MISSILE COMMAND

ATARI®

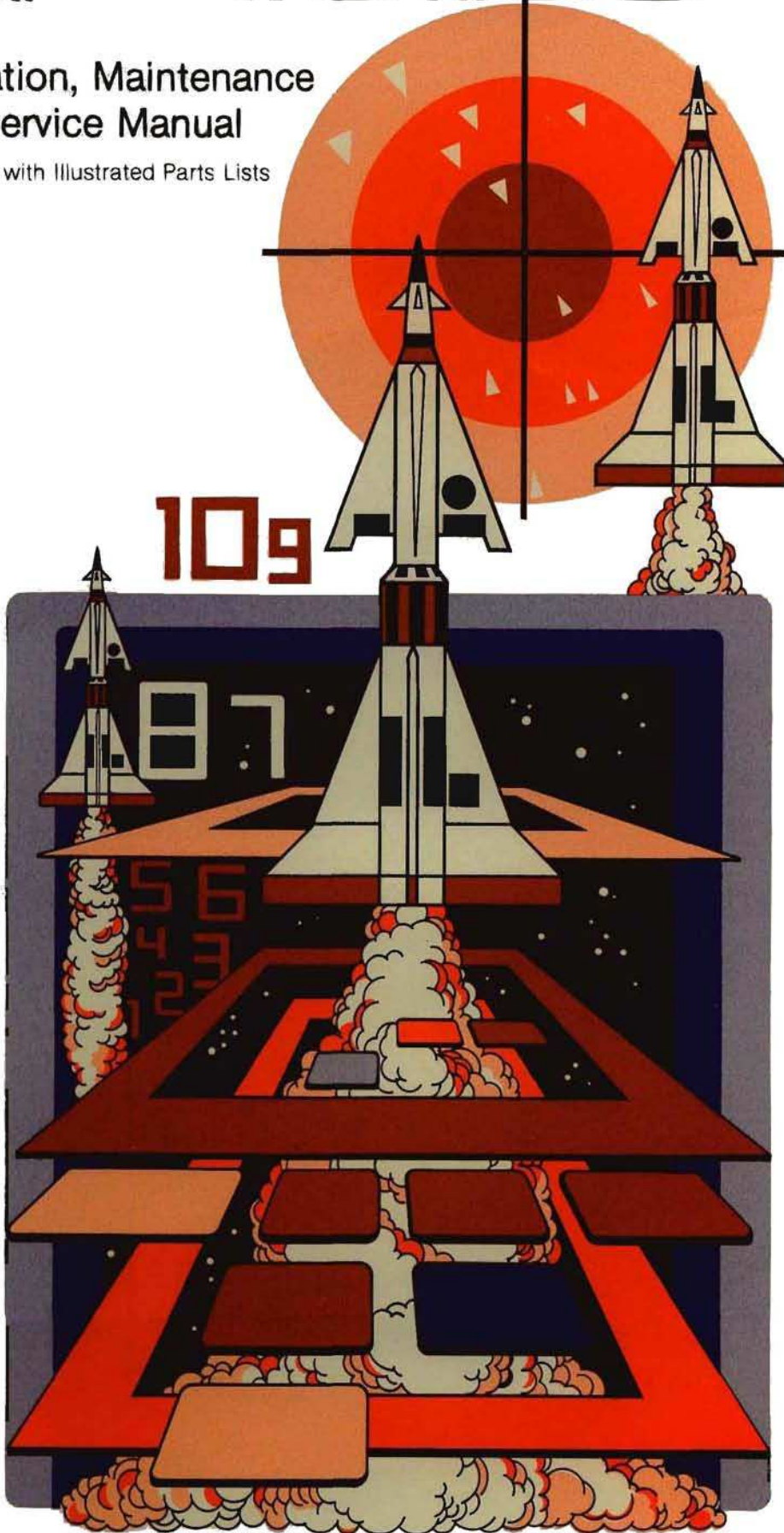## Operation, Maintenance and Service Manual

Complete with Illustrated Parts Lists

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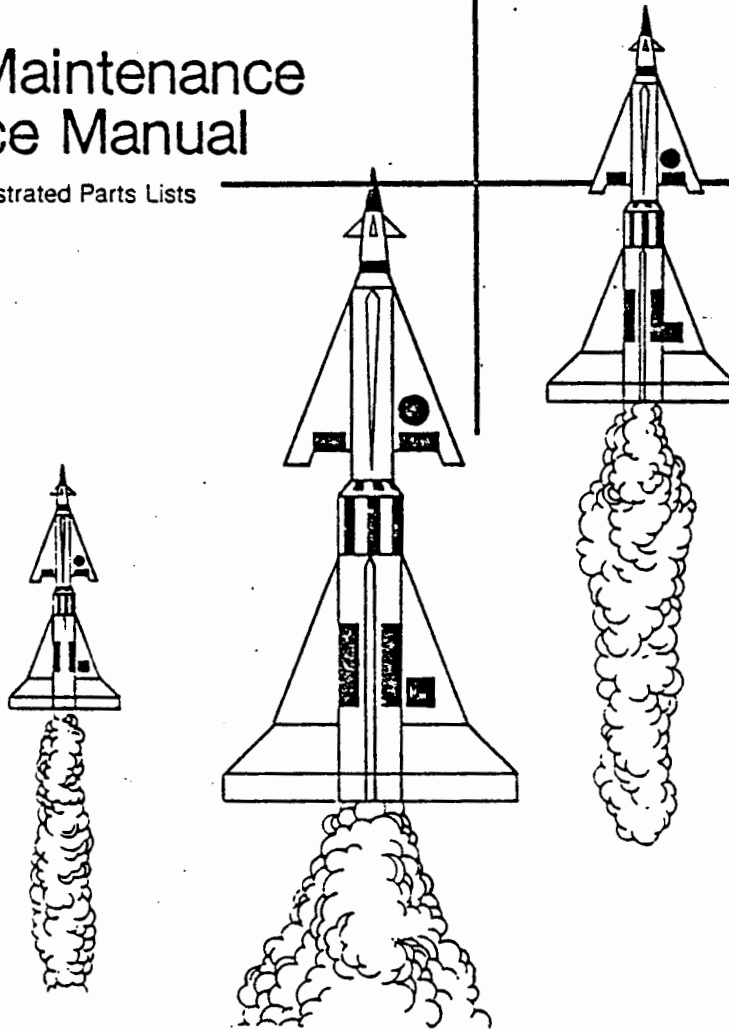
SIT-DOWN

™

/IT·DOWN
MISSILE COMMAND ™

Operation, Maintenance and Service Manual

Complete with Illustrated Parts Lists

Published by:
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ATARI ®

A Warner Communications Company

GAME SERIAL NUMBER LOCATION

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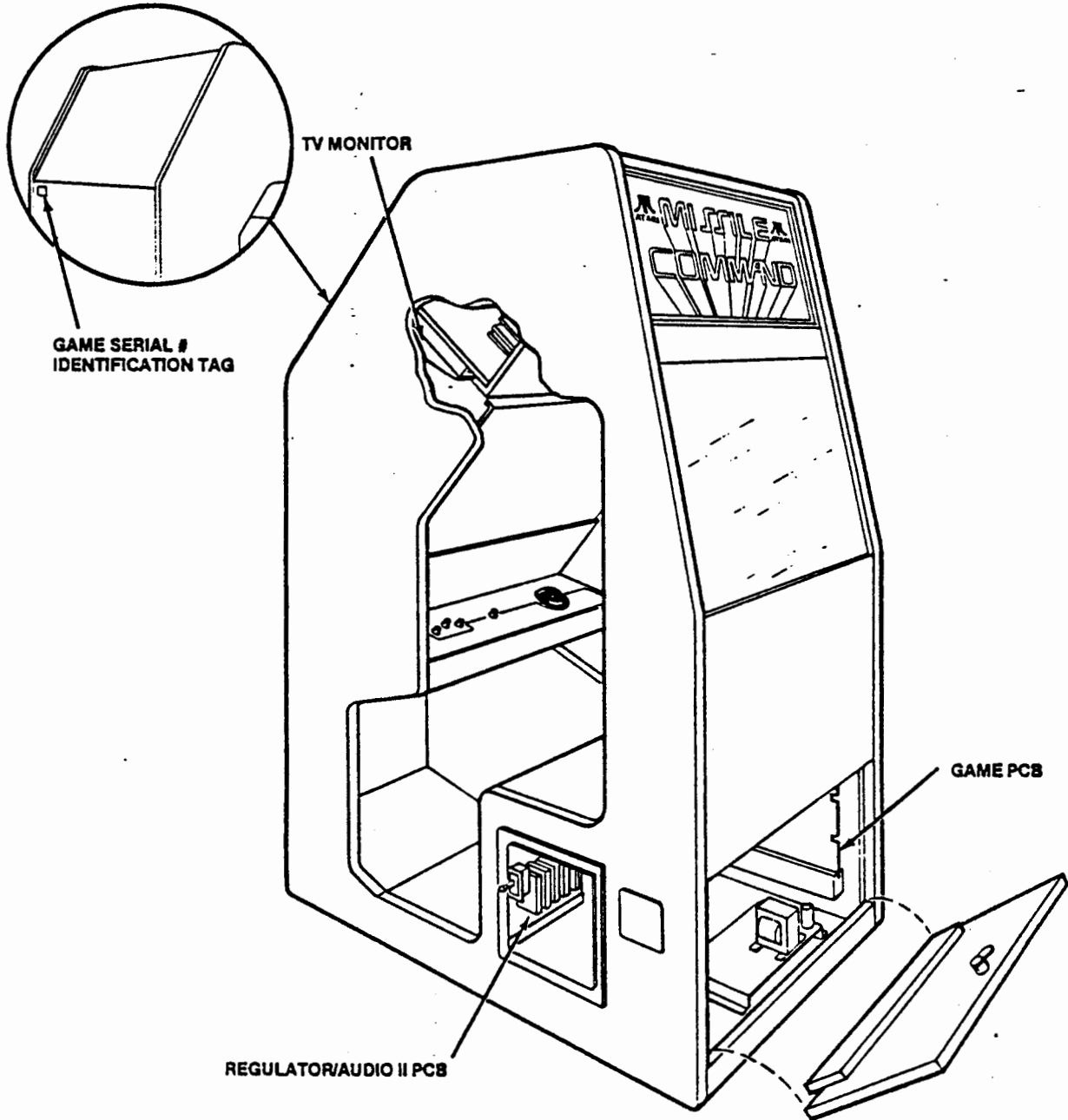
TV MONITOR

**GAME SERIAL #
IDENTIFICATION TAG**

GAME PCB

REGULATOR/AUDIO II PCB

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─────────────────────────────── NOTE ───────────────────────────────
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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.

WEST and CENTRAL U.S.A.

Parts for all Atari Customers. Sales and Service

Atari Coin-Op Customer Service
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Telex 17-1103

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    (408) 745-2900

☎ From anywhere else in this area
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☎ From New Jersey
    (201) 469-5993

☎ From anywhere else in this area
    toll-free (800) 526-3849
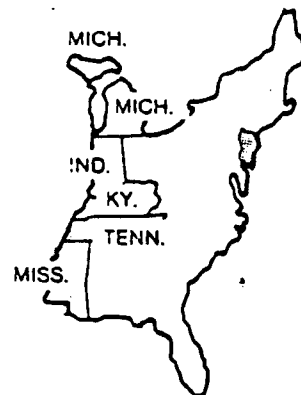
Notice Regarding Non-Atari Parts

⚠ — WARNING — ⚠

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

Atari, Inc.'s warranty (printed on the inside back cover of this manual) may be voided, if you do any of the following:

1.) you substitute non-Atari parts in your coin-operated game, or

2.) you modify or alter any circuits in your Atari game by using kits or parts not supplied by Atari.

Not only may the use of any non-Atari parts void your warranty, but any such alteration may also adversely affect the safety of your game, and may cause injury to you and your players.

Location Setup
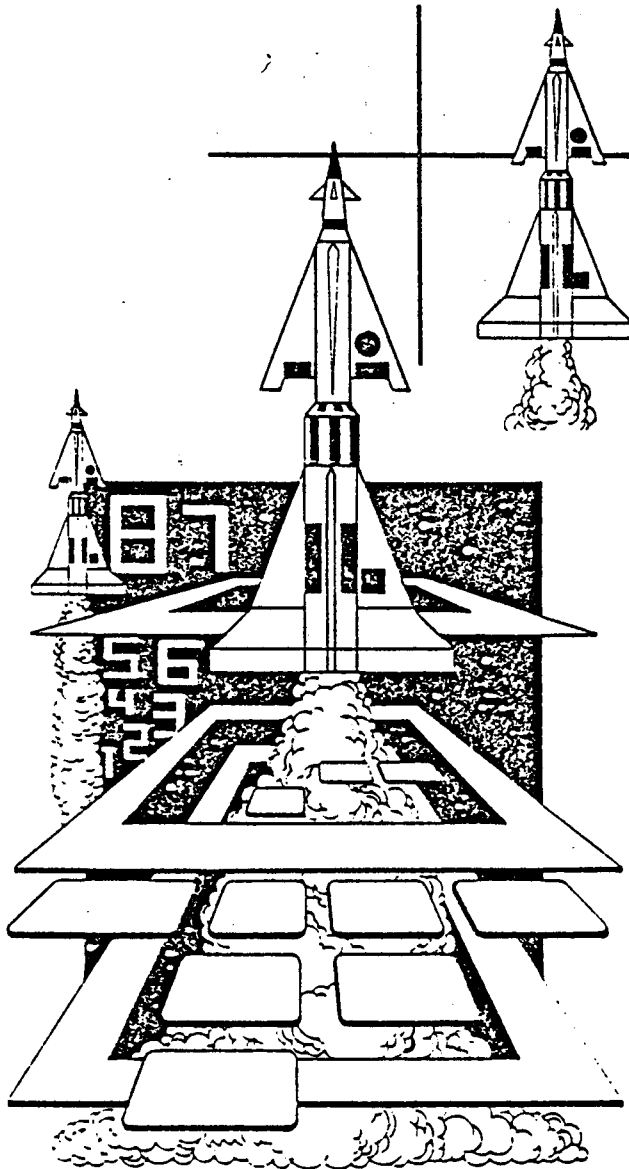
A. New Parts

The Sit-Down Missile Command™ 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:

- **Color TV Monitor.** Made especially to Atari specifications by Electrohome, Ltd., the 25-inch monitor has been color-converged at the factory. All convergence adjustments are cemented and locked in place, to prevent accidental changes. *Important Note:* The monitor's horizontal-yoke connectors have been reversed, to provide proper screen orientation in this sit-down cabinet.

- **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.

- **Sit-Down Cabinet.** This new cabinet provides an almost complete environment for the player. The large 25-inch monitor screen and half-silvered mirror create an illusion of great cabinet depth. In addition, a large speaker directly above the player's head projects the exciting audio. Potential players standing behind the game can view the missile attacks over the player's shoulders, by looking thru the windows in the cabinet.

⚠ WARNING – SHOCK HAZARD ⚠

This game is designed to be connected 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!

Sit-Down Missile Command™

1

COLOR TV
MONITOR

ATTRACTION PANEL

TV MONITOR
SHIELD

TRAK BALL™ CONTROL

CONTROL
PANEL

GAME PCB

COIN DOOR

REGULATOR/
AUDIO II PCB

VENTILATION FAN

POWER SUPPLY

LOWER REAR
ACCESS PANEL
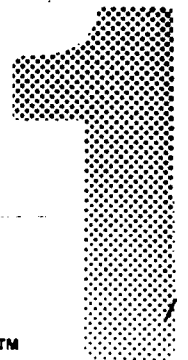
Figure 1   Overview of Game

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

B. Unpacking and Setup

After removing the steel strapping and cardboard packaging materials, you will have to remove the pallet on which your Sit-Down Missile Command™ was shipped. You also must unpack the acrylic window panel and graphics attraction panel and mount these in the rear opening of the game.

Setup involves inserting the four cabinet-leveling legs into the base. While you are inserting the legs into the base, be aware that this game weighs about 580 pounds! In addition, you may choose to route the AC power cord through the base, if you want to have the game free-standing.

1. Removing Pallet and Attaching Legs

First, bring the game as close as possible to its final location. Now use a wrench and locate the four bolts that secure the pallet to the game's base (these are near the four corners). You must reach in between the two layers of the pallet to loosen the bolts and remove them. Lift game from pallet.

Second, remove the four cabinet-leveling legs from the coin box. Have an assistant tilt the game slightly to one side, and screw two legs into the T-Nuts provided at the base. Tilt the game in the other direction and repeat for the remaining two legs.

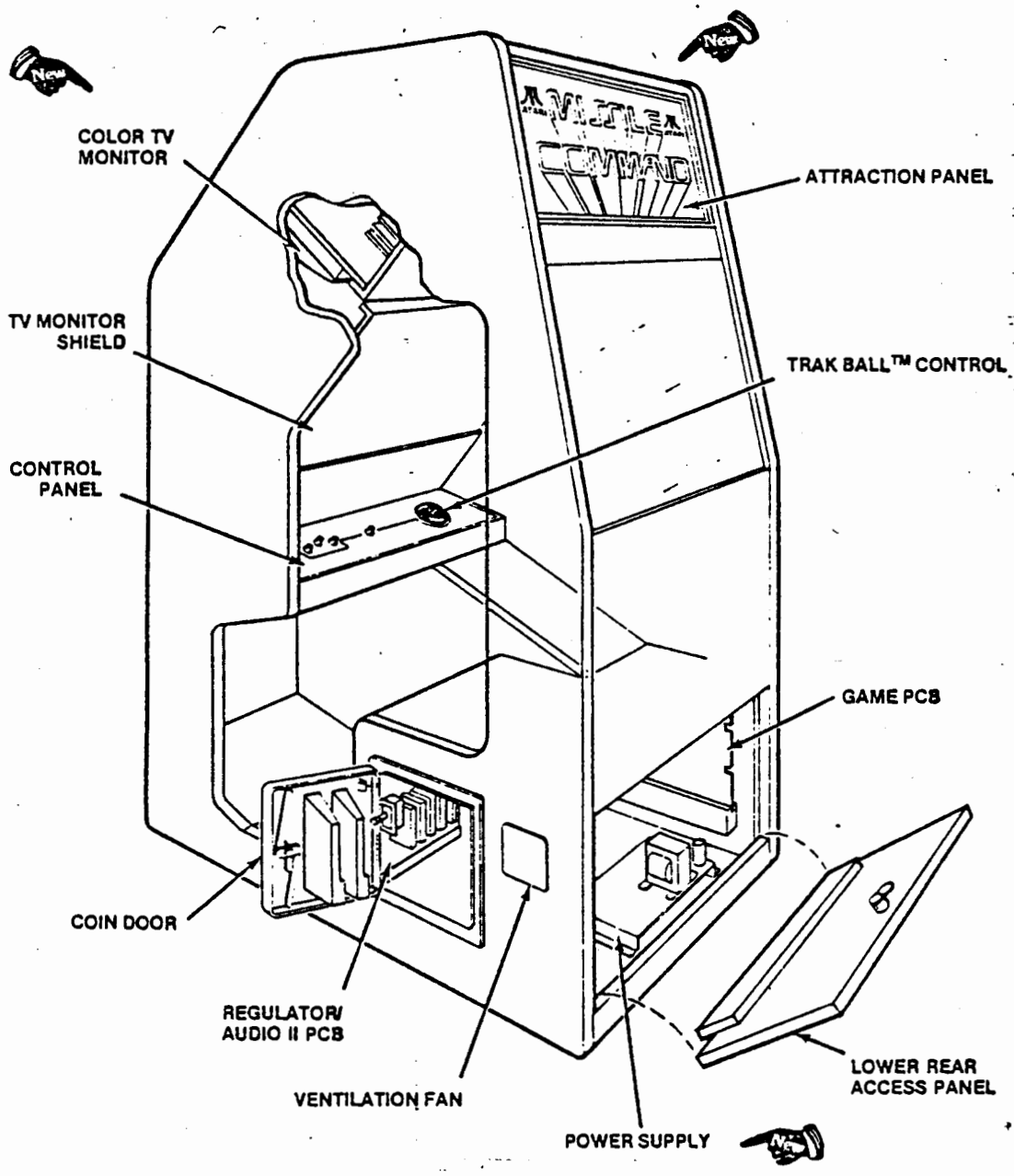## 2. Installing Acrylic Panels

Remove the package of two acrylic panels and envelope of screws that are taped to the control panel and seat. Peel off the protective paper backing on the smoke-color window panel. Place this panel in the lower half of the game's rear opening.

Using an Allen wrench, remove the three screws that secure the black metal retainer strip at the top rear of the game. Place the bottom edge of the graphics attraction panel in the slot behind the wood retainer strip. Secure the top edge of this panel with the metal retainer strip and its three Allen-head screws. In addition, use the two screws

in the envelope for securing the left and right edges of this panel (it has pre-drilled holes).

3. Rerouting Power Cord

Now decide if you want to place the game against a wall or have it free-standing. If you choose a location against a wall, push the game so its front end (where the power cord exits) is near the wall. If you have an arcade with a floor-mounted power outlet and want the game free-standing, reroute the power cord through the base as follows.

Unlock and open the rear access panel. Remove the small 2½-inch-square cover plate secured to the base of the cabinet. Open the control panel (see Figure 8) and remove the power cord plate inside the front cabinet wall. Do not disassemble the cord from this plate.

Pull the cord inside the game and route it through the large hole near the console, down to the area underneath the seat. Push the plug through the hole in the base, and secure the power cord plate to the cabinet base. You will have excess cord, but you can easily store it inside the game.

Reattach the small cover plate to the inside of the front cabinet wall. Close both the control panel and the rear access panel.

C. 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 two access panels of the cabinet and inspect the interior of the game as follows:

For voltage ratings and colors of all four
voltage selection plugs, see text under "1.
Line Voltage Selection."
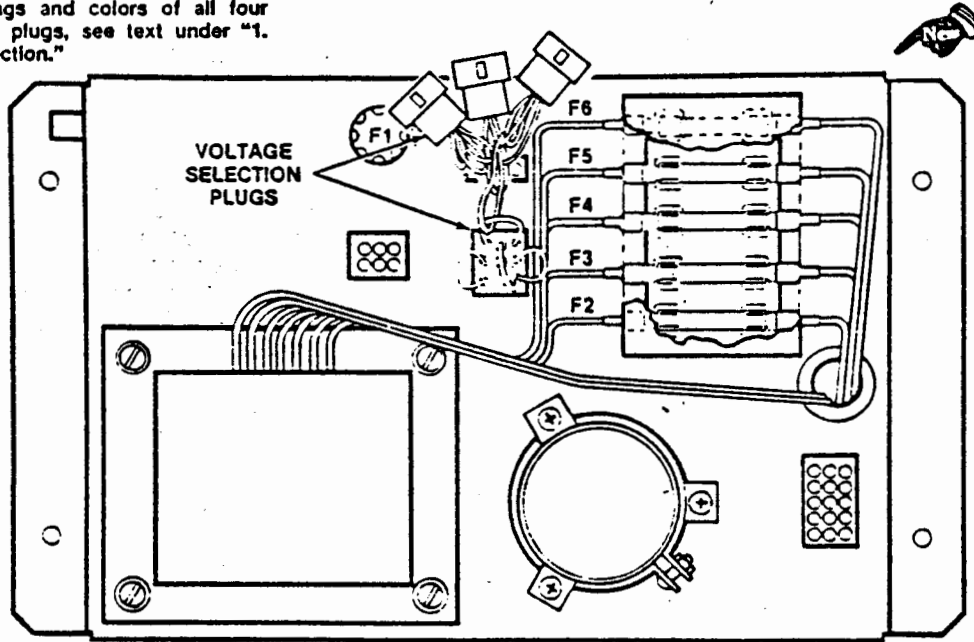
Figure 3   Line Voltage Selection

- 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.

> ⚠ ——— 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!

- Check that all plug-in integrated circuits on the game PCB are firmly seated in their sockets.

- Note the location of the game's serial number—it is printed on the special label on the outside of the game cabinet. Verify that the serial numbers also stamped on the Game PCB, Regulator/Audio II 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.

- Check all major assemblies such as the power supply, control panel and TV moni-

tor for secure mounting. For the safety of players, be certain that all green ground wires are secured at their terminations.

D. Game Installation

Figure 2   Installation Requirements

Power	Approximately 289 watts
Temperature	0 to 38° C (32 to 100°F)
Humidity	Not over 95% relative
Space Required	75 × 118½ cm (29½ × 46½ in.)
Game Height	198 cm (78 in.)

1.   Line 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 (225)	Blue
220-260 VAC (240)	Brown

FRONT ACCESS PANEL
INTERLOCK SWITCH

ATTRACTION PANEL
INTERLOCK SWITCH

SWITCH
COVER

POWER
ON/OFF SWITCH

COIN DOOR
INTERLOCK SWITCH

LOWER REAR ACCESS
PANEL INTERLOCK
SWITCH
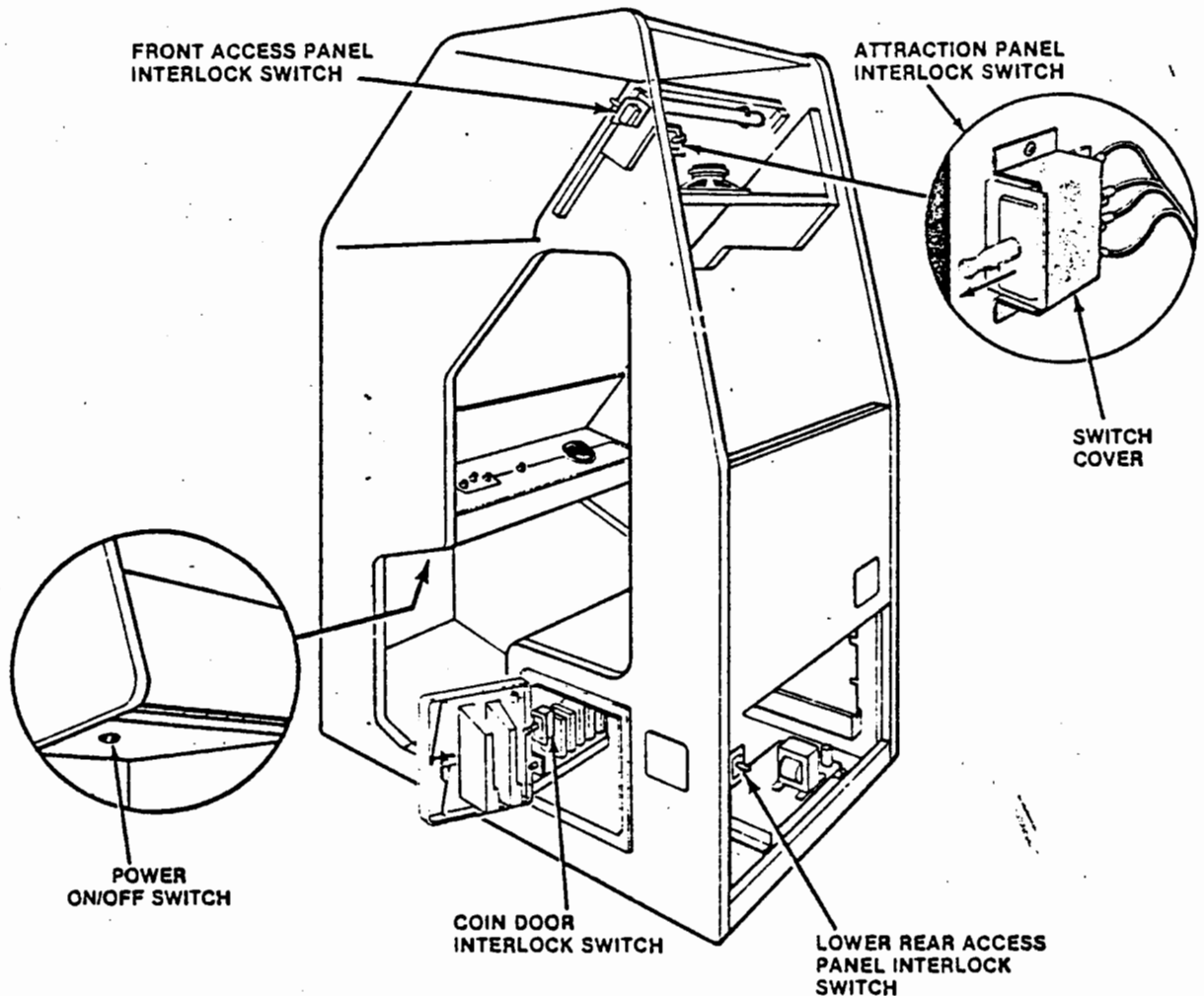
Figure 4   Interlock and Power On/Off Switches

2.   Interlock and Power On/Off Switches

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

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

● Plug the AC line power cord into an AC outlet.

● Make sure to close the access panels and the coin door.

● Set the power on/off switch to the on position. Within approximately 30 seconds the TV monitor should display a picture.

● Slowly open the lower rear access panel. The TV monitor picture should disappear when the panel is opened approximately 2.5 cm (1 inch). Close and lock the lower rear access panel and repeat this step with the other access panel, acrylic attraction panel and the coin door.

● If the results of the previous step 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.

Normally the *only* adjustments on the Missile Command™ game are option switch changes (made on the 8-toggle DIP switches). Unless you are qualified technician, *do not turn the small knob on the Regulator/Audio PCB.* For information pertaining to this control, refer to schematic drawings DP-158-01 and -02.
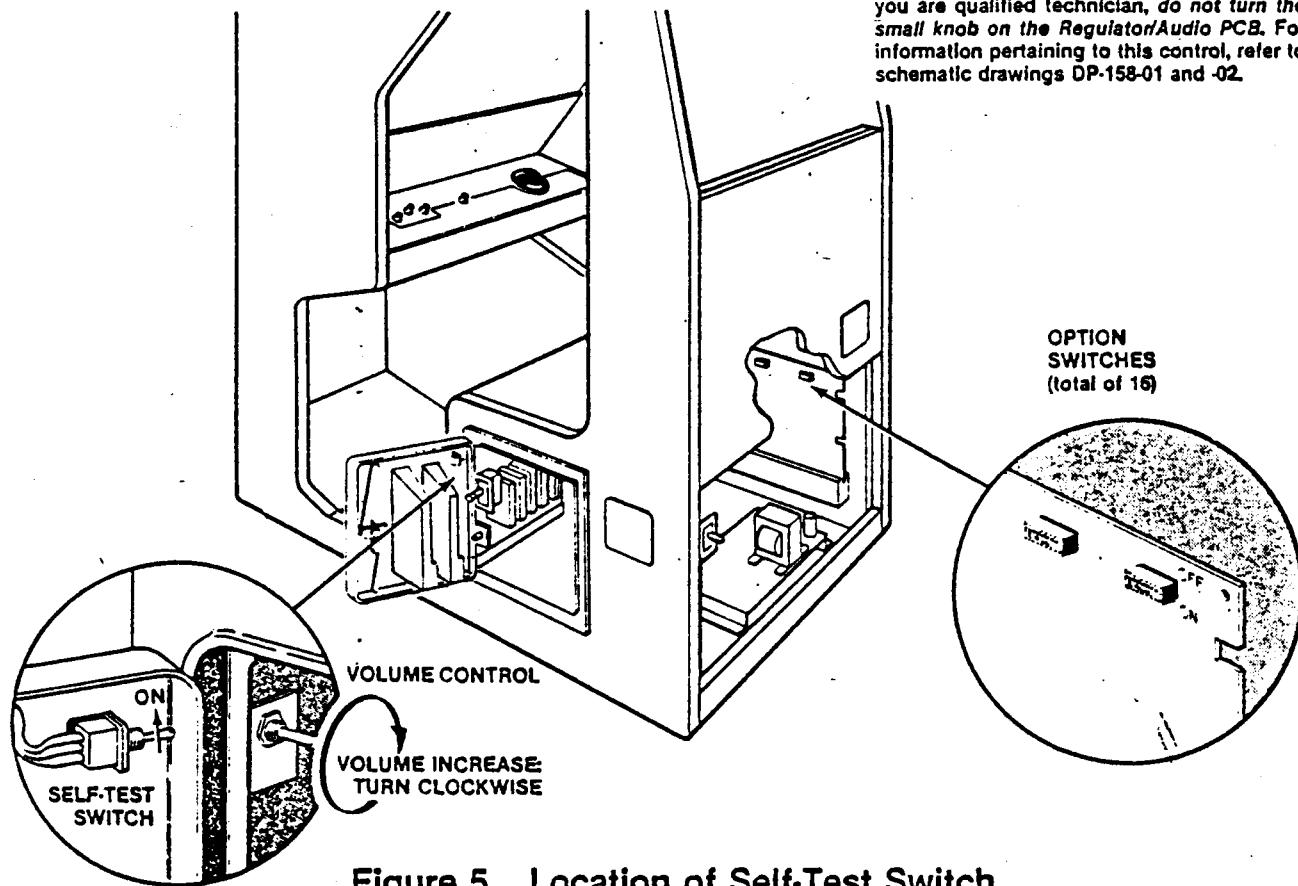
Figure 5   Location of Self-Test Switch,
Volume Control and Option Switches

E. 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.

F. Option Switch Settings

1. Bonus Play Feature

Missile Command™ is the first Atari game to offer a bonus play for every $1.00 worth of coins inserted. This bonus feature is operator-selectable, meaning you may choose to offer it or not.

With your game set at 50¢ per play and the bonus option on, players who deposit four successive quarters or a $1.00 coin, then press the start button, will receive a bonus play. Therefore, players receive 3 plays for $1.00.

This bonus feature encourages players to insert more money than just the minimum 50¢ required for one game.

Figure 6   Self-Test Procedure

Instruction	Result if Test Passes	Result if Test Fails
1. Set self-test switch to **on** position (see Figure 5). Note: entering self-test will set the HIGH SCORE TODAY display to 7500.	After about 5 seconds of frozen attract mode, a low raspy tone is followed by a low beep, then high beep. TV monitor screen displays picture as shown below: ROM OK MAP OK RAM OK + ...plus the options display—see Figure 7 for explanation. Both LED start buttons will also be lighted.	A continuous raspy tone means V BLANK is malfunctioning. Self-test will not continue. A RAM failure is indicated by a blank or "garbage"-filled screen and a repeated series of 8 beeps, separated by a low raspy tone. See note 1 below. Self-test will not restart. ROM failure is indicated by BAD ROM; see note 2 below. BAD MAP means bit-mapping hardware has failed. BAD CHIP means custom audio I/O chip at location P8/9 has failed.
2. Roll the Trak Ball control in all directions.	The + moves around on the screen in directions corresponding to Trak Ball control—up to an invisible border along the screen's edges.	The + doesn't move in same direction as ball, or not at all. One of the Steering PCBs on Trak Ball control may be bad, harness wires or connector may be loose, Trak Ball reading circuitry on Game PCB may be bad, or Trak Ball bearings may need oiling.
3. Press the following switches: ● Coin switch trip wires ● Coin door slam switch ● All three fire switches ● Player start button	A sound is heard as each switch is pressed. The background color also changes.	No sound or color changes are produced when pressing one of these switches: indicates a bad switch, loose harness wires, or loose connector.
4. Set self-test switch to **off** position.		

Note 1: In test no. 1, a low beep means a good chip; a high beep is a bad RAM, as follows:

High beep in series of 8 tones:	Bad chip at location:
1st	P4
2nd	N4
3rd	M4
4th	L4
5th	K4
6th	J4
7th	H4
8th	F4

Note 2: BAD ROM plus some or all of the digits 1 thru 6 are displayed. These numbers show which 2K of memory are bad. For example, 1 means the first 2K are bad. The + may not appear.

2. Coin Mechanism Multipliers

Since early in 1980; Atari has made available its new coin door which has either two or three mechanisms. All recent Atari game PCBs identify the different mechanisms in a certain pattern.

The right coin mechs are all the same to the game's logic, regardless of whether you have two or three mechs in your door. In addition, the logic sees the left mech in a 2-mech door and the center mech in a 3-mech door as the same. Refer to the diagram below.
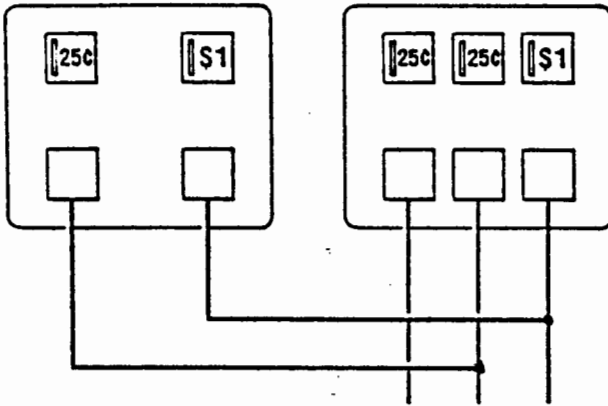
This pattern is important for you to know, so you can correctly set the "multipliers" for each mech. The multipliers determine how much each mechanism will be worth to the game's logic.

The basic unit of measurement is 25¢, which equals a multiplier of ×1. Therefore, if you have a 25¢/25¢/$1 coin door, you will probably want to set the center and right option-switch multipliers at × 1/ × 4. (The left mech in a 3-mech door always has a value of × 1—you cannot change its value.)

You can set these multipliers with toggles 3 thru 5 on the Missile Command PCB switch assembly at location R10. For exact settings of these toggles, refer to Figure 7 on the next page.

3. Examples of Option Switch Settings

To explain the options, we have provided below four examples of the most common U.S. situations. The toggles mentioned below only relate to game price, coin mechanism multipliers, and the bonus credit for 4 successive quarters or the $1.00 coin. You should set the toggles relating to other functions as you see fit, although Figure 7 provides "$" signs indicating Atari's recommendations.

For the first and second examples, we will assume your door (either 2 or 3 mechanisms) has only 25¢ slots:

If you want 50¢ (2 coins) for 1 play, and $1.00 for 3 plays:

At R10, set toggles—

5	4	3	2	1
on	on	on	on	off

At R8, set toggle 3 off.

If you want 50¢ (2 coins) for 1 play, and no bonus credit:

At R10, set toggles—

5	4	3	2	1
on	on	on	on	off

At R8, set toggle 3 on.

For the third and fourth examples, we will assume your door (either 2 or 3 mechanisms) has a 25¢ mechanism at left and center, and $1.00 mechanism at right:

If you want 50¢ (2 coins) for 1 play, and $1.00 for 3 plays:

At R10, set toggles—

5	4	3	2	1
on	on	off	on	off

At R8, set toggle 3 off.

If you want 50¢ (2 coins) for 1 play, and no bonus credit:

At R10, set toggles—

5	4	3	2	1
on	on	off	on	off

At R8, set toggle 3 on.

Figure 7 Option Switch Settings

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

When changing the options, verify proper results on the TV monitor display by performing the self-test. Note that changing an option on any toggle will cause an immediate change on the TV monitor screen during the self-test.

Toggle Settings of 8-Toggle Switch on Game PCB *(at R10)*
(RIGHT switch when PCB is in game)

8	7	6	5	4	3	2	1	Option
						On	On	1 coin* for 1 play
						Off	On	Free play
						On	Off	2 coins* for 1 play $
						Off	Off	1 coin* for 2 plays
				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					Center coin mech × 1 $ *(Center mech is a left*
			Off					Center coin mech × 2 *mech in a 2-mech door)*
	On	On						English language
	On	Off						French language
	Off	On						German language
	Off	Off						Spanish language

(8 = Not Used)

Toggle Settings of 8-Toggle Switch on Game PCB *(at R8)*
(LEFT switch when PCB is in game)

8	7	6	5	4	3	2	1	Option
						Off	Off	Game starts with 7 cities
						On	On	Game starts with 6 cities $
						Off	On	Game starts with 5 cities
						On	Off	Game starts with 4 cities
				☆	On			No bonus credit
				☆	Off			1 bonus credit for 4 successive quarters or a $1 coin $
			Off					Large Trak Ball input (switch must be off for proper operation of Sit-Down Missile Command game) $
	Off	Off	On					Bonus city every 8,000 points
	On	On	On					Bonus city every 10,000 points $
	On	On	Off					Bonus city every 12,000 points
	On	Off	On					Bonus city every 14,000 points
	On	Off	Off					Bonus city every 15,000 points
	Off	On	On					Bonus city every 18,000 points
	Off	On	Off					Bonus city every 20,000 points
	Off	Off	Off					No bonus city

(8 = Not Used)

The format of the self-test display is as follows:

Bonus city every _____ points (line disappears if no bonus city is chosen)
+
Coinage setting
4, 5, 6, or 7 cities (always in English)
A   B   C   D

A is the center mech multiplier for 3-mech doors, left mech multiplier if a 2-mech door. This number is either 1 or 2.
B is the right coin mech multiplier and is 1, 4, 5, or 6.
C is an "F" if switch 4 (of R8) is off.
D is an "X" if switch 3 (of R8) is off.

An example of an actual option switch display is as follows:

BONUS CITY EVERY 10,000 POINTS
+
2 COINS 1 PLAY
6 CITIES
1   1   F   X

In the U.S., a "coin" is defined as 25¢. If your game also has a $1 mechanism, you must set the right coin mechanism multiplier as per your choice.

$ Manufacturer's suggested settings

☆ This option available only if game PC3 has -02 memory installed.

G. Game Play

Sit-Down Missile Command™ is a 1-player game with a color monitor. The game depicts an Armageddon-style war in which a player defends bases and cities with antiballistic missiles (ABMs). The enemy—the game computer—launches incoming waves of attack missiles. These weapons may be either individual or branching attack missiles. In addition, the enemy occasionally launches missiles from a fast-moving "killer" satellite or from bombers. The enemy also launches "smart" missiles that usually avoid explosions.

Players receive varying numbers of points for intercepting attack missiles, for having unused missiles still in their bases' arsenals, and for having their cities undamaged after a missile wave.

The game has five possible modes of operation: attract, ready-to-play, play, high-score initial, and self-test. The latter 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, and the "HIGH SCORE TODAY" is reset to 7500. A list of eight "highest" scores and initials are also reset onto the screen (to provide player challenge).

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 game is paid for and accepted, or when entering self-test.

In this mode, the *Missile Command* name is displayed, then the computer plays one wave—handling both offense and defense. Following this, the computer displays the high score table, then the *Missile Command* graphics reappear.

2. Ready-to-Play Mode

This mode begins when sufficient coins have been accepted for a one-player game. It ends when the 1 PLAYER START pushbutton is pressed.

When this mode begins, the message PRESS START scrolls along the bottom of the screen. DEFEND CITIES and red arrows pointing down to each

city also appear on the screen. The displayed pictures are otherwise the same as those shown in the attract mode.

3. Play Mode

The play mode begins when the start pushbutton is pressed. The mode ends when the player's last city is destroyed.

The three bases—Alpha, Delta and Omega—each have 10 ABMs ready to be fired (shown as ∆'s). Players must be careful to fire the missiles more or less evenly from among those bases, because no more missiles are granted until the screen resets in preparation for a new wave of attack missiles. If the enemy missiles strike a city or base, the colorful buildings or base will change to the solid color of the landscape.

The game continues until all cities are destroyed. Missile Command™ has no operator-selectable fixed time length. Thus a highly skilled player can play longer than the novice.

During the second wave, a "killer" satellite and/or bomber will appear on the screen, moving quickly and launching attack missiles at the bases and cities. Players get bonus points for shooting down the satellites or bombers.

The general approach for getting high point scores is fairly quickly discovered: try to launch your ABMs when the enemy missiles have just appeared at the top of the screen. Then they are clustered together, where one ABM can usually destroy several enemy missiles. In the later more advanced waves, players can lay out a blanket of explosions.

4. High Score Initial Mode

If a player's score exceeds the minimum on the high score initial list, he or she may put up to three initials on this list at the end of the game. Spinning the Trak Ball control changes the letters (A thru Z and a blank are available). Pressing any fire switch will fix that letter on the screen, and move the choice to the next letter. If the player doesn't enter his or her initials within 90 seconds, three blank spaces will be entered automatically.
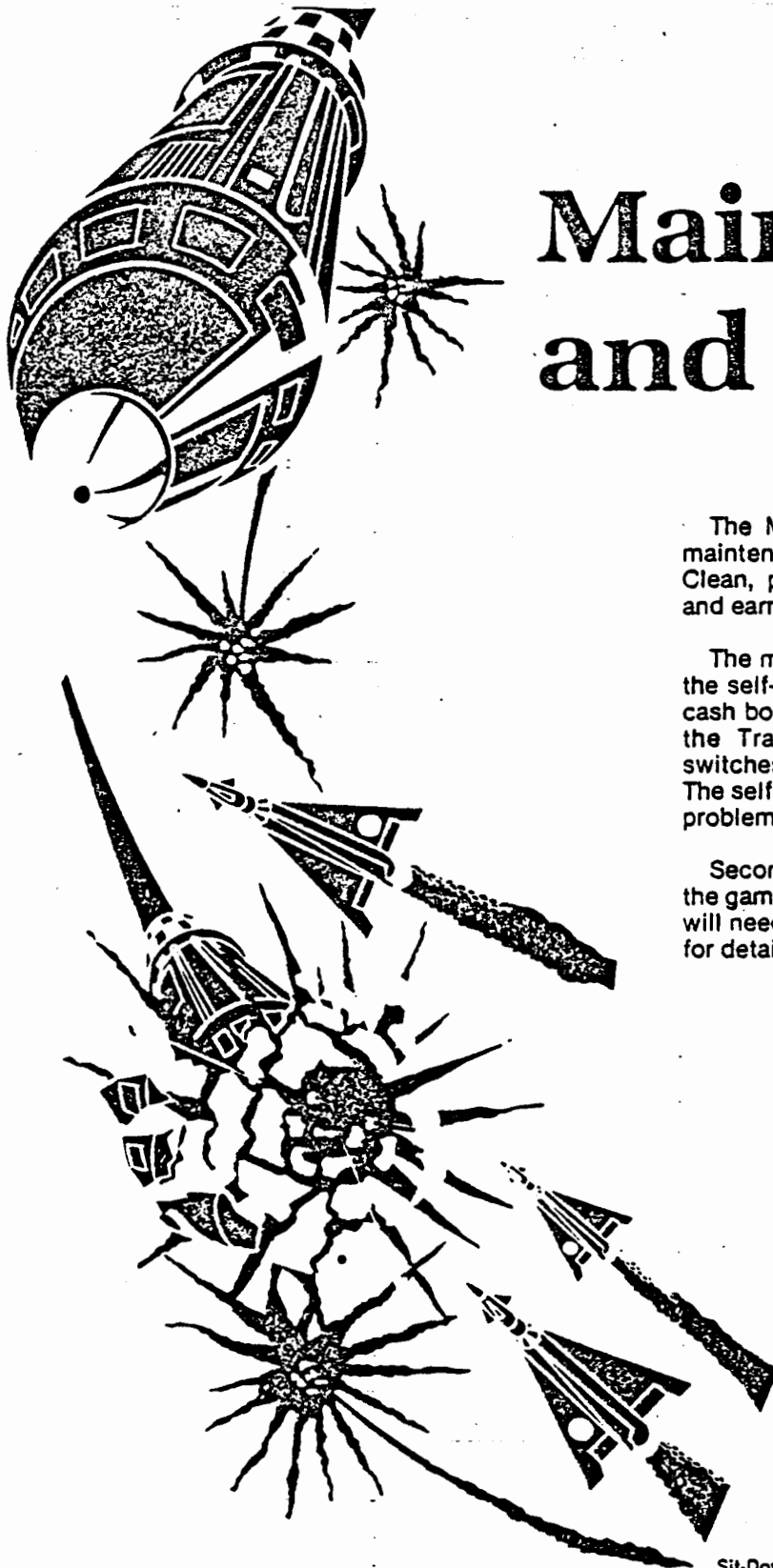
Maintenance and Repair

The Missile Command™ 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 the Trak Ball™ control or light-emitting-diode 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 lubricate the Trak Ball control: for details see this chapter.

Sit-Down Missile Command™

2

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 20 of this manual. See the color TV monitor manual, TM-148, for the monitor fuse data.

C. Opening the Control Panel

Prior to replacing any switch or repairing the Trak Ball™ on the control panel, be sure to unplug the game. Then you will have to open the control panel as described below.

Using an Allen wrench, remove all three Allen-head screws along the top edge of the control panel (see Figure 8). Lift up on the control panel and tilt it towards you. Now the LED switches and the Trak Ball control are accessible for servicing.
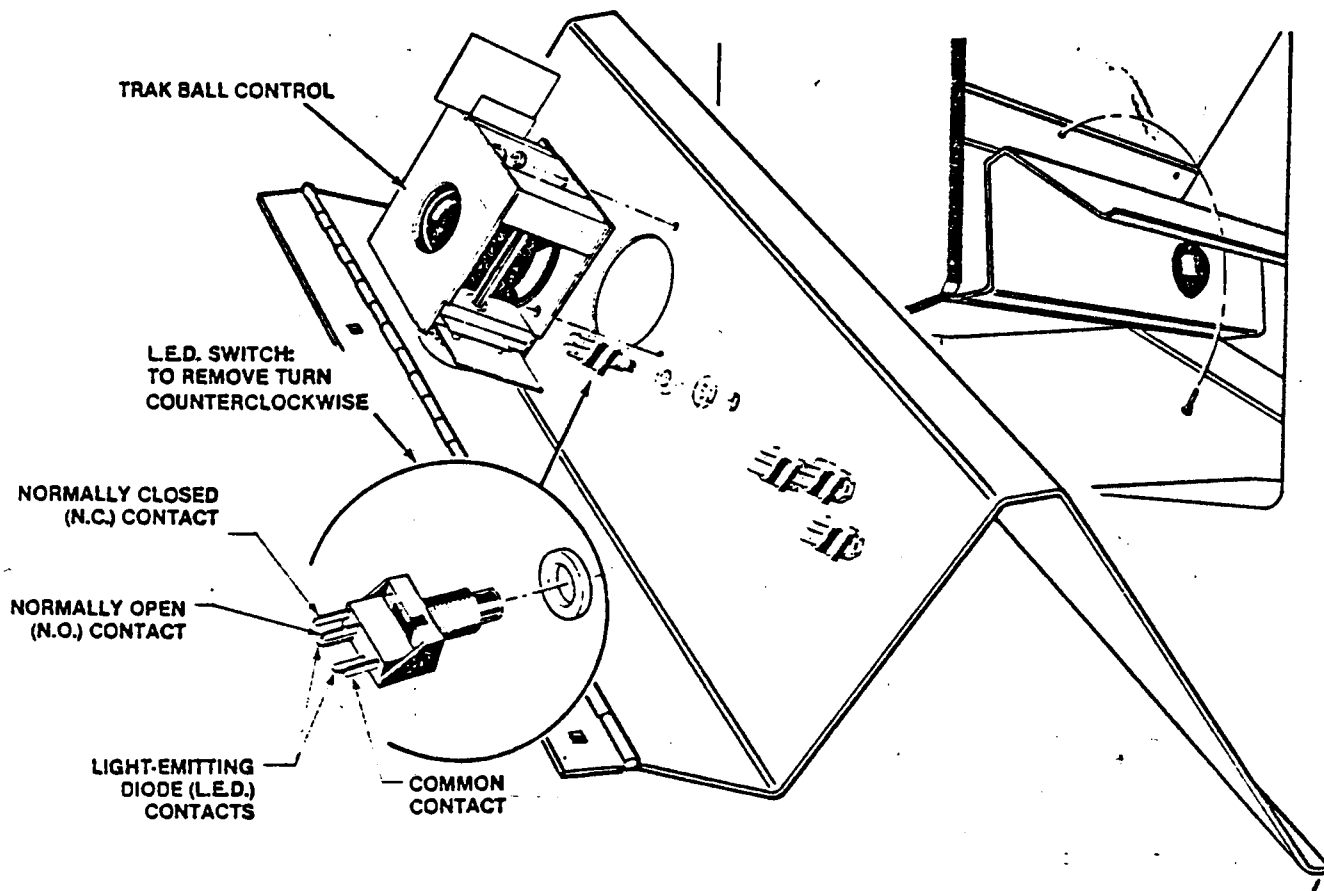

TRAK BALL CONTROL

L.E.D. SWITCH:
TO REMOVE TURN
COUNTERCLOCKWISE

NORMALLY CLOSED
(N.C.) CONTACT

NORMALLY OPEN
(N.O.) CONTACT

LIGHT-EMITTING
DIODE (L.E.D.)
CONTACTS

COMMON
CONTACT

Figure 8   Opening the Control Panel

Disassemble in the order indicated.
(Circled numbers match the steps
described below.)

Ball Replacement

1. Remove the entire Trak Ball assembly as shown in the previous figure. Locate the three countersunk machine screws in the acrylic top plate; remove these screws. (When the assembly is installed, these three screws are right underneath the control panel.).

2. Remove and replace the ball.

LUBRICATE THIS BEARING
(1 OF 5 PLACES)
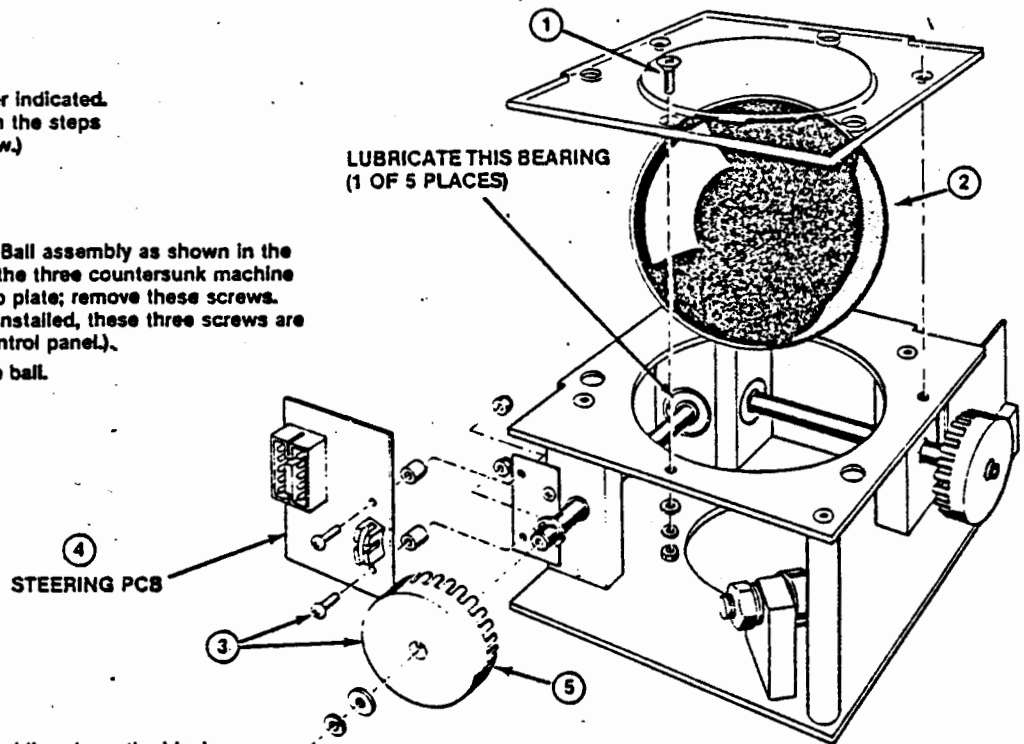
STEERING PCB

Steering PCB Replacement

3. Remove the hardware holding down the black toothed wheel (the light hub); lift this wheel off of the black roller shaft. Unplug the connector on the steering PCB. Remove the two cross-recessed machine screws, brown spacers and lock nuts from the steering PCB.

4. Remove the steering PCB.

5. When replacing this PCB assembly, be certain that the black toothed wheel turns freely between the two halves of the red photosensor device.

Trak Ball Lubrication

1. Open control panel as illustrated in Figure 8.

2. Unplug the control panel harness connector.

3. Apply only 2 drops of 3-in-One³ oil in each of the ball bearings. (Each Trak Ball control has five bearings.) Tilt the panel to its closed position and roll the ball in all directions. Be sure the oil has not spread onto the shafts—otherwise your players will get oily hands.

Figure 9   Trak Ball™ Maintenance and Repair

1. 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.

● Remove the wires from the suspected switch.

● Set multimeter to the ohms scale. Set ohms scale to $R \times 1$, then zero the meter.

● Connect multimeter leads to appropriate LED switch contacts (see Figure 8 for designation of switch 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 as outlined in the figure.

2. Trak Ball™ Maintenance and Repair

To maintain this control, you will only have to lubricate the bearings approximately every 2,000 credits. The number of credits can be read off the coin counter, located on the coin door. Use only 2 drops of 3-in-One³ oil in each of the ball bearings. (The Trak Ball control has five bearings.)

For further instructions on how to replace the Trak Ball or either Steering PCB, see Figure 9.

D. TV Monitor Removal

── CAUTION ──

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!

In addition, be sure to use heavy gloves when handling the monitor. You could cut your hands on the metal TV chassis, without such protection.

If you should need to service or replace the color TV monitor, you must first remove it from the game cabinet. Follow the instructions given in Figure 10.

Note that two people are required to remove the monitor assembly—it weighs about 80 pounds! In addition, Atari recommends you use a small step stool to stand on while tilting the monitor upwards. However, if you are about 6½ feet tall, you could probably remove the monitor without this stool.
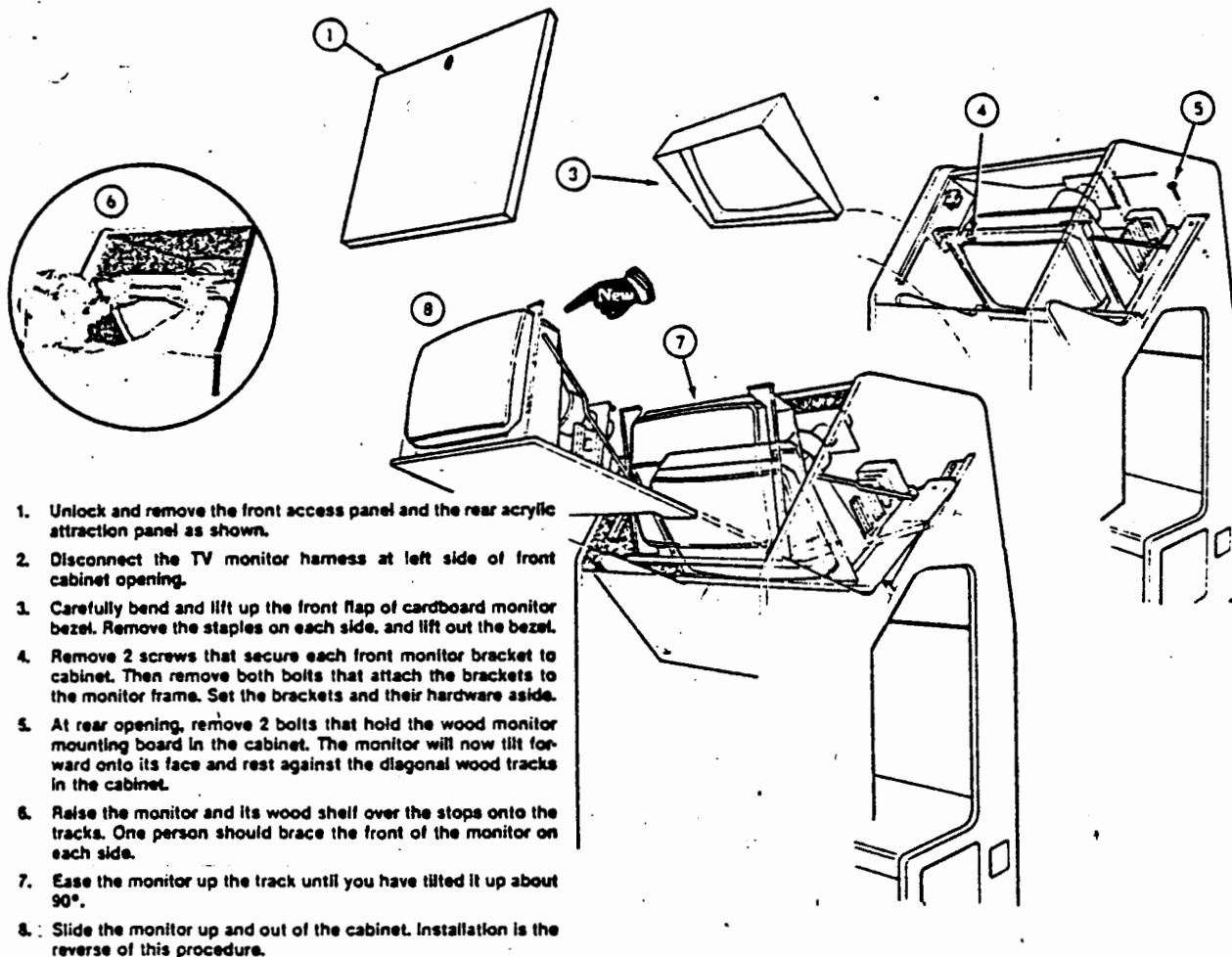

1. Unlock and remove the front access panel and the rear acrylic attraction panel as shown.

2. Disconnect the TV monitor harness at left side of front cabinet opening.

3. Carefully bend and lift up the front flap of cardboard monitor bezel. Remove the staples on each side, and lift out the bezel.

4. Remove 2 screws that secure each front monitor bracket to cabinet. Then remove both bolts that attach the brackets to the monitor frame. Set the brackets and their hardware aside.

5. At rear opening, remove 2 bolts that hold the wood monitor mounting board in the cabinet. The monitor will now tilt forward onto its face and rest against the diagonal wood tracks in the cabinet.

6. Raise the monitor and its wood shelf over the stops onto the tracks. One person should brace the front of the monitor on each side.

7. Ease the monitor up the track until you have tilted it up about 90°.

8. Slide the monitor up and out of the cabinet. Installation is the reverse of this procedure.
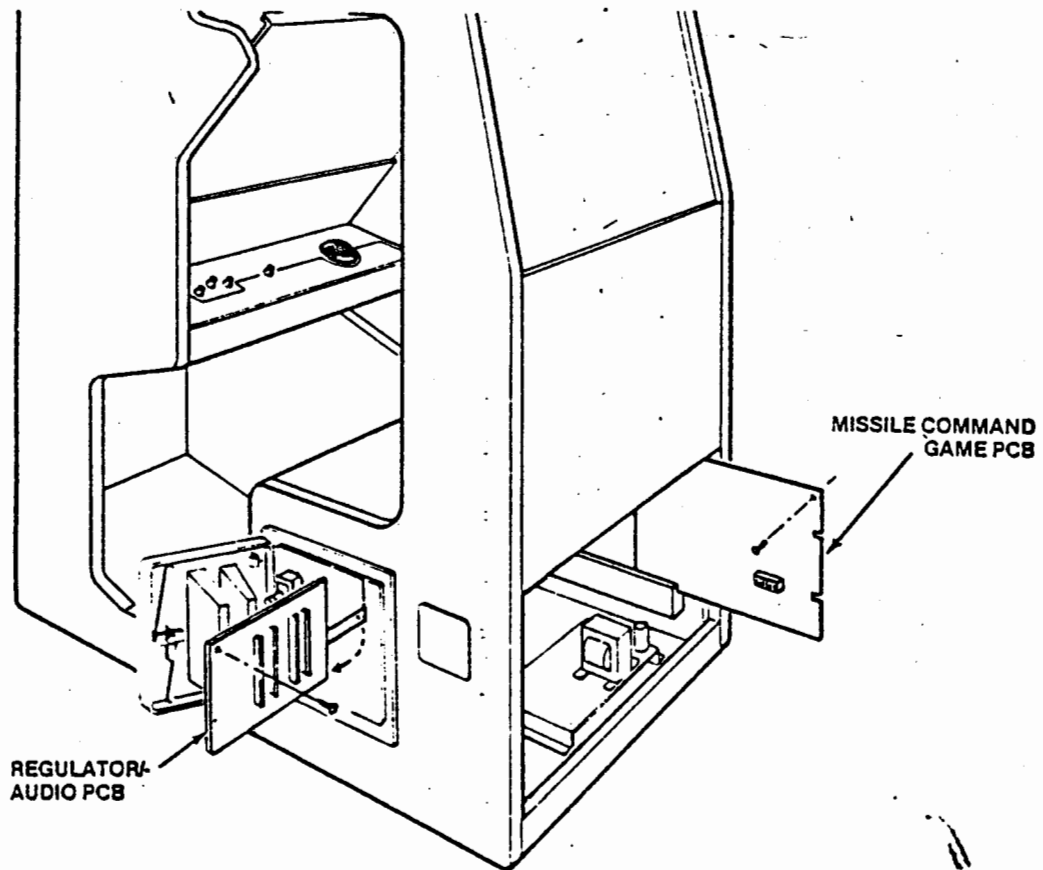
Figure 10   TV Monitor Removal

Figure 11   Game and Regulator/Audio PCB Replacement

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 11 and proceed as follows:

1. Game PCB Removal

● Unlock and open the lower rear access panel.

● Remove the two beaded tie wraps and then the 44-pin edge connector from the right side of the game PCB.

● Locate the Phillips-head screw that extends through the PCB and into the wood block near the game's opening. Remove this screw.

● Remove the PCB from the game by sliding it out of the plastic PCB retainer.

● Reinstall the PCB, making sure that the 44-pin edge connector is properly plugged in. Note that the connector is keyed to fit on only one way, so if it doesn't slip on easily, don't force it! A reversed connector will probably damage your game and will void the warranty.

● Check that the operation of the game is correct by performing the self-test. This is especially important with any game when you replace a PCB.

2. Regulator/Audio II PCB Removal

● Unlock and open the access panel.

● Remove the five plug-in connectors.

● Locate the two Phillips-head screws that extend through the PCB and into the wood blocks at the top two corners of the PCB. Remove these two screws.

● Remove the PCB from the inside wall of the cabinet by pulling it up and out of the wood slot.

F. Opening the Attraction Panel

Prior to replacing the fluorescent tube or the speaker, you will first have to remove the graphics attraction panel at the top rear of the Sit-Down Missile Command™ game.

Unplug the game; then remove the three Allen-head screws at the top of the panel. They secure the metal retainer strip for the attraction panel. Remove the retainer completely.

Now remove the two Phillips screws located on the sides of the panel. Tilt the top of the ¼-inch attraction panel towards you, then lift it up and out of the bottom wood retainer (see Figure 12).

Behind it you will find a smaller, 1/8-inch smoke-color window panel: this can remain in place while you service the fluorescent tube or speaker.

1. Replacing Fluorescent Tube

⚠️— 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.

First remove the colorful attraction panel as previously described. Then replace the white fluorescent tube by following this procedure (see Figure 12).

- Remove the two Y-shaped connectors from the ends of the fluorescent tube. Now carefully remove the tube from its clamps by pulling it towards you.
- Replace with a new tube. Do not snap the tube in vigorously—you may break it, causing an implosion!
- Close up the game by replacing the attraction panel, retainer strip, and three Allen-head screws.

2. Replacing Speaker

First disconnect the harness plugs for the speaker. Remove the four screws that secure the speaker on the wood panel. Replace the speaker, then reconnect the harness connectors.

Never operate the game without the metal shield located just above the speaker: the shield prevents the speaker's magnetism from adversely affecting the monitor's color purity.
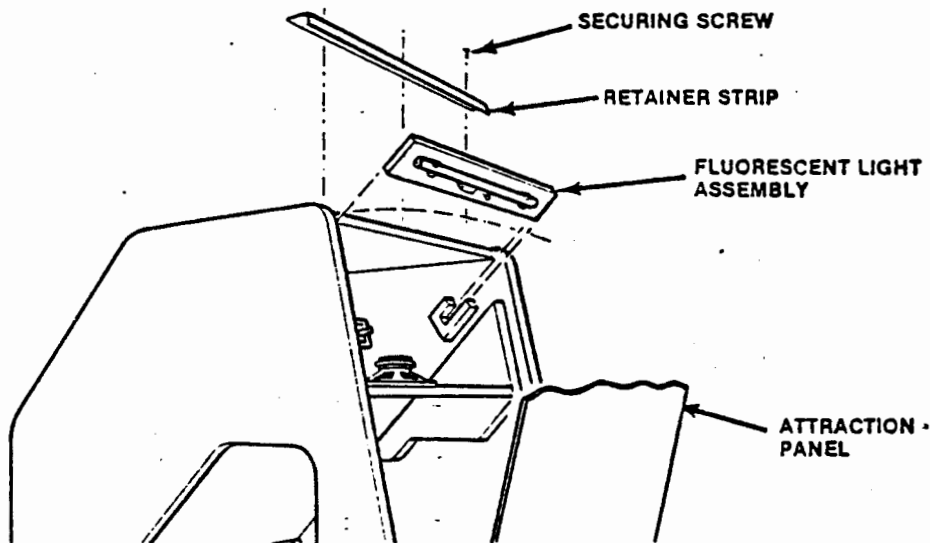

Figure 12   Fluorescent Tube and Speaker Replacement
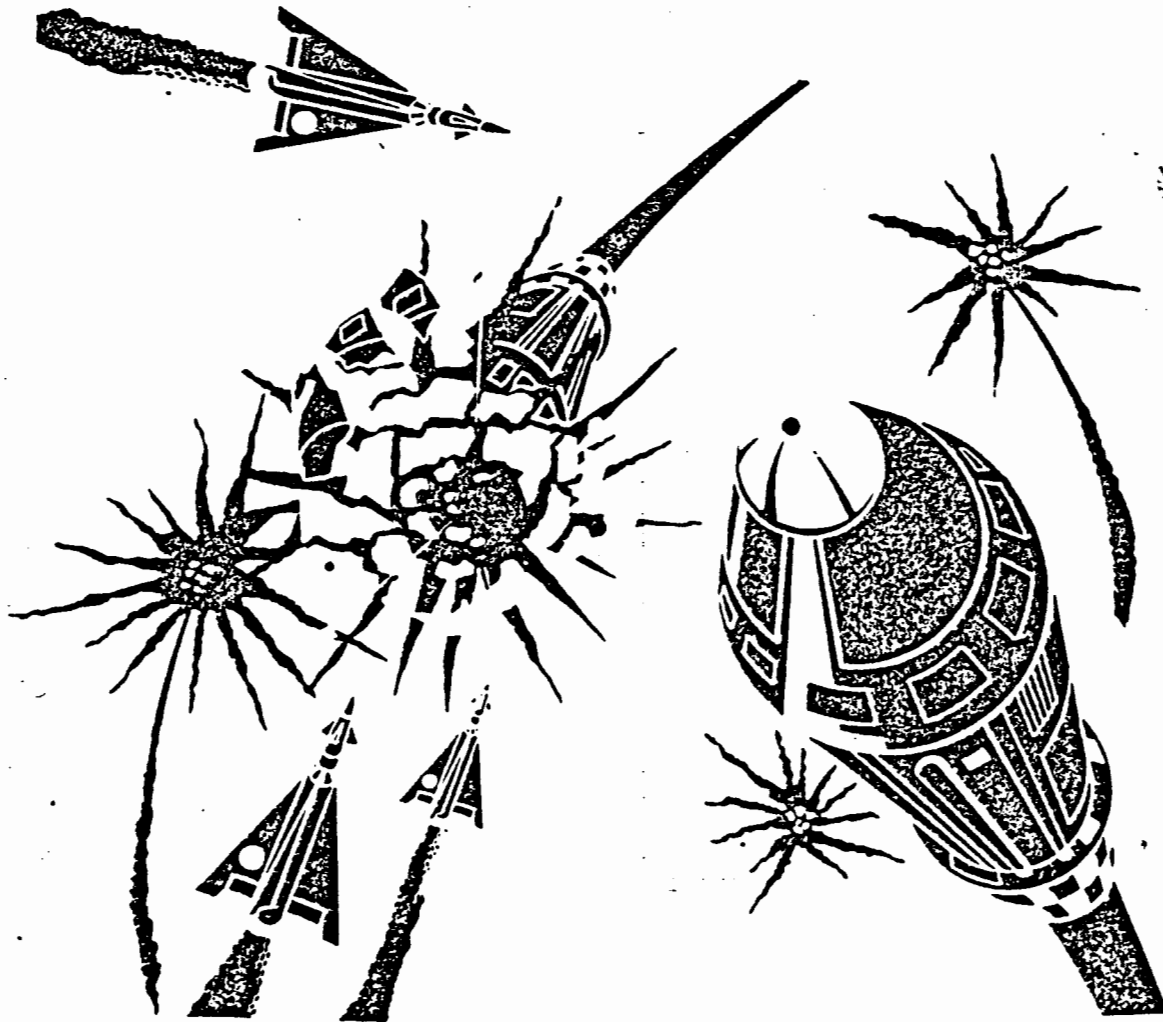
G. Game Operation

With this manual you received two large sheets that contain the wiring and schematic diagrams for your game. Sheet 1, Side A, includes information that shows the arrangement of these diagrams. These diagrams include information that explains the functions of the circuits and defines inputs and outputs.

Missile Command™ is a microprocessor-controlled game. The microprocessor is mounted 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 II PCB, loudspeaker, and control panel.

The Regulator/Audio II PCB performs two functions: 1) it regulates the +10 VDC from the power supply to +5 VDC, and 2) it amplifies the audio output from the game PCB. The +5 VDC from the Regulator/Audio II PCB provides most logic power to the game PCB. The audio output from the Regulator/Audio II 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 three fuses (F3, F4 and F5) on the power supply chassis. The primary winding of the power supply transformer is protected by the fuses F1 and F2 on the power supply chassis.

Figure 13 illustrates the distribution of power in this game. Figure 14 illustrates the distribution of signals.
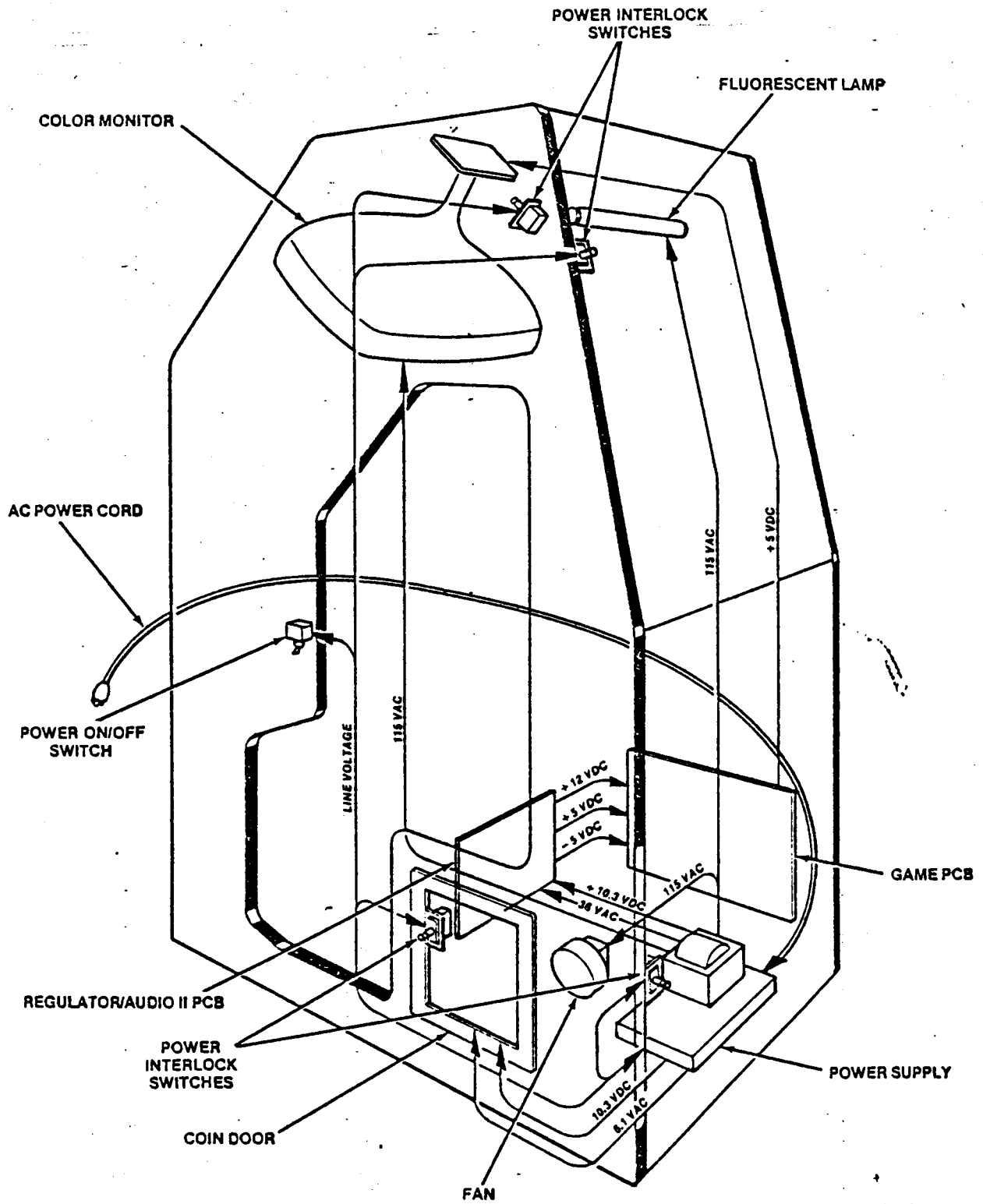
POWER INTERLOCK SWITCHES

FLUORESCENT LAMP

COLOR MONITOR

AC POWER CORD

115 VAC

+ 5 VDC

POWER ON/OFF SWITCH

LINE VOLTAGE

115 VAC

+ 12 VDC

+ 5 VDC

- 5 VDC

+ 10.3 VDC

34 VAC

115 VAC

GAME PCB

REGULATOR/AUDIO II PCB

POWER INTERLOCK SWITCHES

10.3 VDC

6.1 VAC

POWER SUPPLY

COIN DOOR

FAN

Figure 13   Power Distribution

COLOR MONITOR

GAME SPEAKER

CONTROL PANEL

REGULATOR/
AUDIO II PCB

GAME PCB

SPEAKER

AUDIO
OUTPUT

RED

BLUE

GREEN

COMP SYNC

START LED

START

RIGHT FIRE

CENTER FIRE

LEFT FIRE

TRAK BALL H DIR & CK

TRAK BALL V DIR & CK

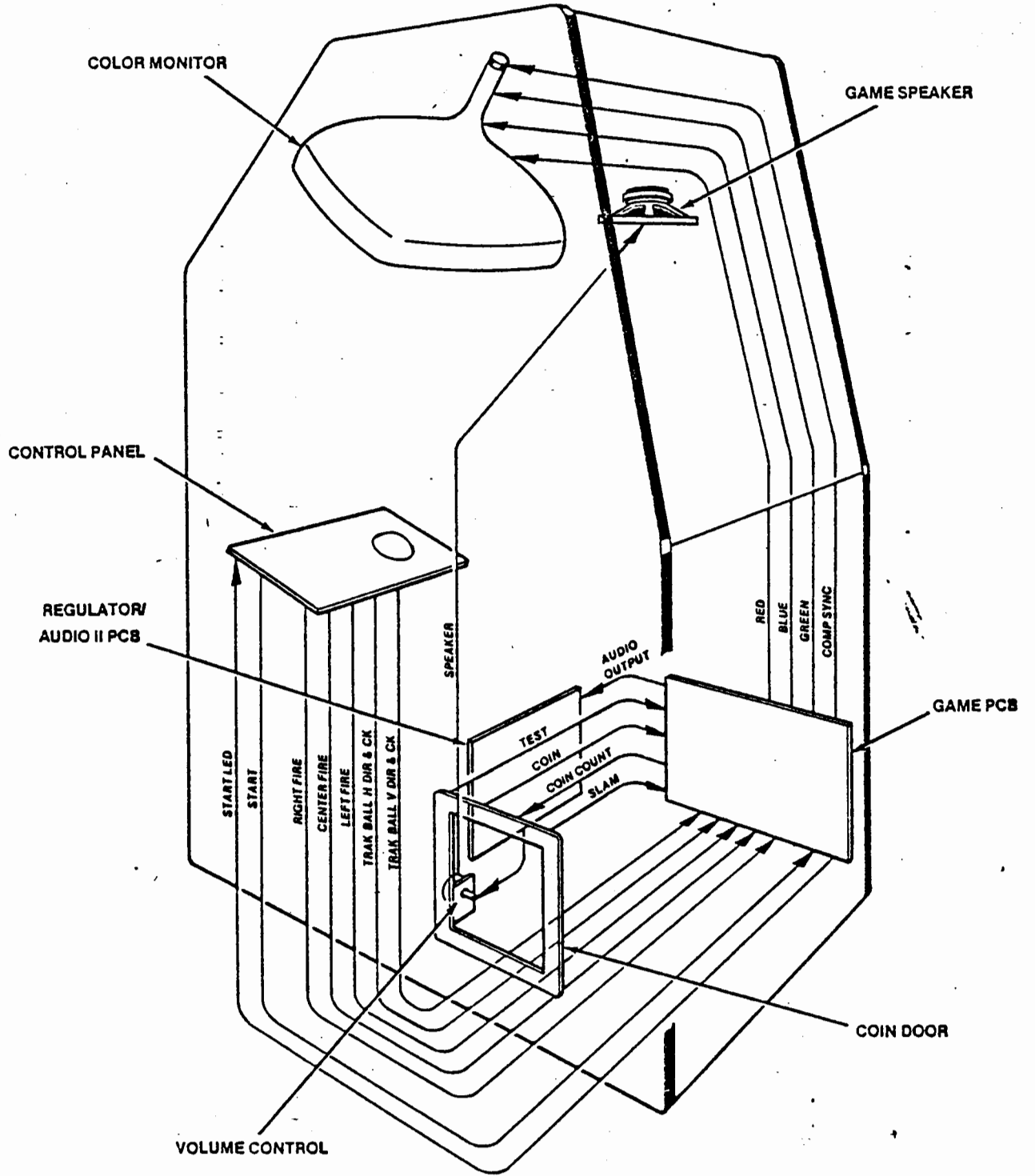TEST

COIN

COIN COUNT

SLAM

COIN DOOR

VOLUME CONTROL

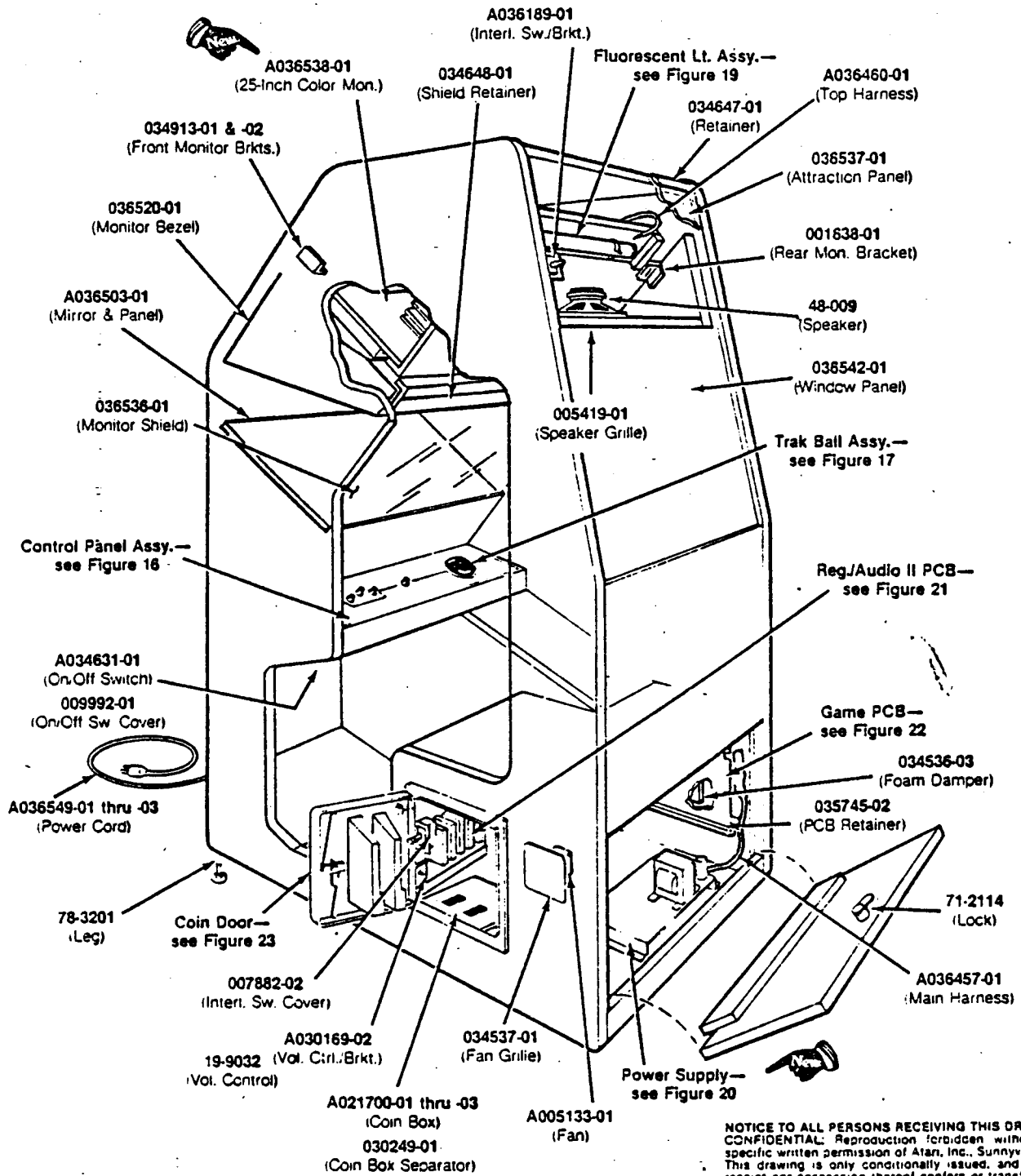Figure 14   Signal Distribution

Illustrated Parts Lists

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

The parts lists have been 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 110000-.

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.

Sit-Down Missile Command™

3

A036189-01
(Interl. Sw./Brkt.)

A036538-01
(25-Inch Color Mon.)

034648-01
(Shield Retainer)

Fluorescent Lt. Assy.—
see Figure 19

034647-01
(Retainer)

A036460-01
(Top Harness)

034913-01 & -02
(Front Monitor Brkts.)

036537-01
(Attraction Panel)

036520-01
(Monitor Bezel)

001638-01
(Rear Mon. Bracket)

A036503-01
(Mirror & Panel)

48-009
(Speaker)

036536-01
(Monitor Shield)

036542-01
(Window Panel)

005419-01
(Speaker Grille)

Trak Ball Assy.—
see Figure 17

Control Panel Assy.—
see Figure 16

Reg./Audio II PCB—
see Figure 21

A034631-01
(On/Off Switch)
009992-01
(On/Off Sw Cover)

Game PCB—
see Figure 22

034536-03
(Foam Damper)

035745-02
(PCB Retainer)

A036549-01 thru -03
(Power Cord)

71-2114
(Lock)

78-3201
(Leg)

Coin Door—
see Figure 23

A036457-01
(Main Harness)

007882-02
(Interl. Sw. Cover)

A030169-02
19-9032 (Vol. Ctrl./Brkt.)
(Vol. Control)

034537-01
(Fan Grille)

Power Supply—
see Figure 20

A021700-01 thru -03
(Coin Box)

A005133-01
(Fan)

030249-01
(Coin Box Separator)

Figure 15   Cabinet-Mounted Assemblies
A036530-xx   B

Figure 15   Cabinet-Mounted Assemblies
Parts List

Part No.	Description
A005133-01	Exhaust Fan
A021700-01	Coin Box Assembly *(for all the same coins)*
A021700-02	Coin Box Assembly *(for two different coin denominations—has one separator)*
A021700-03	Coin Box Assembly *(for three different coin denominations—has two separators)*
A030169-02	Volume Control & Bracket Assembly
A034631-01	On/Off Switch Assembly
A036189-01	Interlock Switch & Bracket Assembly *(modified for safety)*
A036457-01	Main Harness and Components Assembly *(Includes lower two interlock switches and on/off switch)*
A036460-01	Top Harness and Components Assembly *(includes top two interlock switches)*
A036462-01	Monitor Harness and AC Cord Assembly
A036503-01	Mirror/Panel Assembly
A036538-01	25-Inch Electrohome Color Monitor Assembly
A036549-01	Strain-Relief Power Cord *(domestic)*
OR A036549-02	Strain-Relief Power Cord *(German)*
OR A036549-03	Strain-Relief Power Cord *(Australian)*
DP-158-01	Sit-Down Missile Command™ Schematic Drawings, Sheet 1
DP-158-02	Sit-Down Missile Command Schematic Drawings, Sheet 2
TM-162	Sit-Down Missile Command Operation, Maintenance, Service Manual
TM-163	Service Manual for Electrohome 25-Inch Color Monitor
19-9032	Volume Control Potentiometer
48-009	8-Inch 8-Ohm 8-Watt High-Fidelity Speaker
71-2114	Panel Cartridge Lock Mechanism *(for access panels)*
75-07017	Spacer for Mounting Printed-Circuit Boards *(two per screw)*
78-24012	5-Inch Beaded Nylon Tie Wrap *(for securing edge connector to Game PCB)*
78-3201	Cabinet-Leveling Leg
000869-01	5-Inch Ventilation Grille
001638-01	Rear Monitor Mounting Bracket
005419-01	8-Inch Speaker Grille
006870-01	Coin Box Bracket
007882-02	Interlock Switch Cover
009992-01	On/Off Switch Cover
030249-01	Coin Box Separator
034536-03	Foam Vibration Damper
034537-01	Fan Grille
034647-01	Attraction-Panel Retainer *(at top rear of game)*
034648-01	Monitor-Shield Retainer
034913-01	Front Monitor Support Bracket—Left Side (as seen facing front of game where power cord exits)
034913-02	Front Monitor Support Bracket—Right Side
035745-02	18-Inch Plastic PCB Retainer
036515-01	Graphics Label for Console
036520-01	Cardboard Bezel *(for monitor)*
036521-01	Cover Plate for Power-Cord Hole
036536-01	Smoke-Color Monitor Shield
036537-01	Graphics Attraction Panel
036542-01	Smoke-Color Window Panel

033127-01

62-041

75-9910W0

62-039

Trak Ball Assy.—
See Figure 17

036535-01

75-07054

Figure 16   Control Panel Assembly
A036523-01   B

Parts List

Part No.	Description
A036458-01	Control-Panel Harness Assembly
62-039	SPDT Momentary Pushbutton Switch, with Red Cap and Light-Emitting-Diode
62-041	SPDT Black Momentary Pushbutton Switch
75-07054	Nylon Spacer
75-9910W0	Steel Stamped Nut
033127-01	Black Molded Switch Bushing
036535-01	Metal Control Panel with Graphics

Figure 17   Trak Ball™ Assembly
A033360-01   G

26

Figure 17 Trak Ball™ Assembly
Parts List

Part No.	Description
72-1006S	#10-32 × 3/8″ Cross-Recessed Pan-head Cadmium-Plated Steel Machine Screw
72-1408S	#4-40 × ½″ Cross-Recessed Pan-Head Cadmium-Plated Steel Machine Screw
72-1606S	#6-32 × 3/8″ Cross-Recessed Pan-Head Cadmium-Plated Steel Machine Screw
72-8808	#8-32 × ½″ Hex Socket-Head Cap Alloy Steel Machine Screw
72-8920S	#3/8-16 × 1¼″ Hex Socket-Head Cap Alloy Steel Machine Screw
73-3006	Carbon Spring Steel External Retaining Ring, for 3/8″ shaft diameter
74-A00011	Phenolic Spacer, 1/8″ inside diameter × ¼″ outside diameter × ¼″ long
75-010S	#10 Flat Plain SAE-Standard Zinc-Plated Steel Washer
75-016S	#6 Flat Plain SAE-Standard Zinc-Plated Steel Washer
75-018S	#8 Flat SAE-Standard Zinc-Plated Steel Washer
75-040S	#10 Steel Split Lock Washer
75-041S	#3/8 Steel Split Lock Washer
75-046S	#6 Zinc-Plated Steel Split Lock Washer
75-048S	#8 Zinc-Plated Steel Split Lock Washer
75-3608S	#6-32 × ½″ Cross-Recessed Flat-Head Cadmium-Plated Steel Machine Screw
75-916S	#6-32 Standard Cadmium-Plated Steel Machine Hex Nut
75-919S	#3/8-16 Standard Cadmium-Plated Steel Machine Hex Nut
75-990504C	#4-40 Shallow-Pattern Prevailing-Torque Corrosion Resistant Lock Nut
85-1808B	#8-32 × ½″ Socket Cap Flat Countersunk-Head Black-Oxide Steel Screw
000616-01	Light Hub
033355-01	Base Plate
033356-01	Top Plate
033357-01	Cover Plate (Acrylic)
033358-01	Corner Post
033359-01	End Post
033361-01	Steering PCB Bracket
033362-01	Roller Shaft
033363-01	Cylindrical Post
033364-01	Adjustable Post
033365-01	Spacer
033366-01	Trak Ball™
033367-01	Bearing
034168-01	Label with Lubrication Instructions

030369-01
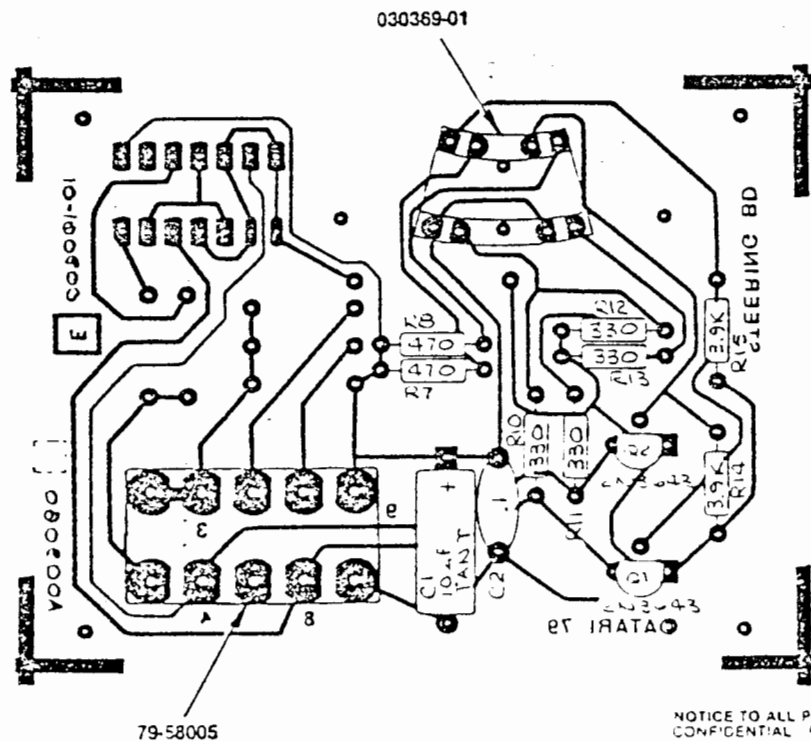
Traces shown are
on opposite side.

79-58005

Figure 18   Steering Printed-Circuit Board Assembly
A009060-02   C

Parts List

Part No.	Description (Reference Designations and Locations in Bold)
10-5331	330 Ohm, ±5%, ¼W Carbon Composition Resistor (R10-13)
10-5392	3.9K Ohm, ±5%, ¼W Carbon Composition Resistor (R14, 15)
10-5471	470 Ohm, ±5%, ¼W Carbon Composition Resistor (R7-8)
27-250104	0.1 uf, ±20%, 25V Ceramic-Disk Radial-Lead Capacitor (C2)
29-046	10 uf, ±10%, 20V Tantalum Axial-Lead Capacitor (C1)
34-2N3643	Type 2N3643 Switching Transistor (Q1, 2)
79-58005	10-Contact Connector
030369-01	Radial Optical Coupler

Figure 19 Fluorescent Light Assembly
A036528-01   A

Parts List

Part No.	Description
A005493-01	Fluorescent Light Harness Assembly
70-301	24-Inch 20-Watt Cool White Fluorescent Tube
79-561816P	Wire Nut for 16- to 18-Guage Wires
99-11003	Fluorescent Lamp Starter
99-11008	Ballast Transformer
99-11009	Starter Socket
99-11011	1½-Inch Clamp
035835-01	Y-Lead Connector *(two required per light).* Alternate is part no. A036045-01

TOP VIEW

034482-01   79-4411006   034544-01   46-2013002
             46-2017002

F6   F5   F4   F3   F2   F1

79-3206

A035674-01

A034623-01

78-2708

78-70501SC   46-2017002

29-053

42-7140   A006555-01

BOTTOM VIEW

A034630-01

79-15021001

A034629-01

Figure 20   Power Supply Assembly for Raster-Scan Games
A034560-02   D

Figure 20   Power Supply Assembly for Raster-Scan Games
Parts List

Part No.	Description
A006555-01	Rectifier Printed-Circuit Board Assembly
A034623-01	Transformer and Harness Assembly *(includes Power Transformer)*
A034629-01	AC Harness Assembly
A034630-01	RFI Filter Assembly
A035674-01	Voltage Plug Assembly *(set of four plugs)*
29-053	26,000 uf 15V Electrolytic Capacitor
42-7140	Power Transformer Only
46-2013002	3-Amp. 250V 3AG Slow-Blow Glass Cartridge-Type Fuse
46-2017002	7-Amp. 250V 3AG Slow-Blow Glass Cartridge-Type Fuse
78-2708	Nylon Type 6/6 Hole Bushing with 5/8″ Inside Diameter × 55/64″ Outside Diameter × ¼″ Thick
78-70501SC	2″-Diameter Capacitor Mounting Bracket
79-15021001	2-Circuit Single-Row Terminal Block
79-3206	5-Position 3AG Fuse Block with ¼″ Quick-Disconnect Terminals
79-4411006	Panel-Mounting Non-Indicating 3AG Cartridge-Type Fuse Post
034544-01	Fuse Block Cover

Figure 21   Regulator/Audio II PCB Assembly
A035435-02   B

Figure 21 Regulator/Audio II PCB Assembly
Parts List

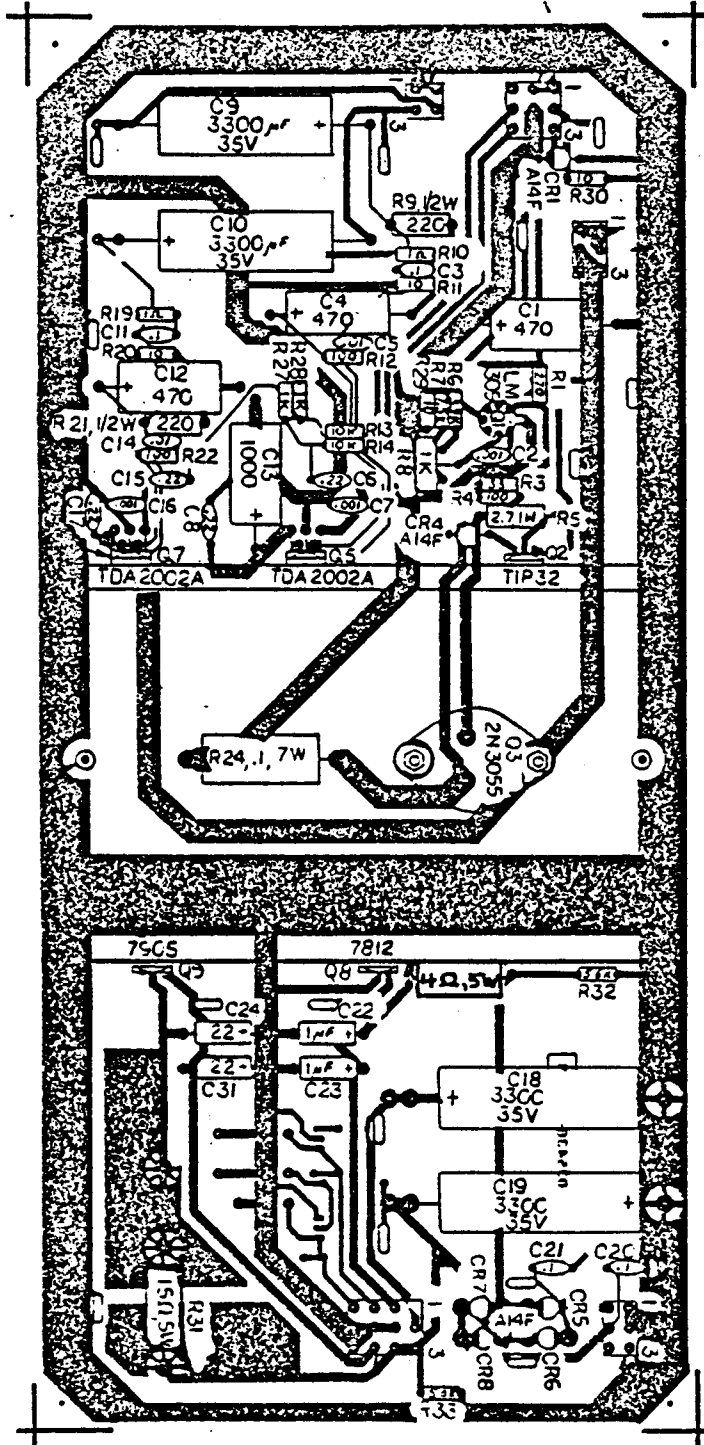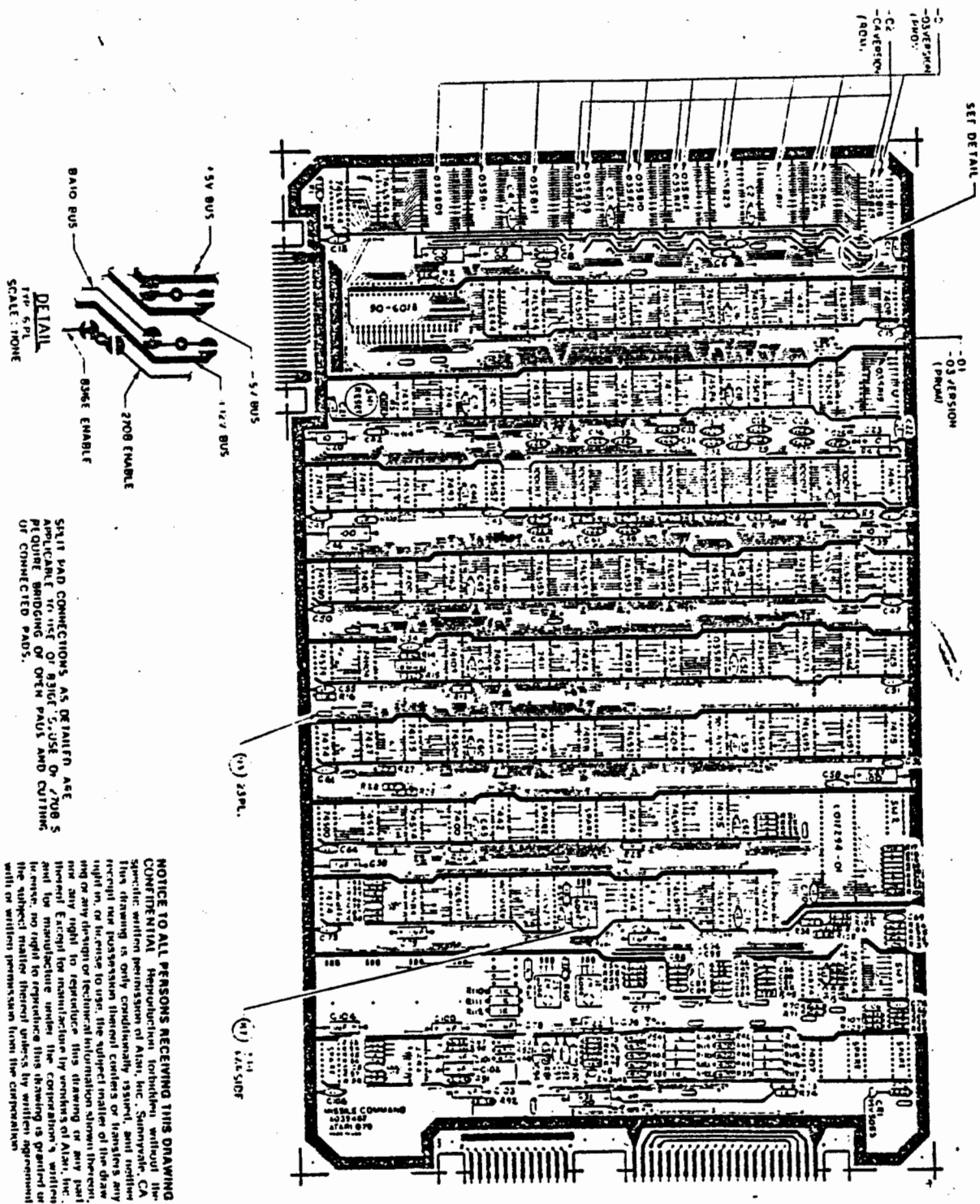| Part No.	Description (Reference Designations and Locations in Bold)
12-52P7	2.7 Ohm, ± 5%, 1W Resistor (R5)
16-54P0	4 Ohm, ± 5%, 5W Wirewound Resistor (R25)
19-100P1015	.1 Ohm, ± 3%, 7W Wirewound Resistor (R24)
19-315102	1K Ohm Vertical PCB-Mounting Cermet Trimpot (R8)
24-250106	10 uf Aluminum Electrolytic Fixed Axial-Lead 25V Capacitor (C5, 15)
24-250108	1000 uf Aluminum Electrolytic Fixed Axial-Lead 25V Capacitor (C9, 10, 13)
24-250477	470 uf Aluminum Electrolytic Fixed Axial-Lead 25V Capacitor (C1, 4, 12)
24-250478	4700 uf Aluminum Electrolytic Fixed Axial-Lead 25V Capacitor (C29)
24-250108	1000 uf Aluminum Electrolytic Fixed Axial-Lead 25V Capacitor (C13)
24-250477	470 uf Aluminum Electrolytic Fixed Axial-Lead 25V Capacitor (C1, 4, 12)
24-350226	22 uf Aluminum Electrolytic Fixed Axial-Lead 35V Capacitor (C24, 31)
24-350338	3300 uf Aluminum Electrolytic Fixed Axial-Lead 35V Capacitor (C9, 10, 18, 19)
24-500105	1 uf Aluminum Electrolytic Fixed Axial-Lead 50V Capacitor (C22, 23)
27-250102	.001 uf Ceramic-Disc 35V Radial-Lead Capacitor (C2, 7, 16)
27-250103	.01 uf Ceramic-Disc 25V Radial-Lead Capacitor (C5, C14)
29-088	.1 uf Ceramic-Disc 25V Radial-Lead Capacitor (C3, 11, 20, 21)
31-A14F	50V 2.5A Miniature Axial-Lead High-Current Rectifier (CR1, 4-8)
33-TIP32	PNP Power Transistor, Type TIP32 (Q2)
34-2N3055	NPN Silicon Transistor, Type 2N3055 (Q3)
37-LM305	5V Linear Voltage Regulator (Q1)
37-7812	+12V Voltage Regulator, Type 7812 (Q8)
37-7905	-5V Voltage Regulator, Type 7905 (Q9)
72-1608C	#6-32 × ½" Cross-Recessed Pan-Head Corrosion-Resistant Steel Machine Screw
75-F60405	#6-32 × ¼" Binder-Head Nylon Screw
75-99516	#6-32 Nut/Washer Assembly
78-16008	Thermally Conductive Compound (Q3)
78-16014	Thermally Conductive Compound (Q2, 5, 7-9)
79-58306	6-Position Connector Receptacle (J6, 9)
79-58308	9-Position Connector Receptacle (J7)
79-58346	12-Position Connector Receptacle (J10)
79-58354	4-Position Connector Receptacle (J8)
020670-01	Test Point
034531-01	Heat Sink
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)
116000-220	22 Ohm, ± 5%, 10W Wirewound Resistor (R31)
122004-224	.22 uf Ceramic-Disc 25V Capacitor (C6, 8, 15, 17)
137151-002	Type TDA2002A 8W Linear Audio Amplifier Integrated Circuit (Q5, 7)

Figure 22   Game PCB Assembly
A035467-01 thru -04   D

Figure 22   Game PCB Assembly
Parts List

Part No.	Description (Reference Designations and Locations in Bold)
C012294-01	Audio I/O N-Channel MOS/LSI Custom Chip **(P8/9)**
21-101683	.068 uf, ± 10%, Radial-Lead Epoxy-Dipped 100V Mylar Capacitor **(C65-68)**
24-250105	1 uf Aluminum Electrolytic Fixed Axial-Lead 25V Capacitor **(C76-79, 98, 100-104)**
24-250106	10 uf Aluminum Electrolytic Fixed Axial-Lead 25V Capacitor **(C20, 23, 39)**
24-250107	100 uf Aluminum Electrolytic Fixed Axial-Lead 25V Capacitor **(C9, 10, 46, 57, 91)**
24-250226	22 uf Aluminum Electrolytic Fixed Axial-Lead 25V Capacitor **(C90)**
27-250103	.01 uf Ceramic-Disc 25V Radial-Lead Capacitor **(C76-79)**
28-101102	1000 pf Epoxy-Dipped 100V Radial-Lead Mica Capacitor **(C99, 105)**
29-088	.1 uf Ceramic-Disc 25V Radial-Lead Capacitor **(C1-8, 13-16, 18, 19, 21, 22, 30, 38, 43-45, 47-56, 58-64, 69-75, 80-89, 92-97, 106)**
31-1N914	75V Type-1N914 Switching Diode **(CR2)**
34-2N3643	Type 2N3643 NPN Switching Transistor **(Q8)**
34-2N6044	Type 2N6044 NPN Darlington Transistor **(Q1-3)**
37-4584B	Type 14584 Integrated Circuit **(C9, C11)**
37-7400	Type 7400 Integrated Circuit **(C5, D8)**
37-74S00	Type 74S00 Integrated Circuit **(A8)**
37-7404	Type 7404 Integrated Circuit **(E6, K7)**
37-74H04	Type 74H04 Integrated Circuit **(B6)**
37-74S04	Type 74S04 Integrated Circuit **(D7)**
37-7407	Type 7407 Integrated Circuit **(N11)**
37-74LS08	Type 74LS08 Integrated Circuit **(H7)**
37-7408	Type 7408 Integrated Circuit **(R2, J6)**
37-74S08	Type 74S08 Integrated Circuit **(M3)**
37-74LS10	Type 74LS10 Integrated Circuit **(E3)**
37-7410	Type 7410 Integrated Circuit **(B5)**
37-74LS14	Type 74LS14 Integrated Circuit **(D3)**
37-7414	Type 7414 Integrated Circuit **(J9)**
37-7427	Type 7427 Integrated Circuit **(B7)**
37-7432	Type 7432 Integrated Circuit **(C3, R5)**
37-74LS32	Type 74LS32 Integrated Circuit **(J7)**
37-74S32	Type 74S32 Integrated Circuit **(C4, L5, K6)**
37-7442	Type 7442 Integrated Circuit **(N2, E8)**
37-7474	Type 7474 Integrated Circuit **(H6, A7, E7, F7, J8, A9)**
37-74S74	Type 74S74 Integrated Circuit **(A6, B8, C8)**
37-7475	Type 7475 Integrated Circuit **(R7)**
37-7493	Type 7493 Integrated Circuit **(D4)**
37-74109	Type 74109 Integrated Circuit **(D6)**
37-74125	Type 74125 Integrated Circuit **(R6)**
37-74LS139	Type 74LS139 Integrated Circuit **(P2, M5)**
37-74LS153	Type 74LS153 Integrated Circuit **(F5, H5, J5, K5, P7)**
37-74153	Type 74153 Integrated Circuit **(F3, H3, J3, K3)**
37-74LS157	Type 74LS157 Integrated Circuit **(H2, J2, K2, L2, M2, M7, D9)**
37-74S157	Type 74S157 Integrated Circuit **(E4)**
37-74160	Type 74160 Integrated Circuit **(E5)**

Figure 22 Game PCB Assembly, continued
Parts List

Part No.	Description (Reference Designations and Locations in Bold)
37-74163	Type 74163 Integrated Circuit (D5)
37-74LS163A	Type 74LS163A Integrated Circuit (R4)
37-74LS166	Type 74LS166 Integrated Circuit (P6)
37-74175	Type 74175 Integrated Circuit (L8)
37-74LS175	Type 74LS175 Integrated Circuit (C7)
37-74LS191	Type 74LS191 Integrated Circuit (K8, K9)
37-74191	Type 74191 Integrated Circuit (A4, B4)
37-74LS195	Type 74LS195 Integrated Circuit (M6, N7)
37-74LS244	Type 74LS244 Integrated Circuit (A/B1, E2, F2, P5, L9, M9, P10, B/C1, N/P3)
37-74LS251	Type 74LS251 Integrated Circuit (N5)
37-74S260	Type 74S260 Integrated Circuit (A5)
37-74LS273	Type 74LS273 Integrated Circuit (N6, F9)
37-LM324	Type LM324 Integrated Circuit (N10)
38-MV5053	Type MV5053 Light-Emitting Diode (CR1)
62-001	SPST Pushbutton Switch (B3)
66-118P1T	8-Station Single-Throw, Dual-Inline-Package Bit Switch (R8, R10)
79-42C24	24-Contact Medium-Insertion-Force Integrated Circuit Socket (For -01 and -03 PCB Assemblies: D1, E1, F1, H1, J/K1, K/L1, L/M1, M/N1, N/P1, R1, R3; For -02 and -04 PCB Assemblies: H1, J/K1, K/L1, L/M1, N/P1, R1)
79-42C40	40-Contact Medium-Insertion-Force Integrated Circuit Socket (C2, P8/9)
81-4302	Nylon Snap-In Fastener
90-123	10.000 MHz, ±.005%, Crystal (Y1)
90-6013	Microprocessor (C2)
90-7005	Random-Access Memory (L7)
020670-01	Test Point
035826-01	Programmable Read-Only Memory (L6)
100017-001	Random-Access Memory (F4, H4, J4, K4, L4, M4, N4, P4)
110000-102	1K Ohm, ±5%, ¼W Resistor (R1, 2, 4, 13, 16, 21-26, 39, 60, 61, 73, 74, 85, 95, 109-122)
110000-103	10K Ohm, ±5%, ¼W Resistor (R3, 17-20, 30-38, 60-71, 83, 84, 86-88, 93, 94, 96-100)
110000-152	1.5K Ohm, ±5%, ¼W Resistor (R79)
110000-220	22 Ohm, ±5%, ¼W Resistor (R46, 47, 82)
110000-221	220 Ohm, ±5%, ¼W Resistor (R72)
110000-222	2.2K Ohm, ±5%, ¼W Resistor (R76)
110000-332	3.3K Ohm, ±5%, ¼W Resistor (R56-59, 89-92)
110000-270	27 Ohm, ±5%, ¼W Resistor (R5-12, 27-29)
110000-331	330 Ohm, ±5%, ¼W Resistor (R14, 15, 78)
110000-391	390 Ohm, ±5%, ¼W Resistor (R45, 81)
110000-471	470 Ohm, ±5%, ¼W Resistor (R40-44, 48-55, 80)
110000-472	4.7K Ohm, ±5%, ¼W Resistor (R75)
110000-682	6.8K Ohm, ±5%, ¼W Resistor (R101-108)
110000-822	8.2K Ohm, ±5%, ¼W Resistor (R77)
122004-224	.22 uf Ceramic-Disc 25V Radial-Lead Capacitor (C24-29, 31-37, 40-42)
137002-001	Type 74S86 Integrated Circuit (L3)
137149-001	Type 74LS11 Integrated Circuit (F6, N3)

For remaining memory components and their part numbers, see list on next page.

Figure 22   Game PCB Assembly, continued
Parts List

Memory Components and Their Equivalents
(Locations Shown in Bold)

-01 P.C. Boards (mostly PROMs)		-02 P.C. Boards (ROMs)		-03 P.C. Boards (mostly PROMs)		-04 P.C. Boards (ROMs)	
035812-01	K/L1	035822-01	K/L1	035812-02	K/L1	035822-02	K/L1
035813-01	F1			035813-02	F1		
035823-01	L/M1	035823-01	L/M1	035823-02	L/M1	035823-02	L/M1
035816-01	N/P1	035824-01	N/P1	035816-02	N/P1	035824-02	N/P1
035817-01	M/N1			035817-02	M/N1		
035818-01	R1	035825-01	R1	035818-02	R1	035825-02	R1
035819-01	R3			035819-02	R3		
035808-01	H1	035820-01	H1	035808-02	H1	035820-02	H1
035809-01	D1			035809-02	D1		
035810-01	J/K1	035821-01	J/K1	035810-02	J/K1	035821-02	J/K1
035811-01	E1			035811-02	E1		

99-10103
99-10096
75-948S
99-10095

99-10071

75-1408S

99-10073

PART OF 99-10095

75-944S

99-10096
99-10064

COIN INLET
CHUTE

99-10101

99-10097

70-11-47

99-10080

72-9406S

99-10104

99-10041

99-10105

99-10081

COIN MECHANISM
SEE PARTS LIST
(71-12xxxx)

75-944S

72-9603S

COIN RETURN
CHUTE

99-10102

99-10065

99-10068

65-441C

SWITCH WIRE
SEE PARTS LIST
(99-10075 thru
99-10078)

99-10047

31-1N4002
PART OF 99-10047

COIN SWITCH ASSY.
SEE PARTS LIST
(99-10042 thru
99-10045)

99-10008

75-1412S

99-10082

Figure 23   New Coin Door
71-10xxxx   B

COIN RETURN BUTTON COVER—
SEE PARTS LIST (99-10055 thru 99-10059)

COIN RETURN BUTTON ASSY.—
SEE PARTS LIST
(99-10012 thru 99-10022,
and 99-10107)

PRICE PLATE—
SEE PARTS LIST
(99-10070, 99-10083
thru 99-10092, and
99-10108)

99-10074

72-JA1405B

COIN DOOR ONLY—
SEE PARTS LIST
(99-10009 and 10010)

99-10062

99-10054

72-HA1404C

99-10094

PART OF 93-10074

99-10049

75-5520B

99-10061

99-10066

75-915S

72-JA1405B

99-10051

Figure 23   New Coin Door
71-10xxxx   B

Figure 23   New Coin Door, continued
Parts List

Part No.	Description
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	#4x¼" 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	#¼-20 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	#4-40x½" Slotted pan-head steel machine screw
75-1412S	#4-40x¾" Slotted pan-head steel machine screw
75-5520B	#¼-20x1¼" 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
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)

Figure 23 New Coin Door, continued
Parts List

Part No.	Description
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
99-10052	Coin return lever
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
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
99-10104	Anti-penny-flip bar retainer
99-10105	Anti-penny-flip bar
99-10107	U.S. 50¢ coin return button assembly
99-10108	U.S. 50¢ price plate—for two quarters

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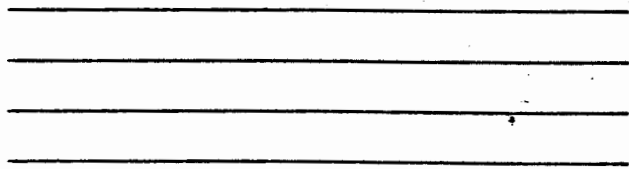FIRST CLASS   PERMIT NO. 1004   SUNNYVALE, CA

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