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ENVIRONMENTAL TEST REPORT NO. C024673-149

ENVIRONMENTAL EVALUATION OF VIDEO GAME M/N 5100

AUTHOR: G. D. ONGMAN

DATE: FEBRUARY 8, 1984

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		SIZE	A	DRAWING NO.	C024673-149	REV	1
		SCALE		SHEET	1	OF	15



ABSTRACT

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AUTHOR: G. ONGMAN

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TITLE: ENVIRONMENTAL EVALUATION OF VIDEO GAME M/N 5100

This report covers the environmental testing that was performed on the video game M/N 5100 preproduction units. These tests were performed to evaluate the unit's ability to withstand the conditions that may occur during shipment or in its normal service life.

The 5100 game was subjected to the following tests: 1. Thermal Mapping, 2. High Temperature, 3. Low Temperature, 4. Temperature Shock, 5. Temperature and Humidity, 6. Vibration, 7. Package Qualification, 8. Electrostatic Discharge and 9. Life.

There were two discrepant conditions noted during this test program. The first discrepancy was a unit failed the temperature and humidity test on the first attempt. The failure was attributed to poor workmanship in the construction of the specimens used for the test. The specimen was repaired and the test was repeated. The second discrepancy was it was noted that the specimen, which requires 9 VDC, uses the same power connector as several other Atari products, which require 9 VAC. When the 9 VAC power supply is connected to the 5100, the voltage regulators fail.

NOTE

This report contains Atari private data, and is for use only within the Atari technical community.

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1.0 INTRODUCTION

The environmental tests covered in this report were designed to simulate, under controlled laboratory conditions, the entire lifetime of the product. To accelerate this simulated life into a reasonable time period, the actual test conditions are probably more severe than most units will see in normal use.

The package qualification tests were performed at Package Analysis Laboratory, an independent test laboratory. The remaining tests were conducted by Atari environmental engineers at the Atari San Jose plant. It is the intent of this report to supply only a brief description of the tests. Supplemental details may be found in the test data included at the end of this report and in the "Environmental Engineering Manual" C061616 (rev. 1A).

2.0 TEST PROCEDURES

2.1 THERMAL MAPPING

A thermal mapping test is performed to determine if any component part of the specimen could cause or be affected by adverse thermal conditions.

The first portion of a thermal mapping test is a thermal survey of all components to identify any potential problems. For this portion of the test, a specimen is removed from its case for complete access to all components, and operated. Each component of the operating specimen was individually monitored with a temperature indicating device to determine if it was operating well within the manufacturer's specifications. All of the components operated at temperatures well below 45° C., so no further testing was deemed necessary.

2.2 HIGH TEMPERATURE

The high temperature test is a two part test. For the first portion of the test (60° C.) the specimen is nonoperating and is intended to simulate the storage conditions a unit may encounter during its normal service life. For the second portion of the test (45° C.) the specimen is operating and is intended to simulate the worst case conditions a unit is likely to be subjected to in normal service.

2.3 LOW TEMPERATURE

The low temperature test is also a two part test. For the first portion of the test (- 30 ° C.) the specimen is non-operating and is intended to simulate the storage conditions a unit may encounter in normal service. For the second portion of the test (10 degrees C), the specimen is operating and is intended to simulate the worst case conditions that a unit is likely to be subjected to in normal service life.

2.4 TEMPERATURE SHOCK

The temperature shock test is a nonoperating test which is performed to simulate the rapid transfer from one temperature extreme to another that often occurs during transportation.

2.5 TEMPERATURE AND HUMIDITY

The temperature and humidity test is an operating test performed to simulate the adverse climatic conditions that exist worldwide. The first time this test was performed on this product, the specimen stopped functioning. The test was terminated and the failure was analyzed. The test specimen itself operated normally but the power supply, which was not in the test chamber, had been shorted. A visual examination of the test specimen revealed that the flux had not been removed from the printed circuit board after the soldering process. It was believed that the flux had reacted with the high humidity to short out the power supply. The flux was cleaned from the specimen and the test was restarted. This time the specimen operated normally for the entire duration of the test.

2.6 VIBRATION

A vibration test is performed to simulate the abuse a product may receive during transportation or throughout a normal service life. The frequency range and levels used to perform this test cover the vibratory conditions common to transportation by land, sea, and air.

2.7 PACKAGE QUALIFICATION

The package qualification tests are performed to verify that the packing method used to ship the product will adequately protect that product. There are two package qualification tests, the transportation vibration and the package drop.

The test procedures used to perform these tests were in accordance with the specifications used by the National Safe Transit Association. For these tests the product is packed in its normal shipping configurations. In this case it meant that three units were combined into a single package.

The transportation vibration test is performed by placing the package on the table of a vibration machine, in one of its normal shipping positions, and slowly increasing the vibration frequency until the package decouples from the table by at least 0.060". The package is vibrated in this manner for about 30 minutes. The package is then rotated to another of its normal shipping positions and the above procedure is repeated.

The drop test is performed by placing the package on the table of the drop machine in one of the required orientations. The package is then allowed to freefall from a height of 30" and impact on a steel base. The above procedure is repeated with the package reoriented until it has been dropped in all ten of the required orientations.

2.8 ELECTROSTATIC DISCHARGE

An electrostatic discharge test is performed to simulate the conditions that would occur if an operator walked across a carpeted floor and touched an operating product.

2.9 LIFE

The life test is performed to simulate the normal usage a consumer might expect from our product. Three specimens were placed in a temperature chamber and connected to a timer that cycled the power on and off. The ambient temperature within the chamber was increased to 39° C. The specimens were programmed to operate for 30 minutes followed by 15 minutes off. This power on/off cycling at elevated temperature was continued for one week. Due to the acceleration factors introduced by the elevated temperature and the power cycling this equates to about 3.5 years of normal consumer use.

3.0 CONCLUSIONS

The video game M/N 5100 proved to be mechanically and electrically rugged and to have wide margins in its design and construction. The fact that the 5100 will accept Atari power adapters that supply AC voltage could lead to 5100 damage. Adequate warning labels are to be positioned at power inlet of the 5100.

Date Started	Specimen Description	
1-27-84	Video Game w/ 5100	
Date Completed	Type of Test	
1-27-84	Low Temperature	
Engineer (Signature)	Manufacturer	
J.R. [Signature]	ATARI	
Technician (Signature)	Test Specification	
J.R. [Signature]	EPA C0416.16 (REV 1A) PARA. 3.2.3	
Specimen	Temp	
4	0705 amb	START Temperature decrease
	0830 30	START Stabilization
	0835 30	
	0840 30	
	0845 30	START 4 hour conditioning
	0941 30	
	1043 30	
	1245 30	START Temperature increase
	1400 10	START Stabilization
	1405 10	
	1410 10	
	1415 10	START 1 hour conditioning
	1455 10	
4	1515 10	Specimen operates normally - no discrepancies noted due to this test

Date Started 1-25-84	Specimen Description Video Game MINI SICO
Date Completed 1-25-84	Type of Test VIBRATION
Engineer (Signature) J. D. Brennan	Manufacturer Atari
Technician (Signature) J. S. Ferguson	Test Specification EEM C061616 (REV 1A) Para. 3.3.2.5.1 (PARTS B+C)

Cycling

Specimen Number	Axis	Time Start	Time Stop	Remarks
1	Z	0729	0744	No Resonance Noted - No discrepancies noted
1	Y	0811	0826	No Resonance Noted - No discrepancies noted
1	X	0904	0919	No Resonance Noted - No discrepancies noted
Note: The specimen was cycled from 5 Hz - 100 Hz - 5 Hz at 0.015" DA				

Dwell

Specimen Number	Axis	Time Start	Time Stop	Freq (Hz)	Remarks
1	Z	0748	0758	30	No discrepancies noted
1	Y	0830	0840	30	No discrepancies noted
1	X	0920	0930	30	No discrepancies noted
Note: No physical or functional discrepancies were noted due to this test.					
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PAL PACKAGE ANALYSIS LABORATORY

500 LAURELWOOD ROAD, SUITE 5
 SANTA CLARA, CALIFORNIA 95050
 (408) 970-0606



Customer: ATARI INC Date: 1-31-84
 Product: 5100 GAME 3 PACK P. O. No. V-59213 X REL. NO. 1
 Package O.D. 20 7/8 x 13 1/4 x 13 5/8 200# S.W. Temp. 67°F
 Gross Wt. 31 LBS. Product Wt. _____ Humid. 55% R.H.
 Package Description: 3 EA. 20 1/2 x 12 3/4 x 4 1/2" O.P.F.

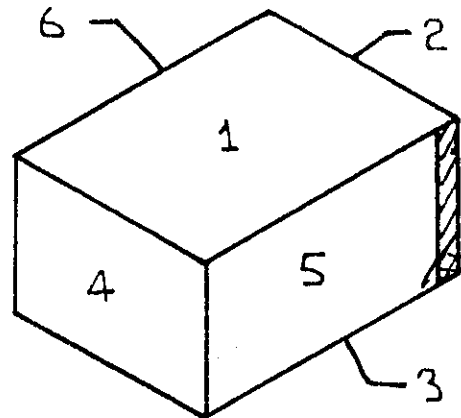
Vibration: 90° ROTATION

	1	2	3	4	5	6
Speed	220 CPM	195 CPM				
Time	33 MIN.	37 MIN.				

Drop Test:

Surface	Ref. No.	G's	Time
CORNER <u>2-3-5</u>	<u>2-3-5</u>		
S. EDGE	<u>2-3</u>		
MED. EDGE	<u>2-5</u>		
L. EDGE	<u>3-5</u>		
	<u>4</u>		
	<u>2</u>		
	<u>6</u>		
	<u>5</u>		
	<u>1</u>		
	<u>3</u>		

Drop Height: 30"



Remarks: PASSED

Witness: H.D. Angeman

Signed: [Signature]

Date Started	Specimen Description
1-26-84	Videa Game #105100
Date Completed	Type of Test
1-26-84	ELECTROSTATIC Discharge
Engineer (Signature)	MANUFACTURER
J. E. Muenich	Atari
Technician (Signature)	Test Specification
J. E. Muenich	FEM C061616 (REV 1A) Para. 3.4.1 (modified)

Specimen Number	Voltage (KVDC)	Remarks
#5	15	No discrepancies noted
	20	Areas were all Top Vents, power switch, Right controller connector, RF connector, and power connector - No discrepancies noted
		Area To The Cartridge caused Joke on The Screen - The specimen power was turned off and back on to Reset The program
	25	Areas To The Right Seam, back middle seam, RF connector, power connector, Top vents, and power switch - No discrepancies noted
#5		Area To The left seam - RESET game
#5		Area To The Cartridge - RESET game
		Note: The Joysticks to be used with this product were not available at the time this test was performed

DATE STARTED		SPECIMEN DESCRIPTION			
2-1-84		Video Game w/c 5100			
DATE COMPLETED		TYPE OF TEST			
2-8-84		Life			
ENGINEER (SIGNATURE)		MANUFACTURER			
J. L. Brennan		Atari			
TECHNICIAN (SIGNATURE)		TEST SPECIFICATION			
J. L. Brennan		Verbal INSTRUCTIONS			
SPECIMEN			Temp	OPERATING	
NUMBER	DATE	TIME	(°C)	(V)	REMARKS
1,293	2-1-84	1220	38	✓	SPECIMENS STARTED IN POWER CYCLING TEST AT elevated TEMPERATURE. The power cycle consists of 30 minutes power on followed by 15 minutes power off.
	2-1-84	1530	39	✓	
	2-2-84	0715	38	✓	
		1130	38	✓	
	2-2-84	1545	38	✓	
	2-3-84	0710	38	✓	
		1145	38	✓	
	2-3-84	1530	38	✓	
	2-6-84	0720	38	✓	
	2-6-84	1510	38	✓	
	2-7-84	0705	38	✓	
	2-7-84	1145	39	✓	
	2-8-84	0715	38	✓	
1,293	2-8-84	1222	39	✓	