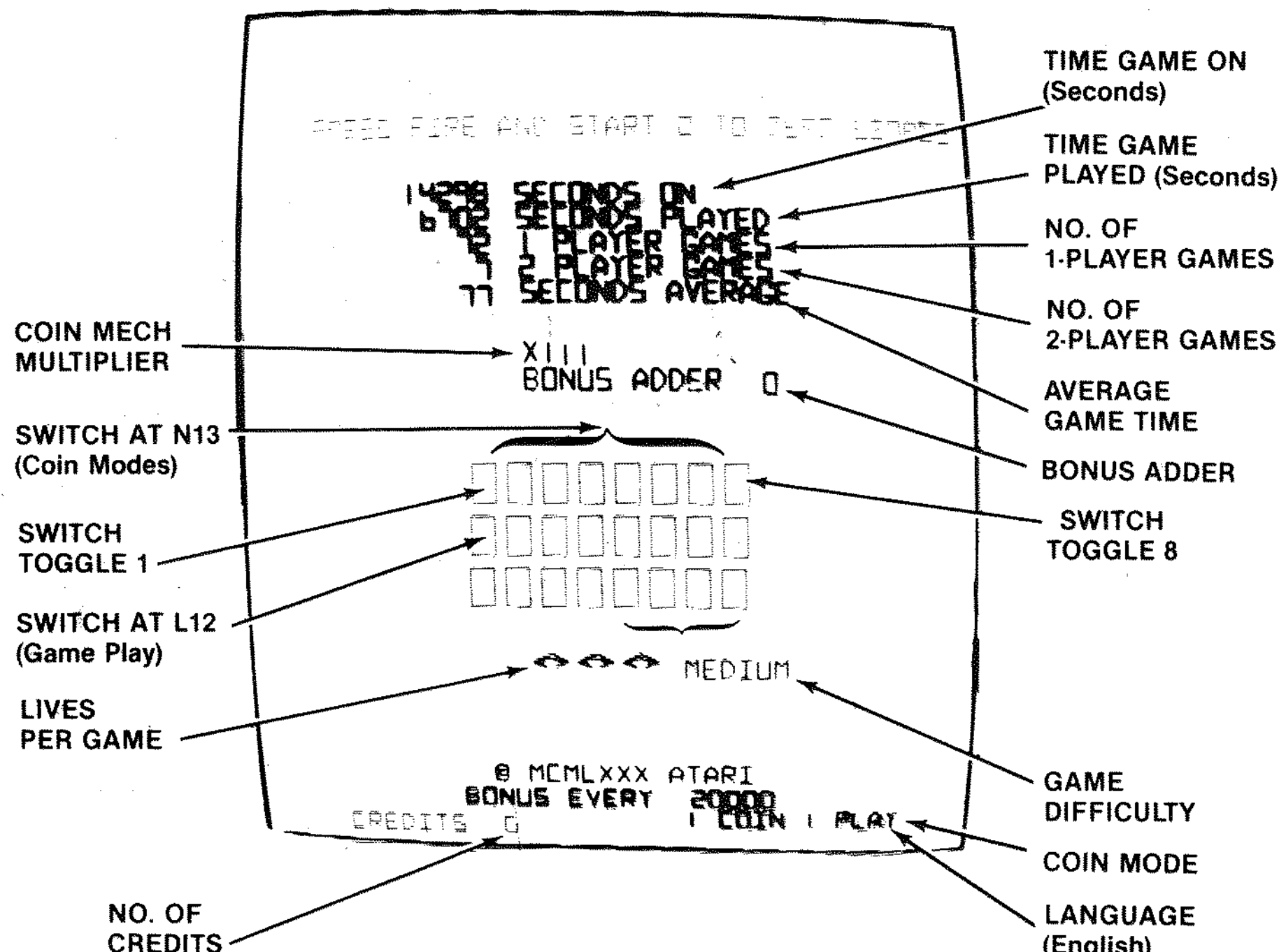


Self-Test Procedure

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.



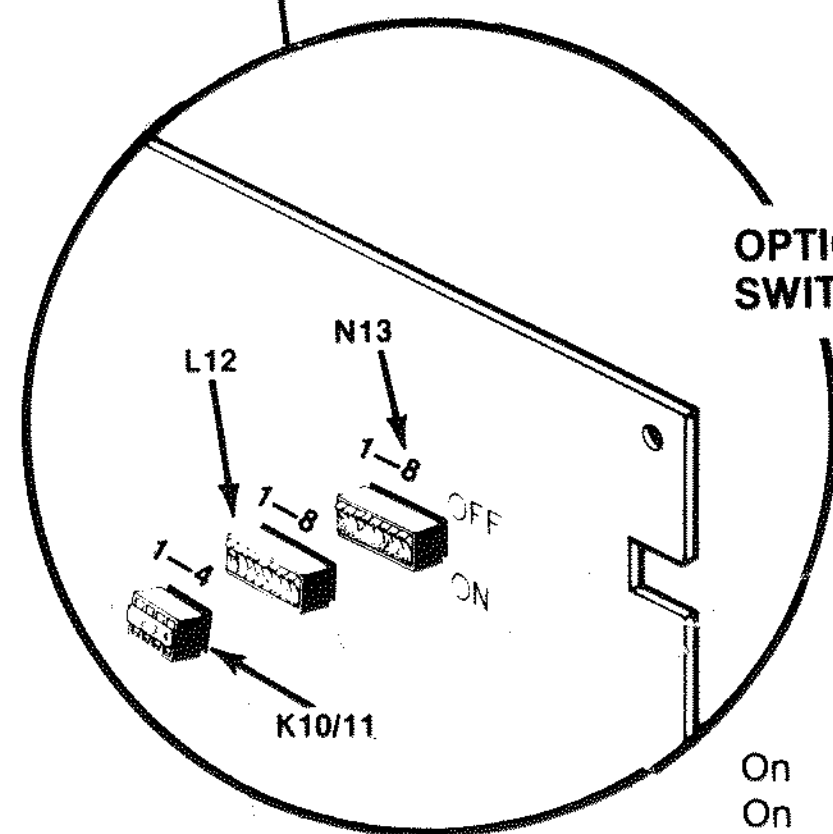
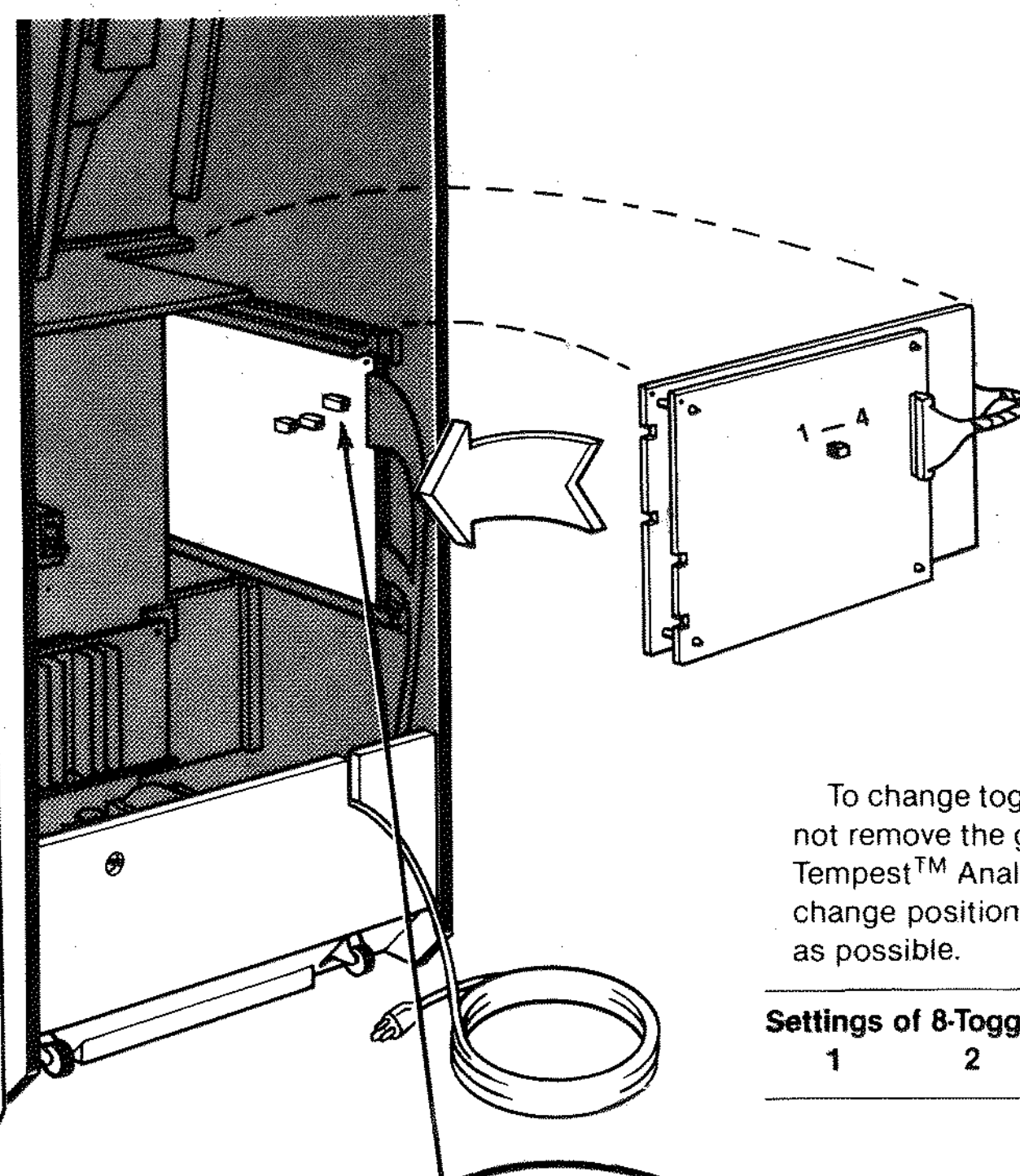
Operator Information Display

To erase High Score Table:

- Turn control knob until top line reads PRESS FIRE AND START 2 TO ZERO HIGH SCORES.
- Press both FIRE and START 2.
- 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:

- Turn control knob until top line reads PRESS FIRE AND START 1 TO ZERO TIMES.
- Press both FIRE and START 1.
- 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.



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

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

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

Not Used	Off	Off	On	On	Option
Off	Off	Off	On	On	Game difficulty*
Off	On	On	On	On	Medium \$
On	On	On	On	On	Easy
On	On	On	On	On	Hard
On	On	On	On	On	Medium
On	On	On	On	On	Minimum rating range: 1, 3, 5, 7, 9 \$
On	On	On	On	On	Minimum rating range tied to high score

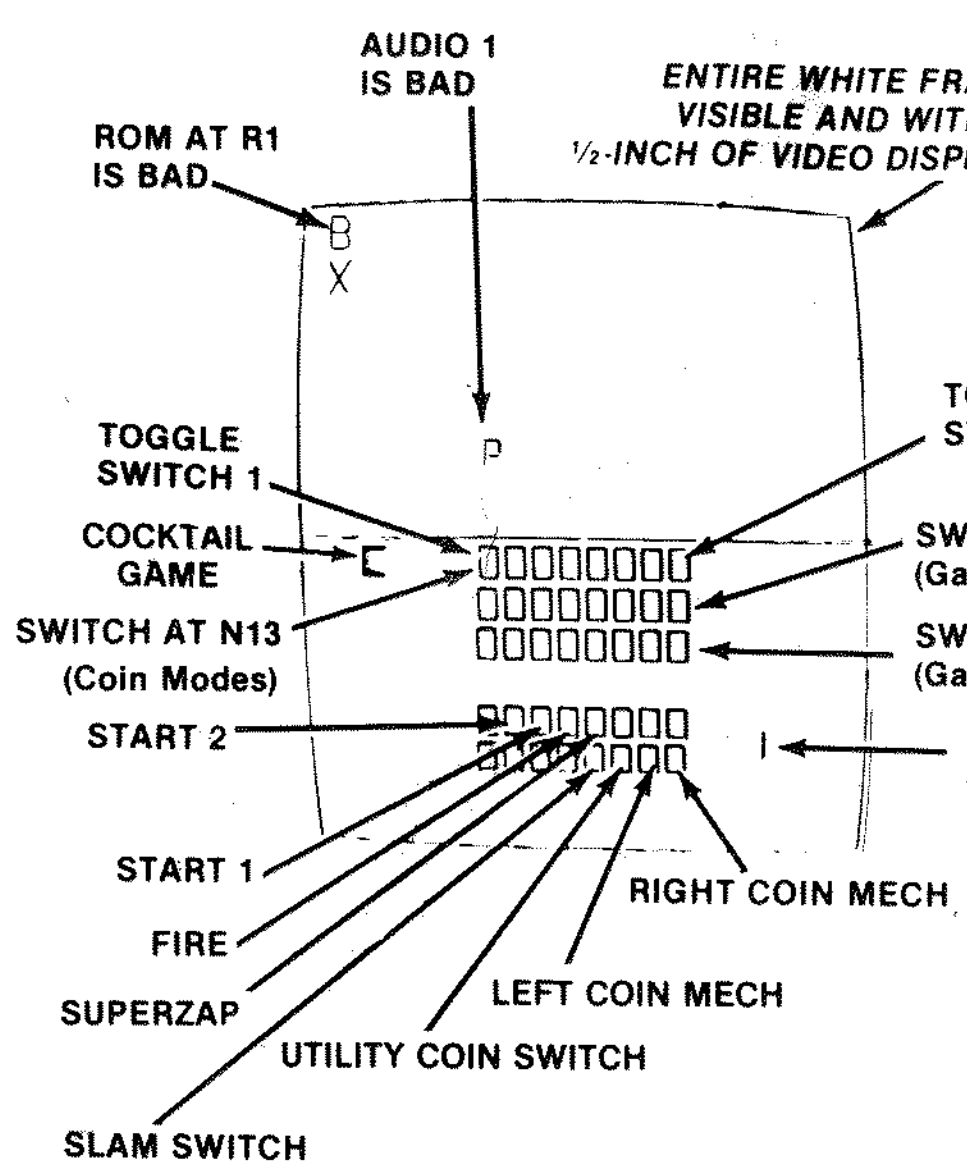
\$ Manufacturer's suggested settings

Changing toggles 1-5 erases the high score table.

* 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.

Instruction	Test Passes	Test Fails
1. Set self-test switch to on (see Figure 5). 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-Generator PCB
7	K1	
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.

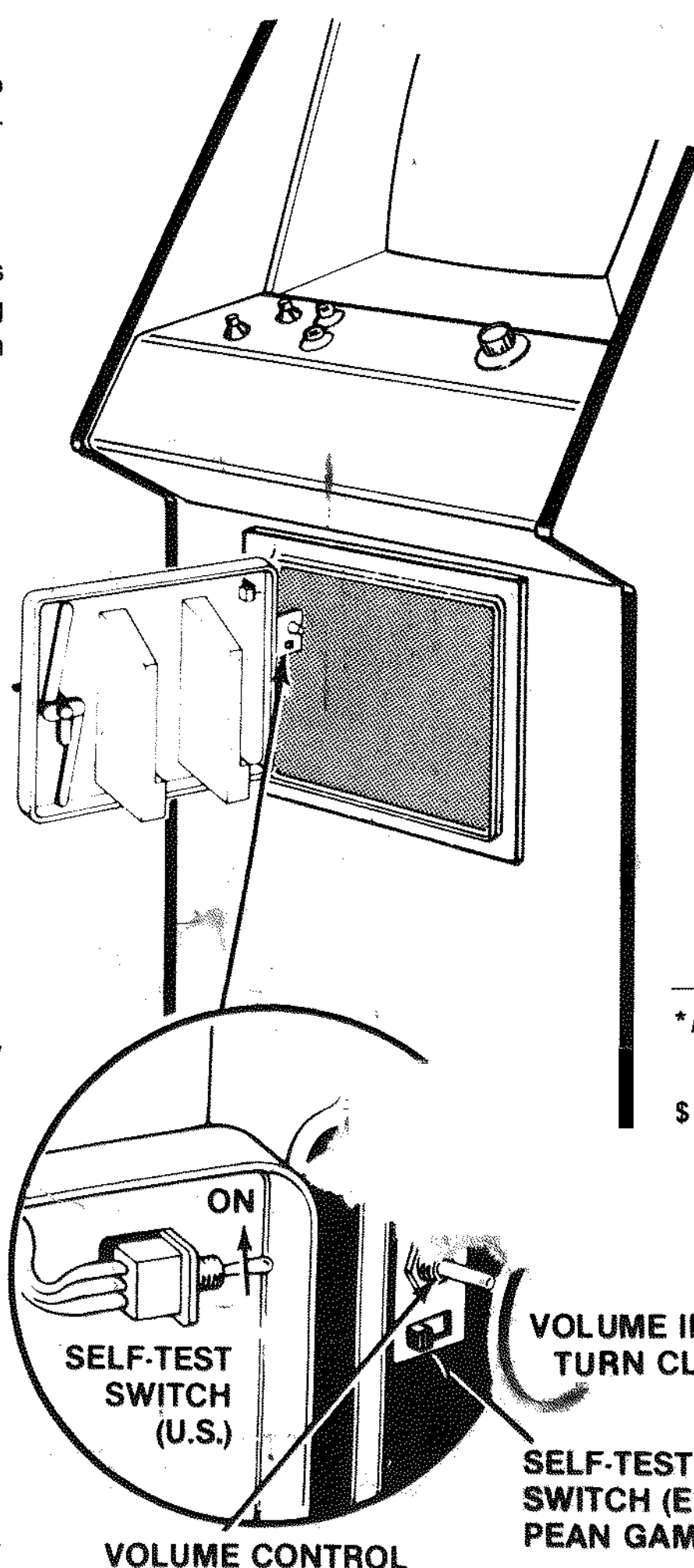
Displayed Letter	Failure	PCB Location
E	EAROM	C3 (Aux. PCB)
P	Audio 1	B/C2 (Aux. PCB)
Q	Audio 2	C/D2 (Aux. PCB)
R	RAM	See Ram test above
M	Math Box**	

* 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.

- 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.
- As line rotates clockwise around one end point when you slowly spin the wheel clockwise. The line rotates counterclockwise when you spin the wheel counterclockwise. Rotating line changes direction. Indicates harness wires are incorrectly connected or loose, or the encoder wheel is bad.
- Each frame corner should be within 1/2-inch of each video display bezel corner. Consult Tempest™ Drawing Package to adjust video pots.
- If display is not centered and symmetrical on the video display, adjust video pots (see Tempest Drawing Package) on the main PCB. If character set is incorrect, check Vector ROMs (see Troubleshooting Guide).
- Rectangle appears at display edges, shrinks smoothly to about 1/3 screen size and snaps back to full size. 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. Rectangle abruptly changing size indicates trouble in linear scale circuitry. Lines not crossing indicate video pot on main PCB needs adjusting (see Drawing Package). No sound indicates failure of an audio amplifier and/or the custom audio chip(s).
- 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 Display Manual).
- A checkerboard pattern touches the sides and corners of the video display. Rotate the control knob to change color. Use this pattern for purity and convergence adjustments (see Color X-Y Display Manual).
- A white frame is displayed on the screen.
- When satisfied with test, 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.



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)	Two coin acceptors in the coin door:		Three coin acceptors in the coin door:
	4	3 2 1	
On Off	Both acceptors activate all coin counters simultaneously.	Left acceptor activates one coin counter; center and right* acceptor activate another coin counter. <i>Not for any currently designed 3-mech coin door.</i>	
Off On	Both acceptors activate 2 counters separately. \$\$	Left and center acceptor activate one coin counter; right acceptor activates another coin counter.	
Off Off	Both acceptors activate 2 counters separately.	Left, center and right acceptors activate 2 coin counters separately. \$\$\$	
On On	Both acceptors activate all coin counters simultaneously. \$	All 3 are same denomination and they 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.

\$\$\$ Manufacturer's suggested settings for games with optional second and third coin counters.

* See Drawing Package DP-190 for additional components required for operating the third coin counter.

Game Price Settings

The table below contains the switch settings for those options relating to game price, coin mechanism multipliers, bonus play, demonstration and freeze mode. This information is useful if you want to view all 99 levels of play or freeze the action, if you need to temporarily set the Tempest™ game on free play, or if you have worn coin mechanisms in your door.

The Demonstration Mode** allows you to choose any level (1-81) in the ready-to-play mode and accelerate through the tubes without having to kill the enemies. Freeze 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.

To achieve bonus plays, all coins must be inserted before pressing the start button. If you choose the two play minimum, set toggle 8 at PCB switch assembly L12 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	Off	Off	Off	Off	Off	Off	Off	Free play
Off	Off	Off	Off	Off	Off	Off	Off	1 coin* for 2 credits
On	On	On	On	On	On	On	On	1 coin* for 1 credit \$
On	On	On	On	On	On	On	On	2 coins* for 1 credit
On	On	On	On	On	On	On	On	Right coin mech x 1 \$
On	On	On	On	On	On	On	On	Right coin mech x 4
On	On	On	On	On	On	On	On	Right coin mech x 5
On	On	On	On	On	On	On	On	Right coin mech x 6
On	On	On	On	On	On	On	On	Left coin mech x 1 \$
On	On	On	On	On	On	On	On	Left coin mech x 2
On	On	On	On	On	On	On	On	No bonus coins \$
On	On	On	On	On	On	On	On	For every 2 coins* inserted, game logic adds 1 more coin*
On	On	On	On	On	On	On	On	For every 4 coins* inserted, game logic adds 1 more coin*
On	On	On	On	On	On	On	On	For every 4 coins* inserted, game logic adds 2 more coins*
On	On	On	On	On	On	On	On	For every 5 coins* inserted, game logic adds 1 more coin*
On	On	On	On	On	On	On	On	For every 3 coins* inserted, game logic adds 1 more coin*
On	Off	Off	Off	Off	Off	Off	Off	Demonstration Mode
Off	Off	Off	Off	Off	Off	Off	Off	Demonstration-Freeze Mode

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

\$ Manufacturer's suggested settings

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

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.)