TM-202
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Dig Dug™

Operation, Maintenance and Service Manual
Complete with Illustrated Parts Lists

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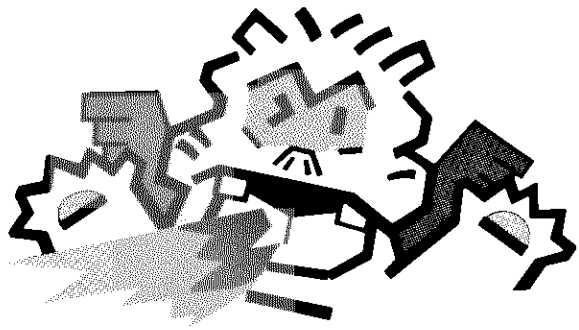


How to Use This Manual

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

Chapter One includes new features, game set-up, option switch settings, self-test procedures and game play.

Chapter Two details troubleshooting procedures.

Chapter Three contains maintenance, repair and parts information.

In addition, schematic diagrams of the game circuitry are included with this manual.

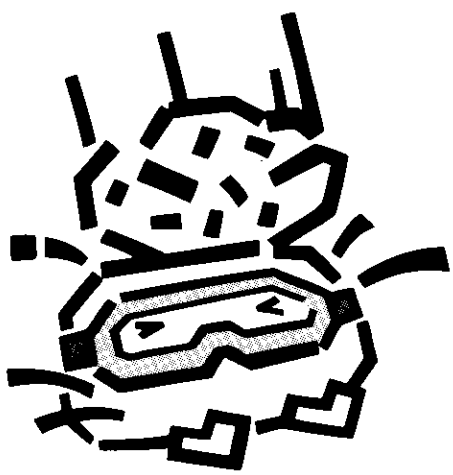
Figures 1-1 and 3-1 illustrate the game cabinet. Italicized lettering on these figures refers you to other places in the manual for information about specific cabinet parts.

A. New Features

The Dig Dug™ game has two new features. Even if you're familiar with ATARI® games, you should note these important differences:

- **Joystick Control.** This new four-position control is made of steel and molded plastic. It has few parts, which make servicing easier. The leaf switches snap in and out for easy replacement. The rubber bellows is designed for a quick return to center.
- **Game Cabinet.** The Dig Dug cabinet has several new features. The cabinet grille is both a speaker grille and display-shield retainer. In addition, the upper part of the display shield also serves as the attraction panel.

These new features, as well as all other major parts in the game, are illustrated in Figure 1-1. Throughout this manual, wherever one of these new features is mentioned, you will see this symbol:



Chapter 1

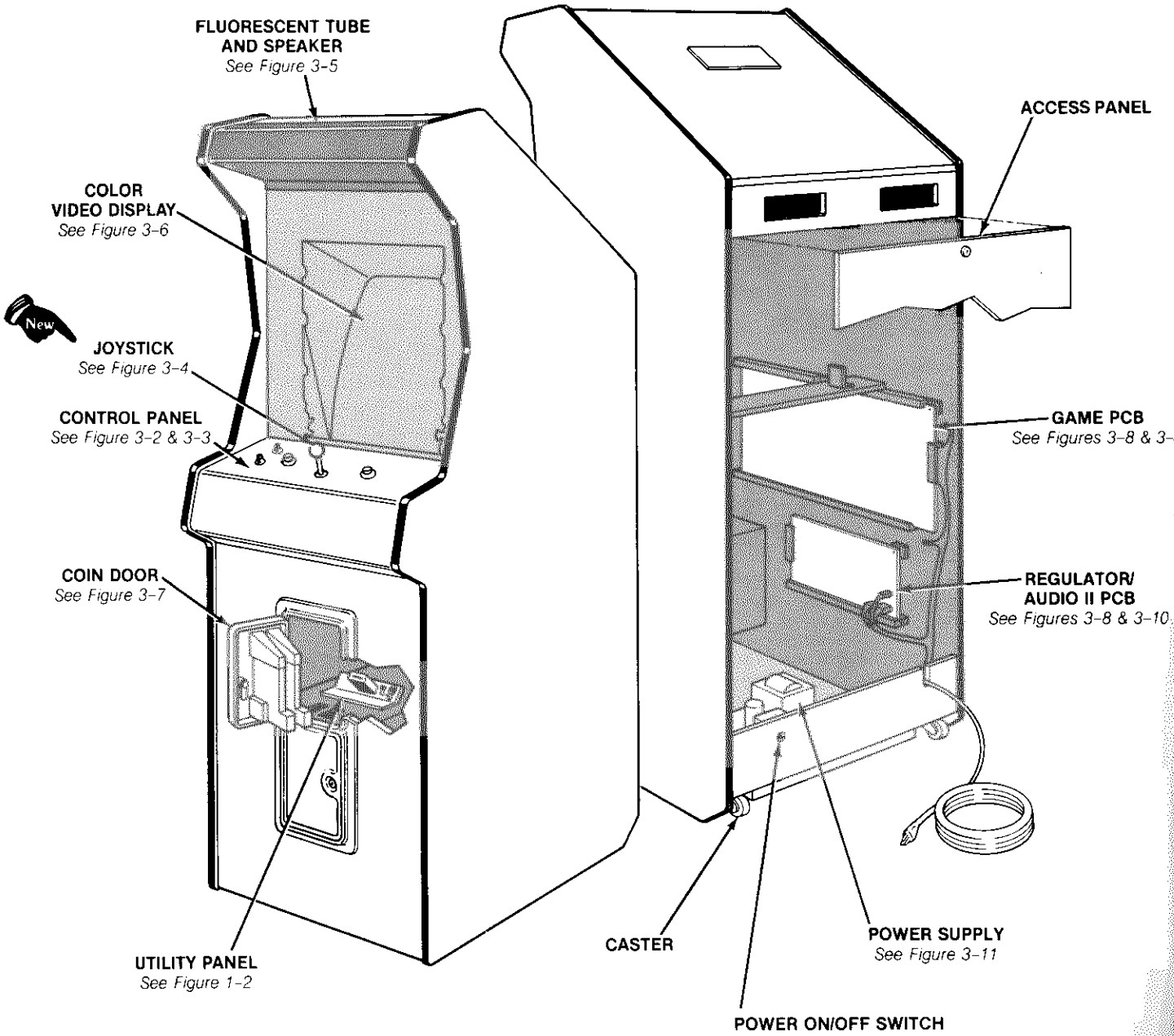


Figure 1-1 Game Overview

WARNING

SHOCK HAZARD

Connect this game only 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 electric shock** if this game is not properly grounded!

B. Game Inspection

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

NOTE

Do not plug the game in yet!

1. Examine the exterior of the game cabinet for dents, chips, or broken parts.
2. Remove the screws that were used as extra security to seal the rear access panel. Unlock and open this panel and the coin door; inspect the interior of the game as follows:
   - Check that all plug-in connectors (on the game harness) are firmly seated. Replug any connectors found unplugged. **Don't force connectors together.** The connectors are keyed so they only go on in the proper orientation. **A reversed edge connector will damage a PCB** and will void your warranty.
   - Check that all plug-in integrated circuits on the game PCB are firmly seated in their sockets.
   - Remove the tie-wrap that holds the coiled power cord on the inside cabinet wall. Check the cord for any cuts or dents in the insulation. Place the square black plastic strain-relief plate in the wood slot at the bottom of the rear panel opening.

WARNING

To avoid electrical shock, do not touch internal parts of the display with your hands or with metal objects held in your hands!

- Note the game's serial number. It is printed on the special label on the back of the game cabinet. Verify that the same serial number is also on the Dig Dug game PCB, Regulator/Audio II PCB, power supply and video display. A drawing of the serial-numbered components is on the inside front cover of this manual. Please mention this number whenever you call your distributor for service.
- Check major subassemblies, such as the power supply, control panel and video display, for secure mounting.

C. Game Installation

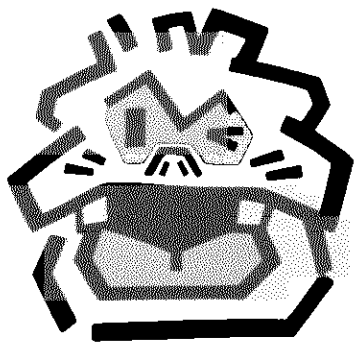
1. Installation Requirements

Power	140 watts
Temperature	0 to 38°C (32 to 100°F)
Humidity	Not over 95% relative
Space Required	64 x 79 cm (25⅜ x 31 in.)
Game Height	174 cm (68¾ in.)

2. Voltage Selection

The power supply used in this game operates on the line voltage of almost any country in the world. The power supply has three different voltage selection plugs: 100 VAC (violet wire color), 220 VAC (blue wire color), and 240 VAC (brown wire color).

Before plugging in your game, check your line voltage. Then check the wire color on the voltage selection plug that is plugged into your power supply. Make sure the voltage selection plug is correct for your location's line voltage (see *Figure 3-12).*



D. Switch Locations

1. On/Off Switch

The on/off switch is located on the back of the cabinet, lower left side (see Figure 1-2).

2. Utility Panel Switches

The utility panel includes the volume control, self-test and coin switches, and coin counter. The coin switch is used to credit the game without tripping the coin counter. These switches are located inside the upper coin door (see Figure 1-2).

3. Option Switches

Option switches are located on the game PCB as follows:

- Game price and bonus options are at PCB location 2C/D.
- Game difficulty, price and special options are at PCB location 2C.

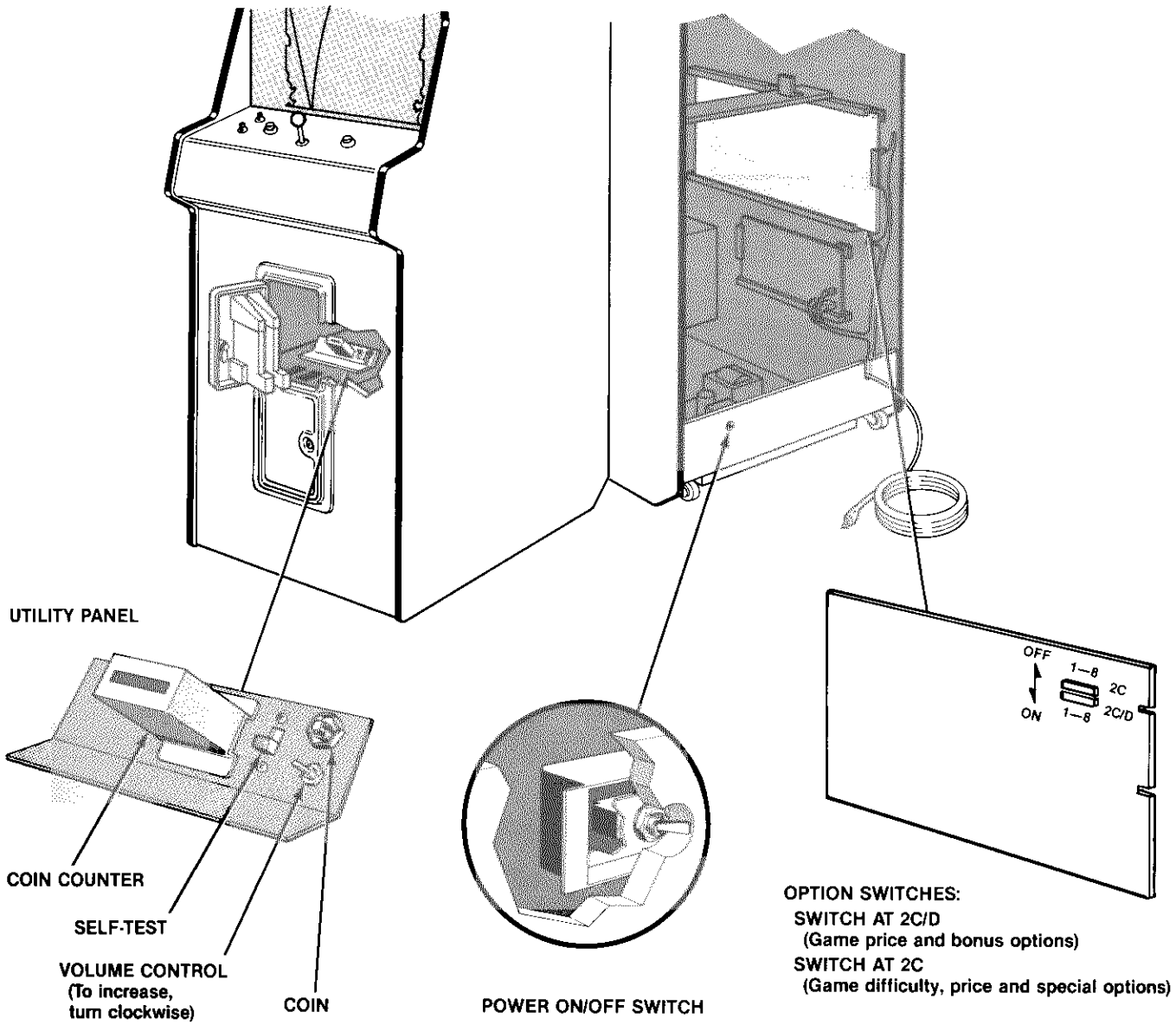


Figure 1-2 Game Switch Locations

E. Option Switch Settings

Tables 1-1 and 1-2 detail game options and their settings. Options are preset at the factory and shown by the **$** symbols. However, you may change the settings to suit your individual needs.

Table 1-1 Game Price and Bonus Option Settings

The 8-toggle switch at location 2C/D is accessible when the Dig Dug™ game PCB is mounted in place. To change switch settings, set the self-test switch to *on*. Verify the changes on the self-test screen. Then turn the self-test switch to *off*.

A "coin" is defined as 25¢, 1DM or 1Fr. If you have a 2DM/1DM or 2Fr/1Fr coin door with two coin counters, set switch 8 at PCB location 2C to *off*. Then different denominations are counted on the two coin counters.

Settings of 8-Toggle Switch on Dig Dug PCB *(at 2C/D)*								Option	
8	7	6	5	4	3	2	1		
On	On							1 Dig Dug life	
On	Off							2 Dig Dug lives	
Off	On							3 Dig Dug lives **$**	
Off	Off							5 Dig Dug lives	
								Bonus lives awarded at the following point values:	
								With 1, 2 or 3 Dig Dug lives	With 5 Dig Dug lives
		On	On	On				No Bonus	No Bonus
		Off	On	On				First at 10,000, second at 40,000, and every 40,000 **$**	First at 20,000, second at 60,000, and every 60,000
		On	Off	On				First at 10,000, second at 50,000, and every 50,000	First at 30,000, second at 80,000, and every 80,000
		Off	Off	On				First at 20,000, second at 60,000, and every 60,000	First at 20,000, second at 50,000
		On	On	Off				First at 20,000, second at 70,000, and every 70,000	First at 20,000, second at 60,000
		Off	On	Off				First at 10,000, second at 40,000	First at 30,000, second at 70,000
		On	Off	Off				First at 20,000, second at 60,000	First at 20,000
		Off	Off	Off				First at 10,000	First at 30,000
								Right coin mech—coin doors with 1 or 2 coin counters*	
					On	On	On	1 coin for 7 credits	
					Off	On	On	1 coin for 6 credits	
					On	Off	On	1 coin for 3 credits	
					Off	Off	On	1 coin for 2 credits	
					On	On	Off	1 coin for 1 credit **$**	
					Off	On	Off	2 coins for 3 credits	
					On	Off	Off	2 coins for 1 credit	
					Off	Off	Off	3 coins for 1 credit	

$ Manufacturer's suggested settings

** See Table 1-2 for left coin mechanism*

Table 1-2 Game Difficulty, Price and Special Options

The table below contains the switch settings for options relating to game difficulty, price and special options. The switches, on the game PCB at location 2C, are accessible when the PCB is mounted in place.

A special option allows for continuation of game play. If a player is at a more advanced round when his game ends, he has 16 seconds to begin the next game at the same round. Another special option allows you to freeze the game action.

Settings of 8-Toggle Switch on Dig Dug PCB *(at 2C)*								
8	7	6	5	4	3	2	1	Option
On								One coin counter $
Off								Two coin counters*
	On	On						A—Easy game difficulty
	On	Off						B—Medium game difficulty $
	Off	On						C—Hard game difficulty
	Off	Off						D—Expert game difficulty
			On					Continuation of game play $
			Off					No continuation of game play
				On				Attract Mode sound $
				Off				No Attract Mode sound
					Off			Normal game action $
					On			Freeze game action
								Left coin mech—coin doors with 2 coin counters
						On	On	1 coin for 1 credit $
						On	Off	1 coin for 2 credits
						Off	On	2 coins for 1 credit
						Off	Off	2 coins for 3 credits

$ Manufacturer's recommended settings

** Coin doors with different denominations and two coin counters.*

F. Self-Test Procedure

This game will test itself and provide data to show that the game's circuitry and controls are operating properly. The data is provided on the video display and speaker. No additional equipment is necessary.

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

Refer to Figure 1-2 for the location of the self-test switch and option switches. To perform the self-test, set the self-test switch to *on*. After about eight seconds the self-test screen will be displayed.

To see game statistics, press the utility coin switch. To reset the high score table, simultaneously push and hold the pump and utility coin switches for 10 seconds. To end the self-test, set the self-test switch to *off*.

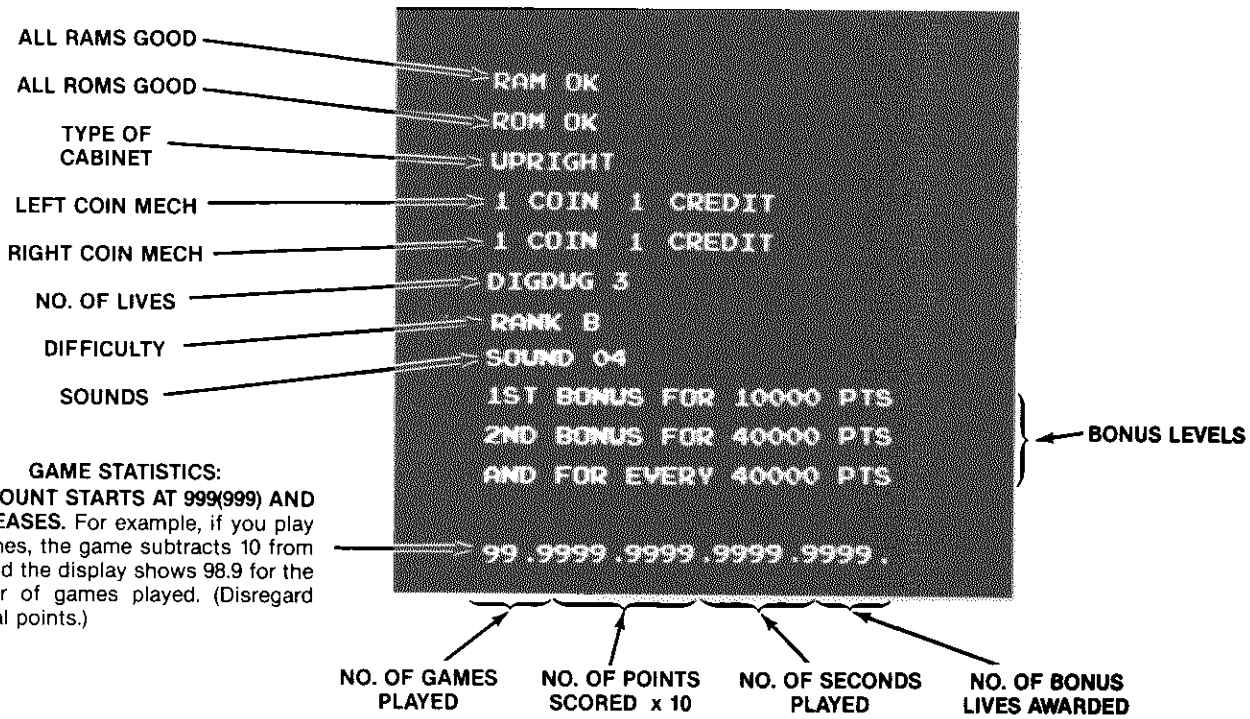
The complete self-test procedure is explained in *Chapter 2, Self-Test Procedure.* If any part of the test described in Figure 1-3 *fails,* refer to Chapter 2.

Figure 1-3 Self-Test Procedure

Instruction	Test Passes
1. Set the self-test switch to *on* (see Figure 1-2).	Patterns appear on the screen. After about 8 seconds, the screen displays the picture below. The RAMs, ROMs and other chips are tested. If the picture is different from the picture below, refer to *Chapter 2, Self-Test Procedure.*
2. Activate any control panel switch.	Game sounds are produced, from *SOUND 00* through *SOUND 20.* Activating any control panel switch produces a new sound. Test *all* switches this way. If test fails, refer to *Chapter 2, Self-Test Procedure.*

Game sounds:

SOUND 00	Credit issued
SOUND 01	Start of game
SOUND 02	Indication of highest score
SOUND 03	Game over
SOUND 04	Monster attacking Dig Dug
SOUND 05	Dig Dug dies
SOUND 06	Monster escaping
SOUND 07	Bonus Dig Dug awarded
SOUND 08	End of wave
SOUND 09	Monster speeding up
SOUND 10	Monster crushed by rock
SOUND 11	Monster bursting
SOUND 12	Rock hitting ground
SOUND 13	Rock falling
SOUND 14	Dragon spitting fire
SOUND 15	Dig Dug throwing harpoon
SOUND 16	Dig Dug pumping up monster
SOUND 17	Dig Dug walking
SOUND 18	Monster moving
SOUND 19	Dig Dug capturing vegetable
SOUND 20	Enter initials into high score table



GAME STATISTICS:
THE COUNT STARTS AT 999(999) AND DECREASES. For example, if you play 10 games, the game subtracts 10 from 99.9 and the display shows 98.9 for the number of games played. (Disregard decimal points.)

G. Game Play

The Dig Dug™ game is a one- or two-player game with a color raster-scan video display. The screen shows a cutaway view of the land, most of which is below ground. The player controls the Dig Dug character who travels through and digs tunnels in the dirt. The object is for Dig Dug to capture vegetables and destroy monsters by pumping them up or dropping rocks on them.

Dig Dug has five possible modes of operation: attract, ready-to-play, play, high score and self-test. Self-test is a special mode for checking the game switches and computer functions. You may enter self-test at any time (all credits will be cancelled).

1. Attract Mode

The attract mode begins when power is applied to the game, after a play or high-score mode, or after self-test. This mode is continuous and stops only when a credit is entered, or when in self-test. This mode may last for about one minute and fifteen seconds. In the attract mode, the screen displays one of four possible pictures.

In the first picture, Dig Dug enters the screen from the top right and walks across the surface. He digs a tunnel into the ground and begins to dig around the words *DIG DUG*. Meanwhile, monsters escort the word *ATARI* across the top of the screen. When Dig Dug digs entirely around the words *DIG DUG*, these words, *ATARI* and the monsters fall down to a new position on the screen. Everything in the picture rolls up except the words *DIG DUG*.

In the second picture, game characters appear on the screen. Dig Dug is between FYGAR, the fire-breathing dragon, and POOKA, the fat monster. First, Dig Dug pumps up POOKA until he explodes and disappears, and *200-500* (points) appears in his place. Then, Dig Dug pumps up FYGAR until he explodes and disappears, and *200-1000* appears in his place.

The third picture simulates game play. Dig Dug walks through underground tunnels. Monsters chase him and he periodically pumps them up or drops rocks on them. This picture ends when Dig Dug is caught (touched) by a monster.

The fourth picture shows the high-score table. The top five scores, round played and matching initials appear on the screen.

During the attract mode, the high score and score(s) for one or both players appear at the top of the screen. Credits or number of Dig Dug lives and the round number appear at the bottom of the screen. This mode ends when coins are inserted and accepted for game play.

2. Ready-to-Play Mode

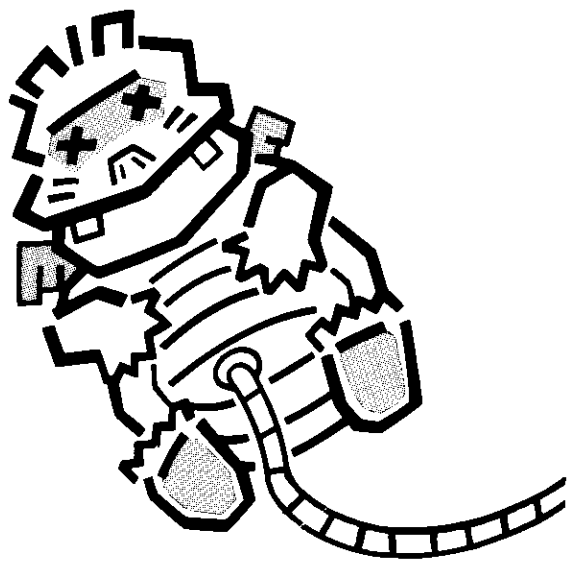
During this mode, the high score and score(s) for one or both players appear at the top of the screen. The words *PUSH START BUTTON, 1 PLAYER ONLY or 1 OR 2 PLAYERS* and bonus life information appear in the center of the screen. ATARI copyright, credits and the round number appear near the bottom of the screen. This mode ends when a player pushes the start button.

3. Play Mode

This mode begins when Dig Dug enters the screen from the top right and walks across the surface. He digs down to the center of the screen. The words *PLAYER 1 READY* or *PLAYER 2 READY* appear on the screen. Also, high score and score(s) for one or both players appears at the top of the screen. The number of Dig Dug lives and the round number appear at the bottom of the screen.

Game play takes place on a cutaway section of the land. The characters are Dig Dug and two monsters, one of which is a fire-breathing dragon. The underground area is divided into four different colored layers of dirt. Rocks are scattered in the dirt. The sky is at the top of the screen.

The player controls Dig Dug. He moves through horizontal and vertical tunnels. When Dig Dug digs new tunnels he moves slowly. When he is on the surface or in an existing tunnel, he moves faster. The object of the game is for Dig Dug to destroy all the monsters and go to the next round.



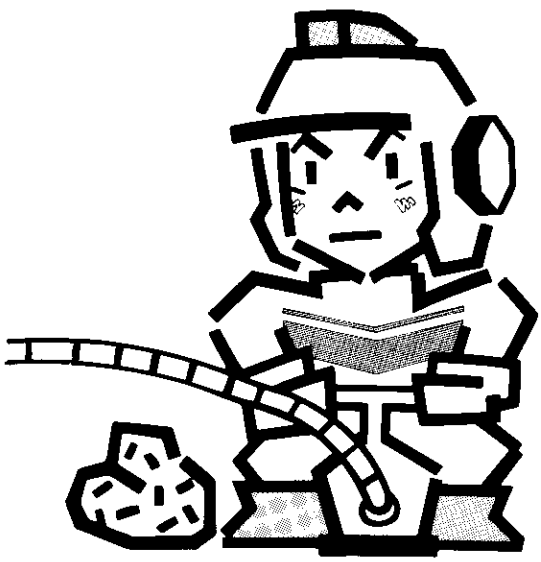
Monsters are trapped in caves. A monster may get out of a cave two ways. Dig Dug may dig him out. Then, the monster chases Dig Dug. The monster may also get out of the cave by turning into a ghost. As a ghost, he cannot be destroyed. The ghost does not travel in the tunnels. He travels through the dirt, and can travel diagonally. However, he reappears as the monster when he goes into a tunnel.

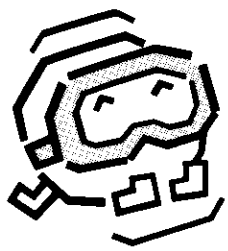
The monster moves faster than Dig Dug in vertical tunnels and slower on the surface. He destroys Dig Dug by catching him. In addition, the dragon destroys Dig Dug by breathing fire on him. The dragon only breathes fire horizontally. The fire can penetrate the dirt.

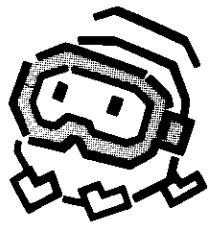
Dig Dug destroys the monsters by pumping them up until they burst, or by causing rocks to drop on them. To pump up and destroy a monster, the player presses and holds down the pump button. It is possible to stun a monster for a few seconds by pressing the pump button once or twice. While a monster is stunned, Dig Dug may pass over him without being destroyed. If two monsters are very close together, only one may be stunned. The other will catch and destroy Dig Dug.

Dig Dug must dig tunnels under the rocks to get them to drop. A rock may fall in a vertical or a horizontal tunnel. A rock also goes through a thin layer of dirt from one tunnel to the next. In a vertical tunnel, Dig Dug may stay directly under a rock and it will not drop. However, in a horizontal tunnel, Dig Dug must move out from under a rock right away, or he will be crushed.

After two rocks are dropped, a vegetable (worth extra points) appears in a tunnel in the center of the







screen. A player has 10 seconds to capture (touch) the vegetable or it will disappear. There is only one vegetable per round.

The game progresses by rounds. Round 1 starts with four monsters and three rocks. The vegetable is a carrot. One flower on the surface (top right of the screen) represents Round 1. Two flowers represent Round 2, etc. As the rounds progress, the monsters move a little faster, and are better at avoiding falling rocks. In each round, the last monster tries to escape. If he is not caught by Dig Dug, he exits on the surface (top left).

The game ends when all of the Dig Dug lives are used up. A player may continue to play at the same round (level) by following instructions on the screen. He has 16 seconds to insert a coin(s). Then he must push and hold the pump and start buttons at the same time.

4. High Score Mode

This mode begins when a player has one of the five top scores. A player enters his initials in the center of the screen. The initials are then transferred to the table. To reset the high-score table, set the self-test switch to *on*. Simultaneously push and hold the pump and utility coin switches for 10 seconds. Then set the self-test switch to *off*.

5. Hints for Game Play

- Get many monsters to follow you. Then dig a long vertical tunnel up to a rock. Drop the rock by digging right or left.
- Dig Dug may take extra time to turn. It is better to start turning early than to wait until the last second.
- Destroy monsters at bottom dirt level for more points.
- Use PUMP to stun monsters. Then you may escape or walk through them.
- Don't stop next to dragon when he is in a cave. His fire can go through a thin layer of dirt and destroy you.
- A vegetable appears after two rocks have been dropped. So be sure to drop two rocks in each round.

G. Game Play

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3. Play Mode

This mode begins when Dig Dug enters the screen from the top right and walks across the surface. He digs down to the center of the screen. The words *PLAYER 1 READY* or *PLAYER 2 READY* appear on the screen. Also, high score and score(s) for one or both players appears at the top of the screen. The number of Dig Dug lives and the round number appear at the bottom of the screen.

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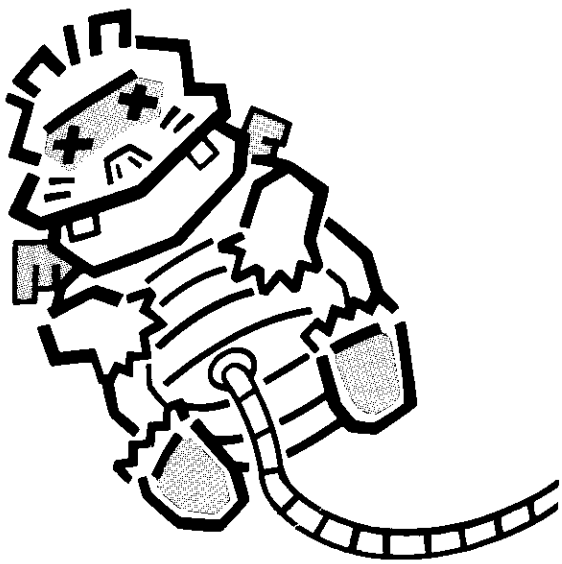


Table 1-3 Dig Dug Scoring

Bursting Monsters

Dirt Layer	POOKA	FYGAR*
1	200	400
2	300	600
3	400	800
4	500	1000

**Worth ½ amount vertically*

Dropping Rocks

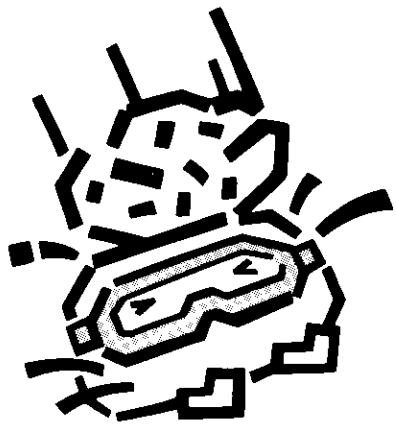
Monsters Destroyed	Points
1	1000
2	2500
3	4000
4	6000
5	8000
6	10,000
7	12,000
8	15,000

Vegetables

Round	Vegetable	Points for Capture
1	Carrot	400
2	Rutabaga	600
3	Mushroom	800
4	Cucumber	1000
5	Cucumber	1000
6	Eggplant	2000
7	Eggplant	2000
8	Bell Pepper	3000
9	Bell Pepper	3000
10	Tomato	4000
11	Tomato	4000
12	Onion	5000
13	Onion	5000
14	Watermelon	6000
15	Watermelon	6000
16	Galaxian	7000
17	Galaxian	7000
18	Pineapple	8000
19	Pineapple	8000
20-30	Pineapple	8000

Digging a new tunnel is worth 10 points per ⅝ inch (1.61 cm).

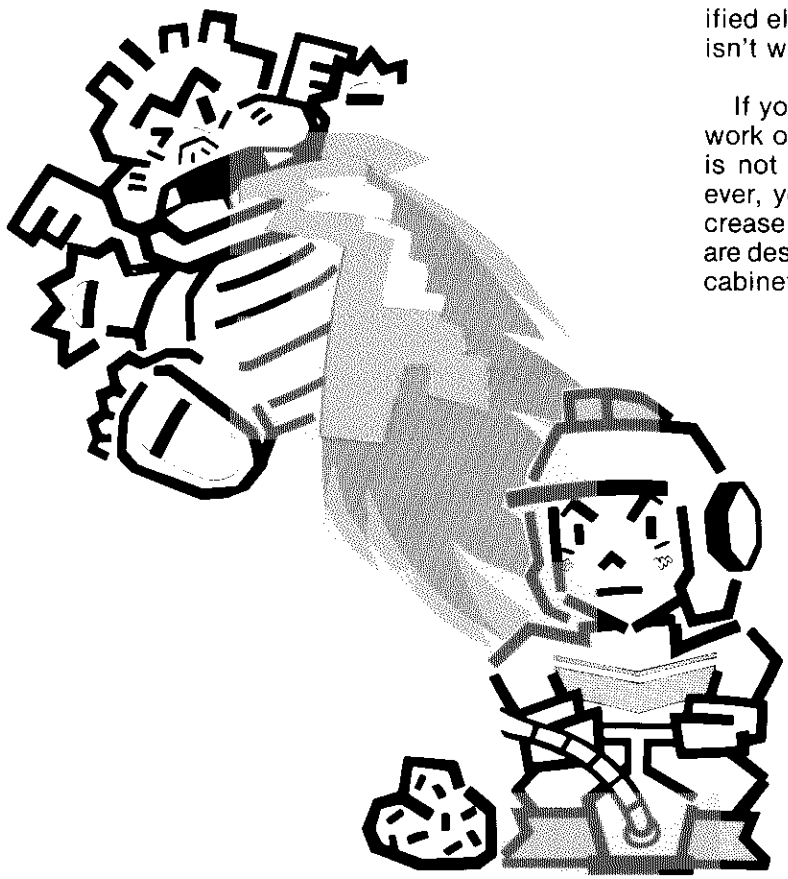
Troubleshooting



A. Introduction

This game tests itself when the self-test switch is set to the *on* position. If there is a failure, the game produces audiovisual aids to help you isolate the failing portion of the game. The self-test procedure included in Chapter 1 is to help you decide if the game is or isn't working properly. The expanded procedures in this chapter are included to help the qualified electronic technician determine why the game isn't working properly.

If you are not a qualified technician, do not try to work on the game circuitry or video display. True, it is not earning money when it doesn't work. However, your investment in this game may greatly increase if either the video display and/or game PCB are destroyed while you are working inside the game cabinet. Be assured, it isn't worth it.



Chapter 2

B. Commments on Troubleshooting

When troubleshooting, first determine the symptom(s) of the failure. After determining the symptom, look over the wiring diagram and determine what assemblies could cause the failure. Could it be caused by the power supply, Regulator/Audio II PCB, or the video display?

The next step is to check all harness wires and connectors to the suspected failing assembly. If you find no harness or connector problem, substitute an assembly known to be good for the suspected failing assembly. If the game functions properly, you have successfully isolated the failure. If it doesn't, repeat the procedure with another assembly.

When you have isolated the failing assembly, you must troubleshoot that assembly and make the necessary repairs. If the display is failing, we suggest that a qualified video display technician handle the troubleshooting and repair. If the power supply or Regulator/Audio II PCB is failing, troubleshooting and repair is relatively simple, as these assemblies are not too complicated. If a game PCB is failing, troubleshooting and repair will greatly depend on your understanding of the operation of this PCB.

To effectively troubleshoot problems of a game PCB, it is necessary for you, the technician, to become familiar with the PCB's hardware. The diagrams in the schematic package (included with the game) show the functions of the circuitry. Again, while troubleshooting this PCB, first determine the symptom of the failure, then locate the suspected area on the schematic diagram.

C. Self-Test Procedure

To enter Self-Test, set the self-test switch to the *on* position. Patterns appear on the screen. After about 8 seconds, the self-test screen is displayed (see *Figure 2-1*). See *Chapter 1, Section F, Self-Test Procedure* for a complete description of this part of the self-test.

NOTE

This procedure does not test the coin door lockout coils. If the self-test passes, but the lockout coils do not energize when the self-test switch is set to *off,* suspect the lockout coil wiring, coin door harness, game PCB harness, or driver Q5 and related circuitry of the game PCB.

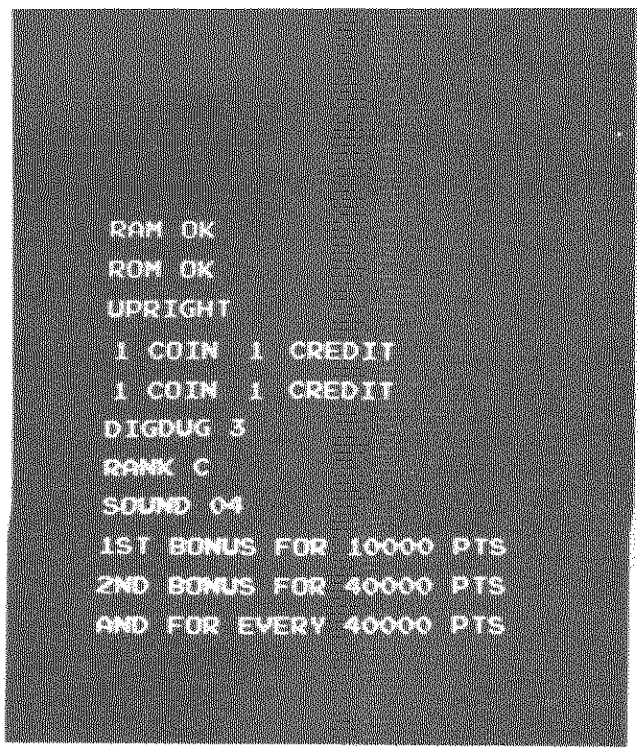


Figure 2-1 Self-Test Screen 1 Test Passes

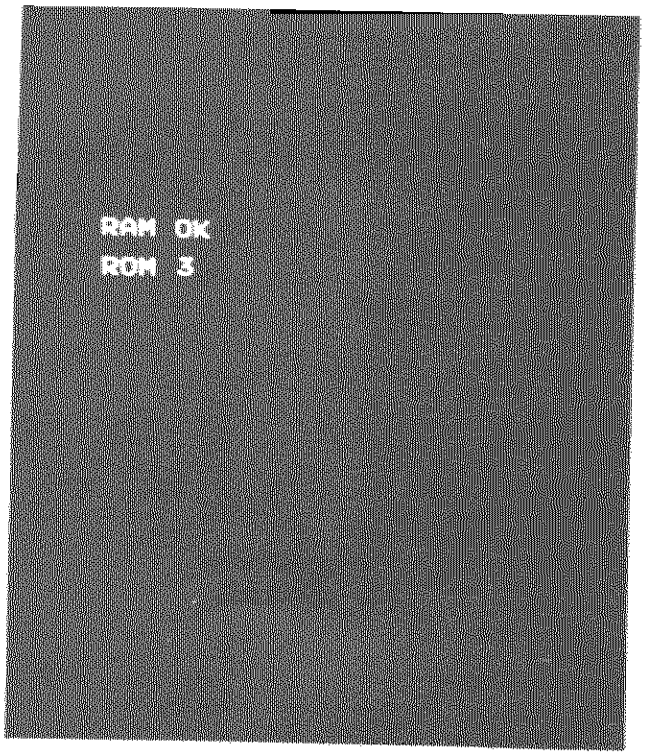


Figure 2-2 Self-Test Screen 1 Test Fails

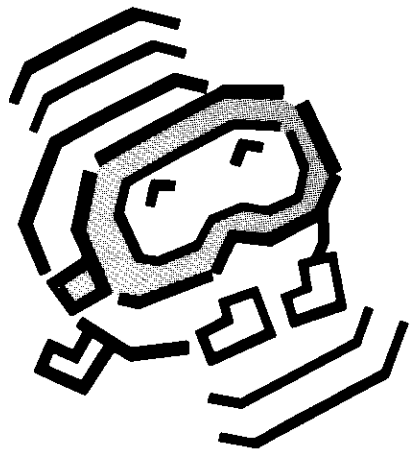
SCREEN 1:

RAM FAILURE is indicated by the word RAM and a pair of alphanumeric characters displayed at the top of the screen. The following table lists the bad RAM chip and its location.

Screen Display	Bad RAM chip location on game PCB
RAM 0L	9M
RAM 0H	9M
RAM 1L	9M
RAM 1H	9M
RAM 2L	9E
RAM 2H	9J/K
RAM 3L	9H/J
RAM 3H	9H
RAM 4L	9F/G
RAM 4H	9G/H

ROM FAILURE is indicated by the word ROM and a number displayed at the top of the screen. The following table lists the bad ROM chip and its location.

Screen Display	Bad ROM chip location on game PCB
ROM 1	6L
ROM 2	6M
ROM 3	6N/P
ROM 4	6R
ROM 5	6C
ROM 6	6D
ROM 7	5L



To go to screen 2, set the self-test switch to *off* and immediately to *on* again.

SCREEN 2:

A white crosshatch pattern appears on the screen (see *Figure 2-3*). Use this pattern for convergence (see the raster-scan video display manual).

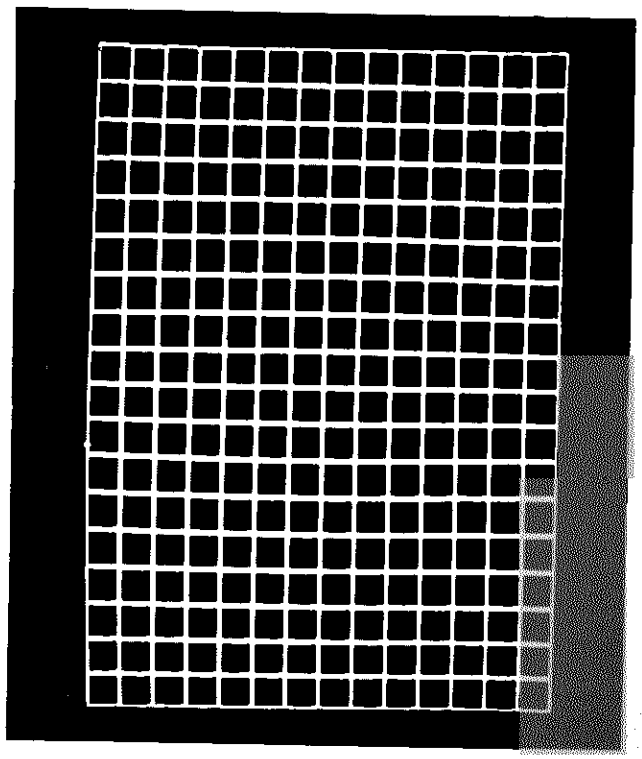
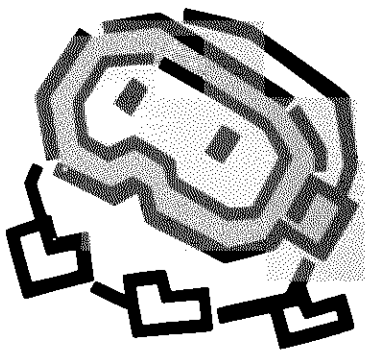
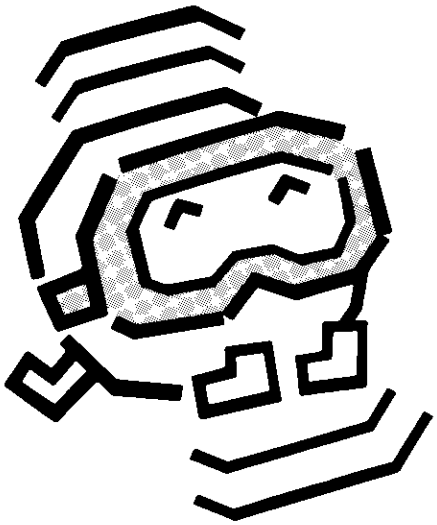


Figure 2-3 Self-Test Screen 2

Maintenance, Repair and Parts



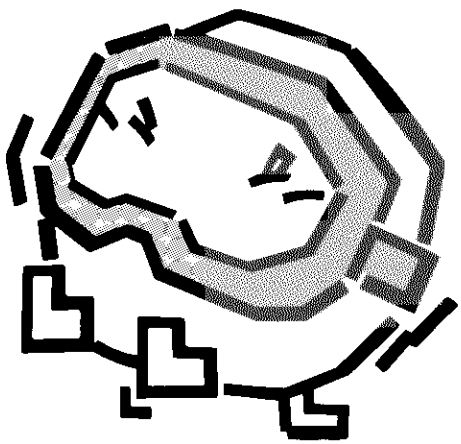


In addition to maintenance and repair information, this chapter provides the necessary information for you to order parts for your Dig Dug game. Please note that **common hardware has been deleted** from most of the parts lists. This includes screws, nuts, washers, bolts, etc.

The parts lists are arranged in alphanumeric order. For example, all "A-" prefix numbers come first. Following this are numbers in sequence evaluated up to the hyphen, namely 00- thru 99-, then 000598-thru approximately 190000-.

When ordering parts, please give the part number, part name, applicable figure number of this manual, and serial number of your game. This will help to avoid confusion and mistakes in your order. We hope the results will be less downtime and more profit from your game.

Atari Customer Service numbers are listed in the front of this manual for your convenience.



Chapter 3

A. Cabinet-Mounted Assemblies

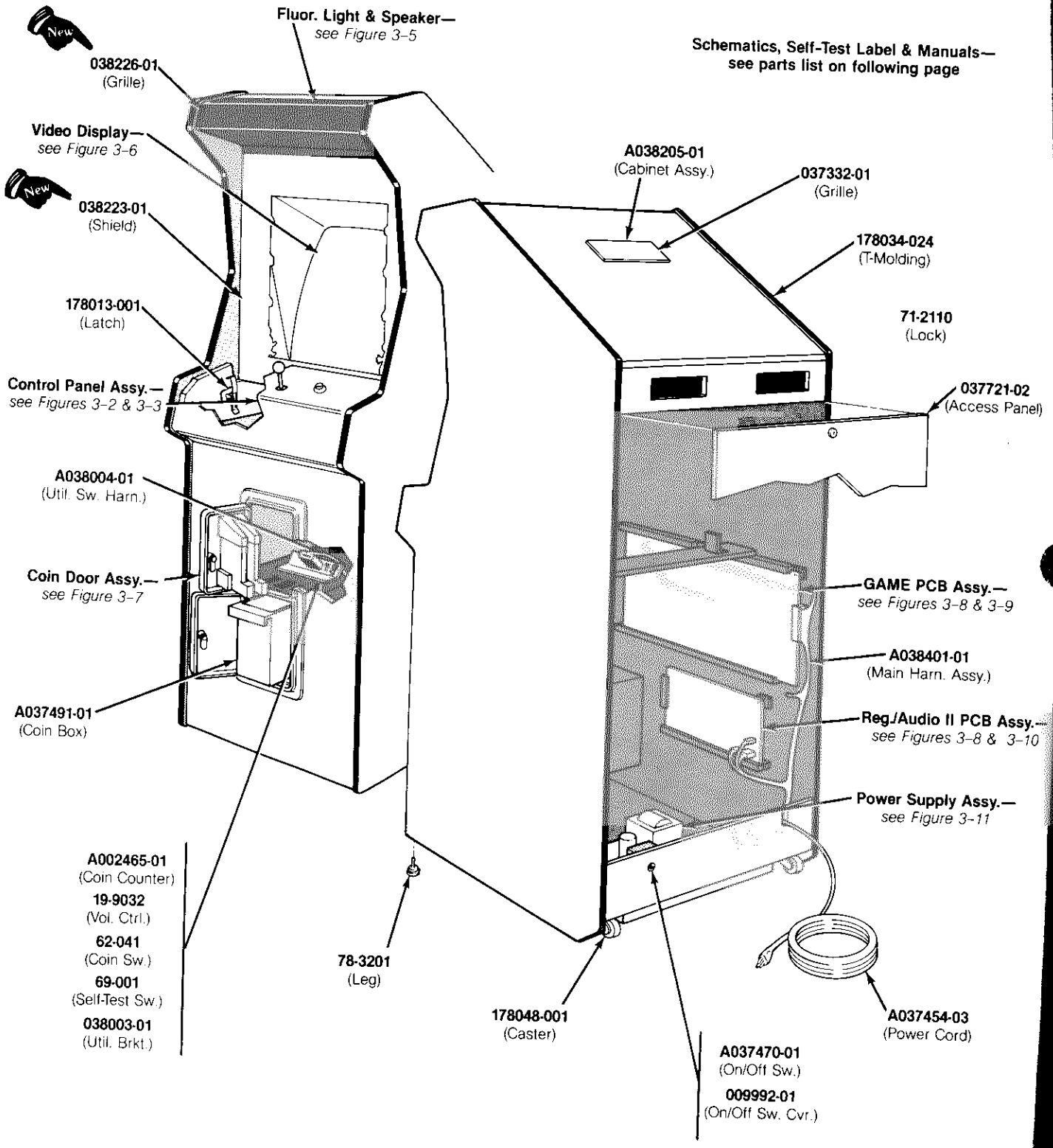


Figure 3-1 Cabinet-Mounted Assemblies

Figure 3-1 Cabinet-Mounted Assemblies, continued
Parts List

Part No.	*Description*
A002465-01	Coin Counter
A037454-03	Strain-Relief Power Cord *(Austria, Belgium, Chile, Denmark, Finland, France, Germany, Greece, Indonesia, Italy, Netherlands, Norway, Spain, Sweden, and Uruguay)*
A037470-01	Power On/Off Switch and Mounting Plate Assembly
A037491-01	Coin Box
A038004-01	Harness for Volume Control/Self-Test Switch/Coin Counter Assembly
A038205-01	Cabinet Assembly *(includes legs and PCB retainers, but not the rear access panel)*
A038401-01	Main Harness Assembly
	The following four items are the technical information supplements to this game:
SP-202	Dig Dug™ Schematic Package
ST-202	Dig Dug Label with Self-Test Procedure and Option Switch Settings
TM-160	Service Manual for 19-Inch Electrohome Color Raster-Scan Display *Acceptable substitute is manual TM-201, used with display no. 92-055.*
TM-202	Dig Dug Operation, Maintenance and Service Manual
19-9032	Volume Control
62-041	SPDT Momentary-Contact Pushbutton Utility Coin Switch with Black Cap
69-001	DPDT Self-Test Switch
71-2110	Panel Cartridge Lock Mechanism *(for rear access panel)*
78-3201	Cabinet-Leveling Leg
009992-01	On/Off Switch Cover
034536-02	Foam Vibration Damper *(goes between cabinet wall and PCBs)*
036686-01	Card of Game Pricing Labels *(not shown in illustration)*
037721-02	Rear Access Panel *(does not include lock)*
037332-01	Ventilation Grille *(located on cabinet top)*
038003-01	Utility Switch Bracket for Volume Control, Self-Test Switch, Coin Switch and Coin Counter
038208-01	Side Panel Decal *(not shown in illustration)*
038223-01	Video Display Shield with Graphics
038226-01	Upper Cabinet Grille
178013-001	Spring Draw Latch
178034-024	¾-Inch Black Plastic T-Molding
178048-001	Rigid Caster

B. The Control Panel

WARNING

Prior to removing or repairing any switch on the control panel, **unplug the game.**

To Open the Control Panel:

1. Open the coin door. Reach up through the opening and release the spring-draw latches. They are on the cabinet side walls at each end of the control panel.
2. Lift up on the control panel at the top edge, and tilt it toward you. The control panel edge next to the display shield has foam tape applied to it. The tape cushions the shield and prevents liquids from entering the cabinet interior. Make sure this tape is in good condition.

Leaf Switch Repair:

- Adjust the leaf switches for a narrow gap. When a switch button 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.
- To replace a leaf switch, remove the screw with a Phillips-head screwdriver.
- To replace the switch button, 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, due to its design.
- Reinstall the switch. Reconnect the harness wires as shown in the *Schematic Package, Game Wiring Diagram.* Make certain the right colors go to the right tabs on the switch.

LED Start-Switch Replacement:

The LED switches have a very low failure rate. If a switch should ever be suspect, first test it using the directions that follow.

To Test LED Switch:

- Remove the wires from the suspected switch.
- Attach the leads of an ohmmeter to normally open and common contacts.
- Check contacts (push and release the switch button) for closed and open continuity.
- If the contacts do not operate sharply or always remain closed or open, then replace the LED switch.

To Replace LED Switch:

- Remove all wires from the faulty switch.
- Turn the switch counterclockwise while holding the black cone-shaped bushing on the outside of the control panel.
- Install a new switch using the reverse procedure.
- Reconnect the harness wires as shown.

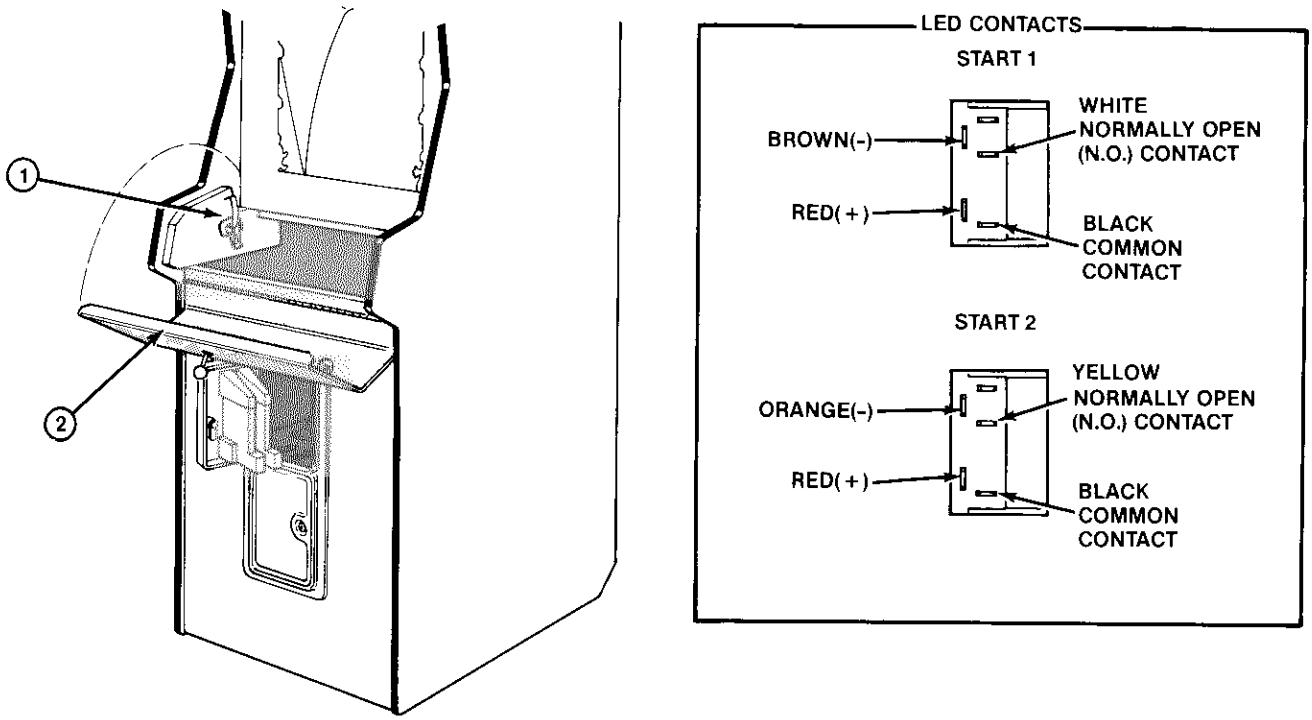


Figure 3-2 The Control Panel

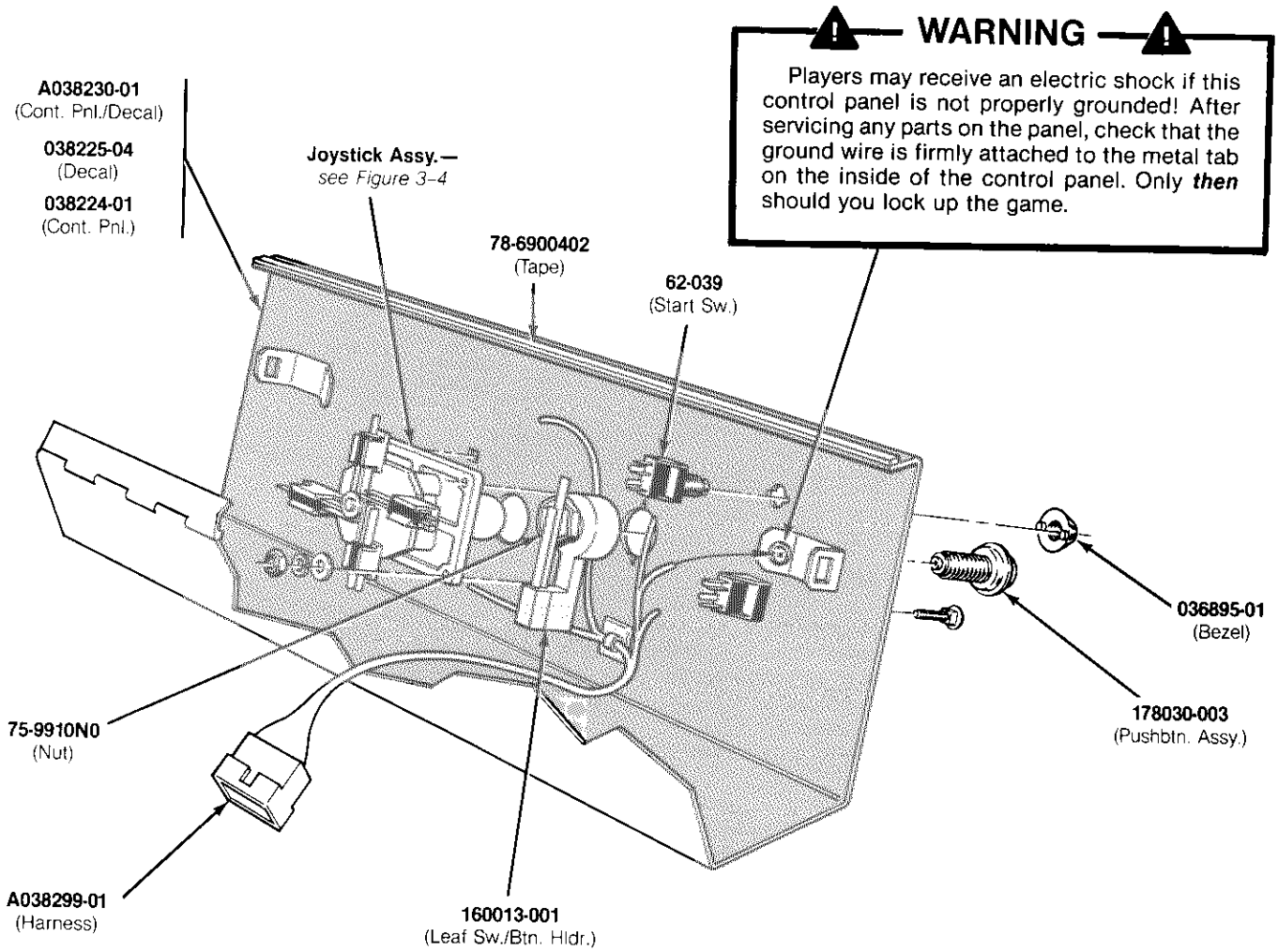


Figure 3-3 Control Panel Assembly

Parts List

Part No.	*Description*
A038230-01	Control Panel with Decal
A038231-01	Control Panel Assembly
A038299-01	Control Panel Harness Assembly
62-039	SPDT Momentary Pushbutton Start Switch, with Red Light-Emitting Diode
75-9910N0	#⅝-11 Steel Stamped Nut
78-6900402	Vinyl Foam Single-Coated-Adhesive Tape, ¼-Inch wide × ⅛-Inch thick (24 in. required)
036895-01	Black Molded Switch Bezel
038224-01	Control Panel
038225-04	Control Panel Decal
160013-001	Leaf Switch and Button Holder *(leaf switch only is part no. 160012-001)*
171016-001	Joystick Assembly
178030-003	Black Pushbutton Assembly

WARNING

Prior to removing or repairing the joystick, **unplug the game.**

To Repair the Joystick:

1. First, remove the entire joystick assembly from the control panel (see *Figure 3-3*). Now locate the four screws in the plastic joystick frame and remove these screws.
2. Next, remove the clip ring from the bottom of the shaft. The assembly will come apart.
3. To replace the *bellows*, pry it up and out of the plastic frame.
   - Reassemble in reverse order.
   - Note that the inner raised ring on the bellows is longer on one side. This side goes on the top of the assembly (toward the control knob).
4. To replace a *leaf switch*, you don't 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.
   - Slide the switch out of its holder. Replace the switch in reverse order. Adjust the switch for a narrow gap.

Disassemble in the order indicated. (Circled numbers match the numbered instructions.)

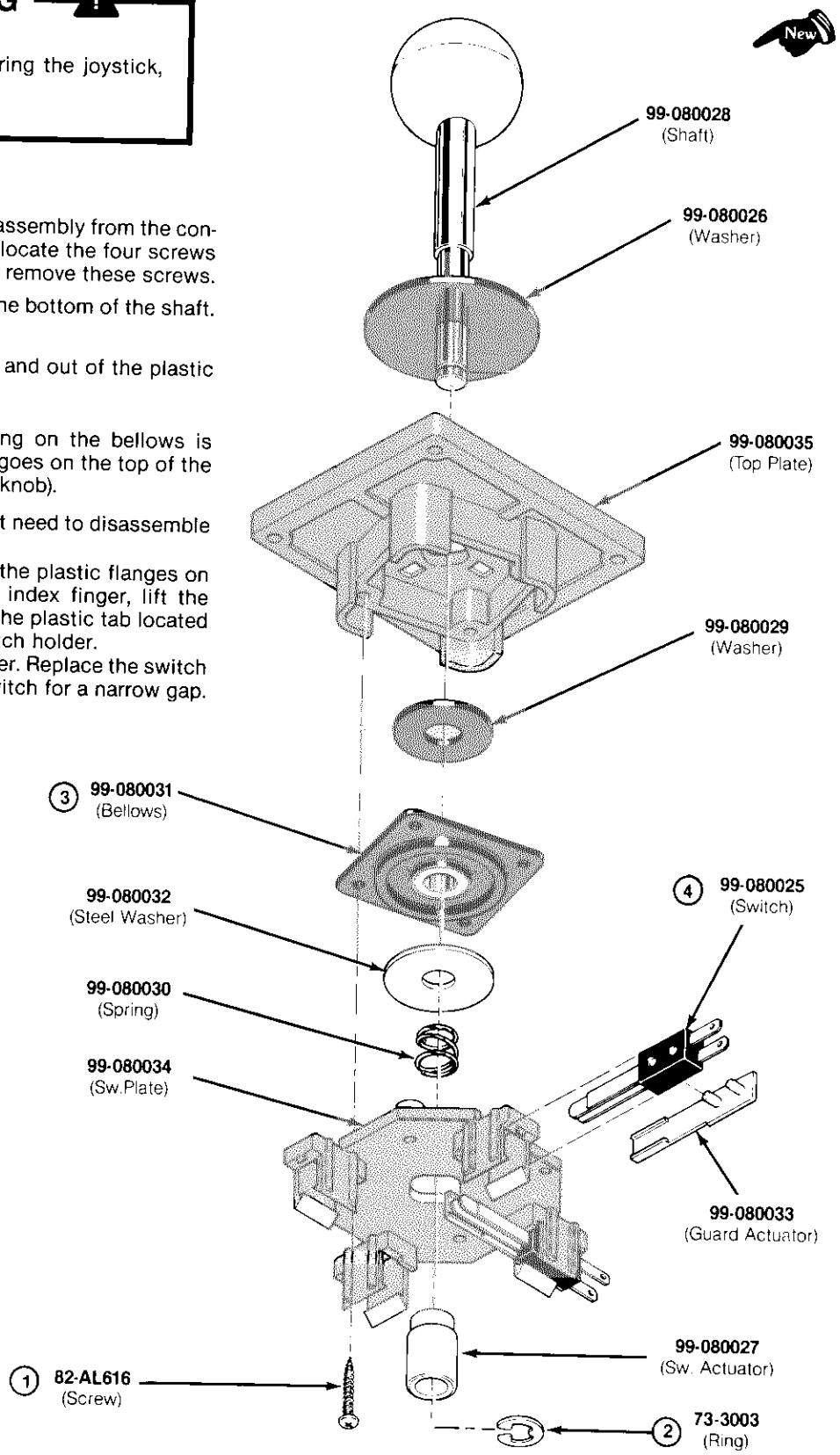


Figure 3-4 Joystick Assembly

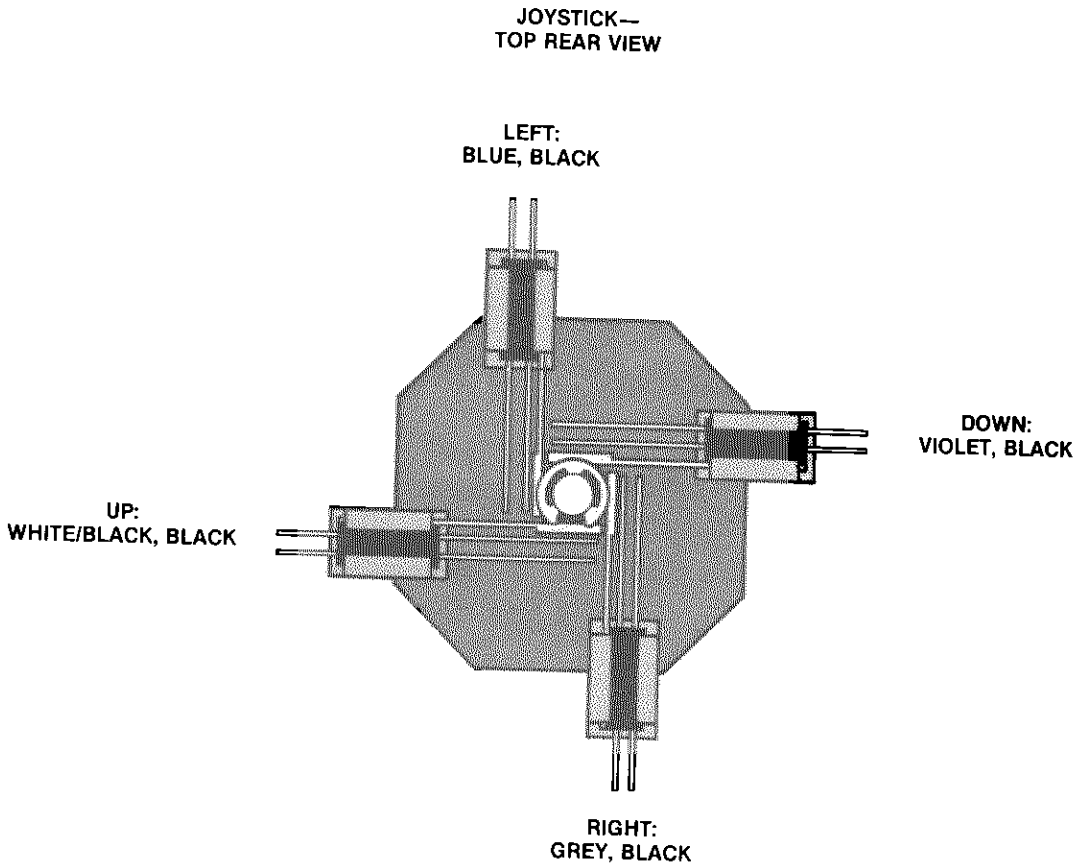


Figure 3-4 Joystick Assembly, continued

Parts List

Part No.	*Description*
73-3003	Retaining Ring
82-AL616	#6 × 1-Inch Cross-Recessed Pan-Head Type BT Tapping Steel Screw
99-080025	Leaf Switch
99-080026	2-Inch Black Plastic Washer
99-080027	Nylon Switch Actuator
99-080028	Metal Shaft
99-080029	Nylon Washer
99-080030	Spring
99-080031	Bellows
99-080032	Flat Steel Washer
99-080033	Plastic Guard Actuator
99-080034	Switch Mounting Plate
99-080035	Top Plate

C. Fluorescent Tube and Speaker

WARNING

Prior to removing or repairing the speaker, fluorescent tube or fan, **unplug the game.**

If you drop a fluorescent tube and it breaks, *it will implode!* Shattered glass can fly 6 feet or more from the implosion. Use care when replacing any fluorescent tube.

To Remove the Tube and Speaker Board:

1. From the back of the game, unlock and open the rear access panel. The tube and speaker harness has a 5-pin connector. Unplug this connector.
2. Open the control panel (see *Figure 3-2, The Control Panel*).
3. From the top front of the game, remove the five button-head screws that secure the upper cabinet grille to the cabinet. Lift the grille up and away from the cabinet. Be careful glass display shield doesn't fall forward.
4. Lift the video display shield up and out of the cabinet.
5. Slide the baffle board that is underneath the fluorescent tube out the front of the cabinet.
6. Remove the screws that secure the tube and speaker board to the cabinet. Slide this board up and out of the cabinet.

To Replace Fluorescent Tube:

7. Remove the Y-lead connectors at each end of the fluorescent tube.
8. Slightly rotate the tube up or down, and carefully remove it from its clamps. Replace it with a new tube. Do not snap the tube in vigorously—*you may break it, causing an implosion!* Replace the Y-lead connectors. Reinstall the light and speaker board, baffle board, shield, grille, and reconnect the harness. Close and lock the control panel and the rear access panel.

To Replace The Speaker:

9. Unplug the two plug-in connectors on the back of the speaker.
10. Remove the hardware that attaches the speaker to the board. Replace the speaker and reinstall the hardware and two plug-in connectors. Reinstall the light and speaker board, baffle board, shield, grille, and reconnect the harness. Close and lock the control panel and the rear access panel.

Disassemble in the order indicated. (Circled numbers match the numbered instructions.)

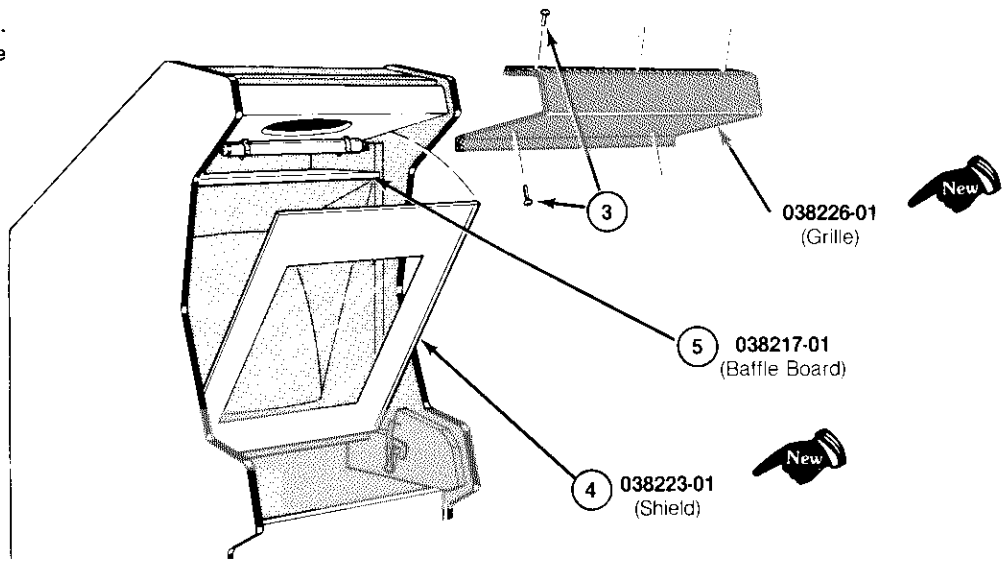
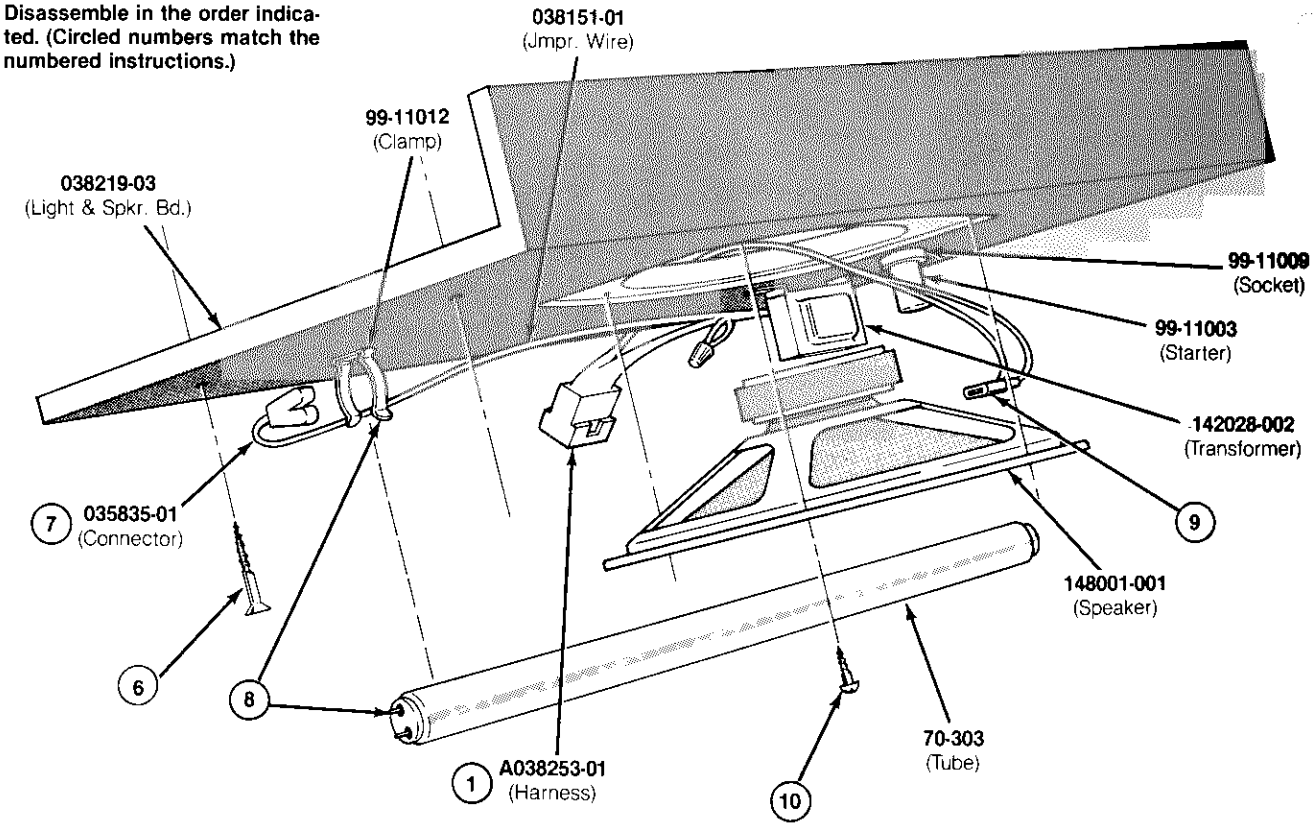


Figure 3-5 Fluorescent Tube and Speaker

Disassemble in the order indicated. (Circled numbers match the numbered instructions.)



NOTE

To ensure that the fluorescent tube starts, make sure the ground wire is firmly attached to the transformer.

Figure 3-5 Fluorescent Tube and Speaker, continued

Parts List

Part No.	*Description*
A038228-01	Fluorescent Tube and Speaker Assembly
A038253-01	Light and Speaker Harness
70-303*	18-Inch Long, 1-Inch Diameter, 15W Cool White Fluorescent Tube
99-11003	Fluorescent Lamp Starter
99-11009	Starter Socket
99-11012*	1⅛-Inch Fluorescent Tube Clamp
035835-01	12-Inch Y-Lead Connector
038151-01	Jumper Wire
038217-01	Baffle Board
038219-03	Light and Speaker Board
038223-01	Display Shield
038226-01	Cabinet Grille
142028-002	50 Hz 118V Ballast Transformer
148001-001	6 × 9-Inch 4-Ohm 15W Oval High-Fidelity Speaker

** Acceptable substitutes are part numbers 70-304 (tube) and 99-11011 (clamp). They must be used together.*

D. Video Display

WARNING

Shock Hazard

The following procedure should only be performed by a *qualified service technician.* Prior to removing or repairing the video display, **unplug the game.** As an extra precaution, we highly recommend *you discharge the high voltage* from the picture tube.

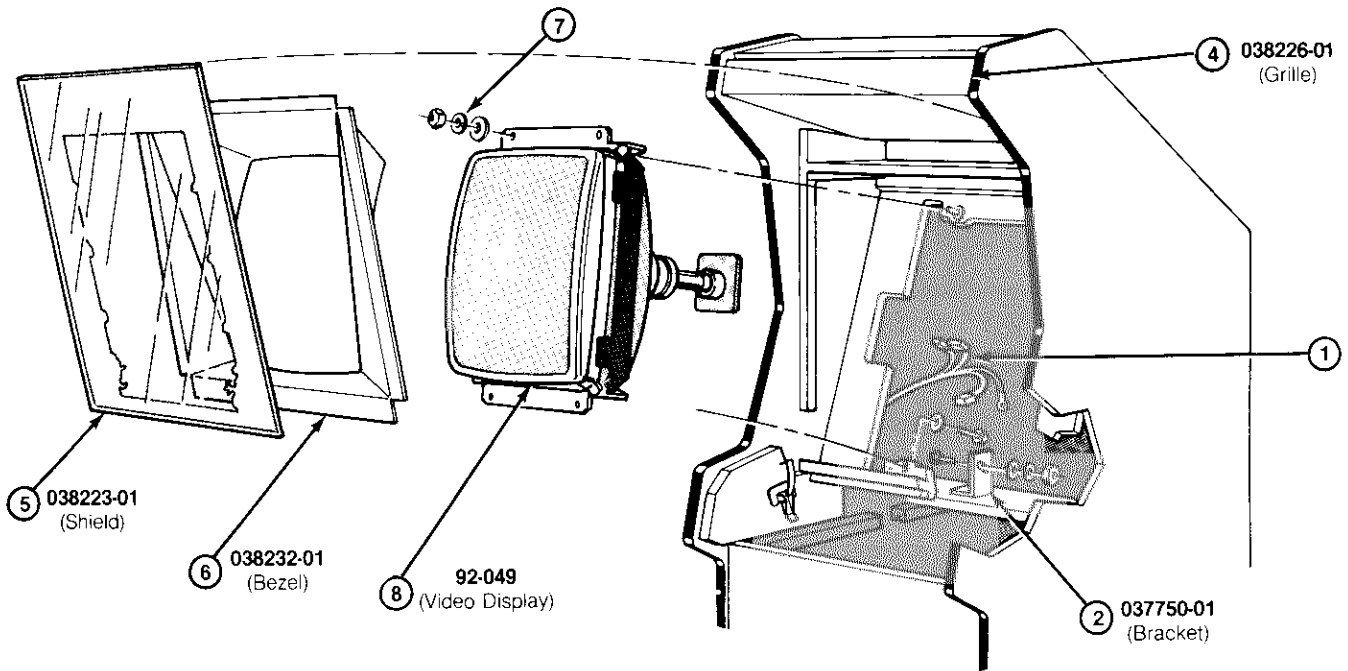
High voltages may exist in any video display, even with power disconnected. Use extreme caution and do not touch electrical parts of the display yoke area with your hands or with metal objects in your hands!

Implosion Hazard

If you drop the display and the picture tube breaks, *it will implode!* Shattered glass and the yoke can fly 6 feet or more from the implosion. Use care when replacing any display.

To Remove Video Display:

1. Open the rear access panel and unplug the three display harness connectors.
2. The rear of the display chassis is attached to a mounting bracket. Remove the hardware that secures the chassis to this bracket.
3. Open the control panel (see *Figure 3-2).*
4. Remove the 5 button-head screws that secure the upper cabinet grille to the cabinet (see *Figure 3-5).* Lift the grille up and away from the cabinet.
5. Lift the video display shield up and out of the cabinet.
6. Carefully remove the cardboard bezel.
7. Remove the four sets of hardware that secure the display chassis to the wood frame.
8. Carefully pull the display out through the front of the cabinet. After servicing the display, reinstall in reverse order.



Disassemble in the order indicated. (Circled numbers match the numbered instructions.)

Figure 3-6 Video Display Parts List

Part No.	*Description*	
92-049	19-Inch Electrohome Color Raster-Scan Video Display	*Acceptable substitute is part no. 92-055—use with TM-201*
037750-01	Display Mounting Bracket	
038223-01	Display Shield with Graphics	
038226-01	Upper Cabinet Grille	
038232-01	Display Bezel	

VA038203

E. Vertical-Mounted Coin Door

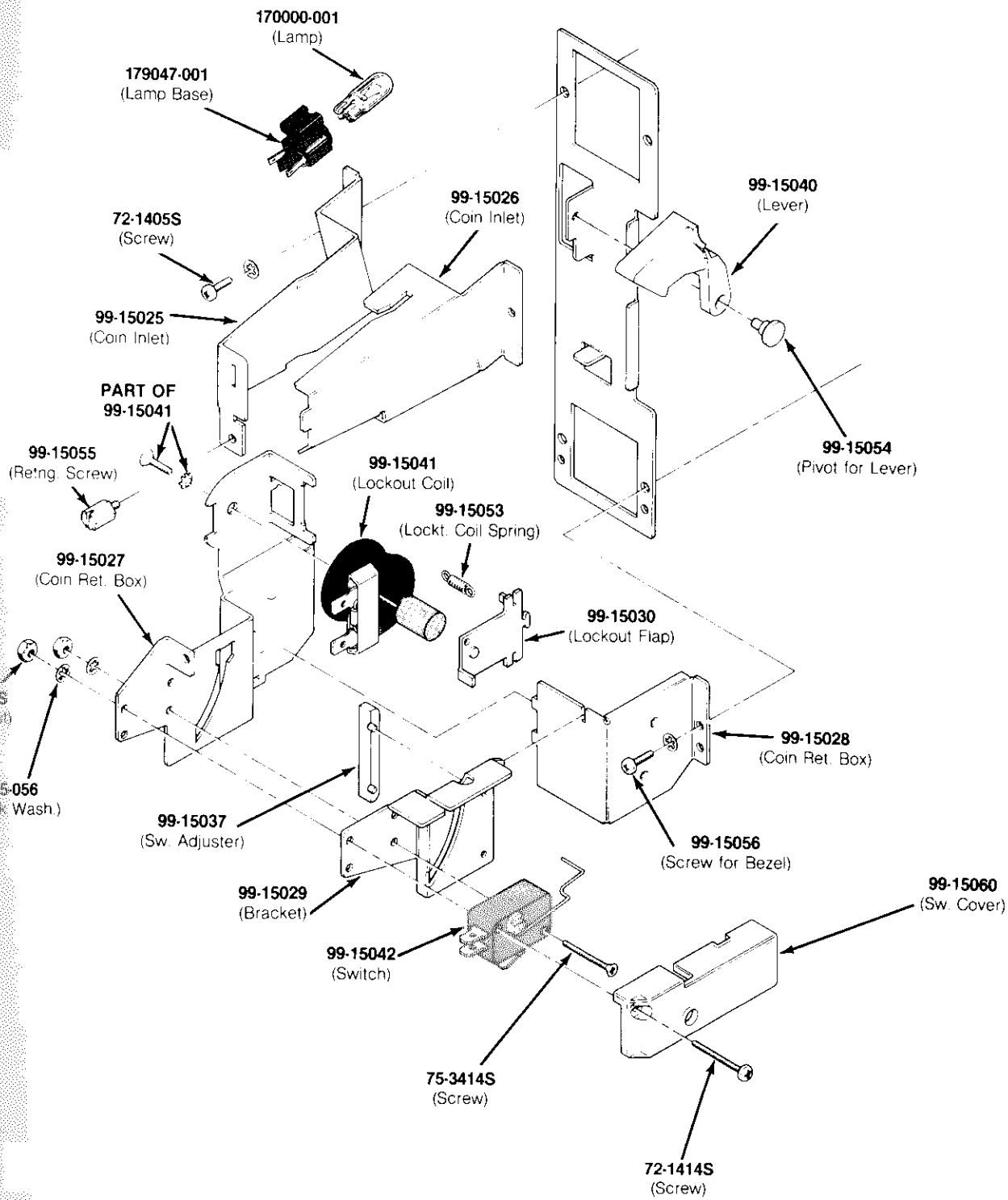


Figure 3–7 Vertical-Mounted Coin Door

D. Video Display

WARNING

Shock Hazard

The following procedure should only be performed by a *qualified service technician.* Prior to removing or repairing the video display, **unplug the game.** As an extra precaution, we highly recommend *you discharge the high voltage* from the picture tube.

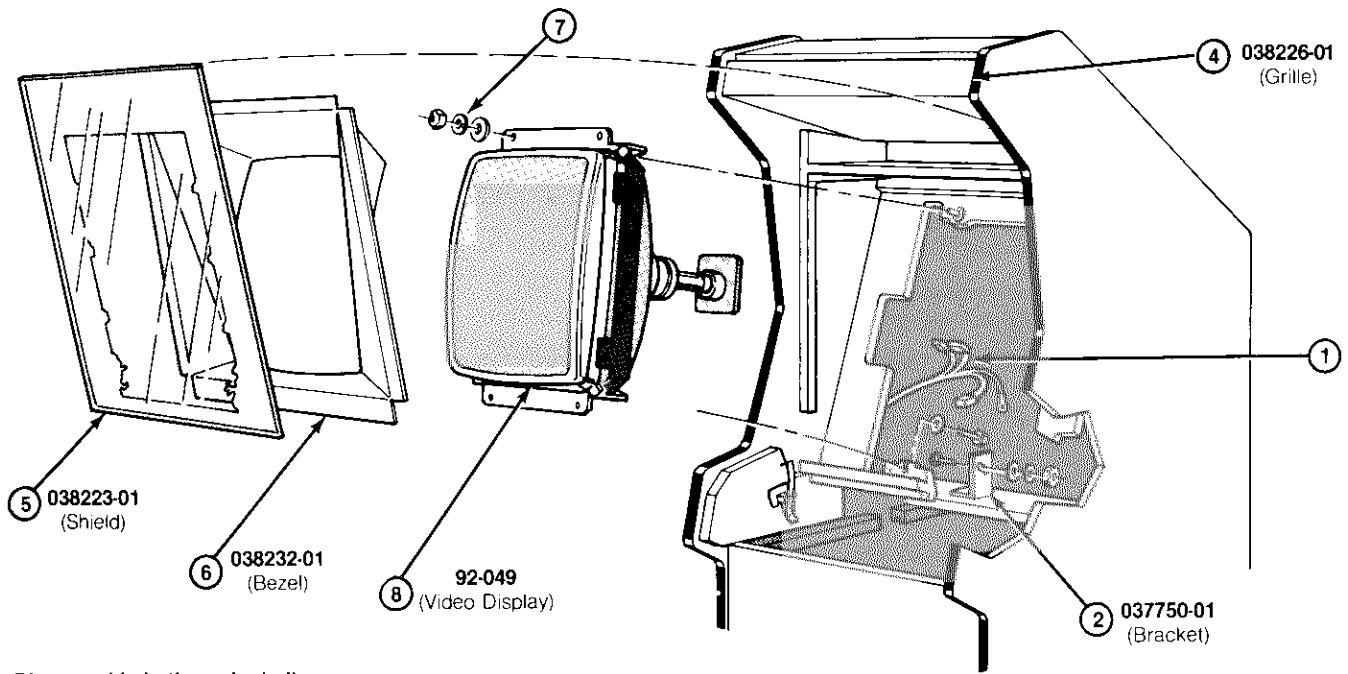
High voltages may exist in any video display, even with power disconnected. Use extreme caution and do not touch electrical parts of the display yoke area with your hands or with metal objects in your hands!

Implosion Hazard

If you drop the display and the picture tube breaks, *it will implode!* Shattered glass and the yoke can fly 6 feet or more from the implosion. Use care when replacing any display.

To Remove Video Display:

1. Open the rear access panel and unplug the three display harness connectors.
2. The rear of the display chassis is attached to a mounting bracket. Remove the hardware that secures the chassis to this bracket.
3. Open the control panel (see *Figure 3-2).*
4. Remove the 5 button-head screws that secure the upper cabinet grille to the cabinet (see *Figure 3-5).* Lift the grille up and away from the cabinet.
5. Lift the video display shield up and out of the cabinet.
6. Carefully remove the cardboard bezel.
7. Remove the four sets of hardware that secure the display chassis to the wood frame.
8. Carefully pull the display out through the front of the cabinet. After servicing the display, reinstall in reverse order.

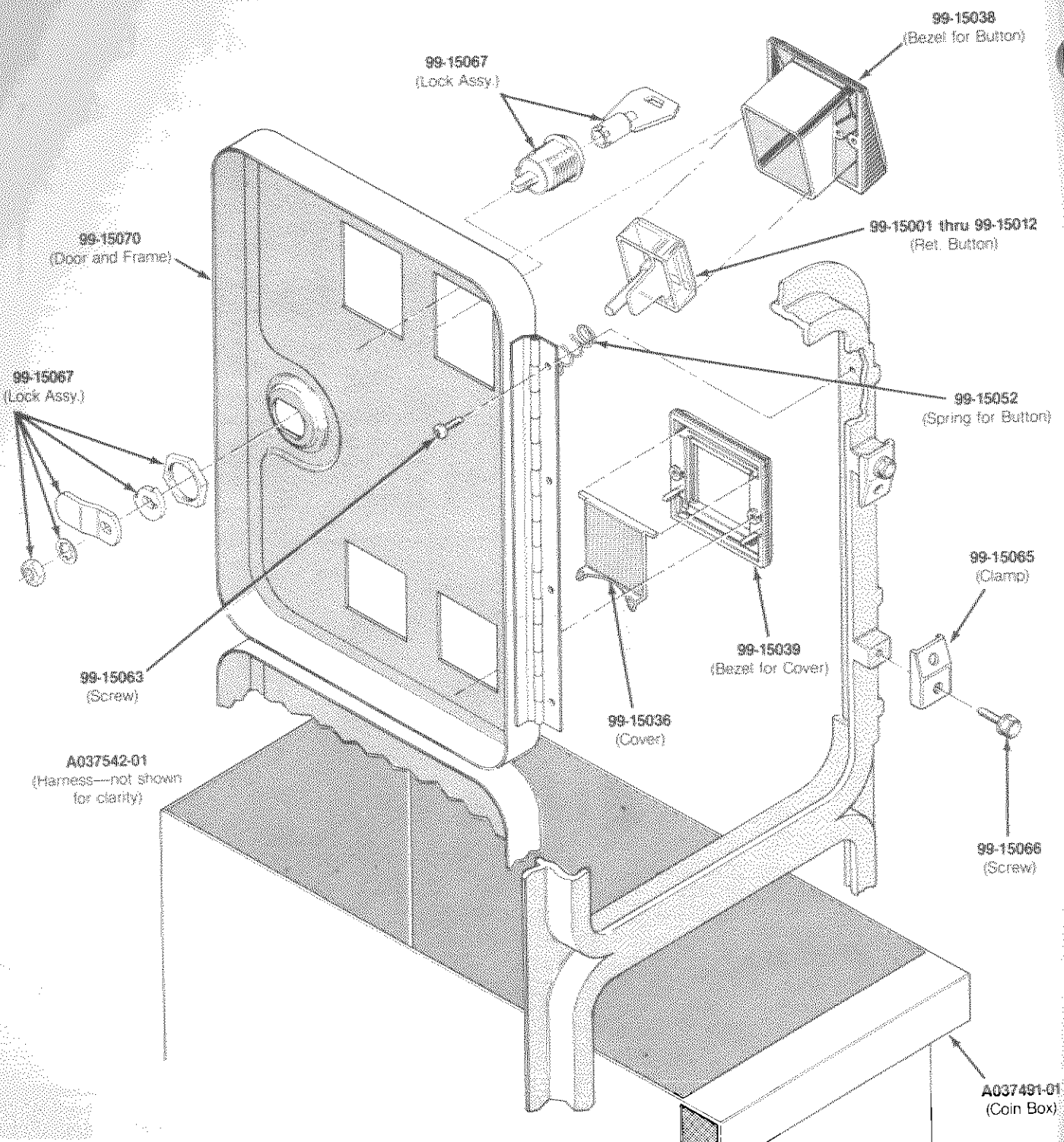


Disassemble in the order indicated. (Circled numbers match the numbered instructions.)

Figure 3-6 Video Display

Parts List

Part No.	*Description*
92-049	19-Inch Electrohome Color Raster-Scan Video Display *Acceptable substitute is part no. 92-055—use with TM-201*
037750-01	Display Mounting Bracket
038223-01	Display Shield with Graphics
038226-01	Upper Cabinet Grille
038232-01	Display Bezel



A037619-01 — U.S. 25¢/25¢ Coin Door
A037619-02 — U.S. 50¢/50¢ Coin Door
A037619-03 — Canadian 25¢/25¢ Coin Door
A037619-04 — British 10 P/10 P Coin Door
A037619-05 — British 10 P/50 P Coin Door
A037619-06 — British 20 P/50 P Coin Door
A037619-07 — Australian 20¢/20¢ Coin Door

A037619-08 — German 1 DM/1 DM Coin Door
A037619-09 — German 2 DM/1 DM Coin Door
A037619-10 — German 2 DM/5 DM Coin Door
A037619-11 — German 1 DM/5 DM Coin Door
A037619-12 — 5 Fr/5 Fr Coin Door
A037619-13 — Swiss 1 Fr/1 Fr Coin Door
A037619-14 — French 1 Fr/1 Fr Coin Door

A037619-15 — French 2 Fr/1 Fr Coin Door
A037619-16 — Swedish 1 Kr/1 Kr Coin Door
A037619-17 — Spanish 25 Pts/25 Pts Coin Door
A037619-18 — Italian 100 L/100 L Coin Door
A037619-19 — Hong Kong $1/$1 Coin Door
A037619-20 — Japanese 100Y/100Y Coin Door

Figure 3-7 Vertical-Mounted Coin Door, continued

Figure 3-7 Vertical-Mounted Coin Door, continued
Parts List

Part No.	*Description*
A037491-01	Coin Box
A037542-01	Harness Assembly
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
99-15012	Coin Return Button with U.S. 50¢ (2 x 25¢) 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
99-15030	Flap for Lockout Coil *(U.S. 25¢)*
99-15036	Metal Coin Return Cover
99-15037	Switch Adjuster
99-15038	Bezel for Coin Return Button
99-15039	Metal Bezel for Coin Return Cover
99-15040	Coin Return Lever
99-15041	Lockout Coil
99-15042	Coin Switch for U.S. 25¢
99-15052	Spring for Coin Return Button
99-15053	Spring for Lockout Coil
99-15054	Pivot for Coin Return Lever
99-15055	Retaining Screw
99-15056	Screw for Both Bezels
99-15060	Switch Cover
99-15063	Screw for Hinge
99-15065	Clamp for Frame
99-15066	Screw for Clamp
99-15067	Lock Assembly
99-15070	Door and Frame
170000-001	6.3V Miniature Wedge Base Incandescent Lamp
179047-001	Lamp Base

F. Printed-Circuit Boards

WARNING

Prior to removing or repairing any printed-circuit board, **unplug the game.**

To Remove Printed-Circuit Boards:

1. Open the rear access panel.
2. Locate the hardware that secures the PCB to the cabinet, and remove this hardware. (Each PCB has one screw and two spacers to secure it.)
3. If you are removing the game board, first remove the tie wraps that fasten the edge connector to that board. Then unplug the edge connector. If you are removing the Regulator/Audio II PCB, disconnect the three small harness connectors on this board.
4. Carefully slide the game PCB straight out of its retainers. Slide and lift the Regulator/Audio II PCB out of its slot. Be careful not to twist the boards, as this may loosen connections or components. Repair as required.

To Replace Printed-Circuit Boards:

- Reinstall the PCB, making sure that the connectors are properly plugged in. Note that they are keyed to fit only one way, so if they don't slip on easily, don't force them. **A reversed connector will probably damage your game** and void the warranty.
- Replace the hardware that secures the PCB to the cabinet wall. Close and lock the rear access panel.
- Check that the operation of the game is correct by performing the self-test. This is very important when you repair a PCB. Unless you are a qualified technician, **do not turn the small knob on the Regulator/Audio II PCB.**

Disassemble in the order indicated. (Circled numbers match the numbered instructions.)

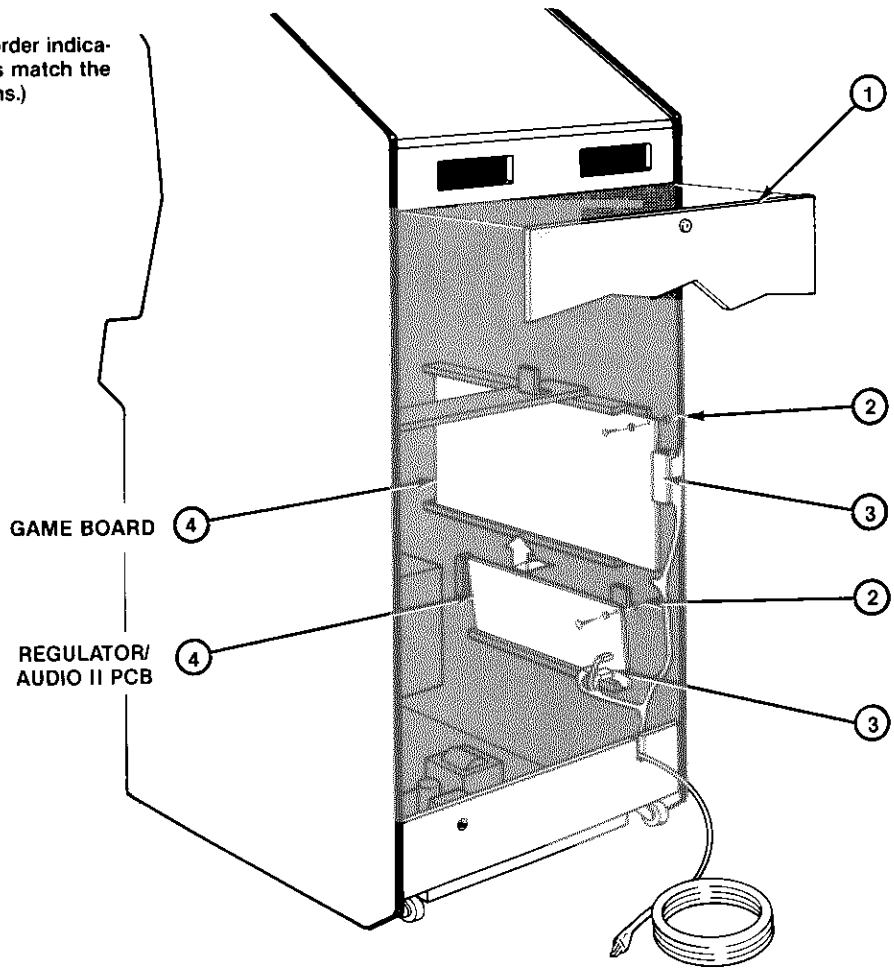


Figure 3-8 Printed-Circuit Board Removal

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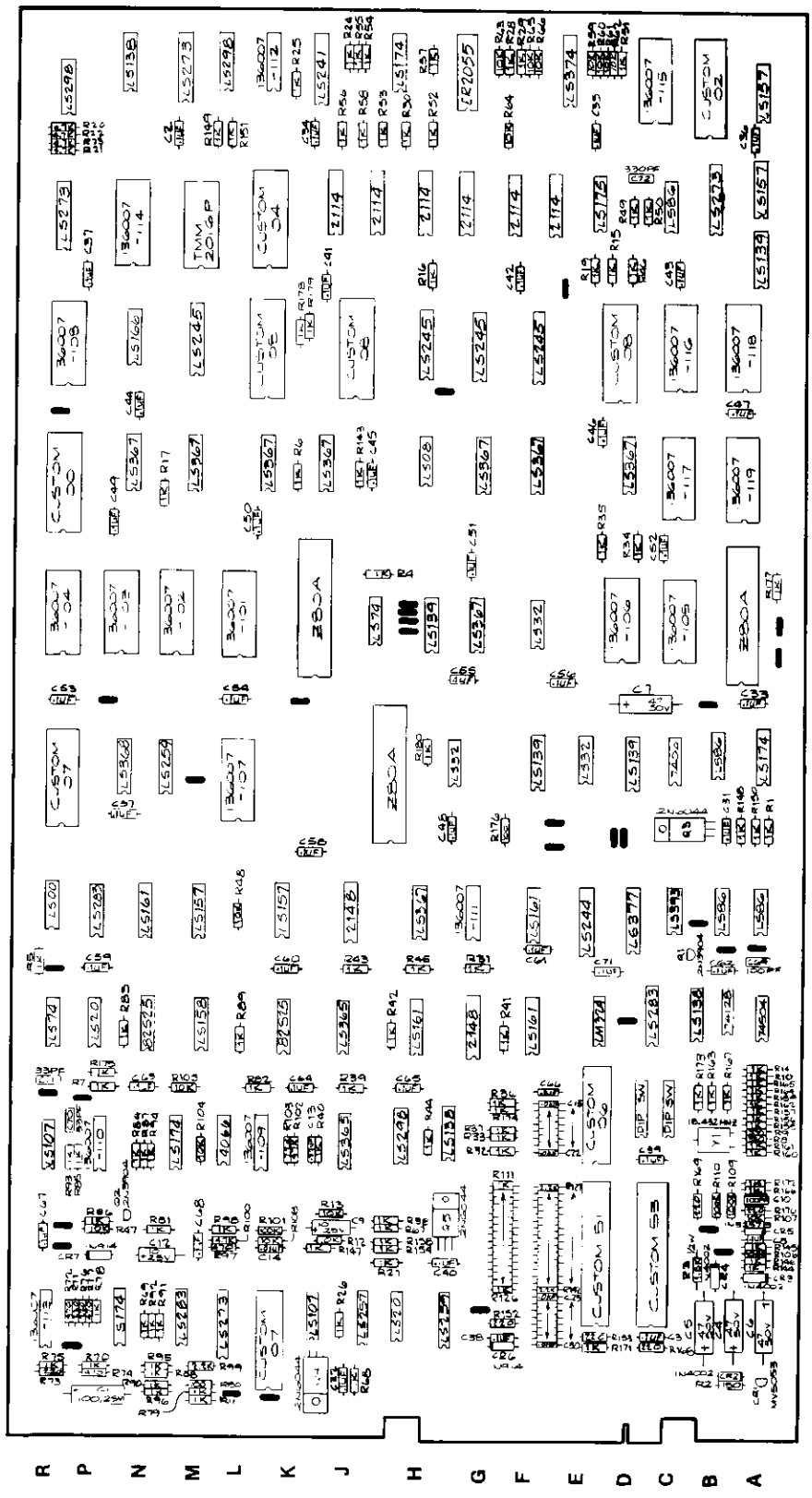

Figure 3-9 Dig Dug Game PCB Assembly

Figure 3-9 Dig Dug Game PCB Assembly, continued Parts List

Part No.	*Description (Reference Designations and Locations in Bold)*
A038156-01	Dig Dug Game PCB Assembly
24-250106	10 μF 25V Aluminum Electrolytic Fixed Axial-Lead Capacitor **(C9, 12)**
24-250107	100 μF 25V Aluminum Electrolytic Fixed Axial-Lead Capacitor **(C1)**
24-500476	47 μF 50V Aluminum Electrolytic Fixed Axial-Lead Capacitor **(C4-7)**
29-088	.1 μF 50V Ceramic-Disc Axial-Lead Capacitor **(C2, 3, 8, 31-68,71)**
31-1N4002	Type-1N4002 100V Switching Diode **(CR2-4)**
31-1N914	Type-1N914 75V Switching Diode **(CR6, 7)**
34-2N3904	Type-2N3904 NPN 60V 1W Transistor **(Q1, 2)**
34-2N6044	Type-2N6044 Darlington NPN Transistor **(Q3-5)**
37-4066	Type-4066 Quad Analog Switch Integrated Circuit **(2L)**
37-7406	Type-7406 Integrated Circuit **(5C)**
37-74LS00	Type-74LS00 Integrated Circuit **(4R)**
37-74LS08	Type-74LS08 Integrated Circuit **(7H)**
37-74LS20	Type-74LS20 Integrated Circuit **(1H, 3P)**
37-74LS32	Type-74LS32 Integrated Circuit **(5E, 6F, 5G/H)**
37-74LS74	Type-74LS74 Integrated Circuit **(6H/J, 3R)**
37-74LS86	Type-74LS86 Integrated Circuit **(4A, 4B, 5B, 9C)**
37-74LS139	Type-74LS139 Integrated Circuit **(8/9A, 5D, 5F, 6H)**
37-74LS157	Type-74LS157 Integrated Circuit **(9A, 10A, 4K, 4M)**
37-74LS161	Type-74LS161 Integrated Circuit **(3F, 4F, 3H, 4N)**
37-74LS166	Type-74LS166 Integrated Circuit **(8N)**
37-74LS174	Type-74LS174 Integrated Circuit **(5A, 10H/J, 2M/N)**
37-74LS175	Type-74LS175 Integrated Circuit **(9E)**
37-74LS241	Type-74LS241 Integrated Circuit **(10J/K)**
37-74LS244	Type-74LS244 Integrated Circuit **(4E)**
37-74LS245	Type-74LS245 Integrated Circuit **(8F, 8G, 8H, 8M)**
37-74LS259	Type-74LS259 Integrated Circuit **(1G/H, 5M/N)**
37-74LS273	Type-74LS273 Integrated Circuit **(9B, 1L, 10M/N, 9R)**
37-74LS367	Type-74LS367 Integrated Circuit **(7D, 7F, 6G, 7G, 4H, 7J/K, 7K/L, 7M, 7P)**
37-74LS374	Type-74LS374 Integrated Circuit **(10E/F)**
37-74LS377	Type-74LS377 Integrated Circuit **(4D)**
37-74LS393	Type-74LS393 Integrated Circuit **(4C)**
37-74S04	Type-74S04 Integrated Circuit **(3A)**
37-LM324	Type-LM324 Integrated Circuit **(3D/E)**
38-MV5053	Type-MV5053 Light-Emitting Diode **(CR1)**
66-118P1T	8-Station Single-Throw, Dual-Inline-Package Switch **(2C, 2C/D)**
72-6810S	#8 × ⅝-Inch Cross-Recessed Pan-Head Screw *(for mounting PCB to cabinet wall)*
78-24012	5-Inch Beaded Nylon Tie Wrap
79-42C22	22-Contact Medium-Insertion-Force Integrated Circuit Socket **(10G)**
79-42C24	24-Contact Medium-Insertion-Force Integrated Circuit Socket **(7A/B, 8A/B, 6C-8C, 10C/D, 6D, 5L, 6L, 6M, 9M, 9N, 6N/P, 6R, 8R)**
79-42C28	28-Contact Medium-Insertion-Force Integrated Circuit Socket **(10B, 8D, 2E, 8J, 1K, 9K, 8K/L, 5R, 7R)**
79-42C40	40-Contact Medium-Insertion-Force Integrated Circuit Socket **(6A/B, 5H/J, 6J/K)**
79-42C42	42-Contact Medium-Insertion-Force Integrated Circuit Socket **(1/2C, 1/2E)**
81-4302	Nylon Snap-In Fastener

[Continued on next page]

Figure 3-9 Dig Dug Game PCB Assembly, continued Parts List

Part No.	Description (Reference Designations and Locations in Bold)
90-7005	Random-Access Memory **(3K, 3N)**
90-7036	Random-Access Memory **(9E/F, 9F/G, 9G/H, 9H, 9H/J, 9J/K)**
110000-101	100 Ohm, ±5%, ¼W Resistor **(R80, 176)**
110000-102	1K Ohm, ±5%, ¼W Resistor **(R1, 4-7, 10, 11, 14-7, 19, 24-46, 49-58, 67-70, 75, 78, 79, 81-96, 98, 111-126, 143-151, 154-167, 171-175, 177-180)**
110000-103	10K Ohm, ±5%, ¼W Resistor **(R12, 13, 47, 48, 59-66, 104, 105, 107, 108)**
110000-104	100K Ohm, ±5%, ¼W Resistor **(R101, 106, 109, 110)**
110000-151	150 Ohm, ±5%, ¼W Resistor **(R2)**
110000-221	220 Ohm, ±5%, ¼W Resistor **(R71, 73, 76, 152, 153, 168-170)**
110000-222	2.2K Ohm, ±5%, ¼W Resistor **(R99, 127-142)**
110000-223	22K Ohm, ±5%, ¼W Resistor **(R103)**
110000-331	330 Ohm, ±5%, ¼W Resistor **(R8, 9)**
110000-471	470 Ohm, ±5%, ¼W Resistor **(R72, 74, 77, 97)**
110000-472	4.7K Ohm, ±5%, ¼W Resistor **(R20-23, 100)**
110000-473	47K Ohm, ±5%, ¼W Resistor **(R102)**
110001-152	1.5K Ohm, ±5%, ½W Resistor **(R3)**
122005-103	.01 μF, 25V Minimum, ±10% Ceramic-Disc Axial-Lead Capacitor **(C14-30)**
122008-224	.22 μF 25V Minimum Ceramic-Disc Axial-Lead Capacitor **(C13)**
128002-101	100 pF 100V Epoxy-Dipped Radial-Lead Mica Capacitor **(C10, 69)**
128002-330	33 pF 100V Epoxy-Dipped Radial-Lead Mica Capacitor **(C11, 70)**
128002-331	330 pF 100V Epoxy-Dipped Radial-Lead Mica Capacitor **(C72)**
131003-001	Type-1N5257B 6.2V 1W Zener Diode **(CR5)**
136007-101	Programmable Read-Only Memory, ROM0 **(6L)**
136007-102	Programmable Read-Only Memory, ROM1 **(6M)**
136007-103	Programmable Read-Only Memory, ROM2 **(6N/P)**
136007-104	Programmable Read-Only Memory, ROM3 **(6R)**
136007-105	Programmable Read-Only Memory, ROM4 **(6C)**
136007-106	Programmable Read-Only Memory, ROM5 **(6D)**
136007-107	Programmable Read-Only Memory, ROM6 **(5L)**
136007-108	Programmable Read-Only Memory **(8R)**
136007-109	Programmable Read-Only Memory **(2K/L)**
136007-110	Programmable Read-Only Memory **(2P)**
136007-111	Programmable Read-Only Memory **(4G)**
136007-112	Programmable Read-Only Memory **(10K/L)**
136007-113	Programmable Read-Only Memory **(1R)**
136007-114	Programmable Read-Only Memory **(9N)**
136007-115	Programmable Read-Only Memory **(10C/D)**
136007-116	Programmable Read-Only Memory **(8C)**
136007-117	Programmable Read-Only Memory **(7C)**
136007-118	Programmable Read-Only Memory **(8A/B)**
136007-119	Programmable Read-Only Memory **(7A/B)**
137161-001	Read-Only Memory **(10G)**
137168-001	Type-74LS368 Integrated Circuit **(5N/P)**
137169-001	Type-74LS107 Integrated Circuit **(1J/K, 2R)**

[Continued on next page]

Figure 3-9 Dig Dug Game PCB Assembly, continued Parts List

Part No.	*Description (Reference Designations and Locations in Bold)*
137177-001	Type-74LS138 Integrated Circuit **(3B/C, 2G/H, 10N/P)**
137186-001	Multi-CPU Bus Controller Custom Chip 08 **(8D, 8J, 8K/L)**
137187-001	Coin and I/O Controller Custom Chip 51 **(1/2E)**
137188-001	Steering Controller Custom Chip 53 **(1/2C)**
137189-001	Video Ram Addresser Custom Chip 00 **(7R)**
137190-001	Universal Shift Register Custom Chip 02 **(10B)**
137191-001	Motion Object Controller Custom Chip 04 **(9K)**
137192-001	Controller Custom Chip 06 **(2E)**
137193-001	Sync Generator Custom Chip 07 **(1K, 5R)**
137194-001	4.0 MHz Z80A Central Processing Unit **(6A/B, 5H/J, 6J/K)**
137199-001	Random-Access Memory **(3G, 4J)**
137200-001	Type-74LS365 Integrated Circuit **(2J, 3J)**
137201-001	Type-74LS298 Integrated Circuit **(2H/J, 10L/M, 10R)**
137202-001	Type-74128 Integrated Circuit **(3A/B)**
137203-001	Type-74LS158 Integrated Circuit **(3M)**
137204-001	Type-74LS283 Integrated Circuit **(3C/D, 1M, 4P)**
137209-001	Type-74S174 Integrated Circuit **(1N/P)**
137211-001	Static Random-Access Memory **(9M)**
137217-001	Type-74S257 Integrated Circuit **(1H/J)**
144000-002	18.432 MHz Crystal **(Y1)**
175004-706	#6 Spacer for Mounting Printed Circuit Board
179051-001	Test Point *Acceptable substitute is part no. 020670-01*

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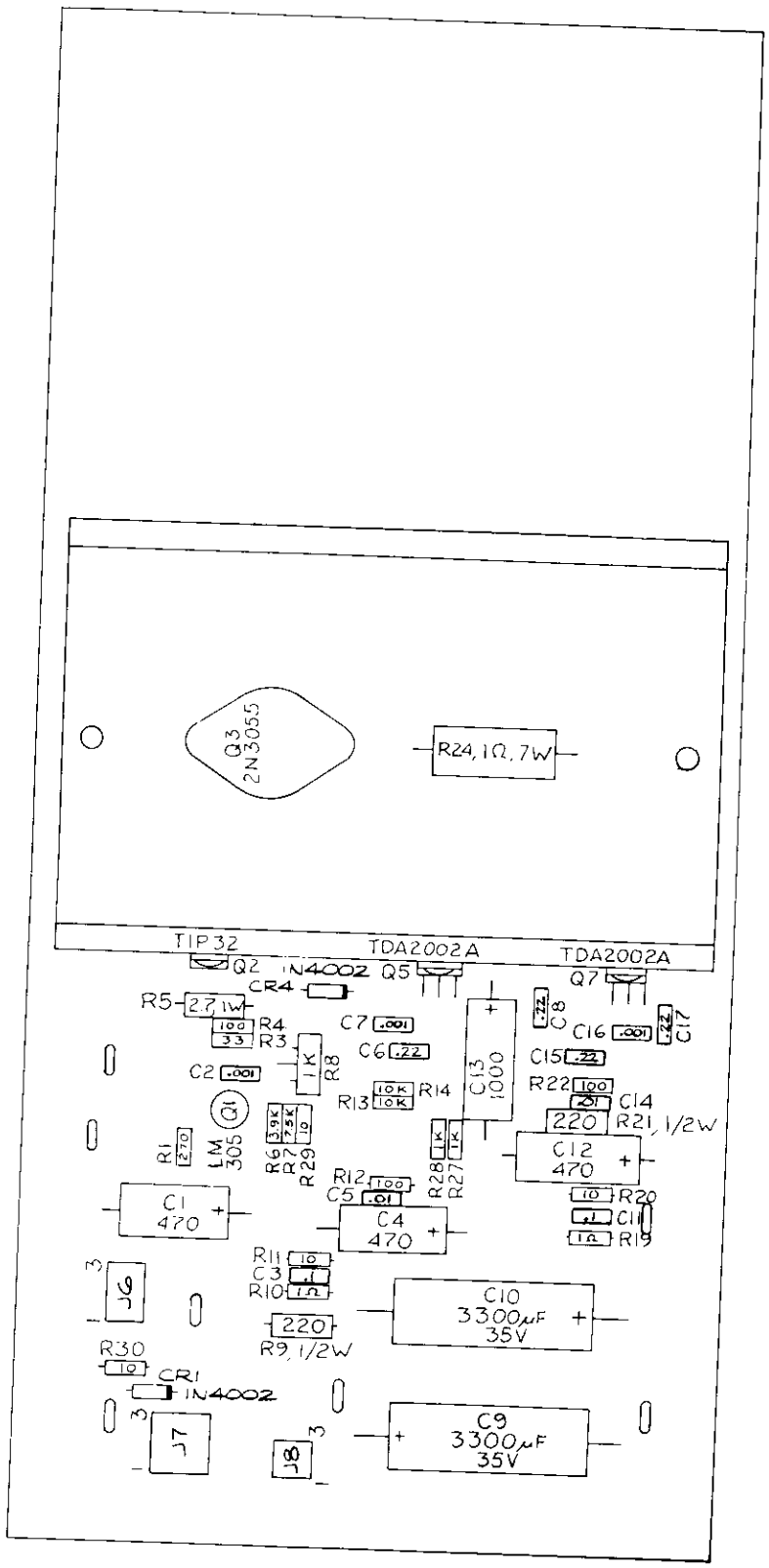

Figure 3-10 Regulator/Audio II PCB Assembly

Figure 3-10 Regulator/Audio II PCB Assembly Parts List

Part No.	Description (Reference Designations and Locations in Bold)
A035435-01	Regulator/Audio II PCB Assembly *Acceptable substitute is part no. A035435-02 thru -04.*
19-100P1015	.1 Ohm, ±3%, 7W Wirewound Resistor **(R24)**
19-315102	1K Ohm Vertical PCB-Mounting Cermet Trimpot **(R8)** *Acceptable substitute is part no. 119002-102.*
24-250108	1000 μF 25V Aluminum Electrolytic Fixed Axial-Lead Capacitor **(C13)**
24-250477	470 μF 25V Aluminum Electrolytic Fixed Axial-Lead Capacitor **(C1, 4, 12)**
24-350338	3300 μF 35V Aluminum Electrolytic Fixed Axial-Lead Capacitor **(C9, 10)**
29-088	.1 μF 25V Ceramic-Disc Radial-Lead Capacitor **(C3, 11)**
31-1N4002	Type-1N4002 100V 1-Amp. Silicon Rectifier Diode **(CR1, 4)**
33-TIP32	Type-TIP32 PNP Power Transistor **(Q2)**
34-2N3055	Type-2N3055 NPN Silicon Transistor **(Q3)**
37-LM305	5V Linear Voltage Regulator **(Q1)**
72-1608C	#6-32 × ½-Inch Cross-Recessed Pan-Head Corrosion-Resistant Steel Machine Screw
72-6606S	#6 × ⅜-Inch Pan-Head Thread-Forming Cross-Recessed Type-AB Zinc-Plated-Steel Screw
75-99516	#6-32 Nut/Washer Assembly
75-F60405	#6-32 × ¼-Inch Binder-Head Nylon Screw
78-16008	Thermally Conductive Compound **(Q3)**
78-16014	Thermally Conductive Silicon Insulator **(Q2)**
79-58306	6-Position Connector Receptacle **(J6)**
79-58308	9-Position Connector Receptacle **(J7)**
79-58354	4-Position Connector Receptacle **(J8)**
034531-01	Heat Sink
100015-103	.01 μF 25V Ceramic-Disc Radial-Lead Capacitor **(C5, C14)**
110000-010	1 Ohm, ±5%, ¼W Resistor **(R10, 19)**
110000-100	10 Ohm, ±5%, ¼W Resistor **(R11, 20, 29, 30)**
110000-101	100 Ohm, ±5%, ¼W Resistor **(R4, 12, 22)**
110000-102	1K Ohm, ±5%, ¼W Resistor **(R27, 28)**
110000-103	10K Ohm, ±5%, ¼W Resistor **(R13, 14)**
110000-271	270 Ohm, ±5%, ¼W Resistor **(R1)**
110000-330	33 Ohm, ±5%, ¼W Resistor **(R3)**
110000-392	3.9K Ohm, ±5%, ¼W Resistor **(R6)**
110000-562	5.6K Ohm, ±5%, ¼W Resistor **(R32, 33)**
110000-752	7.5K Ohm, ±5%, ¼W Resistor **(R7)**
110001-221	220 Ohm, ±5%, ½W Resistor **(R9, 21)**
110009-027	2.7 Ohm, ±5%, 1W Resistor **(R5)**
122002-102	.001 μF 25V Ceramic-Disc Minimum Radial-Lead Capacitor **(C2, 7, 16)**
122004-224	.22 μF 25V Ceramic-Disc Capacitor **(C6, 8, 15, 17)**
137151-002	Type-TDA2002A 8W Linear Audio Amplifier **(Q5, 7)**
179051-001	Test Point *Acceptable substitute is part no. 020670-01.*

G. Power Supply Assembly

Line Voltage Range	*Voltage Selection Plug Wire Color*
90-110 VAC (100)	*Violet*
200-240 VAC (220)	*Blue*
220-260 VAC (240)	*Brown*

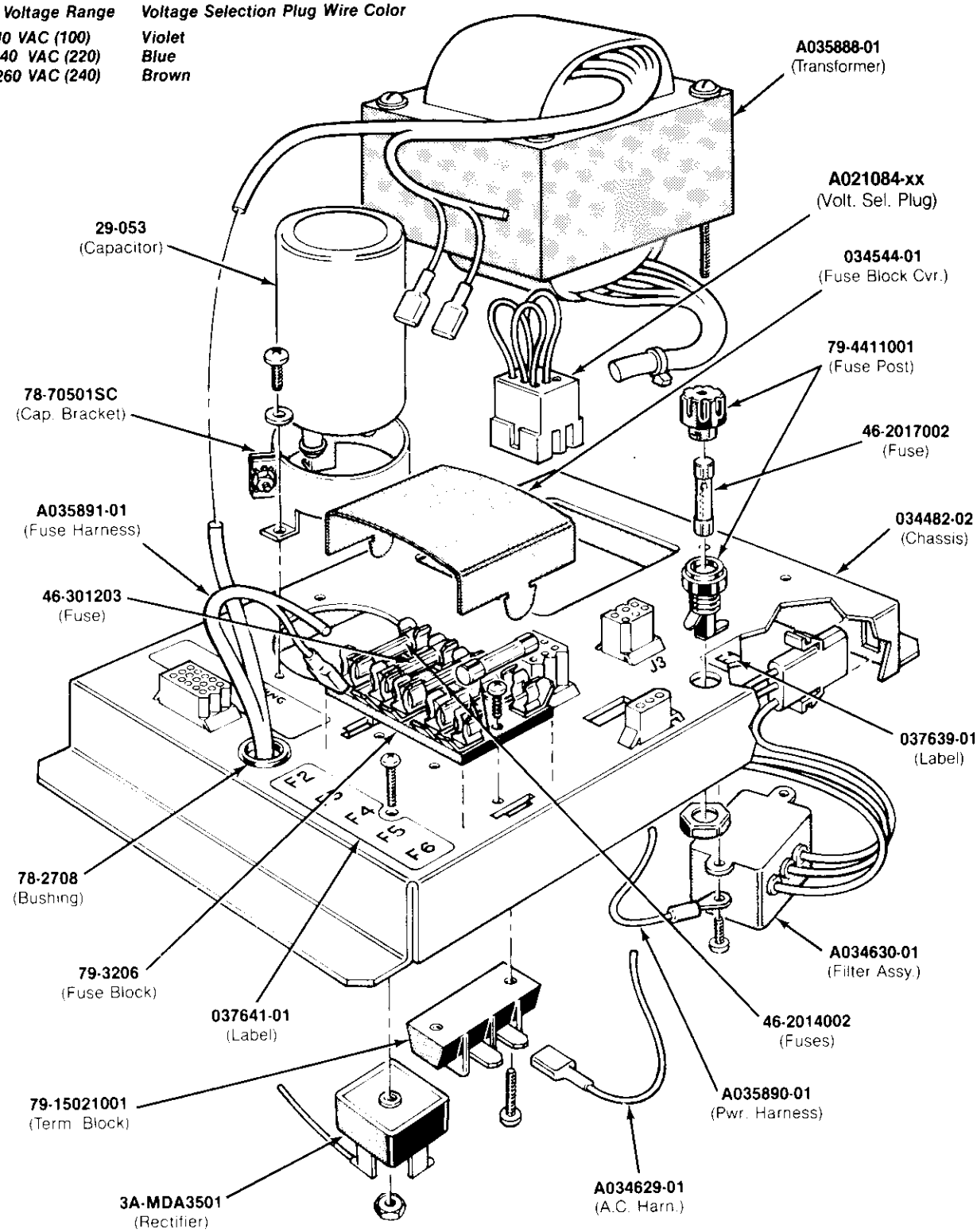

Figure 3-11 Power Supply Assembly

Figure 3-11 Power Supply Assembly Parts List

Part No.	*Description (Reference Designations in Bold)*
A021084-01	Voltage Plug for 100V *(violet)*
A021084-04	Voltage Plug for 220V *(blue)*
A021084-05	Voltage Plug for 240V *(brown)*
A034629-01	AC Harness Assembly
A034630-01	RFI Filter Assembly **(FL1)**
A035888-01	Transformer Assembly **(T1)** *Acceptable substitute is part no. A035888-02*
A035890-01	Power Harness Assembly
A035891-01	Fuse Harness Assembly
A037671-02	Power Supply Assembly
29-053	27,000 μF 15V DC Electrolytic Capacitor **(C1)**
3A-MDA3501	Bridge Rectifier, Type MDA 3501 **(CR1)**
46-2014002	4-Amp. 250V 3AG Slow-Blow Glass Cartridge-Type Fuse **(F2, F4-F6)**
46-2017002	7-Amp. 250V 3AG Slow-Blow Glass Cartridge-Type Fuse **(F1)**
46-301203	20-Amp. 32V 3AG Slow-Blow Glass Cartridge-Type Fuse **(F3)**
78-2708	Nylon Type 6/6 Hole Bushing with ⅜-Inch Inside Diameter × $^{55}/_{64}$-Inch Outside Diameter × ¼-Inch Thick
78-70501SC	2-Inch Diameter Capacitor Mounting Bracket
79-15021001	2-Circuit Single-Row Terminal Block
79-3206	5-Position 3AG Fuse Block with ¼-Inch Quick-Disconnect Terminals
79-4411001	Panel-Mounting Non-Indicating 3AG Cartridge-Type Fuse Post
034482-02	Power Supply Chassis
034544-01	Fuse Block Cover
037639-01	Label for Fuse Value **(F1)**
037641-01	Label for Fuse Values **(F2-F6)**