



For Cockpit Game

Operators Manual

with Illustrated Parts Lists

RoadBlasters™

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Road Blasters™ Operators Manual

with Illustrated Parts Lists



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Notice Regarding Non-ATARI® Parts



WARNING



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

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

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

NOTE

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

- All ground wires in the game are properly connected as shown in the game wiring diagram.
- The power cord is properly plugged into a grounded three-wire outlet.
- On games provided with an Electromagnetic Interference (EMI) ground plane, be sure the game printed-circuit boards (PCBs) are properly installed on the EMI Ground Plane. If you are still unable to solve the interference problem, please contact Customer Service at Atari Games Corporation. See the inside front cover of this manual for service in your area.

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Safety Summary

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

▲ WARNING ▲

Properly Ground the Game. Players may receive an electrical shock if this game is not properly grounded! To avoid electrical shock, do not plug in the game until it has been inspected and properly grounded. This game should only be plugged into a grounded three-wire outlet. If you have only a 2-wire outlet, we recommend you hire a licensed electrician to install a grounded outlet. Players may receive an electrical shock if the control panel is not properly grounded! After servicing any parts on the control panel, check that the grounding wire is firmly secured to the inside of the control panel. Only then should you lock up the game.

AC Power Connection. Before connecting the game to the AC power source, verify that the game's power supply is properly configured for the line voltage in your location.

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

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

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

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

CAUTION

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

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

ABOUT NOTES, CAUTIONS, AND WARNINGS

In all Atari publications, notes, cautions, and warnings have the following meaning:

NOTE—A highlighted piece of information.

CAUTION—Equipment and/or parts can be damaged or destroyed if instructions are not followed. You will void the warranty on Atari printed-circuit boards, parts thereon, and video displays if equipment or parts are damaged or destroyed due to failure of following instructions.

WARNING—Players and/or technicians can be injured or killed if instructions are not followed. (The word *WARNING* is always surrounded by international warning symbols—triangles with exclamation marks inside of them.)

Chapter 1

Set-Up

RoadBlasters™



How to Use This Manual

This manual is written for game operators and service personnel, and provides information for setting up, playing, testing, and maintaining your Road Blasters™ game.

The manual is divided into the following chapters:

- Chapter 1 contains set-up and game play information.
- Chapter 2 contains self-test procedures.
- Chapter 3 contains preventive and corrective maintenance procedures.
- Chapter 4 contains troubleshooting information.
- Chapter 5 contains illustrated parts lists.

Wiring and schematic diagrams for the Road Blasters game circuitry are contained in the *Schematic Package Supplement* (SP-299) included with your game.

This chapter includes information required to set up and play your Road Blasters game. Carefully read the information in this chapter before applying power to the game.



WARNING



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

This cabinet should only be connected to a grounded three-wire outlet. If you have only a two-wire outlet, we recommend that you hire a licensed electrician to install a grounded outlet. Players can receive an electrical shock if the cabinet is not properly grounded.

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

Inspecting the Game



WARNING



Do not plug in the game until you have completed the following inspection steps.

Please inspect your Road Blasters game carefully to ensure that the game is complete and delivered to you in good condition. Figure 5-1 shows the locations of the component parts of the game. Table 1-1 lists space, power, and environmental requirements.

Inspect the factory-assembled game as follows:

1. Examine the exterior of the cabinet for dents, chips, or broken parts.
2. Unlock and open the rear access panel. Unlock and open the coin doors. Inspect the interior of the cabinet as follows:
 - a. Ensure that all plug-in connectors (on the cabinet harnesses) are firmly plugged in. Do not force connectors together. The connectors are keyed so they only fit in the proper orientation. *A reversed edge connector can damage a printed-circuit board (PCB) and will void your warranty.*
 - b. Ensure that all plug-in integrated circuits on each PCB are firmly plugged into their sockets.
 - c. Inspect the power cord for any cuts or dents in the insulation.
 - d. Inspect the power supply. Make sure that the correct fuses are installed. Check that the harness is plugged in correctly and that the fuse block cover is mounted in place. Check that the green ground wires are connected.
 - e. Inspect other major sub-assemblies, such as the video display, printed-circuit boards (PCBs), and speakers. Make sure that they are mounted securely and that the ground wires are connected.

Table 1-1 Game Specifications

Characteristic	Specification
Power Consumption	300 V-A, 239 W RMS
Temperature	+ 5° to + 38° C (+ 37° to + 100° F)
Humidity	Not to exceed 95% relative
Line Voltage	102 to 132 VAC (U.S. games) 198 to 264 VAC (Irish games)
Width	29.5 in. (75 cm)
Length	84 in. (213 cm)
Height	53.25 in. (135 cm)

Control and Switch Locations

Power On/Off Switch

The power on/off switch is located in the lower corner of the right side panel of the cabinet. (See Figure 1-1.)

Volume Control

The volume control is located on the Audio II PCB on the inside of the rear access panel. (See Figure 1-1.) The volume control adjusts the level of sound produced by the game.

Coin Counter

The coin counter is located on the shelf inside the upper coin door. The coin counter records the number of coins deposited.

Self-Test Switch

The self-test switch is located on the shelf inside the upper coin door. (See Figure 1-1.) The self-test switch selects the Self-Test Mode to check game operation. Refer to Chapter 2 for a complete description of self-test operation.

Stabilizing the Sit-Down Cabinet

The sit-down cabinet should be immobilized so that players cannot roll the cabinet around. To stabilize the cabinet, lift up the game from one side. Place a two-inch thick block of wood, book, or other object under the edge of the raised cabinet. Partially unscrew the adjustable glides until they extend below the casters. Then, lower the cabinet and lift the other side. Partially unscrew the adjustable glides until they extend below the casters. Lower the cabinet. (See Figure 1-2.)

Setting the Coin and Game Option Settings

The Road Blasters coin and game options are set in the Self-Test Mode. Refer to Chapter 2 for the recommended settings and the procedure for setting the options.

Game Play

This section of the manual describes the theme of the Road Blasters game, the operating modes, and the game play features.

Introduction

Road Blasters is an action-packed battle game where the player drives a high-performance armored car. Road

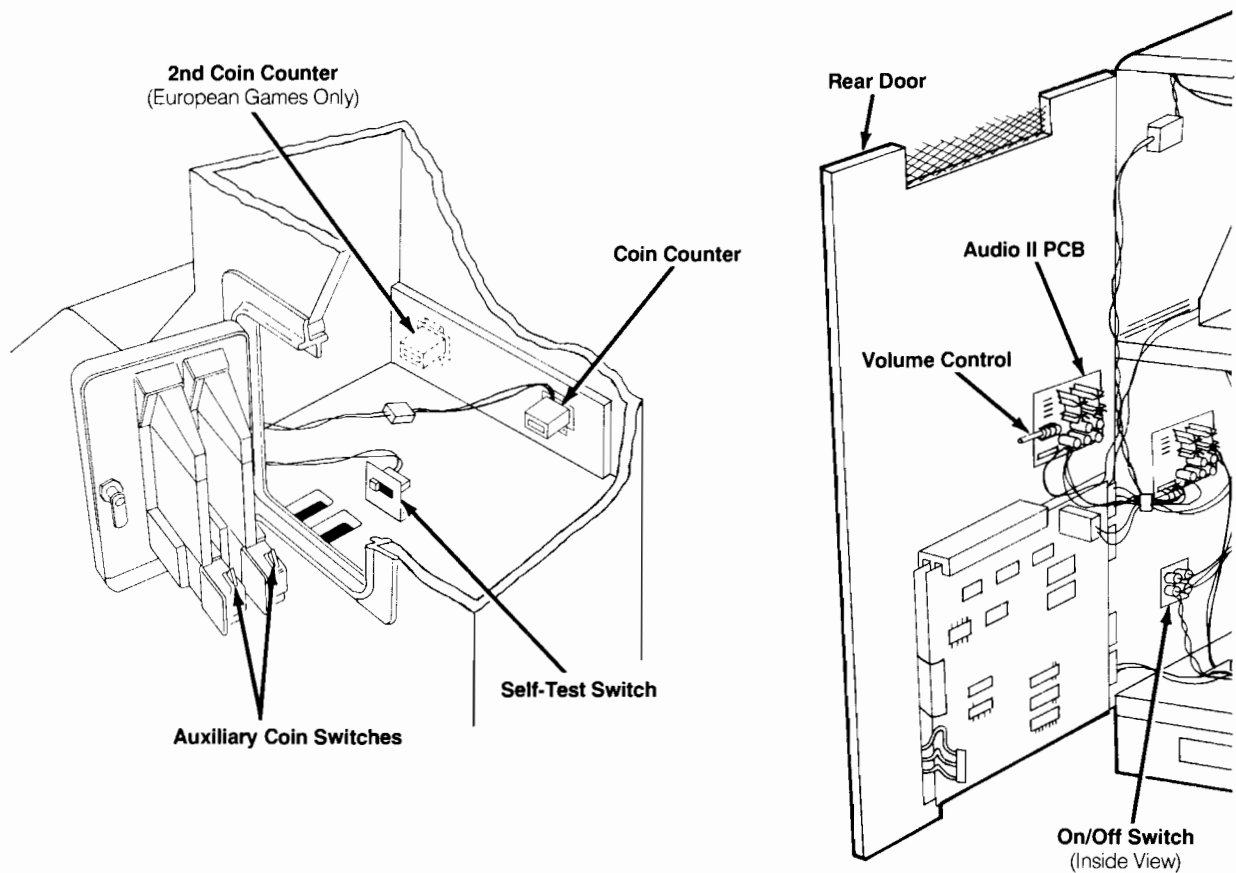


Figure 1-1 Control and Switch Locations

Blasters features a new return-to-center (RTC) steering control with fire buttons to highlight the realistic driving perspective and added action element of laser artillery and unique special weapons.

Atari Games has designed Road Blasters in cooperation with Matchbox Toys, a company famous for its authentically detailed collectible die-cast cars. Road Blasters is a new Matchbox line of futuristic action/adventure vehicles.

Attract Mode

The Attract Mode begins when the game is powered up or after exiting the Play or Self-Test Modes. The Attract Mode ends when coins or tokens are inserted and the gas pedal is pressed. The Attract Mode continuously cycles through the following displays:

- Road Blasters title screen
- Game play demonstration
- Screen displaying The Enemy and their respective point values
- High score table

- Contest information (U.S. and Canada only)

Unique Features to Attract Players

- Tie-in with the Matchbox Road Blasters line of action/adventure vehicles. Matchbox Toys will support its Road Blasters line with television advertising in the spring and fall of 1987, in addition to retail promotions and an ambitious public relations campaign. As an amusement game operator owning a Road Blasters video game, you will profit from the public awareness created by Matchbox Toys.
- A special player contest (in the U.S. and Canada only) to promote increased play on the game. Players who complete rally 50 are asked to enter their name and obtain a secret code. When mailed to Atari Games, this secret code entitles the player to a specially designed Road Blasters T-shirt. Detailed rules are on the marquee packaged with your Road Blasters game.
- The Road Blasters unique high-tech cockpit cabinet will be an attention-grabber in all locations.

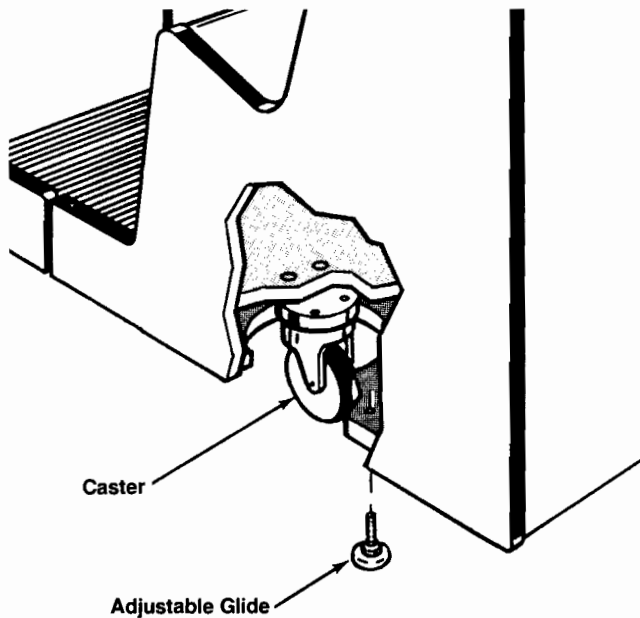


Figure 1-2 Stabilizing the Sit-Down Cabinet

- Realistic graphic quality is highlighted by the unique fresnel lens that overlays the display and magnifies the screen graphics, simulating a 25-inch monitor.

Play Mode

Road Blasters is the Ultimate Race of the Future—being part road race and part combat-zone survival exercise.

The roadway leads the player through a progression of countries, alternating checkpoints, and rally points. Checkpoints are mid-point goals that award additional fuel as the player races past. Rally points are similar to finish lines in ordinary race games because they indicate the completion of a race section. In the case of Road Blasters, a scroll-up video display evaluates player performance at each rally point. The game ends when the players run out of fuel by driving too slow, or crashing too often.

Player controls consist of an RTC steering control with triggers and thumb firing buttons, and a gas pedal. The triggers control the laser gun; the thumb buttons ignite the special weapons.

Players can tag the green and red fuel globes placed along the roadway to obtain more fuel. As a reward, their cars are also refueled when they reach each checkpoint and rally point.

Four unique computer-controlled opponent vehicles challenge players: sleek, fast Stingers; heavily armored Command cars; evasive and unpredictable Rat Jeeps; and quick, darting Cycles. These vehicles combine forces to try to prevent the players from reaching the next rally point. In addition, there are mines in the road, gun turrets

on the side of the road shooting at the players, spikers thrown by opponent vehicles, and other obstacles to be avoided.

The player can dock with the special attribute pack dropped by the support jet to acquire special weapons. Special weapons include: Cruise Missiles that destroy everything in the path of the player that is visible on the screen; Nitro Injectors that boost the speed of players' cars; U.Z. Cannons that rapid-fire; and Electro Shields that protect players' cars from shots, collisions, mines, and spikers.

High Score Mode

Upon completing a game and if players are among the top ten scorers recorded on the game, they have 17 seconds to enter their first initial and another 17 seconds for the next initial, until all have been entered. Players select their initials by pressing the thumb buttons or the triggers. Players can correct their initials by selecting the arrow that points to the left and pressing the gas pedal, then repeating the procedure for entering their correct initials.

To encourage high score competitiveness among players, your Road Blasters game automatically resets the high score table to the default list of players' initials and scores. During normal use (when the game is turned off at closing time), the top four scores are reset if more than 200 sequential games have elapsed and no players have entered their initials as one of the top four scores. This interval is about once a week; the reset occurs during power-up. Scores 5 through 10 are reset daily during power-up.

Maximizing Earnings

Operator options on this game have been kept very simple. You should thoroughly read Chapter 2, Self-Test, for the Coin Options, Game Options, Histograms, and Statistics screens so that you can effectively use the available options. Use the Self-Test screens showing Statistics and Histograms to evaluate game data, and the Game Options screen to make adjustments. (Refer also to the Self-Test chapter for more information on setting options.)

The key to maximum earnings is striking a midpoint on game times. Game times must be short enough so that player turnover is high. Conversely, game times must be long enough to give players a good value and ensure repeat play. (Repeat play is crucial to longevity.) The Road Blasters software gives the operator the flexibility to tune game difficulty and enough statistics to intelligently make adjustments.

If collections seem low or are dropping off, check all player controls and coin mechanisms for proper operation.

If earnings seem low, the game is technically sound and the average game time per quarter is under 110 seconds,

try changing the game difficulty option to an easier setting. This change will give players more game time relative to their score.

If the average game time per quarter is over 180 seconds, first try changing the game difficulty to a harder setting. If the average game time per quarter is still over 180 seconds after a few weeks, try an even harder setting.

NOTE

Be sure to keep the factory default at *no* if you wish to try other than factory-recommended settings.

After changing the game difficulty settings, it is a good idea to reset the game statistics. The coin information and game statistics should be cleared in self-test by pressing the trigger button; this resets the average game time statistic. In addition, the histograms should be cleared by pressing the foot pedal while displaying the level 5 Histogram screen.

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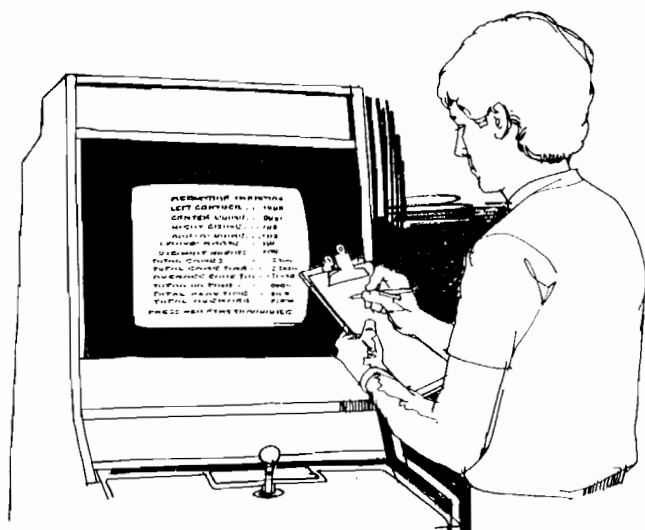
Self-Test

The Road Blasters™ game tests itself and provides visual and audible indications of the condition of the game circuitry. Self-test information is displayed on the screen and through the sound system. No additional equipment is required.

We suggest that you perform a self-test when you first set up the game, each time you collect the money, or when you suspect game failure. Coin and game options are selected in the Self-Test Mode.

After the self-test switch is turned on, 16 self-test screens provide information pertaining to the game circuits. Refer to Chapter 1 for the location of the self-test switch.

When the self-test switch is turned on, and the power is then turned on, the game enters the full Self-Test Mode. If the self-test switch is turned on while pressing the trigger button, the game enters a shorter Self-Test Mode. The following self-test screens are arranged in the sequence in which they occur after the self-test switch is first turned on. After the Sound Test, the sequence starts over with the Switch Test. Turning the self-test switch off at any time during the Self-Test Mode causes the game to return to the Attract Mode.



NOTE

During any of the self-tests, press the thumb button on the RTC (return-to-center) steering control to advance to the next screen.

RAM/ROM Test

The RAM/ROM Test screens are shown in Figures 2-1 and 2-2. These tests provide a visual check of the game RAM, ROM, and associated circuitry. If the RAM and ROM test passes, the display advances to the Switch Test.

The RAM/ROM Test is divided into two sections. The condition of the RAM circuitry is displayed in the bottom half of the screen and, after about an eight-second delay, the condition of the ROM circuitry is displayed in the top half of the screen. An error message indicates that the RAM, ROM, or associated circuitry may be faulty.

If the ROM test fails, an error message appears in the top half of the screen as shown in Figure 2-1. Refer to Table 2-1 for the faulty ROM locations.

If the upper or lower main memory ROM circuits on the Main PCB fail, an *Upper or Lower Main ROM Error* message appears at the top of the screen. Press the thumb button to obtain any RAM or ROM error message(s) from

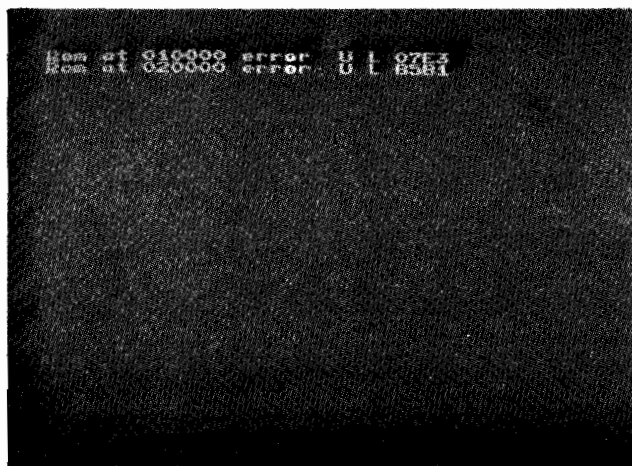


Figure 2-1 ROM Test Fails

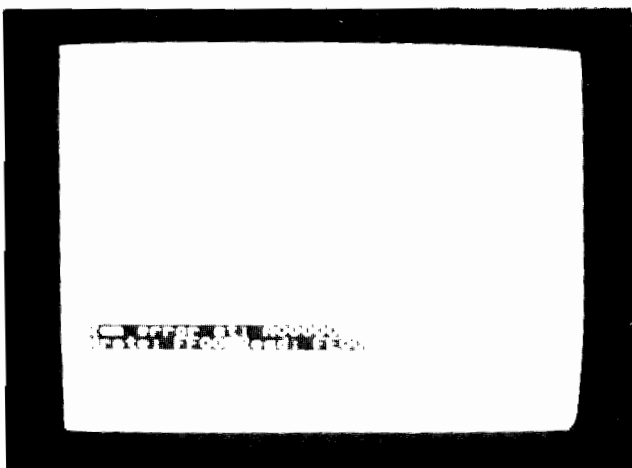


Figure 2-2 RAM Test Fails

Table 2-1 Faulty ROM Locations

Error Message	Location on Cartridge 5 PCB Assy	
ROM at 10000 error	U = 7P	L = 8P
ROM at 20000 error	U = 7R	L = 8R
ROM at 30000 error	U = 7S	L = 8S
ROM at 50000 error	U = 7L	L = 8L
ROM at 60000 error	U = 7M	L = 8M
ROM at 70000 error	U = 7N	L = 8N
Bank switch error		

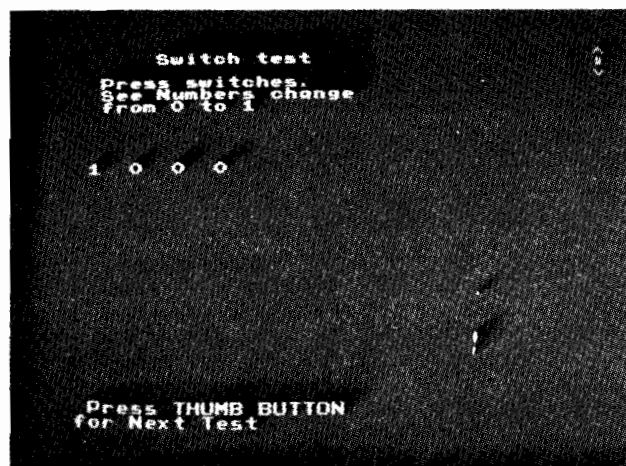


Figure 2-3 Switch Test

the Cartridge PCB RAM or ROM circuits. Press the thumb button again. If the bank switch ROM circuits on the Cartridge PCB are faulty, the message *Bank Switch Error* will appear.

If the RAM test fails, an error message appears as shown in Figure 2-2. Refer to the memory maps and schematic diagrams in the *Schematic Package Supplement (SP-299)* to determine the location of the faulty RAM circuit.

Repair the faulty RAM or ROM circuit or press the thumb button to obtain the Switch Test.

Switch Test

The Switch Test screen is shown in Figure 2-3. This test indicates the condition of the trigger pushbutton switch. Press the trigger button, and note that the first number changes to a 1.

Press the thumb button to obtain the next screen.

NOTE

For all subsequent tests in the self-test, the following summarizes the functions of the various switches:

- The thumb button sequences to the next test.
- The foot pedal has an action function. For example, in the convergence test pressing the pedal changes the grid lines from white to violet; in the sound test, the audio starts sounding.
- The RTC steering control left-to-right movement selects choices. (Right/left arrows are displayed in the upper right corner on the screen.)
- The trigger switch, if pressed, changes the RTC steering control to show up/down movement on the screen. (Up/down arrows are displayed in the upper right corner of the screen.)

Coin Options

The Coin Options screen is shown in Figure 2-4. This screen indicates the current coin option settings and is used to change these settings. Refer to Table 2-2 for the available and recommended settings.

NOTE

If you wish to try other than factory-recommended options, leave the *Restore Factory Options* setting at *no*.

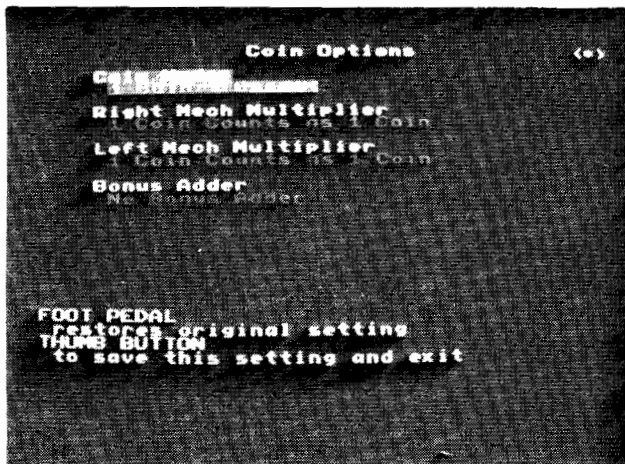


Figure 2-4 Coin Options

Table 2-2 Coin Option Settings

Option Name	Available Settings
Credit Mode	1 Coin 1 Credit ◀ 2 Coins 1 Credit 3 Coins 1 Credit 4 Coins 1 Credit
Right Mech Multiplier	1 Coin Counts as 1 Coin ◀ 1 Coin Counts as 4 Coins 1 Coin Counts as 5 Coins 1 Coin Counts as 6 Coins
Left Mech Multiplier	1 Coin Counts as 1 Coin ◀ 1 Coin Counts as 2 Coins
Bonus Adder	No Bonus Adder ◀ 2 Coins Give 1 Extra Coin 4 Coins Give 1 Extra Coin 4 Coins Give 2 Extra Coins 5 Coins Give 1 Extra Coin 3 Coins Give 1 Extra Coin Free Play

◀ *Manufacturer's recommended settings*

Coin Mode should be highlighted. Move the RTC steering control right or left, and note that the coin mode values change. Select the desired value. Move the RTC steering control to the right (while the trigger switch is pressed); this moves the box to *Right Mech Multiplier*. Move the RTC steering control right or left (without pressing the trigger switches) to cycle through all the available multiplier values. Select the desired value. Repeat this procedure for the remaining options.

If you wish to cancel the option changes and restore the original settings, press the foot pedal.

Press the thumb button to set the selected coin options and to obtain the next screen.

Game Options

The Game Options screen is shown in Figure 2-5. This screen indicates the current game option settings and is used to reset the high score table and to change the game option settings. Refer to Table 2-3 for the available options and the default (recommended) settings. Note that the recommended settings are highlighted in green.

Move the RTC steering control right or left and note that the settings for the option in the shaded block change. Select the desired value. Press the trigger switch and simultaneously move the RTC steering control left/right to move the desired option into the shaded block. Move the RTC steering control right or left (without pressing the trigger switch) to cycle through all the available game option settings and select the desired value. Repeat this procedure for the remaining options.

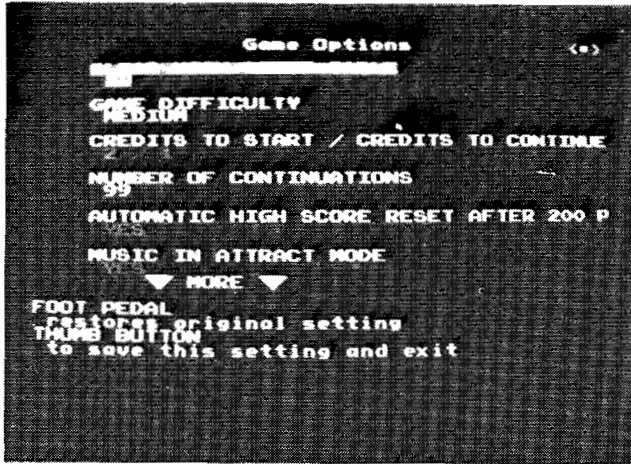


Figure 2-5 Game Options

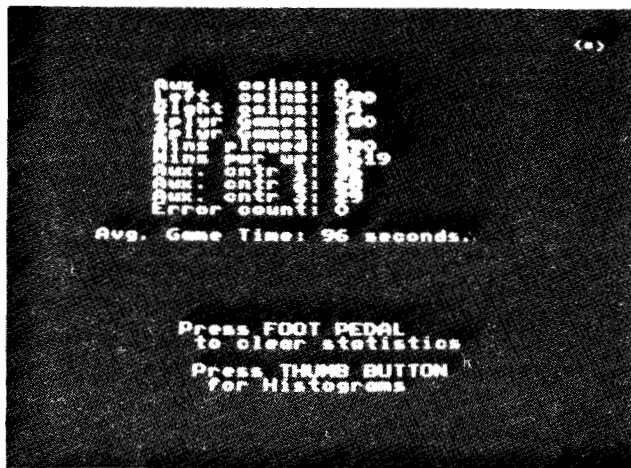


Figure 2-6 Statistics

If you want to cancel the option changes and restore the original settings, press the foot pedal.

Press the thumb button to set the selected game options and to obtain the next screen.

Statistics

The Statistics screen is shown in Figure 2-6. This screen provides a visual check of the current game statistics. The statistics information is accumulated either from the first time the game was turned on or from the last time the statistics were reset. To reset the statistics information, press the trigger button.

The following information appears on the Statistics screen:

- *Aux coins* is not used in the Road Blasters game.
- *Left coins* shows the number of coins deposited in the left coin mechanism.

- *Right coins* shows the number of coins deposited in the right coin mechanism.
- *1 plyr Games* shows the number of 1-player games.
- *Mins played* shows the total time, in minutes, of all the games played.
- *Mins pur up* shows the total time, in minutes, that the game has been turned on.
- *Aux. cntr 1* shows the highest rally achieved.
- *Aux. cntr 2* shows the total number of times the add-a-coin was used.
- *Aux. cntr 3* shows the number of games without a new high-score entry.
- *Error count* shows the number of EEPROM errors that were detected. Replace the EEPROM at location 15F on the Main PCB if the errors detected exceed approximately 75 per week.
- *Avg. Game Time* shows the average game time per play in seconds, including add-a-coin continuation games.

Table 2-3 Game Option Settings

Option Name	Available Settings
Clear high score table	No ◀ Yes
Game difficulty	Easy Medium ◀ Hard Difficult
Credits to start/credits to continue	1/1 2/1 2/2 ◀
Number of continuations	2 3 4 Unlimited number ◀
Automatic high score reset after 200 games	Yes ◀ No
Music in attract mode	Yes ◀ No
Rally 50 contest enabled	Yes ◀ (U.S. and Canada only) No (Europe only)
Demo/play mode	Playable game mode ◀ Demonstration mode (players cannot crash)
Restore factory options	Yes No ◀

◀ *Manufacturer's recommended settings*

Press the thumb button to obtain the next screen.

Histograms

There are five Histogram screens. One screen is shown in Figure 2-7. The screens are selected by pressing the thumb button. Each screen shows the lengths of the games from 0 to 540 or more seconds and the total number of players. The high score for each level is also displayed.

The Histograms for Levels 1 through 3 show the players' wave selections (choosing from Rookie, Veteran, or Expert). The Histogram for Level 4 shows the number of games that ended on the original level of the game continuation feature. The Histogram for Level 5 shows the number of games that ended on a higher level after a game continuation.

The game times information is accumulated either from the first time the game was turned on or from the last time the game times were reset. To reset the Histograms, press the foot pedal while displaying the Histogram for the Level 5 screen.

Press the thumb button to obtain the next screen.

Playfield Test

The Playfield Test screen is shown in Figure 2-8. This screen indicates the condition of some of the graphics ROM, and the vertical and horizontal playfield scrolling registers.

Move the RTC steering control to the left, and the playfield should slowly scroll to the left. Move the RTC steering control right, and the playfield should scroll right. Pressing the trigger button causes the RTC steering control to scroll the playfield up/down when the RTC control is moved left/right.

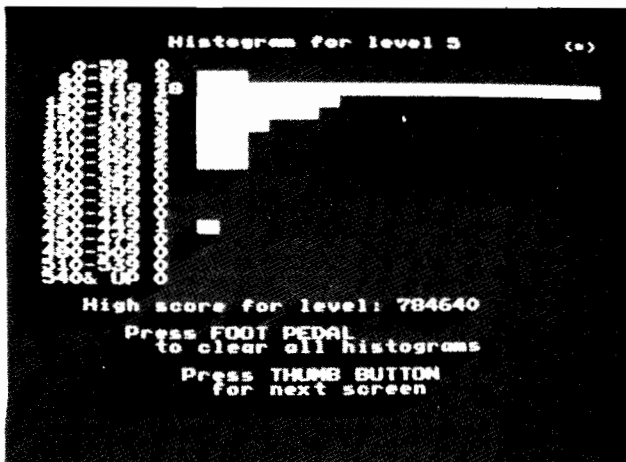


Figure 2-7 Histograms

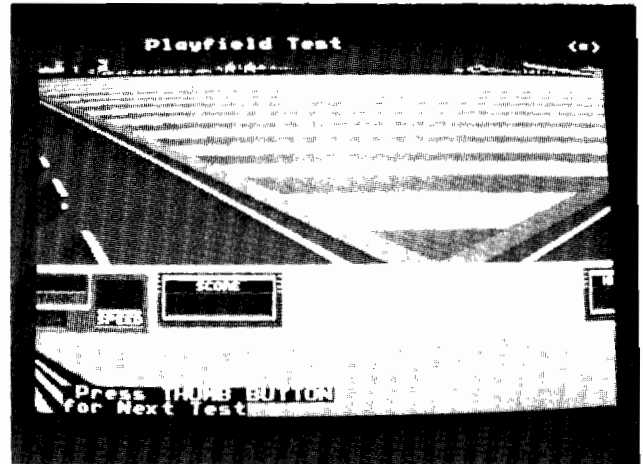


Figure 2-8 Playfield Test

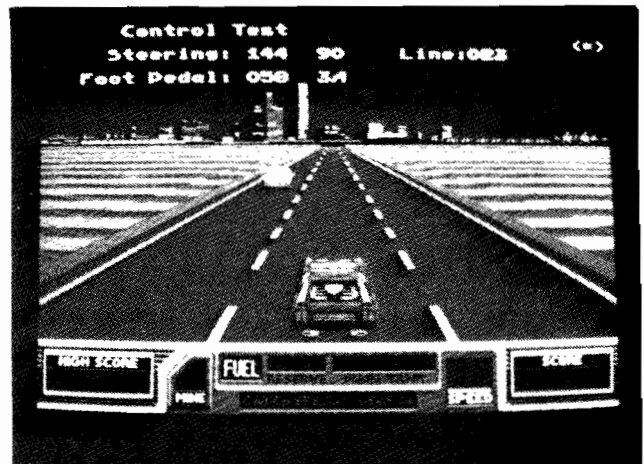


Figure 2-9 Control Test

Press the thumb button to obtain the next screen.

Control Test

The Control Test screen is shown in Figure 2-9. This screen indicates the condition of the controls, graphics ROMs, and motion object circuitry. Moving the RTC steering control to the left and right will change the displayed value next to the word *STEERING*: (the left number is in decimal, the right one is in hexadecimal). Look for consistent readings (within ± 2) when you move the control to its left and right limits.

The *FOOT PEDAL*: message also displays decimal (left) and hexadecimal (right) values. Look for a difference of at least 64 between the fully pressed and fully upright positions of the foot pedal. These values should increase as the pedal is pressed.

Also note that the player's car should be displayed in the center pointing ahead, as in game play. Another vehicle is

displayed (initially a stinger) at the top of the roadway in the left lane.

Moving the RTC steering control selects a different opponent; moving the RTC steering control to the left or right steps that opponent through the next lane on the left or right. Finally, pressing the foot pedal moves the vehicle down the screen towards the bottom. Eventually the opponents will disappear as they move outside the display window.

Motion Object Test

The Motion Object Test indicates the condition of the motion-object buffer circuit. The seven groups of eight motion objects should be identical and eight pixels high.

Press the trigger button to select one of the 56 motion objects. RTC left/right movement moves an object left/right. The object should be invisible about half the distance of its travel (for about five seconds). Pressing the trigger switch causes the RTC steering control left/right movement to move the object up/down. (Figure 2-10 shows the screen after some motion objects have been moved.)

Press the thumb button to obtain the next screen.

Motion Object Height Test

The Motion Object Height Test indicates the condition of the motion object/playfield graphic address generator circuit.

Each successive column of motion objects should be eight pixels taller than the last. The top eight pixels of all the columns should be the same. The top 16 pixels of all the columns that are at least 16 pixels high should be the same. Each column should add a new 8x8 pixel stamp picture to the bottom and slide the old picture up by eight pixels. The motion objects can be moved by following

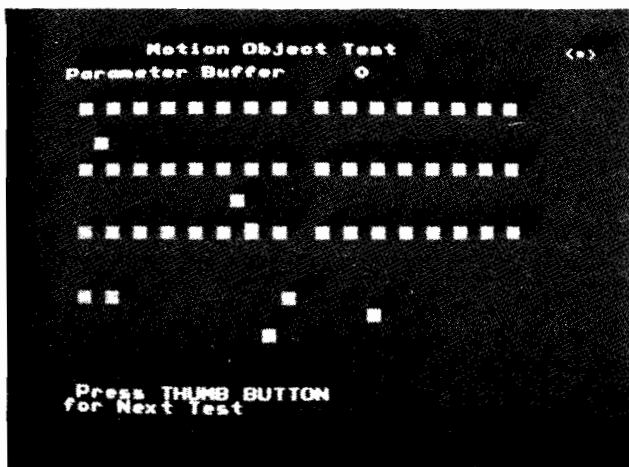


Figure 2-10 Motion Object Test

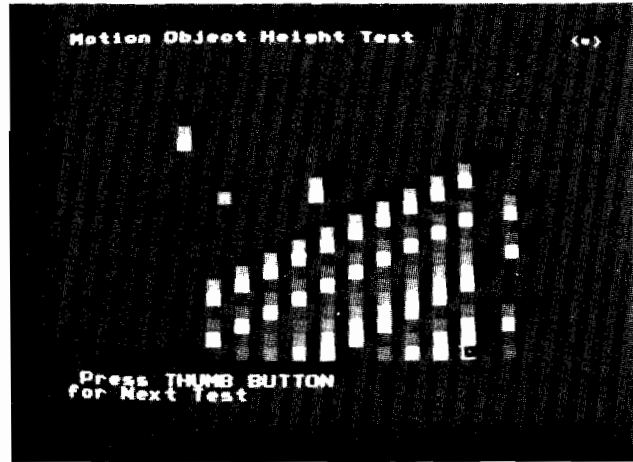


Figure 2-11 Motion Object Height Test

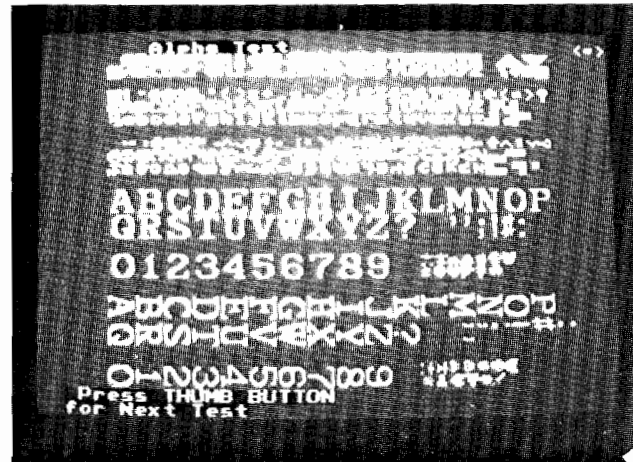


Figure 2-12 Alphanumeric Test

the same procedure as in the Motion Object Height Test. (Figure 2-11 shows the screen after some motion objects have been moved.)

Press the thumb button to obtain the next screen.

Alphanumeric Test

The Alphanumeric Test screen is shown in Figure 2-12. This test indicates the condition of the alphanumeric circuit.

Press the thumb button to obtain the next screen.

Color Test

The Color Test screen is shown in Figure 2-13. This test indicates the condition of the display color circuits.

There should be eight vertical grey-scale bars and three groups of eight horizontal bars with shades of red, green, and blue. The brightest bars should be on the left, and the

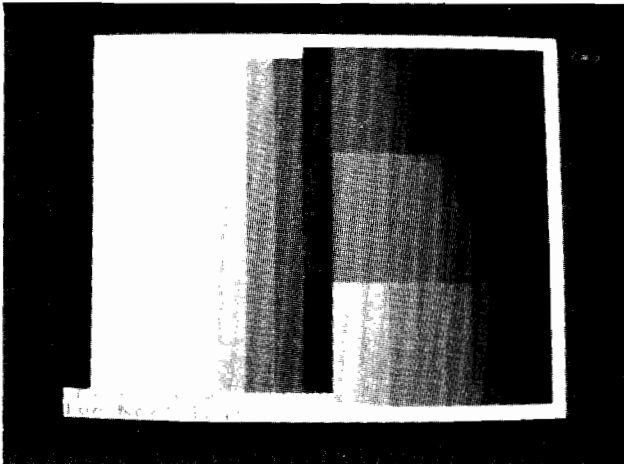


Figure 2-13 Color Test

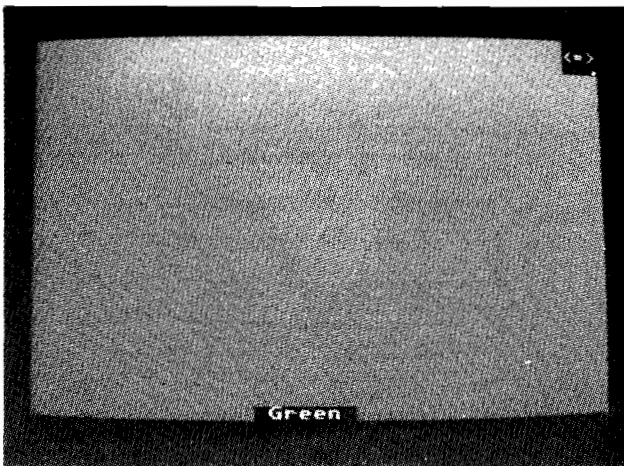


Figure 2-14 Color Purity Test

darkest (black) bars should be on the right. A bright white frame should surround the screen: this frame will help to identify the darkest color band. If the display characteristics are not correct, refer to the display manual for the color-gun adjustment procedure or to determine the possible cause of failure.

Press the thumb button to obtain the next screen.

Color Purity Test

The Color Purity Test consists of five color displays that indicate the condition of the display color-purity circuits. The first display to appear should be a red screen with the word *RED* displayed at the bottom of the screen.

Press the foot pedal and the next display to appear should be green with the word *GREEN* displayed at the bottom of the screen (see Figure 2-14). Press the foot pedal to obtain a blue, white, and finally a grey screen. After the grey screen the software repeats the cycle, beginning with the red screen.

If the display characteristics are not correct, refer to the video display manual for the color-purity adjustment procedure or the possible cause of failure.

Press the thumb button to obtain the next screen.

Convergence Test

The Convergence Test screen is shown in Figure 2-15. This test indicates the condition of the display size, centering, linearity, and convergence. The grid pattern should be white.

Press the foot pedal, and the pattern should turn violet. Repeated pressing of the foot pedal should cause the screen to alternate between violet and white. Check the grid pattern for the following characteristics (the violet and white patterns are used to adjust the display convergence):

- The four corners of the frame around the grid pattern should touch all four corners of the screen.
- Grid lines should exhibit no pincushioning or barreling, and the lines should be straight within 3 mm.
- Violet and white pattern convergence should be within 2 mm.

If the display characteristics are not within these limits, refer to the display manual for the linearity and convergence adjustment procedures or to determine the possible cause of failure.

Move the RTC steering control left/right, and the pattern should slowly move left/right. Moving the RTC steering control left or right with the trigger switch depressed should cause the pattern to scroll up or down.

Press the thumb button to obtain the next screen.

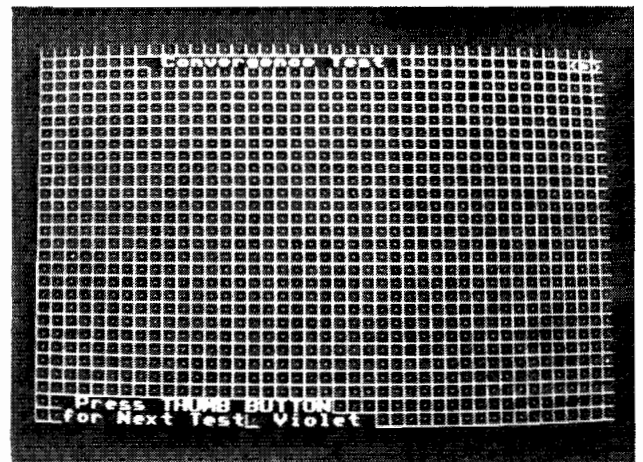


Figure 2-15 Convergence Test

Sound Test

The Sound Test screen is shown in Figure 2-16. This test indicates the condition of the coin mechanisms, and the music and sound-effects circuits.

The sound microprocessor is reset at the beginning of this test; the reset can take several seconds. If the sound-microprocessor reset fails, the message *SOUND PROCESSOR NOT RESPONDING* should flash near the top of the screen. Move the RTC steering control left with the trigger switch pressed to sequence forward through the

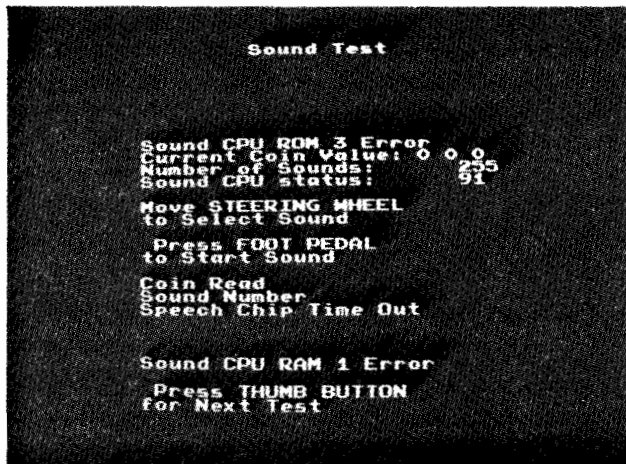


Figure 2-16 Sound Test

sounds; move the RTC steering control right with the trigger switch pressed to sequence backwards. Press the foot pedal to start the selected sound. The Sound Test provides the following sound information:

- *Current Coin Value* consists of three zeros. As coins are deposited in each of the coin mechanisms, the second and third zero should change to a *1* as the coin switch is held down and should change back to zero when the coin switch is released.
- *Number of Sounds* indicates the number of sounds used in the Road Blasters game.
- *Sound CPU Status* indicates the condition of the sound microprocessor. If the sound microprocessor is good, the word *Good* should appear. If the sound microprocessor is faulty, the message *Sound CPU ROM 1, ROM 2, or ROM 3 Error* appears at the top of the screen. (ROM 1 is at location 7/8C/D on the Cartridge 5 PCB Assembly; ROM 2 and ROM 3 is at location 7/8D on the same PCB.)
- *Music Chip Test* consists of eight tones in a major scale that alternate between sound channels (16 tones in all).
- *Effects Chip Test* consists of four tones in a major chord that come from both sound channels simultaneously.
- *Speech Chip Test* consists of a synthesized voice repeating the message "speech chip test."

Press the thumb button to obtain the first screen (the RAM/ROM Test).

Maintenance

This chapter includes preventive and corrective maintenance procedures for the Road Blasters™ game components that are subject to the most use. To assure maximum trouble-free operation from this game, we recommend that preventive maintenance be performed as described in this chapter.

Removal, disassembly, reassembly, and replacement procedures are provided for components that might require corrective maintenance. Appropriate references are provided to Chapter 5, Illustrated Parts Lists, to help locate the parts of this game that are mentioned, but not illustrated, in the maintenance procedures.



Preventive Maintenance

Preventive maintenance includes cleaning, lubricating, and tightening hardware. How often preventive maintenance is performed depends upon the game environment and frequency of play. We recommend that preventive maintenance be performed at the intervals specified.

⚠ WARNING ⚠

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

Preventive-Maintenance Intervals

The preventive-maintenance intervals are the recommended minimum requirements for the components listed.

- RTC Steering Control Inspect weekly, lubricate, and tighten hardware at least every three months. Also, inspect the handle microswitches weekly.
- Foot Pedal Lubricate and tighten hardware at least every three months.
- Coin Mechanism Inspect whenever coins are collected. Clean at least every three months.
- Interior Components Clean at least every six months.

Removing the Control Panel

Perform the following procedure to remove/replace the control panel. (See Figure 3-1.)

1. Unlock and open the rear door.
2. Use a Phillips screwdriver to remove the four screws holding the speakers and grilles to the control panel. Also remove the speaker wires.
3. Use a 5/32-inch Allen wrench to remove the four screws holding the RTC steering control to the control panel.
4. Carefully guide the RTC steering control through the hole in the control panel.
5. Disconnect the RTC steering control harness connector.
6. Use a 1/8-inch Allen wrench to remove the ten screws holding the control panel to the cabinet.
7. Replace the control panel in the reverse order of removal. Be sure that the RTC harness wires do not in-

terfere with the gears when the RTC steering control is installed.

Maintaining the RTC Steering Control

Preventive maintenance on the RTC steering control consists of:

- Inspecting the RTC steering control housing for excessive wear or dirt.
- Checking the operation of all four handle microswitches.
- Inspecting the Optical Coupler PCB Assembly for damage and contamination.
- Lubricating the bronze bearings attached to the control base weldment.
- Replacing or tightening the securing hardware if necessary.

Perform the following procedure to lubricate and tighten the RTC steering control. (See Figure 3-2.)

1. Remove the control panel as previously described.
2. Apply a film of light oil (Atari part no. 107013-001) to the inside and top surfaces of both bronze bearings attached to the inside ends of the control base weldment.
3. Use a 5/32-inch Allen wrench to tighten the button-head screws holding the RTC steering control to the control panel.

Cleaning the Coin Mechanism

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

Cleaning the Interior Components

Perform the following procedure to clean the components inside the cabinet.

⚠ WARNING ⚠

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

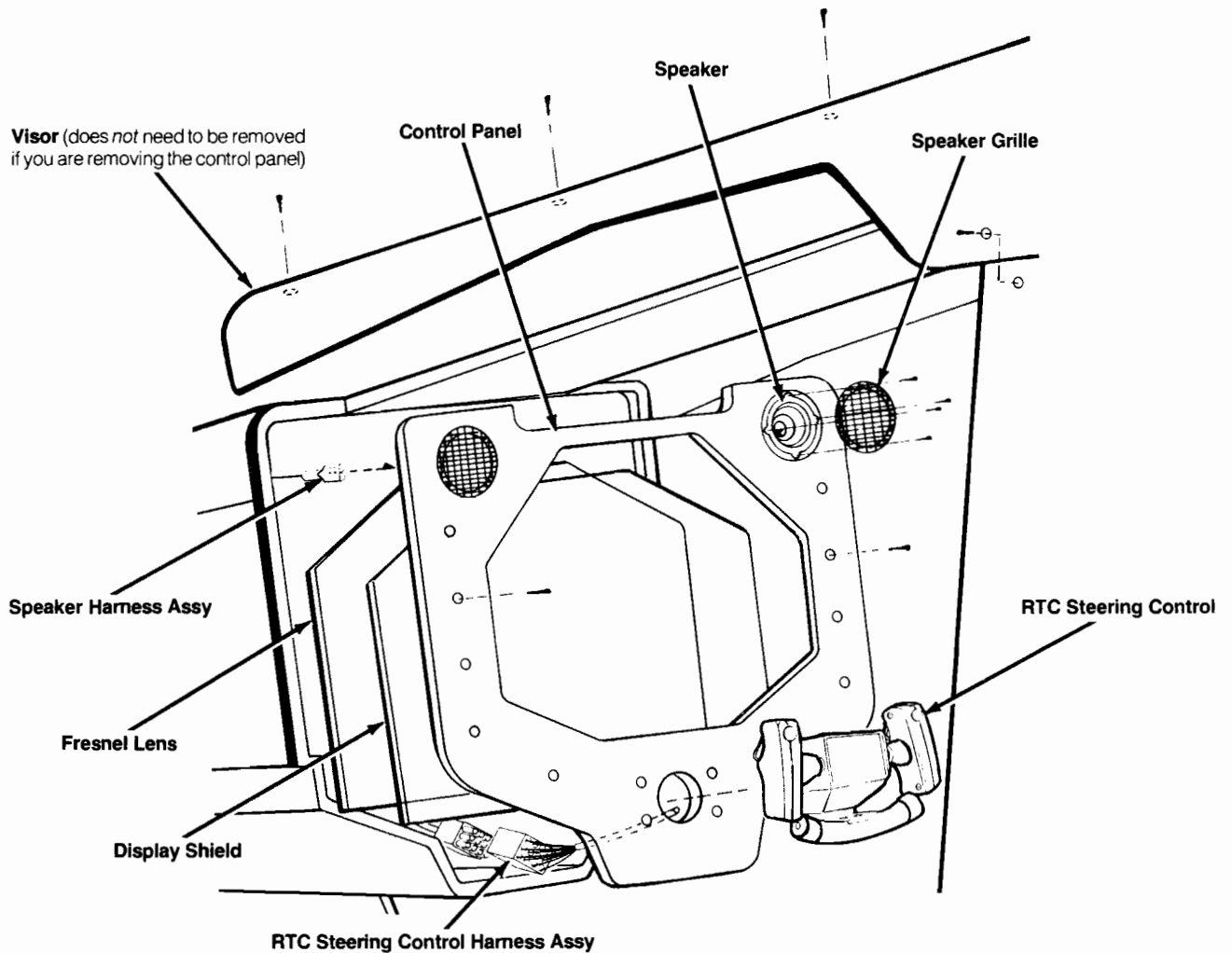


Figure 3-1 Speaker, Fresnel Lens, and Video Display Shield Removal

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

CAUTION

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

3. Use a vacuum cleaner with a soft long-bristled brush attachment or use a soft-bristled paint brush to remove loose dirt and dust accumulated on the inside of the cabinet. Be sure to clean the electrical components thoroughly (power supplies, PCB assemblies, display, etc.).

Corrective Maintenance

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

Removing the RTC Steering Control

Perform the following procedure to remove/replace the RTC steering control. (See Figure 3-2.)

1. Unlock and open the rear door on the front of the cabinet.

Screw Torque Specifications Table

Ref. No.	Screw Size	Seating Torque Inch-Lbs.
①	2-56	3 ± 1
②	4-40	12 ± 3
③	6-32	28 ± 5
④	8-32	32 ± 5
⑤	10-32	64 ± 5

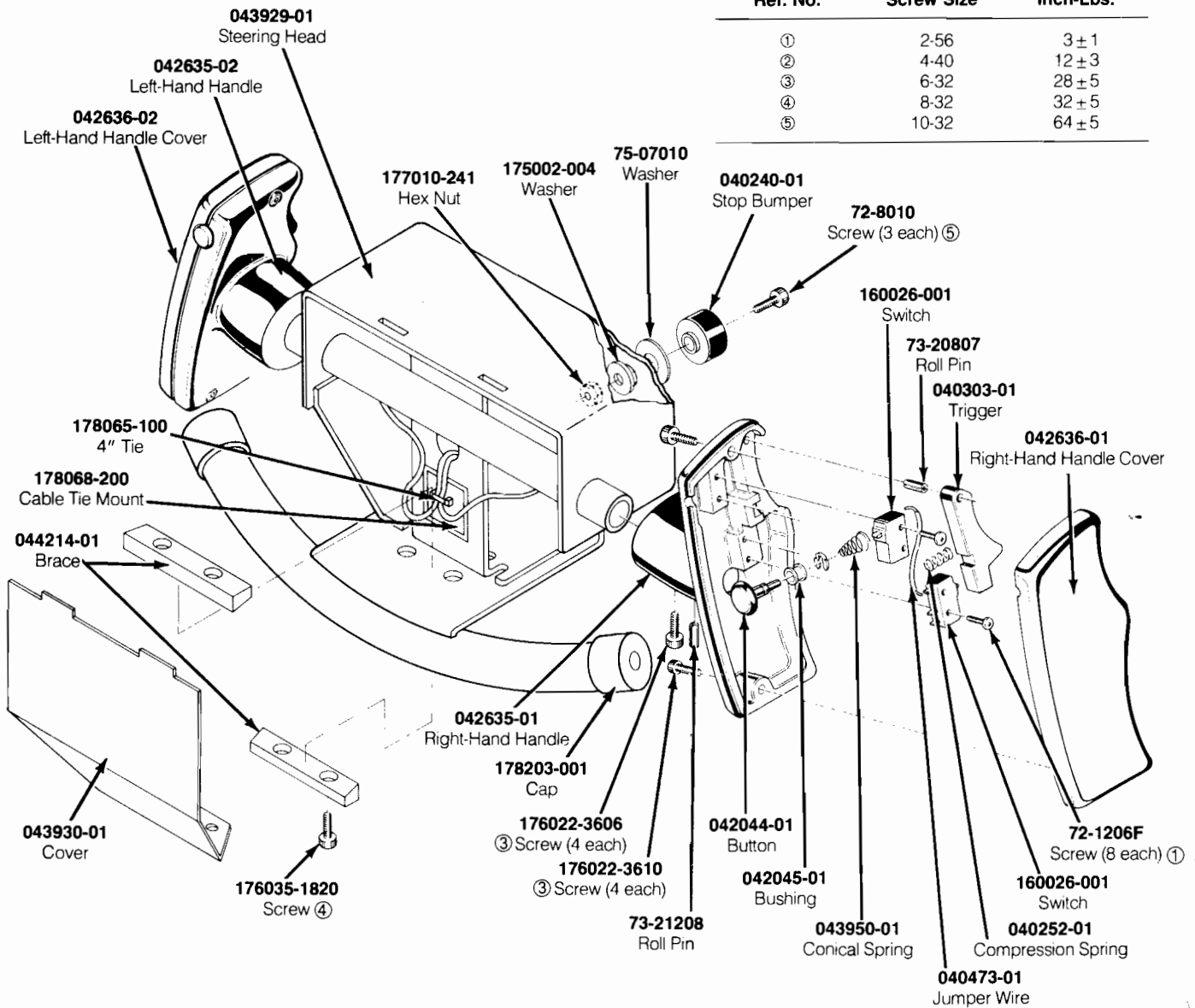


Figure 3-2 RTC Steering Control Disassembly and Lubrication

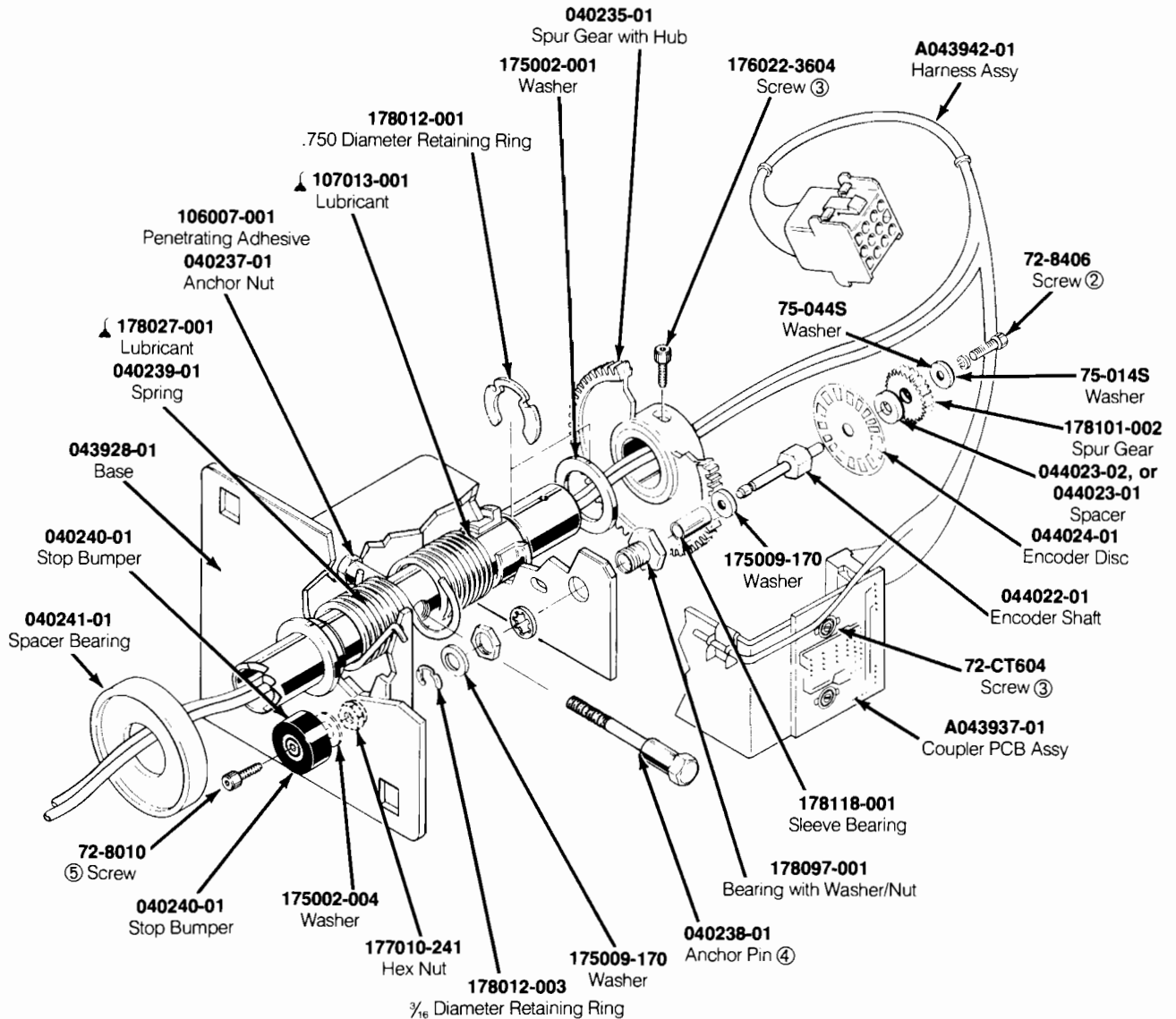


Figure 3-2 RTC Steering Control Disassembly and Lubrication, Continued

2. Use a 5/32-inch Allen wrench to remove the four buttonhead screws holding the RTC steering control to the control panel.
3. Carefully guide the RTC steering control through the hole in the control panel.
4. Disconnect the RTC steering control harness connector inside the cabinet.
5. Replace the RTC steering control in the reverse order of removal. Be sure to reconnect the control harness connector and the Coupler PCB Assembly harness connector. Also be sure that the RTC harness wires do not interfere with the gears when the control is installed.

NOTE

Certain corrective maintenance procedures can be performed with the RTC steering control attached to the control panel. However, for convenience and to avoid damaging the control panel, we recommend that the RTC steering control be removed from the control panel before any maintenance or repair is performed.

RTC Steering Control

The following corrective maintenance procedures apply to the RTC steering control. The RTC steering control consists of the handle assembly and the steering assembly.

Removing the Handles

Perform the following procedure to remove the handles from the handle assembly. (See Figure 3-1.)

1. Use a 7/64-inch hex driver to remove the two cap screws holding the cover on each handle. Be careful when removing the covers that the trigger and push-button springs do not fall free off the handles.
2. Unsolder the three harness wires from the trigger and push-button microswitches inside each handle.
3. Use a 9/64-inch hex driver to loosen and remove the two cap screws that secure the brace and cover.
4. Cut the tie wrap holding the harness, then gently pull the harness out of the shaft.
5. Use a 7/64-inch hex driver to remove the two cap screws that hold each handle to the shaft.
6. Use a 3/16-inch punch and gently drive the two roll pins from the shaft.
7. Gently slide the handles from the shaft.
8. Reassemble the handle in the reverse order of removal.

Disassembling the Handle Assembly

Perform the following procedure to disassemble the handle assembly. (See Figure 3-2.)

NOTE

Removing the handle assembly from the steering assembly is not necessary to perform the following disassembly procedure. However, refer to *Disassembling the Steering Assembly* later in this chapter for the procedure describing how to separate the two assemblies.

1. Use a 7/64-inch hex driver to remove the two cap screws from each handle assembly cover.
2. Remove the handles as previously described.
3. Replace the handle assembly in the reverse order of removal. Be sure to install a new tie wrap to hold the harness.

Disassembling the Steering Assembly

Perform the following procedure to disassemble the steering assembly. (See Figure 3-2.)

1. Remove the handle covers as described previously. Be careful when opening the handles that the push-button and trigger springs do not fall out.
2. Unsolder the three harness wires from the handle push-button and trigger microswitches.
3. Remove the green ground wire from the ground clip on the base, and the Optical Coupler PCB harness connector.
4. Use a hex driver to remove the two screws holding the Optical Coupler PCB Assembly to the base.
5. Use a 3/32-inch hex driver to remove the cap screw holding the encoder disc. Remove the retaining ring, two washers, encoder disc, encoder spacer, and small gear.

⚠ WARNING ⚠

Shield your face and eyes when prying the retainer from the shaft because the retainer can fly loose at a high speed. Cover the retainer with a rag or any material that can trap the retainer.

6. Use a 7/64-inch hex driver to remove the cap screw holding the large spur gear and hub to the shaft.
7. Use a slotted screwdriver (or an appropriate tool) to remove the retainer from the shaft.
8. Use a 3/16-inch wrench to remove the anchor nut on the end of the anchor pin. (The anchor nut holds the hook ends of the torsion-steering springs.)
9. Use a 9/64-inch hex driver to remove the two screws holding the cover to the steering head.
10. Cut the tie wrap holding the harness, then gently pull the harness out of the shaft.
11. Gently pull the steering assembly from the handle assembly. Make sure the harness wires are free to slide out of the handle-assembly shaft.
12. Use a 5/32-inch hex driver and 3/8-inch combination wrench to remove the two bumpers from the frame.

NOTE

With the steering control disassembled, lubricate the bronze bearing surfaces, and the torsion springs. Also, apply penetrating adhesive inside the anchor nut hole after assembly. Refer to *Maintaining the RTC Steering Control* earlier in this chapter for further information.

13. Reassemble the steering assembly in the reverse order of removal. Be sure that all necessary screws have

been tightened according to the Screw Torque Specifications Table. (See Figure 3-2.)

Installing the Harness Assembly

Perform the following procedure to install the harness assembly to the RTC steering control. (See Figure 3-2.)

1. If necessary, remove the handle covers as described under *Removing the Handles*.
2. Guide the harness wires into the spur-gear end of the hollow steering-assembly shaft. The wire routing on both microswitches should be as follows:

C = Common, should be the black wire. The black wire can go to either C (common) switch tab as long as there is a jumper wire.

NO = Normally open (Thumb Button), should be the red wire.

NO = Normally open (Trigger Button), should be the white wire.

NOTE

The tab locations are identical on both microswitches. However, because one microswitch is upside down, the markings are not visible.

3. Route and solder the wires to the microswitches. Note that either wire bundle can go to either handle.
4. Install the wire tie, optical coupler PCB connector, and the ground clip. Make sure the wires do not interfere with the gears when the steering control is mounted.

Removing the Video Display

Perform the following procedure to remove/replace the video display. (See Figure 3-3.)

1. Turn the game power off and wait two minutes. Unplug the power cord.
2. Unlock and open the rear door.



WARNING



High Voltage

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

X-Radiation

The video display has been designed to minimize X-radiation. However, to avoid possible exposure to soft X-radiation, *never* modify the high-voltage circuitry.

Implosion Hazard

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

3. Discharge the high-voltage from the cathode-ray tube (CRT) before proceeding. The display assembly contains a circuit for discharging the high voltage to ground when power is removed. However, to make certain, always discharge the display as follows.
 - a. Attach one end of a large, well-insulated, 18-gauge jumper wire to ground.
 - b. Momentarily touch the free end of the grounded jumper to the CRT anode by sliding it under the anode cap.
 - c. Wait two minutes and repeat part b.
4. From the back of the cabinet, disconnect all the display harness connectors. Remove the ground strap from the display chassis.
5. Use a $\frac{7}{16}$ -inch nut driver to remove the two hex head screws and washers from the upper corners of the video display chassis.
6. Also use a $\frac{7}{16}$ -inch nut driver to remove the two hex head screws, washers, and carriage bolts from the bottom corners of the video display chassis.
7. Carefully slide the display out through the rear of the cabinet.
8. Replace the video display in the reverse order of removal.

NOTE

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

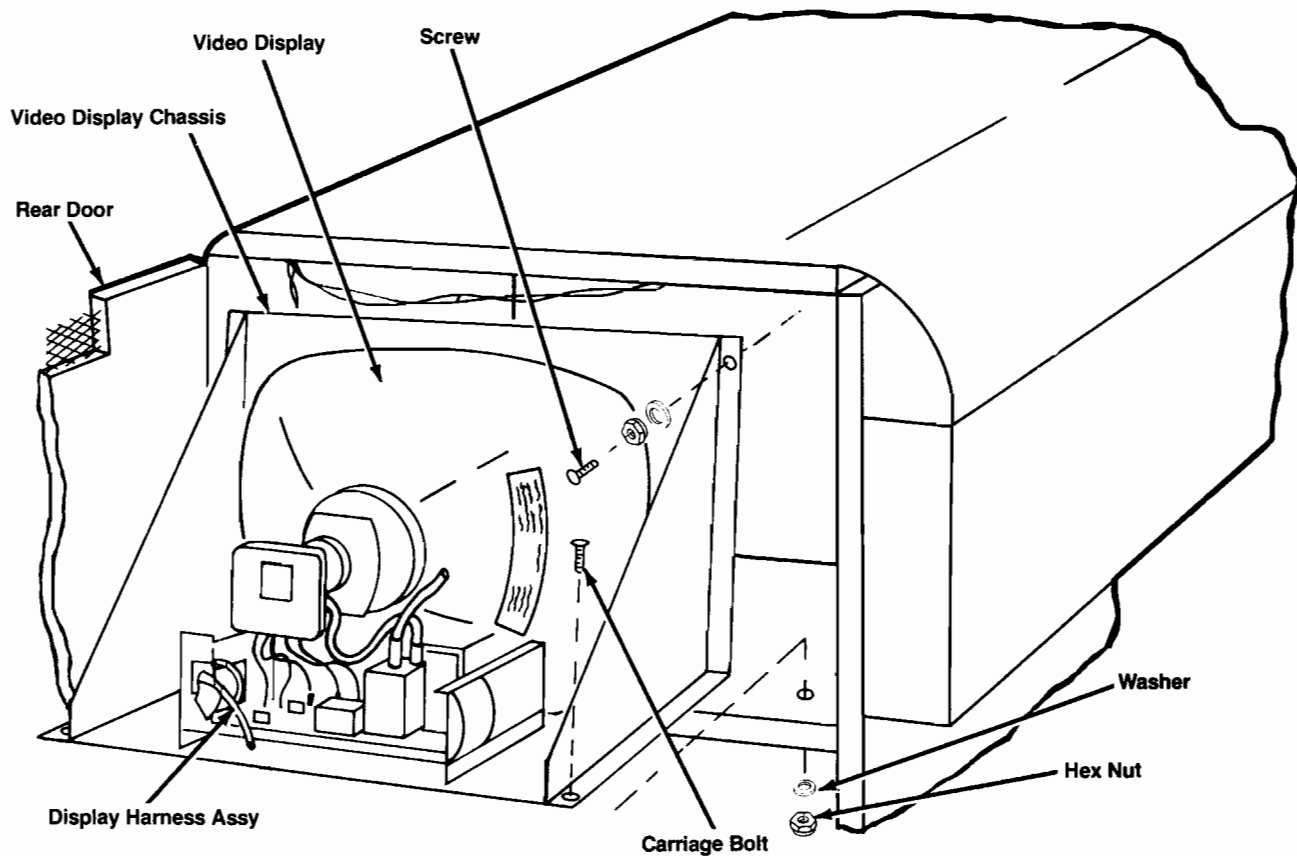


Figure 3-3 Video Display Removal

Removing the Foot Pedal Control

Perform the following procedure to remove/replace the foot pedal control.

1. Disconnect the foot pedal harness connector from the main harness assembly located inside the cabinet.
2. Use a 5/32-inch Allen wrench to remove the four screws and washers holding the foot pedal assembly to the foot panel. Remove the foot pedal.
3. Replace the foot pedal in the reverse order of removal.

Removing the Game PCBs

Perform the following procedure to remove/replace the game PCBs. (See Figure 3-4.)

1. Turn the game power off.

2. Unlock and open the rear door.
3. Use a Phillips screwdriver to remove the two screws holding the upper PCB cleat on the inside of the rear door. Remove the cleat.
4. Remove the screw and washers located in the upper right corner of the PCB board set that hold the set to the rear door.
5. Disconnect the video harness connector and the main edge connector from the Main PCB.
6. Tilt the Main PCB and the Cartridge PCB away from the door. Remove the audio connector from the Cartridge PCB.
7. Remove both the Main PCB and the Cartridge PCB from the bottom PCB cleat.
8. Replace both the Main and Cartridge PCBs in the reverse order of removal.

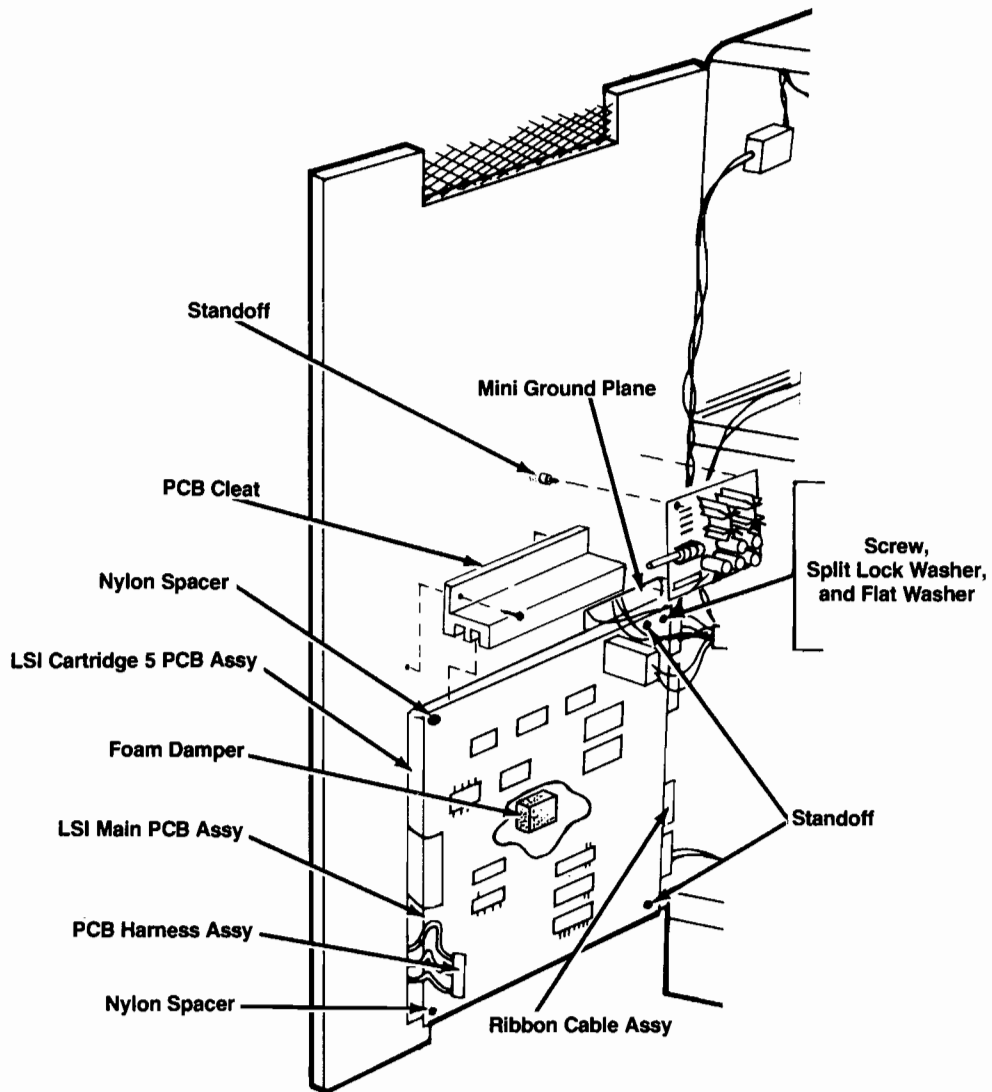


Figure 3-4 Game PCB Removal

Removing the Speakers

The Road Blasters game contains three speakers. Two small speakers are located in the upper corners of the control panel. One large speaker is located on the foot pedal panel below the control panel. Perform the following procedure to remove/replace the speakers. (See Figure 3-1.)

Control Panel Speakers

1. Turn the game power off.
2. From the front of the control panel, use a 1/8-inch hex driver to remove the four screws holding the speaker and grille to the control panel. Do not let the speaker fall.

CAUTION

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

3. Lower the speaker just far enough to disconnect the two speaker wires. Ensure that the speakers are properly phased by placing the same color-coded connector on the same tab on each speaker.
4. Replace the speaker in the reverse order of removal.

Foot Pedal Panel Speaker

Perform the following procedure to remove/replace the speakers.

1. Turn the game power off.
2. From the front of the foot pedal panel, use a 1/8-inch hex driver to remove the four screws holding the speaker grille to the foot pedal panel.
3. Use a Phillips screwdriver to remove the four screws holding the speaker. Do not let the speaker fall.
4. Follow steps 3 and 4 in the preceding procedure.

Troubleshooting

The information in this chapter discusses troubleshooting aids and techniques to assist the service technician when trouble is suspected in a game. Most troubles can be located quickly by following the information in this chapter. However, if problems persist, contact your local distributor or your Atari Games Corporation Customer Service Office, listed on the inside front cover of this manual, for assistance.

NOTE

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



Troubleshooting Aids

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

Assembly and Component Locations

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

Diagrams

The schematic package supplement for this manual contains schematic diagrams with component locations, active component type numbers, and electrical values.

Troubleshooting Techniques



WARNING



To avoid electrical shock, turn off the game power before attempting to troubleshoot this game.

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

Check Fuses

Check for open fuses. Refer to the power supply parts list in Chapter 5 and to the display manual for the location and rating of each fuse used in this game. Make sure that replacement fuses are the proper type and rating.

Check Power-Supply Voltages

Improper operation of all circuits usually indicates a power supply problem. Be sure that the proper line voltage is available to the power supply. Refer to the label on the power supply for its voltage rating.

Localize Trouble

Determine the trouble symptom. Use the wiring diagrams in the schematic package supplement to determine which assemblies or major circuits could cause the trouble. Perform the self-test procedure provided in Chapter 2 of this manual.

Visual Check

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

Check Individual Components

Check soldered-in passive components (e.g., resistors, capacitors, diodes) by disconnecting one end to isolate the measurement from the effects of the surrounding circuitry. Often, direct substitution is the most practical way to determine if a component is faulty. However, eliminate the possibility of some other circuit problem that could damage the substitute component.

Repair the Assembly

CAUTION

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

Repair or replace the defective part. Refer to Chapter 3 and information in this chapter for special removal and replacement procedures. Check for proper operation of the repaired circuit.

Soldering Techniques

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

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

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

CAUTION

Solder guns are *not* recommended for removing or replacing soldered-in components on a printed-circuit board. Solder guns can overheat a device, and their large transient voltage can damage a voltage-sensitive device.

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

- Solder Sucker—Hand-operated vacuum tool used to remove liquified solder from the PCB. We recommend the top-of-the-line Soldapull® brand.
- Solder Wick—Resin-soaked copper braid used for removing excess solder from the lead connections on the PCB. See *Removing Integrated Circuits* for precautions relating to the use of a solder wick on a multi-layer PCB with plated-through holes.
- Flux Remover—Non-corrosive chemical used to clean foreign material from the PCB before soldering and to remove any flux residue where components have been replaced. Also used to clean any foreign material from the PCB during preventive maintenance. Isopropyl alcohol is recommended.
- Acid Brush—Small stiff-bristled paint or toothbrush used with flux remover to clean flux and other foreign material from the PCB.

Removing Integrated Circuits

The easiest and safest method for removing soldered-in integrated circuits (IC) from a PCB is to cut off each pin as close to the IC case as possible with a tip dyke (diagonal cutter) as shown in Figure 4-1.

Use the proper soldering iron as previously described under *Soldering Techniques*. Then, to avoid excessive heat buildup in one area of the PCB, apply heat directly to each pin in a random order. Remove the loosened pin with the tip of the soldering iron or a needle-nose pliers as shown in Figure 4-2. Allow a moment for the PCB to cool before

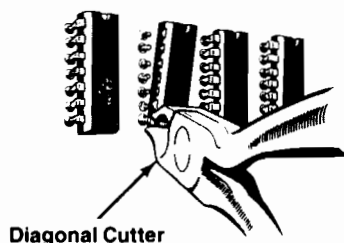


Figure 4-1 Removing IC (Cut-Pin Method)

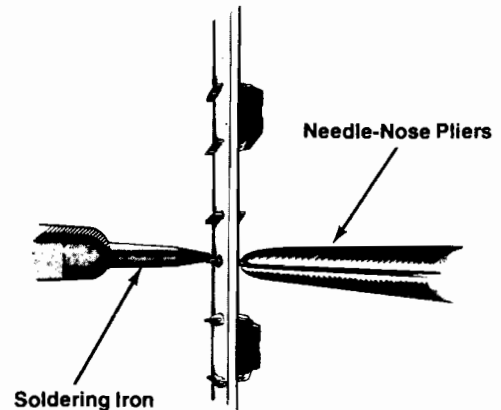


Figure 4-2 Removing IC Pins

proceeding to the next pin. Apply just enough heat to remove any stubborn pins.

For a multi-layer PCB with plated-through holes, use a solder sucker to remove the remaining solder from inside each hole as shown in Figure 4-3. If possible, suck the solder from the opposite side of the PCB from where the heat is applied.

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

CAUTION

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

Use an integrated-circuit (IC) pulling tool to remove socketed ICs. Do not pry up on one end of the ICs, because the pins could be bent or broken.

Troubleshooting Static-Sensitive Devices

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

Before handling a static-sensitive device or a PCB with such devices attached to it, ground any static voltage that may have accumulated in your body by touching an ob-

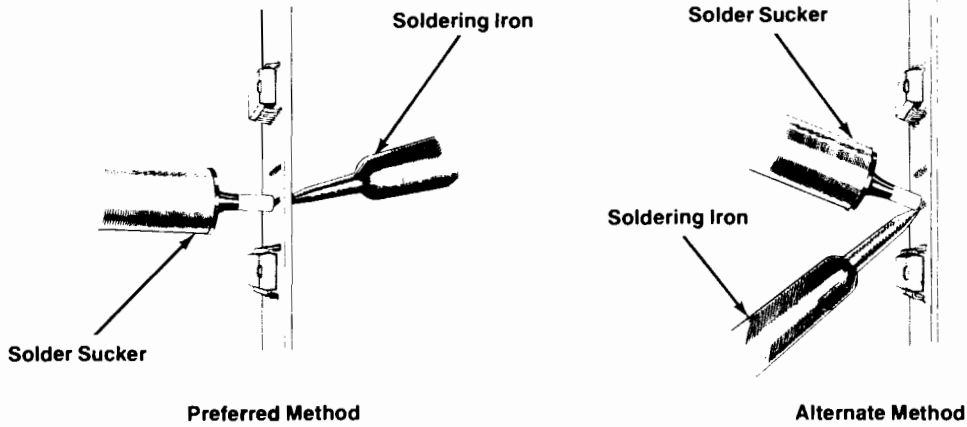


Figure 4-3 Removing Solder from Plated-Through Holes

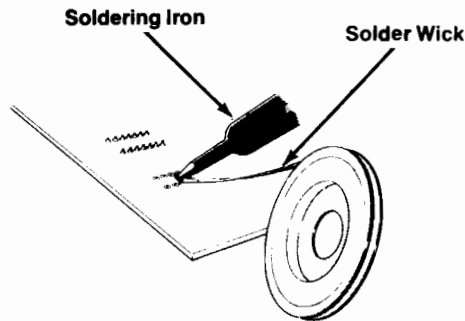


Figure 4-4 Removing Solder from Lead Connection Pads

ject that has been earth grounded. A bare wire wrapped around your wrist and attached to an earth ground is ef-

fective when working extensively with static-sensitive devices. When soldering a static-sensitive device, use a soldering iron with a properly grounded three-wire cord. (Refer to *Soldering Techniques* for a discussion of recommended soldering irons and procedures.)

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

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

Illustrated Parts Lists

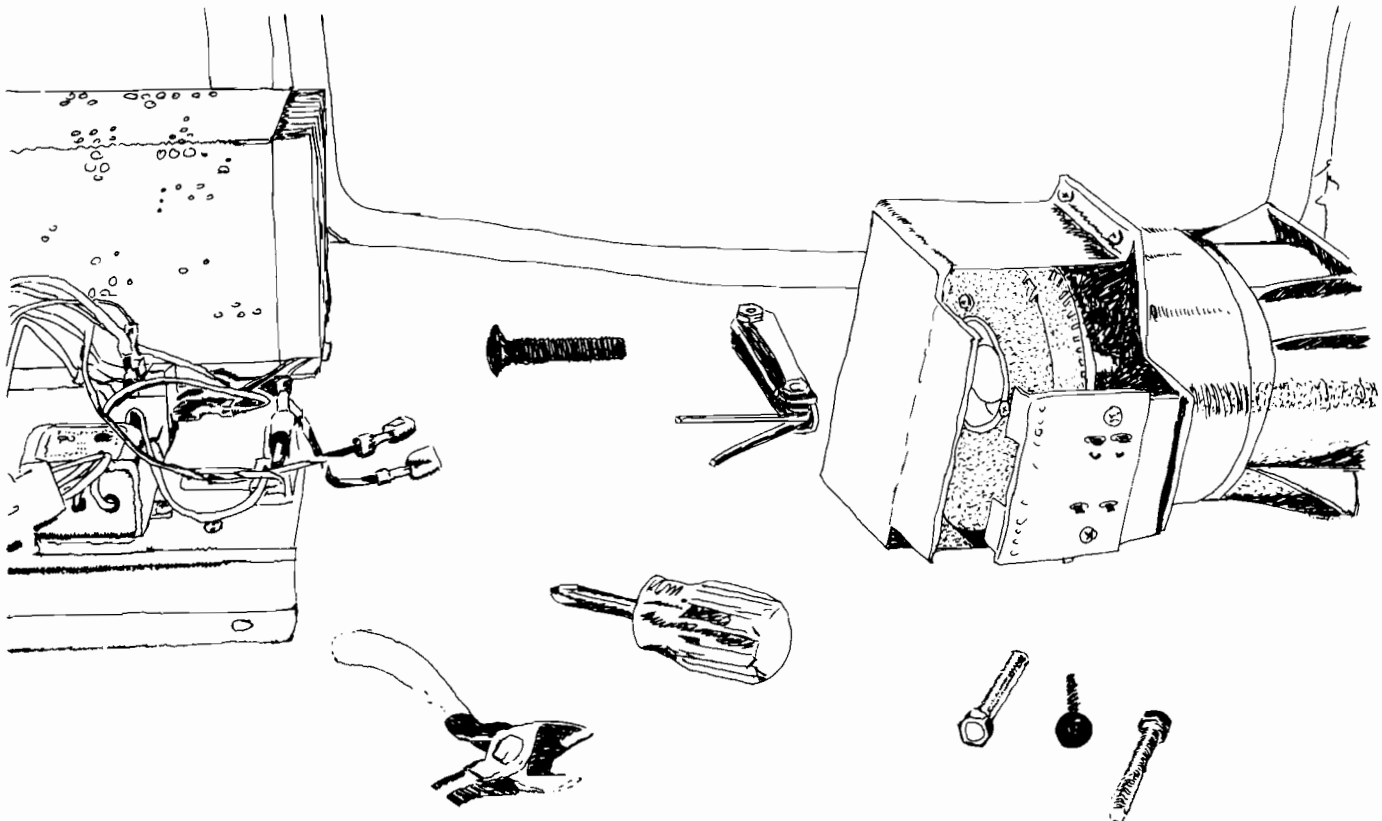
This chapter provides information you need to order parts for your game. Common hardware (screws, nuts, washers, etc.) has been deleted from most of the parts lists.

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

Other parts lists are arranged alphanumerically by Atari part number. In these parts lists, all A-prefix numbers come first. Following these are numbers in sequence evaluated up to the hyphen, namely 00- through 99-, then 000598- through approximately 201000-.

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

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



Parts Not Shown:

- A044056-01**
Test Switch Assy
- A044072-01**
12 V Coin Counter Assy
- 044054-02**
Right Trim Plate
- 044234-02**
Right Inner Side Decal
- 044324-01**
Contest Marquee

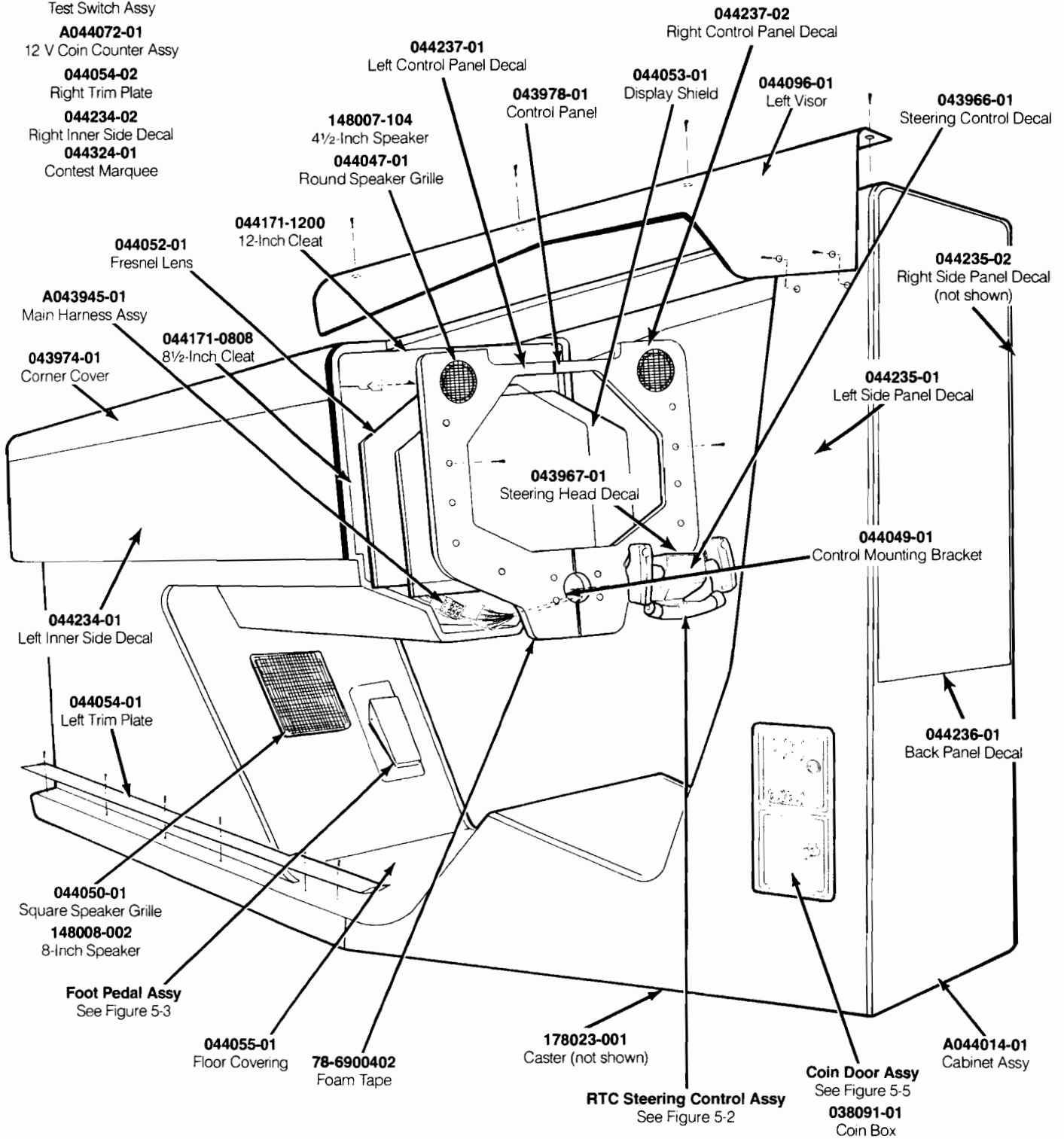


Figure 5-1 Cabinet-Mounted Assemblies
A044213-01 B

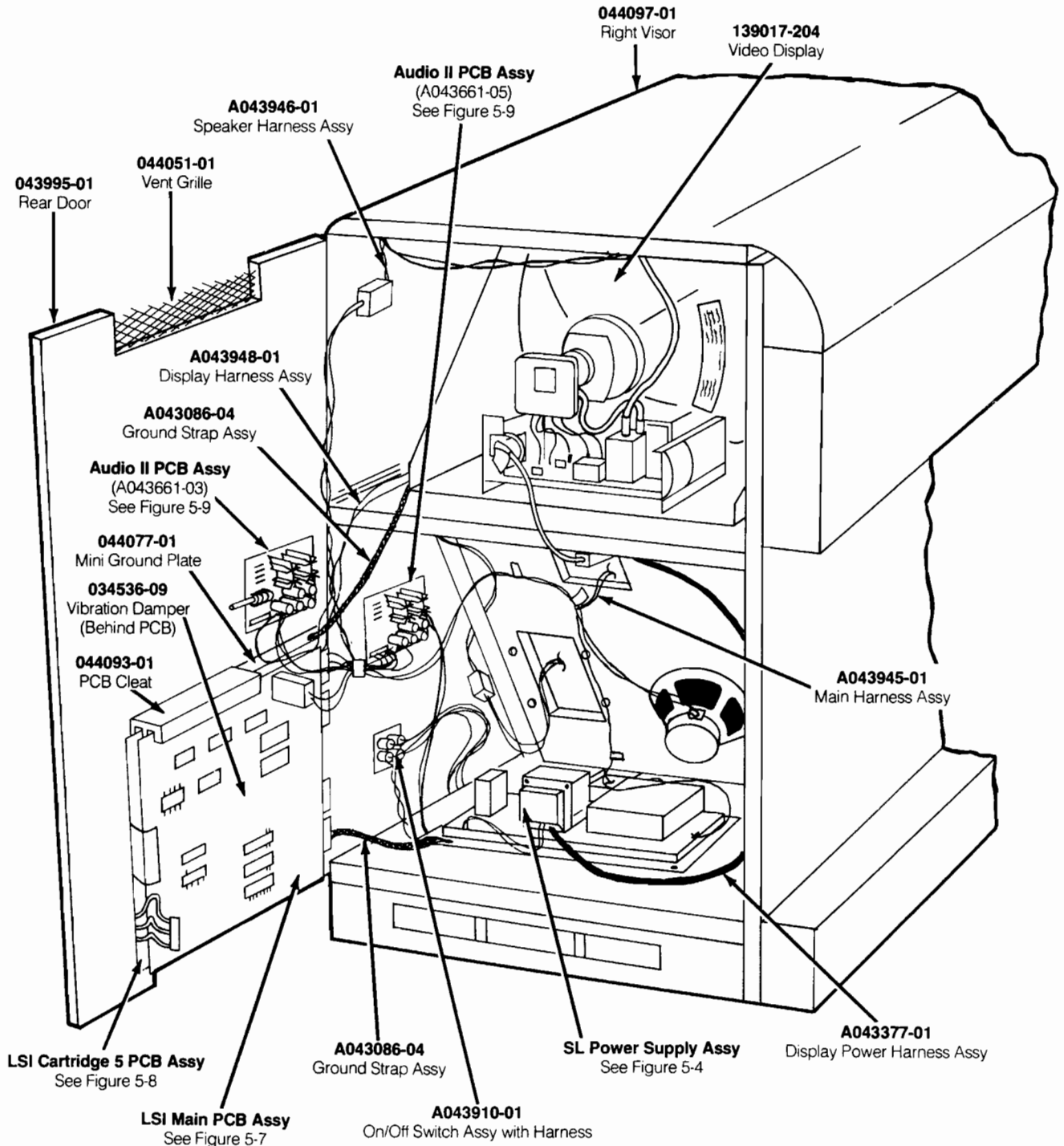


Figure 5-1 Cabinet-Mounted Assemblies, Continued
A044213-01 B

Cabinet-Mounted Assemblies Parts List

Part No.	Description
A043086-04	Ground Strap Assembly
A043377-01	Display Power Harness Assembly
A043910-01	On/Off Switch Assembly with Harness
A043945-01	Main Harness Assembly
A043946-01	Speaker Harness Assembly
A043948-01	Display Harness Assembly
A044014-01	Cabinet Assembly
A044056-01	Test Switch Assembly
A044072-01	12 V Coin Counter Assembly
78-3201	Adjustable Glide
78-6900402	¼-Inch × ¼-Inch Foam Tape (48 inches required; used between lens and control panel cover)
034536-09	1-Inch-Thick Vibration Damper
038091-01	Coin Box
043966-01	RTC Steering Control Cover Decal (with instructions)
043967-01	Steering Head Decal
043974-01	Corner Cover
043978-01	Control Panel (includes laminates and T-molding, but not the decals)
043995-01	Rear Door
044047-01	Round Speaker Grille
044049-01	Control Mounting Bracket
044050-01	Square Speaker Grille
044051-01	Vent Grille
044052-01	Fresnel Lens
044053-01	Display Shield
044054-01	Left Metal Trim Plate
044054-02	Right Metal Trim Plate
044055-01	Floor Covering
044077-01	Mini Ground Plate
044093-01	Printed-Circuit Board (PCB) Cleat with Holes
044096-01	Left Visor
044097-01	Right Visor
044171-0808	8½-Inch Long × ¾-Inch Square Painted Cleat with Holes
044171-1200	12-Inch Long × ¾-Inch Square Painted Cleat with Holes
044234-01	Left Inner Side Decal
044234-02	Right Inner Side Decal
044235-01	Left Side Panel Decal
044235-02	Right Side Panel Decal
044236-01	Back Panel Decal
044237-01	Left Control Panel Decal
044237-02	Right Control Panel Decal
044324-01	Contest Marquee
139017-204	Wells-Gardner 19-Inch Standard-Resolution Color Raster Video Display, Model 19K7901
148007-104	4½-Inch Round, 8 Ω Speaker
148008-002	12-Inch Round, 8 Ω, 20 W Speaker
178023-001	4-Inch-Diameter Caster
<i>The following are the technical information supplements for this game:</i>	
TM-299	Road Blasters/Cockpit Operators Manual
SP-299	Road Blasters/Cockpit Schematic Package
ST-299	Road Blasters/Cockpit Self-Test Label
TM-296	Wells-Gardner Model 19K7901 Video Display Service Manual

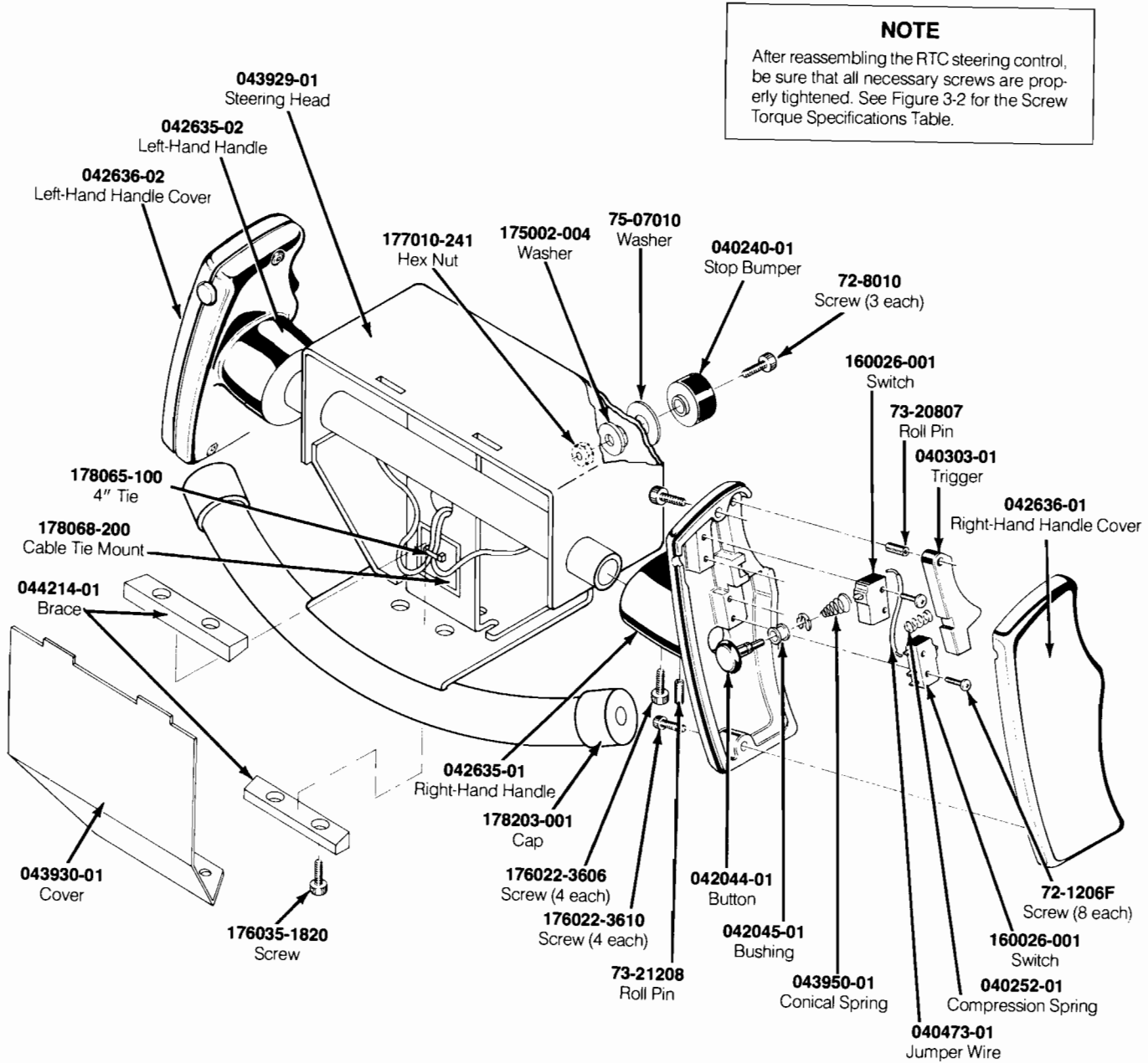
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**Figure 5-2 RTC Steering Control Assembly
A043968-01 D**

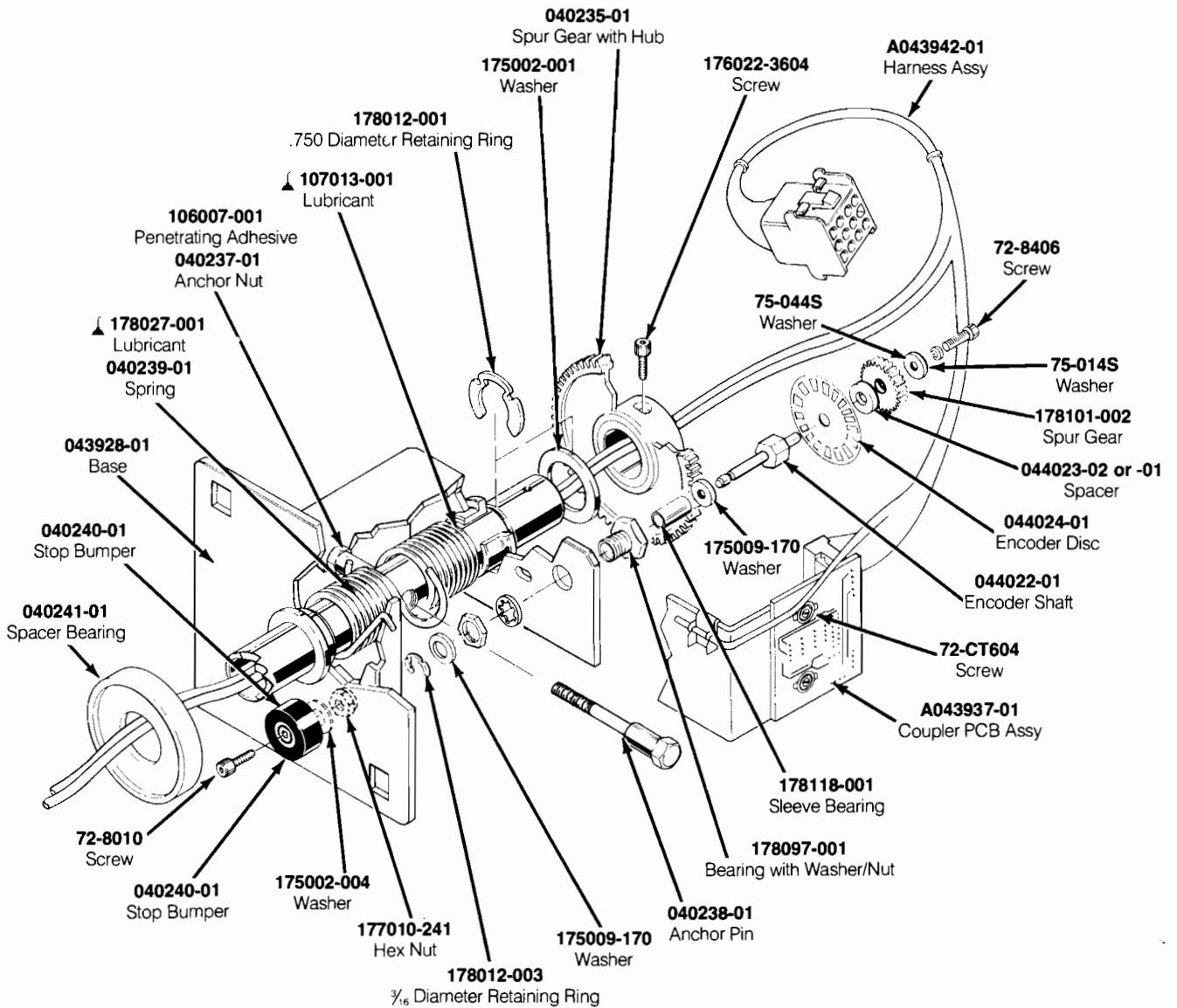
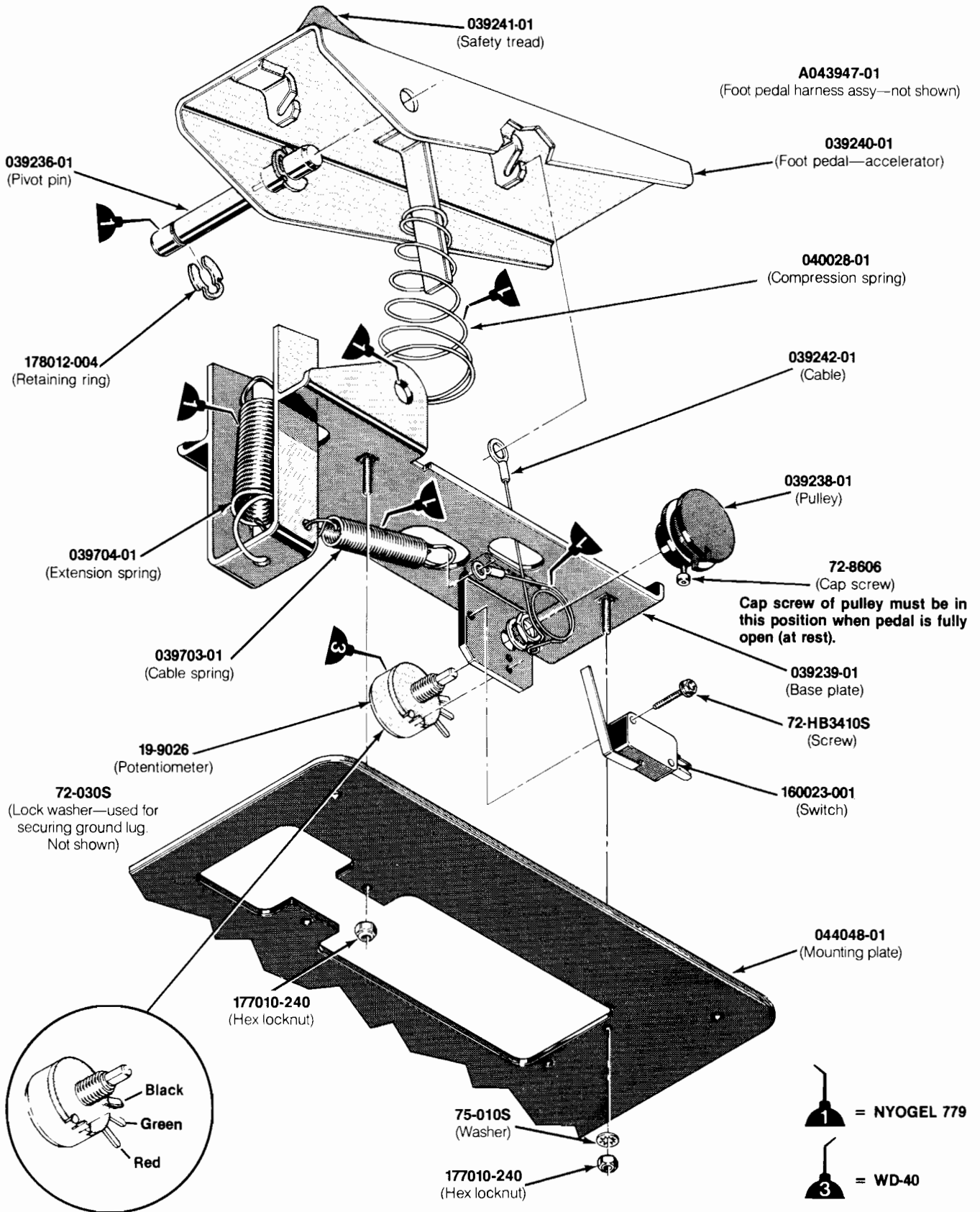


Figure 5-2 RTC Steering Control Assembly, Continued
A043968-01 B

RTC Steering Control Assembly Parts List

Part No.	Description
A043937-01	Coupler PCB Assembly
A043942-01	Control Harness Assembly
72-1206F	2-56 × ⅜-Inch Cross-Recessed Pan-Head Machine Screw
72-8010	10-32 × ⅜-Inch Socket-Head Cap Screw
72-8406	4-40 × ⅜-Inch Socket-Head Cap Screw
72-CT604	6-32 × ¼-Inch Hex Washer-Head Thread-Forming Machine Screw
73-20807	⅜-Inch Diameter × ⅞-Inch Spring Roll Pin
73-21208	⅝-Inch Diameter × ½-Inch Spring Roll Pin
75-044S	#4 Split-Lock Washer
75-07010	.320 I.D., .750 O.D., .015 Thick Special Washer
75-014S	#4 Steel/Zinc Flat Washer
040235-01	60T Spur Gear with Hub
040237-01	Anchor Nut
040238-01	Anchor Pin
040239-01	Torsion-Steering Spring
040240-01	Stop Bumper
040241-01	Spacer Bearing
040252-01	Compression Spring
040303-01	Trigger
040473-01	Jumper Wire
042044-01	Button
042045-01	Bushing
042635-01	Machined Handle (Right-Hand)
042635-02	Machined Handle (Left-Hand)
042636-01	Machined Handle Cover (Right-Hand)
042636-02	Machined Handle Cover (Left-Hand)
043928-01	Base
043929-01	Steering Head
043930-01	Cover
043950-01	Conical Compression Spring
044022-01	Encoder Shaft
044023-02	Encoder Shaft Spacer (Acceptable substitute is part no. 044023-01)
044024-01	Etched Encoder Disc
044214-01	Brace
106007-001	Penetrating Adhesive
107013-001	Lubricant
160026-001	Switch, Snap, SPDT
175002-001	Large Washer with ⅜-Inch Diameter Shaft
175002-004	#10, .062 Thick, Flat Washer
175009-170	Special Nylon Flat Washer
176022-3604	6-32 × ¼-Inch Self-Locking Socket-Head Cap Screw
176022-3606	6-32 × ⅜-Inch Self-Locking Socket-Head Cap Screw
176022-3610	6-32 × ⅝-Inch Self-Locking Socket-Head Cap Screw
176035-1820	8-32 × 1 ¼-Inch Black Type F Socket-Head Cap Screw
177010-241	#10-32 Nyloc Hex Nut
178012-001	Retaining Ring for ⅜-Inch Diameter Shaft
178012-003	Retaining Ring for ⅝-Inch Diameter Shaft
178027-001	Lubricant
178065-100	4-Inch Wire and Cable Tie
178068-200	Cable Tie Mount
178097-001	.25 Shaft Panel Bearing with Lock Washer and Nut
178101-002	24 DP × 20 PA × .583 P.D. × 2.50 Spur Gear
178118-001	Oil-Impregnated Sleeve Bearing
178203-001	Cap



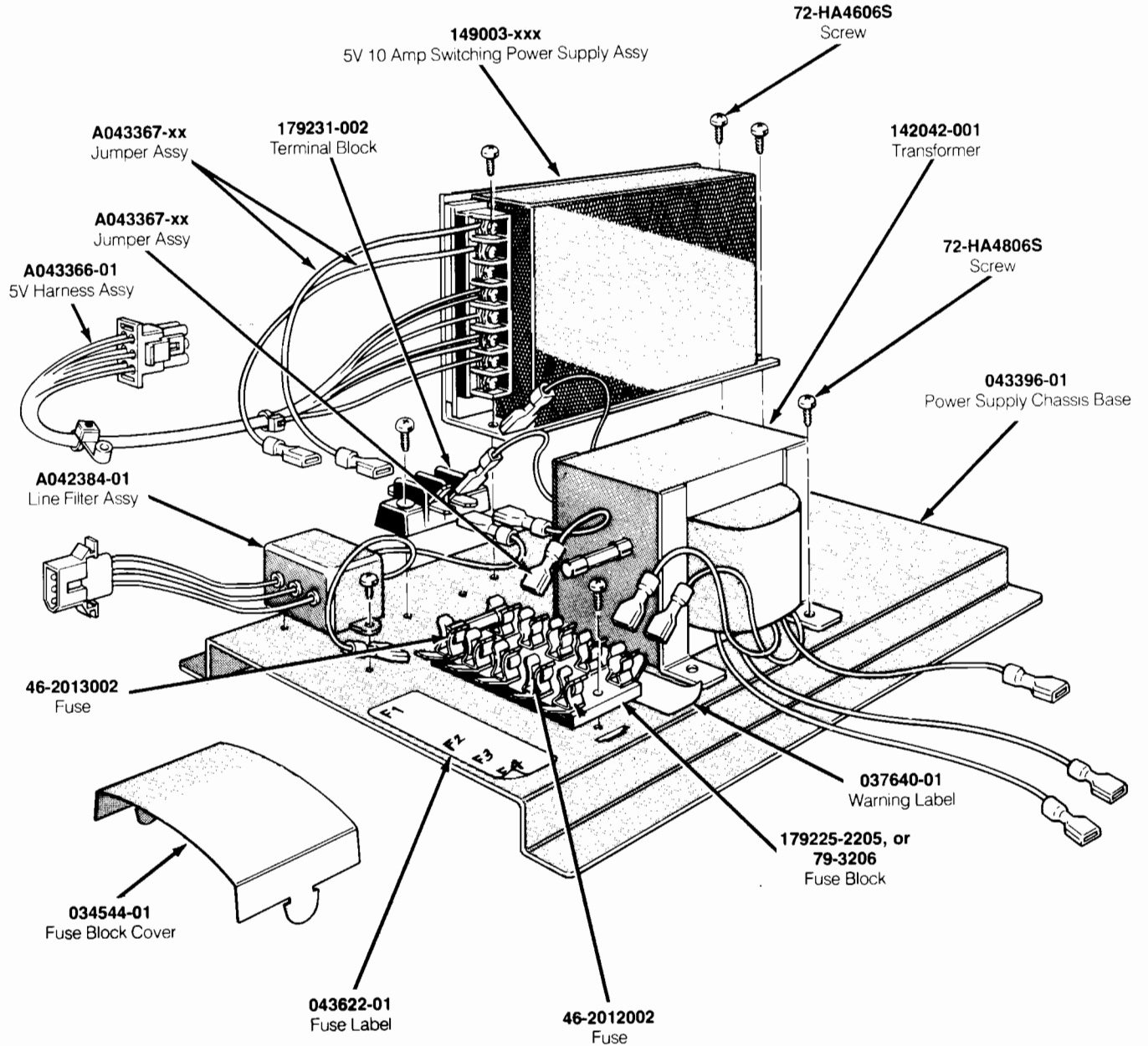
**Figure 5-3 Foot Pedal Assembly
A044091-01 A**

Foot Pedal Assembly Parts List

Part No.	Description
19-9026	5 k Ω Potentiometer (Acceptable substitute is part no. 19-9022)
72-030S	#10 External-Tooth Lock Washer
72-8606	#6-32 x .38-Inch Hex Socket-Head Cap Screw
75-010S	#10 Flat Washer
75-035S	1/4-Inch Flat Washer
75-5520B	#1/4-20 x 1 1/4-Inch Black Carriage Bolt
75-915S	#1/4-20 Hex Nut
039236-01	Pivot Pin
039238-01	Pulley
039239-01	Foot Pedal Control Base Plate
039240-01	Foot Pedal Accelerator
039241-01	Safety Tread
039242-01	Cable
039703-01	Extension Spring for Cable
039704-01	Extension Spring for Pedal
040028-01	Compression Spring for Pedal
044048-01	Pedal Mounting Plate
107012-001	Dry Teflon Spray Lubricant
160023-001	SPDT Snap Switch with Actuator
177010-240	#10-24 Hex Locknut
178012-004	External Retaining Ring for 3/8-Inch Diameter Shaft
A043947-01	Gas Pedal Harness Assembly

⚠ WARNING ⚠

This 5-volt switching power supply may not have a shield as illustrated below. The power supply has high voltages on it when power is turned on. Therefore, be sure you *do not touch this power supply* unless you have turned off the power to the game.



**Figure 5-4 Switching/Linear (SL) Power Supply Assembly
A043787-01 A**

Switching/Linear (SL) Power Supply Assembly Parts List

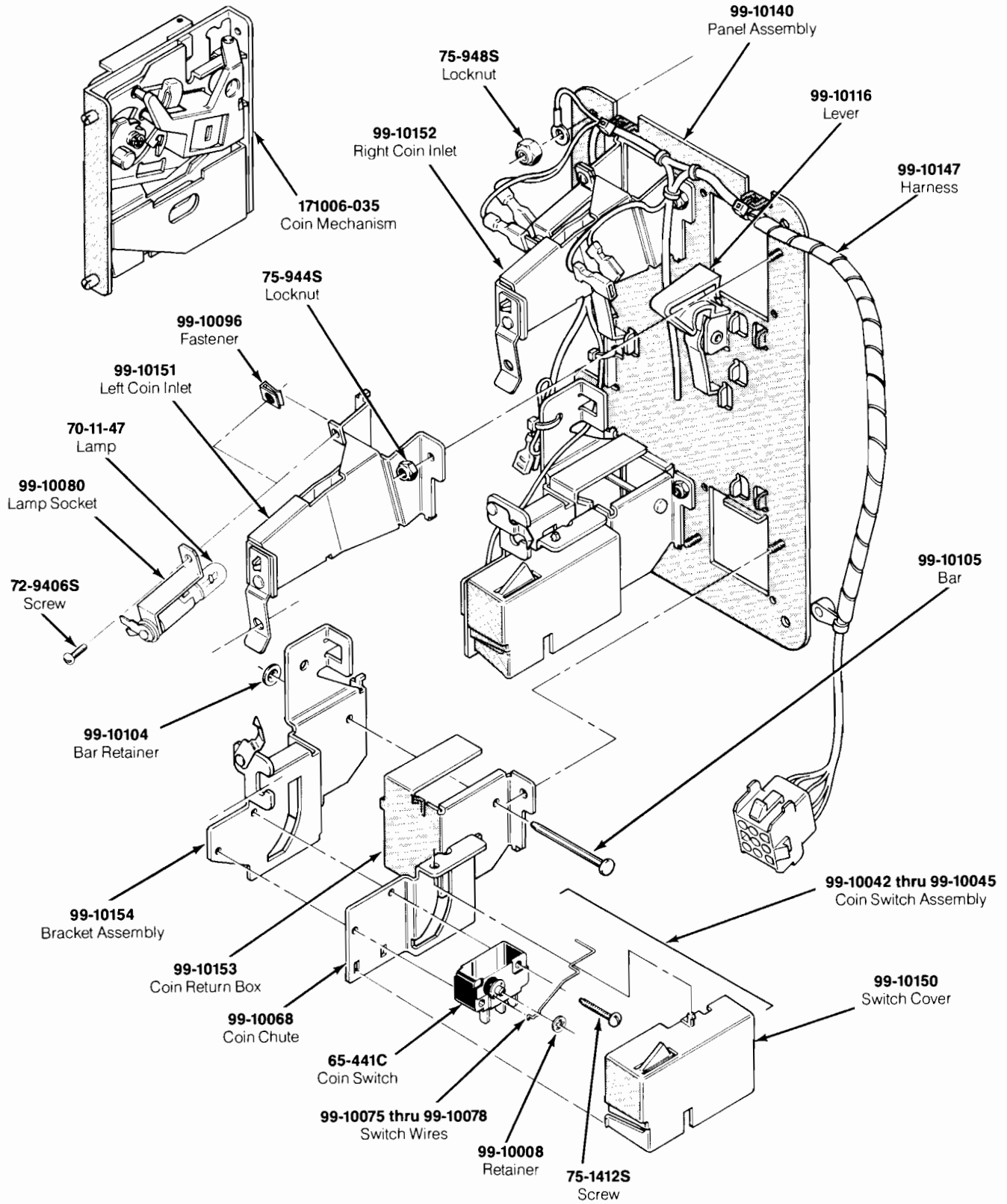
Part No.	Description
A042384-01	Line Filter Assembly
A043366-01	5 V Harness Assembly
A043367-01	Jumper Assembly
A043367-02	6-Inch, Black Jumper Assembly
A043367-03	6-Inch, White Jumper Assembly
46-2012002	250 V Slow-Blow 2 A Fuse
46-2013002	250 V Slow-Blow 3 A Fuse
72-HA4606S	#6-32 x 3/8-Inch Cross-Recessed Pan-Head Thread-Forming Screw
72-HA4806S	#8-32 x 3/8-Inch Cross-Recessed Pan-Head Thread-Forming Screw
034544-01	Fuse Block Cover
037640-01	Power Supply Warning Label
043396-01	Power Supply Chassis Base
043622-01	Power Supply Fuse Label
142042-001	Transformer
149003-003	Hitron 5 V 10 A Switching Power Supply Sub-Assembly
179225-2205	5-Position Fuse Block (Acceptable substitute is part no. 79-3206)
179231-002	2-Position Terminal Block

Hitron 5-Volt Power Supply Sub-Assembly Parts List

Designator	Description	Part No.
Capacitors		
C1	CAPACITOR, METAL FILM, 0.047 μ F, 250 V	99-211036
C2	CAPACITOR, METAL FILM, 0.1 μ F, 400 V	99-211038
C3, C4	CAPACITOR, CERAMIC, 4700 μ F, 400 V	99-211049
C5, C6	CAPACITOR, ELECTROLYTIC, 100 μ F, 200 V	99-211046
C7	CAPACITOR, METAL FILM, 0.1 μ F, 400 V	99-211038
C8	CAPACITOR, CERAMIC, 0.001 μ F, 2 kV	99-211042
C9	CAPACITOR, CERAMIC, 0.01 μ F, 1 kV, Z5U	99-211041
C10	CAPACITOR, ELECTROLYTIC, 220 μ F, 25 V	99-211045
C11	CAPACITOR, METAL FILM, 0.22 μ F, 100 V	99-211037
C12	CAPACITOR, METAL FILM, 0.022 μ F, 100 V	99-211039
C13	CAPACITOR, METAL FILM, 0.22 μ F, 100 V	99-211037
C14	CAPACITOR, CERAMIC, 1800 pF, 2 kV, Z5 V	99-211040
C17	CAPACITOR, ELECTROLYTIC, 470 μ F, 25 V	99-211044
C19	CAPACITOR, ELECTROLYTIC, 2200 μ F, 16 V	99-211048
C20	CAPACITOR, ELECTROLYTIC, 1000 μ F, 25 V	99-211047
C21	CAPACITOR, CERAMIC, 470 pF, 1 kV, Z5P	99-211043
C22	CAPACITOR, ELECTROLYTIC, 2200 μ F, 16 V	99-211048
C23	CAPACITOR, ELECTROLYTIC, 1000 μ F, 25 V	99-211047
C24	CAPACITOR, ELECTROLYTIC, 2200 μ F, 16 V	99-211048
Diodes		
D1, D2	DIODE, FAST RECOVERY, RPG10K	99-211010
D3	DIODE, FAST RECOVERY, RPG15B	99-211011
D4	DIODE, FAST RECOVERY, RPG10B	99-211009
D5-D7	DIODE, SWITCHING, 1N4148	99-211012

**Hitron 5-Volt Power Supply Sub-Assembly
Parts List, Continued**

Designator	Description	Part No.
D9	DIODE, FAST RECOVERY, 30DF1	99-211006
D11, D12	DIODE, SCHOTTKY, S10SC4M	99-211005
D13-D16	DIODE, RECTIFIER, 1N4006	99-211008
Inductors		
L1	INDUCTOR, 15 mH	99-211052
L3	INDUCTOR, 7 μ H (Acceptable substitute is part no. 99-211051)	99-211050
L4	INDUCTOR, 2.2 μ H	99-211054
L5	INDUCTOR, 1.5 mH	99-211053
Resistors		
R1, R2	RESISTOR, CARBON FILM, 180 k Ω , \pm 5%, 1 W	99-211034
R3	RESISTOR, WIREWOUND, 120 Ω , \pm 5%, 2 W	99-211019
R4	RESISTOR, WIREWOUND, 0.47 Ω , \pm 5%, 2 W	99-211018
R5	RESISTOR, WIREWOUND, 33 Ω , \pm 5%, 2 W	99-211017
R6, R7	RESISTOR, CARBON FILM, 5.6 Ω , \pm 5%, 1/4 W	99-211027
R8	RESISTOR, WIREWOUND, 0.47 Ω , \pm 5%, 2 W	99-211018
R9	RESISTOR, CARBON FILM, 10 Ω , \pm 5%, 1/4 W	99-211029
R10	RESISTOR, CARBON FILM, 1 k Ω , \pm 5%, 1/4 W	99-211032
R11	RESISTOR, CARBON FILM, 47 Ω , \pm 5%, 1/4 W	99-211025
R12	RESISTOR, CARBON FILM, 5.6 Ω , \pm 5%, 1/4 W	99-211027
R13	RESISTOR, CARBON FILM, 330 Ω , \pm 5%, 1/4 W	99-211026
R14	RESISTOR, CARBON FILM, 270 Ω , \pm 5%, 1/2 W	99-211023
R15	RESISTOR, CARBON FILM, 330 Ω , \pm 5%, 1/2 W	99-211022
R16	RESISTOR, CARBON FILM, 8.2 Ω , \pm 5%, 1/4 W	99-211028
R17, R18	RESISTOR, CARBON FILM, 56 Ω , \pm 5%, 1/4 W	99-211031
R19	RESISTOR, CARBON FILM, 39 Ω , \pm 5%, 1/4 W	99-211030
R20	RESISTOR, CARBON FILM, 2 k Ω , \pm 5%, 1/4 W	99-211035
R21	RESISTOR, CARBON FILM, 470 Ω , \pm 5%, 1/4 W	99-211024
R22	RESISTOR, 2.2 k Ω , \pm 2%, 1/4 W	99-211021
R23	RESISTOR, METAL FILM, 2 k Ω , \pm 2%, 1/4 W	99-211033
R25	RESISTOR, CARBON FILM, 10 Ω , \pm 5%, 1/4 W	99-211029
R26	RESISTOR, WIREWOUND, 50 Ω , \pm 5%, 2 W	99-211015
R27	RESISTOR, CARBON FILM, 47 Ω , \pm 5%, 1/4 W	99-211025
R31	RESISTOR, WIREWOUND, 150 Ω , \pm 5%, 2 W	99-211016
Transistors		
Q1	TRANSISTOR, NPN, 2SC1413A	99-211002
Q2	TRANSISTOR, NPN, PE8050B	99-211003
Q3	TRANSISTOR, PNP, PE8550B	99-211004
Miscellaneous		
F1	FUSE, 2 A, 250 V, SEMKO	99-211058
IC1	REGULATOR, UA431AWC	99-211001
SCR1	THYRISTOR, SCR, S2800	99-211013
T1	TRANSFORMER	99-211055
TR1	THERMISTOR, 0.5 Ω , \pm 5%, 5 W	99-211020
VR1	POTENTIOMETER, TRIMMING, 3 k Ω	99-211014
ZD1	DIODE, ZENER, 1N752A	99-211007
	FUSE, 2 A, 250 V	99-211056
	FUSE HOLDER, 6.35 mm	99-211060
	TERMINAL BLOCK, 8 CKT	99-211057
	HEAT SINK	99-211059
	HEAT SINK, 1.5 mm	99-211061



**Figure 5-5 Coin Acceptors, Inc. Coin Door Assembly
171027-001 A**

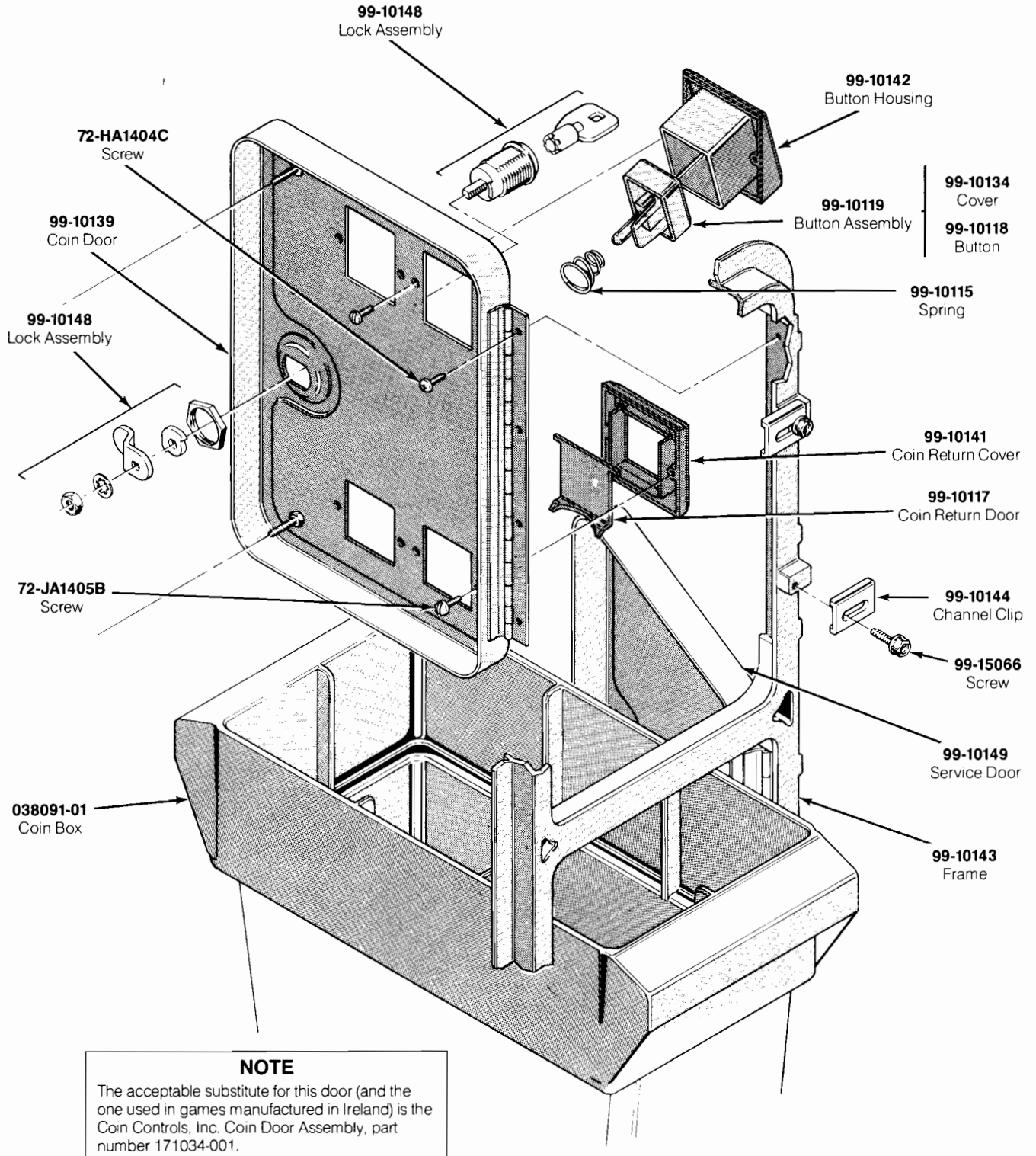
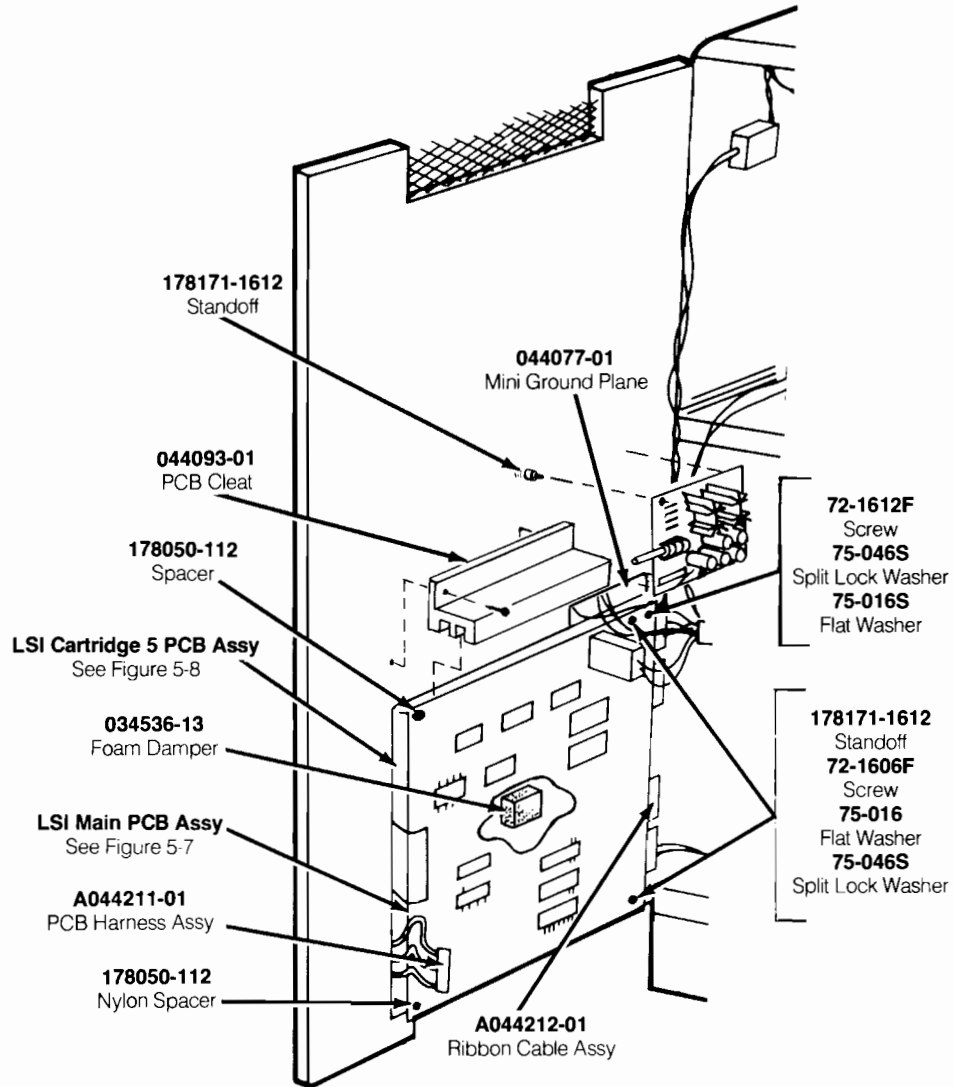


Figure 5-5 Coin Acceptors, Inc. Coin Door Assembly, Continued
171027-001 A

Coin Acceptors, Inc. Coin Door Assembly Parts List

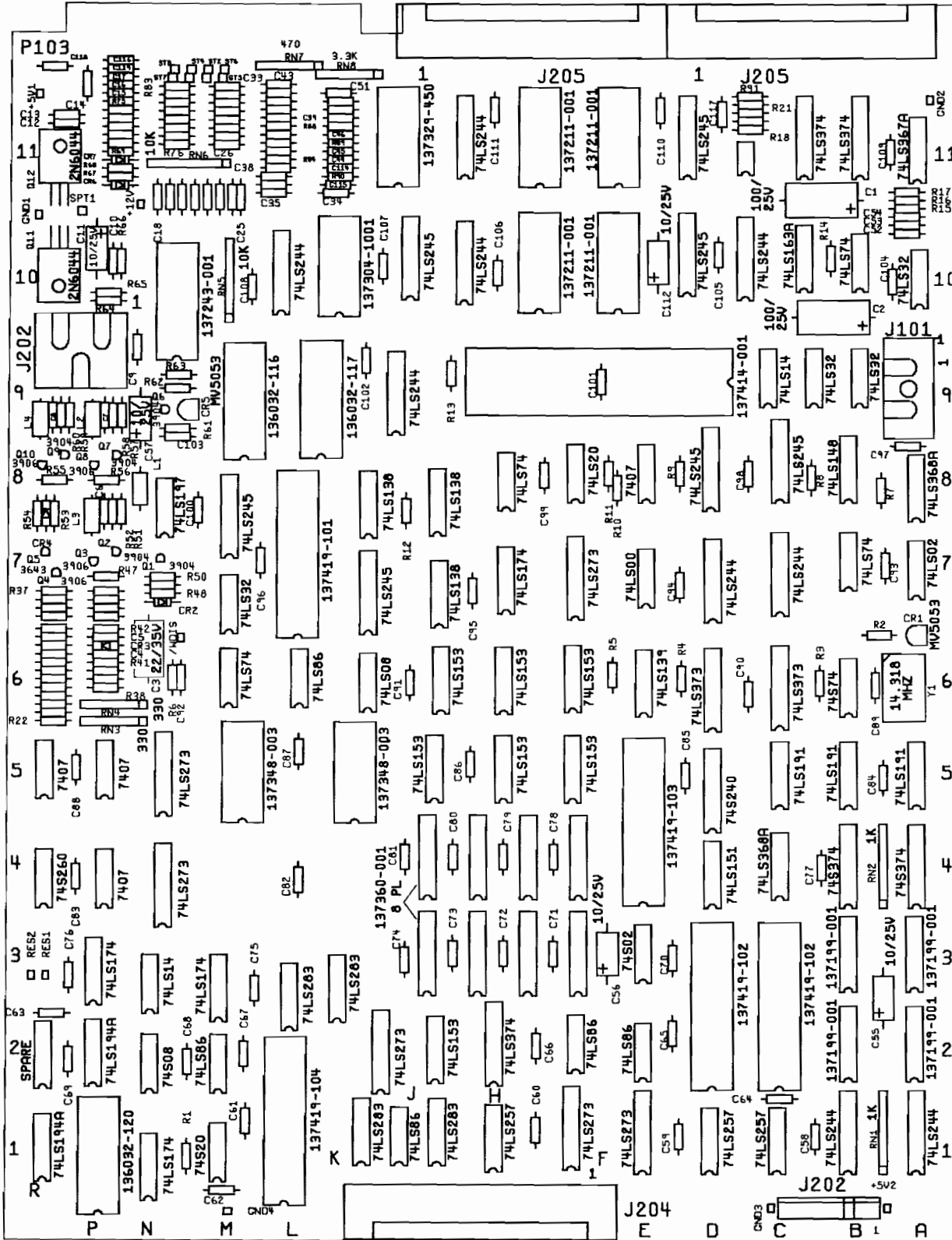
Part No.	Description
65-441C	Coin Switch
70-11-47	Miniature Bayonet Lamp
72-9406S	#4-40 × 3/8-Inch Truss-Head Screw
72-HA1404C	#4-40 × 1/4-Inch Pan-Head Screw
72-JA1405B	#4-40 × 0.31-Inch Pan-Head Screw
75-1412S	#4-40 × 3/4-Inch Pan-Head Screw
75-994S	#4-40 Locknut
99-10008	Retainer
99-10042	Coin Switch Assembly for Belgian 5 Fr and U.S. \$.25
99-10043	Coin Switch Assembly for German 1 DM, Japanese 100 Yen, Swiss 1 Fr
99-10044	Coin Switch Assembly for German 2 DM, Italian 100 L, U.S. \$1.00
99-10045	Coin Switch Assembly for Australian \$.20, German 5 DM, British 10 P
99-10068	Coin Return Chute
99-10075	Switch Wire (included in coin switch assembly 99-10043)
99-10076	Switch Wire (included in coin switch assembly 99-10042)
99-10077	Switch Wire (included in coin switch assembly 99-10044)
99-10078	Switch Wire (included in coin switch assembly 99-10045)
99-10080	Lamp Socket
99-10081	Key Holder
99-10096	Fastener
99-10104	Bar Retainer
99-10105	Bar
99-10115	Spring
99-10116	Plastic Coin Return Lever
99-10117	Steel Coin Return Door
99-10118	Amber Coin Return Button
99-10119	Amber Coin Button for U.S. \$.25
99-10134	Coin Button Cover
99-10139	Coin Door
99-10140	Coin Door Inner-Panel Assembly
99-10141	Die-Cast Coin Return Cover
99-10142	Die-Cast Button Housing
99-10143	Coin Door Frame
99-10144	Channel Clip
99-10147	Harness
99-10148	Lock Assembly
99-10149	Service Door
99-10150	Switch Cover
99-10151	Left Coin Inlet
99-10152	Right Coin Inlet
99-10153	Coin Return Box
99-10154	Bracket Assembly
99-15066	Screw for Clamp
171006-035	Metal Coin Mechanism for U.S. \$.25



**Figure 5-6 PCB Mounting Hardware
A044098-01 B**

**PCB Mounting Hardware
Parts List**

Part No.	Description
A044211-01	PCB Harness Assembly
A044212-01	Ribbon Cable Assembly
72-1606F	#6-32 x 3/8-Inch Cross-Recessed Pan-Head Machine Screw
75-016	#6 Flat Washer
75-046S	#6 Split Lock Washer
034536-13	3 x 3 x 3/4-Inch Foam Vibration Damper
044077-01	PCB Mini Ground Plane
044093-01	PCB Cleat, Removable
178050-112	3/4-Inch Nylon Dual-Locking Circuit Board Spacer
178171-1612	#6-32 x 3/4-Inch Aluminum Threaded-Through 1/4-Inch Diameter Standoff



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Figure 5-7 Road Blasters/Cockpit LSI Main PCB Assembly
A043356-21 D

Road Blasters/Cockpit LSI Main PCB Assembly Parts List

Designator	Description	Part No.	Designator	Description	Part No.
Integrated Circuits					
1/2L	IC, PFHS	137419-104	5F, 5H, 5J	IC, 74LS153	37-74LS153
1A, 1B	IC, 74LS244	37-74LS244	5K, 5M	IC, AMD2918-10	137348-003
1C, 1D	IC, 74LS257	37-74LS257	5N	IC, 74LS273	37-74LS273
1E, 1F	IC, 74LS273	37-74LS273	5P, 5R	IC, 7407	37-7407
1H	IC, 74LS257	37-74LS257	6B	IC, 74S74	37-74S74
1J	IC, 74LS283	137204-001	6C, 6D	IC, 74LS373	37-74LS373
1J/K	IC, 74LS86	37-74LS86	6E	IC, 74LS139	37-74LS139
1K	IC, 74LS283	137204-001	6F, 6H, 6J	IC, 74LS153	37-74LS153
1M	IC, 74S20	137423-001	6K	IC, 74LS08	37-74LS08
1N	IC, 74LS174	37-74LS174	6L	IC, 74LS86	37-74LS86
1P	IC, 27128-300	136032-120	6M	IC, 74LS74	37-74LS74
1R	IC, 74LS194 A	37-74LS194	7/8L	IC, GPC	137419-101
2/3C, 2/3D	IC, LBC	137419-102	7A	IC, 74LS02	37-74LS02
2A, 2B	IC, 2149H-3	137199-001	7B	IC, 74LS74	37-74LS74
2E, 2F	IC, 74LS86	37-74LS86	7C, 7D	IC, 74LS244	37-74LS244
2H	IC, 74LS374	37-74LS374	7E	IC, 74LS00	37-74LS00
2J	IC, 74LS153	37-74LS153	7F	IC, 74LS273	37-74LS273
2K	IC, 74LS273	37-74LS273	7H	IC, 74LS174	37-74LS174
2M	IC, 74LS86	37-74LS86	7J	IC, 74LS138	137177-001
2N	IC, 74S08	37-74S08	7K	IC, 74LS245	37-74LS245
2P	IC, 74LS194 A	37-74LS194	7M	IC, 74LS32	37-74LS32
3A, 3B	IC, 2149H-3	137199-001	8A	IC, 74LS368 A	137168-001
3E	IC, 74S02	37-74S02	8B	IC, 74LS148	137417-002
3F	IC, IMS1420L	137360-001	8C, 8D	IC, 74LS245	37-74LS245
3F/H	IC, IMS1420L	137360-001	8E	IC, 7407	37-7407
3H/J	IC, IMS1420L	137360-001	8F	IC, 74LS20	37-74LS20
3J	IC, IMS1420L	137360-001	8H	IC, 74LS74	37-74LS74
3K/L, 3L	IC, 74LS283	137204-001	8J, 8K	IC, 74LS138	137177-001
3M	IC, 74LS174	37-74LS174	8M	IC, 74LS245	37-74LS245
3N	IC, 74LS14	37-74LS14	8N	IC, 74LS197	137240-001
3P	IC, 74LS174	37-74LS174	9B, 9B/C	IC, 74LS32	37-74LS32
4/5E	IC, SYNGEN	137419-103	9C	IC, 74LS14	37-74LS14
4A, 4B	IC, 74S374	137206-001	9F	IC, 68010	137414-001
4C	IC, 74LS368 A	137168-001	9K	IC, 74LS244	37-74LS244
4D	IC, 74LS151	37-74LS151	9L	IC, 27128-200	136032-117
4F	IC, IMS1420L	137360-001	9M	IC, 27128-200	136032-116
4F/H	IC, IMS1420L	137360-001	10A	IC, 74LS32	37-74LS32
4H/J	IC, IMS1420L	137360-001	10B	IC, 74LS74	37-74LS74
4J	IC, IMS1420L	137360-001	10B/C	IC, 74LS163 A	37-74LS163A
4N	IC, 74LS273	37-74LS273	10D	IC, 74LS244	37-74LS244
4P	IC, 7407	37-7407	10E	IC, 74LS245	37-74LS245
4R	IC, 74S260	37-74S260	10F, 10H	IC, HM6116	137211-001
5A,-5C	IC, 74LS191	37-74LS191	10J	IC, 74LS244	37-74LS244
5D	IC, 74S240	137416-001	10K	IC, 74LS245	37-74LS245

Road Blasters/Cockpit LSI Main PCB Assembly Parts List, Continued

Designator	Description	Part No.	Designator	Description	Part No.
10L	IC, Leta	137304-1001	Q11	Transistor, 2N6044	34-2N6044
10L/M	IC, 74LS244	37-74LS244	Q12	Transistor, 2N6044	34-2N6044
10M	IC, ADC0809	137243-001			
11A	IC, 74LS367 A	37-74LS367			
				Resistors	
			R1	Resistor, 1 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-102
11B, 11B/C	IC, 74LS374	37-74LS374	R2	Resistor, 220 Ω , \pm 5%, $\frac{1}{4}$ W	110000-221
11E	IC, 74LS245	37-74LS245	R3	Resistor, 1 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-102
11F, 11H	IC, HM6116	137211-001	R4, R5	Resistor, 4.7 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-472
11J	IC, 74LS244	37-74LS244			
11K	IC, X2804 A	137329-450	R6	Resistor, 10 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-103
			R7-R9	Resistor, 4.7 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-472
	Capacitors		R10, R11	Resistor, 10 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-103
C1, C2	Capacitor, 100 μ F, 25 V, Electrolytic	24-250107	R12	Resistor, 4.7 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-472
C3	Capacitor, 22 μ F, 35 V, Electrolytic	24-350226	R13-R17	Resistor, 1 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-102
C4, C5	Capacitor, .1 μ F, 50 V, Ceramic	122002-104	R18-R20	Resistor, 10 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-103
C6-C8	Capacitor, 470 pF, 50 V, Ceramic	122013-471	R21	Resistor, 470 Ω , \pm 5%, $\frac{1}{4}$ W	110000-471
			R22-R25	Resistor, 27 Ω , \pm 5%, $\frac{1}{4}$ W	110000-270
C9	Capacitor, 1000 pF, 100 V, Ceramic	122016-102			
C10	Capacitor, .1 μ F, 50 V, Ceramic	122002-104	R26	Resistor, 2.2 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-222
C11	Capacitor, 10 μ F, 25 V, Electrolytic	24-250106	R27	Resistor, 4.7 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-472
C12-C45	Capacitor, .1 μ F, 50 V, Ceramic	122002-104	R28	Resistor, 10 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-103
			R29	Resistor, 20 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-203
C46-C51	Capacitor, .01 μ F, 25 V, Ceramic	122005-103	R30-R33	Resistor, 100 Ω , \pm 5%, $\frac{1}{4}$ W	110000-101
C52-C54	Capacitor, .1 μ F, 50 V, Ceramic	122002-104	R34	Resistor, 2.49 K Ω , \pm 1%, $\frac{1}{4}$ W, Metal Film	110011-252
C55-C57	Capacitor, 10 μ F, 25 V, Electrolytic	24-250106			
C58-C111	Capacitor, .1 μ F, 50 V, Ceramic	122002-104	R35	Resistor, 4.99 K Ω , \pm 1%, $\frac{1}{4}$ W, Metal Film	110011-502
			R36	Resistor, 10 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-103
C112	Capacitor, 10 μ F, 25 V, Electrolytic	24-250106			
C114,	Capacitor, .01 μ F, 25 V, Ceramic	122005-103			
C115			R37	Resistor, 20 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-203
C116-	Capacitor, .1 μ F, 50 V, Ceramic	122002-104	R38	Resistor, 2.2 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-222
C119			R39	Resistor, 4.7 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-472
			R40	Resistor, 10 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-103
	Diodes				
CR1	Diode, MV5053, Light-Emitting	38-MV5053	R41	Resistor, 20 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-203
CR2	Diode, 1N4001	31-1N4001	R42, R43	Resistor, 2.2 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-222
CR3, CR4	Diode, 1N4148	131033-001	R44	Resistor, 4.7 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-472
CR5	Diode, MV5053, Light-Emitting	38-MV5053	R45	Resistor, 10 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-103
CR6, CR7	Diode, 1N4001	31-1N4001			
			R46	Resistor, 20 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-203
	Inductors		R47	Resistor, 510 Ω , \pm 5%, $\frac{1}{4}$ W	110000-511
L1	Inductor, 68 μ H	141016-008	R48, R49	Resistor, 10 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-103
L2-L4	Inductor, 1 μ H, 830 mA	141007-001	R50	Resistor, 1 K Ω , \pm 5%, $\frac{1}{4}$ W	110000-102
	Transistors		R51	Resistor, 68 Ω , \pm 5%, $\frac{1}{4}$ W	110000-680
Q1, Q2	Transistor, 2N3904	34-2N3904	R52	Resistor, 12 Ω , \pm 5%, $\frac{1}{4}$ W	110000-120
Q3, Q4	Transistor, 2N3906	33-2N3906	R53	Resistor, 510 Ω , \pm 5%, $\frac{1}{4}$ W	110000-511
Q5	Transistor, 2N3643	34-2N3643	R54	Resistor, 68 Ω , \pm 5%, $\frac{1}{4}$ W	110000-680
Q6, Q7	Transistor, 2N3904	34-2N3904			
			R55, R56	Resistor, 510 Ω , \pm 5%, $\frac{1}{4}$ W	110000-511
Q8	Transistor, 2N3906	33-2N3906	R57	Resistor, 68 Ω , \pm 5%, $\frac{1}{4}$ W	110000-680
Q9	Transistor, 2N3904	34-2N3904	R58	Resistor, 12 Ω , \pm 5%, $\frac{1}{4}$ W	110000-120
Q10	Transistor, 2N3906	33-2N3906	R59	Resistor, 68 Ω , \pm 5%, $\frac{1}{4}$ W	110000-680
			R60	Resistor, 12 Ω , \pm 5%, $\frac{1}{4}$ W	110000-120
			R61	Resistor, 220 Ω , \pm 5%, $\frac{1}{4}$ W	110000-221

Road Blasters/Cockpit LSI Main PCB Assembly Parts List, Continued

Designator	Description	Part No.	Designator	Description	Part No.
R62, R63	Resistor, 4.7 K Ω , \pm 5%, 1/4 W	110000-472			
R64	Resistor, 150 Ω , \pm 5%, 1/4 W	110000-151			
R65	Resistor, 220 Ω , \pm 5%, 1/4 W	110000-221			
R66	Resistor, 150 Ω , \pm 5%, 1/4 W	110000-151			
R67-R70	Resistor, 1 K Ω , \pm 5%, 1/4 W	110000-102			
R71, R72	Resistor, 220 Ω , \pm 5%, 1/4 W	110000-221			
R73-R75	Resistor, 470 Ω , \pm 5%, 1/4 W	110000-471			
R76-R83	Resistor, 100 Ω , \pm 5%, 1/4 W	110000-101			
R84-R89	Resistor, 1 K Ω , \pm 5%, 1/4 W	110000-102			
R90	Resistor, 3.3 K Ω , \pm 5%, 1/4 W	110000-332			
R91	Resistor, 1 K Ω , \pm 5%, 1/4 W	110000-102			
RN1, RN2	Resistor Network, 1K \times 9 Ω , \pm 5%, 1/8 W, SIP (10-pin)	118010-102			
RN3, RN4	Resistor Network, 330 \times 7 Ω , \pm 5%, 1/4 W, SIP (8-pin)	118007-331			
RN5, RN6	Resistor Network, 10K \times 9 Ω , \pm 5%, 1/8 W, SIP (10-pin)	118010-103			
RN7	Resistor Network, 470 \times 7 Ω , \pm 5%, 1/8 W, SIP (8-pin)	118007-471			
RN8	Resistor Network, 3.3K \times 7 Ω , \pm 5%, 1/4 W, SIP (8-pin)	118007-332			
				Miscellaneous	
			J101	Connector, 3-Circuit, Header, .250 Ctr	179069-003
			J106	Connector, 6-Circuit, Header, .250 Ctr	179069-006
			J202	Connector, 8-Circuit, Header, .156 Ctr Key 3	179213-008
			J204, J205A, J205B	Connector, 50-Circuit, 4-Wall, Header, Rt 2 Rows	179186-001
				Fastener, Nylon, Snap-in	81-4302
			SW1	Switch, 4-Position DIP	66-114P1T
			Y1	Crystal Oscillator, 14.318 MHz	144008-001
				Socket, 24-Pin	79-42C24
				Socket, 28-Pin	79-42C28
				Socket, 40-Pin	79-42C40
				Socket, 64-Pin	79-42C64
			+ 5V1, + 5V2, + 12V, GND1-4, WDIS, RES1, RES2	Test Point	179051-002

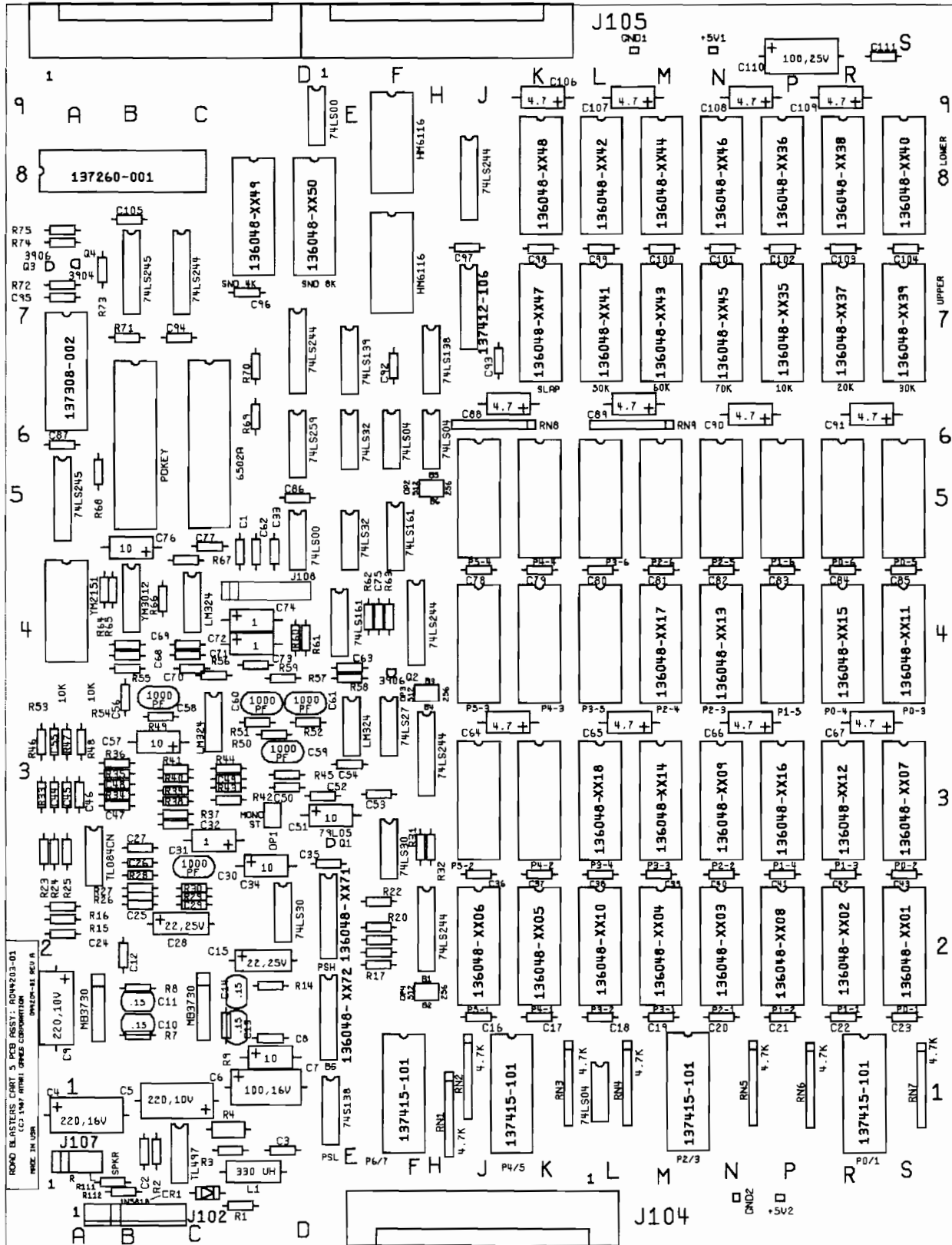


Figure 5-8 Road Blasters/Cockpit Cartridge 5 PCB Assembly
A044203-01 B

Road Blasters/Cockpit Cartridge 5 PCB Assembly Parts List

Designator	Description	Part No.	Designator	Description	Part No.
Integrated Circuits					
1/2D	IC, PROM, 74S472	136048-1172	6E	IC, 74LS32	37-74LS32
1D	IC, 74S138	137174-001	6E, 6H	IC, 74LS04	37-74LS04
1L	IC, 74LS04	37-74LS04	7/8B	IC, 74LS245	37-74LS245
2/3A	IC, TL084CN	37-347	7/8C	IC, 74LS244	37-74LS244
2/3F, 2C/D	IC, 74LS30	37-74LS30	7/8C/D	IC, EPROM, 27128, 300 ns	136048-1149
2D	IC, PROM, 74S473	136048-1171	7/8D	IC, EPROM, 27256, 300 ns	136048-1150
2H	IC, 74LS244	37-74LS244	7/8F	IC, HM6116	137211-001
2J	IC, EPROM, 27256, 300 ns	136048-1106	7J	IC, SLAPSTIC	137412-106
2K	IC, EPROM, 27256, 300 ns	136048-1105	7K	IC, EPROM, 27128, 200 ns	136078-1147
2L	IC, EPROM, 27512, 300 ns	136048-1110	7L	IC, EPROM, 27256, 200 ns	136048-1141
2M	IC, EPROM, 27256, 300 ns	136048-1104	7M	IC, EPROM, 27256, 200 ns	136048-1143
2N	IC, EPROM, 27256, 300 ns	136048-1103	7N	IC, EPROM, 27256, 200 ns	136048-1145
2P	IC, EPROM, 27512, 300 ns	136048-1108	7P	IC, EPROM, 27256, 200 ns	136048-1135
2R	IC, EPROM, 27256, 300 ns	136048-1102	7R	IC, EPROM, 27256, 200 ns	136048-1137
2S	IC, EPROM, 27256, 300 ns	136048-1101	7S	IC, EPROM, 27256, 200 ns	136048-1139
3/4C, 3/4E	IC, LM324	37-LM324	8B	IC, Interface Adapter, 6522A	137260-001
3/4F	IC, 74LS27	37-74LS27	8F	IC, HM6116	137211-001
3H	IC, 74LS244	37-74LS244	8J	IC, 74LS244	37-74LS244
3L	IC, EPROM, 27512, 300 ns	136048-1118	8K	IC, EPROM, 27128, 200 ns	136048-1148
3M	IC, EPROM, 27512, 300 ns	136048-1114	8L	IC, EPROM, 27256, 200 ns	136048-1142
3N	IC, EPROM, 27512, 300 ns	136048-1109	8M	IC, EPROM, 27256, 200 ns	136048-1144
3P	IC, EPROM, 27512, 300 ns	136048-1116	8N	IC, EPROM, 27256, 200 ns	136048-1146
3R	IC, EPROM, 27512, 300 ns	136048-1112	8P	IC, EPROM, 27256, 200 ns	136048-1136
3S	IC, EPROM, 27512, 300 ns	136048-1107	8R	IC, EPROM, 27256, 200 ns	136048-1138
4/5D	IC, 74LS00	37-74LS00	8S	IC, EPROM, 27256, 200 ns	136048-1140
4/5E	IC, 74LS32	37-74LS32	9D	IC, 74LS00	37-74LS00
4/5F	IC, 74LS161	37-74LS161	Capacitors		
4A	IC, YM2151	137401-001	C1, C3	Capacitor, .1 μ F, 50 V, Ceramic	122002-104
4B	IC, YM3012	137402-001	C7	Capacitor, 10 μ F, 35 V, Electrolytic	24-350106
4C	IC, LM324	37-LM324	C8, C16–C23, C26	Capacitor, .1 μ F, 50 V, Ceramic	122002-104
4E	IC, 74LS161	37-74LS161	C27	Capacitor, .0068 μ F, 50 V, Ceramic	122015-682
4H	IC, 74LS244	37-74LS244	C30	Capacitor, 1000 pF, 100 V, Mica	128002-102
4M	IC, EPROM, 27512, 300 ns	136048-1117	C31	Capacitor, 1 μ F, 50 V, Electrolytic	24-500105
4N	IC, EPROM, 27512, 300 ns	136048-1113	C32	Capacitor, .22 μ F, 25 V, Ceramic	122004-224
4R	IC, EPROM, 27512, 300 ns	136048-1115	C33	Capacitor, .01 μ F, 25 V, Ceramic	122005-103
4S	IC, EPROM, 27512, 300 ns	136048-1111	C34	Capacitor, 10 μ F, 35 V, Electrolytic	24-350106
5A	IC, 74LS245	37-74LS245	C35–C43	Capacitor, .1 μ F, 50 V, Ceramic	122002-104
6/7A	IC, LPC Voice Synthesis Processor, 5220C	137308-002	C44	Capacitor, .0027 μ F, 50 V, Ceramic	122015-272
6/7D	IC, 74LS244	37-74LS244	C45	Capacitor, .0012 μ F, 50 V, Ceramic	122015-122
6/7E	IC, 74LS139	37-74LS139	C46	Capacitor, .018 μ F, 50 V, Ceramic	122015-183
6/7H	IC, 74LS138	137177-001	C47	Capacitor, .22 μ F, 25 V, Ceramic	122004-224
6B	IC, POKEY	137430-001	C48, C49	Capacitor, .1 μ F, 50 V, Ceramic	122002-104
6C	IC, 6502 A	90-6013	C50	Capacitor, .001 μ F, 50 V, Ceramic	122002-102
6D	IC, 74LS259	37-74LS259	C51	Capacitor, 10 μ F, 35 V, Electrolytic	24-350106
			C52–C54	Capacitor, .1 μ F, 50 V, Ceramic	122002-104
			C55	Capacitor, .0039 μ F, 50 V, Ceramic	122015-392
			C56	Capacitor, .22 μ F, 25 V, Ceramic	122004-224

Road Blasters/Cockpit Cartridge 5 PCB Assembly Parts List, Continued

Designator	Description	Part No.	Designator	Description	Part No.
C57	Capacitor, 10 μ F, 25 V, Electrolytic	24-250106	R48	Resistor, 5.6 K Ω , \pm 5%, 1/4 W	110000-562
C58-C61	Capacitor, 1000 pF, 100 V, Mica	128002-102	R49	Resistor, 10 K Ω , \pm 5%, 1/4 W	110000-103
C62	Capacitor, .01 μ F, 25 V, Ceramic	122005-103			
C63	Capacitor, .1 μ F, 50 V, Ceramic	122002-104	R50, R51	Resistor, 22 K Ω , \pm 5%, 1/4 W	110000-223
			R52	Resistor, 10 K Ω , \pm 5%, 1/4 W	110000-103
C64-C67	Capacitor, 4.7 μ F, 50 V, Electrolytic	24-500475	R55	Resistor, 1 K Ω , \pm 5%, 1/4 W	110000-102
C68, C69	Capacitor, .0027 μ F, 50 V, Ceramic	122015-272	R56	Resistor, 10 K Ω , \pm 5%, 1/4 W	110000-103
C70-C72	Capacitor, .1 μ F, 50 V, Ceramic	122002-104			
C73, C74	Capacitor, 1 μ F, 50 V, Electrolytic	24-500105	R57	Resistor, 39 K Ω , \pm 5%, 1/4 W	110000-393
			R58	Resistor, 390 Ω , \pm 5%, 1/4 W	110000-391
C75	Capacitor, 100 pF, 100 V, Ceramic	122016-101	R59	Resistor, 10 K Ω , \pm 5%, 1/4 W	110000-103
C76	Capacitor, 10 μ F, 25 V, Electrolytic	24-250106	R60, R61	Resistor, 15 K Ω , \pm 5%, 1/4 W	110000-153
C77-C87	Capacitor, .1 μ F, 50 V, Ceramic	122002-104			
C88-C91	Capacitor, 4.7 μ F, 50 V, Electrolytic	24-500475	R62	Resistor, 3.3 K Ω , \pm 5%, 1/4 W	110000-332
			R63	Resistor, 10 K Ω , \pm 5%, 1/4 W	110000-103
C92-C105	Capacitor, .1 μ F, 50 V, Ceramic	122002-104	R64, R65	Resistor, 330 Ω , \pm 5%, 1/4 W	110000-331
C106-C109	Capacitor, 4.7 μ F, 50 V, Electrolytic	24-500475	R66	Resistor, 390 Ω , \pm 5%, 1/4 W	110000-391
C110	Capacitor, 100 μ F, 25 V, Electrolytic	24-250107			
C111	Capacitor, .1 μ F, 50 V, Ceramic	122002-104	R67	Resistor, 560 Ω , \pm 5%, 1/4 W	110000-561
			R68	Resistor, 1 K Ω , \pm 5%, 1/4 W	110000-102
	Transistors		R69, R70	Resistor, 330 Ω , \pm 5%, 1/4 W	110000-331
Q1	IC, 79L05	37-79L05	R71	Resistor, 10 K Ω , \pm 5%, 1/4 W	110000-103
Q2, Q3	Transistor, 2N3906	33-2N3906			
Q4	Transistor, 2N3904	34-2N3904	R72	Resistor, 1 K Ω , \pm 5%, 1/4 W	110000-102
			R73, R74	Resistor, 3.3 K Ω , \pm 5%, 1/4 W	110000-332
	Resistors		R75	Resistor, 10 K Ω , \pm 5%, 1/4 W	110000-103
R17-R20,	Resistor, 4.7 K Ω , \pm 5%, 1/4 W	110000-472	R111, R112	Resistor, 0 Ω , 1/4 W	110005-001
R22			RN1-RN7	Resistor Network, 4.7K \times 9 Ω , \pm 5%, 1/4 W, SIP (10-pin)	118010-472
R23	Resistor, 8.2 K Ω , \pm 5%, 1/4 W	110000-822			
R24	Resistor, 56 K Ω , \pm 5%, 1/4 W	110000-563			
R25	Resistor, 12 K Ω , \pm 5%, 1/4 W	110000-123			
				Miscellaneous	
R27	Resistor, 43 K Ω , \pm 5%, 1/4 W	110000-433	J102	Connector, 8 Circuit, Header, .156 Ctr Key 3	79-58334
R28	Resistor, 20 K Ω , \pm 5%, 1/4 W	110000-203	J104,	Connector, 50 Circuit, 4 Wall Header, Rt 2 Rows	179186-001
R30	Resistor, 39 K Ω , \pm 5%, 1/4 W	110000-393	J105A,		
R31	Resistor, 330 Ω , \pm 5%, 1/4 W	110000-331	J105B		
			J107	Connector, 6 Circuit, Header, .100 Ctr, Key 2	179118-006
R32	Resistor, 220 Ω , \pm 5%, 1/4 W	110000-221	J108	Connector, 11 Circuit, Header, .100 Ctr, Key 2	179118-011
R33	Resistor, 3.9 K Ω , \pm 5%, 1/4 W	110000-392			
R34	Resistor, 10 K Ω , \pm 5%, 1/4 W	110000-103	OP1-OP4	Conn, 6 Ckt, Hdr, .100 Ctr	179177-006
R35	Resistor, 20 K Ω , \pm 5%, 1/4 W	110000-203	OP3, OP4	Conn, Rcpt, 2 Ckt	179178-001
			+ 5V1,	Test Point	179051-002
R36	Resistor, 43 K Ω , \pm 5%, 1/4 W	110000-433	+ 5V2,		
R37	Resistor, 1 K Ω , \pm 5%, 1/4 W	110000-102	GND1,		
R38	Resistor, 10 K Ω , \pm 5%, 1/4 W	110000-103	GDN2		
R39	Resistor, 27 K Ω , \pm 5%, 1/4 W	110000-273		Socket, 16-Pin	79-42C16
				Socket, 20-Pin	79-42C20
R40-R42	Resistor, 10 K Ω , \pm 5%, 1/4 W	110000-103		Socket, 24-Pin	79-42C24
R43	Resistor, 15 K Ω , \pm 5%, 1/4 W	110000-153		Socket, 28-Pin	79-42C28
R44	Resistor, 1 K Ω , \pm 5%, 1/4 W	110000-102		Socket, 40-Pin	79-42C40
R45	Resistor, 27 K Ω , \pm 5%, 1/4 W	110000-273			
R46	Resistor, 1.8 K Ω , \pm 5%, 1/4 W	110000-182			
R47	Resistor, 10 K Ω , \pm 5%, 1/4 W	110000-103			

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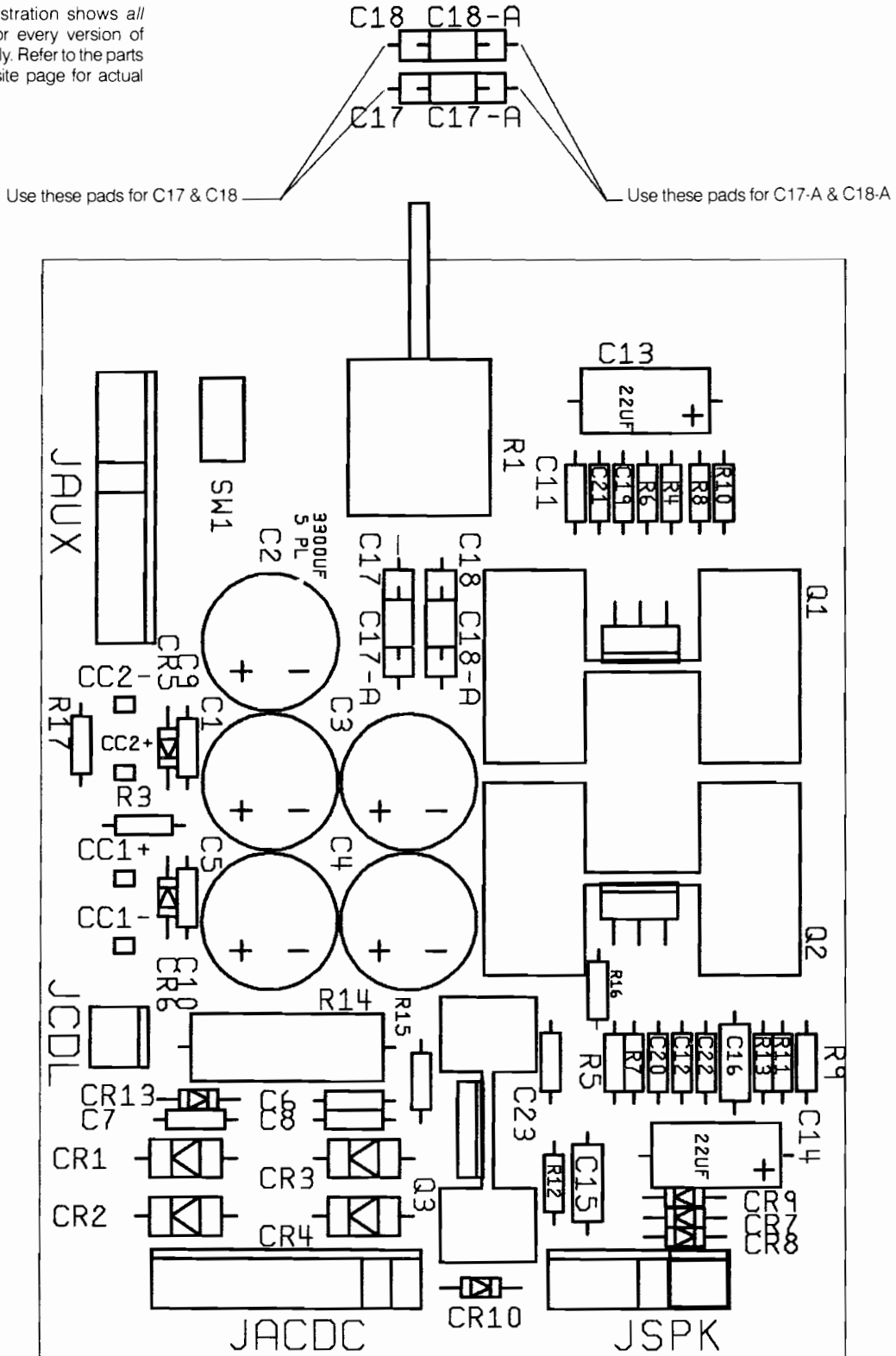
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NOTE: This illustration shows all parts required for every version of this PCB assembly. Refer to the parts list on the opposite page for actual parts used.



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**Figure 5-9 Audio II PCB Assembly
 A043661-03 and -05 D**

**Audio II PCB Assembly
A0403661-03 D
Parts List**

Designator	Description	Part No.
Capacitors		
C1, C3	3300 μ F, 25 V Radial Electrolytic Capacitor	123003-338
C7-C10, C12	.1 μ F, 50 V Ceramic Capacitor	122002-104
C14	22 μ F, 35 V Electrolytic Capacitor	24-350226
C16	.22 μ F, 25 V Ceramic Capacitor	122006-224
C17A, C18A	.22 μ F, 25 V Ceramic Capacitor	122006-224
C20	.001 μ F, 50 V Ceramic Capacitor	122002-102
C22	.1 μ F, 50 V Ceramic Capacitor	122002-104
Diodes		
CR1-CR4	Type-1N5401 Diode	31-1N5401
CR5-CR8	Type-1N4001 Diode	31-1N4001
Connectors		
JACDC	Key 6, 9 Ckt., .156-Inch Ctr. Header Connector	179213-009
JAUX	Key 6, 9 Ckt., .156-Inch Ctr. Header Connector	179213-009
JCDL	2 Ckt., .156-Inch Ctr. Header Connector	179213-002
JSPK	2 Ckt., .156-Inch Ctr. Header Connector	179213-002
Resistors		
R3	10 Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-100
R5	22 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-223
R7	3.3 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-332
R11	1 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-102
R13	1 Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-010
R16	22 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-223
R17	0 Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110005-001
Miscellaneous		
	Type-TDA-2030 Heat Sink	178190-032
	#6-32 \times $\frac{1}{4}$ -Inch Cross-Recessed Pan-Head Screw	72-1606S
	#6-32 Nut/Washer Assembly	75-99516
	Thermal Compound	78-16001
	Hot Melt Adhesive	106006-001
	Test Point	179051-001

**Audio II PCB Assembly
A043661-05 D
Parts List**

Designator	Description	Part No.
Capacitors		
C1-C4	3300 μ F, 25 V Radial Electrolytic Capacitor	123003-338
C7-C12	.1 μ F, 50 V Ceramic Capacitor	122002-104
C13, C14	22 μ F, 35 V Electrolytic Capacitor	24-350226
C15-C18	.22 μ F, 25 V Ceramic Capacitor	122006-224
C19, C20	.001 μ F, 50 V Ceramic Capacitor	122002-102
C21, C22	.1 μ F, 50 V Ceramic Capacitor	122002-104
Diodes		
CR1-CR4	Type-1N5401 Diode	31-1N5401
CR5-CR10	Type-1N4001 Diode	31-1N4001
Connectors		
JACDC	Key 6, 9 Ckt., .156-Inch Ctr. Header Connector	179213-009
JAUX	Key 6, 9 Ckt., .156-Inch Ctr. Header Connector	179213-009
JCDL	2 Ckt., .156-Inch Ctr. Header Connector	179213-002
JSPK	Key 3, 6 Ckt., .156-Inch Ctr. Header Connector	179213-006
Integrated Circuits		
Q1, Q2	Type-TDA-2030 Amplifier	137301-001
Resistors		
R1	10 k Ω , Dual Horizontal Pot Resistor	119011-103
R3	10 Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-100
R4-R7	22 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-223
R8, R9	10 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-103
R10-R11	1 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-102
R12, R13	1 Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-010
R17	0 Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110005-001
Miscellaneous		
SW1	SPDT Miniature Slide Self-Test Switch	69-004
	Type-TDA-2030 Heat Sink	178190-032
	#6-32 \times 3/8-Inch Cross-Recessed Pan-Head Screw	72-1606S
	#6-32 Nut/Washer Assembly	75-99516
	Thermal Compound	78-16001
	Hot Melt Adhesive	106006-001
	Test Point	179051-001

N O T E S

Road Blasters™

Coin Information and Game Statistics

Date: _____

Aux Coins	_____	Not used in Road Blasters game
Left Coins	_____	Number of coins deposited in left coin mechanism
Right Coins	_____	Number of coins deposited in right coin mechanism
1 Plyr Games	_____	Number of 1-player games
Mins Played	_____	Total time, in minutes, of all games played
Mins Pwr Up	_____	Total time, in minutes, that the game has been turned on
Aux Cntr 1	_____	Highest rally achieved
Aux Cntr 2	_____	Total number of times add-a-coin used
Aux Cntr 3	_____	Number of games without a new high-score entry
Error Count	_____	Number of EEPROM errors
Avg. Game Time	_____	Average game time in seconds (including add-a-coin continuation games)

Histogram Information

Length of Game in Seconds	Number of Games That Reached Level				
	1	2	3	4	5
0-59	_____	_____	_____	_____	_____
60-89	_____	_____	_____	_____	_____
90-119	_____	_____	_____	_____	_____
120-149	_____	_____	_____	_____	_____
150-179	_____	_____	_____	_____	_____
180-209	_____	_____	_____	_____	_____
210-239	_____	_____	_____	_____	_____
240-269	_____	_____	_____	_____	_____
270-299	_____	_____	_____	_____	_____
300-329	_____	_____	_____	_____	_____
330-359	_____	_____	_____	_____	_____
360-389	_____	_____	_____	_____	_____
390-419	_____	_____	_____	_____	_____
420-449	_____	_____	_____	_____	_____
450-479	_____	_____	_____	_____	_____
480-509	_____	_____	_____	_____	_____
510-539	_____	_____	_____	_____	_____
540 & up	_____	_____	_____	_____	_____
High Score	_____	_____	_____	_____	_____

Histogram Levels 1-3:

Number of games that started at the Rookie, Veteran, or Expert level, respectively. These are only games that were played without using the game continuation feature.

Histogram Level 4:

Number of games that ended on the original level for add-a-coin game continuation.

Histogram Level 5:

Number of games that ended on a higher level after a game continuation.

Warranty

Seller warrants that its printed-circuit boards and parts thereon are free from defects in material and workmanship under normal use and service for a period of ninety (90) days from date of shipment. Seller warrants that its video displays and laser video disc players (in games supplied with displays and video-disc players) are free from defects in material and workmanship under normal use and service for a period of thirty (30) days from date of shipment. None of the Seller's other products or parts thereof are warranted.

If the products described in this manual fail to conform to this warranty, Seller's sole liability shall be, at its option, to repair, replace, or credit Buyer's account for such products which are returned to Seller during said warranty period, provided:

- (a) Seller is promptly notified in writing upon discovery by Buyer that said products are defective;
- (b) Such products are returned prepaid to Seller's plant; and
- (c) Seller's examination of said products discloses to Seller's satisfaction that such alleged defects existed and were not caused by accident, misuse, neglect, alteration, improper repair, installation, or improper testing.

In no event shall Seller be liable for loss of profits, loss of use, incidental or consequential damages.

Except for any express warranty set forth in a written contract between Seller and Buyer which contract supersedes the terms herein, this warranty is expressed in lieu of all other warranties expressed or implied, including the implied warranties of merchantability and fitness for a particular purpose, and of all other obligations or liabilities on the Seller's part, and it neither assumes nor authorizes any other person to assume for the Seller any other liabilities in connection with the sale of products by Seller.

The use of any non-Atari parts may void your warranty, according to the terms of the warranty. The use of any non-Atari parts may also adversely affect the safety of your game and cause injury to you and others. Be very cautious in using non-Atari-supplied components with our games, in order to ensure your safety.

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