

IDENTIFICATION

PRODUCT CODE: MAINDEC-08-DJMSA-A-D

PRODUCT NAME: 1-4K MS8-A MOS MEMORY TEST

DATE CREATED: SEPTEMBER 1974

MAINTAINER: PDP-8 DIAGNOSTICS

AUTHOR: MARK SANDLER

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DIGITAL EQUIPMENT CORPORATION
MAYNARD, MASSACHUSETTS 01754

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1. ABSTRACT

THE 1-4K MS8-A MOS MEMORY TEST IS A PROGRAM THAT WILL TEST MOS MEMORIES FROM 1K UP TO 4K. IT CONSISTS OF AN ADDRESS SELECTION TEST, A FLOATING ONE'S AND ZEROS TEST AND A WORST CASE DATA TEST. THIS PROGRAM PROVIDES CPU-XOR, ACT-8/A, ACT-8/E AND STAND ALONE FRAME CAPABILITIES.

2. REQUIREMENTS

2.1 HARDWARE

THE FOLLOWING HARDWARE IS REQUIRED FOR THE EXECUTION OF THIS PROGRAM.

PROCESSOR(S): PDP8A

MEMORY: AT LEAST 1K OF MOS RAM

OPTIONS: MS8-A MOS RAM MEMORY

2.2 STORAGE

PROGRAM REQUIRES 4 PAGES OF A 1K RANGE.

2.3 PREREQUISITE SOFTWARE

PRIOR TO RUNNING THIS PROGRAM, THE PDP8A CENTRAL PROCESSOR TEST (MAINDEC-08-DJKKA) MUST HAVE BEEN SUCCESSFULLY RUN.

3. RESTRICTIONS

A. ASSUMPTION IS MADE THAT RAM WILL NEVER GO BEFORE ROM MEMORY.

B. THE 1K RAM IN WHICH THE DIAGNOSTIC IS LOADED WILL BE CONSIDERED THE LOWEST 1K SEGMENT WHEN TEST BEGINS.

C. THE PROGRAM WILL HAVE TO BE RELOADED WHENEVER THE USER WISHES TO CHANGE TO ANOTHER TEST ENVIRONMENT (STAND ALONE, CPU-XOR, ACT-8/A, ACT-8/E).

4. STANDARD TEST PROCEDURE

THE MODIFIED RIM LOADER IN 4.3 IS TOGGLED IN. THEN THE DIAGNOSTIC IS READ IN TO THE DESIRED 1K RANGE FROM THE RIM FORMAT TAPE THE PROGRAM STARTS AT LOCATION 200 OF THE CHOSEN RANGE. THE TOP HALF OF THIS RANGE AND ALL 1K SEGMENTS ABOVE IT WILL BE TESTED. THE ADDRESS OF THE LAST ADDRESS OF THE HIGHEST RANGE TO BE TESTED WILL BE IN LOCATION 23 OF THE CHOSEN LOWEST RANGE INITIALLY, AFTER THE 3 TESTS ARE COMPLETED THE PROGRAM WILL FLIP TO THE TOP HALF OF IT'S RANGE AND THE BOTTOM HALF AND ALL HIGHER RANGES WILL BE TESTED. THE PROGRAM WILL FLIP BACK AND THE PROCESS WILL CONTINUE FROM THE BEGINNING. ONE FULL PASS FOR 4K OF MEMORY REQUIRES ABOUT 23 SECONDS.

- A. THE DIAGNOSTIC IS IN RIM FORMAT. TOGGLE IN THE RIM LOADER MODIFIED AS DESCRIBED IN 4.2.
- B. READ IN THE 1-4K MSB-A MOS MEMORY TEST FROM THE TAPE. DEPOSIT THE LAST ADDRESS OF THE HIGHEST ADDRESS RANGE TO BE TESTED INTO LOCATION 23 OF THE RANGE THE DIAGNOSTIC WAS LOADED INTO. THE DEFAULT IS 1777 WHICH SIGNIFIES A 1K MEMORY STARTING AT LOCATION 0.
- C. SET SWITCH REGISTER TO LOCATION 200 OF THE RANGE THE DIAGNOSTIC WAS LOADED INTO. PRESS LOAD ADDRESS, SET SWITCH REGISTER ACCORDING TO 6.2. IN ADDITION TO THE ERROR RELATED SWITCHES IN 6.2 SET SW3 TO A ONE IF THE CPU IS TO HALT AFTER ONE FULL PASS. IF SW3=0 THE DIAGNOSTIC WILL LOOP INDEFINITELY.
- D. PRESS CLEAR AND THEN CONTINUE
- E. PROGRAM WILL HALT ON ERROR OR ON PASS COMPLETION IF SW3 IS UP. OTHERWISE IT WILL RUN INDEFINITELY.

4.1 CHANGING DEVICE IOT CODES

NOT APPLICABLE

4.2

MODIFIED RIM LOADER

IN ORDER TO LOAD THE DIAGNOSTIC INTO A 1K RANGE OTHER THAN 0-1777 THE MODIFIED RIM LOADER IS USED OTHERWISE THE STANDARD RIM LOADER IS SATISFACTORY.

LOW MOD. RIM LOADER

X753/	6032 KCC
X754/	0375 AND X775
X755/	1377 TAD X777
X756/	3376 DCA X776
X757/	6031 KSF
X760/	5357 JMP .-1
X761/	6036 KRB
X762/	7106 CLL RTL
X763/	7006 RTL
X764/	6031 SPA
X765/	5367 JMP X757
X766/	6034 RTL
X767/	7420 KSF
X770/	5367 JMP .-1
X771/	6034 KRS
X772/	7420 SNL
X773/	3776 DCA I X776
X774/	5353 JMP X753
X775/	1777 /MASK
X776/	0
X777/	0 /ADDRESS RANGE

HIGH MOD. RIM LOADER

6014	RCF
0375	AND X775
1377	TAD X777
3376	DCA X776
6011	RSF
5357	JMP .-1
6016	RCC
7106	CLL RTL
7006	RTL
7510	SPA
5354	JMP X754
7006	RTL
6011	RSF
5367	JMP .-1
6016	RCC
7420	SNL
3776	DCA I X776
5354	JMP X754
1777	/MASK
0	
0	/ADDRESS RANGE

THE USER WILL MODIFY X777 TO ADDRESS RANGE DESIRED; (0000,2000,4000,6000),

5.

ERRORS

ALL ERRORS ARE REPORTED BY ERROR HALTS.

5.1

ERROR HALTS/INDICATIONS

ALL TESTS USE THE SAME ERROR REPORTER ROUTINE. ERROR HALTS WILL OCCUR AT EITHER LOCATION 737 OR LOCATION 1737, DEPENDING ON WHICH PORTION OF MOS RAM THE PROGRAM HAS ENTERED.

ERRORS SHOULD BE HANDLED IN THE FOLLOWING SEQUENCE:

- A. AC WILL DISPLAY PC OF TEST IN ERROR.
- B. HIT CONTINUE
- C. AC WILL DISPLAY LOCATION BEING TESTED
- D. HIT CONTINUE
- E. AC WILL DISPLAY CONTENTS OF LOCATION
- F. HIT CONTINUE
- G. AC WILL DISPLAY EXPECTED CONTENTS.
- H. SET SWITCH REGISTER FOR RECOVERY AS DESIRED ACCORDING TO 6.2.

PROGRAM SWAP OR PROGRAM RELOCATION ERRORS WILL HALT AT EITHER LOCATION 264 OR LOCATION 1264. THIS TYPE OF ERROR IS FATAL AND INDICATES THAT THE MOS RAM IS FAULTY AND THAT THE PROGRAM SHOULD NOT BE CONTINUED.

5.2 ERROR PRINTOUTS

THERE ARE NO ERROR PRINTOUTS

6. SWITCH REGISTER SETTINGS

IF YOU DO NOT HAVE A FRONT PANEL DEPOSIT THE DESIRED SWITCH REGISTER CONTENTS IN LOCATION 21 OF THE RANGE THE PROGRAM IS USING BY OS/8 ODT ETC. IF YOU DO HAVE A FRONT PANEL DEPOSIT 4000 IN LOCATION 21 OF THAT SAME 1K SEGMENT.

6.1 NORMAL OPERATING SWITCHES

SW3=0 RUN DIAGNOSTIC INDEFINITELY
SW3=1 HALT ON PASS COMPLETION

6.2 ERROR RELATED SWITCHES

SW0=0 HALT ON ERROR
SW0=1 INHIBIT ERROR HALT

SW1=0 DO NEXT LOCATION AFTER ERROR
SW1=1 LOOP ON ERROR

SW2=0 DO ALL 3 TESTS
SW2=1 LOOP ON TEST

7. REVISIONS

NONE

8. PROGRAM DESCRIPTION

THIS DIAGNOSTIC FITS IN 4 PAGES OF A 1K SEGMENT. IT WILL TEST THE UPPER 4 PAGES PLUS UP TO 3K OF RAM MEMORY ABOVE THE 1K SEGMENT. THEN THE PROGRAM RELOCATES TO THE UPPER 4 PAGES AND TESTS THE LOWER 4 PAGES PLUS UP TO 3K OF RAM MEMORY ABOVE. THE PROGRAM THEN RELOCATES BACK TO REPEAT THE CYCLE CONTINUOUSLY. THE MODIFIED RIM LOADER IN 4.2 LOADS THE DIAGNOSTIC INTO THE DESIRED 1K SEGMENT. THIS BECOMES THE LOWEST 1K SEGMENT TO BE TESTED. BEFORE RUNNING THE PROGRAM THE LAST ADDRESS TO BE TESTED IS DEPOSITED IN LOCATION 23. THE PROGRAM WRITES OVER THE RIM LOADER IN OPERATION, SO IT MUST BE TOGGLED IN AGAIN IF DESIRED AFTER THE PROGRAM RUNS 3 TESTS ON THE RAM MEMORY.

A. TEST1 ADDRESS SELECTION TEST

EACH LOCATION BEING TESTED HAS IT'S ADDRESS WRITTEN INTO IT'S SELF. THEY ARE THEN ALL TESTED SCANNING BACKWARDS, THEN SCANNING BACKWARDS EACH LOCATION HAS THE COMPLEMENT OF IT'S ADDRESS WRITTEN INTO ITSELF. THE MEMORY IS THEN TESTED SCANNING FORWARDS.

B. TEST2 FLOATING ONES AND ZEROS TEST

THROUGH EACH LOCATION BEING TESTED A WORD IS WRITTEN THEN TESTED. THE WORD CONSISTS OF THE TWELVE WAYS TO A 1 CAN BE FLOATED (FROM 1,2,4---4096) AND THE TWELVE WAYS A ZERO CAN BE FLOATED OR THE COMPLEMENT OF THE LAST 12 WORDS. THIS TEST CHECKS FOR INTRA-ADDRESS BIT SHORTS.

C. TEST3 WORST CASE DATA PATTERN TEST

1. WRITE WORST CASE DATA PATTERN THROUGH RAM AND TEST EACH LOCATION
2. REPEAT WITH COMPLEMENT OF PATTERN
3. VARY PATTERN AND CONTINUE AT STEP 1.
AFTER A MAXIMUM OF 12 PATTERNS FALL OUT OF TEST, THE PATTERN WILL BE VARIED FROM X,X',X,X'... TO X,X,X',X'... TO X,X,X,X,X',X',X',X',X' TO ETC. THE LAST PATTERN IN THIS PROGRESSION WILL HAVE THE FIRST HALF OF THE RAM CONTAIN X AND THE REST CONTAIN X'. THE DEFAULT FOR THIS TEST IS X=2525 AND X'=5252.

D. ACT-8A CAPABILITY

ACT-8A HOOKS HAVE BEEN PROVIDED IN THE PROGRAM WHICH WILL REPLACE ALL ERROR HALTS WITH EXIT RETURNS TO HOST WHEN RUNNING PROGRAM ON THE ACT-8A SYSTEM.

E. CPU-XOR CAPABILITY

XOR HOOKS HAVE BEEN PROVIDED IN THE PROGRAM TO LOOP ON XOR ERRORS WHEN RUNNING ON THE CPU-XOR TESTER,

F. ACT-8E CAPABILITY

ACT-8E HOOKS HAVE BEEN PROVIDED IN THE PROGRAM TO ALLOW IT TO BE RUN ON THE ACT-8E SYSTEM.

9. FLOWCHARTS

NONE

10. PROGRAM LISTING



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1
2
3 /1-4K MS8-A MOS MEMORY TEST
4 /MAINDEC-09-DJMSA-A-L
5 /COPYRIGHT (C) 1974, DIGITAL EQUIPMENT CORP., MAYNARD, MASS., 01754
6
7 0010 *10
8 7501 MQA=7501
9 7421 MQL=7421
10 7521 SWP=7521
11 6170 XRON=6170
12 6171 SKXR=6171
13 6173 STIP=6173
14 6176 XRTD=6176
15 0010 3000 FLCPAT, 0
16 0011 7777 FLMCNT, -1
17 0012 4000 LEMN2, 0
18 0013 1777 KZ777, 0777
19 0014 3000 FLTPAT, 0
20 0015 4000 FLPAT, 4000
21 0016 7776 FLCNT, -2
22
23 3020 *20
24 0020 3000 SWR, 0
25 0021 3000 OP1, 0
26 0022 3000 OP2, 0
27 0023 1777 MEMLM, 1777
28
29 //ROUTINE TO TEST EACH ADDRESS WITH FLOATING ONES AND ZEROS
30 /
31 0024 3000 TST2, 0
32 0025 1755 200+ TAD I AMEMB2
33 0026 3354 200+ DCA FЛАDR //BEGINNING ADDRESS
34 0027 1755 200+ TAD I AMEMB2
35 0030 1213 200+ TAD K0777
36 0031 7040 CMA
37 0032 3212 200+ DCA LEMN2 //END OF FIRST SEGMENT ADDRESS
38 0033 7040 CMA
39 0034 3211 200+ DCA FLMCNT
40 0035 7344 FL00, CLA CLL CMA RAL //TAD (-2)
41 0036 3216 200+ DCA FLCNT
42 0037 7130 FL0, CLL CML RAR //TAD (4000)
43 0040 3215 200+ DCA FLPAT //SAVE INITIAL PATTERN
44 0041 1216 FL1, 200+ TAD FLCNT
45 0042 7150 CLL CMA RAR //SET UP LINK FOR TEST,
46 0043 1215 200+ TAD FLPAT
47 0044 7421 MQL
48 0045 7501 MQA
49 0046 7040 CMA
50 0047 7420 SNL //SKIP THE FIRST TIME AROUND,
51 0051 7521 SWP //SWAPS PATTERN WITH COMPLEMENT
52 0051 7021 IAC
53 0052 3210 200+ DCA FLCPAT //SAVE TWO'S COMP. OF TEST PATTERN,
54 0053 7501 MQA
55 0054 3214 200+ DCA FLTPAT //SAVE TEST PATTERN

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/1-4: MS8-A MOS MEMORY TEST PA-10 V142 18-SEP-74 22132 PAGE 1-1
56 0055 1214 FL2, 200+ TAD FLTPAT
57 0056 3754 200+ DCA I FЛАDR //STORE PATTERN IN LOC. TO BE TESTED.
58
59 0057 1754 200+ TAD I FЛАDR
60 0060 1210 200+ TAD FLCPAT
61 0061 7650 SNA CLA //WAS PATTERN STORED CORRECTLY?
62 0062 5270 200+ JMP FL3
63 0063 1214 200+ TAD FLTPAT //SAVE EXPECTED PATTERN,
64 0064 7421 MQL
65 0065 1354 200+ TAD FЛАDR //SAVE CURRENT ADDRESS,
66 0066 4760 200+ JMS I AERR2
67 0067 5255 200+ JMP FL2 //ERROR RETRY RETURN,
68 0070 4764 FL3, 200+ JMS I AREPT2 //CHECK FOR XOR ERROR,
69 0071 5225 200+ JMP TST2+1 //ERROR RETURN
70 0072 1215 200+ TAD FLPAT
71 0073 7110 CLL RAR
72 0074 3215 200+ DCA FLPAT //ROTATE PATTERN
73 0075 7420 SNL //ARE WE OFF THE END?
74 0076 5241 200+ JMP FL1 //NO DO NEXT PATTERN
75 0077 2216 200+ IS2 FLCNT //RETEST ADDRESS WITH COMP. OF PATTERN?
76 0100 5237 200+ JMP FL0
77 0101 2354 200+ IS2 FЛАDR //BUMP ADDRESS POINTER
78 0102 1354 200+ TAD FЛАDR
79 0103 3377 200+ AND (377)
80 0104 7650 SNA CLA
81 0105 4764 MA2, 200+ JMS I AREPT2 //IT IS TIME TO REPORT TO AUTO ACCEPTANCE
82 0106 1354 200+ TAD FЛАDR
83 0107 1212 200+ TAD LEMN2
84 0113 7640 SZA CLA //IS SEGMENT FINISHED?
85 0111 5235 200+ JMP FL0 //NO DO NEXT ADDRESS
86 0112 2211 200+ IS2 FLMCNT //SKIP IF FIRST SEGMENT,
87 0113 5325 200+ JMP FL4
88 0114 1757 200+ TAD I AFLIP2 //IS THERE A GAP TO CROSS?
89 0115 7510 SPA
90 0116 7200 CLA //DO NOT SKIP A 1000 WORD GAP.
91 0117 1354 200+ TAD FЛАDR
92 0120 3354 200+ DCA FЛАDR
93 0121 1756 200+ TAD I AMEML2
94 0122 7040 CMA
95 0123 3212 200+ DCA LEMN2 //SET TO END OF SECOND SEGMENT
96 0124 5306 200+ JMP FL35
97 0125 4332 FL4, 200+ JMS MYLAS //GET SWR
98 0126 7006 RTL
99 0127 7710 SPA CLA //LOOP ON TEST?
100 0131 5225 200+ JMP TST2+1
101 0131 5624 200+ JMP I TST2 //RETJRN
102
103
104 //ROUTINE TO GET SWR INTO AC
105
106 0132 3000 MYLAS, 0
107 0133 1221 200+ TAD OP1 //GET OPTIONS
108 0134 7710 SPA CLA //SKIP ON NO FRONT PANEL
109 0135 5340 200+ JMP .+3
110 0136 1220 200+ TAD SWR //GET PSEUDO SWR

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/1-4K MSB-A MOS MEMORY TEST PA-10 V142 18-SEP-74 22132 PAGE 1-2

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111 0137 5732    200+ JMP I MYLAS
112 0140 7404    OSR
113 0141 5732    200+ JMP I MYLAS
114
115
116
117 /ROUTINE TO INITIALIZE FOR BEGINNING OF PASS FOR TST3
118 /
119 0142 0000 MINT3, 0
120 0143 7240 CLA CMA
121 0144 3763 200+ DCA I ANSMCT /SET UP TO PASS TWICE THROUGH MSET3
122 0145 1755 200+ TAD I AMEMB2
123 0146 1213 200+ TAD K0777
124 0147 7040 CMA
125 0150 3762 200+ DCA I ALEMN /SET TO END OF FIRST SEGMENT,
126 0151 1755 200+ TAD I AMEMB2
127 0152 3761 200+ DCA I ANSADR /SET TO BEGINNING OF SEGMENT,
128 0153 5742 200+ JMP I MINT3
129 0154 0000 FLADR, 0
130 /RELOCATABLE CONSTANTS
131 0155 0351 AMEMB2, MEMBG /START ADDRESS OF MEMORY
132 0156 0023 AMEML2, MEML4
133 0157 0355 AFLIP2, FLIPCN
134 0160 0731 AERR2, ERR
135 0161 0761 ANSADR, NSADR
136 0162 0756 ALEMN, LEMN
137 0163 2757 ANSMCT, NSMCNT
138 0164 0334 AREPT2, REPT
139 0165 0000 0 /END RELOCATABLE CONSTANTS
140
141 0200 *200
142 0203 5206 START, JMP .+6
143 0201 6170 XRON
144 0202 6173 STIP
145 0203 5201 JMP .+2
146 0204 7344 CLA CMA CLL RAL /LOOP UNTIL READY
147 0205 3353 DCA XCNT /TAD -2
148 0206 4207 JMS RELOC
149 0207 7402 RELOC, HLT /WILL CONTAIN IT'S ADDRESS
150 0210 1355 TAD FLIPCN
151 0211 0207 AND RELOC
152 0212 3207 DCA RELOC /SAVE ORIGIN
153 0213 1207 REL0, TAD RELOC
154 0214 1377 TAD (LNK0)
155 0215 3341 DCA LNKPOS /POINT TO PAGE ZERO TABLE
156 0216 1741 REL1, TAD I LNKPOS
157 0217 1207 TAD RELOC
158 0220 3350 DCA LNKIDX /POINT TO FIRST ENTRY IN TABLE
159 0221 1750 REL2, TAD I LNKIDX /GET TAG
160 0222 7450 SNA
161 0223 5231 JMP REL3 /IF ZERO DO NEXT PAGE
162 0224 0354 AND RELAN /MAKE RELATIVE TO LOC 0
163 0225 1207 TAD RELOC
164 0226 3750 DCA I LNKIDX /FIX TAG
165 0227 2350 ISZ LNKIDX /BUMP TAG POINTER

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/1-4K MSB-A MOS MEMORY TEST PA-10 V142 18-SEP-74 22132 PAGE 1-3

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166 0230 5221 JMP REL2 /DO NEXT TAG ON PAGE
167 0231 2341 REL3, ISZ LNKPOS //BUMP PAGE TABLE POINTER
168 0232 1341 TAD LNKPOS
169 0233 7041 CIA
170 0234 1357 TAD ALEND
171 0235 7640 SZA CLA /ARE ALL 4 PAGES DONE?
172 0236 5216 JMP REL1 /DO NEXT PAGE.
173 0237 5771 GINT, JMP I AINT /DO INITIALIZATION CODE,
174 0240 1355 TAD FLIPCN
175 0241 7041 CIA
176 0242 1207 TAD RELOC
177 0243 3351 DCA MEMBG /SAVE MEMORY TEST BEGIN
178 0244 4762 RUN, JMS I ATST1
179 0245 4763 JMS I ATST2
180 0246 4764 JMS I ATST3
181 0247 1355 TAD FLIPCN
182 0250 7041 CIA
183 0251 3355 DCA FLIPCN /SET UP TO FLIP PROGRAM LATER.
184 0252 1207 TAD RELOC
185 0253 3352 DCA RTTEMP
186 0254 1351 TAD MEMBG
187 0255 3207 DCA RELOC /SET UP NEW ORIGIN
188 0256 1752 RL1, TAD I RTTEMP
189 0257 3751 DCA I MEMBG
190 0260 1752 TAD I RTTEMP
191 0261 7041 CIA
192 0262 1751 TAD I MEMBG
193 0263 7640 SZA CLA /IS INSTRUCTION CORRECT?
194 0264 7402 RLERR, HLT /ERROR IN RELOCATING.
195 0265 2352 ISZ RTTEMP
196 0266 2351 ISZ MEMBG
197 0267 1352 TAD RTTEMP
198 0270 0376 AND (0777) /SET UP NEW ORIGIN
199 0271 7640 SZA CLA /IS ALL CODE MOVED?
200 0272 5256 JMP RL1
201 0273 1355 TAD FLIPCN
202 0274 7000 SMA CLA /SKIP IF FULL PASS COMPLETED
203 0275 5306 JMP SWTCH
204 0276 4760 JMS I AMYLAS /GET SWR
205 0277 0375 AND (400) /HALT AT END OF PASS?
206 0300 7640 SZA CLA
207 0301 7402 HLT
208 0302 6170 X1, XRON /SECOND OR THIRD XRON FOR XOR.
209 0303 2756 ISZ I AXCNT1
210 0304 5306 JMP SWTCH
211 0305 5767 CT1, JMP I AOFF /DISABLE MODULE UNDER TEST
212 0306 1374 SWTCH, TAD (REL0)
213 0307 1207 TAD RELOC
214 0310 3352 DCA RTTEMP
215 0311 5752 JMP I RTTEMP /FLIP PROGRAM
216
217
218 0312 0000 MSET1, 0
219 0313 3352 DCA RTTEMP /SAVE DIRECTION OF SCAN
220 0314 2766 ISZ I ASEMCZ /FALL OUT ON THIRD PASS

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/1-4K MS8-A MOS MEMORY TEST PA-18 V142 18-SEP-74 22132 PAGE 1-4

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221 0315 5712      JMP I MSET1
222 0316 1355      TAD FLIPCN
223 0317 7510      SPA
224 0320 7200      CLA
225 0321 2352      ISZ RTEMP
226 0322 7041      CIA
227 0323 1765      TAD I ASELDR
228 0324 3765      DCA I ASELDR
229 0325 7501      MQA
230 0326 7041      CIA
231 0327 3761      DCA I ALEMN1
232 0330 1312      TAD MSET1
233 0331 1373      TAD (-14)
234 0332 3352      DCA RTEMP
235 0333 5752      JMP I RTEMP
236
237
238 0334 0000      REPT, 0
239 0335 6171      SKXR /SKIP ON XOR ERROR.
240 0336 2334      ISZ REPT
241 0337 5734      JMP I REPT
242 0340 5734      JMP I REPT /FOR AUTO ACCEPTANCE.
243
244 0341 0000      LNKPOS, 0 /POINTS TO A PAGE TABLE POINTER
245 0342 0155      LNK0, AMEMB2 /PAGE 0 TABLE START
246 0343 0356      LNK1, AXCNT1 /PAGE 1 TABLE START
247 0344 0565      LNK2, AFLIP1 /PAGE 2 TABLE START
248 0345 0766      LNK3, AMEMB3 /PAGE 3 TABLE START
249 0346 1126      LNK4, AMA1 /PAGE4 TABLE START
250 0347 1257      LNK5, AA-END /PAGES TABLE START
251 0350 0000      LNKIDX, 0 /INDIVIDUAL TABLE POINTER
252 0351 3000      MEMBG, 0 /BEG. OF MEMORY FOR TEST
253 0352 0000      RTEMP, 0
254 0353 0000      XCNT, 0 /XOR COUNTER.
255 0354 1777      RELAN, 1777 /RELOCATION MASK
256 0355 7000      FLIPCN, -1000 /CONSTANT TO FLIP PROGRAM.
257 /THESE CONSTANTS WILL BE RELOCATED
258
259 0356 0353      AXCNT1, XCNT
260 0357 0350      ALEND, LN<5+1 /ADDRESS OF ROUTINE TO GET SWR
261 0360 0132      AMYLAS, MYLAS
262 0361 0564      ALEMN1, LEMN1
263 0362 3400      ATST1, TST1 /ADDRESS SELECTION TEST,
264 0363 0024      ATST2, TST2 /FLOATING ONES AND ZEROS TEST.
265 0364 0600      ATST3, TST3 /DATA TEST,
266 0365 0554      ASELDRL, SELADR
267 0366 0562      ASEMCZL, SEMCNT
268 0367 0544      AOFF, OFF
269 0370 0731      AERR, ERR
270 0371 1000      AINT, INT /END OF RELOCATABLE CONSTANTS
271 0372 0000      0
272 0373 7764
273 0374 0213
274 0375 3400
275 0376 0777

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/1-4K MS8-A MOS MEMORY TEST PA-18 V142 18-SEP-74 22132 PAGE 1-5

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276 0377 0342
277 0400 *400 /ROUTINE TO DO ADDRESS SELECTION TEST
278
279 0400 0000 TST1, 0
280 0401 7344 CLA CMA CLL RAL /TAD(-2)
281 0402 3357 DCA SELCNT
282 0403 1377 TAD (NOP)
283 0404 3226 JCA SWL1
284 0405 1341 TAD LCIA
285 0406 3251 JCA SWL2
286 0407 1772 TAD I AMEMB1 /SAVE BEGIN ADDRESS
287 0410 3355 DCA SELOP1
288 0411 1766 TAD I AMEML1
289 0412 3356 DCA SELOP2 /SAVE END ADDRESS
290 0413 7001 LIAC, IAC
291 0414 3360 DCA SELINC /INIT, INC.
292 0415 7040 LCMA, CMA
293 0416 3361 DCA SELDEC /INIT, DEC.
294 0417 1226 SEL0, TAD SWL1
295 0420 3256 DCA SWL3
296 0421 1355 TAD SELOP1
297 0422 3354 DCA SELADR /SAVE BEG, ADDRESS
298 0423 1360 TAD SELINC
299 0424 4325 JMS MINT1
300 0425 1354 SEL1, TAD SELADR
301 0426 7402 SWL1, HLT
302 0427 3754 DCA I SELADR /STORE ADDRESS IN SELF
303 0430 4774 SLX1, JMS I AREPT1 /CHECK FOR XOR ERROR.
304 0431 5201 JMP TST1+1 /ERROR RETURN,
305 0432 1354 TAD SELADR
306 0433 1364 TAD LEMN1 /IS FIRST SEGMENT FINISHED?
307 0434 7650 SNA CLA
308 0435 5242 JMP SEL15
309 0436 1354 TAD SELADR
310 0437 1360 TAD SELINC
311 0443 3354 DCA SELADR /BUMP ADDRESS
312 0441 5225 JMP SEL1
313 0442 1356 SEL15, TAD SELOP2
314 0443 7421 MQL
315 0444 1361 TAD SELDEC /BUMP LEMN
316 0445 4771 JMS I AMSET1
317 0446 1361 TAD SELDEC
318 0447 4325 JMS MINT1
319 0450 1754 SEL3, TAD I SELADR
320 0451 7402 SWL2, HLT
321 0452 1354 TAD SELADR
322 0453 7650 SNA CLA /IS THERE AN ERROR
323 0454 5263 JMP SEL35
324 0455 1354 TAD SELADR /SAVE EXPECTED PATTERN
325 0456 7402 SWL3, HLT
326 0457 7421 MQ_
327 0460 1354 TAD SELADR /SAVE CURRENT ADDRESS
328 0461 4767 JMS I AERR1
329 0462 5250 JMP SEL3 /ERROR RETRY ADDRESS

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```

330 0463 4774 SEL35, JMS I AREPT1 /CHECK FOR XOR ERROR,
331 0464 5201 JMP TST1+1 /ERROR RETURN.
332 0465 1354 TAD SELADR
333 0466 1364 TAD LEMN1
334 0467 7650 SNA CLA /IS FIRST SEGMENT FINISHED?
335 0470 5275 JMP SEL4
336 0471 1354 TAD SELADR
337 0472 1361 TAD SELDEC
338 0473 3354 DCA SELADR /BUMP ADRESS
339 0474 5250 JMP SEL3
340 0475 1355 SEL4, TAD SELOP1
341 0476 7421 MQL
342 0477 1360 TAD SELINC
343 0500 4771 JMS I AMSET1 /BUMP LEMN1
344 0501 7201 CLA IAC /TAD(1)
345 0502 3361 DCA SELDEC /SCAN IN OPP. DIRECTION
346 0503 7240 CLA CMA /TAD(-1)
347 0504 3360 DCA SELINC /SCAN IN OPP. DIRECTION
348 0505 1215 TAD LCMA
349 0506 3226 DCA SWL1
350 0507 1213 TAD LIAC
351 0510 3251 DCA SWL2
352 0511 1766 TAD I AMEML1
353 0512 3355 DCA SELOP1
354 0513 1772 TAD I AMEMB1
355 0514 3356 DCA SELOP2 /SWAP END POINTS.
356 0515 2357 ISZ SELCNT
357 0516 5217 JMP SEL0 /DO TEST IN OPP. DIRECTION
358 0517 4774 MA1, JMS I AREPT1 /TIME TO REPORT IN A GOOD PASS.
359
360 0520 4770 JMS I AMLAS1 /GET SWR
361 0521 7006 RT-
362 0522 7710 SPA CLA /LOOP ON TEST?
363 0523 5201 JMP TST1+1
364 0524 5600 JMP I TST1 /RETURN
365
366
367 /ROUTINE TO SET LOCAL END OF SEGMENT POINTER
368
369
370 /ROUTINE TO INITIALIZE FOR TST1
371
372 0525 4000 MINT1, 0
373 0526 3363 DCA TMP2
374 0527 7240 MK1, CLA CMA SEMCNT
375 0530 3362 DCA ISZ TMP2
376 0531 2363 JMS MNT2
377 0532 5337 MK2, TAD I AFLIP1
378 0533 1765 SPA
379 0534 7510 CLA
380 0535 7200 IAC
381 0536 7001 MNT2, TAD K0777A
382 0537 1353 TAD I AMEMB1
383 0540 1772 TAD I CIA
384 0541 7041 LCIA, CIA

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385 0542 3364 DCA LEMN1
386 0543 5725 JMP I MINT1
387 /
388
389 /ISSUE TIMEOUT FOR XOR AND EXIT.
390
391 0544 1776 OFF, TAD I (START+1) /RELOCATE START POINTER.
392 0545 1773 TAD I ARELOC
393 0546 3363 DCA TMP2
394 0547 6176 XRTD /TIMEOUT
395 0551 6173 STIP
396 0551 5763 JMP I TMP2 /DO NEXT MODULE.
397 0552 5354 JMP .+2 /WAIT TILL MODULE IS OFF.
398
399 /CONSTANTS
400
401 0553 8777 K0777A, 0777 /CURRENT ADDRESS IN TST1.
402 0554 0000 SELADR, 0 /DELIMITS SCAN RANGE
403 0555 0000 SELOP1, 0 /DELIMITS SCAN RANGE
404 0556 0000 SELOP2, 0 /DO TEST TWICE, ONCE IN EACH DIRECTION.
405 0557 7776 SELCNT, -2
406 0560 8001 SELINC, 1
407 0561 7777 SELDEC, -1
408 0562 0000 SEMCNT, 0
409 0563 0000 TMP2, 0 /TEMPORARY
410 0564 0000 LEMN1, 0 /LOCAL END OF MEMORY.
411
412 /RELOCATABLE CONSTANTS
413
414 0565 0355 AFLIP1, FLIPCN
415 0566 0023 AMEML1, MEMLY
416 0567 0731 AERR1, ERR
417 0570 0132 AMLAS1, MYLAS
418 0571 0312 AMSET1, MSET1
419 0572 0351 AMEMB1, MEMBG
420 0573 0207 ARELOC, RELOC /BEGIN ADDRESS
421 0574 0334 AREPT1, REPT
422 0575 0000 0 /END OF CONSTANTS
423
424 0576 0201
425 0577 7000
426 0600 *600 /THIS ROUTINE CHECKS FOR INTER-ADDRESS DATA BIT SHORTS
427 / AND ATTEMPTS TO SET UP A WORST CASE DATA PATTERN
428
429 0600 3000 TST3, 0
430 0601 7301 CLA CLL IAC /TAD (1)
431 0602 3362 DCA NSMASK /INITIAL MASK
432 0603 7344 NS0, CLA CLL CMA RAL /TAD (-2)
433 0604 3360 DCA NSCNT
434 0605 1363 NS1, TAD NSPAT1
435 0606 7104 CLL RAL
436 0607 7001 IAC
437 0610 3364 DCA NSPAT2 /SET UP COMPLEMENT
438 0611 1363 TAD NSPAT1

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```

439 0612 7040      CMA
440 0613 3363      DCA    NSPAT1
441 0614 4772      JMS I  AMINT3
442 0615 1361      NS2,   TAD    NSADR
443 0616 3362      AND    NSMASK
444 0617 7640      SZA CLA /CHOOSE NSPAT1 OR NSPAT2 + NSPAT1
445 0620 1364      TAD    NSPAT2
446 0621 1363      TAD    NSPAT1
447 0622 3761      DCA I  NSADR
448 0623 4773      NSX1,  JMS I  AREPT3
449 0624 5601      JMP I  TST3+1 /STORE CHOSEN WORD
450 0625 2361      ISZ    NSADR /CHECK FOR XOR ERROR,
451 0626 1361      TAD    NSADR /ERROR RETURN,
452 0627 1356      TAD    LEMN
453 0630 7640      SZA CLA /ARE WE AT THE END?
454 0631 5215      JMP I  NS2
455 0632 4313      JMS    MSET3
456 0633 5226      JMP I  NS3 /DO NEXT ADR
457 0634 4772      NS4,   JMS I  AMINT3
458 0635 1361      TAD    NSADR
459 0636 3362      AND    NSMASK
460 0637 7640      SZA CLA /CHOOSE COMP. OF PATTERN
461 0640 1364      TAD    NSPAT2
462 0641 1363      TAD    NSPAT1
463 0642 7041      CIA
464 0643 1761      TAD I  NSADR /IS IT CORRECT?
465 0644 7650      SNA CLA
466 0645 5257      JMP I  NS5
467 0646 1361      TAD    NSADR
468 0647 3362      AND    NSMASK
469 0650 7640      SZA CLA /CHOOSE PAT.
470 0651 1364      TAD    NSPAT2
471 0652 1363      TAD    NSPAT1
472 0653 7421      MQ_
473 0654 1361      TAD    NSADR /SAVE EXPECTED PAT.
474 0655 4331      JMS    ERR /SAVE CURRENT ADDRESS.
475 0656 5235      JMP I  NS4
476 0657 4773      NS5,   JMS I  AREPT3 /ERROR RETRY RETURN,
477 0660 5201      JMP I  TST3+1 /CHECK FOR XOR ERROR.
478 0661 2361      ISZ    NSADR
479 0662 1361      TAD    NSADR
480 0663 1356      TAD    LEMN
481 0664 7640      SZA CLA /ARE WE AT THE END?
482 0665 5235      JMP I  NS4
483 0666 4313      JMS    MSET3
484 0667 5262      JMP I  NS6 /DO TWICE
485 0670 2360      ISZ    NSCNT
486 0671 5205      JMP I  NS1
487 0672 1766      TAD I  AMEMB3
488 0673 7041      CIA
489 0674 1767      TAD I  AMEML3 /DIVIDE BY #2
490 0675 7170      CLL CML CMA RAR
491 0676 1362      TAD    NSMASK
492 0677 7730      SMA CLA
493 0701 5326      JMP I  NS7

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494 0701 1362      TAD    NSMASK
495 0702 7104      RAL CLL /ROTATE MASK
496 0703 3362      DCA    NSMASK
497 0704 4773      MA3,   JMS I  AREPT3 /REPORT A GOOD PASS TO AUTO ACCEPTANCE,
498 0705 5203      JMP I  NS0
499 0706 4770      NS7,   JMS I  AMLAS3
500 0707 7006      RTL
501 0710 7710      SPA CLA /LOOP ON TEST?
502 0711 5201      JMP I  TST3+1
503 0712 5600      JMP I  TST3
504
505 /ROUTINE TO BRIDGE GAP IN MEMORY FOR TST3
506 /
507 0713 0000      MSET3,  0
508 0714 2357      ISZ    NSMCNT
509 0715 5327      JMP I  MS31
510 0716 1771      TAD I  AFLIP3
511 0717 7510      SPA
512 0720 7200      CLA
513 0721 1361      TAD    NSADR
514 0722 3361      DCA    NSADR
515 0723 1767      TAD I  AMEML3
516 0724 7040      CMA
517 0725 3356      DCA    LEMN
518 0726 5713      JMP I  MSET3
519 0727 2313      MS31,  ISZ    MSET3
520 0730 5713      JMP I  MSET3
521
522 /ERROR REPORTER ROUTINE
523
524 0731 3000      ERR,   0
525 0732 3365      DCA    ERRTMP /SAVE CURRENT ADDRESS
526 0733 4770      JMS I  AMLAS3 /GET SWR
527 0734 7710      SPA CLA /INHIBIT ERROR HALT?
528 0735 5351      JMP I  ERR1
529 0736 1331      TAD    ERR
530 0737 7402      HLT   /DISPLAY PC
531 0740 7200      CLA
532 0741 1365      TAD    ERRTMP
533 0742 7402      HLT   /DISPLAY CURRENT ADDRESS
534 0743 7200      CLA
535 0744 1765      TAD I  ERRTMP /DISPLAY CONTENTS OF CURRENT ADDRESS
536 0745 7402      HLT
537 0746 7701      CLA MQA
538 0747 7402      HLT   /DISPLAY EXPECTED CONTENTS
539 0750 7200      CLA
540 0751 4770      ERR1,  JMS I  AMLAS3
541 0752 7004      RA_
542 0753 7700      SMA CLA /LOOP ON ERROR?
543 0754 2331      ISZ    ERR
544 0755 5731      JMP I  ERR
545
546 /CONSTANTS
547
548 0756 0000      LEMN,  0 /LOCAL END OF MEMORY

```

549 0757 7777 NSMCNT, -1
 550 0760 7776 NSCNT, -2
 551 0761 0000 NSADR, 0
 552 0762 0000 NSMASK, 0
 553 0763 2525 NSPAT1, 2525
 554 0764 2525 NSPAT2, 2525
 555 0765 0000 ERRTMP, 0
 556
 557 /RELOCATABLE CONSTANTS
 558 0766 0351 AMEMB3, MEMBG
 559 0767 0023 AMEML3, MEML4
 560 0770 0132 AMLAS3, MYLAS
 561 0771 0355 AFLIP3, FLIPCN
 562 0772 0142 AMINT3, MINT3
 563 0773 0334 AREPT3, REPT
 564 0774 0000 0
 565 1000 *1000 /END OF CONSTANTS
 566 /THIS CODE IS FOR INITIALIZATION OF LOCATION 23 FOR AUTO-ACCEPTANCE
 567 /FROM MEMORY SIZE IN LOCATION 21 AND THE INSTRUCTION FIELD.
 568
 569
 570 1000 1751 INT, TAD I AOP2
 571 1001 7700 SMA CLA /IS IT AUTO ACCEPTANCE?
 572 1002 5254 JMP NAUTO /NO AUTO ACCEPTANCE,
 573 1003 1750 TAD I AOP1 /GET TOTAL MEMORY SIZE,
 574 1004 0377 AND (37) /MASK OFF SUPERFLUOUS BITS,
 575 1005 3352 DCA ITMP /SAVE IT.
 576 1006 6224 RIF
 577 1007 7110 CLL RAR /GET AMOUNT OF MEMORY BEFORE ORIGIN
 578 1010 7041 CIA /SUBTRACT IT FROM
 579 1011 1352 TAD ITMP /THE TOTAL MEMORY SIZE
 580 1012 3352 DCA ITMP /SAVE THE MEMORY SIZE OF FIELD.
 581 1013 1352 TAD ITMP
 582 1014 0376 AND (34)
 583 1015 7650 SNA CLA /IS IT OVER 4K?
 584 1016 5221 JMP .+3 CLA CLL CML IAC RAL /IT IS. MAKE IT 4K,
 585 1017 7325 SKP
 586 1020 7410 TAD ITMP /IT IS OKAY.
 587 1021 1352 CLL RAR /SHIFT INTO POSITION.
 588 1022 7110 RTR
 589 1023 7012 TAD (1777)
 590 1024 1375 DCA I AMEML4 /SAVE LAST ADDRESS TO BE TESTED
 591 1025 3746
 593 /SET UP ROJINE TO REPORT A GOOD PASS.
 594
 595
 596 1026 1374 TAD (C1F 70)
 597 1027 3740 DCA I AREPT4
 598 1030 2340 ISZ AREPT4
 599 1031 1373 TAD (REPT&177+4603) /JMS I REPT+3
 600 1032 3740 DCA I AREPT4
 601 1033 2340 ISZ AREPT4
 602 1034 1372 TAD (6500)
 603 1035 3740 DCA I AREPT4

604 1036 1371 TAD (ERR&177+1200) /TAD (TAD ERR)
 605 1037 3744 DCA I AERR4
 606 1040 2344 ISZ AERR4
 607 1041 1374 TAD (C1F 70) /SET UP ERROR REPORTER FOR ACT 8/A
 608 1042 3744 DCA I AERR4
 609 1043 2344 ISZ AERR4
 610 1044 1370 TAD (ERR&177+5605) /JMP I ERR+5
 611 1045 3744 DCA I AERR4
 612 1046 2344 ISZ AERR4
 613 1047 1367 TAD (6520)
 614 1050 3744 DCA I AERR4
 615 1051 1366 TAD (AERR&177+4600) /TAD (JMS I AERR)
 616 1052 3736 DCA I ARLERR /REPORT TO ACT 8/A RELOC. ERR,
 617
 618 1053 5262 NAUTO, JMP CHXOR
 619 1054 1365 TAD (NOP)
 620 1055 3726 DCA I AMA1
 621 1056 1364 TAD (FL35&177+5200) /JMP FL35
 622 1057 3727 DCA I AMA2
 623 1060 1365 TAD (NOP)
 624 1061 3730 DCA I AMA3
 625 1062 1747 CHXOR, TAD I AXCNT
 626 1063 7640 SZA CLA /SKIP IF NOT XOR
 627 1064 5301 JMP LFIX
 628 1065 1363 TAD (SKP)
 629 1066 3731 DCA I AX1
 630 1067 1363 TAD (SKP)
 631 1070 3732 DCA I AFL3
 632 1071 1363 TAD (SKP)
 633 1072 3733 DCA I ASLX1
 634 1073 1363 TAD (SKP)
 635 1074 3741 DCA I ASEL35
 636 1075 1363 TAD (SKP)
 637 1076 3742 DCA I ANSX1
 638 1077 1363 TAD (SKP)
 639 1101 3743 DCA I ANS5
 640
 641 /CHECK IF ONLY 1K OF MEMORY IS PRESENT AND FIX MINT1 IF NECESSARY,
 642
 643 1101 7331 LFIX, CLA CLL CML IAC RAR /TAD (6000)
 644 1102 0745 AND I AMEMB4
 645 1103 1375 TAD (1777)
 646 1104 7041 CIA
 647 1105 1746 TAD I AMEML4
 648 1106 7640 SZA CLA /SKIP IF 1K PRESENT
 649 1107 5325 JMP NXINT
 650 1110 1365 TAD (NOP)
 651 1111 3734 DCA I AMK1
 652 1112 1362 TAD (AMEMB1&177+1600) /TAD I AMEMB1
 653 1113 3735 DCA I AMK2
 654 1114 2335 ISZ AMK2
 655 1115 1361 TAD (K0777A&177+1200) /TAD K0777A
 656 1116 3735 DCA I AMK2
 657 1117 2335 ISZ AMK2
 658 1120 1360 TAD (SELADR&177+3200) /DCA SELADR

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659	1121	3735	DCA I	AMK2
660	1122	2335	ISZ	AMK2
661	1123	1363	TAD	(SKP)
662	1124	3735	DCA I	AMK2
663				
664				
665				
666	1125	5737	NXINT, JMP I	AINT2
667			/JMP TO NEXT INITIALIZATION PAGE	
668				
669			/RELOCATABLE CONSTANTS START HERE.	
670				
671	1126	0517	AMA1,	MA1
672	1127	0105	AMA2,	MA2
673	1130	0704	AMA3,	MA3
674	1131	0302	AX1,	X1
675	1132	0070	AFL3,	FL3
676	1133	0430	ASLX1,	SLX1
677	1134	0527	AMK1,	MK1
678	1135	0533	AMK2,	MK2
679	1136	0264	ARLERR,	RLERR
680	1137	1200	AINT2,	INT2
681	1140	0335	AREPT4,	REPT+1
682	1141	0463	ASEL35,	SE_35
683	1142	0623	ANSX1,	VSX1
684	1143	0657	ANS5,	VS5
685	1144	0733	AERR4,	ERR+2
686	1145	0351	AMEMB4,	MEMBG
687	1146	0023	AMEML4,	MEML4
688	1147	0353	AXCNT,	XCVT
689	1150	0021	AOP1,	OP1
690	1151	0022	AOP2,	OP2
691	1152	0000	ITMP,	0
692	1160	3354		
693	1161	1353		
694	1162	1772		
695	1163	7410		
696	1164	5306		
697	1165	7000		
698	1166	4770		
699	1167	6520		
700	1172	5736		
701	1171	1331		
702	1172	6500		
703	1173	4737		
704	1174	6272		
705	1175	1777		
706	1176	0034		
707	1177	0037		
708		1200	*1200	
709			/THIS PAGE IS THE INITIALIZATION THAT DID NOT FIT ON THE LAST PAGE,	
710			/IT SETS UP THE ACT 8/E HOOKS AND CUTS THE UMBILICAL CORD BETWEEN	
711			/ THESE TWO PAGES AND THE MAIN CODE	
712	1201	1660	INT2, TAD I	AOP2B

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713	1201	7004	RAL	
714	1202	7700	SMA CLA	/SKIP IF ACT 8/E
715	1203	5233	JMP NFIX	
716	1204	1660	TAD I AOP2B	
717	1205	7006	RTL	
718	1206	7700	SMA CLA	/SKIP ON QUICK VERIFY
719	1207	1377	TAD (-33)	/10 MINUTES RUN TIME
720	1210	1376	TAD (-1)	/ONE PASS FOR Q,V,
721	1211	3661	DCA I AXCNT5	/SET UP ISZ LOOP
722	1212	1375	TAD (NOP)	
723	1213	3663	DCA I AX18	
724	1214	7040	CMA	/TAD (7777)
725	1215	3664	DCA I AMEML5	/SET UP FOR 4K OF MEMORY
726	1216	1270	TAD ADONE	
727	1217	3665	DCA I AAOFF	/SET UP COMPLETION RETURN TO ACT 8/E
728	1220	1374	TAD (AERR&177+4600)	/TAD (JMS I AERR)
729	1221	3671	DCA I ARLER5	/REPORT TO ACT 8/E RELOC. ERR,
730				
731				
732			/MOVE IN CODE FOR ACT8/E ERROR REPORTER AND COMPLETION RETRN	
733				
734	1222	1666	ACLOOP, TAD I ACT8E	/GET INSTRUCTION
735	1223	3672	DCA I AERR5	/MOVE IT IN PLACE
736	1224	2272	ISZ AERR5	/BUMP POINTERS
737	1225	2266	ISZ ACT8E	
738	1226	1266	TAD ACT8E	
739	1227	7041	CIA	
740	1230	1267	TAD ACTND	
741	1231	7640	SEA CLA	/ARE ALL INSTRUCTIONS MOVED?
742	1232	5222	JMP ACLOOP	
743				
744				
745			/REMOVE THESE PAGES FROM PAGE RELOCATION TABLE BEFORE	
746			/ THIS PAGE GOES BYE BYE.	
747				
748	1233	7344	NFIX, CLA CLL CMÄ RAL	/TAD (-2)
749	1234	1657	TAD I AALEND	
750	1235	3657	DCA I AALEND	
751	1236	1375	TAD (NOP)	
752	1237	3673	DCA I AGINT	/REMOVE JMP TO THIS PAGE.
753	1240	1373	TAD (0777)	
754	1241	3674	DCA I ARELAN	/FIX UP MASK FOR SWAPING
755	1242	2662	ISZ I ALNK1	/DO NOT RELOCATE AXCNT1 ANY MORE.
756	1243	5673	JMP I AGINT	/RETURN
757				
758				
759			/THE FOLLOWING IS CODE TO BE MOVED IN FOR ACT 8/E ERROR	
760			/ REPORTER AND COMPLETION RETURN HOOKS.	
761				
762	1244	6731	CT8E, 6731	/SET DIAGNOSTIC ERROR
763	1245	7410	SKP	
764	1246	6734	6734	/SET PROGRAM DONE
765	1247	7240	CLA CMA	/TAD (7777)
766	1250	3003	3003	/DCA 3
767	1251	7240	CLA CMA	

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768	1252	3002	3002	/DCA 2
769	1253	3344	ERR&177+1213	/TAD ERR+13
770	1254	3001	3001	/DCA 1
771	1255	5001	5001	/JMP 1
772	1256	1256	CTND,	.
773			/THE FOLLOWING ARE RELOCATABLE CONSTANTS	
775				
776	1257	0357	AALEND, ALEN0	
777	1260	0022	AOP28, OP2	
778	1261	0353	AXCNT5, XCNT	
779	1262	0343	ALNK1, LNK1	
780	1263	0302	AX1B, X1	
781	1264	0023	AMEML5, MEML4	
782	1265	0367	AAOFF, AOFF	
783	1266	1244	ACTBE, CTBE	
784	1267	1256	ACTND, CTND	
785	1270	0735	ADONE, ERR+4	
786	1271	0264	ARLER5, RLERR	
787	1272	0733	AERR5, ERR+2	
788	1273	0237	AGINT, GINT	
789	1274	0354	ARELAN, RELAN	
790	1275	0132	AMLAS5, MYLAS	
791	1276	0000	0	
792			\$	
793	1373	0777		
794	1374	4770		
795	1375	7000		
796	1376	7777		
797	1377	7745		
798	0177	0377		

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3000	00000000	11111110	11111111	11111111	11111111	11111111	11111111	11111111	11111111
3100	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111100	00000001
3200	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
3300	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
3400	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
3500	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
3600	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
3700	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111100	
3800	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111100	
3900	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
4000	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
4100	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
4200	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
4300	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
4400	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
4500	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
4600	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
4700	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
4800	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
4900	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
5000	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
5100	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
5200	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
5300	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
5400	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
5500	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
5600	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
5700	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
5800	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
5900	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
6000	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
6100	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
6200	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
6300	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
6400	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
6500	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
6600	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
6700	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
6800	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
6900	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
7000	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
7100	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
7200	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
7300	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
7400	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
7500	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
7600	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
7700	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111	11111111
7800	11111111	11111111	11111111	11111111					

4000

4100

4200

4300

4400

4500

4600

4700

5000

5100

5200

5300

5400

5500

5600

5700

6000

6100

6200

6300

6400

6500

6600

6700

7000

7100

7200

7300

7400

00

7600

7700

AALEND	1257	AREPT1	0574	LNK0	0342	RLI	0256
AAOFF	1265	AREPT2	0164	LNK1	0343	RLERR	0264
ACLOOP	1222	AREPT3	0773	LNK2	0344	RTEMP	0352
ACTBE	1266	AREPT4	1140	LNK3	0345	RUN	0244
ACTND	1267	ARLER5	1271	LNK4	0346	SEL0	0417
ADONE	1270	ARLERR	1136	LNK5	0347	SEL1	0425
AERR	0370	ASEL35	1141	LNKIDX	0350	SEL15	0442
AERR1	0567	ASELDR	0365	LNKPOS	0341	SEL3	0450
AERR2	0160	ASEMCZ	0366	MA1	0517	SEL35	0463
AERR4	1144	ASLX1	1133	MA2	0105	SEL4	0475
AERR5	1272	ATST1	0362	MA3	0704	SELADR	0554
AFL3	1132	ATST2	0363	MEMBG	0351	SELCNT	0557
AFLIP1	0565	ATST3	0364	MEMLM	0023	SELDEC	0561
AFLIP2	3157	AX1	1131	MINT1	0525	SELINC	0560
AFLIP3	0771	AX1B	1263	MINT3	0142	SELOP1	0555
AGINT	1273	AXCNT	1147	MK1	0527	SELOP2	0556
AIN1	0371	AXCNT1	0356	MK2	0533	SEMCNT	0562
AIN2	1137	AXCNT5	1261	MNT2	0537	SKXR	6171
ALEMN	0162	CHXXOR	1062	MQA	7501	SLX1	0430
ALEMN1	0361	CT1	0365	MQL	7421	START	0200
ALEN0	0357	CTBE	1244	MSJ1	0727	STIP	6173
ALNK1	1262	CTVD	1256	MSET1	0312	SWL1	0426
AMA1	1126	ERR	0731	MSET3	0713	SWL2	0451
AMA2	1127	ERR1	0751	MYLAS	0132	SWL3	0456
AMA3	1130	ERRTMP	0765	NAUTO	1054	SWP	7521
AMEMB1	0572	FL0	0037	NFIX	1233	SWR	0020
AMEMB2	0155	FL00	0035	NS0	0603	SWICH	0306
AMEMB3	0766	FL1	0041	NS1	0605	TMP2	0563
AMEMB4	1145	FL2	0055	NS2	0615	TS1	0400
AMEML1	0566	FL3	0070	NS3	0626	TS2	0024
AMEML2	0156	FL35	0106	NS4	0635	TS3	0600
AMEML3	0767	FL4	0125	NS5	0657	X1	0302
AMEML4	1146	FLADR	0154	NS6	0662	XCNT	0353
AMEML5	1264	FLCNT	0016	NS7	0706	XRON	6170
AMINT3	0772	FLCPAT	0010	NSADR	0761	XR0	6176
AMK1	1134	FLIPCN	0355	NSCNT	0760		
AMK2	1135	FLMCNT	0011	NSMASK	0762		
AMLAS1	0570	FLPAT	0015	NSMCNT	0757		
AMLAS3	0770	FLTPAT	0014	NSPAT1	0763		
AMLAS5	1275	GINT	0237	NSPAT2	0764		
AMSET1	0571	INT	1000	NSX1	0623		
AMYLAS	0360	INT2	1200	NXINT	1125		
ANS5	1143	ITMP	1152	OFF	0544		
ANSADR	0161	K0777	0013	OP1	0021		
ANSMCT	0163	K0777A	0553	OP2	0022		
ANSX1	1142	LCIA	0541	REL0	0213		
AOFF	0367	LCMA	0415	REL1	0216		
AOP1	1150	LEMN	0756	REL2	0221		
AOP2	1151	LEMN1	0564	REL3	0231		
AOP2B	1260	LEMN2	0012	RELAN	0354		
ARELAN	1274	LFIIX	1101	RELOC	0207		
ARELOC	3573	LIAC	0413	REPT	0334		

ERRORS DETECTED: 0

LINKS GENERATED: 0

RUN-TIME: 5 SECONDS

3K CORE USED

AALEND	252	749	750	776#				
AAOFF	727	782#						
ACLOOP	734#	742						
ACTBE	734	737	738	783#				
ACTND	743	784#						
ADONE	726	785#						
AERR	269#	615	728					
AERR1	328	416#						
AERR2	66	134#						
AERR4	605	606	608	609	611	612	614	685#
AERR5	735	736	787#					
AFL3	631	675#						
AFLIP1	247	378	414#					
AFLIP2	88	133#						
AFLIP3	510	561#						
AGINT	752	756	788#					
AINT	173	270#						
AIN2	666	680#						
ALEMN	125	136#						
ALEMN1	231	262#						
ALEND	170	260#	776					
ALNK1	755	779#						
AMA1	249	620	671#					
AMA2	622	672#						
AMA3	624	673#						
AMEMB1	286	354	383	419#	652			
AMEMB2	32	34	122	126	131#	245		
AMEMB3	248	487	558#					
AMEMB4	644	686#						
AMEML1	288	352	415#					
AMEML2	93	132#						
AMEML3	489	515	559#					
AMEML4	591	647	687#					
AMEML5	725	781#						
AMINT3	441	457	562#					
AMK1	651	677#						
AMK2	653	654	656	657	659	660	662	678#
AMLAS1	360	417#						
AMLAS3	499	526	540	560#				
AMLAS5	790#							
AMSET1	316	343	418#					
AMYLAS	204	261#						
ANS5	639	684#						
ANSADR	127	135#						
ANSMCT	121	137#						
ANSX1	637	683#						
AOFF	211	268#	782					
AOP1	573	689#						
AOP2	570	690#						
AOP2B	712	716	777#					
ARELAN	754	789#						
ARELOC	392	420#						
AREPT1	303	330	358	421#				

LNK2	247#													
LNK3	248#													
LNK4	249#													
LNK5	250#	260												
LNKIDX	158	159	164	165	251#									
LNKPOS	155	156	167	168	244#									
MA1	358#	671												
MA2	81#	672												
MA3	497#	673												
MEMBG	131	177	186	189	192	196	252#	419	558	686				
MEMLM	27#	132	415	559	687	781								
MINT1	299	318	372#	386										
MINT3	119#	128	562											
MK1	374#	677												
MK2	378#	678												
MNT2	377	382#												
MQA	8#	48	54	229	537									
MQL	9#	47	64	314	326	341	472							
MS31	509	519#												
MSET1	218#	221	232	418										
MSET3	455	483	507#	518	519	520								
MYLAS	97	106#	111	113	261	417	560	790						
NAUTO	572	619#												
NFIX	715	748#												
NS0	432#	498												
NS1	434#	486												
NS2	442#	454												
NS3	451#	456												
NS4	458#	475	482											
NS5	466	476#	684											
NS6	479#	484												
NS7	493	499#												
NSADR	135	442	447	450	451	458	464	467	473	478	479	513	514	551#
NSCNT	433	485	550#											
NSMASK	431	443	459	468	491	494	496	552#						
NSMCNT	137	508	549#											
NSPAT1	434	438	440	446	462	471	553#							
NSPAT2	437	445	461	470	554#									
NSX1	448#	683												
NXINT	649	666#												
OFF	268	391#												
OP1	25#	107	689											
OP2	26#	690	777											
RELOC	153#	212												
REL1	156#	172												
REL2	159#	166												
REL3	161	167#												
RELAN	162	255#	789											
RELOC	148	149#	151	152	153	157	163	176	184	187	213	420		
REPT	138	238#	240	241	242	421	563	599	681					
RL1	188#	200												
RLERR	194#	679	786											
RTEMP	185	188	190	195	197	214	215	219	225	234	235	253#		

.L1174	596	607	704#
.L1175	590	645	705#
.L1176	582	706#	
.L1177	574	707#	
.L1373	753	793#	
.L1374	728	794#	
.L1375	722	751	795#
.L1376	720	796#	
.L1377	719	797#	
.V0034	582	706#	
.V0037	574	707#	
.V0201	391	424#	
.V0213	212	273#	
.V0342	154	276#	
.V0377	79	798#	
.V0400	205	274#	
.V0777	198	275#	753 793#
.V1331	604	701#	
.V1353	655	693#	
.V1772	652	694#	
.V1777	590	645	705#
.V3354	658	692#	
.V4737	599	703#	
.V4770	615	698#	728 794#
.V5306	621	696#	
.V5736	610	700#	
.V6272	596	607	704#
.V6500	602	702#	
.V6520	613	699#	
.V7000	282	425#	619 623 650 697# 722 751 795#
.V7410	628	630	632 634 636 638 661 695#
.V7745	719	797#	
.V7764	233	272#	
.V7777	720	796#	