



# ARABIAN™

**Operators Manual**  
With Illustrated Parts Lists

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# Set-Up Procedures

## 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.

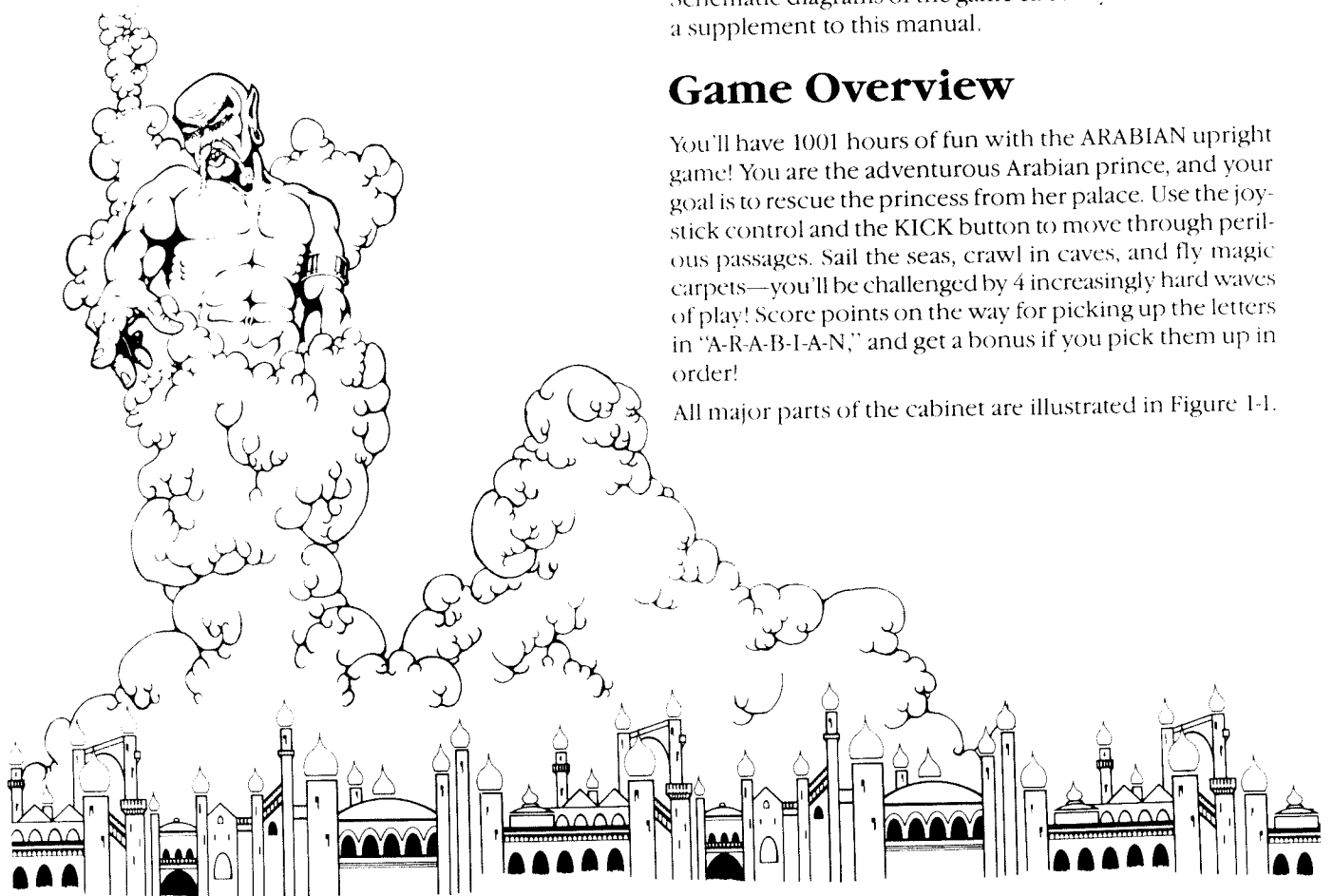
A glossary of terms is in the back of this manual for your convenience.

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

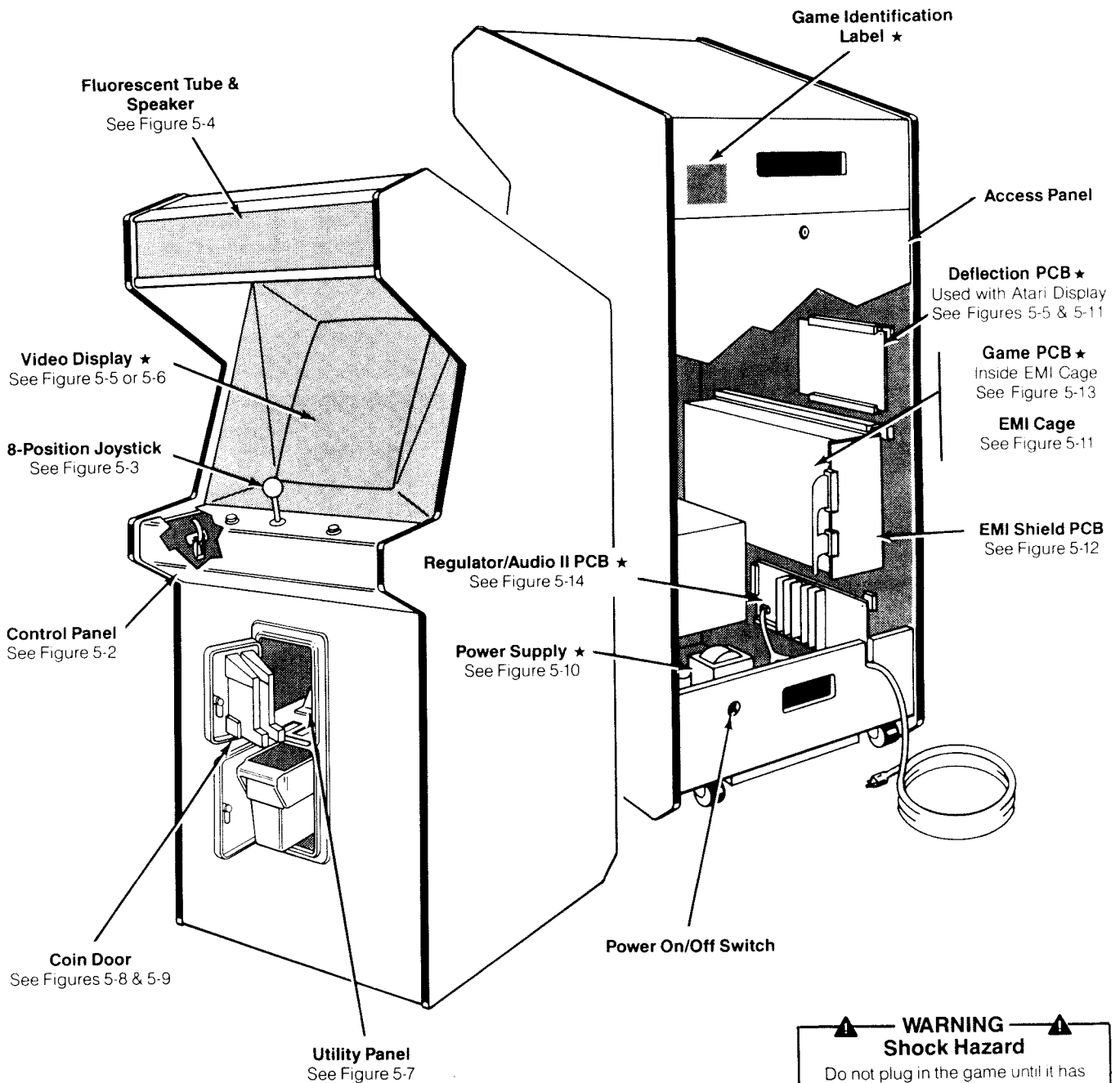
## Game Overview

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**

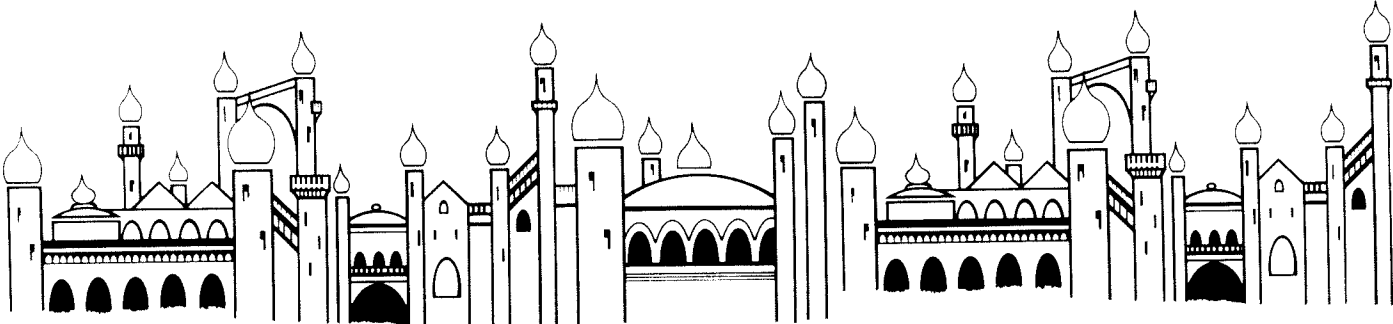
To avoid electrical shock, do not plug in the game until the procedures in Sections B and C have been completed!

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

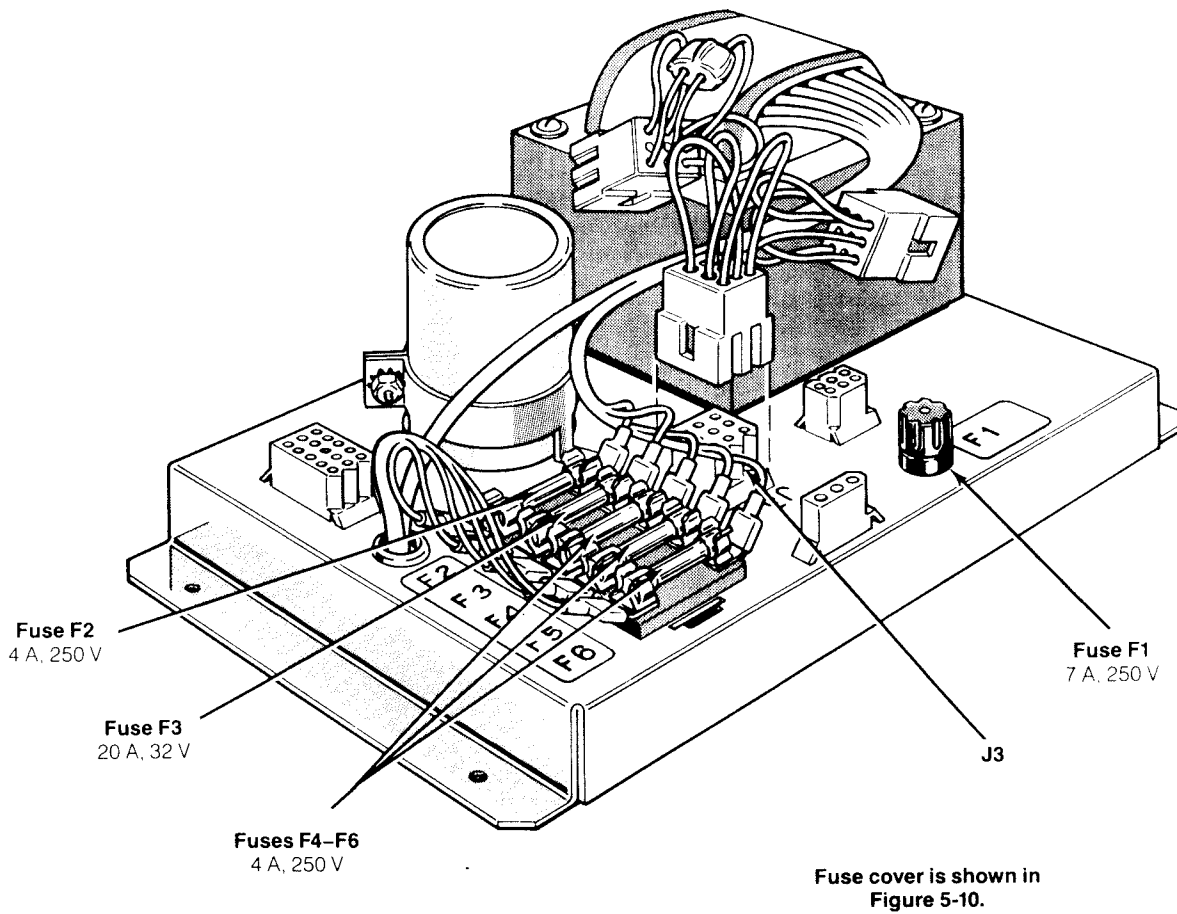
The power supply in your game contains six fuses. When you replace a fuse, use the identical type fuse with the same electrical rating (see Figure 1-2).

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).

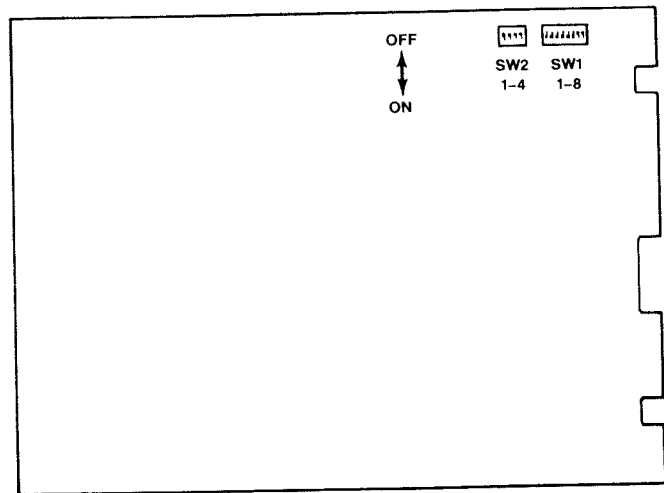
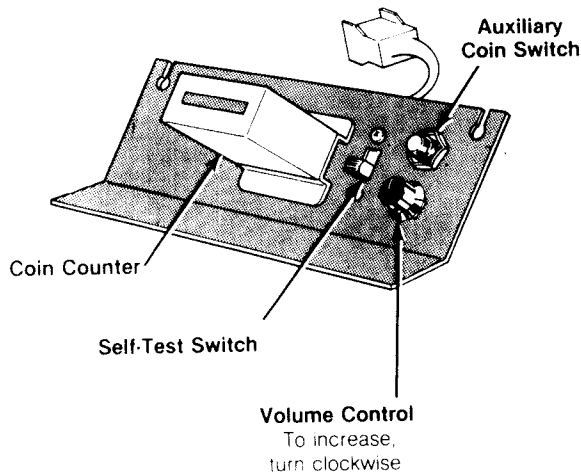
## E. Selecting the Coin and Credit Options

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<br>at location SW1 near RA12 |     |     |     |     |     |     |     | Option                          |
|--|-----|-----|-----|-----|-----|-----|-----|---------------------------------|
| 1  | 2   | 3   | 4   | 5   | 6   | 7   | 8   |                                 |
| 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            |
|  |     |     |     |     |     |     |     | <b>Left Coin Mechanism</b>      |
|  |     |     |     | Off | Off | Off | Off | 1 coin = 1 credit               |
|  |     |     |     | On  | Off | Off | Off | 2 coins = 1 credit              |
|  |     |     |     | Off | On  | Off | Off | 2 coins = 1 credit              |
|  |     |     |     | On  | On  | Off | Off | 1 coin = 1 credit               |
|  |     |     |     | Off | Off | On  | Off | 1 coin = 1 credit               |
|  |     |     |     | On  | Off | On  | Off | 1 coin = 1 credit               |
|  |     |     |     | Off | On  | On  | Off | 1 coin = 1 credit               |
|  |     |     |     | On  | On  | On  | Off | 1 coin = 1 credit               |
|  |     |     |     | Off | Off | Off | On  | 1 coin = 2 credits              |
|  |     |     |     | On  | Off | Off | On  | 1 coin = 2 credits              |
|  |     |     |     | Off | On  | Off | On  | 1 coin = 2 credits              |
|  |     |     |     | On  | On  | Off | On  | 1 coin = 2 credits              |
|  |     |     |     | Off | Off | On  | On  | 1 coin = 2 credits              |
|  |     |     |     | On  | Off | On  | On  | 1 coin = 2 credits              |
|  |     |     |     | Off | On  | On  | On  | 1 coin = 2 credits              |
|  |     |     |     | On  | On  | On  | On  | Free Play (Demonstration Mode)  |
|  |     |     |     |     |     |     |     | <b>Right Coin Mechanism</b>     |
|  |     |     |     |     |     |     |     | 1 coin = 1 credit ◀             |
|  |     |     |     |     |     |     |     | 2 coins = 1 credit              |
|  |     |     |     |     |     |     |     | 1 coin = 3 credits              |
|  |     |     |     |     |     |     |     | 1 coin = 2 credits              |
|  |     |     |     |     |     |     |     | 1 coin = 3 credits              |
|  |     |     |     |     |     |     |     | 1 coin = 4 credits              |
|  |     |     |     |     |     |     |     | 1 coin = 5 credits              |
|  |     |     |     |     |     |     |     | 1 coin = 6 credits              |
|  |     |     |     |     |     |     |     | 1 coin = 2 credits              |
|  |     |     |     |     |     |     |     | 1 coin = 4 credits              |
|  |     |     |     |     |     |     |     | 1 coin = 5 credits              |
|  |     |     |     |     |     |     |     | 1 coin = 10 credits             |
|  |     |     |     |     |     |     |     | 1 coin = 11 credits             |
|  |     |     |     |     |     |     |     | 1 coin = 12 credits             |
|  |     |     |     |     |     |     |     | 1 coin = 6 credits              |

◀ Manufacturer's recommended settings

**Table 1-3 Switch Settings for Special Options**

| Settings of 4-Toggle Switch on Arabian Game PCB<br>at location SW2 near RA14 |     |     |     | Options   |
|--|-----|-----|-----|---|
| 1  | 2   | 3   | 4   |   |
| 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):

|             |                 |             |
|-------------|-----------------|-------------|
| <i>1-UP</i> | <i>HI-SCORE</i> | <i>2-UP</i> |
| 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*

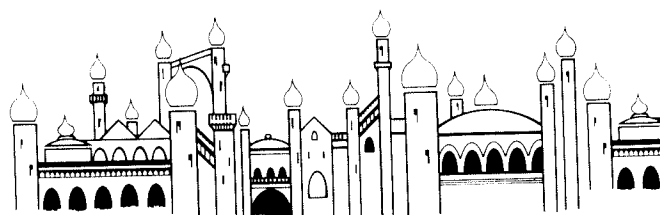
### Play Mode

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 ( $2000 + 2000 \times \text{section number}$ ).

- 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      | $2000 + 2000 \times \text{section number}$ |
| 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.



# A. Master Self-Test Display

To enter the self-test mode, set the self-test switch on the utility panel to the on position (see Figure 1-3 for the location of this switch). The game will first test the random-access memory (RAM) and read-only memory (ROM), and then display the rest of the master self-test display, which includes the current status of the option switches. The entire master self-test display is shown in Figure 2-1. You will be returning the game to this screen between phases of the self-test procedure.

When the game RAM and ROM are tested, a message appears in the upper right corner of the display to give you the status of RAM and ROM. If the RAM and ROM are operating properly, the self-test display will show *RAM OK* and *ROM OK*.

**RAM failure** may cause an *ERROR RAM* message. Check the address lines at IC10. **ROM failure** is indicated on the screen by the words *ERROR ROM* followed by a number which indicates the failed ROM. Table 2-1 lists these screen messages and the corresponding ROM numbers. Not all ROM failures may be diagnosed in the master self-test display.

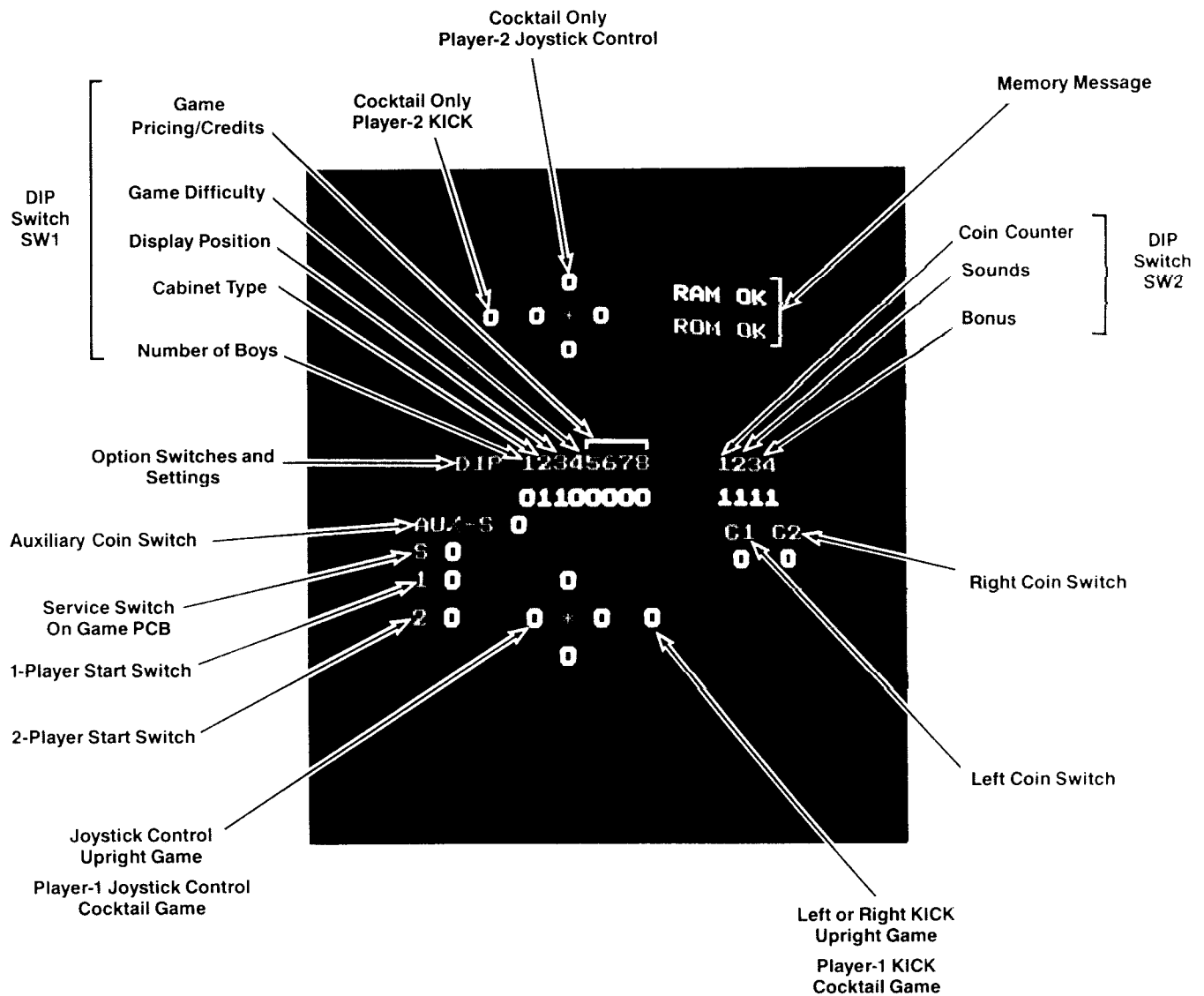


Figure 2-1 Master Self-Test Display

**Table 2-1 ROM Locations**

| Screen Message | ROM Number |
|----------------|------------|
| ERROR ROM 1    | IC1        |
| ERROR ROM 2    | IC2        |
| ERROR ROM 3    | IC3        |
| ERROR ROM 4    | IC4        |

**Option-switch status** is shown in the center of the master self-test display (see Figure 2-1). As shown in this example, option-switch status would appear as:

```
DIP      1 2 3 4 5 6 7 8      1 2 3 4
         0 1 1 0 0 0 0 0      1 1 1 1
```

The status of each of the eight toggle switches of dual-in-line-package (DIP) switch SW1 is shown in the center, and the status of each of the four toggle switches of DIP switch SW2 is shown to the right. *0* indicates the switch is off; *1* indicates the switch is on. Option switch SW1 is located near RA12 on the game PCB; option switch SW2 is located near RA14 on the game PCB. Refer to Tables 1-2 and 1-3 for their possible settings.

## B. Game Controls Test

You can test the following game controls and switches while the master self-test screen is displayed: the auxiliary coin switch on the utility panel, service switch on the game PCB, 1-Player start switch, 2-Player start switch, right coin switch, left coin switch, left KICK button, right KICK button, and the joystick control. Refer to Figure 2-1 for the location of the *0* that corresponds to the control or switch you will be testing.

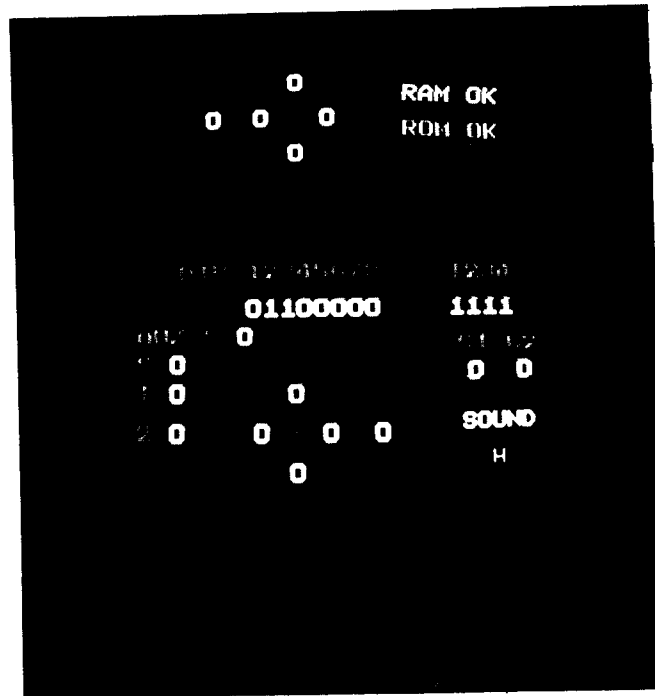
To test a switch or control, activate it. The corresponding *0* should change to *1* as each switch is activated. If the test fails, troubleshoot using the information in Chapters 3 and 4, and the Schematic Package Supplement.

**NOTE**

This game uses an 8-position joystick control, which enables a player to move diagonally as well as horizontally and vertically. Test the joystick by pushing it right, left, up, and down. Each corresponding *0* should change to *1*. Then push it diagonally up and to the left. For proper game operation, both the top and left switches must close at the same time, and the top and left *0* should each become *1*. Repeat this procedure in all 4 diagonal directions. If each corresponding *0* fails to change to *1*, troubleshoot using the information in Chapters 3 and 4, and the Schematic Package Supplement.

## C. Sound Test

The sound test checks the Custom Audio sound chip. To start the sound test, simultaneously press the 1-Player and 2-Player start switches. Game sounds are produced and advance automatically from *SOUND 1* through *SOUND 9* and *SOUND A* through *SOUND H*. This test is displayed in the lower right corner of the screen (see Figure 2-2). Each sound is explained in Table 2-2.



**Figure 2-2 Sound Test Display**

**Table 2-2 Sound Test Index**

| Sound Number | Action                     |
|--------------|----------------------------|
| 1            | Jump                       |
| 2            | Kick                       |
| 3            | Crawl                      |
| 4            | Fatal Fall                 |
| 5            | Genie with Throw           |
| 6            | Super Oscar/Roc Start      |
| 7            | Oscar/Roc Getting Kicked   |
| 8            | Birth of Oscar             |
| 9            | Player Death               |
| A            | Complete Page Introduction |
| B            | Bonus Life                 |
| C            | Pick Up Jug                |
| D            | Wave 1 Music               |
| E            | Wave 2 Music               |
| F            | Page Introduction          |
| G            | Attract Mode Music         |
| H            | Complete Wave              |

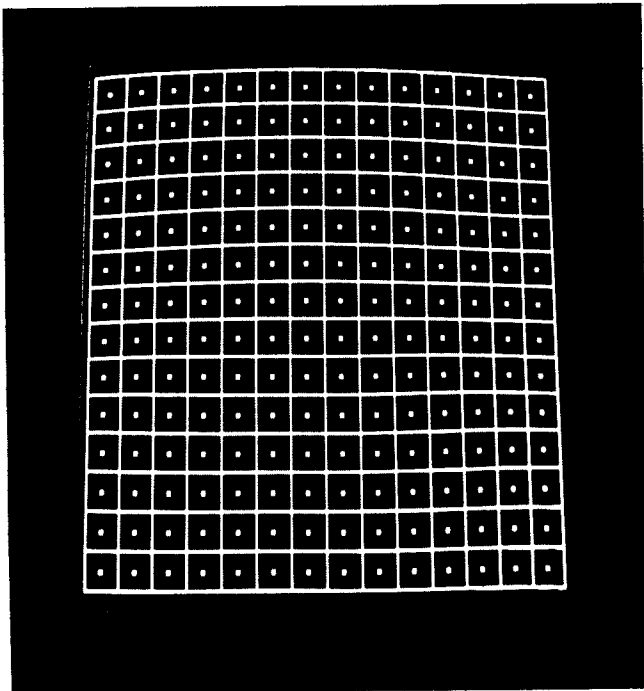
## D. Convergence Display

Simultaneously press the 1-Player start switch and either KICK button. The convergence pattern shown in Figure 2-3 should appear. If the convergence is correct the following occurs:

- the grid pattern should be pale pink
- the square sizes should be the same
- the red outline around the grid pattern should be visible within the bezel, because game play occurs within this boundary
- the dots should be displayed in the center of each square
- red and pale pink should be the *only* colors on the screen.

If any of the above conditions do not exist, refer to the raster-scan video display manual for a detailed procedure on how to adjust display convergence.

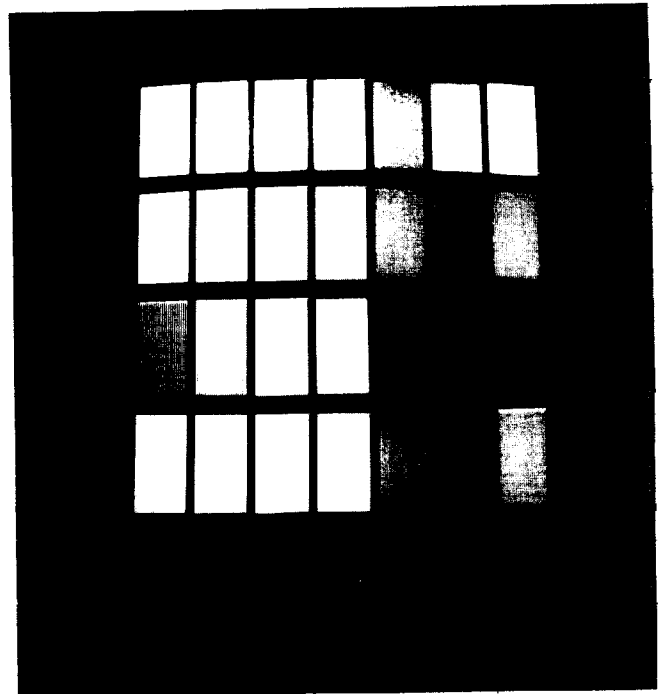
Simultaneously press the 1-Player start switch and either KICK button to end this test and return to the master self-test display.



**Figure 2-3 Convergence Pattern Display**

## E. Color Test and Character Display

Simultaneously press the 2-Player start switch and either KICK button. The color-bar pattern shown in Figure 2-4 will appear.



**Figure 2-4 Color-Bar Display**

Twenty-eight bars of color—7 across by 4 down—are shown on the screen. If the display color is correctly adjusted, the colors should match those listed in Table 2-3. If any colors on your screen do not match those listed in Table 2-3, refer to the raster-scan video display manual for a detailed procedure on how to adjust the color.

**Table 2-3 Color-Bar Display Colors**

| Row | Column | Color             |
|-----|--------|-------------------|
| 1   | 1      | Yellow-green      |
| 1   | 2      | Lilac             |
| 1   | 3      | Light blue-violet |
| 1   | 4      | Sky blue          |
| 1   | 5      | Red-orange        |
| 1   | 6      | Light green       |
| 1   | 7      | Royal blue        |
| 2   | 1      | Orange            |
| 2   | 2      | Bright pink       |
| 2   | 3      | Light pink        |
| 2   | 4      | Blue              |
| 2   | 5      | Red-orange        |
| 2   | 6      | Green             |
| 2   | 7      | Dark royal blue   |
| 3   | 1      | Dark amber        |
| 3   | 2      | Olive green       |
| 3   | 3      | Yellow-green      |
| 3   | 4      | Light green       |
| 3   | 5      | Dark red-orange   |
| 3   | 6      | Forest green      |
| 3   | 7      | Green             |
| 4   | 1      | Light red-orange  |
| 4   | 2      | Orange            |
| 4   | 3      | Yellow-green      |
| 4   | 4      | Dark yellow-green |
| 4   | 5      | Red-orange        |
| 4   | 6      | Brown             |
| 4   | 7      | Olive green       |

The next section of this test is the character display. Press the KICK button repeatedly to cycle through all playfield pictures described in Table 2-4.

**Table 2-4 Character Display List**

| Segment                    | Screen Display                 |
|----------------------------|--------------------------------|
| Playfield 1                | Ship                           |
| Playfield 2                | Cave Maze                      |
| Playfield 3                | Castle Wall                    |
| Playfield 4                | Castle Dungeon                 |
| 1st Book Page              | Ship Near Shore                |
| 2nd Book Page              | Shore                          |
| 3rd Book Page              | Castle Wall                    |
| 4th Book Page              | Castle and Tower               |
| Animation Between Sections | Castle and Tower Closeup       |
| Character Display          | 17 Characters and Arabian Logo |

Press KICK again, and the master self-test display will appear.

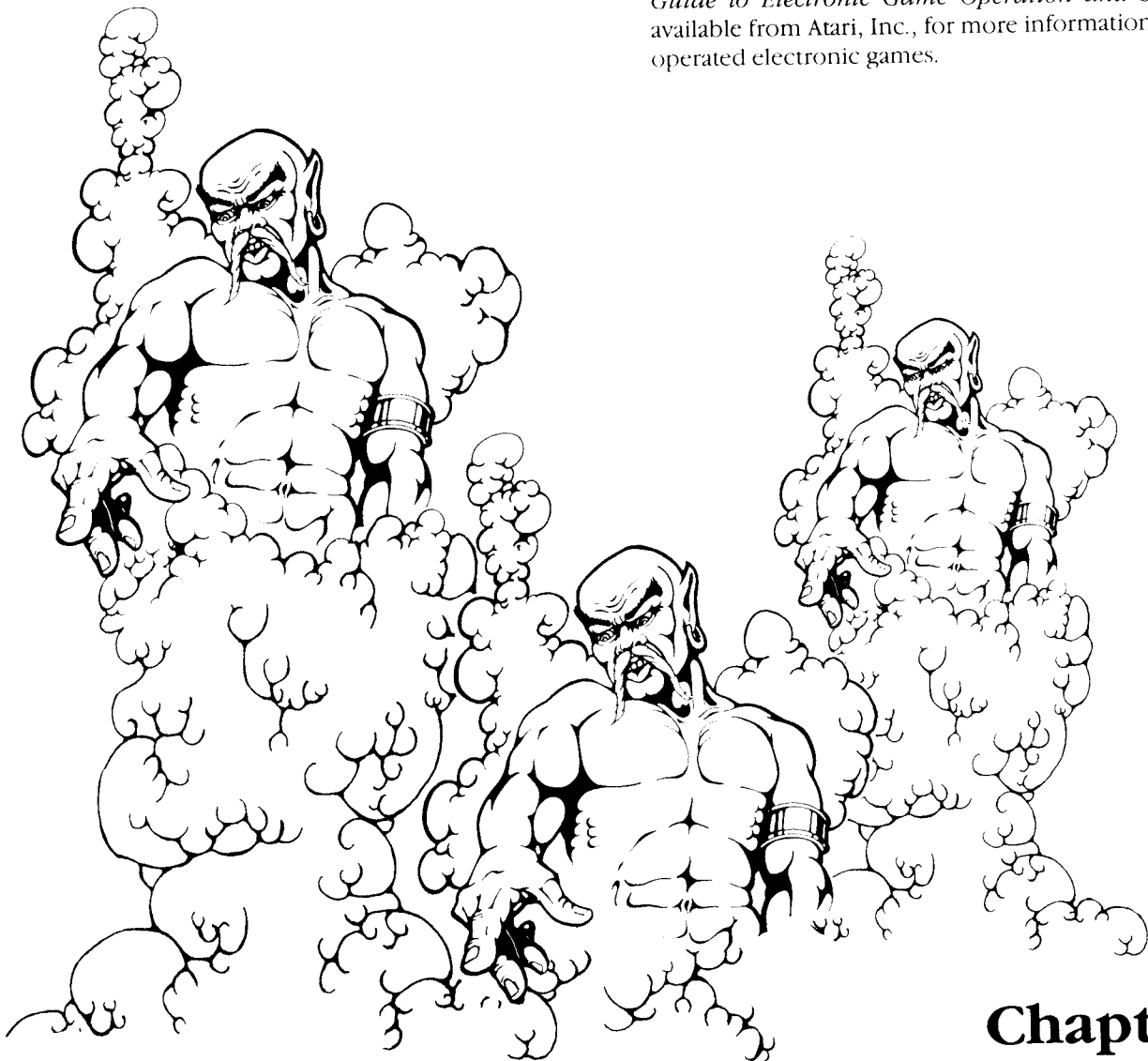
To end the self-test mode, set the self-test switch to off. The attract mode will automatically start.



# Troubleshooting Procedures

This chapter contains a discussion of troubleshooting aids and techniques to assist the service technician when a problem is suspected in this game. Most problems can be located quickly by following the information in this chapter. However, if problems persist, contact your nearest Atari Customer Service office listed on the inside cover of this manual for assistance.

A thorough knowledge of game operation is desirable for effective troubleshooting. In addition to the operation and service information in the Schematic Package Supplement (SP-237) included with this manual, refer to *The Book, A Guide to Electronic Game Operation and Servicing*, available from Atari, Inc., for more information on coin-operated electronic games.



## Chapter 3

**▲ WARNING ▲**

To avoid electrical shock, turn the game off before removing or replacing components.

**NOTE**

We recommend that troubleshooting and repair procedures be performed by a qualified electronic technician.

## A. Troubleshooting Aids

Troubleshooting aids are provided throughout this manual and the Schematic Package Supplement. The following information is intended to acquaint the service technician with the portions of these documents that contain useful troubleshooting and repair information.

### Assembly and Component Locations

The illustrated parts lists in Chapter 5 illustrate the locations of assemblies and components. Printed-circuit board (PCB) illustrations aid in rapidly locating components contained on the corresponding schematic diagram(s).

### Schematic Diagrams

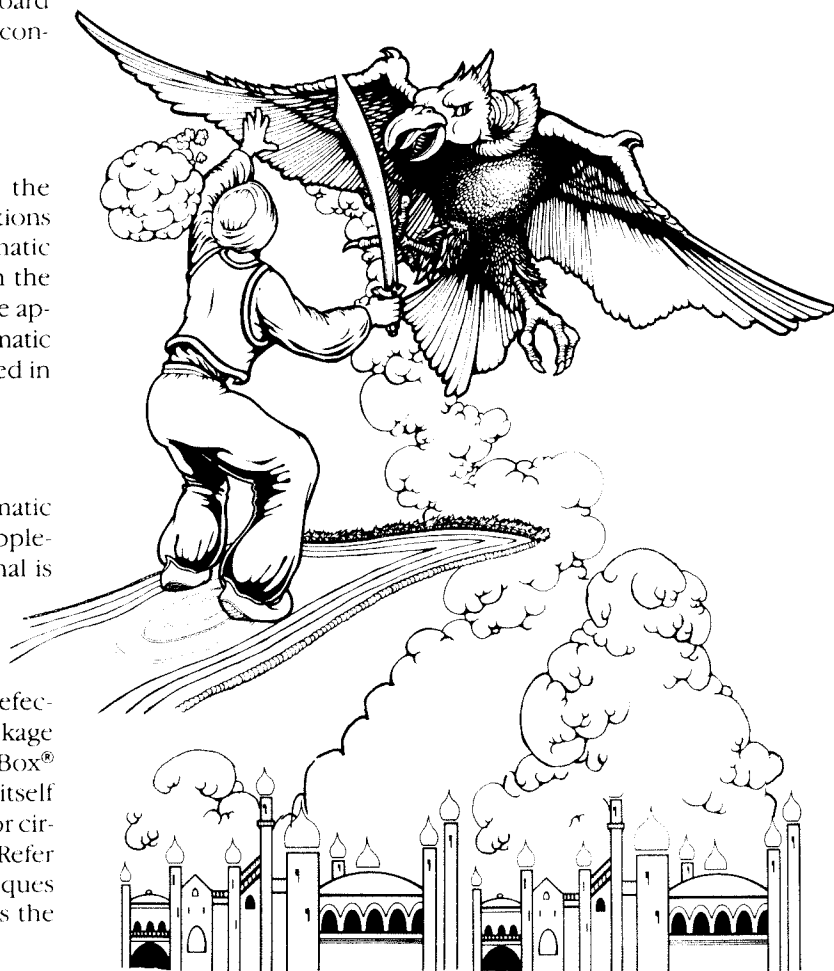
Complete schematic diagrams are provided in the Schematic Package Supplement. Component designations and their electrical values are included on the schematic diagrams. A block diagram of the major circuits on the game PCB (with sheet numbers to aid in locating the appropriate schematic diagrams) is included in the Schematic Package Supplement. A memory map is also included in the Schematic Package Supplement.

### Signal Names

A description of signal names used on the PCB schematic diagrams is provided in the Schematic Package Supplement. Each signal description states where the signal is generated, its destination, and its purpose.

### Troubleshooting Procedures

Detailed troubleshooting procedures for locating defective components are provided in the Schematic Package Supplement. These procedures utilize the Atari CAT Box<sup>®</sup> to troubleshoot the game PCB. This game will test itself and provide data to aid in localizing troubles to a major circuit. Self-test procedures are provided in Chapter 2. Refer to the following section on Troubleshooting Techniques for a suggested troubleshooting sequence that uses the self-test procedures.



## B. Troubleshooting Techniques

The following troubleshooting steps are arranged in a sequence recommended for locating a defective component. The procedure begins with a check of the simple trouble possibilities and progresses to more extensive procedures for localizing the trouble to an assembly or major circuit, and then to a defective component.

### 1. Check Switch Settings

Incorrect switch settings can sometimes indicate a problem that does not exist. Refer to Chapter 1 Set-Up Procedures, to verify that the game has been installed properly and that the switches are set to their correct positions. Check for proper operation in all game-play modes.

### 2. Check Fuses

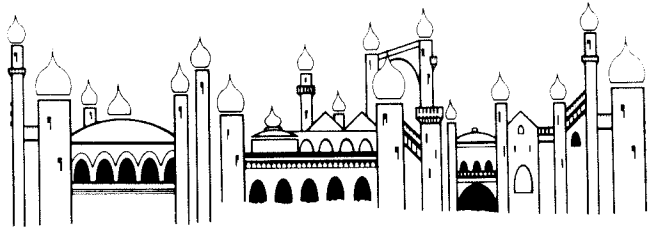
Check for open fuses. Refer to Figure 5-10 in Chapter 5 Illustrated Parts Lists, and the Color Raster Display Manual for the location and rating of each fuse used in this game. Make sure that replacement fuses are the proper type and rating.

### 3. Check Power-Supply Voltages

Improper operation of all circuits usually indicates a power supply problem. Check that the proper line voltage is available to the power supply.

### 4. Localize Trouble

Determine the trouble symptom. Use the wiring diagrams in the Schematic Package Supplement to determine which assemblies or major circuits could cause the trouble. Perform the self-test procedure provided in Chapter 2.



### 5. Visual Check

Visually check for obvious problems in the portion of the game where a problem is suspected. For example, check for loose or defective solder connections, integrated circuits loose in their sockets, loose cable connections, broken wires, damaged printed circuit boards or components.

### 6. Check Voltages, Waveforms, and Signatures

Check for correct voltages and waveforms. Perform the troubleshooting procedures provided in the Schematic Package Supplement.

### 7. Check Individual Components

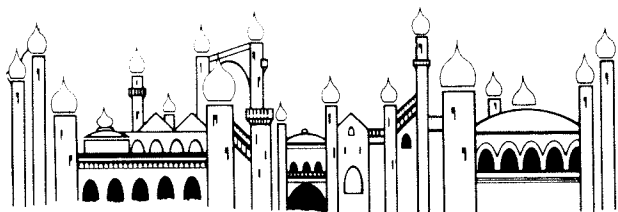
#### CAUTION

Transistors and integrated circuits soldered in place are difficult to remove without damaging the printed circuit board or component. Be extremely careful when removing these components.

Check soldered-in components by disconnecting one end to isolate the measurement from the effects of the surrounding circuitry. Often, direct substitution is the most practical way to determine if a component is faulty. However, eliminate the possibility of some other circuit problem existing which could damage the substitute component.

### 8. Repair the Assembly

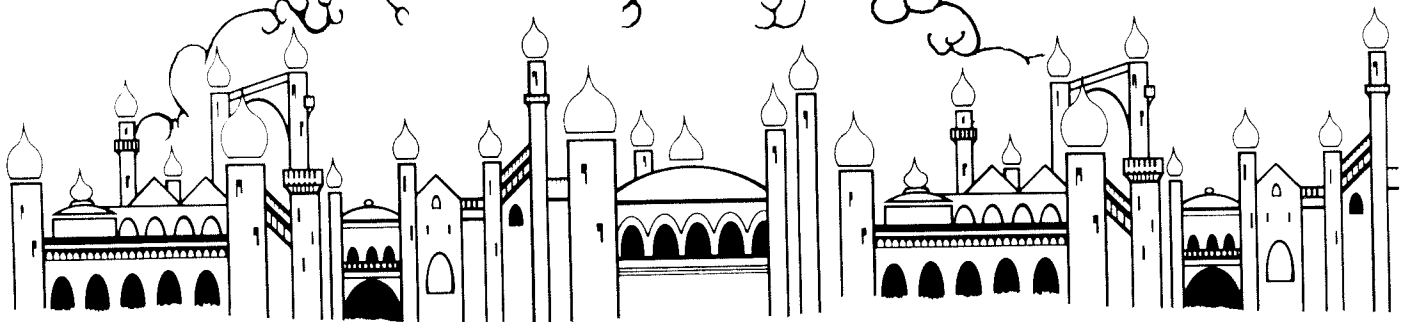
Repair or replace the defective part. Refer to Chapter 4 Maintenance and Repair, for special repair and replacement procedures. Check for proper operation of any repaired circuit.



# Maintenance and Repair Procedures



The maintenance procedures provided in this chapter are for those items which are subject to the most severe use. To assure the maximum trouble-free operation from this game, Atari recommends that periodic routine maintenance be performed on the game components described in the following procedures. How often routine maintenance is performed depends upon the game environment and frequency of play.



▲ — **WARNING** — ▲

To avoid possible electrical shock hazard, unplug the game prior to performing any maintenance.

## A. Cleaning Requirements

The game cabinet and display shield may be cleaned with any non-abrasive household cleaner. The coin mechanism should be cleaned periodically with hot or boiling water and a mild detergent. A toothbrush may be used to remove any stubborn build-up of residue in the coin path. After cleaning the coin mechanism, flush thoroughly with hot or boiling water and blow out all the water with compressed air. Compressed air is also recommended for cleaning dust from the interior of the cabinet. No lubrication is required for any of the moving parts in this game.

## B. Opening the Control Panel

The remaining procedures in this chapter are performed with the control panel open to provide access to the controls. Perform the following procedure to open the control panel:

1. Unlock and open the coin door. Reach up through the opening to the top of the control panel and release the two spring-draw latches.
2. Close the coin door.
3. Lift the control panel at the top edge and tilt it toward you. The control panel has foam tape on it. Make sure the tape is in good condition.

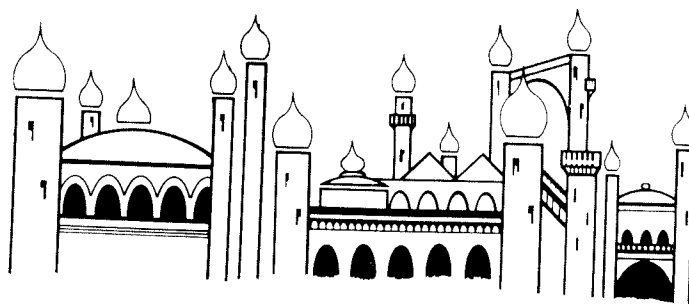
## C. Joystick Leaf Switches

1. To replace the joystick leaf switches, you do not need to disassemble the joystick. Using your thumbs, pry apart the plastic flanges on the switch holder. With your index finger, lift the switch up so that it will clear the plastic tab located on the outside end of the switch holder.
2. Slide the leaf switch out of its holder. Replace the switch in reverse order.
3. Make sure that each leaf switch is firmly seated in its holder. There is a small gray plastic tab on the outside end of the switch holder. The black plastic part of each leaf switch must be in front of this tab.
4. Check that all four leaf switches can be activated by watching the switch blades as you move the joystick handle up, down, left, and right.

5. Test the four diagonal positions. In each diagonal position, two leaf switches should close. Switches should continue bending slightly after making contact.
6. Adjust each switch contact for a narrow gap using the following procedure:
  - a. Push the joystick handle away from the switch for easier servicing.
  - b. Use a pair of needlenose pliers or a switch adjustment tool to bend each double set of blades in toward the center. Make the bend where the double set of blades protrude from the black plastic part of the switch.
7. Recheck the switch action. The switches must move independently for right, left, up, down, and diagonal motion of the joystick.

## D. Joystick Assembly

1. Remove the entire joystick assembly from the control panel.
2. Remove the four screws in the plastic joystick frame.
3. Remove the retaining ring from the bottom of the shaft. The assembly will now come apart.
4. To replace the bellows, pry it up and out of the plastic frame. Note that the inner raised ring on the bellows is longer on one side. This longer side goes on top of the assembly (toward the control knob).
5. Reassemble the joystick in reverse order.



## E. Pushbutton Leaf Switches

1. Adjust the leaf switch contacts for a narrow gap. When a pushbutton is depressed, the resulting wiping action of the cross bar contacts provides a self-cleaning feature. **Don't burnish the contacts.** To clean them, use electrical contact cleaner.
2. To replace a leaf switch, remove the screw with a Phillips-head screwdriver.
3. To replace the switch pushbutton, turn the stamped nut with a wrench in a counterclockwise direction, as seen from the inside of the control panel. The ring on the outside of the control panel should not spin.
4. Reinstall the pushbutton switch. Reconnect the harness wires to the switch terminals.

## F. Start Switches

### NOTE

Start switches can be checked for proper operation with an ohmmeter. Disconnect the wires from the switch terminals and connect an ohmmeter between the normally open and common contacts. Press and release the pushbutton and check for zero and infinite resistance. If the switch is not operating properly, perform the following procedure.

1. Turn the switch counterclockwise while firmly holding the black cone-shaped bushing on the outside of the control panel.
2. Install a new switch using the reverse procedure.
3. Reconnect the harness wires as shown in Figure 4-1. Make certain the right colors go to the right tabs on the switch.

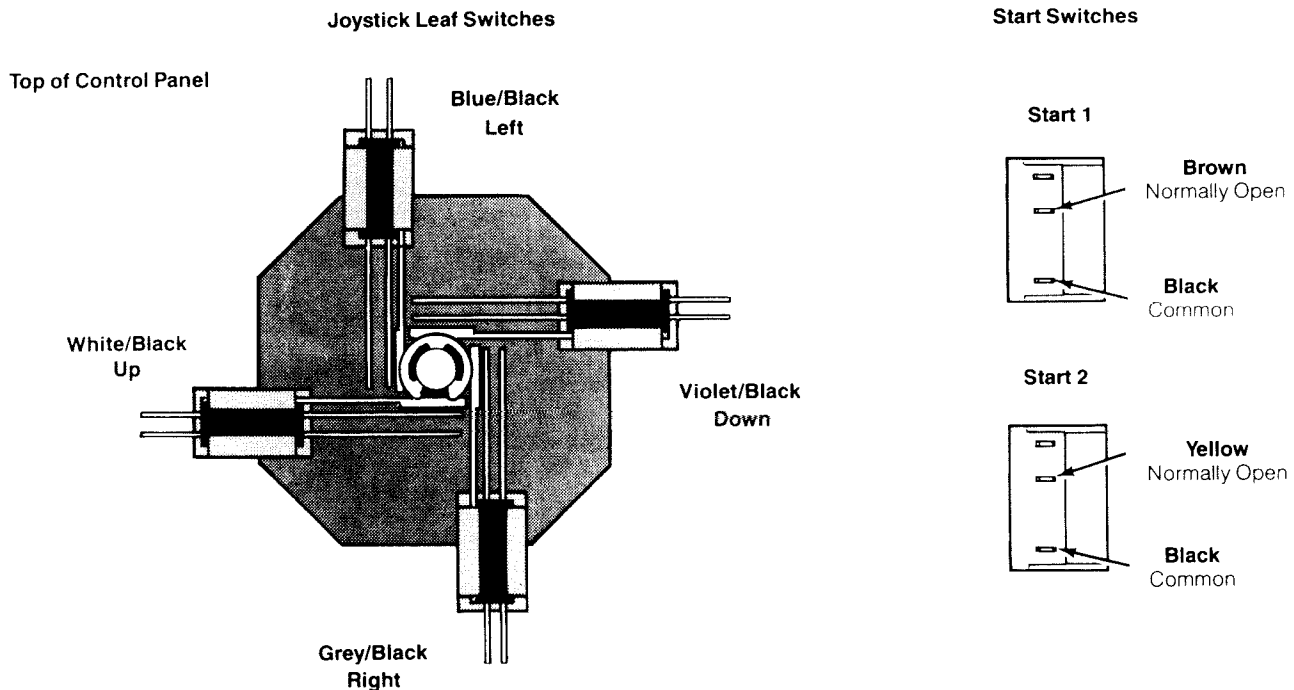


Figure 4-1 Wire Connections to Joystick Leaf and Start Switches

# Illustrated Parts Lists

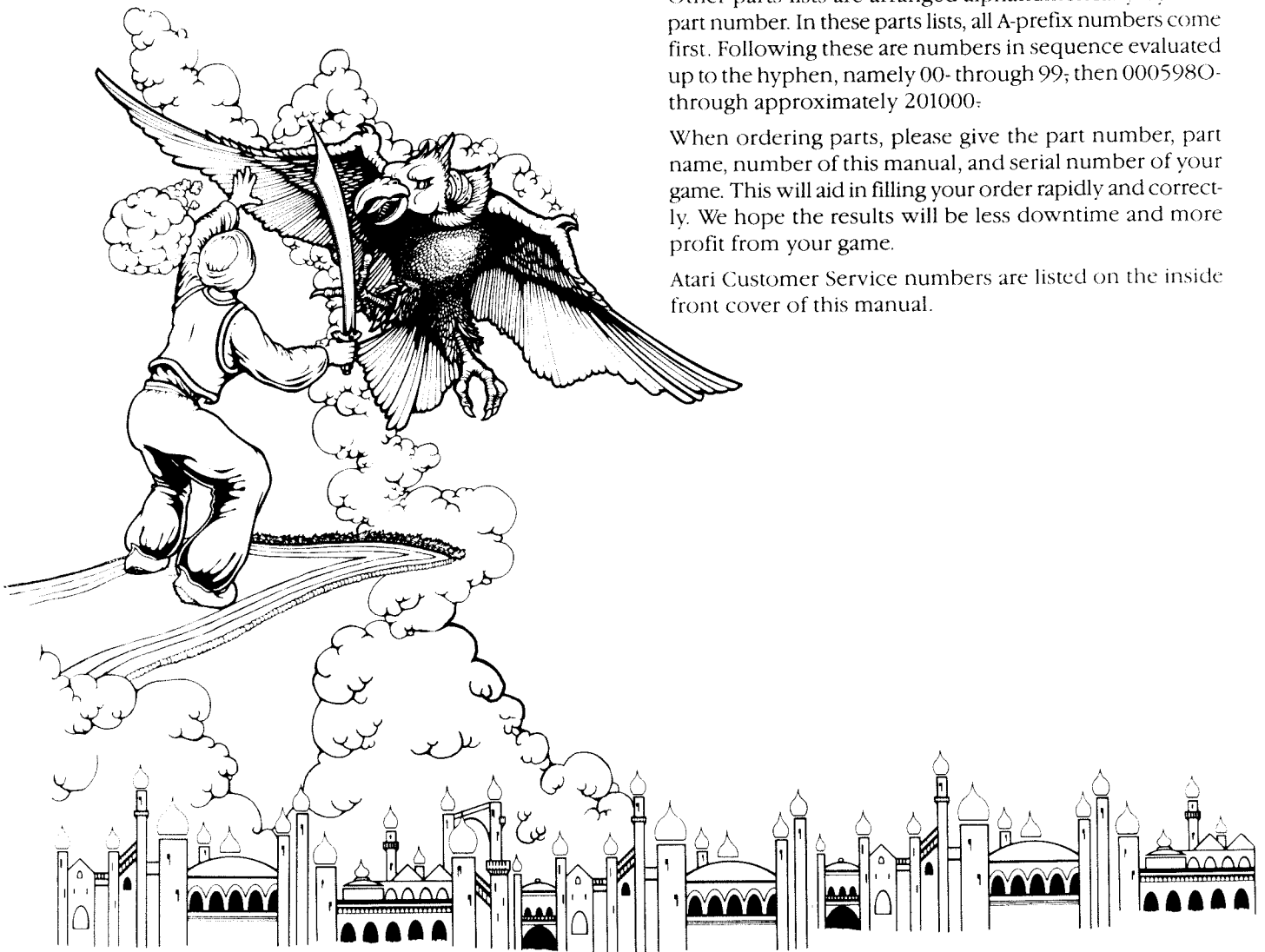
This chapter provides information you need to order parts for your game. Common hardware (screws, nuts, washers, etc.) has been deleted from most of the parts lists. However, there is a parts list for the hardware to mount the game PCB and Regulator/Audio II PCB to the cabinet.

The PCB parts lists are arranged in alphabetical order by component. Each component subsection is arranged alphanumerically by reference designator.

Other parts lists are arranged alphanumerically by Atari part number. In these parts lists, all A-prefix numbers come first. Following these are numbers in sequence evaluated up to the hyphen, namely 00- through 99; then 0005980- through approximately 201000-

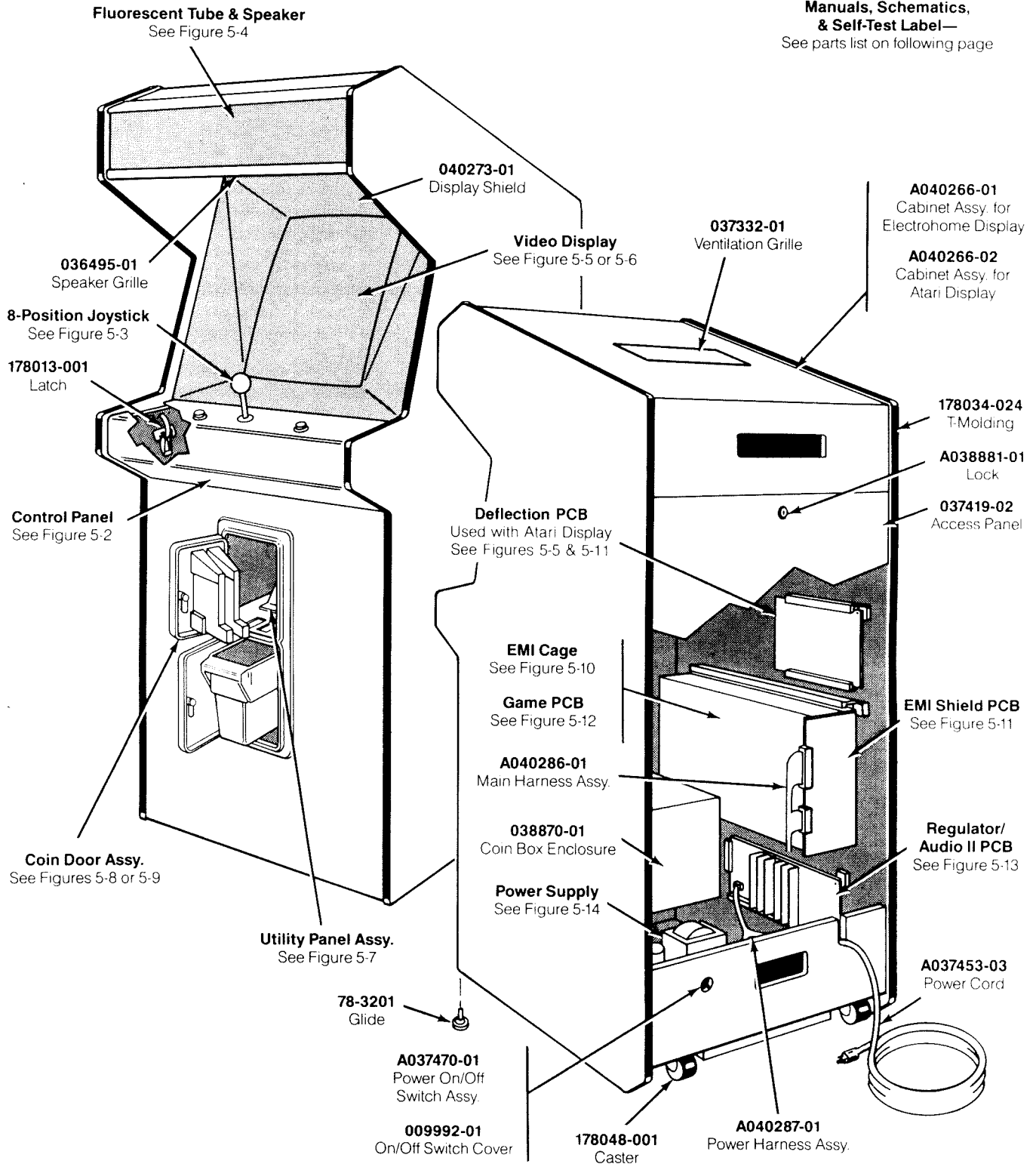
When ordering parts, please give the part number, part name, number of this manual, and serial number of your game. This will aid in filling your order rapidly and correctly. We hope the results will be less downtime and more profit from your game.

Atari Customer Service numbers are listed on the inside front cover of this manual.



## Chapter 5

**Manuals, Schematics,  
& Self-Test Label—**  
See parts list on following page

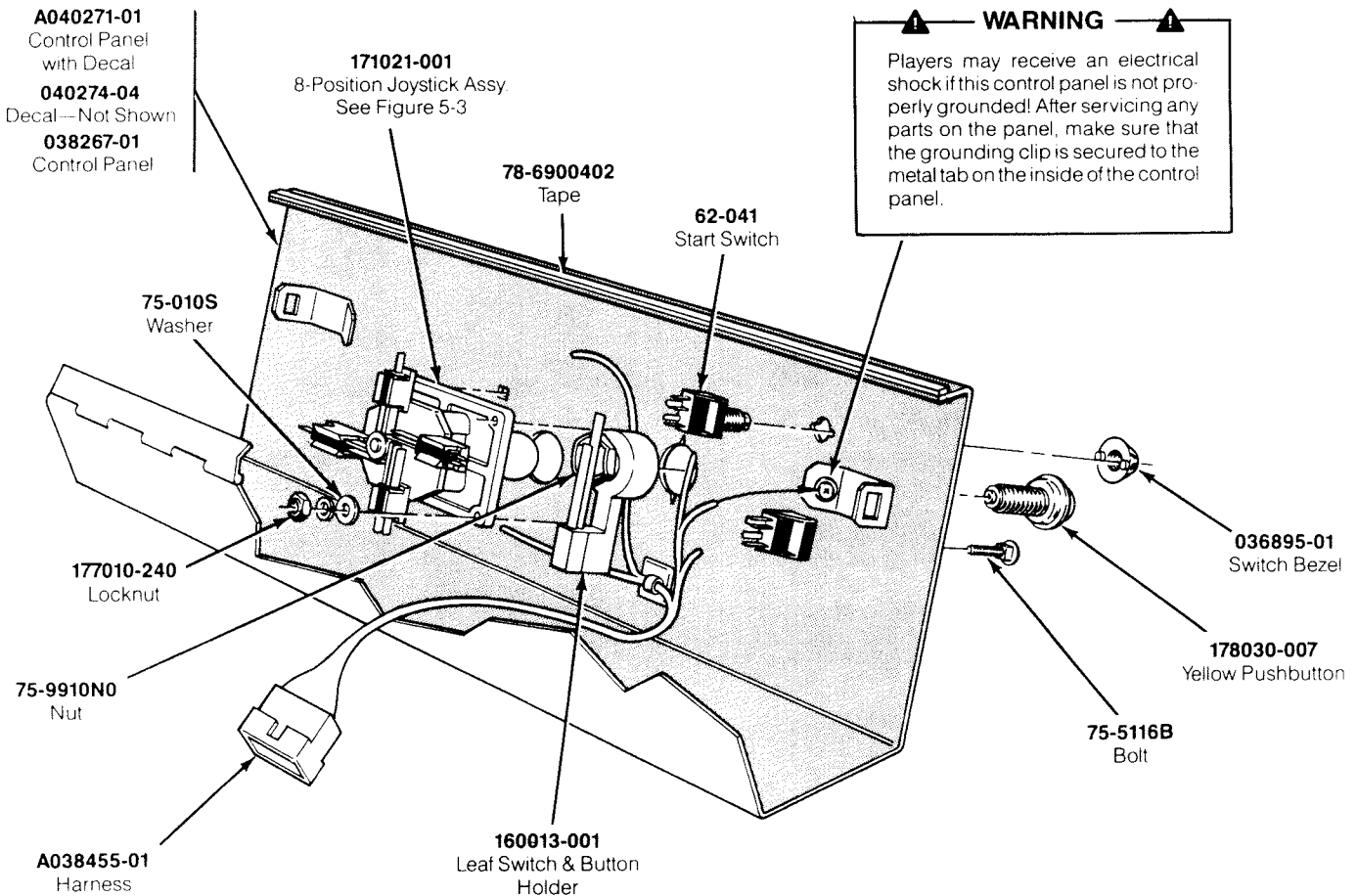


**Figure 5-1 Cabinet Mounted Assemblies**  
**A040265-01 C**



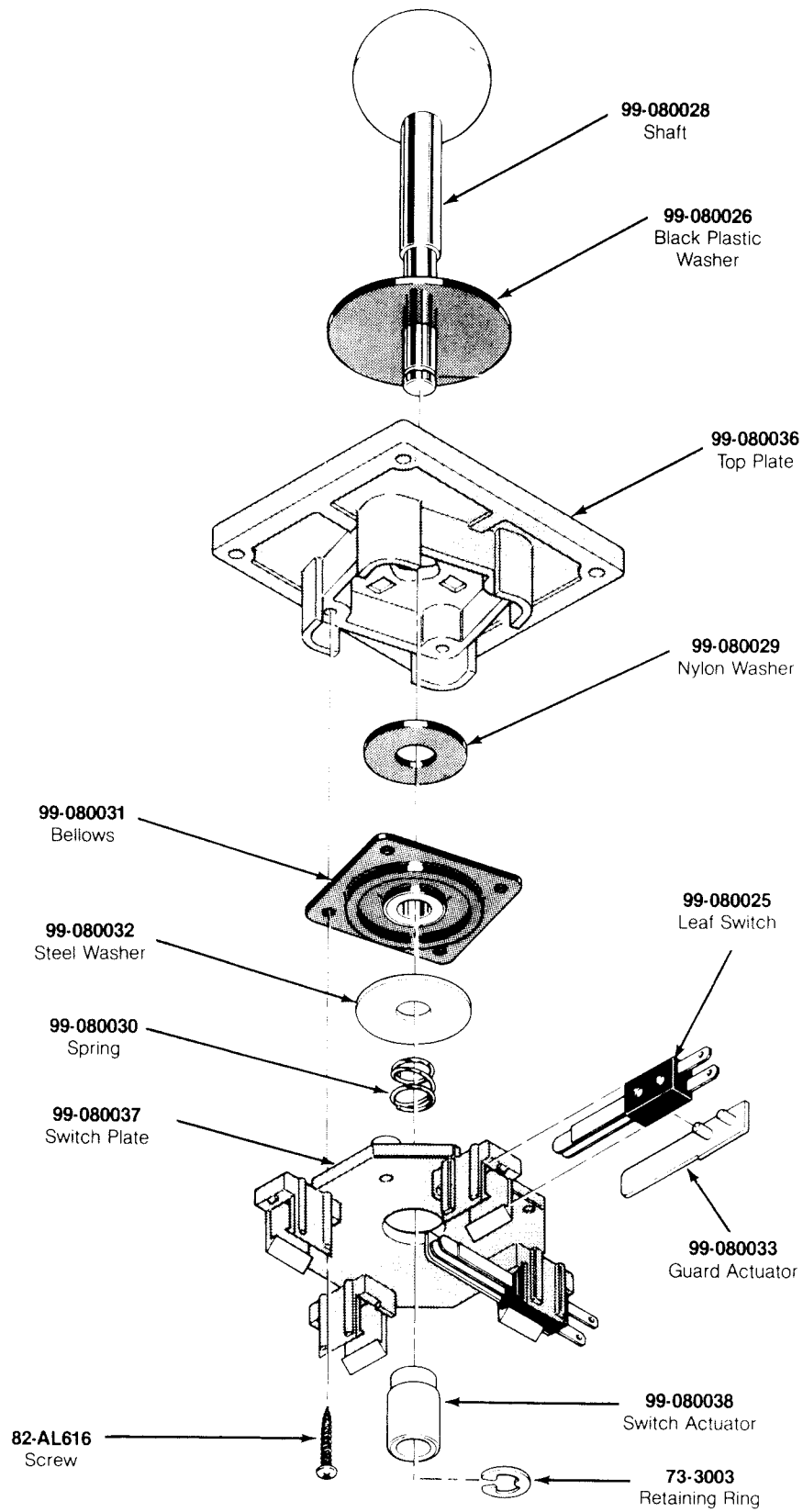
## Cabinet-Mounted Assemblies Parts List

| Part No.  | Description   |
|---|---|
| A037453-03  | Strain-Relief Power Cord (U.S. and Canada)  |
| A037470-01  | Power On/Off Switch and Mounting Plate Assembly   |
| A038881-01  | Lock Assembly (for rear access panel) Acceptable substitute is part no. A038881-03                          |
| A040266-01  | Cabinet Assembly for Electrohome Display (includes glides and PCB retainers, but not the rear access panel) |
| A040266-02  | Cabinet Assembly for Atari Display (includes glides and PCB retainers, but not the rear access panel)       |
| A040286-01  | Main Harness Assembly   |
| A040287-01  | Power Harness Assembly  |
| <i>The following five items are technical information supplements to this game:</i> |   |
| SP-237  | Arabian Schematic Package   |
| ST-237-01   | Arabian Label with Self-Test Procedure and Option Switch Settings   |
| TM-220  | Service Manual for 19-Inch Matsushita Color-Raster Display (use with part no. 139003-1004)                  |
| or  |   |
| TM-199  | Service Manual for 19-Inch Atari Color-Raster Display   |
| TM-237  | Arabian Operators Manual with Illustrated Parts List  |
| 78-3201   | Adjustable Glide  |
| 009992-01   | Power On/Off Switch Cover   |
| 036495-01   | Speaker Grille  |
| 037332-01   | Ventilation Grille  |
| 037419-02   | Rear Access Panel (does not include lock)   |
| 038091-01   | Molded Coin Box   |
| 038870-01   | Coin Box Enclosure  |
| 040273-01   | Video Display Shield with Graphics  |
| 178013-001  | Spring Draw Latch   |
| 178034-024  | 3/4-Inch Black Plastic T-Molding  |
| 178048-001  | 2-Inch Rigid Caster   |



**Figure 5-2 Control Panel Assembly  
 A040270-01 A  
 Parts List**

| Part No.   | Description   |
|------------|---|
| A038455-01 | Control Panel Harness Assembly  |
| A040271-01 | Control Panel with Decal  |
| 62-041     | SPDT Momentary Pushbutton Start Switch  |
| 75-010S    | #10 Flat Washer   |
| 75-5116B   | #10-24 Black Carriage Bolt  |
| 75-9910N0  | # $\frac{3}{8}$ × 11 Stamped Nut  |
| 78-6900402 | Vinyl Foam Single-Coated Adhesive Tape, ¼-Inch Wide × ¼-Inch Thick (24 inches required) |
| 036895-01  | Black Molded Switch Bezel   |
| 040274-04  | Control Panel Decal (not shown)   |
| 038267-01  | Control Panel   |
| 160013-001 | Leaf Switch and Button Holder (leaf switch only is part no. 160012-001)                 |
| 171021-001 | 8-Position Joystick Assembly  |
| 177010-240 | #10-24 Hex Locknut  |
| 178030-007 | Yellow Pushbutton Assembly  |
| 179125-001 | Grounding Terminal (not shown)  |



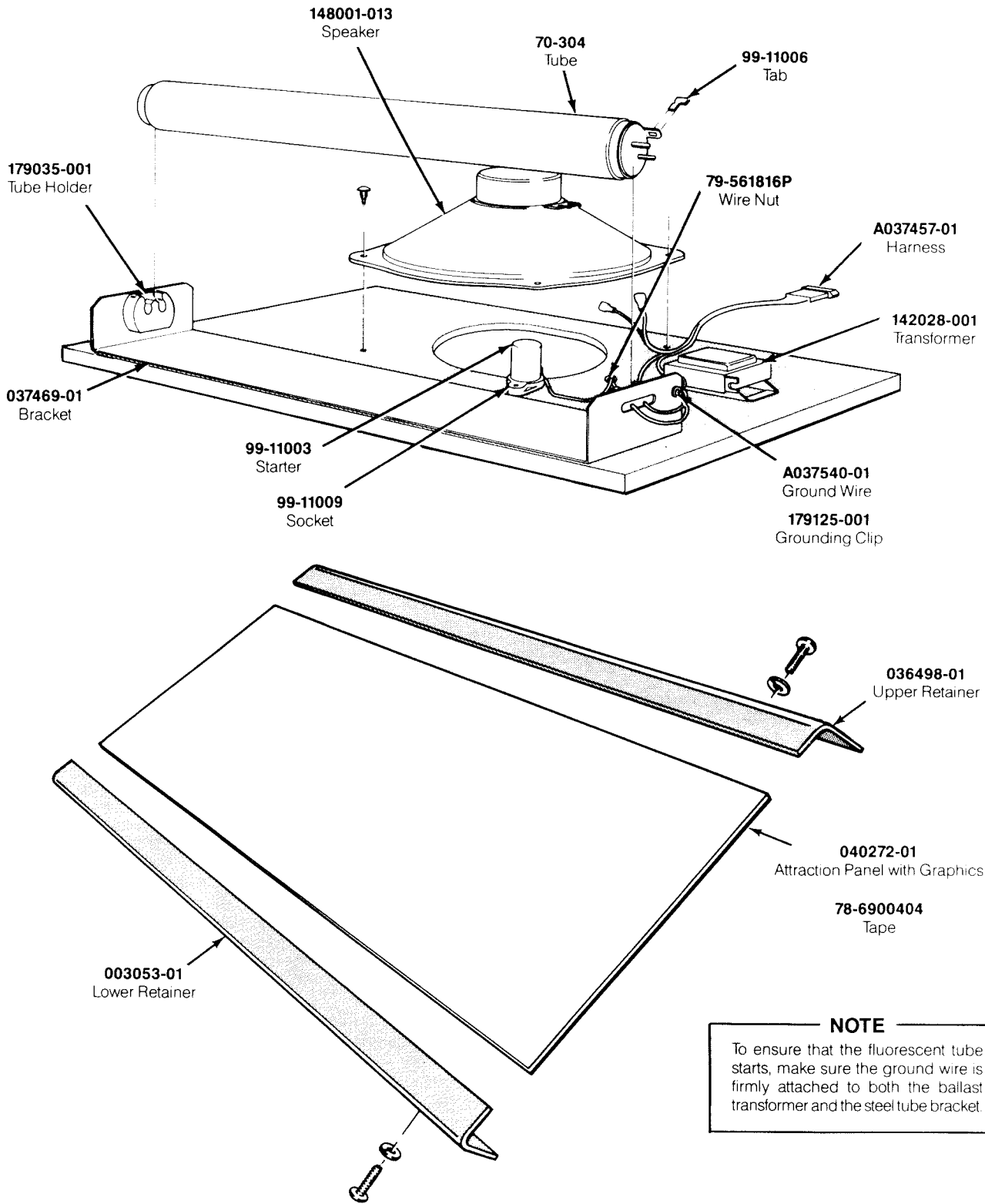
**Figure 5-3 8-Position Joystick Assembly  
171021-001**

## 8-Position Joystick Assembly Parts List

---

| Part No.  | Description  |
|-----------|--|
| 73-3003   | Retaining Ring   |
| 82-AL616  | #6 x 1-Inch Cross-Recessed Pan-Head Type BT Self-Tapping Steel Screw |
| 99-080025 | Leaf Switch  |
| 99-080026 | 2-Inch Black Plastic Washer  |
| 99-080028 | Metal Shaft  |
| 99-080029 | Nylon Washer   |
| 99-080030 | Spring   |
| 99-080031 | Bellows  |
| 99-080032 | Flat Steel Washer  |
| 99-080033 | Plastic Guard/Actuator   |
| 99-080036 | Top Plate  |
| 99-080037 | Switch Mounting Plate  |
| 99-080038 | Nylon Switch Actuator  |

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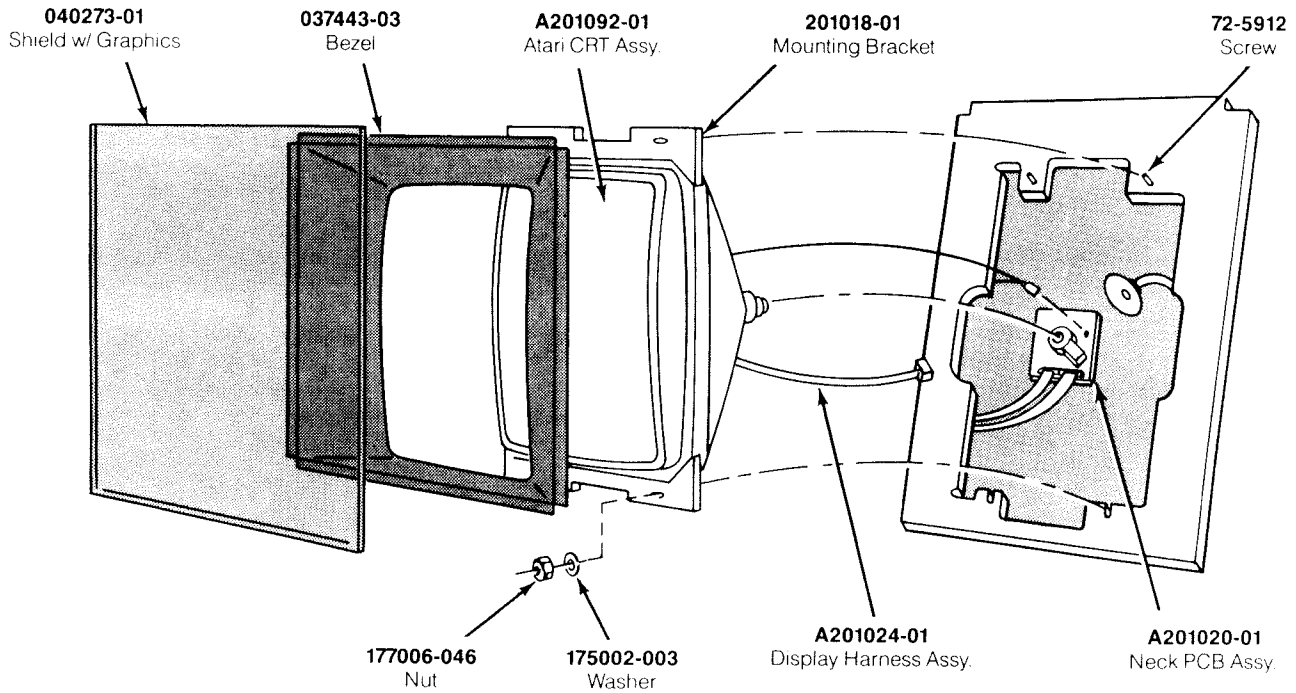
**NOTE**

To ensure that the fluorescent tube starts, make sure the ground wire is firmly attached to both the ballast transformer and the steel tube bracket.

**Figure 5-4 Fluorescent Tube and Speaker Assembly**  
**A039737-01 B**

## Fluorescent Tube and Speaker Assembly Parts List

| Part No.   | Description   |
|------------|---|
| A037457-01 | Tube and Speaker Harness Assembly   |
| A037540-01 | Ground Wire with Ring Lug   |
| 70-304     | 18-Inch, 15-Watt, Cool White Fluorescent Tube   |
| 78-6900404 | Vinyl Foam Single-Coated Adhesive Tape, ¼-Inch Wide × ¼-Inch Thick (48 inches required) |
| 79-561816P | Spring-Connector Wire Nut for 16- to 18-Gauge Wires                                     |
| 99-11003   | Fluorescent Tube Starter  |
| 99-11006   | Fluorescent Tube Locking Tab (consists of two pieces)                                   |
| 99-11009   | Starter Socket  |
| 003053-01  | Lower Attraction Panel Retainer   |
| 036498-01  | Upper Attraction Panel Retainer   |
| 037469-01  | Steel Tube Bracket  |
| 038151-01  | 15-Inch Jumper Wire   |
| 040272-01  | Attraction Panel with Graphics  |
| 142028-001 | 60 Hz, 118 V, Ballast Transformer (used on A038161-01 assembly)                         |
| 148001-013 | 6 × 9-Inch Oval, 4 Ω, 6-Ounce, Shielded High-Fidelity Speaker                           |
| 179035-001 | 2-Pin Fluorescent Tube Holder   |
| 179125-001 | Grounding Clip (Acceptable substitute is part no. 179074-010)                           |



**Figure 5-5 Atari Video Display Assembly  
A039650-01 A  
Parts List**

| Part No.    | Description   |
|-------------|---|
| A200001-01* | 19-Inch Atari Color Raster-Scan Cathode-Ray Tube (CRT) Assembly—includes: |
| A201092-01* | CRT Assembly  |
| A201022-01* | Deflection PCB Assembly (not shown)                                       |
| A201024-01  | Color Raster Harness Assembly   |
| A201020-01* | Neck PCB Assembly   |
| 72-5912     | 5/16-18 x 3/4-Inch Hex-Head Screw   |
| 034536-01   | Foam Pad (between Deflection PCB and cabinet wall—not shown)              |
| 037443-03   | Display Bezel   |
| 040273-01   | Display Shield with Graphics  |
| 175002-003  | 1-Inch Flat Washer  |
| 177006-046  | 5/16-18 Caged Nut   |
| 201018-01   | Mounting Bracket  |

\*See the Atari 19-Inch Color Raster Display Manual (TM-199) for complete parts information.

**WARNING**

**Shock Hazard**

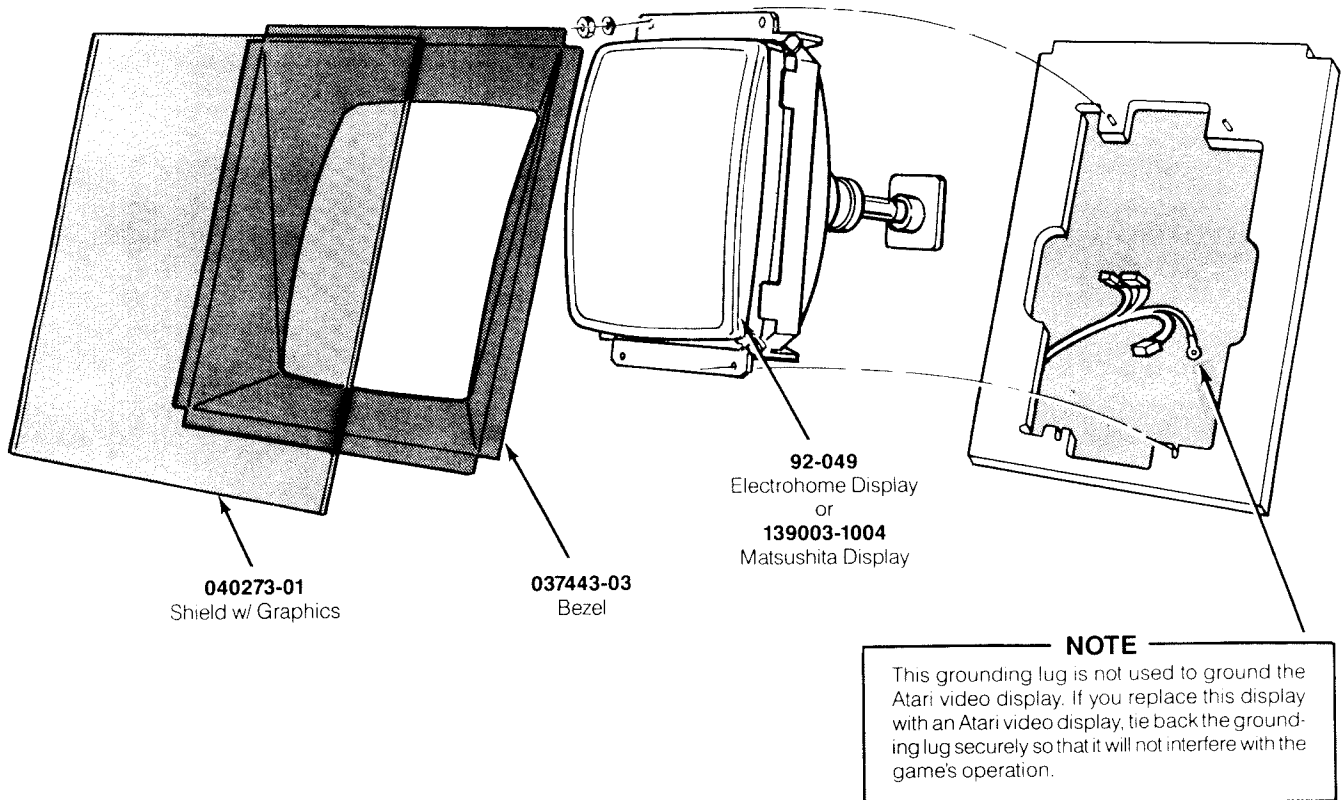
Display repair should only be performed by a qualified service technician. Before removing or repairing the video display, **unplug the game.**

High voltages may exist in any video display, even with power disconnected. Use extreme caution and do not touch electrical parts of the display yoke area with your hands!

**Discharge the high-voltage** from the cathode ray tube as follows: Attach one end of a large, well-insulated, 20-kV jumper to ground. Momentarily touch the free end of the grounded jumper to the anode by sliding it under the anode cap. Wait two minutes and discharge the anode again.

**Implosion Hazard**

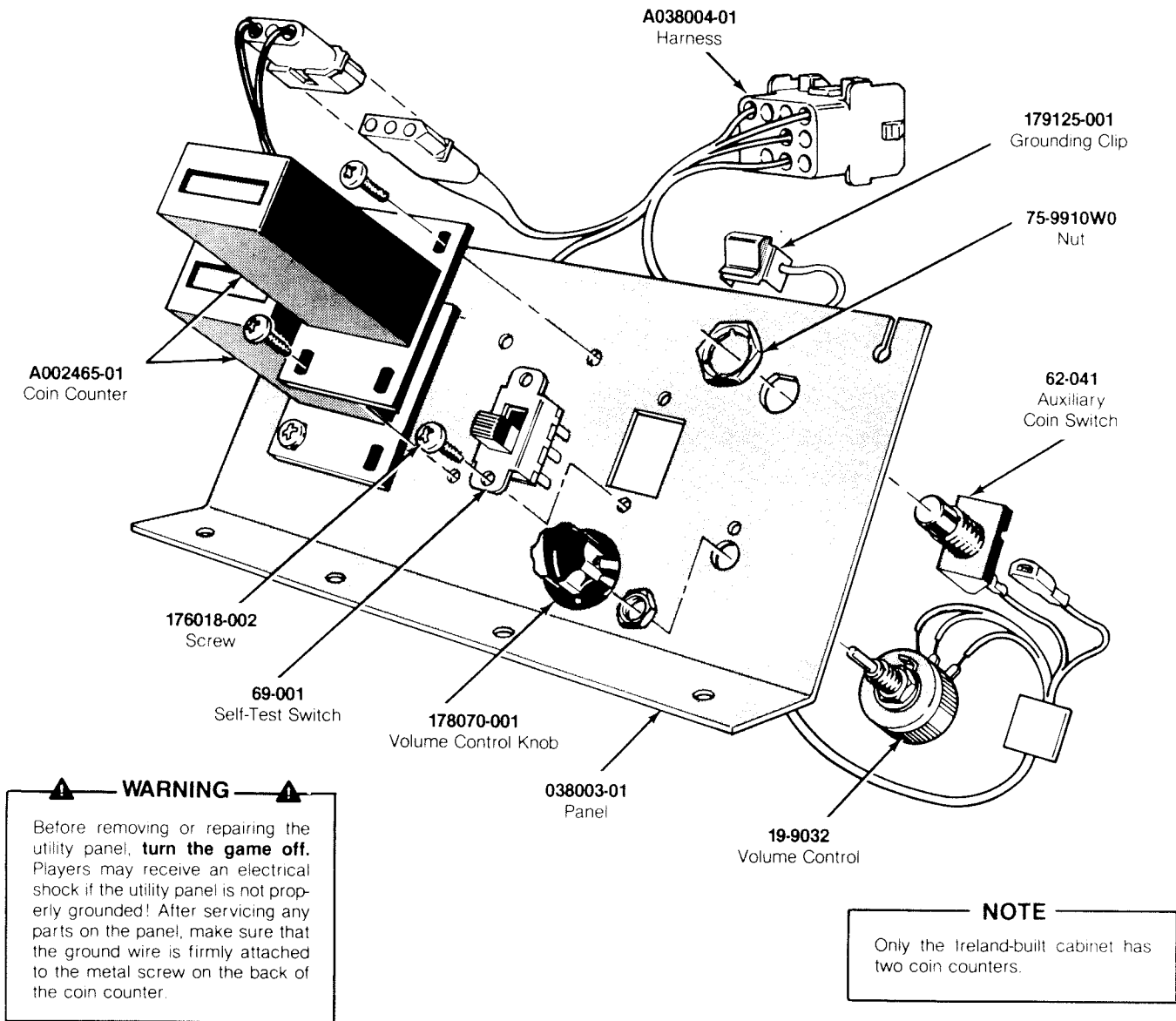
If you drop the display and the picture tube breaks, it may implode! Shattered glass can fly six feet or more from the implosion. Use care when replacing any display.



**Figure 5-6 Electrohome Video Display  
Parts List**

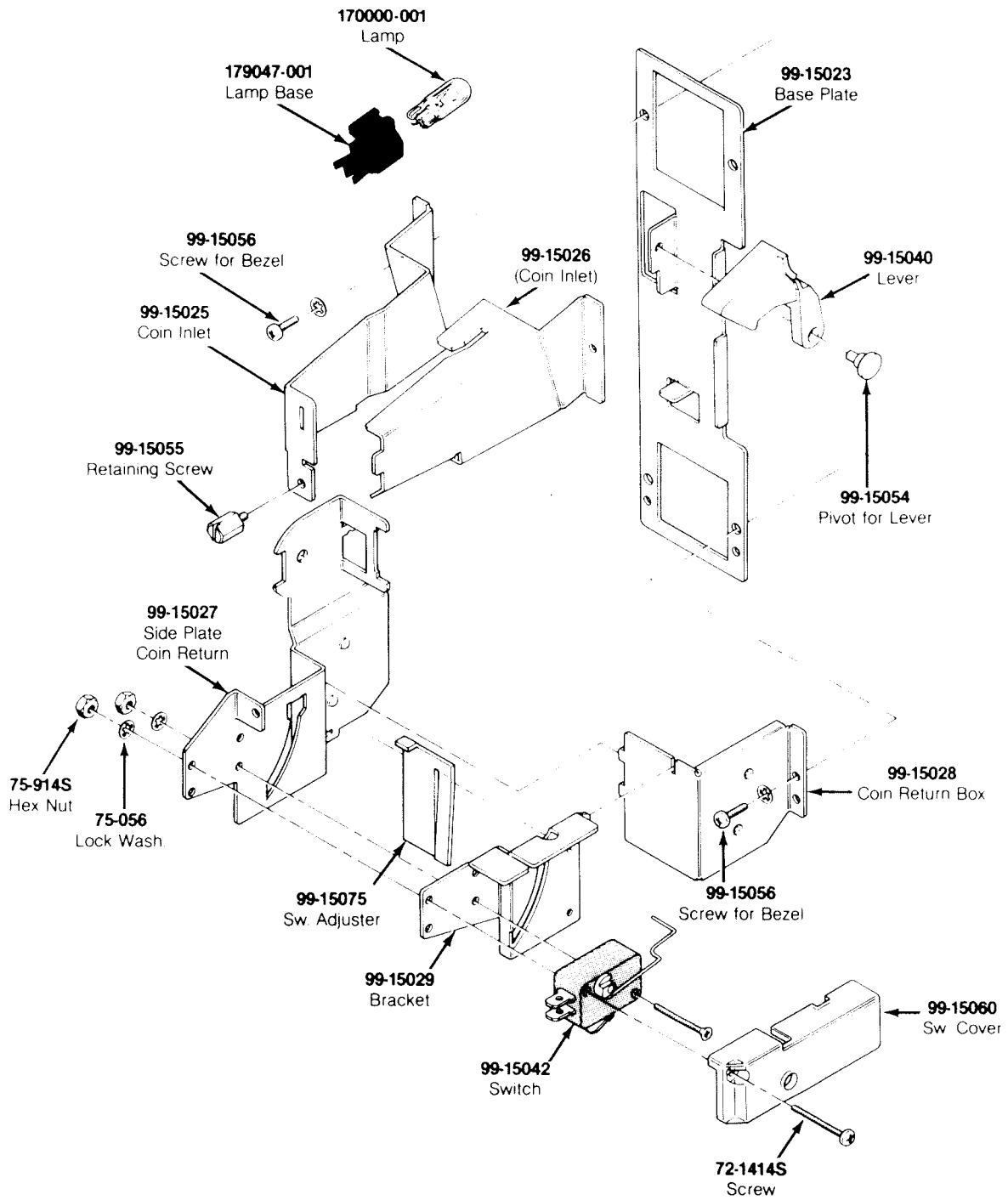
| <i>Part No.</i> | <i>Description</i>  |
|-----------------|---|
| 78-6900-102     | Vinyl Foam Single-Coated Adhesive Tape, 1/4-Inch Wide × 1/8-Inch Thick (24 inches required between the display shield and the control panel, not shown) |
| 92-049          | 19-Inch Electrohome Color Raster-Scan Display (Acceptable substitute is part no. 139003-1004—19-Inch Matsushita Color Raster-Scan Display)              |
| 037443-03       | Display Bezel   |
| 040273-01       | Display Shield with Graphics  |



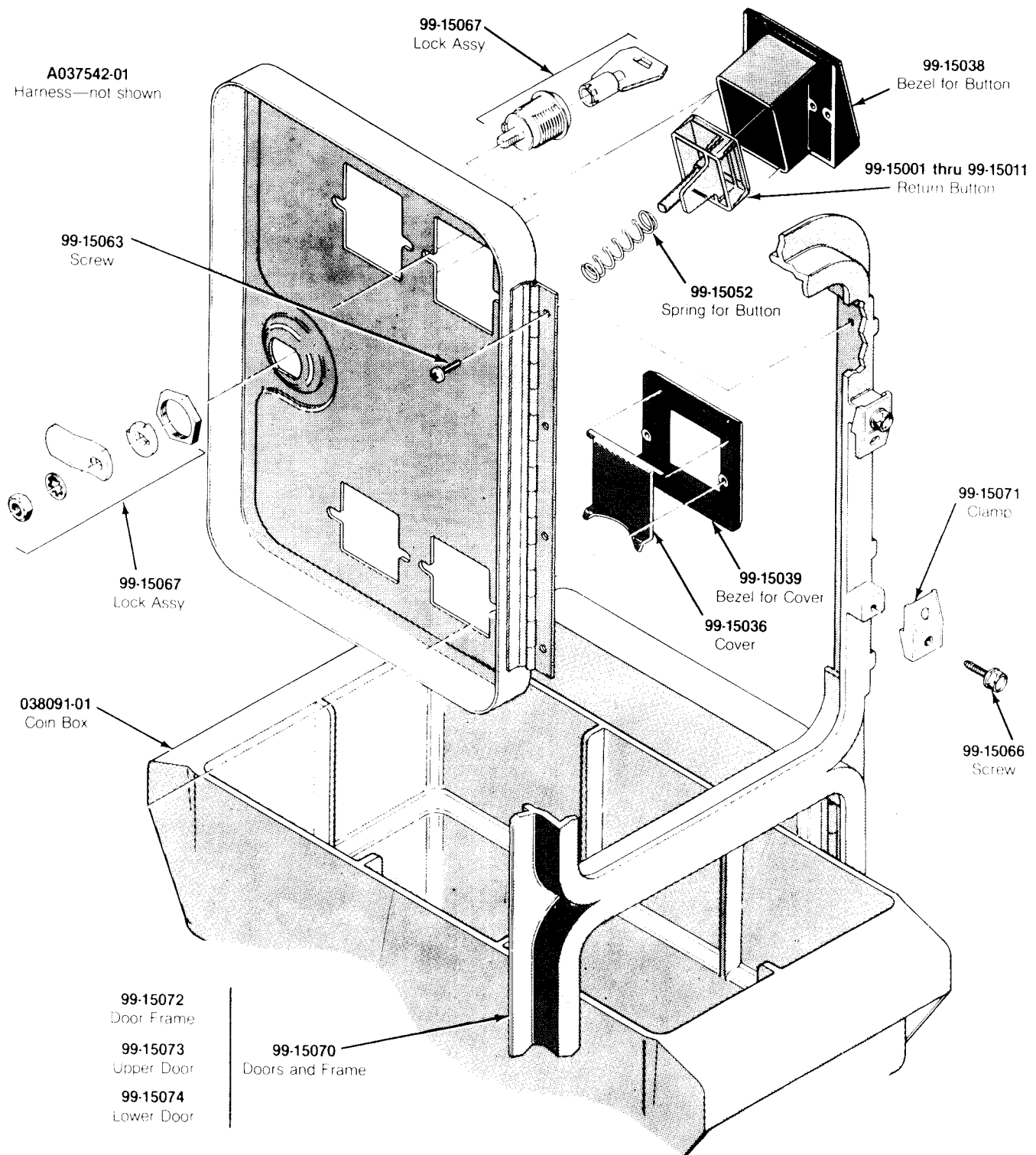


**Figure 5-7 Utility Panel Assembly  
A038002-01 H  
Parts List**

| Part No.   | Description  |
|------------|--|
| A002465-01 | 6 V Coin Counter   |
| A038004-01 | Utility Panel Harness  |
| 19-9032    | Volume Control   |
| 62-041     | SPDT Momentary-Contact Pushbutton Auxiliary Coin Switch with Black Cap |
| 69-001     | DPDT Self-Test Switch  |
| 038003-01  | Utility Panel  |
| 176018-002 | #6-32 x 1/2-Inch Machine Screw   |
| 178070-001 | Volume Control Knob  |
| 75-9910W0  | 1/4"-32 Stamped Nut  |
| 179125-001 | Grounding Clip   |



**Figure 5-8 Vertically Mounted Coin Door  
171034-xxx A**



171034-001 — U.S. 25¢/25¢ Coin Door  
 171034-003 — Canadian 25¢/25¢ Coin Door  
 171034-005 — U.K. 10 P/50 P Coin Door

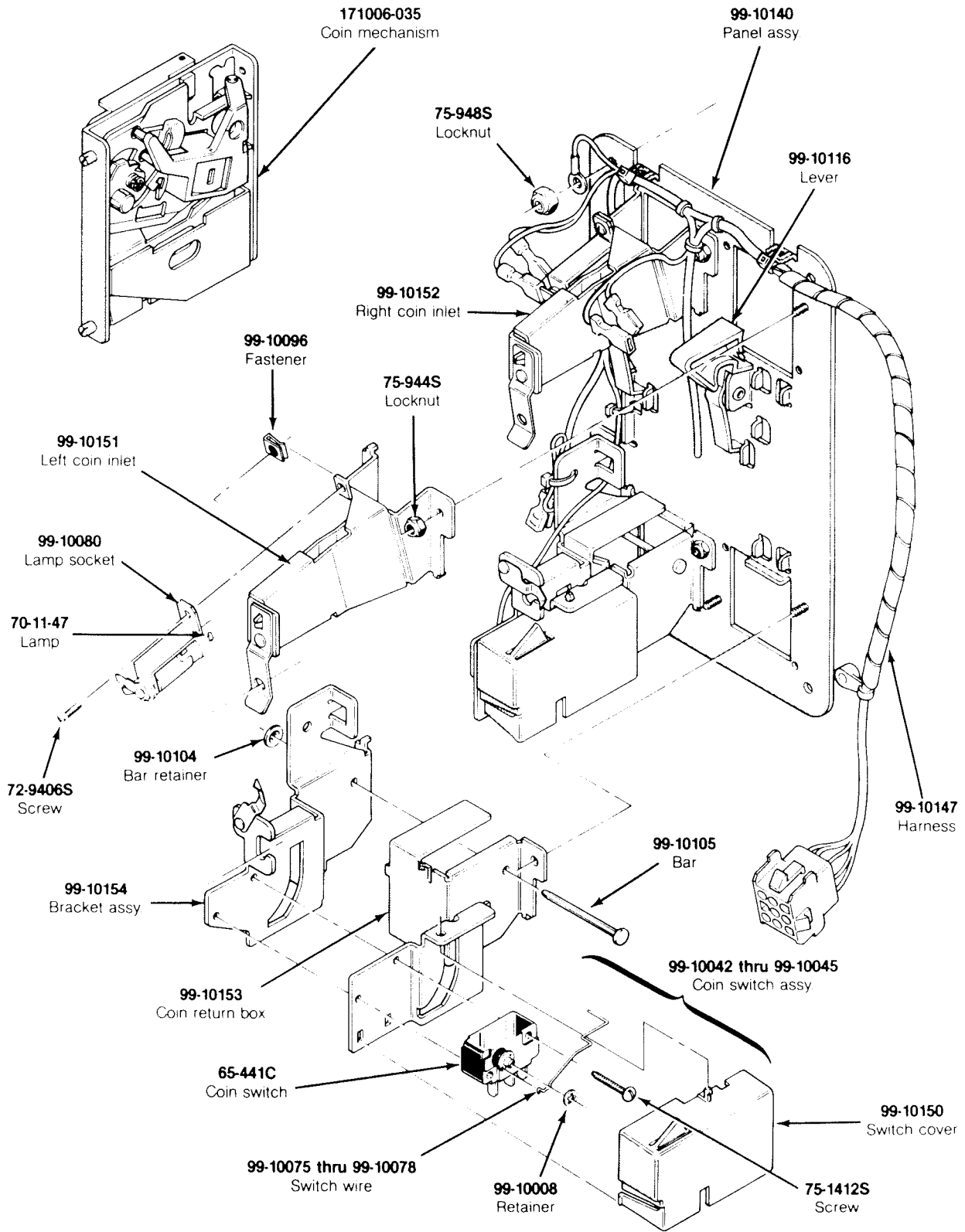
171034-006 — U.K. 20 P/50 P Coin Door  
 171034-009 — German 2 DM/1 DM Coin Door  
 171034-010 — German 2 DM/5 DM Coin Door

171034-011 — German 1 DM/5 DM Coin Door  
 171034-015 — French 2 Fr/1 Fr Coin Door

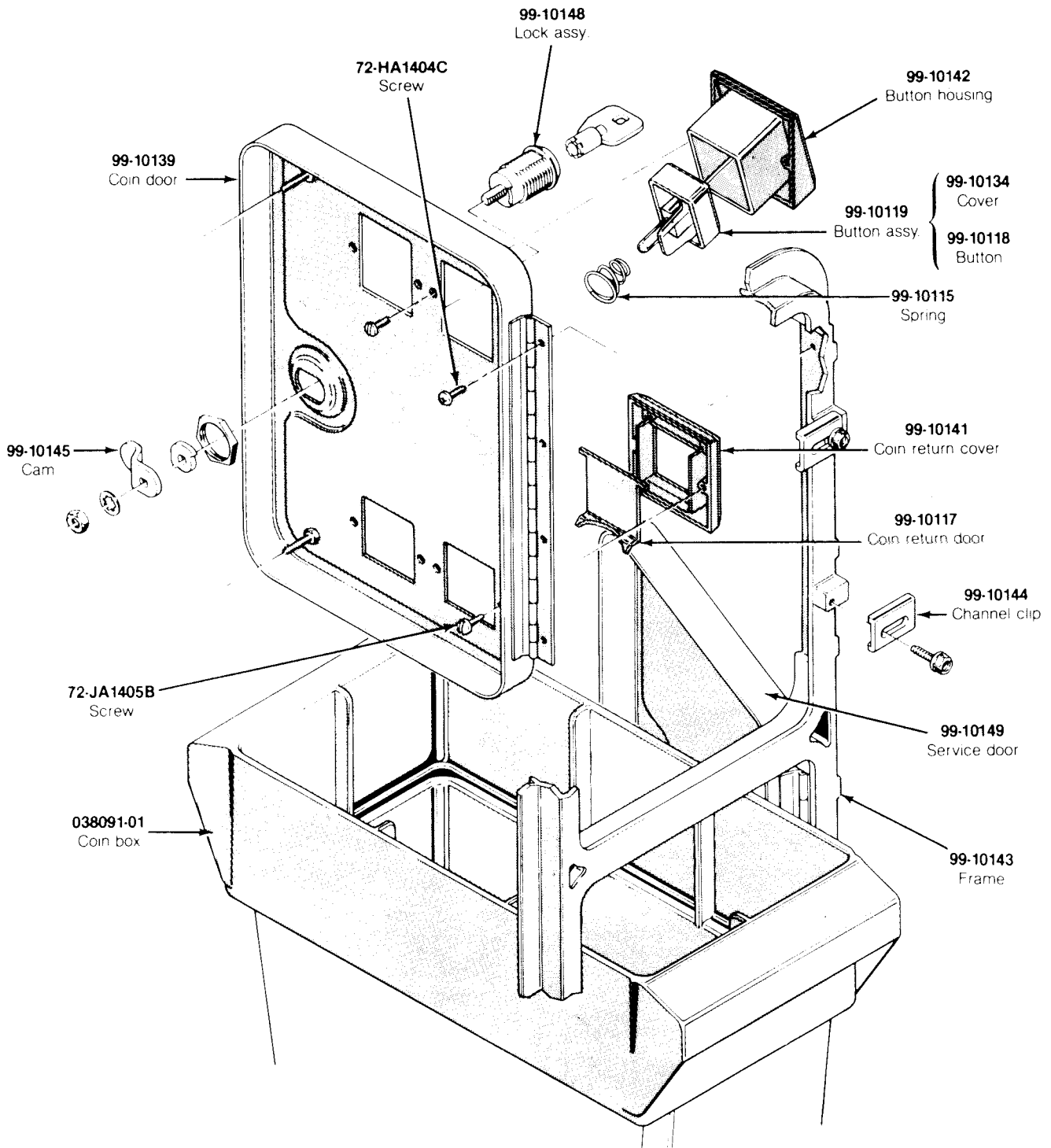
**Figure 5-8 Vertically Mounted Coin Door, continued**  
**171034-xxx A**

## Vertically Mounted Coin Door Parts List

| Part No.   | Description   |
|------------|---|
| A037542-01 | Harness Assembly  |
| 72-14148   | #4-40 × 7/8-Inch Cross-Recessed Pan-Head Steel Machine Screw                        |
| 75-056     | #6 Internal-Tooth Zinc-Plated Steel Lock Washer                                     |
| 75-9148    | #4-40 Steel Machine Hex Nut   |
| 75-34148   | #4-40 × 7/8-Inch 82° Cross-Recessed Flat-Head Steel Machine Screw                   |
| 99-15001   | Coin Return Button with U.S. 25¢ Price Plate  |
| 99-15002   | Coin Return Button with U.S. \$1 Price Plate  |
| 99-15003   | Coin Return Button with German 1 DM Price Plate                                     |
| 99-15004   | Coin Return Button with German 2 DM Price Plate                                     |
| 99-15005   | Coin Return Button with German 5 DM Price Plate                                     |
| 99-15006   | Coin Return Button with Belgian 5 Fr Price Plate                                    |
| 99-15007   | Coin Return Button with French 1 Fr Price Plate                                     |
| 99-15008   | Coin Return Button with Japanese 100 Yen Price Plate                                |
| 99-15009   | Coin Return Button with British 10 Pence Price Plate                                |
| 99-15010   | Coin Return Button with Australian 20¢ Price Plate                                  |
| 99-15011   | Coin Return Button with Italian 100 Lire Price Plate                                |
| 99-15023   | Base Plate  |
| 99-15025   | Left Half of Coin Inlet   |
| 99-15026   | Right Half of Coin Inlet  |
| 99-15027   | Side Plate of Coin Return Box   |
| 99-15028   | Base Plate of Coin Return Box   |
| 99-15029   | Switch Bracket  |
| 99-15036   | Metal Coin Return Cover   |
| 99-15038   | Bezel for Coin Return Button  |
| 99-15039   | Metal Bezel for Coin Return Cover   |
| 99-15040   | Coin Return Lever   |
| 99-15042   | Coin Switch for U.S. 25¢  |
| 99-15052   | Spring for Coin Return Button   |
| 99-15054   | Pivot for Coin Return Lever   |
| 99-15055   | Retaining Screw   |
| 99-15056   | #4-40 × 5/16-Inch Cross-Recessed Pan-Head Steel Machine Screw                       |
| 99-15060   | Switch Cover  |
| 99-15063   | Screw for Hinge   |
| 99-15066   | Screw for Clamp   |
| 99-15067   | Lock Assembly   |
| 99-15070   | Doors and Frame   |
| 99-15071   | Clamp for Frame   |
| 99-15072   | Door Frame  |
| 99-15073   | Upper Door  |
| 99-15074   | Lower Door  |
| 99-15075   | Switch Adjuster   |
| 038091-01  | Coin Box (Not included in assembly—Acceptable substitute is part number A037491-01) |
| 170000-001 | 6.3 V Miniature Wedge-Base Incandescent Lamp  |
| 171006-035 | Metal Coin Mechanism  |
| 179047-001 | Lamp Base   |



**Figure 5-9 American-Made Coin-Door Assembly  
171027-001 A**

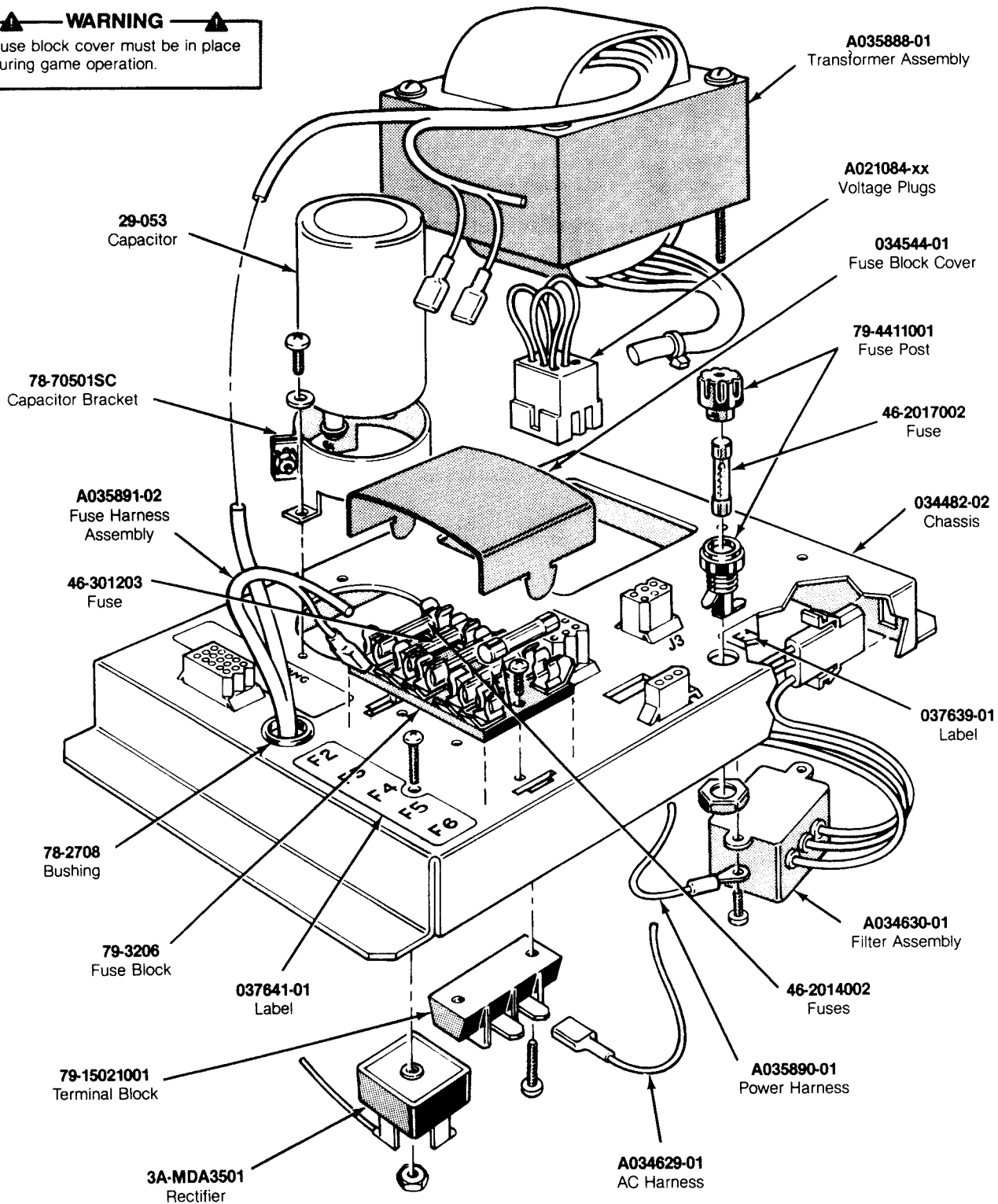


**Figure 5-9 American-Made Coin-Door Assembly, continued**  
**171027-001 A**

## American-Made Coin-Door Assembly Parts List

| Part No.    | Description  |
|-------------|--|
| 17-1006-035 | Metal Coin Mechanism for U.S. \$.25                                  |
| 65-441C     | Coin Switch  |
| 70-11-47    | Miniature Bayonet Lamp   |
| 72-9406S    | #4-40 x 3/8-Inch Truss-Head Screw                                    |
| 72-HA1404C  | #4-40 x 1/4-Inch Pan-Head Screw                                      |
| 72-JA1405B  | #4-40 x .31-Inch Pan-Head Screw                                      |
| 75-1412S    | #4-40 x 3/4-Inch Pan-Head Screw                                      |
| 75-944S     | #4-40 Locknut  |
| 99-10008    | Retainer   |
| 99-10042    | Coin Switch Assembly for Belgian 5 Fr and U.S. \$.25                 |
| 99-10043    | Coin Switch Assembly for German 1 DM, Japanese 100 Yen, Swiss 1 Fr   |
| 99-10044    | Coin Switch Assembly for German 2 DM, Italian 100 L, U.S. \$1.00     |
| 99-10045    | Coin Switch Assembly for Australian \$.20, German 5 DM, British 10 P |
| 99-10068    | Coin Return Chute  |
| 99-10075    | Switch wire (included in coin switch assembly)                       |
| 99-10076    | Switch wire (included in coin switch assembly)                       |
| 99-10077    | Switch wire (included in coin switch assembly)                       |
| 99-10078    | Switch wire (included in coin switch assembly)                       |
| 99-10080    | Lamp socket  |
| 99-10081    | Key holder   |
| 99-10096    | Fastener   |
| 99-10104    | Bar retainer   |
| 99-10105    | Bar  |
| 99-10115    | Spring   |
| 99-10116    | Plastic Coin Return Lever  |
| 99-10117    | Steel Coin Return Door   |
| 99-10118    | Amber Coin Return Button   |
| 99-10119    | Amber Coin Button for U.S. \$.25                                     |
| 99-10134    | Coin Button Cover  |
| 99-10139    | Coin Door  |
| 99-10140    | Coin Door Inner-Panel Assembly                                       |
| 99-10141    | Diecast Coin Return Cover  |
| 99-10142    | Diecast Button Housing   |
| 99-10143    | Coin Door Frame  |
| 99-10144    | Coin Door Channel Clip   |
| 99-10145    | Offset Cam   |
| 99-10146    | Coin Inlet Chute Assembly  |
| 99-10147    | American-Made Coin Door Harness                                      |
| 99-10148    | Lock Assembly  |
| 99-10149    | Service Door   |
| 99-10150    | Switch Cover   |
| 99-10151    | Left Coin Inlet  |
| 99-10152    | Right Coin Inlet   |
| 99-10153    | Coin Return Box  |
| 99-10154    | Bracket Assembly   |

**WARNING**  
 Fuse block cover must be in place during game operation.



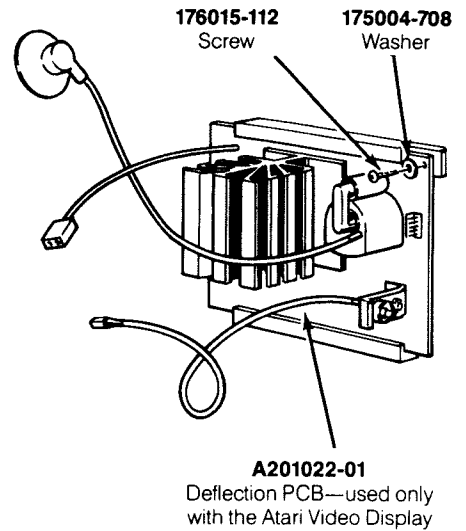
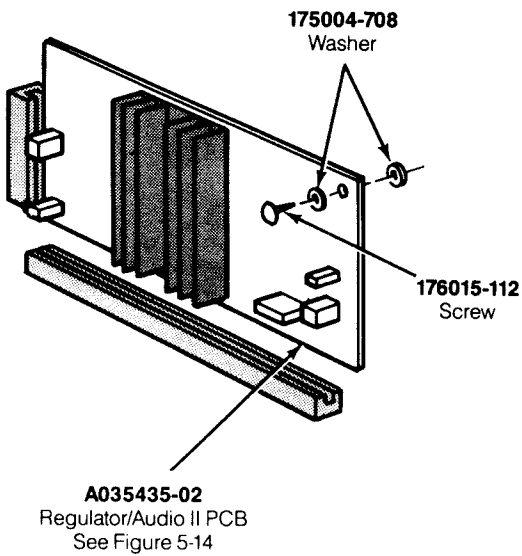
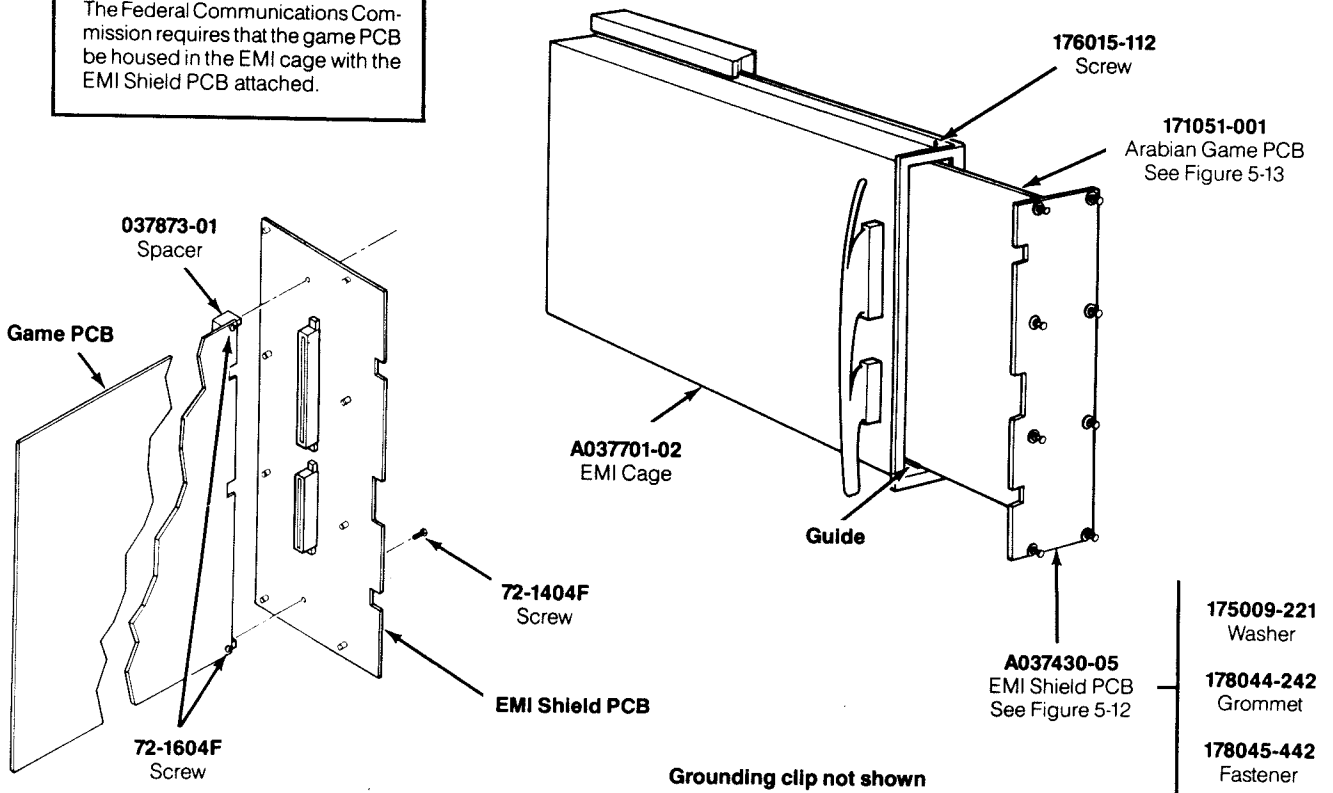
**Figure 5-10 Power Supply Assembly  
 A037671-01 H**



## Power Supply Assembly Parts List

| Designator | Description   | Part No.    |
|------------|---|-------------|
| C1         | 27,000 $\mu$ F, 15 VDC Electrolytic Capacitor   | 29-053      |
| C1         | 2-Inch Diameter Capacitor Mounting Bracket  | 78-70501SC  |
| CR1        | Type-MDA 3501 Bridge Rectifier  | 3A-MDA3501  |
| F1         | Panel-Mounting Non-Indicating 3AG Cartridge-Type Fuse Post  | 79-4411001  |
| F1         | 7 A, 250 V, 3AG Slow-Blow Glass Cartridge-Type Fuse   | 46-2017002  |
| F1         | Label for Fuse Value  | 037639-01   |
| F2         | 4 A, 250 V, 3AG Slow-Blow Glass Cartridge-Type Fuse   | 46-2014002  |
| F2-F6      | 5-Position 3AG Fuse Block with $\frac{1}{4}$ -Inch Quick-Disconnect Terminals   | 79-3206     |
| F2-F6      | Fuse Harness Assembly   | A035891-02  |
| F2-F6      | Fuse Block Cover  | 034544-01   |
| F2-F6      | Label for Fuse Values   | 037641-01   |
| F3         | 20 A, 32 V, 3AG Slow-Blow Glass Cartridge-Type Fuse   | 46-301203   |
| F4         | 2-Circuit Single-Row Terminal Block (located under <b>F4</b> )  | 79-15021001 |
| F4-F6      | 4 A, 250 V, 3AG Slow-Blow Glass Cartridge-Type Fuse   | 46-2014002  |
| FL1        | RFI Filter Assembly (designation not marked)  | A034630-01  |
| J2         | Power Harness Assembly  | A035890-01  |
| J3         | Voltage Plug for 120 V (105-135 VAC) (yellow wire color—plugs into <b>J3</b> )  | A021084-02  |
| J4A        | AC Harness Assembly   | A034629-01  |
| T1         | Transformer Assembly (designation covered) (Acceptable substitute is part no. A035888-02)   | A035888-01  |
|            | Nylon Type 6/6 Hole Bushing with $\frac{5}{8}$ -Inch Inside Diameter $\times$ $\frac{5}{8}$ -Inch Outside Diameter $\times$ $\frac{1}{4}$ -Inch Thick | 78-2708     |
|            | Power Supply Chassis Base   | 034482-02   |
|            | Metal Base Plate (not shown in illustration)  | 037243-01   |

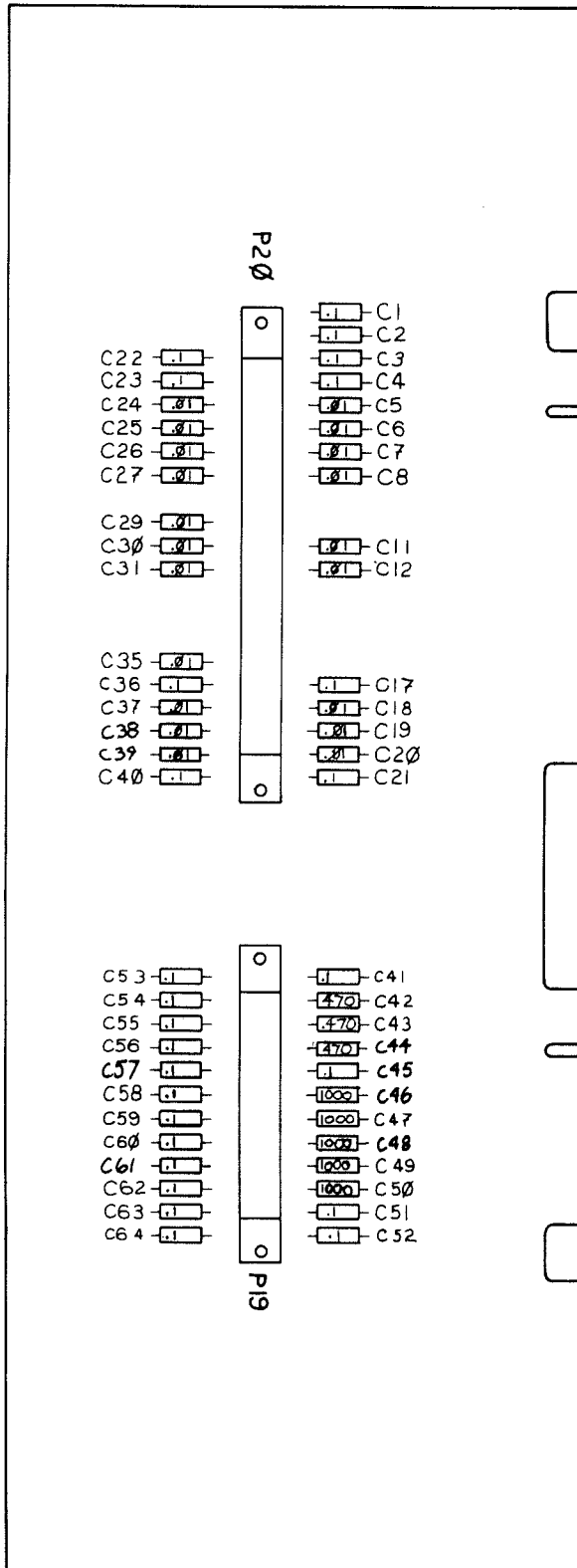
**NOTE**  
 The Federal Communications Commission requires that the game PCB be housed in the EMI cage with the EMI Shield PCB attached.



**Figure 5-11 Electromagnetic Interference (EMI) Cage Assemblies and PCB Mounting Hardware**

## EMI Cage Assemblies and PCB Mounting Hardware Parts List

| Part No.   | Description   |
|------------|---|
| A201022-01 | Deflection PCB—used only with the Atari Video Display                 |
| A035435-02 | Regulator/Audio II PCB (Acceptable substitute is part no. A035435-06) |
| A037701-02 | EMI Cage (includes guide)   |
| A037430-05 | EMI Shield PCB—includes:  |
| 72-1404F   | #4-40 x ¼-Inch Cross-Recessed Steel Screw                             |
| 037873-01  | Spacer  |
| 175009-221 | Plastic Washer  |
| 178044-242 | Grommet   |
| 178045-442 | Snap-In Fastener  |
| 72-1604F   | #6-32 x ¼-Inch Cross-Recessed Pan-Head Steel Screw                    |
| 171051-001 | Arabian Game PCB  |
| 175004-708 | #8 Flat Fiber Washer  |
| 176015-112 | #10 x ¾-Inch Cross-Recessed Pan-Head Screw                            |



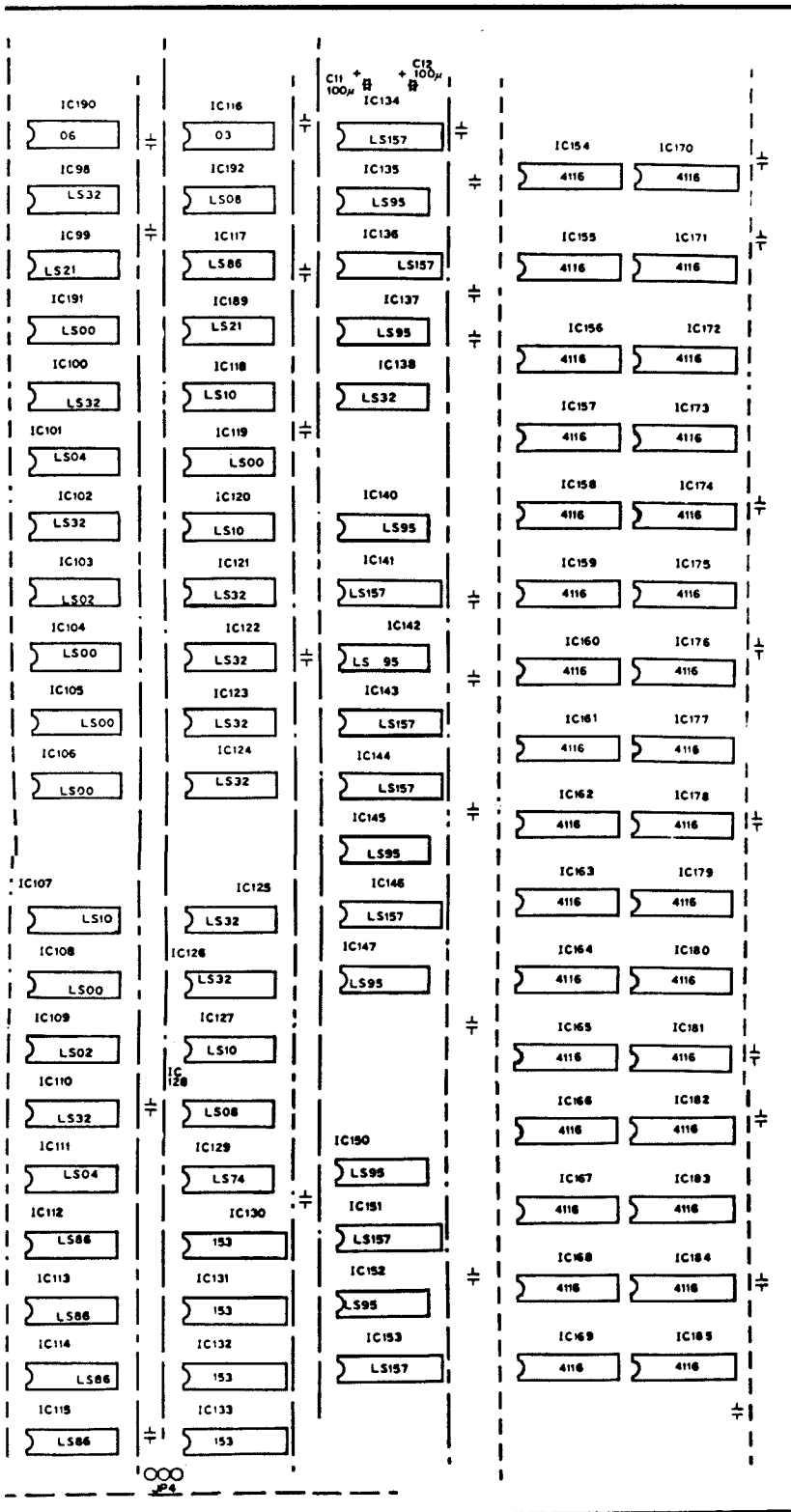
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**Figure 5-12 EMI Shield PCB Assembly**  
**A037430-05 A**

## Electromagnetic Interference Shield PCB Parts List

| Designator           | Description  | Part No.   |
|----------------------|--|------------|
| <b>Capacitors</b>    |  |            |
| C1-C4                | 0.1 $\mu$ F, +80, -20%, 50 V Ceramic Capacitor   | 122002-104 |
| C5-C8                | 0.01 $\mu$ F, +80, -20%, 25 V Minimum Ceramic Axial-Lead Capacitor                                 | 122005-103 |
| C11, C12             | 0.01 $\mu$ F, +80, -20%, 25 V Minimum Ceramic Axial-Lead Capacitor                                 | 122005-103 |
| C17                  | 0.1 $\mu$ F, +80, -20%, 50 V Ceramic Capacitor   | 122002-104 |
| C18-C20              | 0.01 $\mu$ F, +80, -20%, 25 V Minimum Ceramic Axial-Lead Capacitor                                 | 122005-103 |
| C21-C23              | 0.1 $\mu$ F, +80, -20%, 50 V Ceramic Capacitor   | 122002-104 |
| C24-C27              | 0.01 $\mu$ F, +80, -20%, 25 V Minimum Ceramic Axial-Lead Capacitor                                 | 122005-103 |
| C29-C31              | 0.01 $\mu$ F, +80, -20%, 25 V Minimum Ceramic Axial-Lead Capacitor                                 | 122005-103 |
| C35                  | 0.01 $\mu$ F, +80, -20%, 25 V Minimum Ceramic Axial-Lead Capacitor                                 | 122005-103 |
| C36                  | 0.1 $\mu$ F, +80, -20%, 50 V Ceramic Capacitor   | 122002-104 |
| C37-C39              | 0.01 $\mu$ F, +80, -20%, 25 V Minimum Ceramic Axial-Lead Capacitor                                 | 122005-103 |
| C40, C41             | 0.1 $\mu$ F, +80, -20%, 50 V Ceramic Capacitor   | 122002-104 |
| C42-C44              | 470 pF, 100 V, Ceramic Axial-Lead Capacitor Acceptable substitute is part no. 122013-471           | 122016-471 |
| C45                  | 0.1 $\mu$ F, +80, -20%, 50 V Ceramic Capacitor   | 122002-104 |
| C46-C50              | 1000 pF, $\pm$ 5%, 100 V Ceramic Axial-Lead Capacitor Acceptable substitute is part no. 122002-102 | 122016-102 |
| C51-C64              | 0.1 $\mu$ F, +80, -20%, 50 V Ceramic Capacitor   | 122002-104 |
| <b>Connectors</b>    |  |            |
| P19                  | 24-Pin Connector   | 179073-024 |
| P20                  | 44-Pin Connector Acceptable substitute is part no. 179046-044                                      | 179073-044 |
| <b>Miscellaneous</b> |  |            |
|                      | Spacer   | 037873-01  |
|                      | #4-40 x 1/4 -Inch Cross-Recessed Steel Screw   | 72-1404F   |
|                      | Plastic Washer   | 175009-221 |
|                      | Grommet  | 178044-242 |
|                      | Snap-In Fastener   | 178045-442 |





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Figure 5-13 Arabian Game PCB Assembly, continued

## Game PCB Assembly Parts List

| Designator                 | Description   | Part No.   |
|----------------------------|---|------------|
| <b>Capacitors</b>          |   |            |
| C1                         | 470 $\mu$ F, $\pm$ 20%, 16-V Minimum, Radial-Lead Aluminum Electrolytic Capacitor | 123004-471 |
| C2                         | 1 $\mu$ F, 25 V, Tantalum Electrolytic Capacitor                                  | 99-200008  |
| C3                         | 0.1 $\mu$ F, 50 V, Polyester Film Capacitor                                       | 21-101104  |
| C4                         | 47 $\mu$ F, 16 V, Aluminum Electrolytic Capacitor                                 | 123004-470 |
| C5                         | 22 $\mu$ F, 16 V, Electrolytic Capacitor  | 123004-220 |
| C6                         | 470 $\mu$ F, $\pm$ 20%, 16-V Minimum, Radial-Lead Aluminum Electrolytic Capacitor | 123004-471 |
| C7                         | 10 $\mu$ F, 16 V, Electrolytic Capacitor  | 123004-100 |
| C8                         | 47 $\mu$ F, 16 V, Aluminum Electrolytic Capacitor                                 | 123004-470 |
| C9                         | 33 pF Ceramic Capacitor   | 99-200009  |
| C10                        | 47 pF Ceramic Capacitor   | 99-200013  |
| C11, C12                   | 100 $\mu$ F, $\pm$ 20%, 16-V Minimum, Radial-Lead Aluminum Electrolytic Capacitor | 123004-101 |
| C13-C15                    | 47 pF Ceramic Capacitor   | 99-200010  |
| <b>Coils</b>               |   |            |
| CL1-CL3                    | 1 $\mu$ H Coil (SP0406/RO)  | 99-200012  |
| <b>Crystal</b>             |   |            |
| X1                         | 12.000-MHz Crystal  | 99-200015  |
| <b>Diodes</b>              |   |            |
| D1                         | Type 1S1588 Diode   | 99-200004  |
| <b>Integrated Circuits</b> |   |            |
| IC1-IC4                    | Type 2764 RAM   | 99-200005  |
| IC9                        | Tri-State Octal Bus Transceiver Integrated Circuit                                | 37-74LS245 |
| IC10                       | 150 ns Tri-State Static RAM Integrated Circuit                                    | 137211-001 |
| IC11-IC14                  | Hex Bus Driver Integrated Circuit   | 137168-001 |
| IC15                       | Z-80A 4-MHz Game Microprocessor   | 99-200014  |
| IC16                       | Tri-State Hex Bus Driver Integrated Circuit                                       | 37-74LS367 |
| IC17, IC18                 | 4 to 10 Decoder Integrated Circuit  | 37-74LS42  |
| IC19                       | Tri-State Hex Bus Driver Integrated Circuit                                       | 37-74LS367 |
| IC20                       | Quad 2-Input OR Gate Integrated Circuit   | 37-74LS32  |
| IC21, IC22                 | Tri-State Hex Bus Driver Integrated Circuit                                       | 37-74LS367 |
| IC23-IC25                  | Quad Data Selector/Multiplexer Integrated Circuit                                 | 37-74LS157 |
| IC26                       | MB8841-1057   | 99-200007  |
| IC27                       | Programmable Sound Generator Integrated Circuit                                   | 137222-001 |
| IC28                       | Tri-State Octal Bus Transceiver Integrated Circuit                                | 37-74LS245 |
| IC29                       | Quad 2-Input NAND Gate Integrated Circuit   | 37-74LS00  |
| IC30                       | Quad 2-Input OR Gate Integrated Circuit   | 37-74LS32  |
| IC31                       | 3 to 8 Decoder/Multiplexer Integrated Circuit                                     | 37-74LS138 |
| IC32                       | Quad Data Selector/Multiplexer Integrated Circuit                                 | 137221-001 |
| IC33                       | Hex Inverter Integrated Circuit   | 37-74LS04  |
| IC34                       | 4-Bit Synchronous Counter Integrated Circuit                                      | 37-74LS163 |

(continued on next page)



## Game PCB Assembly Parts List, continued

| Designator | Description                                       | Part No.   |
|------------|---|------------|
| IC35       | Quad 2-Input AND Gate Integrated Circuit          | 37-74LS08  |
| IC36       | Tri-State Hex Bus Driver Integrated Circuit       | 37-74LS367 |
| IC37       | Quad D-Type Flip-Flop Integrated Circuit          | 37-74LS175 |
| IC38       | Tri-State Hex Bus Driver Integrated Circuit       | 37-74LS367 |
| IC39, IC40 | Dual D-Type Flip-Flop Integrated Circuit          | 37-74LS74  |
| IC41       | Hex Bus Driver Integrated Circuit                 | 137168-001 |
| IC42       | Audio Power Amplifier Integrated Circuit          | 137223-001 |
| IC43       | 4-Bit Synchronous Counter Integrated Circuit      | 37-74LS163 |
| IC44       | Quad D-Type Flip-Flop Integrated Circuit          | 37-74LS175 |
| IC45       | Quad Data Selector/Multiplexer Integrated Circuit | 37-74LS157 |
| IC46, IC47 | 4-Bit Synchronous Counter Integrated Circuit      | 37-74LS163 |
| IC48       | Quad Data Selector/Multiplexer Integrated Circuit | 37-74LS157 |
| IC49       | 4-Bit Synchronous Counter Integrated Circuit      | 37-74LS163 |
| IC50       | Quad D-Type Flip-Flop Integrated Circuit          | 37-74LS175 |
| IC51       | 4-Bit Synchronous Counter Integrated Circuit      | 37-74LS163 |
| IC52, IC53 | Quad Data Selector/Multiplexer Integrated Circuit | 37-74LS157 |
| IC54       | Quad 2-Input AND Gate Integrated Circuit          | 37-74LS08  |
| IC55       | Dual D-Type Flip-Flop Integrated Circuit          | 37-74LS74  |
| IC56       | Quad 2-Input OR Gate Integrated Circuit           | 37-74LS32  |
| IC57       | Hex Inverter Integrated Circuit                   | 37-74LS04  |
| IC58       | Quad 2-Input AND Gate Integrated Circuit          | 37-74LS08  |
| IC59       | Dual D-Type Flip-Flop Integrated Circuit          | 37-74LS74  |
| IC60       | Hex Inverter Integrated Circuit                   | 37-74LS04  |
| IC61       | Hex Bus Driver Integrated Circuit                 | 137168-001 |
| IC62       | 4-Bit Synchronous Counter Integrated Circuit      | 37-74LS163 |
| IC63       | Quad D-Type Flip-Flop Integrated Circuit          | 37-74LS175 |
| IC64       | Quad Data Selector/Multiplexer Integrated Circuit | 37-74LS157 |
| IC65       | 4-Bit Synchronous Counter Integrated Circuit      | 37-74LS163 |
| IC66       | Quad D-Type Flip-Flop Integrated Circuit          | 37-74LS175 |
| IC67       | Quad Data Selector/Multiplexer Integrated Circuit | 37-74LS157 |
| IC68       | 4-Bit Synchronous Counter Integrated Circuit      | 37-74LS163 |
| IC69       | Quad D-Type Flip-Flop Integrated Circuit          | 37-74LS175 |
| IC70       | 4-Bit Synchronous Counter Integrated Circuit      | 37-74LS163 |
| IC71, IC72 | Quad Data Selector/Multiplexer Integrated Circuit | 37-74LS157 |
| IC73       | Quad 2-Input NAND Gate Integrated Circuit         | 37-74LS00  |
| IC74       | Dual D-Type Flip-Flop Integrated Circuit          | 37-74LS74  |
| IC75       | Hex Inverter Integrated Circuit                   | 37-74LS04  |
| IC76       | Quad 2-Input NAND Gate Integrated Circuit         | 37-74LS00  |
| IC77       | Hex Inverter Integrated Circuit                   | 37-74LS04  |
| IC78, IC79 | Dual D-Type Flip-Flop Integrated Circuit          | 37-74LS74  |
| IC80       | Quad D-Type Flip-Flop Integrated Circuit          | 37-74LS175 |
| IC81       | Dual J-K Flip-Flop Integrated Circuit             | 137169-001 |
| IC84-IC87  | Type 2764 RAM                                     | 99-200005  |
| IC90       | Quad D-Type Flip-Flop Integrated Circuit          | 37-74LS175 |
| IC91       | Dual D-Type Flip-Flop Integrated Circuit          | 37-74LS74  |
| IC92       | Quad 2-Input NAND Gate Integrated Circuit         | 37-74LS00  |
| IC93       | Quad 2-Input OR Gate Integrated Circuit           | 37-74LS32  |
| IC95, IC96 | Dual 4-Bit Counter Integrated Circuit             | 37-74LS393 |

(continued on next page)

## Game PCB Assembly Parts List, continued

| Designator   | Description                                       | Part No.   |
|--------------|---|------------|
| IC94         | Dual 4-Input NAND Gate Integrated Circuit         | 37-74LS20  |
| IC97         | Quad 2-Input AND Gate Integrated Circuit          | 37-74LS08  |
| IC98         | Quad 2-Input OR Gate Integrated Circuit           | 37-74LS32  |
| IC99         | Dual 4-Input AND Gate Integrated Circuit          | 137210-001 |
| IC100        | Quad 2-Input OR Gate Integrated Circuit           | 37-74LS32  |
| IC101        | Hex Inverter Integrated Circuit                   | 37-74LS04  |
| IC102        | Quad 2-Input OR Gate Integrated Circuit           | 37-74LS32  |
| IC103        | Quad 2-Input NOR Gate Integrated Circuit          | 37-74LS02  |
| IC104–IC106  | Quad 2-Input NAND Gate Integrated Circuit         | 37-74LS00  |
| IC107        | Triple 3-Input NAND Gate Integrated Circuit       | 37-74LS10  |
| IC108        | Quad 2-Input NAND Gate Integrated Circuit         | 37-74LS00  |
| IC109        | Quad 2-Input NOR Gate Integrated Circuit          | 37-74LS02  |
| IC110        | Quad 2-Input OR Gate Integrated Circuit           | 37-74LS32  |
| IC111        | Hex Inverter Integrated Circuit                   | 37-74LS04  |
| IC112–IC115  | Quad 2-Input Exclusive-OR Gate Integrated Circuit | 37-74LS86  |
| IC116        | Quad 2-Input NAND Gate Integrated Circuit         | 37-7403    |
| IC117        | Quad 2-Input Exclusive-OR Gate Integrated Circuit | 37-74LS86  |
| IC118        | Triple 3-Input NAND Gate Integrated Circuit       | 37-74LS10  |
| IC119        | Quad 2-Input NAND Gate Integrated Circuit         | 37-74LS00  |
| IC120        | Triple 3-Input NAND Gate Integrated Circuit       | 37-74LS10  |
| IC121–IC126  | Quad 2-Input OR Gate Integrated Circuit           | 37-74LS32  |
| IC127        | Triple 3-Input NAND Gate Integrated Circuit       | 37-74LS10  |
| IC128        | Quad 2-Input AND Gate Integrated Circuit          | 37-74LS08  |
| IC129        | Dual D-Type Flip-Flop Integrated Circuit          | 37-74LS74  |
| IC130–IC133  | Dual Data Selector/Multiplexer Integrated Circuit | 37-74153   |
| IC134        | Quad Data Selector/Multiplexer Integrated Circuit | 37-74LS157 |
| IC135        | 4-Bit Shift Register Integrated Circuit           | 37-74LS95  |
| IC136        | Quad Data Selector/Multiplexer Integrated Circuit | 37-74LS157 |
| IC137        | 4-Bit Shift Register Integrated Circuit           | 37-74LS95  |
| IC138        | Quad 2-Input OR Gate Integrated Circuit           | 37-74LS32  |
| IC140        | 4-Bit Shift Register Integrated Circuit           | 37-74LS95  |
| IC141        | Quad Data Selector/Multiplexer Integrated Circuit | 37-74LS157 |
| IC142        | 4-Bit Shift Register Integrated Circuit           | 37-74LS95  |
| IC143, IC144 | Quad Data Selector/Multiplexer Integrated Circuit | 37-74LS157 |
| IC145        | 4-Bit Shift Register Integrated Circuit           | 37-74LS95  |
| IC146        | Quad Data Selector/Multiplexer Integrated Circuit | 37-74LS157 |
| IC147        | 4-Bit Shift Register Integrated Circuit           | 37-74LS95  |
| IC150        | 4-Bit Shift Register Integrated Circuit           | 37-74LS95  |
| IC151        | Quad Data Selector/Multiplexer Integrated Circuit | 37-74LS157 |
| IC152        | 4-Bit Shift Register Integrated Circuit           | 37-74LS95  |
| IC153        | Quad Data Selector/Multiplexer Integrated Circuit | 37-74LS157 |
| IC154–IC185  | 375 ns Dynamic RAM Integrated Circuit             | 100017-001 |
| IC187        | Quad 2-Input OR Gate Integrated Circuit           | 37-74LS32  |
| IC188        | Hex Inverter Integrated Circuit                   | 37-74LS04  |
| IC189        | Dual 4-Input AND Gate Integrated Circuit          | 137210-001 |
| IC190        | Hex Buffer/Driver Inverter Integrated Circuit     | 37-7406    |
| IC191        | Quad 2-Input NAND Gate Integrated Circuit         | 37-74LS00  |
| IC192        | Quad 2-Input AND Gate Integrated Circuit          | 37-74LS08  |

(continued on next page)

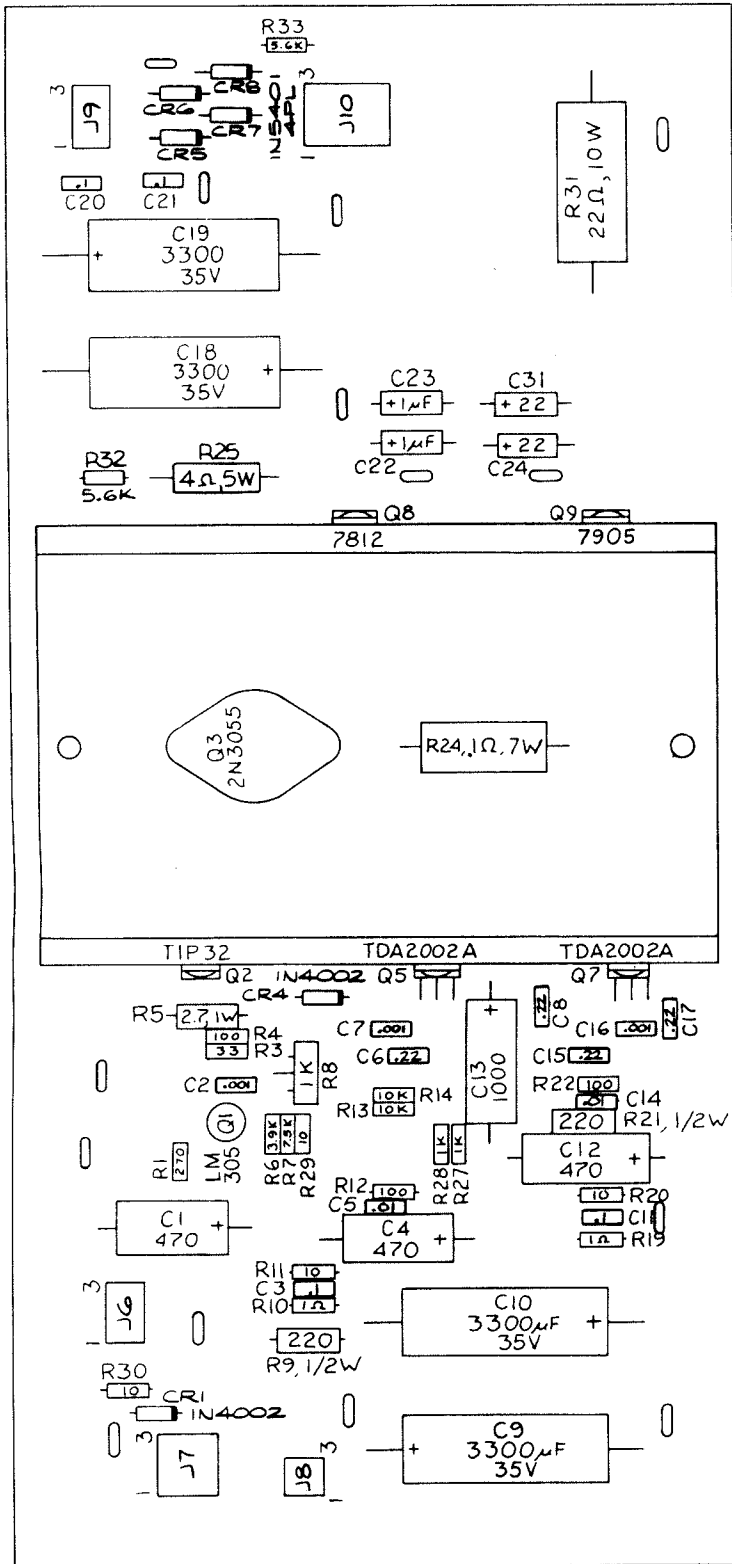
## Game PCB Assembly Parts List, continued

| Designator                        | Description   | Part No.   |
|-----------------------------------|---|------------|
| <b>Resistors</b>                  |   |            |
| R1                                | 10 K $\Omega$ , $\pm 5\%$ , 1/4 W Resistor          | 110000-103 |
| R2                                | 560 $\Omega$ , $\pm 5\%$ , 1/4 W Resistor           | 110000-561 |
| R3                                | 4.7 K $\Omega$ , $\pm 5\%$ , 1/4 W Resistor         | 110000-472 |
| R4                                | 330 $\Omega$ , $\pm 5\%$ , 1/4 W Resistor           | 110000-331 |
| R5                                | 5.1 K $\Omega$ , $\pm 5\%$ , 1/4 W Resistor         | 110000-512 |
| R6                                | 1.0 K $\Omega$ , $\pm 5\%$ , 1/4 W Resistor         | 110000-102 |
| R7                                | 4.7 K $\Omega$ , $\pm 5\%$ , 1/4 W Resistor         | 110000-472 |
| R8                                | 1.0 K $\Omega$ , $\pm 5\%$ , 1/4 W Resistor         | 110000-102 |
| R9                                | 22 K $\Omega$ , $\pm 5\%$ , 1/4 W Resistor          | 110000-223 |
| R10                               | 1.2 K $\Omega$ , $\pm 5\%$ , 1/4 W Resistor         | 110000-122 |
| R11, R12                          | 220 $\Omega$ , $\pm 5\%$ , 1/4 W Resistor           | 110000-221 |
| R13                               | 560 $\Omega$ , $\pm 5\%$ , 1/4 W Resistor           | 110000-561 |
| R14                               | 82 $\Omega$ , $\pm 5\%$ , 1/4 W Resistor            | 110000-820 |
| R15                               | 82 $\Omega$ , $\pm 5\%$ , 1/4 W Resistor            | 110000-820 |
| R16                               | 1.0 K $\Omega$ , $\pm 5\%$ , 1/4 W Resistor         | 110000-102 |
| R17                               | 82 $\Omega$ , $\pm 5\%$ , 1/4 W Resistor            | 110000-820 |
| R18-20                            | 220 $\Omega$ , $\pm 5\%$ , 1/4 W Resistor           | 110000-221 |
| R21                               | 1.2 K $\Omega$ , $\pm 5\%$ , 1/4 W Resistor         | 110000-122 |
| R22                               | 510 $\Omega$ , $\pm 5\%$ , 1/4 W Resistor           | 110000-511 |
| R23                               | 1.2 K $\Omega$ , $\pm 5\%$ , 1/4 W Resistor         | 110000-122 |
| R25                               | 510 $\Omega$ , $\pm 5\%$ , 1/4 W Resistor           | 110000-511 |
| R26                               | 1.8 K $\Omega$ , $\pm 5\%$ , 1/4 W Resistor         | 110000-182 |
| R27                               | 1.2 K $\Omega$ , $\pm 5\%$ , 1/4 W Resistor         | 110000-122 |
| R28                               | 510 $\Omega$ , $\pm 5\%$ , 1/4 W Resistor           | 110000-511 |
| RA1-RA6                           | 100 $\Omega$ , $\pm 5\%$ , 1/8 W Resistor Package   | 118000-101 |
| RA7                               | 22 K $\Omega$ , $\pm 5\%$ , 1/8 W Resistor Package  | 118001-223 |
| RA8                               | 100 $\Omega$ , $\pm 5\%$ , 1/8 W Resistor Package   | 118000-101 |
| RA9-RA12                          | 1.0 K $\Omega$ , $\pm 5\%$ , 1/8 W Resistor Package | 118001-102 |
| RA13                              | 4.7 K $\Omega$ , $\pm 5\%$ , 1/8 W Resistor Package | 118001-472 |
| RA14                              | 1.0 K $\Omega$ , $\pm 5\%$ , 1/8 W Resistor Package | 118001-102 |
| RA15                              | 1.0 K $\Omega$ , $\pm 5\%$ , 1/8 W Resistor Package | 118001-102 |
| RA16                              | 100 $\Omega$ , $\pm 5\%$ , 1/8 W Resistor Package   | 118000-101 |
| RA17                              | 3 K $\Omega$ , $\pm 5\%$ , 1/8 W Resistor Package   | 118001-332 |
| RA18, RA19                        | 22 K $\Omega$ , $\pm 5\%$ , 1/8 W Resistor Package  | 118001-223 |
| RA20                              | 1.0 K $\Omega$ , $\pm 5\%$ , 1/8 W Resistor Package | 118000-102 |
| VRI                               | 10 K $\Omega$ Variable Resistor                     | 99-200006  |
| <b>Integrated Circuit Sockets</b> |   |            |
| 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**

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



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

## Regulator/Audio II PCB Assembly Parts List

| Designator        | Description  | Part No.   |
|-------------------|--|------------|
| <b>Capacitors</b> |  |            |
| C1                | 470 $\mu$ F, 25 V, Aluminum Electrolytic Fixed Axial-Lead Capacitor                                    | 24-250477  |
| C2                | 0.001 $\mu$ F, 35 V, Ceramic-Disc Axial-Lead Capacitor   | 122002-102 |
| C3                | 0.1 $\mu$ F, 25 V, Ceramic-Disc Axial-Lead Capacitor (Acceptable substitute is part no. 122002-104)    | 29-088     |
| C4                | 470 $\mu$ F, 25 V, Aluminum Electrolytic Fixed Axial-Lead Capacitor                                    | 24-250477  |
| C5                | .01 $\mu$ F, 25 V Ceramic-Disc Axial-Lead Capacitor (Acceptable substitute is part no. 122005-103)     | 100015-103 |
| C6                | 0.22 $\mu$ F, 25 V, Ceramic-Disc Axial-Lead Capacitor  | 122004-224 |
| C7                | 0.001 $\mu$ F, 35 V, Ceramic-Disc Axial-Lead Capacitor   | 122002-102 |
| C8                | 0.22 $\mu$ F, 25 V, Ceramic-Disc Axial-Lead Capacitor  | 122004-224 |
| C9, C10           | 3300 $\mu$ F, 35 V, Aluminum Electrolytic Fixed Axial-Lead Capacitor                                   | 24-350338  |
| C11               | 0.1 $\mu$ F, 25 V, Ceramic-Disc Axial-Lead Capacitor (Acceptable substitute is part no. 122002-104)    | 29-088     |
| C12               | 470 $\mu$ F, 25 V, Aluminum Electrolytic Fixed Axial-Lead Capacitor                                    | 24-250477  |
| C13               | 1000 $\mu$ F, 25 V, Aluminum Electrolytic Fixed Axial-Lead Capacitor                                   | 24-250108  |
| C14               | .01 $\mu$ F, 25 V Ceramic-Disc Axial-Lead Capacitor (Acceptable substitute is part no. 122005-103)     | 100015-103 |
| C15               | 0.22 $\mu$ F, 25 V, Ceramic-Disc Axial-Lead Capacitor  | 122004-224 |
| C16               | 0.001 $\mu$ F, 35 V, Ceramic-Disc Axial-Lead Capacitor   | 122002-102 |
| C17               | 0.22 $\mu$ F, 25 V, Ceramic-Disc Axial-Lead Capacitor  | 122004-224 |
| C18, C19          | 3300 $\mu$ F, 35 V, Aluminum Electrolytic Fixed Axial-Lead Capacitor                                   | 24-350338  |
| C20, C21          | 0.1 $\mu$ F, 25 V, Ceramic-Disc Axial-Lead Capacitor (Acceptable substitute is part no. 122002-104)    | 29-088     |
| C22, C23          | 1 $\mu$ F, 50 V, Aluminum Electrolytic Fixed Axial-Lead Capacitor                                      | 24-500105  |
| C24               | 22 $\mu$ F, 35 V, Aluminum Electrolytic Fixed Axial-Lead Capacitor                                     | 24-350226  |
| C31               | 22 $\mu$ F, 35 V, Aluminum Electrolytic Fixed Axial-Lead Capacitor                                     | 24-350226  |
| <b>Diodes</b>     |  |            |
| 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  |
| <b>Resistors</b>  |  |            |
| R1                | 270 $\Omega$ , $\pm 5\%$ , $\frac{1}{4}$ W Resistor  | 110000-271 |
| R3                | 33 $\Omega$ , $\pm 5\%$ , $\frac{1}{4}$ W Resistor   | 110000-330 |
| R4                | 100 $\Omega$ , $\pm 5\%$ , $\frac{1}{4}$ W Resistor  | 110000-101 |
| R5                | 2.7 $\Omega$ , $\pm 5\%$ , 1 W Resistor  | 110009-027 |
| R6                | 3.9 k $\Omega$ , $\pm 5\%$ , $\frac{1}{4}$ W Resistor  | 110000-392 |
| R7                | 7.5 k $\Omega$ , $\pm 5\%$ , $\frac{1}{4}$ W Resistor  | 110000-752 |
| R8                | 1 k $\Omega$ Vertical PCB-Mounting Cermet Potentiometer (Acceptable substitute is part no. 119002-102) | 19-315102  |
| R9                | 220 $\Omega$ , $\pm 5\%$ , $\frac{1}{2}$ W Resistor  | 110001-221 |
| R10               | 1 $\Omega$ , $\pm 5\%$ , $\frac{1}{4}$ W Resistor  | 110000-010 |
| R11               | 10 $\Omega$ , $\pm 5\%$ , $\frac{1}{4}$ W Resistor   | 110000-100 |
| R12               | 100 $\Omega$ , $\pm 5\%$ , $\frac{1}{4}$ W Resistor  | 110000-101 |
| R13, R14          | 10 k $\Omega$ , $\pm 5\%$ , $\frac{1}{4}$ W Resistor   | 110000-103 |

(Continued on next page)

## Regulator/Audio II PCB Assembly Parts List, continued

| Designator           | Description  | Part No.    |
|----------------------|--|-------------|
| R20                  | 10 $\Omega$ , $\pm 5\%$ , 1/4 W Resistor                 | 110000-100  |
| R21                  | 220 $\Omega$ , $\pm 5\%$ , 1/2 W Resistor                | 110001-221  |
| R19                  | 1 $\Omega$ , $\pm 5\%$ , 1/4 W Resistor                  | 110000-010  |
| R22                  | 100 $\Omega$ , $\pm 5\%$ , 1/4 W Resistor                | 110000-101  |
| R24                  | 0.1 $\Omega$ , $\pm 3\%$ , 7 W Wirewound Resistor        | 19-100P1015 |
| R25                  | 4 $\Omega$ , $\pm 5\%$ , 5 W Wirewound Resistor          | 116001-040  |
| R27, R28             | 1 k $\Omega$ , $\pm 5\%$ , 1/4 W Resistor                | 110000-102  |
| R29, R30             | 10 $\Omega$ , $\pm 5\%$ , 1/4 W Resistor                 | 110000-100  |
| R31                  | 22 $\Omega$ , $\pm 5\%$ , 10 W Wirewound Resistor        | 116000-220  |
| R32, R33             | 5.6 k $\Omega$ , $\pm 5\%$ , 1/4 W Resistor              | 110000-562  |
| <b>Transistors</b>   |  |             |
| Q2                   | Type-TIP32 PNP Power Transistor                          | 33-TIP32    |
| Q3                   | Type-2N3055 NPN Silicon Transistor                       | 34-2N3055   |
| <b>Miscellaneous</b> |  |             |
| 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

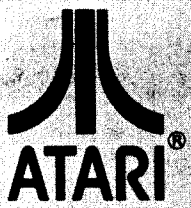
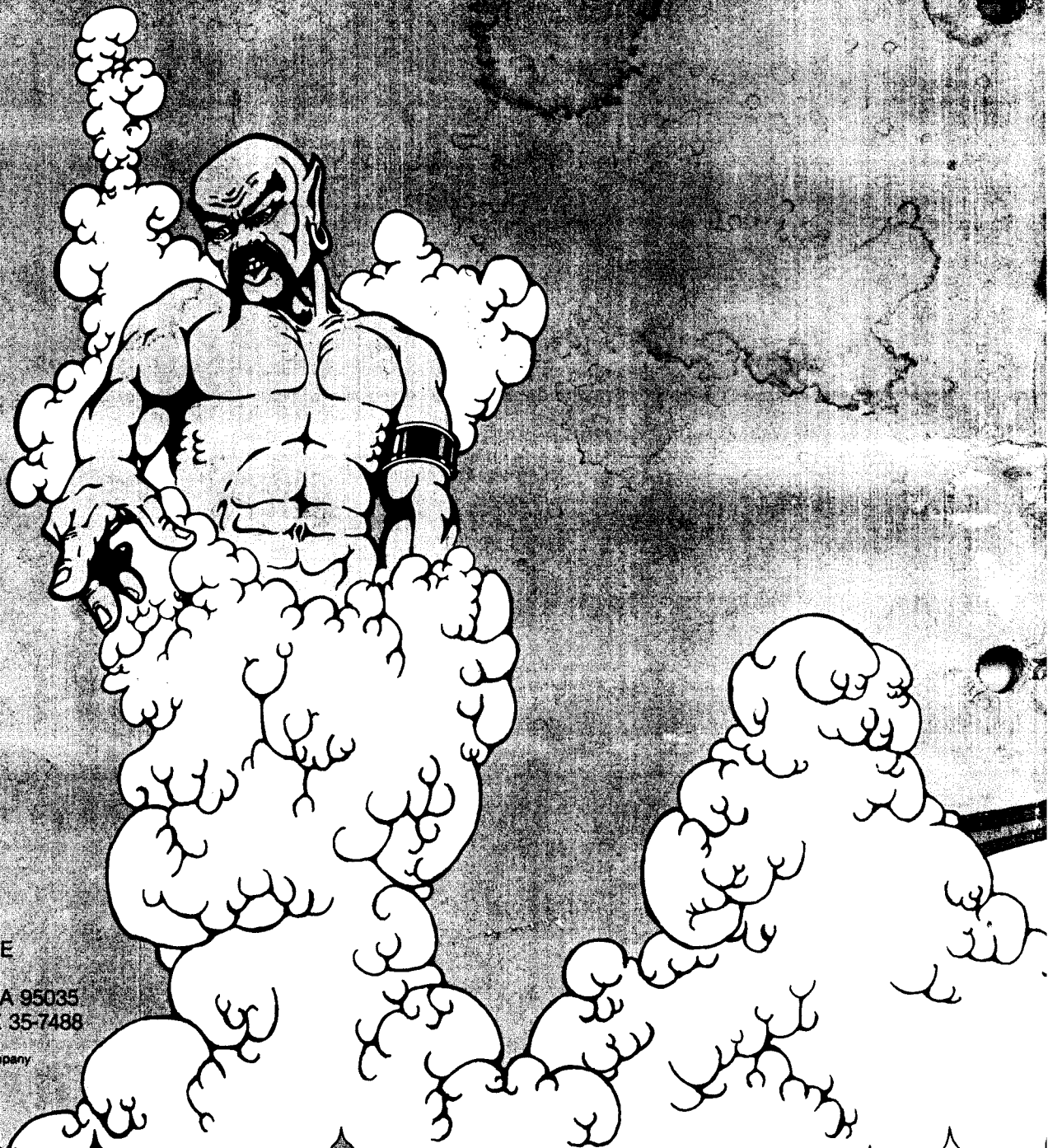
a malfunction does occur, the counter applies continuous pulses to the reset line of the microprocessor, which causes the microprocessor to keep re-setting.

#### **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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