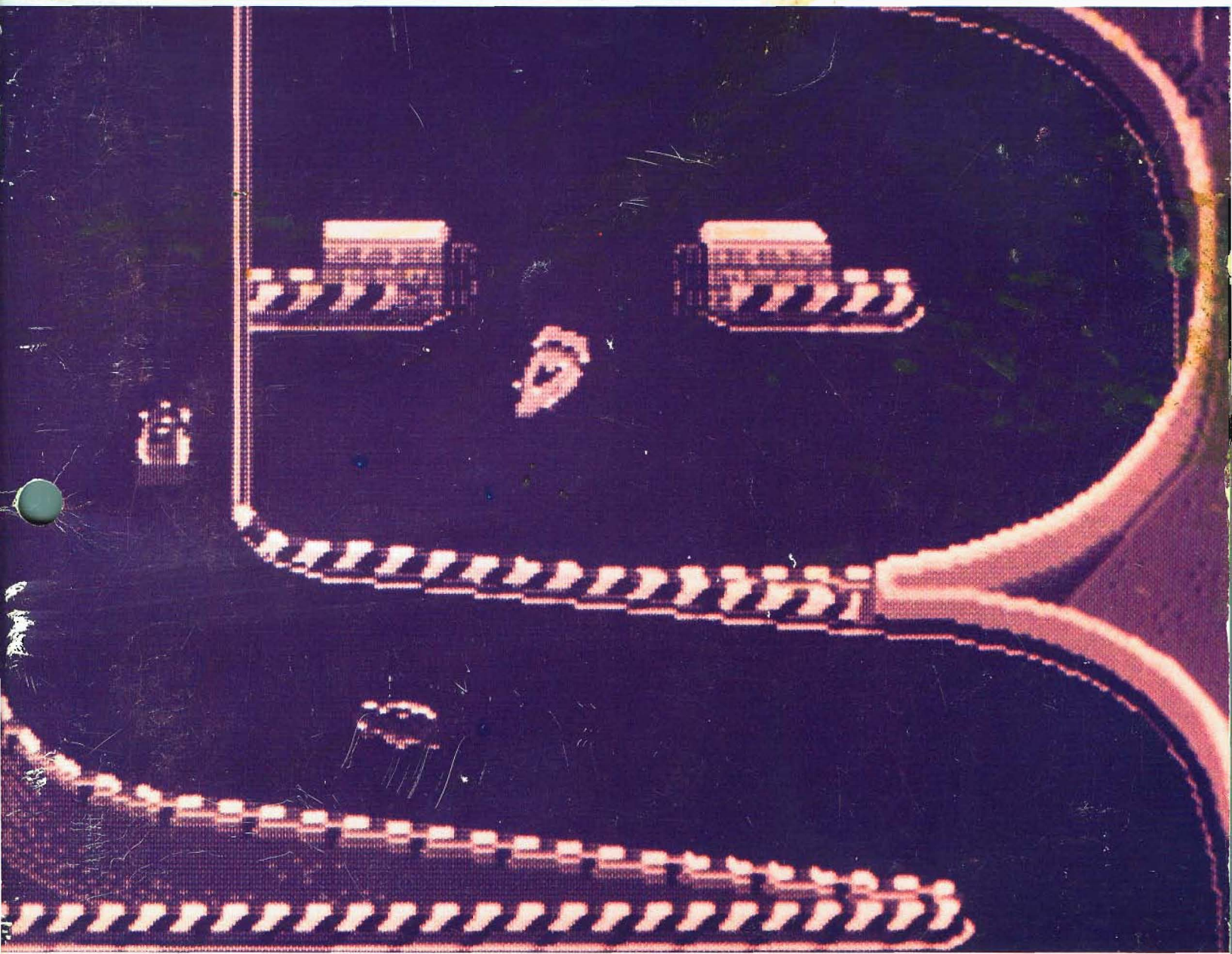ATARI
GAMES

Operators Manual
with Illustrated Parts Lists

CHAMPIONSHIP SPRINT™

Atari Games Corporation
Customer Service

If reading through this manual does not lead to solving a certain maintenance problem, call TELEHELP® at one of these Atari Games Customer Service offices:

UNITED STATES

Parts and Service
Atari Games Corporation
California Customer Service Office
737 Sycamore Drive
P.O. Box 361110
Milpitas, CA 95035-1110
Telex 17-2976
(Monday–Friday, 7:30–4:00 pm Pacific Time)
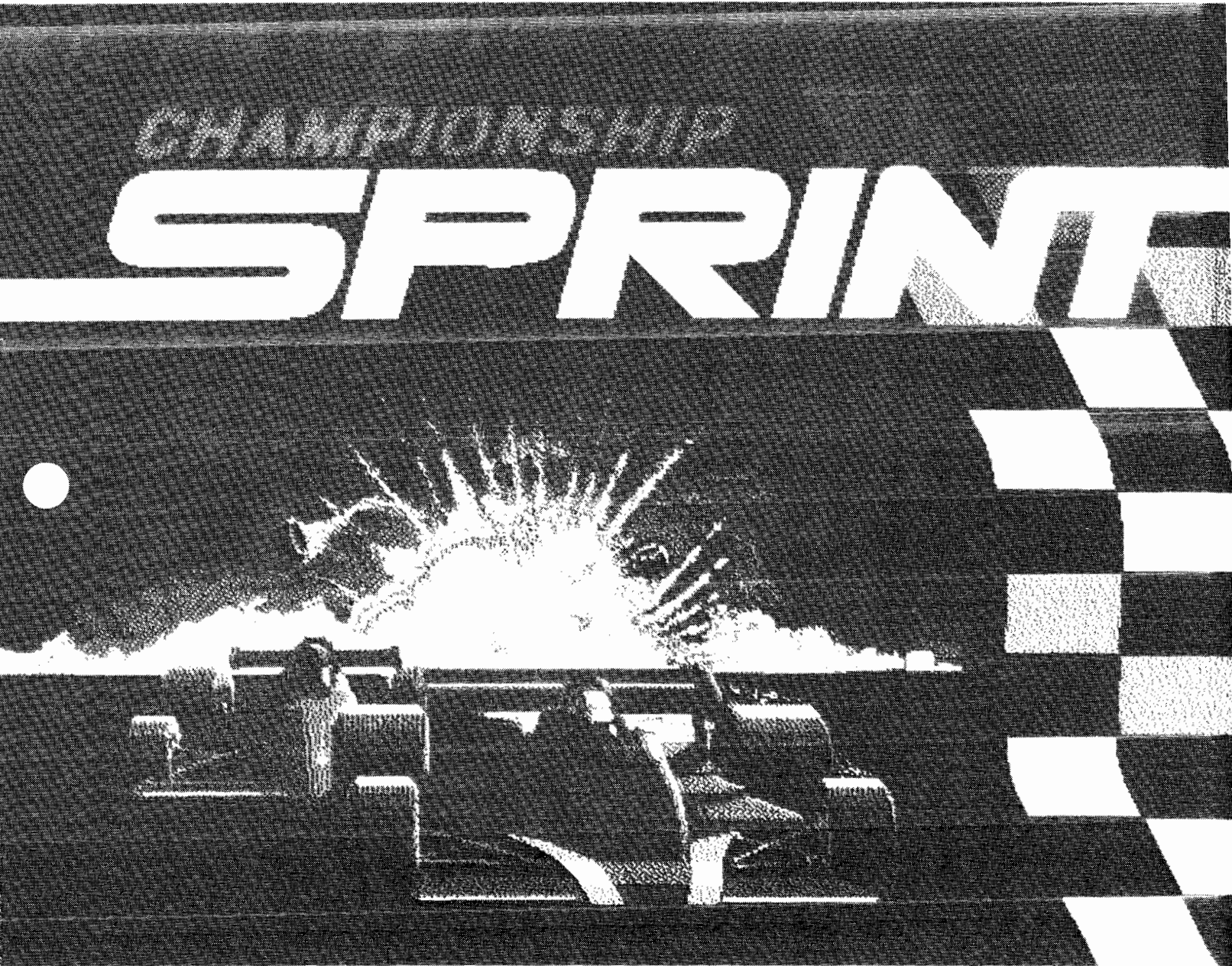
☎   **(408) 434-3950**

EUROPE

Parts and Service
Atari Games Corporation
European Customer Service Office
Tipperary Town, Ireland
Telex 28165
(Monday–Friday, 9:00–6:00 pm GMT)

☎   **062-52155**

Championship Sprint Operators Manual

with Illustrated Parts Lists

ATARI
G A M E S

Notice Regarding Non-ATARI® Parts

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━━━━━ ⚠ ━━━━ 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 green ground wires in the game are properly connected as shown in the game wiring diagram.

- The power cord is properly plugged into a grounded three-wire outlet.

- The game printed-circuit boards (PCBs) are properly installed with the Electromagnetic Interference (EMI) ground plane.

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

Table of Contents

List of Illustrations

List of Tables

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 electical shock because high voltages may exist within the display circuitry and cathode-ray tube (CRT) even after power has been disconnected. Do not touch internal parts of the display with your hands or with metal objects! Always discharge the high voltage from the CRT before servicing this area of the game. To discharge the CRT: Attach one end of a large, well-insulated, 18-gauge jumper wire to ground. Momentarily touch the free end of the grounded jumper to the CRT anode by sliding it under the anode cap. Wait two minutes and discharge the anode again.

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

Handle 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.)

Set-Up
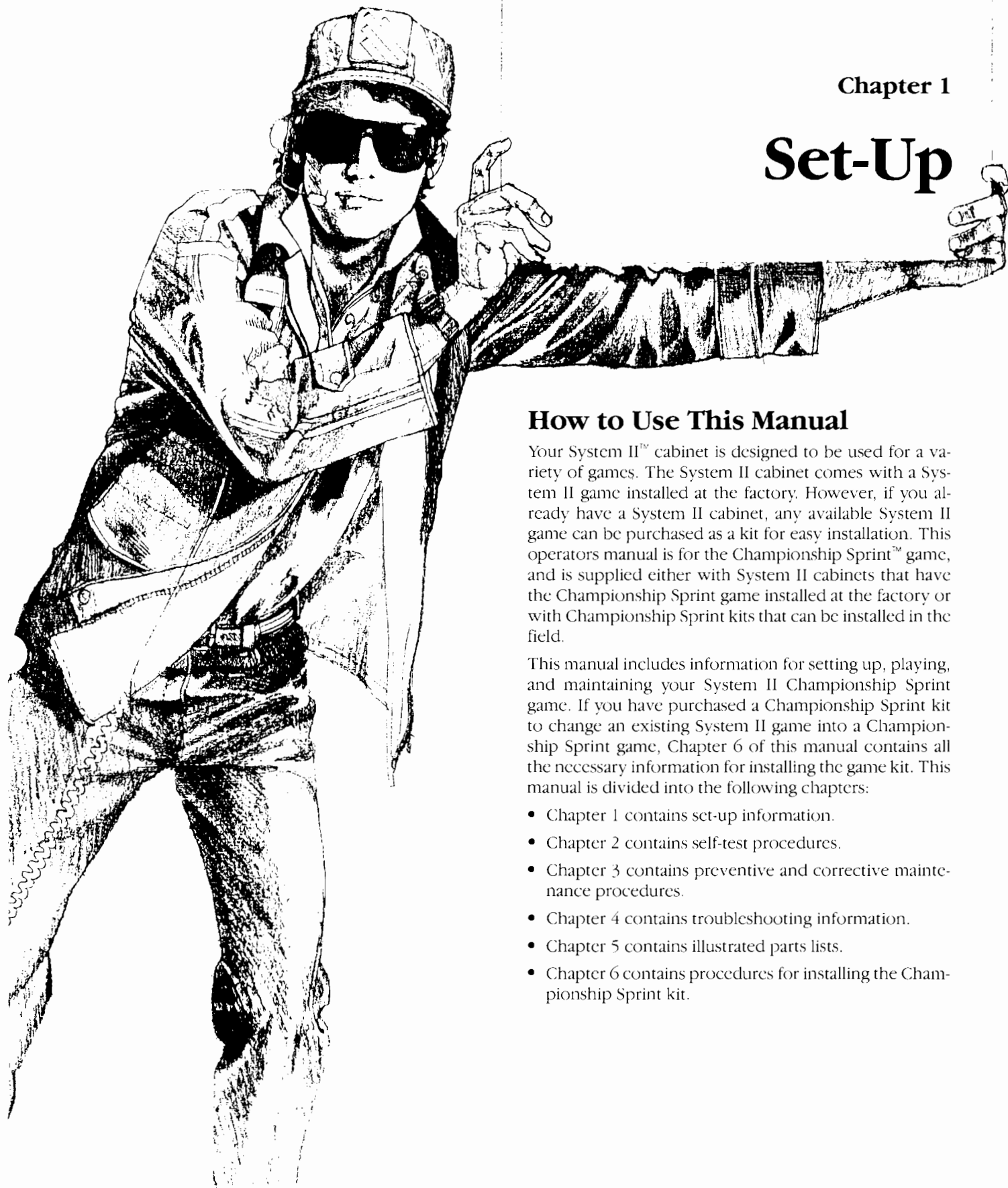
How to Use This Manual

Your System II™ cabinet is designed to be used for a variety of games. The System II cabinet comes with a System II game installed at the factory. However, if you already have a System II cabinet, any available System II game can be purchased as a kit for easy installation. This operators manual is for the Championship Sprint™ game, and is supplied either with System II cabinets that have the Championship Sprint game installed at the factory or with Championship Sprint kits that can be installed in the field.

This manual includes information for setting up, playing, and maintaining your System II Championship Sprint game. If you have purchased a Championship Sprint kit to change an existing System II game into a Championship Sprint game, Chapter 6 of this manual contains all the necessary information for installing the game kit. This manual is divided into the following chapters:

- Chapter 1 contains set-up 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.
- Chapter 6 contains procedures for installing the Championship Sprint kit.

System II Paperboy™ games located in the field were built with a different power supply, Audio PCB, and utility panel than the System II Championship Sprint games. Refer to Chapter 5, Illustrated Parts List, in the *Paperboy Operators Manual* (TM-275) for information regarding these components. The figure number and part number for each of these components follow:

Figure No.	Part No.	Component
5-5	A037671-16	Linear Power Supply
5-12	A043046-01	Regulator/Audio III PCB
5-6	A043146-01	Utility Panel
Refer to CO-275-01 Supplement	A043785-xx	Sierracin 5-Volt Power Supply

For the wiring and schematic diagrams, refer to the *Paperboy Schematic Package Supplement* (SP-275) and the *Sierracin 5-Volt Power Supply Supplement* (CO-275-01).

NOTE

If you do not have the Paperboy manual or the supplements, use the form in the back of this manual to obtain a free copy.

Wiring and schematic diagrams for the System II Championship Sprint game circuitry are contained in the Schematic Package Supplement (SP-292) included with your game.

This chapter includes information required to set up and play your Championship Sprint 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 System II Championship Sprint game (or kit) carefully to ensure that the game (or kit) is complete and delivered to you in good condition. Figure 6-1 shows the locations of the component parts of the assembled game. Refer to Chapter 6 for a list of the kit parts. Table 1-1 lists the 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

Table 1-1 Game Specifications

Characteristic	Specification
Power Consumption	300 V-A, 239 W RMS maximum with kit parts installed
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	25.25 in. (64 cm)
Depth	37¾ in. (95 cm) with control panel installed
Height	72 in. (183 cm)
Weight	330 lbs. (149 kg) maximum with kit parts installed

is mounted in place. Check that the green ground wire is connected.

e. Inspect other major sub-assemblies, such as the video display, printed-circuit boards (PCBs), speakers, and the fluorescent tube. Make sure they are mounted securely and that the green ground wires are connected.

Inspect the Championship Sprint kit as follows:

1. Verify that all of the Championship Sprint kit parts listed in Table 6-1 of this manual are included in your kit.

2. Examine the kit parts for dents, chips, or broken parts.

Installation of Control Panel

For packaging purposes, the Championship Sprint control panel is shipped inside the cabinet. The panel is mounted on a single metal bracket on the inside left side panel in the rear of the cabinet. (See Figure 1-1.) Perform the following procedure to remove the control panel from the cabinet.

1. Using a Phillips screwdriver, remove the two screws holding the metal bracket to the cabinet. Remove the control panel from inside the cabinet.

2. Using a 1/8-inch hex driver, remove the two screws and washers holding the metal bracket to the control panel. *Save this hardware.* Discard the bracket or re-mount it in the cabinet for future control panel storage.

3. Replace the existing control panel with the Championship Sprint control panel. Refer to Chapter 3, *Removing the Control Panel*.

Control and Switch Locations

Power On/Off Switch

The power on/off switch is located at the bottom rear of the cabinet. (See Figure 5-1.)

Volume Control

The volume control is located on the Audio II PCB behind the upper coin door. (See Figure 1-2.) The volume control adjusts the level of sound produced by the game.

Coin Counter

The coin counter is located on the inner cabinet wall opposite the upper coin door. The coin counter records the number of coins deposited.

Self-Test Switch

The self-test switch is located on the Audio II PCB behind the upper coin door. (See Figure 1-2.) 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. (See Figure 1-2.)

Coin and Game Option Settings

The System II cabinet has two dual-in-line package (DIP) option switches located on the CPU printed circuit board (PCB).

• The option switch at location 6/7A is for selecting coin options.

• The option switch at location 5/6A is for selecting game options.

Set the coin and credit option settings, game option settings, and automatic high score reset setting by changing the settings of the DIP switches. Refer to Table 1-2 and Table 1-3 for the available options and default (recommended) settings.

To change these settings, first remove the thin film of plastic covering the option switch. Use a pen or a sharp-pointed instrument to slide the appropriate small buttons to different settings. Right is the *on position*, and left is the *off position*. The steering wheel controls and the pushbuttons are *not* used to change these settings.

Operating Modes

Championship Sprint has four operating modes: Attract, Play, High Score, and Self-Test.

Attract Mode

The Attract Mode begins either when the game is plugged in or after exiting the Play, High Score, or Self-Test Modes. The Attract Mode ends when the correct amount of coins or tokens are inserted and the start button(s) are pressed, or when the self-test switch is turned off. The Attract Mode continuously cycles through the following events:

• Title Page—The title *CHAMPIONSHIP SPRINT* is displayed on an explosion/checkerboard background.

• High Score Table—The top 30 scores are displayed. (Championship Sprint Racing Team). The top 3 scores are highlighted at the top of the screen.

• Demo Mode—The drone cars run two laps on each of the eight tracks, taking each checkered flag.

During the Attract Mode, if a whole new credit (not partial credits) is entered into the game through the coin mechanisms, a gong sound is played. The credit status and current coin mode are constantly displayed and updated throughout the Attract Mode.

Play Mode

Play mode begins when the correct credit is entered and the blue or red start button is pressed. Refer to *Game Play* for playing information.

Control Panel

Metal Bracket
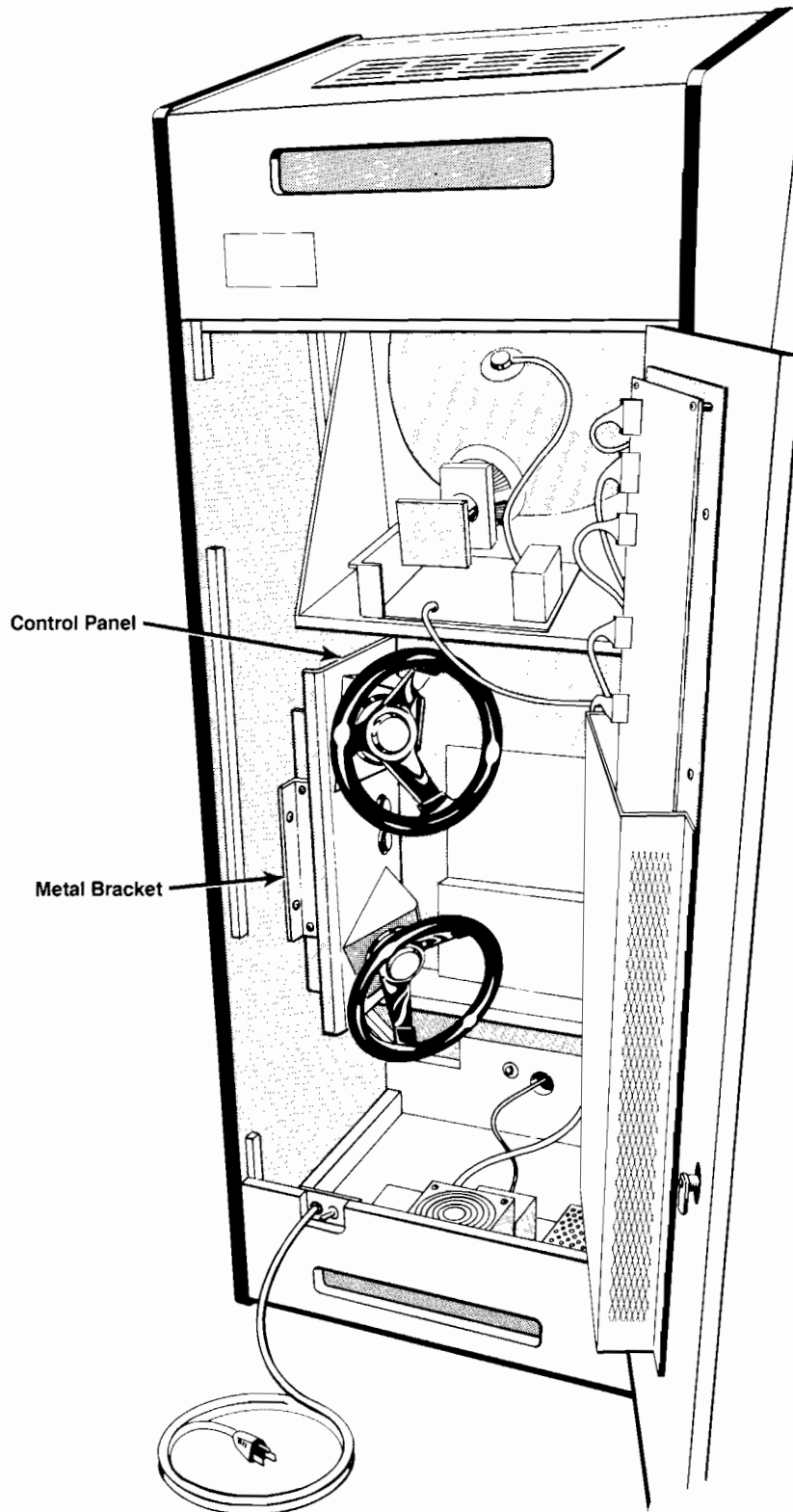
Figure 1-1   Removing Control Panel from Shipping Position

Coin Option Switch

Game Option Switch

CPU PCB

Coin Counter

Audio II PCB

Self-Test Switch

Volume Control

Auxiliary Coin Switches
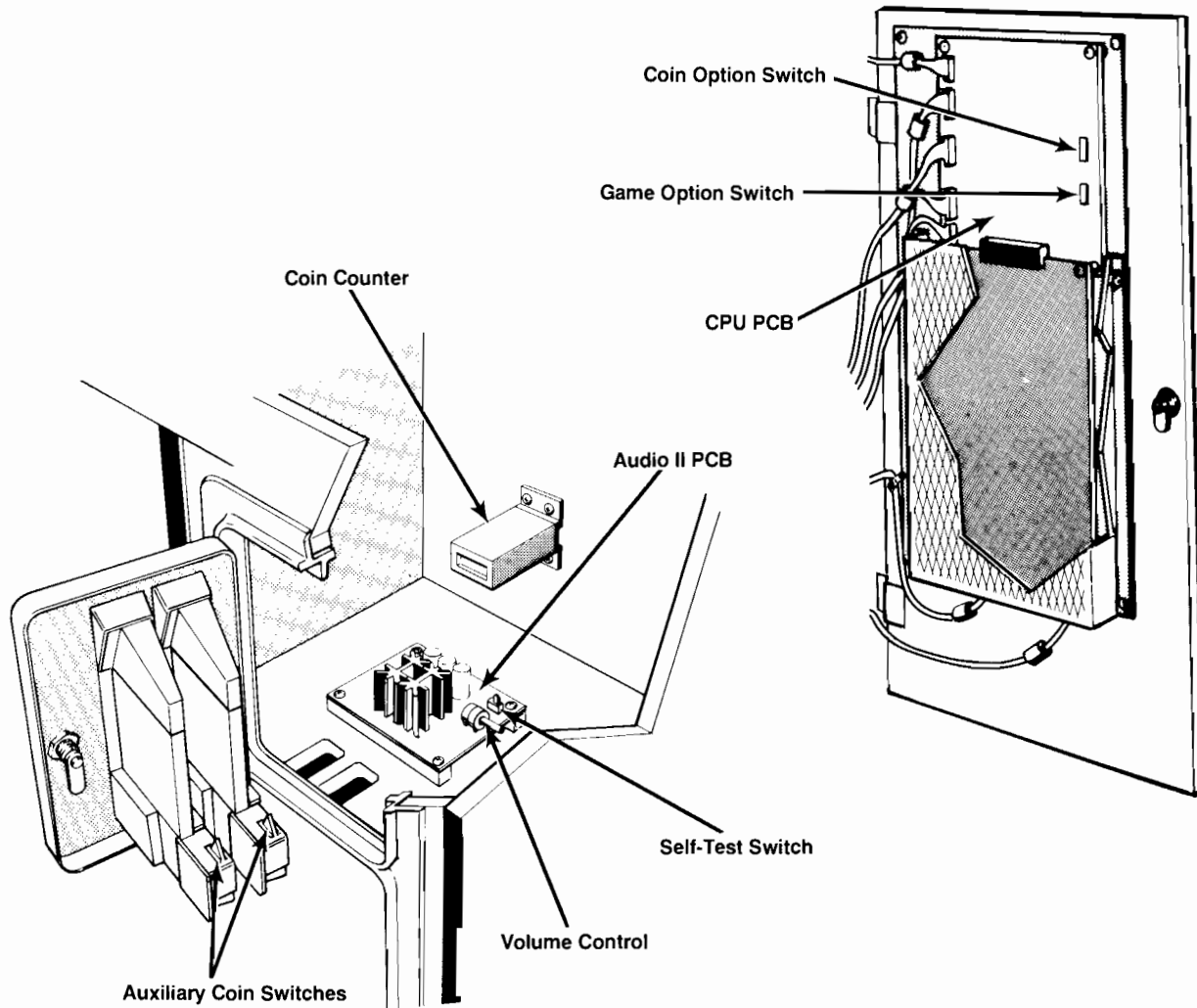
Figure 1-2   Control and Switch Locations

High Score Mode

In the High Score Mode, if a player's score is among the top 30, the player can enter the desired initials by turning the steering wheel to select the initial, and by pressing the start button or accelerator pedal to insert the initial.

Self-Test Mode

You can set the Championship Sprint game to the Self-Test Mode by turning on the self-test switch located on the Audio II PCB behind the upper coin door. Refer to Chapter 2 for detailed self-test information.

Game Play

The game play begins once players select a car by depositing coins into the proper coin slot. One coin slot is designated for each of the two player cars—blue, or red. The first player to press start is given the option to select one of eight unique starting tracks. A select screen displays all

tracks. Players choose the desired starting track by using the steering wheel to indicate the desired track, and by pressing the accelerator pedal to start the game on the chosen track.

At the starting line, a green flag indicates the race is on. During the race, the lead player's lap number is flashing. A white flag appears when the last lap is on. At the finish line, a checkered flag awaits the winner. At the end of each heat, players go to the "Winner's Circle" where racing statistics show the players' rankings, their best lap times, and their average lap times. Players who beat the drone cars continue in the game by going on to the next heat. Each new heat takes place on a new track.

During each race, players compete to collect gold wrenches that appear randomly on each track. These wrenches are a key element in the game because players can trade them in for custom car features. Players can customize their cars to suit their driving skills with the following options:

Table 1-2 Coin and Credit Option Settings

Settings of 8-Toggle Switch on Championship Sprint CPU PCB (at 6/7A)								Option
1	2	3	4	5	6	7	8	
								Coins Per Credit
						Off	Off	1 Coin 1 Credit ◄
						Off	On	2 Coins 1 Credit
						On	Off	3 Coins 1 Credit
						On	On	4 Coins 1 Credit
								All Coin Mechanisms
			Off	Off	Off			1 Coin Counts as 1 Coin ◄
			Off	Off	On			1 Coin Counts as 2 Coins
			Off	On	Off			1 Coin Counts as 3 Coins
			Off	On	On			1 Coin Counts as 4 Coins
			On	Off	Off			1 Coin Counts as 5 Coins
			On	Off	On			1 Coin Counts as 6 Coins
			On	On	Off			1 Coin Counts as 7 Coins
			On	On	On			1 Coin Counts as 8 Coins
								Bonus Adder
Off	Off	Off						No Bonus Adder ◄
Off	Off	On						2 Coins Give 1 Extra Coin
Off	On	Off						4 Coins Give 1 Extra Coin
Off	On	On						4 Coins Give 2 Extra Coins
On	Off	Off						5 Coins Give 1 Extra Coin
On	Off	On						3 Coins Give 1 Extra Coin
On	On	On						Free Play

◄ *Manufacturer's recommended settings*

Table 1-3 Game Option Settings

Settings of 8-Toggle Switch on Championship Sprint CPU PCB (at 5/6A)								Option
1	2	3	4	5	6	7	8	
								Drone Difficulty
						Off	On	Easy
						Off	Off	Medium ◄
						On	Off	Medium Hard
						On	On	Hard
								Track Hazard Difficulty
				Off	On			Easy
				Off	Off			Medium ◄
				On	Off			Medium Hard
				On	On			Hard
								Number of Wrenches to Customize Car
		Off	On					2
		Off	Off					3 ◄
		On	Off					4
		On	On					5
								Automatic High Score Reset After 2000 Plays
Off								Yes ◄
On								No

◄ *Manufacturer's recommended settings*

Super Traction—gives players more maneuverability around sharp turns.

Turbo Acceleration—gets players off to a fast start at the beginning of the game or after they crash.

Higher Top Speed—helps players stay in the lead, only if they can handle the high speed. (Beginning players learn quickly that this feature should be used with more practice.)

Fast Chopper—increases the speed of the helicopter recovery sequence.

There are five levels of each of these features for a total of 20 custom car bonuses. After completing five levels of Fast Chopper, players are also given an unlimited option of *increased score*, to motivate more skillful players who can gradually acquire all 20 car bonuses. Operators can select the number of wrenches required for each car bonus. Championship Sprint is shipped on a 3-wrench-per-bonus setting.

These bonus wrenches also provide additional player incentives that result in higher earnings: Players get to keep acquired custom car features if they lose to a drone car, as long as they use the add-a-coin feature in the game. Also, bonus wrenches are awarded to new players who enter a game on the more difficult tracks. Additionally, a bonus wrench is awarded to each winning car that betters the existing "best lap time" for each track.

Championship Sprint has eight different tracks, each one introducing new challenges. Jump ramps, opening and closing gates, hidden short cuts, over/under passes, and banked turns all require special driving maneuvers. Throughout each heat, players are introduced to new track obstacles such as oil spills, twisters, traffic cones, and "poppers." Special bonus score pads also appear that players can run over for points. Players will crash whenever they hit a wall at high speeds. Each time they crash, they must wait for a recovery period, indicated by the rescue helicopter that comes on the screen.

To complete the driving experience, Championship Sprint has detailed animation and custom stereo music with realistic sound effects.

Operator Hints

Here are some pointers for maximizing earnings from your System II Championship Sprint game.

Maximizing Earnings

The key to maximum earnings is striking a midpoint on game times. Initially, game times should be short enough to allow higher player turnover. At the same time, game times must be long enough to give the player good value and ensure repeat play.

Championship Sprint has a comprehensive statistics and coin accounting package, which is described in greater detail in Chapter 2 of this manual. To find out whether or not your players are getting adequate value for their money, you should evaluate the following information.

NOTE

For your convenience, a pre-printed, tear-out statistics sheet is included at the back of this manual. Use this sheet to track your Championship Sprint game statistics.

Average Game Times/Average Time Between Coin Drop

Two statistics are crucial in evaluating the appropriate option settings on your Championship Sprint game. First, check the average game time which is shown in the Accounting Information screen in the Self-Test Mode. If the game is set at the factory-recommended settings, initial game times should average between 2:00 and 3:00. If this is not the case, you should then check the average time between coin drop, which can be calculated by two readings shown on the Accounting Information screen.

To calculate: divide the total play time by the total games: ((No. of hours played × 60 + minutes) ÷ total games) × 60 = seconds between coin drop. This number should range from 65 to 90 seconds.

If a high percentage of your average game times are under 90 seconds, and your average time between coin drop is under 50 seconds, the current game settings may be too difficult. You should consider changing the drone difficulty to the EASY setting. If game times are still too short after one or two weeks, try changing the track hazard difficulty to the EASY setting.

Conversely, if a high percentage of your average game times are over 3:30, and your average time between coin drop is over 100 seconds, the current game settings may be too easy. Try changing the drone difficulty and the track hazard difficulty options to the MEDIUM HARD setting.

NOTE

The previously mentioned recommendations are based on one coin per play, U.S. currency.

Game Sounds

Your System II cabinet with the Championship Sprint game uses more effective audio than previous games, which results in more player involvement and enjoyment. The System II games use advanced digital sound-generation techniques to create realistic musical instrument sounds (such as clarinets, harmonicas, drums, and violins). Although a player may not be consciously aware

of the music, it has a direct effect on the excitement and emotional experience of the game.

The Championship Sprint game creates ear-catching sound effects, which are designed to give feedback to make the player believe that the game is responding directly to his actions. To maximize the player's enjoyment of this enhanced audio and maximize your earnings, consider the following hints:

1. The game location should be a relatively dead acoustical environment. The goal is to minimize unnecessary sound reflection, so that the sounds from the Championship Sprint game won't be drowned out by the accumulation of other sounds that bounce around the room. Carpets help eliminate sound reflections from the floor. Acoustical tile is also useful, especially if you have low ceilings.

2. If you use an environmental sound system or a stereo, consider lowering its volume or perhaps even turning it off. In the days when video games just made harsh beeps and boops, a central sound system helped make up for the lack of drive and excitement in a game's sounds. But your Championship Sprint game is very musical, and a sound system interferes with the game's ability to interest players and draw bystanders.

3. Be concerned with the overall volume levels in arcade environments. The goal is to involve the players' emotions, not to damage their hearing. To a certain point, raising the game volume helps add to player excitement, but above that level it creates hearing fatigue and the high volume starts to drive players away. Rather than turning up the volume on the Championship Sprint games to cut through the background sound level, try lowering the volume of any neighboring games that have sounds which are not an attractive or important element. Careful placement of games and attention to unnecessary noise sources can also help increase the player's sense of game involvement and interaction.

Self-Test

This game tests itself and provides visual and audible indications of the condition of the game circuitry and controls. Self-test information is displayed on the screen and sent 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 option settings are displayed in the Self-Test Mode.

Thirteen self-test screens provide a visual and audible check of the Championship Sprint™ game circuits. Refer to Chapter 1 for the self-test switch location.

The Self-Test Mode can be entered immediately after turning on the game power, either from the Play Mode or from the Attract Mode. If the self-test switch is turned on during the Play or the Attract Mode, the first display to appear is the 6502 Processor Test. By pressing the red start (right) button, the self-test advances to the Pedal Test. The self-test then advances from the Pedal Test to the end. The game power must be turned off, the self-test switch turned on, and the game power turned on again to start the self-test with the RAM/Interrupt/ROM Test.

The following self-test procedure is presented in the sequence in which the self-test screens appear when the self-test switch is turned on and *then* the game power is turned on. Turning off the self-test switch at any time during the self-test causes the game to return to the Attract Mode.
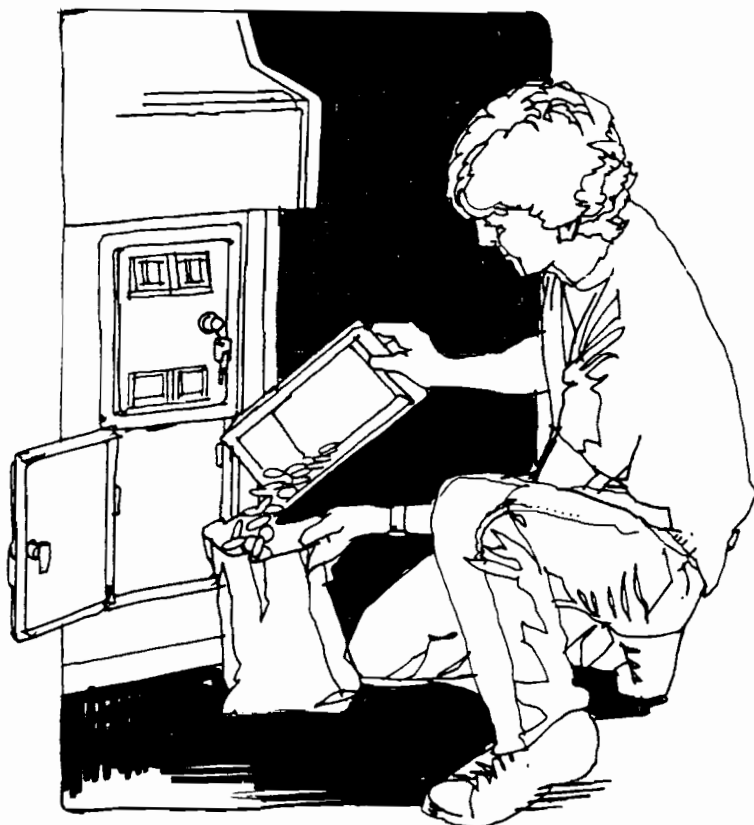
NOTE

During any of the self-tests, press the red start (or right) button to advance to the next screen.

RAM/Interrupt/ROM Test

The RAM/Interrupt/ROM Test screens are shown in Figures 2-1, 2-2, and 2-3. These screens display the failure information for the RAM, interrupt, and program ROM circuitry on the CPU and Video PCBs. If the RAM/Interrupt/ROM test passes, the display advances to the 6502 Processor Test.

The RAM test checks the condition of the T-11 microprocessor RAM, zero page RAM, motion object RAM, playfield RAM, alphanumeric RAM, and associated circuitry located on the Video PCB. If the RAM test fails, an error message gives the location of the failed RAM or associated circuitry on the Video PCB as shown in Figure 2-1.

If the zero-page RAM or associated circuitry fails, the screen turns red and the address location of the failed component flashes continuously to facilitate troubleshooting.
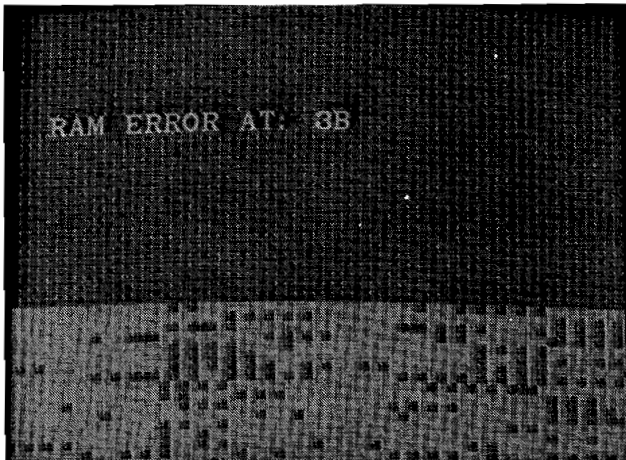
Figure 2-1   RAM Test Fails
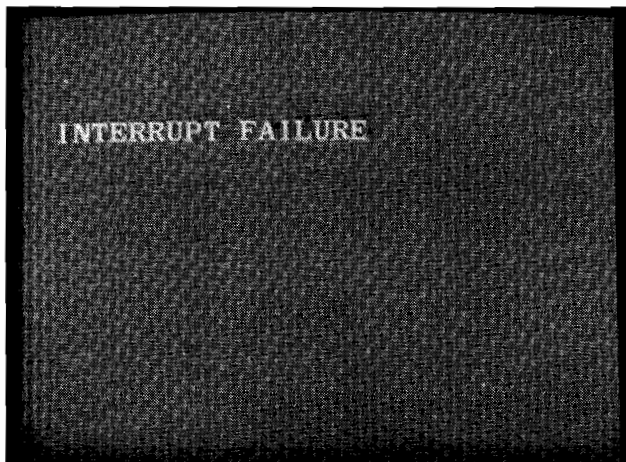
Figure 2-2   Interrupt Test Fails
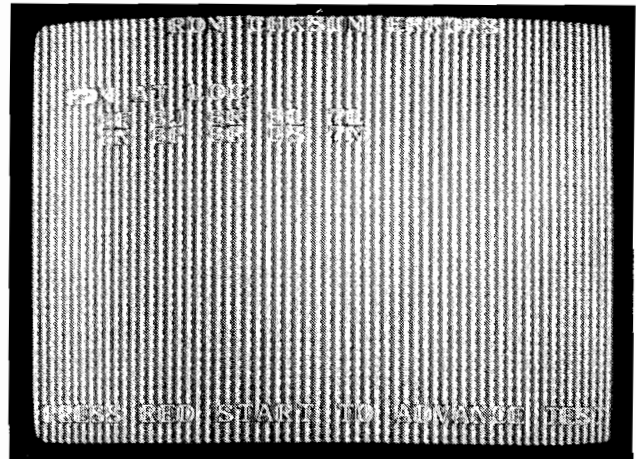
Figure 2-3   ROM Test Fails

After the RAM test passes, the interrupts on the CPU and Video PCB are checked. If the interrupt test fails, an error message as shown in Figure 2-2 can appear on a green screen, which indicates a possible vertical-blanking or interrupt-logic failure.

After the interrupt test passes, all eight of the program ROMs on the CPU PCB are tested for checksums. If the ROM test fails, an error message gives the location of the failed ROM or associated circuitry as shown in Figure 2-3.

6502 Processor Test

The 6502 Processor Test screen provides visual and audible information to indicate the condition of the 6502 sound microprocessor and associated circuitry. All functions of the sound microprocessor are checked including: RAM/ROM, interrupts, music synthesizer, and sound-effects processor. Basic communication between the T-11 (master) and the 6502 (slave) microprocessors is also checked.

The 6502 test starts with a reset/communications check that first resets the 6502 and then checks for proper response to start up protocol. This test checks the communications ports (T-11 to 6502 and 6502 to T-11), the 6502 reset circuit, and the general condition of the 6502.

If the 6502 circuitry does not respond properly to the reset, the system retries the reset procedure ten times. Then an error message and retry count number is displayed as shown in Figure 2-4.

If the 6502 circuitry fails to reset through all ten attempts, a communications error message is displayed as shown in Figure 2-5.

If the reset/communications check passes, then the condition of the 6502 microprocessor, RAM, ROM, interrupts, music (Yamaha) synthesizer, and associated circuitry is checked. If one or more of these circuits fails, an error message is displayed as shown in Figure 2-6.
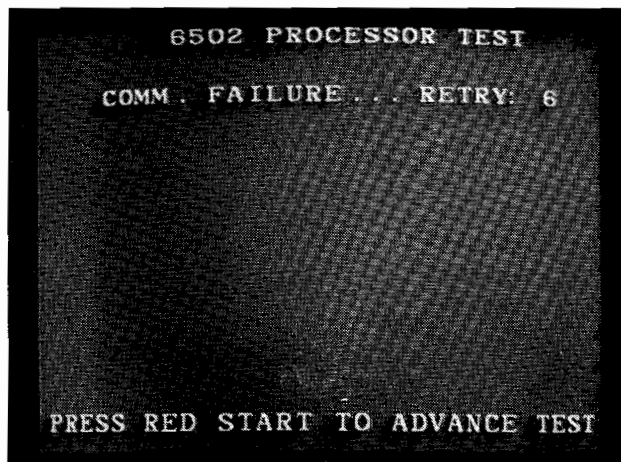
Figure 2-4 Reset Retry
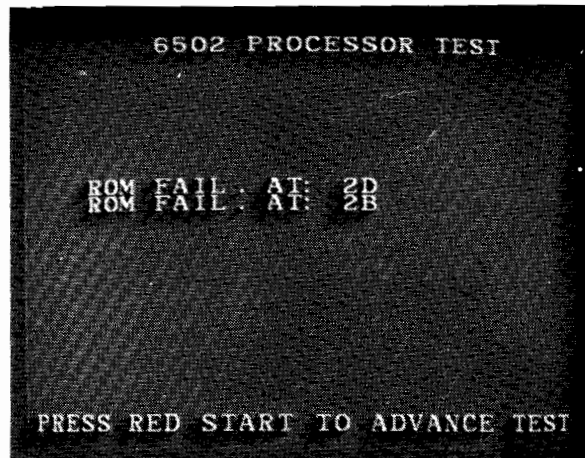
Figure 2-6 Music/RAM/ROM Fails
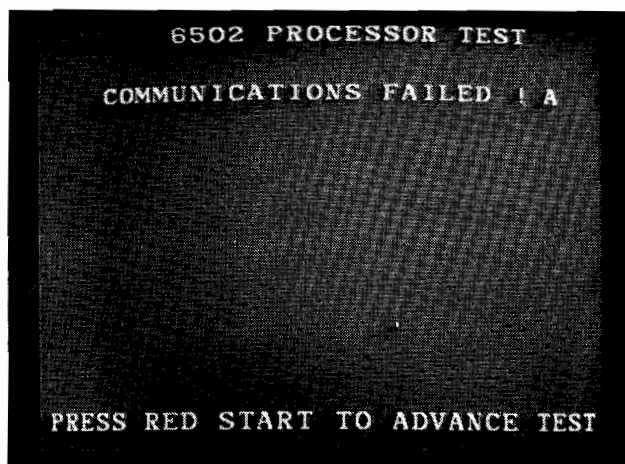
Figure 2-5 Communications Fails
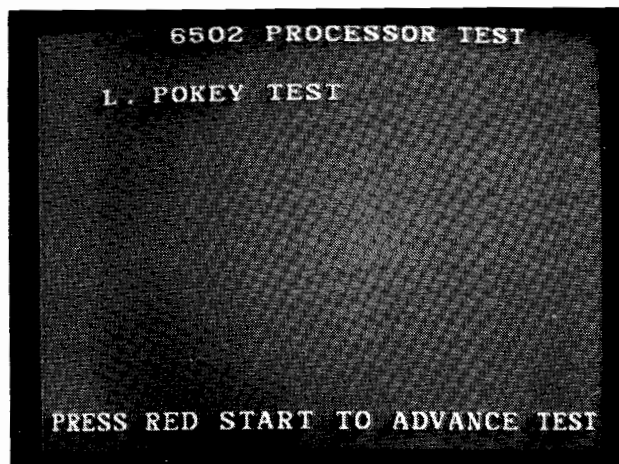
Figure 2-7 Sound Output

If the RAM, ROM, and music synthesizer check passes, then the music (Yamaha) synthesizer, and sound-effects generator (POKEY) sound outputs are checked. As each of these three tests is run, an appropriate message is displayed as shown in Figure 2-7.

- *YAMAHA TEST* consists of eight tones in a major scale that alternate between left and right sound channels (16 tones total).
- *L. POKEY TEST* consists of four tones in a major chord that come from the left sound channel.
- *R. POKEY TEST* consists of four tones in a major chord that come from the right sound channel.

After the three sound output tests are completed, the sound status messages are displayed as shown in Figure 2-8.

- *NUMBER OF SOUNDS* is the total number of sounds used in the Championship Sprint game.

- *CURRENT SOUND* is the current sound selected for playing.

Press the blue car button to select the sound numbers indicated by the *CURRENT SOUND* message shown in Figure 2-8. Turn the blue car steering wheel to sequence through the selected sounds.

The sound status screen also indicates the condition of the left and right coin switches. Press the left and right coin switches, and check the screen for a corresponding *LEFT COIN* and *RIGHT COIN* message. (See Figure 1-2 in Chapter 1 for the switch locations.)

Press the red start button to obtain the next screen.

Pedal Test

The Pedal Test screen is shown in Figure 2-9. This screen indicates the condition of the two foot pedal potentiometers, A/D converter, blue car switch, and associated cir-
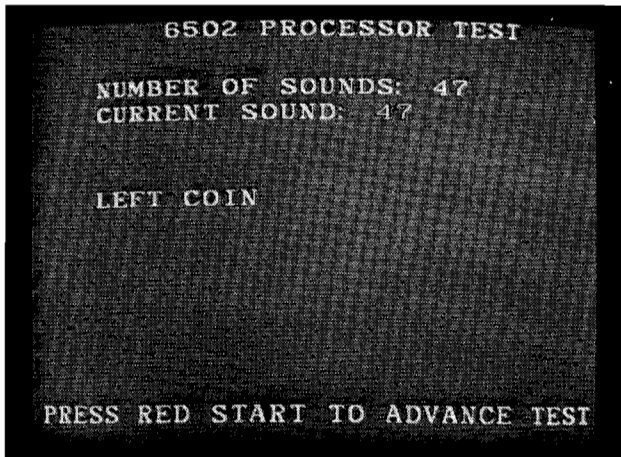
Figure 2-8   Sound Status
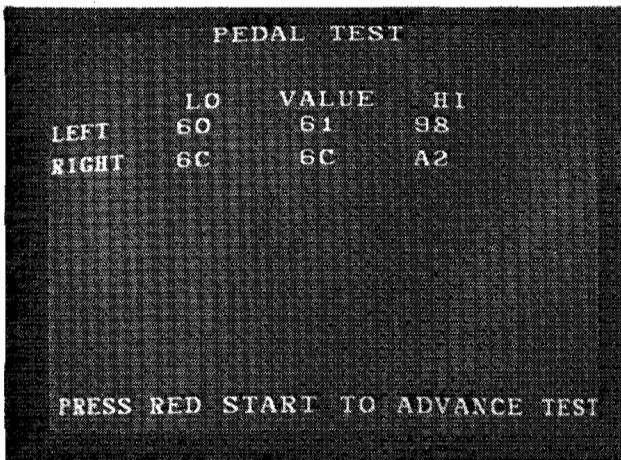
Figure 2-9   Pedal Test Passes

cuitry. (It is assumed that the red start switch works because it was used to advance to this screen.) The Pedal Test screen is also used to calibrate the foot pedal potentiometers.

Press the blue car button to obtain the Pedal Test screen shown in Figure 2-9.

If the range of the foot pedal potentiometers (low to high) is large enough, then the message *OK* is displayed next to the appropriate control range reading. If the range is too small, then the message *BAD* is displayed.

Calibration Procedure

The foot pedal controls are calibrated at the factory and should recalibrate themselves during game play. However, if the foot pedals do not respond correctly, calibrate each one as follows:

1. Press and hold down the blue car button. Press the red car button once.

2. While holding down the blue button, cycle each foot pedal to its extreme up and down positions. Check the display screen; each foot pedal range should read *OK*. Then release the blue car button. Press the red start button.

NOTE

After completing the calibration procedure, you *must* press the red start button to save the calibration. Pressing the button also advances the screen at this point.

---

3. If the pedal problem persists, check the physical alignment of each foot pedal potentiometer.

Leta Test

The Leta Test screen is shown in Figure 2-10. This screen indicates the condition of the steering wheel circuitry. Each wheel should display a zero value when the wheel is idle. Turning each wheel in either direction should change at least one of the zero values to a non-zero value.

Press the red start button to obtain the next screen.

Alphanumeric Test

The Alphanumeric Test screen is shown in Figure 2-11. This screen indicates the condition of the alphanumeric ROM, alphanumeric color palettes, and associated circuitry.

The displayed alphanumeric characters are in four rows, with the first row white, the second row red, the third row yellow, and the fourth row green. If not, then there may be a problem with the color palette select circuits.
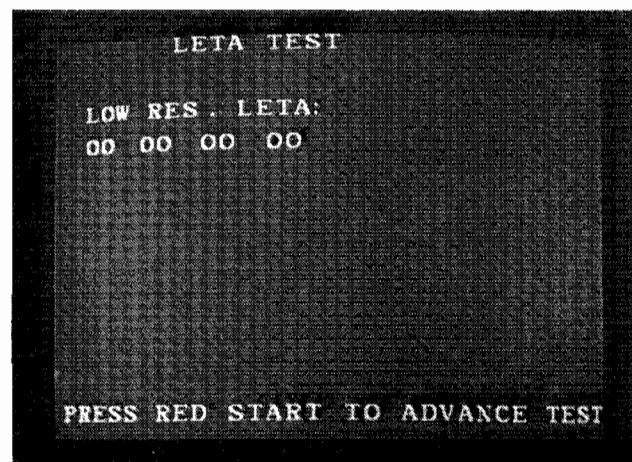
Figure 2-10   Leta Test
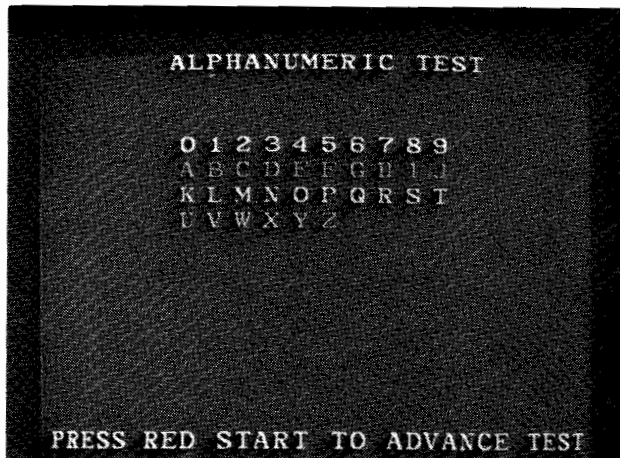
Figure 2-11 Alphanumeric Test
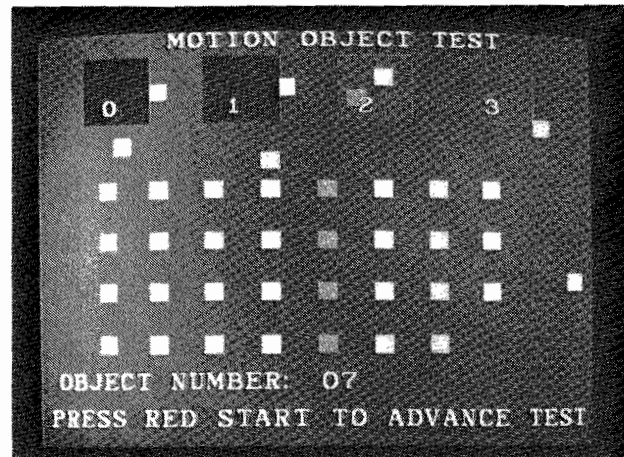
Figure 2-13 Motion Object Test
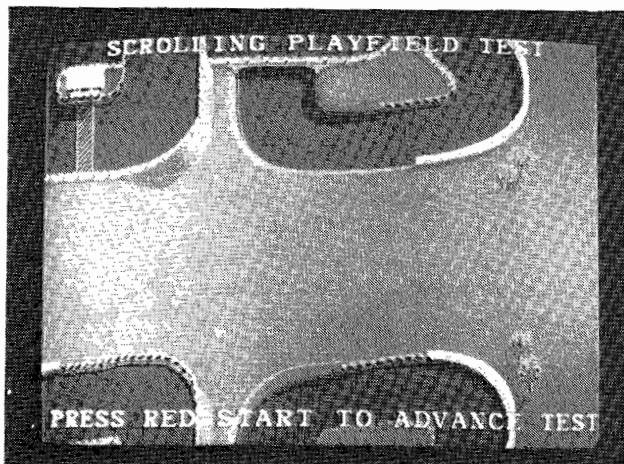
Figure 2-12 Scrolling Playfield Test

Press the red start button to obtain the next screen.

Scrolling Playfield Test

The Scrolling Playfield Test screen is shown in Figure 2-12. This screen indicates the condition of the playfield ROM, playfield display circuits, and playfield color palettes.

The display in Figure 2-12 shows a racetrack. Turn the blue car (left) steering wheel to control forward and backward scrolling. Turn the red car (right) steering wheel to control the right and left scrolling. Note that the display scrolls correspondingly.

Press the red start button to obtain the next screen.

Motion Object Test

The first Motion Object Test screen is shown in Figure 2-13. This test indicates the motion object horizontal and vertical display locations, motion-object color palettes, and the motion/playfield prioritizing logic circuit.

The Motion Object Test screen should show 39 motion objects and four colored boxes (numbered 0 through 3). The left two boxes (0 and 1) should be red, and the right two boxes (2 and 3) should be green. The motion objects should be colored (from left to right) blue, light blue, purple, and white. Any error in color can indicate a problem with the color palette select circuits.

Turn the red car steering wheel to control forward and backward scrolling, and the blue car steering wheel to control right and left scrolling. Note that the currently displayed motion object moves correspondingly. Move the motion object across the four colored boxes. Note that the motion object moves *behind* the red boxes and *in front of* the green boxes. Press the blue car button to select the next motion object and repeat the preceding procedure. This procedure checks the prioritizing logic circuitry.

Press the red start button to obtain the next screen.

Motion Object Height Test

The Motion Object Height Test screen is shown in Figure 2-14. This test indicates the motion object height circuit and the horizontal load disable circuit.

Each successive column of motion objects should be 16 pixels taller than the last. The top 16 pixels of each column should be the same. Each column should add a new 16×16 pixel stamp picture to the bottom and slide the previous one up by 16 pixels. Turn the blue car and the red car steering wheels to move the entire picture around on the screen. Press the blue car button to obtain a new set of motion objects.

Press the red start button to obtain the next screen.
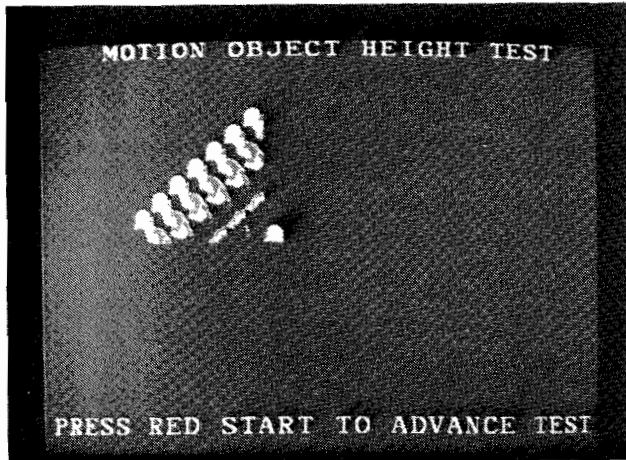
Figure 2-14 Motion Object Height Test
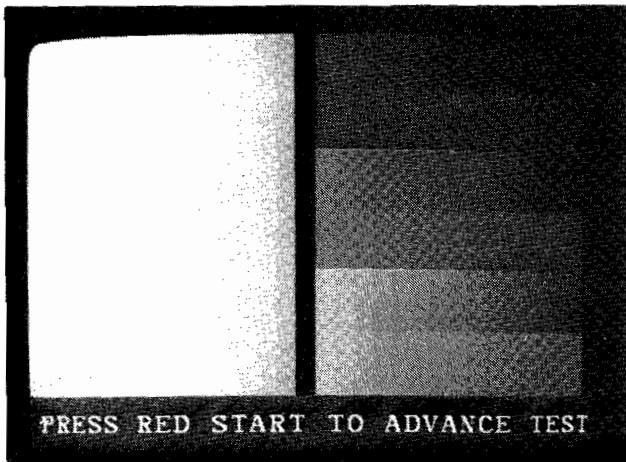
Figure 2-15 Color Bar Test

Color Bar Test

The Color Bar Test screen is shown in Figure 2-15. This test indicates the condition of the color RAM, video amplifiers, and associated circuitry.

Sixteen vertical grey-scale bars and three groups of sixteen vertical bars with shades of red, green, or blue are displayed. The brightest bar should be on the left and darkest (black) bar on the right, with a black frame around the screen. Each group of red, green, or blue should be split in half horizontally to show two fade scales. Each upper fade scale is ranged by changes in overall intensity (Z) and each lower fade scale by individual color intensity (R, G, B). This test helps to determine if white tracking is set properly (grey-scale bars range from white to grey). Refer to the white tracking procedure in the video display manual if adjustment is required.

Press the red start 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 as shown in Figure 2-16.

Press the blue car button, and the next display to appear should be a green screen with the word *GREEN* displayed at the bottom of the screen. Press the blue car button to obtain a blue, white, and finally a grey screen. After the grey screen, the display will repeat the same sequence.

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 red start button to obtain the next screen.

Convergence Test

The Convergence Test screen is shown in Figure 2-17. This test indicates the condition of the display size, centering, linearity, and convergence.

A violet dot pattern displays the red-to-blue convergence. Press the blue car button to obtain a white-dot convergence pattern. Convergence between any two colors should not exceed 0.7 mm in the middle of the screen and 1.2 mm in the corners. This pattern can also be used to set up screen size, centering, and brightness (black level).

Press the red start button to obtain the next screen.

Accounting Information

The Accounting Information is shown in Figure 2-18. 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.
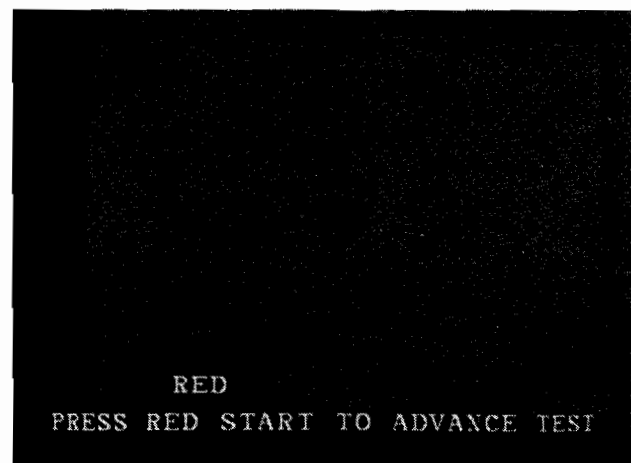
Figure 2-16 Color Purity Test
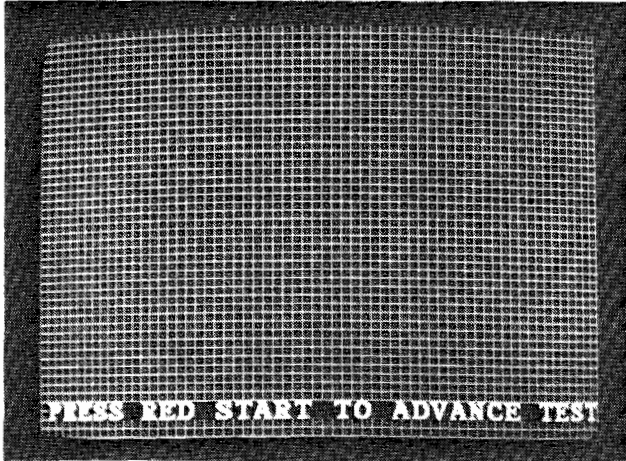
Figure 2-17 Convergence Test
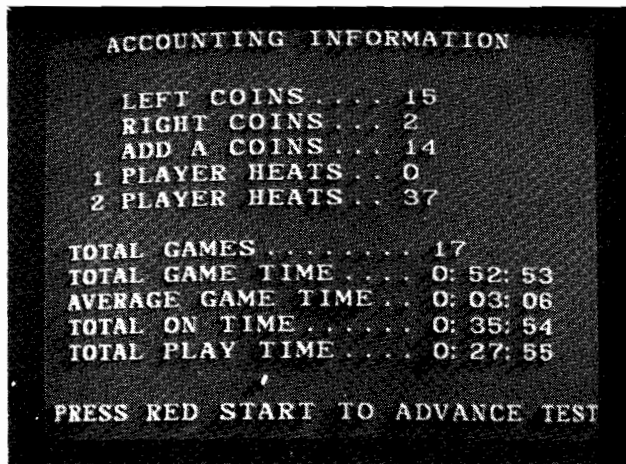
Figure 2-18 Accounting Information

The following game statistics appear on the Accounting Information screen:

- *LEFT COINS* shows the total number of coins deposited in the left or blue car coin mechanism.

- *RIGHT COINS* shows the total number of coins deposited in the right or red car coin mechanism.

- *ADD A COINS* shows the total number of coins deposited in all coin mechanisms during the add-a-coin mode of game play only.

- *1 PLAYER HEATS* shows the total number of heats or races that were run with one player only.

- *2 PLAYER HEATS* shows the total number of heats or races that were run with two players.

- *TOTAL GAMES* shows the total number of coins deposited in all coin mechanisms.

- *TOTAL GAME TIME* shows the accumulated time of all one- and two-player games played in hours, minutes, and seconds.

- *AVERAGE GAME TIME* shows the total game time divided by the total number of games in hours, minutes, and seconds.

- *TOTAL ON TIME* shows the total time in hours, minutes, and seconds that the game has been turned on.

- *TOTAL PLAY TIME* shows the total time in hours, minutes, and seconds that the game has been played (percent usage = total play time/total on time).

The game statistics are accumulated from the first time the game is turned on or from the last time the statistics were reset.

Reset Saved Information Screen

The Reset Saved Information screen is shown in Figure 2-19. This screen resets the high score table and the accounting information. Use the following procedure to reset these items:

1. Rotate the left steering wheel to select the item to reset.

2. Press the blue car button to change the *NO* message to *YES*.

3. Press the red start button to reset the selected tables. After a brief *PLEASE WAIT* message is displayed, the self-test automatically advances to the next screen.

Switch Settings

The Switch Settings screen is shown in Figure 2-20. This screen indicates the current coin and credit option settings, and the game option settings of the two dual-in-line
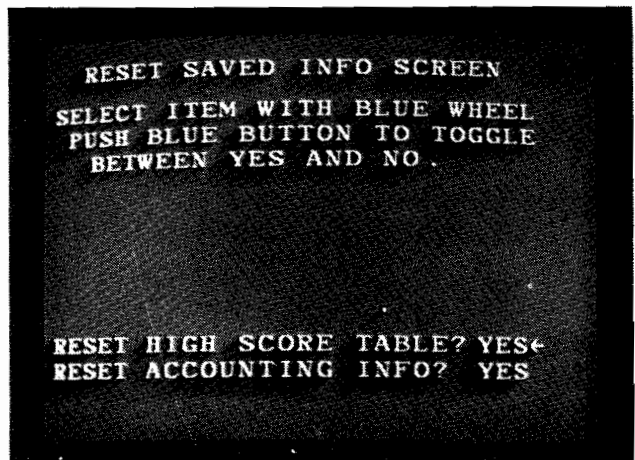
Figure 2-19 Reset Saved Information Screen
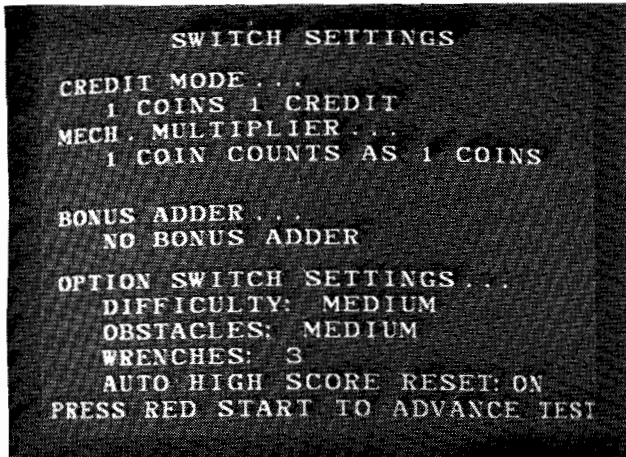
Figure 2-20 Switch Settings

package (DIP) switches at locations 6/7A and 5/6A on the CPU PCB.

- The option switch at location 6/7A is used for selecting the coin and credit options.
- The option switch at location 5/6A is used for selecting the game options.

Set the coin and credit option settings and the game option settings by changing the settings of the DIP switches located on the CPU PCB. Refer to Tables 1-2 and 1-3 in this manual for the available options and default (recommended) settings.

To change these settings, first remove the thin film of plastic covering the option switch. Use a pen or a sharp-pointed instrument to slide the appropriate small buttons to different settings. Right is the *on position*, and left is the *off position*. The steering wheel controls and the push buttons are *not* used to change these settings.

Press the red start button to return to the 6502 Processor Test.

Maintenance

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

Removal, disassembly, reassembly, and replacement pro-
cedures are provided for components that might require
corrective maintenance. Appropriate references are pro-
vided to Chapter 5, Illustrated Parts Lists, to aid in locating
the parts of this game that are mentioned, but not illus-
trated, in the maintenance procedures.
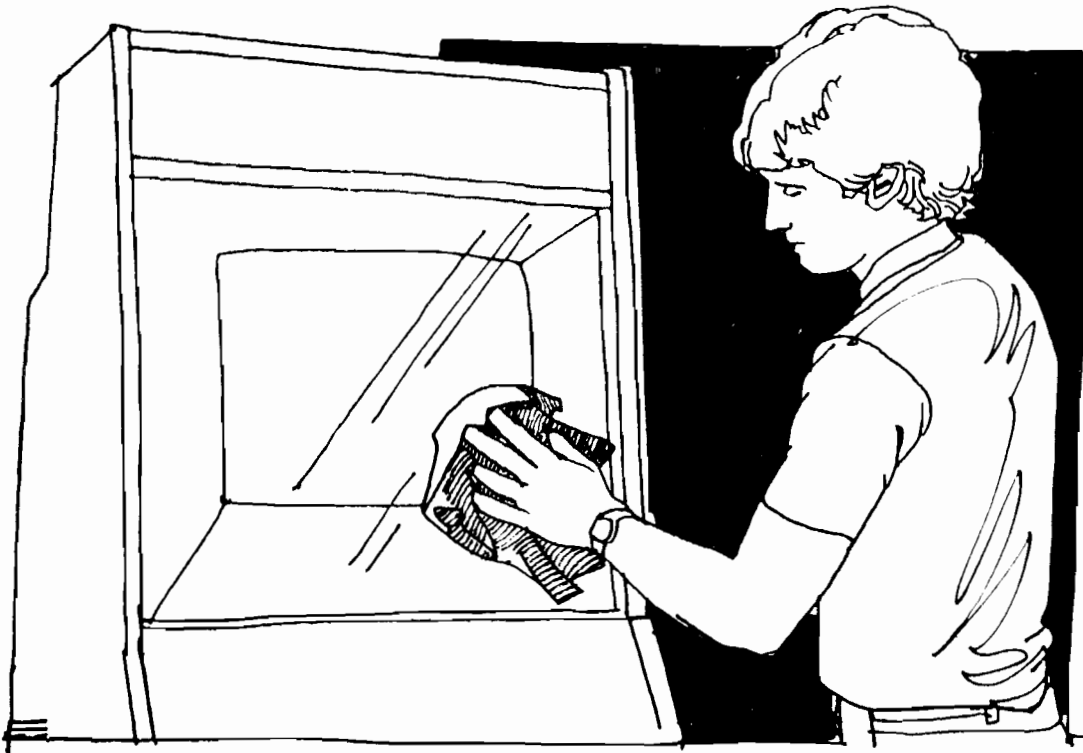
Preventive Maintenance

Preventive maintenance includes cleaning, lubricating, and tightening hardware. How often preventive maintenance is performed depends upon the game environment and frequency of play. However, for those components listed in Table 3-1 Preventive-Maintenance Intervals, we recommend that preventive maintenance be performed at the intervals specified.

Preventive-Maintenance Intervals

The preventive-maintenance intervals specified in Table 3-1 are the recommended minimum requirements for the components listed.

⚠ WARNING ⚠

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

The 5-volt switching power supply for this game does not have a shield. This 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.

Removing the Control Panel

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

1. Use a 1/8-inch hex driver to loosen the two screws securing the lower retainer to the cabinet.

2. Unlock and open the coin door on the front of the cabinet.

3. Carefully reach up through the coin door opening and release the spring-draw latches located under the control panel on both sides of the cabinet.

Table 3-1 Recommended Preventive-Maintenance Intervals

Steering Wheel Control	Inspect weekly, lubricate, and tighten hardware at least every three months.
Foot Pedal Control	Lubricate, and tighten hardware at least every three months.
Coin Mechanism	Inspect whenever you collect coins. Clean at least every three months.

4. Use a 1/8-inch hex driver to remove the two screws and washers securing the front of the control panel to the cabinet.

5. Grasp the steering wheel and gently lift until the bottom edge of the control panel clears the cabinet.

6. Carefully slide the top edge of the control panel from under the lower retainer.

7. Lift the control panel from the cabinet just far enough to expose the control-panel harness connector.

8. Disconnect the steering wheel harness connector and remove the control panel from the cabinet.

9. Replace the control panel in the reverse order of removal.

Cleaning the Pushbutton Leaf Switches

Perform the following procedure to clean the leaf switch contacts and tighten the securing hardware.

1. Follow the procedure described in the preceding steps 1–8 for removing the control panel.

2. Use electrical contact cleaner to clean the contacts. Do not burnish them. When the pushbutton is pressed, the wiping action of the cross-bar contacts provides a self-cleaning feature. Then use the Self-Test to verify proper switch contact. (See Figure 3-1.)

3. Using a 15/16-inch open-end wrench, tighten the stamped nut securing the pushbutton leaf switches to the control panel.

Maintaining the Steering Wheel Controls

Preventive maintenance on the steering wheel controls consists of inspecting the steering wheel housing for excessive wear or dirt, inspecting the Coupler PCB Assembly for damage, lubricating the friction-producing surfaces of both white bearings, and, if necessary, replacing or tightening the securing hardware.

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

1. Open the control panel as previously described.

2. Apply a film of light oil (Atari part no. 107013-001) to the lubrication points shown in Figure 3-2.

3. Using a 5/16-inch nut driver (or an appropriate tool), tighten the screws holding the steering wheel assembly to the control panel.
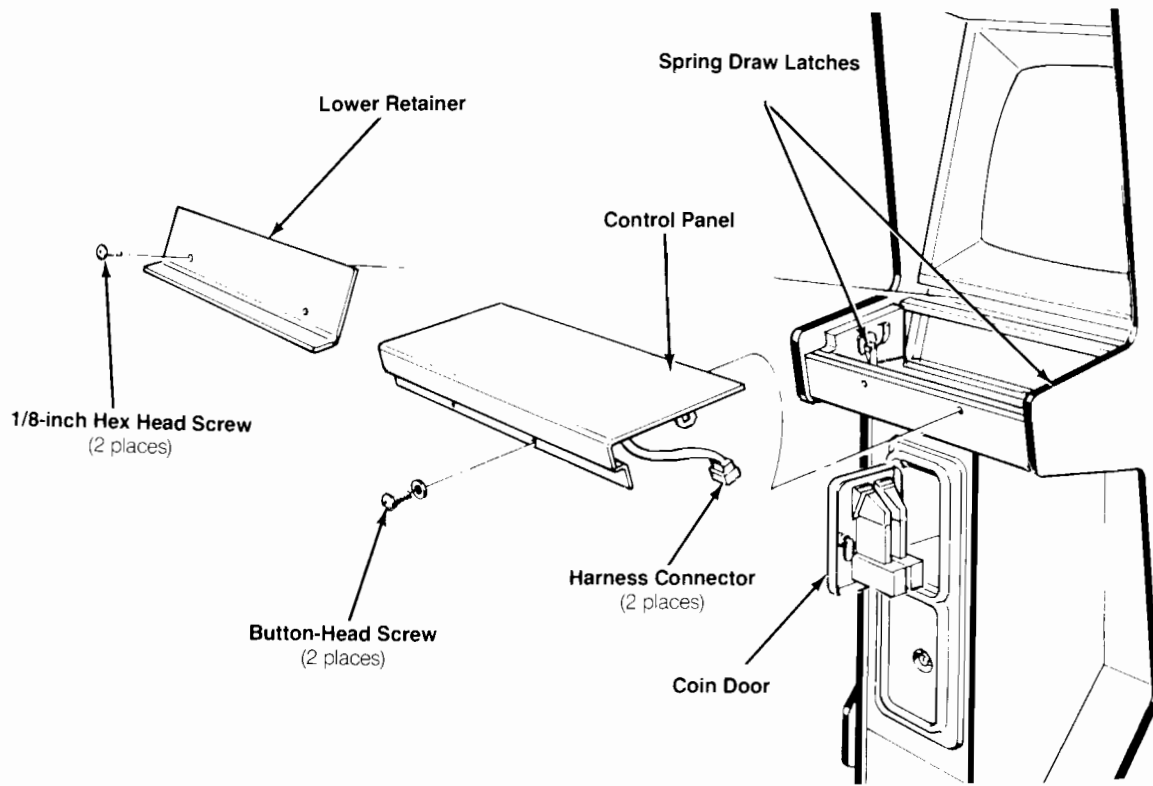
Figure 3-1 Control Panel Removal

Cleaning the Coin Mechanism

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

Cleaning the Interior Components

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

⚠ WARNING ⚠

Turn off the game power, and be sure that the on/off switch cover is in place. However, 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.

---

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.
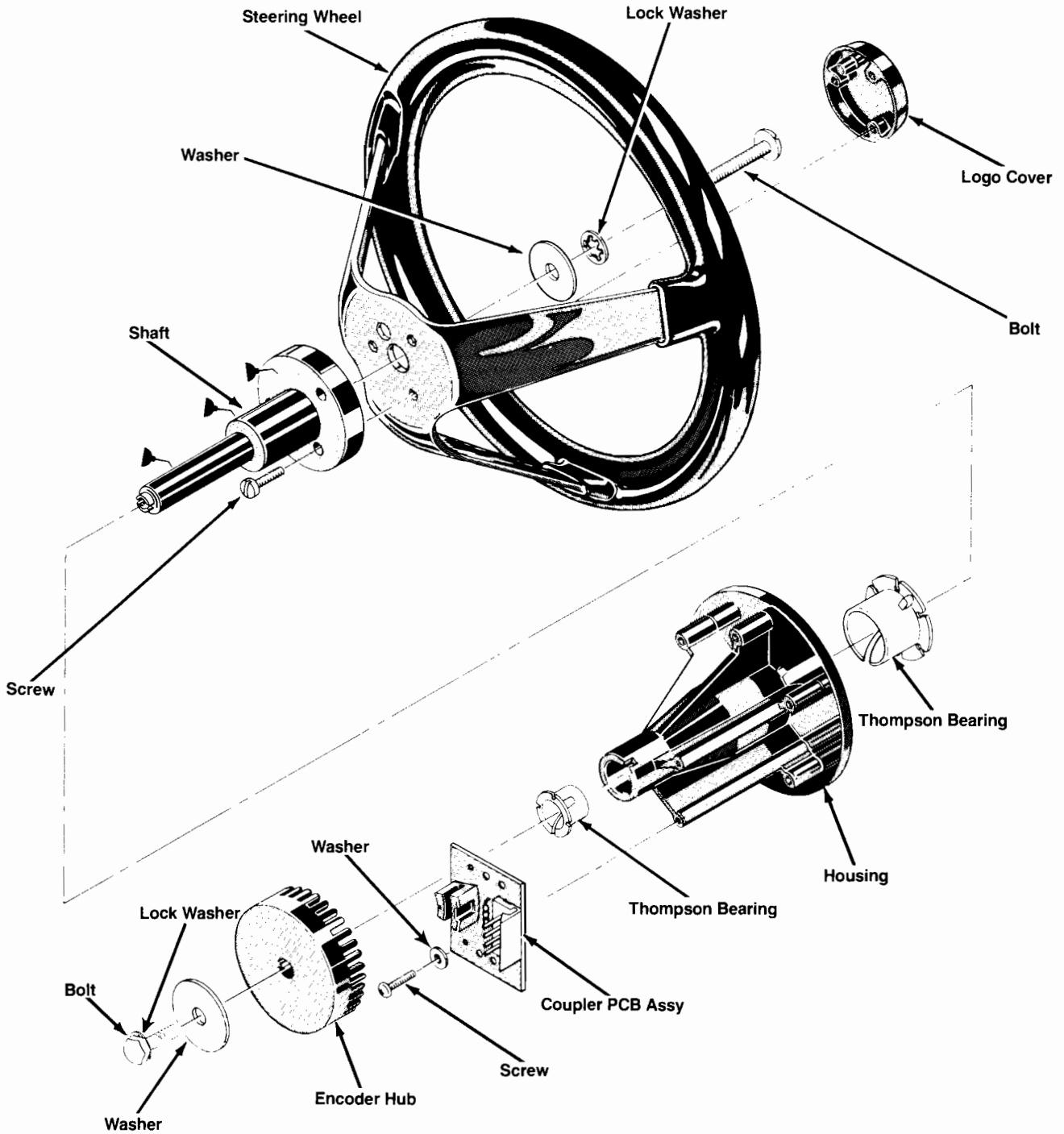
Figure 3-2 Maintaining the Steering Wheel Controls

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 may require corrective maintenance.

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. Use a 1/8-inch hex driver to remove the two screws securing the lower retainer to the cabinet.

3. Grasp the display shield on the bottom edge and gently pull it out about a half-inch from the cabinet.

4. Gently lower the display shield to free the top edge from under the speaker grille.

5. Use a flat-head screwdriver to remove the staples, if any, securing the bezel to the cabinet.

6. Remove the bezel.

7. Unlock and open the rear access door.

⚠   WARNING   ⚠

High Voltage

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

X-Radiation

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.

---

8. 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.
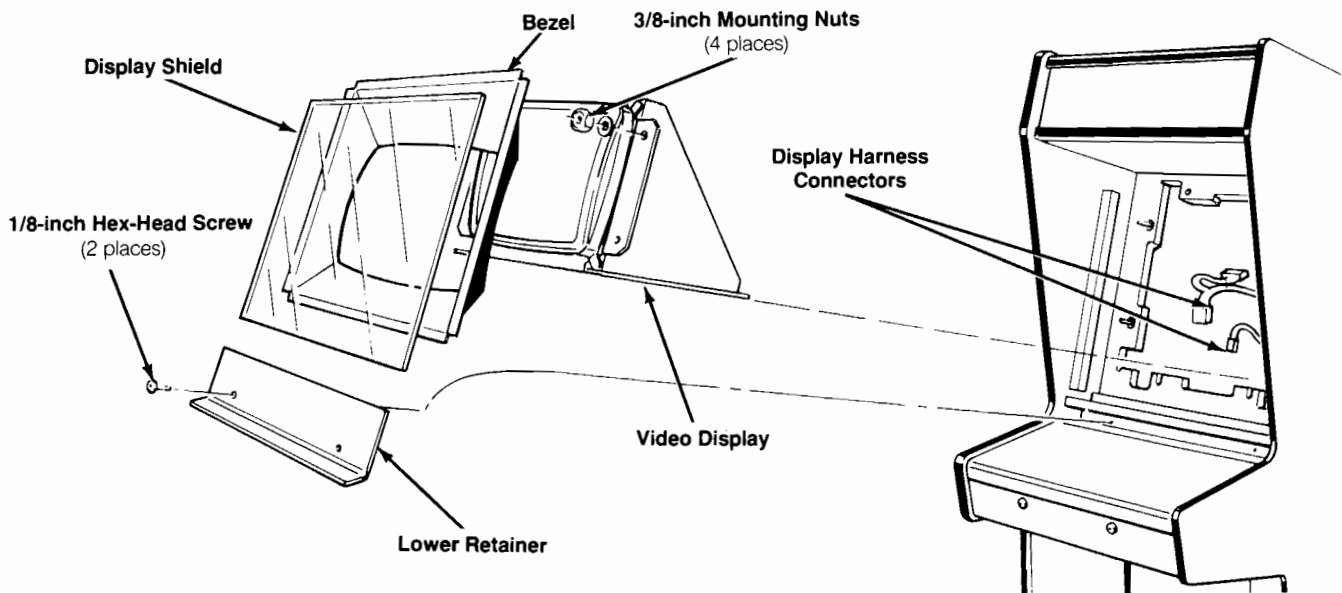
Figure 3-3 Video Display Removal

c. Wait two minutes and repeat part b.

9. From the back of the cabinet, unplug the display harness connectors and disconnect the green ground wire from the clip on the video display chassis.

⚠ WARNING ⚠

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

---

10. From the front of the cabinet, use a 3/8-inch wrench to remove the four nuts and flat washers securing the display to the cabinet.

11. Carefully slide the display out through the front of the cabinet.

12. 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.

Removing the Steering Wheel

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

1. Open the control panel as described under *Preventive Maintenance*.

2. Disconnect the harness connectors from the coupler PCB connector.

3. Using a 5/16-inch nut driver, remove the six screws holding the steering wheel assembly to the control panel.

4. Lift the steering wheel assembly out of the control panel.

5. Replace the steering wheel in the reverse order of removal. Reconnect the harness connectors to the coupler PCB connector.

Disassembling the Steering Wheel

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

1. Using a 5/16-inch nut driver (or appropriate tool), remove the six screws holding the steering wheel assembly to the control panel.

2. Using a 7/16-inch nut driver (or appropriate tool), remove the bolt and washer from the bottom of the encoder hub.

3. Pull the shaft from the housing.

4. Remove the three screws holding the cover to the shaft.

5. Remove the 3/8-inch × 1-inch screw from the shaft.

Reassembling the Steering Wheel

Replace the steering wheel parts in the reverse order of removal. After reassembling the steering wheel, be sure that the hub can spin freely in the slot of the optical coupler on the PCB.

Removing the Foot Pedal Controls

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

1. Disconnect the foot pedal harness assembly from the cabinet control harness assembly located inside the rear of the cabinet.

2. Using a 7/16-inch hex driver (or appropriate tool), remove the nuts and washers from the two bolts holding the foot pedal frame to the pedestal enclosure rear wall. Remove the nut and washer from the adjustable glide protruding through the front of the pedal frame. Remove the foot pedals.

3. Replace the foot pedals in the reverse order of removal.

Removing the Game PCBs

Perform the following procedure to remove/replace the game PCBs.

CAUTION

Do not attempt to remove the CPU and Video PCBs while they are connected together. If you are going to remove both of these PCBs, remove the Video PCB first to avoid damaging the PCBs or the edge connectors.

Video PCB

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

1. Turn the game power off.

2. Unlock and open the lower rear access panel.

3. Remove the four thumb nuts holding the EMI cover to the ground plane.

CPU Printed-Circuit Board

Edge Connector

Ground Plane

Yellow Connector

Red Connector
(Black Wire on Top)

Red Connector
(Brown Wire on Top)

Red Connector
(Black Wire on Top)

Spacers
(2 places)

NOTE
To comply with emission require-
ments, the Federal Communica-
tions Commission requires that the
Video PCB Assembly be housed in
the EMI Cover. *Do not operate this
game* without properly installing
the EMI Cover. metal spacers. and
thumb nuts.

Thumb Nuts
(4 places)

Video PCB

Harness Connector

EMI Cover

Figure 3-4 Game PCB Removal

4. Disconnect the harness connectors from the bottom
   of the Video PCB.

NOTE

The brass thumb nuts are easy to cross-thread.
Use care when installing and tightening them.

5. Remove *one* of the two thumb nuts and spacers hold-
   ing the top of the Video PCB (and the bottom of the

CPU PCB) to the ground plane. Loosen, but do not
remove, the other thumb nut.

6. Remove the two thumb nuts holding the bottom of
   the Video PCB to the ground plane. Carefully hold
   the Video PCB in place to prevent the PCB from fall-
   ing or causing excessive bending at the edge
   connector.

7. Remove the remaining thumb nut and spacer that
   was loosened in step 5. Gently disconnect the Video
   PCB from the CPU PCB.

8. Replace the Video PCB by first connecting the Video PCB to the CPU PCB edge connector. Carefully position both the Video and CPU PCBs so that the holes (in the bottom of the CPU PCB and at the top of the Video PCB) are aligned. Partially install one thumb nut and spacer through both of the PCBs and into the corresponding ground plane post.

9. Install and tighten the two thumb nuts holding the bottom of the CPU PCB to the ground plane.

10. Install the remaining thumb nut holding the top of the Video PCB (and bottom of the CPU PCB) to the ground plane.

11. Finger-tighten both thumb nuts holding the top of the Video PCB (and bottom of the CPU PCB) to the ground plane.

12. Connect the harness connector to the bottom of the Video PCB.

NOTE

To comply with emission requirements, the Federal Communications Commission requires that the Video PCB Assembly be housed in the EMI cover. *Do not operate* this game without properly installing the EMI cover, metal spacers, and thumb nuts.

CPU PCB

Perform the following procedure to remove/replace the Central Processing Unit (CPU) PCB. (See Figure 3-4.)

NOTE

If the Video PCB has already been removed, disconnect the harness connectors from the left edge of the CPU PCB, then remove the two thumb nuts holding the top of the CPU PCB to the ground plane. Remove the CPU PCB.

---

1. Turn the game power off.

2. Unlock and open the lower rear access panel.

3. Remove the four thumb nuts holding the EMI cover to the ground plane.

4. Disconnect the harness connectors from the left edge of the CPU PCB.

5. Remove the four thumb nuts holding the CPU PCB (and the top of the Video PCB) to the ground plane.

6. Gently disconnect the CPU PCB from the Video PCB.

7. Replace the CPU PCB by first connecting the CPU PCB to the Video PCB edge connector. Carefully po-

sition both the CPU and the Video PCBs so that the holes (in the bottom of the CPU PCB and at the top of the Video PCB) are aligned. Partially install one thumb nut and spacer through both of the PCBs and into the corresponding ground plane post.

8. Install and tighten the two thumb nuts holding the top of the Video PCB to the ground plane.

9. Install the remaining thumb nut holding the bottom of the CPU PCB (and the top of the Video PCB) to the ground plane.

10. Finger-tighten both thumb nuts holding the bottom of the CPU PCB (and the top of the Video PCB) to the ground plane.

11. Connect the harness connectors to the left edge of the CPU PCB. (See Figure 3-4 for the proper connector locations.)

Removing the Fluorescent Light Assembly

Perform the following procedure to remove/replace the fluorescent light assembly. (See Figure 3-5.)

1. Turn the game power off.

2. From the front of the cabinet, using a 1/8-inch hex driver, remove the three screws and washers holding the upper retainer to the top of the cabinet.

3. Grasp the top edge of the attraction shield and the attraction film, and lift them out of the cabinet.

4. Disconnect the fluorescent-light harness connector.

5. To remove the fluorescent tube, gently twist the tube a quarter turn and remove it from the sockets. Replace in the reverse order.

6. To remove the entire fluorescent light assembly, disconnect the light harness connector in the rear of the cabinet. Using a Phillips screwdriver, remove the two screws holding the fluorescent light board to the cabinet. Lift the fluorescent light assembly out of the front of the cabinet. Replace the fluorescent light assembly in the reverse order of removal.

Removing the Speakers

Perform the following procedure to remove/replace the speakers. (See Figure 3-6.)

1. Using a 1/8-inch hex driver, remove the three screws holding the rear of the speaker grille to the cabinet.

2. Using a Phillips screwdriver, remove the three screws holding the front of the speaker grille to the cabinet.

3. Remove the speaker grille.

1/8-inch Hex-Head Screws
(3 places)

**Attraction
Shield**

**Upper
Retainer**

Phillips-Head Screws
(2 places)

**Fluorescent
Tube**

**Attraction
Film**

**Fluorescent
Light Assy**

**Fluorescent Light
Harness Connector**
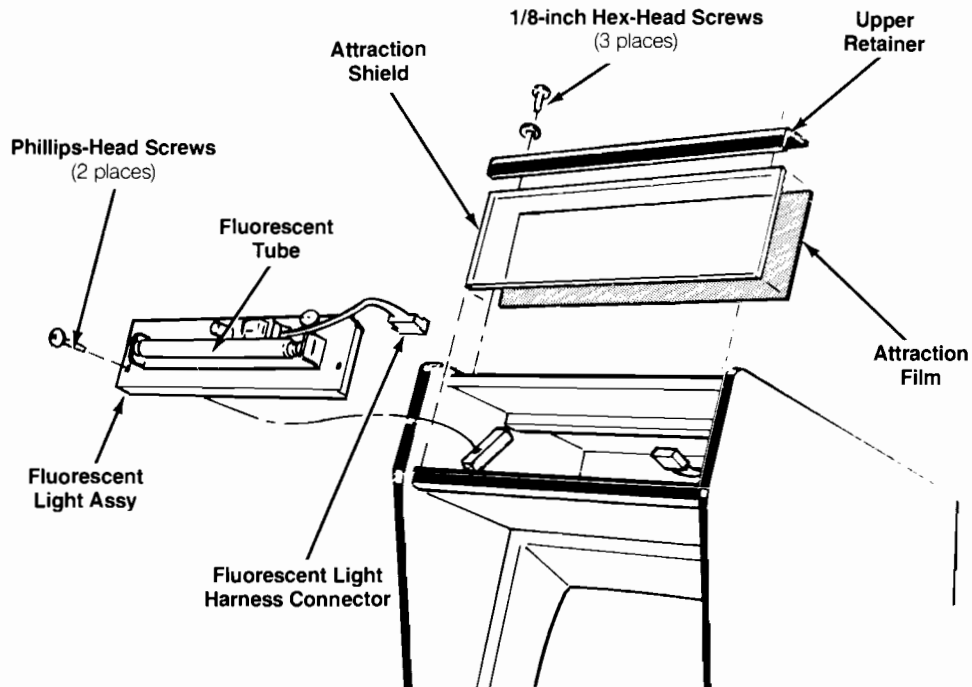
Figure 3-5 Fluorescent Light Assembly Removal

Speakers

**Speaker
Grille**

**Speaker
Wires**

1/8-inch Hex-Head Screws
(3 places)

Phillips-Head Screws
(3 places)

Phillips-Head Screws
(3 places)
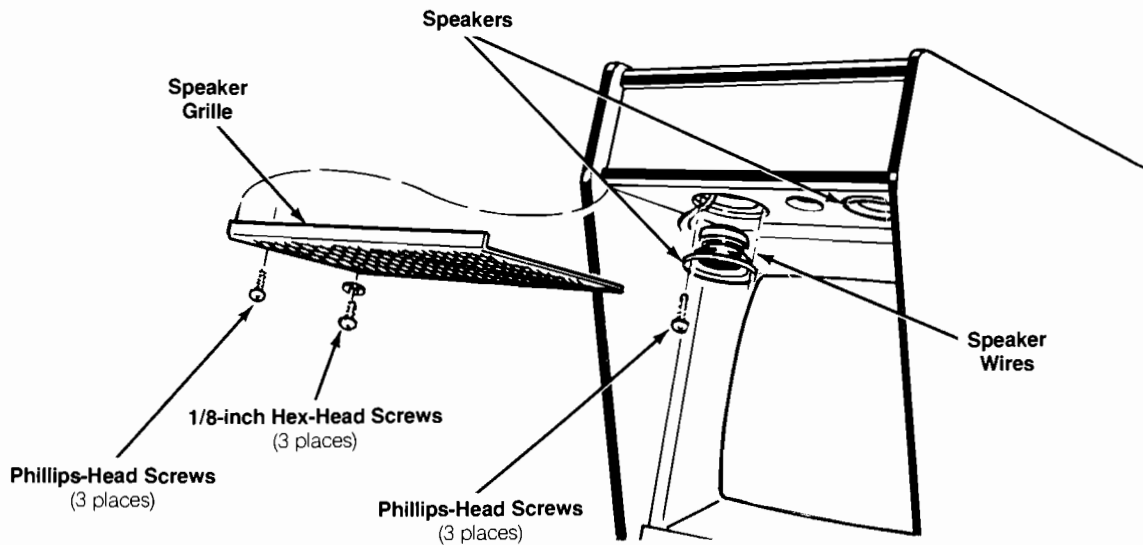
Figure 3-6 Speaker Removal

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

4. Using a Phillips screwdriver, remove the four screws holding the speaker to the cabinet. Do not let the speaker fall.

5. 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.

6. Replace the speaker in the reverse order of removal.

N O T E S

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.
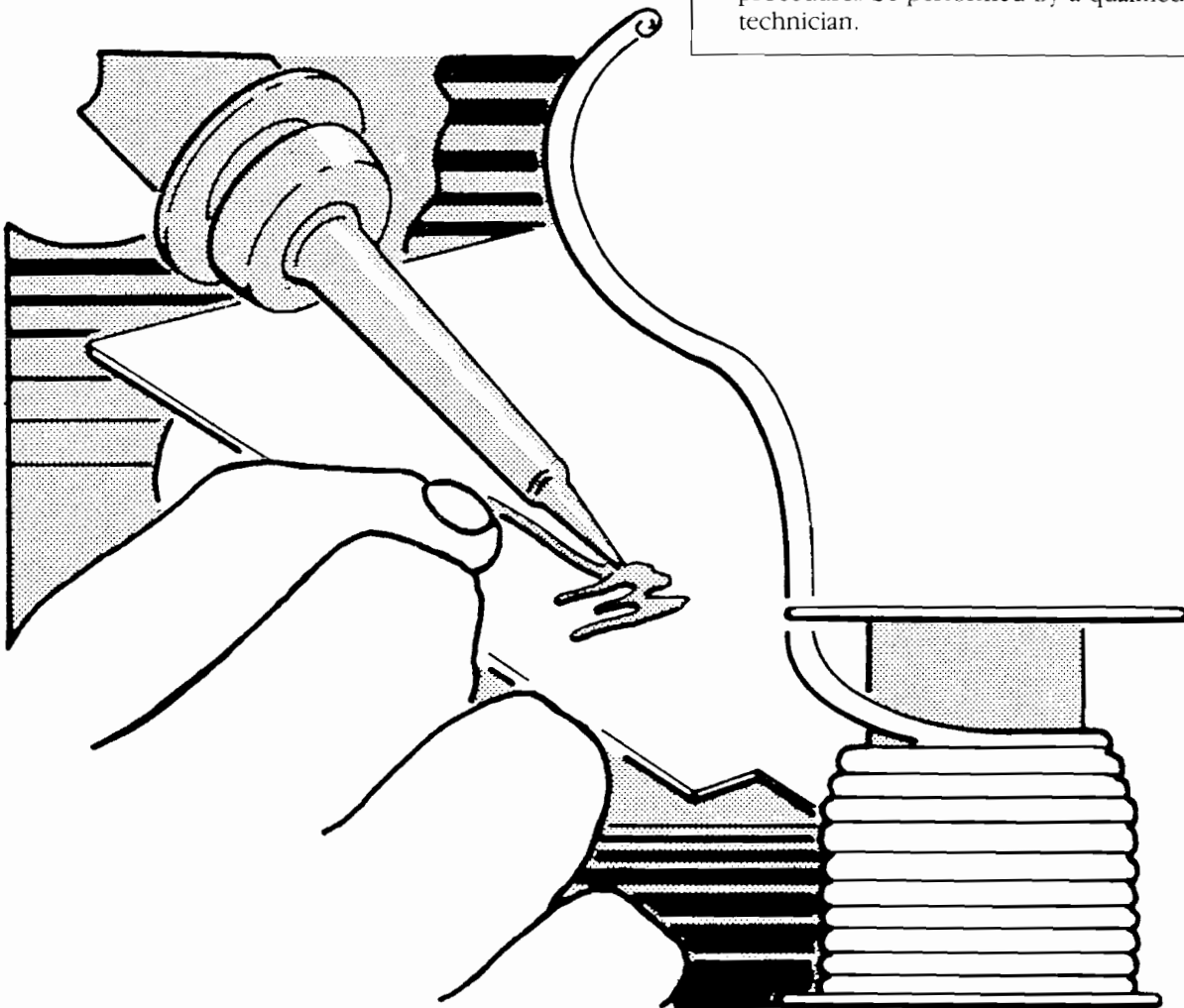
Troubleshooting Aids

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 solder- │
│  ing 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 Soldapullt®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 multilayer 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

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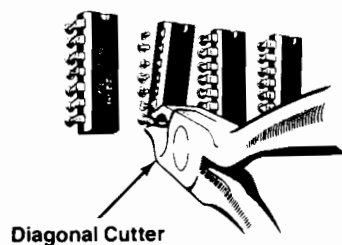
Figure 4-1   Removing IC (Cut-Pin Method)

Needle-Nose Pliers

Soldering Iron
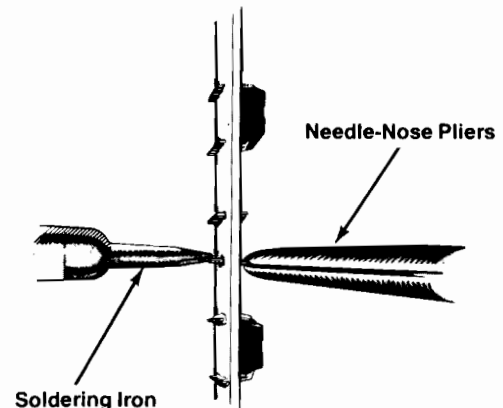
Figure 4-2   Removing IC Pins

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-

Preferred Method   **Alternate Method**
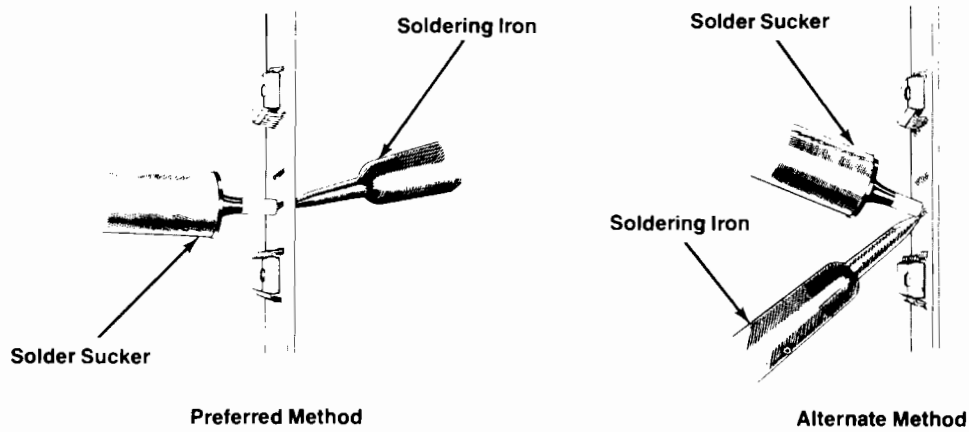
Figure 4-3 Removing Solder from Plated-Through Holes
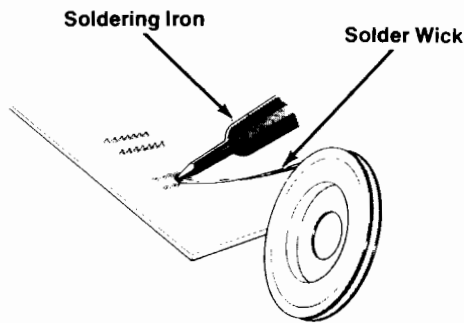
Figure 4-4 Removing Solder from Lead Connection Pads

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.

Items Not Shown

78-6900402
Foam Tape

042895-01
Upper Attraction Panel Retainer

042707-01
Attraction Shield

139012-1202
Wells-Gardner Display, or
139012-1206
ADI (Disco) Display

Fluorescent Light Panel Assy
See Figure 5-4

043729-01
Attraction Film with Graphics

043016-01
Display Bezel

042715-01
Speaker Grille

148007-001
Speaker

040936-01
H-Molding

042709-01
Display Shield

178013-001
Spring Draw Latch

043011-01
Lower Retainer

Control Panel Assy
See Figure 5-2

Coin Door Assy
See Figure 5-7

Steering Wheel Assy
See Figure 5-3

171078-002
Coin Counter

78-3201
Adjustable Glide

038091-01
Coin Box

Foot Pedal Assy
See Figure 5-6

Audio II PCB Assy
See Figure 5-11

Figure 5-1   Cabinet-Mounted Assemblies
A043725-xx   C

Items Not Shown

A043372-01
Speaker Harness Assy

A043377-01
Display Power Harness Assy

A043786-01
+5V Power AC Harness Assy

A043705-01
Fan Cord Assy

A043704-01
Light Harness Assy

A043703-01
Auxiliary Harness Assy

A043702-01
Secondary Power Harness Assy

A043708-01
Cabinet Control Harness Assy

A043785-xx
+5V Power Supply Assy

A043169-01
Video Harness Assy

A040547-01
Fan Assy

A043787-xx
10 Amp Power Supply Assy
See Figure 5-5

A043105-01
Cabinet Assy

040036-01
Power Cord Plate

A043166-01
+5V Harness Assy

043544-01
Ground Plane

034536-10
0.62-Inch Vibration Damper

CPU PCB Assy
See Figure 5-9

034536-11
0.81-Inch Vibration Damper

A038881-01
Lock Assy

Video PCB Assy
See Figure 5-10

043148-01
EMI Cover

043123-01
Rear Door Panel

A040699-01
On/Off Switch Assy

A040586-01
Power Cord Assy

Figure 5-1   Cabinet-Mounted Assemblies, Continued
A043725-xx   C

Cabinet-Mounted Assemblies
Parts List

Part No.	Description
A000598-09	Steering Wheel Assembly
A038881-01	Lock Assembly for Rear Panel
A040547-01	Fan and Bracket Assembly (70 CFM); Acceptable substitute is part no. A040547-02
A040586-01	Power Cord Assembly
A040699-01	On/Off Switch Assembly with Harness
A042701-01	Fluorescent Light Panel Assembly
A043105-01	Cabinet Assembly
A043166-01	5 V Harness Assembly
A043169-01	Video Harness Assembly
A043372-01	Speaker Harness Assembly
A043377-01	Display Power Harness Assembly
A043661-01	Audio II PCB Assembly
A043692-01	Control Panel Assembly
A043702-01	Secondary Power Harness Assembly
A043703-01	Auxiliary Harness Assembly
A043704-01	Fluorescent Light Harness Assembly
A043705-01	Fan Cord Assembly
A043708-01	Cabinet Control Harness Assembly
A043734-01	Video PCB Assembly
A043735-01	CPU PCB Assembly
A043785-01	5 V Power Supply Assembly (Acceptable substitutes are part numbers A043785-02, -03, and -04)
A043786-01	5 V Power AC Harness Assembly
A043787-01	10 A Power Supply Assembly (Acceptable substitutes are part numbers A043787-02, -03, -04, -05, and -06)
78-3201	Adjustable Glide
78-6900402	1/4-Inch × 1/8-Inch Foam Tape (72 inches required; used on inside lips of both retainers)
034536-10	0.62-Inch Thick Vibration Damper
034536-11	0.81-Inch Thick Vibration Damper
038091-01	Molded Coin Box
040036-01	Power Cord Plate
040936-01	H-Molding
042707-01	Attraction Shield
042709-01	Display Shield
042715-01	Speaker Grille
042895-01	Upper Attraction Panel Retainer
043011-01	Lower Attraction Retainer
043016-01	Display Bezel
043123-01	Rear Door Panel
043148-01	EMI Cover
043544-01	Ground Plane
043729-01	Attraction Film with Graphics
139012-1202	Wells-Gardner 19-Inch Color Raster Display OR
139012-1206	ADI (formerly known as Disco) 19-Inch Color Raster Display
148007-001	5-Inch Round, 8Ω, Speaker
171078-002	Non-Resettable Coin Counter, 12 VDC
178013-001	Spring Draw Latch

The following are technical information supplements for this game:

TM-279	ADI (formerly known as Disco) 19-Inch Color Raster Display Manual OR
TM-281	Wells-Gardner 19-Inch Color Raster Display Manual
TM-292	System II/Championship Sprint Operators Manual
SP-292	Championship Sprint Schematic Package
ST-292	Championship Sprint Self-Test Label
CO-292-02	Check the Colors in Your System II™ ADI Medium-Resolution Video Display

Steering Wheel Assy
See Figure 5-3
043563-01
Spacer
043463-01
Bow Washer
85-23F110
Screw

178030-003
Button Assy
160013-001
Leaf Switch with Button Holder
75-9910N0
Stamped Nut

043728-01
Control Panel Decal

043461-01
Control Panel Weldment

82-8116B
Screw

75-050B
Lock Washer

75-010F
Flat Washer

A043709-01
Harness Assy
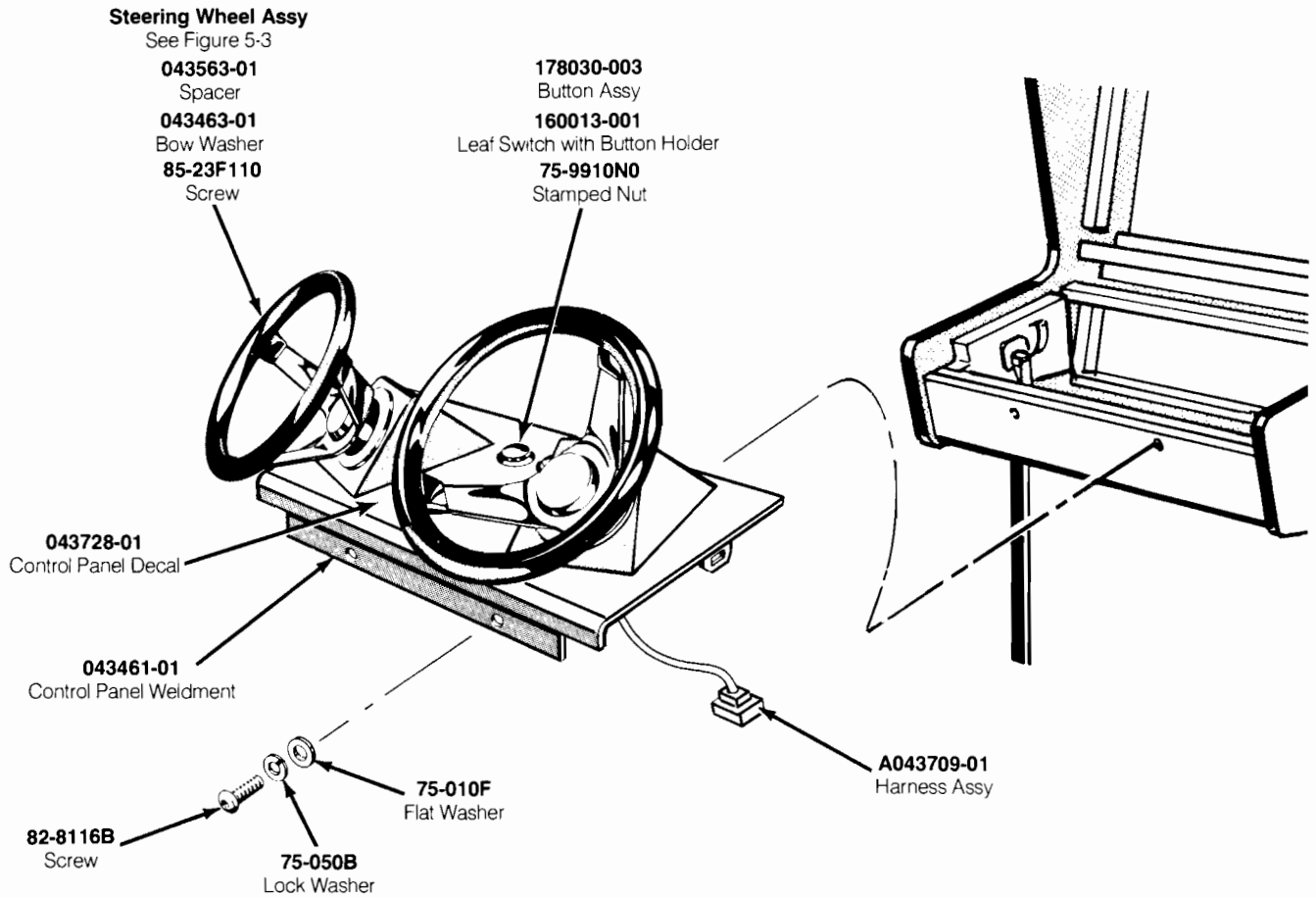
Figure 5-2 Control Panel Assembly
A043692-01   A

Control Panel Assembly
Parts List

Part No.	Description
A000598-09	Steering Wheel Assembly
A043709-01	Control Panel Harness Assembly
75-010F	#10 Black Flat Washer
75-050B	#10 Black Internal Tooth Lock Washer
75-9910N0	#11 5/8-Inch Stamped Nut
82-8116B	#10-24 × 1-Inch Black Button-Head Hex Socket Machine Screw
85-23F110	#10-24 × 5/8-Inch Type F Hex Washer-Head Screw
043461-01	Control Panel Weldment
043463-01	Bow Washer
043563-01	Spacer
043728-01	Control Panel Decal
160013-001	Leaf Switch with Button Holder
178030-003	Black Button Assembly

78-40104
Steering Wheel

72-039S
Lock Washer

000599-02
Logo Cover

175005-004
Flat Washer

72-5416X
Bolt

043788-01
Shaft

72-8512
Screw

76-092020
Thompson Bearing

75-012S
Washer

000605-01
Housing

75-055B
Lock Washer

76-091010
Thompson Bearing

72-5512
Bolt

A035220-02
Coupler PCB Assy

85-22F206
Screw

75-07002
Washer

000616-01
Encoder Hub
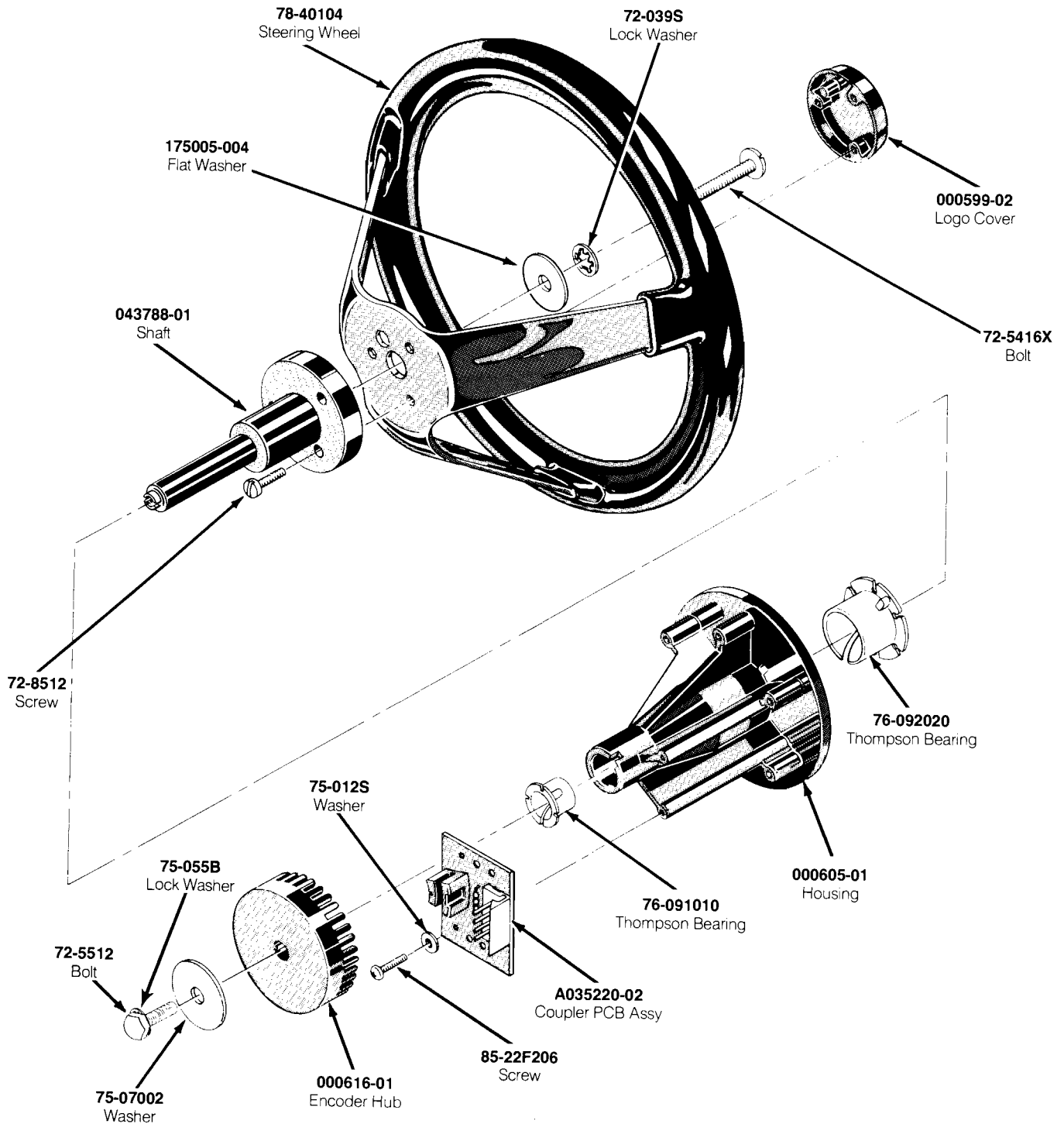
**Figure 5-3 Steering Wheel Control Assembly
A000598-09   AB**

Steering Wheel Control Assembly
Parts List

Part No.	Description
A035220-02	Coupler PCB Assembly
72-039S	3/8-Inch External Steel/Zinc Lock Washer
72-5416X	3/8-16 × 1-Inch Steel/Zinc Hex-Head Bolt
72-5512	1/4-20 × 3/4-Inch Steel/Zinc Hex-Head Bolt
72-8512	1/4-20 × 3/4-Inch Socket Head Cap Screw
75-012S	#2 Flat Plain Washer
75-055B	1/4-Inch Internal Tooth Lock Washer
75-07002	1/4-Inch Special Flat Washer
76-091010	Type-10L10-FK Thompson Bearing
76-092020	Type-20L20-FK Thompson Bearing
78-40104	10-Inch Steering Wheel
85-22F206	#2-56 × 3/8-Inch Cross-Recessed Pan-Head Machine Screw
000599-02	Atari Logo Cover
000605-01	Housing
000616-01	Encoder Hub
043788-01	Shaft
107013-001	Light Oil Lubricant
175005-004	.406 I.D., 1.25 O.D., 16-Gauge Thick Steel/Zinc Flat Washer

142028-001
Transformer

A037540-01
Ground Jumper Assy

99-11003
Starter

99-11009
Starter Socket

A005493-01
Harness Assy

179035-001
Light Holder

041981-01
Light Bracket

70-304
Fluorescent Light
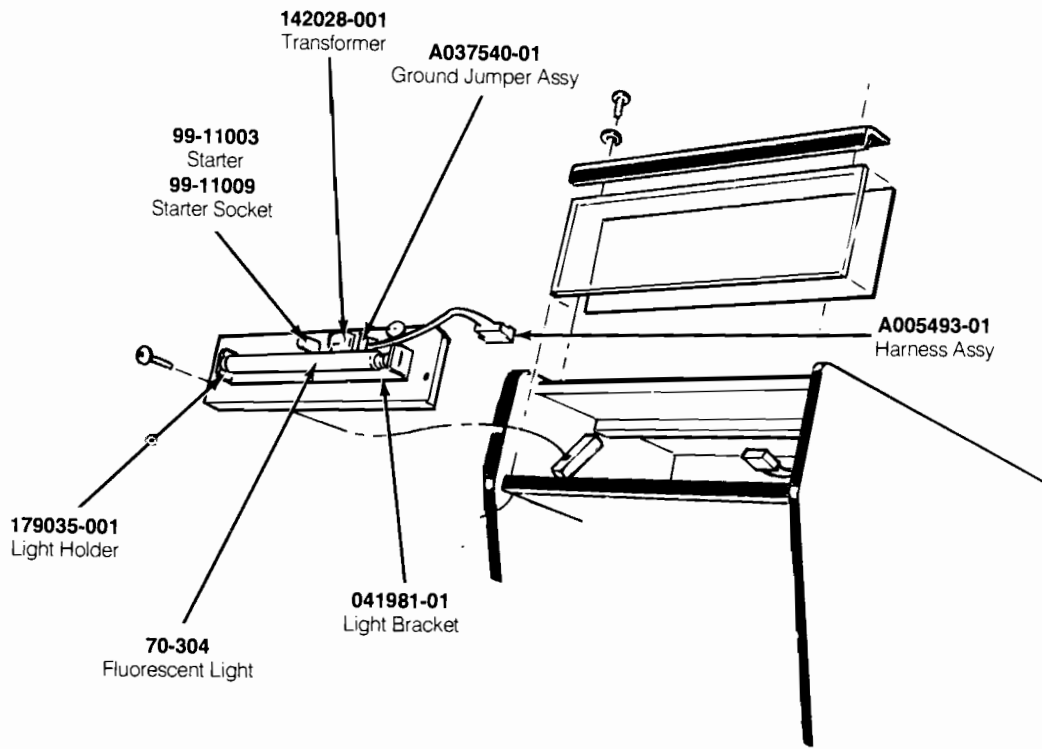
Figure 5-4 Fluorescent Light Panel Assy
A042701-01   B

Fluorescent Light Panel Assembly
Parts List

Part No.	Description
A005493-01	Fluorescent Light Harness Assembly
A037540-01	Ground Jumper Assembly
70-304	18-Inch, 15 W Fluorescent Light
72-6408S	#4 × ½ -Inch Pan-Head Self-Tapping Screw
79-561816P	Wire Nut
99-11003	Starter
99-11006	Retaining Clip (consists of two pieces)
99-11009	Starter Socket
041981-01	Light Bracket
042740-01	Light Panel
142028-001	60 Hz Ballast Transformer
176015-108	#10 × ½ -Inch Cross-Recessed Pan-Head Screw
179035-001	Light Holder

N O T E S

⚠ **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.

Not Shown
A043785-04
Sierracin 5V Power Supply Assy

72-HA4606S
Screw

149003-xxx
5V 10 Amp Switching Power Supply Assy

A043367-xx
Jumper Assy

179231-002
Terminal Block

142042-001
Transformer

A043367-xx
Jumper Assy

A043366-01
5V Harness Assy

72-HA4806S
Screw

A042384-01
Line Filter Assy

043396-01
Power Supply Chassis Base

46-2013002
Fuse

037640-01
Warning Label

179225-2205, or
79-3206
Fuse Block

034544-01
Fuse Block Cover

043622-01
Fuse Label

46-2012002
Fuse

Figure 5-5 Power Supply Assemblies
Switching/Linear (SL) Power Supply Assembly
A043787-xx   A

Switching/Linear (SL) Power Supply Assembly
Parts List

Part No.	Description
A042384-01	Line Filter Assembly
A043366-01	5 V Harness Assembly
A043367-xx	Jumper Assembly
46-2012002	250 V Slow-Blow 2 A Fuse
46-2013002	250 V Slow-Blow 3 A Fuse
72-HA4606S	#6-32 × 3/8-Inch Cross-Recessed Pan-Head Thread-Forming Screw
72-HA4806S	#8-32 × 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-xxx	5 V 10 A Switching Power Supply Assembly
176017-006	#M3 × 6 mm Stainless Steel Machine Screw
179225-2205	5-Position Fuse Block OR
79-3206	5-Position Fuse Block
179231-002	2-Position Terminal Block

Sierracin 5-Volt Power Supply Assembly
A043785-04   A
Parts List

Part No.	Description
99-207001	Chassis
99-207002	Strap, Small Black Cable
99-207003	Box, #172 Indestructible
99-207004	Assembly, PCB
99-207005	Diode, 100 V, 1 A, 1N4002
99-207006	Diode, 100 V, 3 A, Standard Recovery
99-207007	Thyristor, SCR, Sens Gate, 30 V, 4 A, TO220AB
99-207008	Diode, Zener, 6.2 V, 400 mW, 1N753A
99-207009	Regulator, 723 Standard DIP Voltage
99-207010	3055 Transistor, 75 W, NPN, SEL, TO-220
99-207011	2N2219A Transistor, NPN, TO-5
99-207012	Capacitor, Electrolytic, 220 Ω, 16 V, Radial
99-207013	Capacitor, Electrolytic, 10 kΩ, 16 V, Axial
99-207014	Capacitor, Poly Film, .0047 μF, 100 V
99-207015	Resistor, 100 Ω, ± 5%, ¼ W,
99-207016	Resistor, 1 kΩ, ± 5%, ¼ W
99-207017	Resistor, 1.5 kΩ ± 5%, ¼ W,
99-207018	Resistor, 4.7 kΩ ± 5%, ¼ W,
99-207019	Resistor, 820 Ω ± 5%, ¼ W,
99-207020	Potentiometer, 500 Ω, ± 20%, 2 W, Horizontal
99-207021	Resistor, Metal Oxide, .10 Ω, 2 W,
99-207022	Tie Mount, PCB, TM-35B-M
99-207023	Cable Strap, Medium Black
99-207024	Terminal, Swage Double Turret
99-207025	Terminal, Swage Double Turret
99-207026	Standoff, 4-40 × .200 Threaded
99-207027	Fabrication, 2.43 × 3.85 PCB
99-207028	Transformer

043746-01
Pedal Frame

043691-01
Spring

In 2 places
(in each pin slot)

043750-01
Foot Pedal Link

75-918S
Nut

72-8808
Screw

043749-02
Foot Pedal
Safety Tread (Left)

043749-01
Foot Pedal
Safety Tread (Right)

043747-02
Double Pedal (Left)

043747-01
Double Pedal (Right)

In 6 places
(under each bearing)

043748-01
Pedal Shaft

A043710-01
Foot Pedal Harness Assy

19-9026
Potentiometer

178012-006
Retaining Ring

76-080802
Bearing

175005-003
Flat Washer

Figure 5-6 Foot Pedal Assembly
A043745-01   B

Foot Pedal Assembly
Parts List

Part No.	Description
A043710-01	Dual Foot Pedal Harness Assembly
19-9026	5 kΩ Potentiometer with Hex Nut and Lock Washer
72-8808	#8-32 × ½-Inch Hex Socket-Head Cap Screw
75-918S	#8-32 Steel Cadium Hex Machine Nut
76-080802	½-Inch I.D. × 1/8-Inch Bearing (Nyliner)
043691-01	Pedal Return Spring
043746-01	Pedal Frame
043747-01	Double Pedal (Right)
043747-02	Double Pedal (Left)
043748-01	Pedal Shaft
043749-01	Foot Pedal Safety Tread (Right)
043749-02	Foot Pedal Safety Tread (Left)
043750-01	Foot Pedal Link
107027-001	Multi-Use Lithium-Base Lubricant
175005-003	.60 Thick .505 I.D. 1.00 O.D. × ½-Inch Flat Washer
178012-006	½-Inch Diameter Shaft Retaining Ring

99-10140
Panel Assembly

75-948S
Locknut

99-10116
Lever

99-10152
Right Coin Inlet

99-10147
Harness

171006-035
Coin Mechanism

75-944S
Locknut

99-10096
Fastener

99-10151
Left Coin Inlet

70-11-47
Lamp

99-10080
Lamp Socket

72-9406S
Screw

99-10105
Bar

99-10104
Bar Retainer

99-10154
Bracket Assembly

99-10153
Coin Return Box

99-10068
Coin Chute

65-441C
Coin Switch

99-10075 thru 99-10078
Switch Wires

99-10008
Retainer

75-1412S
Screw

99-10042 thru 99-10045
Coin Switch Assembly

99-10150
Switch Cover

**Figure 5-7 Coin Acceptors, Inc. Coin Door Assembly
171027-001   A**

99-10148
Lock Assembly

99-10142
Button Housing

72-HA1404C
Screw

99-10134
Cover

99-10139
Coin Door

99-10119
Button Assembly

99-10118
Button

99-10148
Lock Assembly

99-10115
Spring

99-10141
Coin Return Cover

99-10117
Coin Return Door

72-JA1405B
Screw

99-10144
Channel Clip

99-15066
Screw

99-10149
Service Door

038091-01
Coin Box

99-10143
Frame

NOTE

Acceptable alternate or substi-
tute coin door assembly is part
number 171034-001.

Figure 5-7   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 × .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 Belgium 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

N O T E S

NOTE

To comply with emission requirements, the Federal Communications Commission requires that the Video PCB Assembly be housed in the EMI cover. *Do not operate this game* without properly installing the EMI cover, metal spacers, and thumb nuts.

75-058
Lock Washer

72-1610F
Screw

043143-01
Ground Plane

CPU PCB Assy
See Figure 5-9

034536-10
0.62 Foam Pad

Video PCB Assy **178181-6802**
See Figure 5-10   Spacer

76015-110
Screw

72-1612S
Screw
(2 places)

75-058
Lock Washer

043148-01
EMI Cover

034536-11
0.81 Foam Pad

177018-206
Thumb Nut
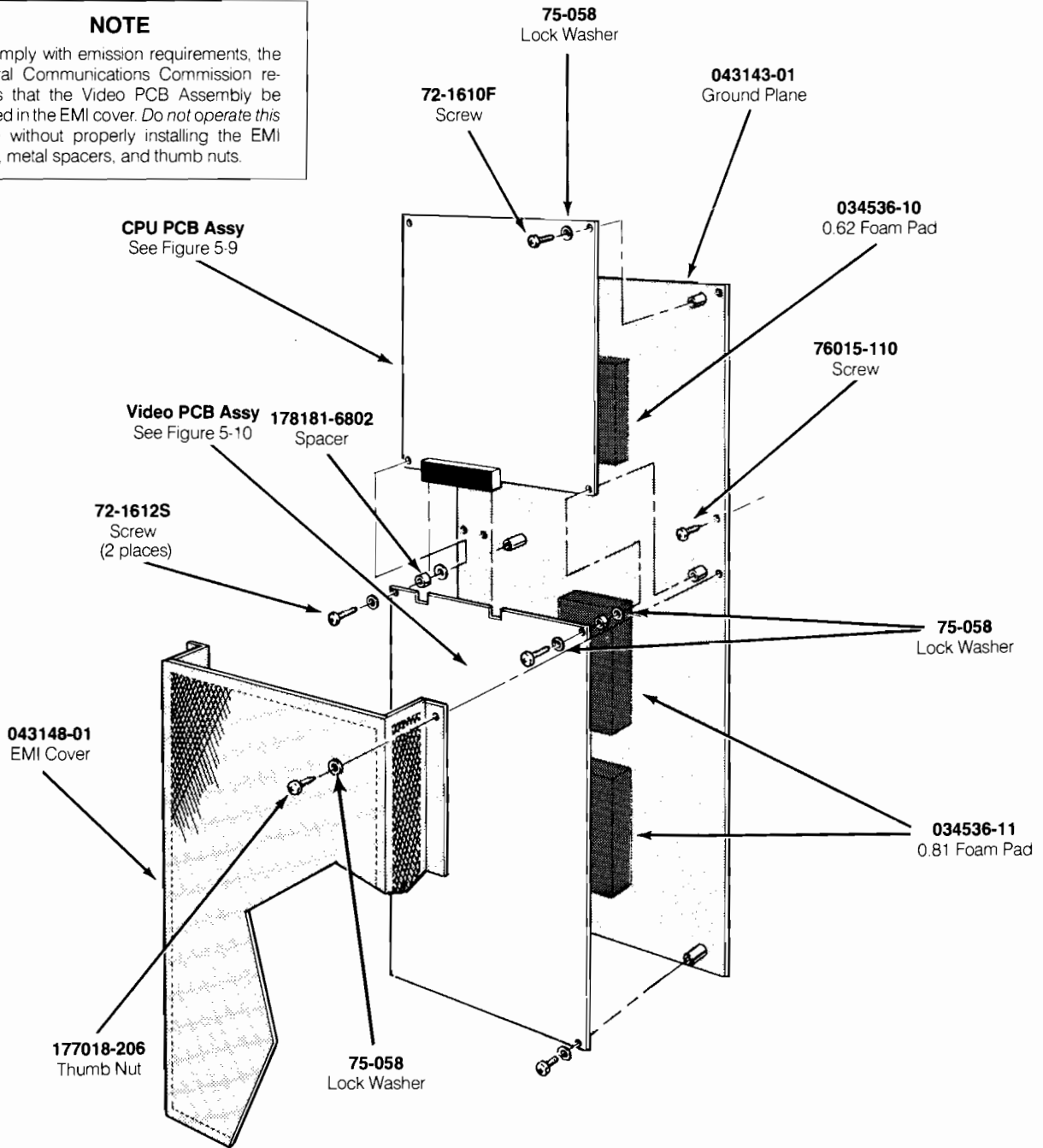
75-058
Lock Washer

Figure 5-8 PCB Mounting Hardware

PCB Mounting Hardware
Parts List

Part No.	Description
A043734-01	Video PCB Assembly
A042735-01	CPU PCB Assembly
72-1610F	#6-32 × 5/8-Inch Pan-Head Screw
72-1612S	#6-32 × ¾-Inch Pan-Head Screw
75-058	#8 Internal Tooth Lock Washer
034536-10	0.62-Inch Foam Vibration Damper
034536-11	0.81-Inch Foam Vibration Damper
043544-01	Ground Plane
043148-01	EMI Cover
176015-110	10 × 5/8-Inch Cross-Recessed Pan-Head Screw
177018-206	#6-32 Knurled Brass Thumb Nut
178181-6802	Round Spacer

Figure 5-9   Central Processing Unit (CPU) PCB Assembly
A043735-01   A

Central Processing Unit (CPU) PCB Assembly
Parts List

Designator	Description	Part No.
The following set of four ICs is used in the German Championship Sprint CPU PCB only:		
6F	Integrated Circuit, EPROM, Type-27256, 300 ns	136045-x225
6N	Integrated Circuit, EPROM, Type-27256, 300 ns	136045-x222
7L	Integrated Circuit, EPROM, Type-27128, 300 ns	136045-x226
7N	Integrated Circuit, EPROM, Type-27128, 300 ns	136045-x227
Integrated Circuits		
1A	Integrated Circuit, Type-6116	137211-001
1B/C	Integrated Circuit, Type-6116	137211-001
1D	Integrated Circuit, Type-2804-3 EEPROM	137329-300
1E	Integrated Circuit, Type-74LS32	37-74LS32
1J	Integrated Circuit, Type-74LS245	37-74LS245
1K	Integrated Circuit, Type-74LS245	37-74LS245
1L	Integrated Circuit, Type-74LS32	37-74LS32
1M	Integrated Circuit, Type-74LS244	37-74LS244
1N	Integrated Circuit, Type-74LS244	37-74LS244
1P	Integrated Circuit, Type-74LS244	37-74LS244
1R	Integrated Circuit, Type-74S32	37-74S32
1S	Integrated Circuit, Type-ADC0809	137243-001
2B/C	Integrated Circuit, EPROM, Type-27128, 300 ns	136045-x118
2D	Integrated Circuit, EPROM, Type-27128, 300 ns	136045-x119
2D/E	Integrated Circuit, Type-74LS04	37-74LS04
2F	Integrated Circuit, Type-74LS244	37-74LS244
2J	Integrated Circuit, Type-T11 (DCT11-XA)	137361-002
2L	Integrated Circuit, Type-74LS174	37-74LS174
2M	Integrated Circuit, Type-74LS74	37-74LS74
2N	Integrated Circuit, Type-74LS670	37-74LS670
2P	Integrated Circuit, Type-74LS670	37-74LS670
3E	Integrated Circuit, Type-74LS138	137177-001
3F	Integrated Circuit, Type-74LS161	37-74LS161
3H	Integrated Circuit, Type-74LS00	37-74LS00
3J	Integrated Circuit, Type-74LS139	37-74LS139
3K	Integrated Circuit, Type-74LS393	37-74LS393
3L	Integrated Circuit, Type-74S74	37-74S74
3M	Integrated Circuit, Type-74LS138	137177-001
3N	Integrated Circuit, Type-74LS74	37-74LS74
3P	Integrated Circuit, Type-74S74	37-74S74
3R	Integrated Circuit, Type-74LS20	37-74LS20
4A	Integrated Circuit, Type-74LS244	37-74LS244
4A/B	Integrated Circuit, Type-74LS244	37-74LS244
4B/C	Integrated Circuit, Type-74LS139	37-74LS139
4C/D	Integrated Circuit, Type-74LS74	37-74LS74
4D	Integrated Circuit, Type-74LS163A	37-74LS163A
4E	Integrated Circuit, Type-74LS138	137177-001
4F	Integrated Circuit, Type-74LS393	37-74LS393
4H	Integrated Circuit, Type-74LS74	37-74LS74
4J	Integrated Circuit, Type-74LS74	37-74LS74

"x" in the part number denotes the revision level

Central Processing Unit (CPU) PCB Assembly
Parts List, Continued

Designator	Description	Part No.
4K	Integrated Circuit, Type-74LS373	37-74LS373
4L	Integrated Circuit, Type-74LS138	137177-001
4M	Integrated Circuit, SLAPSTIC	137412-109
4N	Integrated Circuit, Type-74LS245	37-74LS245
4P	Integrated Circuit, Type-74LS244	37-74LS244
5B	Integrated Circuit, Type-6502A	90-6013
5D	Integrated Circuit, Type-74LS245	37-74LS245
5E	Integrated Circuit, Type-74LS374	37-74LS374
5F	Integrated Circuit, Type-74LS175	37-74LS175
5H	Integrated Circuit, Type-74LS245	37-74LS245
5J	Integrated Circuit, Type-74LS08	37-74LS08
5K	Integrated Circuit, Type-74LS04	37-74LS04
5L	Integrated Circuit, Type-74LS139	37-74LS139
5M	Integrated Circuit, Type-74LS373	37-74LS373
5N	Integrated Circuit, Type-74LS174	37-74LS174
5P	Integrated Circuit, Type-74LS244	37-74LS244
6B	Integrated Circuit, POKEY	C012294-01
6D	Integrated Circuit, Type-74LS245	37-74LS245
6E	Integrated Circuit, Type-74LS374	37-74LS374
6F	Integrated Circuit, EPROM, Type-27256, 300 ns	136045-x125
6K	Integrated Circuit, EPROM, Type-27256, 300 ns	136045-x124
6L	Integrated Circuit, EPROM, Type-27256, 300 ns	136045-x123
6N	Integrated Circuit, EPROM, Type-27256, 300 ns	136045-x122
6R	Integrated Circuit, EPROM, Type-27256, 300 ns	136045-x121
6S	Integrated Circuit, EPROM, Type-27256, 300 ns	136045-x120
7B	Integrated Circuit, POKEY	C012294-01
7D	Integrated Circuit, Type-TMS5220C	137308-002
7F	Integrated Circuit, Leta	137304-1001
7H	Integrated Circuit, Type-74LS74	37-74LS74
7J	Integrated Circuit, Type-74LS10	37-74LS10
7K	Integrated Circuit, Type-6116	137211-001
7L	Integrated Circuit, EPROM, Type-27128, 300 ns	136045-x126
7N	Integrated Circuit, EPROM, Type-27128, 300 ns	136045-x127
7P	Integrated Circuit, Type-6116	137211-001
7R	Integrated Circuit, Type-74LS161	37-74LS161
8B	Integrated Circuit, Type-74LS161	37-74LS161
8C	Integrated Circuit, Type-74LS273	37-74LS273
8D	Integrated Circuit, Type-74LS273	37-74LS273
8F	Integrated Circuit, Type-74LS244	37-74LS244
8H/J	Integrated Circuit, Type-Y2151	137401-001
8J/K	Integrated Circuit, Type-YM3012	137402-001
8N	Integrated Circuit, Type-74S04	37-74S04
9B	Integrated Circuit, Type-LF13201	137352-001
9C	Integrated Circuit, Type-LF13201	137352-001
9D	Integrated Circuit, Type-LF13201	137352-001
9D/E	Integrated Circuit, Type-LF13201	137352-001

''x'' in the part number denotes the revision level

Central Processing Unit (CPU) PCB Assembly
Parts List, Continued

Designator	Description	Part No.
9J/K	Integrated Circuit, Type-LM324	37-LM324
9L/M	Integrated Circuit, Type-LM324	37-LM324
10B	Integrated Circuit, Type-LM324	37-LM324
10C	Integrated Circuit, Type-LM324	37-LM324
10F	Integrated Circuit, Type-LM324	37-LM324
10L/M	Integrated Circuit, Type-TLO82CP	37-TLO82CP
11M	Integrated Circuit, Type-74C04	137309-001
	Sockets	
	Socket, Medium-Insertion-Force, 16-Pin	79-42C16
	Socket, Medium-Insertion-Force, 20-Pin	79-42C20
	Socket, Medium-Insertion-Force, 24-Pin	79-42C24
	Socket, Medium-Insertion-Force, 28-Pin	79-42C28
	Socket, Medium-Insertion-Force, 40-Pin	79-42C40
	Capacitors	
C1–C60	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C31–C60	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C61	Capacitor, Ceramic, .018 μF, 50 V	122015-183
C62–C64	Capacitor, Ceramic, .22 μF, 25 V	122004-224
C65	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C66	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C67	Capacitor, Mica, 100 pF, 100 V	128002-101
C68	Capacitor, Mica, 39 pF, 100 V	128002-390
C69	Capacitor, Ceramic, .1μF, 50 V	122002-104
C70	Capacitor, Mica, 39 pF, 100 V	128002-390
C71	Capacitor, Mica, 100 pF, 100 V	128002-101
C72–C79	Capacitor, Ceramic, .01 μF, 25 V	122005-103
C80	Capacitor, Ceramic, .001 μF, 50 V	122002-102
C81	Capacitor, Ceramic, .001 μF, 50 V	122002-102
C82–C89	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C90	Capacitor, Ceramic, .22, 25 V	122004-224
C91	Capacitor, Tantalum, 10 μF, 20 V	29-046
C92	Capacitor, Ceramic, .01 μF, 25 V	122005-103
C93	Capacitor, Mica, 220 pF, 100 V	128002-221
C94	Capacitor, Mica, 220 pF, 100 V	128002-221
C95	Capacitor, Ceramic, .0027 μF, 50 V	122015-272
C96	Capacitor, Tantalum, 10 μF, 20 V	29-046
C97	Capacitor, Ceramic, .0027 μF, 50 V	122015-272
C98–C100	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C101	Capacitor, Aluminum, 10 μF, 35 V	24-350106
C102	Capacitor, Aluminum, 10 μF, 35 V	24-350106
C103–C109	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C110	Capacitor, Ceramic, .01 μF, 25 V	122005-103
C111	Capacitor, Ceramic, .01 μF, 25 V	122005-103
C112	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C113	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C115	Capacitor, Mica, 220 pF, 100 V	128002-221

Central Processing Unit (CPU) PCB Assembly
Parts List, Continued

Designator	Description	Part No.
C116	Capacitor, Mica, 220 pF, 100 V	128002-221
C117	Capacitor, Ceramic, .01 μF, 25 V	122005-103
C118	Capacitor, Ceramic, .001 μF, 50 V	122002-102
C119	Capacitor, Ceramic, .001 μF, 50 V	122002-102
C120	Capacitor, Ceramic, .01 μF, 25 V	122005-103
C121	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C122	Capacitor, Ceramic, .22 μF, 25 V	122004-224
C123	Capacitor, Ceramic, .22 μF, 25 V	122004-224
C124	Capacitor, Mica, 470 pF, 100 V	128002-471
C125	Capacitor, Mica, 470 pF, 100 V	128002-471
C126	Capacitor, Ceramic, .22 μF, 25 V	122004-224
C127	Capacitor, Ceramic, .22 μF, 25 V	122004-224
C128	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C132	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C133	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C134	Capacitor, Ceramic, .22 μF, 25 V	122004-224
C135	Capacitor, Aluminum, 470 μF, 25 V	24-250477
C136	Capacitor, Aluminum, 470 μF, 25 V	24-250477
C138	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C139	Capacitor, Aluminum, 100 μF, 35 V	24-350107
C140	Capacitor, Aluminum, 1 μF, 50 V	24-500105
C141	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C143	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C144	Capacitor, Ceramic, .0027 μF, 50 V	122015-272
C145	Capacitor, Ceramic, .0012 μF, 50 V	122015-122
C146	Capacitor, Ceramic, .0039 μF, 50 V	122015-392
C147	Capacitor, Ceramic, .0068 μF, 50 V	122015-682
C148	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C149–C152	Capacitor, Ceramic, .1 μF, 50 V	122002-104
Diodes		
CR1–CR3	Diode, Type-1N100	31-1N100
CR4	Diode, Type-1N4001	31-1N4001
CR5	Diode, Type-1N4001	31-1N4001
CR6	Diode, Light-Emitting, Type-MV5053	38-MV5053
CR7	Diode, Type-1N4001	31-1N4001
Connectors and Fasteners		
J15	Connector, Header, 17-Circuit, .100 ctr	179118-017
J16	Connector, Header, 5-Circuit, .100 ctr	179118-005
J20	Connector, Header, 9-Circuit, .156 ctr, pol	179014-009
J102, J103	Connector, Header, 11-Circuit, .100 ctr	179118-011
J106	Connector, Header, 11-Circuit, .100 ctr	179118-011
P18	Connector, Card Edge, 80-Circuit (40×2)	179221-180
Q1, Q2	Fastener, Nylon, Snap-in	81-4302
Q9, Q10	Fastener, Nylon, Snap-in	81-4302
VR1	Fastener, Nylon, Snap-In	81-4302
	Terminal, Fast-On Tab (Acceptable substitute is part number 020670-01)	179051-002

Central Processing Unit (CPU) PCB Assembly
Parts List, Continued

Designator	Description	Part No.
Inductors		
L1	Inductor, 33 μH	141016-007
L2	Inductor, 100 μH	141002-001
Transistors		
Q1, Q2	Transistor, 2N6044	34-2N6044
Q3, Q4	Transistor, 2N3906	33-2N3906
Q5–Q8	Transistor, 2N3904	34-2N3904
Q11, Q12	Transistor, 2N3904	34-2N3904
Resistors		
R1, R2	Resistor, ¼ W, 10K Ω, $\pm 5\%$	110000-103
R3, R4	Resistor, ¼ W, 1K Ω, $\pm 5\%$	110000-102
R5–R7	Resistor, ¼ W, 220 Ω, $\pm 5\%$	110000-221
R8–R11	Resistor, ¼ W, 4.7K Ω, $\pm 5\%$	110000-472
R12	Resistor, ¼ W, 470 Ω, $\pm 5\%$	110000-471
R13–R20	Resistor, ¼ W, 100 Ω, $\pm 5\%$	110000-101
R21–R23	Resistor, ¼ W, 1K Ω, $\pm 5\%$	110000-102
R24–R27	Resistor, ¼ W, 4.7K Ω, $\pm 5\%$	110000-472
R28–R33	Resistor, ¼ W, 470 Ω, $\pm 5\%$	110000-471
R34	Resistor, ¼ W, 10K Ω, $\pm 5\%$	110000-103
R35	Resistor, ¼ W, 1K Ω, $\pm 5\%$	110000-102
R36	Resistor, ¼ W, 220 Ω, $\pm 5\%$	110000-221
R37	Resistor, ¼ W, 220 Ω, $\pm 5\%$	110000-221
R38–R42	Resistor, ¼ W, 1K Ω, $\pm 5\%$	110000-102
R43–R58	Resistor, ¼ W, 10K Ω, $\pm 5\%$	110000-103
R59	Resistor, ¼ W, 1K Ω, $\pm 5\%$	110000-102
R60–R67	Resistor, ¼ W, 3.3K Ω, $\pm 5\%$	110000-332
R68	Resistor, ¼ W, 1K Ω, $\pm 5\%$	110000-102
R69	Resistor, ¼ W, 1.8K Ω, $\pm 5\%$	110000-182
R70	Resistor, ¼ W, 10K Ω, $\pm 5\%$	110000-103
R71	Resistor, ¼ W, 5.6K Ω, $\pm 5\%$	110000-562
R72–R74	Resistor, ¼ W, 100K Ω, $\pm 5\%$	110000-104
R75	Resistor, ¼ W, 1K Ω, $\pm 5\%$	110000-102
R76–R85	Resistor, ¼ W, 10K Ω, $\pm 5\%$	110000-103
R86	Resistor, ¼ W, 220 Ω, $\pm 5\%$	110000-221
R87	Resistor, ¼ W, 220 Ω, $\pm 5\%$	110000-221
R88, R89	Resistor, ¼ W, 10K Ω, $\pm 5\%$	110000-103
R90	Resistor, ¼ W, 100 Ω, $\pm 5\%$	110000-101
R91	Resistor, ¼ W, 4.7K Ω, $\pm 5\%$	110000-472
R92	Resistor, ¼ W, 100 Ω, $\pm 5\%$	110000-101
R93	Resistor, ¼ W, 4.7K Ω, $\pm 5\%$	110000-472
R94	Resistor, ¼ W, 22K Ω, $\pm 5\%$	110000-223
R95	Resistor, ¼ W, 47K Ω, $\pm 5\%$	110000-473
R96	Resistor, ¼ W, 100K Ω, $\pm 5\%$	110000-104
R97	Resistor, ¼ W, 22K Ω, $\pm 5\%$	110000-223
R98	Resistor, ¼ W, 47K Ω, $\pm 5\%$	110000-473

Central Processing Unit (CPU) PCB Assembly
Parts List, Continued

Designator	Description	Part No.
R99	Resistor, ¼ W, 100K Ω, ±5%	110000-104
R100	Resistor, ¼ W, 22K Ω, ±5%	110000-223
R101	Resistor, ¼ W, 47K Ω, ±5%	110000-473
R102	Resistor, ¼ W, 100K Ω, ±5%	110000-104
R103	Resistor, ¼ W, 100K Ω, ±5%	110000-104
R104, R105	Resistor, ¼ W, 1K Ω, ±5%	110000-102
R106	Resistor, ¼ W, 100K Ω, ±5%	110000-104
R107, R108	Resistor, ¼ W, 18K Ω, ±5%	110000-183
R109	Resistor, ¼ W, 100K Ω, ±5%	110000-104
R110	Resistor, ¼ W, 390 Ω, ±5%	110000-391
R111	Resistor, ¼ W, 560 Ω, ±5%	110000-561
R112	Resistor, ¼ W, 1K Ω, ±5%	110000-102
R113	Resistor, ¼ W, 5.6K Ω, ±5%	110000-562
R114	Resistor, ¼ W, 10K Ω, ±5%	110000-103
R115, R116	Resistor, ¼ W, 1K Ω, ±5%	110000-102
R117	Resistor, ¼ W, 470 Ω, ±5%	110000-471
R118	Resistor, ¼ W, 470 Ω, ±5%	110000-471
R119	Resistor, ¼ W, 470K Ω, ±5%	110000-474
R120–R124	Resistor, ¼ W, 100K Ω, ±5%	110000-104
R125	Resistor, ¼ W, 2.2K Ω, ±5%	110000-222
R126, R127	Resistor, ¼ W, 4.7K Ω, ±5%	110000-472
R128	Resistor, ¼ W, 2.2K Ω, ±5%	110000-222
R129	Resistor, ¼ W, 100K Ω, ±5%	110000-104
R130	Resistor, ¼ W, 47K Ω, ±5%	110000-473
R131–R133	Resistor, ¼ W, 100K Ω, ±5%	110000-104
R134	Resistor, ¼ W, 47K Ω, ±5%	110000-473
R135–R138	Resistor, ¼ W, 100K Ω, ±5%	110000-104
R139	Resistor, ¼ W, 47K Ω, ±5%	110000-473
R140	Resistor, ¼ W, 68K Ω, ±5%	110000-683
R141, R142	Resistor, ¼ W, 47K Ω, ±5%	110000-473
R143	Resistor, ¼ W, 68K Ω, ±5%	110000-683
R144	Resistor, ¼ W, 47K Ω, ±5%	110000-473
R148, R151	Resistor, ¼ W, 100K Ω, ±5%	110000-104
R155, R156	Resistor, ¼ W, 470 Ω, ±5%	110000-471
R157	Resistor, ¼ W, 10K Ω, ±5%	110000-103
R158, R159	Resistor, ¼ W, 3.3K Ω, ±5%	110000-332
R160	Resistor, ¼ W, 1K Ω, ±5%	110000-102
R161	Resistor, ¼ W, 150 Ω, ±5%	110000-151
R162	Resistor, ¼ W, 10K Ω, ±5%	110000-103
R163	Resistor, ¼ W, 3.3K Ω, ±5%	110000-332
R164, R166	Resistor, ¼ W, 1K Ω, ±5%	110000-102
R168	Resistor, ¼ W, 1K Ω, ±5%	110000-102
R169, R170	Resistor, ¼ W, 4.7K Ω, ±5%	110000-472
R171	Resistor, ¼ W, 270 Ω, ±5%	110000-271

Central Processing Unit (CPU) PCB Assembly
Parts List, Continued

| Designator	Description	Part No.
R172	Resistor, ¼ W, 12 Ω, ± 5%	110000-123
R173	Resistor, ¼ W, 56 Ω, ± 5%	110000-563
R174	Resistor, ¼ W, 10K Ω, ± 5%	110000-103
R175	Resistor, ¼ W, 8.2 Ω, ± 5%	110000-822
R176	Resistor, ¼ W, 3.9K Ω, ± 5%	110000-392
R177	Resistor, ¼ W, 470 Ω, ± 5%	110000-471
R178	Resistor, ¼ W, 1K Ω, ± 5%	110000-102
R179	Resistor, ¼ W, 0 Ω, ± 5%	110005-001
RN1, RN2	Resistor Network, SIP, 10K × 8, 1/8 W	118002-103
Miscellaneous		
VR1	Voltage Regulator, Type-7905	37-7905
Y1	Crystal, 20 MHz	144000-003
Y2	Crystal, 14.318 MHz	90-101
5/6A	Switch, 8-Position, DIP	160031-008
6/7A	Switch, 8-Position, DIP	160031-008
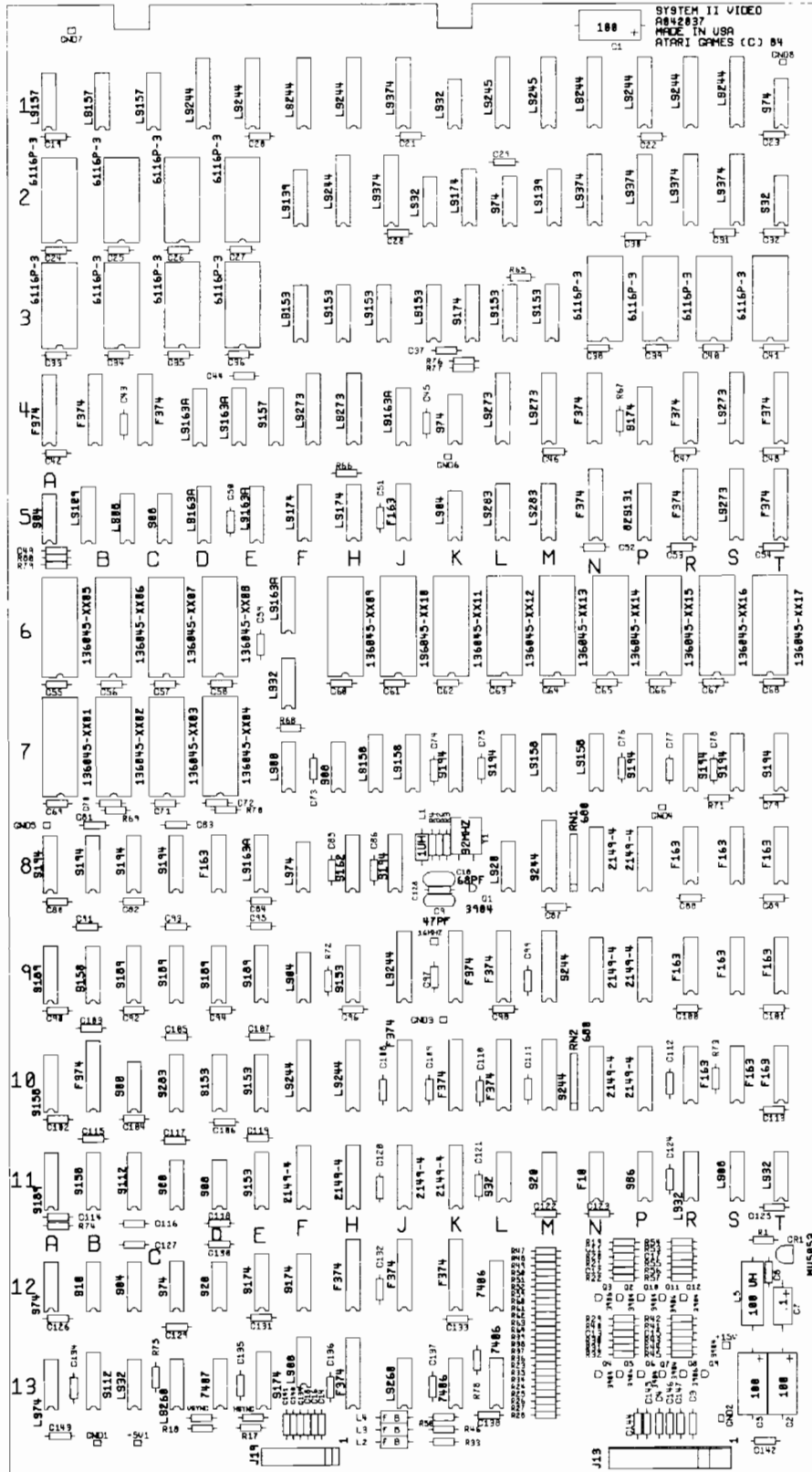
Figure 5-10 Video PCB Assembly
A043734-01   A

NOTE:
1. DO NOT INSTALL R3 AND C143.
2. MODIFICATIONS TO ASSEMBLIES USING 042038-01 REV A AND
   B PC BOARDS:
   • LIFT PIN 15 OF IC 9K.
   • ADD JUMPER BETWEEN 9K PAD 5 AND 9F PAD 1.
   • ADD JUMPER BETWEEN 9F PAD 2 AND 9K PAD 15.

Video PCB Assembly
Parts List

Designator	Description	Part No.
Integrated Circuits		
1A	Type-74LS157 Integrated Circuit	37-74LS157
1B	Type-74LS157 Integrated Circuit	37-74LS157
1C	Type-74LS157 Integrated Circuit	37-74LS157
1D	Type-74LS244 Integrated Circuit	37-74LS244
1E	Type-74LS244 Integrated Circuit	37-74LS244
1F	Type-74LS244 Integrated Circuit	37-74LS244
1H	Type-74LS244 Integrated Circuit	37-74LS244
1J	Type-74LS374 Integrated Circuit	37-74LS374
1K	Type-74LS32 Integrated Circuit	37-74LS32
1L	Type-74LS245 Integrated Circuit	37-74LS245
1M	Type-74LS245 Integrated Circuit	37-74LS245
1N	Type-74LS244 Integrated Circuit	37-74LS244
1P	Type-74LS244 Integrated Circuit	37-74LS244
1R	Type-74LS244 Integrated Circuit	37-74LS244
1S	Type-74LS244 Integrated Circuit	37-74LS244
1T	Type-74S74 Integrated Circuit	37-74S74
2A	Type-6116P-3, 150 ns RAM Integrated Circuit	137211-001
2B/C	Type-6116P-3, 150 ns RAM Integrated Circuit	137211-001
2C/D	Type-6116P-3, 150 ns RAM Integrated Circuit	137211-001
2E	Type-6116P-3, 150 ns RAM Integrated Circuit	137211-001
2F	Type-74LS139 Integrated Circuit	37-74LS139
2H	Type-74LS244 Integrated Circuit	37-74LS244
2H/J	Type-74LS374 Integrated Circuit	37-74LS374
2J/K	Type-74LS32 Integrated Circuit	37-74LS32
2K/L	Type-74LS174 Integrated Circuit	37-74LS174
2L	Type-74S74 Integrated Circuit	37-74S74
2M	Type-74LS139 Integrated Circuit	37-74LS139
2N	Type-74LS374 Integrated Circuit	37-74LS374
2P	Type-74LS374 Integrated Circuit	37-74LS374
2R	Type-74LS374 Integrated Circuit	37-74LS374
2S	Type-74LS374 Integrated Circuit	37-74LS374
2T	Type-74S32 Integrated Circuit	37-74S32
3A	Type-6116P-3, 150 ns RAM Integrated Circuit	137211-001
3B/C	Type-6116P-3, 150 ns RAM Integrated Circuit	137211-001
3C/D	Type-6116P-3, 150 ns RAM Integrated Circuit	137211-001
3E	Type-6116P-3, 150 ns RAM Integrated Circuit	137211-001
3F	Type-74LS153 Integrated Circuit	37-74LS153
3H	Type-74LS153 Integrated Circuit	37-74LS153
3H/J	Type-74LS153 Integrated Circuit	37-74LS153
3J/K	Type-74LS153 Integrated Circuit	37-74LS153
3K/L	Type-74S174 Integrated Circuit	137209-001
3L	Type-74LS153 Integrated Circuit	37-74LS153
3M	Type-74LS153 Integrated Circuit	37-74LS153
3N	Type-6116P-3, 150 ns RAM Integrated Circuit	137211-001
3P/R	Type-6116P-3, 150 ns RAM Integrated Circuit	137211-001
3R/S	Type-6116P-3, 150 ns RAM Integrated Circuit	137211-001

Video PCB Assembly
Parts List, Continued

Designator	Description	Part No.
3T	Type-6116P-3, 150 ns RAM Integrated Circuit	137211-001
4A	Type-74F374 Integrated Circuit (Acceptable substitute is Type-74AS374N Integrated Circuit, part no. 137422-001)	137420-001
4B	Type-74F374 Integrated Circuit (Acceptable substitute is Type-74AS374N Integrated Circuit, part no. 137422-001)	137420-001
4C	Type-74F374 Integrated Circuit (Acceptable substitute is Type-74AS374N Integrated Circuit, part no. 137422-001)	137420-001
4D	Type-74LS163A Integrated Circuit	37-74LS163A
4E	Type-74LS163A Integrated Circuit	37-74LS163A
4E/F	Type-74S157 Integrated Circuit	37-74S157
4F	Type-74LS273 Integrated Circuit	37-74LS273
4H	Type-74LS273 Integrated Circuit	37-74LS273
4J	Type-74LS163A Integrated Circuit	37-74LS163A
4K	Type-74S74 Integrated Circuit	37-74S74
4L	Type-74LS273 Integrated Circuit	37-74LS273
4M	Type-74LS273 Integrated Circuit	37-74LS273
4N	Type-74F374 Integrated Circuit (Acceptable substitute is Type-74AS374N Integrated Circuit, part no. 137422-001)	137420-001
4P	Type-74S174 Integrated Circuit	137209-001
4R	Type-74F374 Integrated Circuit (Acceptable substitute is Type-74AS374N Integrated Circuit, part no. 137422-001)	137420-001
4S	Type-74LS273 Integrated Circuit	37-74LS273
4T	Type-74F374 Integrated Circuit (Acceptable substitute is Type-74AS374N Integrated Circuit, part no. 137422-001)	137420-001
5A	Type-74S04 Integrated Circuit	37-74S04
5B	Type-74LS109 Integrated Circuit	37-74LS109
5B/C	Type-74LS08 Integrated Circuit	37-74LS08
5C/D	Type-74S08 Integrated Circuit	37-74S08
5D	Type-74LS163A Integrated Circuit	37-74LS163A
5E	Type-74LS163A Integrated Circuit	37-74LS163A
5F	Type-74LS174 Integrated Circuit	37-74LS174
5H	Type-74LS174 Integrated Circuit	37-74LS174
5J	Type-74F163 Integrated Circuit (Acceptable substitute is Type-74AS163N Integrated Circuit, part no. 137421-001)	137345-001
5K	Type-74LS04 Integrated Circuit	37-74LS04
5L	Type-74LS283 Integrated Circuit	137204-001
5M	Type-74LS283 Integrated Circuit	137204-001
5N	Type-74F374 Integrated Circuit (Acceptable substitute is Type-74AS374N Integrated Circuit, part no. 137422-001)	137420-001
5P	Type-82S131 Program PROM Integrated Circuit	136034-131
5R	Type-74F374 Integrated Circuit (Acceptable substitute is Type-74AS374N Integrated Circuit, part no. 137422-001)	137420-001
5S	Type-74LS273 Integrated Circuit	37-74LS273
5T	Type-74F374 Integrated Circuit (Acceptable substitute is Type-74AS374N Integrated Circuit, part no. 137422-001)	137420-001
6A	200 ns Type-27256 EPROM Integrated Circuit	136045-x105
6B	200 ns Type-27256 EPROM Integrated Circuit	136045-x106
6C	200 ns Type-27256 EPROM Integrated Circuit	136045-x107

"x" in the part number denotes the revision level

Video PCB Assembly
Parts List, Continued

Designator	Description	Part No.
6D/E	200 ns Type-27256 EPROM Integrated Circuit	136045-x108
6E/F	Type-74LS163A Integrated Circuit	37-74LS163A
6/7E/F	Type-74LS32 Integrated Circuit	37-74LS32
6F/H	200 ns Type-27256 EPROM Integrated Circuit	136045-x109
6H/J	200 ns Type-27256 EPROM Integrated Circuit	136045-x110
6K	200 ns Type-27256 EPROM Integrated Circuit	136045-x111
6L	200 ns Type-27256 EPROM Integrated Circuit	136045-x112
6M	200 ns Type-27256 EPROM Integrated Circuit	136045-x113
6N	200 ns Type-27256 EPROM Integrated Circuit	136045-x114
6P/R	200 ns Type-27256 EPROM Integrated Circuit	136045-x115
6R/S	200 ns Type-27256 EPROM Integrated Circuit	136045-x116
6T	200 ns Type-27128 EPROM Integrated Circuit	136045-x117
7A	200 ns Type-27512 EPROM Integrated Circuit (Acceptable substitute is a 250 ns EPROM)	136045-x101
7B	200 ns Type-27256 EPROM Integrated Circuit	136045-x102
7C	200 ns Type-27256 EPROM Integrated Circuit	136045-x103
7D/E	200 ns Type-27512 EPROM Integrated Circuit (Acceptable substitute is a 250 ns EPROM)	136045-x104
7E/F	Type-74LS00 Integrated Circuit	37-74LS00
7F/H	Type-74S08 Integrated Circuit	37-74S08
7H/J	Type-74LS158 Integrated Circuit	137203-001
7J	Type-74LS158 Integrated Circuit	137203-001
7K	Type-74S194 Integrated Circuit	137424-001
7L	Type-74S194 Integrated Circuit	137424-001
7M	Type-74LS158 Integrated Circuit	137203-001
7N	Type-74LS158 Integrated Circuit	137203-001
7P	Type-74S194 Integrated Circuit	137424-001
7R	Type-74S194 Integrated Circuit	137424-001
7S	Type-74S194 Integrated Circuit	137424-001
7T	Type-74S194 Integrated Circuit	137424-001
8A	Type-74S194 Integrated Circuit	137424-001
8B	Type-74S194 Integrated Circuit	137424-001
8B/C	Type-74S194 Integrated Circuit	137424-001
8C/D	Type-74S194 Integrated Circuit	137424-001
8D	Type-74F163 Integrated Circuit (Acceptable substitute is Type-74AS163N Integrated Circuit, part no. 137421-001)	137345-001
8E	Type-74LS163A Integrated Circuit	37-74LS163A
8F	Type-74LS74 Integrated Circuit	37-74LS74
8H	Type-74S162 Integrated Circuit	137342-001
8J	Type-74S194 Integrated Circuit	137424-001
8L	Type-74LS20 Integrated Circuit	37-74LS20
8M	Type-74S244 Integrated Circuit	137333-001
8N	Type-2149, 35 ns Static RAM Integrated Circuit	137199-003
8P	Type-2149, 35 ns Static RAM Integrated Circuit	137199-003
8R	Type-74F163 Integrated Circuit (Acceptable substitute is Type-74AS163N Integrated Circuit, part no. 137421-001)	137345-001
8S	Type-74F163 Integrated Circuit (Acceptable substitute is Type-74AS163N Integrated Circuit, part no. 137421-001)	137345-001

"x" in the part number denotes the revision level

Video PCB Assembly
Parts List, Continued

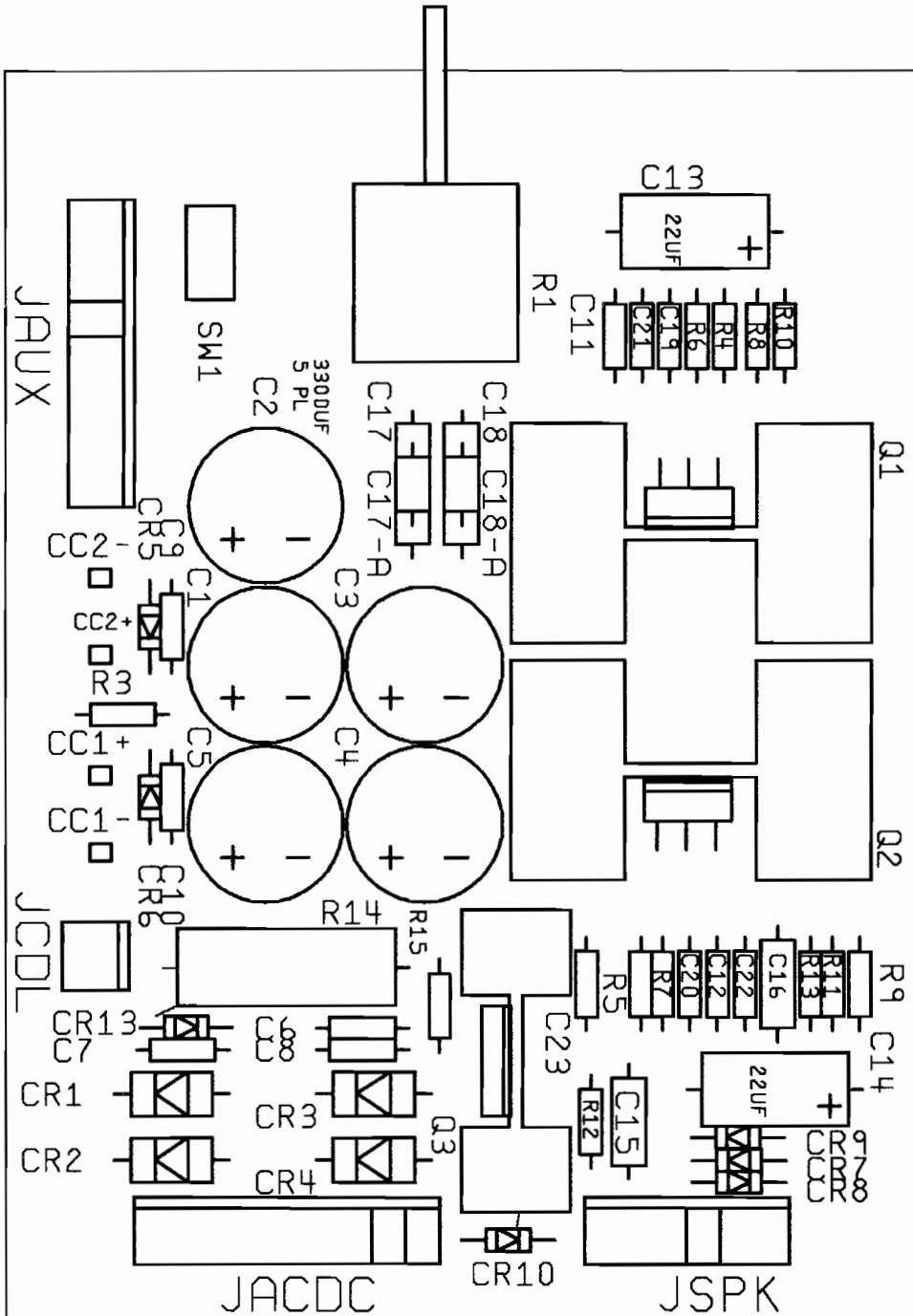| Designator	Description	Part No.
8T	Type-74F163 Integrated Circuit (Acceptable substitute is Type-74AS163N Integrated Circuit, part no. 137421-001)	137345-001
9A	Type-74S189 Integrated Circuit	37-74S189
9B	Type-74S158 Integrated Circuit	137312-001
9B/C	Type-74S189 Integrated Circuit	37-74S189
9C/D	Type-74S189 Integrated Circuit	37-74S189
9D	Type-74S189 Integrated Circuit	37-74S189
9E	Type-74S189 Integrated Circuit	37-74S189
9F	Type-74LS04 Integrated Circuit	37-74LS04
9H	Type-74S153 Integrated Circuit	137207-001
9J	Type-74LS244 Integrated Circuit	37-74LS244
9K	Type-74F374 Integrated Circuit (Acceptable substitute is Type-74AS374N Integrated Circuit, part no. 137422-001)	137420-001
9L	Type-74F374 Integrated Circuit (Acceptable substitute is Type-74AS374N Integrated Circuit, part no. 137422-001)	137420-001
9M	Type-74S244 Integrated Circuit	137333-001
9N	Type-2149, 35 ns Static RAM Integrated Circuit	137199-003
9P	Type-2149, 35 ns Static RAM Integrated Circuit	137199-003
9R	Type-74F163 Integrated Circuit (Acceptable substitute is Type-74AS163N Integrated Circuit, part no. 137421-001)	137345-001
9S	Type-74F163 Integrated Circuit (Acceptable substitute is Type-74AS163N Integrated Circuit, part no. 137421-001)	137345-001
9T	Type-74F163 Integrated Circuit (Acceptable substitute is Type-74AS163N Integrated Circuit, part no. 137421-001)	137345-001
10A	Type-74S158 Integrated Circuit	137312-001
10B	Type-74F374 Integrated Circuit (Acceptable substitute is Type-74AS374N Integrated Circuit, part no. 137422-001)	137420-001
10B/C	Type-74S00 Integrated Circuit	37-74S00
10C/D	Type-74S283 Integrated Circuit	137241-001
10D	Type-74S153 Integrated Circuit	137207-001
10E	Type-74S153 Integrated Circuit	137207-001
10F	Type-74LS244 Integrated Circuit	37-74LS244
10H	Type-74LS244 Integrated Circuit	37-74LS244
10J	Type-74F374 Integrated Circuit (Acceptable substitute is Type-74AS374N Integrated Circuit, part no. 137422-001)	137420-001
10K	Type-74F374 Integrated Circuit (Acceptable substitute is Type-74AS374N Integrated Circuit, part no. 137422-001)	137420-001
10L	Type-74F374 Integrated Circuit (Acceptable substitute is Type-74AS374N Integrated Circuit, part no. 137422-001)	137420-001
10M	Type-74S244 Integrated Circuit	137333-001
10N	Type-2149, 35 ns Static RAM Integrated Circuit	137199-003
10P	Type-2149, 35 ns Static RAM Integrated Circuit	137199-003
10R	Type-74F163 Integrated Circuit (Acceptable substitute is Type-74AS163N Integrated Circuit, part no. 137421-001)	137345-001
10S	Type-74F163 Integrated Circuit (Acceptable substitute is Type-74AS163N Integrated Circuit, part no. 137421-001)	137345-001
10T	Type-74F163 Integrated Circuit (Acceptable substitute is Type-74AS163N Integrated Circuit, part no. 137421-001)	137345-001
11A	Type-74S189 Integrated Circuit	37-74S189

Video PCB Assembly
Parts List, Continued

Designator	Description	Part No.
11B	Type-74S158 Integrated Circuit	137312-001
11B/C	Type-74S112 Integrated Circuit	137334-001
11C/D	Type-74S00 Integrated Circuit	37-74S00
11D	Type-74S08 Integrated Circuit	37-74S08
11E	Type-74S153 Integrated Circuit	137207-001
11F	Type-2149, 45 ns Static RAM Integrated Circuit	137199-002
11H	Type-2149, 45 ns Static RAM Integrated Circuit	137199-002
11J	Type-2149, 45 ns Static RAM Integrated Circuit	137199-002
11K	Type-2149, 45 ns Static RAM Integrated Circuit	137199-002
11L	Integrated Circuit Type-74S32	37-74S32
11M	Integrated Circuit Type-74S20	137423-001
11N	Integrated Circuit Type-74F10	137428-001
11P	Integrated Circuit Type-74S86	137002-001
11R	Integrated Circuit Type-74LS32	37-74LS32
11S	Integrated Circuit Type-74LS08	37-74LS08
11T	Integrated Circuit Type-74LS32	37-74LS32
12A	Integrated Circuit Type-74S74	37-74S74
12B	Integrated Circuit Type-74S10	137236-001
12B/C	Integrated Circuit Type-74S04	37-74S04
12C/D	Integrated Circuit Type-74S74	37-74S74
12D	Integrated Circuit Type-74S20	137423-001
12E	Integrated Circuit Type-74S174	137209-001
12F	Integrated Circuit Type-74LS174	37-74LS174
12H	Integrated Circuit Type-74F374 (Acceptable substitute is Type-74AS374N Integrated Circuit, part no. 137422-001)	137420-001
12J	Integrated Circuit Type-74F374 (Acceptable substitute is Type-74AS374N Integrated Circuit, part no. 137422-001)	137420-001
12K	Integrated Circuit Type-74F374 (Acceptable substitute is Type-74AS374N Integrated Circuit, part no. 137422-001)	137420-001
12L	Integrated Circuit Type-7406	37-7406
13A	Integrated Circuit Type-74LS74	37-74LS74
13B	Integrated Circuit Type-74S112	137334-001
13B/C	Integrated Circuit Type-74LS32	37-74LS32
13C/D	Integrated Circuit Type-74LS260	137332-001
13D	Integrated Circuit Type-7407	37-7407
13E	Integrated Circuit Type-74S174	137209-001
13F	Integrated Circuit Type-74LS08	37-74LS08
13H	Integrated Circuit Type-74F374 (Acceptable substitute is Type-74AS374N Integrated Circuit, part no. 137422-001)	137420-001
13J	Integrated Circuit Type-74LS260	137332-001
13K	Integrated Circuit Type-7406	37-7406
13L	Integrated Circuit Type-7406	37-7406

Sockets

	24-Contact, Medium-Insertion-Force IC Socket	79-42C24
	28-Contact, Medium-Insertion-Force IC Socket	79-42C28

Video PCB Assembly
Parts List, Continued

Designator	Description	Part No.
	Capacitors	
C1	Capacitor, Aluminum, 100 μF, 35 V	24-350107
C2	Capacitor, Aluminum, 100 μF, 35 V	24-350107
C3	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C4	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C5	Capacitor, Aluminum, 100 μF, 35 V	24-350107
C7	Capacitor, Electrolytic, 1 μF, 50 V	24-500105
C8	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C9	Capacitor, Mica, 47 pF, 100 V	128002-470
C10	Capacitor, Mica, 68 pF, 100 V	128002-680
C11–C13	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C14	Capacitor, Ceramic, 100 pF, 100 V	122016-101
C15	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C16	Capacitor, Ceramic, 100 pF, 100 V	122016-101
C17	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C18	Capacitor, Ceramic, 100 pF, 100 V	122016-101
C19–C138	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C139–C141	Capacitor, Ceramic, .001 μF 50 V	122002-102
C142	Capacitor, Ceramic, .1 μF, 50 V	122002-104
C144–C147	Capacitor, Ceramic, .1 μF, 50 V	122002-104
	Connectors	
J13	Connector, Header, 11-Circuit, .156 ctr, pol	179014-011
J19	Connector, Header, Sq. Pin, 11-Circuit, .100 ctr	179118-011
	Ferrite Beads and Inductors	
L1	Inductor, 1 μH	141007-001
L2	Ferrite Bead	141003-005
L3	Ferrite Bead	141003-005
L4	Ferrite Bead	141003-005
L5	Inductor, 100 μH	141019-001
	Transistors	
Q1, Q2	Type-2N3904 Transistor	34-2N3904
Q3	Type-2N3906 Transistor	33-2N3906
Q4	Type-2N3904 Transistor	34-2N3904
Q5	Type-2N3906 Transistor	33-2N3906
Q6, Q7	Type-2N3904 Transistor	34-2N3904
Q8	Type-2N3906 Transistor	33-2N3906
Q9, Q10	Type-2N3904 Transistor	34-2N3904
Q11	Type-2N3906 Transistor	33-2N3906
Q12	Type-2N3904 Transistor	34-2N3904
	Resistors	
R1	150 Ω, ±5%, ¼ W Resistor	110000-151
R2	10K Ω, ±5%, ¼ W Resistor	110000-103
R4	68 Ω, ±5%, ¼ W Resistor	110000-680
R17, R18	220 Ω, ±5%, ¼ W Resistor	110000-221
R19	1K Ω, ±5%, ¼ W Resistor	110000-102
R20	120 Ω, ±5%, ¼ W Resistor	110000-121
R21, R22	180 Ω, ±5%, ¼ W Resistor	110000-181
R23	220 Ω, ±5%, ¼ W Resistor	110000-221
R24	470 Ω, ±5%, ¼ W Resistor	110000-471
R25	1K Ω, ±5%, ¼ W Resistor	110000-102
R26	2 Ω, ±5%, ¼ W Resistor	110000-202
R27	150 Ω, ±5%, ¼ W Resistor	110000-151

Video PCB Assembly
Parts List, Continued

Designator	Description	Part No.
R28	3.9K Ω, ±5%, ¼ W Resistor	110000-392
R29	390 Ω, ±5%, ¼ W Resistor	110000-391
R30	68 Ω, ±5%, ¼ W Resistor	110000-680
R31	470 Ω, ±5%, ¼ W Resistor	110000-471
R32	68 Ω, ±5%, ¼ W Resistor	110000-680
R33	10 Ω, ±5%, ¼ W Resistor	110000-100
R34	620 Ω, ±5%, ¼ W Resistor	110000-621
R35	1.2K Ω, ±5%, ¼ W Resistor	110000-122
R36	2.4K Ω, ±5%, ¼ W Resistor	110000-242
R37	5.1K Ω, ±5%, ¼ W Resistor	110000-512
R38	820 Ω, ±5%, ¼ W Resistor	110000-821
R39	10K Ω, ±5%, ¼ W Resistor	110000-103
R40, R41	160 Ω, ±5%, ¼ W Resistor	110000-161
R42	390 Ω, ±5%, ¼ W Resistor	110000-391
R43	68 Ω, ±5%, ¼ W Resistor	110000-680
R44	470 Ω, ±5%, ¼ W Resistor	110000-471
R45	68 Ω, ±5%, ¼ W Resistor	110000-680
R46	10 Ω, ±5%, ¼ W Resistor	110000-100
R47	620 Ω, ±5%, ¼ W Resistor	110000-621
R48	1.2K Ω, ±5%, ¼ W Resistor	110000-122
R49	2.4K Ω, ±5%, ¼ W Resistor	110000-242
R50	5.1K Ω, ±5%, ¼ W Resistor	110000-512
R51	820 Ω, ±5%, ¼ W Resistor	110000-821
R52	10K Ω, ±5%, ¼ W Resistor	110000-103
R53	160 Ω, ±5%, ¼ W Resistor	110000-161
R54	390 Ω, ±5%, ¼ W Resistor	110000-391
R55	68 Ω, ±5%, ¼ W Resistor	110000-680
R56	470 Ω, ±5%, ¼ W Resistor	110000-471
R57	68 Ω, ±5%, ¼ W Resistor	110000-680
R58	10 Ω, ±5%, ¼ W Resistor	110000-100
R59	620 Ω, ±5%, ¼ W Resistor	110000-621
R60	1.2K Ω, ±5%, ¼ W Resistor	110000-122
R61	2.4K Ω, ±5%, ¼ W Resistor	110000-242
R62	5.1K Ω, ±5%, ¼ W Resistor	110000-512
R63	820 Ω, ±5%, ¼ W Resistor	110000-821
R64	10K Ω, ±5%, ¼ W Resistor	110000-103
R65–R76	1K Ω, ±5%, ¼ W Resistor	110000-102
R77	0 Ω, ±5%, ¼ W, Resistor	110005-001
R78	220 Ω, ±5%, ¼ W Resistor	110000-221
R79	270 Ω, ±5%, ¼ W Resistor	110000-271
R80	270 Ω, ±5%, ¼ W Resistor	110000-271
RN1, RN2	680 Ω × 7 SIP Resistor Network	118007-681
HSYNC, VSYNC	0 Ω, ±5%, ¼ W, Resistor	110005-001
Miscellaneous		
CR1	Diode, Light-Emitting, MV5053	38-MV5053
Y1	Crystal, 32 MHz	144003-002
	Terminal, Fast-On Tab (Acceptable subsitute is Test Point, part no. 020670-001)	179051-002

Figure 5-11   Audio II PCB Assembly
A043661-01   B

Audio II PCB Assembly
Parts List

Designator	Description	Part No.
	Capacitors	
C1–C5	3300 μF, 25 V Radial Electrolytic Capacitor	123003-338
C6–C12	.1 μF, 50 V Ceramic Capacitor	122002-104
C13–C14	22 μF, 35 V Electrolytic Capacitor	24-350226
C15–C18	.22 μF, 25 V Ceramic Capacitor	122006-224
C19–C20	.001 μF, 50 V Ceramic Capacitor	122002-102
C21–C23	.1 μF, 50 V Ceramic Capacitor	122002-104
	Diodes	
CR1–CR4	Type-1N5401 Diode	31-1N5401
CR5–CR10	Type-1N4001 Diode	31-1N4001
CR13	Type-1N4002 Diode	31-1N4002
	Connectors	
JACDC	Key 2, 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
Q3	Standup Type-7815 Integrated Circuit	37-7815
	Resistors	
R1	10 kΩ, Dual Horizontal Pot Resistor	119011-103
R3	10 Ω, ±5%, ¼ W Resistor	110000-100
R4–R7	22 kΩ, ±5%, ¼ W Resistor	110000-223
R8–R9	10 kΩ, ±5%, ¼ W Resistor	110000-103
R10–R11	1 kΩ, ±5%, ¼ W Resistor	110000-102
R12–R13	1 Ω, ±5%, ¼ W Resistor	110000-010
R14	0 Ω, ±5%, ¼ W Resistor	110005-001
	Miscellaneous	
SW1	SPDT Miniature Slide Self-Test Switch	69-004
TP28–TP29	#6-32 × 3/8-Inch Cross-Recessed Pan-Head Screw	72-1606S
TP28–TP29	#6-32 Nut/Washer Assembly	75-99516
TP28–TP29	Thermal Compound	78-16001
TP28–TP29	Type-TDA-230 Heat Sink	178190-032
TP101	#4-40 × 3/8-Inch Cross-Recessed Pan-Head Screw	72-1406S
TP101	#4-40 Nut/Washer Assembly	75-99514
TP101	Thermal Compound	78-16001
TP101	Type-7815 Heat Sink	178190-124
	Hot Melt Adhesive	106006-001
	Test Point	179051-001

N O T E S

Kit Installation

Your Championship Sprint™ game uses the System II™ cabinet designed to accept the necessary hardware to easily convert the cabinet into a variety of games. This chapter contains information that applies to those parts of your existing System II cabinet that are added or replaced to convert the cabinet to a Championship Sprint game. (See Figure 6-1.) The conversion instructions include: (1) replacing the attraction film, control panel, and some integrated circuits (ICs) on the game printed-circuit board (PCB); (2) installing the foot pedal assembly and the cabinet control harness assembly, and (3) cleaning the video display. See Figure 6-1 for the locations of the parts of the System II cabinet that are replaced, installed, and cleaned.

Wiring and schematic diagrams for the Championship Sprint game are contained in the Schematic Package Supplement (SP-292) included with your game.
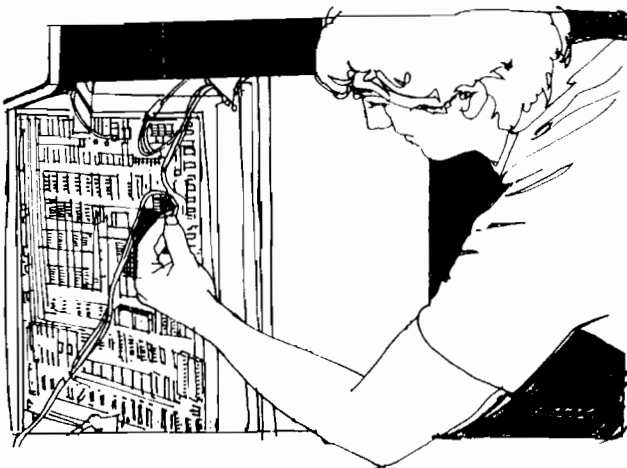
System II Paperboy™ games located in the field were built with a different power supply, Audio PCB, and utility panel than the System II Championship Sprint games. Refer to Chapter 5, Illustrated Parts List, in the *Paperboy Operators Manual* (TM-275) for information regarding these components. The figure number in the manual and the part number for each of these components follow:

Figure No.	Part No.	Component
5-5	A037671-16	Linear Power Supply
5-6	A043146-01	Utility Panel
5-12	A043046-01	Regulator/Audio III PCB
Refer to CO-275-01 Supplement	A043785-xx	Sierracin 5-Volt Power Supply

For the wiring and schematic diagrams, refer to the *Paperboy Schematic Package Supplement* (SP-275) and the *Sierracin 5-Volt Power Supply Supplement* (CO-275-01).

NOTE

If you do not have the Paperboy manual or the supplements, use the form in the back of this manual to obtain a free copy.

6-2

Product Identification Label

CPU PCB Components Kit

Cabinet Control Harness

Attraction Film

Self-Test Label

Control Panel Assy
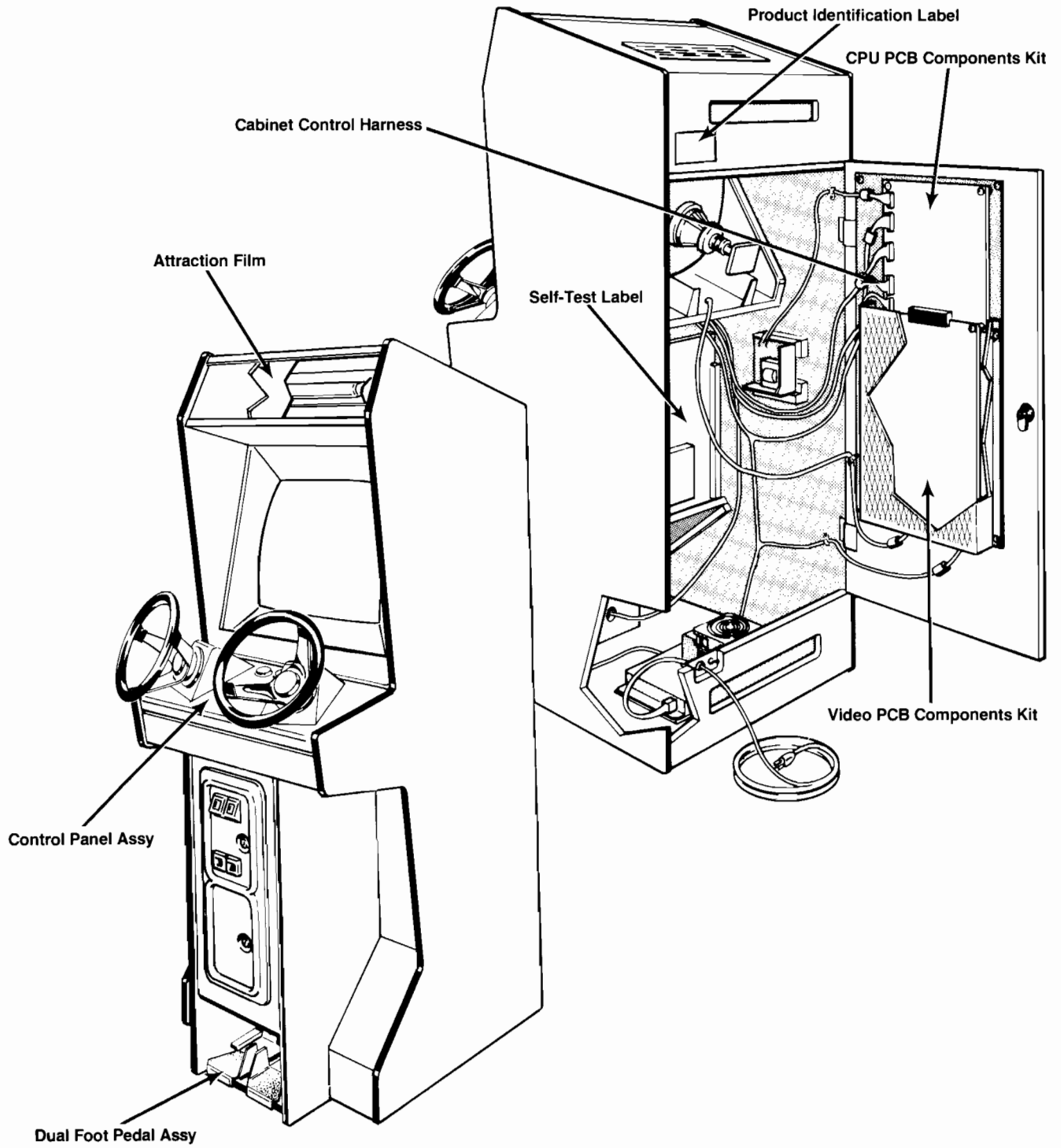
Video PCB Components Kit

Dual Foot Pedal Assy

Figure 6-1 Kit Part Locations

Kit Parts Inventory

The assemblies listed in Table 6-1 are included in the Championship Sprint Conversion Kit. Refer to Chapter 5, Illustrated Parts List, for a description of the component parts comprising the control panel, foot pedals, CPU PCB assembly, and Video PCB assembly listed in Table 6-1.

Tools Required

The only tools required to perform a complete Championship Sprint conversion are a Phillips screwdriver, 1/8-inch hex driver, 7/16-inch nut driver, 9/16-inch open-end wrench, chip extractor tool, flat black paint, and Scotch tape (or stapler). (A 3/8-inch wrench is also required if your game has a vertically mounted video display.)

Conversion Instructions

Table 6-1 Championship Sprint Kit Parts Inventory A043726-xx

Part No.	Quantity	Description
A043692-02	1	Control Panel Assembly
A043708-01	1	Cabinet Control Harness Assembly
A043734-01	1	Video PCB Components Kit
A043735-01	1	CPU PCB Components Kit
A043745-01	1	Foot Pedal Assembly
175005-004	1	.406 I.D. × 1.25 O.D. Wide-Pattern Flat Washer
75-5524B	2	#1/4-20 × 1½-Inch Black Square-Neck Round-Head Carriage Bolt
75-7002	2	#1/4 Special Fender Flat Washer
75-99515	2	#1/4-20 Nut/Washer Assembly
75-99519	2	#3/8-16 Nut/Washer Assembly
038158-01	1	Product Identification Label (Non-UL)
043729-01	1	Attraction Film With Graphics
SP-292	1	Schematic Package Supplement
ST-292	1	Self-Test Label
TM-292	1	Operators Manual

⚠ WARNING ⚠

To avoid electrical shock, unplug the game before performing the conversion procedures.

The following procedures are arranged in the sequence recommended for performing the game conversion. The parts of your cabinet that are affected by the conversion are removed first and then replaced by the new Championship Sprint kit parts.

NOTE

The following conversion should be performed by qualified service personnel.

Replace the Attraction Film

Perform the following procedure to remove/replace the existing attraction film with the Championship Sprint attraction film. (See Figure 6-2).

1. Turn off the game power.

2. Using a 1/8-inch hex driver, remove the three screws and washers holding the upper retainer to the top of the cabinet.

3. Grasp the top edge of the existing attraction film behind the attraction shield and slide it up to remove.
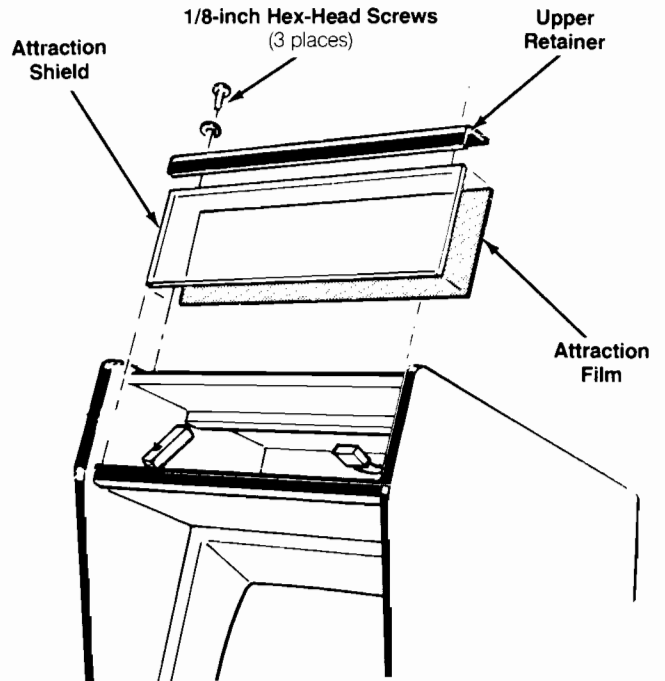

Figure 6-2 Attraction Film Replacement

4. Install the Championship Sprint attraction film. Make sure the film is fully inserted into the bottom slot.

5. Remount the upper retainer.

Replace the Control Panel

Perform the following procedure to remove/replace the existing control panel with the Championship Sprint control panel. (See Figure 6-3).

1. Using a 1/8-inch hex driver, loosen the two screws holding the lower retainer to the cabinet.

2. Unlock and open the coin door on the front of the cabinet.

3. Carefully reach up through the coin door opening and release the spring draw latches located under the control panel on both sides of the cabinet.

4. Using a 1/8-inch hex driver, remove the two screws and washers holding the front of the control panel to the cabinet.

5. Gently lift the front of the control panel until the front edge clears the cabinet.

6. Carefully slide the top edge of the control panel from under the lower retainer.

7. Lift the control panel from the cabinet just far enough to expose the control-panel harness connector.

8. Disconnect the player control harness connector and remove the control panel from the cabinet.

9. Install the Championship Sprint control panel in the reverse order of removal.

Install the Cabinet Control Harness

Perform the following procedure to install the cabinet control harness. (See Figure 6-1.)

1. Remove the existing control harness.

2. Plug the cabinet control harness connectors P102, P106, and P103 into the CPU PCB at J102, J106, and J103, matching keyed connectors with keyed PCB headers.

3. Route the harness along the existing cabinet harness and attach both together with two twist cable ties.

4. Plug the 12-position harness connector P24 into the control panel harness connector.

5. Plug the 6-position harness connector P25 into the foot pedal harness connector after the foot pedals have been installed.

6. Connect the two green ground wires to the corner mounting screw located at the edge of the switching/linear power supply chassis.

7. Mount the harness to the cabinet right side panel with screws at the screw-down tie-wrap locations.

Clean the Video Display Glass

Static electricity attracts dust to the video display glass and can cause the video image to grey out, making the
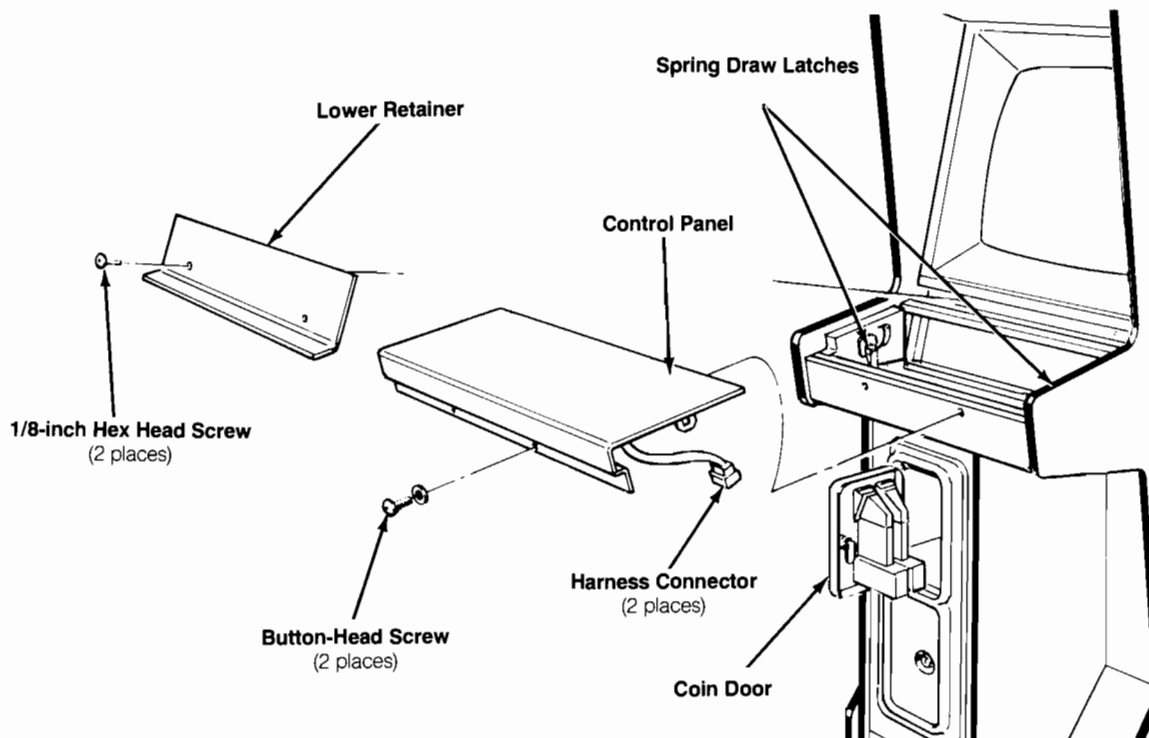

Figure 6-3 Control Panel Replacement

screen colors appear faded. In order to prevent this from happening, the video display glass must be cleaned. Perform the following procedure to clean the display glass.

1. Using a 1/8-inch hex driver, remove the two screws holding the lower retainer to the cabinet.

2. Grasp the display shield on the bottom edge and gently pull it out about one half inch from the cabinet.

3. Gently lower the display shield to free the top edge from under the speaker grille.

4. Using a glass cleaner, clean the display glass and the monitor screen. Be sure to avoid spraying the bezel.

5. Replace the display shield in the reverse order of removal.

Install the Foot Pedals

Dual foot pedals are used in the Championship Sprint game. Perform the following procedure to install the foot pedals.

1. Using a Phillips screwdriver, remove the four screws holding the pedestal front panel to the cabinet. Remove the front panel.

2. Using a Phillips screwdriver, remove the two screws from both mounting cleats inside the pedestal side panels. Remove the cleats.

3. Paint any unfinished surfaces within the pedestal enclosure with flat black paint.

4. After the paint has dried, insert the foot pedals into the pedestal enclosure opening. Be sure the foot pedal harness is inserted first into the rear enclosure wall opening. Then fasten the foot pedals to the rear enclosure wall with two carriage bolts. Be sure that the bottom of the adjustable glide protrudes through the hole at the front of the pedal frame.

5. Using a 9/16-inch open-end wrench, tighten the nut and washer of the glide. (The nut and washer are supplied in the kit.) From the rear of the cabinet, using a 7/16-inch nut driver, tighten the two nuts and washers of the bolts.

6. Connect the foot pedal harness to the cabinet control harness inside the rear of the cabinet.

7. Using the existing Phillips screws, mount the pedestal front panel and two cleats on the inner rear cabinet wall opposite the rear access panel for future use.

IC Kit

A new set of 28 integrated circuits (ICs) has been designed for your Championship Sprint Game PCBs. Table 6-2 lists the ICs and their locations on the CPU and the Video PCBs.

Location of Replacement ICs

The CPU PCB Assembly and the Video PCB Assembly showing the location of each IC to be added, deleted, or replaced are included in this manual. (See Figures 6-4 and 6-5.) Each IC location is marked with the letter A, D, or R.

> A represents an EPROM to be added
> D represents an EPROM to be deleted
> R represents an EPROM to be replaced

Install the Game ICs

Perform the following procedure to install the new integrated circuits (ICs).

▲ WARNING ▲

To avoid electrical shock, unplug the game before performing the conversion procedures if you have not already done so.

---

1. Unlock and open the rear access panel.

2. Remove the four thumb nuts holding the EMI cover to the ground plane. (See Figure 3-4.)

3. Refer to the CPU PCB Assembly and Video PCB Assembly, and determine the location of the ICs to be replaced, added, and removed. (See Figures 6-4 and 6-5.)

NOTE

Slide a block of wood or similar device behind the PCBs to prevent the PCBs from bending excessively when installing the ICs.

---

4. Locate each IC to be replaced or removed, and remove each with a chip extractor tool.

5. For each replacement IC, align all of the pins on one side of the chip, and bend that row inward so that it is parallel to the other row. Carefully insert the chip into the proper socket on the game PCB, making sure the orientation notch faces the correct direction. (The notch differs on the CPU PCB and the Video PCB.)

6. Then locate each new IC to be added, and insert each in its correct socket.

7. Install the CPU PCB label (Atari part no. 043754-01) and the Video PCB label (Atari part no. 043753-01) on the respective PCBs.

8. Reinstall the EMI cover, and connect all the harness connectors.

Table 6-2 Integrated Circuits in Championship Sprint Conversion Kit

Designator	Description	Part No.
	ICs on Championship Sprint CPU PCB:	
	Basic Set of ICs:	
2B/C	300 ns Type-27128 EPROM Integrated Circuit	136045-x118
2D	300 ns Type-27128 EPROM Integrated Circuit	136045-x119
4M	SLAPSTIC Custom Integrated Circuit	137412-109
6K	300 ns Type-27256 EPROM Integrated Circuit	136045-x124
6L	300 ns Type-27256 EPROM Integrated Circuit	136045-x123
6R	300 ns Type-27256 EPROM Integrated Circuit	136045-x121
6S	300 ns Type-27256 EPROM Integrated Circuit	136045-x120
	U.S. Set of ICs:	
6F	300 ns Type-27256 EPROM Integrated Circuit	136045-x125
6N	300 ns Type-27256 EPROM Integrated Circuit	136045-x122
7L	300 ns Type-27128 EPROM Integrated Circuit	136045-x126
7N	300 ns Type-27128 EPROM Integrated Circuit	136045-x127
	German Set of ICs:	
6F	300 ns Type-27256 EPROM Integrated Circuit	136045-x225
6N	300 ns Type-27256 EPROM Integrated Circuit	136045-x222
7L	300 ns Type-27128 EPROM Integrated Circuit	136045-x226
7N	300 ns Type-27128 EPROM Integrated Circuit	136045-x227
	ICs on Championship Sprint Video PCB:	
6A	200 ns Type-27256 EPROM Integrated Circuit	136045-x105
6B	200 ns Type-27256 EPROM Integrated Circuit	136045-x106
6C	200 ns Type-27256 EPROM Integrated Circuit	136045-x107
6D/E	200 ns Type-27256 EPROM Integrated Circuit	136045-x108
6F/H	200 ns Type-27256 EPROM Integrated Circuit	136045-x109
6H/J	200 ns Type-27256 EPROM Integrated Circuit	136045-x110
6K	200 ns Type-27256 EPROM Integrated Circuit	136045-x111
6L	200 ns Type-27256 EPROM Integrated Circuit	136045-x112
6M	200 ns Type-27256 EPROM Integrated Circuit	136045-x113
6N	200 ns Type-27256 EPROM Integrated Circuit	136045-x114
6P/R	200 ns Type-27256 EPROM Integrated Circuit	136045-x115
6R/S	200 ns Type-27256 EPROM Integrated Circuit	136045-x116
6T	200 ns Type-27128 EPROM Integrated Circuit	136045-x117
7A	200 ns Type-27512 EPROM Integrated Circuit	136045-x101*
7B	200 ns Type-27256 EPROM Integrated Circuit	136045-x102
7C	200 ns Type-27256 EPROM Integrated Circuit	136045-x103
7D/E	200 ns Type-27512 EPROM Integrated Circuit	136045-x104*

*A 250 ns speed EPROM can be substituted if necessary
"x" in the part number denotes the revision level

NOTE

Some of the IC sockets might be left empty since the System II game PCBs are designed to accommodate different ICs for a variety of games.

NOTE

The coin and credit option settings and the game option settings must be reset for the Championship Sprint kit conversion.

Reset the Coin and Credit and Game Option Settings

The settings are reset with the two dual-in-line package (DIP) switches at locations 6/7A and 5/6A on the CPU PCB. (See Figure 1-2.) Each set of DIP switches contains
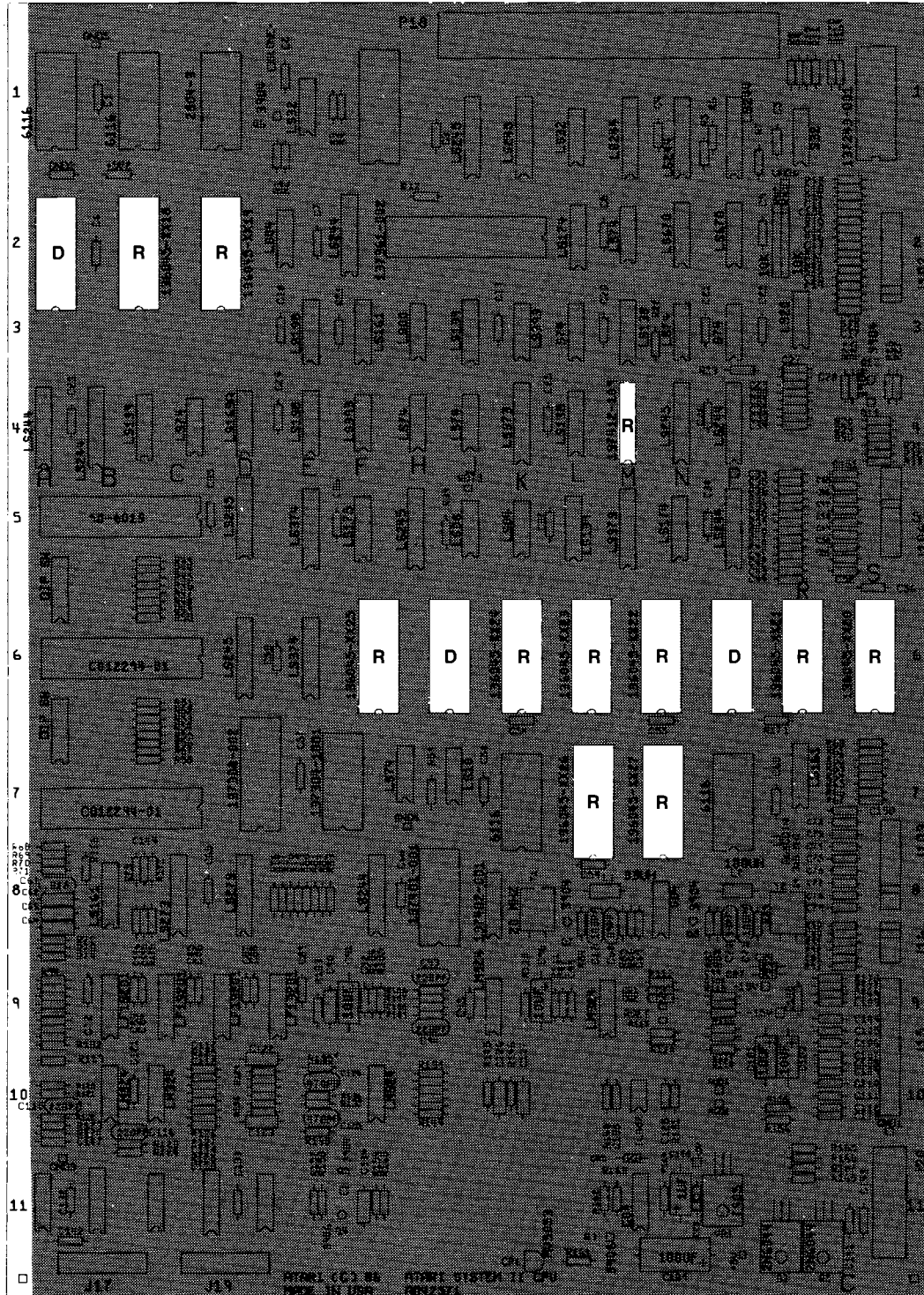
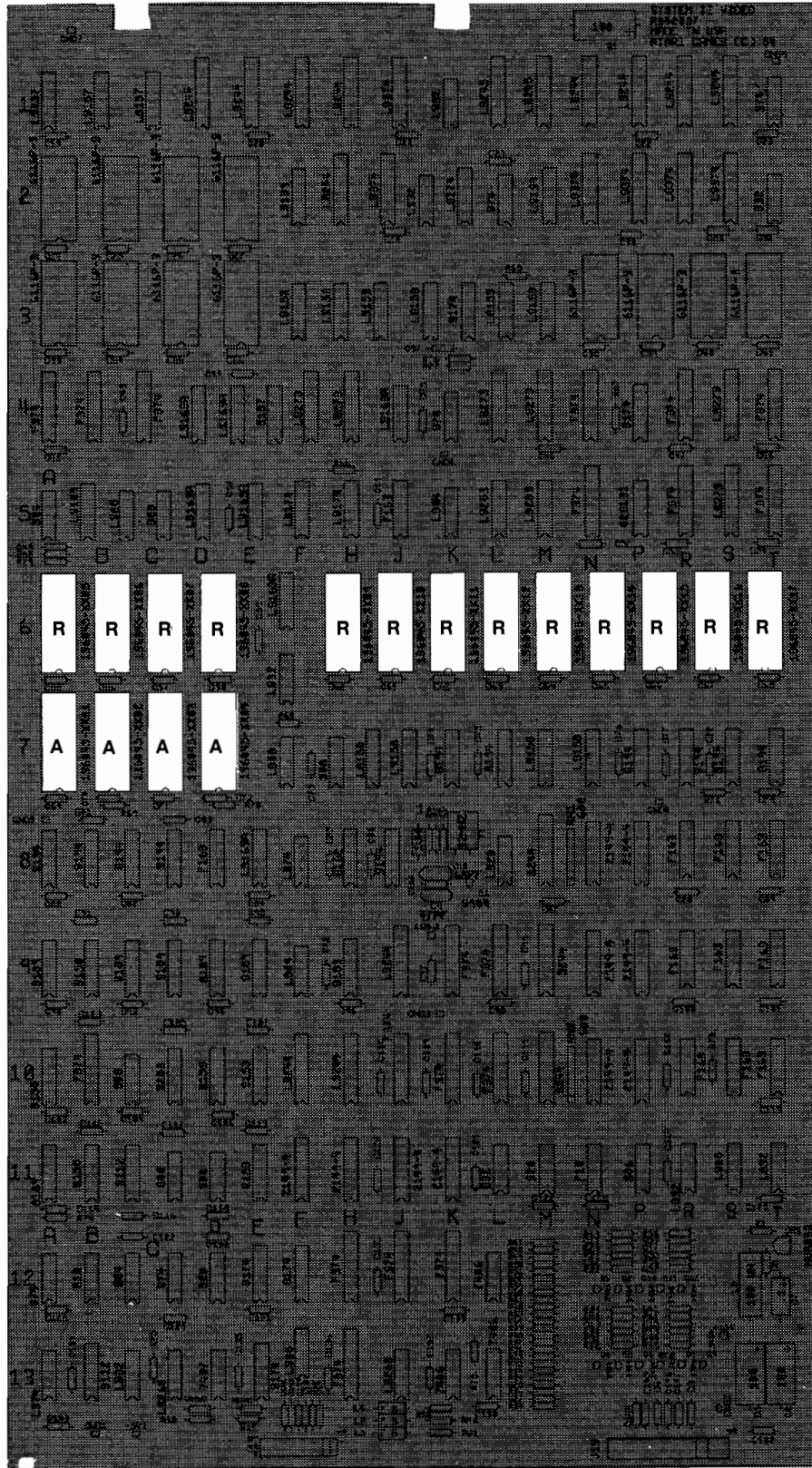**Figure 6-4 Installing ICs into CPU PCB Assembly**

Figure 6-5   Installing ICs into Video PCB Assembly

eight switches. Perform the following procedure to reset the option settings.

1. Remove the thin film of plastic covering the option switch, if any remains.

2. Using a pen or sharp-pointed instrument, slide the appropriate small button to the left or *off* position. (The steering wheel controls and the pushbuttons are *not* used to change this setting.)

Refer to Tables 1-2 and 1-3 in this manual for the available options and default (recommended) settings.

Install the Self-Test Label

Staple or tape the Championship Sprint Self-Test Label to the inner rear cabinet wall opposite the rear access door.

Install the Product Identification Label

Perform the following procedure to install the Championship Sprint product identification label.

1. Remove the protective backing from the Championship Sprint product identification label.

2. Place the Championship Sprint product identification label over the existing product identification label on the back of the cabinet.

Inspect the Game

Before applying power, perform the following inspection procedure.

1. Carefully check that the Championship Sprint conversion kit parts have been properly installed. Check that all the ICs are inserted properly with the orientation notch facing the correct direction. (Inserting an IC backwards can destroy the IC.) Make sure that the control-panel harness connector is tightly connected to the cabinet control harness connector, and that the spring draw latches under the control panel are securely fastened.

2. Plug in the game power cord.

3. Perform the self-test procedure as given in Chapter 2. Be sure that all of the DIP switches on the CPU PCB

have been properly set. Refer to Tables 1-2 and 1-3 in this manual for the available options and the default (recommended) settings.

4. Be sure to recalibrate each foot pedal. Refer to *Calibration Procedure* in Chapter 2.

5. Be sure to reset the high score table and the accounting information. Refer to the procedure in *Reset the High Score Table and the Accounting Information* later in this chapter.

6. Close and lock the rear access panel.

Reset the High Score Table and the Accounting Information

The high score table and the accounting information, or game statistics, must be reset after completing the conversion to ensure accurate game data. This information is displayed on the Accounting Information screen in the Self-Test Mode. (Refer to *Accounting Information* in Chapter 2.) Perform the following procedure to reset this information.

1. Enter the Self-Test Mode by turning on the self-test switch, and press the red start (right) button until the Accounting Information screen is displayed.

2. Rotate the left steering wheel to select *RESET HIGH SCORE TABLE.*

3. Press the blue car button to change the *NO* message to *YES*.

4. Press the red start button to reset the high score table. After a brief *PLEASE WAIT* message is displayed, the self-test automatically advances to the next screen.

5. Press the red start button until the Reset Saved Info Screen is displayed again. Rotate the left steering wheel to select *RESET ACCOUNTING INFO*.

6. Press the blue car button to change the *NO* message to *YES*.

7. Press the red start button to reset the accounting information. After a brief *PLEASE WAIT* message is displayed, the self-test automatically advances to the next screen.

NOTES

Form to Obtain Free Paperboy™ Manual, Schematic Package Supplement, and/or 5V Sierracin Power Supply Supplement

System II™ Paperboy games located in the field were built with a different power supply, Audio PCB, and utility panel than most of the System II Championship Sprint™ games. The *Paperboy Operators Manual* (TM-275) has part number information on these components. The wiring and schematic diagrams are printed in the *Paperboy Schematic Package Supplement* (SP-275) and the *Sierracin 5-Volt Power Supply Supplement* (CO-275-01).

If you do not have this manual or the supplements, you can obtain one free copy of each one that you need. To receive your free copy(ies), please fill in the information required below and mail this postage-paid form to us.

Publication(s) you need: ☐ Paperboy Operators Manual, TM-275

☐ Paperboy Schematic Package Supplement, SP-275

☐ Sierracin 5V Power Supply Supplement, CO-275-01

Championship Sprint game kit serial no. _____

Game purchased from _____State _____

Your phone no. (_____) _____

Please print!

Firm _____

Your name _____

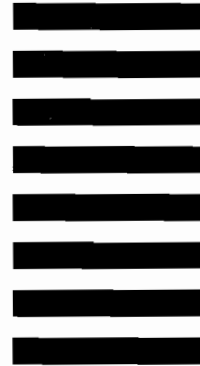Street _____

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Second Fold

From: _____

_____

_____

_____

Championship Sprint™
Coin Information and Game Statistics
Date: _____

NOTE

Advance screens in the Self-Test Mode by pressing the red start (right) button.

Accounting Information

Left Coins	_____	Number of coins deposited in left coin mechanism	Total Games	_____	Total number of coins deposited in all coin mechanisms
Right Coins	_____	Number of coins deposited in right coin mechanism	Total Game Time	_____	Accumulated time of all 1- or 2-player games played in hours, minutes, and seconds
Add-A-Coins	_____	Total number of coins deposited in all coin mechanisms during add-a-coin mode only	Average Game Time	_____	Total game time divided by total games in hours, minutes, seconds
1 Player Heats	_____	Total number of heats/races run with 1 player only	Total On Time	_____	Total time in hours, minutes, and seconds that the game was turned on
2 Player Heats	_____	Total number of heats/races run with 2 players	Total Play Time	_____	Total time in hours, minutes, and seconds that the game was played

Reset Saved Info Screen

NOTE

Use this screen only to reset high score table and accounting information.

How to reset: select item to be reset with left steering wheel. Push blue car (left) button to toggle between Yes and No. Press red start button to reset selected tables.

Reset Accounting Info?	Yes	No
Reset High Score Table?	Yes	No

Game Times*

0:30	_____	3:00	_____	5:30	_____
1:00	_____	3:30	_____	6:00	_____
1:30	_____	4:00	_____	6:30	_____
2:00	_____	4:30	_____	7:00	_____
2:30	_____	5:00	_____	7:30	_____
				8:00 & Up	_____

Note: It is possible for a limited number of players to play Championship Sprint for over eight minutes. Generally, this can occur during a 2-player game when one or two players lose frequently and continue using the add-a-coin feature. In locations where there are many highly skilled players, you should expect to see 3–7% of total games played at over eight minutes (after four weeks on location).

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:
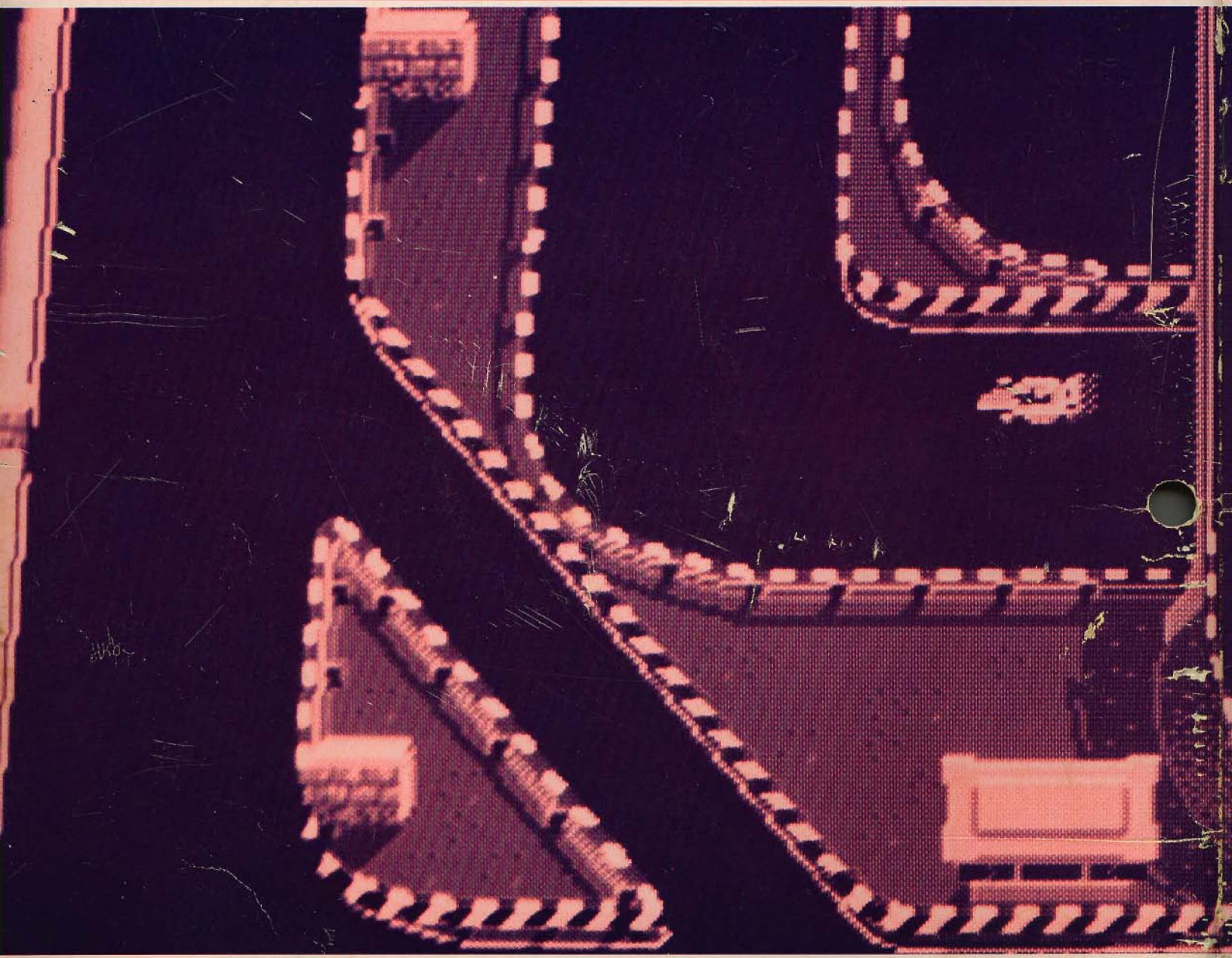
(a) Seller is promptly notified in writing upon discovery by Buyer that said products are defective;

(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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