TM-237
1st Printing

ARABIAN™*

Operators Manual

With Illustrated Parts Lists

*Manufactured under license from Sun Electronics Corporation.

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How to Use This Manual

This manual, written for game operators and service technicians, describes the Arabian™ game.

Chapter 1 contains a game overview, game specifications, inspection procedures, voltage plug and fuse information, switch locations, option information, and a description of game play.

Chapter 2 contains self-test procedures.

Chapter 3 contains troubleshooting procedures.

Chapter 4 contains maintenance and repair procedures.

Chapter 5 contains illustrated parts lists. Figure 5-1 illustrates the game cabinet. Notes in this chapter refer you to other places in the manual for more detailed information.

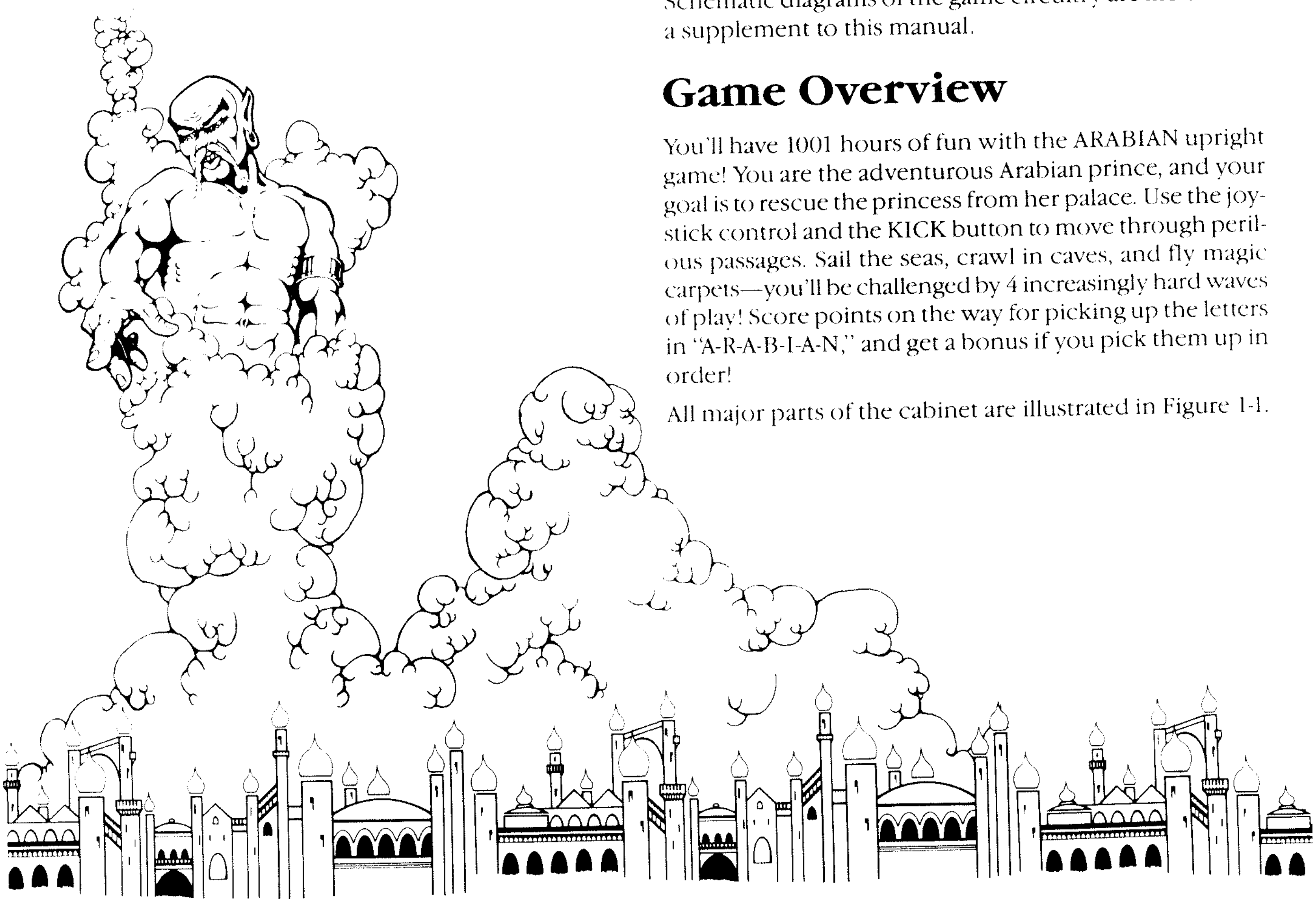
A glossary of terms is in the back of this manual for your convenience.

Schematic diagrams of the game circuitry are included as a supplement to this manual.

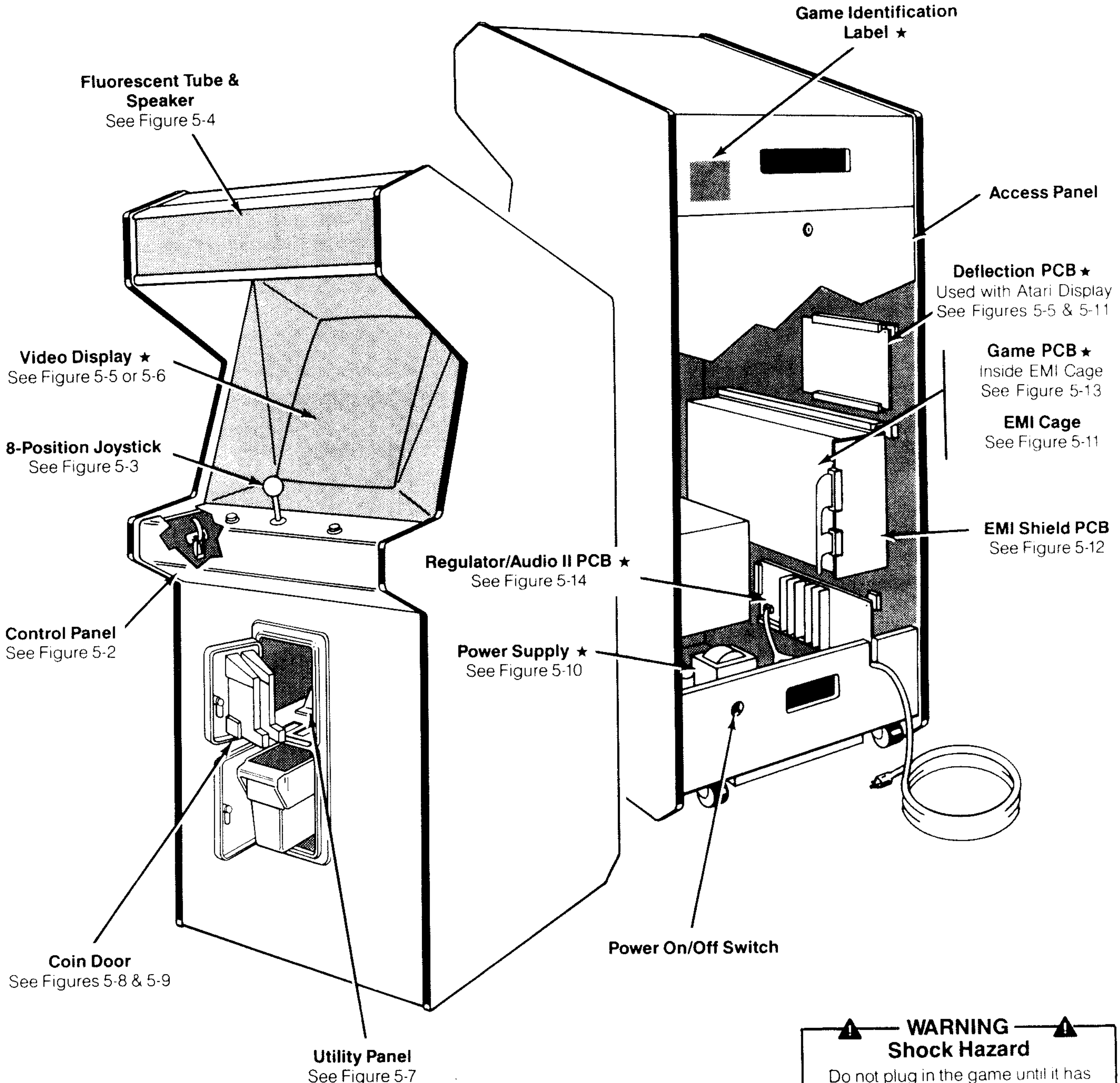
Game Overview

You'll have 1001 hours of fun with the ARABIAN upright game! You are the adventurous Arabian prince, and your goal is to rescue the princess from her palace. Use the joystick control and the KICK button to move through perilous passages. Sail the seas, crawl in caves, and fly magic carpets—you'll be challenged by 4 increasingly hard waves of play! Score points on the way for picking up the letters in "A-R-A-B-I-A-N," and get a bonus if you pick them up in order!

All major parts of the cabinet are illustrated in Figure 1-1.



Chapter 1



★ Item with a serial number label

> **WARNING**
> **Shock Hazard**
> Do not plug in the game until it has been inspected. This game should only be connected to a grounded 3-wire outlet. If you have only a 2-wire outlet, we recommend you hire a licensed electrician to install a grounded outlet. Players may receive an electrical shock if this game is not properly grounded!

Figure 1-1 Game Overview

A. Installation Specifications

Table 1-1 describes the physical, electrical, and environmental specifications of the game.

Table 1-1 Installation Requirements

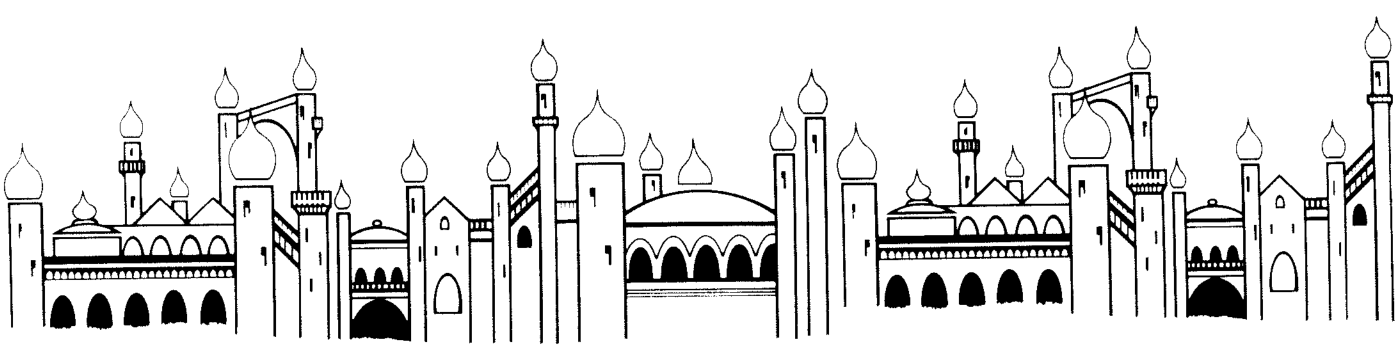
Characteristic	Requirement
Power Consumption	200 W
Temperature	0° to +32° C (+32° to +100° F)
Humidity	Not to exceed 95% relative
Line Voltage	100 to 240 VAC
Width	67.95 cm (26.75 in.)
Depth	64.14 cm (25.25 in.)
Height	180.34 cm (71 in.)

> **WARNING**
> **Shock Hazard**
> To avoid electrical shock, do not plug in the game until the procedures in Sections B and C have been completed!
> Do not touch internal parts of the display with your hands or with metal objects!

B. Inspecting the Game

Please inspect your game carefully to ensure that it was delivered to you in good condition.

1. Examine the exterior of the game cabinet for dents, chips, or broken parts.
2. Remove the screws from the rear access panel. Unlock and open this panel and the coin door. Inspect the interior of the game as follows:
   a. Ensure that all plug-in connectors (on the game harnesses) are firmly plugged in. Replug any connectors found unplugged. Do not force connectors together. The connectors are keyed so they only fit in the proper orientation. *A reversed edge connector may damage a printed-circuit board (PCB) and will void your warranty.*
   b. Ensure that all plug-in integrated circuits on each (PCB) are firmly plugged into their sockets.
   c. Remove the tie-wrap that secures the coiled power cord inside the cabinet. Inspect the power cord for any cuts or dents in the insulation. Repair or replace it as required. Place the square strain-relief plate in the wood slot at the bottom of the rear panel opening.
   d. Inspect the power supply. Make sure the fuse block cover is mounted in place. Check that the green ground wire is connected.
   e. Inspect other major subassemblies, such as the control panel, video display, EMI cage, and each PCB. Make sure they are mounted securely and that the green ground wires are connected.



C. Voltage-Plug Selection and Fuses

The power supply in your game contains six fuses. When you replace a fuse, use the identical type fuse with the same electrical rating (see Figure 1-2).

This power supply operates on the line voltage of many countries. The power supply comes with either one, two, or three voltage-selection plugs. Plug voltages and wire colors are 100 VAC (violet wire color), 120 VAC (yellow wire color), 220 VAC (blue wire color), and 240 VAC (brown wire color).

See Figure 1-2 for placement of the voltage-selection plug. Before plugging in your game, check your line voltage. Next, check the wire color on the voltage-selection plug. Make sure the voltage-selection plug is correct for the line voltage of your location.

Now plug the game into a **grounded** 3-wire outlet.

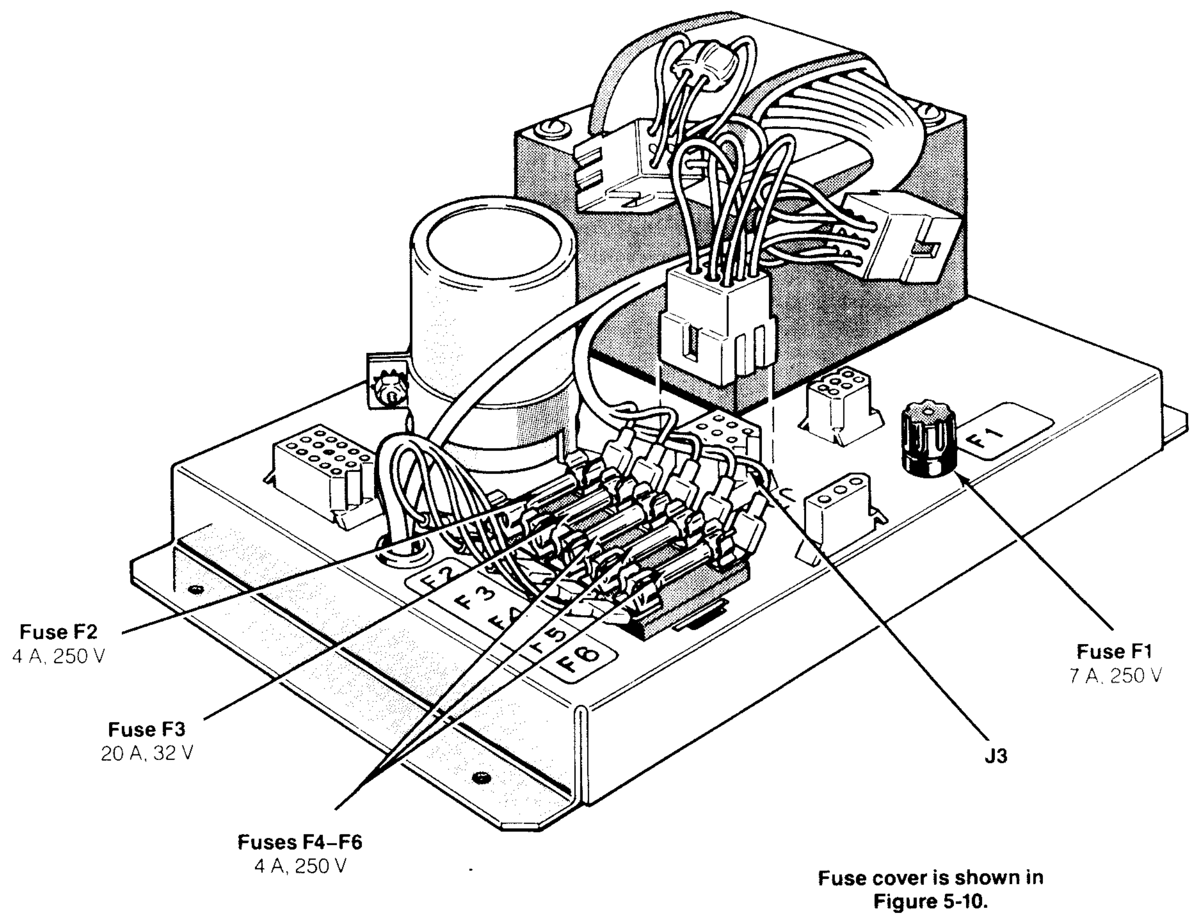


Figure 1-2 Voltage-Selection Plug and Fuse Locations

D. Switch Locations

Power On/Off Switch

The power on/off switch is located on the back of the cabinet on the lower left side (see Figure 1-1).

Utility Panel Switches

The volume control, coin counter(s), self-test switch, and auxiliary coin switch are on the utility panel. The utility panel is located inside the upper coin door (see Figure 1-1). The volume control adjusts the level of sound produced by the game. The coin counter(s) records the number of coins entered into the game. The self-test switch initiates the self-test mode. The auxiliary coin switch credits the game without activating a coin counter. See Figures 1-3 and 5-7 for details of these switches.

Option Switches

Option switches for game price selection are on the game PCB at location SW1 (see Figure 1-3).

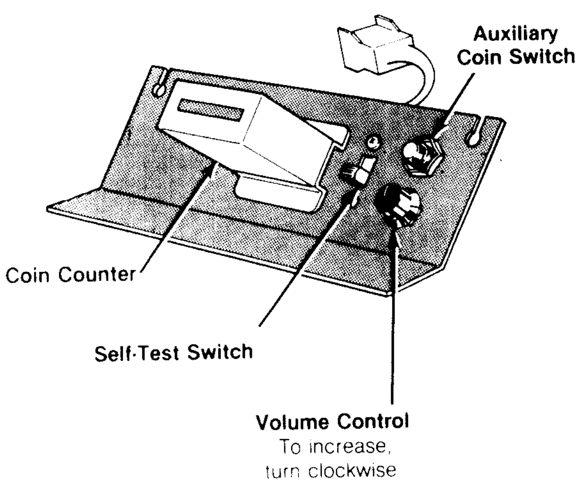
E. Selecting the Coin and Credit Options

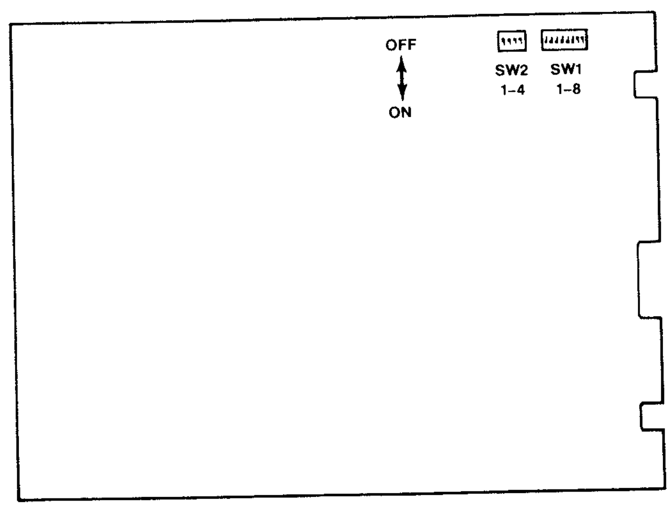
Settings for the option switches are listed in Tables 1-2 and 1-3. Note that options preset at the factory are shown by the ◄ symbol. You may change the settings according to your needs.

To verify other option selections, check the self-test display that appears when you turn on the game. Then, verify the option switch settings on the self-test display as described in Chapter 2.

Table 1-2 describes the settings for the DIP switch designated SW1. This switch selects the game coin and credit options available for the left and right coin mechanisms. Table 1-3 describes the settings for the DIP switch designated SW2. This switch selects special options (such as sound in the Attract Mode, and bonus life levels).

The basic unit of measurement is a coin worth $.25 or 1 DM. Thus, if you have a 1 DM/2 DM coin door with two coin counters, set switches 5 and 6 at location SW1 to on. Then, different denominations are counted on the two coin counters.





Game PCB

Figure 1-3 Switch Locations

Table 1-2 Switch Settings for Coin and Credit Options

Settings of 8-Toggle Switch on Arabian Game PCB at location SW1 near RA12 1	2	3	4	5	6	7	8	Option	
Off								3 boys ◄	
On								5 boys	
	Off							Cocktail cabinet	
	On							Upright cabinet ◄	
		Off						Reverse picture frame position	
		On						Normal picture frame position ◄	
			Off					Easy game difficulty ◄	
			On					Hard game difficulty	
								Left Coin Mechanism	**Right Coin Mechanism**
				Off	Off	Off	Off	1 coin = 1 credit	1 coin = 1 credit ◄
				On	Off	Off	Off	2 coins = 1 credit	2 coins = 1 credit
				Off	On	Off	Off	2 coins = 1 credit	1 coin = 3 credits
				On	On	Off	Off	1 coin = 1 credit	1 coin = 2 credits
				Off	Off	On	Off	1 coin = 1 credit	1 coin = 3 credits
				On	Off	On	Off	1 coin = 1 credit	1 coin = 4 credits
				Off	On	On	Off	1 coin = 1 credit	1 coin = 5 credits
				On	On	On	Off	1 coin = 1 credit	1 coin = 6 credits
				Off	Off	Off	On	1 coin = 2 credits	1 coin = 2 credits
				On	Off	Off	On	1 coin = 2 credits	1 coin = 4 credits
				Off	On	Off	On	1 coin = 2 credits	1 coin = 5 credits
				On	On	Off	On	1 coin = 2 credits	1 coin = 10 credits
				Off	Off	On	On	1 coin = 2 credits	1 coin = 11 credits
				On	Off	On	On	1 coin = 2 credits	1 coin = 12 credits
				Off	On	On	On	1 coin = 2 credits	1 coin = 6 credits
				On	On	On	On	Free Play (Demonstration Mode)	

◄ *Manufacturer's recommended settings*

Table 1-3 Switch Settings for Special Options

Settings of 4-Toggle Switch on Arabian Game PCB at location SW2 near RA14 1	2	3	4	Options
Off				2 Coin Counters
On				1 Coin Counter ◄
	Off			Attract Mode Sound
	On			No Attract Mode Sound ◄
		Off	Off	No Bonus
		On	Off	Bonus at 20,000 points
		Off	On	Bonus at 40,000 points
		On	On	Bonus at 20,000, 50,000, 100,000 and each 100,000 points thereafter ◄

◄ *Manufacturer's recommended settings*

F. Game Play

Arabian is a "video book" with a happy ending! The attract mode introduces the story, and animated storybook "pages" let you experience the Arabian Prince's adventures. Use the 8-position joystick to jump, super-jump, walk, crawl, or climb in all directions. Tap either KICK button (are you right- or left-handed?) to kick your enemies out of the way.

There are 5 modes of operation in the game program — the attract mode, play mode, high-score mode, self-test mode, and demonstration mode.

Attract Mode

Arabian has a colorful and entertaining attract mode. You can select either Music or Silence for this mode. (See Tables 1-2 and 1-3 for a complete listing of operator-selectable options.) Four scenes cycle through the attract mode. The following message appears at the top of each of these scenes (the number under *HI-SCORE* will show the highest score earned on the game):

1-UP	*HI-SCORE*	*2-UP*
000000	*000000*	*000000*

Scene 1 shows the ARABIAN logo, the message *INSERT COINS*, and the high-score table. The high-score table lists the 10 top scores. The number of credits appear at the bottom left side of the screen. A big blue Roc* flies across the screen, carrying a Princess with him. Thus the story begins—the Arabian Prince must try to rescue the Princess!

Scene 2 shows the Prince swinging across vines collecting lettered jugs. Then the Prince kicks a pair of Rocs and Oscars, while *ARABIAN* shimmers.

Scene 3 shows a sample of game play. The castle playfield appears. *SPELL 'ARABIAN' FOR BONUS* is on the top of the screen, and *© 1983 ATARI, INC.* is at the bottom of the screen. Brass jugs, each with a different letter in the word A-R-A-B-I-A-N, are scattered about the castle wall. Flying carpets sail across the screen in either direction. Purple Oscars and blue Rocs are misbehaving.

The Prince jumps onto a flying carpet and captures (touches) lettered jugs. Each letter he captures is replaced on the screen by a point value. He falls off a flying carpet and loses his life.

Scene 4 continues game play. The playfield is a ship with 2 masts. Lettered jugs appear scattered about the rigging of the masts. The Prince kicks evil Genies, Oscars, and Rocs out of the way, and picks up the letters in order. When he reaches the top of the mast, *BONUS* flashes on the screen.

*A Roc is a "legendary bird of great size and strength believed to inhabit the Indian Ocean area"—*Webster's New Collegiate Dictionary*

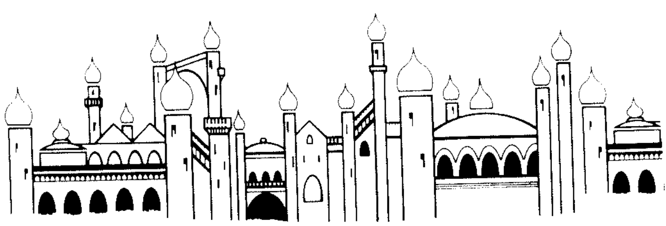
Play Mode

The player controls a young Arabian Prince who must rescue his Princess from the castle tower where she is being held prisoner. Evil Genies in brass jugs, swooping Rocs, and purple ghostly creatures called Oscars will try to stop him along the way. The Prince scores points for kicking Oscars or Rocs, picking up lettered jugs, or spelling A-R-A-B-I-A-N. The Prince loses a life when he's hit by a smokeball, falls off a ledge, flying carpet or vine, or gets caught (touched) by a Genie, Oscar, or Roc.

The Prince must successfully complete four levels to rescue the Princess. (Four levels or "pages" equals 1 section.) Each level is introduced with the turning of a page, which shows a distant view of the upcoming playfield. Each playfield has 7 lettered jugs that must be picked up before the player can advance to the next level, but he must avoid or KICK evil Genies, Oscars, and Rocs that will try to stop him.

Page 1. Page 1 turns, revealing a ship. The Prince must work his way to the crow's nest at the top of the mast before the vessel reaches the shore. As he climbs up the rigging, Rocs and Oscars dive at him in an attempt to knock him down. The Prince must KICK them out of the way to survive. While contending with these rascals, he must also try to collect all the jugs with letters on them. Beware! The jugs hold devilish Genies which can appear at any time and throw smokeballs at the Prince. Once a Genie has materialized, the Prince's kicking power cannot be used against him and he is unable to collect the jug so he should avoid the Genie. However, the Prince may collect the jug while the Genie is in smoke.

When the Arabian has collected all the jugs and reaches the top of the ship, Page 2 introduces the second level of the story.



Page 2. Now the Arabian has arrived on shore. To reach the Princess he must complete a cave maze under the cliff. Low-hanging rocks and climbing vines force him to crawl and climb. The Prince must still dodge Rocs, Oscars, and the Genie's smokeballs. And he must still collect the brass jugs. When he reaches the top of the cave, he must try to collect the letter "N" jug.

Page 3. Now the Arabian Prince must scale the walls of the castle. As flying carpets whiz by, the Arabian must jump from one to the next, taking care he isn't knocked off his present perch by another carpet flying too closely. He can duck to avoid them, but his timing has to be precise or he will take a tumble down to the ground. He must still dodge Rocs, Oscars, and the Genie's smokeballs. The player must beware—sometimes a pair will merge into one super Roc bird or super Oscar!

Page 4. The Prince has at last entered the castle. The Princess beckons him from high in the tower. To reach her, he must ride atop some flying carpets and pull himself up ropes—all the while collecting the brass jugs and kicking meddlesome Rocs and Oscars. When he reaches his loving and grateful Princess, the two fly happily into the sunset on a magic carpet.

Once the player has taken the Arabian through a section (all four levels), the next section begins. But the action gets faster, the Genies are angrier and fling more smokeballs, and there are more intelligent and challenging Rocs and Oscars. Even the brass jugs are rearranged so that it becomes more difficult for the player to spell A-R-A-B-I-A-N in order.

Hints for Game Play

- The player can still complete a level even if he collects the jugs out of sequence. But if he collects jugs in sequence to spell A-R-A-B-I-A-N, he'll score *many* more bonus points (2000 + 2000 × section number).
- Kicking a Roc or Oscar into other Rocs or Oscars awards higher points.
- Kicking a Super-Oscar or Super-Roc scores 1000 points.
- When a Genie begins to appear, the player should move to an area which allows him to avoid the smokeballs the Genie will throw!

High-Score Mode

Table 1-4 lists the point values in the Arabian game.

Table 1-4 Arabian Scoring Table

Action	Point Value
Collect letter jar	500
Spell A-R-A-B-I-A-N in order	2000 + 2000 × section number
Kick 1 Oscar or Roc with 1 kick	100
Kick 2 Oscars or Rocs with 1 kick	500 + 100
Kick 3 Oscars or Rocs with 1 kick	1000 + 500 + 100
Kick 4 Oscars or Rocs with 1 kick	2000 + 1000 + 500 + 100
Kick Super-Roc or Super-Oscar	1000

When a player has earned one of the ten highest scores on the game, the alphabet will appear on the screen. He must use the joystick to advance a jug to the letter he wants to select, and use either KICK button to select that initial. His initials and score will be transferred to the High-Score Table.

If the game is turned off, all high scores are erased.

Demonstration Mode

The demonstration mode allows an operator to demonstrate all levels of game play. To enter the demonstration mode, set the game to free play. (Refer to Table 1-2 for the option switch settings.) Press the 1-Player start switch to begin the play mode. If you press the 1- and 2-Player start switches simultaneously for just an instant, the game will advance to the end of the level you are on, the Arabian Prince will jump up and down as if the level was successfully completed, and the game will automatically start the next level of play. In the demonstration mode, you may play the game at any time.

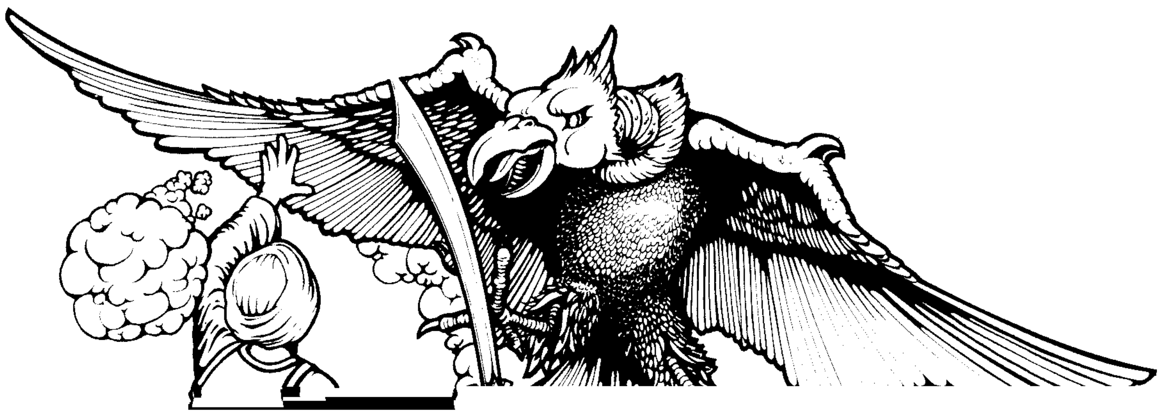
Self-Test Mode

The self-test is a diagnostic program that will automatically check the game computer functions. You can also check the controls when the game is in self-test. Option-switch settings are displayed on the master self-test screen. Refer to Chapter 2 for complete self-test instructions (no equipment is needed).

Self-Test Procedures

This game will test itself and provide data to show that the game circuitry and controls are operating properly. Self-test data is presented visually on the video display and audibly through the speakers. No additional equipment is required.

We suggest you perform a self-test when you first set up, each time you collect money, change the game options, or suspect game failure.



Game PCB Assembly Parts List, continued

Designator	Description	Part No.
	Resistors	
R1	10 KΩ, ±5%, ¼ W Resistor	110000-103
R2	560 Ω, ±5%, ¼ W Resistor	110000-561
R3	4.7 KΩ, ±5%, ¼ W Resistor	110000-472
R4	330 Ω, ±5%, ¼ W Resistor	110000-331
R5	5.1 KΩ, ±5%, ¼ W Resistor	110000-512
R6	1.0 KΩ, ±5%, ¼ W Resistor	110000-102
R7	4.7 KΩ, ±5%, ¼ W Resistor	110000-472
R8	1.0 KΩ, ±5%, ¼ W Resistor	110000-102
R9	22 KΩ, ±5%, ¼ W Resistor	110000-223
R10	1.2 KΩ, ±5%, ¼ W Resistor	110000-122
R11, R12	220 Ω, ±5%, ¼ W Resistor	110000-221
R13	560 Ω, ±5%, ¼ W Resistor	110000-561
R14	82 Ω, ±5%, ¼ W Resistor	110000-820
R15	82 Ω, ±5%, ¼ W Resistor	110000-820
R16	1.0 KΩ, ±5%, ¼ W Resistor	110000-102
R17	82 Ω, ±5%, ¼ W Resistor	110000-820
R18–20	220 Ω, ±5%, ¼ W Resistor	110000-221
R21	1.2 KΩ, ±5%, ¼ W Resistor	110000-122
R22	510 Ω, ±5%, ¼ W Resistor	110000-511
R23	1.2 KΩ, ±5%, ¼ W Resistor	110000-122
R25	510 Ω, ±5%, ¼ W Resistor	110000-511
R26	1.8 KΩ, ±5%, ¼ W Resistor	110000-182
R27	1.2 KΩ, ±5%, ¼ W Resistor	110000-122
R28	510 Ω, ±5%, ¼ W Resistor	110000-511
RA1–RA6	100 Ω, ±5%, ⅛ W Resistor Package	118000-101
RA7	22 KΩ, ±5%, ⅛ W Resistor Package	118001-223
RA8	100 Ω, ±5%, ⅛ W Resistor Package	118000-101
RA9–RA12	1.0 KΩ, ±5%, ⅛ W Resistor Package	118001-102
RA13	4.7 KΩ, ±5%, ⅛ W Resistor Package	118001-472
RA14	1.0 KΩ, ±5%, ⅛ W Resistor Package	118001-102
RA15	1.0 KΩ, ±5%, ⅛ W Resistor Package	118001-102
RA16	100 Ω, ±5%, ⅛ W Resistor Package	118000-101
RA17	3 KΩ, ±5%, ⅛ W Resistor Package	118001-332
RA18, RA19	22 KΩ, ±5%, ⅛ W Resistor Package	118001-223
RA20	1.0 KΩ, ±5%, ⅛ W Resistor Package	118000-102
VR1	10 KΩ Variable Resistor	99-200006
	Integrated Circuit Sockets	
IC1–IC5	24 Contact, Medium-Insertion-Force IC Socket	79-42C24
IC10	24 Contact, Medium-Insertion-Force IC Socket	79-42C24
IC15	40 Contact, Medium-Insertion-Force IC Socket	79-42C40
IC27	40 Contact, Medium-Insertion-Force IC Socket	79-42C40
IC82–IC84	24 Contact, Medium-Insertion-Force IC Socket	79-42C24
IC86–IC88	24 Contact, Medium-Insertion-Force IC Socket	79-42C24

(continued on next page)

Game PCB Assembly Parts List, continued

Designator	Description	Part No.
	Switches	
SW1	8 Toggle DIP Switch	66-118P1T
SW1	Tactile Service Switch	99-200011
SW2	4 Toggle DIP Switch	66-114P1T
	Transistors	
TR1, TR2	Type D1128 Transistor	99-200001
TR3	Type C1815 Transistor	99-200002
TR4–TR6	Type C752G (Y) Transistor	99-200003

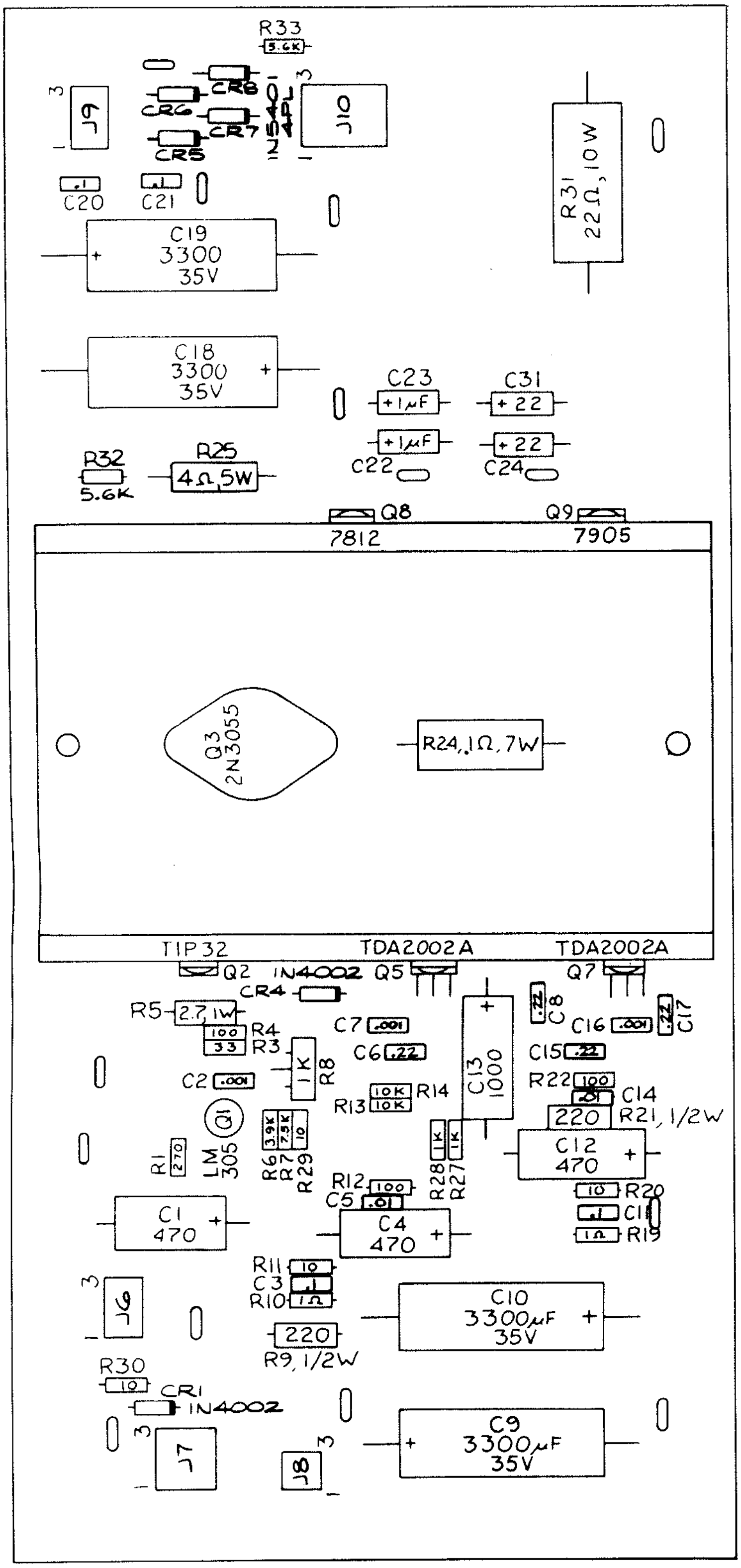


**Figure 5-14 Regulator/Audio II PCB Assembly
A035435-02 G**

Regulator/Audio II PCB Assembly Parts List

Designator	Description	Part No.
	Capacitors	
C1	470 μF, 25 V, Aluminum Electrolytic Fixed Axial-Lead Capacitor	24-250477
C2	0.001 μF, 35 V, Ceramic-Disc Axial-Lead Capacitor	122002-102
C3	0.1 μF, 25 V, Ceramic-Disc Axial-Lead Capacitor (Acceptable substitute is part no. 122002-104	29-088
C4	470 μF, 25 V, Aluminum Electrolytic Fixed Axial-Lead Capacitor	24-250477
C5	.01 μF, 25 V Ceramic-Disc Axial-Lead Capacitor (Acceptable substitute is part no. 122005-103)	100015-103
C6	0.22 μF, 25 V, Ceramic-Disc Axial-Lead Capacitor	122004-224
C7	0.001 μF, 35 V, Ceramic-Disc Axial-Lead Capacitor	122002-102
C8	0.22 μF, 25 V, Ceramic-Disc Axial-Lead Capacitor	122004-224
C9, C10	3300 μF, 35 V, Aluminum Electrolytic Fixed Axial-Lead Capacitor	24-350338
C11	0.1 μF, 25 V, Ceramic-Disc Axial-Lead Capacitor (Acceptable substitute is part no. 122002-104	29-088
C12	470 μF, 25 V, Aluminum Electrolytic Fixed Axial-Lead Capacitor	24-250477
C13	1000 μF, 25 V, Aluminum Electrolytic Fixed Axial-Lead Capacitor	24-250108
C14	.01 μF, 25 V Ceramic-Disc Axial-Lead Capacitor (Acceptable substitute is part no. 122005-103)	100015-103
C15	0.22 μF, 25 V, Ceramic-Disc Axial-Lead Capacitor	122004-224
C16	0.001 μF, 35 V, Ceramic-Disc Axial-Lead Capacitor	122002-102
C17	0.22 μF, 25 V, Ceramic-Disc Axial-Lead Capacitor	122004-224
C18, C19	3300 μF, 35 V, Aluminum Electrolytic Fixed Axial-Lead Capacitor	24-350338
C20, C21	0.1 μF, 25 V, Ceramic-Disc Axial-Lead Capacitor (Acceptable substitute is part no. 122002-104	29-088
C22, C23	1 μF, 50 V, Aluminum Electrolytic Fixed Axial-Lead Capacitor	24-500105
C24	22 μF, 35 V, Aluminum Electrolytic Fixed Axial-Lead Capacitor	24-350226
C31	22 μF, 35 V, Aluminum Electrolytic Fixed Axial-Lead Capacitor	24-350226
	Diodes	
CR1	Type-1N4002, 1 A, 100 V Silicon Rectifier Diode	31-1N4002
CR4	Type-1N4002, 1 A, 100 V Silicon Rectifier Diode	31-1N4002
CR5–CR8	Type-1N5401, 3 A, 100 V Silicon Rectifier Diode	31-1N5401
	Resistors	
R1	270 Ω, ±5%, ¼ W Resistor	110000-271
R3	33 Ω, ±5%, ¼ W Resistor	110000-330
R4	100 Ω, ±5%, ¼ W Resistor	110000-101
R5	2.7 Ω, ±5%, 1 W Resistor	110009-027
R6	3.9 kΩ, ±5%, ¼ W Resistor	110000-392
R7	7.5 kΩ, ±5%, ¼ W Resistor	110000-752
R8	1 kΩ Vertical PCB-Mounting Cermet Potentiometer (Acceptable substitute is part no. 119002-102)	19-315102
R9	220 Ω, ±5%, ½ W Resistor	110001-221
R10	1 Ω, ±5%, ¼ W Resistor	110000-010
R11	10 Ω, ±5%, ¼ W Resistor	110000-100
R12	100 Ω, ±5%, ¼ W Resistor	110000-101
R13, R14	10 kΩ, ±5%, ¼ W Resistor	110000-103

(Continued on next page)

Regulator/Audio II PCB Assembly Parts List, continued

Designator	Description	Part No.
R20	10 Ω, ±5%, ¼ W Resistor	110000-100
R21	220 Ω, ±5%, ½ W Resistor	110001-221
R19	1 Ω, ±5%, ¼ W Resistor	110000-010
R22	100 Ω, ±5%, ¼ W Resistor	110000-101
R24	0.1 Ω, ±3%, 7 W Wirewound Resistor	19-100P1015
R25	4 Ω, ±5%, 5 W Wirewound Resistor	116001-040
R27, R28	1 kΩ, ±5%, ¼ W Resistor	110000-102
R29, R30	10 Ω, ±5%, ¼ W Resistor	110000-100
R31	22 Ω, ±5%, 10 W Wirewound Resistor	116000-220
R32, R33	5.6 kΩ, ±5%, ¼ W Resistor	110000-562
	Transistors	
Q2	Type-TIP32 PNP Power Transistor	33-TIP32
Q3	Type-2N3055 NPN Silicon Transistor	34-2N3055
	Miscellaneous	
J6	6-Position Connector Receptacle	79-58306
J7	9-Position Connector Receptacle	79-58308
J8	4-Position Connector Receptacle	79-58354
J9	6-Position Connector Receptacle	79-58306
J10	12-Position Connector Receptacle	79-58346
Q1	5 V Linear Voltage Regulator	37-LM305
Q2, Q9	Thermally Conductive Silicon Insulator	78-16014
Q3	Thermally Conductive Silicon Insulator	78-16008
Q5	Audio Amp TDA2002A	137151-002
Q7	Audio Amp TDA2002A	137151-002
Q8	Type-7812 +12 V Voltage Regulator	37-7812
Q9	Type-7905 -5 V Voltage Regulator	37-7905
	Heat Sink	034531-01
	Test Point (Acceptable substitute is part no. 020670-01)	179051-001

Glossary

AC
Alternating current; from zero it rises to a maximum positive level, then passes through zero again to a maximum negative level.

ACTIVE STATE
The true state of a signal. For example: The active state for START is low.

ADDRESS
A value that identifies a specific location of data in memory; normally expressed in hexadecimal notation.

ANALOG
Measurable in an absolute quantity (as opposed to on or off). Analog devices are volume controls, light dimmers, stereo amplifiers, etc.

ANODE
The positive (arrow) end of a diode.

AMPLIFIER
A device used to increase the strength of an applied signal.

AMPLITUDE
The maximum instantaneous value of a waveform pulse from zero.

ASTABLE
Having no normal state. An astable device will free-run or oscillate as long as operating voltage is applied. The oscillation frequency is usually controlled by external circuitry.

AUXILIARY COIN SWITCH
A momentary-contact pushbutton switch with a black cap located on the utility panel. The auxiliary coin switch adds credits to the game without activating the coin counter.

BEZEL
A cut, formed, or machined retention device, such as the conical device used to mount a pushbutton switch to a control panel, or the formed device used to frame the video display screen.

BIDIRECTIONAL
Able to send or receive data on the same line (e.g., the data bus of a microprocessor).

BINARY
A number system that expresses all values by using two digits (0 and 1).

BIT
A binary digit; expressed as a 1 or a 0.

BLANKING
Turning off the beam on a cathode-ray tube during retrace.

BLOCK DIAGRAM
A drawing in which functional circuitry units are represented by blocks. Very useful during initial troubleshooting.

BUFFER
1. An isolating circuit designed to eliminate the reaction of a driven circuit on the circuits driving it (e.g., a buffer amplifier).

2. A device used to supply additional drive capability.

BUS
An electrical path over which information is transferred from any of several sources to any of several destinations.

CAPACITOR
A device capable of storing electrical energy. A capacitor blocks the flow of DC current while allowing AC current to pass.

CATHODE
The negative end of a diode.

CHIP
An integrated circuit comprising many circuits on a single wafer slice.

CLOCK
A repetitive timing signal for synchronizing system functions.

COINCIDENCE
Occurring at the same time.

COIN COUNTER
A 6-digit electro-mechanical device that counts the coins inserted in the coin mechanism(s).

COIN MECHANISM
A device on the inside of the coin door that inspects the coin to determine if the correct coin has been inserted.

COMPLEMENTARY
Having opposite states, such as the outputs of a flip-flop.

COMPOSITE SYNC
Horizontal and vertical synchronization pulses that are bused together into a single signal. This signal provides the timing necessary to keep the display in synchronization with the game circuitry.

COMPOSITE VIDEO
Complete video signal from the game system to drive the display circuitry, usually comprising H SYNC, V SYNC, and the video.

CREDIT
One play for one person based on the game switch settings.

CRT
Cathode-ray tube.

DATA
General term for the numbers, letters, and symbols that serve as input for device processing.

DARLINGTON
A two-transistor amplifier that provides extremely high gain.

DC
Direct current, meaning current flowing in one direction and of a fixed value.

DEFLECTION YOKE
Electro-magnetic coils around the neck of a cathode-ray tube. One set of coils deflects the electron beam horizontally and the other set deflects the beam vertically.

DIAGNOSTICS
A programmed routine for checking circuitry. For example: the self-test is a diagnostic routine.

DIODE
A semiconductor device that conducts in only one direction.

DISCRETE
Non-integrated components, such as resistors, capacitors, and transistors.

DMA
Direct memory access. DMA is a process of accessing memory that bypasses the microprocessor logic. DMA is normally used for transferring data between the input/output ports and memory.

DOWN TIME
The period during which a game is malfunctioning or not operating correctly due to machine failure.

EAROM
Electrically alterable read-only memory (see ROM). The EAROM is a memory that can be changed by the application of high voltage.

FLYBACK
A step-up transformer used in a display to provide the high voltage.

GATE
1. A circuit with one output that responds when and only when a certain combination of pulses is present at the inputs.

2. A circuit in which one signal switches another signal on and off.

3. To control the passage of a pulse or signal.

HARNESS
A prefabricated assembly of insulated wires and terminals ready to be attached to a piece of equipment.

HEXADECIMAL
A number system using the equivalent of the decimal number 16 as a base. The symbols 0–9 and A–F are usually used.

IMPLODE
To burst inward; the inward collapse of a vacuum tube.

I/O
Input/Output.

IRQ
Interrupt request. IRQ is a control signal to the microprocessor that is generated by external logic. This signal tells the microprocessor that external logic needs attention. Depending on the program, the processor may or may not respond.

LED
The abbreviation for a light-emitting diode.

LOCKOUT COIL
Directs coins into the coin return box when there is no power to the game.

LOGIC STATE
The binary (1 or 0) value at the node of a logic element or integrated circuit during a particular time. Also called the logic level. The list below shows the voltage levels corresponding to the logic states (levels) in a TTL system.

Logic 0, Low = 0 VDC to +0.8 VDC
Grey Area (Tri-State Level) = +0.8 VDC to +2.4 VDC
Logic 1, High = +2.4 VDC to +5 VDC

MULTIPLEXER
A device that takes several low-speed inputs and combines them into one high-speed data stream for simultaneous transmission on a single line.

NMI
Non-maskable interrupt. NMI is a request for service by the microprocessor from external logic. The microprocessor cannot ignore this interrupt request.

PAGE
A subsection of memory. A read-only memory device (see ROM) is broken into discrete blocks of data. These blocks are called pages. Each block has X number of bytes.

PCB
The abbreviation for a printed-circuit board.

PHOTOTRANSISTOR
A transistor that is activated by an external light source.

POTENTIOMETER
1. A resistor that has a continuously moving contact which is generally mounted on a moving shaft. Used chiefly as a voltage divider. Also called a *pot* (slang).

2. An instrument for measuring a voltage by balancing it against a known voltage.

RAM
Random-access memory. A device for the temporary storage of data.

RASTER-SCAN DISPLAY
A display system whereby images are displayed by continuously scanning the cathode-ray tube horizontally and vertically with an electron beam. The display system controls the intensity of the electron beam.

RETRACE
In a raster-scan display, retrace is the time during which the cathode-ray tube electron beam is resetting either from right to left or from bottom to top.

RESISTOR
A device designed to have a definite amount of resistance. Used in circuits to limit current flow or to provide a voltage drop.

ROM
Read-only memory. A device for the permanent storage of data.

SIGNATURE ANALYSIS
A process of isolating digital logic faults at the component level by means of special test equipment called signature analyzers. Basically, signature analyzers (e.g., the ATARI® CAT Box) convert lengthy bit streams into four-digit hexadecimal signatures. The signature read by the analyzer at each circuit node is then compared with the known good signature for that node. This process continues until a fault is located.

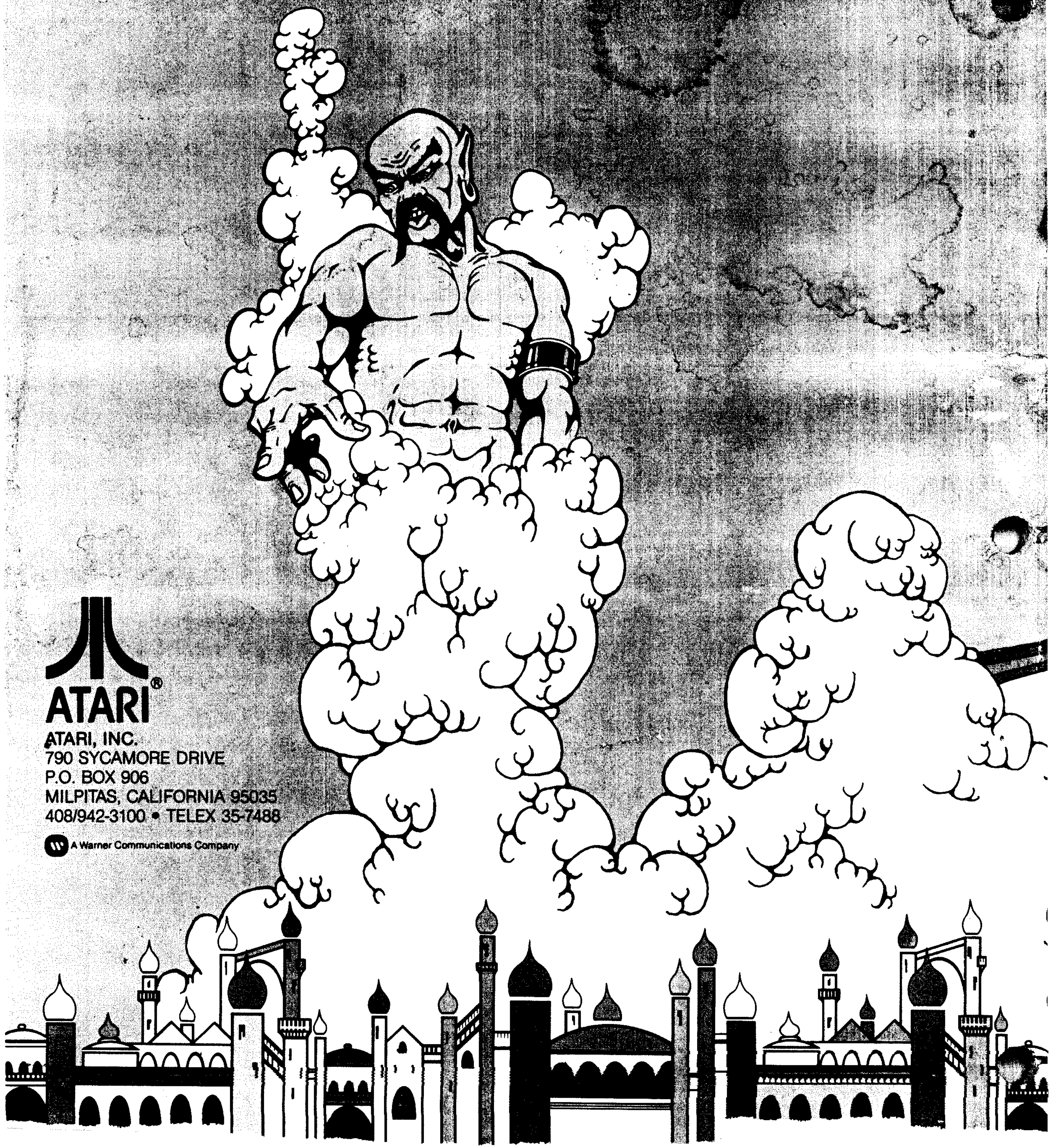
TROUBLESHOOT
The process of locating and repairing a fault.

VECTOR
A line segment drawn between specific X and Y coordinates on a cathode-ray tube.

WATCHDOG
A counter circuit designed to protect the microprocessor from self-destruction if a program malfunction occurs. If a malfunction does occur, the counter applies continuous pulses to the reset line of the microprocessor, which causes the microprocessor to keep resetting.

X-Y DISPLAY
A display system whereby images are displayed with vectors.

ZENER DIODE
A special diode used as a regulator. Its main characteristic is breaking down at a specified reverse-bias (Zener) voltage.



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