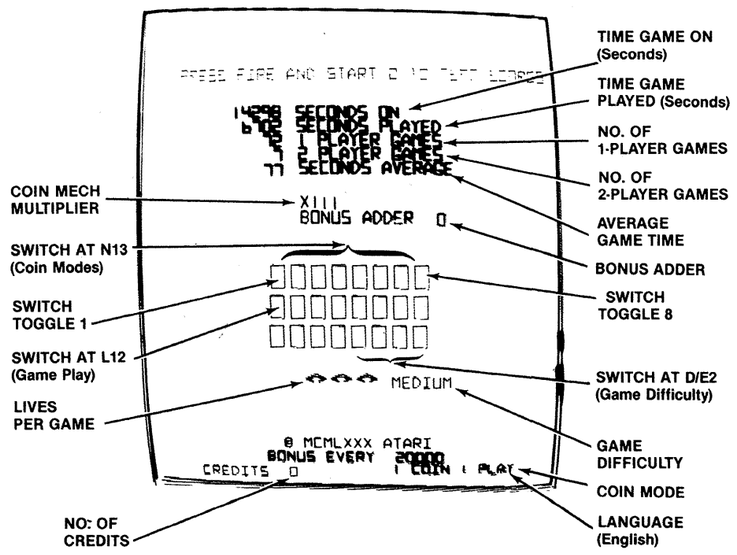
Self-Test Procedure

The information below is displayed on the screen if you set the self-test switch to **on** during the attract mode. Look at the displayed numbers for *SECONDS ON* and *SECONDS PLAYED*. If these numbers run together vertically, make adjustments to the X-BIP and Y-BIP potentiometers on the game PCB.

To go to Self-test Part 2, rotate the control knob until the message *PRESS FIRE AND SUPERZAPPER FOR SELF-TEST* appears on the monitor. Then press both FIRE and SUPERZAPPER. To end the operator information display, set self-test switch to **off.**

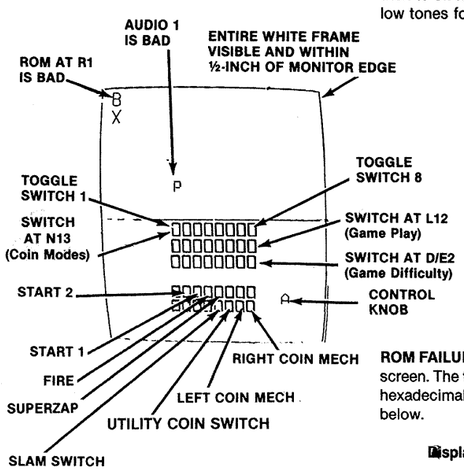


Operator Information Display

To erase High Score Table:
1. Turn control knob until top line reads *PRESS FIRE AND START 2 TO ZERO SCORES.*
2. Press both FIRE and START 2.
3. The word *ERASING* appears and blinks on the screen until the entire table is erased. **Wait until the word *ERASING* disappears** before continuing with other tests.

To erase Game Times:
1. Turn control knob until top line reads *PRESS FIRE AND START 1 TO ZERO TIMES.*
2. Press both FIRE and START 1.
3. The word *ERASING* appears and blinks on the screen until the entire table is erased. **Wait until the word *ERASING* disappears** before continuing with other tests.

Instruction	Test Passes	Test Fails
1. Set self-test switch to **on** . Press RESET on the PCB, or turn power off and on again.	After about 5 seconds, the monitor displays the picture below. No sounds are produced.	**RAM FAILURE** is indicated by a sequence of 1 to 12 tones and an *R* displayed in top half of screen. You will hear a short low tone and see a short flash on the LED start pushbutton for each good RAM chip, and a long high tone accompanied by a long pulse on the start pushbutton for a failing RAM chip. The test stops with the first failing RAM. To restart the sequence, press RESET on the PCB, or power game to **off,** then to **on** again. Identify the bad RAM chip with the table below. Example: four short low tones followed by a long high tone indicates failure of RAM at location M3.



Long High Tone	Bad RAM Chip Location on Analog Vector-Generator PCB
1st	R2
2nd	P2
3rd	R4
4th	P4
5th	M3
6th	M4
7th	L3
8th	L4
9th	K3
10th	K4
11th	J3
12th	J4

ROM FAILURE is indicated by a vertical pair of hexadecimal numbers on the top of the screen. The top number indicates the location of the failing ROM(s). Ignore the bottom hexadecimal number in the pair. Identify the bad ROM with the table immediately below.

Displayed No.	Bad ROM Chip Location	PCB Location
B	R1	
A	P1	
9	M/N1	
8	L/M1	Analog Vector-
7	K1	Generator PCB
6	J1	
5	H1	
4	F1	
3	E1	
2	D1	
1	R3	
0	N/P3*	

EAROM, Audio and Math Box Failure are indicated by a single letter in the center of the display. Identify the failure with the table below.

Displayed Letter	Failure	PCB Location
E	EAROM	C3 (Aux. PCB)
P	Audio 1	B/C2 (Aux. PCB)
Q	Audio 2	C/D2 (Aux. PCB)
R	RAM	See RAM test above
M	Math Box**	

*If this ROM is bad, you will hear a continuous low tone, and the program may be unable to display a screen image.

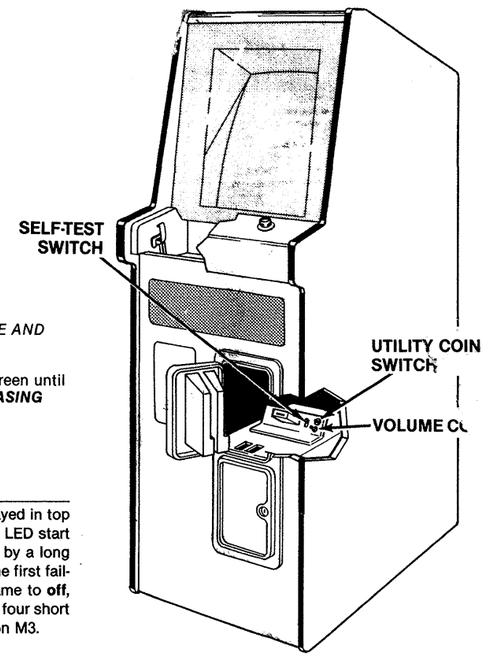
**Math-box failure is explained in TM-195, Tempest Troubleshooting Guide.

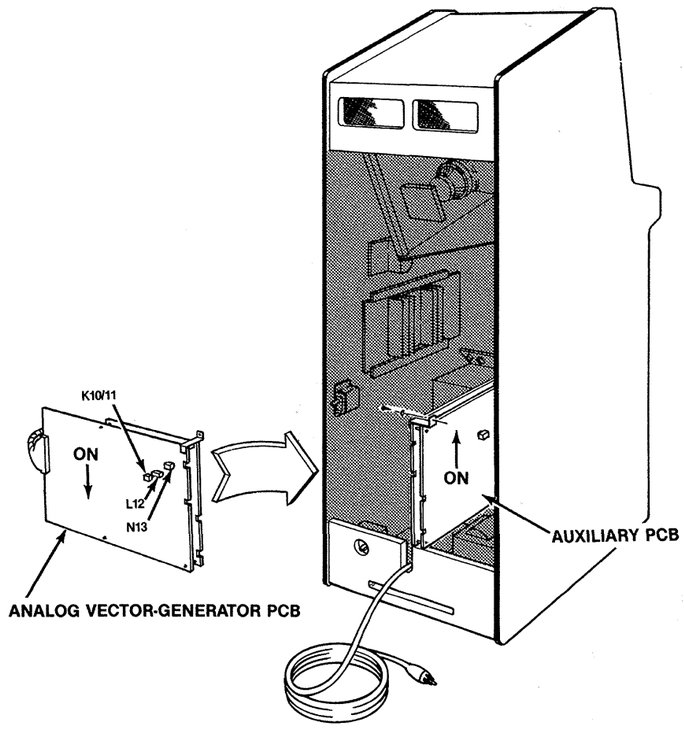
2. Activate start, fire, Superzap, SLAM, and coin switches.*	As switch activates, you'll hear a beep and 0 changes to 1 on the screen.	You will not hear a beep and 0 will remain on the screen for the defective switch.
3. Rotate encoder wheel clockwise and counterclockwise.	The right hexadecimal number on the screen will increase with counter clockwise motion, and decrease with clockwise motion.	Incorrect progression of numbers indicates encoder wheel harness wires were connected incorrectly. No number change indicates encoder wheel is bad or harness wires are loose.
4. Observe the white frame around the outside of the screen.	Each frame corner should be within ½-inch of each monitor bezel corner.	Consult Tempest™ Drawing Package to adjust video pots.
5. Activate SLAM switch.	A white cross hatch pattern appears. A character set appears at the bottom of the screen.	If display is not centered and symmetrical on the monitor, adjust video pots (see Tempest Drawing Package) on the main PCB. If character set is incorrect, check Vector ROMs (see Troubleshooting Guide).
6. Activate SLAM switch.	Horizontal and vertical lines cross in the center of the screen displaying a large "plus" sign. Audio I/O 1 and 2 alternate to produce four tones.	No sound indicates failure of an audio amplifier and/or the custom audio chip(s).
7. Activate SLAM switch.	Tests purple, cyan, yellow, white, green, blue, and red for color and intensity. Displays seven groups of vertical lines, each with right line the brightest and left line the dimmest.	Use this pattern for tracking adjustments (see the Color X-Y Monitor Manual).
8. Activate SLAM switch.	A checkerboard pattern touches the sides and corners of the monitor. Rotate the control knob to change color.	Use this pattern for purity and convergence adjustments (see Color X-Y Monitor Manual).
9. Activate SLAM switch.	A white frame is displayed on the screen.	
10. When satisfied with tests, set self-test switch to **off** position.		

Activate coin switches by inserting at least one coin in each coin slot. You will not trip the coin counters as long as you are in self-test.

Important Note to Operators:

If the operation, maintenance and service manual or troubleshooting guide was not included in this game when you unpacked it, contact your distributor to get a free copy. (All Atari manuals for coin-operated games also include complete illustrated parts lists.)





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Game Option Settings

To change toggle positions on the switch assemblies, you need not remove the game PCB. The switches are accessible when the Tempest™ Analog Vector-Generator PCB is mounted in place. To change positions on the Auxiliary PCB slide the board out as far as possible.

When changing the options, verify proper results on the monitor display **by performing the self-test.** Note that changing an option on any of the following eight toggles will **not** cause an immediate change on the monitor screen during the attract mode.

Settings of 8-Toggle Switch on Tempest Analog Vector-Generator PCB *(at L12)*

1	2	3	4	5	6	7	8	Option
							On	1-credit minimum $
							Off	2-credit minimum
					On	On		English $
					On	Off		French
					Off	On		German
					Off	Off		Spanish
								Bonus life granted at every:
		On	On	Off				10,000 points
		On	On	On				20,000 points $
		On	Off	On				30,000 points
		On	Off	Off				40,000 points
		Off	On	On				50,000 points
		Off	On	Off				60,000 points
		Off	Off	On				70,000 points
		Off	Off	Off				No bonus life
Off	Off							2 lives per game
On	On							3 lives per game $
On	Off							4 lives per game
Off	On							5 lives per game

Settings of 4-Toggle Switch on Auxiliary PCB *(at D/E2)*.

		Off	Off	Game difficulty*
		Off	On	Medium $
		On	Off	Easy
		On	On	Hard
Not Used	Off			Medium
	On			Starting Level:
				1, 3, 5, 7 or 9 $
				1, 3, 5, 7, 9 or 11 if current high score 300,000–499,999
				1, 3, 5, 7, 9, 11 or 13 if current high score 500,000–699,999
				1, 3, 5, 7, 9, 11, 13 or 15 if current high score more than 700,000

$ Manufacturer's suggested settings

** Easy—Enemies move slower and one less enemy shot on the screen at one time.*

Hard—One more enemy, enemies move faster and 1–4 more enemy shots on the screen at one time.

Changing toggles 1-5 erases the high score table.

Coin Counter Option Settings

[These toggles determine which coin mechanisms activate which counters]

Toggle Settings of 4-Toggle Switch on Analog Vector-Generator PCB (K10/11) 4	3	2	1	Two coin acceptors in the coin door:
		On	Off	Both acceptors activate all coin counters simultaneously.
Not Used	*Not Used*	Off	On	Both acceptors activate 2 counters separately. $$
		Off	Off	Both acceptors activate 2 counters separately.
		On	On	Both acceptors activate all coin counters simultaneously. $

$ Manufacturer's suggested settings for games with 1 coin counter.

$$ Manufacturer's suggested settings for games with two coin counters.

Game Price Settings

The table below contains the switch settings for options relating to game price, coin mechanism multipliers (German coin doors), bonus play, demonstration and freeze mode.

The Demonstration Mode allows you to choose any level (1-81) in the ready-to-play mode and accelerate through as many as 99 levels without having to kill the enemies. The Demonstration-Freeze Mode** allows you to stop the action. The score is zeroed at the end of the game in this mode.

Set the toggles per the table below for the Demonstration Mode. Next, rotate the control knob. You may choose level 1 through 81 during the ready-to-play mode. Press either START button to accelerate through the tubes. Press the FIRE button to clear the spikes at the bottom of the tube. To freeze play, set switch 1 to off.

Toggle Settings of 8-Toggle Switch on Tempest Analog Vector-Generator PCB *(at N13)*

1	2	3	4	5	6	7	8	Option
						Off	On	Free play
						Off	Off	1 coin* for 2 credits
						On	On	1 coin* for 1 credit $
						On	Off	2 coins* for 1 credit
				On	On			Right coin mech × 1 $
				On	Off			Right coin mech × 4
				Off	On			Right coin mech × 5
				Off	Off			Right coin mech × 6
			On					Left coin mech × 1 $
			Off					Left coin mech × 2
On	On	On						No bonus coins $
On	On	Off						For every 2 coins inserted, game logic adds 1 more coin*
On	Off	On						For every 4 coins inserted, game logic adds 1 more coin*
On	Off	Off						For every 4 coins inserted, game logic adds 2 more coins*
Off	On	On						For every 5 coins inserted, game logic adds 1 more coin*
Off	On	Off						For every 3 coins inserted, game logic adds 1 more coin*

Demonstration and Freeze Mode**

Off	Off					Off	On	Demonstration Mode
Off	Off					Off	On	Demonstration-Freeze Mode

$ Manufacturer's suggested settings

** In the U.S., a "coin" is defined as 25¢. In Germany a "coin" is 1 DM.*

***** If you press RESET during this mode, game will lock up. To recover, set switch 1 to on.***

To achieve bonus plays, all coins must be inserted before pressing start button.