Operators Manual

With Illustrated Parts Lists

TM-277
1st Printing

ATARI
GAMES

ATARI SYSTEM I™

Atari Games, Inc. Customer Service

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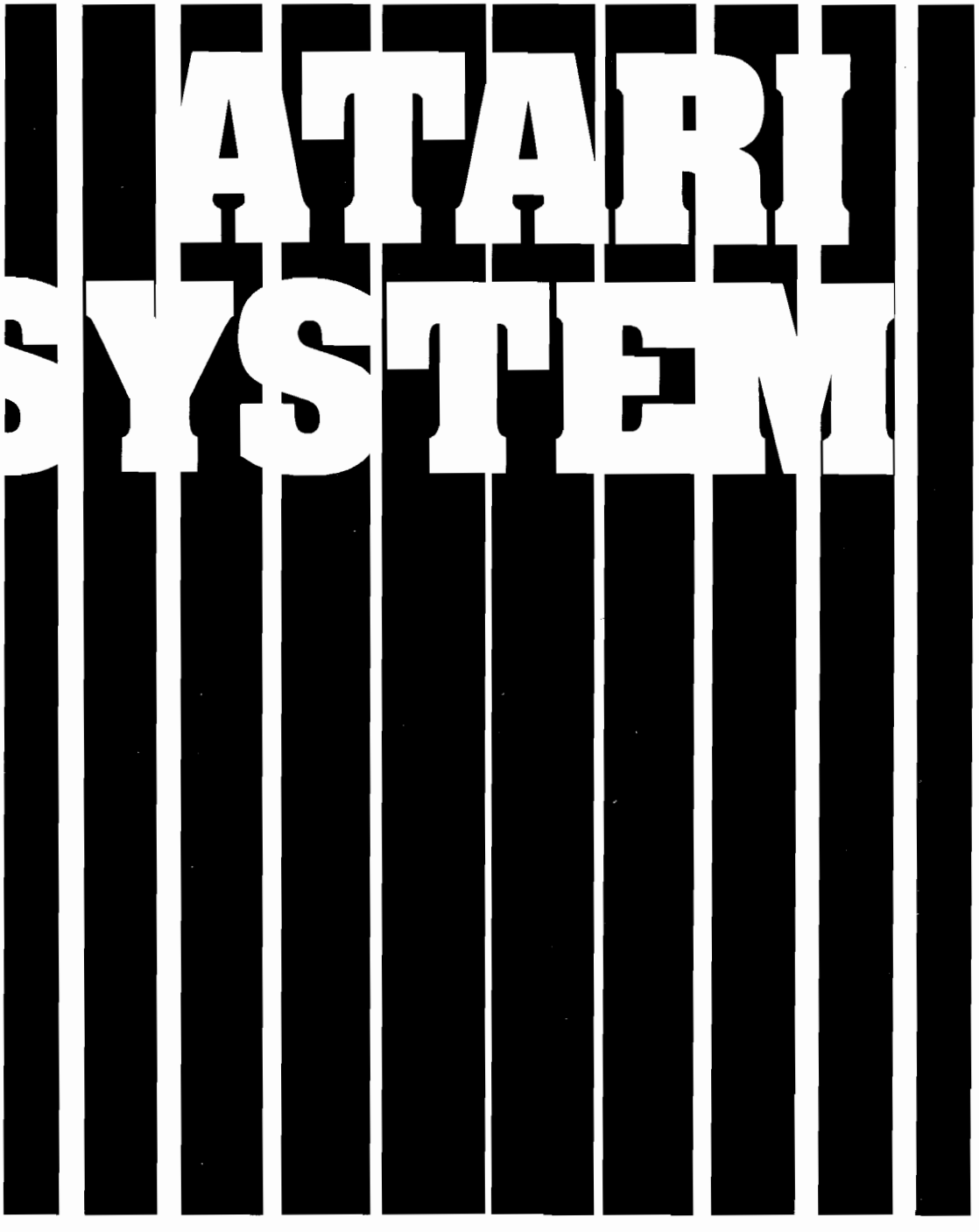

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Notice Regarding Non-Atari Parts

⚠ WARNING ⚠

Use of non-Atari parts or modifications of any ATARI® game circuitry may adversely affect the safety of your game, and may cause injury to you and your players.

You may void the game warranty (printed on the inside back cover of this manual) if you do any of the following:

- Substitute non-Atari parts in the game.
- Modify or alter any circuits in the game by using kits or parts *not* supplied by Atari Games, Inc.

NOTE

This equipment generates, uses, and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to Subpart J of Part 15 of Federal Communications Commission (FCC) Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area or modification to this equipment is likely to cause interference in which case the user, at his own expense, will be required to take whatever measures may be required to correct the interference. If you suspect interference from an ATARI® game at your location, check the following:

- All green ground wires in the game are properly connected as shown in the game wiring diagram.
- The power cord is properly plugged into a grounded three-wire outlet.
- The game printed-circuit boards (PCB) are properly installed with the Electromagnetic Interference (EMI) ground plane.

If you are still unable to solve the interference problem, please contact Customer Service at Atari Games, Inc. See the inside front cover of this manual for service in your area.

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Safety Summary

The following safety precautions apply to all game operators and service personnel. Specific warnings and cautions will be found throughout this manual where they apply.

⚠ WARNING ⚠

Properly Ground the Game. Players may receive an electrical shock if this game is not properly grounded! To avoid electrical shock, do not plug in the game until it has been inspected and properly grounded. This game should only be plugged into 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 the control panel is not properly grounded! After servicing any parts on the control panel, check that the grounding clip is firmly secured to the metal tab on the inside of the control panel. Only then should you lock up the game.

AC Power Connection. Before connecting the game to the AC power source, verify that the proper voltage-selection plug is installed on the game's power supply.

Disconnect Power During Repairs. To avoid electrical shock, disconnect the game from the AC power source before removing or repairing any part of the game. When removing or repairing the video display, extra precautions must be taken to avoid electical shock because high voltages may exist within the display circuitry and cathode-ray tube (CRT) even after power has been disconnected. Do not touch internal parts of the display with your hands or with metal objects! Always discharge the high voltage from the CRT before servicing this area of the game. To discharge the CRT: Attach one end of a large, well-insulated, 18-gauge jumper wire to ground. Momentarily touch the free end of the grounded jumper to the CRT anode by sliding it under the anode cap. Wait two minutes and discharge the anode again.

Use Only ATARI Parts. To maintain the safety integrity of your ATARI game, do not use non-ATARI parts when repairing the game. Use of non-ATARI parts or other modifications to the game circuitry may adversely affect the safety of your game, and injure you or your players.

Handle Fluorescent Tube and CRT With Care. If you drop a fluorescent tube or CRT and it breaks, it may implode! Shattered glass can fly six feet or more from the implosion.

Use the Proper Fuses. To avoid electrical shock, use replacement fuses which are specified in the parts list for this game. Replacement fuses must match those replaced in fuse type, voltage rating, and current rating. In addition, the fuse cover must be in place during game operation.

CAUTION

Properly Attach All Connectors. Make sure that the connectors on each printed-circuit board (PCB) are properly plugged in. Note that they are keyed to fit only one way. If they do not slip on easily, do not force them. A reversed connector may damage your game and void the warranty.

Ensure the Proper AC Line Frequency. Video games manufactured for operation on 60 Hz line power (i.e., United States) must not be operated in countries with 50 Hz line power (i.e., Europe). The fluorescent light ballast transformer will overheat, causing a potential fire hazard if 60 Hz games are operated on power lines using 50 Hz. Check the product identification label of your game for the line frequency required.

Set-Up

⚠ WARNING ⚠

To avoid electrical shock, do not plug in the cabinet until it has been properly inspected and set up for the line voltage in your area.

This cabinet should be connected to a grounded 3-wire outlet only. 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 cabinet is not properly grounded.

Do not touch internal parts of the display with your hands or with metal objects.

How to Use This Manual

This manual is intended for game operators and service personnel. The information in this manual describes how to set up, maintain, and troubleshoot your Atari Games System I™ cabinet. Please refer to the game kit manual for information on the Cartridge PCB and the self-test of the game.

Your System I™ cabinet is designed to accept the necessary hardware to easily convert the cabinet into a variety of games. Consequently, this manual contains information that applies to those parts of the System I cabinet that are common to *all* games. Information that applies to those parts that are replaced to convert the System I cabinet to a particular game are contained in a game kit operators manual that comes with each game game kit. Where applicable, references are provided in this manual to the game kit operators manual.

This manual contains the following information on the System I cabinet:

- Chapter 1 provides set-up information.
- Chapter 2 provides preventive and corrective maintenance procedures.
- Chapter 3 provides troubleshooting procedures.
- Chapter 4 provides illustrated parts lists.

Schematic diagrams of the System I cabinet circuitry are included as a supplement to this manual (SP-277). Refer to the Schematic Package Supplement included with the *game kit operators manual* for the game cartridge schematic, control-panel wiring diagrams, and any other diagrams pertaining exclusively to the game kit.

Chapter 1

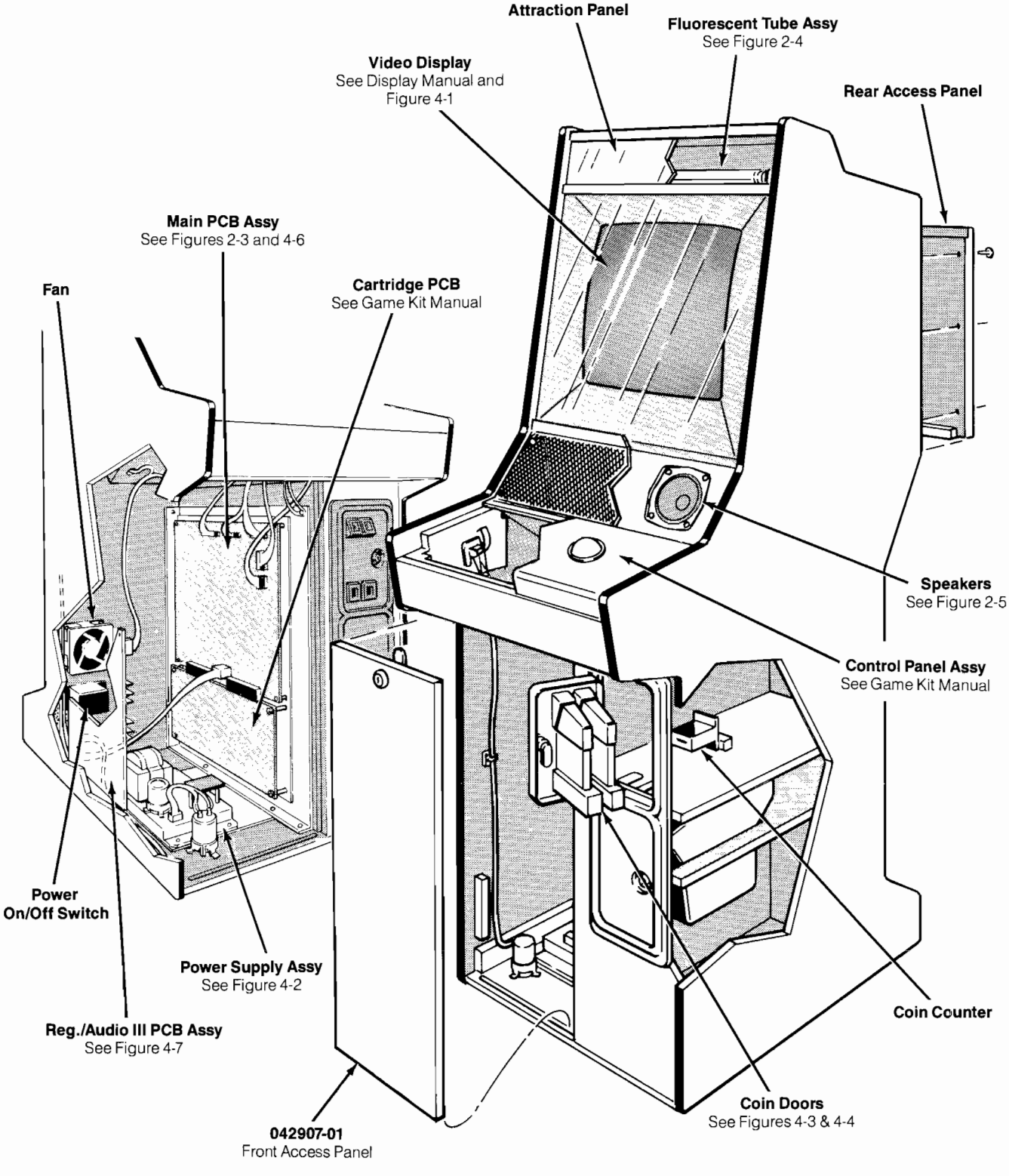

Figure 1-1 System I™ Cabinet Overview

Inspecting the Cabinet

⚠ WARNING ⚠

Do not plug in the cabinet until you have completed steps 1 through 3.

Please inspect your System I cabinet carefully to ensure that it has been delivered to you in good condition. Refer to Figure 1-1 for the locations of the component parts of the cabinet. Table 1-1 lists space, power, and environmental requirements for this cabinet.

1. Examine the exterior of the cabinet for dents, chips, or broken parts.
2. Unlock and remove the front-access panel. Unlock and open the coin door. From the top rear of the cabinet, remove the six attaching screws and lift off the display-access panel. Inspect the interior of the cabinet as follows:
   a. Ensure that all plug-in connectors (on the cabinet harnesses) are firmly plugged in. 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 the warranty.*
   b. Ensure that all plug-in integrated circuits on each PCB are firmly plugged into their sockets.
   c. Inspect the power cord for any cuts or dents in the insulation.
   d. Inspect the power supply. Make sure that the correct fuses are installed and that the proper voltage plugs are inserted for your location's line voltage (refer to *Voltage-Plug Selection and Fuses).* Check that the harness is plugged in correctly and that the fuse-block cover is mounted in place. Check that the green ground wire is connected.
   e. Inspect other major subassemblies, such as the video display, printed-circuit boards (PCBs), speakers, and the fluorescent tube. Make sure they are mounted securely and that the green ground wires are connected.

Table 1-1 Installation Requirements

Characteristic	Requirement
Power Consumption	225 V-A, 210 W RMS typical with game components installed
Temperature	+5° to +38° C (+37° to +100° F)
Humidity	Not to exceed 95% relative
Line Voltage	100 to 132 VAC (or 200 to 264 VAC)
Width	25.50 in. (64.6 cm)
Depth	35 in. (89 cm)
Height	70 in. (178 cm)
Weight	327 lbs. (148 kg) maximum with game components installed

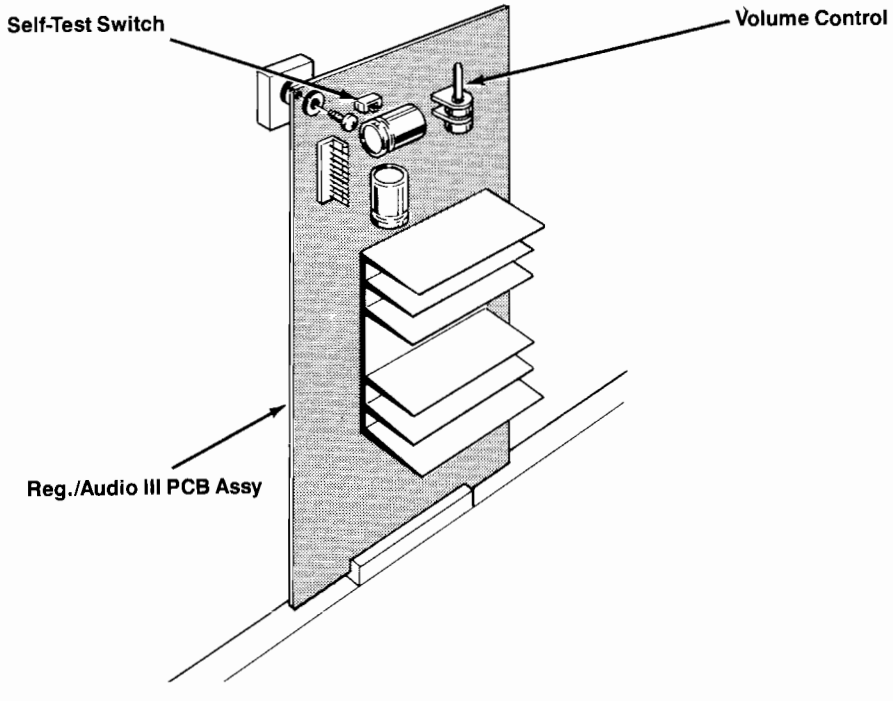

Figure 1-2 Control and Switch Locations

Control and Switch Information

Power On/Off Switch

The power on/off switch is located at the rear of the cabinet.

Volume Controls

The volume controls are located on the Regulator/Audio III PCB (see Figure 1-2). The volume controls adjust the level of sound produced by each game sound channel.

Coin Counters

The coin counter(s) are located behind the upper coin door (see Figure 1-1). The coin counter(s) record the number of coins played.

Self-Test Switch

The self-test switch is located on the Regulator/Audio III PCB (see Figure 1-2). The self-test switch selects the Self-Test Mode to check game operation. Refer to the conversion kit operators manual for the complete description of self-test operation.

Option Settings

Refer to the self-test information in the game conversion kit operators manual for setting the options.

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 1-3).

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

See Figure 1-3 for placement of the voltage plugs. Before plugging in your System I cabinet, check your line voltage. Next, check the wire color on the voltage plug and make sure the voltage plug is correct for the line voltage in your location.

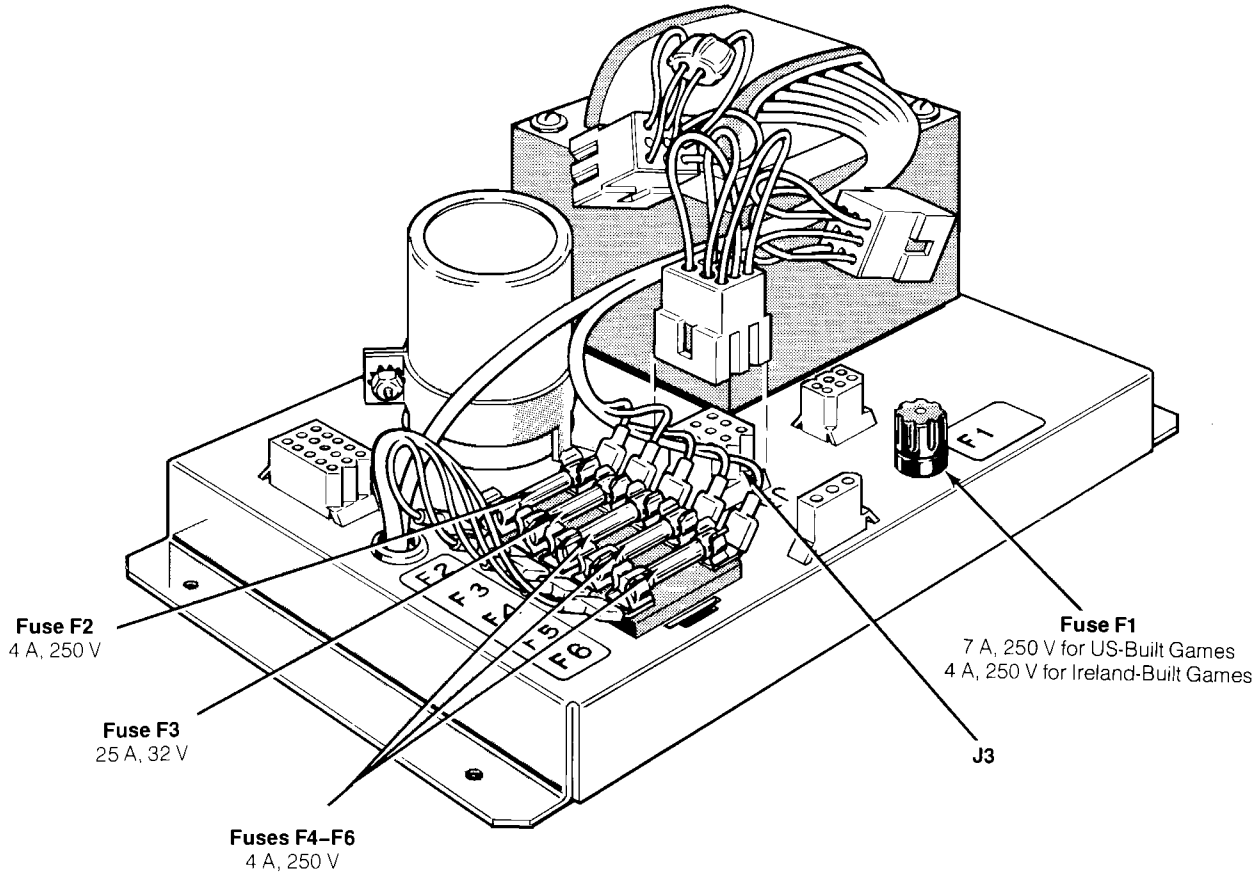

Figure 1-3 Voltage Plug and Fuse Locations

Maintenance

This chapter includes preventive and corrective maintenance procedures for components that are common to all System I cabinets. References are provided, where applicable, to the Maintenance chapter in the game kit operators manual for those components that are unique to a specific game. To assure maximum trouble-free operation from this game, we recommend that preventive maintenance be performed as described in this chapter *and* in the Maintenance chapter of the game kit operators manual.

Removal, disassembly, reassembly, and replacement procedures are provided for System I cabinet components that may require corrective maintenance. Appropriate references are provided to Chapter 4, Illustrated Parts Lists, to aid in locating the parts of this cabinet that are mentioned, but not illustrated, in the maintenance procedures.

Chapter 2

Preventive Maintenance

Preventive maintenance includes cleaning the coin mechanism, interior components of the cabinet, and display shield. How often preventive maintenance is performed depends upon the game environment and frequency of play. However, for those components listed in *Table 2-1 Recommended Preventive-Maintenance Intervals,* we recommend that preventive maintenance be performed at the intervals specified.

NOTE

Refer to the Maintenance chapter in the conversion kit operators manual for preventive maintenance procedures for the player controls on the control panel.

Preventive-Maintenance Intervals

The preventive-maintenance intervals specified in Table 2-1 are the recommended minimum requirements for the components listed.

⚠ WARNING ⚠

To avoid possible electrical shock, turn off and unplug the game before performing any maintenance procedures.

1. Insure that the fan is operating and is forcing air into the cabinet's interior. Lack of air circulation will severely shorten the life of the power-supply components.
2. Re-seat the various connectors between the power supply and PCBs to insure good electrical contact.
3. Verify correct display adjustments using the self-test screens described in the game kit manual.

Table 2-1 Recommended Preventive-Maintenance Intervals

Component	Maintenance Interval
Coin Mechanism	Clean at least every three months.
Interior Components	Clean at least every six months.

Removing the Control Panel

Refer to the Maintenance chapter in the conversion kit operators manual for control panel removal procedures.

Cleaning

Cleaning the Coin Mechanism

Use a soft-bristled brush to remove loose dust or foreign material from the coin mechanism. A toothbrush may be used to remove any stubborn build-up of residue in the coin path. After cleaning the coin mechanism, blow out all of the dust with compressed air.

Cleaning the Display Shield

The display shield may be cleaned with any non-abrasive household cleaner.

Cleaning the Interior Components

Perform the following procedure to clean the electrical assemblies inside the cabinet.

⚠ WARNING ⚠

Turn off the cabinet power, but do not unplug the power cord before cleaning inside the cabinet. The power cord provides a ground path for stray static voltages that may be present on the cleaning tools.

1. Unlock and remove the front access panel from the cabinet.
2. Use a Phillips screwdriver to remove the six screws securing the display access panel to the top rear of the cabinet.
3. Discharge the high-voltage from the cathode-ray tube (CRT) before proceeding. The display assembly contains a circuit for discharging the high voltage to ground when power is removed. However, to make certain, always discharge the display as follows.
   a. Attach one end of a large, well-insulated, 18-gauge jumper wire to ground.
   b. Momentarily touch the free end of the grounded jumper to the CRT anode by sliding it under the anode cap.
   c. Wait two minutes and repeat part b.

CAUTION

Be extremely careful when cleaning the electrical components inside the cabinet. Avoid touching the electrical components with any solid object other than the soft bristles of the vacuum attachment or paint brush.

4. Use a vacuum cleaner with a soft long-bristled brush attachment or a soft-bristled paint brush to remove loose dirt and dust accumulation on the electrical assemblies inside the cabinet.

Corrective Maintenance

Corrective maintenance consists of removal, disassembly, reassembly, and replacement of cabinet components. The following procedures are provided for components that may require corrective maintenance.

NOTE

Refer to the Maintenance chapter in the game kit operators manual for the corrective maintenance procedures for the player controls.

Removing the Display Shield and Bezel

Perform the following procedure to remove/replace the display shield and bezel (see Figure 2-1).

1. Remove the control panel as described in the Maintenance chapter of the game kit operators manual.
2. Use a Phillips screwdriver to remove the two screws securing the speaker grille to the cabinet.
3. Grasp the display shield on the bottom edge and gently pull it out about a half inch from the cabinet.
4. Gently lower the display shield to free it from the grooved moulding under the attraction panel.
5. Use a flat-head screwdriver to remove the staples, if any, securing the bezel to the cabinet.
6. Remove the bezel.

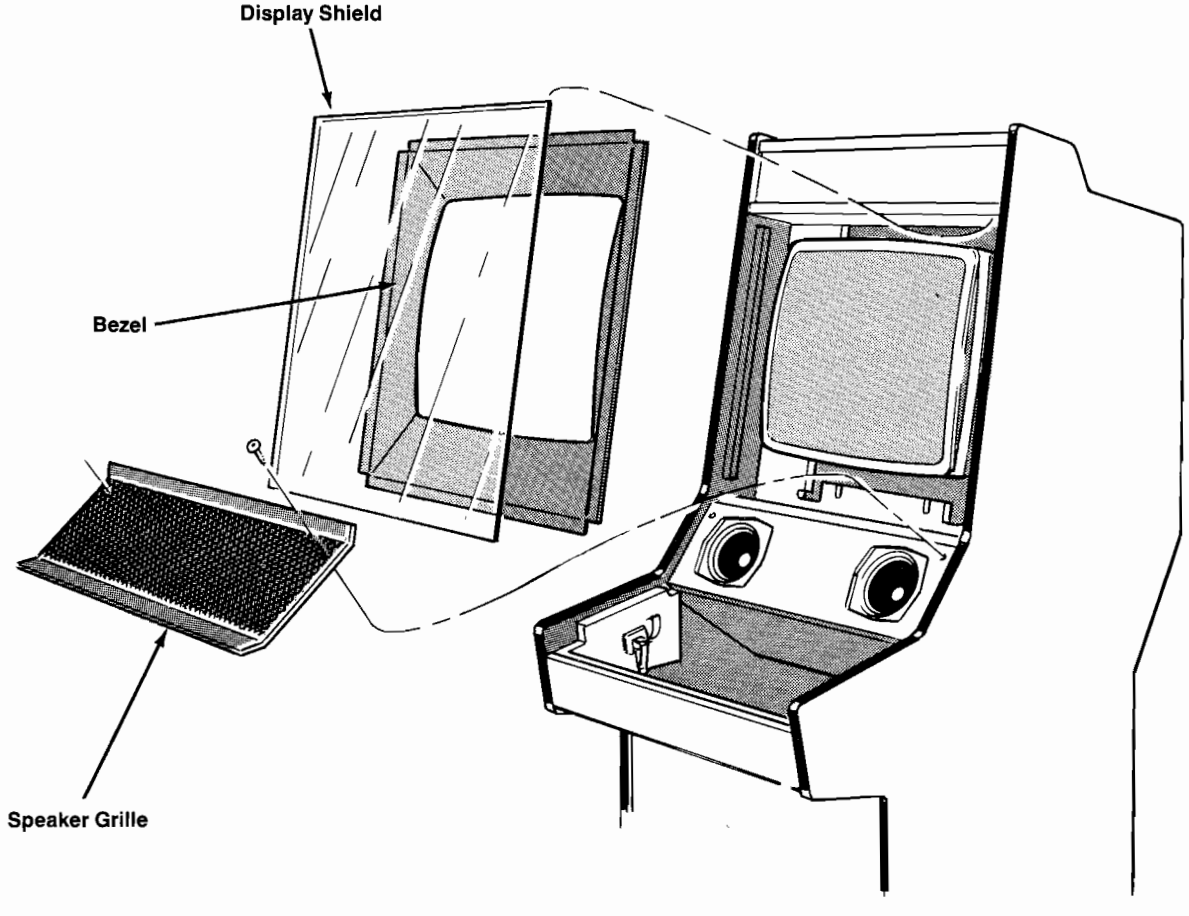

Figure 2-1 Display Shield and Bezel Removal

Removing the Display

⚠ WARNING ⚠

High Voltage

This display contains lethal high voltages. To avoid injury, do not attempt to service this display until you observe all precautions necessary for working on high-voltage equipment.

X-Radiation

This display has been designed to minimize X-radiation. However, to avoid possible exposure to soft X-radiation, NEVER modify the high-voltage circuitry.

Implosion Hazard

The cathode-ray tube may implode if struck or dropped. Shattered glass may cause injury within a 6-foot radius. Use care when handling the display.

Perform the following procedure to remove/replace the display (see Figure 2-2).

1. Turn the game off and wait two minutes. Unplug the game.
2. Use a Phillips screwdriver to remove the six screws securing the display-access panel to the top rear of the cabinet.
3. Remove the display shield and bezel as previously described.
4. Discharge the high-voltage from the cathode-ray tube (CRT) before proceeding. The display assembly contains a circuit for discharging the high voltage to ground when power is removed. However, to make certain, always discharge the display as follows.
   a. Attach one end of a large, well-insulated, 18-gauge jumper wire to ground.
   b. Momentarily touch the free end of the grounded jumper to the CRT anode by sliding it under the anode cap.
   c. Wait two minutes and repeat part b.
5. From the back of the cabinet, unplug the display-harness connectors and disconnect the ground wire.

⚠ WARNING ⚠

To avoid dropping the display assembly out of the game cabinet, use extreme care when removing the display-mounting nuts. We recommend that a second person *carefully* hold the display chassis from the back of the cabinet while the mounting nuts are being removed.

6. From the front of the cabinet, use a $\frac{3}{8}$-inch wrench to remove the four nuts and flat washers securing the display to the cabinet.
7. Carefully slide the display out through the front of the cabinet.
8. Replace the display in the reverse order of removal.

NOTE

Whenever the cathode-ray tube is replaced, re-adjust the brightness, purity, and convergence as described in the display manual.

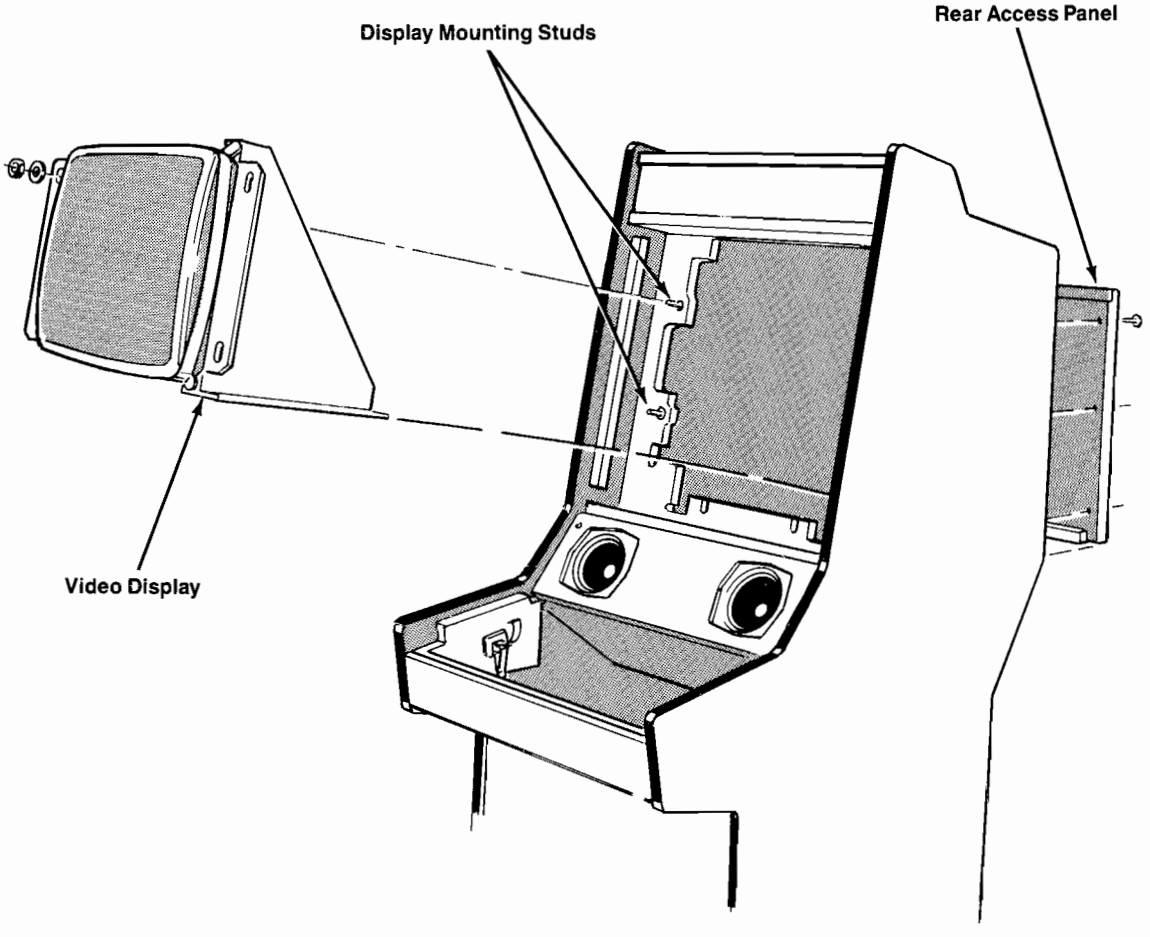

Figure 2-2 Display Removal

Removing the Main PCB

Perform the following procedure to remove/replace the Main PCB (see Figure 2-3).

NOTE

The procedure for removing the Cartridge PCB is included in the Maintenance chapter of the game conversion kit operators manual.

1. Turn the cabinet power off.
2. Unlock and remove the front-access panel from the cabinet.
3. Disconnect the harness connectors from the Main PCB.
4. Use a Phillips screwdriver to remove the six screws securing the ground plane to the cabinet.
5. Carefully remove the ground plane, with the PCB(s) attached, and place on a clean surface.
6. Use a Phillips screwdriver to remove the four screws securing the Main PCB to the ground plane.
7. Gently disconnect the Main PCB from the Cartridge PCB.
8. Replace the Main PCB in the reverse order of removal. Make sure that the Main PCB is fully inserted into the Cartridge PCB edge connectors and the ground strap is properly connected to the ground plane. Refer to Figure 2-3 for the ground strap and harness connector locations.

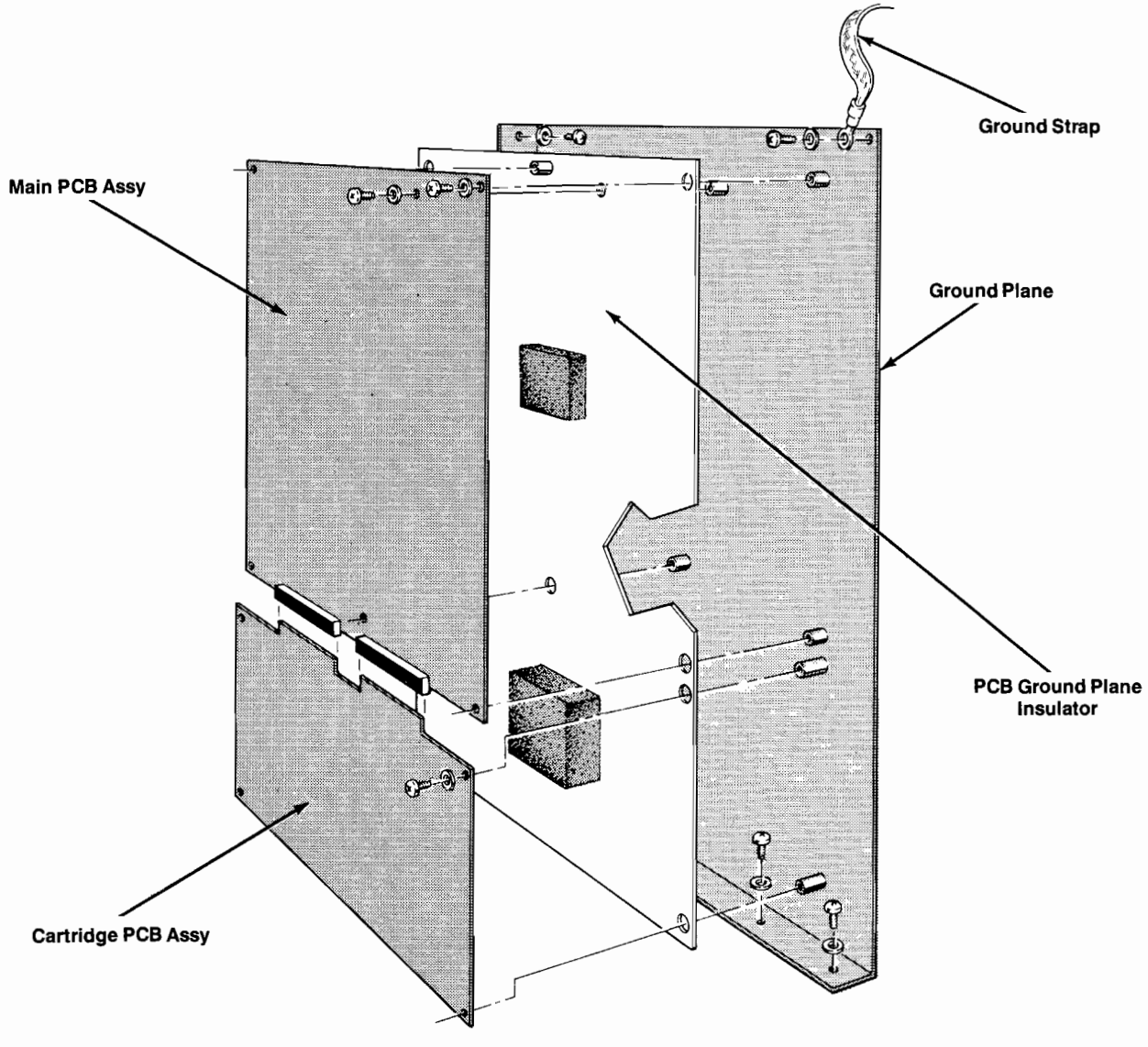

Figure 2-3 Main PCB Removal

Removing the Fluorescent-Light Assembly

Perform the following procedure to remove/replace the fluorescent-light assembly (see Figure 2-4).

1. Turn the game power off.
2. From the rear of the cabinet, use a Phillips screwdriver to remove the six screws securing the display-access panel to the cabinet.
3. Disconnect the fluorescent-light harness connector.
4. From the front of the cabinet, use a ⅛-inch hex driver to remove the three screws and washers securing the upper retainer to the top of the cabinet.
5. Grasp the top edge of the attraction shield and film and lift out of the cabinet.
6. Gently twist the fluorescent tube a quarter turn and remove from the sockets.
7. Use a Phillips screwdriver to remove the two screws securing the fluorescent-light bracket to the cabinet.
8. Lift the fluorescent-light assembly out of the front of the cabinet.
9. Replace the fluorescent-light assembly in the reverse order of removal.

Removing the Speakers

Perform the following procedure to remove/replace the speakers (see Figure 2-5).

1. Remove the control panel as described in the Maintenance chapter of the game kit operators manual.
2. Use a Phillips screwdriver to remove the two screws securing the speaker grille to the cabinet.
3. Use a Phillips screwdriver to remove the four screws securing each speaker to the cabinet.

CAUTION

Do not touch the speaker cones when handling the speakers. The cone material is fragile and can be easily damaged.

4. Lift the speaker out just far enough to disconnect the two speaker wires from the back of the speaker.
5. Replace the speaker in the reverse order of removal.

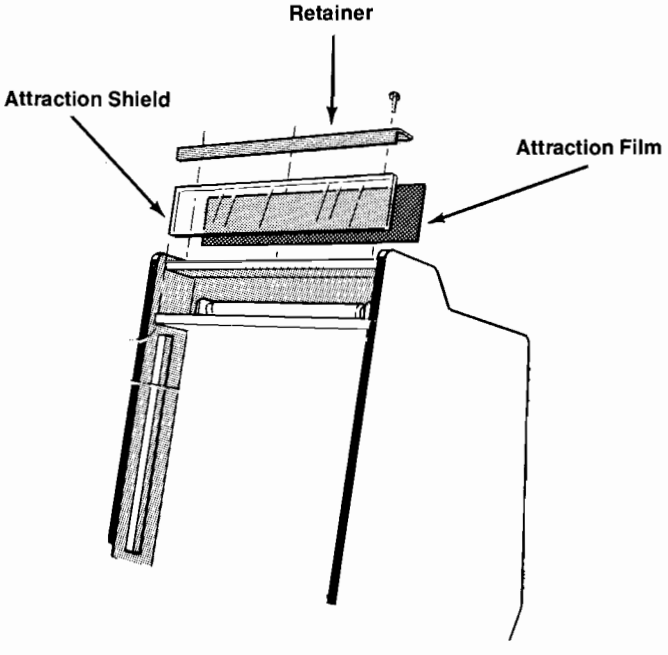

Figure 2-4 Fluorescent-Light Assembly Removal

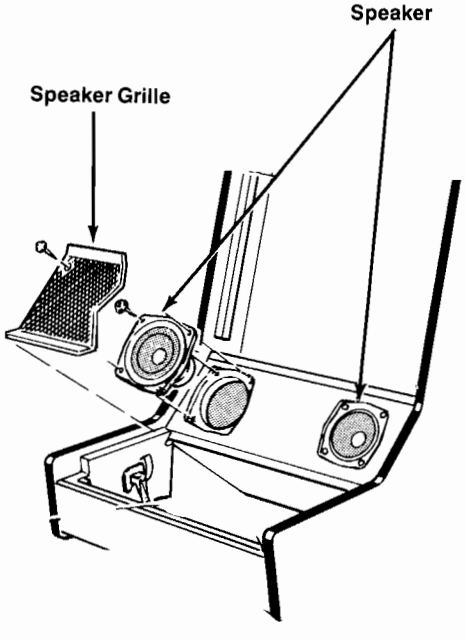

Figure 2-5 Speaker Removal

Troubleshooting

This chapter contains troubleshooting aids and techniques to assist service personnel when trouble is suspected in a game. Most troubles can be located quickly by following the information in this chapter. However, if problems persist, contact your Atari Games Customer Service office for assistance.

In addition to the troubleshooting information in this chapter, refer to *The Book, A Guide to Electronic Game Operation and Servicing*, available from Atari Games Inc., for additional information.

NOTE

We recommend that troubleshooting and repair procedures be performed by qualified service personnel.

Troubleshooting Aids

Troubleshooting aids are provided throughout the System I operators manual and Schematic Package Supplement, and also in the game kit operators manual and Schematic Package Supplement. The following information is intended to acquaint the service technician with the portions of these publications that contain useful troubleshooting and repair information.

Assembly and Component Locations

The illustrated parts lists in Chapter 4 of this manual and in the game kit operators manual illustrate the locations of assemblies and components. Printed-circuit board (PCB) illustrations aid in rapidly locating components shown on the corresponding schematic diagram.

Diagrams

The Schematic Package Supplement for this manual and for the game kit operators manual contains schematic diagrams with component locations, active component type numbers, and electrical values.

Troubleshooting Techniques

⚠ WARNING ⚠

The following steps may require power and should be performed only by knowledgeable service personnel.

The following troubleshooting steps start with a game that has no display and progresses to more extensive procedures for localizing the problem to an assembly or major circuit, and then to a defective component.

Check Fuses

Check for open fuses. Refer to the power supply parts list in Chapter 4 and to the 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.

Check Power-Supply Voltages

Improper operation of all circuits usually indicates a power supply problem. Be sure that the proper line voltage is available to the power supply (see Chapter 1). Check for correct output voltages.

Localize Trouble

Determine the trouble symptom. Use the wiring and schematic diagrams in the Schematic Package Supplement for this manual and the game conversion kit operators manual to determine which assemblies or major circuits could cause the trouble. Perform the self-test procedure provided in the game conversion kit operators manual.

Visual Check

Visually check for obvious problems in that portion of the game where the trouble is suspected. For example, check for loose or defective solder connections, integrated circuits loose in their sockets, loose cable connections, broken wires, and damaged PCBs or components.

Check Individual Components

Check soldered-in passive components (e.g., resistors, capacitors, diodes) 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 that could damage the substitute component.

Repair or Replace the Faulty Assembly

CAUTION

Soldered-in transistors and integrated circuits are difficult to remove without damaging the printed-circuit board or component. Refer to the information in this chapter pertaining to soldering and replacing integrated circuits and transistors.

Repair or replace the faulty part. Refer to Chapter 2 and information in this chapter for special removal and replacement procedures. Check for proper operation of the repaired circuit.

Soldering Techniques

Observe the following recommendations when removing or replacing components soldered to a PCB. Poor soldering practices can damage a PCB or heat-sensitive electrical components.

Choosing the proper soldering iron is essential before attempting to remove or replace soldered-in components. Excessive heat is a common cause of damage to a component or PCB. However, transient voltages from solder guns or improperly grounded soldering irons can also damage certain voltage-sensitive semiconductor devices. Refer to *Troubleshooting Static-Sensitive Devices* for more specific information.

A 15- to 27-watt pencil-tip soldering iron is recommended to avoid separating the etched circuit wiring from the board material and to avoid damaging active components. A temperature-controlled soldering station rated at 700° F with a fine cone or a very fine chisel tip can also be used.

CAUTION

Solder guns are not recommended for removing or replacing soldered-in components on a printed-circuit board. The added possibility for overheating, and the large transient voltage induced by the solder gun, could cause damage to heat- or voltage-sensitive devices.

The following additional equipment is recommended for removing and replacing soldered-in components:

- Solder Sucker—Hand-operated vacuum tool used to remove liquified solder from the PCB. Top-of-the-line Soldapullt® brand is recommended.
- Solder Wick—Resin-soaked copper braid used for removing excess solder from the lead connections on the PCB. See *Removing Integrated Circuits* for precautions relating to the use of a solder wick on a multi-layer PCB with plated-through holes.

- Flux Remover—Non-corrosive chemical used to clean foreign material from the PCB before soldering and to remove any flux residue where components have been replaced. Also used to clean any foreign material from the PCB during preventive maintenance. Isopropyl alcohol is recommended.
- Acid Brush—Small stiff-bristled paint or toothbrush used with flux remover to clean flux and other foreign material from the PCB.

Removing Integrated Circuits

The easiest and safest method for removing soldered-in integrated circuits (IC) from a PCB is to cut off each pin as close to the IC case as possible with a tip dyke (diagonal cutter) as shown in Figure 3-1.

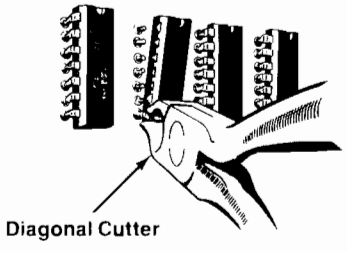

Figure 3-1 IC Removal (Cut Pin Method)

Use the proper soldering iron as previously described under *Soldering Techniques*. Then, to avoid excessive heat buildup in one area of the PCB, apply heat directly to each pin in a random order. Remove the loosened pin with the tip of the soldering iron or a needle-nose pliers as shown in Figure 3-2. Allow a moment for the PCB to cool before proceeding to the next pin. Apply just enough heat to remove any stubborn pins.

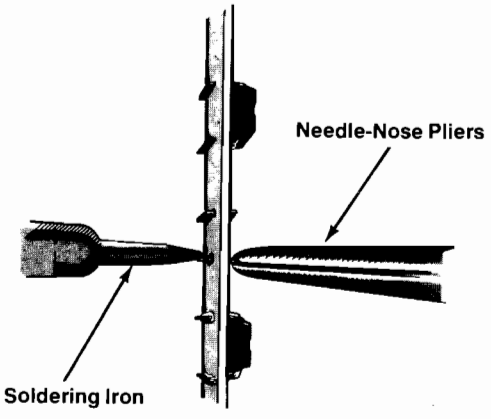

Figure 3-2 IC Pin Removal

For a multi-layer PCB with plated-through holes, use a solder sucker to remove the remaining solder from inside each hole as shown in Figure 3-3. If possible, suck the solder from the opposite side of the PCB from where the heat is applied.

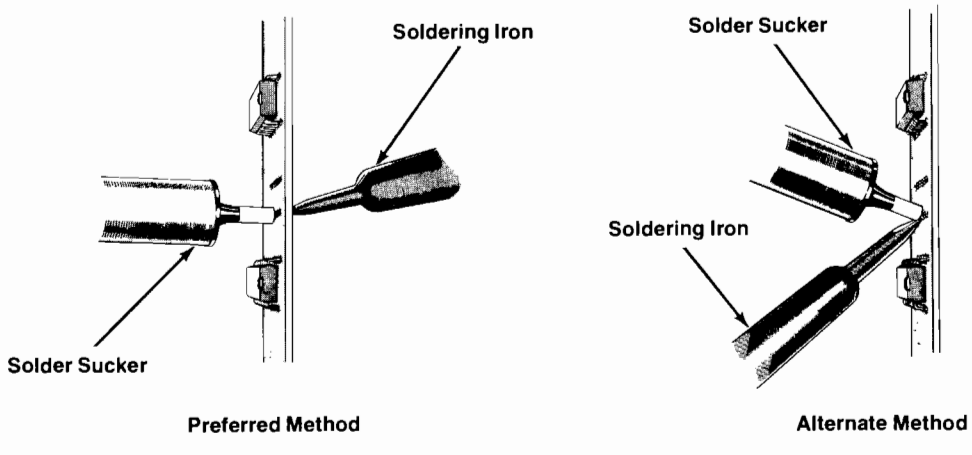

Figure 3-3 Solder Removal From Plated-Through Holes

Use a solder wick to remove excess solder from around the lead connection pads on the top and/or bottom surface of the PCB as shown in Figure 3-4.

CAUTION

Do not use a solder wick to remove solder from inside plated-through holes. The heat required for the solder wick to remove the solder from inside the hole could damage the PCB.

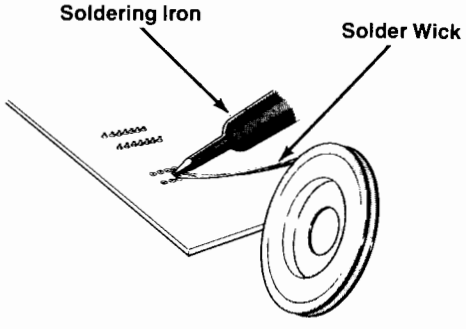

Figure 3-4 Solder Removal From Wire-Connection Pads

Troubleshooting Static-Sensitive Devices

Certain precautions must be taken when working with static-sensitive devices, (e.g., microprocessors, field-effect transistors (FET), complementary metal-oxide semiconductors (CMOS), and other large-scale integration (LSI) devices that use metal-oxide semiconductor (MOS) technology). Static charge buildup in a person's body or leakage from an improperly grounded soldering iron can cause static-sensitive device failure.

Before handling a static-sensitive device or a PCB with such devices attached to it, ground any static voltage that may have accumulated in your body by touching an object that has been earth grounded. A bare wire wrapped around your wrist and attached to an earth ground is effective when working extensively with static-sensitive devices. When soldering on a static-sensitive device, use a soldering iron with a properly grounded three-wire cord. (Refer to *Soldering Techniques* for a discussion of recommended soldering irons and procedures.)

A static-sensitive device may appear defective due to leakage on a PCB. Observe the precautions for grounding static voltages described in the preceding paragraph and clean both sides of the PCB with flux remover or an eraser before replacing what may be a good static-sensitive device. For discrete FETs, clean thoroughly between the gate, drain, and source leads.

Static-sensitive devices may be packaged in conductive foam or have a protective shorting wire attached to the pins. Remove the conductive foam just prior to inserting the device into its socket or soldering to a PCB. Remove the shorting wire only *after* the device is inserted into its socket or *after* all the leads are soldered in place.

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, a parts list is included for the hardware to mount the printed-circuit boards (PCBs) 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 appear first. Following these are numbers in sequence evaluated up to the hyphen, namely 00- through 99-, then 000598- 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 4

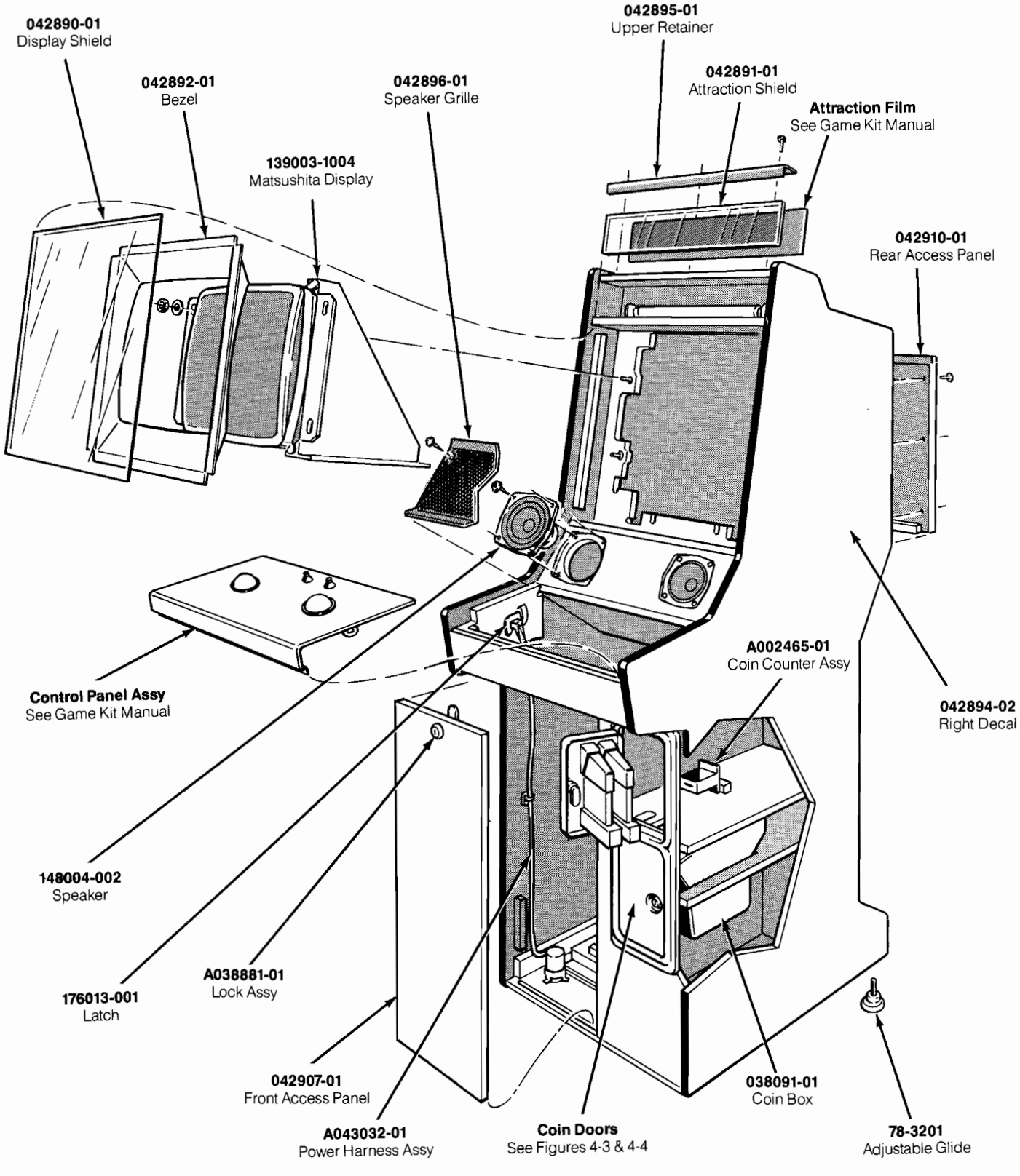

Figure 4-1 Cabinet-Mounted Assemblies
A042880-01 A

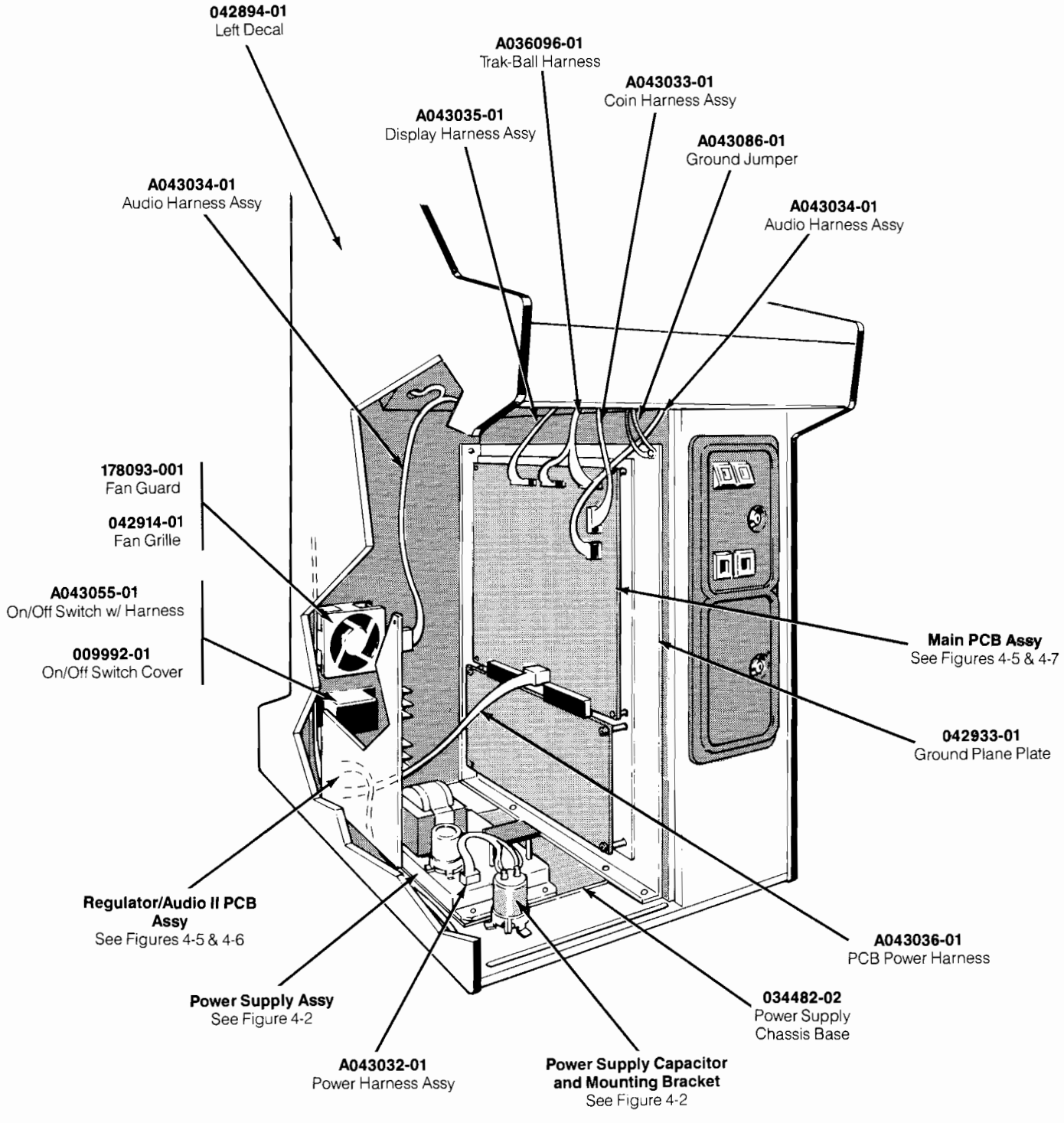

Figure 4-1 Cabinet-Mounted Assemblies, continued
A042880-01 A

Cabinet-Mounted Assemblies
Parts List

Part No.	Description
A002465-01	Coin Counter Assembly
A038881-01	Lock Assembly
A042881-01	Cabinet Assembly
A042884-01	Fluorescent Light Panel Assembly—consists of:
A005493-01	Light Harness Assembly
A037458-03	Light Kit Assembly
A037540-01	Ground Jumper Assembly
70-304	18-Inch, 15 W, Cool White Fluorescent Tube
72-6408S	#4 × ½-Inch Pan-Head Cross-Recessed Screw
79-561816P	Wire Nut
99-11006	Retaining Clip
038151-01	Jumper Wire
042920-01	Attraction Glass Panel
176015-110	#10 × ⅝-Inch Pan-Head Cross-Recessed Screw
A043032-01	Power Harness Assembly
A043033-01	Coin Harness Assembly
A043034-01	Audio Harness Assembly
A043035-01	Display Harness Assembly
A043036-01	PCB Power Harness Assembly
A043037-01	Fan with Harness Assembly
A043055-01	On/Off Switch with Harness Assembly
A043086-01	Ground Jumper
	The following are the technical information supplements to this game cabinet:
TM-220	19-Inch Matsushita Color Raster Display Manual. (Acceptable substitutes are TM-160—Electrohome and TM-210—Disco)
TM-277	Atari System I Operators Manual
SP-277	Atari System I Schematic Package
78-3201	Adjustable Glide
78-6900402	¼-Inch × ⅛-Inch Foam Tape (used on control panel and attraction glass)
009992-01	On/On Switch Cover
037768-01	Vent Grille
038091-01	Molded Coin Box
042890-01	Display Shield
042891-01	Attraction Shield
042892-01	Display Bezel
042894-01	Left Side Panel Decal
042894-02	Right Side Panel Decal
042895-01	Attraction Panel Upper Retainer
042896-01	Speaker Grille
042907-01	Front Access Panel
042910-01	Rear Access Panel
042914-01	Fan Grille
042933-01	Power Supply Ground Plane Plate
139003-1004	19-Inch Color Raster Matsushita Display (Acceptable substitutes are 92-049—Electrohome and 139003-1006—Disco)
148004-002	5-Inch Round, 4-Ohm High-Fidelity Speaker
176013-001	Spring Draw Latch
178093-001	Fan Guard

N O T E S

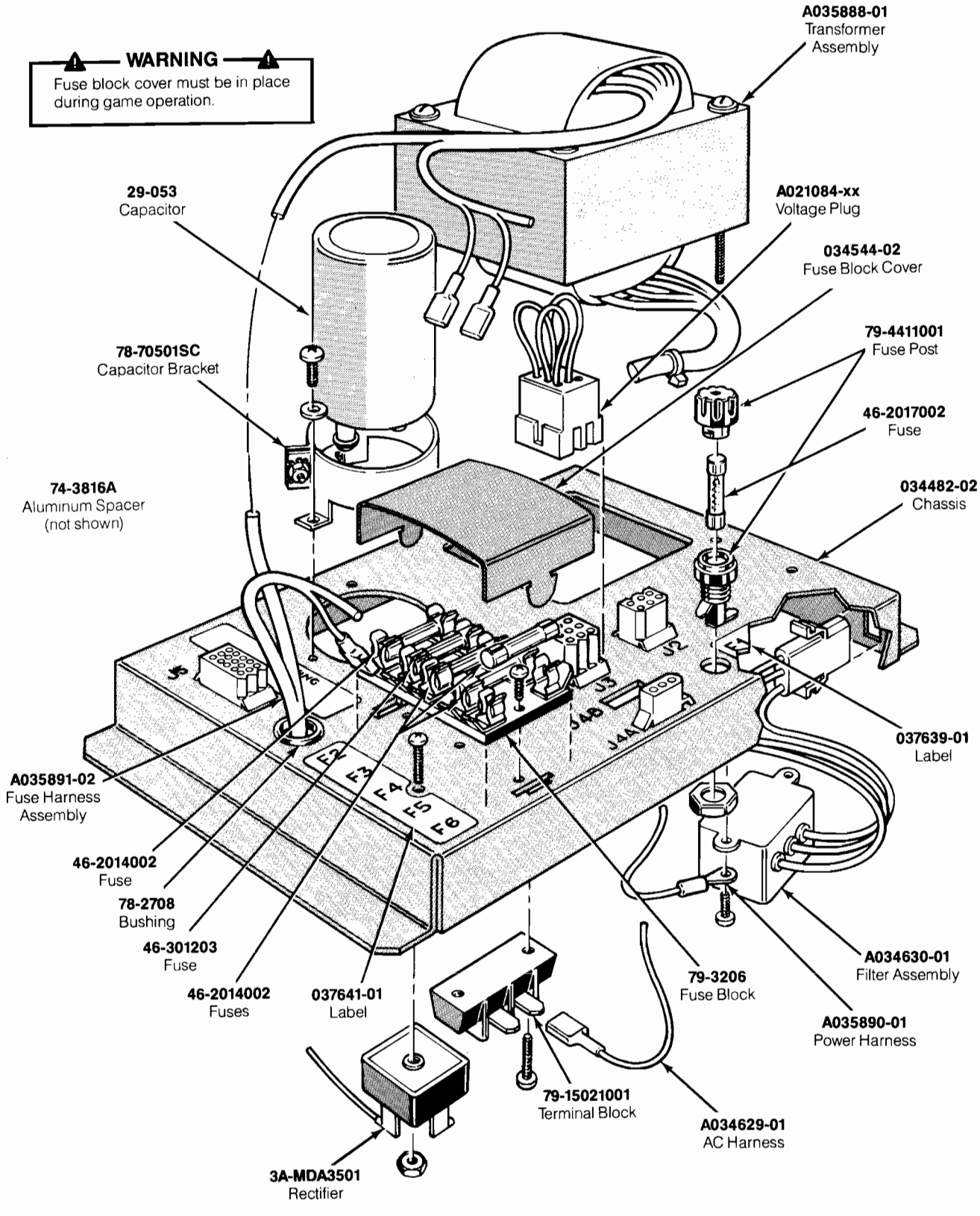

Figure 4-2 Power Supply Assembly
A037671-16 M

Power Supply Assembly
Parts List

Designator	Description	Part No.
C1	27,000 μF, 15 VDC Electrolytic Capacitor	29-053
C1	2-Inch Capacitor Mounting Bracket	78-70501SC
CR1	Type-MDA3501 Bridge Rectifier	3A-MDA3501
F1	Fuse Label	037639-01
F1	4 A, 250 V, 3AG Slow-Blow Glass Cartridge-Type Fuse (Acceptable substitute is part no. 46-2014001)	46-2014002
F1	7 A, 250 V, 3AG Slow-Blow Glass Cartridge-Type Fuse	46-2017002
F1	Panel-Mounting 3AG Cartridge-Type Fuse Post	79-4411001
F2	5-Position 3AG Fuse Block with ¼-Inch Terminals	79-3206
F2-F6	Fuse Harness Assembly	A035891-02
F2-F6	Fuse Block Cover	034544-02
F2-F6	Fuse Label	037641-02
F3	25 A, 32 V, 3AG Slow-Blow Glass Cartridge-Type Fuse	46-301253
F4	2-Circuit Single-Row Terminal Block	79-15021001
FL1	RFI Filter Assembly	A034630-01
J2	Power Harness Assembly	A035890-01
J3	Voltage Block Assembly (105–135 VAC—yellow wire)	A021084-02
J4A	AC Harness Assembly	A034629-01
T1	Transformer Assembly	A035888-01
	#8 × 1-Inch Unthreaded Aluminum Spacer	74-3816A
	Nylon 6/6 Hole Bushing with ⅜-Inch Inside Diameter × $^{55}/_{64}$-Inch Outside Diameter	78-2708
	Power Supply Chassis Base	034482-02

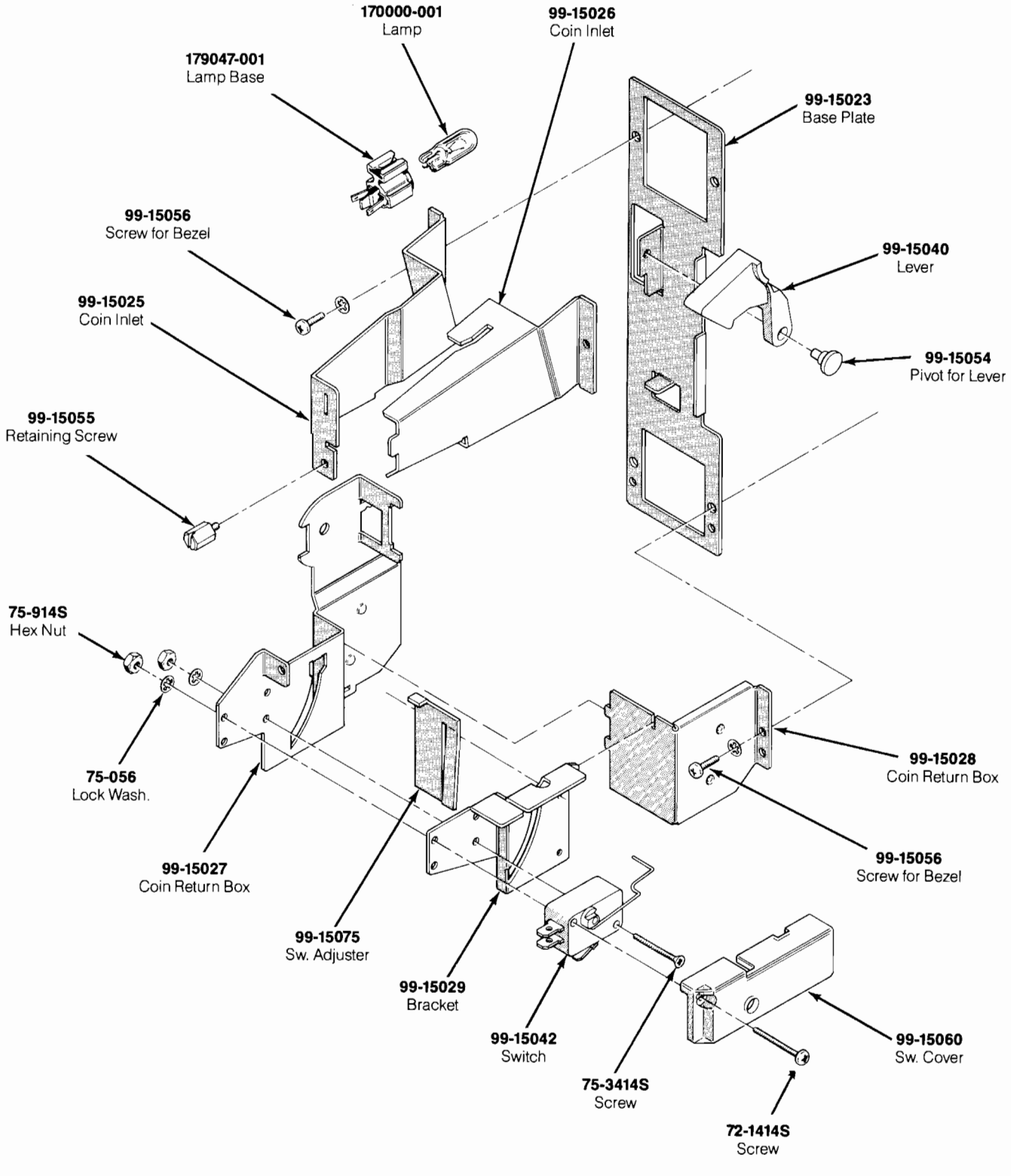

Figure 4-3 Coin Controls, Inc. Coin Door Assembly 171034-xxx A

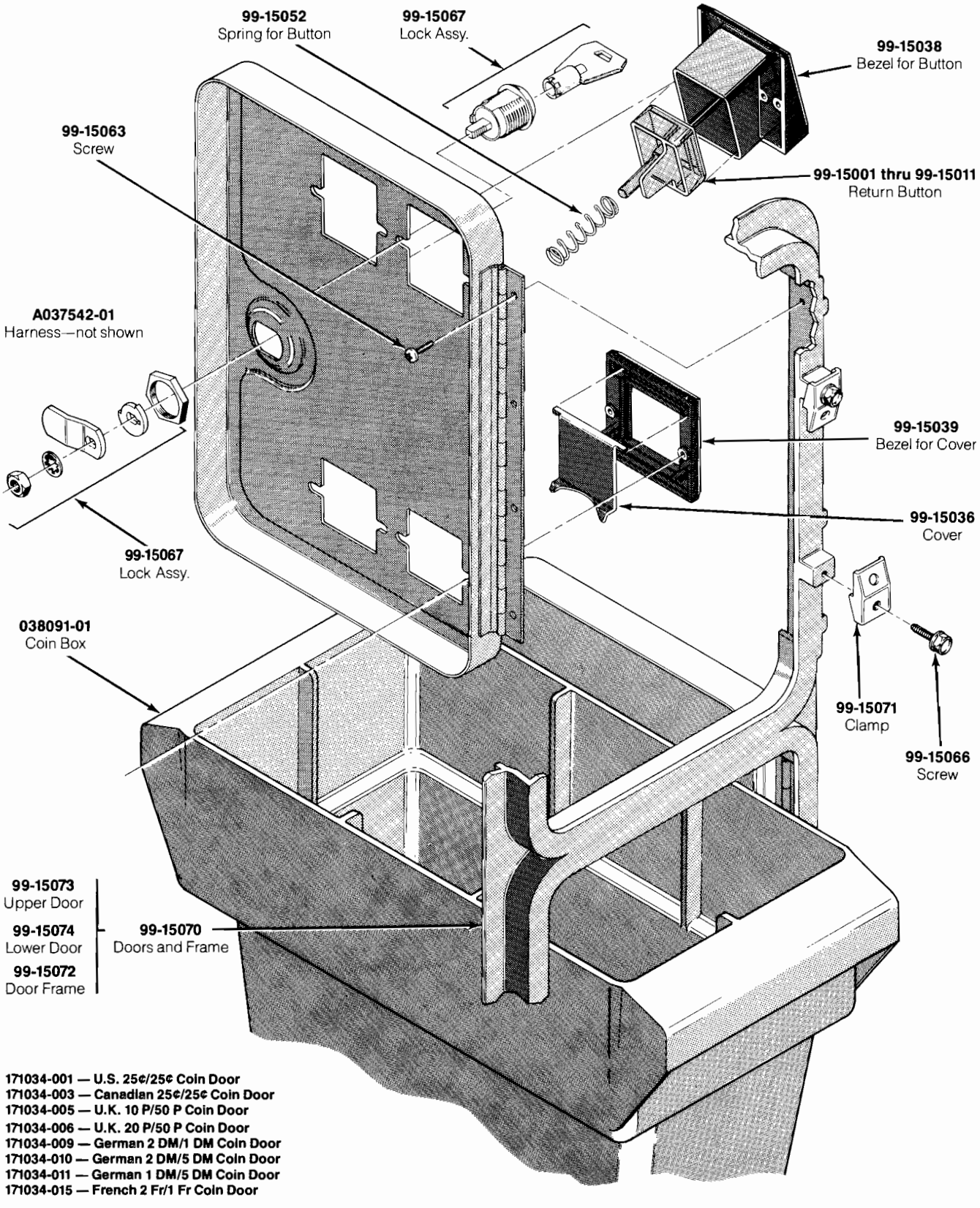

Figure 4-3 Coin Controls, Inc. Coin Door Assembly, continued
171034-xxx A

Coin Controls, Inc. Coin Door Assembly
Parts List

Part No.	Description
A036597-01	Harness Assembly (Ireland-built cabinet only)
A037542-01	Harness Assembly
72-1414S	#4-40 × 7/8-Inch Cross-Recessed Pan-Head Steel Machine Screw
75-056	#6 Internal-Tooth Zinc-Plated Steel Lock Washer
75-914S	#4-40 Steel Machine Hex Nut
75-3414S	#4-40 × 7/8-Inch 82° Cross-Recessed Flat-Head Steel Machine Screw
99-15001	Coin Return Button with U.S. 25-Cent 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-Cent Price Plate
99-15011	Coin Return Button with Italian 100 Lire Price 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 Button
99-15042	Coin Switch for U.S. 25 Cents
99-15052	Spring for Coin Return Button
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
99-15083	Base Plate—includes:
99-15040	Lever
99-15054	Pivot for Lever
038091-01	Coin Box—not included in assembly (Acceptable substitute is part no. A037491-01)
170000-001	6.3 V Miniature Wedge-Base Incandescent Lamp
171006-035	Metal Coin Mechanism
171050-001	Dual Entry Face Plate
179047-001	Lamp Base

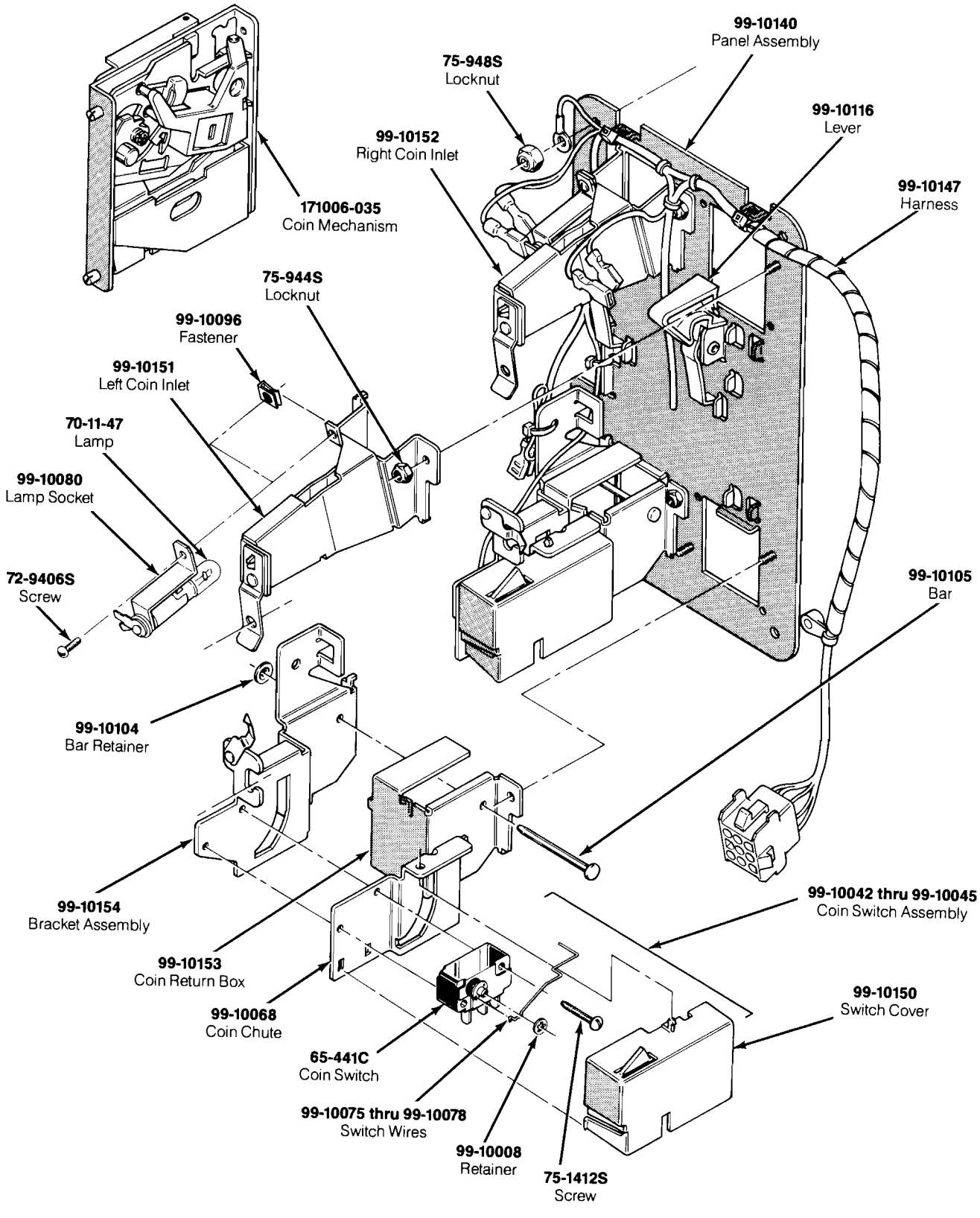

Figure 4-4 Coin Acceptors, Inc. Coin Door Assembly 171027-001 A

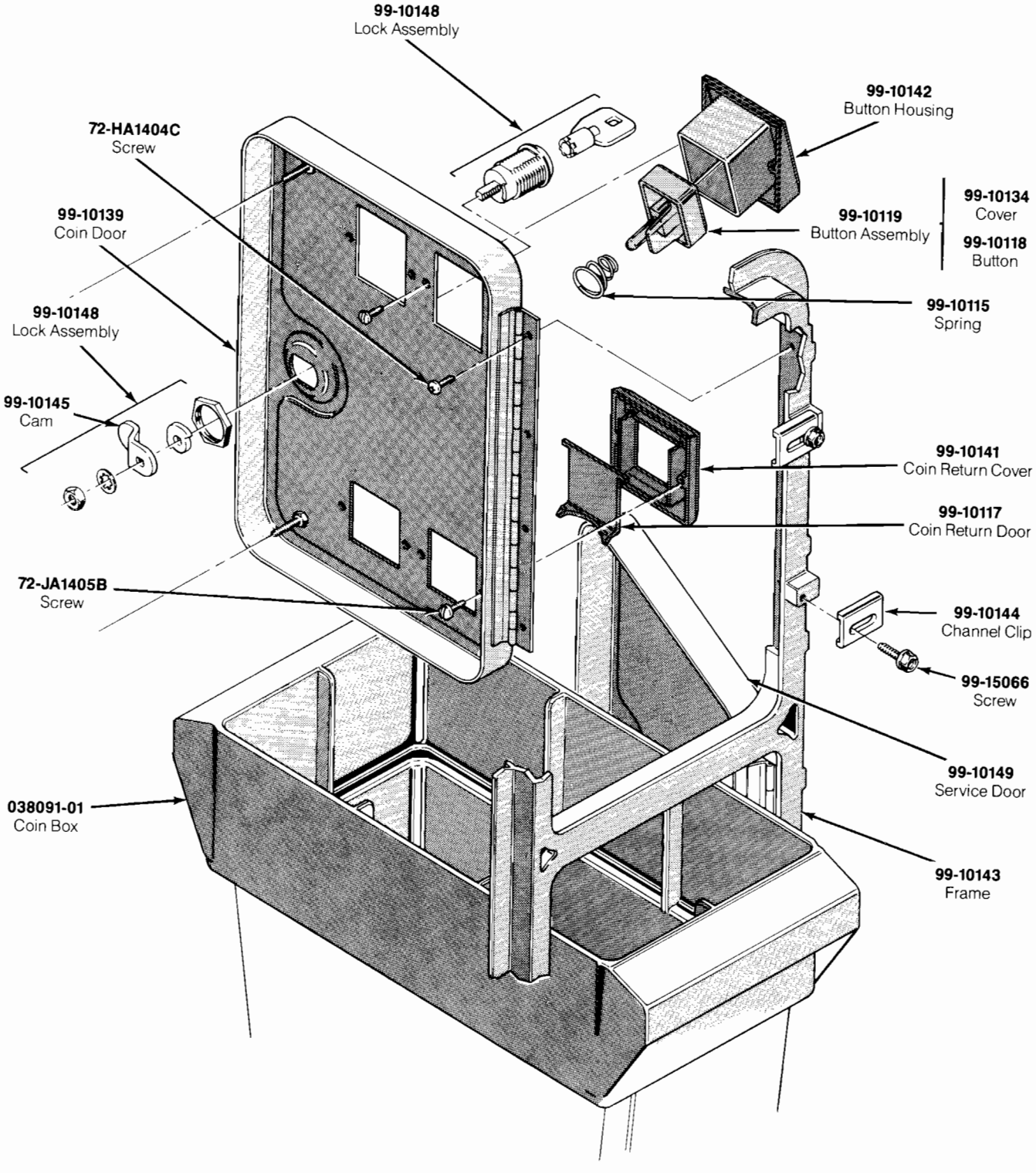

Figure 4-4 Coin Acceptors, Inc. Coin Door Assembly, continued
171027-001 A

Coin Acceptors, Inc. Coin Door Assembly Parts List

Part No.	Description
65-441C	Coin Switch
70-11-47	Miniature Bayonet Lamp
72-9406S	#4-40 × ⅜-Inch Truss-Head Screw
72-HA1404C	#4-40 × ¼-Inch Pan-Head Screw
72-JA1405B	#4-40 × .31-Inch Pan-Head Screw
75-1412S	#4-40 × ¾-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 99-10043)
99-10076	Switch Wire (included in coin switch assembly 99-10042)
99-10077	Switch Wire (included in coin switch assembly 99-10044)
99-10078	Switch Wire (included in coin switch assembly 99-10045)
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	Die-Cast Coin Return Cover
99-10142	Die-Cast Button Housing
99-10143	Coin Door Frame
99-10144	Channel Clip
99-10145	Cam
99-10147	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
99-15066	Screw for Clamp
038091-01	Coin Box
171006-035	Metal Coin Mechanism for U.S. $.25
177010-238	#8-32 Hex Locknut

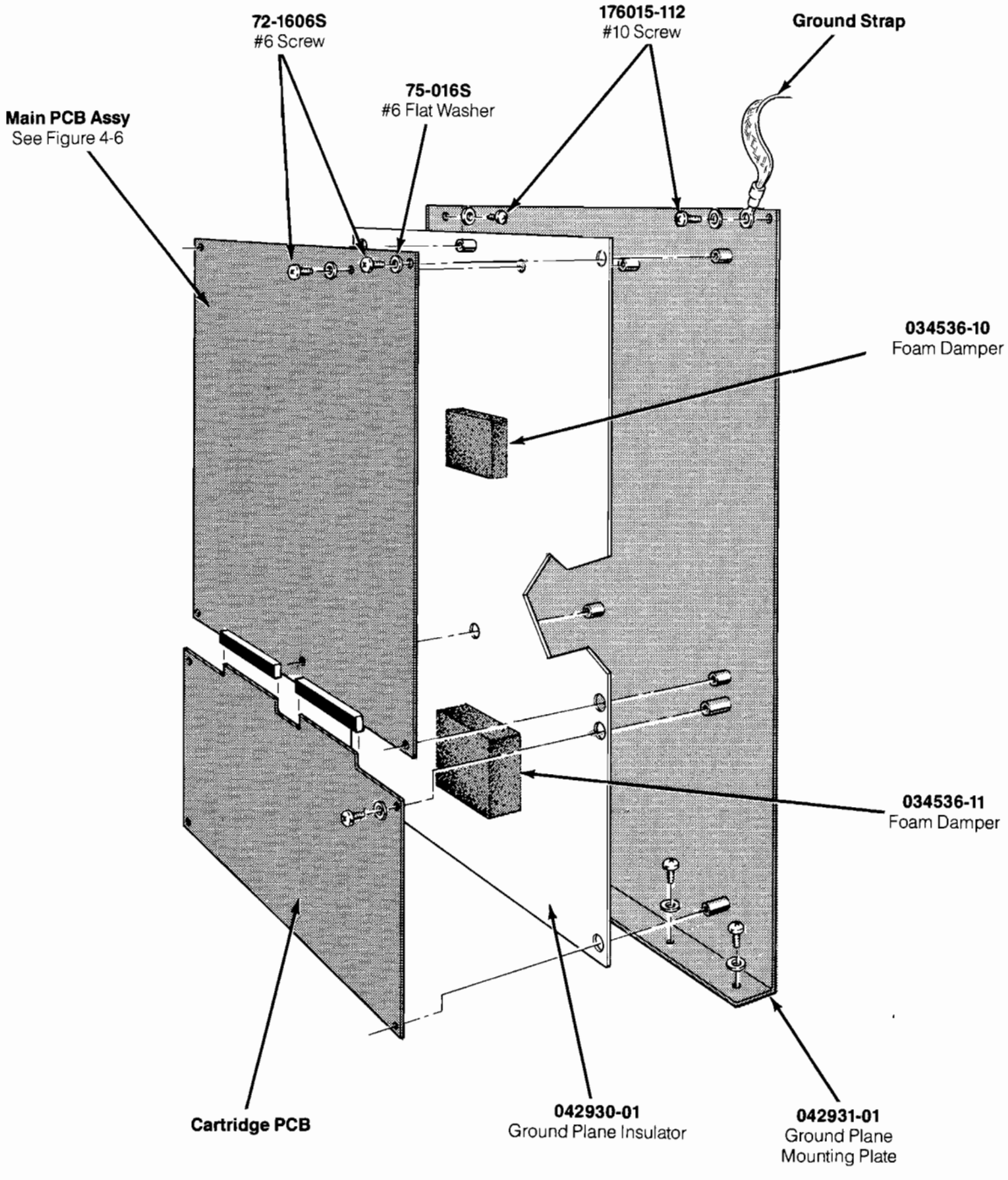

Figure 4-5 Printed-Circuit Board Mounting Hardware A042932-01 A

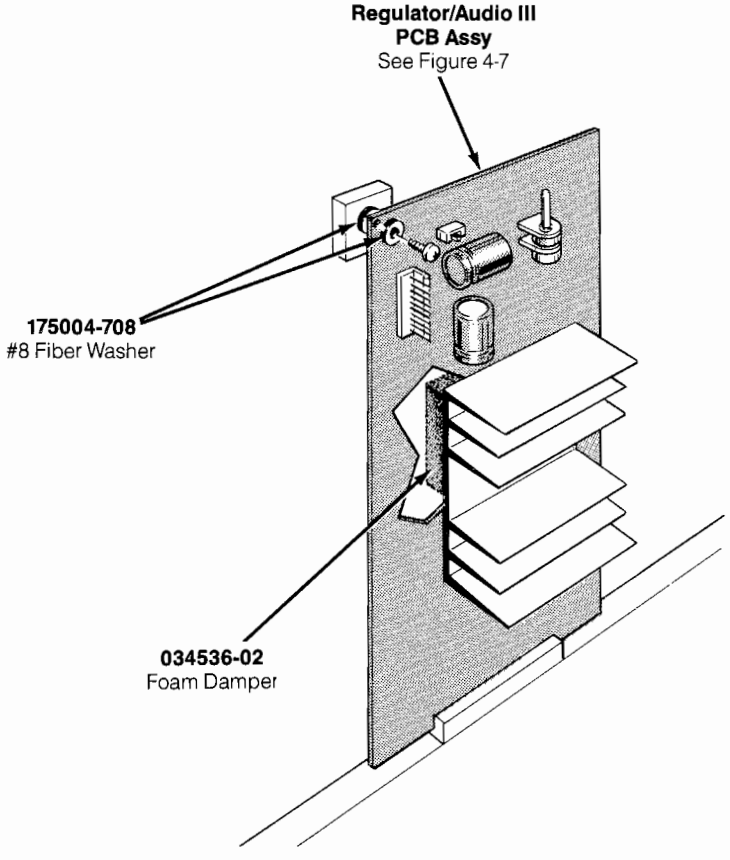

Figure 4-5 Printed-Circuit Board Mounting Hardware, continued

Printed-Circuit Board Mounting Hardware Parts List

Part No.	Description
A042854-21	Atari System I Main PCB Assembly—see Figure 4-6
A043046-01	Regulator/Audio III PCB Assembly—see Figure 4-7
034536-02	3×3×½-Inch Foam Vibration Damper
034536-10	3×6×.62-Inch Foam Vibration Damper
034536-11	3×6×.81-Inch Foam Vibration Damper
042930-01	PCB Ground Plane Insulator
042931-01	PCB Ground Plane Mounting Plate
72-1606S	#6 × ⅜-Inch Cross-Recessed, Pan-Head Machine Screw
75-016S	#6 Flat Washer
175004-708	#8 Fiber Washer
176015-112	#10 × ¾-Inch Cross-Recessed, Pan-Head, Deep-Threaded Screw

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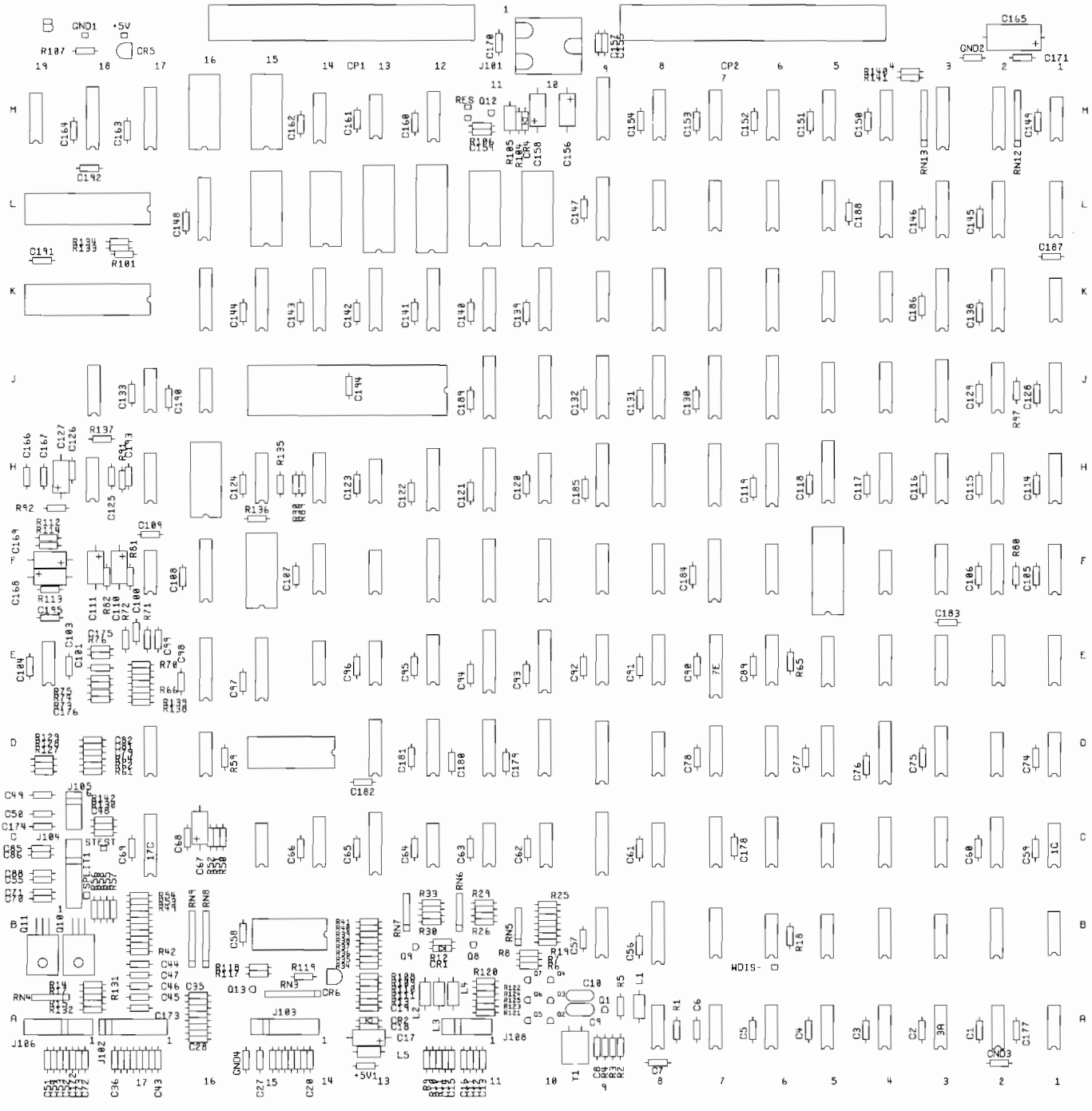

Figure 4-6 Main Printed-Circuit Board Assembly A042854-21 A

Main Printed-Circuit Board Assembly Parts List

Designator	Description	Part No.
	Capacitors	
C1–8	0.1 μF, 50 V, Ceramic Capacitor	122002-104
C9	100 pF, 100 V, Mica Capacitor	128002-101
C10	39 pF, 100 V, Mica Capacitor	128002-390
C11–13	470 pF, 50 V, Ceramic Capacitor	122013-471
C14–16	1000 pF, 100 V, Ceramic Capacitor	122016-102
C17	10 μF, 25 V, Electrolytic Capacitor	24-250106
C18, C19	0.1 μF, 50 V, Ceramic Capacitor	122002-104
C20–27	0.01 μF, 25 V, Ceramic Capacitor	122005-103
C28–48	0.1 μF, 50 V, Ceramic Capacitor	122002-104
C49, C50	0.01 μF, 25 V, Ceramic Capacitor	122005-103
C51–66	0.1 μF, 50 V, Ceramic Capacitor	122002-104
C67	10 μF, 25 V, Electrolytic Capacitor	24-250106
C68–79	0.1 μF, 50 V, Ceramic Capacitor	122002-104
C81, C82	0.1 μF, 50 V, Ceramic Capacitor	122002-104
C85, C86	0.1 μF, 50 V, Ceramic Capacitor	122002-104
C88–98	0.1 μF, 50 V, Ceramic Capacitor	122002-104
C99–100	1000 pF, 100 V, Ceramic Capacitor	122016-102
C101	0.001 μF, 50 V, Ceramic Capacitor	122002-102
C103–109	0.1 μF, 50 V, Ceramic Capacitor	122002-104
C110, C111	1 μF, 50 V, Electrolytic Capacitor	24-500105
C114–126	0.1 μF, 50 V, Ceramic Capacitor	122002-104
C127	10 μF, 25 V, Electrolytic Capacitor	24-250106
C128–133	0.1 μF, 50 V, Ceramic Capacitor	122002-104
C138–155	0.1 μF, 50 V, Ceramic Capacitor	122002-104
C156	10 μF, 25 V, Electrolytic Capacitor	24-250106
C157	0.1 μF, 50 V, Ceramic Capacitor	122002-104
C158	10 μF, 25 V, Electrolytic Capacitor	24-250106
C159–164	0.1 μF, 50 V, Ceramic Capacitor	122002-104
C165	100 μF, 35 V, Electrolytic Capacitor	24-350107
C166	0.0027 μF, 50 V, Ceramic Capacitor	122015-272
C167	0.0027 μF, 50 V, Ceramic Capacitor	122015-272
C168	10 μF, 25 V, Electrolytic Capacitor	24-250106
C169	1 μF, 50 V, Electrolytic Capacitor	24-500105
C170–174	0.1 μF, 50 V, Ceramic Capacitor	122002-104
C175–176	1000 pF, 100 V, Ceramic Capacitor	122016-102
C177–194	0.1 μF, 50 V, Ceramic Capacitor	122002-104
C195	1000 pF, 100 V, Ceramic Capacitor	122016-102
	Connectors	
J101	12-Position Header Connector	179069-012
J102–J104	11-Position Square Pin Header Connector	179118-011
J105	6-Position Square Pin Header Connector	179118-006
J106	11-Position Square Pin Header Connector	179118-011
J108	8-Position Square Pin Header Connector	179118-008
P1, P2	80-Position Card Edge Connector	179221-180

(continued on next page)

Main Printed-Circuit Board Assembly Parts List, continued

Designator	Description	Part No.
	Diodes	
CR1–2	Type-1N4148 Diode	131033-001
CR4	Type-1N756A Diode	32-1N756A
CR5–6	Type-MV5053 Light-Emitting Diode	38-MV5053
	Inductors	
L1	100 μH Inductor	141002-001
L2–4	1 μH Inductor	141007-001
L5	68 μH Inductor	141016-008
	Integrated Circuits	
1A	Type-74LS86 Integrated Circuit	37-74LS86
1B	Type-74LS74 Integrated Circuit	37-74LS74
1C	Type-74S10 Integrated Circuit	137236-001
1D	Type-74S08 Integrated Circuit	37-74S08
1E	Type-74LS153 Integrated Circuit	37-74LS153
1F	Type-74S163 Integrated Circuit	137274-001
1H	Type-74S163 Integrated Circuit	137274-001
1J	Type-74S163 Integrated Circuit	137274-001
1K	Type-74LS74 Integrated Circuit	37-74LS74
1L–4L	1024 × 4, 45 ns Static RAM Integrated Circuit	137199-002
1M	Type-74S30 Integrated Circuit	137407-001
2A	Type-74S02 Integrated Circuit	37-74S02
2B	Type-74LS194 Integrated Circuit	37-74LS194
2C	Type-74LS138 Integrated Circuit	137177-001
2D	Type-74LS04 Integrated Circuit	37-74LS04
2E	Type-74LS153 Integrated Circuit	37-74LS153
2F	Type-74S163 Integrated Circuit	137274-001
2H	Type-74S163 Integrated Circuit	137274-001
2J	Type-74S163 Integrated Circuit	137274-001
2K	Type-74S374 Integrated Circuit	137206-001
2M	Type-74LS244 Integrated Circuit	37-74LS244
3A	Type-74LS74 Integrated Circuit	37-74LS74
3B	Type-74LS32 Integrated Circuit	37-74LS32
3C	Type-74LS153 Integrated Circuit	37-74LS153
3D	Type-74LS139 Integrated Circuit	37-74LS139
3E	Type-82S129, 50 ns PROM Integrated Circuit	136032-101
3F	Type-74LS378 Integrated Circuit	137305-001
3H	Type-74LS174 Integrated Circuit	37-74LS174
3J	Type-74LS273 Integrated Circuit	37-74LS273
3K	Type-74S374 Integrated Circuit	137206-001
3M	Type-74LS244 Integrated Circuit	37-74LS244
4A	Type-74LS14 Integrated Circuit	37-74LS14
4B	Type-74LS194 Integrated Circuit	37-74LS194
4C	Type-74LS153 Integrated Circuit	37-74LS153
4D	Type-74S273 Integrated Circuit	137247-001
4E	Type-74LS163A Integrated Circuit	37-74LS163A

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Main Printed-Circuit Board Assembly Parts List, continued

Designator	Description	Part No.
4F	Type-74LS32 Integrated Circuit	37-74LS32
4H	Type-74LS153 Integrated Circuit	37-74LS153
4J	Type-74LS139 Integrated Circuit	37-74LS139
4K	Type-74LS151 Integrated Circuit	37-74LS151
4M	Type-74S189 Integrated Circuit	37-74S189
5A	Type-74LS197 Integrated Circuit	137240-001
5B	Type-74LS74 Integrated Circuit	37-74LS74
5C	Type-74LS04 Integrated Circuit	37-74LS04
5D	Type-74LS163A Integrated Circuit	37-74LS163A
5E	Type-82S129, 50 ns PROM Integrated Circuit	136032-102
5F	Type-2364, 300 ns ROM Integrated Circuit (Acceptable substitute is part no. 136032-107)	136032-104
5H	Type-74LS273 Integrated Circuit	37-74LS273
5J	Type-74LS153 Integrated Circuit	37-74LS153
5K	Type-74LS174 Integrated Circuit	37-74LS174
5L	Type-74LS283 Integrated Circuit	137204-001
5M	Type-74S189 Integrated Circuit	37-74S189
6A	Type-74LS74 Integrated Circuit	37-74LS74
6B	Type-74LS08 Integrated Circuit	37-74LS08
6C	Type-74LS153 Integrated Circuit	37-74LS153
6D	Type-74LS163A Integrated Circuit	37-74LS163A
6E	Type-74S163 Integrated Circuit	137274-001
6F	Type-74LS163A Integrated Circuit	37-74LS163A
6H	4k × 4, 55 ns Static RAM Integrated Circuit	137360-001
6J	4k × 4, 55 ns Static RAM Integrated Circuit	137360-001
6K	Type-74LS273 Integrated Circuit	37-74LS273
6L	Type-74LS283 Integrated Circuit	137204-001
6M	Type-74LS257 Integrated Circuit	37-74LS257
7A	Type-74S74 Integrated Circuit	37-74S74
7B	Type-74LS191 Integrated Circuit	37-74LS191
7C	Type-74LS153 Integrated Circuit	37-74LS153
7D	Type-74S175 Integrated Circuit	37-74S175
7E	Type-74LS273 Integrated Circuit	37-74LS273
7F	Type-82S153, 50 ns PAL Integrated Circuit	136032-103
7H	4k × 4, 55 ns Static RAM Integrated Circuit	137360-001
7J	4k × 4, 55 ns Static RAM Integrated Circuit	137360-001
7K	Type-74LS273 Integrated Circuit	37-74LS273
7L	Type-74LS283 Integrated Circuit	137204-001
7M	Type-74LS257 Integrated Circuit	37-74LS257
8A	Type-74S74 Integrated Circuit	37-74S74
8B	Type-74S240 Integrated Circuit	137416-001
8C	Type-74S260 Integrated Circuit	37-74S260
8D	Type-74LS125 Integrated Circuit	137317-001
8E	Type-74LS163A Integrated Circuit	37-74LS163A
8F	Type-74LS153 Integrated Circuit	37-74LS153

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Main Printed-Circuit Board Assembly Parts List, continued

Designator	Description	Part No.
8H	4k × 4, 55 ns Static RAM Integrated Circuit	137360-001
8J	4k × 4, 55 ns Static RAM Integrated Circuit	137360-001
8K	Type-74LS273 Integrated Circuit	37-74LS273
8L	Type-74LS283 Integrated Circuit	137204-001
8M	Type-74LS257 Integrated Circuit	37-74LS257
9B	Type-74LS163A Integrated Circuit	37-74LS163A
9C	Type-74LS273 Integrated Circuit	37-74LS273
9D	Type-74LS374 Integrated Circuit	37-74LS374
9E	Type-74LS191 Integrated Circuit	37-74LS191
9F	Type-74LS191 Integrated Circuit	37-74LS191
9H	4k × 4, 55 ns Static RAM Integrated Circuit	137360-001
9J	4k × 4, 55 ns Static RAM Integrated Circuit	137360-001
9K	Type-74LS174 Integrated Circuit	37-74LS174
9L	Type-74LS244 Integrated Circuit	37-74LS244
9M	Type-74LS374 Integrated Circuit	37-74LS374
10C	Type-7407 Integrated Circuit	37-7407
10D	1024 × 4, 35 ns Static RAM Integrated Circuit	137199-001
10E	Type-74LS273 Integrated Circuit	37-74LS273
10F	Type-74LS273 Integrated Circuit	37-74LS273
10H	Type-74LS153 Integrated Circuit	37-74LS153
10J	Type-74LS245 Integrated Circuit	37-74LS245
10K	Type-74LS244 Integrated Circuit	37-74LS244
10L	150 ns Static RAM Integrated Circuit	137211-001
11C	Type-7407 Integrated Circuit	37-7407
11D	1024 × 4, 35 ns Static RAM Integrated Circuit	137199-001
11E	Type-74LS273 Integrated Circuit	37-74LS273
11F	Type-74LS244 Integrated Circuit	37-74LS244
11H	Type-74LS373 Integrated Circuit	37-74LS373
11J	Type-74LS245 Integrated Circuit	37-74LS245
11K	Type-74LS373 Integrated Circuit	37-74LS373
11L	150 ns Static RAM Integrated Circuit	137211-001
12C	Type-7407 Integrated Circuit	37-7407
12D	1024 × 4, 35 ns Static RAM Integrated Circuit	137199-001
12E	Type-74S151 Integrated Circuit	37-74S151
12F	Type-74LS245 Integrated Circuit	37-74LS245
12H	Type-74LS245 Integrated Circuit	37-74LS245
12K	Type-74LS245 Integrated Circuit	37-74LS245
12L	Type-23128, 200 ns, ROM Integrated Circuit (Acceptable substitute is part no. 136032-109)	136032-106
12M	Type-74LS163A Integrated Circuit	37-74LS163A
13C	Type-74LS273 Integrated Circuit	37-74LS273
13D	1024 × 4, 35 ns Static RAM Integrated Circuit	137199-001
13E	Type-74LS02 Integrated Circuit	37-74LS02
13F	Type-74LS32 Integrated Circuit	37-74LS32
13H	Type-74LS20 Integrated Circuit	37-74LS20

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Main Printed-Circuit Board Assembly
Parts List, continued

Designator	Description	Part No.
13/14J	Type-68010-L8 Integrated Circuit Microprocessor	137414-001
13L	Type-23128, 200 ns ROM Integrated Circuit (Acceptable substitute is part no. 136032-108)	136032-105
13K	Type-74LS245 Integrated Circuit	37-74LS245
13M	Type-74LS32 Integrated Circuit	37-74LS32
14/15B	LETA Integrated Circuit	137304-1001
14/15D	ADC0809 Integrated Circuit	137243-001
14C	Type-74LS138 Integrated Circuit	137177-001
14E	Type-74LS00 Integrated Circuit	37-74LS00
14F	Type-74LS368A Integrated Circuit	137168-001
14H	Type-74LS148 Integrated Circuit	137417-001
14K	Type-74LS244 Integrated Circuit	37-74LS244
14L	150 ns Static RAM Integrated Circuit	137211-001
14M	Type-74LS138 Integrated Circuit	137177-001
15C	Type-74LS74 Integrated Circuit	37-74LS74
15E	Type-74LS245 Integrated Circuit	37-74LS245
15F	Type-2804, 450 ns EPROM Integrated Circuit	137329-450
15H	Type-74LS259 Integrated Circuit	37-74LS259
15K	Type-74LS244 Integrated Circuit	37-74LS244
15L	150 ns Static RAM Integrated Circuit	137211-001
15M	150 ns Static RAM Integrated Circuit	137211-001
16D	Type-74LS08 Integrated Circuit	37-74LS08
16E	Type-74LS374 Integrated Circuit	37-74LS374
16F	Type-74LS374 Integrated Circuit	37-74LS374
16H	Type-Y2151 Integrated Circuit	137401-001
16J	Type-74LS74 Integrated Circuit	37-74LS74
16K	Type-74LS245 Integrated Circuit	37-74LS245
16L	Type-74LS245 Integrated Circuit	37-74LS245
16M	150 ns Static RAM Integrated Circuit	137211-001
17C	Type-74LS244 Integrated Circuit	37-74LS244
17D	Type-74LS367A Integrated Circuit	37-74LS367A
17F	Type-LM324 Integrated Circuit	37-LM324
17H	Type-YM3012 Integrated Circuit	137402-001
17J	Type-74LS32 Integrated Circuit	37-74LS32
17M	Type-74LS244 Integrated Circuit	37-74LS244
18H	Type-LM324 Integrated Circuit	37-LM324
18J	Type-74LS138 Integrated Circuit	137177-001
18K	Custom Integrated Circuit	C012294
18L	Type-6502A Integrated Circuit Microprocessor	90-6013
18M	Type-74LS244 Integrated Circuit	37-74LS244
19E	Type-LM324 Integrated Circuit	37-LM324
19M	Type-74LS139 Integrated Circuit	37-74LS139

(continued on next page)

Main Printed-Circuit Board Assembly Parts List, continued

Designator	Description	Part No.
	Resistors	
R1	1 kΩ, ±5%, ¼ W Resistor	110000-102
R2	220 Ω, ±5%, ¼ W Resistor	110000-221
R3, R4	10 kΩ, ±5%, ¼ W Resistor	110000-103
R5	390 Ω, ±5%, ¼ W Resistor	110000-391
R6–8	510 Ω, ±5%, ¼ W Resistor	110000-511
R9–11	1 kΩ, ±5%, ¼ W Resistor	110000-102
R12	510 Ω, ±5%, ¼ W Resistor	110000-511
R13	2.2 kΩ, ±5%, ¼ W Resistor	110000-222
R14, R15	1 kΩ, ±5%, ¼ W Resistor	110000-102
R17	1 kΩ, ±5%, ¼ W Resistor	110000-102
R18	10 kΩ, ±5%, ¼ W Resistor	110000-103
R19	68 Ω, ±5%, ¼ W Resistor	110000-680
R20	2.2 kΩ, ±5%, ¼ W Resistor	110000-222
R21	4.7 kΩ, ±5%, ¼ W Resistor	110000-472
R22	10 kΩ, ±5%, ¼ W Resistor	110000-103
R23	20 kΩ, ±5%, ¼ W Resistor	110000-203
R24, R25	10 kΩ, ±5%, ¼ W Resistor	110000-103
R26	2.2 kΩ, ±5%, ¼ W Resistor	110000-222
R27	4.7 kΩ, ±5%, ¼ W Resistor	110000-472
R28	10 kΩ, ±5%, ¼ W Resistor	110000-103
R29	20 kΩ, ±5%, ¼ W Resistor	110000-203
R30	2.2 kΩ, ±5%, ¼ W Resistor	110000-222
R31	4.7 kΩ, ±5%, ¼ W Resistor	110000-472
R32	10 kΩ, ±5%, ¼ W Resistor	110000-103
R33	20 kΩ, ±5%, ¼ W Resistor	110000-203
R34	2.49 kΩ, ±1%, ¼ W Resistor	110011-252
R35	4.99 kΩ, ±1%, ¼ W Resistor	110011-502
R36	10 kΩ, ±5%, ¼ W Resistor	110000-103
R37	20 kΩ, ±5%, ¼ W Resistor	110000-203
R38–41	27 Ω, ±5%, ¼ W Resistor	110000-270
R42–49	100 Ω, ±5%, ¼ W Resistor	110000-101
R50, R51	1 kΩ, ±5%, ¼ W Resistor	110000-102
R52	3.3 kΩ, ±5%, ¼ W Resistor	110000-332
R53, R54	220 Ω, ±5%, ¼ W Resistor	110000-221
R55–58	1 kΩ, ±5%, ¼ W Resistor	110000-102
R59	4.7 kΩ, ±5%, ¼ W Resistor	110000-472
R61, R62	1 kΩ, ±5%, ¼ W Resistor	110000-102
R64, R65	1 kΩ, ±5%, ¼ W Resistor	110000-102
R66–69	10 kΩ, ±5%, ¼ W Resistor	110000-103
R70	27 kΩ, ±5%, ¼ W Resistor	110000-273
R71, R72	22 kΩ, ±5%, ¼ W Resistor	110000-223
R73	39 kΩ, ±5%, ¼ W Resistor	110000-393
R74	27 kΩ, ±5%, ¼ W Resistor	110000-273
R75	15 kΩ, ±5%, ¼ W Resistor	110000-153

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Main Printed-Circuit Board Assembly Parts List, continued

Designator	Description	Part No.
R76	39 kΩ, ±5%, ¼ W Resistor	110000-393
R80	1 kΩ, ±5%, ¼ W Resistor	110000-102
R81, R82	15 kΩ, ±5%, ¼ W Resistor	110000-153
R89, R90	4.7 kΩ, ±5%, ¼ W Resistor	110000-472
R91	560 Ω, ±5%, ¼ W Resistor	110000-561
R92	390 Ω, ±5%, ¼ W Resistor	110000-391
R97	1 kΩ, ±5%, ¼ W Resistor	110000-102
R101	1 kΩ, ±5%, ¼ W Resistor	110000-102
R104	1 kΩ, ±5%, ¼ W Resistor	110000-102
R105	220 Ω, ±5%, ½ W Resistor	110001-221
R106	4.7 kΩ, ±5%, ¼ W Resistor	110000-472
R107	220 Ω, ±5%, ¼ W Resistor	110000-221
R108–111	100 Ω, ±5%, ¼ W Resistor	110000-101
R112	1 kΩ, ±5%, ¼ W Resistor	110000-102
R113, R114	10 kΩ, ±5%, ¼ W Resistor	110000-103
R117, R118	4.7 kΩ, ±5%, ¼ W Resistor	110000-472
R119	220 Ω, ±5%, ¼ W Resistor	110000-221
R120–125	68 Ω, ±5%, ¼ W Resistor	110000-680
R127–129	470 Ω, ±5%, ¼ W Resistor	110000-471
R130–132	1 kΩ, ±5%, ¼ W Resistor	110000-102
R133–136	330 Ω, ±5%, ¼ W Resistor	110000-331
R137–139	1 kΩ, ±5%, ¼ W Resistor	110000-102
R140, R141	330 Ω, ±5%, ¼ W Resistor	110000-331
R142	1 kΩ, ±5%, ¼ W Resistor	110000-102
RN3	3.3k × 8, ±5%, ⅛ W, SIP Resistor	118002-332
RN4	470 × 5, ±5%, ⅛ W, SIP Resistor	118009-471
RN5–7	330 × 5, ±5%, ⅛ W, SIP Resistor	118009-331
RN8, RN9	10k × 8, Com, ±5%, ⅛ W SIP Resistor	118002-103
RN12, RN13	1k × 8, Com, ±5%, ⅛ W SIP Resistor	118002-102
GND+5V1	0 Ω, ±5%, ¼ W Resistor	110005-001
GND2–GND4	0 Ω, ±5%, ¼ W Resistor	110005-001
	Sockets	
3E	16-Pin Medium-Insertion-Force IC Socket	79-42C16
5E	16-Pin Medium-Insertion-Force IC Socket	79-42C16
5F	28-Pin Medium-Insertion-Force IC Socket	79-42C28
7F	20-Pin Medium-Insertion-Force IC Socket	79-42C20
12L	28-Pin Medium-Insertion-Force IC Socket	79-42C28
13/14J	64-Pin Medium-Insertion-Force IC Socket	79-42C64
13L	28-Pin Medium-Insertion-Force IC Socket	79-42C28
15F	24-Pin Medium-Insertion-Force IC Socket	79-42C24
15M	24-Pin Medium-Insertion-Force IC Socket	79-42C24
16H	24-Pin Medium-Insertion-Force IC Socket	79-42C24
17H	16-Pin Medium-Insertion-Force IC Socket	79-42C16
18K	40-Pin Medium-Insertion-Force IC Socket	79-42C40
18L	40-Pin Medium-Insertion-Force IC Socket	79-42C40

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Main Printed-Circuit Board Assembly Parts List, continued

Designator	Description	Part No.
	Transistors	
Q1	Type-2N3904 Transistor	34-2N3904
Q2–4	Type-2N3906 Transistor	33-2N3906
Q5–7	Type-2N3904 Transistor	34-2N3904
Q8	Type-2N3643 Transistor	34-2N3643
Q9	Type-2N3906 Transistor	33-2N3906
Q10–11	Type-2N6044 Transistor	34-2N6044
Q12, Q13	Type-2N3904 Transistor	34-2N3904
	Miscellaneous	
Q10, Q11	Nylon Snap-In Fastener	81-4302
Y1	14.318 MHZ Crystal	90-101
	15.5-Inch Bus Bar	178178-011
	6.8-Inch Bus Bar	178178-005
	9.7-Inch Bus Bar	178178-007
	Test Point (Acceptable substitute is part no. 020670-01)	179051-002

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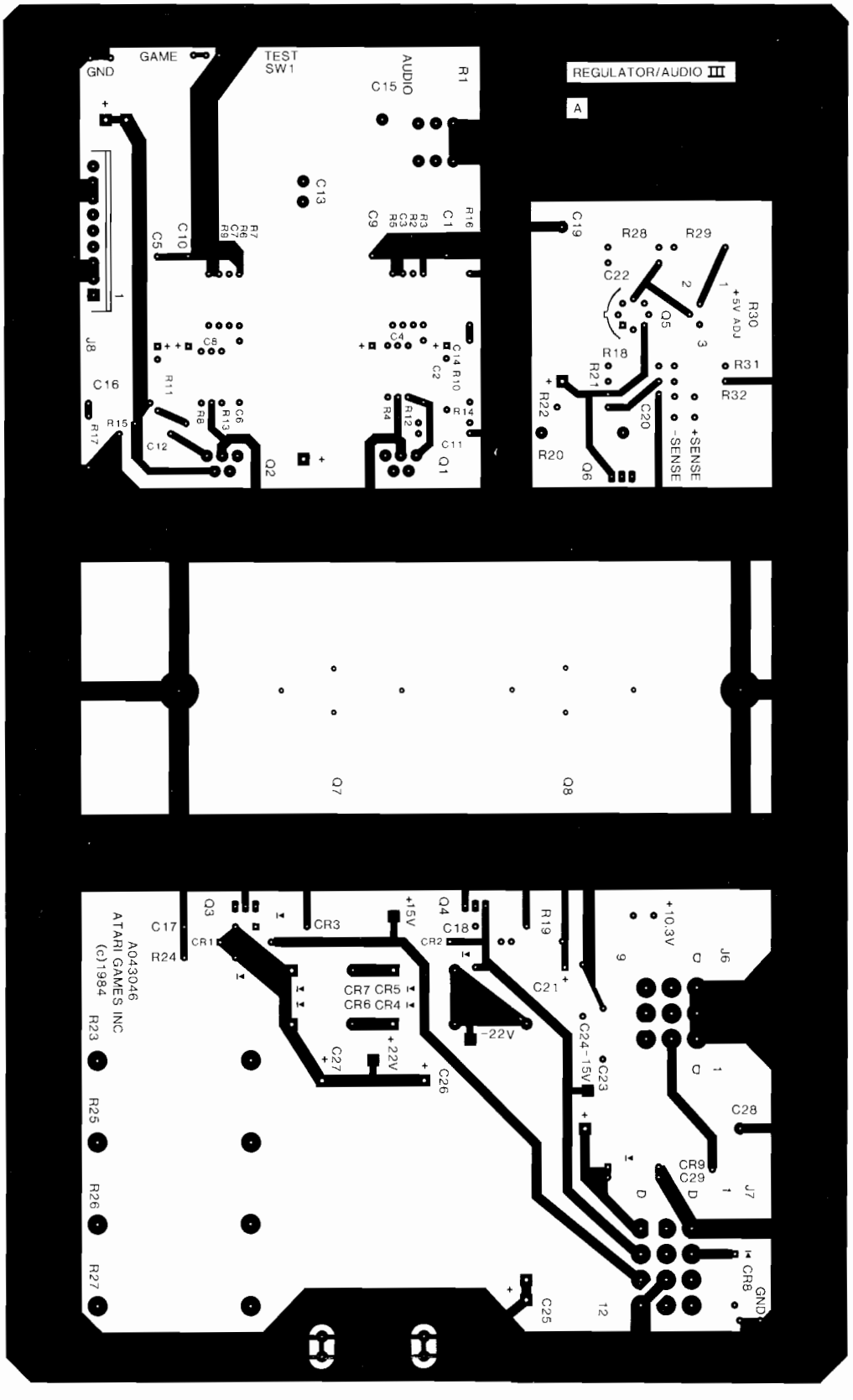

Figure 4-7 Regulator/Audio III Printed-Circuit Board Assembly A043046-01 A

Regulator/Audio III Printed-Circuit Board Assembly Parts List

Designator	Description	Part No.
	Capacitors	
C1	22 μF, 35 V Electrolytic Capacitor	24-350226
C2	0.22 μF, 25 V Ceramic Capacitor	122004-224
C3	0.001 μF, 50 V Ceramic Capacitor	122002-102
C4	0.1 μF, 50 V Ceramic Capacitor	122002-104
C5	22 μF, 35 V Electrolytic Capacitor	24-350226
C6	0.22 μF, 25 V Ceramic Capacitor	122004-224
C7	0.001 μF, 50 V Ceramic Capacitor	122002-102
C8	0.1 μF, 50 V Ceramic Capacitor	122002-104
C9, C10	22 μF, 35 V Electrolytic Capacitor	24-350226
C11, C12	0.1 μF, 50 V Ceramic Capacitor	122002-104
C13	3300 μF, 35 V Electrolytic Capacitor	24-350338
C14	0.22 μF, 25 V Ceramic Capacitor	122004-224
C15	3300 μF, 35 V Electrolytic Capacitor	24-350338
C16	0.22 μF, 25 V Ceramic Capacitor	122004-224
C17, C18	0.1 μF, 50 V Ceramic Capacitor	122002-104
C19	1000 μF, 25 V Electrolytic Capacitor	24-250108
C20	0.1 μF, 50 V Ceramic Capacitor	122002-104
C21	22 μF, 35 V Electrolytic Capacitor	24-350226
C22	0.001 μF, 50 V Ceramic Capacitor	122002-102
C23, C24	0.1 μF, 50 V Ceramic Capacitor	122002-104
C25–C27	3300 μF, 35 V Electrolytic Capacitor	24-350338
C28	470 μF, 25 V Electrolytic Capacitor	24-250477
C29	0.1 μF, 50 V Ceramic Capacitor	122002-104
	Connectors	
J6	9-Position Header Connector	179069-009
J7	12-Position Header Connector	179069-012
J8	9-Position Header Connector	179213-009
	Diodes	
CR1–CR3	Type-1N4002 Diode	31-1N4002
CR4–CR7	Type-1N5401 Rectifier Diode	31-1N5401
CR8, CR9	Type-1N4002 Diode	31-1N4002
	Resistors	
R2	22 kΩ, ±5%, ¼ W Resistor	110000-223
R3	12 kΩ, ±5%, ¼ W Resistor	110000-123
R4, R5	100 kΩ, ±5%, ¼ W Resistor	110000-104
R6	22 kΩ, ±5%, ¼ W Resistor	110000-223
R7	12 kΩ, ±5%, ¼ W Resistor	110000-123
R8, R9	100 kΩ, ±5%, ¼ W Resistor	110000-104
R10, R11	1 kΩ, ±5%, ¼ W Resistor	110000-102
R12, R13	100 kΩ, ±5%, ¼ W Resistor	110000-104
R14, R15	10 kΩ, ±5%, ¼ W Resistor	110000-103
R16, R17	1 Ω, ±5%, ¼ W Resistor	110000-010
R18	100 Ω, ±5%, ¼ W Resistor	110000-101
R19	5.6 kΩ, ±5%, ¼ W Resistor	110000-562

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Regulator/Audio III Printed-Circuit Board Assembly Parts List, continued

Designator	Description	Part No.
R20	2.7 Ω, ±5%, 1 W Resistor	110009-027
R21	27 Ω, ±5%, ¼ W Resistor	110000-270
R22	100 Ω, ±5%, ¼ W Resistor	110000-101
R23	0.1 Ω, ±5%, 5 W Resistor	116007-001
R24	5.6 kΩ, ±5%, ¼ W Resistor	110000-562
R25–R27	0.1 Ω, ±5%, 5 W Resistor	116007-001
R28	2.7 Ω, ±5%, ¼ W Resistor	110000-027
R29	7.5 kΩ, ±5%, ¼ W Resistor	110000-752
R31	3.9 kΩ, ±5%, ¼ W Resistor	110000-392
R32	2.7 Ω, ±5%, ¼ W Resistor	110000-027
	Transistors	
Q6	T1P-32 Transistor	33-T1P32
Q7, Q8	Type-2N3055 Transistor	34-2N3055
	Miscellaneous	
Q1, Q2	TDA-2030 Amplifier	137301-001
Q3	7815, +15V Regulator	37-7815
Q4	7915, -15V Regulator	37-7915
Q5	Type-LM305 Regulator	37-LM305
R1	10k Dual Potentiometer	119011-103
R30	1k Horizontal Potentiometer	119002-102
SW1	SPST Slide Switch	160024-001
	Heat Sink	034531-01
	Test Point (Acceptable substitute is part no. 120670-01)	179051-002

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 $\overline{\text{START}}$ 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 a 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 1 or 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 electromechanical 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
Electromagnetic 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 only when a certain combination of pulses is present at the inputs.
2. A circuit in which one signal switches another signal on and off.
3. To control the passage of a pulse or signal.

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

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

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

I/O
Input/Output.

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

LED
The abbreviation for a light-emitting diode.

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

LOGIC STATE
The binary (1 or 0) value at the node of a logic element or integrated circuit during a particular time. Also called the logic level. The list below shows the voltage levels corresponding to the logic states (levels) in a TTL system.
Logic 0, Low = 0 VDC to +0.8 VDC
Grey Area (Tri-State Level) = +0.8 VDC to +2.4 VDC
Logic 1, High = +2.4 VDC to +5 VDC

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

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

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

PCB
The abbreviation for a printed-circuit board.

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

POTENTIOMETER
1. A resistor that has a continuously moving contact which is generally mounted on a moving shaft. Used chiefly as a voltage divider. Also called a *pot* (slang).
2. An instrument for measuring a voltage by balancing it against a known voltage.

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

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

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

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

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

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

TROUBLESHOOT
The process of locating and repairing a fault.

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

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

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

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

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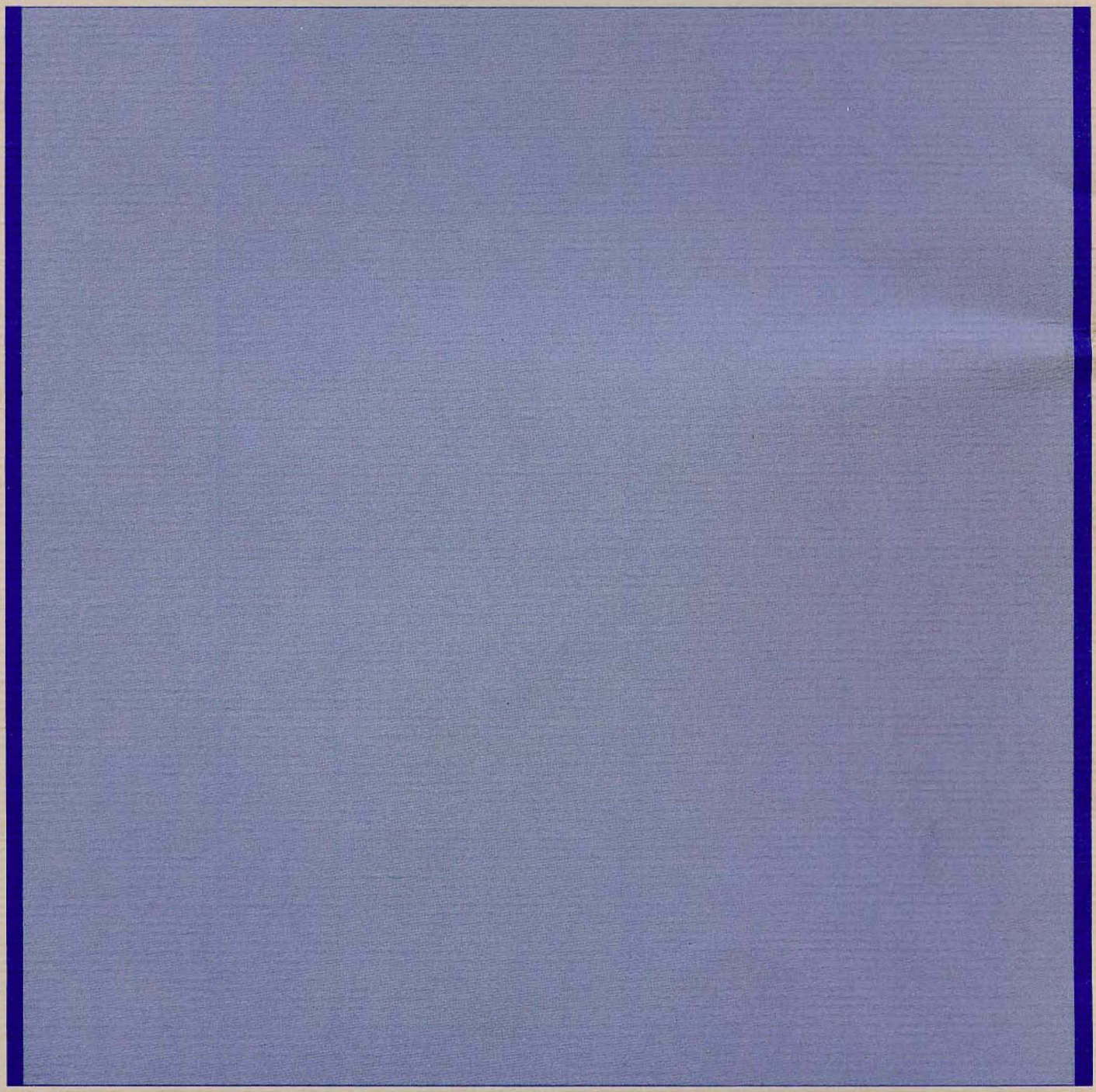

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