E. Math Box

The Math Box signature analysis procedure is somewhat different from other procedures, so follow these set-up instructions for the three tests carefully.

In addition to your CAT Box or signature analyzer, you'll need an SA Harness Assembly. Order Atari part number A036836-01 or see Figure 6 to make your own.

A. Math Box Test #1 Procedure:

1. Plug SA Harness Assembly Test #1 connector onto Signature Analyzer connector (J16) on the Auxiliary PCB.
2. Connect the CAT Box Start, Stop and Clock E-Z hooks to the SA Harness Assembly as shown in Figure 7.
3. On the main PCB, connect PWR ON RESET test point to ground, and power-up the game and the CAT Box.
4. Don't remove the microprocessor (6502A) from the main PCB.
   Don't connect the 50 pin ribbon cable to the main PCB edge connector.
   Don't connect W DOG DIS to ground.
5. Set the CAT Box switches as follows:
   a. START ⌐¬
   b. STOP ⌐¬
   c. CLOCK ⌐¬
   d. TESTER MODE: SIG
   e. Press TESTER RESET
6. With the logic probe touching the +5V test point on the Auxiliary PCB, the ADDRESS/SIGNATURE display should read CC34. This will verify that your test set-up is correct. If you don't get CC34, recheck your set-up.

NOTE: Signatures are listed in the order that they should be done. As often as possible, *IC-Pin* refers to a chip output. As a general rule, when a bad signature is discovered, the IC listed in the *IC-Pin* column can be suspected as faulty.

Those signatures marked with an asterisk (*) should be taken with a 1K resistor clipped between the logic probe and the +5V test point.

Signatures

Logic Probe on IC-Pin	*Signature Should Be*
C1-11	H58A
C1-12	77F7
C1-13	85PA
C1-14	7P25
D1-11	5CP0
D1-12	P5PH
D1-13	725C
D1-14	96PF
F1-12	4PPF
F1-11	OUF0
F1-10	3CAP
F1-9	A6A3
H1-12	26A6
H1-11	91HA
H1-10	P9C1
H1-9	2987
J1-12	96U0
J1-11	UC59
J1-10	6989
J1-9	3FU4
K1-12	05A6
K1-11	60H6
K1-10	PPF6
K1-9	34C2
L1-12	58A1
L1-11	1AA2
L1-10	F74F
L1-9	6CF6
E1-12	F765
E1-11	CPU8
E1-10	0000
E1-9	F515
F4-2	CC34
E4-6	A6A3
A2-6	0000
B1-2	8A7H
B1-5	CU2P
B1-6	1C6C
B1-9	6U30
B1-12	5AAH
B1-15	03A7
B1-16	9A08
B1-19	2327
K/L2-33	6PUP
K/L2-16	9AFH*
K/L2-8	809A*
F/H2-33	9CPP
F/H2-16	11C5*
F/H2-8	78AA*
J2-33	8631
J2-16	11C5*
J2-8	7U19*
E2-34	A1F7
E2-31	1781
E2-16	9AFH*
E5-11	C646
D4-8	0600
E4-11	CC34
F5-11	C835*
D4-6	C4U4
F5-6	753F
E4-8	CPU8
E5-8	45A1*

B. Math Box Test #2A Procedure

1. Plug SA Harness Assembly Test #2 connector onto Signature Analyzer connector (J16) on the Auxiliary PCB.
2. Connect the CAT Box Start, Stop and Clock E-Z hooks to the SA Harness Assembly as shown in Figure 7.
3. Don't remove the microprocessor (6502A) from the main PCB.
   Don't connect the 50 pin ribbon cable to the main PCB edge connector.
   Don't connect W DOG DIS to ground.
   Don't connect PWR ON RESET to ground.
4. Set the CAT Box switches as follows:
   a. START ⌐¬
   b. STOP ¬⌐
   c. CLOCK ¬⌐
   d. TESTER MODE: SIG
   e. Press TESTER RESET
5. Enter the self-test mode and advance the screen with the slam switch until the large blank rectangle appears. This procedure is described in Figure 6, Chapter 2 of the Tempest™ Operation, Maintenance, and Service Manual.
6. With the logic probe touching the +5V test point on the Auxiliary PCB, the ADDRESS/SIGNATURE display should read *3951*. This will verify that your test set-up is correct. If you don't get 3951, recheck your set-up.

NOTE: Signatures are listed in the order that they should be done. As often as possible, *IC-Pin* refers to a chip output. As a general rule, when a bad signature is discovered, the IC listed in the *IC-Pin* column can be suspected as faulty.

Signatures

Logic Probe on IC-Pin	*Signature Should Be*
A1-14	F722
A1-13	C4P5
A1-12	6UAC
A1-11	3441
A1-10	2P61
A1-9	92F3
A1-7	A856
A1-6	3050
A1-5	H8F9
A1-4	9569
A1-3	3U53
A1-2	9F47
A1-1	4FUF

C. Math Box Test #2B Procedure

1. Plug SA Harness Assembly Test #2 connector onto Signature Analyzer connector (J16) on the Auxiliary PCB.
2. Connect the CAT Box Start, Stop and Clock E-Z hooks to the SA Harness Assembly as shown in Figure 7.
3. Don't remove the microprocessor (6502A) from the main PCB.
   Don't connect the 50 pin ribbon cable to the main PCB edge connector.
   Don't connect W DOG DIS to ground.
   Don't connect PWR ON RESET to ground.
4. Set the CAT Box switches as follows:
   a. START ⎍
   b. STOP ⎏
   c. CLOCK ⎍
   d. TESTER MODE: SIG
   e. Press TESTER RESET
5. Enter the self-test mode and advance the screen with the slam switch until the large blank rectangle appears. This procedure is described in Figure 6, Chapter 2 of the Tempest™ Operation, Maintenance, and Service Manual.
6. With the logic probe touching the +5V test point on the Auxiliary PCB, the ADDRESS/SIGNATURE display should read *3951.* This will verify that your test set-up is correct. If you don't get *3951,* recheck your set-up.

NOTE: Signatures are listed in the order that they should be done. As often as possible, *IC-Pin* refers to a chip output. As a general rule, when a bad signature is discovered, the IC listed in the *IC-Pin* column can be suspected as faulty.

Signatures

Logic Probe on IC-Pin	*Signature Should Be*
C1-11	92F3
C1-12	A856
C1-13	3050
C1-14	H8F9
D1-11	9569
D1-12	3U53
D1-13	9F47
D1-14	4FUF

D. Math Box Test #3 Procedure

1. Plug SA Harness Assembly Test #3 connector onto Signature Analyzer connector (J16) on the Auxiliary PCB.
2. Connect the CAT Box Start, Stop and Clock E-Z hooks to the SA Harness Assembly as shown in Figure 7.
3. Don't remove the microprocessor (6502A) from the main PCB.
   Don't connect the 50 pin ribbon cable to the main PCB edge connector.
   Don't connect W DOG DIS to ground.
   Don't connect PWR ON RESET to ground.
4. Set the CAT Box switches as follows:
   a. START ⎍
   b. STOP ⎏
   c. CLOCK ⎍
   d. TESTER MODE: SIG
   e. Press TESTER RESET
5. Enter the self-test mode and advance the screen with the slam switch until the large blank rectangle appears. This procedure is described in Figure 6, Chapter 2 of the Tempest™ Operation, Maintenance, and Service Manual.
6. With the logic probe touching the +5V test point on the Auxiliary PCB, the ADDRESS/SIGNATURE display should read *3951.* This will verify that your test set-up is correct. If you don't get *3951,* recheck your set-up.

NOTE: Signatures are listed in the order that they should be done. As often as possible, *IC-Pin* refers to a chip output. As a general rule, when a bad signature is discovered, the IC listed in the *IC-Pin* column can be suspected as faulty.

Signatures

Logic Probe on IC-Pin	*Signature Should Be*
E2-22	1441
E2-23	2883
E2-24	5107
E2-25	A20P
J2-22	441H
J2-23	883A
J2-24	1074
J2-25	20P9