

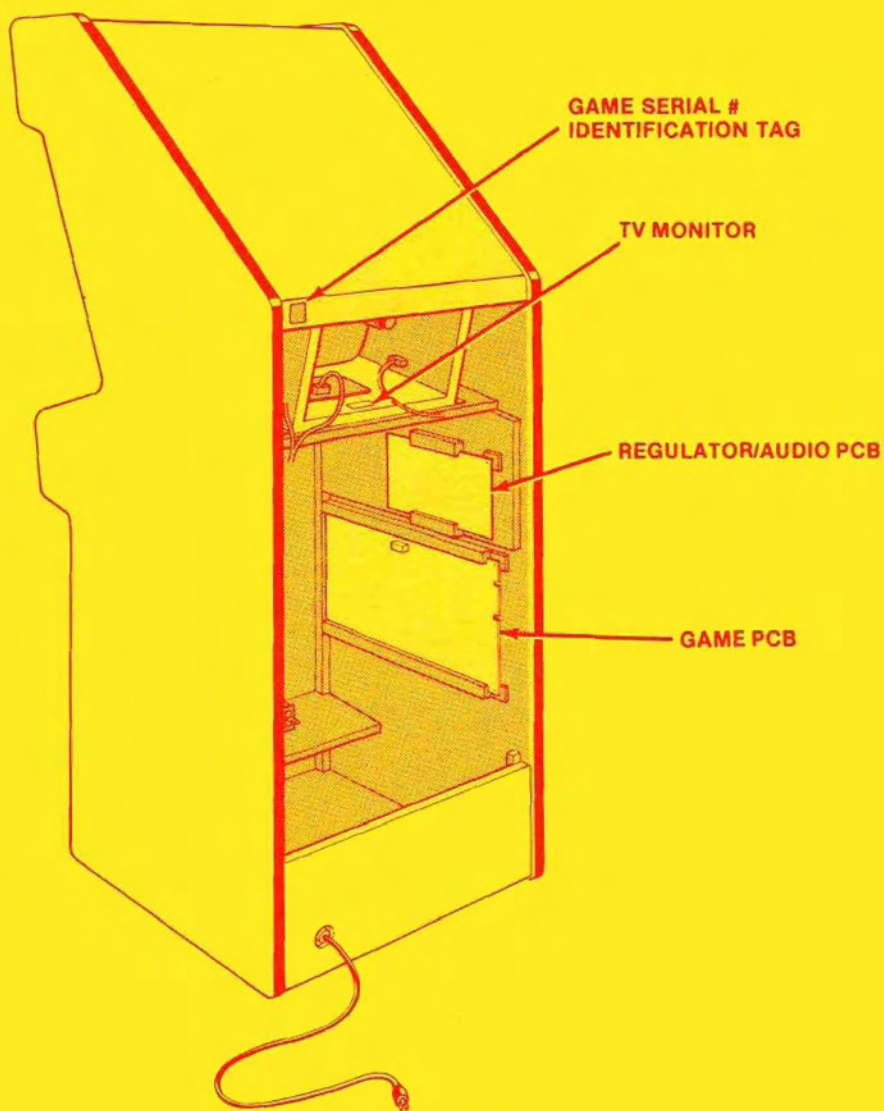
ASTEROIDS

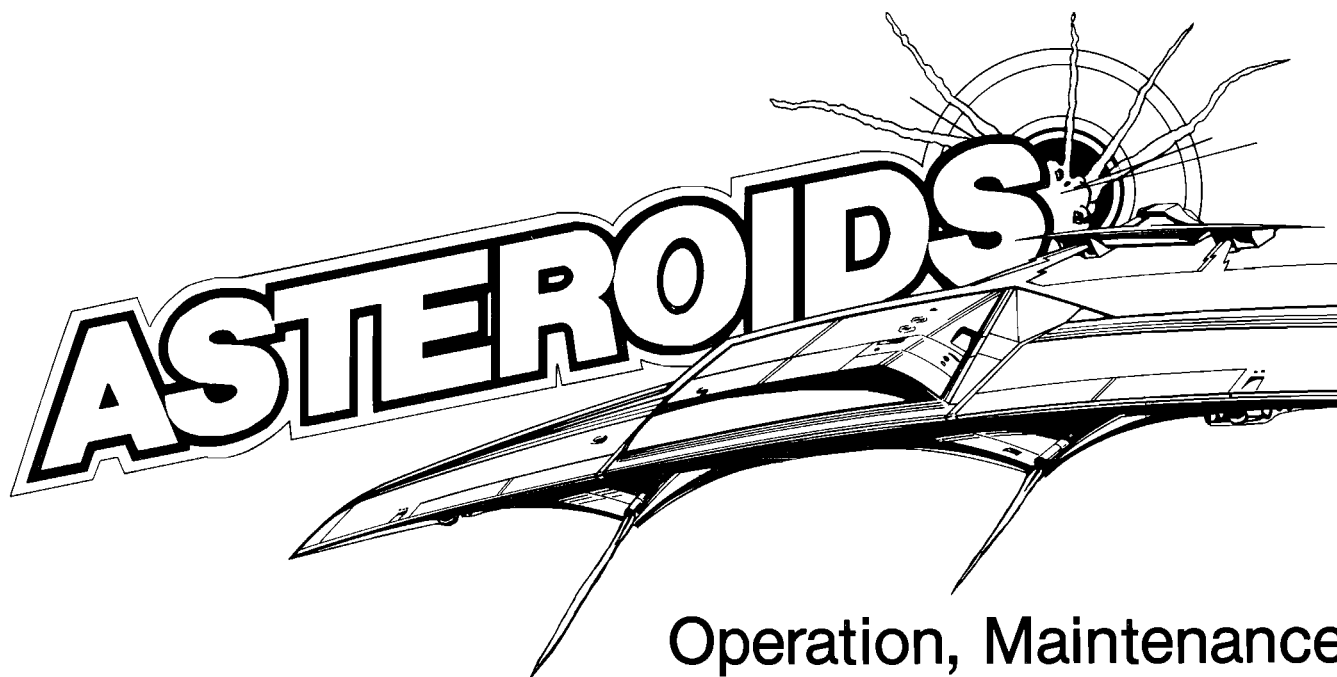


Operation, Maintenance
and Service Manual
Complete with Illustrated Parts Lists

GAME SERIAL NUMBER LOCATION

Your game's serial number is located on the outside rear of the game. The same number is also stamped on the chassis of the TV monitor, Game PCB and Regulator/Audio PCB. Please mention this number whenever calling your distributor for service.





Operation, Maintenance and Service Manual

Complete with Illustrated Parts Lists

Published by:
ATARI INC
1265 Borregas Avenue
P. O. Box 427
Sunnyvale, California 94086

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A Warner Communications Company



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NOTE

If reading through this manual does not lead to solving a certain maintenance problem, call Tele-Help™ at the Atari Customer Service office in your geographical area, as shown in one of the two maps below. Order all parts from the California office.

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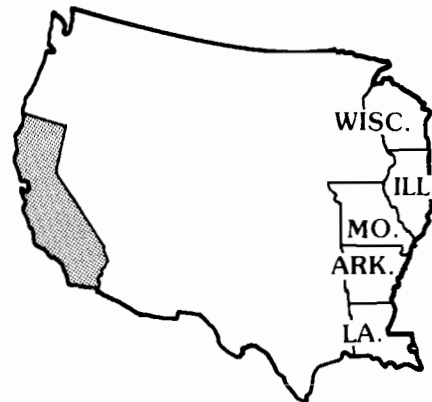
Atari Coin-Op Customer Service
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Telex 17-1103
(Monday - Friday, 7:30 - 4:00 pm Pacific Time)



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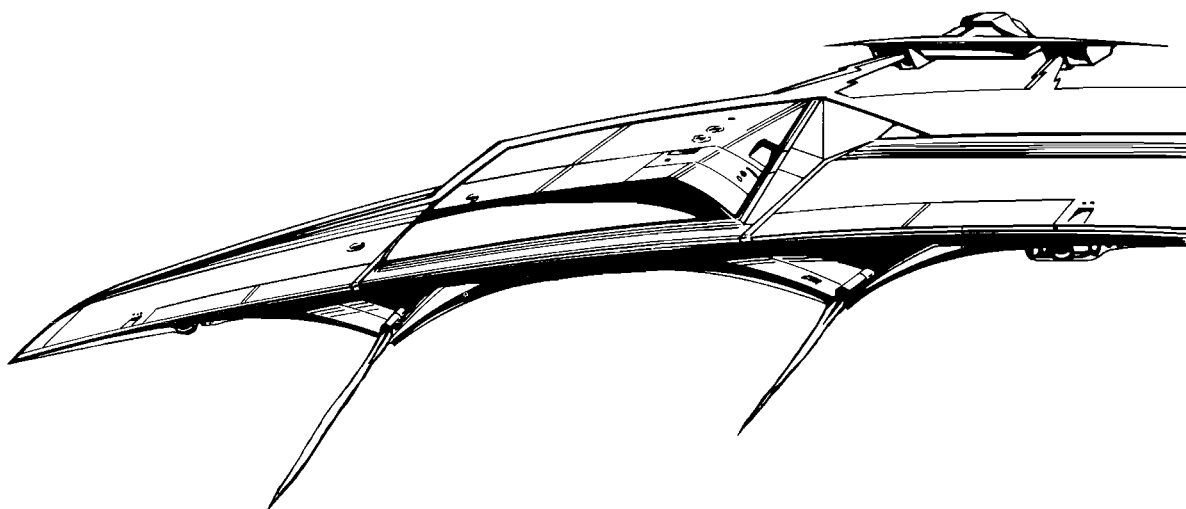
From New Jersey
(201) 469-5993



From anywhere else in this area
toll-free (800) 526-3849



Location Setup

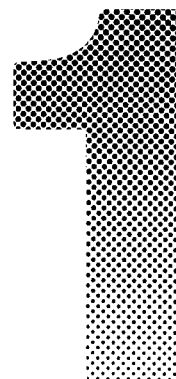
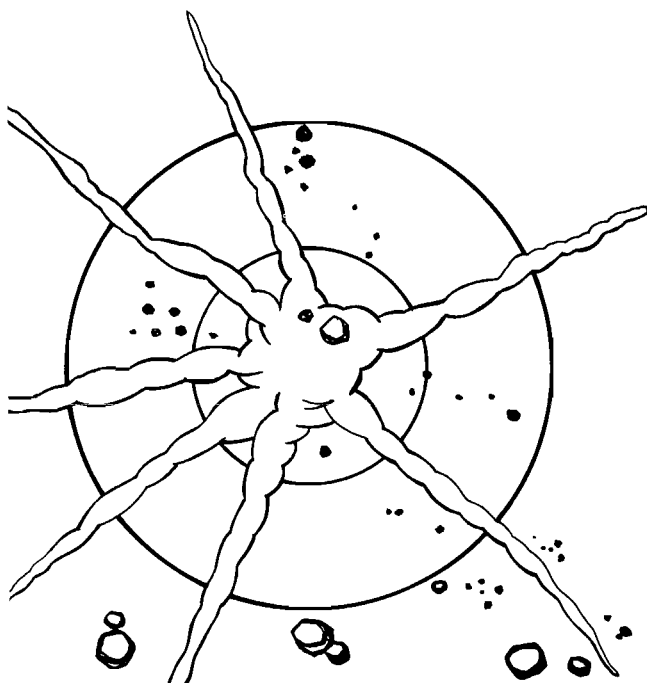


A. New Parts

The Asteroids game has three new parts. If you have worked on Atari games in the past, then you should be aware of these important differences. The new parts are:

- **Power Supply Assembly.** It covers a wider voltage range than before, has higher reliability, a smaller overall size, and all fuse numbers and fuse amperages are marked directly on the metal chassis.
- **Game PCB Circuitry and TV Monitor.** Most video games to date have used the raster scan method of display. This game uses vector generation with X and Y axes to allow greater contrast, a greater number of moving objects on the screen, and lines at any angle to be "drawn" on the screen.

Throughout this manual, wherever one of these three new parts is mentioned, you will see this symbol in the page margin:



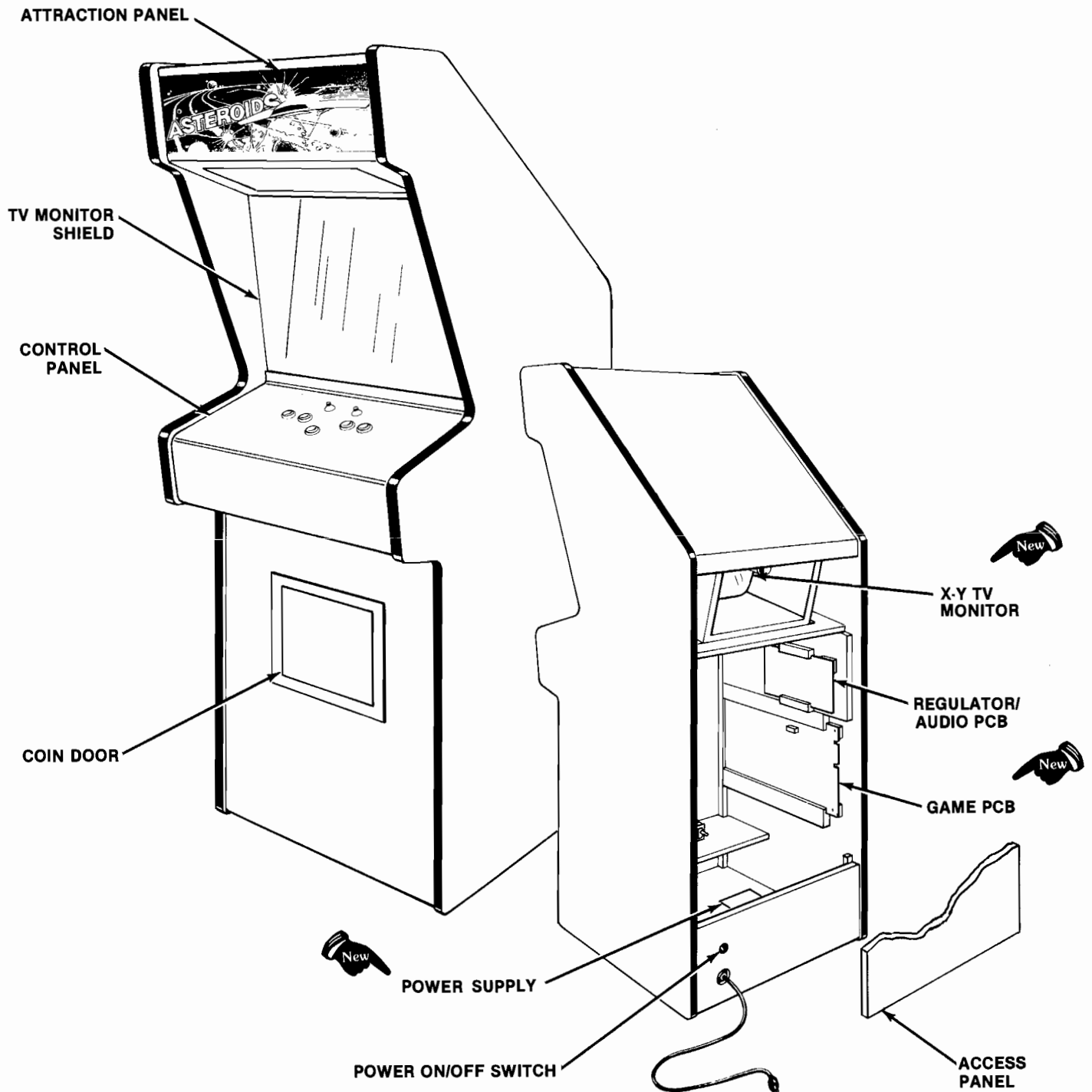


Figure 1 Overview of Game

B. Game Inspection

This new game is ready to play upon removal from the shipping carton. However, your careful inspection is needed to supply the final touch of quality control. Please follow these steps to help us insure that your new game 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. Unlock and open the access panel of the cabinet and inspect the interior of the game as follows:
 - a. 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.
 - b. Check that all plug-in integrated circuits on the game PCB are firmly seated in their sockets.



WARNING

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

- c. Note the location of the game's serial number—it is on the metallic label on the back of the game cabinet. Verify that the serial numbers also stamped on the Game PCB, Regulator/Audio PCB and TV Monitor are all identical. A drawing of the serial number locations is on the inside front cover of this manual. Please mention this number whenever you call your distributor for service.
- d. Check all major subassemblies such as the power supply, control panel and TV monitor for secure mounting.

C. Game Installation

Figure 2 Installation Requirements

| | |
|----------------|---------------------------|
| Power | 175 watts |
| Temperature | 0 to 38° C (32 to 100° F) |
| Humidity | Not over 95% relative |
| Space Required | 65 × 79 cm (25½ × 31 in.) |
| Game Height | 184 cm (72½ in.) |



1. Voltage Selection

Before plugging in your game, make sure that the voltage selection plug on the power supply (see Figure 3) is correct for your location's line voltage. Check the wire color on the plug and see if it is correct per the list below.

| Line Voltage Range | Voltage Selection Plug Color |
|--------------------|------------------------------|
| 90-110 VAC (100) | Violet |
| 105-135 VAC (120) | Yellow |
| 200-240 VAC (220) | Blue |
| 220-260 VAC (240) | Brown |

2. Interlock and Power On/Off Switches

To minimize the hazard of electrical shock while working on the inside of the game cabinet, two interlock switches have been installed (see Figure 4). One is located behind the access panel and one is behind the coin door. These switches remove all AC line power from the game circuitry when a door is opened.

Check for proper operation of the interlock switches by performing the following steps:

1. Unlock and open the access panel and the coin door.
2. Plug the AC line power cord into an AC outlet.
3. Close the access panel and coin door.

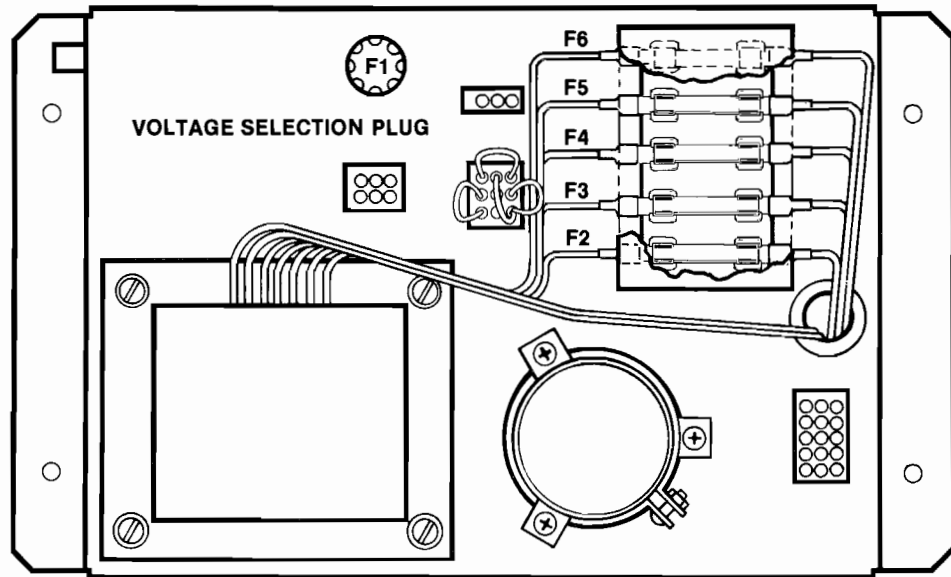


Figure 3 Power Supply

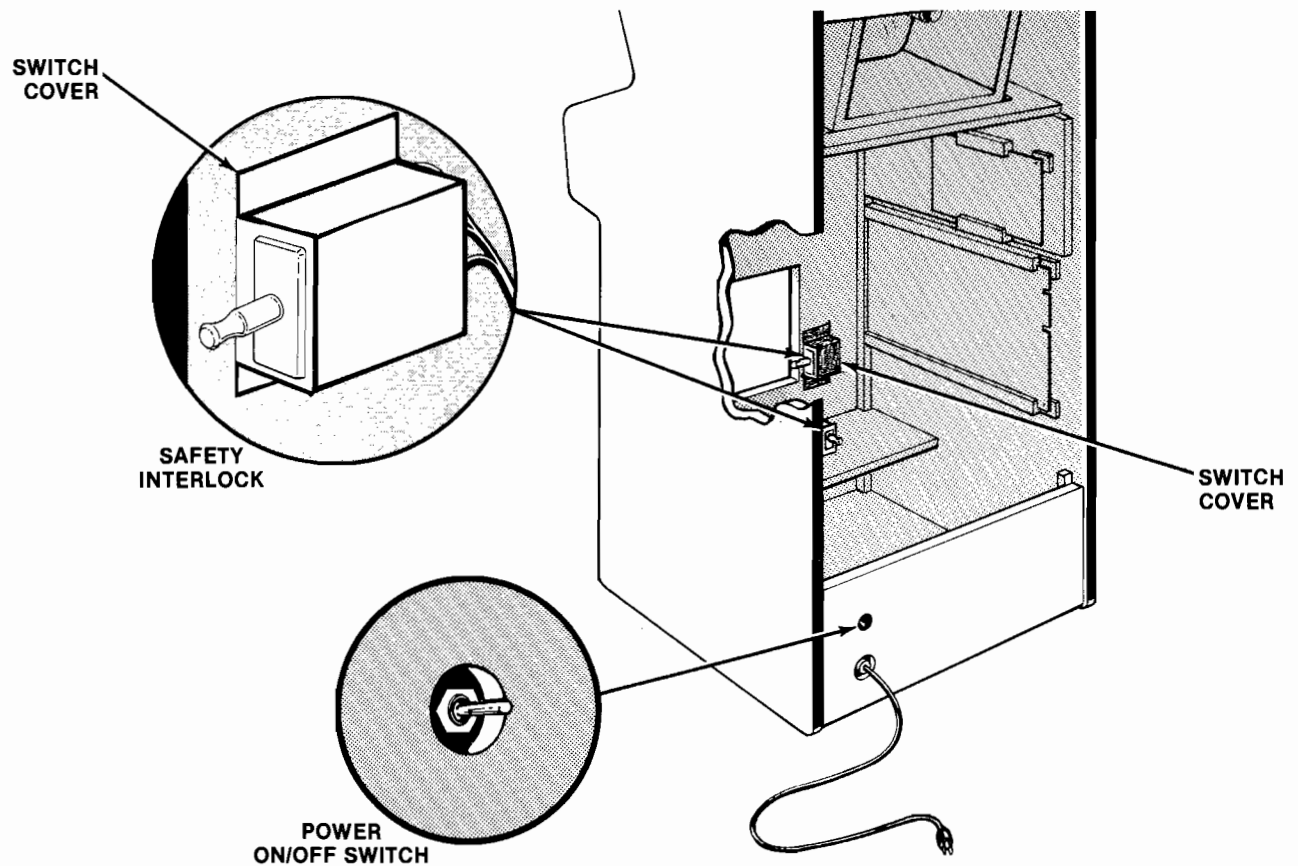


Figure 4 Interlock and Power On/Off Switches

4. Set the power on/off switch to the on position. Within 30 seconds the TV monitor should display a picture.
5. Slowly open the rear access panel. The TV monitor picture should disappear when the panel is opened approximately 2.5cm (1 inch). Close and lock the access panel and repeat this step with the coin door.
6. If the results of step 5 are satisfactory, the interlock switches are operating properly. If the TV monitor doesn't go off as described, check to see if the corresponding interlock switch is broken from its mounting or stuck in the on position.

3. Game Fuses

For continued protection of your game, as well as for the safety of the players, fuses must be replaced **only** with fuses with identical ratings. These ratings are shown in Figure 18. See the Schematic Drawing Package for fuse functions.

Information on the TV monitor fuses is contained in the TV monitor manual that is supplied with this game.

D. Self-Test Procedure

This game will test itself and provide data to demonstrate that the game's circuitry and controls are operating properly. The data is provided on the TV monitor and the game speaker; no additional equipment is necessary.

Part of the self-test procedure includes a display of the operator-selectable game options. Therefore, we suggest you run the self-test procedure anytime you need to change the game's options.

To run the self-test, follow the instructions outlined in Figure 6.

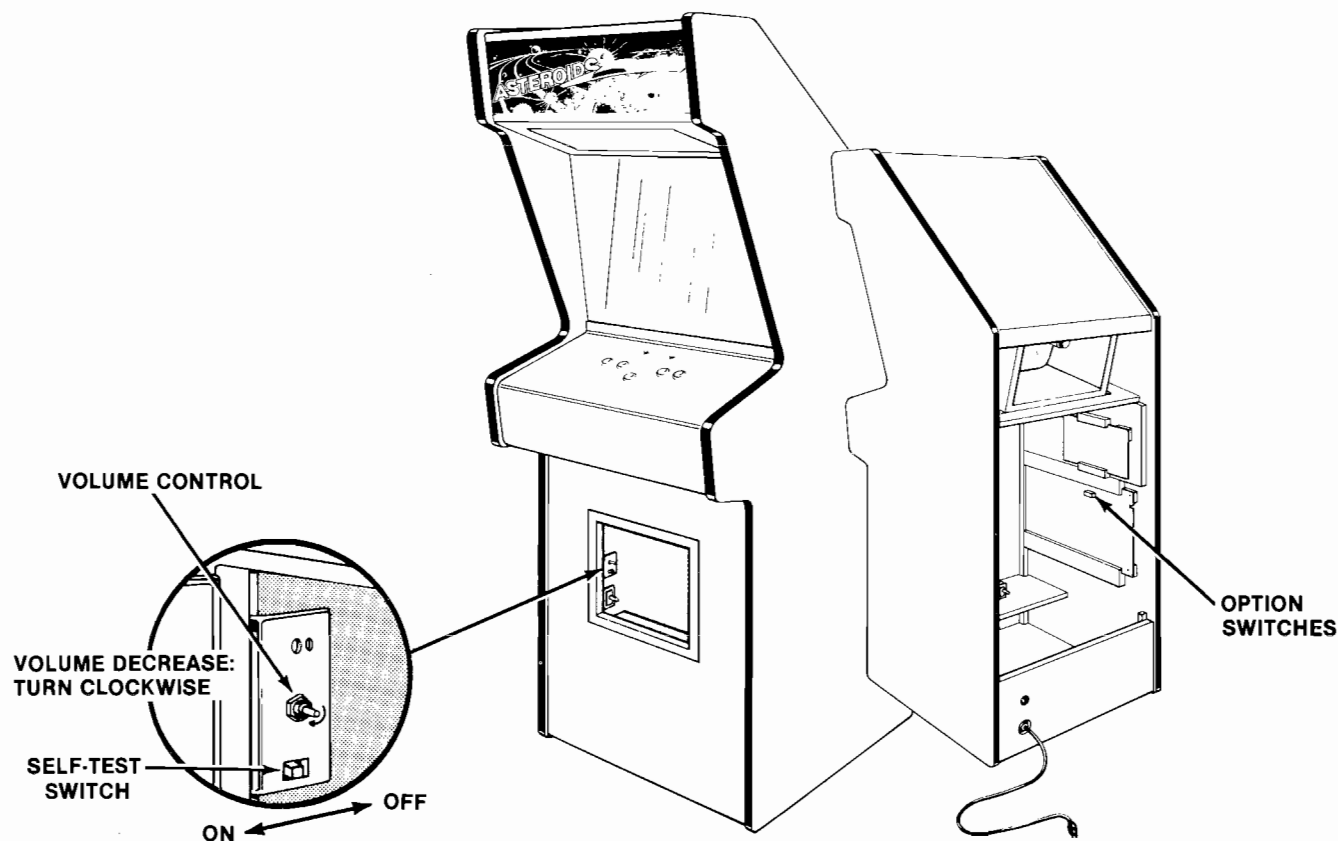


Figure 5 Location of Self-Test Switch, Volume Control and Option Switch

Figure 6 Self-Test Procedure

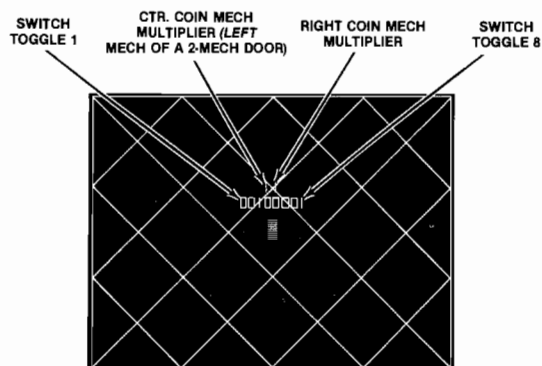
| INSTRUCTION | RESULTS IF TEST PASSES | RESULTS IF TEST FAILS | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|---|---|--------|-------------------|---|----|---|----|---|----|---|----|---|----|---|----|---------------|------------------|--|--|---|--|--|--|---|------|--------|--|---|--|--|--------|---|----|--------|--------|---|--|--|--------|---|------|--------|--------|---|--|--|--------|---|----|--------|--------|---------------|-------------|---|----|---|----|---|----|---|----|----|----|----|----|----|----|----|----|
| 1. Set self-test switch to on position (see Figure 5). | TV monitor displays picture as shown in Figure 7. | <p><i>RAM FAILURE</i> is indicated by a sequence of from 1 to 6 tones. A low-frequency tone is heard for each good RAM chip. A much lower frequency is heard for a failing RAM chip. The sequence stops with the last failing RAM chip. To restart the sequence, press the Reset pushbutton on the game PCB or set the self-test switch to off, then again to the on position. Identify the bad RAM chip with table below. Example: Three tones, then a tone of much lower frequency indicates failure of RAM chip R4.</p> <table><tr><th>TONE #</th><th>RAM CHIP LOCATION</th></tr><tr><td>1</td><td>D2</td></tr><tr><td>2</td><td>E2</td></tr><tr><td>3</td><td>M4</td></tr><tr><td>4</td><td>R4</td></tr><tr><td>5</td><td>N4</td></tr><tr><td>6</td><td>P4</td></tr></table> <p><i>ROM/PROM FAILURE</i> is indicated by two columns or lines of numbers in the upper left-hand corner of the display. The number in the left column or first line indicates the failing ROM/PROM chip(s). Identify the bad ROM/PROM with table below.</p> <p>The number in the right column or second line indicates the failing data bit of the failing ROM/PROM. Identify the bad bit with the second table below. If more than one bit is failing, the displayed number(s) are hexadecimal combinations of the numbers shown below. Examples:</p> <ol style="list-style-type: none">1) If bits D2 and D3 fail, C is displayed.2) If bits D2, D3 and D7 fail, 8C is displayed.3) If bits D4 and D5 fail, 30 is displayed.4) If bits D1, D3, D5 and D6 fail, 6A is displayed <table><tr><th>DISPLAYED NO.</th><th colspan="3">FAILING ROM/PROM</th></tr><tr><td>0</td><td></td><td></td><td></td></tr><tr><td>1</td><td>N/P3</td><td>K4, L4</td><td></td></tr><tr><td>2</td><td></td><td></td><td>F2, H1</td></tr><tr><td>3</td><td>F1</td><td>F2, L1</td><td>L2, L1</td></tr><tr><td>4</td><td></td><td></td><td>H2, J1</td></tr><tr><td>5</td><td>D/E1</td><td>H2, J1</td><td>M2, M1</td></tr><tr><td>6</td><td></td><td></td><td>J2, K1</td></tr><tr><td>7</td><td>C1</td><td>K1, J2</td><td>N2, N1</td></tr></table> <table><tr><th>DISPLAYED NO.</th><th>FAILING BIT</th></tr><tr><td>1</td><td>D0</td></tr><tr><td>2</td><td>D1</td></tr><tr><td>4</td><td>D2</td></tr><tr><td>8</td><td>D3</td></tr><tr><td>10</td><td>D4</td></tr><tr><td>20</td><td>D5</td></tr><tr><td>40</td><td>D6</td></tr><tr><td>80</td><td>D7</td></tr></table> <p><i>RAMSEL SIGNAL FAILURE</i> is indicated by a BANK ERROR or PAGE SELECT ERROR message at lower middle of display.</p> | TONE # | RAM CHIP LOCATION | 1 | D2 | 2 | E2 | 3 | M4 | 4 | R4 | 5 | N4 | 6 | P4 | DISPLAYED NO. | FAILING ROM/PROM | | | 0 | | | | 1 | N/P3 | K4, L4 | | 2 | | | F2, H1 | 3 | F1 | F2, L1 | L2, L1 | 4 | | | H2, J1 | 5 | D/E1 | H2, J1 | M2, M1 | 6 | | | J2, K1 | 7 | C1 | K1, J2 | N2, N1 | DISPLAYED NO. | FAILING BIT | 1 | D0 | 2 | D1 | 4 | D2 | 8 | D3 | 10 | D4 | 20 | D5 | 40 | D6 | 80 | D7 |
| TONE # | RAM CHIP LOCATION | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | D2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | E2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | M4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | R4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | N4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | P4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DISPLAYED NO. | FAILING ROM/PROM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | N/P3 | K4, L4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | | F2, H1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | F1 | F2, L1 | L2, L1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | | H2, J1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | D/E1 | H2, J1 | M2, M1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | J2, K1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | C1 | K1, J2 | N2, N1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DISPLAYED NO. | FAILING BIT | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | D0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | D1 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | D2 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | D3 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | D4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | D5 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 | D6 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 80 | D7 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2. Activate all control panel and coin door switches. When satisfied with test, set self-test switch to off position. | 1 PLAYER START and 2 PLAYER START LEDs are lighted. High-pitched click for each activated switch. | 1 PLAYER START and/or 2 PLAYER START LEDs not lighted. High-pitched click sound is not heard for any particular switch. | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Figure 7 Option Switch Settings

To change toggle positions of the switch assembly, you need not remove the game PCB. The switch, usually colored blue, is easily accessible when the game PCB is mounted in place.

When changing the options, verify proper results on the TV monitor display during self-test. A switch toggle in the **on** position is indicated by a 0 for that switch on the TV monitor display. A switch in the **off** position is indicated by the number 1.

| Toggle Settings of 8-Toggle Switch on Game PCB | | | | | | | | Option |
|--|-----|-----|-----|-----|-----|-----|-----|---|
| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | |
| | | | | | | On | On | English |
| | | | | | | On | Off | German |
| | | | | | | Off | On | French |
| | | | | | | Off | Off | Spanish |
| | | | | | On | | | 4-Ship Game |
| | | | | | Off | | | 3-Ship Game |
| | | | | On | | | | Center Coin Mech × 1 |
| | | | | Off | | | | Center Coin Mech × 2 |
| | | | | | | | | (Both settings are for left mech, if a 2-mech door) |
| | | On | On | | | | | Right Coin Mech × 1 |
| | | On | Off | | | | | Right Coin Mech × 4 |
| | | Off | On | | | | | Right Coin Mech × 5 |
| | | Off | Off | | | | | Right Coin Mech × 6 |
| On | On | | | | | | | Free Play |
| On | Off | | | | | | | 1 Coin* for 2 Plays |
| Off | On | | | | | | | 1 Coin* for 1 Play |
| Off | Off | | | | | | | 2 Coins* for 1 Play |



Photograph above shows toggles 1, 2, 4-7 on, and toggles 3 and 8 off.

Suggested settings are shown in illustration at right.

* Note: In the U.S. and Germany only, a "coin" is defined as 25¢ or 1 DM. If your game also has \$1, 2 DM or 5 DM mechanisms, you must set the center and right coin mechanism factors as per your choice.

Toggle Settings of 4-Toggle Switch on Game PCB

| 4 | 3 | 2 | 1 | For Games Having These Coin Doors: | Option |
|---|---|-----|-----|---|--|
| | | On | On | Thai 1 Baht/1 Baht, German 1 DM/1 DM, U.S. 25¢/25¢, Belgian or French 5 Fr/5 Fr, Swiss or French 5 Fr/5 Fr, U.S. 25¢/25¢/25¢, Japanese ¥100/¥100, Swedish 1 Kr/1 Kr, U.K. 10 P/10 P, Australian 20¢/20¢, or Italian 100 L/100 L | All 3 coin mechanisms are same denomination; all register on one coin counter. |
| | | Off | On | German 2 DM/1 DM, German 1 DM/5 DM, U.S. 25¢/25¢/\$1, or U.S. 25¢/\$1 | Left and center mechanisms are same denomination; right mech is another denomination. Requires two coin counters. |
| | | On | Off | <i>No coin door is currently designed for this configuration.</i> | Left mech is one denomination; center and right mech are another denomination. Requires two coin counters. |
| | | Off | Off | German 1 DM/2 DM/5 DM | Left, center and right mechs are 3 different denominations. Requires three coin counters. |

E. Game Play

Atari's Asteroids game has five possible modes of operation: Attract, Ready-to-Play, Play, High Score Initial, and Self-Test. Self-test is a special mode for checking the game switches and computer functions. You may enter this mode at any time. When entered, all game credits are cancelled.

1. Attract Mode

The attract mode begins when power is applied to the game, after a play or high score initial mode, or after self-test. This mode is continuous and is only interrupted when a coin is inserted and accepted or when in self-test. In this mode, the TV monitor displays two possible pictures. Both pictures have three score values across the top of the screen and a message that states the number of coins for a game. The middle score represents the high score to date. The left score is for player 1. The right score is for player 2.

One picture displays asteroids and an occasional enemy spaceship "floating" across the screen. The second picture displays up to 10 of the highest scores since the game was last powered up or since the last self-test. These two displays alternate every 16 seconds.

2. Ready-to-Play Mode

This mode begins when sufficient coins have been accepted for a one- or two-player game. It ends when the 1 PLAYER START or 2 PLAYER START pushbutton is pressed. When this mode begins, the message *PUSH START* flashes immediately below the center score at the top of the screen. The displayed pictures are otherwise the same as those shown in the attract mode.

3. Play Mode

The play mode begins when either start pushbutton is pressed. The mode ends when the player's last ship of the game is lost.

If the 1 PLAYER START pushbutton is pressed, the following picture is displayed: the PLAYER 2's score disappears; the PLAYER 1's score becomes 00, and the number of ships (3 or 4, depending on the operator's setting) for the game appears below that score. The message *PLAYER 1* also appears below the high score to date. Two seconds after pressing the 1 PLAYER START button the *PLAYER 1* message disappears, and the game ship appears at

the center of the display. Four large asteroids appear and drift in from the outer edges of the display.

If the 2 PLAYER START pushbutton is pressed, the following picture is displayed: the PLAYER 1 and PLAYER 2 scores become 00, and the number of ships for the game appears below each score. The player 1 score also flashes as the message *PLAYER 1* appears below the high score to date. Two seconds after the 2 PLAYER START pushbutton is pressed, the *PLAYER 1* message disappears. The game ship for player 1 appears at the center of the display as four large asteroids appear and drift in from the outer edges of the display.

By pressing the LEFT ROTATE and RIGHT ROTATE pushbuttons on the control panel, the player may aim a spaceship toward any of the asteroids. By pressing the FIRE pushbutton, the player may shoot at the asteroids.

When shot, each large asteroid divides into two medium-sized asteroids and the game adds twenty points to the player's score. Medium-sized asteroids, when shot, divide into two small-sized asteroids, and the player receives fifty points. Small-sized asteroids, when shot, will completely disappear, and the game awards 100 points to the player. When players have shot all asteroids, a new set of large asteroids again appear and drift in from the outer edges of the TV monitor display. At the beginning of the game, four large asteroids appear. At the beginning of the next cycle when large asteroids reappear, there are six, the next time eight, and thereafter ten—to increase player challenge.

At any time during game play, a flying saucer may appear from either side of the display. The game awards players 200 points for shooting a large saucer and 1000 points for a small saucer. (The latter is a smaller target for players, though not any faster moving than the large one. It also shoots more accurately.)

The player's objective in the game is to shoot and destroy as many asteroids as possible before all his or her spaceships are destroyed. A ship is destroyed if an asteroid or saucer smashes into it, or if a flying saucer shoots it. To prevent losing a ship, the player may press the THRUST pushbutton to move out of the path of an asteroid or saucer. As an emergency maneuver, players can press the HYPERSPACE pushbutton: the ship disappears and reappears at a random location on the display—however, possibly right on top of, or in the path of, an asteroid. The ship may also explode on reentry.

The game awards an extra ship each time a player's score reaches multiples of 10,000; i.e., one ship is awarded at 10,000 points, another ship at 20,000 points, etc.

When the last ship of the game is destroyed, the message *GAME OVER* appears below the high score. This message remains for 3 seconds before the high score initial mode begins.

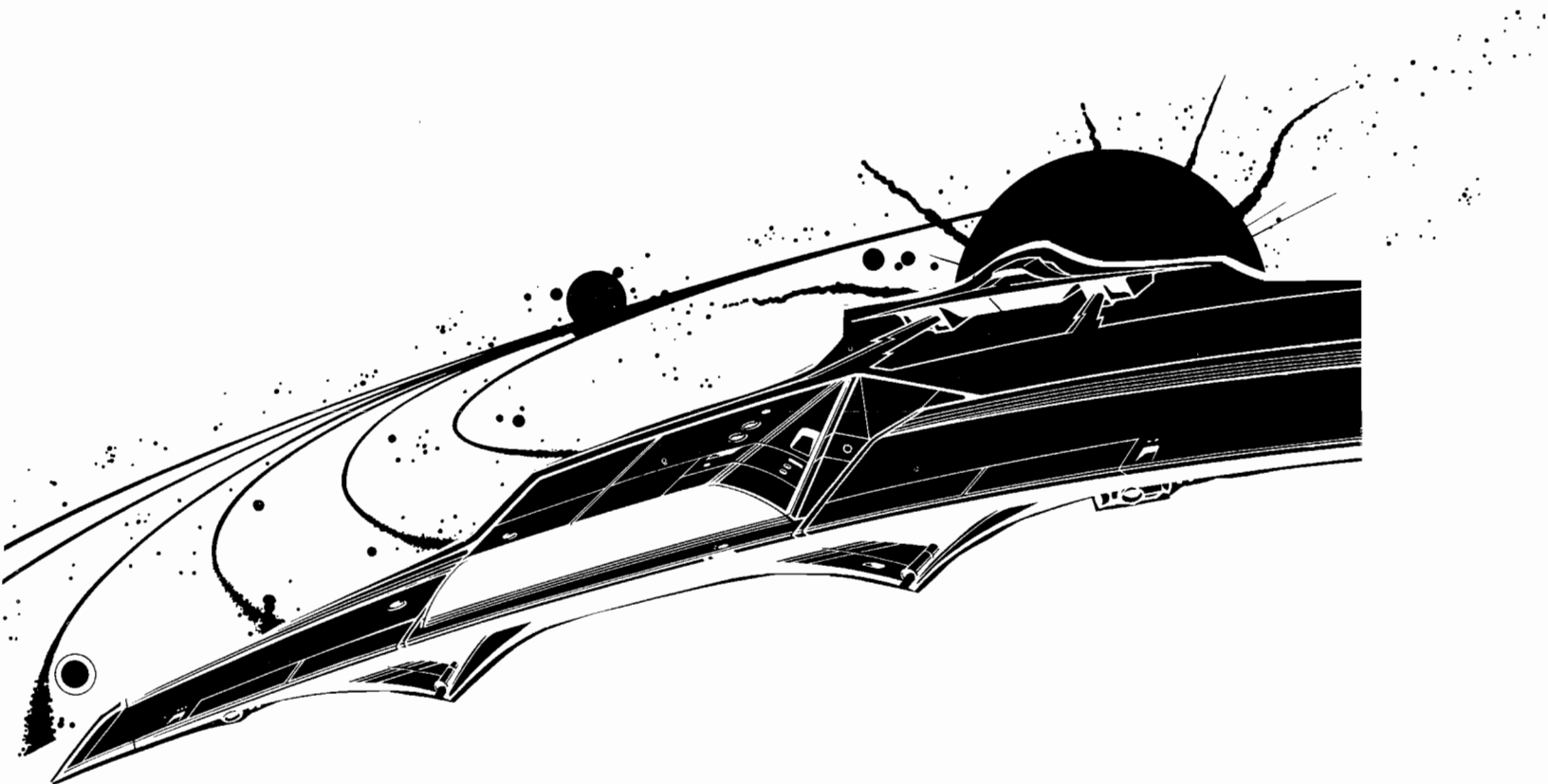
4. High Score Initial Mode

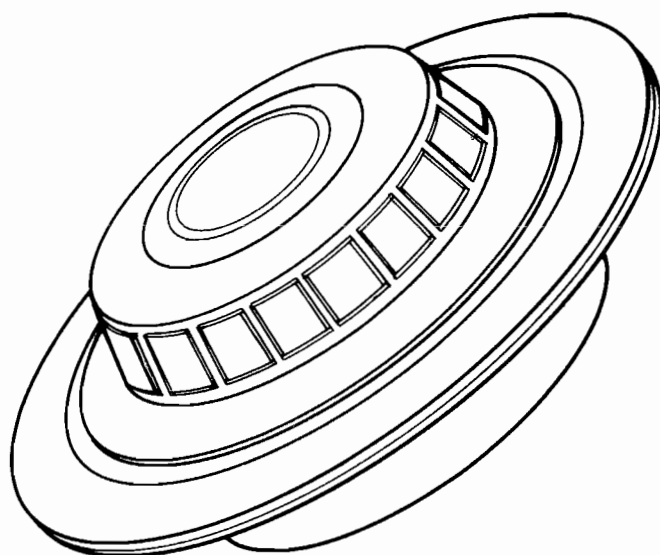
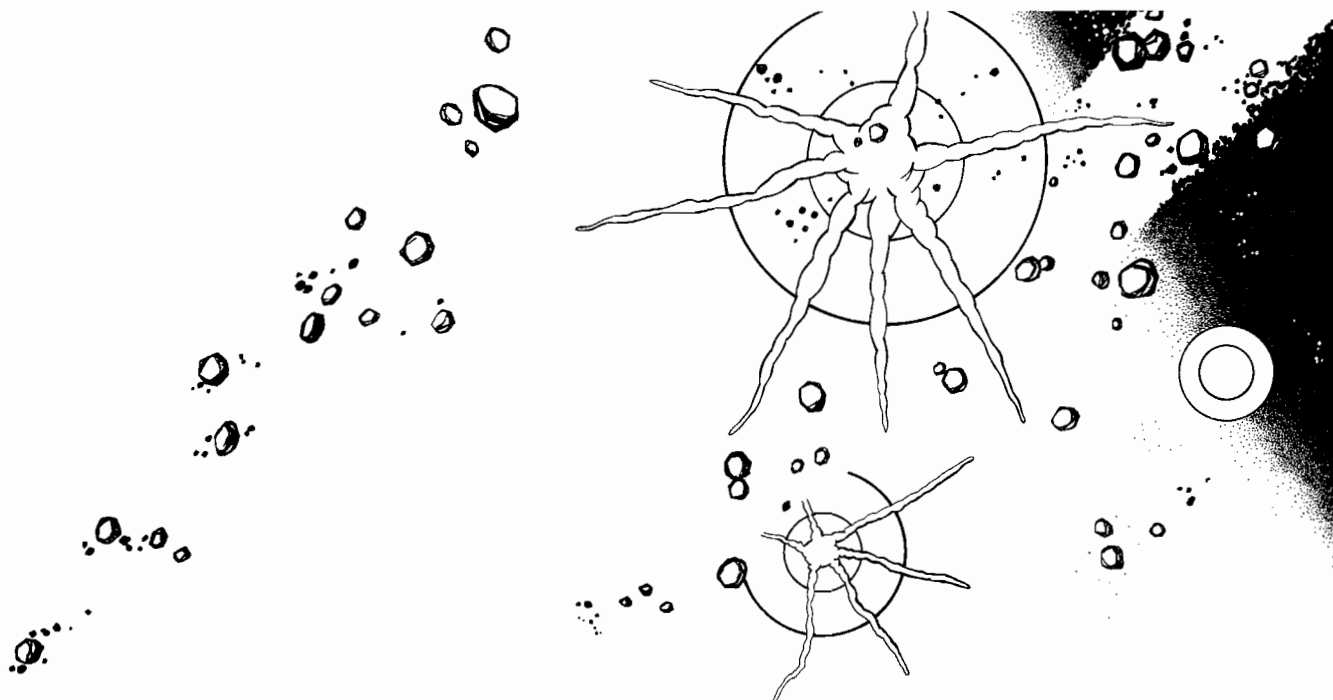
At the beginning of the high score initial mode, the player instructions appear at the top of the screen, and A _ _ appears at the lower center of the display. Players enter initials one character at a

time. By pressing the LEFT ROTATE pushbutton, the displayed character steps through the alphabet from A to Z. By pressing the RIGHT ROTATE pushbutton, the character steps backwards through the alphabet from A to a *blank*, then from Z to A.

Once the game displays the desired letter, players should press the HYPERSPACE pushbutton to record the letter; then an A appears in the next space.

If players need only two letters for their initials, they should use the *blank* between Z and A in one of the three locations. Pressing the HYPERSPACE pushbutton a third time will cause the initials and game score to be transferred to the "10 highest scores" listing that appears during the attract mode.





The Atari Asteroids game requires certain maintenance to keep it in good working order. Clean, properly maintained games attract players and earn more profits.

The most important maintenance item is running the self-test every time you collect money from the cash box. Just looking at a game will not tell you if LED switches or leaf switches are broken or if LEDs have burned out. The self-test will inform you of any of these possible problems.

Second, you should regularly clean the outside of the game and the coin mechanisms. In addition, you will need to regularly clean the leaf switch contacts: for details see this chapter.

Maintenance and Repair



A. Cleaning

The exterior of the game cabinet and the metal and acrylic surfaces may be cleaned with any non-abrasive household cleaner. If desired, special coin machine cleaners that leave no residue can be obtained from your distributor. **Do not** dry-wipe any of the acrylic panels, because any dust can scratch the surface and result in fogging the plastic.



B. Fuse Replacement

This game contains six fuses—all on the power supply assembly (not including the TV monitor fuses). Replace fuses only with the same type as listed in Figure 18 of this manual. See the Quadrascan TV monitor manual, TM-146, for the monitor fuse data.

C. Opening the Control Panel

Prior to repairing or replacing any switch on the control panel or prior to removing the TV monitor, unplug the game. Then open the coin door.

Reach through the opening and remove both sets of wing nuts, split lock washers, and flat washers, located on the underside of the control panel (see Figure 8). The two carriage bolts will remain in the control panel.

Lift up on the control panel and tilt it towards you. **Be sure that the acrylic TV monitor shield does not fall on you.** The top edge of the control panel acts as a retainer strip for the shield: once the control panel is opened, the shield is free and could slide out under its own power.

1. Leaf Switch Replacement

All five of these leaf switches operate on 5 volts at a very low current. Therefore, pitting of these switches would be extremely rare. Probably the only reason that pitting would occur is in very high-humidity locations.

Don't burnish the switches. Burnishing them removes their plating, thus increasing the corrosion of the contacts. **The best method of cleaning the switch contacts is to wipe them with a non-abrasive surface.** A business card works very well.

To replace any switch, remove both of its screws with a Phillips-head screwdriver—see Figure 8.

If the white button itself needs to be replaced, turn the stamped nut with a wrench in a counterclockwise direction, as seen from the inside of the control panel. The white ring on the outside of the control panel should not spin, due to its design.

2. LED Switch Replacement

The light-emitting diode (LED) switches on the control panel have a very low failure rate. In case a switch should ever be suspect, first test it per the description that follows. To replace the switch, refer to Figure 8.

1. Remove the wires from the suspected switch.
2. Set multimeter to ohms scale. Set ohms scale to $R \times 1$, then zero the meter.
3. Connect multimeter leads to appropriate LED switch contacts (see Figure 8 for designation of switch contacts and meter lead placement).
4. Check contacts (push and release the switch button) for closed and open continuity.
5. If the contacts do not operate sharply or always remain closed or open, then replace the LED switch as outlined in the figure.

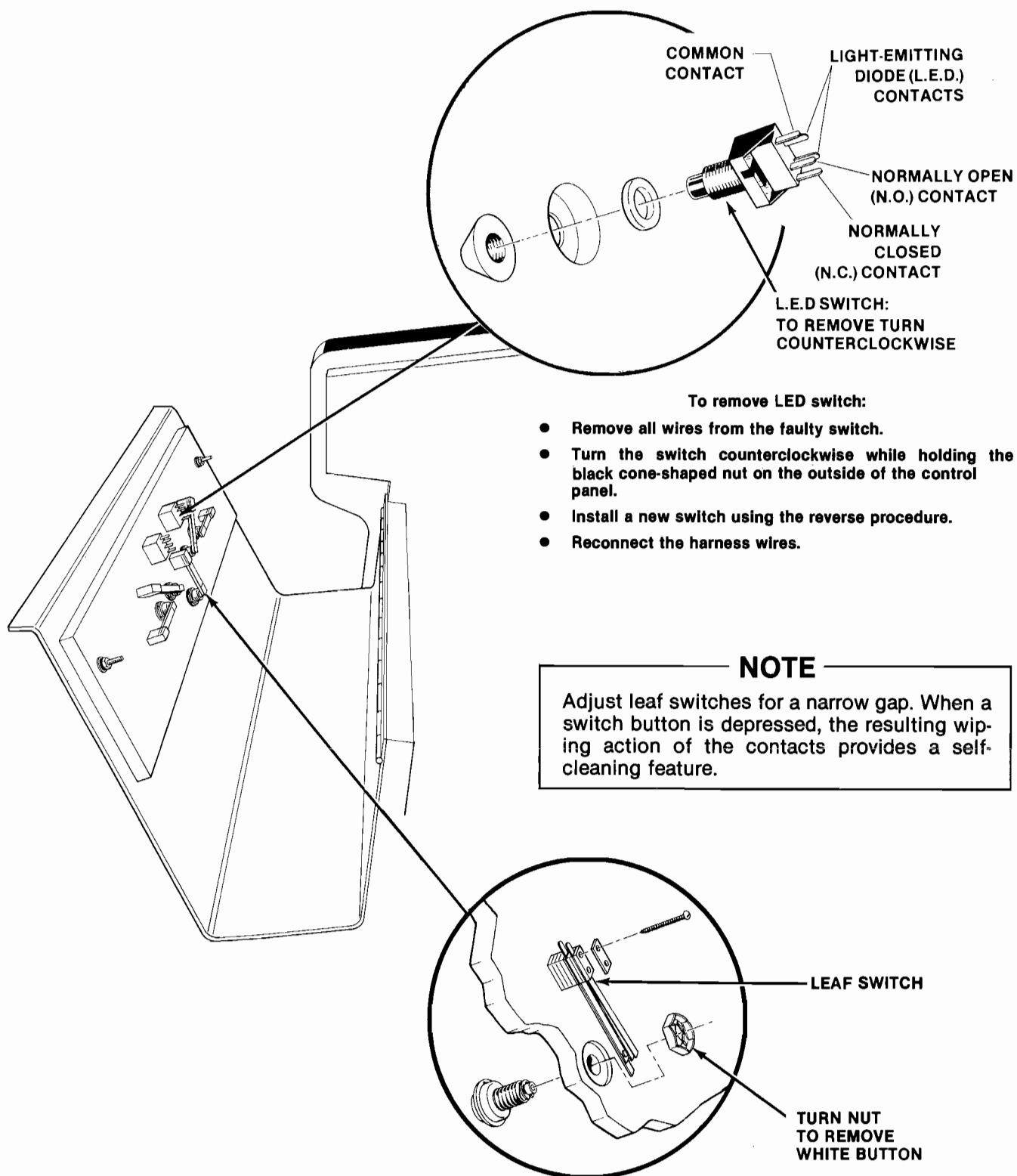


Figure 8 Opening the Control Panel

D. TV Monitor Replacement

WARNING

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

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

If you should need to remove the Quadrascan X-Y TV monitor, follow steps 1 thru 6 on this page. Refer also to Figure 9 below.

1. Open the control panel as described in Section C, Opening the Control Panel. **Be sure the game is unplugged from its wall outlet!**
2. Remove the acrylic TV monitor shield by sliding its lower edge out.
3. Working up from the bottom side corners, carefully pry loose the two side flaps of the colorful 2-piece cardboard bezel. (A 4-inch strip of double-sided adhesive tape is centered behind both side flaps, flush with each edge.) Remove the bezel as a complete unit—do not remove the smaller part first.
4. Open the rear access panel and unplug the TV monitor harness connectors—both are on the TV's printed circuit boards.
5. Remove the four sets of carriage bolts, flat and split lock washers, and hex nuts that hold down the metal TV chassis.
6. Carefully slide the TV monitor chassis out the front of the game.

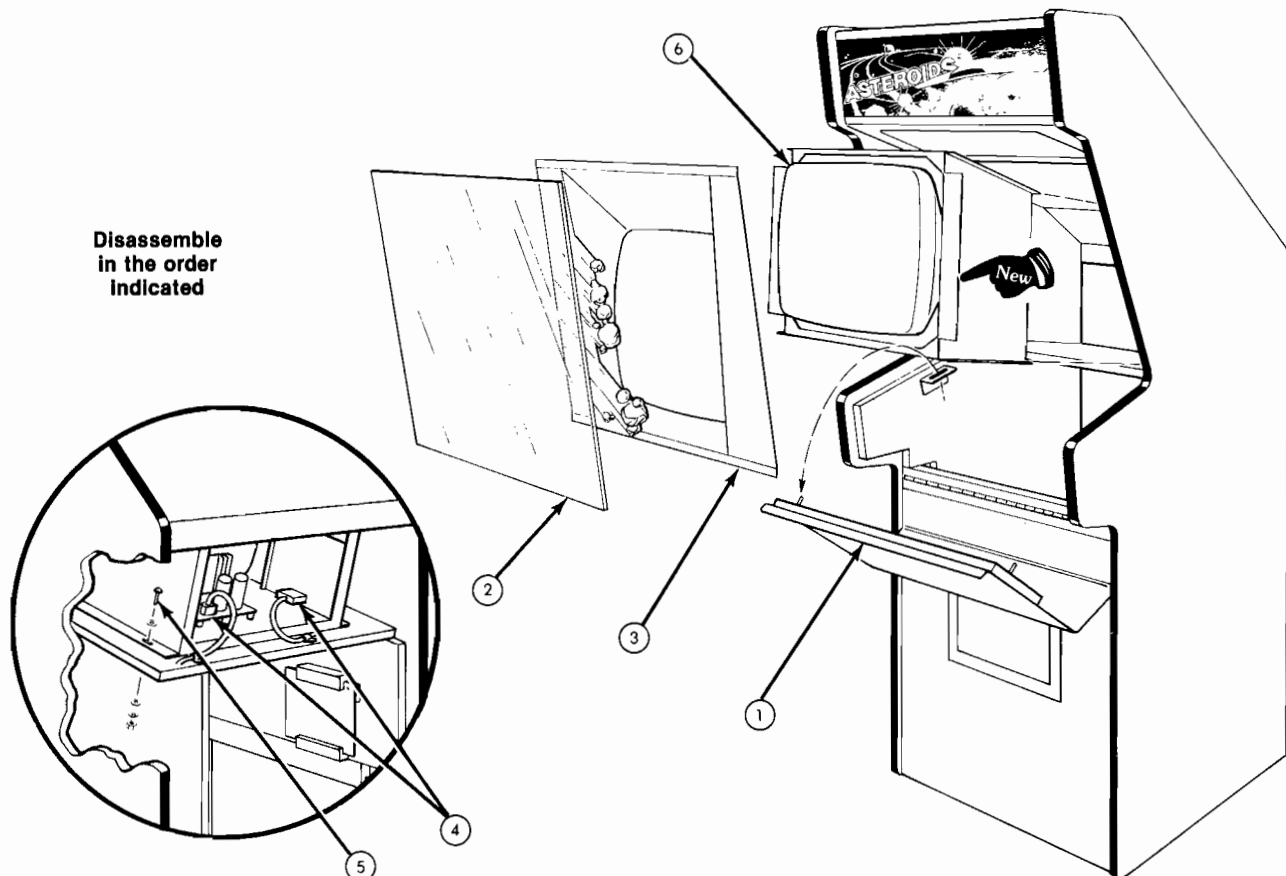


Figure 9 TV Monitor Removal

E. Printed Circuit Board Replacement

You may wish to remove the game printed circuit board (PCB) or the Regulator/Audio PCB for service or inspection. To do this, refer to Figure 10 and proceed as follows:

1. Open the rear access panel.
2. Locate the securing screws and fiber washers that hold down the PCB in its slots, and remove them. (The game PCB has two, the Regulator/Audio PCB has one set of this fastening hardware.)
3. If you are removing the game board, first remove the two machine screws or tie wraps that fasten the edge connector to the game PCB. Then unplug the edge connector on the game PCB. If you are removing the Regulator/Audio PCB, simply disconnect the three small harness connectors on this board.
4. Carefully slide either PCB straight out of its slots. Be careful not to twist the board, as this may loosen connections or components. Replace or repair as required.
5. Reinstall the PCB, making sure that the connectors are properly plugged in. Note that they are keyed to fit on only one way, so if they don't slip on easily, don't force them! **A reversed connector will probably damage your game and will void the warranty.**
6. Replace the securing screws and fiber washers in the PCB. Reinstall the fasteners used to secure the edge connectors to the PCB. Close and lock the rear access panel.
7. Check that the operation of the game is correct and **perform the self-test**. This is especially important with any game when you replace a PCB. Normally the **only** adjustments on the Asteroids game are option switch changes (made on the 4-toggle and 8-toggle DIP switches). Unless you are qualified technician, **do not turn any of the knobs near the game PCB's edge connector. Also do not turn the small knobs on the Regulator/Audio PCB.**

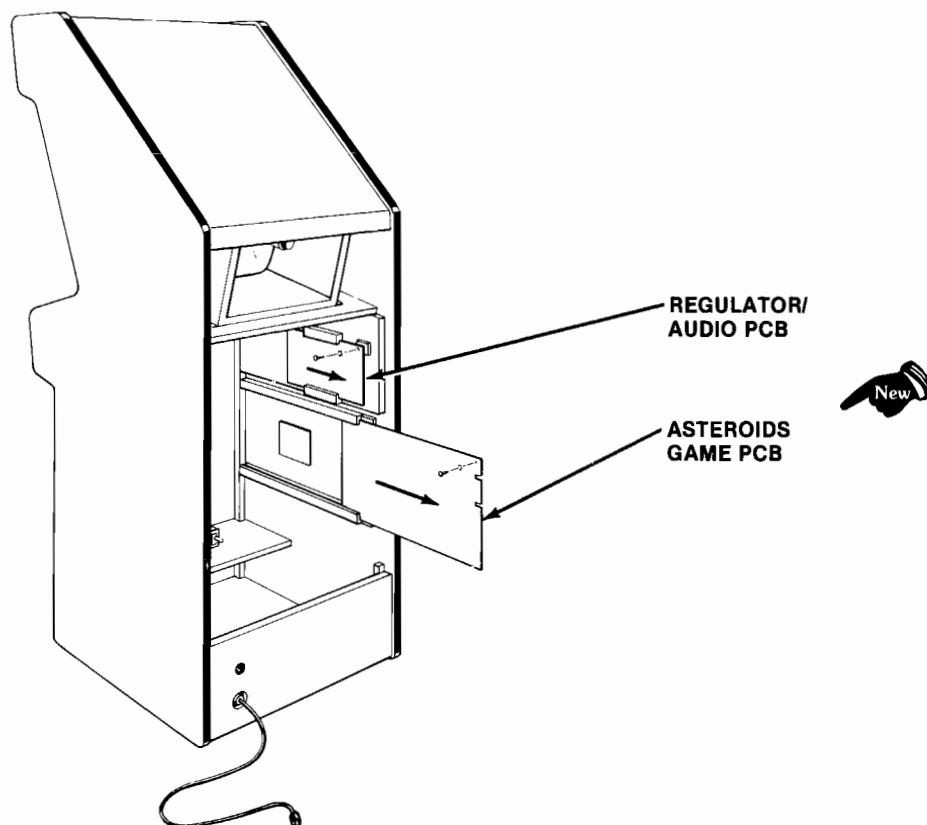


Figure 10 Game and Regulator/Audio PCB Replacement

F. Fluorescent Tube Replacement

⚠ WARNING

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 replace the white fluorescent tube behind the graphics attraction panel, follow this procedure (see Figure 11).

1. Remove the three Allen-head screws at the top of the game. They secure the metal retainer for the silk-screened panel. Remove the retainer completely.
2. Tilt the top of the attraction panel towards you, then lift it up and out of the bottom retainer.
3. Remove the two grey clips from the fluorescent tube. Now turn the tube one quarter turn in either direction. Remove the tube and both orange clips.
4. Replace with a new tube. If you move games a lot from one location to another, you should reuse the orange and grey clips. They provide extra protection against vibration loosening the tube out of its fixture.
5. Close up the game by following these instructions in reverse order.

G. Game Operation

With this manual you received two large sheets that contain the wiring and schematic diagrams for the Asteroids game. Sheet 1, Side A, includes information that shows the arrangement of these dia-

grams. These diagrams include information that explains the functions of the circuits and defines inputs and outputs.

Atari's Asteroids is a microprocessor-controlled game. The microprocessor is contained on the game PCB. The game PCB receives switch inputs from the control panel and coin door. These inputs are processed by the game PCB and output to the TV monitor, Regulator/Audio PCB and control panel.

The TV monitor is an X-Y monitor. Therefore, the monitor receives signals for the X, Y and Z axes. Since the location of the beam in the monitor is totally controlled by the X- and Y-axis outputs of the game PCB, the game PCB does not contain a standard sync circuit. The X- and Y-axis inputs to the monitor step in increments of 1024 steps for the X (horizontal) axis and 768 steps for the Y (vertical) axis. The Z axis merely controls the intensity of the beam.

The Regulator/Audio PCB performs two functions: 1) regulates the +10.3 VDC from the power supply to +5 VDC, and 2) amplifies the audio output from the game PCB. The +5 VDC from the Regulator/Audio PCB provides most logic power to the game PCB. The audio output from the Regulator/Audio PCB directly drives the game speaker and is controlled by the volume control mounted inside the coin door.

The Power Supply is the source of all voltages in the game. These voltages are protected by five fuses in the fuse block on the Power Supply chassis. The primary winding of the Power Supply transformer is protected by the cartridge-type fuse in the power supply chassis.

Figure 12 illustrates the distribution of power in this game. Figure 13 illustrates the distribution of signals.

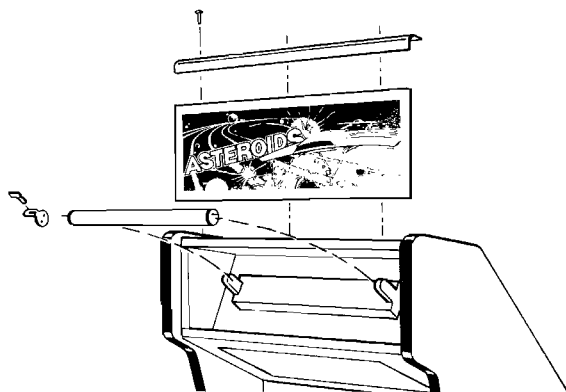


Figure 11 Fluorescent Tube Replacement

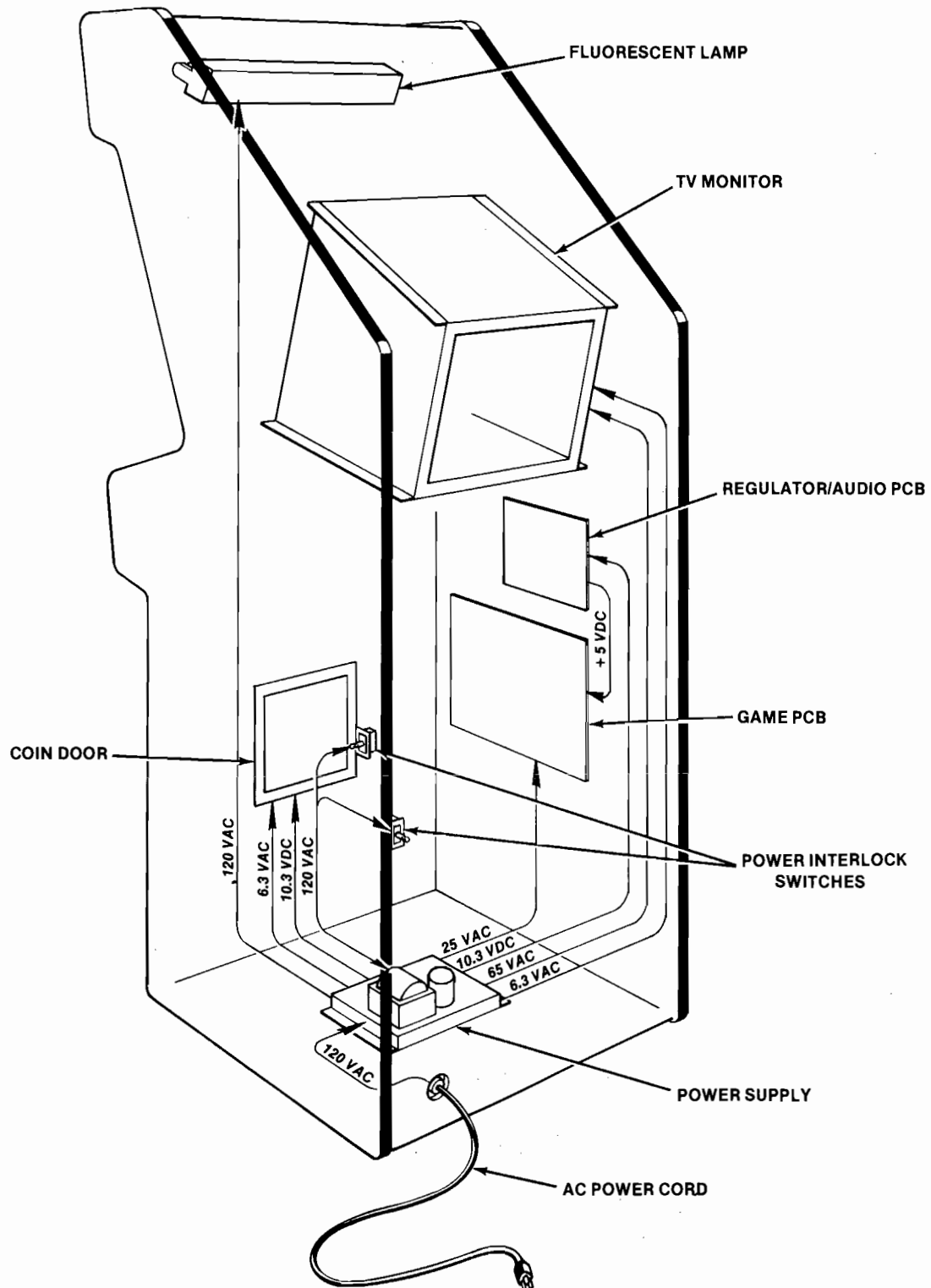


Figure 12 Power Distribution

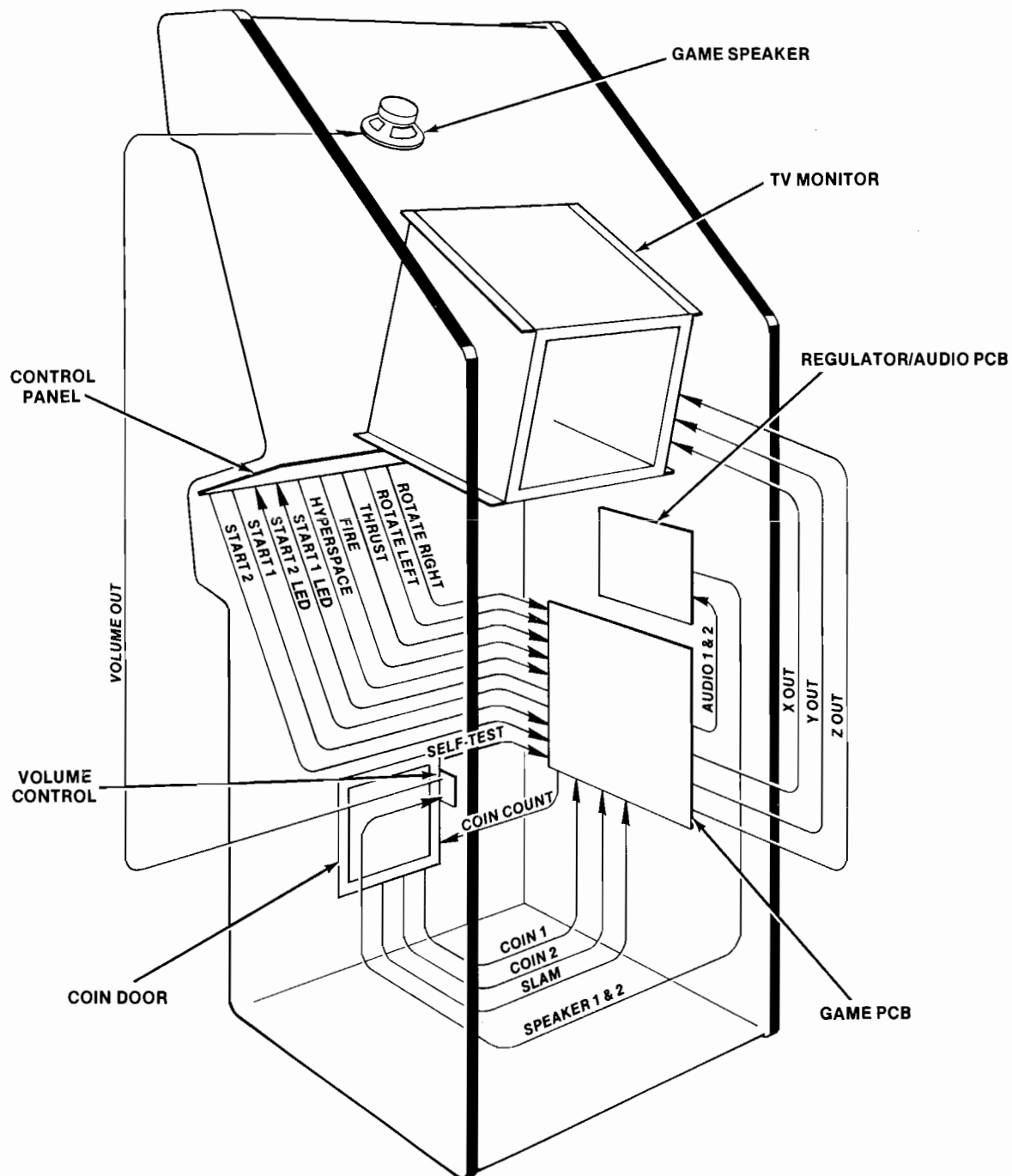
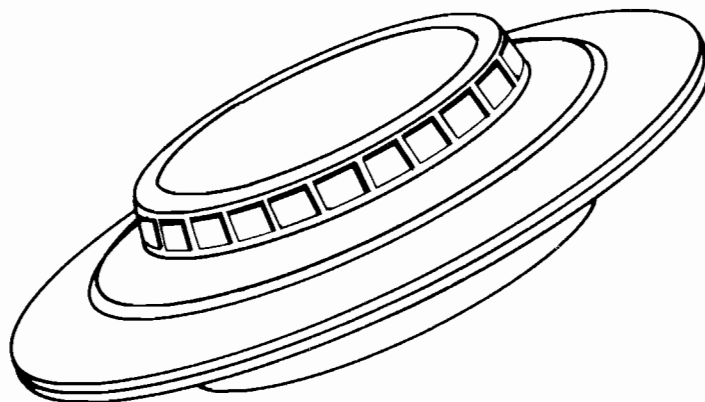


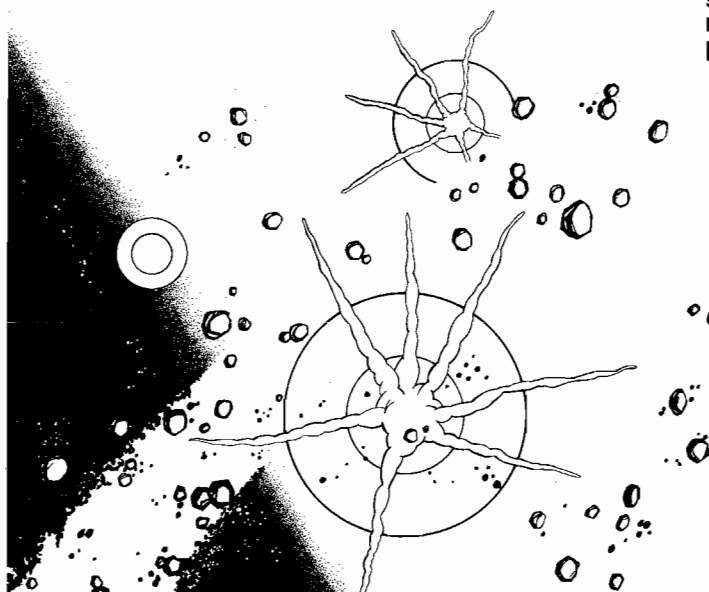
Figure 13 Signal Distribution

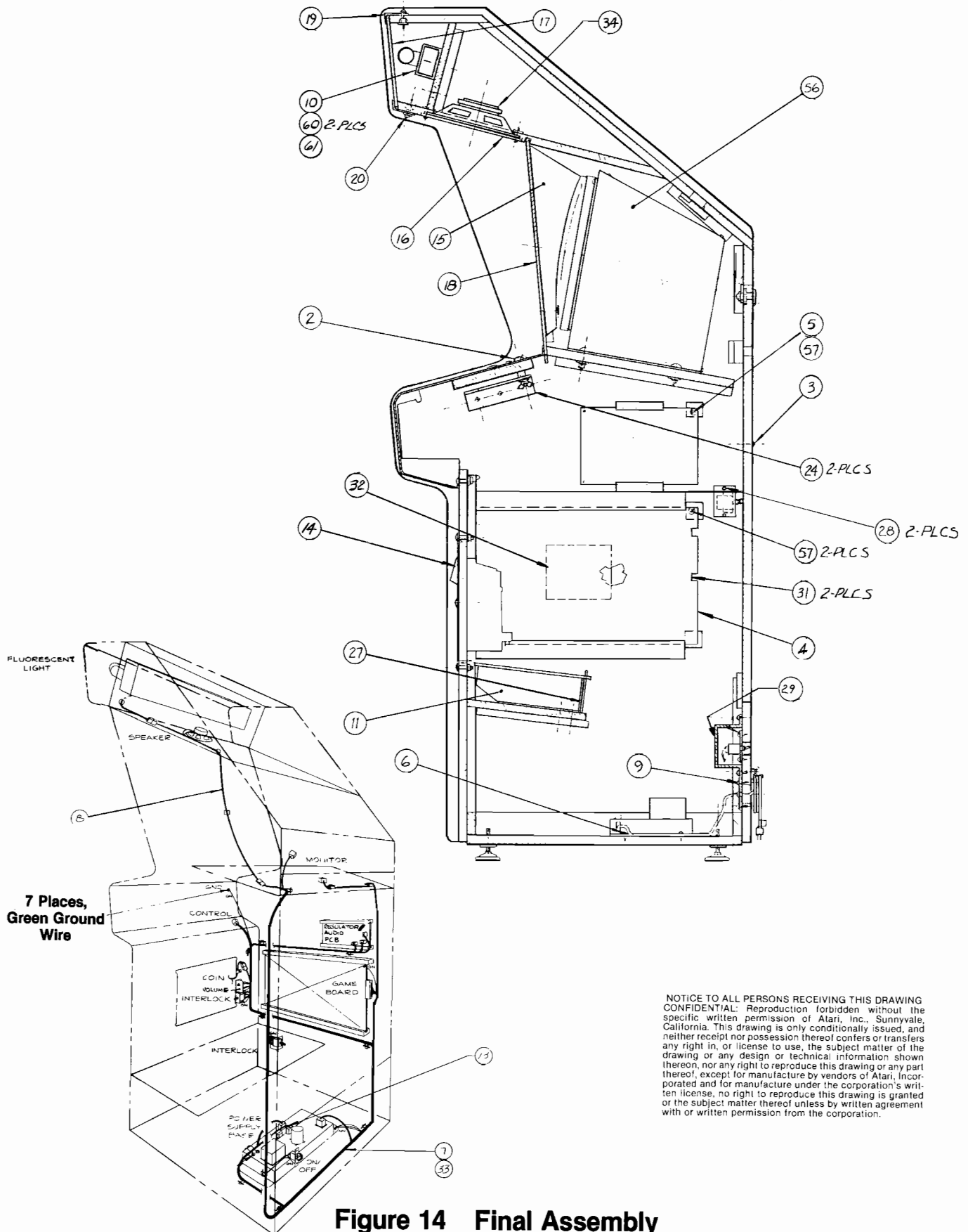
Illustrated Parts Lists



The purpose of this chapter is to provide you with the necessary information for ordering replacement parts for your Atari Asteroids game. Please note that, for simplicity, **common hardware has been deleted** from most of these parts lists. This includes screws, nuts, washers, bolts, etc.





When ordering parts from your distributor, 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.





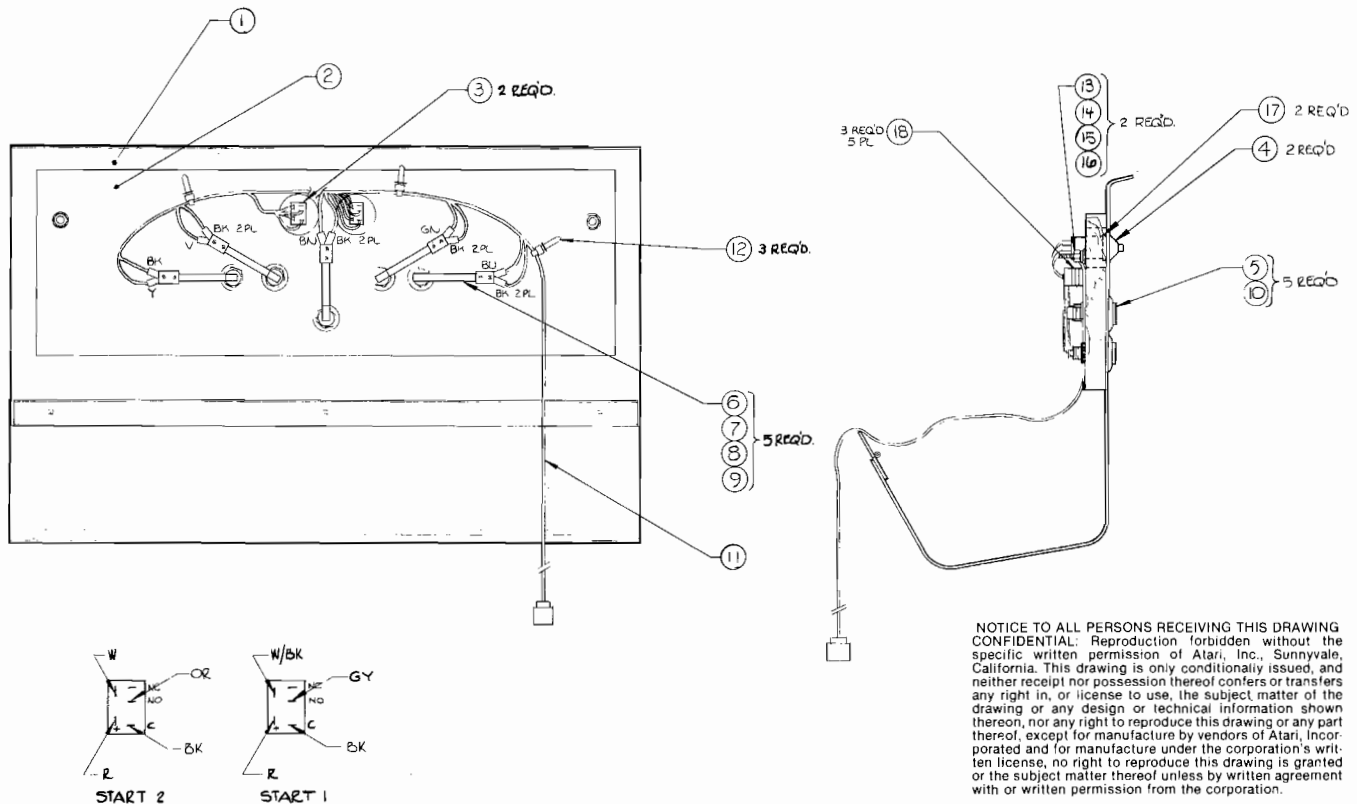
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Figure 14 Final Assembly Parts List

| <i>Item</i> | <i>Part No.</i> | <i>Description</i> |
|-------------|-----------------|--|
| 2 | A035053-01 | Control Panel Assembly—see Figure 15 |
| 3 | A035056-01 | Access Panel Assembly |
| 4 | A034986-01 | Asteroids Game PCB Assembly (PROM version)—see Figure 16  |
| | OR | |
| | A034986-02 | Asteroids Game PCB Assembly (ROM version)—see Figure 16 |
| 5 | A034485-01 | Regulator/Audio PCB Assembly—see Figure 17 |
| 6 | A034561-01 | Power Supply Assembly for X-Y Games—see Figure 18  |
| 7 | A035158-01 | Main Harness and Component Assembly—see Figure 19 |
| | OR | |
| | A035158-02 | Main Harness and Component Assembly |
| 8 | A034628-01 | Light and Speaker Harness Assembly |
| 9 | A034841-01 | Strain Relief Power Cord (domestic) |
| | OR | |
| | A034863-01 | Strain Relief Power Cord (German) |
| 10 | A034752-01 | Fluorescent Light Assembly—see Figure 20 |
| 11 | A030268-01 | Coin Box Assembly (2 holes) |
| | OR | |
| | A021700-01 | Coin Box Assembly (3 holes) |
| 13 | A021084-01 | Voltage Selection Plug, 100V |
| | A021084-02 | Voltage Selection Plug, 120V |
| | A021084-04 | Voltage Selection Plug, 220V |
| | A021084-05 | Voltage Selection Plug, 240V |
| 14 | A009083-xx | Coin Door Assembly—see Figure 21 |
| | OR | |
| | 71-102201 | New Coin Door (U.S. 25¢/25¢)—see Figure 23  |
| | 71-102204 | New Coin Door (German 2DM/1DM) |
| | 71-102206 | New Coin Door (German 1DM/5DM) |
| | 71-102207 | New Coin Door (Belgian 5Fr/5Fr) |
| | 71-102208 | New Coin Door (Swiss 1Fr/1Fr) |
| | 71-102209 | New Coin Door (Japanese 100Y/100Y) |
| | 71-102210 | New Coin Door (U.K. 10P/10P) |
| | 71-102211 | New Coin Door (Australian 20¢/20¢) |
| | 71-102212 | New Coin Door (Italian 100L/100L) |
| | 71-103202 | New Coin Door (U.S. 25¢/25¢/25¢) |
| | 71-103203 | New Coin Door (U.S. 25¢/25¢/\$1) |
| | 71-103205 | New Coin Door (German 1DM/2DM/5DM) |
| 15 | A035724-01 | Cardboard Bezel Assembly with Graphics |
| 16 | 034457-01 | Speaker Grille |
| 17 | 035051-01 | Acrylic Attraction Panel with Graphics |
| 18 | 035049-01 | TV Monitor Shield with Graphics |
| 19 | 034515-01 | Upper Retainer Strip |
| 20 | 034516-01 | Lower Retainer Strip |
| 23 | TM-143 | Asteroids Technical Manual |
| 24 | 001638-01 | Control-Panel Mounting Bracket |
| 27 | 006870-01 | Coin Box Bracket |
| 28 | 007882-02 | Interlock Switch Cover |
| 29 | 007103-01 | On/Off Switch Cover |
| 31 | 78-24012 | 5" Beaded Nylon Tie Wrap |
| 32 | 034536-02 | Foam Vibration Damper for Game PCB |
| 33 | A035319-01 | Coin Door Adapter Harness (only for A009083-xx coin door) |
| 34 | 48-001 | 8" High-Fidelity Speaker |
| 36 | 035437-01 | Connector Mount for TV Monitor |
| 56 | 92-042 | 19" X-Y Black-and-White TV Monitor  |
| 57 | 75-07017 | Fiber Washer |

**Figure 14 Final Assembly, continued
Parts List**

| Item | Part No. | Description |
|------|-----------|--|
| 60 | 99-11006 | Lamp Socket Clip (each clip includes 2 pieces) |
| 61 | 70-303 | 18" 15-Watt Cool White Fluorescent Lamp |
| 65 | TM-146 | Manual for Quadrascan X-Y Monitor |
| 66 | DP-143-01 | Asteroids Schematic Drawings (Sheet 1) |
| 67 | DP-143-02 | Asteroids Schematic Drawings (Sheet 2) |



**Figure 15 Control Panel Assembly
A035053-01 C**

| Item | Part No. | Description |
|------|------------|---|
| 1 | 035047-01 | Control Panel with Graphics |
| 2 | 035046-01 | Control Panel Support |
| 3 | 62-039 | Light-Emitting Diode Switch |
| 4 | 001856-01 | Aluminum Switch Bushing |
| 5 | A035798-01 | Pushbutton Assembly |
| 6 | 99-080023 | Leaf Switch |
| 7 | 021105-01 | Metal Header Plate for Leaf Switch |
| 11 | A035159-01 | Control Harness Assembly |
| 17 | 75-07054 | Flat Nylon Washer |
| 18 | 60-06015 | Phenolic Switch Spacer, 3/8" Hole Spacing x .094" Thick |



USE THIS I.C. POSITION
IF INSTALLING 74LS245
DETAIL
POSITION E3
USE THIS I.C. POSITION
IF INSTALLING AM8504B

USE REG. NETWORKS,
ITEM 34 ONLY IF USING
74LS105 IN E4, H4, J4

Board is permanently marked -01 or -02 after
"A034986", located between rows 10 & 11 (-01 for
PROM, -02 for ROM version).

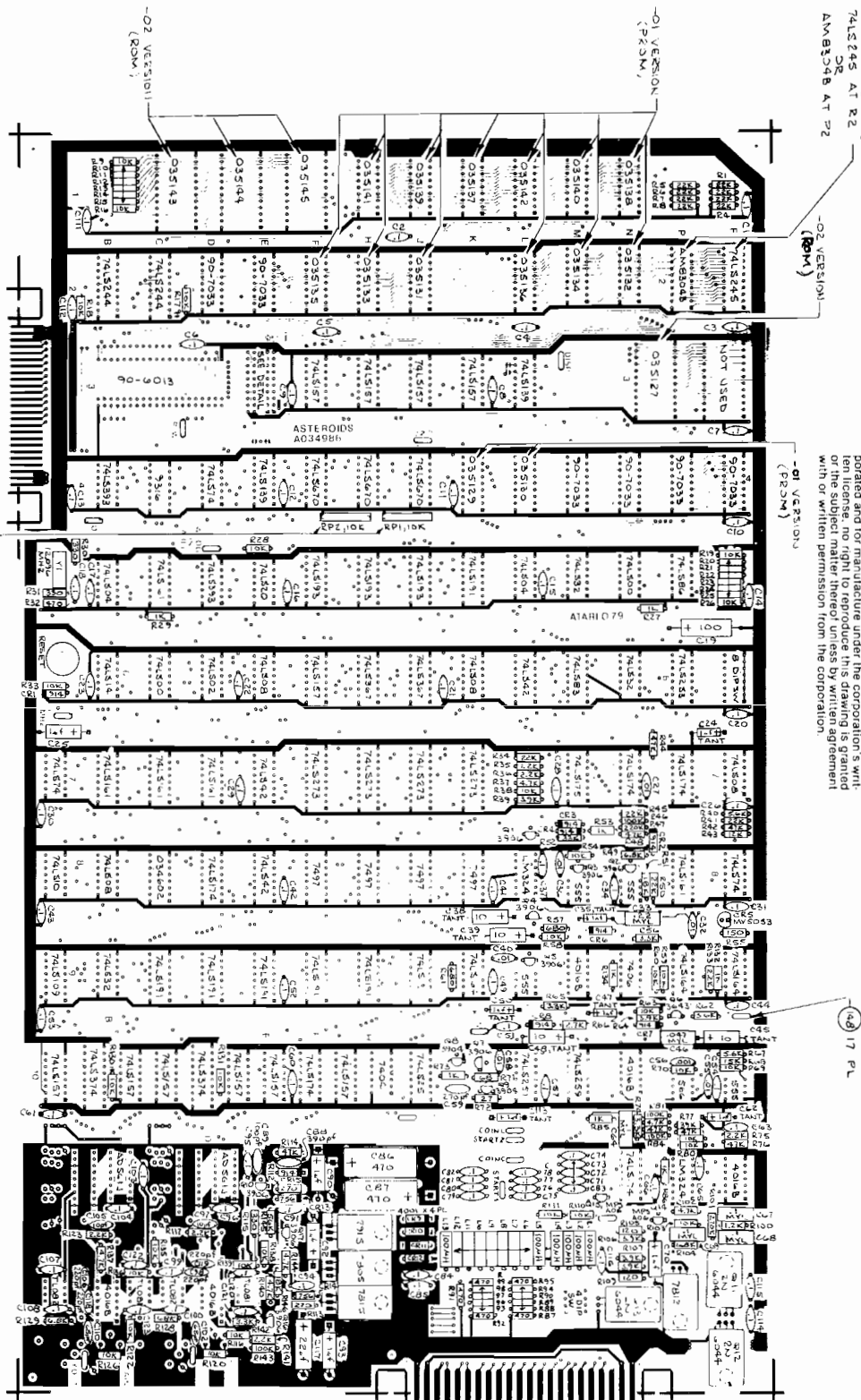


Figure 16 Asteroids Game PCB Assembly
A034986-01 and -02 F

**Figure 16 Asteroids Game PCB Assembly
Parts List**

| <i>Item</i> | <i>Part No.</i> | <i>Description (Reference Designations and Locations in Bold)</i> |
|-------------|-----------------|--|
| 2 | 100000-270 | 27 Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R72) |
| 3 | 100000-680 | 68 Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R71) |
| 4 | 100000-121 | 120 Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R105, 109) |
| 5 | 100000-151 | 150 Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R55) |
| 6 | 100000-331 | 330 Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R30, 31, 115) |
| 7 | 100000-471 | 470 Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R32, 87-99) |
| 8 | 100000-681 | 680 Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R57, 61) |
| 9 | 100000-102 | 1K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R27, 29, 53, 73, 85, 86, 132, 134) |
| 10 | 100000-271 | 270 Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R112-113) |
| 11 | 100000-122 | 1.2K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R35, 100) |
| 12 | 100000-222 | 2.2K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R36, 75, 117, 123, 133, 141) |
| 13 | 100000-272 | 2.7K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R66) |
| 14 | 100000-332 | 3.3K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R56, 65, 74, 142) |
| 15 | 100000-392 | 3.9K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R39, 64, 106-108) |
| 16 | 100000-472 | 4.7K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R37, 82, 102, 137, 140, 144) |
| 17 | 100000-562 | 5.6K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R40, 62, 67) |
| 18 | 100000-682 | 6.8K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R49, 104, 128, 129) |
| 20 | 100000-103 | 10K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R9-26, 28, 33, 38, 54, 58-60, 63, 69, 70, 79, 103, 110-1, 116, 122, 130-1, 135-6, 138-9) |
| 21 | 100000-123 | 12K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R43) |
| 22 | 100000-153 | 15K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R68) |
| 23 | 100000-183 | 18K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R51, 146) |
| 24 | 100000-223 | 22K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R1-8, 34, 41, 45, 50) |
| 25 | 100000-333 | 33K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R52) |
| 26 | 100000-473 | 47K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R42, 44, 48, 76, 78, 83, 114) |
| 27 | 100000-563 | 56K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R145) |
| 28 | 100000-104 | 100K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R46, 81, 84, 143) |
| 29 | 100000-224 | 220K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R47) |
| 30 | 100000-274 | 270K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R101) |
| 33 | 100000-393 | 39K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R77) |
| 34 | 19-007 | 10K Ohm, 8-Pin Resistor Network. Use with the LS170 only, item 120. (RP1, 2) |
| 35 | 19-315103 | 10K Ohm Vertical PCB-Mounting Cermet Trimpot, Bournes Series 3352V-1-10K (R120, 126) |
| 39 | 21-101104 | .1 uf, $\pm 10\%$, Radial-Lead Epoxy-Dipped 100V Mylar Capacitor (C64, 67-69) |
| 40 | 21-101224 | .22 uf, $\pm 10\%$, Radial-Lead Epoxy-Dipped 100V Mylar Capacitor (C33) |
| 41 | 21-101473 | .047 uf, $\pm 10\%$, Radial-Lead Epoxy-Dipped 100V Mylar Capacitor (C46) |
| 44 | 24-250105 | 1.0 uf Aluminum Electrolytic Fixed Axial-Lead 25V Capacitor (C25, 70, 90, 92, 93) |
| 45 | 24-250107 | 100 uf Aluminum Electrolytic Fixed Axial-Lead 25V Capacitor (C19) |
| 46 | 24-250477 | 470 uf Aluminum Electrolytic Fixed Axial-Lead 25V Capacitor (C86, 87) |
| 47 | 24-250226 | 22 uf Aluminum Electrolytic Fixed Axial-Lead 25V Capacitor (C117) |
| 49 | 27-250102 | .001 uf Ceramic-Disc 25V Radial-Lead Capacitor (C56) |
| 50 | 27-250103 | .01 uf Ceramic-Disc 25V Radial-Lead Capacitor (C27, 32, 36, 40, 55, 58) |
| 51 | 27-250104 | .1 uf Ceramic-Disc 25V Radial-Lead Capacitor (C1-18, 20-23, 26, 28-31, 34, 37, 41-44, 49, 51-54, 57, 60, 61, 63, 65, 66, 71-85, 91, 94-96, 99-100, 103-104, 107-108, 111-112, 114-116, 120-123) |
| 53 | 28-101100 | 10 pf Radial-Lead Epoxy-Dipped 100V Mica Capacitor (C97, 105) |
| 54 | 28-101680 | 68 pf Radial-Lead Epoxy-Dipped 100V Mica Capacitor (C102, 110) |
| 55 | 28-101101 | 100 pf Radial-Lead Epoxy-Dipped 100V Mica Capacitor (C89) |
| 56 | 28-101221 | 220 pf Radial-Lead Epoxy-Dipped 100V Mica Capacitor (C98, 106, 118-119) |
| 57 | 28-101271 | 270 pf Radial-Lead Epoxy-Dipped 100V Mica Capacitor (C59) |
| 58 | 28-101391 | 390 pf Radial-Lead Epoxy-Dipped 100V Mica Capacitor (C88) |
| 61 | 29-006 | 1.0 uf, $\pm 10\%$, 35V Tantalum Capacitor (C24, 35, 47, 50, 62, 113) |
| 63 | 29-046 | 10 uf, $\pm 10\%$, 20V Tantalum Capacitor (C38, 39, 45, 48) |
| 66 | 31-1N914 | 75V 1N914 Switching Diode (CR1-4, 6-8, 15) |
| 67 | 31-1N4001 | 50V 1N4001 Silicon Rectifier Diode (CR9-12) |

**Figure 16 Asteroids Game PCB Assembly, continued
Parts List**

| <i>Item</i> | <i>Part No.</i> | <i>Description (Reference Designations and Locations in Bold)</i> |
|-------------|-----------------|---|
| 68 | 31-1N756A | 8.2V, $\pm 5\%$, 1N756A Zener Diode (CR13, 14) |
| 71 | 33-2N3906 | Type 2N3906 PNP Switching and Amplifying Transistor (Q1-5, 7, 10, 16-17) |
| 72 | 34-2N3643 | Type 2N3643 NPN Silicon Transistor (Q6) |
| 73 | 34-2N3904 | Type 2N3904 NPN 60V 1-Watt Transistor (Q8, 9) |
| 74 | 34-2N6044 | Type 2N6044 Darlington NPN Transistor (Q11-13) |
| 75 | 34-MPSA06S | Type MPSA06S NPN 80V 500ma Transistor (Q14, 15) |
| 78 | 37-74LS00 | Type 74LS00 Integrated Circuit (N5, C6) |
| 79 | 37-74LS02 | Type 74LS02 Integrated Circuit (D6) |
| 80 | 37-7404 | Type 7404 Integrated Circuit (H10) |
| 81 | 37-74LS04 | Type 74LS04 Integrated Circuit (B5, L5) |
| 82 | 37-7406 | Type 7406 Integrated Circuit (N9) |
| 83 | 37-74LS08 | Type 74LS08 Integrated Circuit (E6, K6, R7, B8) |
| 84 | 37-74LS10 | Type 74LS10 Integrated Circuit (A8) |
| 85 | 37-74LS14 | Type 74LS14 Integrated Circuit (B6) |
| 86 | 37-74LS20 | Type 74LS20 Integrated Circuit (E5) |
| 87 | 37-74LS32 | Type 74LS32 Integrated Circuit (M5, N6, B9) |
| 88 | 37-74LS42 | Type 74LS42 Integrated Circuit (L6, E7, E8) |
| 89 | 37-74LS74 | Type 74LS74 Integrated Circuit (D4, A7, R8) |
| 91 | 37-74LS83 | Type 74LS83 Integrated Circuit (M6) |
| 92 | 37-74LS86 | Type 74LS86 Integrated Circuit (P5) |
| 93 | 37-7497 | Type 7497 Integrated Circuit (F8, H8, J8, K8) |
| 94 | 37-74LS109 | Type 74LS109 Integrated Circuit (A9) |
| 95 | 37-74LS139 | Type 74LS139 Integrated Circuit (L3, E4) |
| 97 | 37-74LS157 | Type 74LS157 Integrated Circuit (F3, H3, J3, K3, F6, A10, B/C10, F/H10, C10, D/E10, E10) |
| 98 | 37-74LS161 | Type 74LS161 Integrated Circuit (C5, P8, B7, C7, D7) |
| 99 | 37-74LS164 | Type 74LS164 Integrated Circuit (K9, P9, R9) |
| 101 | 37-74LS174 | Type 74LS174 Integrated Circuit (N7, P7, D8, N11, F10) |
| 102 | 37-74LS175 | Type 74LS175 Integrated Circuit (M7) |
| 103 | 37-74191 | Type 74191 Integrated Circuit (C4) |
| 104 | 37-74LS191 | Type 74LS191 Integrated Circuit (K5, C9, D9, E9, F9, H9, J9) |
| 105 | 37-74LS193 | Type 74LS193 Integrated Circuit (F5, H5, J5) |
| 106 | 37-74LS244 | Type 74LS244 Integrated Circuit (B2, C2) |
| 107 | 37-74LS245 | Type 74LS245 Integrated Circuit (R2, E3) |
| | OR | |
| 108 | 37-8304B | Type 8304B Integrated Circuit—substitute for item 107 (P2, E3) |
| 110 | 37-74LS251 | Type 74LS251 Integrated Circuit (J10, L10) |
| 111 | 37-74LS253 | Type 74LS253 Integrated Circuit (P6) |
| 112 | 37-74LS259 | Type 74LS259 Integrated Circuit (M10) |
| 113 | 37-74LS273 | Type 74LS273 Integrated Circuit (F7, H7, J7, K7) |
| 114 | 37-74LS367 | Type 74LS367 Integrated Circuit (H6, J6) |
| 116 | 37-74LS393 | Type 74LS393 Integrated Circuit (B4, D5) |
| 117 | 37-74LS374 | Type 74LS374 Integrated Circuit (B10, D10) |
| | OR | |
| 118 | 37-74LS273 | Type 74LS273 Integrated Circuit—substitute for item 117 |
| 119 | 37-74LS670 | Type 74LS670 Integrated Circuit (F4, H4, J4) |
| | OR | |
| 120 | 37-74LS170 | Type 74LS170 Integrated Circuit—substitute for item 119 |
| 121 | 37-9316 | Type 9316 Integrated Circuit (C4) |
| 122 | 37-LM324 | Type LM324 Integrated Circuit (L8, P11) |
| 124 | 37-555 | Type 555 Timer Integrated Circuit (M8, N8, L9, R10) |
| 125 | 37-566 | Type 566 Function Generator Integrated Circuit (P10) |
| 127 | 37-4016B | Type 4016B Integrated Circuit (M9, N10, R11, B12, D12) |
| 128 | 37-TL082CP | Type TL082CP Integrated Circuit (A12, C12) |
| 129 | 37-AD561J | Type AD561J Integrated Circuit (B11, D11) |
| 130 | 137108-001 | Operational Amplifier Integrated Circuit (B/C12, E12) |

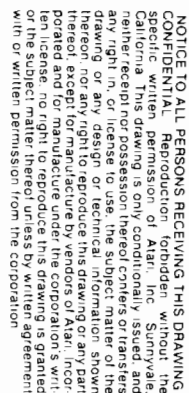
**Figure 16 Asteroids Game PCB Assembly, continued
Parts List**

| <i>Item</i> | <i>Part No.</i> | <i>Description (Reference Designations and Locations in Bold)</i> |
|-------------|-----------------|--|
| 132 | 37-7805 | + 5V Voltage Regulator |
| 133 | 37-7812 | + 12V Voltage Regulator |
| 134 | 37-7815 | + 15V Voltage Regulator |
| 135 | 37-7915 | – 15V Voltage Regulator |
| 137 | 38-MV5053 | Type MV5053 Light-Emitting Diode (CR5) |
| 139 | 41-3003 | 100 μ H, \pm 5%, Hot-Molded Plastic Fixed R.F. Choke (L1-13) |
| 141 | 62-001 | SPST Pushbutton Switch (A6) |
| 142 | 66-118P1T | 8-Station Single-Throw, Dual-Inline-Package Bit Switch (R6) |
| 143 | 66-114P1T | 4-Station Single-Throw, Dual-Inline-Package Bit Switch (M12) |
| 144 | 79-42C40 | 40-Contact Medium-Insertion-Force Integrated Circuit Socket (C3) |
| 146 | 81-4302 | Nylon Snap-In Fastener |
| 148 | 020670-01 | Test Point |
| 150 | 90-102 | 12.096 MHz, \pm .005%, Crystal (Y1) |
| 151 | 90-6013 | Microprocessor (C3) |
| 152 | 90-7033 | Random-Access Memory (D2, E2, M4, N4, P4, R4) |
| 155 | 034602-01 | Programmable Read-Only Memory (C8) |
| 157 | 035127-01 | Read-Only Memory (N/P3) |
| | | OR THE FOLLOWING TWO ITEMS: |
| 159 | 035129-01 | Programmable Read-Only Memory, MSB—substitute for half of item 157 (K4) |
| 159 | 035130-01 | Programmable Read-Only Memory, LSB—substitute for half of item 157 (L4) |

*For remaining memory components and their part numbers,
see listing below.*

Memory Components and Their Equivalents (Locations Shown in Bold)

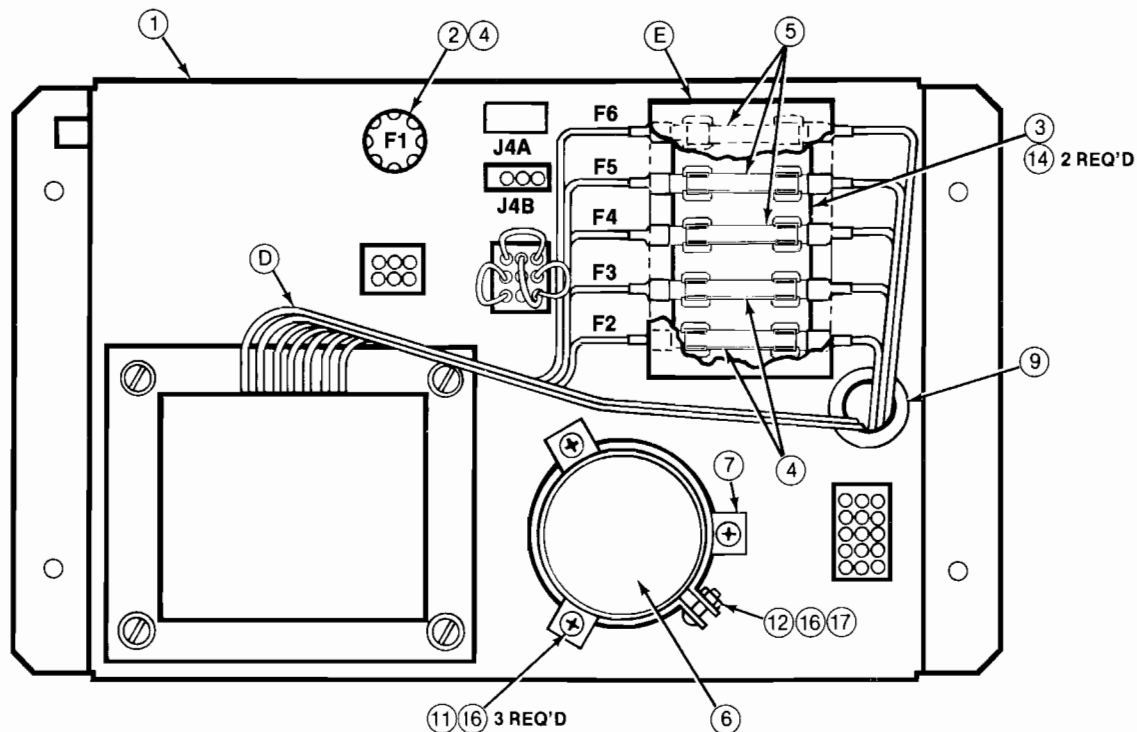
| -01 P.C. Boards (PROMs) | Alternate -01 P.C. Boards (PROMs) | -02 P.C. Boards (ROMs) |
|------------------------------------|--|-----------------------------------|
| 035131-01 J2 | 035150-01 J2 | |
| 035132-01 N2 | | 035143-01 C1 |
| 035137-01 K1 | 035153-01 K1 | |
| 035138-01 N1 | | |
| 035133-01 H2 | 035151-01 H2 | |
| 035134-01 M2 | | 035144-01 D/E1 |
| 035139-01 J1 | 035154-01 J1 | |
| 035140-01 M1 | | |
| 035135-01 F2 | 035152-01 F2 | |
| 035136-01 L2 | | 035145-01 F1 |
| 035141-01 H1 | 035155-01 H1 | |
| 035142-01 L1 | | |



**Figure 17 Regulator/Audio PCB Assembly
A034485-01 D**

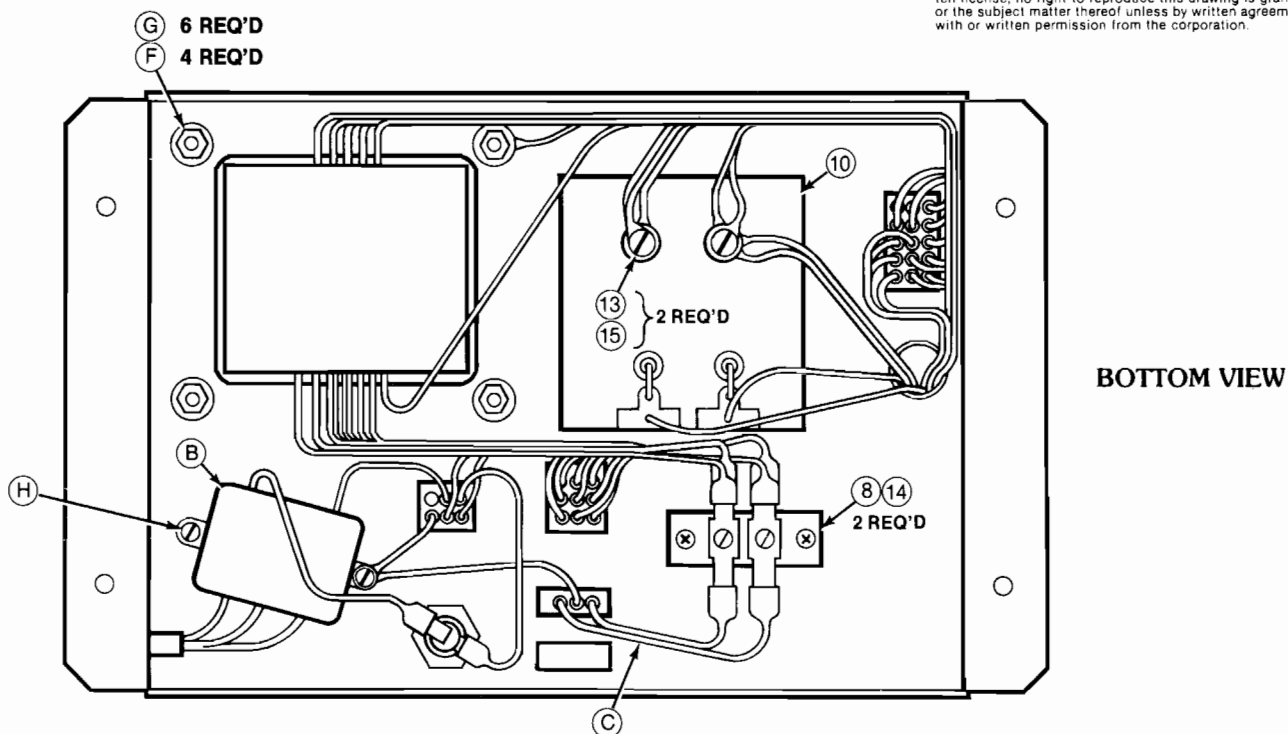
**Figure 17 Regulator/Audio PCB Assembly
Parts List**

| <i>Item</i> | <i>Part No.</i> | <i>Qty.</i> | <i>Description (Ref. Designations in Bold)</i> |
|-------------|-----------------|-------------|--|
| 2 | 110000-010 | 2 | 1 Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R10, 19) |
| 3 | 110000-100 | 2 | 10 Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R11, 20) |
| 4 | 110000-330 | 1 | 33 Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R3) |
| 5 | 110000-101 | 5 | 100 Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R4, 12, 17, 18, 22) |
| 6 | 110000-271 | 1 | 270 Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R1) |
| 7 | 110000-102 | 1 | 1K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R2) |
| 8 | 110000-272 | 1 | 2.7K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R23) |
| 9 | 110000-752 | 1 | 7.5K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R7) |
| 10 | 110000-103 | 2 | 10K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R13, 14) |
| 11 | 110000-392 | 1 | 3.9K Ohm, $\pm 5\%$, $\frac{1}{4}$ W Resistor (R6) |
| 13 | 110001-221 | 2 | 220 Ohm, $\pm 5\%$, $\frac{1}{2}$ W Resistor (R9, 21) |
| 15 | 12-52P7 | 1 | 2.7 Ohm, $\pm 5\%$, 1W Resistor (R5) |
| 16 | 19-100P1015 | 1 | .1 Ohm, $\pm 3\%$, 7W Wirewound Resistor (R24) |
| 17 | 19-315102 | 1 | 1K Ohm Vertical PCB-Mounting Cermet Trimpot, Bournes Series 3352V-1-1K (R8) |
| 20 | 24-250106 | 2 | 10 uf Aluminum Electrolytic Fixed Axial-Lead 25V Capacitor (C6, 15) |
| 22 | 24-250477 | 3 | 470 uf Aluminum Electrolytic Fixed Axial-Lead 25V Capacitor (C1, 4, 12) |
| 23 | 24-250108 | 3 | 100 uf Aluminum Electrolytic Fixed Axial-Lead 25V Capacitor (C9, 10, 13) |
| 25 | 27-250103 | 2 | .01 uf Ceramic-Disc 25V Radial-Lead Capacitor (C5, C14) |
| 26 | 27-250104 | 2 | .1 uf Ceramic-Disc 25V Radial-Lead Capacitor (C3, C11) |
| 27 | 27-250224 | 2 | .22 uf Ceramic-Disc 25V Radial-Lead Capacitor (C8, 17) |
| 29 | 27-250102 | 3 | .001 uf Ceramic-Disc 25V Radial-Lead Capacitor (C2, 7, 16) |
| 31 | 31-A14F | 2 | 50V 2.5A Miniature Axial-Lead High-Current Rectifier (CR1, CR4) |
| 32 | 31-1N4001 | 2 | 50V Silicon Rectifier 1N4001 Diode (CR2-3) |
| 34 | 33-TIP32 | 1 | PNP Power Transistor, Type TIP32 (Q2) |
| 35 | 34-2N3055 | 1 | NPN Silicon Transistor, Type 2N3055 (Q3) |
| 36 | 34-2N3904 | 2 | NPN Silicon Transistor, Type 2N3904 (Q4, 6) |
| 38 | 37-LM305 | 1 | 5V Linear Voltage Regulator (Q1) |
| 39 | 37-TDA2002A | 2 | Type TDA2002A 8W Linear Audio Amplifier Integrated Circuit (Q5, 7) |
| 44 | 79-58008 | 1 | 9-Position Connector Receptacle (J7) |
| 45 | 79-58092 | 1 | 6-Position Connector Receptacle (J6) |
| 46 | 79-58059 | 1 | 4-Position Connector Receptacle (J8) |
| 47 | 79-20230 | 19 | Female PCB-Mounting Terminal |
| 48 | 034531-01 | 1 | Heat Sink |
| 49 | 72-1608C | 4 | #6-32 $\times \frac{1}{2}$ " Cross-Recessed Pan-Head Corrosion-Resistant Steel Machine Screw |
| 50 | 75-99516 | 7 | #6-32 Nut/Washer Assembly |
| 51 | 75-056 | 7 | #6 Internal-Tooth Steel Lock Washer |
| 52 | 020670-01 | 6 | Test Point |
| 53 | 75-F60805 | 3 | #6-32 $\times \frac{1}{2}$ " Binder-Head Nylon Screw |
| 57 | 78-16008 | 1 | Thermally Conductive Compound for the 2N3055 |
| 58 | 78-16014 | 3 | Thermally Conductive Compound for TDA2002A and TIP32 |
| 60 | 52-003 | 2 | Teflon-Insulated Solder-Plated Solid Copper PCB-Mounting Jumper Wire with .6" Centers |
| 61 | 52-004 | 2 | Teflon-Insulated Solder-Plated Solid Copper PCB-Mounting Jumper Wire with .3" Centers |



The four available voltage selection plugs are listed in Figure 14, Final Assembly.

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Figure 18 Power Supply Assembly for X-Y Games Parts List



| <i>Item</i> | <i>Part No.</i> | <i>Qty.</i> | <i>Description</i> |
|-------------|-----------------|-------------|---|
| A | A034955-01 | 1 | Power Supply Sub-Assembly, Rev. A, consisting of the following 17 items: |
| 1 | 034482-01 | 1 | Base for Power Supply Chassis |
| 2 | 79-4411006 | 1 | Panel-Mounting Non-Indicating 3AG Cartridge-Type Fuse Post |
| 3 | 79-3206 | 1 | 5-Position 3AG Fuse Block with 1/4" Quick-Disconnect Terminals |
| 4 | 46-2017002 | 3 | 7-Amp. 250V 3AG Slow-Blow Glass Cartridge-Type Fuse |
| 5 | 46-2013002 | 3 | 3-Amp. 250V 3AG Slow-Blow Glass Cartridge-Type Fuse |
| 6 | 29-053 | 1 | 26,000 uf 15V Electrolytic Capacitor |
| 7 | 78-70501SC | 1 | 2" Diameter Capacitor Mounting Bracket |
| 8 | 79-15021001 | 1 | 2-Circuit Single-Row Terminal Block |
| 9 | 78-2708 | 1 | Nylon Type 6/6 Hole Bushing with 5/8" Inside Diameter x 55/64" Outside Diameter x 1/4" Thick |
| 10 | A006555-01 | 1 | Rectifier Printed Circuit Board Assembly |
| 11 | 72-HA4804S | 3 | #8-32 x 1/4" Cross-Recessed Pan-Head Zinc-Plated Steel Thread-Rolling Tri-Fluted "Taptite" Screw |
| 12 | 72-HA4812S | 1 | #8-32 x 1/4" Cross-Recessed Pan-Head Zinc-Plated Steel Thread-Rolling Tri-Fluted "Taptite" Screw |
| 13 | 72-1008F | 2 | #10-32 x 1/2" Cross-Recessed Pan-Head Zinc-Plated Steel Thread-Rolling Tri-Fluted "Taptite" Screw |
| 14 | 72-HA4606S | 4 | #6-32 x 3/8" Cross-Recessed Pan-Head Zinc-Plated Steel Thread-Rolling Tri-Fluted "Taptite" Screw |
| 15 | 75-010S | 2 | #10 Flat Plain SAE-Standard Zinc-Plated Steel Washer |
| 16 | 75-018S | 4 | #8 Flat Plain SAE-Standard Zinc-Plated Steel Washer |
| 17 | 75-99518 | 1 | #8-32 Nut/Washer Assembly |
| B | A034630-01 | 1 | RFI Filter Assembly |
| C | A034629-01 | 2 | A.C. Harness Assembly |
| D | A034623-02 | 1 | Power Supply Harness Assembly (for X-Y Games) |
| E | 034544-01 | 1 | Fuse Block Cover |
| F | 75-018S | 4 | #8 Flat Plain SAE-Standard Zinc-Plated Steel Washer |
| G | 75-99518 | 6 | #8-32 Nut/Washer Assembly |
| H | 72-HA4812S | 2 | #8-32 x 3/4" Cross-Recessed Pan-Head Zinc-Plated Steel Thread-Rolling Tri-Fluted "Taptite" Screw |

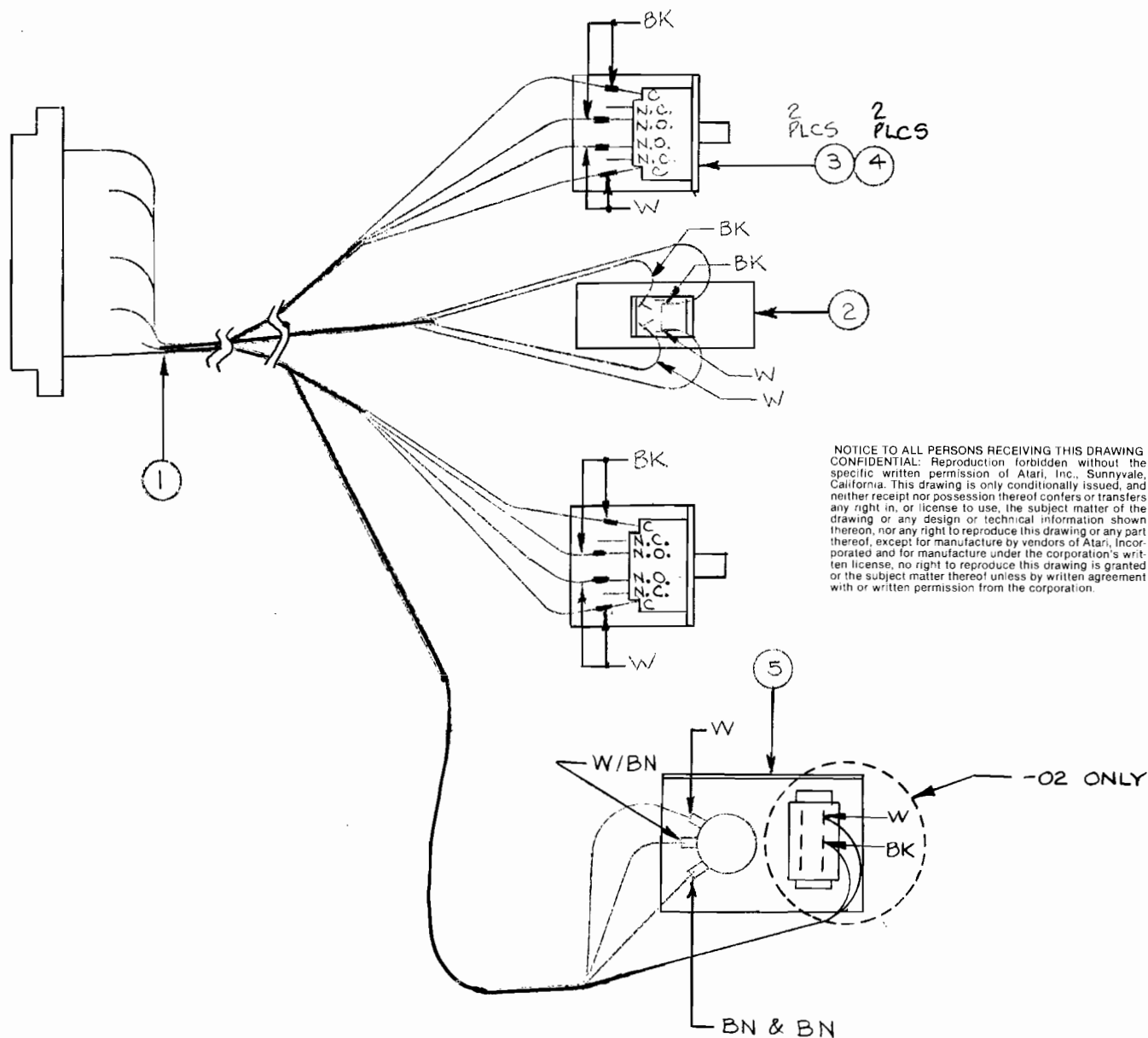
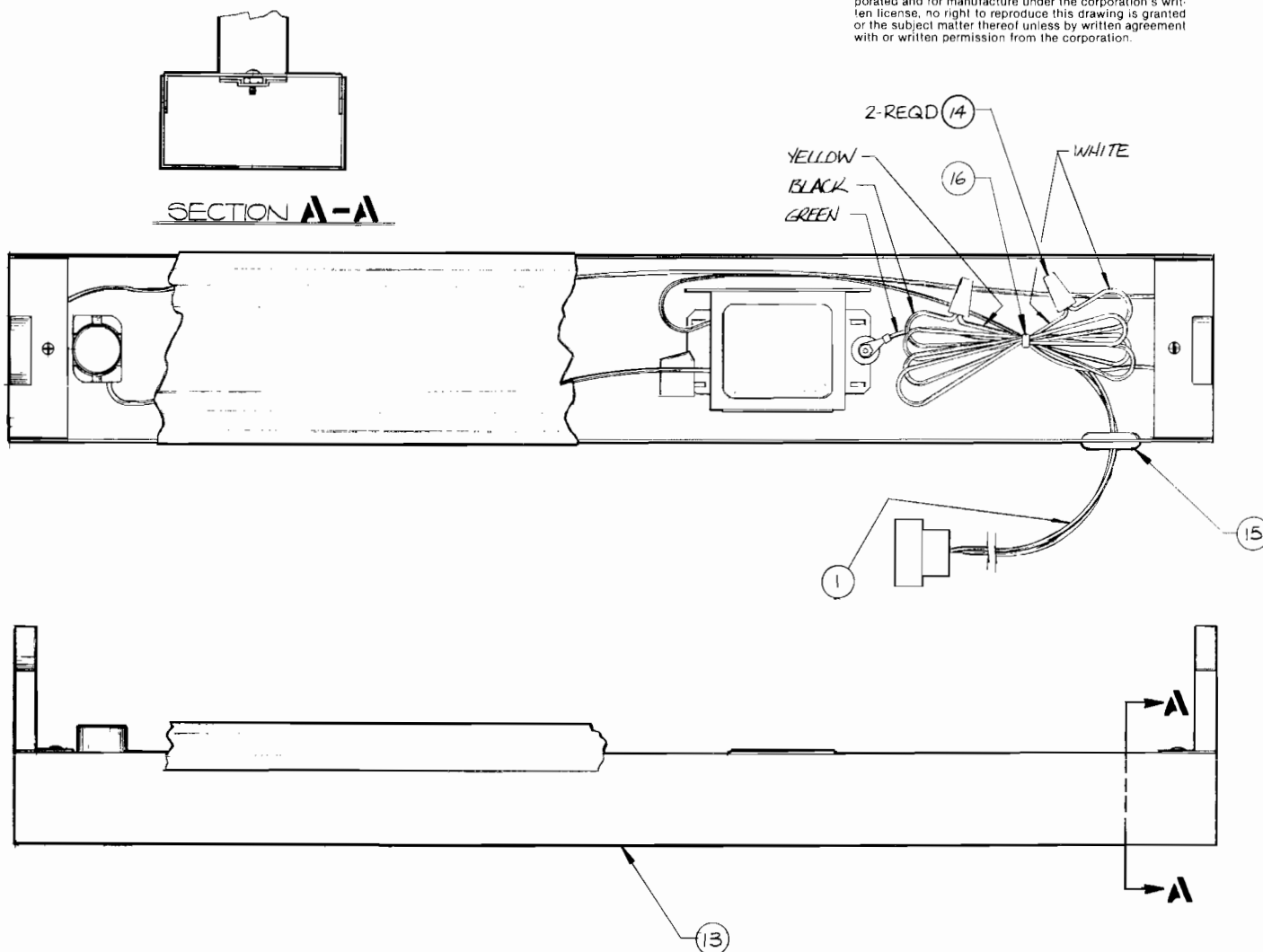


Figure 19 Main Harness and Component Assembly
A035158-02 A

| Item | Part No. | Description |
|------|------------|---|
| 1 | A035157-01 | Main Harness Assembly |
| 2 | A034631-01 | On/Off Switch Assembly |
| 3 | 68-002 | Interlock Switch (2 per game) |
| 4 | 000268-02 | Interlock Switch Mounting Bracket |
| 5 | A030169-01 | Volume Control/Test Switch/Bracket Assembly |

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**Figure 20 Fluorescent Light Assembly
 A034752-01 A**

| Item | Part No. | Description |
|------|------------|--|
| 1 | A005493-01 | Fluorescent Light Harness |
| 13 | 93-113 | 18" Fluorescent Lamp Fixture with Starter |
| 14 | 79-561816 | Spring Connector Wire Nut for 16- to 18-Gauge Wires |
| 15 | 78-2652 | Rubber Grommet with 5/8" Inside Diameter x 1 1/8" Outside Diameter x 5/16" Thick—for 7/8" Diameter Sheet-Metal Holes |

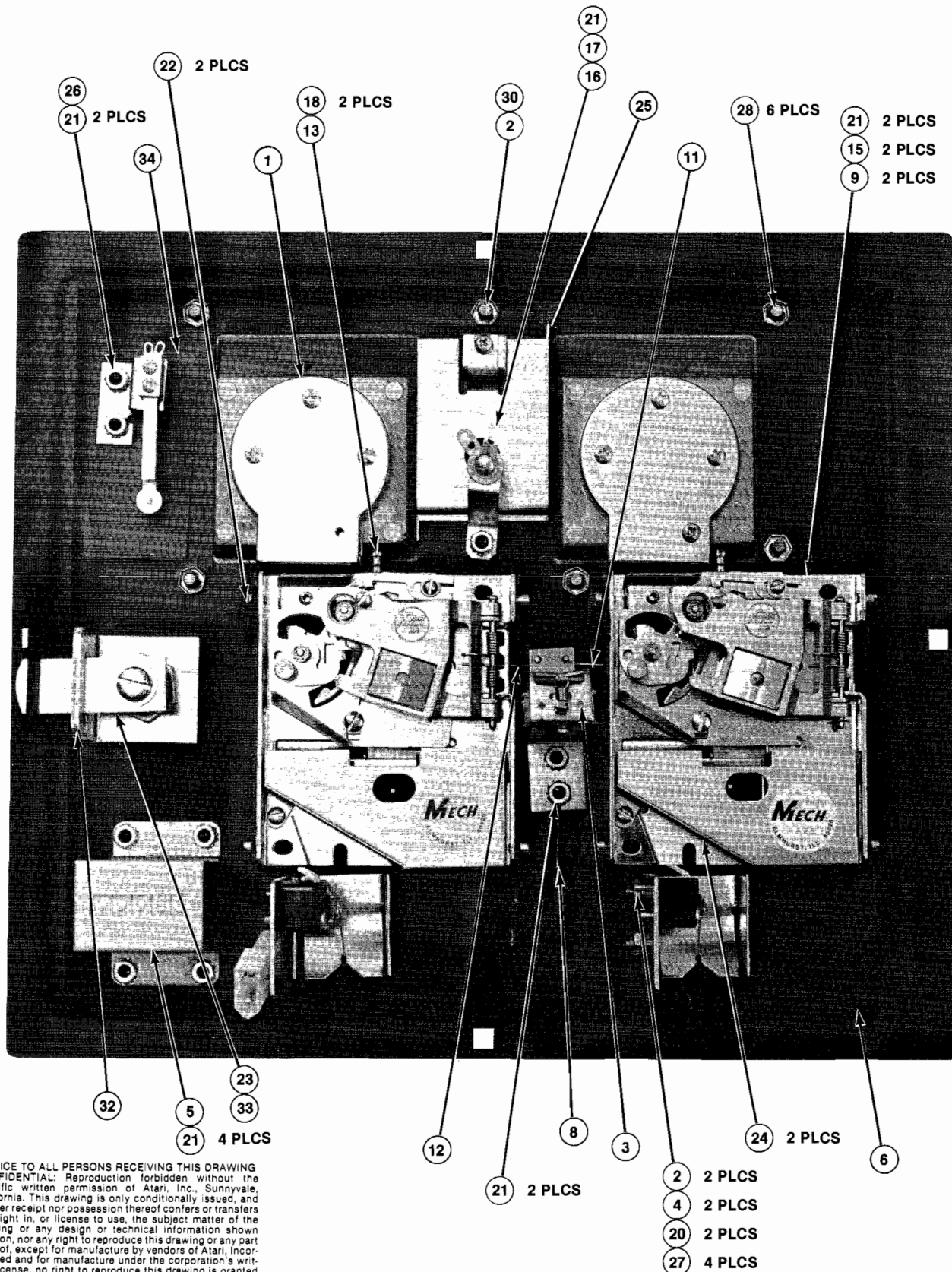


Figure 21 Coin Door Assembly
A006794-16 thru -28 K

**Figure 21 Coin Door Assembly
Parts List**

| Item | Part No. | Qty. | Description |
|--|--|---|--|
| 1 | A007637-16 A007637-17 A007637-18 A007637-19 A007637-20 A007637-21 A007637-22 A007637-23 A007637-24 A007637-25 A007637-26 A007637-27 A007637-28 | ↑ One of these used per coin door ↓ | Front Bezel Assy.—Used only on -16 Coin Door Assy. (25¢) Front Bezel Assy.—Used only on -17 Coin Door Assy. (5 Fr) Front Bezel Assy.—Used only on -18 Coin Door Assy. (1 DM) Front Bezel Assy.—Used only on -19 Coin Door Assy. (1 Kr) Front Bezel Assy.—Used only on -20 Coin Door Assy. (100 Y) Front Bezel Assy.—Used only on -21 Coin Door Assy. (10 pence) Front Bezel Assy.—Used only on -22 Coin Door Assy. (20¢ Australian) Front Bezel Assy.—Used only on -23 Coin Door Assy. (2 DM/1 DM) Front Bezel Assy.—Used only on -24 Coin Door Assy. (1 Fr) Front Bezel Assy.—Used only on -25 Coin Door Assy. (1 Baht) Front Bezel Assy.—Used only on -26 Coin Door Assy. (1 DM/5 DM) Front Bezel Assy.—Used only on -27 Coin Door Assy. (100 Lire) Front Bezel Assy.—Used only on -28 Coin Door Assy. (25¢/U.S. \$1 coin) |
| <i>For breakdown of Front Bezel Assy., see Figure 22</i> | | | |
| 2 | 72-HA4608C | 3 | #6-32 × 1/2" Cross-Recessed Pan-Head Cadmium-Plated Steel Tri- Fluted Thread-Rolling Screw |
| 3 | A030362-01 | 1 | Coin Lockout Assembly |
| 4 | A030250-01 | 2 | Coin Switch Assembly |
| 5 | A002465-01 | 1 | Coin Counter Assembly |
| 6 | 004320-01 | 1 | Coin Door Weldment |
| 8 | 004344-01 | 1 | Key Loop |
| 9 | 004340-01 | 2 | Spring Return (used only on German DM coin doors) |
| 10 | 004337-01 | 2 | Bracket for Lock-Out Wires |
| 11 | 004338-01 | 1 | Right-Hand Lock-Out Wire |
| 12 | 004336-01 | 1 | Left-Hand Lock-Out Wire |
| 13 | 004326-01 | 2 | Scavenger Button |
| 15 | 006904-01 | 2 | Spacer (used only on German DM coin doors) |
| 16 | 030257-01 | 1 | Lamp Socket |
| 17 | 70-11-47 | 1 | NEMA #47 Incandescent Miniature Bayonet-Base Lamp |
| 18 | 73-3008 | 2 | Carbon Spring Steel External Retaining Ring, for 1/4" Diameter Shaft |
| 20 | 72-HA4604C | 2 | #6-32 × 1/4" Cross-Recessed Pan-Head Cadmium-Plated Steel Tri- Fluted Thread-Rolling Screw |
| 21 | 75-99516 | 13* | #6-32 Steel Nut and Spring Washer Assembly *Quantity of 15 is used on the German DM coin doors |
| 22 | 008629-01 | 2 | Spring |
| 23 | 71-2118 | 1 | Cam Lock, Hudson #CR73A045S |
| 24 | 71-1225CU 71-1205FF 71-1201MG 71-1201KS 71-12100YJ 71-1210PE 71-1220CA 71-1202MG 71-1201FF 71-1201BT 71-1205MG 71-12100LI 71-1201ADU | ↑ 2 of any of these used per coin door, as required ↓ | Coin Mechanism for American Quarter Coin Mechanism for French 5-Francs Coin Coin Mechanism for German 1-Mark Coin Coin Mechanism for Swedish 1-Krona Coin Coin Mechanism for Japanese 100-Yen Coin Coin Mechanism for English 10-Pence Coin Coin Mechanism for Australian 20-Cent Coin Coin Mechanism for German 2-Mark Coin Coin Mechanism for French 1-Franc Coin Coin Mechanism for Thai 1-Baht Coin Coin Mechanism for German 5-Mark Coin Coin Mechanism for Italian 100-Lire Coin Coin Mechanism for U.S. \$1.00 Coin |
| 25 | 007753-01 | 1 | Anti-Probe Plate |
| 26 | A007638-01 | 1 | Slam Switch Assembly |
| 27 | 75-036S | 4 | #6 Flat Plain SAE-Standard Zinc-Plated Steel Washer |
| 28 | 73-3025 | 6 | Carbon Spring Steel External Retaining Ring, for 0.184" Diameter Shaft |
| 30 | 75-056 | 1 | #6 Internal-Tooth Zinc-Plated Steel Lock Washer |
| 32 | 033368-01 | 1 | Lock Bracket |
| 33 | 033369-01 | 1 | Lock Arm |
| 34 | 033371-01 | 1 | Slam Switch Insulator |

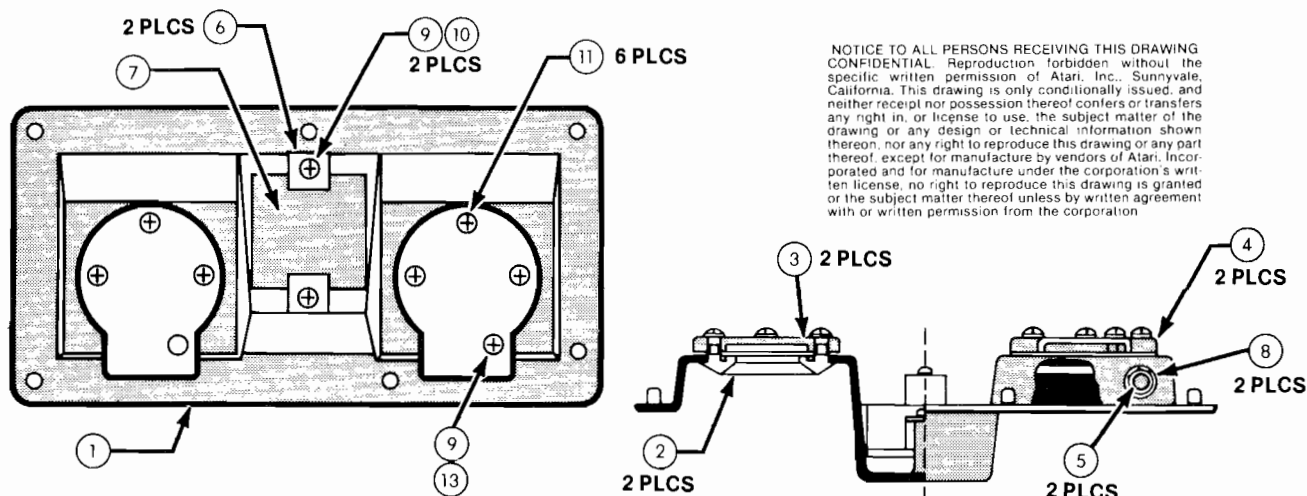
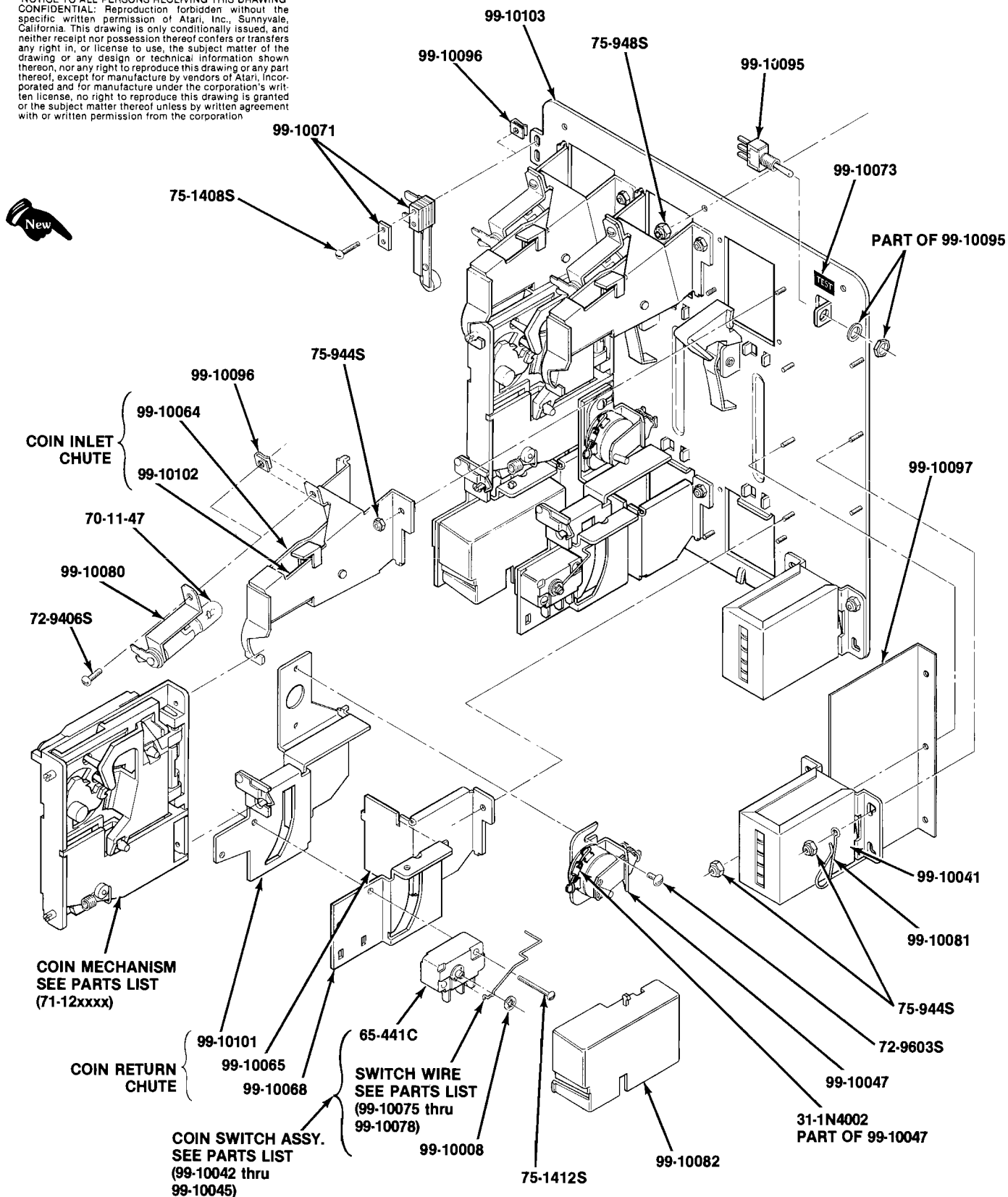


Figure 22 Front Bezel Assembly
A007637-16 thru -28 J
Parts List

| Item | Part No. | Qty. | Description |
|------|-----------|------|---|
| 1 | 004328-02 | 1 | Bezel |
| 2 | 004330-02 | ↑ | Ring for American Quarter |
| | 004330-02 | ↑ | Ring for French 5-Franc Coin |
| | 009153-02 | ↑ | Ring for German 1-Deutschmark Coin |
| | 004330-02 | ↑ | Ring for Swedish 1-Krona Coin |
| | 009153-02 | ↑ | Ring for Japanese 100-Yen Coin |
| | 007752-02 | ↑ | Ring for English 10-Pence Coin |
| | 007752-02 | ↑ | Ring for Australian 20 Coin |
| | 030677-02 | ↑ | Ring for German 2-Deutschmark and U.S. \$1.00 Coins |
| | 009153-02 | ↑ | Ring for French 1-Franc Coin |
| | 030677-02 | ↑ | Ring for Thai 1-Baht Coin |
| | 007752-02 | ↑ | Ring for German 5-Deutschmark Coin |
| | 030677-02 | ↑ | Ring for Italian 100-Lire Coin |
| 3 | 004331-02 | 2 | Coin Shield |
| 4 | 004332-02 | 2 | Primary Coin Chute |
| 5 | 004327-01 | 2 | Scavenger Button Bearing |
| 6 | 004329-01 | 2 | Price Plate Clamp |
| 7 | 004343-01 | ↑ | Price Plate—25¢ |
| | 004343-06 | ↑ | Price Plate—5 FR |
| | 004343-04 | ↑ | Price Plate—1 DM |
| | 004343-03 | ↑ | Price Plate—1 KR |
| | 004343-05 | ↑ | Price Plate—¥ 100 |
| | 004343-02 | ↑ | Price Plate—10 P |
| | 004343-07 | ↑ | Price Plate—20¢ Australian |
| | 004343-08 | ↑ | Price Plate—Einwurf 2 DM/1 DM |
| | 004343-09 | ↑ | Price Plate—1 FR |
| 7 | 004343-10 | ↑ | Price Plate—1 Baht |
| | 004343-11 | ↑ | Price Plate—Einwurf 1 DM/5 DM |
| | 004343-12 | ↑ | Price Plate—100 Lire |
| | 004343-13 | ↑ | Price Plate—25¢/\$1 |
| 8 | 73-3009 | 2 | Carbon Spring Steel External Retaining Ring, for 3/8" Shaft Diameter |
| 9 | 72-1604S | 3 | #6-32 × 1/4" Cross-Recessed Pan-Head Cadmium-Plated Steel Machine Screw |
| 10 | 75-046 | 2 | #6 Corrosion-Resistant Steel Split Lock Washer |
| 11 | 72-CL606 | 6 | #6-32 × 3/8" Phillips Pan-Head Steel "Rolok" Self-Threading, Thread-Rolling Machine Screw |
| 13 | 75-056 | 1 | #6 Internal-Tooth Zinc-Plated Steel Lock Washer |

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**Figure 23 New Coin Door
71-10xxxx**

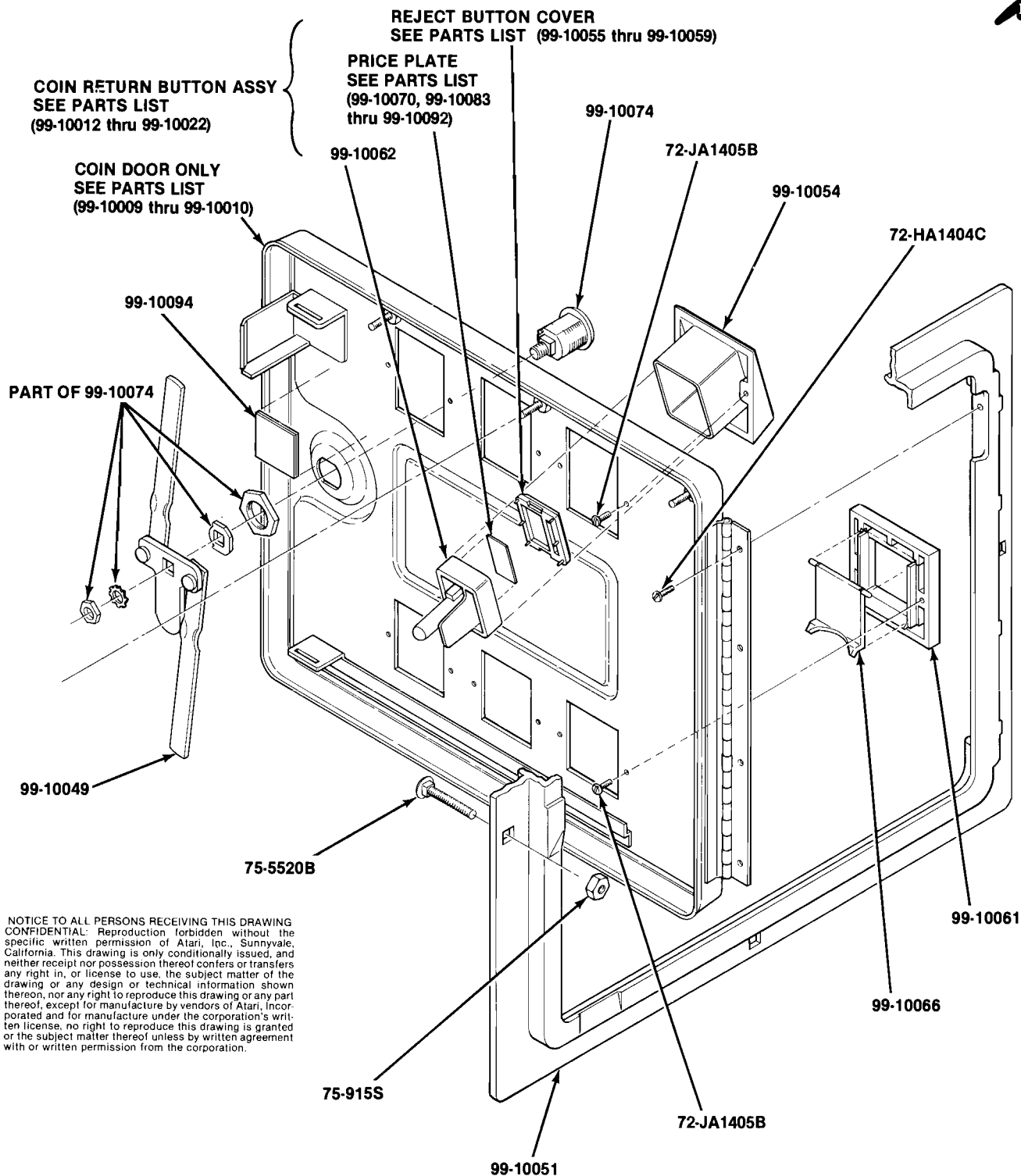


Figure 23 New Coin Door
71-10xxxx

Figure 23 New Coin Door, continued Parts List

| <i>Part No.</i> | <i>Description</i> |
|-----------------|---|
| 31-1N4002 | 100V Silicon Rectifier 1N4002 Diode |
| 65-441C | General-usage low-force miniature switch |
| 70-11-47 | Miniature bayonet-base incandescent lamp, type #47 |
| 71-1201ADU | U.S. \$1.00 coin mechanism |
| 71-1201FCH | Swiss 1 Fr coin mechanism |
| 71-1201MG | German 1 DM coin mechanism |
| 71-1202MG | German 2 DM coin mechanism |
| 71-1205FB | Belgian 5 Fr coin mechanism |
| 71-1205MG | German 5 DM coin mechanism |
| 71-1210PE | U.K. 10 P coin mechanism |
| 71-1220CA | Australian 20¢ coin mechanism |
| 71-1225CU | U.S. 25¢ coin mechanism |
| 71-12100LI | Italian 100 Lire coin mechanism |
| 71-12100YJ | Japanese Y100 coin mechanism |
| 72-HA1404C | #4x1/4" Slotted pan-head thread-rolling tri-fluted "Taptite" cadmium-plated screw |
| 72-JA1405B | #4x5/16" Slotted pan-head thread-rolling tri-fluted "Plastite" black screw |
| 72-9406S | #4-40x3/8" Slotted truss-head steel machine screw |
| 72-9603S | #6-32x3/16" Slotted truss-head steel machine screw |
| 75-915S | #1/4-20 Standard pattern cadmium-plated steel hex nut |
| 75-918S | #8-32 Standard pattern cadmium-plated steel hex nut |
| 75-944S | #4-40 Polymer self-locking steel hex nut |
| 75-948S | #8-32 Polymer self-locking steel hex nut |
| 75-1408S | #4-40x1/2" Slotted pan-head steel machine screw |
| 75-1412S | #4-40x3/4" Slotted pan-head steel machine screw |
| 75-5520B | #1/4-20x1 1/4" Round-head square-neck steel bolt with black finish |
| 99-10008 | Switch wire retainer |
| 99-10009 | 2-Mech coin door only |
| 99-10010 | 3-Mech coin door only |
| 99-10011 | Inner panel |
| 99-10012 | U.S. 25¢ coin return button assembly |
| 99-10013 | U.S. \$1.00 coin return button assembly |
| 99-10014 | German 1 DM coin return button assembly |
| 99-10015 | German 2 DM coin return button assembly |
| 99-10016 | German 5 DM coin return button assembly |
| 99-10017 | Belgian 5 Fr coin return button assembly |
| 99-10018 | Swiss 1 Fr coin return button assembly |
| 99-10019 | Japanese Y100 coin return button assembly |
| 99-10020 | U.K. 10 P coin return button assembly |
| 99-10021 | Australian 20¢ coin return button assembly |
| 99-10022 | Italian 100 Lire coin return button assembly |

**Figure 23 New Coin Door, continued
Parts List**

| <i>Part No.</i> | <i>Description</i> |
|-----------------|---|
| 99-10040 | Coin inlet chute assembly |
| 99-10041 | Coin counter assembly |
| 99-10042 | Coin switch assembly for U.S. 25¢ and Belgian 5 Fr coins (silver wire) |
| 99-10043 | Coin switch assembly for German 1 DM, Swiss 1 Fr, and Japanese Y100 coins (black wire) |
| 99-10044 | Coin switch assembly for U.S. \$1.00, German 2 DM, and Italian 100 Lire coins (gold wire) |
| 99-10045 | Coin switch assembly for German 5 DM, U.K. 10 P, and Australian 20¢ coins (green wire) |
| 99-10047 | Lockout coil assembly |
| 99-10048 | Coin door harness assembly |
| 99-10049 | Locking arm assembly |
| 99-10051 | Coin door frame |
| 99-10054 | Coin button housing |
| 99-10055 | Coin return button cover for Japanese Y100 coin |
| 99-10056 | Coin return button cover for German 1 DM and Swiss 1 Fr coins |
| 99-10057 | Coin return button cover for U.S. 25¢ and Belgian 5 Fr coins |
| 99-10058 | Coin return button cover for U.S. \$1.00, German 2 DM, and Italian 100 Lire coins |
| 99-10059 | Coin return button cover for German 5 DM, U.K. 10 P, and Australian 20¢ coins |
| 99-10061 | Coin return bezel |
| 99-10062 | Coin return button |
| 99-10063 | Right half of coin inlet chute |
| 99-10064 | Left half of coin inlet chute |
| 99-10065 | Coin return box |
| 99-10066 | Coin return cover |
| 99-10070 | U.S. 25¢ price plate |
| 99-10071 | Slam switch assembly |
| 99-10073 | Test switch decal |
| 99-10074 | Lock assembly |
| 99-10075 | Black switch wire—for German 1DM, Swiss 1Fr and Japanese Y100 coins |
| 99-10076 | Silver switch wire—for U.S. 25¢ and Belgian 5Fr coins |
| 99-10077 | Gold switch wire—for U.S. \$1.00, German 2DM and Italian 100 Lire coins |
| 99-10078 | Green switch wire—for German 5DM, U.K. 10P and Australian 20¢ coins |
| 99-10080 | Miniature bayonet-base lamp socket |
| 99-10081 | Wire key holder |
| 99-10082 | Switch cover |
| 99-10083 | U.S. \$1.00 price plate |
| 99-10084 | German 1 DM price plate |
| 99-10085 | German 2 DM price plate |
| 99-10086 | German 5 DM price plate |
| 99-10087 | Belgian 5 Fr price plate |
| 99-10088 | Swiss 1 Fr price plate |

Figure 23 New Coin Door, continued Parts List

| <i>Part No.</i> | <i>Description</i> |
|-----------------|--|
| 99-10089 | Japanese Y100 price plate |
| 99-10090 | U.K. 10 P price plate |
| 99-10091 | Australian 20¢ price plate |
| 99-10092 | Italian 100 Lire price plate |
| 99-10094 | Fish paper insulation |
| 99-10095 | Toggle switch |
| 99-10096 | "U"-type fastener |
| 99-10097 | Fish paper insulation |
| 99-10101 | Coin inlet chute sub-assembly |
| 99-10102 | Switch and lockout coil bracket sub-assembly |
| 99-10103 | Inner panel with levers sub-assembly |

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