

Components identified by shading have special characteristics important to safety and should be replaced only with identical types.

Self-Test Procedure Part 1

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

To continue with self-test, rotate the control knob until the message FOR SELF TEST PRESS FIRE AND SUPERZAPPER appears on the monitor. Then press both FIRE and SUPERZAP-PER. To end the operator information display, set self-test switch to off.

- START 2 TO ZERO HIGH SCORES.
- disappears before continuing with other tests.
- START 1 TO ZERO TIMES.
- 2. Press both FIRE and START 1
- the entire table is erased. Wait until the word ERASING disappears before continuing with other tests.

Self-Test Procedure Part 2

RAM FAILURE is indicated by a sequence of 1 to 12 tones and an *R* displayed in top After about 5 sechalf of screen. You will hear a short low tone and see a short flash on the LED start onds, the monitor dispushbutton for each good RAM chip, and a long high tone accompanied by a long Figure 5). Press RE- plays the picture be-SET on the PCB, or low. No sounds are 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, turn power off and produced. 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.

	Bad RAM Chip Location	
Long High Tone		on Analog Vector-Generat 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

Displayed No.	Bad ROM Chip Location	PCB Location
В	R1	
Α	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.

Activate start, As switch activates, You will not hear a beep and 0 will remain on the screen for the defective switch. SLAM, and coin 0 changes to 1 on the switches.*

3. Rotate encoder The right hexadecimal Incorrect progression of numbers indicates encoder wheel harness wires were conwheel clockwise and number on the screen nected incorrectly. No number change indicates encoder wheel is bad or harness counterclockwise. will increase with wires are loose. counter clockwise motion, and decrease with clockwise mo-

4. Observe the Each frame corner Consult TempestTM Drawing Package to adjust video pots. white frame around should be within the outside of the ½-inch of each moni-

tor bezel corner.

2 alternate to produce

cal lines, each with right line the brightest and left line the dim-

monitor. Rotate the control knob to

*Activate coin switches by inserting at least one coin in each coin slot. You will not

5. Activate SLAM A white cross hatch 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 Vecpattern appears. A tor ROMs (see Troubleshooting Guide). character set appears

at the bottom of the screen.

6. Activate SLAM Horizontal and vertical Lines not crossing indicates video pot on main PCB needs adjusting (see Drawing lines cross in the center of the screen discustom audio chip(s). playing a large "plus" sign. Audio I/O 1 and

four tones. Activate SLAM Tests purple, cyan, Use this pattern for tracking adjustments (see the Color X-Y Monitor Manual). yellow, white, green,

blue, and red for color and intensity. Displays seven groups of verti-

Use this pattern for purity and convergence adjustments (see Color X-Y Monitor Activate SLAM A checkerboard pattern touches the sides Manual). and corners of the

change color.

Perform math-box signature analysis (see Troubleshooting Guide). Activate SLAM A white frame is displayed on the screen.

with test, set selftest switch to off position.

trip the coin counters as long as you are in self-test.

When satisfied

screen.

Operator Information Display

1. Set self-test

switch to on (see

these numbers run together vertically, make adjustments to the X and Y outputs of the game PCB.

To erase High Score Table:
1. Turn control knob until top line reads PRESS FIRE AND

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

To erase Game Times:

1. Turn control knob until top line reads PRESS FIRE AND

3. The word ERASING appears and blinks on the screen until

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Sheet 1, Side A

DP-190-01 2nd printing



Drawing Package Supplement

Tempest™ upright

Operation, Maintenance, and Service Manual

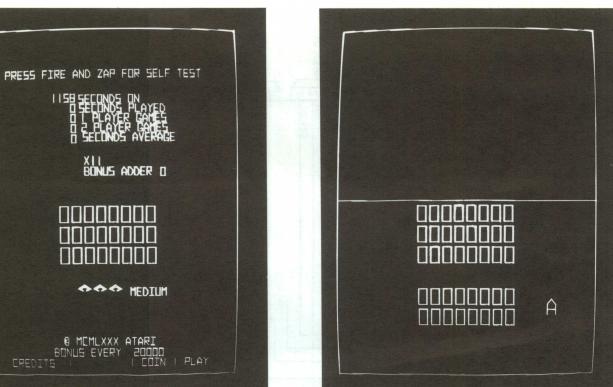
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Contents of this Drawing Package

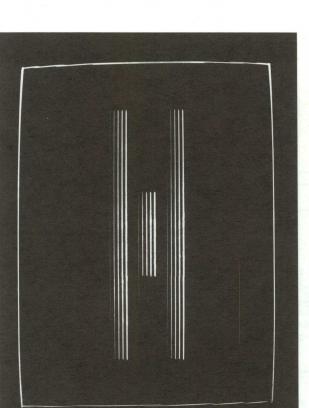
Self-Test Screens Self-Test Procedure 19-In. Wells-Gardner Color X-Y Monitor Sheet 1, Side A
Color X-Y Power Supply Regulator/Audio II PCB Tempest Upright Wiring Diagram Coin Door
Microprocessor Address Decoder Power Input Clock IRQ Counter Memory Map Power Reset and Watchdog Counter ROM Memory RAM Memory Sheet 2, Side A
X-Y Outputs Coin Counter and Video Invert Outputs Coin Door and Option Switch Inputs Color Outputs
Vector Generator: Program Counter RAM ROM Data Shifter Data Buffer Address Selector Vector Timer State Machine
Auxiliary PCB: Power Inputs Address Decoder Math Box High Score Memory Player Inputs and Audio Output

A Warner Communications Company

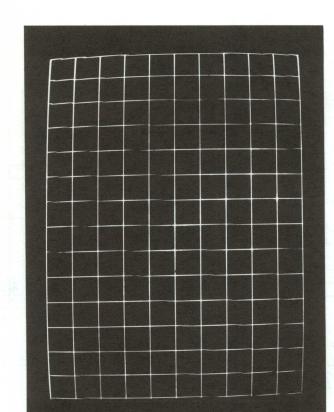
Self-Test Screens



Screen #1



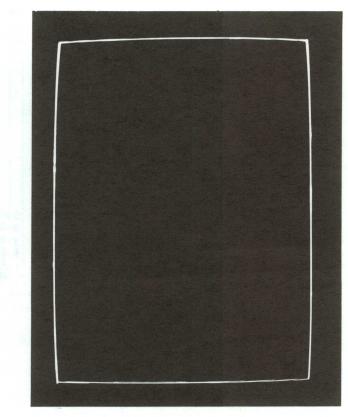
Screen #2



1123456789ABCDEFGHIJKLMMOPORSTUVNXYZ 🕬

Screen #3

Screen #6



Screen #7

Screen #4 Screen #5