REV REVISIONS DESCRIPTION DATE APPROVED

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ENVIRONMENTAL/RELIABILITY TEST REPORT NO. CO24673-129

VIDEO GAME M/N 2100 (PAL I) ENVIRONMENTAL EVALUATION

ENGINEERING RELEASED

DRAWN BY DATE Atari, Inc. 30 E. Plumaria Drive San Jose, CA 95134 Technician **NEXT ASSY USED ON** ATARI* W A Warner Communications Company Terry a. Minto NOTICE TO ALL PERSONS RECEIVING THIS DRAWING **ENGINEER** CONFIDENTIAL: Reproduction Forbidden without the specific TITLE written permission of Atari Inc., Sunnyvale, California. This 2100 PAL I, Environmental drawing in only conditionally issued, and neither receipt nor Stress Analysis possession thereof confers or transfers any right in, or license to use, the subject matter of the drawing or any design or technical information shown thereon, nor any right to reproduce this drawing or any part thereof, except for manufacture by vendors DRAWING NO. CO24673-129 SIZE REV for Atari Incorporated and for manufacture under the corpora-1 Α APPROVED tion's written license, no right to reproduce this drawing is granted or the subject matter thereof unless by written agree-SCALE **OF** 18 SHEET ment with or written permission from the corporation.

ABSTRACT

ENVIRONMENTAL/RELIABILITY TEST REPORT NO. C024673-129

AUTHORS: G. ONGMAN & T. MUSTO

DATE: DECEMBER 19. 1983

TITLE: VIDEO GAME M/N 2100 (PAL I) ENVIRONMENTAL EVALUATION

This report covers testing that was performed on the video game M/N 2100 (PAL I) preproduction units to evaluate its ability to withstand conditions that may occur durring shipment or its normal service life.

The 2100 video game was subjected to the following tests: thermal mapping, high temperature, low temperature, temperature shock, temperature & humidity, vibration, electrostatic discharge, shock (impact), and software regression. The 2100 operated properly throughout all operating tests and during all post test check-outs. No package qualification tests were performed at this time due to the fact that no final packouts were available.

No physical or mechanical discrepancies were noted due to any testing that was performed. The 2100 units proved to be mechanically and electrically rugged and to have wide safety margins in its design and construction.

NOTE

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



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ENVIRONMENTAL/RELIABILITY TEST REPORT NO. C024673-129
VIDEO GAME M/N 2100(PAL I) ENVIRONMENTAL EVALUATION

PREPARED BY: G. ONGMAN & T. MUSTO

DATE: DECEMBER 19, 1983

1.0 INTRODUCTION

All the tests covered by this report were performed by Atari environmental engineers at the Atari San Jose plant except for the shock test which was performed by Viking Laboratories, an independent test laboratory. A copy of the test data for each test is included at the end of this report.

All of the tests covered by this report were performed in accordance with "Environmental/Reliability Engineering Test Plan" no. CO24673-109 and "Environmental Engineering Manual" no. CO31616

2.0 TEST PROCEDURES

2.1 THERMAL MAPPING

The product case was opened, and a thermal survey of the components was conducted with a temperature indicating device. Because of the low operating temperatures measured, it was determined that no thermal problem exists. Based on this, no formal thermal mapping test was performed.

2.2 HIGH TEMPERATURE

A test specimen was placed in a high temperature chamber. The ambient temperature within the chamber was increased, over a period of 1 1/2 hours, to 60 degrees C. Once the specimen temperature had stabilized, the specimen was soaked at this condition for a period of 4 hours. The chamber ambient temperature was then decreased, over a period of 1-1/4 hours, to 45 degrees C. Once the specimen temperature had stabilized, the specimen was soaked for a period of 1 hour. Upon completion of the soak, the specimen was operated. No discrepancies were noted due to this test.

2.3 LOW TEMPERATURE

A specimen was placed in a low temperature chamber. The



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ambient temperature within the chamber was decreased, over a period of 1 1/2 hours, to -30 degrees C. Once the specimen temperature had stabilized, the specimen was soaked for a period of 4 hours. The chamber ambient temperature was then increased, over a period 1-1/4 hours, to 10 degrees C. Once the specimen temperature had stabilized, the specimen was soaked for a period of 1 hour. Upon completion of the soak, the specimen was operated. No discrepancies were noted due to this test.

2.4 TEMPERATURE SHOCK

A test specimen was placed in a low temperature chamber that had been preconditioned to -30 degrees C. The specimen maintained at this condition for 1 hour. The specimen was then transfered, within 1 minute, to a high temperature chamber that had been preconditioned to a temperature of 60 degrees C. The specimen was maintained at this condition for 1 hour. The above cycle was repeated twice for a total of three cycles. No discrepancies were noted due to this test.

2.5 TEMPERATURE AND HUMIDITY (OPERATING)

An operating specimen was placed in a temperature and humidity chamber. The chamber temperature was increased, over a period of 50 minutes, to 45 degrees C. The chamber humidity was then increased, over a period of 35 minutes, to 95% relative humidity. The operating specimen was maintained at this condition for 96 hours. No discrepancies were noted due to this test.

2.6 VIBRATION

A test specimen was subjected to a vibration cycling test and a resonance dwell test. For the cycling test the specimen was attached to the table of the vibration machine in one of its three major axes. The specimen was subjected to 15 minutes of sine vibration cycling from 5Hz.-100Hz.-5Hz. at 0.015" DA. The above procedure was repeated twice with the specimen oriented in the two remaining axes for a total of 45 minutes of cycling. The specimen was monitored during the cycling for any indication of a resonance. For the resonance dwell test the specimen was to have been subjected to a 10 minute dwell at each resonant frequency. Since no resonances were noted, the specimen was subjected to a 10 minute dwell at 30Hz. at 0.015"DA. in each of the three axes. No disrepancies were noted due to this test.



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2.7 ELECTROSTATIC DISCHARGE

The exterior of the operating specimen was probed at any point it was likely for an operator to touch it in normal use. For this test a probe with a 100 pf capacitor and a 1500 ohm resistor was used at the following voltages: 10 KVDC, 15 KVDC, 20 KVDC, and 25 KVDC. Some minor program stoppage occurred, but there was no permanent damage due to this test.

2.8 SHOCK (IMPACT)

The shock machine was adjusted to deliver a 30 g. 11 ms half-sine shock pulse. The machine was dropped several times to verify the repeatablity. The test specimen was attached to the table of the shock machine and subjected to three shocks. The specimen was then removed from the shock machine and functionally tested. The specimen was reoriented and the above procedure was repeated until the specimen had been subjected to shock in each direction of each axis for a total of 18 shocks. No discrepancies were noted due to this test.

2.9 SOFTWARE REGRESSION

Twenty-five of the most popular games from Atari and various other companies were played on a test specimen. The software regression data sheat gives a list of the games and an evaluation of the game play.

3.0 CONCLUSION

The video game M/N 2100 (PAL I) exhibits a rugged mechanical and structural design that is capable of withstanding normal home usage and shipping stresses. Substantial margins of safety in regard to mechanical stresses and thermal sensitivity have been proven to be present. Game play and graphics aren't quite as good as the M/N 2600 but are adequate for the average consumers needs.



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SHEET 5

are started		Specimen Description
12-12.	-83	Video Game M/N 2100 (PAL I)
12-12. Late Complete	٩	Type 2ª Test
12-12- Enginese (sign	83	Thermal Mappies
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	11/0	
A-1	46.8	
A - 2	44.5	
A-3	46	
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A-4	25.9	
V.P-1	46.6	
		Test was performed on the PC board of
<u> </u>	PECIMEN	#3. Due To The low Temperatures measured and
<u> </u>	he Temp	estature patings of the devices (70%) No further
	estivis w	ill be conducted at this time
		CO24673-129 Sheet 6 of 18
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ı 🤈 .	1 4.3	Video Game M/N 2/Or (PALI)
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J. D. 1	Incme	~ EEM COGIGIE (ROV 14) Para 323.4.1
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1415	43	START STABILIZATION
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J.D. Oreman			ATARI						
Technician (Danotore)			ATARI Text Specification						
12 B. B.	K assassa		EEM COBIGIG (Rev IA) Para 3.2.3.4.2						
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Tine			Remarks						
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1300	-30	STURT	Temp increase						
1420	10		57abil 1 707101						
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			CO24673-129 Sheet 8 of 18						
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Dure started	SPECIMEN DESCEPTION						
12-7-83	Video Game M/N 2100 (PALI)						
12-7-83 Date Completed	Type of Tear						
12.7-83	Temperature Shock						
12.7-83 Engineer (Signature)	MANUESTURES STEEK						
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J. D. Dryman Technician (S) guotive)	ATAR. Text Specification						
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Dure STa	Piel		Specim	DESCE PTION						
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12-12-83 Engineer (signature)			Mayo	Temperature and Humidity (operative)						
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l l		. 1								
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	are started				SPECIMEN DESCRIPTION						
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-	Axis.	STEAT II II	35cp 1/21	30	No discrepancies voted						
Speciment Jumber	Axis.	11 11 11 43	35cp 1/21	30 30	No discrepancies voted						
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Dare Staried		Specimen Description					
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12-1 Date Complet	3-83 el	Video Game MIS 2100 (PALE) Type == Test					
12 -13 Enginera (519	3-83	Electico Static Discharge					
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U.D. Dure	rudy quainse)	ATARI TEXT SPECIFICATION					
		FEM COLULG (Rev 11) PARO. 3.4.1					
Voltage)	FEM COLIGIE (Rev 14) 14RG. 3.4.7					
(KNDC)		Renarics					
	Test Perfer	ned ou speciment #2					
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2.444	· · · · · · · · · · · · · · · · · · ·	The days the Barry Sam Out					
ZONV	Res AT Sele	er Switch, Top Veur Neur The Resor, Seam ou					
		USAR The Reset POWER CONNECTOR PF CONNECTOR					
17.		F, left front screw, Course - bottom vents, No					
i	iscrepancies						
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		e label - Peou ped power off To Peser					
- 1	o carring	P TROST KUGU KUM FINCE EST TO MESSES					
2561/	3000 1000	PASSET SWITCH Solver Switch PF CONNECTOR'S Primary					
		Reset Switch, Select Switch, RF CONNECTOR, Panell both front screwe, bottom-center vents we					
1	. /						
l l	asc usus s						
		CONER light - Moved Players but Resutable IGHT JOYSTICK CONNOCTOR - REQUIRED POWER OFF TO RESET					
i i		eft Sugar - Moved Players - Resetable					
		· · · · · · · · · · · · · · · · · · ·					
	ARC NEAR DETTON - LEFT CENTER VENT - Changed Colors : Reserted ARC NEAR CAPTRIDGE label - game stopped - Resertable						
	THE WEAK C	arinogu lader Sant Stepped					
		CO24673-129 Sheet12 of 18					
	<u> </u>	10/69H/17167 3H9UL6 W1 20					



TEST DATA

DATE STARTED	CUSTOMER	TECHNICIAN (SIGNATURE)
12-16-83	ATARI	Charles
DATE COMPLETED	SPECIMEN DESCRIPTION	ENGINEER (SIGNATURE)
12-16-83	ATARI 800.800PS., ATARI 2100	Some (
TEMPERATURE	TYPE OF TEST	ENGINEER
7205	SHOCK-HALF SINE	B. Dover
HUMIDITY	MANUFACTURER	JOB NUMBER
42%RH	ATARI	41412-7
SPECIMEN NUMBER	TEST SPECIFICATION	

SPECIMEN NUMBER		TEST SP	HALL ECIFICATION	////2-/		
SE/	9	ATA	RI ETPN	7.3.3		
SPECIMEN NUMBER	DATE	AXIS	LEVEL (g)	PULSE DURATION (MS)	NO. OF SHOCKS	REMARKS
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5wA		у	30	11 .	3	
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54		У ₂	31	11	3	
5WA		Y2_	3/	11	3	
υK		X, ···	30	11	3	
.5A		×1 .	30	11	3	
5wA		X	30	11	3	
<i>U</i> K4		X2	30	1)	3	
5A		XZ	30	77	3	
5WA		X2	30	1)	3	
2100		Υı	30	. 11	3	
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soops		У1	30	17	3	
500P5		y2_	30	1)	3	
2100		Χı	30	7.1	3	
8 00 RS.		X ₁	30	73	3	C024673-129 Sheet 13 of 18
8100		XI	30	11	3	
800 P.S.	12-16-83	12	30	1)	3	



TEST DATA

CUSTOMER DATE STARTED 12-16-83
DATE COMPLETED ATART
SPECIMEN DESCRIPTION ATARI 800, 800 P.S., ATARI 2 100 12-16-83 TEMPERATURE B. Dover SHOCK-HALF SINE MANUFACTURER 4470 RH SPECIMEN NUMBER 41412-7 ATART TEST SPECIFICATION SEA ATARI ETP. No CO61616 PARA 3.3.3 PULSE DURATION (MS) LEVEL NO. OF SPECIMEN REMARKS DATE AXI5 SHOCKS NUMBER (g) 12-16-83 IIUK 30 3 Z 3 21 30 ı) 5 A て, 3/ 11 5WA 31 800 P.S. \overline{II} 2100 31 3 VK. Z₂ 11 5A 3 22 31 31 3 5WA 22 800P.5. 31 1) 3 Z_{2} 2100 12-16-83 72 31 3 NOTE: NO EXTERNAL PHYSICAL DAMAGE NOTED DUE TOTHIS TEST. CO24673-129 Sheet 14 of 18

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VIKING LABORATORIES



TEST DATA

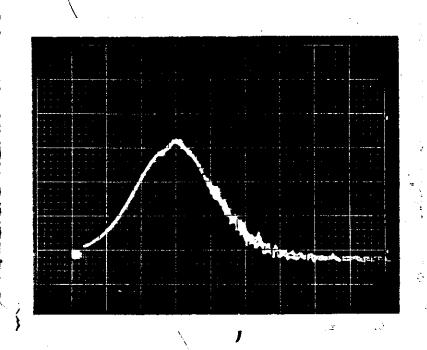
DATE START	ED	CUSTOMER				TECHNICIAN ISIGNATURE		
18-16	5-83	ATARI				ENGINEER (SIGNATURE)		
DATE COMPL	ETED	SPECIMEN DESCRIPTI						
12-16 TEMPERATU	-83	ATARI 800,	80	0 P.	S., ATARI 2160	ENGINEER		
		TYPE OF TEST			·			
	عره	VISUAL EXAMI	NA	TIO	N	B. Dover		
HUMIDITY	-	MANUFACTURER				JOB NUMBER		
42	% RH	PIARI				41412-7		
SPECIMEN NO		TEST SPECIFICATION		.				
<u>58</u>			σ	-06/	616 PARA 3.3.3			
SPECIMEN NUMBER	SERIAL NUMBER	PART OR MODEL NUMBER		.OT IO.	REMARKS			
الكسيسين والمراد					No a secondario march			
N/9	UK-4	ATARI 800	4	9	NO DISCREPANCIES NOTED			
	50	カイカクザ グェウ						
	5A	ATARI 800						
	5WA	0400+ d=0						
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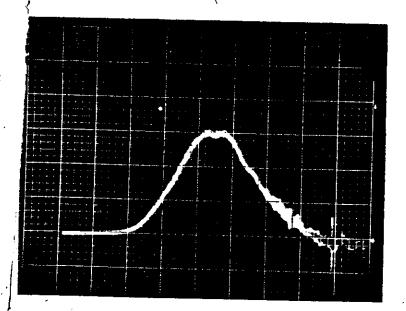
TEST DESCRIPTION: Shock-HALF SINE

QUIPMENT LIS



EQUIPMENT	MANUFACTURER	MODEL	ASSET	PANGE	ACCURACY	CALIB	CALIB. PERIOD
Shock Machine	BARRY CONTROLS	VP-400	6225	Table Size: 24x34"	± 10%	12.16-83	70.7
			-	Max, Impact Vel: 36 ft/seq			
				Accel: /500			
				Min. Duration: /. o m.s.	-		
Accelerameter	Endevco Corp.	17 40 B	1501	Freq. Resp.: 5/4/12	+ <9	7.14-83	lo mo.
Amplifier			:				
				Freq. Resp.: 0.1 Hz to 7KHz	\$5%	7.0-83	le mo.
Accelermeter	Endevco Corp.	2852	6502	Max. · Accel.: 5/4 g's			
Oscilloscope	Tektronix Inc.	645	2041	Freq. Resp.: DC to 30MHz	+ 3%	7-6-83	6 mo.
				Rise Time: 22 ns			
				0.lu sec. to 5 sec/cm			
Oscilloscope	Tektronix Inc.	S.	2229	Freq. Resp.: DC to 15MHz	± 3%	9-9-83	6mo.
Plugath		-		Rise Time: 10 ns			
				0.05v to 20v/cm (AC-DC)			10
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Camera	Tektronix Inc.	C-12	2404	1.0:09 Object to figure	No Cal.	Require	A
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						-	





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Date STARTES	ebesimen pe	SCP-PTIO)				
12.6.83	Vidaa	Gama 11/4 2100 (PALT)				
12-5-83 Date Completed	77.P= 2= 7e.	Video Game M/N 2100 (PALI)				
12.12.82	Safrua	Software Rengessing				
12 · 13 - 83 Eugineze (Signaruze)	May 2 = 2 = 7 × 5	Software Regression				
MA America	AT0. 12.	ATURI TEC SPECIFICATION				
J.D. One man Technician (SQUOTURE)	Tes 5-2015	(COT101)				
Toerry a. Minto	Verba	LUSTRUCTIONS				
Gane	MauufacTurer	Remairks				
DEFENDER	ATAR	Adequate				
PACMAN	ATARI	Adequate				
JUNGLE HUNT	ATARI	Good				
FOOTBALL (SOCUER)	ATARI	Good				
MISSILE COMMAND	ATARI	Adequate				
SPACE INVADERS	ATARI	Good				
VANGUARD	ATARI	Adequate				
VOLLEYBALL	ATARI	Good				
PHOENIX	ATARI	Excellent				
Die Due	ATARI	Below 2600 Graphic capability				
DONKEY KONG	ATARI	Adequate				
Ms. PAC-MAN	ATARI	Adequate				
MARIO BROS.	ATARI	Adequate				
SNOOPY AND REDBARON	ATARI	Good				
ASTERIX	ATARI	Good				
JOYST	ATARI	Below 2600 Graphic capability				
GALAXIAN	ATARI	Good				
MOON PATROL	ATARI	Adequate				
OBELIX	ATARI	Adequate				
PIGS IN SPACE	ATARI	Adequate				
DONKEY KONG	CBS	Adequate				
ATLANTIS	IMAGIC	Adequate				
STAMPEDE	ACTIVISION	Good				
KEYSTONE KAPERS	ACTIVISION	Good				
LASER BLAST	ACTIVISION	Adequate				
	 	NOTE: All remarks based on technicians opinion.				
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