

ABSOLUTE BINARY PROGRAM NO. 24315-16001  
DATE CODE 1624

# MEMORY REFERENCE INSTRUCTIONS DIAGNOSTIC

## reference manual

For HP 2100 Series and HP 1000 M/E/F-Series Computers



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# ***HP 2100 Series Memory Reference Instruction Diagnostic Introduction***

The purpose of the HP 2100 Series Memory Reference Instruction Diagnostic is to check that all 14 memory reference instructions operate correctly. The program operates on any 2100 Series computer in 4K of memory. It should be run before the Alter-Skip Instruction Diagnostic and the Shift-Rotate Instruction Diagnostic programs.

## **GENERAL ENVIRONMENT**

### **Hardware Requirement**

This program can be run on any 2100 Series computer. It does not require a teletype or other peripheral devices. Errors and messages to the user are read from the program listing at the end of this text (see Appendix A), according to the location at which the halt occurs. A paper tape reader is required to load the diagnostic. Communication with the operator is provided through the computer Memory Data Register (T-register), and the A- and B-registers.

### **Software Requirement**

The required software consists of the appropriate Binary Loader and the HP 2100 Series Memory Reference Instruction Diagnostic binary object tape, part no. 24315-16001.

This program does *not* use the Diagnostic Configurator. However, locations  $101_8$ - $127_8$  are reserved for the Diagnostic Configurator so that when the diagnostic is loaded, the Configurator (if present) will not be destroyed.

# Operating Procedures

Operating procedures are divided into three parts--Preparation For Diagnostic Run, Running The Diagnostic, and Diagnostic Halts.

## PREPARATION FOR THE DIAGNOSTIC RUN

Before the test can be initiated, the user must load the diagnostic. Since no special configuration procedures are necessary, the user directly loads the 2100 Series Memory Reference Instruction Diagnostic using the Binary Loader. See the *Front Panel Procedures* for the particular 2100 Series computer being used for a description of how to use the Binary Loader. If the user wishes to insure that the proper diagnostic is loaded, he can check memory location  $126_8$  for the Diagnostic Serial Number =  $101100_8$ .

## RUNNING THE DIAGNOSTIC

If switch 12 is set, the diagnostic will run continuously. If switch 12 is clear, the diagnostic eventually halts with Memory Data Register (MDR) =  $102077_8$  indicating the end of the program cycle (one cycle = approximately 35-45 seconds). The diagnostic can be continued by pressing the RUN button.

In order for the diagnostic to run, it is necessary that the HLT instruction work. A small program residing in memory locations 10 through 13 (octal) can be manually entered and used to check the HLT (and JMP) instructions; also, it checks the ability to read the switch register into the A-register.

This program is as follows:

Location	Contents	Assembly Code
00010 <sub>8</sub>	102501	LPO LIA 1
00011 <sub>8</sub>	102000	HLT 0
00012 <sub>8</sub>	102601	OTA 1
00013 <sub>8</sub>	024010	JMP LPO

To check these instructions, single step from location  $10_8$  using the INSTR STEP or SINGLE CYCLE switch. See Front Panel procedures for the specific 2100 computer being used. Change the register displays as needed. If the RUN switch is pressed during this short program, the computer HALTS with  $MDR = 102000_8$ . If a 2115/16 computer is being used, the A-register should be examined to determine if A was loaded properly.

Start the Memory Reference Test Diagnostic at octal location 100 after pressing PRESET or INTERNAL and EXTERNAL PRESETS and selecting program options.

## DIAGNOSTIC HALTS

If switch 12 has been cleared, the diagnostic will end with HALT and  $MDR = 102077_8$  signifying a normal end to the test.

A HALT with  $MDR = 102000_8$  indicates that a Memory Reference Test failure occurred. The failure can be found in the listing (See Appendix A) from the memory address of the HALT. The diagnostic can be continued by pressing RUN.

If an unexpected HALT with  $MDR = 106077_8$  occurs, an unexpected interrupt has occurred. Check for source of the unwanted interrupt, or for transferred program control into a trap cell. (Any unused memory locations from  $2_8$  through  $77_8$  have  $106077_8$  HALT instructions in them.) To continue after this type of HALT, the diagnostic must be restarted at octal location 130.

Another unexpected HALT may occur with  $MDR = 106075_8$ . An unexpected branching has occurred in the program. (Remaining unused memory locations have  $106075_8$  HALT instructions in them.) To continue after this type of HALT, the diagnostic must be restarted at location  $130_8$ .

The diagnostic may be restarted at any time by halting the computer and starting at location  $130_8$ .

# ***Test Sections***

The 2100 Series Memory Reference Instruction Diagnostic is divided into 10 tests. A NOP instruction is included at the end of each test, and can be replaced (manually through the panel) with JMP and HLT instructions if desired.

The instructions used to check the initial memory reference instructions are simple alter-skip instructions such as RSS, CLA, and CCB. These instructions and the initially checked memory reference instructions are used to test the remaining memory reference instructions. Where possible, a preliminary test is made of the alter-skip instructions before they are used.

## **TESTS**

### **Basic Tests**

This test checks for the proper operation of simple alter-skip instructions used later within this and other tests. The simple uses of each memory reference instruction are tested.

### **Memory References To A-And B-Registers**

This test checks each memory reference instruction by addressing the A- and B-registers.

### **Extend- And Overflow-Register Checks**

This test checks the results in the Extend- and Overflow-registers after execution of ADA and ADB instructions.

### **Indirect Addressing Tests**

This test checks each memory reference instruction for one and two levels of indirect addressing.



### **Indirect Addressing To Page 1**

This test checks the ability of each memory reference instruction to indirectly address Page 1 from Page 0.

*Note: Page 0 is memory locations 0 through 1777 octal  
Page 1 is memory locations 2000 through 3777 octal*

### **Indirect Addressing To Page 0**

This test checks the ability of each memory reference instruction to indirectly address Page 0 from Page 1.

### **Register Interaction Test**

This test checks that the execution of each memory reference instruction does not change any other register; for example, an LDA instruction must not affect the B-, Extend-, and Overflow-registers.

### **Indirect Addressing Via A-And B-Registers**

This test checks each memory reference instruction by indirectly addressing the A- and B-registers.

### **Iterative Tests**

This test repeats each memory reference instruction in a loop 65K times to insure that it repeats consistently. If an intermittent failure occurs, it may be detected this way.

### **Data Pattern Tests**

This test checks the load, store, and compare instructions through 2K of memory (less the last 100<sub>8</sub> locations). It then checks the ADA, ADB, IOR, XOR, and AND instructions for 10 pairs of arbitrary arguments.



# Appendix A

PAGE 0002 #01 2100 SERIES COMPUTER MEMORY REFERENCE TEST

```
0001          ASMB,A,B,L,C
0003 00126          ORG 126H
0004 00126 101100    OCT 101100    DIAGNOSTIC SERIAL NUMBER
0005*
0007*****
0007*
0008* MEMORY REFERENCE INSTRUCTION GROUP DIAGNOSTIC
0009*
0010* RUNS IN 4K MEMORY
0011*
0012* TELETYPE NOT REQUIRED
0013*
0014* DIAGNOSTIC CONFIGURATOR NOT REQUIRED
0015*
0016* DIAGNOSTIC SERIAL NO (DSN) 101100
0017*
0018*      1.  LOAD MRG DIAGNOSTIC.
0019*
0020*      2.  SET P REGISTER TO 100.
0021*
0022*      3.  SELECT PROGRAM OPTIONS IN THE SWITCH REGISTER:
0023*
0024***** SWITCH REGISTER OPTIONS *****
0025*
0026*      BIT          MEANING
0027*
0028*      0-11        RESERVED
0029*      12          CLEAR TO HALT 102077 AT END OF PASS.
0030*                SET TO LOOP ON DIAGNOSTIC
0031*      13-15      RESERVED
0032*
0033*      4.  PRESET(INT. & EXT. IF PRESENT) AND RUN.
0034*
0035***** COMPUTER HALTS *****
0036*
0037*      HALT          MEANING
0038*
0039*      102000      ERROR HALT
0040*      102077      END OF PASS
0041*      106075      UNEXPECTED HALT(LOCATIONS 3472 THRU 6477)
0042*      106077      UNEXPECTED HALT(LOCATIONS 2 THRU 77)
0043*
0044*****
```

PAGE 0003 #01 2100 SERIES COMPUTER MEMORY REFERENCE TEST

0046\* THE FOLLOWING SOURCE LINES ARE SUPPRESSED  
0047\* UNL SUPPRESS SOURCE LISTING  
0048\* ORG 2  
0049\* REP 62 106077 HALTS IN CORE  
0050\* OCT 106077 LOC 2 THRU 77  
0051\* ORG 3472B  
0052\* REP 3005B  
0053\* OCT 106075 LOC 3472 THRU 6477  
0061 LST RESUME SOURCE LISTING

0063\* THE FOLLOWING IS A SIMPLE LOOP WHICH CAN BE USED TO CHECK THE  
0064\* SWITCH REGISTER, HLT INSTRUCTION & JMP INSTRUCTION PRIOR TO  
0065\* EXECUTION OF THE MRG DIAGNOSTIC.  
0066\* THIS PROGRAM MUST BE MANUALLY LOADED VIA THE FRONT PANFL.  
0067\*

0068\* 00010 ORG 10B  
0069\* 00010 102501 LPO LIA 1  
0070\* 00011 102000 HLT 0  
0071\* 00012 102601 OTA 1  
0072\* 00013 024010 JMP LPO

0074 00100 ORG 100B  
0075 00100 024130 JMP 130B

```

0077 00130          ORG 1300
0078*
0079* CHECK SIMPLE ALTER-SKIP INSTRUCTIONS
0080*
0081 00130 002001  START RSS
0082 00131 102000          HLT 0          RSS FAILED
0083*
0084 00132 002400          CLA
0085 00133 002002          SZA
0086 00134 102000          HLT 0          CLA/SZA FAILED
0087*
0088 00135 002400          CLA
0089 00136 002003          SZA,RSS
0090 00137 002001          RSS
0091 00140 102000          HLT 0          CLA/SZA,RSS FAILED
0092*
0093 00141 006400          CLB
0094 00142 006002          SZB
0095 00143 102000          HLT 0          CLB/SZB FAILED
0096*
0097 00144 006400          CLB
0098 00145 006003          SZB,RSS
0099 00146 002001          RSS
0100 00147 102000          HLT 0          CLB/SZB,RSS FAILED
0101*
0102* CHECK CPA INSTRUCTION
0103*
0104 00150 002400          CLA
0105 00151 051657          CPA .0
0106 00152 002001          RSS
0107 00153 102000          HLT 0          CLA/CPA .0 FAILED
0108*
0109 00154 002400          CLA
0110 00155 051655          CPA M1
0111 00156 102000          HLT 0          CLA/CPA M1 FAILED
0112*
0113 00157 003400          CCA
0114 00160 051655          CPA M1
0115 00161 002001          RSS
0116 00162 102000          HLT 0          CCA/CPA M1 FAILED
0117*
0118 00163 002404          CLA,INA
0119 00164 002003          SZA,RSS
0120 00165 102000          HLT 0          CLA,INA/SZA,RSS FAILED
0121*
0122 00166 002404          CLA,INA
0123 00167 051660          CPA .1
0124 00170 002001          RSS

```

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0125	00171	102000	HLT 0	CLA,INA/CPA .1 FAILED
0126*				
0127*	CHECK LDA & CPA INSTRUCTIONS			
0128*				
0129	00172	061657	LDA .0	
0130	00173	051657	CPA .0	
0131	00174	002001	RSS	
0132	00175	102000	HLT 0	LDA .0/CPA .0 FAILED
0133*				
0134	00176	061655	LDA M1	
0135	00177	051655	CPA M1	
0136	00200	002001	RSS	
0137	00201	102000	HLT 0	LDA M1/CPA M1 FAILED
0138*				
0139	00202	061661	LDA EVEN1	
0140	00203	051661	CPA EVEN1	
0141	00204	002001	RSS	
0142	00205	102000	HLT 0	LDA EVEN1/CPA EVEN1 FAILED
0143*				
0144	00206	061662	LDA ODD1	
0145	00207	051662	CPA ODD1	
0146	00210	002001	RSS	
0147	00211	102000	HLT 0	LDA ODD1 /CPA ODD1 FAILED
0148*				
0149	00212	002400	CLA	
0150	00213	051655	CPA M1	
0151	00214	102000	HLT 0	CLA/CPA M1 FAILED
0152*				
0153	00215	061661	LDA EVEN1	
0154	00216	051662	CPA ODD1	
0155	00217	102000	HLT 0	LDA EVEN1/CPA ODD1 FAILED
0156*				
0157*				
0158*	CHECK STA INSTRUCTION			
0159*				
0160	00220	002400	CLA	
0161	00221	071671	STA T1	
0162	00222	051671	CPA T1	
0163	00223	002001	RSS	
0164	00224	102000	HLT 0	CLA/STA T1/CPA T1 FAILED
0165*				
0166	00225	003400	CCA	
0167	00226	071671	STA T1	
0168	00227	051671	CPA T1	
0169	00230	002001	RSS	
0170	00231	102000	HLT 0	CLA/STA T1/CPA T1 FAILED
0171*				
0172	00232	061661	LDA EVEN1	

0173	00233	071671	STA T1	
0174	00234	051671	CPA T1	
0175	00235	002001	RSS	
0176	00236	102000	HLT 0	LDA EVEN1/STA T1/CPA T1 FAILED
0177*				
0178	00237	061662	LDA ODD1	
0179	00240	071671	STA T1	
0180	00241	051671	CPA T1	
0181	00242	002001	RSS	
0182	00243	102000	HLT 0	LDA ODD1/STA T1/CPA T1 FAILED
0183*				
0184*				
0185*	CHECK AND INSTRUCTION			
0186*				
0187	00244	003400	CCA	
0188	00245	011655	AND M1	
0189	00246	051655	CPA M1	
0190	00247	002001	RSS	
0191	00250	102000	HLT 0	CCA/AND M1/CPA M1 FAILED
0192*				
0193	00251	002400	CLA	
0194	00252	011655	AND M1	
0195	00253	002002	SZA	
0196	00254	102000	HLT 0	CLA/AND M1/SZA FAILED
0197*				
0198	00255	002400	CLA	
0199	00256	011657	AND .0	
0200	00257	002002	SZA	
0201	00260	102000	HLT 0	CLA/AND .0/SZA FAILED
0202*				
0203	00261	003400	CCA	
0204	00262	011657	AND .0	
0205	00263	002002	SZA	
0206	00264	102000	HLT 0	CCA/AND .0/SZA FAILED
0207*				
0208*	CHECK IOR INSTRUCTION			
0209*				
0210	00265	002400	CLA	
0211	00266	031657	IOR .0	
0212	00267	002002	SZA	
0213	00270	102000	HLT 0	CLA/IOR .0/SZA FAILED
0214*				
0215	00271	002400	CLA	
0216	00272	031655	IOR M1	
0217	00273	051655	CPA M1	
0218	00274	002001	RSS	
0219	00275	102000	HLT 0	CLA/IOR M1/CPA M1 FAILED
0220*				

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0221	00276	003400	CCA	
0222	00277	031655	IOR	M1
0223	00300	051655	CPA	M1
0224	00301	002001	RSS	
0225	00302	102000	HLT	0
				CCA/IOR M1/CPA M1 FAILED
0226*				
0227	00303	003400	CCA	
0228	00304	031657	IOR	.0
0229	00305	051655	CPA	M1
0230	00306	002001	RSS	
0231	00307	102000	HLT	0
				CCA/IOR .0/CPA M1 FAILED
0232*				
0233*	CHECK XOR INSTRUCTION			
0234*				
0235	00310	002400	CLA	
0236	00311	021657	XOR	.0
0237	00312	002002	SZA	
0238	00313	102000	HLT	0
				CLA/XOR .0/SZA FAILED
0239*				
0240	00314	003400	CCA	
0241	00315	021657	XOR	.0
0242	00316	051655	CPA	M1
0243	00317	002001	RSS	
0244	00320	102000	HLT	0
				CCA/XOR .0/CPA M1 FAILED
0245*				
0246	00321	002400	CLA	
0247	00322	021655	XOR	M1
0248	00323	051655	CPA	M1
0249	00324	002001	RSS	
0250	00325	102000	HLT	0
				CLA/XOR M1/CPA M1 FAILED
0251*				
0252	00326	003400	CCA	
0253	00327	021655	XOR	M1
0254	00330	002002	SZA	
0255	00331	102000	HLT	0
				CCA/XOR M1/SZA FAILED
0256*				
0257*	CHECK CPB INSTRUCTION			
0258*				
0259	00332	006400	CLB	
0260	00333	055657	CPB	.0
0261	00334	002001	RSS	
0262	00335	102000	HLT	0
				CLB/CPB .0 FAILED
0263*				
0264	00336	006400	CLB	
0265	00337	055655	CPB	M1
0266	00340	102000	HLT	0
				CLB/CPB M1 FAILED
0267*				
0268	00341	007400	CCB	



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0269	00342	055655	CPB M1	
0270	00343	002001	RSS	
0271	00344	102000	HLT 0	CCB/CPB M1 FAILED
0272*				
0273	00345	006404	CLB,INB	
0274	00346	006003	SZB,RSS	
0275	00347	102000	HLT 0	CLB,INB/SZB,RSS FAILED
0276*				
0277	00350	006404	CLB,INB	
0278	00351	055660	CPB .1	
0279	00352	002001	RSS	
0280	00353	102000	HLT 0	CLB,INB/CPB .1 FAILED
0281*				
0282*	CHECK LDB & CPB INSTRUCTIONS			
0283*				
0284	00354	065657	LDB .0	
0285	00355	055657	CPB .0	
0286	00356	002001	RSS	
0287	00357	102000	HLT 0	LDB .0/CPB .0 FAILED
0288*				
0289	00360	055655	LDB M1	
0290	00361	055655	CPB M1	
0291	00362	002001	RSS	
0292	00363	102000	HLT 0	LDB M1/CPB M1 FAILED
0293*				
0294	00364	065661	LDB EVEN1	
0295	00365	055661	CPB EVEN1	
0296	00366	002001	RSS	
0297	00367	102000	HLT 0	LDB EVEN1/CPB EVEN1 FAILED
0298*				
0299	00370	065662	LDB ODD1	
0300	00371	055662	CPB ODD1	
0301	00372	002001	RSS	
0302	00373	102000	HLT 0	LDB ODD1/CPB ODD1 FAILED
0303*				
0304	00374	006400	CLB	
0305	00375	055655	CPB M1	
0306	00376	102000	HLT 0	CLB/CPB M1 FAILED
0307*				
0308	00377	065661	LDB EVEN1	
0309	00400	055662	CPB ODD1	
0310	00401	102000	HLT 0	LDB EVEN1/CPB ODD1 FAILED
0311*				
0312*	CHECK STB INSTRUCTION			
0313*				
0314	00402	006400	CLB	
0315	00403	075671	STB T1	
0316	00404	055671	CPB T1	

0317	00405	002001	RSS	
0318	00406	102000	HLT 0	CLB/STB T1/CPB T1 FAILED
0319*				
0320	00407	007400	CCB	
0321	00410	075671	STB T1	
0322	00411	055671	CPB T1	
0323	00412	002001	RSS	
0324	00413	102000	HLT 0	CCB/STB T1/CPB T1 FAILED
0325*				
0326	00414	065661	LDB EVEN1	
0327	00415	075671	STB T1	
0328	00416	055671	CPB T1	
0329	00417	002001	RSS	
0330	00420	102000	HLT 0	LDB EVEN1/STB T1/CPB T1 FAILED
0331*				
0332	00421	065662	LDB ODD1	
0333	00422	075671	STB T1	
0334	00423	055671	CPB T1	
0335	00424	002001	RSS	
0336	00425	102000	HLT 0	LDB ODD1/STB ODD1/CPB T1 FAILED
0337*				
0338*	CHECK ADA INSTRUCTION			
0339*				
0340	00426	002400	CLA	
0341	00427	041655	ADA M1	
0342	00430	051655	CPA M1	
0343	00431	002001	RSS	
0344	00432	102000	HLT 0	CLA/ADA M1/CPA M1 FAILED
0345*				
0346	00433	003400	CCA	
0347	00434	041655	ADA M1	
0348	00435	051656	CPA M2	
0349	00436	002001	RSS	
0350	00437	102000	HLT 0	CCA/ADA M1/CPA M2 FAILED
0351*				
0352	00440	061662	LDA ODD1	A=125252
0353	00441	041662	ADA ODD1	A=052524
0354	00442	051663	CPA K1	
0355	00443	002001	RSS	
0356	00444	102000	HLT 0	LDA ODD1/ADA ODD1/CPA K1 FAILED
0357*				
0358	00445	061661	LDA EVEN1	A = 052525
0359	00446	041661	ADA EVEN1	A = 125252
0360	00447	051662	CPA ODD1	
0361	00450	002001	RSS	
0362	00451	102000	HLT 0	LDA EVEN1/ADA EVEN1/CPA ODD1 FAI
0363*				
0364*	CHECK ADB INSTRUCTION			

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```

0365*
0366 00452 006400      CLB
0367 00453 045655      ADB M1
0368 00454 055655      CPB M1
0369 00455 002001      RSS
0370 00456 102000      HLT 0          CLB/ADB M1/CPB M1 FAILED
0371*
0372 00457 007400      CCB
0373 00460 045655      ADB M1
0374 00461 055656      CPB M2
0375 00462 002001      RSS
0376 00463 102000      HLT 0          CCB/ADB M1/CPB M2 FAILED
0377*
0378 00464 065662      LDB ODD1      B=125252
0379 00465 045662      ADB ODD1      B=052524
0380 00466 055663      CPB K1
0381 00467 002001      RSS
0382 00470 102000      HLT 0          LDB ODD1/ ADB ODD1/CPB K1 FAILED
0383*
0384 00471 065661      LDB EVEN1     B=125252
0385 00472 045661      ADB EVEN1     B=052525
0386 00473 055662      CPB ODD1
0387 00474 002001      RSS
0388 00475 102000      HLT 0          LDB EVEN1/ADB EVEN1/CPB ODD1 FAI
0389*
0390* CHECK JMP INSTRUCTION
0391*
0392 00476 024500      JMP ++2
0393 00477 102000      HLT 0          JMP FAILED
0394*
0395* CHECK JSB INSTRUCTION
0396*
0397 00500 002400      CLA
0398 00501 070504      STA X2        NOP LOCATION X2
0399 00502 014504      JSB ++2
0400 00503 102000      X1 HLT 0      JSB FAILED
0401 00504 000000      X2 NOP
0402 00505 060504      LDA X2
0403 00506 051672      CPA ADDR1     ADDR1 = ADDRESS X1
0404 00507 002001      RSS
0405 00510 102000      HLT 0          JSB FAILED = BAD RETURN ADDRESS
0406*
0407* CHECK ISZ INSTRUCTION
0408*
0409 00511 002400      CLA
0410 00512 071671      STA T1        T1=0
0411 00513 035671      ISZ T1
0412 00514 002001      RSS

```

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0413	00515	102000		HLT 0	ISZ FAILED - UNEXPECTED SKIP
0414	00516	065671		LDB T1	
0415	00517	055660		CPB .1	
0416	00520	002001		RSS	
0417	00521	102000		HLT 0	ISZ FAILED - T1 NOT 1
0418*					
0419	00522	003400		CCA	
0420	00523	071671		STA T1	T1=177777
0421	00524	035671		ISZ T1	
0422	00525	102000		HLT 0	ISZ FAILED - DID NOT SKIP
0423	00526	061671		LDA T1	
0424	00527	002002		SZA	
0425	00530	102000		HLT 0	ISZ FAILED - T1 NOT 0
0426*					
0427	00531	002400		CLA	
0428	00532	071671		STA T1	T1=0
0429	00533	002004	X4	INA	
0430	00534	002003		SZA,RSS	
0431	00535	024545		JMP X5	
0432	00536	035671		ISZ T1	
0433	00537	002001		RSS	
0434	00540	102000		HLT 0	ISZ FAILED - UNEXPECTED SKIP
0435	00541	051671		CPA T1	
0436	00542	024533		JMP X4	
0437	00543	102000		HLT 0	ISZ FAILED - T1 NOT INCREMENTED
0438	00544	024533		JMP X4	
0439*					
0440	00545	000000	X5	NOP *****	MODULE LOOP

PAGE 0012 #01 MEMORY REFERENCES TO A & B REGISTERS

0442	00546	061675		LDA JR1	A ← JMP RTN1
0443	00547	065667		LDB HLT0	B ← 102000
0444	00550	024000		JMP A	
0445	00551	102000		HLT 0	JMP A FAILED
0446*					
0447	00552	061667	RTN1	LDA HLT0	A ← 102000
0448	00553	065676		LDB JR2	B ← JMP RTN2
0449	00554	024001		JMP B	
0450	00555	102000		HLT 0	JMP B FAILED
0451*					
0452	00556	002400	RTN2	CLA	A ← NOP
0453	00557	065677		LDB JR3	B ← JMP RTN3
0454	00560	014000		JSB A	
0455	00561	102000	P3	HLT 0	JSB A FAILED
0456	00562	051673	RTN3	CPA ADDR3	ADDR3 = LOCATION P3
0457	00563	002001		RSS	
0458	00564	102000		HLT 0	BAD RETURN ADDRESS IN A
0459*					
0460	00565	061667		LDA HLT0	A ← 102000
0461	00566	065700		LDB JR4	
0462	00567	074002		STB 2	2 ← JMP RTN4
0463	00570	006400		CLB	B ← NOP
0464	00571	014001		JSB B	
0465	00572	102000	P4	HLT 0	JSB B FAILED
0466	00573	055674	RTN4	CPB ADDR4	ADDR4 = LOCATION P4
0467	00574	002001		RSS	
0468	00575	102000		HLT 0	BAD RETURN ADDRESS IN B
0469*					
0470	00576	061670		LDA H7077	H7077 = 107077
0471	00577	070002		STA 2	RESTORE HALT TO LOCATION 2
0472*					
0473	00600	065661		LDB EVEN1	
0474	00601	060001		LDA B	
0475	00602	051661		CPA EVEN1	
0476	00603	002001		RSS	
0477	00604	102000		HLT 0	LDA B FAILED
0478*					
0479	00605	061662		LDA ODD1	
0480	00606	064000		LDB A	
0481	00607	055662		CPB ODD1	
0482	00610	002001		RSS	
0483	00611	102000		HLT 0	LDB A FAILED
0484*					
0485	00612	007400		CCB	
0486	00613	002400		CLA	
0487	00614	070001		STA B	
0488	00615	006002		SZB	
0489	00616	102000		HLT 0	STA B FAILED

PAGE 0013 #01 MEMORY REFERENCES TO A & B REGISTERS

0490*			
0491	00617	003400	CCA
0492	00620	006400	CLB
0493	00621	074000	STB A
0494	00622	002002	SZA
0495	00623	102000	HLT 0
0496*			STB A FAILED
0497	00624	061661	LDA EVEN1
0498	00625	065661	LDB EVEN1
0499	00626	050001	CPA B
0500	00627	002001	RSS
0501	00630	102000	HLT 0
0502	00631	054000	CPB A
0503	00632	002001	RSS
0504	00633	102000	HLT 0
0505*			CPB A FAILED
0506	00634	065655	LDB M1
0507	00635	002400	CLA
0508	00636	030001	IOR B
0509	00637	051655	CPA M1
0510	00640	002001	RSS
0511	00641	102000	HLT 0
0512*			IOR B FAILED
0513	00642	007400	CCB
0514	00643	002400	CLA
0515	00644	020001	XOR B
0516	00645	051655	CPA M1
0517	00646	002001	RSS
0518	00647	102000	HLT 0
0519*			XOR B FAILED
0520	00650	007400	CCB
0521	00651	061661	LDA EVEN1
0522	00652	010001	AND B
0523	00653	051661	CPA EVEN1
0524	00654	002001	RSS
0525	00655	102000	HLT 0
0526*			AND B FAILED
0527	00656	065661	LDB EVEN1
0528	00657	002400	CLA
0529	00660	040001	ADA B
0530	00661	051661	CPA EVEN1
0531	00662	002001	RSS
0532	00663	102000	HLT 0
0533*			ADA B FAILED
0534	00664	061662	LDA ODD1
0535	00665	006400	CLB
0536	00666	044000	ADB A
0537	00667	055662	CPB ODD1

PAGE 0014 #01 MEMORY REFERENCES TO A & B REGISTERS

0538	00670	002001		RSS	
0539	00671	102000		HLT 0	ADB A FAILED
0540*					
0541	00672	002400		CLA	
0542	00673	006400		CLB	
0543	00674	006004	X20	INB	B+B+1: NEXT EXPECTED A CONTENTS
0544	00675	006002		SZB	EXPECT ISZ TO CAUSE SKIP IF 0
0545	00676	024704		JMP X21	NO SKIP EXPECTED
0546	00677	034000		ISZ A	
0547	00700	102000		HLT 0	ISZ A FAILED - DID NOT SKIP
0548	00701	002002		SZA	
0549	00702	102000		HLT 0	ISZ FAILED - A NOT 0
0550	00703	024715		JMP X22	END OF LOOP
0551	00704	034000	X21	ISZ A	
0552	00705	002001		RSS	
0553	00706	102000		HLT 0	ISZ A FAILED - UNEXPECTED SKIP
0554	00707	050001		CPA B	
0555	00710	024674		JMP X20	
0556	00711	102000		HLT 0	ISZ A FAILED - BAD CONTENTS IN A
0557	00712	024674		JMP X20	
0558*					
0559	00713	002400		CLA	
0560	00714	006400		CLB	
0561	00715	002004	X22	INA	A+A+1: NEXT EXPECTED B CONTENTS
0562	00716	002002		SZA	EXPECT ISZ TO CAUSE SKIP IF 0
0563	00717	024725		JMP X23	NO SKIP EXPECTED
0564	00720	034001		ISZ B	
0565	00721	102000		HLT 0	ISZ B FAILED - DID NOT SKIP
0566	00722	006002		SZB	
0567	00723	102000		HLT 0	ISZ FAILED - B NOT 0
0568	00724	024734		JMP X24	END OF LOOP
0569	00725	034001	X23	ISZ B	
0570	00726	002001		RSS	
0571	00727	102000		HLT 0	ISZ B FAILED - UNEXPECTED SKIP
0572	00730	054000		CPB A	
0573	00731	024715		JMP X22	
0574	00732	102000		HLT 0	ISZ B FAILED - BAD CONTENTS IN B
0575	00733	024715		JMP X22	
0576*					
0577	00734	061661	X24	LDA EVEN1	
0578	00735	050000		CPA A	
0579	00736	002001		RSS	
0580	00737	102000		HLT 0	CPA A FAILED
0581*					
0582	00740	065662		LDB ODD1	
0583	00741	054001		CPB B	
0584	00742	002001		RSS	
0585	00743	102000		HLT 0	CPB B FAILED

PAGE 0015 #01 MEMORY REFERENCES TO A & B REGISTERS

0586*				
0587	00744	061662	LDA	ODD1
0588	00745	060000	LDA	A
0589	00746	050000	CPA	A
0590	00747	002001	RSS	
0591	00750	102000	HLT	0 LDA A/CPA A FAILED
0592*				
0593	00751	065661	LDB	EVEN1
0594	00752	064001	LDB	B
0595	00753	054001	CPB	B
0596	00754	002001	RSS	
0597	00755	102000	HLT	0 LDB B/CPB B FAILED
0598*				
0599	00756	003400	CCA	
0600	00757	070000	STA	A
0601	00760	051655	CPA	M1
0602	00761	002001	RSS	
0603	00762	102000	HLT	0 STA A FAILED
0604*				
0605	00763	065662	LDB	ODD1
0606	00764	074001	STB	B
0607	00765	055662	CPB	ODD1
0608	00766	002001	RSS	
0609	00767	102000	HLT	0 STB B FAILED
0610*				
0611	00770	061661	LDA	EVEN1
0612	00771	040000	ADA	A
0613	00772	051662	CPA	ODD1
0614	00773	002001	RSS	
0615	00774	102000	HLT	0 ADA A FAILED
0616*				
0617	00775	065662	LDB	ODD1
0618	00776	044001	ADB	B
0619	00777	055663	CPB	K1
0620	01000	002001	RSS	
0621	01001	102000	HLT	0 ADB B FAILED
0622*				
0623	01002	003400	CCA	
0624	01003	030000	IOR	A
0625	01004	051655	CPA	M1
0626	01005	002001	RSS	
0627	01006	102000	HLT	0 IOR A FAILED
0628*				
0629	01007	003400	CCA	
0630	01010	010000	AND	A
0631	01011	051655	CPA	M1
0632	01012	002001	RSS	
0633	01013	102000	HLT	0 AND A FAILED



PAGE 0016 #01 MEMORY REFERENCES TO A & B REGISTERS

#634*				
#635	01014	003400	CCA	
#636	01015	020000	XOR A	
#637	01016	002002	SZA	
#638	01017	102000	HLT 0	XOR A FAILED
#639*				
#640	01020	000000	NOP *****	MODULE LOOP

PAGE 0017 #01 E AND OV REGISTER CHECKS

0642	01021	000040	CLE	
0643	01022	002040	SEZ	
0644	01023	102000	HLT 0	CLE/SEZ FAILED
0645*				
0646	01024	000040	CLE	
0647	01025	002041	SEZ,RSS	
0648	01026	002001	RSS	
0649	01027	102000	HLT 0	CLE/SEZ,RSS/RSS FAILED
0650*				
0651	01030	002300	CCE	
0652	01031	002041	SEZ,RSS	
0653	01032	102000	HLT 0	CCE/SEZ,RSS FAILED
0654*				
0655	01033	002300	CCE	
0656	01034	002040	SEZ	
0657	01035	002001	RSS	
0658	01036	102000	HLT 0	CCE/SEZ/RSS FAILED
0659*				
0660	01037	103101	CLO	
0661	01040	102201	SOC	
0662	01041	102000	HLT 0	CLO/SOC FAILED
0663*				
0664	01042	103101	CLO	
0665	01043	102301	SOS	
0666	01044	002001	RSS	
0667	01045	102000	HLT 0	CLO/SOS/RSS FAILED
0668*				
0669	01046	102101	STO	
0670	01047	102301	SOS	
0671	01050	102000	HLT 0	STO/SOS FAILED
0672*				
0673	01051	102101	STO	
0674	01052	102201	SOC	
0675	01053	002001	RSS	
0676	01054	102000	HLT 0	STO/SOC/RSS FAILED
0677*				
0678	01055	102101	STO	
0679	01056	103301	SOS C	
0680	01057	102000	HLT 0	STO/SOS C FAILED
0681	01060	102201	SOC	
0682	01061	102000	HLT 0	SOS,C DID NOT CLEAR OV
0683*				
0684*	CHECK E & OV RESULTS FOR ADA INSTRUCTION			
0685*				
0686	01062	000040	CLE	
0687	01063	103101	CLO	
0688	01064	061664	LDA PMAX	ADD 077777 + 000001
0689	01065	041660	ADA .1	

PAGE 0018 #01 E AND OV REGISTER CHECKS

0690	01066	051666	CPA BIT15	
0691	01067	002001	RSS	
0692	01070	102000	HLT 0	SUM NOT 100000
0693	01071	002040	SEZ	
0694	01072	102000	HLT 0	E NOT 0
0695	01073	102301	SOS	
0696	01074	102000	HLT 0	OV NOT 1
0697*				
0698	01075	000040	CLE	
0699	01076	103101	CLO	
0700	01077	061655	LDA M1	ADD 177777 + 177777
0701	01100	041655	ADA M1	
0702	01101	051656	CPA M2	
0703	01102	002001	RSS	
0704	01103	102000	HLT 0	SUM NOT 177776
0705	01104	002041	SEZ, RSS	
0706	01105	102000	HLT 0	E NOT 1
0707	01106	102201	SOC	
0708	01107	102000	HLT 0	OV NOT 0
0709*				
0710	01110	000040	CLE	
0711	01111	103101	CLO	
0712	01112	061655	LDA M1	ADD 177777 + 000001
0713	01113	041660	ADA .1	
0714	01114	002002	SZA	
0715	01115	102000	HLT 0	SUM NOT 000000
0716	01116	002041	SEZ, RSS	
0717	01117	102000	HLT 0	E NOT 1
0718	01120	102201	SOC	
0719	01121	102000	HLT 0	OV NOT 0
0720*				
0721	01122	000040	CLE	
0722	01123	103101	CLO	
0723	01124	002000	CLA	
0724	01125	041657	ADA .0	ADD 000000 + 000000
0725	01126	002002	SZA	
0726	01127	102000	HLT 0	SUM NOT 000000
0727	01130	002040	SEZ	
0728	01131	102000	HLT 0	E NOT 0
0729	01132	102201	SOC	
0730	01133	102000	HLT 0	OV NOT 0
0731*				
0732	01134	000040	CLE	
0733	01135	103101	CLO	
0734	01136	061664	LDA PMAX	ADD 077777 + 077777
0735	01137	041664	ADA PMAX	
0736	01140	051656	CPA M2	
0737	01141	002001	RSS	

PAGE 0019 #01 E AND OV REGISTER CHECKS

0738	01142	102000	HLT 0	SUM NOT 177776
0739	01143	002040	SEZ	
0740	01144	102000	HLT 0	E NOT 0
0741	01145	102301	SOS	
0742	01146	102000	HLT 0	OV NOT 1
0743*				
0744	01147	000040	CLE	
0745	01150	103101	CLO	
0746	01151	061666	LDA BIT15	ADD 100000 + 100000
0747	01152	041666	ADA BIT15	
0748	01153	002002	SZA	
0749	01154	102000	HLT 0	SUM NOT 000000
0750	01155	002041	SEZ, RSS	
0751	01156	102000	HLT 0	E NOT 1
0752	01157	102301	SOS	
0753	01160	102000	HLT 0	OV NOT 1
0754*				
0755	01161	000040	CLE	
0756	01162	103101	CLO	
0757	01163	061666	LDA BIT15	ADD 100000 + 077777
0758	01164	041664	ADA PMAX	
0759	01165	051655	CPA M1	
0760	01166	002001	RSS	
0761	01167	102000	HLT 0	SUM NOT 177777
0762	01170	002040	SEZ	
0763	01171	102000	HLT 0	E NOT 0
0764	01172	102201	SOC	
0765	01173	102000	HLT 0	OV NOT 0
0766*				
0767	01174	002300	CCE	E + 1
0768	01175	102101	STO	OV + 1
0769	01176	061660	LDA .1	
0770	01177	041660	ADA .1	
0771	01200	002041	SEZ, RSS	
0772	01201	102000	HLT 0	E NOT 1
0773	01202	102301	SOS	
0774	01203	102000	HLT 0	OV NOT 1
0775*				
0776*	CHECK E & OV RESULTS FOR ADB INSTRUCTION			
0777*				
0778	01204	000040	CLE	
0779	01205	103101	CLO	
0780	01206	006400	CLB	
0781	01207	045657	ADB 0	ADD 000000 + 000000
0782	01210	006002	SZB	
0783	01211	102000	HLT 0	SUM NOT 000000
0784	01212	002040	SEZ	
0785	01213	102000	HLT 0	E NOT 0

PAGE 0020 #01 E AND OV REGISTER CHECKS

0786	01214	102201	SOC	
0787	01215	102000	HLT 0	OV NOT 0
0788*				
0789	01216	000040	CLE	
0790	01217	103101	CLO	
0791	01220	065664	LDB PMAX	ADD 077777 + 077777
0792	01221	045664	ADB PMAX	
0793	01222	055656	CPB M2	
0794	01223	002001	RSS	
0795	01224	102000	HLT 0	SUM NOT 177776
0796	01225	002040	SEZ	
0797	01226	102000	HLT 0	E NOT 0
0798	01227	102301	SOS	
0799	01230	102000	HLT 0	OV NOT 1
0800*				
0801	01231	000040	CLE	
0802	01232	103101	CLO	
0803	01233	065664	LDB PMAX	ADD 077777 + 000001
0804	01234	045660	ADB .1	
0805	01235	055666	CPB BIT15	
0806	01236	002001	RSS	
0807	01237	102000	HLT 0	SUM NOT 100000
0808	01240	002040	SEZ	
0809	01241	102000	HLT 0	E NOT 0
0810	01242	102301	SOS	
0811	01243	102000	HLT 0	OV NOT 1
0812*				
0813	01244	000040	CLE	
0814	01245	103101	CLO	
0815	01246	065655	LDB M1	ADD 177777 + 177777
0816	01247	045655	ADB M1	
0817	01250	055656	CPB M2	
0818	01251	002001	RSS	
0819	01252	102000	HLT 0	SUM NOT 177776
0820	01253	002041	SEZ, RSS	
0821	01254	102000	HLT 0	E NOT 1
0822	01255	102201	SOC	
0823	01256	102000	HLT 0	OV NOT 0
0824*				
0825	01257	000040	CLE	
0826	01260	103101	CLO	
0827	01261	065655	LDB M1	ADD 177777 + 000001
0828	01262	045660	ADB .1	
0829	01263	006002	SZB	
0830	01264	102000	HLT 0	SUM NOT 000000
0831	01265	002041	SEZ, RSS	
0832	01266	102000	HLT 0	E NOT 1
0833	01267	102201	SOC	

PAGE 0021 #01 E AND OV REGISTER CHECKS

0834	01270	102000	HLT 0	OV NOT 0
0835*				
0836	01271	000040	CLE	
0837	01272	103101	CLO	
0838	01273	065666	LDB BIT15	ADD 100000 + 100000
0839	01274	045666	ADB BIT15	
0840	01275	006002	SZB	
0841	01276	102000	HLT 0	SUM NOT 000000
0842	01277	002041	SEZ,RSS	
0843	01300	102000	HLT 0	E NOT 1
0844	01301	102301	SOS	
0845	01302	102000	HLT 0	OV NOT 1
0846*				
0847	01303	000040	CLE	
0848	01304	103101	CLO	
0849	01305	065666	LDB BIT15	ADD 100000 + 077777
0850	01306	045664	ADB PMAX	
0851	01307	055655	CPB M1	
0852	01310	002001	RSS	
0853	01311	102000	HLT 0	SUM NOT 177777
0854	01312	002040	SEZ	
0855	01313	102000	HLT 0	E NOT 0
0856	01314	102201	SOC	
0857	01315	102000	HLT 0	OV NOT 0
0858*				
0859	01316	002300	CCE	E + 1
0860	01317	102101	STO	OV + 1
0861	01320	065660	LDB .1	
0862	01321	045660	ADB .1	
0863	01322	002041	SEZ,RSS	
0864	01323	102000	HLT 0	E NOT 1
0865	01324	102301	SOS	
0866	01325	102000	HLT 0	OV NOT 1
0867*				
0868	01326	000000	NOP *****	MODULE LOOP

PAGE 0022 #01 INDIRECT ADDRESSING TESTS

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0870* CHECK JMP INDIRECT
0871*
0872 01327 125704      JMP IA1,I      IA1 = DEF IR1
0873 01330 102000      HLT 0         JMP,I FAILED = 1 INDIRECT LEVEL
0874*
0875 01331 125705      IR1  JMP IA2,I
0876 01332 102000      HLT 0         JMP,I FAILED = 2 INDIRECT LEVELS
0877*
0878* CHECK JSB INDIRECT
0879*
0880 01333 002400      IR2  CLA
0881 01334 071337      STA RA3       RA3 = NOP
0882 01335 115707      JSB IA3,I     IA3 = DEF RA3
0883 01336 102000      HLT 0         JSB,I FAILED = 1 INDIRECT LEVEL
0884 01337 000000      RA3  NOP
0885 01340 061337      LDA RA3
0886 01341 051701      CPA ADDR2     ADDR2 = DEF RA3-1
0887 01342 002001      RSS
0888 01343 102000      HLT 0         JSB,I FAILED = BAD RETURN ADDR.
0889*
0890 01344 002400      CLA
0891 01345 071350      STA RA4       RA4 = NOP
0892 01346 115710      JSB IA4,I
0893 01347 102000      HLT 0         JSB,I FAILED = 2 INDIRECT LEVELS
0894 01350 000000      RA4  NOP
0895 01351 061350      LDA RA4
0896 01352 051702      CPA ADDR4     ADDR4 = DEF RA4-1
0897 01353 002001      RSS
0898 01354 102000      HLT 0         JSB,I FAILED = BAD RETURN ADDR.
0899*
0900* CHECK LDA INDIRECT
0901*
0902 01355 002400      CLA
0903 01356 161712      LDA IA5,I     IA5 = DEF M1, M1 = 177777
0904 01357 051655      CPA M1
0905 01360 002001      RSS
0906 01361 102000      HLT 0         LDA,I FAILED = 1 INDIRECT LEVEL
0907*
0908 01362 002400      CLA
0909 01363 161713      LDA IA6,I     IA6 = DEF IA5,I
0910 01364 051655      CPA M1
0911 01365 002001      RSS
0912 01366 102000      HLT 0         LDA,I FAILED = 2 INDIRECT LEVELS
0913*
0914* CHECK LOB INDIRECT
0915*
0916 01367 006400      CLB
0917 01370 165712      LOB IA5,I     IA5 = DEF M1, M1 = 177777

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PAGE 0023 #01 INDIRECT ADDRESSING TESTS

0918	01371	055655	CPB M1	
0919	01372	002001	RSS	
0920	01373	102000	HLT 0	LDB,I FAILED - 1 INDIRECT LEVEL
0921*				
0922	01374	006400	CLB	
0923	01375	165713	LDB IA6,I	IA6 = DEF IA5,I
0924	01376	055655	CPB M1	
0925	01377	002001	RSS	
0926	01400	102000	HLT 0	LDB,I FAILED - 2 INDIRECT LEVELS
0927*				
0928*	CHECK CPA INDIRECT			
0929*				
0930	01401	061661	LDA EVEN1	EVEN1 = 052525
0931	01402	151714	CPA IA7,I	IA7 = DEF EVEN1
0932	01403	002001	RSS	
0933	01404	102000	HLT 0	CPA,I FAILED - 1 INDIRECT LEVEL
0934*				
0935	01405	061661	LDA EVEN1	
0936	01406	151715	CPA IA8,I	IA8 = DEF IA7,I
0937	01407	002001	RSS	
0938	01410	102000	HLT 0	CPA,I FAILED - 2 INDIRECT LEVELS
0939*				
0940*	CHECK CPB INDIRECT			
0941*				
0942	01411	055661	LDB EVEN1	EVEN1 = 052525
0943	01412	155714	CPB IA7,I	IA7 = DEF EVEN1
0944	01413	002001	RSS	
0945	01414	102000	HLT 0	CPB,I FAILED - 1 INDIRECT LEVEL
0946*				
0947	01415	065661	LDB EVEN1	
0948	01416	155715	CPB IA8,I	IA8 = DEF IA7,I
0949	01417	002001	RSS	
0950	01420	102000	HLT 0	CPB,I FAILED - 2 INDIRECT LEVELS
0951*				
0952*	CHECK STA INDIRECT			
0953*				
0954	01421	003400	CCA	A ← 177777
0955	01422	171716	STA IA9,I	IA9 = DEF T1
0956	01423	051671	CPA T1	
0957	01424	002001	RSS	
0958	01425	102000	HLT 0	STA,I FAILED - 1 INDIRECT LEVEL
0959*				
0960	01426	002400	CLA	A ← 000000
0961	01427	171717	STA IA10,I	IA10 = DEF IA9,I
0962	01430	051671	CPA T1	
0963	01431	002001	RSS	
0964	01432	102000	HLT 0	STA,I FAILED - 2 INDIRECT LEVELS
0965*				



PAGE 0024 #01 INDIRECT ADDRESSING TESTS

```

0966* CHECK STB INDIRECT
0967*
0968 01433 007400 CCB H ← 177777
0969 01434 175716 STB IA9,I IA9 = DEF T1
0970 01435 055671 CPB T1
0971 01436 002001 RSS
0972 01437 102000 HLT 0 STB,I FAILED = 1 INDIRECT LEVEL
0973*
0974 01440 006400 CLB B ← 000000
0975 01441 175716 STB IA10,I IA9 = DEF T1
0976 01442 055671 CPB T1
0977 01443 002001 RSS
0978 01444 102000 HLT 0 STB,I FAILED = 2 INDIRECT LEVELS
0979*
0980* CHECK ADA INDIRECT
0981*
0982 01445 051661 LDA EVEN1 EVEN1 = 052525
0983 01446 141714 ADA IA7,I IA7 = DEF EVEN1
0984 01447 051662 CPA ODD1 EXPECT A = 125252
0985 01450 002001 RSS
0986 01451 102000 HLT 0 ADA,I FAILED = 1 INDIRECT LEVEL
0987*
0988 01452 051661 LDA EVEN1
0989 01453 141715 ADA IA8,I IA8 = DEF IA7,I
0990 01454 051662 CPA ODD1
0991 01455 002001 RSS
0992 01456 102000 HLT 0 ADA,I FAILED = 2 INDIRECT LEVELS
0993*
0994* CHECK ADB INDIRECT
0995*
0996 01457 055661 LDB EVEN1 EVEN1 = 052525
0997 01460 145714 ADB IA7,I IA7 = DEF EVEN1
0998 01461 055662 CPB ODD1 EXPECT B = 125252
0999 01462 002001 RSS
1000 01463 102000 HLT 0 ADB,I FAILED = 1 INDIRECT LEVEL
1001*
1002 01464 055661 LDB EVEN1
1003 01465 145715 ADB IA8,I IA8 = DEF IA7,I
1004 01466 055662 CPB ODD1
1005 01467 002001 RSS
1006 01470 102000 HLT 0 ADB,I FAILED = 2 INDIRECT LEVELS
1007*
1008* CHECK AND INDIRECT
1009*
1010 01471 003400 CCA
1011 01472 111714 AND IA7,I IA7 = DEF EVEN1
1012 01473 051661 CPA EVEN1
1013 01474 002001 RSS

```

PAGE 0025 #01 INDIRECT ADDRESSING TESTS

1014	01475	102000	HLT 0	AND,I FAILED - 1 INDIRECT LEVEL
1015*				
1016	01476	003400	CCA	
1017	01477	111715	AND IA8,I	IA8 = DEF EVEN1
1018	01500	051661	CPA EVEN1	
1019	01501	002001	RSS	
1020	01502	102000	HLT 0	AND,I FAILED - 2 INDIRECT LEVELS
1021*				
1022*	CHECK IOR INDIRECT			
1023*				
1024	01503	002400	CLA	
1025	01504	131714	IOR IA7,I	IA7 = DEF EVEN1
1026	01505	051661	CPA EVEN1	
1027	01506	002001	RSS	
1028	01507	102000	HLT 0	IOR,I FAILED - 1 INDIRECT LEVEL
1029*				
1030	01510	002400	CLA	
1031	01511	131715	IOR IA8,I	IA8 = DEF IA7,I
1032	01512	051661	CPA EVEN1	
1033	01513	002001	RSS	
1034	01514	102000	HLT 0	IOR,I FAILED - 2 INDIRECT LEVELS
1035*				
1036*	CHECK XOR INDIRECT			
1037*				
1038	01515	003400	CCA	
1039	01516	121714	XOR IA7,I	IA7 = DEF EVEN1
1040	01517	051662	CPA ODD1	
1041	01520	002001	RSS	
1042	01521	102000	HLT 0	XOR,I FAILED - 1 INDIRECT LEVEL
1043*				
1044	01522	003400	CCA	
1045	01523	121715	XOR IA8,I	IA8 = DEF IA7,I
1046	01524	051662	CPA ODD1	
1047	01525	002001	RSS	
1048	01526	102000	HLT 0	XOR,I FAILED - 2 INDIRECT LEVELS
1049*				
1050*	CHECK ISZ INDIRECT			
1051*				
1052	01527	003400	CCA	
1053	01530	071671	STA T1	T1 ← 177777
1054	01531	135716	ISZ IA9,I	IA9 = DEF T1
1055	01532	102000	HLT 0	ISZ,I FAILED - 1 INDIRECT LEVEL
1056	01533	061671	LDA T1	
1057	01534	002002	SZA	
1058	01535	102000	HLT 0	ISZ,I FAILED - 1 INDIRECT LEVEL
1059*				
1060	01536	003400	CCA	
1061	01537	071671	STA T1	T1 ← 177777

PAGE 0026 #01 INDIRECT ADDRESSING TESTS

1062	01540	135717	ISZ IA10,I	IA10 = DEF IA9,I
1063	01541	102000	HLT 0	ISZ,I FAILED = 2 INDIRECT LEVELS
1064	01542	061671	LDA T1	
1065	01543	002002	SZA	
1066	01544	102000	HLT 0	ISZ,I FAILED = 2 INDIRECT LEVELS
1067 <sub>A</sub>				
1068	01545	000000	NOP *****	MODULE LOOP

1070	01546	161727	LDA ,P1,I	.P1 = DEF TBL.1, TBL.1 = 015366
1071	01547	051731	CPA K10	K10 = 015366
1072	01550	002001	RSS	
1073	01551	102000	HLT 0	LDA,I FAILED
1074*				
1075	01552	165730	LDB ,P2,I	.P2 = DEF TBL.2, TBL.2 = 051463
1076	01553	055732	CPB K11	K11 = 051463
1077	01554	002001	RSS	
1078	01555	102000	HLT 0	LDB,I FAILED
1079*				
1080	01556	061732	LDA K11	K11 = 051463
1081	01557	151730	CPA ,P2,I	.P2 = DEF TBL.2, TBL.2 = 051463
1082	01560	002001	RSS	
1083	01561	102000	HLT 0	CPA,I FAILED
1084*				
1085	01562	065731	LDB K10	K10 = 015366
1086	01563	155727	CPB ,P1,I	.P1 = DEF TBL.1, TBL.1 = 015366
1087	01564	002001	RSS	
1088	01565	102000	HLT 0	CPB,I FAILED
1089*				
1090	01566	003400	CCA	
1091	01567	171734	STA T2A,I	T2A = DEF T2
1092	01570	151734	CPA T2A,I	
1093	01571	002001	RSS	
1094	01572	102000	HLT 0	STA,I/CPA,I FAILED
1095*				
1096	01573	065661	LDB EVEN1	EVEN1 = 052525
1097	01574	175734	STB T2A,I	
1098	01575	155734	CPB T2A,I	
1099	01576	002001	RSS	
1100	01577	102000	HLT 0	STB,I/CPB,I FAILED
1101*				
1102	01600	003400	CCA	
1103	01601	171734	STA T2A,I	T2A = DEF T2
1104	01602	135734	ISZ T2A,I	
1105	01603	102000	HLT 0	ISZ,I FAILED = DID NOT SKIP
1106	01604	161734	LDA T2A,I	
1107	01605	002002	SZA	
1108	01606	102000	HLT 0	ISZ,I FAILED = T2 NOT 0
1109*				
1110	01607	002400	CLA	
1111	01610	131727	IOR ,P1,I	.P1 = DEF TBL.1, TBL.1 = 015366
1112	01611	051731	CPA K10	K10 = 015366
1113	01612	002001	RSS	
1114	01613	102000	HLT 0	IOR,I FAILED
1115*				
1116	01614	003400	CCA	
1117	01615	121727	XOR ,P1,I	.P1 = DEF TBL.1, TBL.1 = 015366

1118	01616	051733		CPA K12	K12 = 162411
1119	01617	002001		RSS	
1120	01620	102000		HLT 0	XOR,I FAILED
1121*					
1122	01621	003400		CCA	
1123	01622	111727		AND .P1,I	.P1 = DEF TBL.1, TBL.1 = 015366
1124	01623	051731		CPA K10	K10 = 015366
1125	01624	002001		RSS	
1126	01625	102000		HLT 0	AND,I FAILED
1127*					
1128	01626	002400		CLA	
1129	01627	141730		ADA .P2,I	.P2 = DEF TBL.2, TBL.2 = 051463
1130	01630	051732		CPA K11	K11 = 051463
1131	01631	002001		RSS	
1132	01632	102000		HLT 0	ADA,I FAILED
1133*					
1134	01633	006400		CLB	
1135	01634	145727		ADB .P1,I	.P1 = DEF TBL.1, TBL.1 = 015366
1136	01635	055731		CPB K10	K10 = 015366
1137	01636	002001		RSS	
1138	01637	102000		HLT 0	ADB,I FAILED
1139*					
1140	01640	125735		JMP JMP1A,I	JMP TO JMP1(INDIRECT), THEN JMP2
1141	01641	102000		HLT 0	JMP,I FAILED
1142*					
1143	01642	002400	JMP2	CLA	
1144	01643	171736		STA SR1A,I	SR1A = DEF SR1 < SR1 + NOP >
1145	01644	115736		JSB SR1A,I	
1146	01645	102000	.P3	HLT 0	JSB,I FAILED
1147	01646	161736	.P4	LDA SR1A,I	
1148	01647	051737		CPA .ADR3	.ADR3 = DEF .P3
1149	01650	002001		RSS	
1150	01651	102000		HLT 0	JSB,I FAILED - BAD RETURN ADDRESS
1151*					
1152	01652	000000		NOP *****	MODULE LOOP
1154	01653	025777		JMP PG1	GOTO END OF PAGE 0
1155	01654	102000		HLT 0	JMP FAILED
1157	01655	177777	M1	DEC -1	
1158	01656	177776	M2	DEC -2	
1159	01657	000000	.0	DEC 0	
1160	01660	000001	.1	DEC 1	
1161	01661	052525	EVEN1	OCT 52525	ALL EVEN BITS 1'S

PAGE 0029 #01 INDIRECT ADDRESSING TO PAGE 1

1162	01662	125252	ODD1	OCT	125252	ALL ODD BITS 1'S
1163	01663	052524	K1	OCT	52524	
1164	01664	077777	PMAX	OCT	77777	
1165	01665	010000	BIT12	OCT	10000	
1166	01666	100000	BIT15	OCT	100000	
1167	01667	102000	HLT0	HLT	0	
1168	01670	107077	H7077	OCT	107077	
1169	01671	000000	T1	NOP		TEMPORARY STORAGE
1170	01672	000503	ADDR1	DEF	X1	
1171	01673	000561	ADDR3	DEF	P3	
1172	01674	000572	ADDR4	DEF	P4	
1173	01675	024552	JR1	JMP	RTN1	
1174	01676	024556	JR2	JMP	RTN2	
1175	01677	024562	JR3	JMP	RTN3	
1176	01700	024573	JR4	JMP	RTN4	
1177	00000		A	EQU	0	A REGISTER
1178	00001		B	EQU	1	B REGISTER
1179*						
1180	01701	001336	ADDR2	DEF	RA3-1	
1181	01702	001347	ADDRY	DEF	RA4-1	
1182	01703	003217	ADDR7	DEF	Z1	
1183	01704	001331	IA1	DEF	IR1	
1184	01705	101706	IA2	DEF	++1,I	
1185	01706	001333		DEF	IR2	
1186	01707	001337	IA3	DEF	RA3	
1187	01710	101711	IA4	DEF	++1,I	
1188	01711	001350		DEF	RA4	
1189	01712	001655	IA5	DEF	M1	
1190	01713	101712	IA6	DEF	IA5,I	
1191	01714	001661	IA7	DEF	EVEN1	
1192	01715	101714	IA8	DEF	IA7,I	
1193	01716	001671	IA9	DEF	T1	
1194	01717	101716	IA10	DEF	IA9,I	
1195	01720	034075	K7	DEC	14397	
1196*						
1197	01721	002542	IR11	DEF	RA11	
1198	01722	002545	IR12	DEF	RA12	
1199	01723	002552	IR13	DEF	X13	
1200	01724	002567	IR14	DEF	X14	
1201	01725	002551	ADR13	DEF	P13	
1202	01726	002566	ADR14	DEF	P14	
1203*						
1204	01727	003372	.P1	DEF	TBL,1	
1205	01730	003400	.P2	DEF	TBL,2	
1206	01731	051366	K10	OCT	051366	
1207	01732	051463	K11	OCT	051463	
1208	01733	162411	K12	OCT	162411	
1209	01734	003467	T2A	DEF	T2	

PAGE 0030 #01 INDIRECT ADDRESSING TO PAGE 1

1210	01735	003472	JMP1A	DEF	JMP1	
1211	01736	003470	SR1A	DEF	SR1	
1212	01737	001645	.ADR3	DEF	.P3	
1213	01740	002223	P99A	DEF	P99	
1214	01741	000002	FCA	DEF	2	FIRST CORE ADDRESS
1215	01742	003677	LCA	DEF	3677B	LAST CORE ADDRESS (2K)
1216*						
1217	01743	000000	JSB7	NOP		SUBROUTINE FROM PAGE 1
1218	01744	125746		JMP	**2,I	RETURN TO PAGE 1
1219	01745	102000		HLT	0	JMP,I FAILED
1220	01746	302066		DEF	P9	
1221	01747	125751	JMP5	JMP	**2,I	GO BACK TO PAGE 1
1222	01750	102000		HLT	0	JMP
1223	01751	002062		DEF	P6	
1225	01777			ORG	1777B	
1226	01777	000000	PG1	NOP		

PAGE 0031 #01 INDIRECT ADDRESSING TO BASE PAGE

1228	02000	163363	LDA K11A,I	K11 = DEF K11, K11 = 051463
1229	02001	053400	CPA TBL,2	TBL,2 = 051463
1230	02002	002001	RSS	
1231	02003	102000	HLT 0	LDA,I FAILED
1232*				
1233	02004	167362	LDB K10A,I	K10A, = DEF K10, K10 = 015366
1234	02005	057372	CPB TBL,1	TBL,1 = 015366
1235	02006	002001	RSS	
1236	02007	102000	HLT 0	LDB,I FAILED
1237*				
1238	02010	063372	LDA TBL,1	TBL,1 = 015366
1239	02011	153362	CPA K10A,I	K10A = DEF K10, K10 = 015366
1240	02012	002001	RSS	
1241	02013	102000	HLT 0	CPA,I FAILED
1242*				
1243	02014	067400	LDB TBL,2	TBL,2 = 051463
1244	02015	157363	CPB K11A,I	K11A = DEF K11, K11 = 051463
1245	02016	002001	RSS	
1246	02017	102000	HLT 0	CPB,I FAILED
1247*				
1248	02020	061661	LDA EVEN1	
1249	02021	173364	STA T1A,I	T1A = DEF T1
1250	02022	051671	CPA T1	
1251	02023	002001	RSS	
1252	02024	102000	HLT 0	STA,I/CPA FAILED
1253*				
1254	02025	065662	LDB ODD1	
1255	02026	177364	STB T1A,I	T1A = DEF T1
1256	02027	055671	CPB T1	
1257	02030	002001	RSS	
1258	02031	102000	HLT 0	STB,I/CPB FAILED
1259*				
1260	02032	003400	CCA	
1261	02033	071671	STA T1	
1262	02034	137364	ISZ T1A,I	T1A = DEF T1
1263	02035	102000	HLT 0	ISZ,I FAILED - DID NOT SKIP
1264	02036	061671	LDA T1	
1265	02037	002002	SZA	
1266	02040	102000	HLT 0	ISZ,I FAILED - T1 NOT 0
1267*				
1268	02041	002400	CLA	
1269	02042	133363	IOR K11A,I	K11A = DEF K11, K11 = 051463
1270	02043	053400	CPA TBL,2	TBL,2 = 051463
1271	02044	002001	RSS	
1272	02045	102000	HLT 0	IOR,I FAILED
1273*				
1274	02046	003400	CCA	
1275	02047	123365	XOR K12A,I	K12A = DEF K12, K12 = 162411



PAGE 0032 #01 INDIRECT ADDRESSING TO BASE PAGE

1276	02050	053372		CPA	TBL,1	
1277	02051	002001		RSS		
1278	02052	102000		HLT	0	XOR,I FAILED
1279*						
1280	02053	003400		CCA		
1281	02054	113362		AND	K10A,I	K10A = DEF K10, K10 = 015366
1282	02055	053372		CPA	TBL,1	TBL,1 = 015366
1283	02056	002001		RSS		
1284	02057	102000		HLT	0	AND,I FAILED
1285*						
1286	02060	127366		JMP	JMP5A,I	JMP5A = DEF JMP5
1287	02061	102000		HLT	0	JMP,I FAILED
1288*						
1289	02062	302400	P6	CLA		
1290	02063	071743		STA	JSB7	JSB7 ← NOP
1291	02064	117367		JSB	JSB7A,I	JSB7A = DEF JSB7
1292	02065	102000	P7	HLT	0	JSB,I FAILED
1293	02066	361743	P9	LDA	JSB7	
1294	02067	053370		CPA	P7A	P7A = DEF P7
1295	02070	002001		RSS		
1296	02071	102000		HLT	0	JSB,I FAILED - BAD RETURN ADDRESS
1297*						
1298	02072	000000		NOP	*****	MODULE LOOP

PAGE 0033 #01 REGISTER INTERACTION TESTS

1300\* THIS SECTION CHECKS THAT ALL OTHER REGISTERS REMAIN UNCHANGED  
 1301\* WHEN A MEMORY REFERENCE INSTRUCTION IS EXECUTED,

```

1302*
1303 02073 006400      CLB
1304 02074 000040      CLE
1305 02075 103101      CLO
1306 02076 061655      LDA M1          M1 = 177777
1307 02077 006002      SZB
1308 02100 102000      HLT 0          LDA - B CHANGED
1309 02101 002040      SEZ
1310 02102 102000      HLT 0          LDA - E CHANGED
1311 02103 102201      SOC
1312 02104 102000      HLT 0          LDA - OV CHANGED
1313 02105 051655      CPA M1
1314 02106 002001      RSS
1315 02107 102000      HLT 0          CPA FAILED
1316 02110 006002      SZB
1317 02111 102000      HLT 0          CPA - B CHANGED
1318 02112 002040      SEZ
1319 02113 102000      HLT 0          CPA - E CHANGED
1320 02114 102201      SOC
1321 02115 102000      HLT 0          CPA - OV CHANGED
1322*
1323 02116 002400      CLA
1324 02117 000040      CLE
1325 02120 103101      CLO
1326 02121 065661      LDB EVEN1      EVEN1 = 052525
1327 02122 002002      SZA
1328 02123 102000      HLT 0          LDB - A CHANGED
1329 02124 002040      SEZ
1330 02125 102000      HLT 0          LDB - E CHANGED
1331 02126 102201      SOC
1332 02127 102000      HLT 0          LDB - OV CHANGED
1333 02130 055661      CPB EVEN1
1334 02131 002001      RSS
1335 02132 102000      HLT 0          CPB FAILED
1336 02133 002002      SZA
1337 02134 102000      HLT 0          CPB - A CHANGED
1338 02135 002040      SEZ
1339 02136 102000      HLT 0          CPB - E CHANGED
1340 02137 102201      SOC
1341 02140 102000      HLT 0          CPB - OV CHANGED
1342*
1343 02141 061662      LDA ODD1       ODD1 = 125252
1344 02142 007400      CCB
1345 02143 002300      CCE
1346 02144 102101      STO
1347 02145 071671      STA T1
    
```

PAGE 0034 #01 REGISTER INTERACTION TESTS

1348	02146	002041	SEZ,RSS	
1349	02147	102000	HLT 0	STA = E CHANGED
1350	02150	102301	SOS	
1351	02151	102000	HLT 0	STA = OV CHANGED
1352	02152	055655	CPB M1	
1353	02153	002001	RSS	
1354	02154	102000	HLT 0	STA = B CHANGED
1355	02155	051671	CPA T1	
1356	02156	002001	RSS	
1357	02157	102000	HLT 0	STA FAILED
1358*				
1359	02160	065661	LDB EVEN1	EVEN1 = 052525
1360	02161	002400	CLA	
1361	02162	000040	CLE	
1362	02163	103101	CLO	
1363	02164	075671	STB T1	
1364	02165	002002	SZA	
1365	02166	102000	HLT 0	STB = CHANGED
1366	02167	002040	SEZ	
1367	02170	102000	HLT 0	STB = E CHANGED
1368	02171	102201	SQC	
1369	02172	102000	HLT 0	STB = OV CHANGED
1370	02173	055671	CPB T1	
1371	02174	002001	RSS	
1372	02175	102000	HLT 0	STB FAILED
1373*				
1374	02176	103101	CLO	
1375	02177	000040	CLE	
1376	02200	002400	CLA	
1377	02201	006400	CLB	
1378	02202	026204	JMP ++2	
1379	02203	102000	HLT 0	JMP FAILED
1380	02204	002002	SZA	
1381	02205	102000	HLT 0	JMP = A CHANGED
1382	02206	006002	SZB	
1383	02207	102000	HLT 0	JMP = B CHANGED
1384	02210	002040	SEZ	
1385	02211	102000	HLT 0	JMP = E CHANGED
1386	02212	102201	SQC	
1387	02213	102000	HLT 0	JMP = OV CHANGED
1388*				
1389	02214	002400	CLA	
1390	02215	072224	STA X99	X99 ← NOP
1391	02216	003400	CCA	
1392	02217	007400	CCB	
1393	02220	102101	STO	
1394	02221	002300	CCE	
1395	02222	016224	JSB ++2	

PAGE 0035 #01 REGISTER INTERACTION TESTS

1396	02223	102000	P99	HLT 0	JSB FAILED
1397	02224	000000	X99	NOP	
1398	02225	002041		SEZ,RSS	
1399	02226	102000		HLT 0	JSB - E CHANGED
1400	02227	102301		SOS	
1401	02230	102000		HLT 0	JSB - OV CHANGED
1402	02231	051655		CPA M1	
1403	02232	002001		RSS	
1404	02233	102000		HLT 0	JSB - A CHANGED
1405	02234	055655		CPB M1	
1406	02235	002001		RSS	
1407	02236	102000		HLT 0	JSB - B CHANGED
1408	02237	062224		LDA X99	
1409	02240	051740		CPA P99A	P99A = DEF P99
1410	02241	002001		RSS	
1411	02242	102000		HLT 0	JSB - BAD RETURN ADDRESS
1412*					
1413	02243	002400		CLA	
1414	02244	006400		CLB	
1415	02245	041655		ADA M1	< E, OV, A CHECKED ELSEWHERE >
1416	02246	006002		SZB	
1417	02247	102000		HLT 0	ADA - B CHANGED
1418*					
1419	02250	002400		CLA	
1420	02251	006400		CLB	
1421	02252	045662		ADB ODD1	< E, OV, B CHECKED ELSEWHERE >
1422	02253	002002		SZA	
1423	02254	102000		HLT 0	ADB - A CHANGED
1424*					
1425	02255	002400		CLA	
1426	02256	006400		CLB	
1427	02257	103101		CLO	
1428	02260	000040		CLE	
1429	02261	031661		IOR EVEN1	EVEN1 = 052525
1430	02262	021662		XOR ODD1	ODD1 = 125252
1431	02263	011655		AND M1	M1 = 177777
1432	02264	006002		SZB	
1433	02265	102000		HLT 0	IOR OR XOR OR AND - B CHANGED
1434	02266	102201		SOC	
1435	02267	102000		HLT 0	IOR OR XOR OR AND - OV CHANGED
1436	02270	002040		SEZ	
1437	02271	102000		HLT 0	IOR OR XOR OR AND - E CHANGED
1438	02272	051655		CPA M1	
1439	02273	002001		RSS	
1440	02274	102000		HLT 0	IOR/XOR/AND - RESULT NOT 177777
1441*					
1442	02275	003400		CCA	
1443	02276	071671		STA T1	T1 ← 177777

PAGE 0036 #01 REGISTER INTERACTION TESTS

1444	02277	002400	CLA	
1445	02300	006400	CLB	
1446	02301	000040	CLE	
1447	02302	103101	CLO	
1448	02303	035671	ISZ T1	
1449	02304	102000	HLT 0	ISZ FAILED - DID NOT SKIP
1450	02305	002002	SZA	
1451	02306	102000	HLT 0	ISZ = A CHANGED
1452	02307	006002	SZB	
1453	02310	102000	HLT 0	ISZ = B CHANGED
1454	02311	002040	SEZ	
1455	02312	102000	HLT 0	ISZ = E CHANGED
1456	02313	102201	SOC	
1457	02314	102000	HLT 0	ISZ = OV CHANGED
1458*				
1459	02315	000000	NOP *****	MODULE LOOP

PAGE 0037 #01 INDIRECT ADDRESSING VIA A & B REGISTERS

1461	02316	051712	LDA IA5	IA5 = DEF M1, M1 = 177777
1462	02317	160000	LDA A,I	
1463	02320	051655	CPA M1	
1464	02321	002001	RSS	
1465	02322	102000	HLT 0	LDA A,I FAILED
1466*				
1467	02323	055714	LDB IA7	IA7 = DEF EVEN1, EVEN1 = 052525
1468	02324	160001	LDA B,I	
1469	02325	051661	CPA EVEN1	
1470	02326	002001	RSS	
1471	02327	102000	HLT 0	LDA B,I FAILED
1472*				
1473	02330	055712	LDB IA5	IA5 = DEF M1, M1 = 177777
1474	02331	164001	LDB B,I	
1475	02332	055655	CPB M1	
1476	02333	002001	RSS	
1477	02334	102000	HLT 0	LDB B,I FAILED
1478*				
1479	02335	051714	LDA IA7	IA7 = DEF EVEN1, EVEN1 = 052525
1480	02336	164000	LDB A,I	
1481	02337	055661	CPB EVEN1	
1482	02340	002001	RSS	
1483	02341	102000	HLT 0	LDB A,I FAILED
1484*				
1485	02342	006400	CLB	
1486	02343	075671	STB T1	T1 ← 0
1487	02344	051716	LDA IA9	IA9 = DEF T1
1488	02345	174000	STA A,I	
1489	02346	055671	LDB T1	
1490	02347	055671	CPB T1	
1491	02350	002001	RSS	
1492	02351	102000	HLT 0	STA A,I FAILED
1493*				
1494	02352	002400	CLA	
1495	02353	071671	STA T1	T1 ← 0
1496	02354	055716	LDB IA9	IA9 = DEF T1
1497	02355	174001	STB B,I	
1498	02356	051671	LDA T1	
1499	02357	051671	CPA T1	
1500	02360	002001	RSS	
1501	02361	102000	HLT 0	STB B,I FAILED
1502*				
1503	02362	002400	CLA	
1504	02363	071671	STA T1	T1 ← 0
1505	02364	003400	CCA	A ← 177777
1506	02365	055716	LDB IA9	IA9 = DEF T1
1507	02366	170001	STA B,I	
1508	02367	055671	LDB T1	

PAGE 0038 #31 INDIRECT ADDRESSING VIA A & B REGISTERS

1509	02370	055655	CPB M1	
1510	02371	002001	RSS	
1511	02372	102000	HLT 0	STA B,I FAILED
1512*				
1513	02373	006400	CLB	
1514	02374	075671	STB T1	T1 ← 0
1515	02375	007400	CCB	B ← 177777
1516	02376	061716	LDA IA9	IA9 = DEF T1
1517	02377	174000	STB A,I	
1518	02400	061671	LDA T1	
1519	02401	051655	CPA M1	
1520	02402	002001	RSS	
1521	02403	102000	HLT 0	STB A,I FAILED
1522*				
1523	02404	061716	LDA IA9	IA9 = DEF T1
1524	02405	071671	STA T1	
1525	02406	150000	CPA A,I	
1526	02407	002001	RSS	
1527	02410	102000	HLT 0	CPA A,I FAILED
1528	02411	065716	LDB IA9	IA9 = DEF T1
1529	02412	075671	STB T1	
1530	02413	154001	CPB B,I	
1531	02414	002001	RSS	
1532	02415	102000	HLT 0	CPB B,I FAILED
1533*				
1534	02416	061716	LDA IA9	IA9 = DEF T1
1535	02417	071671	STA T1	
1536	02420	065716	LDB IA9	
1537	02421	150001	CPA B,I	
1538	02422	002001	RSS	
1539	02423	102000	HLT 0	CPA B,I FAILED
1540	02424	154000	CPB A,I	
1541	02425	002001	RSS	
1542	02426	102000	HLT 0	CPB A,I FAILED
1543*				
1544	02427	061714	LDA IA7	IA7 = DEF EVEN1
1545	02430	041661	ADA EVEN1	EVEN1 = 052525
1546	02431	071671	STA T1	
1547	02432	061714	LDA IA7	
1548	02433	140000	ADA A,I	
1549	02434	051671	CPA T1	
1550	02435	002001	RSS	
1551	02436	102000	HLT 0	ADA A,I FAILED
1552*				
1553	02437	065712	LDB IA5	IA5 = DEF M1
1554	02440	045655	ADB M1	M1 = 177777
1555	02441	075671	STB T1	
1556	02442	065712	LDB IA5	

PAGE 0039 #01 INDIRECT ADDRESSING VIA A & B REGISTERS

1557	02443	144001	ADB B,I	
1558	02444	055671	CPB T1	
1559	02445	002001	RSS	
1560	02446	102000	HLT 0	ADB B,I FAILED
1561*				
1562	02447	002400	CLA	
1563	02450	065712	LDB IA5	IA5 = DEF M1, M1 = 177777
1564	02451	140001	ADA B,I	
1565	02452	051655	CPA M1	
1566	02453	002001	RSS	
1567	02454	102000	HLT 0	ADA B,I FAILED
1568*				
1569	02455	006400	CLB	
1570	02456	061714	LDA IA7	IA7 = DEF EVEN1, EVEN1 = 052525
1571	02457	144000	ADB A,I	
1572	02460	055661	CPB EVEN1	
1573	02461	002001	RSS	
1574	02462	102000	HLT 0	ADB A,I FAILED
1575*				
1576	02463	061712	LDA IA5	IA5 = DEF M1, M1 = 177777
1577	02464	130000	IOR A,I	
1578	02465	051655	CPA M1	
1579	02466	002001	RSS	
1580	02467	102000	HLT 0	IOR A,I FAILED
1581*				
1582	02470	002400	CLA	
1583	02471	065714	LDB IA7	IA7 = DEF EVEN1, EVEN1 = 052525
1584	02472	130001	IOR B,I	
1585	02473	051661	CPA EVEN1	
1586	02474	002001	RSS	
1587	02475	102000	HLT 0	IOR B,I FAILED
1588*				
1589	02476	061712	LDA IA5	IA5 = DEF M1, M1 = 177777
1590	02477	110000	AND A,I	
1591	02500	051712	CPA IA5	
1592	02501	002001	RSS	
1593	02502	102000	HLT 0	AND A,I FAILED
1594*				
1595	02503	061661	LDA EVEN1	EVEN1 = 052525
1596	02504	065712	LDB IA5	IA5 = DEF M1, M1 = 177777
1597	02505	110001	AND B,I	
1598	02506	051661	CPA EVEN1	
1599	02507	002001	RSS	
1600	02510	102000	HLT 0	AND B,I FAILED
1601*				
1602*	CHECK	CMR INSTRUCTION BEFORE TESTING XOR A,I		
1603*				
1604	02511	065661	LDB EVEN1	B ← 052525



PAGE 0040 #01. INDIRECT ADDRESSING VIA A & B REGISTERS

1605	02512	007000		CMB	
1606	02513	055662		CPB ODD1	
1607	02514	002001		RSS	
1608	02515	102000		HLT 0	CMB FAILED
1609	02516	007000		CMB	
1610	02517	055661		CPB EVEN1	
1611	02520	002001		RSS	
1612	02521	102000		HLT 0	CMB FAILED
1613*					
1614	02522	065712		LDB IA5	IA5 = DEF M1, M1 = 17777
1615	02523	007000		CMB	
1616	02524	061712		LDA IA5	
1617	02525	120000		XOR A,I	
1618	02526	050001		CPA B	
1619	02527	002001		RSS	
1620	02530	102000		HLT 0	XOR A,I FAILED
1621*					
1622	02531	061661		LDA EVEN1	EVEN1 = 052525
1623	02532	065712		LDB IA5	IA5 = DEF M1, M1 = 17777
1624	02533	120001		XOR B,I	
1625	02534	051662		CPA ODD1	
1626	02535	002001		RSS	
1627	02536	102000		HLT 0	XOR B,I FAILED
1628*					
1629	02537	061721		LDA IR11	IR11 = DEF RA11
1630	02540	124000		JMP A,I	
1631	02541	102000		HLT 0	JMP A,I FAILED
1632*					
1633	02542	065722	RA11	LDB IR12	IR12 = DEF RA12
1634	02543	124001		JMP B,I	
1635	02544	102000		HLT 0	JMP B,I FAILED
1636*					
1637	02545	002400	RA12	CLA	
1638	02546	072552		STA X13	X13 ← NOP
1639	02547	061723		LDA IR13	IR13 = DEF X13
1640	02550	114000		JSB A,I	
1641	02551	102000	P13	HLT 0	JSB A,I FAILED
1642	02552	000000	X13	NOP	
1643	02553	051723		CPA IR13	
1644	02554	002001		RSS	
1645	02555	102000		HLT 0	JSB A,I FAILED - A REG. CHANGED
1646	02556	065725		LDB ADR13	ADR13 = DEF P13
1647	02557	056552		CPB X13	
1648	02560	002001		RSS	
1649	02561	102000		HLT 0	JSB A,I FAILED - BAD RETURN ADDR
1650*					
1651	02562	000400		CLB	
1652	02563	076567		STB X14	X14 ← NOP

PAGE 0041 #01 INDIRECT ADDRESSING VIA A & B REGISTERS

1653	02564	065724		LDB IR14	IR14 = DEF X14
1654	02565	114001		JSB B,I	
1655	02566	102000	P14	HLT 0	JSB B,I FAILED
1656	02567	000000	X14	NOP	
1657	02570	055724		CPB IR14	
1658	02571	002001		RSS	
1659	02572	102000		HLT 0	JSB B,I FAILED - B REG. CHANGED
1660	02573	065726		LDB ADR14	ADR14 = DEF P14
1661	02574	056567		CPB X14	
1662	02575	002001		RSS	
1663	02576	102000		HLT 0	JSB B,I FAILED - BAD RETURN ADDR
1664*					
1665	02577	061663		LDA K1	
1666	02600	071671		STA T1	T1 = K1 = 052524
1667	02601	061716		LDA IA9	IA9 = DEF T1
1668	02602	134000		ISZ A,I	
1669	02603	002001		RSS	
1670	02604	102000		HLT 0	ISZ A,I FAILED - IT SKIPPED
1671	02605	065671		LDB T1	
1672	02606	055661		CPB EVEN1	EVEN1 = 052525
1673	02607	002001		RSS	
1674	02610	102000		HLT 0	ISZ A,I FAILED - T1 NOT 052525
1675*					
1676	02611	007400		CCB	
1677	02612	075671		STB T1	T1 = 177777
1678	02613	065716		LDB IA9	IA9 = DEF M1, M1 = 177777
1679	02614	134001		ISZ B,I	
1680	02615	102000		HLT 0	ISZ B,I FAILED - DID NOT SKIP
1681	02616	061671		LDA T1	
1682	02617	002002		SZA	
1683	02620	102000		HLT 0	ISZ B,I FAILED - T1 NOT 0
1684*					
1685	02621	000000		NOP *****	MODULE LOOP

1687\* THESE TESTS TRY TO FIND INTERMITTANT ERRORS

1688\*

1689\* LDA/CPA ITERATIVE TESTS

1690\*

1691	02622	006400		CLB	
1692	02623	061661	LP1	LDA EVEN1	A=052525
1693	02624	051661		CPA EVEN1	
1694	02625	002001		RSS	
1695	02626	102000		HLT 0	LDA/CPA FAILED
1696	02627	034001		ISZ B	
1697	02630	026623		JMP LP1	

1698\*

1699	02631	006400		CLB	
1700	02632	061662	LP2	LDA ODD1	A=125252
1701	02633	051662		CPA ODD1	
1702	02634	002001		RSS	
1703	02635	102000		HLT 0	LDA/CPA FAILED
1704	02636	034001		ISZ B	
1705	02637	026632		JMP LP2	

1706\*

1707\* LDB/CPB ITERATIVE TESTS

1708\*

1709	02640	002400		CLA	
1710	02641	055661	LP3	LDB EVEN1	B=052525
1711	02642	055661		CPB EVEN1	
1712	02643	002001		RSS	
1713	02644	102000		HLT 0	LDB/CPB FAILED
1714	02645	034000		ISZ A	
1715	02646	026641		JMP LP3	

1716\*

1717	02647	002400		CLA	
1718	02650	055662	LP4	LDB ODD1	B=125252
1719	02651	055662		CPB ODD1	
1720	02652	002001		RSS	
1721	02653	102000		HLT 0	LDB/CPB FAILED
1722	02654	034000		ISZ A	
1723	02655	026650		JMP LP4	

1724\*

1725\* LDA/STA/CPA ITERATIVE TESTS

1726\*

1727	02656	006400		CLB	
1728	02657	061661	LP5	LDA EVEN1	A=052525
1729	02660	071671		STA T1	
1730	02661	051671		CPA T1	
1731	02662	002001		RSS	
1732	02663	102000		HLT 0	LDA/STA/CPA FAILED
1733	02664	034001		ISZ B	
1734	02665	026657		JMP LP5	

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1735*
1736 02666 006400 CLB
1737 02667 061662 LP6 LDA ODD1 A=125252
1738 02670 071671 STA T1
1739 02671 051671 CPA T1
1740 02672 002001 RSS
1741 02673 102000 HLT 0 LDA/STA/CPA FAILED
1742 02674 034001 ISZ B
1743 02675 026667 JMP LP6
1744*
1745* LDB/STB/CPB ITERATIVE TESTS
1746*
1747 02676 002400 CLA
1748 02677 065661 LP7 LDB EVEN1 B=052525
1749 02700 075671 STB T1
1750 02701 055671 CPB T1
1751 02702 002001 RSS
1752 02703 102000 HLT 0 LDB/STB/CPB FAILED
1753 02704 034000 ISZ A
1754 02705 026677 JMP LP7
1755*
1756 02706 002400 CLA
1757 02707 065662 LP8 LDB ODD1 B=125252
1758 02710 075671 STB T1
1759 02711 055671 CPB T1
1760 02712 002001 RSS
1761 02713 102000 HLT 0 LDB/STB/CPB FAILED
1762 02714 034000 ISZ A
1763 02715 026707 JMP LP8
1764*
1765* AND ITERATIVE TESTS
1766*
1767 02716 006400 CLB
1768 02717 061661 LP9 LDA EVEN1
1769 02720 011662 AND ODD1
1770 02721 002002 SZA
1771 02722 102000 HLT 0 AND FAILED
1772 02723 034001 ISZ B
1773 02724 026717 JMP LP9
1774*
1775 02725 006400 CLB
1776 02726 061661 LP10 LDA EVEN1
1777 02727 011661 AND EVEN1
1778 02730 051661 CPA EVEN1
1779 02731 002001 RSS
1780 02732 102000 HLT 0 AND FAILED
1781 02733 034001 ISZ B
1782 02734 026726 JMP LP10

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1783*
1784 02735 006400          CLB
1785 02736 061662    LP11 LDA ODD1
1786 02737 011662          AND ODD1
1787 02740 051662          CPA ODD1
1788 02741 002001          RSS
1789 02742 102000          HLT 0           AND FAILED
1790 02743 034001          ISZ B
1791 02744 026736          JMP LP11
1792*
1793* IOR ITERATIVE TESTS
1794*
1795 02745 006400          CLB
1796 02746 061661    LP12 LDA EVEN1
1797 02747 031662          IOR ODD1
1798 02750 051655          CPA M1
1799 02751 002001          RSS
1800 02752 102000          HLT 0           IOR FAILED
1801 02753 034001          ISZ B
1802 02754 026746          JMP LP12
1803*
1804 02755 006400          CLB
1805 02756 061662    LP13 LDA ODD1
1806 02757 031661          IOR EVEN1
1807 02760 051655          CPA M1
1808 02761 002001          RSS
1809 02762 102000          HLT 0           IOR FAILED
1810 02763 034001          ISZ B
1811 02764 026756          JMP LP13
1812*
1813 02765 006400          CLB
1814 02766 061661    LP14 LDA EVEN1
1815 02767 031661          IOR EVEN1
1816 02770 051661          CPA EVEN1
1817 02771 002001          RSS
1818 02772 102000          HLT 0           IOR FAILED
1819 02773 034001          ISZ B
1820 02774 026766          JMP LP14
1821*
1822 02775 006400          CLB
1823 02776 061662    LP15 LDA ODD1
1824 02777 031662          IOR ODD1
1825 03000 051662          CPA ODD1
1826 03001 002001          RSS
1827 03002 102000          HLT 0
1828 03003 034001          ISZ B           IOR FAILED
1829 03004 026776          JMP LP15
1830*

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PAGE 0045 #01 ITERATIVE TESTS

1831\* XOR ITERATIVE TESTS

1832\*

1833	03005	006400		CLB	
1834	03006	061661	LP16	LDA EVEN1	
1835	03007	021661		XOR EVEN1	
1836	03010	002002		SZA	
1837	03011	102000		HLT 0	XOR FAILED
1838	03012	034001		ISZ B	
1839	03013	027006		JMP LP16	

1840\*

1841	03014	006400		CLB	
1842	03015	061662	LP17	LDA ODD1	
1843	03016	021662		XOR ODD1	
1844	03017	002002		SZA	
1845	03020	102000		HLT 0	XOR FAILED
1846	03021	034001		ISZ B	
1847	03022	027015		JMP LP17	

1848\*

1849	03023	006400		CLB	
1850	03024	061661	LP18	LDA EVEN1	
1851	03025	021662		XOR ODD1	
1852	03026	051655		CPA M1	
1853	03027	002001		RSS	
1854	03030	102000		HLT 0	XOR FAILED
1855	03031	034001		ISZ B	
1856	03032	027024		JMP LP18	

1857\*

1858\* ADA ITERATIVE TESTS

1859\*

1860	03033	006400		CLB	
1861	03034	000040	LP19	CLE	
1862	03035	103101		CLO	
1863	03036	061661		LDA EVEN1	
1864	03037	041662		ADA ODD1	052525 + 125252 = 177777
1865	03040	051655		CPA M1	
1866	03041	002001		RSS	
1867	03042	102000		HLT 0	SUM NOT 177777
1868	03043	002040		SEZ	
1869	03044	102000		HLT 0	E NOT 0
1870	03045	102201		SOC	
1871	03046	102000		HLT 0	OV NOT 0
1872	03047	034001		ISZ B	
1873	03050	027034		JMP LP19	

1874\*

1875	03051	006400		CLB	
1876	03052	102101	LP20	STO	OV=1
1877	03053	002300		CCE	E=1
1878	03054	061662		LDA ODD1	

PAGE 0046 #01 ITERATIVE TESTS

1879	03055	041661		ADA EVEN1	125252 + 052525 = 177777
1880	03056	051655		CPA M1	
1881	03057	002001		RSS	
1882	03060	102000		HLT 0	SUM NOT 177777
1883	03061	002041		SEZ, RSS	
1884	03062	102000		HLT 0	E NOT 1
1885	03063	102301		SOS	
1886	03064	102000		HLT 0	OV NOT 1
1887	03065	034001		ISZ B	
1888	03066	027052		JMP LP20	
1889*					
1890	03067	006400		CLB	
1891	03070	000040	LP21	CLE	E=0
1892	03071	103101		CLO	OV=1
1893	03072	061661		LDA EVEN1	052525 + 052525 = 125252
1894	03073	041661		ADA EVEN1	
1895	03074	051662		CPA ODD1	
1896	03075	002001		RSS	
1897	03076	102000		HLT 0	SUM NOT 125252
1898	03077	002040		SEZ	
1899	03100	102000		HLT 0	E NOT 0
1900	03101	102301		SOS	
1901	03102	102000		HLT 0	OV NOT 1
1902	03103	034001		ISZ B	
1903	03104	027070		JMP LP21	
1904*					
1905	03105	006400		CLB	
1906	03106	000040	LP22	CLE	E=0
1907	03107	103101		CLO	OV=0
1908	03110	061662		LDA ODD1	125252 + 125252 = 052524
1909	03111	041662		ADA ODD1	
1910	03112	051663		CPA K1	
1911	03113	002001		RSS	
1912	03114	102000		HLT 0	SUM NOT 052524
1913	03115	002041		SEZ, RSS	
1914	03116	102000		HLT 0	E NOT 1
1915	03117	102301		SOS	
1916	03120	102000		HLT 0	OV NOT 1
1917	03121	034001		ISZ B	
1918	03122	027106		JMP LP22	
1919*					
1920*	ADB ITERATIVE TESTS				
1921*					
1922	03123	002400		CLA	
1923	03124	000040	LP23	CLE	E=0
1924	03125	103101		CLO	OV=0
1925	03126	065661		LDB EVEN1	
1926	03127	045662		ADB ODD1	052525 + 125252 = 177777

PAGE 0047 #01 ITERATIVE TESTS

1927	03130	055655		CPB M1	
1928	03131	002001		RSS	
1929	03132	102000		HLT 0	SUM NOT 177777
1930	03133	002040		SEZ	
1931	03134	102000		HLT 0	E NOT 0
1932	03135	102201		SOC	
1933	03136	102000		HLT 0	OV NOT 0
1934	03137	034000		ISZ A	
1935	03140	027124		JMP LP23	
1936*					
1937	03141	002400		CLA	
1938	03142	002300	LP24	CCE	E=1
1939	03143	102101		STO	OV=1
1940	03144	065662		LDB ODD1	
1941	03145	045661		ADB EVEN1	125252 + 052525 = 177777
1942	03146	055655		CPB M1	
1943	03147	002001		RSS	
1944	03150	102000		HLT 0	SUM NOT 177777
1945	03151	002041		SEZ, RSS	
1946	03152	102000		HLT 0	E NOT 1
1947	03153	102301		SOS	
1948	03154	102000		HLT 0	OV NOT 1
1949	03155	034000		ISZ A	
1950	03156	027142		JMP LP24	
1951*					
1952	03157	002400		CLA	
1953	03160	000040	LP25	CLE	E=0
1954	03161	103101		CLO	OV=0
1955	03162	065661		LDB EVEN1	
1956	03163	045661		ADB EVEN1	052525 + 052525 = 125252
1957	03164	055662		CPB ODD1	
1958	03165	002001		RSS	
1959	03166	102000		HLT 0	SUM NOT 125252
1960	03167	002040		SEZ	
1961	03170	102000		HLT 0	E NOT 0
1962	03171	102301		SOS	
1963	03172	102000		HLT 0	OV NOT 1
1964	03173	034000		ISZ A	
1965	03174	027160		JMP LP25	
1966*					
1967	03175	002400		CLA	
1968	03176	000040	LP26	CLE	E=0
1969	03177	103101		CLO	OV=0
1970	03200	065662		LDB ODD1	
1971	03201	045662		ADB ODD1	125252 + 125252 = 052524
1972	03202	055663		CPB K1	
1973	03203	002001		RSS	
1974	03204	102000		HLT 0	SUM NOT 052524



PAGE 0048 #01 ITERATIVE TESTS

```

1975 03205 002041      SEZ,RSS
1976 03206 102000      HLT 0                E NOT 1
1977 03207 102301      SOS
1978 03210 102000      HLT 0                OV NOT 1
1979 03211 034000      ISZ A
1980 03212 027176      JMP LP26
1981*
1982* JSB ITERATIVE TEST
1983*
1984 03213 006400      CLB
1985 03214 002400      LP27 CLA
1986 03215 073220      STA Z2                Z2 + NOP
1987 03216 017220      JSB **2                JSB FAILED = DID NOT JUMP
1988 03217 102000      Z1 HLT 0
1989 03220 000000      Z2 NOP
1990 03221 063220      LDA Z2
1991 03222 051703      CPA ADDR7                ADDR7 = ADDRESS Z1
1992 03223 002001      RSS
1993 03224 102000      HLT 0                JSB FAILED = BAD RETURN ADDRESS
1994 03225 034001      ISZ B
1995 03226 027214      JMP LP27
1996*
1997* ADA & ISZ ITERATIVE TEST
1998*
1999 03227 002400      CLA
2000 03230 071671      STA T1
2001 03231 041720      ADA K7                000000 + 034075 + 65K = 000000
2002 03232 035671      ISZ T1
2003 03233 027231      JMP **2
2004 03234 002002      SZA
2005 03235 102000      HLT 0                ADA OR ISZ FAILED
2006*
2007* ADB & ISZ ITERATIVE TEST
2008*
2009 03236 006400      CLB
2010 03237 075671      STB T1
2011 03240 045720      ADB K7                000000 + (64K) + 034075 = 000000
2012 03241 035671      ISZ T1
2013 03242 027240      JMP **2
2014 03243 006002      SZB
2015 03244 102000      HLT 0                ADB OR ISZ FAILED
2016*
2017 03245 000000      NOP ***** MODULE LOOP

```

PAGE 0049 #01 SOME DATA PATTERN TESTS

2019\* LDA/CPA - ALL OF CORE - 1ST 2 PAGES

2020\*

2021	03246	065741		LDB FCA	1ST CORE ADDRESS = 000002
2022	03247	160001	PT1	LDA B,I	
2023	03250	150001		CPA B,I	
2024	03251	002001		RSS	
2025	03252	102000		HLT 0	LDA/CPA FAILED: B = ADDRESS
2026	03253	055742		CPB LCA	LAST CORE ADDRESS = 003677
2027	03254	027257		JMP PT2	
2028	03255	006004		INB	NEXT CORE ADDRESS
2029	03256	027247		JMP PT1	CONTINUE

2030\*

2031\* LDB/CPB/STB/CPB - ALL OF CORE - 1ST 2 PAGES

2032\*

2033	03257	061741	PT2	LDA FCA	1ST CORE ADDRESS = 000002
2034	03260	164000	PT3	LDB A,I	
2035	03261	154000		CPB A,I	
2036	03262	002001		RSS	
2037	03263	102000		HLT 0	LDB/CPB FAILED: A = ADDRESS
2038	03264	174000		STB A,I	
2039	03265	154000		CPB A,I	
2040	03266	002001		RSS	
2041	03267	102000		HLT 0	STB/CPB FAILED: A = ADDRESS
2042	03270	051742		CPA LCA	LAST CORE ADDRESS = 003677
2043	03271	027274		JMP PT4	
2044	03272	002004		INA	NEXT CORE ADDRESS
2045	03273	027260		JMP PT3	CONTINUE

2046\*

2047\* ADA - ADB - IOR - XOR - AND USING TABLE VALUES

2048\*

2049	03274	067371	PT4	LDB TBLA	FWA TABLE
2050	03275	077354	PT5	STB A1A	ARG 1 ADDRESS
2051	03276	006004		INB	
2052	03277	077355		STB A2A	ARG 2 ADDRESS
2053	03300	006004		INB	
2054	03301	077356		STB SUMA	SUM ADDRESS
2055	03302	006004		INB	
2056	03303	077357		STB IORA	IOR RESULT ADDRESS
2057	03304	006004		INB	
2058	03305	077360		STB XORA	XOR RESULT ADDRESS
2059	03306	006004		INB	
2060	03307	077361		STB ANDA	AND RESULT ADDRESS
2061	03310	163354		LDA A1A,I	
2062	03311	143355		ADA A2A,I	
2063	03312	153356		CPA SUMA,I	
2064	03313	002001		RSS	
2065	03314	102000		HLT 0	ADA FAILED
2066	03315	167354		LDB A1A,I	

PAGE 0050 #01 SOME DATA PATTERN TESTS

2067	03316	147355	ADB	A2A,I	
2068	03317	157356	CPB	SUMA,I	
2069	03320	002001	RSS		
2070	03321	102000	HLT	0	ADB FAILED
2071	03322	163354	LDA	A1A,I	
2072	03323	133355	IOR	A2A,I	
2073	03324	153357	CPA	IORA,I	
2074	03325	002001	RSS		
2075	03326	102000	HLT	0	IOR FAILED
2076	03327	163354	LDA	A1A,I	
2077	03330	123355	XOR	A2A,I	
2078	03331	153360	CPA	XORA,I	
2079	03332	002001	RSS		
2080	03333	102000	HLT	0	XOR FAILED
2081	03334	163354	LDA	A1A,I	
2082	03335	113355	AND	A2A,I	
2083	03336	153361	CPA	ANDA,I	
2084	03337	002001	RSS		
2085	03340	102000	HLT	0	AND FAILED
2086	03341	067361	LDB	ANDA	
2087	03342	006004	INB		
2088	03343	057466	CPB	TBLE	
2089	03344	002001	RSS		END OF TABLE
2090	03345	027275	JMP	PT5	
2091*					
2092	03346	000000	NOP	*****	MODULE LOOP

2094\* END OF DIAGNOSTIC CYCLE

2095\*

2096	03347	102501	LIA	1	
2097	03350	011665	AND	BIT12	
2098	03351	002003	SZA,	RSS	
2099	03352	102077	HLT	77B	END OF PASS HALT
2100	03353	024130	JMP	START	DO AGAIN

2102	03354	000000	A1A	NOP	ARGUMENT POINTER
2103	03355	000000	A2A	NOP	ARGUMENT POINTER
2104	03356	000000	SUMA	NOP	SUM POINTER
2105	03357	000000	IORA	NOP	IOR RESULT POINTER
2106	03360	000000	XORA	NOP	XOR RESULT POINTER
2107	03361	000000	ANDA	NOP	AND RESULT POINTER
2108	03362	001731	K10A	DEF	K10
2109	03363	001732	K11A	DEF	K11
2110	03364	001671	T1A	DEF	T1

PAGE 0051 #01 SOME DATA PATTERN TESTS

2111	03365	001733	K12A	DEF	K12	
2112	03366	001747	JMP5A	DEF	JMP5	
2113	03367	001743	JSB7A	DEF	JSB7	
2114	03370	002065	P7A	DEF	P7	
2115*						
2116	03371	003372	TBLA	DEF	TBL,1	1ST TABLE ADDRESS
2117	03372	015366	TBL,1	OCT	15366	ARG 1 - 1ST PAIR
2118	03373	127541		OCT	127541	ARG 2
2119	03374	145127		OCT	145127	SUM
2120	03375	137767		OCT	137767	IOR RESULT
2121	03376	132627		OCT	132627	XOR RESULT
2122	03377	005140		OCT	5140	AND RESULT
2123	03400	051463	TBL,2	OCT	51463	ARG 1 - 2ND PAIR
2124	03401	031465		OCT	31465	
2125	03402	103150		OCT	103150	
2126	03403	071467		OCT	71467	
2127	03404	060006		OCT	60006	
2128	03405	011461		OCT	11461	
2129	03406	161271	TBL,3	OCT	161271	ARG 1 - 3TH PAIR
2130	03407	025636		OCT	25636	ARG 2
2131	03410	007127		OCT	7127	SUM
2132	03411	165677		OCT	165677	IOR RESULT
2133	03412	144447		OCT	144447	XOR RESULT
2134	03413	021230		OCT	21230	AND RESULT
2135	03414	105560	TBL,4	OCT	105560	ARG 1 - 4TH PAIR
2136	03415	133410		OCT	133410	
2137	03416	041170		OCT	41170	
2138	03417	137570		OCT	137570	
2139	03420	036170		OCT	36170	
2140	03421	101400		OCT	101400	
2141	03422	141655	TBL,5	OCT	141655	ARG 1 - 5TH PAIR
2142	03423	035334		OCT	35334	
2143	03424	177211		OCT	177211	
2144	03425	175775		OCT	175775	
2145	03426	174561		OCT	174561	
2146	03427	001214		OCT	1214	
2147	03430	175752	TBL,6	OCT	175752	ARG 1 - 6TH PAIR
2148	03431	137257		OCT	137257	
2149	03432	135231		OCT	135231	
2150	03433	177757		OCT	177757	
2151	03434	042505		OCT	42505	
2152	03435	135252		OCT	135252	
2153	03436	032047	TBL,7	OCT	32047	ARG 1 - 7TH PAIR
2154	03437	041163		OCT	41163	
2155	03440	073232		OCT	73232	
2156	03441	073167		OCT	73167	
2157	03442	073124		OCT	73124	
2158	03443	000043		OCT	43	

PAGE 0052 #31 SOME DATA PATTERN TESTS

2159	03444	066144	TBL.8	OCT	66144	ARG 1 - 8TH PAIR
2160	03445	143106		OCT	143106	
2161	03446	031252		OCT	31252	
2162	03447	167146		OCT	167146	
2163	03450	125042		OCT	125042	
2164	03451	042104		OCT	42104	
2165	03452	122241	TBL.9	OCT	122241	ARG 1 - 9TH PAIR
2166	03453	045032		OCT	45032	
2167	03454	167273		OCT	167273	
2168	03455	167273		OCT	167273	
2169	03456	167273		OCT	167273	
2170	03457	000000		OCT	0	
2171	03460	156336	TBL.10	OCT	156336	ARG 1 - 10TH PAIR
2172	03461	146755		OCT	146755	
2173	03462	125313		OCT	125313	
2174	03463	156777		OCT	156777	
2175	03464	010463		OCT	10463	
2176	03465	146314		OCT	146314	
2177	03466	003466	TBLE	DEF	*	LWA TABLE
2178*						
2179	03467	000000	T2	NOP		TEMPORARY STORAGE
2180	03470	000000	SR1	NOP		SUBROUTINE FROM BASE PAGE
2181	03471	025646		JMP	.P4	GO BACK
2182	03472	025642	JMP1	JMP	JMP2	GO BACK TO BASE PAGE
2183*						
2184				END		

\*\* NO ERRORS\*

CROSS-REFERENCE SYMBOL TABLE

**ORG	*****	00003/01	00055/01	00058/01	00074/01	00077/01	00134/03
.0		00068/03	00105/01	00129/01	00130/01	00199/01	00211/01
		00228/01	00236/01	00241/01	00250/01	00284/01	00285/01
		00237/02					00160/02
.1		00069/03	00123/01	00278/01	00415/01	00145/02	00169/02
		00226/02	00260/02	00284/02	00317/02	00318/02	00225/02
.ADR3		00121/03	00057/03				
.P1		00113/03	00526/02	00542/02	00020/03	00026/03	00032/03
							00044/03
.P2		00114/03	00531/02	00537/02	00038/03		
.P3		00055/03	00121/03				
.P4		00056/03	00543/04				
A		00086/03	00444/01	00454/01	00480/01	00493/01	00502/01
		00002/02	00007/02	00028/02	00034/02	00044/02	00045/02
		00068/02	00080/02	00086/02	00092/02	00371/03	00389/03
		00426/03	00434/03	00449/03	00457/03	00460/03	00480/03
		00526/03	00539/03	00002/04	00030/04	00075/04	00084/04
		00124/04	00296/04	00311/04	00326/04	00341/04	00396/04
		00400/04	00401/04				00397/04
A1A		00464/04	00412/04	00423/04	00428/04	00433/04	00436/04
							00443/04
A2A		00465/04	00414/04	00424/04	00429/04	00434/04	00439/04
							00444/04
ADDR1		00079/03	00403/01				
ADDR2		00089/03	00342/02				
ADDR3		00080/03	00456/01				
ADDR4		00081/03	00466/01				
ADDR7		00091/03	00353/04				
ADDRY		00090/03	00352/02				
ADR13		00110/03	00008/04				
ADR14		00111/03	00022/04				
ANDA		00469/04	00422/04	00445/04	00448/04		
B		00087/03	00449/01	00464/01	00474/01	00487/01	00409/01
		00515/01	00522/01	00529/01	00010/02	00020/02	00026/02
		00050/02	00051/02	00052/02	00074/02	00377/03	00383/03
		00416/03	00439/03	00446/03	00466/03	00473/03	00403/03
		00527/03	00533/03	00543/03	00016/04	00041/04	00058/04
							00066/04

## CROSS-REFERENCE SYMBOL TABLE

PAGE 0002

	01819 01902	01828 01917	01838 01994	01846 02022	01855 02023	01872	01887
BIT12	01165	02097					
BIT15	01166 00839	00690 00849	00746	00747	00757	00805	00838
EVEN1	01161 00308 00475 00577 00982 01032 01429 01598 01710 01778 01835 01941	00139 00326 00497 00593 00988 01096 01469 01604 01711 01796 01850 01955	00140 00358 00498 00611 00996 01191 01481 01610 01728 01806 01863 01956	00153 00359 00521 00930 01002 01248 01545 01622 01748 01814 01879	00172 00384 00523 00935 01012 01326 01572 01672 01768 01815 01893	00294 00385 00527 00942 01018 01333 01585 01692 01776 01816 01894	00295 00473 00530 00947 01026 01359 01595 01693 01777 01834 01925
FCA	01214	02021	02033				
H7077	01168	00470					
HLT0	01167	00443	00447	00460			
IA1	01183	00872					
IA10	01194	00961	00975	01062			
IA2	01184	00875					
IA3	01186	00882					
IA4	01187	00892					
IA5	01189 01556 01616	00903 01563 01623	00917 01576	01190 01589	01461 01591	01473 01596	01553 01614
IA6	01190	00909	00923				
IA7	01191 01039 01583	00931 01192	00943 01467	00983 01479	00997 01544	01011 01547	01025 01578
IA8	01192 01045	00936	00948	00989	01003	01017	01031
IA9	01193 01506 01678	00955 01516	00969 01523	01054 01528	01194 01534	01487 01536	01496 01667
IORA	02105	02056	02073				

## CROSS-REFERENCE SYMBOL TABLE

PAGE 0003

IR1	00875	01183					
IR11	01197	01629					
IR12	01198	01633					
IR13	01199	01639	01643				
IR14	01200	01653	01657				
IR2	00880	01185					
JMP1	02182	01210					
JMP1A	01210	01140					
JMP2	01143	02182					
JMP5	01221	02112					
JMP5A	02112	01286					
JR1	01173	00442					
JR2	01174	00448					
JR3	01175	00453					
JR4	01176	00461					
JSB7	01217	01290	01293	02113			
JSB7A	02113	01291					
K1	01163	00354	00380	00619	01665	01910	01972
K10	01206	01071	01085	01112	01124	01136	02108
K10A	02108	01233	01239	01281			
K11	01207	01076	01080	01130	02109		
K11A	02109	01220	01244	01269			
K12	01208	01118	02111				
K12A	02111	01275					
K7	01195	02001	02011				
LCA	01215	02026	02042				
LP1	01692	01697					
LP10	01776	01782					



LP11	01785	01791
LP12	01796	01802
LP13	01805	01811
LP14	01814	01820
LP15	01823	01829
LP16	01834	01839
LP17	01842	01847
LP18	01850	01856
LP19	01861	01873
LP2	01700	01705
LP20	01876	01888
LP21	01891	01903
LP22	01906	01918
LP23	01923	01935
LP24	01938	01950
LP25	01953	01965
LP26	01968	01980
LP27	01985	01995
LP3	01710	01715
LP4	01718	01723
LP5	01728	01734
LP6	01737	01743
LP7	01748	01754
LP8	01757	01763
LP9	01768	01773

H1	01157	00110	00114	00134	00135	00150	00188
	00189	00194	00216	00217	00222	00223	00229
	00242	00247	00248	00253	00265	00269	00289
	00290	00305	00341	00342	00347	00367	00368
	00373	00506	00509	00516	00601	00625	00631
	00700	00701	00712	00759	00815	00816	00827

## CROSS-REFERENCE SYMBOL TABLE

PAGE 0005

	00851	00904	00910	00918	00924	01189	01306
	01313	01352	01402	01405	01415	01431	01438
	01463	01475	01509	01519	01554	01565	01578
	01798	01807	01852	01865	01880	01927	01942
M2	01158	00348	00374	00702	00736	00793	00817
00D1	01162	00144	00145	00154	00178	00299	00300
	00309	00332	00352	00353	00360	00378	00379
	00386	00479	00481	00534	00537	00582	00587
	00605	00607	00613	00617	00984	00990	00998
	01004	01040	01046	01254	01343	01421	01430
	01606	01625	01700	01701	01718	01719	01737
	01757	01769	01785	01786	01787	01797	01805
	01823	01824	01825	01842	01843	01851	01864
	01878	01895	01908	01909	01926	01940	01957
	01970	01971					
P13	01641	01201					
P14	01655	01202					
P3	00455	01171					
P4	00455	01172					
P6	01289	01223					
P7	01292	02114					
P7A	02114	01294					
P9	01293	01220					
P99	01395	01213					
P99A	01213	01409					
P61	01226	01154					
PMAX	01164	00688	00734	00735	00758	00791	00792
	00803	00850					
PT1	02022	02029					
PT2	02033	02027					
PT3	02034	02045					
PT4	02049	02043					
PT5	02050	02090					
RA11	01633	01197					
RA12	01637	01198					

RA3	00884	00881	00885	01180	01186		
RA4	00894	00891	00895	01181	01188		
RTN1	00447	01173					
RTN2	00452	01174					
RTN3	00456	01175					
RTN4	00466	01176					
SR1	02150	01211					
SR1A	01211	01144	01145	01147			
START	00081	02100					
SUMA	02104	02054	02063	02068			
T1	01169	00161	00162	00167	00168	00173	00174
	00179	00180	00315	00316	00321	00322	00327
	00328	00333	00334	00410	00411	00414	00420
	00421	00423	00428	00432	00435	00956	00962
	00970	00976	01053	01056	01061	01064	01193
	01250	01256	01261	01264	01347	01355	01363
	01370	01443	01448	01486	01489	01490	01495
	01498	01499	01504	01508	01514	01518	01524
	01529	01535	01546	01549	01555	01558	01666
	01671	01677	01681	01729	01730	01738	01739
	01749	01750	01758	01759	02000	02002	02010
	02012	02110					
T1A	02110	01249	01255	01262			
T2	02179	01209					
T2A	01209	01091	01092	01097	01098	01103	01104
	01106						
*TB.10	02171						
TBL.1	02117	01204	01234	01238	01276	01282	02116
TBL.2	02123	01205	01229	01243	01270		
*TBL.3	02129						
*TBL.4	02135						
*TBL.5	02141						
*TBL.6	02147						
*TBL.7	02153						

#TBL.8	02159			
#TBL.9	02165			
TBLA	02116	02049		
TBLE	02177	02088		
X1	00400	01170		
X13	01642	01199	01638	01647
X14	01656	01200	01652	01661
X2	00401	00398	00402	
X20	00543	00555	00557	
X21	00551	00545		
X22	00561	00550	00573	00575
X23	00569	00563		
X24	00577	00568		
X4	00429	00436	00438	
X5	00440	00431		
X99	01397	01390	01408	
XORA	02106	02058	02078	
Z1	01988	01182		
Z2	01989	01986	01990	





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