FIELD FROM /LOC: 0 TO 7777.

```

1047 4423
1050 1040
1051 3257
1052 1257
1053 1045
1054 3257
1055 7040
1056 3010
1057 6201
1060 3410
1061 1010
1062 7040
1063 7040
1064 5200
1065 2031
1066 5252

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```

567 /NOW PUT A HLT IN EACH FIELD IN THE SAME
568 /LOCATION AS E40, BELOW.
569 /
570
571
572 JMS I XSTKS /READ SR 9=11
573 TAD KCDF
574 TAD K10
575 DCA I+1
576 CDF 00
577 TAD KE40 /KE40 = ADDRESS OF E40.
578 DCA LOOP /SAVE TEMPORARILY
579 TAD KHLT /KHLT = 7402 (HLT)
580 DCA I LOOP /DONE ALL STACKS WHEN SKIP
581 ISE SYKS
582 SKP I+3
583 JMP CHDF
584 TAD CHDF
585 JMP CHDF-2
586
587 CDF 00
588 TSP /CHECK TTY FLAG
589 JMS I XTFLG /GO SET IT
590 TAD K7707
591 DCA LOOP
592 TAD POINT
593 DCA K75
594 JMS I XSTKS /POINTER FOR K7700 TO K7766
595 TAD KCDF /READ SR 9=11
596 TAD K10 /0
597 DCA STDF /0002
598 TAD K01F /10
599 TAD K10
600 DCA STDF+1
601 TAD STDF+1
602 DCA I XPD
603 JMS I XTRANS /PUT TEST ROUTINE INTO FIELD X
604
605 CDF 10 /FIELD 1 TO START WITH
606 CIP 10
607 JMP I+1 /SHOULD ENTER EXTENDED FIELD
608 /AFTER THIS JMP. HLT IF NOT
609 NOP /ERROR: PI FAILED
610 HLT /C(I.0.)
611 JMP STDF /REPEAT SAME TEST.
612
613
1067 4423
1070 1040
1071 1045
1072 3273
1073 6201
1074 1036
1075 3027
1076 1037
1077 3427
1100 2031
1101 7410
1102 5205
1103 1273
1104 5271
1105 6201
1106 6041
1107 4422
1110 1050
1111 3027
1112 1066
1113 3067
1114 4423
1115 1040
1116 1045
1117 3326
1120 1041
1121 1045
1122 3327
1123 1327
1124 3442
1125 4425
1126 6211
1127 6212
1130 5331
1131 7000
1132 7402
1133 5326

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1245

/ENTER HERE AFTER PI FROM EXTENDED BANK
*1200
/ENTER,
E41,
E42,
E43,

RDF
SNA
JMP +4
HLT
CLA
JMP I XTDF
CIF 10
RMP
RIB 00
CDF 00
TAD I K7S
CMA
SNA CLA
JMP CKPC
RIB
HLT
CLA
CDF 00
CIF 00
JMP I XTDF
TAD KE40
IAC
CIA 0
TAD 0
SNA CLA
JMP +5
TAD 0
HLT
CLA
JMP I XTDF
ISZ STKS
JMP +5
ISZ LOOP
JMP I +2
JMP I XFI8
STRMF+4

/DF SHOULD BE 000
/ERROR IF SKIP
/CHECK C(SF)
/AC=C(DF)
/REPEAT TEST
/SET I.B. TO FIELD 1
/I.B. NOW EQUAL TO SF
/READ IB
/ERROR IF SKIP
/ERROR RMP AND PI WORKED, BUT
/I.B. NOT CORRECT AFTER RMP.
/AC=C(IB)
/BACKUP A PAGE AND REPEAT
/MAKE E40+1
/COMPARE TO C(0)
/SHOULD NOT SKIP
/FALL OK SETUP FOR NEXT FIELD
/ERROR: ALL WORKED, BUT
/CI(PI) WAS NOT TO E40+1
/AFTER PI IN EXTENDED
/FIELD, CI(AC)C(0);F0.
/CHECK FOR PI NOT INHIBITED.
/FOR AUTO-INDEX REG.
/I2 FAILING IN THE EXTENDED FIELD.
/BACKUP AND REPEAT
/SETUP FOR NEXT FIELD
/SETUP FOR NEXT FIELD
/DONE ALL IF SKIP
/DONE LOOPING IF SKIP
/REPEAT ALL AGAIN
/EXIT TO NEXT TEST
/BACK TO LAST PAGE

```

667 /
 668 /SET LAST TESTED FIELD TO ALL 0'S AND PUT A
 669 /HLT IN RESPECTIVE ADDRESS OF E40
 670 /
 671 /

1246	7240	CLA CMA
1247	3010	DCA 10
1250	1477	TAD I XTDF /CDF X0 AT STDF
1251	3252	DCA +1 /F1 TO START WITH
1252	6211	CDF 10
1253	3410	DCA I 10
1254	1010	TAD 10
1255	7040	CMA CLA
1256	7640	SEA CLA /CLEAR IF SKIP
1257	5253	JMP #4
1260	6201	CDF 00
1261	1477	TAD I XTDF /CDF X0 AT STDF
1262	3263	DCA +1
1263	6211	CDF 10
1264	1037	TAD KHLT /E7402 (HLT)
1265	3436	DCA I KE40 /KE40=ADDRESS OF E40
1266	6201	CDF 00 /RESTORE DF

689 /INCREMENT CDF AND CIF 10T'S AT STDF, STDF+1
 690 /TO NEXT FIELD.
 691 /
 692 /

1267	1477	TAD I XTDF
1270	1045	TAD K10 /CDF X0 AT STDF
1271	3477	DCA I XTDF
1272	1500	TAD I XTDF1 /CIF X0 AT STDF
1273	1045	TAD K10
1274	3900	DCA I XTDF1
1275	1500	TAD I XTDF1
1276	3216	DCA EXPD
1277	2067	ISE K7S
1300	4321	JMS TRANS /PUT ROUTINE IN NEW FIELD
1301	5477	JMP I XTDF /TEST NEW FIELD

702
 703

704 /EXTENDED FIELD TEST ROUTINE
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THE FOLLOWING INSTRUCTIONS ARE PLACED IN
EACH EXTENDED FIELD TESTED. THE NUMBERS IN THE
COMMENTS FIELD CORRESPOND TO THE
MEMORY LOCATIONS IN THE TESTED FIELD. LOCATIONS
0 THRU 11 ARE USED FOR AN ERROR ROUTINE
IN CASE FIELD 0 IS NOT ENTERED AFTER AN
INTERRUPT. THE EXTENDED FIELD SHOULD BE
ENTERED AT LOCATION E40+1 WHICH CORRESPONDS
TO E40+1 IN FIELD 0.

EXTENDED FIELD INSTRUCTIONS:

EXPLO: 0 /0
TAD 0 /1
SNA /IF LOC. 0 NOT = 0 PI DIDN'T
/ENTER FIELD 0
JMP ,+5 /3
HLT /4. INTERRUPTED TO THIS FIELD
E44, /INSTEAD OF FIELD 0, C(AC)5C(0)
/WHICH SHOULD BE E40+1
/IF NOT, CHECK LOC. 7777, IT
/MUST = 5412 (JMP I 12).

CLA 0 /5
DCA 0 /6
JMP I 20 /7. C(20) = E40
HLT /10. THE JMP I 12 AT LOC.
/7777 WAS NOT EXECUTED.
/OR INTERRUPT FAILED. IF
/NO INTERRUPT, LOCATION 12
/NOW CONTAINS 0 INSTEAD
/OF ADDRESS E40.
JMP ,+4 /11. REPEAT IN THIS FIELD
E40 /12. AUTO-INDEXS TO E40+1
/IN F 0 IF THE JMP I 12
/WORKS.

LOCS. 13 TO 17 ARE ALL 0'S

E40 /20. EQUALS E40 IN F0.

LOCS. 21 TO E40-2 ARE ALL 0'S

EXPLO: CIF 10 /FIELD 1 TO START WITH
ION /LOC. E40. SEE SYMBOL TABLE
/FOR E40.
LOCS. E40+1 TO 7776 ARE ALL 0'S

JMP I 12 /7777; PI SHOULD OCCUR;
/AFTER THIS INSTRUCTION,
/TO FIELD 0.

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1321 0000
1322 1102
1323 3001
1324 1103
1325 3002
1326 1101
1327 3010
1330 3011
1331 1070
1332 3000
1333 1477
1334 3337
1335 6201
1336 1410
1337 6211
1340 3411
1341 2000
1342 5335
1343 1337
1344 3347
1345 6201
1346 1410
1347 6211
1350 3504
1351 6201
1352 1337
1353 3355
1354 1410
1355 6211
1356 3435
1357 6201
1360 1337
1361 3363
1362 1410
1363 6211
1364 3436
1365 6201
1366 1337
1367 3371
1370 1410
1371 6211
1372 3446
1373 6201
1374 5721

```

/ROUTINE TO TRANSFER TEST ROUTINE TO PROPER FIELD
/TRANS, 0
TAD KJMP
DCA 1
TAD KNTR
DCA 2
TAD KXFLD
DCA 10
DCA 11
TAD K7766
DCA 0
TAD I XTDF
DCA :03
CDF 00
TAD I 10
CDF 10
DCA I 11
ISE 0
JMP :05
TAD TRFLD
DCA :03
CDF 00
TAD I 10
CDF 10
DCA I K20
CDF 00
TAD TRFLD
DCA :02
TAD I 10
CDF 10
DCA I KE40
CDF 00
TAD TRFLD
DCA :02
TAD I 10
CDF 10
DCA I KE40
CDF 00
TAD TRFLD
DCA :02
TAD I 10
CDF 10
DCA I K7777
CDF 00
JMP I TRANS

TRFLD,
/P1 TO START WITH
/PUT IN EXTENDED FIELD
/DONE LOC8 1 TO 12 IF SKIP

/PUT 540 IN LOC. 20

/PUT CIF X0 IN E40:1

/ION TO LOC. 540

/PUT JMP I 12 IN 7777

/EXIT

```

```

804      1400      *1400
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/TEST SF WITH AN RMF JOT, AN INTERRUPT IN FIELD 0 IS CREATED, AFTER
/WHICH, THE DF AND IB REGISTERS ARE SET TO FIELD 1.
/THE SF SHOULD CONTAIN FIELD 0, THE TEST
/THEN MAKES SURE THE IB IS CLEARED, THEN SET BY ISSUING AN RMF,
/FOLLOWED BY A JMP I K7000. IF THE IB IS CLEARED, THE JMP GOES TO 7000 IN FIELD 0,
/IF THE IB AND SF ARE INCLUSIVE OR'D, THE JMP GOES TO 7000 IN FIELD 1, AND
/A HALT OCCURS THERE. RESTART FROM 1400 AFTER AN ERROR, THE TEST IS LOOPED
/512 TIMES.

      TSF
      JMS I XTFLG
      TAD K7000
      DCA LOOP
      CDF IB
      TAD KHLT
      DCA I K7000
      CDF 00
      TAD JMP2
      DCA I K7000

      TAD KJMP
      DCA 1
      TAD KRTRN
      DCA 2

      ION
      NOP
      HLT
      JMP SFIB

      CLA 10
      CIP 10
      RMF I K7000
      JMP I K7000

      IS3 LOOP
      JMP E45A=2
      JMP TAUTO

      /SEE IF FLAG IS SET.
      /SET IT
      /7000
      /DF=FIELD 1
      /HLT
      /7000, FIELD 1=HLT
      /DF=0
      /JMP2=JMP I KFLD0
      /7000, FIELD 0=JMP I KFLD0
      /KFLD0=LOC, RTRN
      /KJMP=JMP I 2
      /KRTRN=LOC, E45A=2
      /ENABLE PI
      /ERROR NO PI
      /REPEAT TEST
      /RETURN HERE AFTER PI
      /DF=FIELD1
      /IB=FIELD1
      /IB SHOULD=FIELD0
      /IF SHOULD=FIELD0
      /LOOP
      /WORKED OK
      /DONE, GO TO NEXT TEST

```

/
 /
 /TEST ALL AUTO-INDEX REGISTERS IN EACH EXTENDED FIELD.
 /IDENTICAL TEST ROUTINES ARE PERFORMED FROM EACH FIELD.
 /AND ERROR HALTS OCCUR IN THE FIELD CURRENTLY RUNNING
 /THE ROUTINE, PRESS CONT, TO RESUME TESTING, EACH
 /FIELD CONTAINS ALL 0'S EXCEPT FOR THE AREA OCCUPIED
 /BY THE TEST ROUTINE. FIELD 0 IS RE-ENTERED
 /AFTER EACH TEST, AND THE NEXT SEQUENTIAL FIELD
 /IS THEN ENTERED. REFER TO THE HEADING "AUTO-
 /INDEX TEST" FOR THE SEQUENCE OF OPERATIONS.

1432	6201	TAUTO,	COF 00
1433	1050	TAD K7707	
1434	3027	DCA LOOP	/LOOP COUNTER
1435	4423	JMS I XSTKS	/READ SR 9=11
1436	1040	TAD KCDF	/0201
1437	3246	DCA DFN	
1440	1246	TAD DFN	
1441	1045	TAD K10	/INCREMENT DF
1442	3246	DCA DFN	

/CLEAR ONE FIELD TO 0

1443	7040	CMA	
1444	3010	DCA 10	/USE LOC. 0 FOR A COUNTER
1445	3000	DCA 0	/FIELD 1 TO START WITH
1446	6211	COF 10	
1447	3410	DCA I 10	
1450	2000	ISE 0	
1451	5247	JMP =2	
1452	6201	COF 00	

/NOW PUT TEST ROUTINE IN THE EXTENDED FIELD

1453	1317	TAD 00AUTO	/1ST LOC. OF ROUTINE MINUS 1
1454	3010	DCA 10	/SOURCE
1455	1072	TAD K7744	/=20 DECIMAL
1456	3000	DCA 0	/USE LOC. 0 AS COUNTER
1457	1317	TAD 00AUTO	/DESTINATION
1460	3011	DCA I 1	/CDF X0
1461	1246	TAD DFN	
1462	3265	DCA =3	
1463	6201	COF 00	
1464	1410	TAD I 10	/FIELD 1 TO START
1465	6211	COF 10	
1466	3411	DCA I 11	/MOVE WHEN SKIP
1467	2000	ISE 0	
1470	5263	JMP MOVE	

MOVE,

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 850
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1471 1065
1472 3000
1473 1044
1474 3010
1475 7040
1476 3410
1477 2000
1500 5275
1501 7040
1502 3446
1503 6214
1504 1041
1505 3306
1506 6212
1507 4716

1510 2031
1511 5240
1512 2027
1513 5235
1514 5715
1515 1600
1516 1002

/ NOW SET AUTO=I REGS 10 TO 17 TO 7777,
/
TAD K7770
DCA 0 / =0 DECIMAL
TAD K7 /
DCA 10 /7
CMA I 10 /7777
DCA 0 /10 TO 17 = 7777 WHEN SKIP
ISZ 0
JMP . =3
CMA I K7777
DCA I K7777 /PUT 7777 IN LOC. 7777 OF EXTENDED FIELD
RDP /READ O.F. /6202
TAD KCIF
DCA I =1
CIP 10
JMS I FILOX

/ FIELD 1 TO START
/ ENTER EXTENDED FIELD
/ 515 OCTAL LOCS. BEFORE THE
/ TAD I 10 INSTRUCTION;
/ THIS IS A TEST OF THE
/ DEFER BIT; 500 US DELAY

/ ENTER FIELD 0 FROM EXTENDED FIELD HERE.
/
GOTO0, ISZ STKS /DONE ALL WHEN SKIP
JMP NEWDF /SETUP FOR NEXT
ISZ LOOP /ALL DONE IF SKIP
JMP NEWDF=3 /REPEAT ALL
JMP I LBTP
LBTP: RMTST
FILOX: DOAUTO=515

```

```

932 /
933 /
934 /
935 /
936 /THE ROUTINE WILL BE PLACED IN THE SAME RESPECTIVE
937 /LOCATIONS IN EACH EXTENDED FIELD; ANY ERROR
938 //HALTS WILL OCCUR IN THE EXTENDED FIELD. PRESS
939 /CONTINUE TO PROCEED WITH TESTING. THE INDEX
940 /REGISTERS 10 TO 17 INITIALLY CONTAIN 7777, AND
941 /ARE AUTO-INDEXED TO 0000 BY A TAD I INSTRUCTION.
942 /A HALT OCCURS IF THE REG. IS NOT INCREMENTED TO 0.
943 /THE TAD I WOULD HAVE THEN REFERENCED LOC. 7777.
944 /WHICH CONTAINS 7777.
945 /
946 /
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1517 1517 DOAUTO, .
1520 7200 CLA
1521 1410 TAD I 10
1522 7440 SEA
1523 7402 HLT
1524 1411 TAD I 11
1525 7440 SEA
1526 7402 HLT
1527 1412 TAD I 12
1530 7440 SEA
1531 7402 HLT
1532 1413 TAD I 13
1533 7440 SEA
1534 7402 HLT
1535 1414 TAD I 14
1536 7440 SEA
1537 7402 HLT
1540 1415 TAD I 15
1541 7440 SEA
1542 7402 HLT
1543 1416 TAD I 16
1544 7440 SEA
1545 7402 HLT
1546 1417 TAD I 17
1547 7440 SEA
1550 7402 HLT
1551 6201 GDF 00
1552 6202 CIP 00
1553 5310 JMP GOTO0
/END OF TEST ROUTINE
/
/

```

```

/THIS LOC. IS NOT MOVED TO
/THE EXTENDED FIELD.

/ERROR, INDEX REG. 10 FAILED

/INDEX REG. 11 FAILED

/12 FAILED

/13 FAILED

/14 FAILED

/15 FAILED

/16 FAILED

/17 FAILED
/SET OF TO FIELD 0
/SET I.B. TO FIELD 0
/EXIT TO FIELD 0

```

```

979 /PD. 61: 8S EXTENDED MEMORY CONTROL TEST. PAL10 Y. 4 20 JUL 70 22140 PAGE 23
980 /CHECK SR 0. IF AN 81 IS BEING USED SR 8 MUST BE
981 /ON A 1. OTHERWISE, 0.
982 /
983 CSR8.
984 LAS 7604
985 AND K10
986 SZL CLA
987 JMP I XMEM /NEXT TEST
988 AND 7
989 TAD .01
990 BELL.
991 TLS /RING BELL
992 TSF
993 JMP .01
994 JMP I X8GN /START OVER AT 200
995 /
996 X8GN: 0200
997 XMEM: 2200
998
999

```


1050 /PD. , 81. 88 EXTENDED MEMORY CONTROL TEST, PAL10 V.L.1 28JUL70 22140 PAGE 24-1

1647 6201 CDF 00

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1702

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3260
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3261
6041
4422
6201
6202
5303
6244
5310
2277
5233
2276
5221
2275
5215
5701
1663
0000
0000
0000
2000
1534
5404

TAD
TAD
DCA
TAD
DCA
TSF
JMS I
COP
CIF
RMP
JMP
ISZ
ISZ
JMP
ISZ
JMP
INTE
INTE
LBTSTC: 0
RMFCN1: 0
DFCN, 0
XFERP, XFER
CSR8, CSR8
JMPI4, JMP I 4
/
/
/
/

RMFE2:
RMF11:
RMF12:
INTE,
RMFE1:
INTEP:
LBTSTC:
RMFCN1:
DFCN,
XFERP,
CSR8,
JMPI4,

/SET DF AND IF TO CURRENT FIELD.
/GO TO RMFDY IN CURRENT IF.
/ENTER FROM INTERRUPT FROM EX. FLD.
/GO BACK TO EXTENDED FIELD.
/ALL DF'S USED WITH CURRENT IF.
/NO. DO NEXT DF.
/ONE PASS OF RMFTST COMPLETE?
/NO. DO NEXT IF.
/RMFTST DONE?
/NO. DO AGAIN.
/YES.

/UPDATE COP INST.
/UPDAT CIF INST.
/ENSURE TTO FLAG SET.
/SET DF AND IF TO CURRENT FIELD.
/GO TO RMFDY IN CURRENT IF.
/ENTER FROM INTERRUPT FROM EX. FLD.
/GO BACK TO EXTENDED FIELD.
/ALL DF'S USED WITH CURRENT IF.
/NO. DO NEXT DF.
/ONE PASS OF RMFTST COMPLETE?
/NO. DO NEXT IF.
/RMFTST DONE?
/NO. DO AGAIN.
/YES.

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/ROUTINE TO CHECK CORRECT TRANSFERS FOR SAVE FIELD TO DATA FIELD AND
/SAVE FIELD TO INST. BUFFER TO INSTRUCTION FIELD AFTER
/RMF.
/STORED IN ALL EXTENDED FIELDS.

1703 6001 RMFDY: ION /THIS IS NOT TRANSFERRED.
1704 7000 NOP
1705 6002 IOP
1706 7402 HLT /INTERRUPT FAILURE.
1707 5333 JMP REPEAT
1710 7200 RMFDY1: CLA /CHECK FOR CORRECT DATA FIELD
1711 6214 ROP MDPSHB
1712 1340 TAD SNA CLA
1713 7650 JMP :+4
1714 5320 TAD KDFSHB
1715 1337 TAD /DATA FIELD INCORRECT
1716 7402 HLT /SF TO DF TRANSFER FAILED AFTER RMF.
1717 5333 JMP REPEAT /REPEAT THIS TEST.
1720 6224 RIF /CHECK FOR CORRECT INSTRUCTION FIELD.
1721 1342 TAD MIFSHB
1722 7650 SNA CLA
1723 5327 JMP :+4
1724 1341 TAD KIFSHB
1725 7402 HLT /INSTRUCTION FIELD INCORRECT.
1726 5333 JMP /SF TO IB TRANSFER FAILED AFTER RMF
1727 6201 COP REPEAT /REPEAT THIS TEST.
1730 5732 CIF /GO BACK AND RUN NEXT TEST.
1731 1665 JMP I
1732 RMFE1
1733 6201 REPEAT: COP
1734 6202 CIF
1735 5736 JMP I
1736 1656 RMFE2
1737 0000 KDFSHB: 0
1740 0000 MDPSHB: 0
1741 0000 KIFSHB: 0
1742 0000 MIFSHB: 0

/ROUTINE TO TRANSFER N1 WORDS STARTING AT P IN FIELD 0 TO P IN THE
/NEXT N2 EXTENDED FIELDS.
/THE CALLING SEQUENCE IS:
/JMS I XPERP
/=N1
/P=1

```

```

1136 2000 0000 / *2000
1137 2001 7200 / XFER,
1138 2002 1600 CLA I
1139 2003 3242 DCA XFER
1140 2004 2200 DCA N2
1141 2005 1600 TAD I XFER
1142 2006 3243 DCA N1
1143 2007 2200 DCA XFER
1144 2010 1600 TAD I XFER
1145 2011 3244 DCA P
1146 2012 2200 DCA XFER
1147 2013 1040 DCA KCOF
1148 2014 3232 DCA XFERIN
1149 2015 1242 DCA N2
1150 2016 3245 DCA XFERC2
1151 2017 1244 TAD P
1152 2020 3010 DCA 10
1153 2021 1244 TAD P
1154 2022 3011 DCA 11
1155 2023 1243 TAD N1
1156 2024 3246 DCA XFERC1
1157 2025 1232 TAD XFERIN
1158 2026 1045 TAD K10
1159 2027 3232 DCA XFERIN
1160 2030 6201 XFERL1: COF 00
1161 2031 1410 TAD I 10
1162 2032 6201 XFERIN: COF 11
1163 2033 3411 DCA XFERC1
1164 2034 2246 DCA XFERL1
1165 2035 5230 JMP XFERC2
1166 2036 2245 DCA XFERL2
1167 2037 5217 JMP XFERL2
1168 2040 6201 COF 00
1169 2041 5600 JMP I XFER
1170 2042 0000 N2,
1171 2043 0000 N1,
1172 2044 0000 P,
1173 2045 0000 XFERC2: 0
1174 2046 0000 XFERC1: 0
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1177
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```

```

/GET =N2
/GET =N1
/GET P=1

```

```

/UPDATE TO RETURN ADDRESS,
/INITIALIZE COF INST.

```

```

/PUT POINTER IN AUTO 10 AND 11.

```

```

/SET COUNTER 1 TO =N1
/UPDATE COF INST.

```

```

/TRANSFER

```

```

/DONE WITH CURRENT FIELD?
/NO, CONTINUE.
/DONE WITH ALL FIELDS?
/NO, DO NEXT FIELD
/ALL DONE. SET DF=0.
/EXIT.

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2200
*2200
/
/REFERENCE ALL 4K FIELDS NOT PRESENT. IF 32K
/IS PRESENT, THE TEST IS BY-PASSED, AND PROGRAM IS
/RESTARTED AT 200, EACH FIELD NOT PRESENT IS
/REFERENCED BY THE PROGRAM WITH JMP, DCA AND TAD.
//THE PROGRAM MUST CONTINUE IN SEQUENCE/ THE TTY
/BELL WILL SIGNAL A SUCCESSFUL TEST, AND THE PRO-
/GRAM IS THEN RESTARTED AT 200.
/
/ NOMEM:
2200 CLA
2201 TAD K7770
2202 DCA LOOP
2203 LAS
2204 AND K7
2205 CIA
2206 TAD K7
2207 SNA
2208 JMP I XBELL
2209 DCA NOSTAK
2210 DCA I XELL
2211
2212

7604
0844
7001
7100
7006
7004
3034
1033
7041
3033

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2214
2215
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2220
2221
2222
2223
2224

LAS AND K7
IAC
CLL
RTL
RAL
DCA NOFLD
TAD NOSTAK
CIA
DCA NOSTAK

/TEST LOOP COUNTER
/READ SR9=11
/SUBTRACT MAX. POSSIBLE
/32K PRESENT. CAN'T TEST
/SAVE NO. MISSING
/CLEAR THE TLS IOT AT
/BELL*1 TO PROHIBIT
/FALSE INDICATION: TLS
/IS RESTORED LATER WRONG
/ENTRY FROM NON-EXISTENT
/MEMORY MAY CAUSE A
/HANG-UP AT BELL*2 AND *3.
/*1 TO GET 1ST MISSING
/POSITION TO AC 6=0.
/1ST MISSING
/* STACKS NOT HERE
/USED AS COUNTER

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2225 1040
2226 1034
2227 3262
2230 1040
2231 1034
2232 3307

2233 1033
2234 7041
2235 7010
2236 7020

2237 5257
2240 4261
2241 2033
2242 5254
2243 2027
2244 5650
2245 1253
2246 3651
2247 5652

2250 2203
2251 1962
2252 1561
2253 6046

2254 1307
2255 1045
2256 3307
2257 4306
2260 5241

TAD KCDF
TAD NOFLD
DCA CDF0S
TAD KCDF
TAD NOFLD
DCA CDF1S

/6201
/MISSING STACK

/
/

/ NOW SEE IF AN ODD OR EVEN NUMBER IS MISSING
/

TAD NOSTAK
CIA
RAR
SNL CLA

JMP POS+3
JMS ALL0
ISE NOSTAK
JMP POS
ISE LOOP
JMP I XNOM
TAD TT0
DCA I XELL
JMP I XBELL

NOMEM+3
BELL+1
BELL
TTS

TAD CDF1S
TAD K10
DCA CDF1S
JMS ALL1
JMP CNSTK

CNSTK:
/

POS:
/

/LE1, FIRST READ 0'S, THEN ALWAYS
/ALL 1'S
/LE0, ALWAYS READ ALL 1'S
/READ ALL 0 FROM 1ST
/DONE ALL MISSING IF SKIP
/READ ALL 1'S FROM HERE ON
/REPEAT
/RESTORE TLS
/RING BELL

/DF PLUS 1
/READ ALL 1'S
/CHECK DONE

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1286

/ROUTINE TO READ ALL 0'S.
/
ALL0.
CDF00.
DCA10.
CMA11.
DCA2.
CMA110.
E94.
ISZ2.
JMP103.
TAD111.
SNA CLA.
JMP103.
TAD11.
HLT.
ISZ2.
JMP E9404.
DONE0.
CDF00.
CIF00.
JMP I ALL0.
/EXIT
/SET DF TO 1ST MISSING
/10 AND 11 USED FOR ADDRESS
/USE AS COUNTER
/WRITE 1'S INTO NON-EXIS-
/TENT FIELD.
/READ NON-EXIST. FIELD
/SHOULD = 0000
/ERROR. AN EXISTING FIELD
/WAS REFERENCED. C(AC)E
/ADDRESS REFERENCED
/READ NEXT

```

```

1287 /ROUTINE TO READ ALL 1'S
1288 /
1289 ALL1, CDF1S,
1290 0000 /SET DF TO MISSING FIELD
1291 2306 2307 6201 CDF 00
1292 2310 2310 7240 CLA CMA
1293 2311 3010 DCA 10
1294 2312 7040 CMA
1295 2313 3011 DCA 11
1296 2314 3002 DCA 2
1297 2315 3410 DCA I 10
1298 2316 2002 ISE 2
1299 2317 5315 JMP I=2
1300 2320 1411 TAD I 11
1301 2321 7040 CMA
1302 2322 7450 SNA
1303 2323 5327 JMP I=4
1304 2324 7040 CMA
1305 2325 7402 HLT
1306 E57.
1307 2326 7200 CLA
1308 2327 2002 ISE 2
1309 2330 5320 JMP E57=5
1310 2331 6201 CDF 00
1311 2332 6202 CIF 00
1312 2333 5706 JMP I ALL1
1313 /EXIT

```

/READ 1'S FROM NO MEMORY

/7777 NOT READ, C(AC)= DATA
/READ, C(11)= ADDRESS.

```

1314 /READ SR9=11
1315 /
1316 NSTKS: 0
1317 LAS 0000
1318 AND K7 2334 0000
1319 CIA 2335 7604
1320 OCA STKS 2336 0044
1321 JMP I NSTKS 2337 7041
1322 2340 3031
1323 2341 5734
1324 /SET TTY FLAG
1325 /
1326 TFLG: 0
1327 CLA 2342 0000
1328 AND 15 2343 7200
1329 TAD :=1 2344 0015
1330 TLS 2345 1344
1331 TSF 2346 6046
1332 JMP :=1 2347 6041
1333 CLA 2350 5347
1334 JMP I TFLG 2351 7200
1335 /EXIT
S

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4200
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4400
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4600
4700

5000
5100
5200
5300
5400
5500
5600
5700

6000
6100
6200
6300
6400
6500
6600
6700

7000
7100
7200
7300
7400
7500
7600
7700

AGAIN1	0711	E24	0653	INTEP	1674	NOHEM	22140	PAGE	2200
AGAIN2	1005	E25	0727	ISEZ	0021	NOSTAK			0033
ALL0	2261	E26	0741	JMP2	0105	NSYKS			2334
ALL1	2306	E27	1024	JMPI0	0020	OK1			0222
BEGIN	0200	E3	0234	JMPI4	1702	OK2			0250
BELL	1561	E30	1036	K1	0043	OK3			0276
CDF	6201	E31	0754	K10	0045	OK4			0324
CDP0S	2262	E32	0755	K20	0104	OK5			0362
CDP1S	2307	E4	0245	K7	0044	OK6			0440
CHDF	1073	E40	1132	K7000	0047	OK7			0502
CIF	6202	E41	1203	K7707	0050	OK8			0544
CYCK	0753	E42	1221	K7717	0056	P			2044
CIPCK1	1046	E43	1235	K7727	0055	POINT			0066
CIFJMP	0723	E44	1306	K7737	0054	POS			2254
CIFJMS	1017	E45	1312	K7744	0072	RDF			6214
CIFJPL	0715	E45A	1420	K7747	0053	REPEAT			1733
CIFJSL	1011	E46	1523	K7757	0052	RIB			6234
CRPC	1226	E47	1526	K7766	0070	RIF			6224
CNSTK	2241	E48	1531	K7767	0051	RMP			6244
CSR0	1594	E49	1534	K7770	0065	RMP0N1			1676
CSR0P	1701	E5	0262	K7771	0064	RMPDY			1703
DAT	0032	E50	1537	K7772	0063	RMPDY1			1710
DCAI	0601	E51	1542	K7773	0062	RMPE1			1665
DF0	0202	E52	1545	K7774	0061	RMPE2			1656
DF1	0226	E53	1550	K7775	0060	RMPI1			1660
DF2	0237	E54	2300	K7776	0057	RMPI2			1661
DF3	0234	E57	2325	K7777	0046	RMPL1			1633
DF4	0265	E6	0273	K78	0067	RMPL2			1621
DF5	0302	E60	1706	K0DF	0040	RMPL3			1615
DF6	0313	E61	1716	K0CF	0041	RMPTST			1600
DF7	0211	E62	1725	K0FSHB	1737	RTRN			1427
DFCN	1677	E7	0310	KE40	0036	SF1B			1400
DFLD	0607	E8	0321	KE00H	0035	STDF			1126
DFN	1446	E9	0341	KFLD0	0106	STKS			0031
DOAUTO	1517	ENTER	1200	KHLT	0037	STRMF			1106
DONE0	2303	EXPD	1316	KIPSHB	1741	TADI			0622
E1	0206	EXFLD	1302	KJMP	0102	TAUTO			1432
E10	0351	FILDY	1516	KNOP	0752	TFLD			0630
E11	0360	COY00	1510	KNR	0103	TFLG			2342
E12	0410	HITS	0671	KRYN	0107	TRANS			1321
E13	0417	IB0	0334	KXFLD	0101	TRPLD			1337
E14	0427	IB1	0343	L8TP	1515	TRMF			1047
E15	0436	IB2	0402	L8YSTC	1675	YTB			2253
E16	0452	IB3	0421	LOOP	0027	XAUTO			0026
E17	0461	IB4	0444	MDFSHB	1740	XBELL			2252
E18	0471	IB5	0463	MIFSHB	1742	XBGN			1566
E19	0500	IB6	0506	MOVE	1463	XBLL			2251
E2	0217	IB7	0525	N1	2043	XFO			0042
E20	0514	IBSF	0656	N2	2042	XFER			2000
E21	0523	IBSF1	1000	NDF	0030	XFERC1			2046
E22	0533	IFCN	1605	NEWOF	1440	XFERC2			2045
E23	0542	INTE	1663	NOFLD	0034	XFERIN			2032

XFERL1 2030
XFERL2 2017
XPERP 1700
XFIB 0110
XMEM 1967
XNOM 2250
XRANS 0025
XRHF 0024
XSTKS 0023
XTDF 0077
XTDF1 0100
XTFLG 0022

ERRORS DETECTED: 0

LINKS GENERATED: 0

RUN-TIME: 11 SECONDS

3K CORE USED

E20
E21
E22
E23
E24
E25
E26
E27
E3
E30
E31
E32
E4
E40
E41
E42
E43
E44
E45
E49A
E46
E47
E48
E49
E5
E50
E51
E52
E53
E54
E57
E6
E60
E61
E62
E7
E8
E9
ENTER
EXFD
EXPLD
FILOX
GOTO0
HLTS
IB0
IB1
IB2
IB3
IB4
IB5
IB6
IB7
IBSF

323#
331#
340#
348#
394
468#
473
515#
123#
520
440
442
134#
38
621#
635#
649#
724#
732#
61
951#
954#
957#
960#
149#
963#
966#
969#
972#
1277#
1305#
1309#
159#
1893#
1101#
1109#
1175#
185#
208#
77
43
75
916
924#
436#
203#
207
230
249
276#
290
317#
330
339

407#
478#
525#
490#
491#
39
610#
739
766
835#
847
1281
1309
618#
700
719#
931#
975
446
209
211#
236#
253#
284
294#
301
332
334#
421#

748#
447
228
218
243
260
292
301
332
341

226
231
268
312
309
353
349

271

