

TX-1

Operators Manual
with Illustrated Parts Lists





Operators Manual with Illustrated Parts Lists

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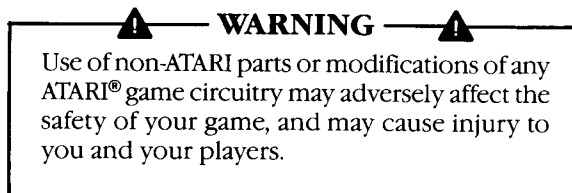
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Published by: Atari, Inc.
790 Sycamore Drive
P.O. Box 906
Milpitas, California 95035

Printed in the U.S.A. **3N**

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

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 (PCB) are properly installed within the Electromagnetic Interference (EMI) cage.
- The EMI Shield PCB is properly installed and connected in series with the game PCB harness.
- All filter capacitors required on the EMI Shield PCB are properly soldered in place.

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

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Safety Summary

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

▲ WARNING ▲

Properly Ground the Game. Players may receive an electrical shock if this game is not properly grounded! To avoid electrical shock, do not plug in the game until it has been inspected and properly grounded. This game should only be plugged into a grounded 3-wire outlet. If you have only a 2-wire outlet, we recommend you hire a licensed electrician to install a grounded outlet. Players may receive an electrical shock if the control panel is not properly grounded! After servicing any parts on the control panel, check that the grounding clip is firmly secured to the metal tab on 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 proper voltage-selection plug is installed on the game's power supply.

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

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

Handle Fluorescent Tube and CRT With Care. If you drop a fluorescent tube or 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.

Set Up

WARNING

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

This game should only be connected to a grounded 3-wire outlet. If you have only a 2-wire outlet, we recommend you hire a licensed electrician to install a grounded outlet. Players may receive an electrical shock if this game is not properly grounded.

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

This manual, written for game operators and service technicians, describes your new ATARI game.

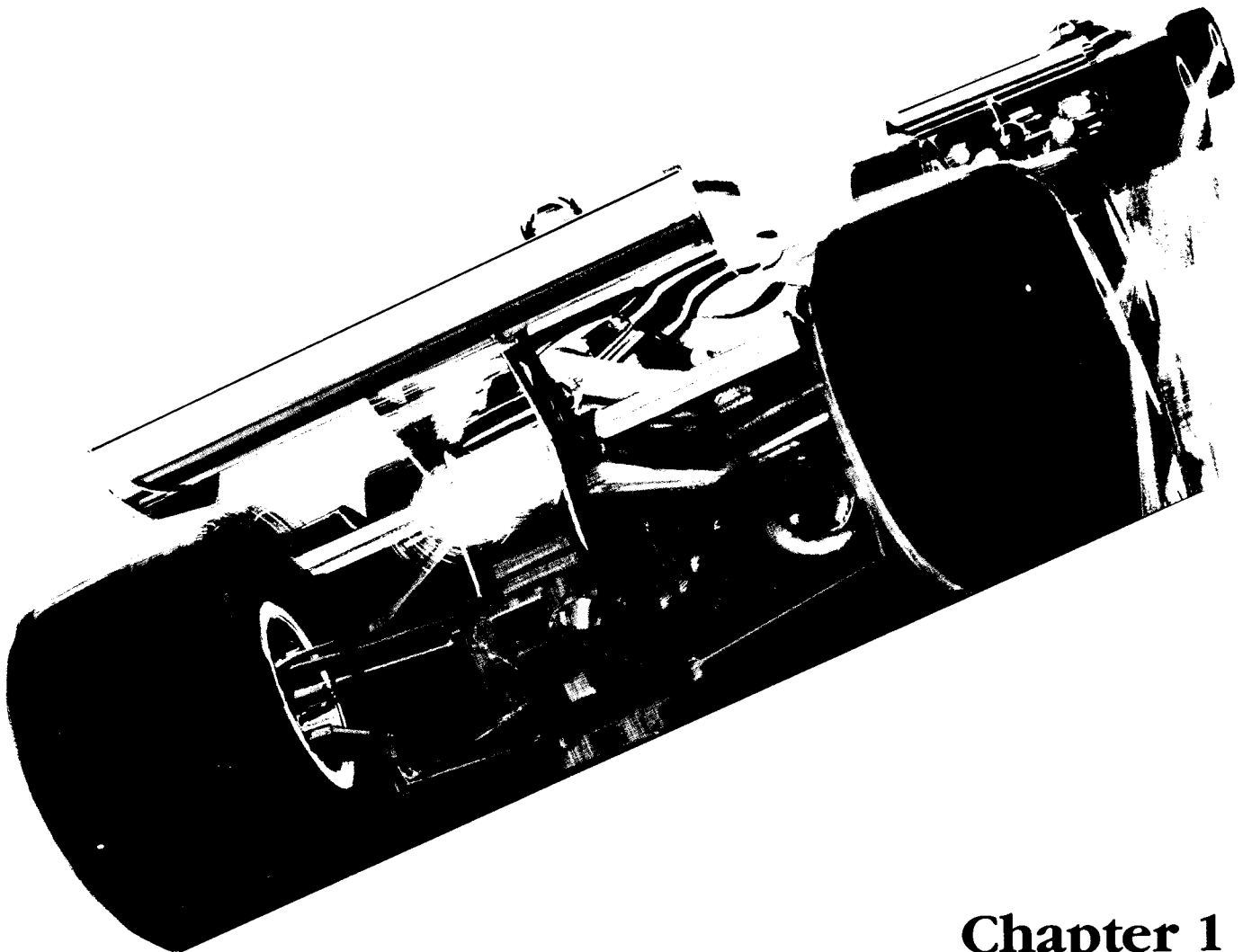
Chapter 1 contains game assembly and inspection procedures, game specifications, switch information, and option information.

Chapter 2 contains self-test procedures.

Chapter 3 contains maintenance and repair procedures for the steering wheel, gear shifter, and foot-pedal assembly.

Chapter 4 contains illustrated parts lists.

Schematic diagrams of the game circuitry are included as a supplement to this manual.



Chapter 1

Game Overview

TX-1* is a sensational new driving game for one player. With three video displays, the player is literally surrounded by the game graphics. TX-1 game graphics and sounds are so realistic that the player experiences the dangers of real speedway racing. Depending upon the course selected, the race takes place in cities, mountains, or snow country. The player's goal is to increase his skill and speed on each speedway course, and finish the three main stages of the game.

New Features

TX-1's new features are:

- Three video displays show the action of demanding and challenging speedways.
- Four-channel sound simulates the realistic sounds of driving a race car.

Installation

TX-1 is shipped from the factory in three sections: the main cabinet assembly, seat assembly, and the header assembly. The main cabinet assembly contains the video displays, coin door, player controls, power supplies, one speaker, four fluorescent tubes, and game printed-circuit boards (PCBs). The seat assembly includes the seat and three speakers. The header assembly rests between the main and seat assemblies, and encases four fluorescent tubes and two attraction panels.

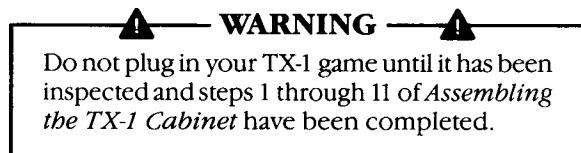


Table 1-1 Installation Specifications

Characteristic	Specification
Power Consumption	500 W Nominal
Temperature	+5° to +38° C (+37° to +100° F)
Humidity	Not to exceed 95% relative
Line Voltage	100 to 132 VAC (or 200 to 264 VAC)
Width	55 in. (139.7 cm)
Length	73 in. (184.9 cm)
Height	71.4 in. (181.4 cm)
Weight	650 lbs. (294.8 kg)

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Inspecting the Game

Inspect your game carefully to ensure that it was delivered in good condition. Examine the exterior of each section of the game for dents, chips, or broken parts.

1. Unlock and remove the upper and lower rear access panels of the main cabinet assembly.
2. Unlock and open the coin doors. From the coin box, remove the package that contains the hardware for assembling the cabinet. Refer to Table 1-2 to check the contents of your hardware package.
3. Inspect the interior of the game as follows:
 - a. Ensure that all plug-in connectors (on the game harnesses) are firmly plugged in. Replug any connectors found unplugged. Do not force connectors together. The connectors are keyed so they only fit in the proper orientation. *A reversed edge connector may 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. See Chapter 3 for PCB removal instructions.
 - c. Remove the tie-wrap that secures the coiled power cord inside the cabinet. Inspect the power cord for any cuts or dents in the insulation. If required, repair or replace the power cord. Place the square strain-relief plate in the wood slot at the bottom of the power-cord access opening.
 - d. Inspect the power supplies. Make sure the harnesses are plugged in correctly.
 - e. Inspect other major subassemblies, such as the control panel, video displays, EMI cage, fluorescent tubes, and each PCB. Make sure they are mounted securely and that all green ground wires are firmly connected.

Table 1-2 Hardware Kit Contents

Quantity	Description
13	¼-20 × 2-Inch Machine Screw
13	¼-Inch Split Lock Washer
13	¼-Inch Fender Washer
4	#10-24 × 1-Inch Button Head Machine Screw
4	#10 Flat Washer
4	#10 Lock Washer
1	Header Attraction/Seat Cap

NOTE: All of the hardware will not be used. Extra parts have been provided.

Stabilizing the Cabinet

Before assembling your TX-1 game, stabilize the main cabinet assembly and seat assembly to prevent players from rolling the game out of position. The main cabinet assembly

has six adjustable glides and the seat assembly has four adjustable glides. Before adjusting the glides, position the seat assembly near the notch at the base of the main cabinet assembly.

To stabilize the main cabinet assembly, lift one side and place a block of wood, a book, or another object at least 2 inches thick under the raised seat assembly. Partially unscrew the glides until they extend below the casters (see Figure 1-1).

Lower the main cabinet assembly and lift the other side. Partially unscrew the adjustable glides until they extend below the casters. Lower the main cabinet assembly. Repeat the above procedure for the seat assembly and unscrew the glides approximately two inches.

Assembling the TX-1 Cabinet

We recommend that two people perform the following procedures in an area of at least 75 square feet. Refer to Figure 1-2 while assembling the game.

1. Slide out the top seat panel and remove the lower seat panel of the seat assembly.
2. Pull the speaker harness connector through the hole at the base of the seat assembly.

3. Position the seat assembly near the main cabinet assembly and connect the speaker harness to the main cabinet harness.
4. Carefully slide the seat assembly into the main cabinet assembly until the cleat on the seat assembly slides into the notch at the base of the main cabinet. Be careful not to pinch the speaker harness wire. DO NOT install the screws yet.
5. Insert the rear end of the header assembly into the opening at the top of the main cabinet (make sure the fluorescent tube harnesses are pushed aside) and lower the front end of the header assembly into the top of the seat assembly.
6. Use four 2-inch screws, fender washers, and lock washers to attach the header assembly.
7. From the back of the main cabinet assembly, use two 2-inch screws, flat washers, and lock washers to attach the rear of the header assembly to the main cabinet (through the upper access area of the main cabinet assembly).
8. Use two button-head screws, flat washers, and lock washers to install the cap on the top of the seat assembly.

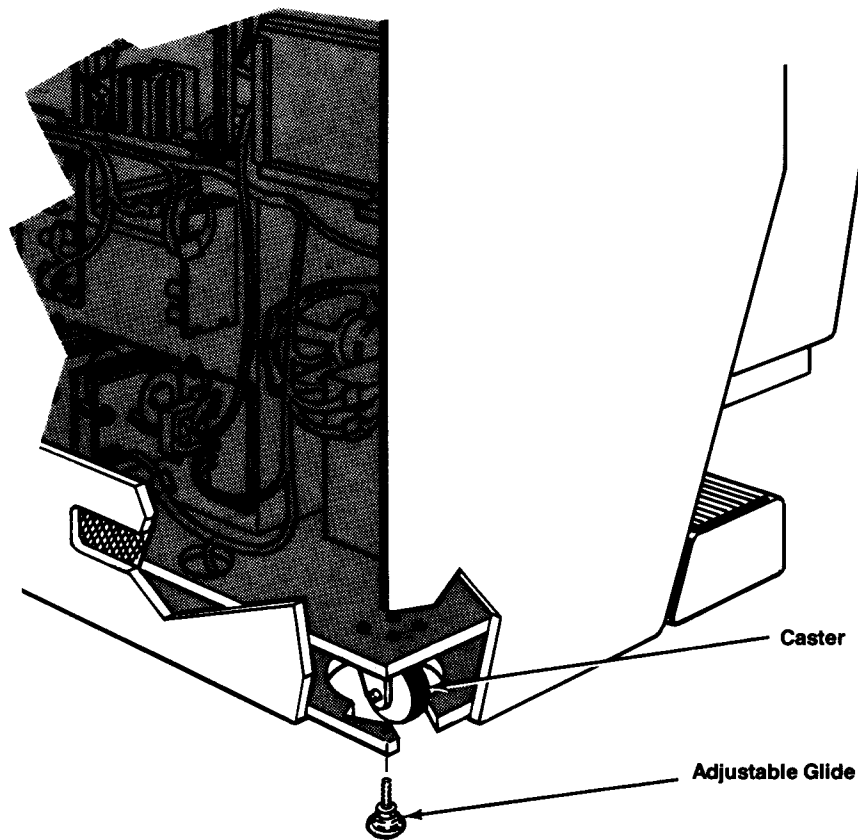


Figure 1-1 Stabilizing the Sit-Down Cabinet

9. Use three 2-inch screws, fender washers, and lock washers to secure the seat assembly to the main cabinet assembly. These screws are installed through the lower seat panel into the base of the main cabinet assembly (see Figure 1-2).
10. From inside the right attraction-panel area of the main cabinet assembly, pull the fluorescent light harness through the hole. Attach both fluorescent light harness connectors to the header assembly harness connectors.
11. Ensure that all fluorescent tubes are installed correctly. Plug the game into a **grounded** 3-wire outlet. If the fluorescent tubes light, go to the next step. If they do not, recheck the harness connectors. If necessary, replace any damaged fluorescent tube(s).
12. After you have made certain that every fluorescent tube lights, unplug the game.
13. Slide each attraction panel and decal into the groove of the header assembly.
14. Place the retainers over the attraction panels.
15. Use three 1½ -inch button-head screws, lock washers, and flat washers to secure the retainers.
16. Slide each attraction panel and decal into the lower retainer of the main cabinet assembly.
17. Place the upper retainers over the attraction panels.
18. Use three 1-inch button-head screws, lock washers, and flat washers to secure the retainers.

Switch Information

Utility Panel Switches

The volume controls, coin counter(s), self-test switch, and auxiliary coin switch are on the utility panel. The utility panel is located inside the upper coin door (see Figures 4-1

and 4-6). Each volume control adjusts the level of sound produced by one sound channel of the game. The coin counter(s) records the number of coins entered into the game. The self-test switch initiates the SelfTest Mode. The auxiliary coin switch credits the game.

Option Switches

Two dual-inline-package (DIP) switches are located on the Sound PCB at locations 6P and 8P (see Figure 4-13). Switch 6P consists of six toggle switches and switch 8P consists of eight toggle switches. Use these switches to select different pricing and game play options. See Tables 1-3 and 1-4 for option information.

Selecting the Game Options

NOTE

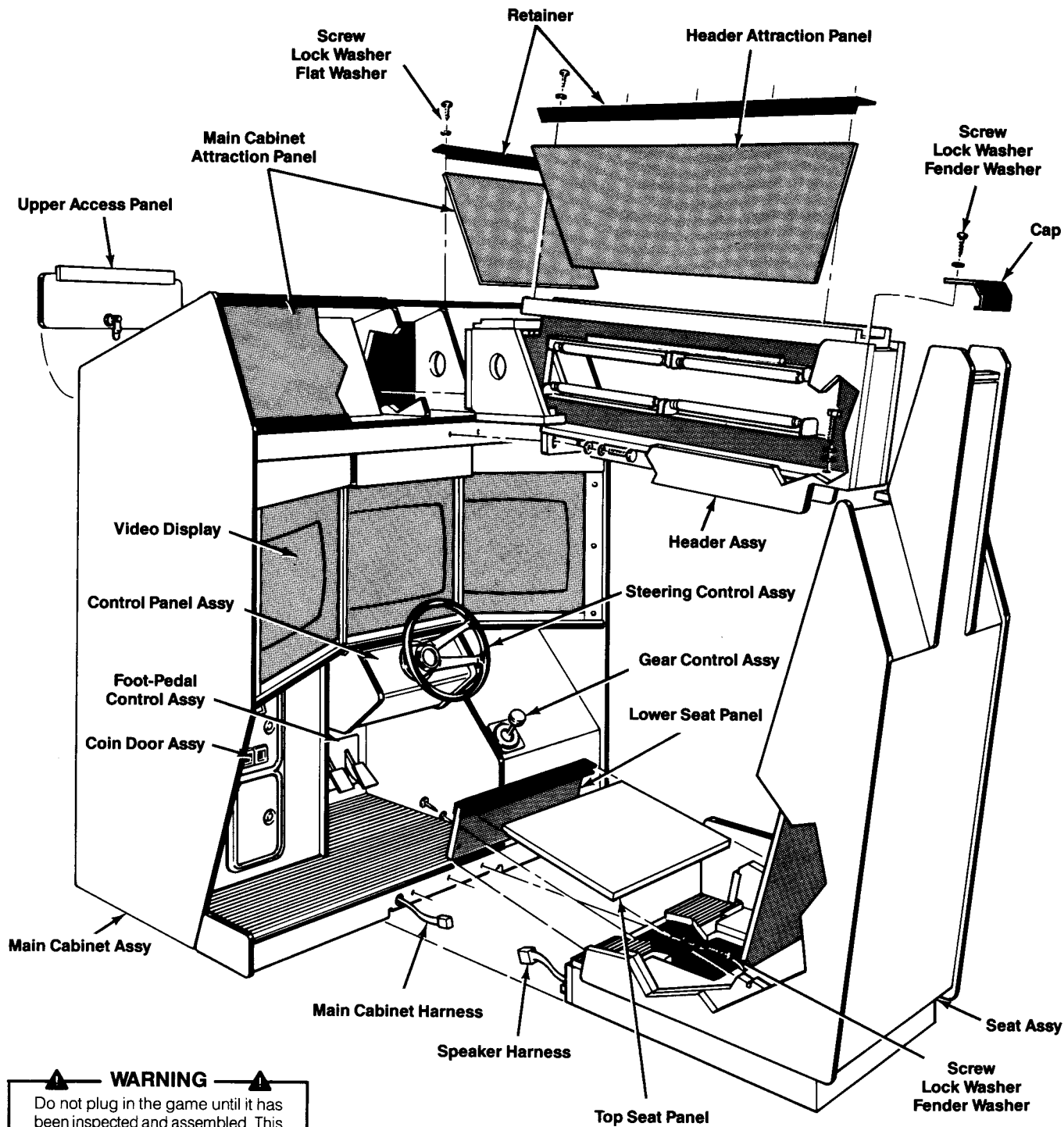
The Sound PCB is the smallest printed-circuit board enclosed in the EMI cage.

- The DIP switch at location 6P is for selecting coin and credit options. These options include credits per coin, and coin multipliers for the right and left coin mechanisms.
- The DIP switch at location 8P is for selecting game difficulty levels, seconds of play, and free play.

Options preset at our American factory are shown by the ◀ symbol. To verify option settings, refer to Chapter 2.

NOTE

If the manufacturer's recommended settings are not satisfactory for your location, you can change the game's option settings to suit your requirements.



WARNING

Do not plug in the game until it has been inspected and assembled. This game should only be connected to a grounded 3-wire outlet. If you have only a 2-wire outlet, we recommend you hire a licensed electrician to install a grounded outlet. Players may receive an electrical shock if this game is not properly grounded!

NOTE

For items with serial number labels, refer to Figure 4-1.

Figure 1-2 Assembling the Sit-Down Cabinet

Table 1-3 Switch Settings for Coin and Credit Options

Settings of 8-Toggle Switch on TX-1 Sound PCB (at location 6P)								Option
1	2	3	4	5	6	7	8	
On	On							Game Cost
Off	On							1 Coin Unit for 1 Credit
On	Off							2 Coin Units for 1 Credit
Off	Off							3 Coin Units for 1 Credit ◀
								4 Coin Units for 1 Credit
		On			Not Used	Not Used	Not Used	Left Coin Mechanism
		Off						1 Coin for 1 Coin Unit ◀
								1 Coin for 2 Coin Units
			On	On				Right Coin Mechanism
			Off	On				1 Coin for 1 Coin Unit ◀
			On	Off				1 Coin for 4 Coin Units
			Off	Off				1 Coin for 5 Coin Units
				Off				1 Coin for 6 Coin Units

Table 1-4 Switch Settings for Game Difficulty, Time, and Bonus Adder

Settings of 8-Toggle Switch on TX-1 Sound PCB (at location 8P)								Option
1	2	3	4	5	6	7	8	
On	On	On						Game Difficulty Level
Off	On	On						A (Easiest)
On	Off	On						B
Off	Off	On						C
								D ◀
On	On	Off						E
Off	On	Off						F
On	Off	Off						G
Off	Off	Off						H (Hardest)
			On	On				Game Times
			Off	On				A (Longest)
			On	Off				B
			Off	Off				C ◀
			Off	Off				D (Shortest)
					On	On	On	Bonus Adder
					Off	On	On	No Bonus
					On	Off	On	2 Coin Units for 1 Credit
					Off	Off	On	3 Coin Units for 1 Credit
					On	On	Off	4 Coin Units for 1 Credit
					Off	On	Off	5 Coin Units for 1 Credit
					On	Off	Off	4 Coin Units for 2 Credits
					Off	Off	Off	Free Play
					Off	Off	Off	No Bonus ◀

◀Manufacturer's recommended settings for American-made games

Game Play

TX-1 is a one-player game with three color raster-scan video displays. Each speedway has three main stages: First Stage, Extended Stage, and Gran Prix Stage. The player will see mountains, deserts, skyscrapers against the skyline, dark tunnels, snow country, and meadows. The player drives a red Formula-1 race car. Upon completion of each

stage, the player automatically enters the next one. Player controls consist of steering, shift, accelerator, and brake. The object of the game is to finish all three main stages.

TX-1 has four modes of operation: Attract, Play, High-Score, and Self-Test. Self-Test is a special mode for checking the game switches and computer functions. You may enter the Self-Test mode from any other mode.

Attract Mode

The Attract Mode begins either when you plug the game in or after exiting from the Play, High-Score, or Self-Test Modes. The Attract Mode ends either when the correct amount of credit is inserted, or when the Self-Test Mode is entered.

When the Attract Mode begins, the left screen displays the highest score achieved for each country. The right screen displays the eight highest overall scores. Eight countries are represented by the letters A through H. The player must finish the three main stages to get into one of the countries. The countries are:

A = Africa	E = Spain
B = U.S.A.	F = Monaco
C = Japan	G = Belgium
D = France	H = Italy

The center screen first displays the layout of Stage 1 and then simulates game play. During game-play simulation, six cars are shown at the starting line. The player drives a red Formula-1 racing car. The starting light flashes to green and the race begins. The race continues until the player's car crashes into another car and explodes. The car reappears on the screen and continues until it hits a sign on the side of the road. Again, the car explodes. During this sequence, the message *GAME OVER* appears in the center of the screen.

Play Mode

The Play Mode begins when the correct amount of coins are inserted into the coin mechanism(s). The game begins with the player's car behind the starting line with six other cars and with 70 game seconds (B setting) showing on the clock. Racing hazards include sharp turns, roadside trees, other racing cars, and road signs. As the race progresses, more cars appear on the track. If the player's car hits another car, road sign, or tree while in HI gear, his car is destroyed in an explosion and racing seconds are lost. The player's car reappears and the race continues. If the player's car hits another car while in LOW gear, he will spin out.

When approaching turns, the player must ease up on the accelerator pedal (or use the brake pedal) to make the corner. The player jockeys for position with the other racers, keeping his eye on the clock at the top center of the middle screen. When time runs out, the race is over. Upon completion of a stage, the seconds remaining are added to the next stage.

While TX-1 is in Play Mode, the right screen displays the number of cars passed, using one star to represent each passed car. The left screen displays the checkpoint map, the high score, and the player's score. The player should refer to the *TX-1 Course Maps* chart (located above the center video screen) for checkpoint and country locations.

First Stage. This stage is comprised of Stage 1. The player must complete Stage 1 in 70 game seconds (B setting) to reach the Extended Stage. At the checkpoint of the Extended Stage, the player must make a decision. If he veers to the right, the course takes him to either Spain, Monaco, Belgium, or Italy. If the player drives to the left, the course takes him to either South Africa, U.S.A., Japan, or France.

Extended Stage. This stage is comprised of Stage 2 and Stage 3. The player must complete Stage 2 in 60 game seconds (B setting) and Stage 3 in 50 game seconds (B setting). At the checkpoint of Stages 2 and 3, the player again must decide whether to go left or right.

Gran Prix Stage. This stage is comprised of Stage 4 and Stage 5. The player must drive through Stage 4 in 60 game seconds (B setting) and Stage 5 in 60 game seconds (B setting). The final checkpoint is at the end of Stage 4. At this checkpoint the player must go straight ahead to drive through Stage 5.

Hints for Game Play

- Accelerate and stay ahead of other racers.
- When cornering, stay to the inside of the track.
- When sliding, ease up on the accelerator.
- Driving off the track slows the car down.

High-Score Mode

The High-Score Mode begins when a player has earned one of the highest scores. The player has ten seconds to record his initials. A player rotates the steering wheel to locate his initial and presses the accelerator pedal to place his initial on the screen. The third time the pedal is pressed, his initials are transferred into the High-Score Table.

Self-Test Mode

NOTE

If TX-1 has a hardware failure, immediately after applying power to the game, the center screen displays the name and location of the faulty component. The display will remain frozen until the faulty component is replaced. Refer to Chapter 2 for further information.

The Self-Test Mode can be entered from all other game modes by pressing the self-test switch on the utility panel. Self-Test allows checking of game switches, potentiometer adjustments, hardware failures, and video-display adjustments. See Chapter 2 for complete self-test information.

Self-Test Procedure

This game will test itself and provide data to show that the game circuitry and controls are operating properly. Self-test data is presented visually on the video display and audibly through the speakers. No additional equipment is required.

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



Chapter 2

Performing the Self-Test

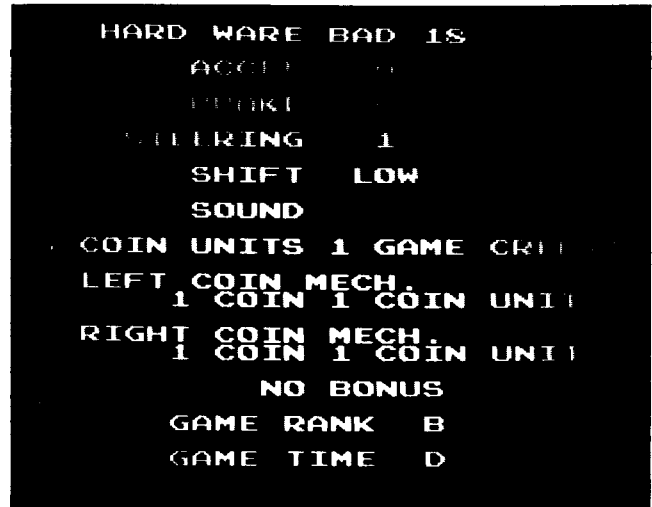
NOTE

The TX-1 game will automatically perform a self-test when the game power is first applied. If a fault occurs, the center display indicates *HARDWARE ERROR* with a *STATUS* number. The right display indicates fault location information as discussed in the following Self-Test Mode description. Refer to the description for Screen 1 to determine which random-access memory (RAM) or read-only memory (ROM) circuit failed. The game will continue to indicate an error until the faulty circuit is repaired.

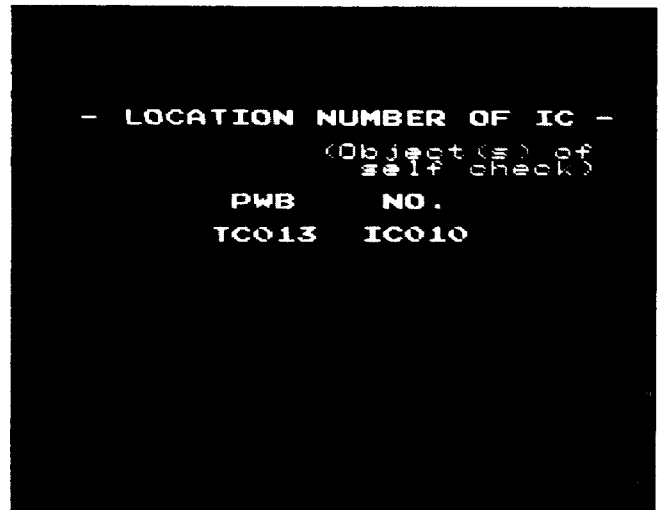
Three self-test screens provide information to indicate the condition of the random-access memory (RAM) and read-only memory (ROM); the accelerator, brake, steering, and shift controls; the sound circuitry; the option-switch settings; and the display circuits. When the self-test switch is turned *on* during the Attract Mode, the game enters the Self-Test Mode. Turning the self-test switch *off* at any time during the Self-Test Mode returns the game to the Attract Mode. The following self-test screens are arranged in the sequence in which they occur. After Screen 3, the self-test switch must first be turned *off* until the Attract Mode display appears, and then turned *on* again to obtain Screen 1.

Screen 1

Select the Self-Test Mode by turning the self-test switch (located on the utility panel) to the *on* position. If the self-test passes, Screen 1 appears on the center display as shown in Figure 2-1. If the test fails, Screen 1 appears as shown in Figure 2-2A, and fault location information appears on the right-hand display as shown in Figure 2-2B.



A
Center Display



B
Right-Hand Display

Figure 2-2 Screen 1—RAM/ROM Test Fails

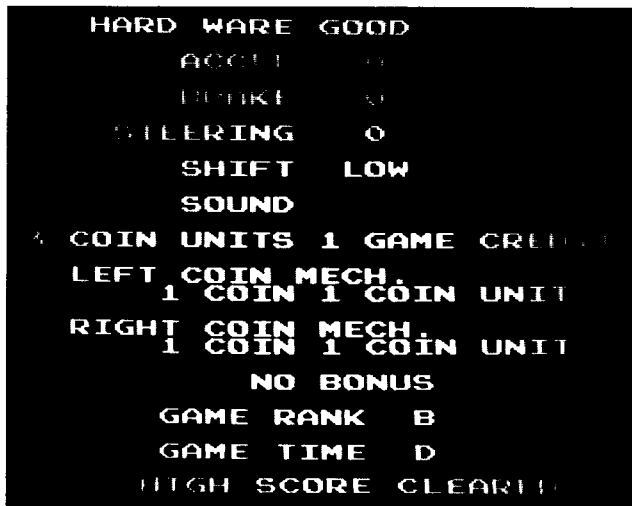


Figure 2-1 Screen 1—RAM/ROM Test Passes

The following is a description of the displayed information.

- *HARDWARE* indicates the condition of the game RAM and ROM. If the test passes, *GOOD* is displayed to the right of *HARDWARE*. If the test fails, *BAD* is displayed to the right of *HARDWARE* with a status number that indicates which RAM or ROM circuit is faulty. Specific fault location information appears on the right-hand display: *PWB* indicates the printed-circuit board number (TCXXX) and *NO.* indicates the RAM or ROM number (ICXXX) in the circuit that failed. The RAM or ROM number only points to the circuit that failed; the RAM or ROM itself may not be the cause of the error indication. Refer to Table 2-1 for a list of status numbers with a description of the corresponding RAM and ROM circuits tested.

Table 2-1 RAM/ROM Circuits Tested

Status No.	Description
1	Main Microprocessor RAM
2	Video RAM
3	Common RAM
4	Sound RAM
5	Main Microprocessor ROM
6	Sound ROM
7	Not Used
8	Not Used
9	Not Used
10	Interface ROM (Time-Out Error)
11	Common RAM (Access for Arithmetic Microprocessor)
12	Common RAM (Access for Arithmetic Microprocessor)
13	Arithmetic RAM
14	Common RAM (Access for Arithmetic Microprocessor)
15	Object RAM
16	Arithmetic ROM
17	Data ROM (Checksum)
18	Arithmetic Unit

- *ACCEL* checks the operation of the accelerator foot pedal. The number to the right of *ACCEL* should increase from 0 to F as the foot-pedal is pressed. A brightened F should appear when the foot-pedal is at the bottom limit.
- *BRAKE* checks the operation of the brake foot pedal. The number to the right of *BRAKE* should increase from 0 to F as the foot-pedal is pressed. A brightened F should appear when the foot-pedal is at the bottom limit.
- *STEERING* checks the operation of the steering wheel. The number to the right of *STEERING* should increase from 0 to FF repeating as the steering wheel is turned continuously clockwise and decreasing as the steering wheel is turned counterclockwise.
- *SHIFT* checks the operation of the shift control. *LOW* should appear to the right of *SHIFT* with the shift control in the up position and *HIGH* should appear in the down position.
- *SOUND* checks the operation of the sound circuitry. Each game sound is selected by pressing the auxiliary coin switch (located on the utility panel behind the coin door). The number of each sound from 0 to 1F is displayed to the right of *SOUND*. Activate the left coin mechanism to hear the sounds selected by the auxiliary coin switch.
- *3 COIN UNITS 1 GAME CREDIT* indicates the number of coins that must be deposited in the left or right coin mechanism for one game credit. The number of coins required is selected by the option switches (see Chapter 1).
- *LEFT COIN MECH.* and *1 COIN 1 COIN UNIT* indicates the number of coins that must be deposited in the left coin mechanism for each coin unit. The number of coin units given for each coin deposited in the left coin mechanism is selected by the option switches (see Chapter 1).
- *RIGHT COIN MECH.* and *1 COIN 1 COIN UNIT* indicates the number of coins that must be deposited in the right coin mechanism for each coin unit. The number of coin units given for each coin deposited in the right coin mechanism is selected by the option switches (see Chapter 1).
- *NO BONUS* indicates that no bonus game credits are given for additional coins deposited in the coin mechanism. *FREE PLAY* indicates that the game credits are given without charge by pressing the accelerator foot pedal. The bonus game credits given for additional coins and free play is selected by the option switches (see Chapter 1).
- *GAME RANK* indicates the game difficulty from A to H selected by the option switches (see Chapter 1).
- *GAME TIME* indicates the game times from A to D selected by the option switches (see Chapter 1).
- *HIGH SCORE CLEARED* indicates that the scores in the high-score table have been cleared (reset) to the starting scores. All the high scores can be reset by pressing the accelerator foot-pedal and the auxiliary coin switch simultaneously.

Screen 2

Place the shift control in the *LOW* position and turn the self-test switch off, then on again, to obtain Screen 2 on each display as shown in Figure 2-3. Use this screen to check or adjust the display color (see the display manual for troubleshooting and color adjustment procedures.)

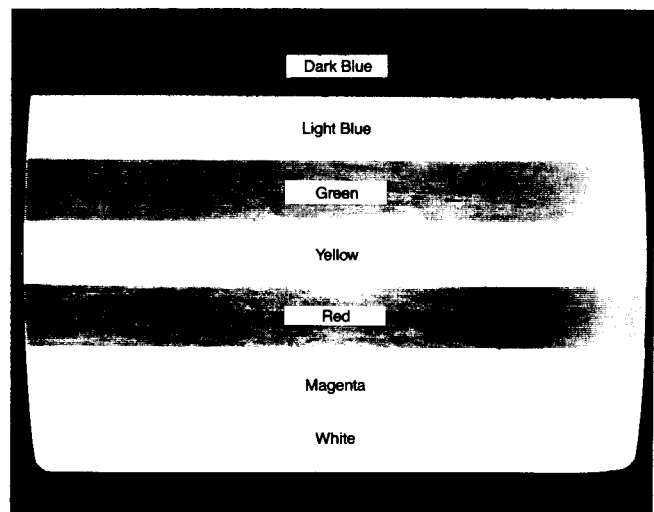


Figure 2-3 Screen 2—Color-Bar Pattern

Screen 3

Place the shift control in the *HIGH* position to obtain Screen 3 on each display as shown in Figure 2-4. Use this screen to check and adjust the display convergence. (See the display manual for troubleshooting and convergence adjustment procedures.)

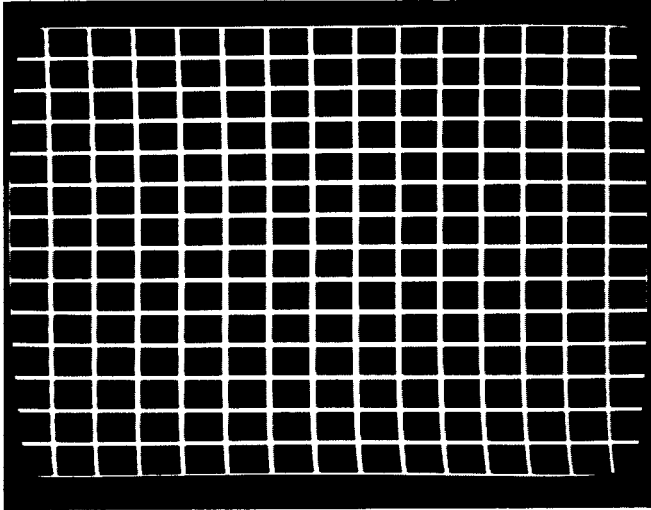


Figure 2-4 Screen 3—Crosshatch Pattern

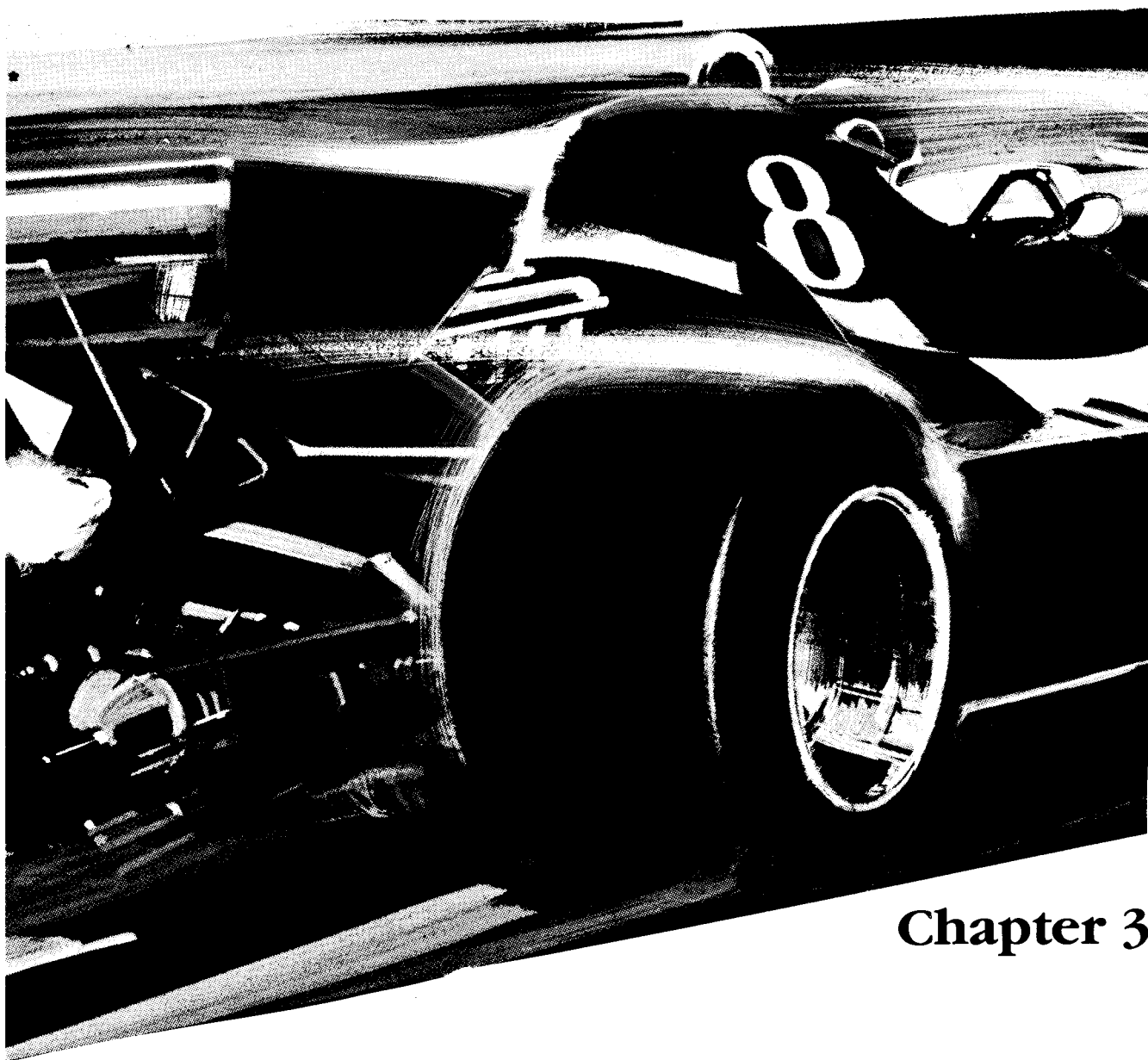
Turn the self-test switch off and wait for the Attract Mode display. Then turn the self-test switch on again to obtain Screen 1.

Maintenance

The maintenance procedures provided in this chapter are for those items which are subject to the most severe use. To assure the maximum trouble-free operation from this game, Atari recommends that periodic routine maintenance be performed on the game components described in the following procedures. How often routine maintenance is performed depends upon the game environment and frequency of play.

▲ WARNING ▲

To avoid possible electrical shock hazard, unplug the game prior to performing any maintenance.



Chapter 3

Preventive Maintenance

This chapter includes preventive and corrective maintenance procedures for the steering, shift, and foot-pedal controls. Atari recommends that periodic preventive maintenance be performed as described in this chapter. References are provided to Chapter 4, Illustrated Parts Lists, to aid in locating the parts that are mentioned, but not illustrated, in the maintenance procedures.

Preventive maintenance includes cleaning, lubricating, and tightening hardware. To assure maximum trouble-free operation, preventive maintenance should be performed at the intervals specified in Table 3-1.

Table 3-1 Recommended Preventive-Maintenance Intervals

Control	Maintenance Interval
Steering Control	Lubricate and tighten securing hardware at least every four months.
Foot-Pedal Controls	Lubricate and tighten securing hardware at least every four months.
Shift Control	Lubricate at least every six months.

⚠ WARNING ⚠

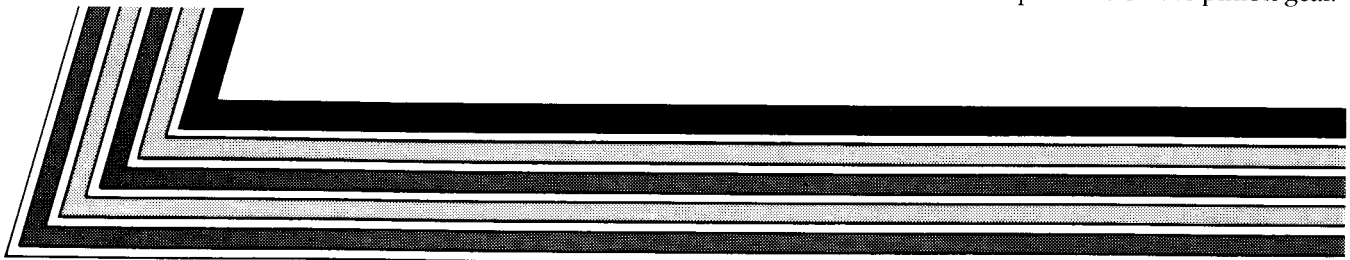
To avoid possible electrical shock, unplug the game power before performing any preventive-maintenance procedures.

Lubricating the Steering Control

The frame shaft and the two gears on the steering control should be lubricated, and the securing hardware tightened, every four months. The bronze bearings of the steering shaft should be lubricated as needed.

Perform the following procedure to lubricate and tighten the steering control (see Figure 3-1 and 3-2).

1. Unlock and remove the lower rear access panel.
2. Reaching through the control-panel access hole from the rear of the cabinet, release the spring-draw latches that secure the control panel to the cabinet.



3. Check that the cap screw, which secures the encoder wheel to the frame shaft, is tight (see Figure 3-2). If the screw needs to be tightened, use a $\frac{7}{16}$ -inch open-end wrench to hold the frame shaft while tightening the cap screw with a $\frac{3}{32}$ -inch Allen wrench.
4. Check that the cap screw on the steering shaft is tight (see Figure 3-2). If the screw needs to be tightened, hold the steering wheel and use a $\frac{5}{32}$ -inch Allen wrench to tighten the cap screw.
5. Check and, if necessary, apply a lightweight oil (part no. 107013-001) to the frame shaft.
6. Check for a grinding feeling caused by inadequate gear clearance or inadequate lubrication. To correct this condition, first lubricate the gears with Nyogel 779 (part no. 178027-001). Check that the encoder wheel is centered between the optical couplers on the Coupler PCB.
7. Check and, if necessary, lubricate the bronze flange bearings in the steering frame with a few drops of lightweight oil.

Lubricating the Shift Control

Lubricate the detent and spherical portion of the shifter handle at least every six months.

1. Perform the procedure provided in *Removing the Shift Control* in the Corrective Maintenance section of this chapter.
2. Apply a light-duty lubricant (part no. 178027-001) to the spherical part of the handle and the detent (see Figure 3-3).

Lubricating the Foot-Pedal Control

Lubricate the pivot-plate and tighten the foot-pedal control mounting nuts at least every four months. Apply a film of lightweight oil (part no. 107013-001) to the pivot-plate shaft (see Figure 3-4). Also, make sure the rubber bumpers are not worn because the pivot-plate does not have very much clearance over the cap screws on the pinion gear.

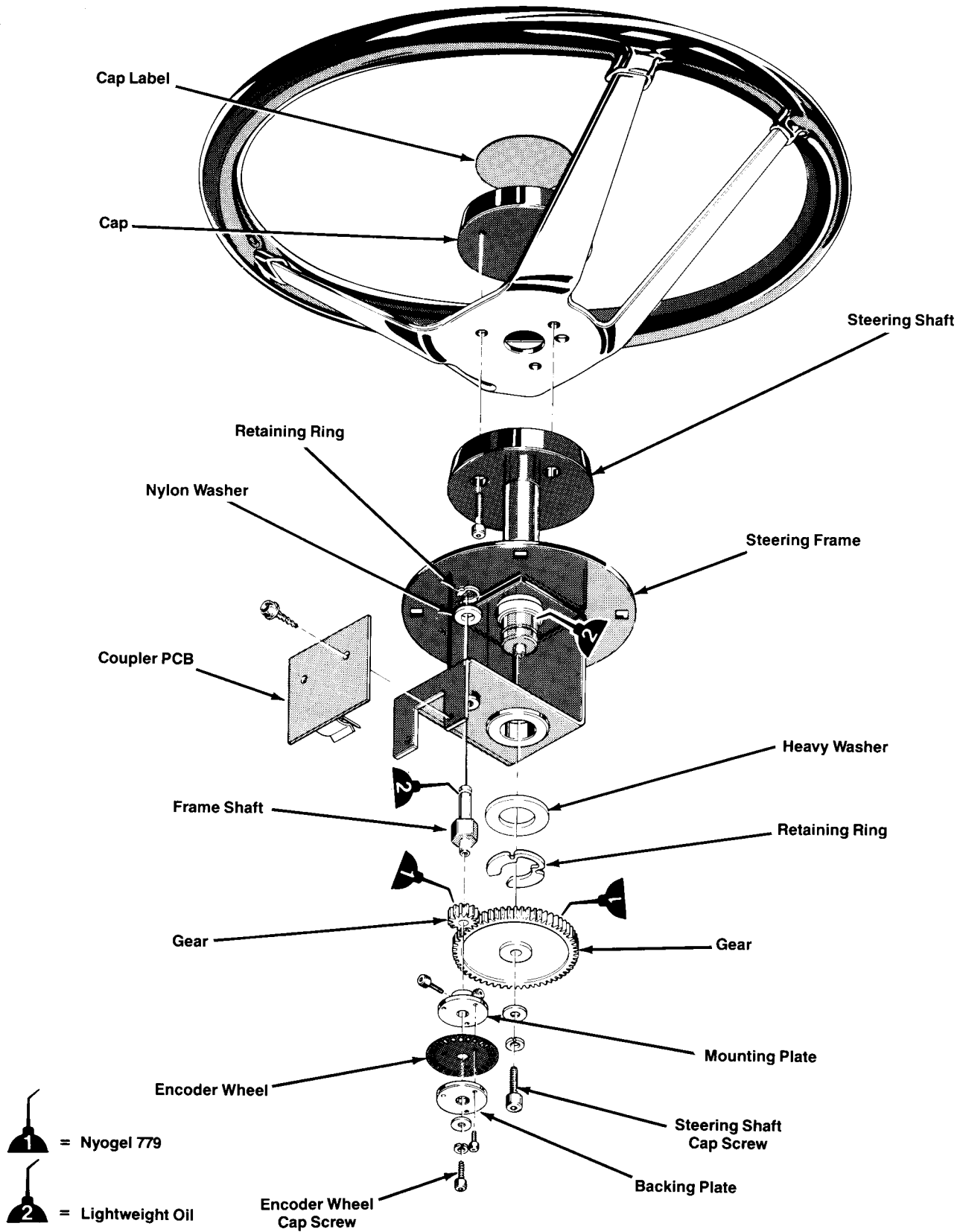


Figure 3-1 Lubricating and Disassembling the Steering Control

Corrective Maintenance

Corrective maintenance consists of removal, disassembly, reassembly, and replacement of the steering, shift, and foot-pedal controls.

⚠ WARNING ⚠

To avoid possible electrical shock, unplug the game before performing any corrective maintenance procedures.

Removing the Steering Control

Perform the following procedure to remove the steering control from the cabinet. Refer to *Disassembling the Steering Control* for detailed disassembly procedures.

1. Unlock and open the lower rear access panel.
2. Reaching through the control-panel access hole from the rear of the cabinet, release the spring-draw latches that secure the control panel to the cabinet.
3. Disconnect the green ground wire from the grounding hardware.
4. Disconnect the harness connector from the Coupler PCB.
5. Use a $\frac{7}{6}$ -inch hex driver to remove the four hex nuts securing the steering control to the control panel.
6. Carefully lift the steering control from the front of the control panel.
7. Replace the steering control in the reverse order of removal. Make certain that the encoder wheel and Coupler PCB are facing the left side of the control panel (when facing the front of the cabinet).

Disassembling the Steering Control

Perform the following procedures to disassemble the steering control. First perform *Removing the Steering Control* to remove the steering control from the cabinet.

Encoder Wheel and Frame Shaft

Perform the following procedure to remove the encoder wheel and frame shaft from the steering-control frame (see Figure 3-1).

1. Using a $\frac{3}{32}$ -inch Allen wrench loosen set screws in encoder mounting plate.
2. Use a $\frac{7}{6}$ -inch open-end wrench to hold the frame shaft.
3. Using a $\frac{3}{32}$ -inch Allen wrench remove the cap screws, washers, and encoder wheel.
4. Pry off the retaining ring to remove the frame shaft.

5. Replace the frame shaft and encoder wheel in the reverse order of removal. Make certain the encoder wheel is centered between the optical couplers on the Coupler PCB.

Steering Wheel and Shaft

Perform the following procedure to remove the steering wheel and shaft from the steering frame (see Figure 3-1).

1. Hold the steering wheel in a fixed position.
2. Use a $\frac{3}{32}$ -inch Allen wrench to remove the cap screw, washers, and gear from the end of the steering shaft.

⚠ WARNING ⚠

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

3. Pry off the retaining ring and remove the heavy washer.
4. Slide the steering wheel and shaft from the frame.
5. Use a $\frac{3}{32}$ -inch Allen wrench to remove the three screws securing the steering wheel to the shaft.
6. Replace the steering wheel and shaft in the reverse order of removal.

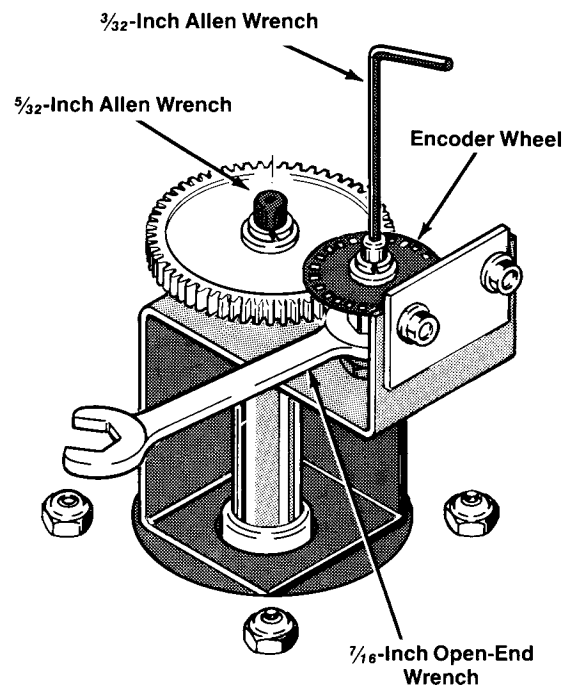


Figure 3-2 Tightening the Steering Control Cap Screws

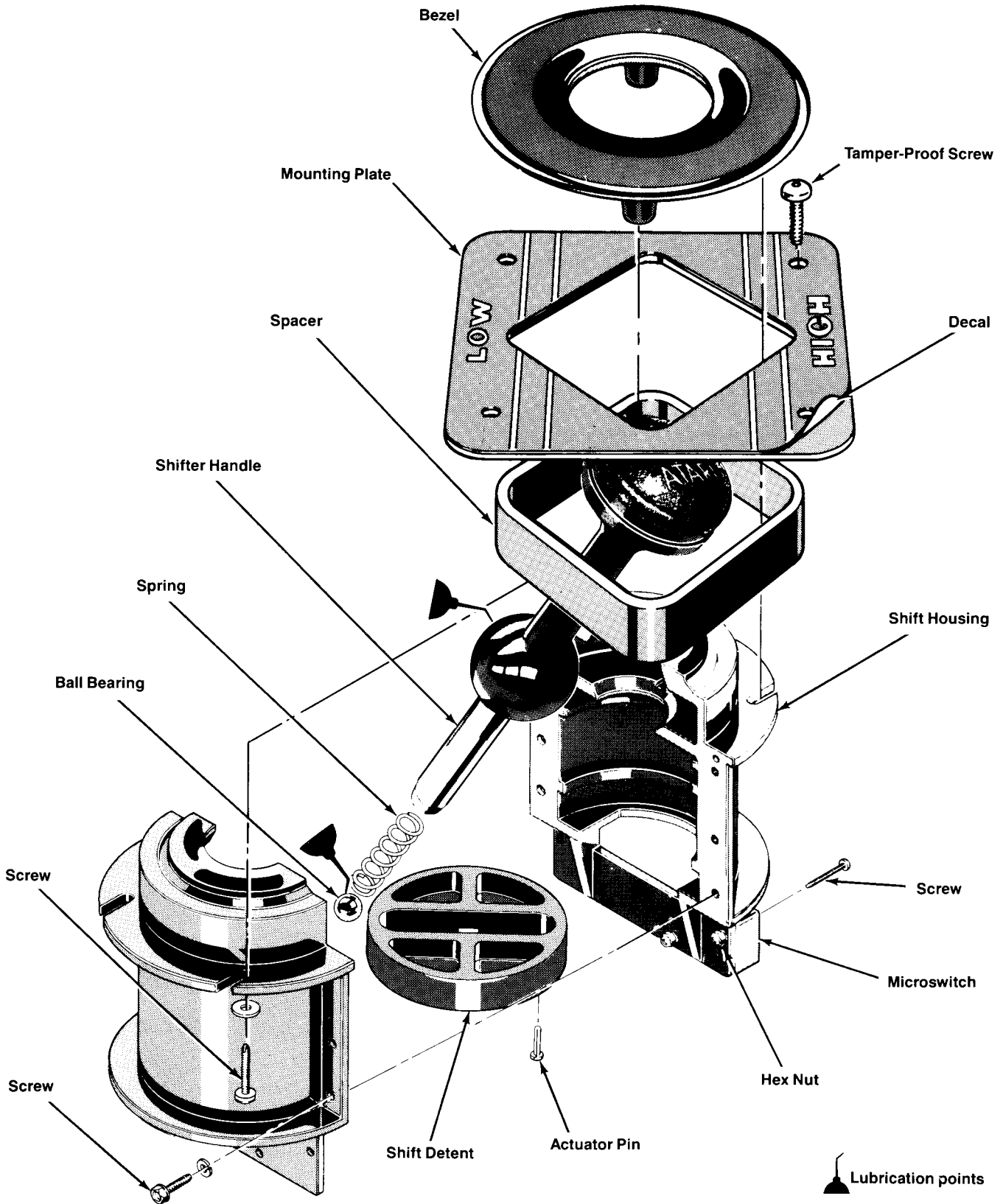


Figure 3-3 Disassembling and Lubricating the Shift Control

Removing the Shift Control

Perform the following procedure to remove the shift control from the cabinet. Refer to *Disassembling the Shift Control* for detailed disassembly procedures.

1. Use the special $\frac{5}{32}$ -inch hex key tool (supplied with the game) to remove the four tamper-proof screws securing the shift control to the cabinet.
2. Gently lift the shift control from the cabinet.
3. Disconnect the harness connector.
4. Replace the shift control in the reverse order of removal.

Disassembling the Shift Control

Perform the following procedures to remove the microswitch and disassemble the shift control (see Figure 3-3). Refer to *Removing the Shift Control* to remove the shift control from the cabinet.

Microswitch

Perform the following procedure to remove the microswitch from the shift housing (see Figure 3-3).

1. Use a $\frac{1}{4}$ -inch open-end wrench to remove the two screws and locknuts securing the switch to the housing. Be careful not to lose the small actuator pin that sits above the switch actuator.
2. Reassemble the microswitch in the reverse order of disassembly.

Shift Housing

Perform the following procedure to disassemble the shift housing (see Figure 3-3).

1. Remove the screws and flat washers securing the mounting plate to the bezel.
2. Use a $\frac{1}{4}$ -inch hex driver to remove the six screws securing the two halves of the housing.
3. Carefully separate the two halves of the housing.
4. Reassemble the shift housing in the reverse order of disassembly.

Removing the Foot-Pedal Controls

Perform the following procedure to remove the foot-pedal control from the cabinet. Refer to *Disassembling the Foot-Pedal Controls* for detailed disassembly procedures.

1. Unlock and remove the lower rear access panel.
2. Disconnect the foot-pedal harness connector.
3. Use a $\frac{7}{16}$ -inch open-end wrench to remove the four nuts and lock washers securing the foot-pedal front panel to the cabinet.

4. From the front of the cabinet, remove the foot-pedal front panel and controls from the cabinet.
5. If necessary, remove the two bolts and lock washers that secure the accelerator or brake pedal to the pivot-plate. Remove the pedal from the front panel.
6. Use a $\frac{7}{16}$ -inch hex driver to remove the four nuts securing the accelerator or brake control to the front panel.
7. Replace the foot-pedal controls in the reverse order of removal.

Disassembling the Foot-Pedal Control

Perform the following procedures to disassemble the accelerator and brake foot-pedal controls (see Figure 3-4). First perform *Removing the Foot-Pedal Controls* to remove the foot-pedal controls from the cabinet.

Encoder Wheel

Perform the following procedure to remove the encoder wheel from the encoder shaft (see Figure 3-4).

1. Use a $\frac{3}{32}$ -inch Allen wrench to loosen the two cap screws on the encoder-wheel collar.
2. Gently remove the encoder wheel from the shaft.
3. Use a $\frac{3}{32}$ -inch Allen wrench to remove the three cap screws securing the encoder wheel to the backing plate.
4. Reassemble the encoder wheel in the reverse order of disassembly. Make certain that: (1) the end of the encoder shaft is flush with the outside surface of the encoder-wheel backing plate; and (2) the two cap screws in the collar are aligned with the flat sides of the shaft.

Segment Gear

Perform the following procedure to remove the segment gear from the foot-pedal control (see Figure 3-4).

1. Remove the encoder wheel as described under *Encoder Wheel*.
2. Use a screwdriver to remove the large spring from the pivot-plate.

WARNING

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

3. Remove the encoder-shaft retaining ring from the outside of the left side frame.
4. Use a $\frac{9}{16}$ -inch open-end wrench to remove the four nuts and lock washers securing the left side frame.

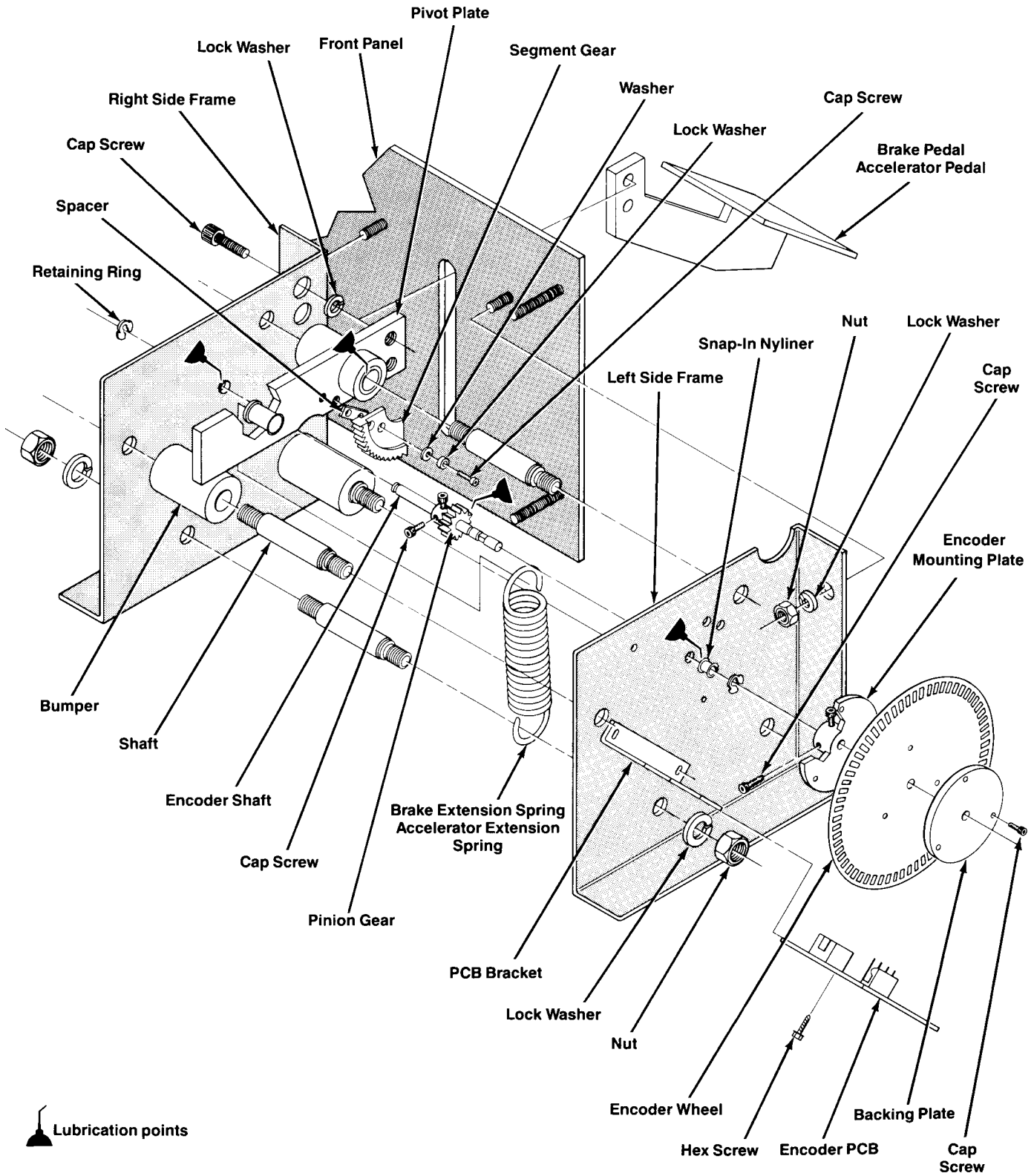


Figure 3-4 Lubricating and Disassembling the Foot-Pedal Control

5. Remove the left side frame.
6. Slide the pivot-plate from the shaft.
7. Use a $\frac{3}{32}$ -inch Allen wrench to remove the two cap screws and washers securing the segment gear and spacer to the pivot-plate.
8. Reassemble the segment gear in the reverse order of disassembly. Make certain the spacer is properly installed between the segment gear and pivot-plate before tightening the two cap screws and washers.

Pinion Gear

Perform the following procedure to remove the pinion gear from the encoder shaft (see Figure 3-4).

1. Remove the pivot-plate as described in steps 1 through 6 under *Segment Gear*.



WARNING



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

2. Remove the encoder-shaft retaining ring from the outside of the right side of the frame. Remove the shaft from the frame.
3. Use a $\frac{7}{64}$ -inch Allen wrench to loosen the two cap screws on the pinion-gear collar.
4. Slide the pinion gear from the shaft.
5. Reassemble the pinion gear in the reverse order of disassembly. Make certain that the pinion-gear collar faces the end of the shaft opposite the encoder wheel.

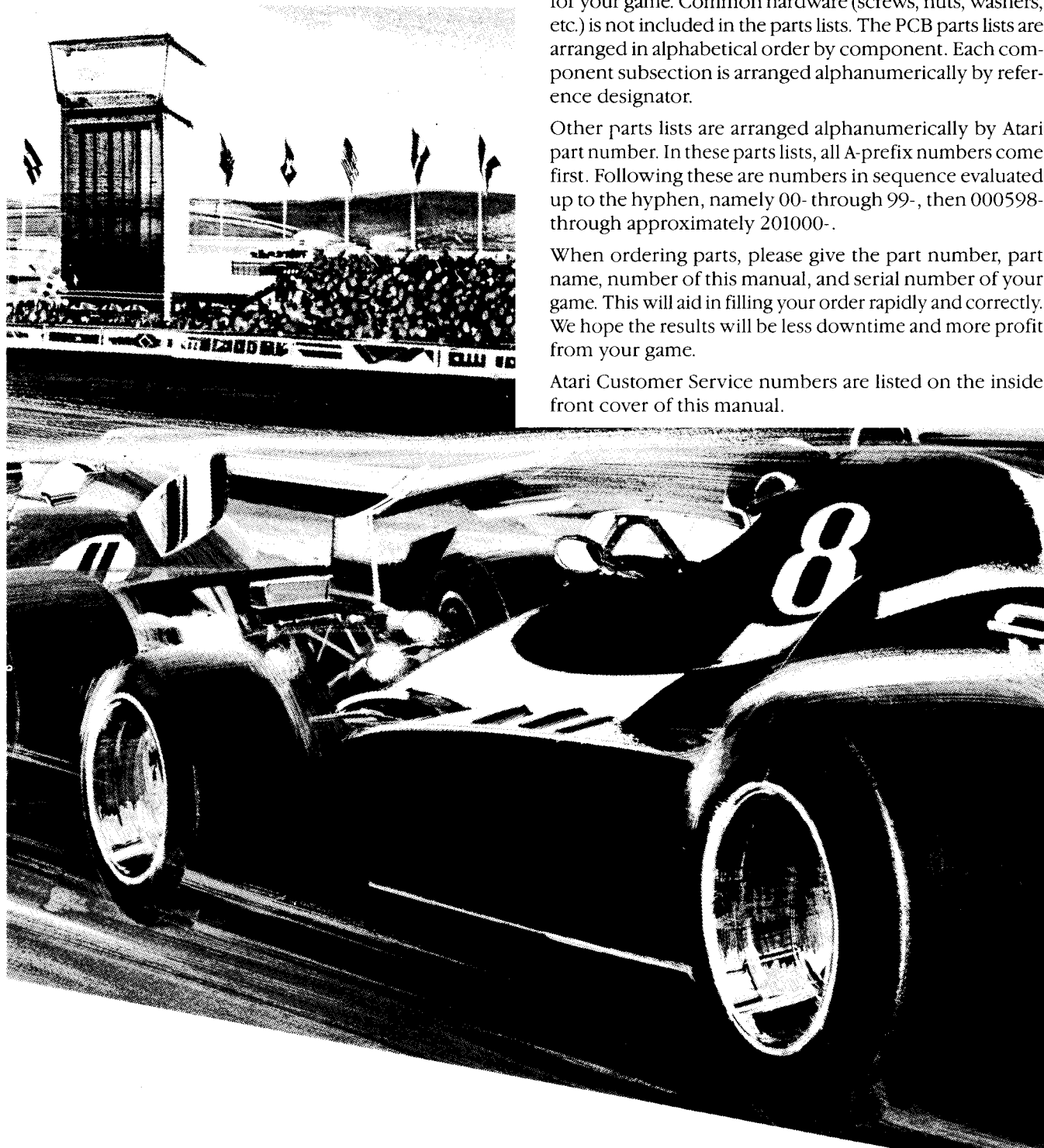
Illustrated Parts Lists

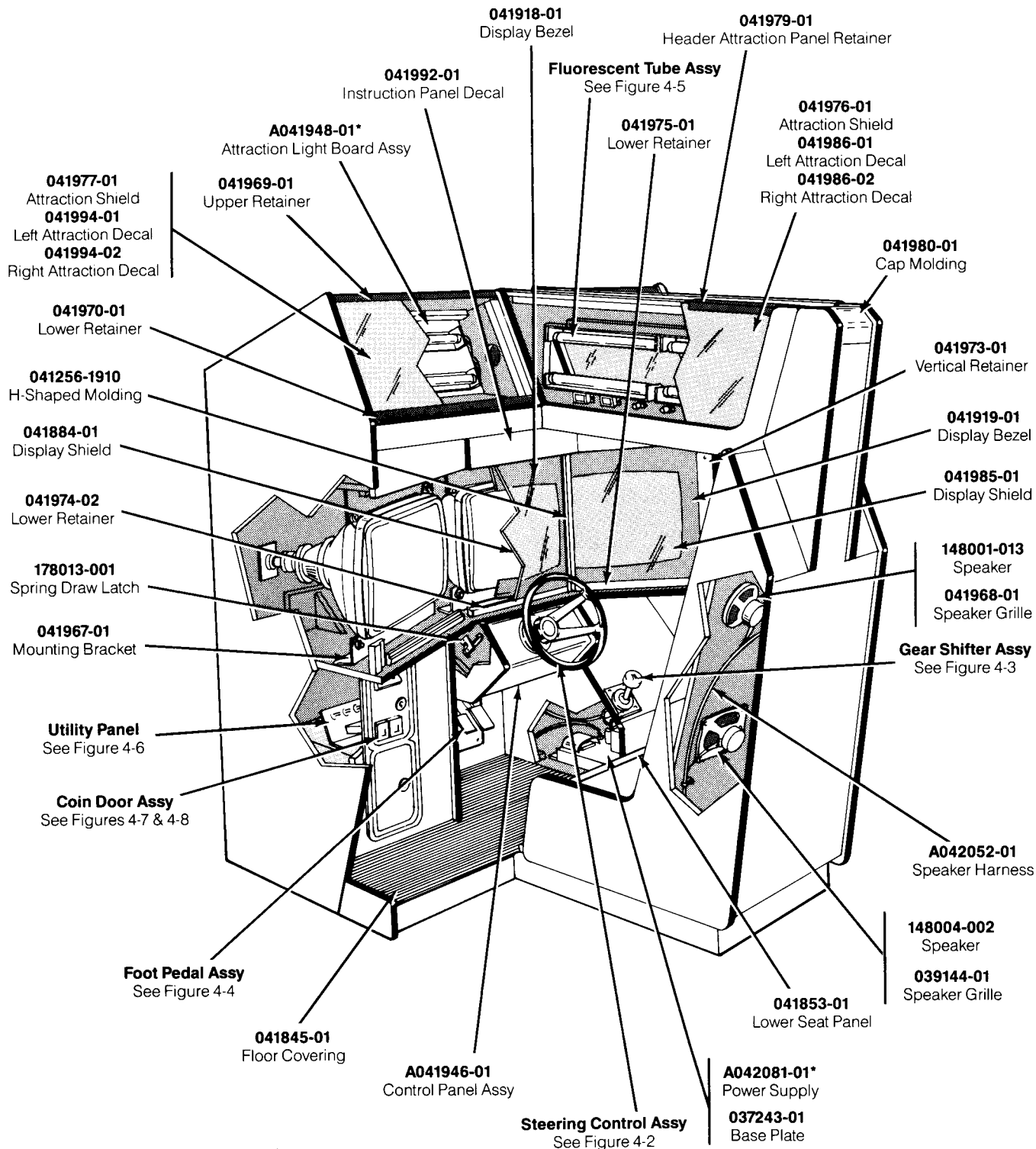
This chapter provides information you need to order parts for your game. Common hardware (screws, nuts, washers, etc.) is not included in the parts lists. The PCB parts lists are arranged in alphabetical order by component. Each component subsection is arranged alphanumerically by reference designator.

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 aid in filling 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.





*See parts list for Ireland part number.

**Figure 4-1 Cabinet-Mounted Assemblies
A041945-XX A**

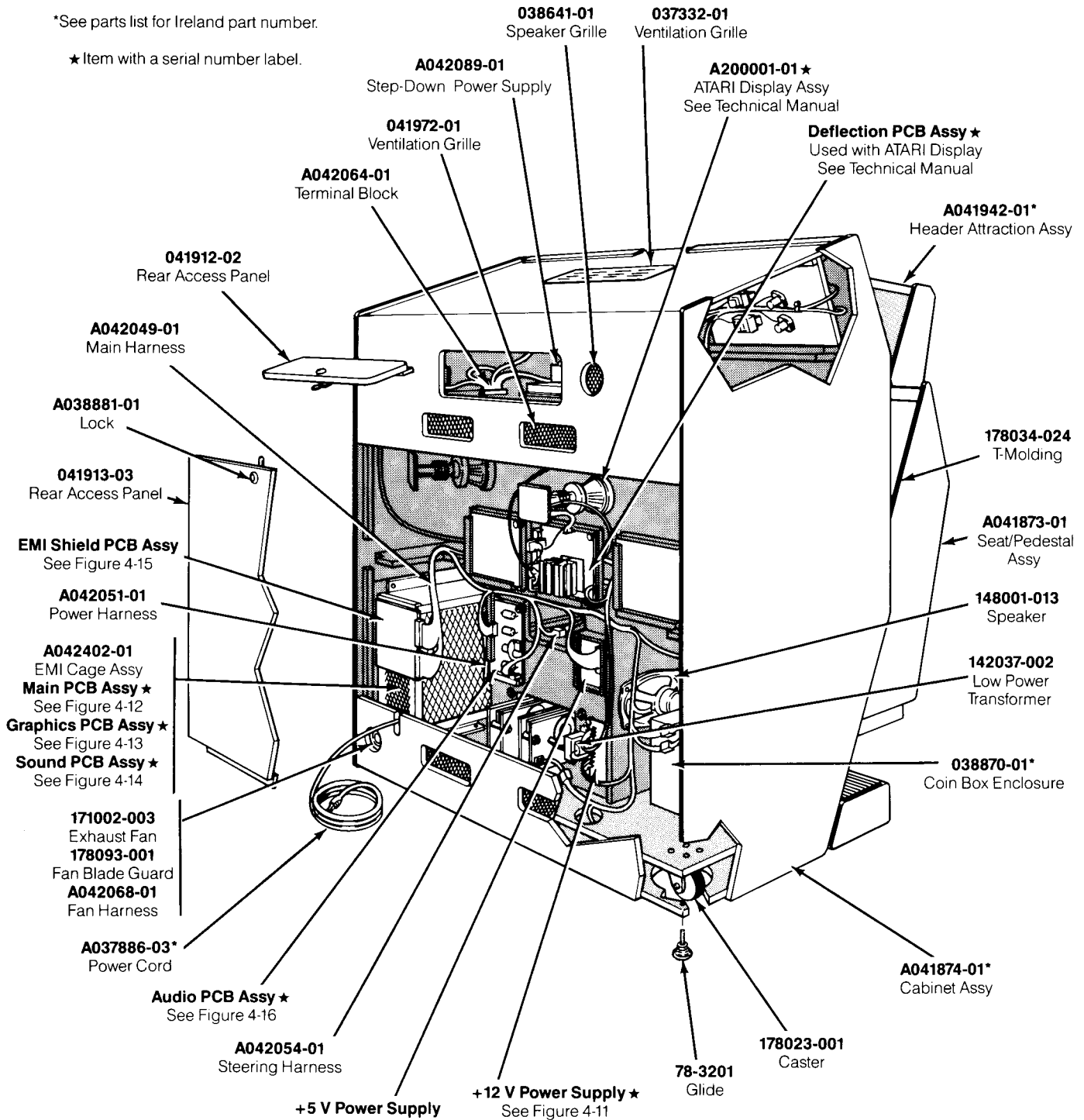


Figure 4-1 Cabinet-Mounted Assemblies, continued
A041945-XX A

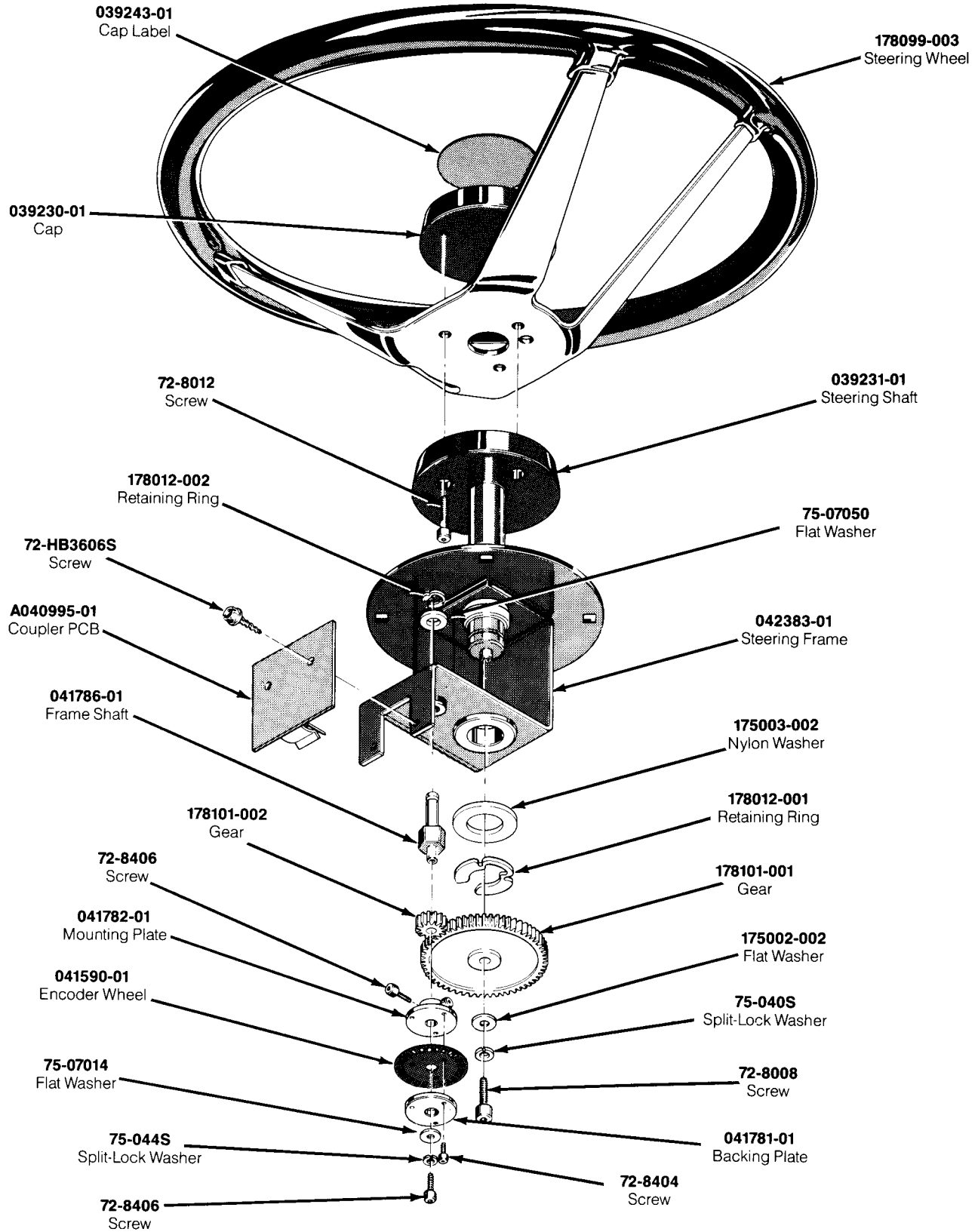
Cabinet-Mounted Assemblies Parts List

Part No.	Description
For US-Built Game	
A037886-03	Strain-Relief Power Cord (U.S. and Canada)
A041874-01	Main Cabinet Assembly
A041942-01	Header Assembly
A041948-01	Attraction Light Board Assembly
A042081-01	110 V Raster Power Supply
A042402-01	EMI Cage Assembly
037243-01	Power Supply Base Plate (not shown)
038870-01	Coin Box Enclosure
For Ireland-Built Game	
A037784-04	Strain-Relief Power Cord (European)
A041874-02	Main Cabinet Assembly
A041942-02	Header Assembly
A041948-02	Attraction Light Board Assembly
A042081-02	220 V Raster Power Supply
A042089-01	Power Supply Step-Down Transformer
038781-01	Coin Box Enclosure
For US- and Ireland-Built Games	
A038881-01	Lock (Acceptable substitute is part no. A038881-03)
A041842-01	Seat Assembly
A041873-01	Seat/Pedestal Assembly
A041942-01	Header Attraction Assembly
A041946-01	Control Panel Assembly—consists of
041966-01	Control Panel
041991-01	Control Panel Decal
A042016-01	Audio Printed Circuit Board
A042049-01	Main Harness Assembly
A042051-01	Power Harness Assembly
A042052-01	Speaker Harness Assembly
A042054-01	Steering Harness Assembly
A042064-01	Terminal Block
A042068-01	Fan Harness Assembly
A200001-01	ATARI 19-Inch Color Raster-Scan Cathode-Ray Tube (CRT) Assembly—consists of
A201022-02	Deflection PCB Assembly
A201092-01	CRT Assembly
A201024-01	Color Raster Harness Assembly (not shown)
A201020-01	Neck PCB Assembly
<i>The following four items are technical information supplements to this game:</i>	
SP-262	TX-1 Schematic Package
ST-262	TX-1 Label with Self-Test Procedure and Option Switch Settings
TM-262	TX-1 Operators Manual
TM-254	ATARI 19-Inch Color Raster Display Manual

(continued on next page)

Cabinet-Mounted Assemblies Parts List, continued

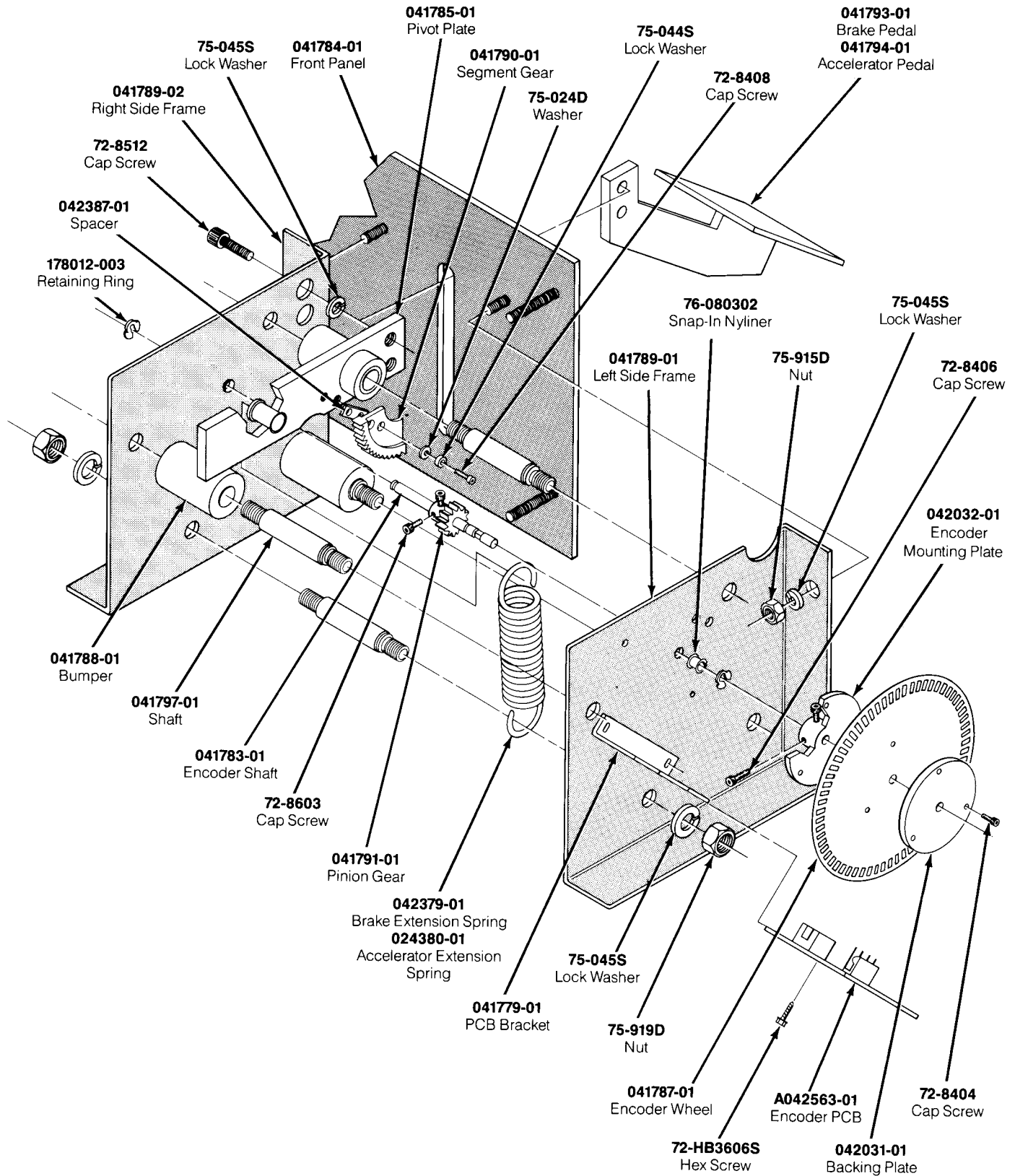
Part No.	Description
78-3201	Adjustable Glide
78-6900402	Vinyl Foam Single-Coated Adhesive Tape ¼-Inch Wide × ⅛-Inch Thick (178 inches required; used along top and bottom edges of main cabinet attraction panels; outside edges and bottom of each display shield; top of header attraction panel—not shown)
034536-02	½-Inch Thick Foam Pad (located between the Power Supply PCB and the cabinet wall, between the Deflection PCBs and the cabinet wall, between the Audio PCB and the cabinet wall, and between the +12 V Supply and the cabinet wall—not shown)
037332-01	Ventilation Grille (located on top panel)
038091-01	Molded Coin Box (not shown)
038641-01	Speaker Grille (located on upper rear panel)
039144-01	Speaker Grille (one on left side of player area, one on seat back panel—not shown)
041256-1910	H-Shaped Molding for Center Display Shield
041853-01	Lower Seat Panel
041845-01	Floor Covering for Pedestal
041884-01	Shield for Center Display
041912-02	Upper Rear Access Panel (includes lock)
041913-03	Lower Rear Access Panel (includes lock)
041918-01	Bezel for Center Display
041919-01	Bezel for Left and Right Displays
041967-01	19-Inch CRT Mounting Bracket
041968-01	Speaker Grille (two located on rear seat panel—not shown)
041969-01	Upper Retainer for Attraction Panel
041970-01	Lower Retainer for Attraction Panel
041972-01	Ventilation Grille (two located on lower rear panel, two located on upper rear panel)
041973-01	Vertical Retainer for Left and Right Display Shields
041974-01	Lower Retainer for Center Display Shield
041975-01	Lower Retainer for Right and Left Display Shields
041976-01	Header Attraction Shield
041977-01	Main Attraction Shield
041979-01	Retainer for Header Attraction Shield
041980-01	Black Aluminum Cap Molding for Seat
041982-01	Hardware Kit (not shown)
041985-01	Shield for Left and Right Displays
041986-01	Left Header Attraction Decal
041986-02	Right Header Attraction Decal
041992-01	Instruction Panel Decal
041994-01	Left Main Attraction Decal
041994-02	Right Main Attraction Decal
142037-002	Low Power Transformer
148001-013	6 × 9-Inch Oval, 4 Ω, 6-Ounce Shielded High-Fidelity Speaker (one located on the left side of player area, and one located on seat back panel)
148004-002	5-Inch Round, 4 Ω Speaker (two located on seat back panel)
171002-003	110 V, 60 Hz Exhaust Fan
178013-001	Spring Draw Latch
178023-001	4-Inch Diameter Rigid Caster
178034-024	¾-Inch Black Plastic T-Molding
178093-001	Guard for Fan Blade
178126-002	⅝ ₂ -Inch Tamper-Proof Hex Key (not shown)
179125-001	Grounding Clip on Main Harness (not shown)



**Figure 4-2 Steering-Wheel Control Assembly
A041792-01 A**

Steering-Wheel Control Assembly Parts List

Part No.	Description
A040995-01	Coupler Printed-Circuit Board Assembly (includes Radial Optical Coupler)
A042054-01	Steering Harness Assembly (not part of the Steering-Wheel Control Assembly)
72-8404	#4-40 × ¼-Inch Steel Socket-Head Cap Screw
72-8008	#10-32 × ½-Inch Steel Socket-Head Cap Screw
72-8012	#10-32 × ¾-Inch Steel Socket-Head Cap Screw
72-8406	#4-40 × ⅝-Inch Socket-Head Cap Screw
72-HB3606S	#6-32 × 0.38-Inch Zinc-Plated Steel Hex Washer-Head Screw
75-040S	#10 Split-Lock Washer
75-044S	#4 Split-Lock Washer
75-07014	Zinc-Plated Steel Hex Washer
75-07050	Nylon Washer
79-58356	4-Position Connector with Locking Ramp (located on the Coupler PCB Assembly)
039230-01	Steering Cap
039231-01	Steering Shaft
039243-01	Steering Cap Label
041590-01	Encoder Wheel
041781-01	Backing Plate
041782-01	Mounting Plate
041786-01	Frame Shaft
042383-01	Steering Frame
107013-001	3-in-One Oil Lubricant (not shown)
175002-001	Steel Washer
175002-002	#10 Heavy Flat Washer
178012-001	Retaining Ring for 0.75-Inch Shaft
178012-002	Retaining Ring for 0.25-Inch Shaft
178027-001	Nyogel 779 Lubricant (not shown)
178099-003	Steering Wheel
178101-001	24 Diametral Pitch × 20° Pressure Angle × 2.500 Pitch Diameter Spur Gear
178101-002	24 Diametral Pitch × 20° Pressure Angle × 0.583 Pitch Diameter Spur Gear



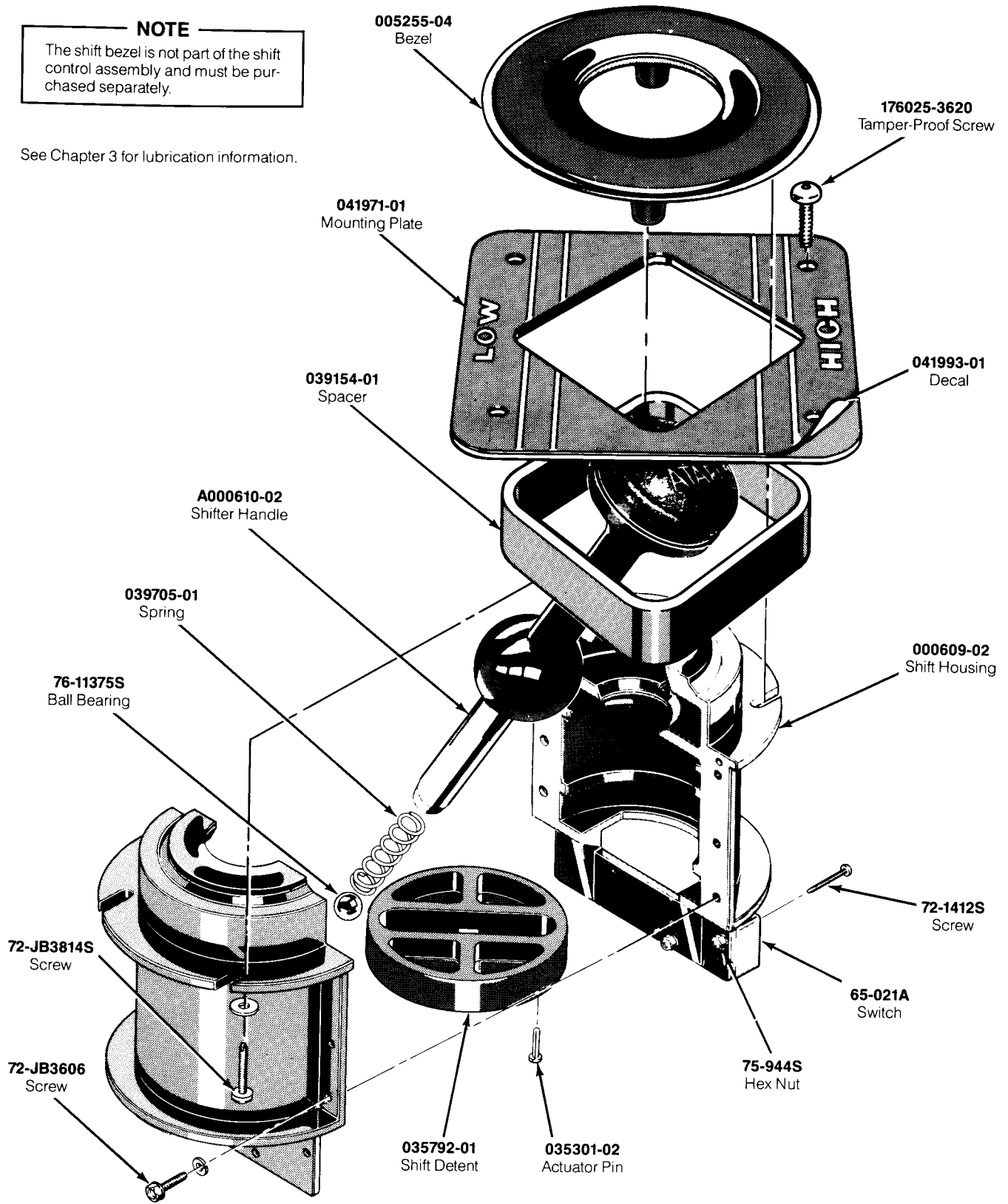
**Figure 4-3 Foot-Pedal Control Assembly
A041796-01 B**

Foot-Pedal Control Assembly Parts List

Part No.	Description
A042053-01	Foot-Pedal Harness Assembly (not shown)
A042563-01	Encoder PCB
72-8404	4-40 × ¼-Inch Cap Screw
72-8406	4-40 × ⅜-Inch Cap Screw
72-8408	4-40 × ½-Inch Cap Screw
72-8512	¼-20 × ¾-Inch Cap Screw
72-8603	6-32 × ⅜-Inch Cap Screw
72-HB3606S	#6 × ⅜-Inch Hex Washer-Head Screw
75-024D	#4 Narrow Flat Washer
75-041S	⅜-Inch Lock Washer
75-044S	#4 Flat Washer
75-045S	¼-Inch Lock Washer
75-915D	¼-20 Nut
75-919D	⅜-16 Nut
76-080302	Snap-In Nyliner
041779-01	PCB Bracket
041783-01	Encoder Shaft
041784-01	Front Panel
041785-01	Pivot Plate
041787-01	Encoder Wheel
041788-01	Pedal Stop Bumper
041789-01	Left Side Frame
041789-02	Right Side Frame
041790-01	Segment Gear
041791-01	Pinion Gear
041793-01	Brake Pedal
041794-01	Accelerator Pedal
041797-01	Shaft
042031-01	Backing Plate
042032-01	Encoder Mounting Plate
042379-01	Brake Extension Spring
042380-01	Accelerator Extension Spring
042387-01	Spacer
107013-001	Lightweight Oil Lubricant
178012-003	Retaining Ring

NOTE
 The shift bezel is not part of the shift control assembly and must be purchased separately.

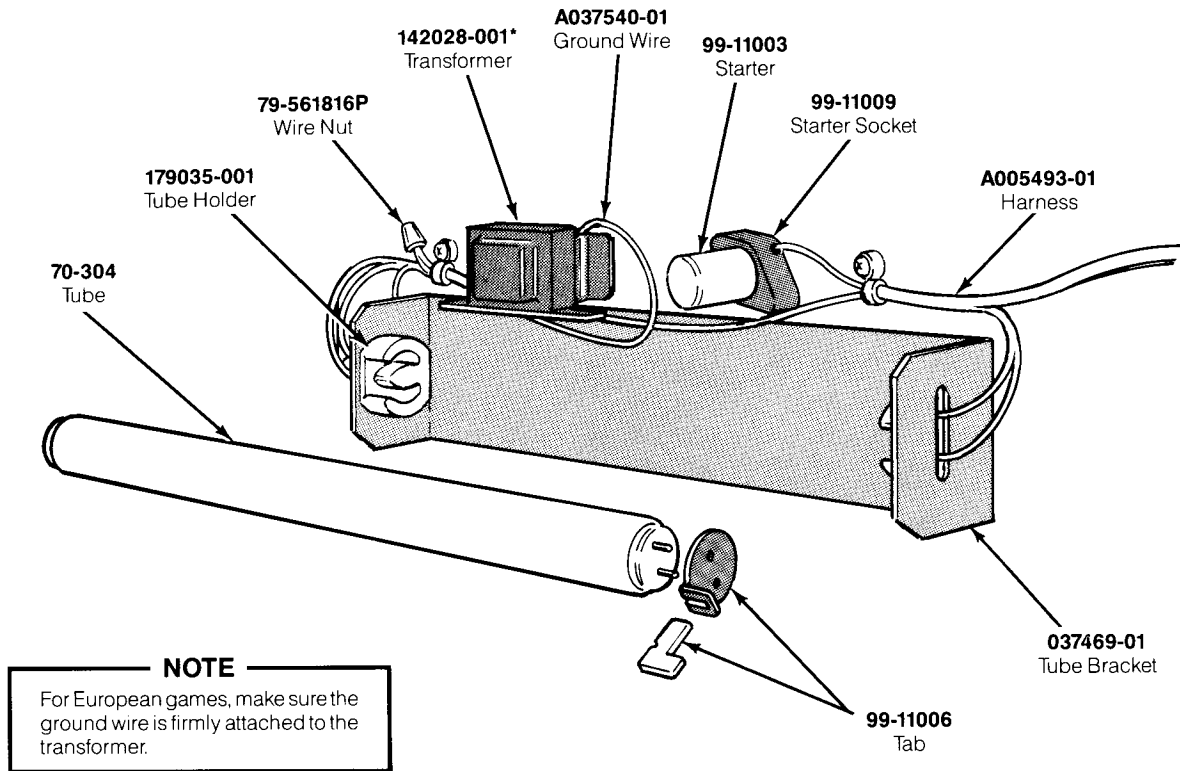
See Chapter 3 for lubrication information.



**Figure 4-4 Shift Control Assembly
 A000608-09 AD**

Shift Control Assembly Parts List

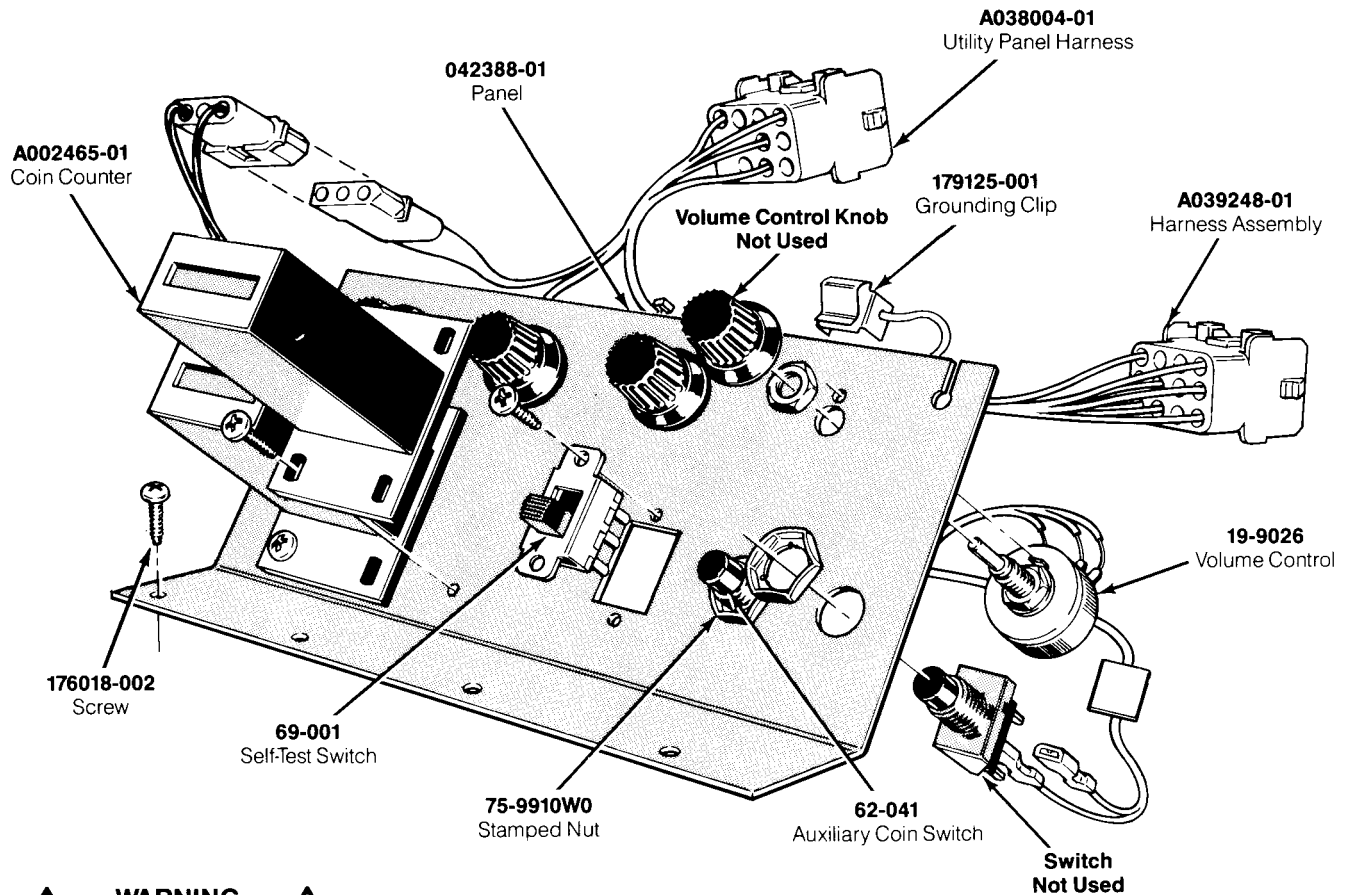
Part No.	Description
A000610-02	Gear-Shifter Handle
65-021A	Single-Pole Single-Throw Low-Force Miniature Switch
72-JB3606	#6 × 0.38-Inch Steel Plastite Screw
72-JB3814S	#8 × 0.87-Inch Steel Plastite Screw
72-1412S	#4-40 × 0.75-Inch Cross-Recessed Pan-Head Steel Machine Screw
75-944S	#4-40 Self-Locking Polymer Hex Nut
76-11375S	$\frac{3}{8}$ -Inch Ball Bearing
78-3002003	Spring
000609-02	Gear-Shifter Housing (two required)
005255-04	Shifter Bezel
039154-01	Shifter Spacer
035792-01	Shift Detent
035301-01	Actuator Pin
041971-01	Mounting Plate
041993-01	Decal
176025-3620	Tamper-Proof Screw
178027-001	Nyogel 779 [®] Lubricant (not shown)



*See parts list for Ireland part number.

**Figure 4-5 Fluorescent Tube Assembly
US-Built Game A037458-03 B
Ireland-Built Game A037458-04 B
Parts List**

Part No.	Description
For US-Built Game	
142028-001	60 Hz, 118 V, Ballast Transformer
179035-001	2-Pin Fluorescent Tube Holder
For Ireland-Built Game	
142028-002	50 Hz, 118 V, Ballast Transformer
035835-01	12-Inch Y-Lead Connector
99-11012	1 3/16-Inch Clamp
For US- and Ireland-Built Games	
A037540-01	Ground Wire with Grounding Clip
A005493-01	Fluorescent Tube Harness Assembly (for Attraction Header Assembly)
70-304	18-Inch, 15-Watt, Cool White Fluorescent Tube
79-561816P	Spring-Connector Wire Nut for 16- to 18-Gauge Wires
99-11003	Fluorescent Tube Starter
99-11006	Fluorescent Tube Locking Tab (consists of two pieces)
99-11009	Starter Socket
037469-01	Steel Tube Bracket

**WARNING**

Before removing or repairing the utility panel, **turn the game off**. Players may receive an electrical shock if the utility panel is not properly grounded! After servicing any parts on the panel, make sure that the ground wire is firmly attached to the panel.

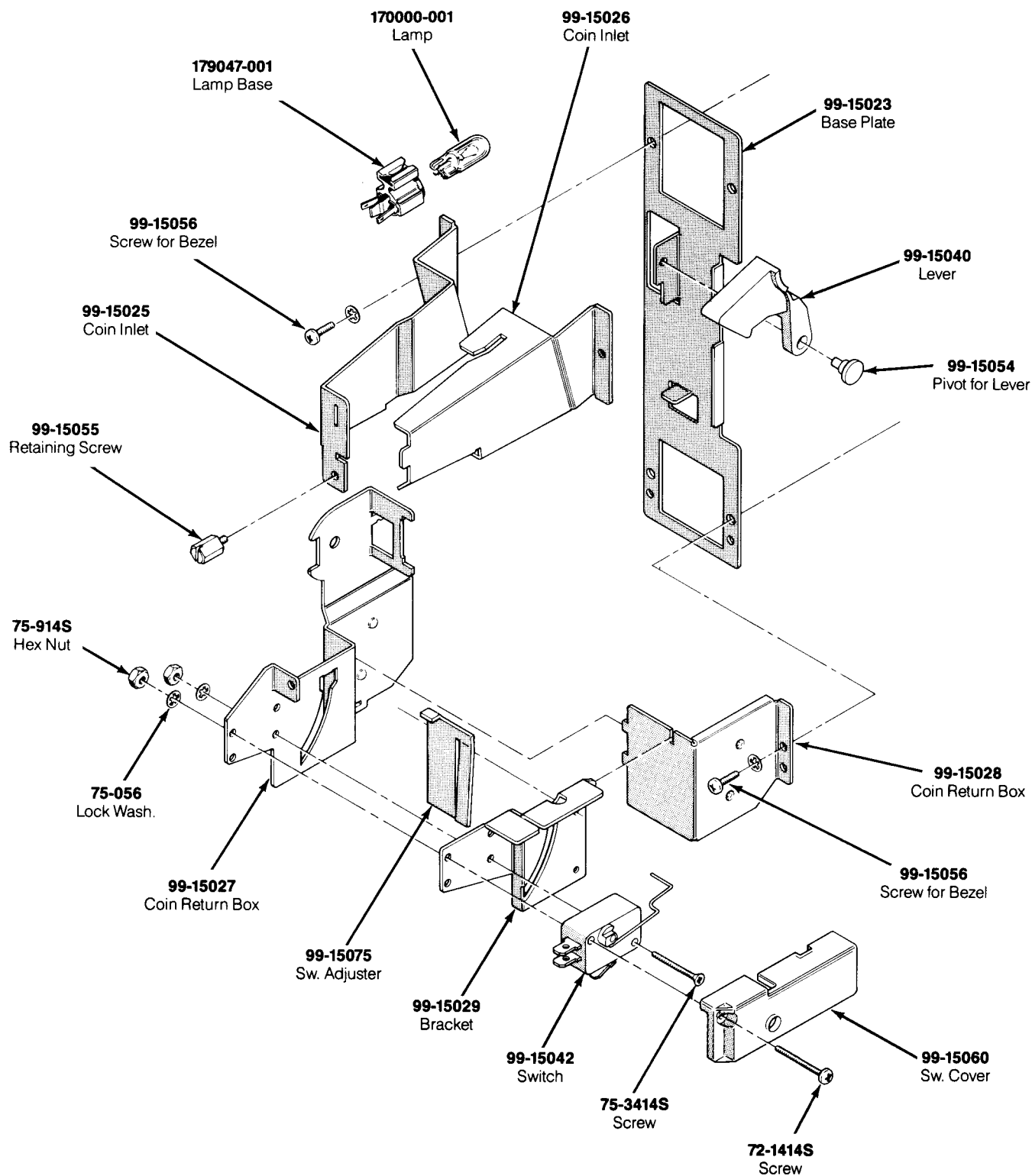
NOTE

Only the Ireland-built cabinet has two coin counters. If using both coin counters, the pad at 10D (pins 11 and 12) on the CPU PCB must be split.

Figure 4-6 Utility Panel Assembly
US-Built Cabinet A042389-01 A
Ireland-Built Cabinet A042389-02 A

Parts List

Part No.	Description
A002465-01	Coin Counter
A038004-01	Utility Harness Assembly
A039248-01	Harness Assembly (Volume Control)
19-9026	Variable Resistor (Volume Control)
62-041	SPDT Pushbutton Auxiliary Coin Switch with Black Cap
69-001	DPDT Self-Test Switch
75-9910W0	$\frac{1}{32}$ -32 Steel Stamped Nut
042388-01	Utility Panel
176018-002	#6-32 x $\frac{1}{2}$ -Inch Thread-Forming Cross-Recessed Pan-Head Screw
179125-001	Grounding Clip



**Figure 4-7 Coin Controls, Inc. Coin Door Assembly
171034-xxx A**

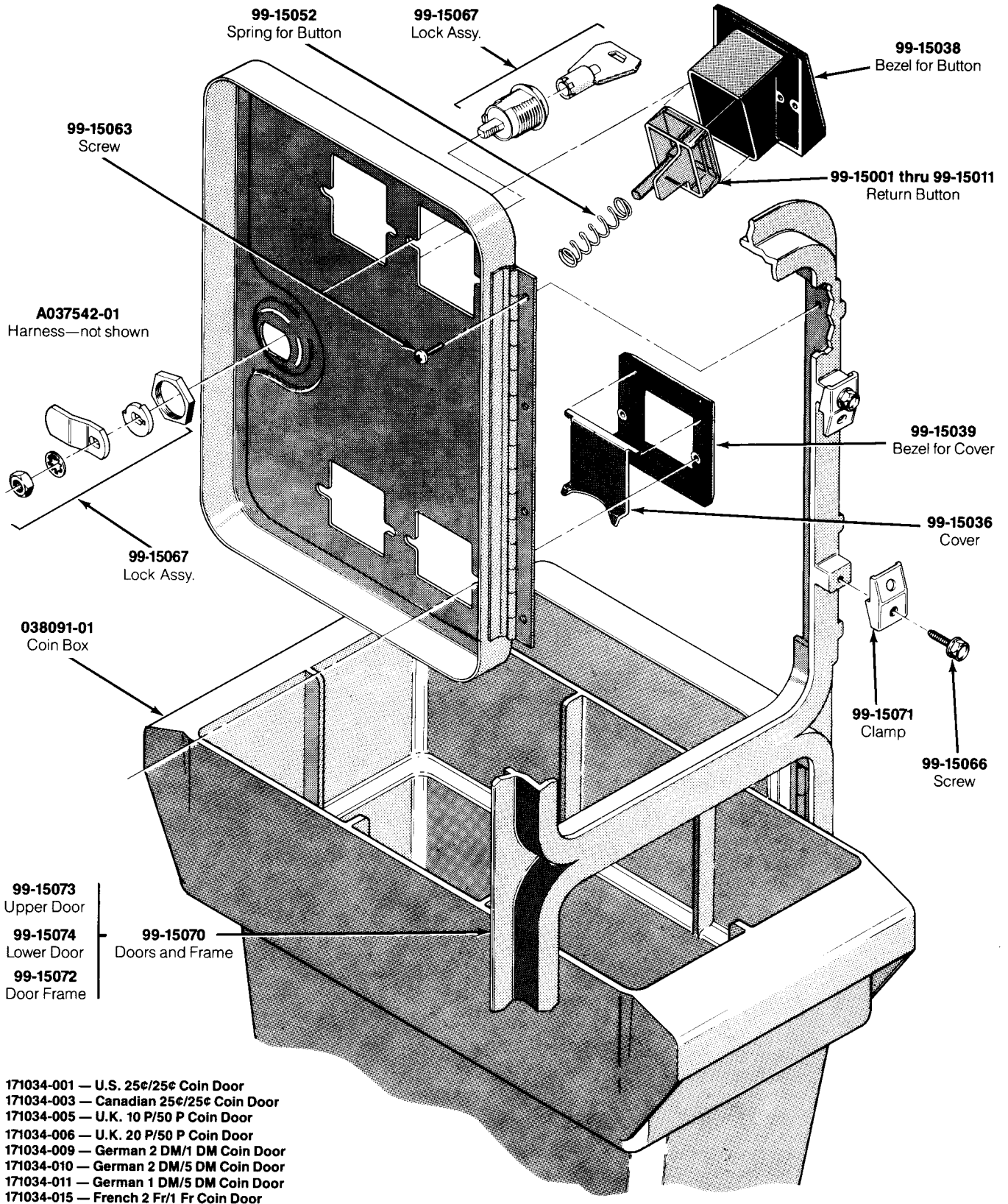
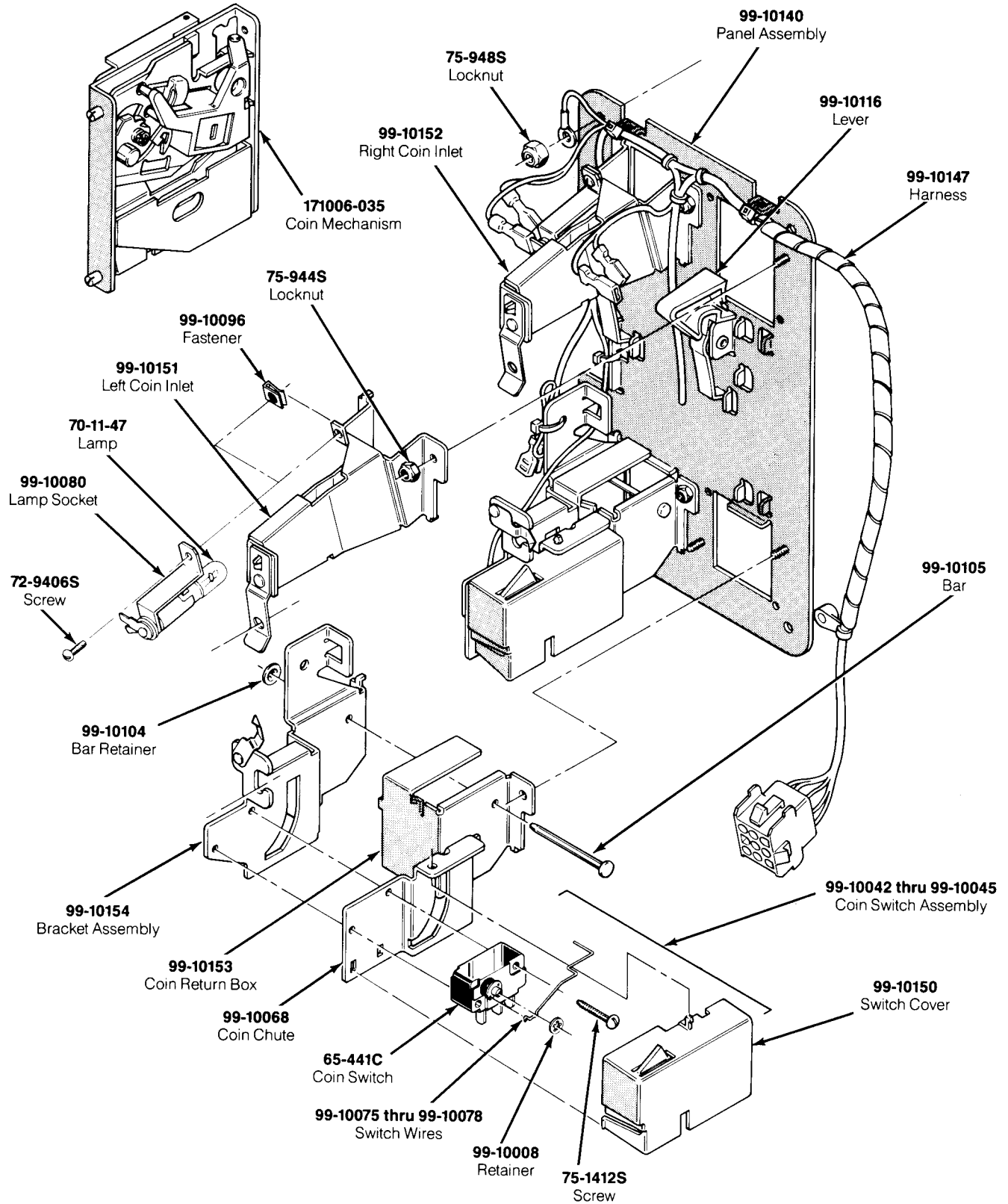


Figure 4-7 Coin Controls, Inc. Coin Door Assembly, continued
 171034-xxx A

Coin Controls, Inc. Coin Door Assembly Parts List

Part No.	Description
A036597-01	Harness Assembly (Ireland-built cabinet only)
A037542-01	Harness Assembly
72-1414S	#4-40 × $\frac{7}{8}$ -Inch Cross-Recessed Pan-Head Steel Machine Screw
75-056	#6 Internal-Tooth Zinc-Plated Steel Lock Washer
75-914S	#4-40 Steel Machine Hex Nut
75-3414S	#4-40 × $\frac{7}{8}$ -Inch 82° Cross-Recessed Flat-Head Steel Machine Screw
99-15001	Coin Return Button with U.S. 25-Cent Price Plate
99-15002	Coin Return Button with U.S. \$1 Price Plate
99-15003	Coin Return Button with German 1 DM Price Plate
99-15004	Coin Return Button with German 2 DM Price Plate
99-15005	Coin Return Button with German 5 DM Price Plate
99-15006	Coin Return Button with Belgian 5 Fr Price Plate
99-15007	Coin Return Button with French 1 Fr Price Plate
99-15008	Coin Return Button with Japanese 100 Yen Price Plate
99-15009	Coin Return Button with British 10 Pence Price Plate
99-15010	Coin Return Button with Australian 20-Cent Price Plate
99-15011	Coin Return Button with Italian 100 Lire Price Plate
99-15025	Left Half of Coin Inlet
99-15026	Right Half of Coin Inlet
99-15027	Side Plate of Coin Return Box
99-15028	Base Plate of Coin Return Box
99-15029	Switch Bracket
99-15036	Metal Coin Return Cover
99-15038	Bezel for Coin Return Button
99-15039	Metal Bezel for Coin Return Button
99-15042	Coin Switch for U.S. 25 Cents
99-15052	Spring for Coin Return Button
99-15055	Retaining Screw
99-15056	#4-40 × $\frac{7}{8}$ -Inch Cross-Recessed Pan-Head Steel Machine Screw
99-15060	Switch Cover
99-15063	Screw for Hinge
99-15066	Screw for Clamp
99-15067	Lock Assembly
99-15070	Doors and Frame
99-15071	Clamp for Frame
99-15072	Door Frame
99-15073	Upper Door
99-15074	Lower Door
99-15075	Switch Adjuster
99-15083	Base Plate—includes:
99-15040	Lever
99-15054	Pivot for Lever
038091-01	Coin Box—not included in assembly (Acceptable substitute is part no. A037491-01)
170000-001	6.3 V Miniature Wedge-Base Incandescent Lamp
171006-035	Metal Coin Mechanism
171050-001	Dual Entry Face Plate
179047-001	Lamp Base



**Figure 4-8 Coin Acceptors, Inc. Coin Door Assembly
171027-001 A**

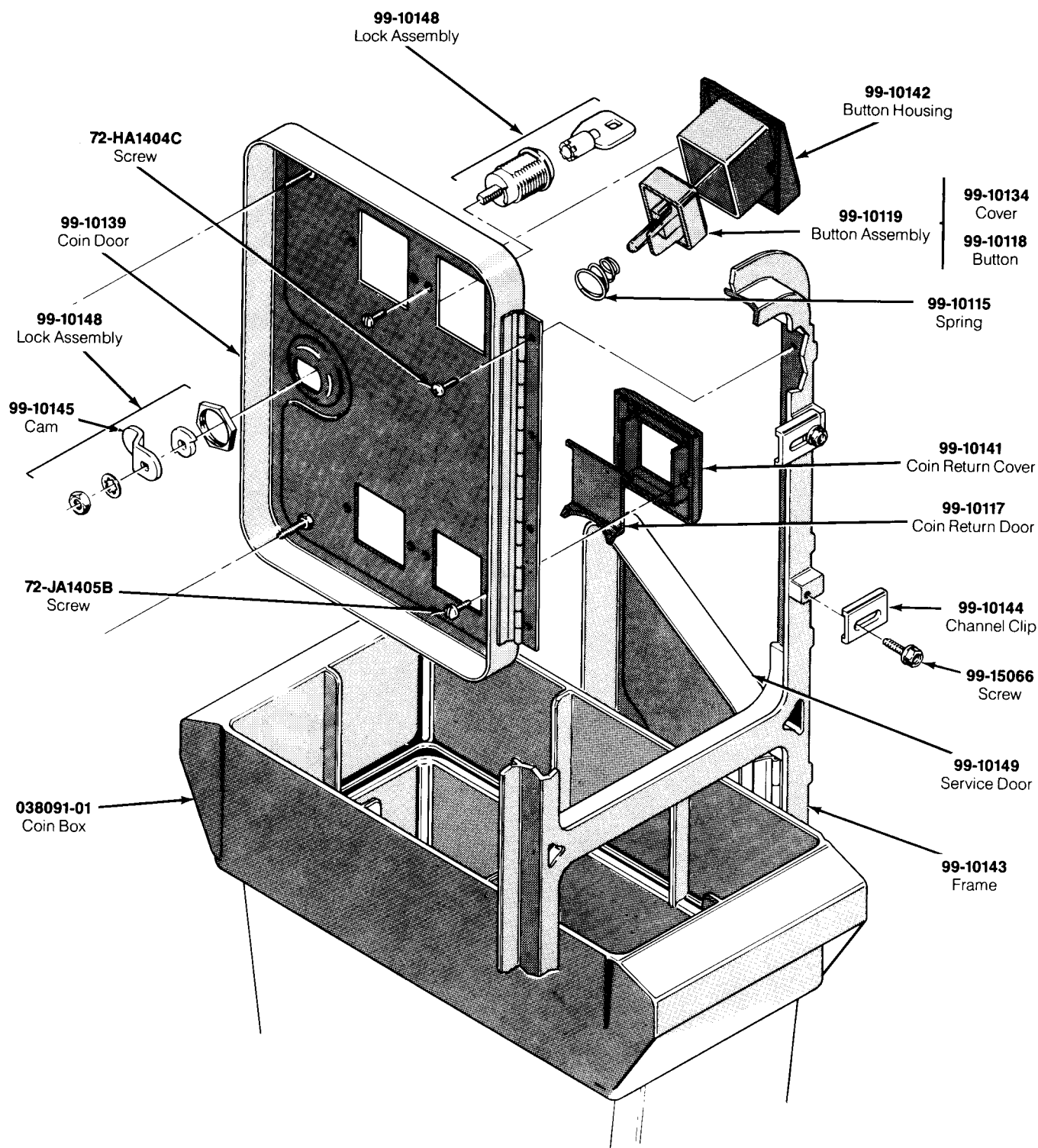


Figure 4-8 Coin Acceptors, Inc. Coin Door Assembly, continued
171027-001 A

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 × $\frac{3}{8}$ -Inch Truss-Head Screw
72-HA1404C	#4-40 × $\frac{1}{4}$ -Inch Pan-Head Screw
72-JA1405B	#4-40 × .31-Inch Pan-Head Screw
75-1412S	#4-40 × $\frac{3}{4}$ -Inch Pan-Head Screw
75-944S	#4-40 Locknut
99-10008	Retainer
99-10042	Coin Switch Assembly for Belgian 5 Fr and U.S. \$.25
99-10043	Coin Switch Assembly for German 1 DM, Japanese 100 Yen, Swiss 1 Fr
99-10044	Coin Switch Assembly for German 2 DM, Italian 100 L, U.S. \$1.00
99-10045	Coin Switch Assembly for Australian \$.20, German 5 DM, British 10 P
99-10068	Coin Return Chute
99-10075	Switch Wire (included in coin switch assembly 99-10043)
99-10076	Switch Wire (included in coin switch assembly 99-10042)
99-10077	Switch Wire (included in coin switch assembly 99-10044)
99-10078	Switch Wire (included in coin switch assembly 99-10045)
99-10080	Lamp Socket
99-10081	Key Holder
99-10096	Fastener
99-10104	Bar Retainer
99-10105	Bar
99-10115	Spring
99-10116	Plastic Coin Return Lever
99-10117	Steel Coin Return Door
99-10118	Amber Coin Return Button
99-10119	Amber Coin Button for U.S. \$.25
99-10134	Coin Button Cover
99-10139	Coin Door
99-10140	Coin Door Inner-Panel Assembly
99-10141	Die-Cast Coin Return Cover
99-10142	Die-Cast Button Housing
99-10143	Coin Door Frame
99-10144	Channel Clip
99-10145	Cam
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
038091-01	Coin Box
171006-035	Metal Coin Mechanism for U.S. +.25
177010-238	#8-32 Hex Locknut

WARNING
Fuse block cover must be in place during game operation.

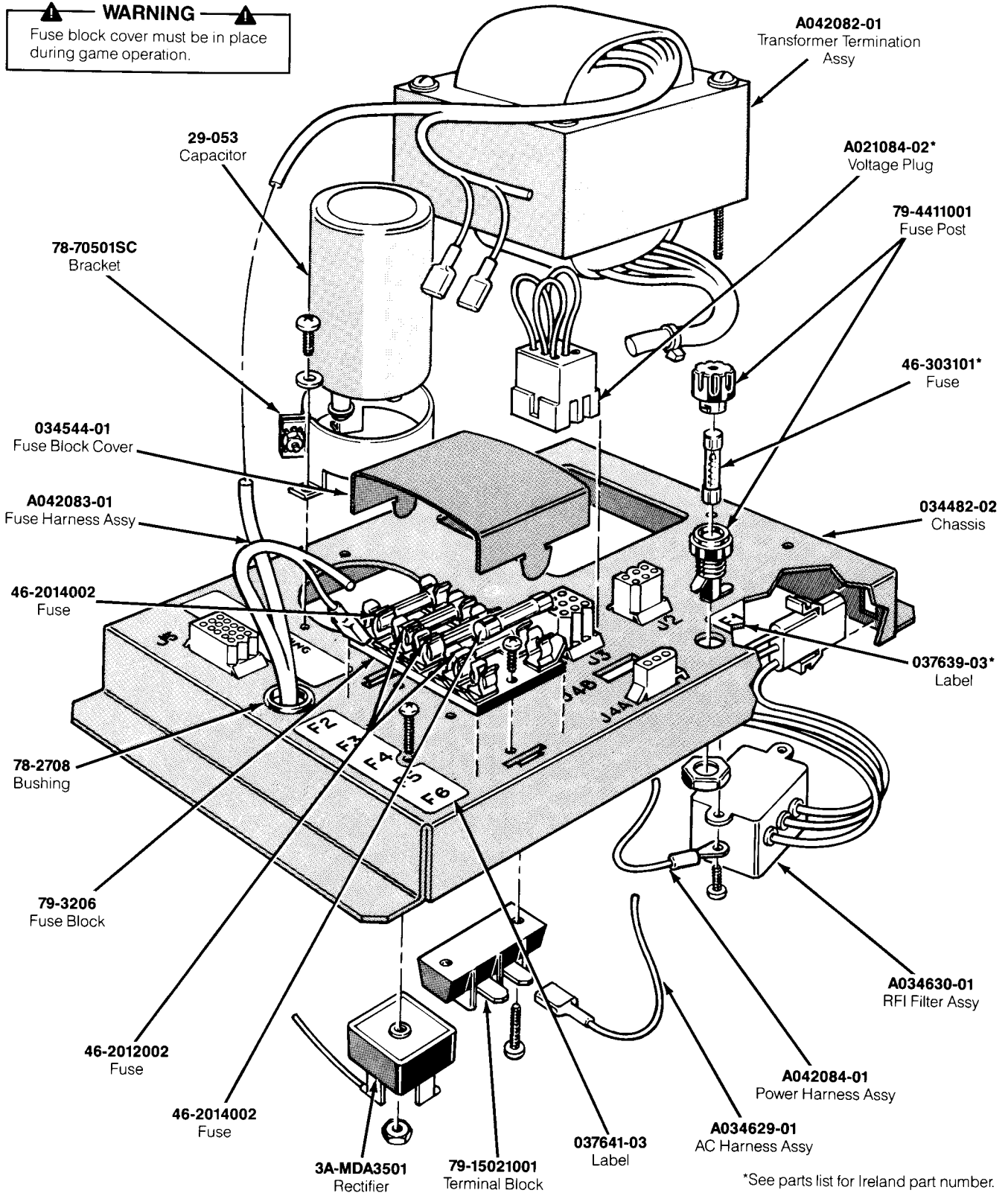
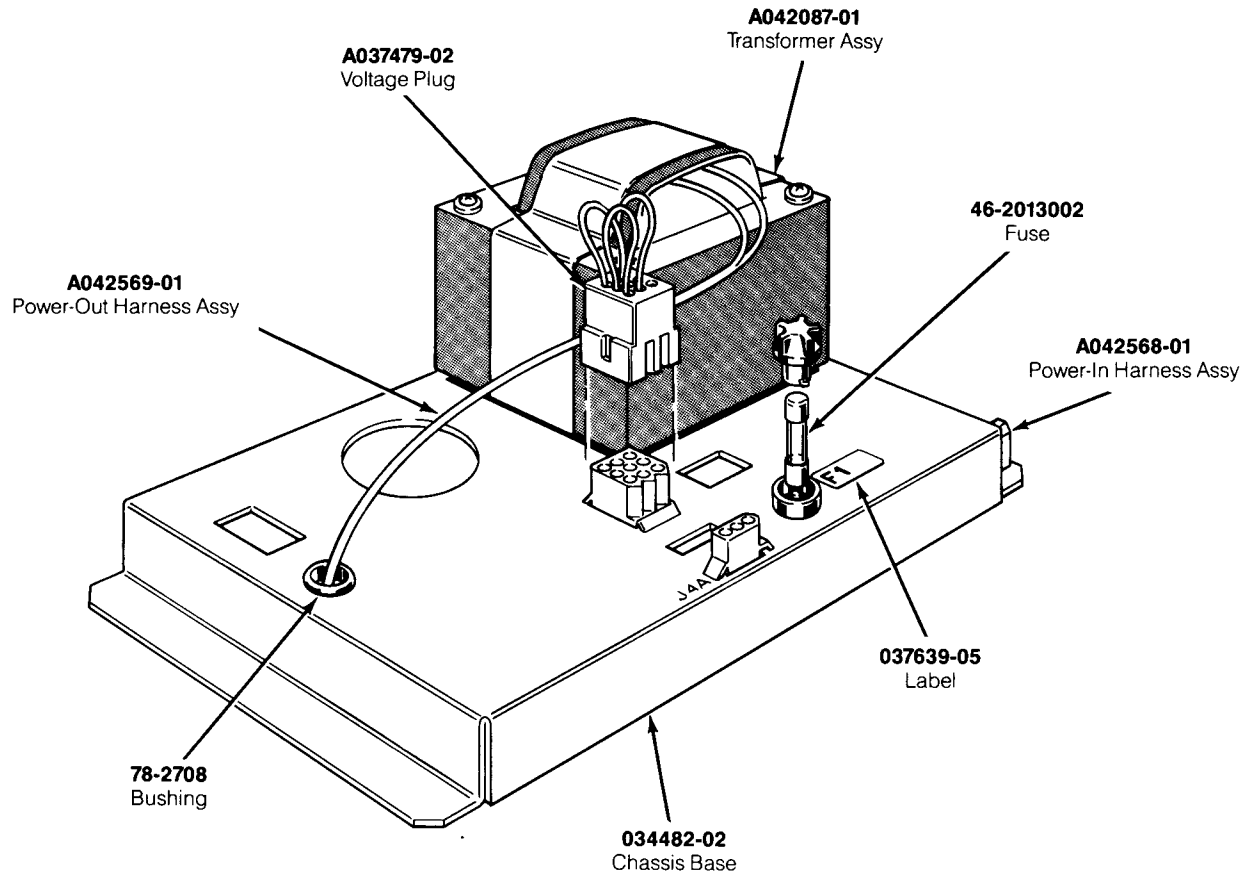


Figure 4-9 Linear Power Supply Assembly
US-Built A042081-01 A Ireland-Built A042081-02 A

Linear Power Supply Assembly Parts List

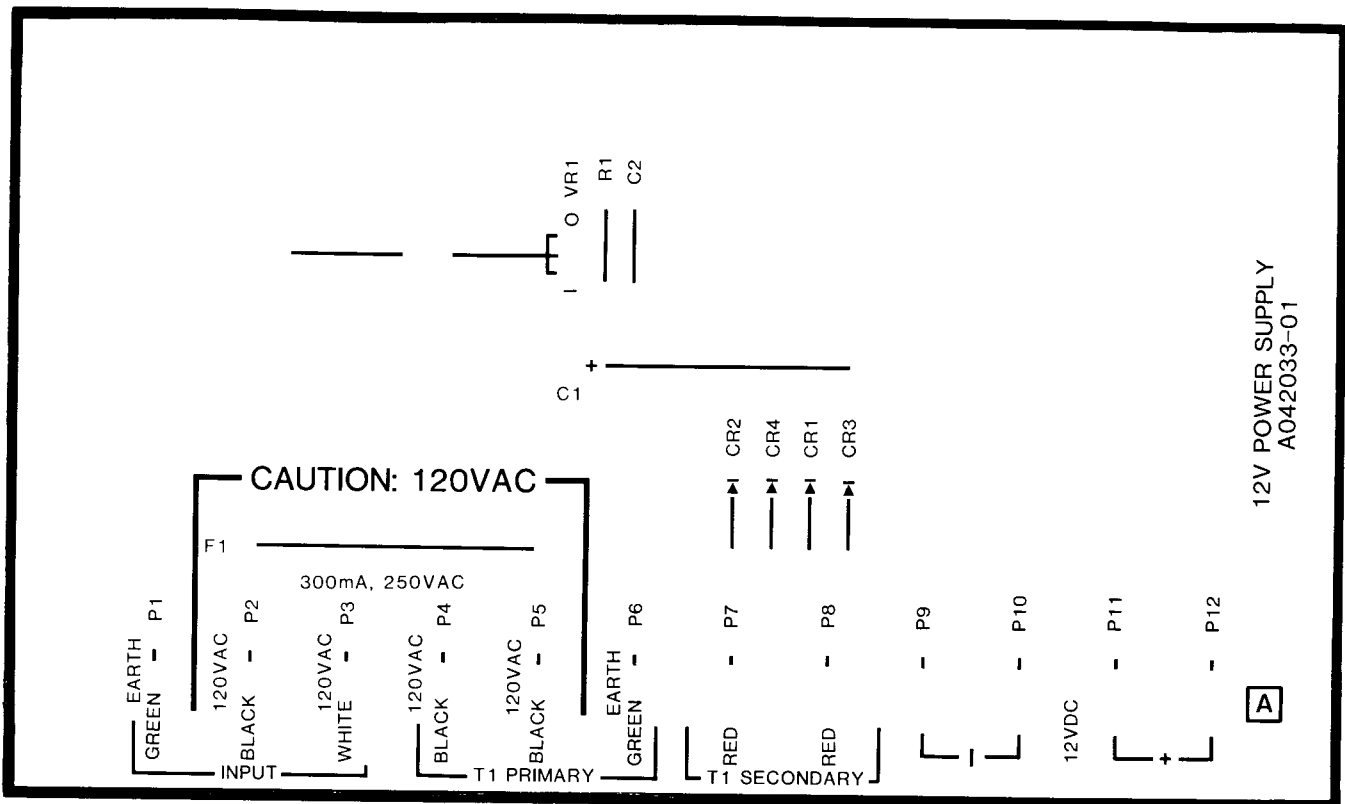
Designator	Description	Part No.
US- and Ireland-Built Games		
CI	27,000 μ F, 15 VDC Electrolytic Capacitor	29-053
CI	2-Inch Diameter Capacitor Mounting Bracket	78-70501SC
CR1	Type-MDA 3501 Bridge Rectifier	3A-MDA3501
F1	Panel-Mounting Non-Indicating 3AG Cartridge-Type Fuse Post	79-4411001
F2	4 A, 250 V, 3AG Slow-Blow Glass Cartridge-Type Fuse	46-2014002
F2-F6	5-Position 3AG Fuse Block with $\frac{1}{4}$ -Inch Quick-Disconnect Terminals	79-3206
F2-F6	Fuse Harness Assembly	A042083-01
F2-F6	Fuse Block Cover	034544-01
F2-F6	Label for Fuse Values	037641-03
F3-F5	2 A, 250 V, Slow-Blow Fuse	46-2012002
F4	2-Circuit Single-Row Terminal Block (located under F4)	79-15021001
F6	4 A, 250 V, 3AG Slow-Blow Glass Cartridge-Type Fuse	46-2014002
FL1	RFI Filter Assembly (designation not marked)	A034630-01
J2	Power Harness Assembly	A042084-01
J4A	AC Harness Assembly	A034629-01
T1	Triple Isolation Transformer Termination Assembly (includes transformer part no. 142009-001)	A042082-01
	Nylon Type 6/6 Hole Bushing with $\frac{3}{8}$ -Inch Inside Diameter \times $\frac{5}{16}$ -Inch Outside Diameter \times $\frac{1}{4}$ -Inch Thick	78-2708
	Power Supply Chassis Base	034482-02
For US-Built Game		
F1	10 A, 125 V, Normal-Blow Fuse	46-303101
F1	Label for Fuse Value	037639-03
J3	Voltage Plug for Jack at J3 (120 V plug has the yellow wires and should be used for 105-135 VAC)	A021084-02
For Ireland-Built Game		
F1	6 $\frac{1}{4}$ A, 250 V, Slow-Blow Fuse	46-2016252
F1	Label for Fuse Value	037639-04
J3	Voltage Plug for Jack at J3 (220 V plug has the blue wires and should be used for 200-240 VAC; 240 V plug has the brown wires and should be used for 220-260 VAC)	A037479-02



**Figure 4-10 Step-Down Power Supply Assembly
Ireland-Built Game A042089-01 A**

Parts List

Designator	Description	Part No.
F1	Label for Fuse Value	037639-05
F1	3 A, 250 V, Slow-Blow Fuse	46-2013002
J3	Voltage Plug for Jack (220 V plug has the blue wires and should be used for 200–240 VAC; 240 V plug has the brown wires and should be used for 220–260 VAC)	A037479-02
J3	Power-In Harness Assembly	A042568-01
J4	Power-Out Harness Assembly	A042569-01
T1	Step-Down Transformer Termination Assembly (includes transformer— part no. 142010-001)	A042087-01
	Nylon Type 6/6 Hole Bushing with $\frac{3}{8}$ -Inch Inside Diameter \times $\frac{5}{16}$ -Inch Outside Diameter \times $\frac{1}{4}$ -Inch Thick	78-2708
	Power Supply Chassis Base	034482-02

12V POWER SUPPLY
A042033-01

A

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**Figure 4-11 TX-1 +12-Volt Power Supply Assembly
A042061-01 A**

Parts List

Designator	Description	Part No.
	+12 V Harness Assembly	A042058-01
	+12 VAC Harness Assembly	A042059-01
C1	1000 μ F, 25 V, Aluminum Electrolytic, Axial-Lead Capacitor	24-250108
C2	0.1 μ F, 50 V, Ceramic-Disc Capacitor	122002-104
CR1-CR4	1 A, 50 V Rectifier	31-1N4001
F1	3 A, 125 V, Pigtail Fuse	146003-022
P1-P12	Test Point	179051-001
R1	1 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-102
VR1	Type-7812 1 A, 12 V Regulator Integrated Circuit Thermalloy Heat Sink	37-7812 178161-001

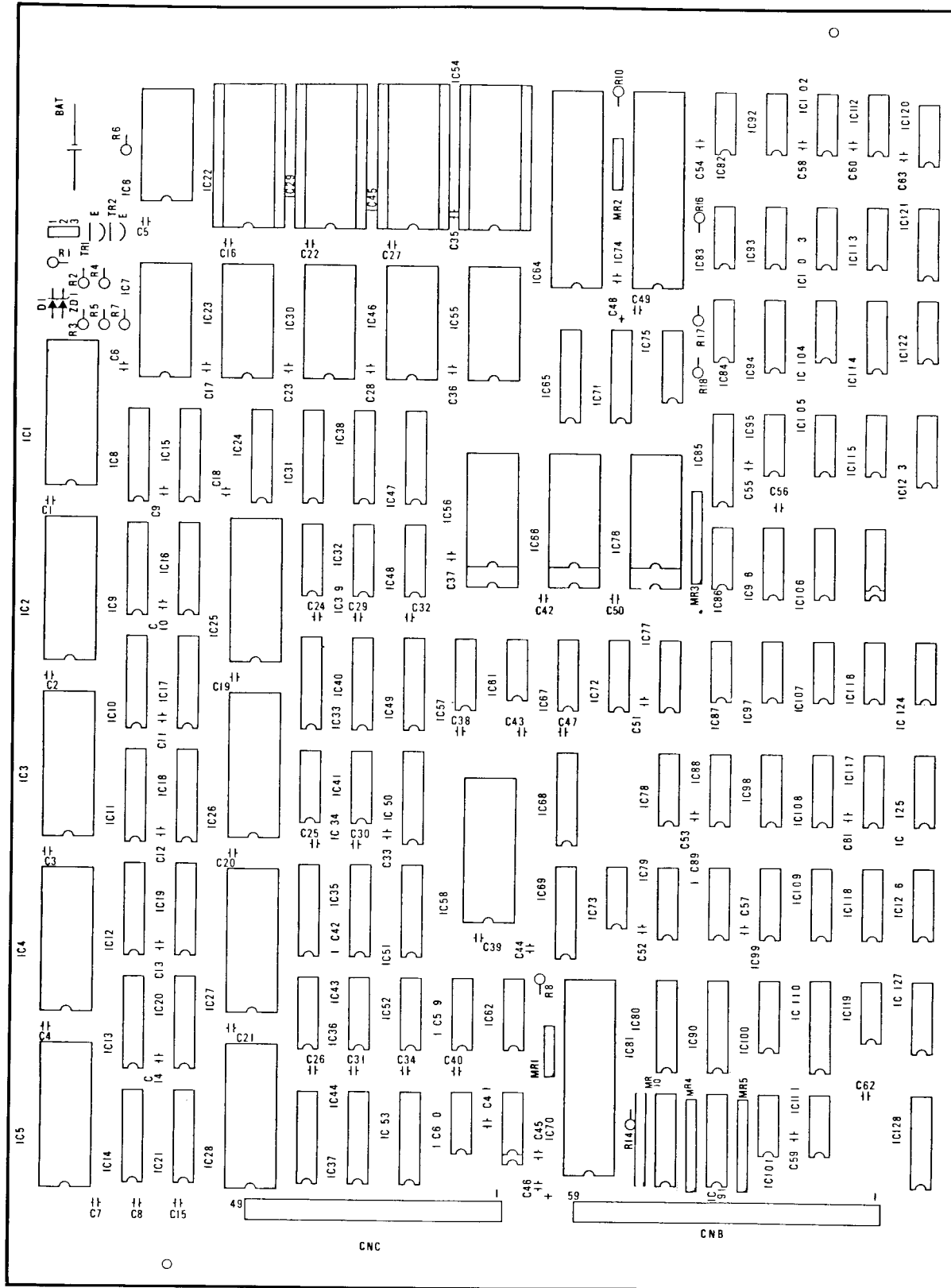


Figure 4-12 TX-1 Main PCB Assembly
A042018-21 A

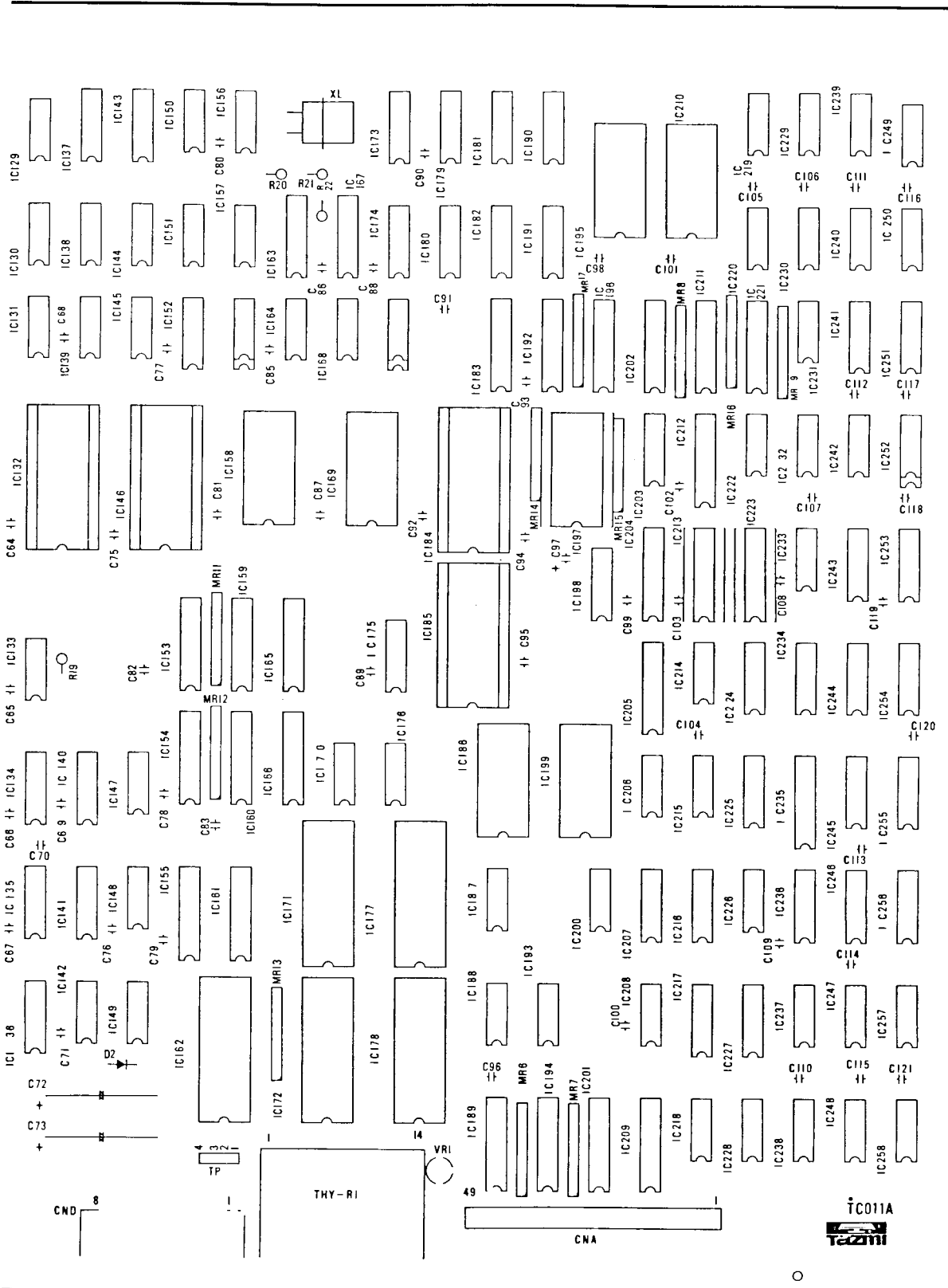


Figure 4-12 TX-1 Main PCB Assembly, continued
A042018-21 A

TX-1 Main PCB Assembly Parts List

Designator	Description	Part No.
Capacitors		
C1-C45	0.002 μ F, 25 V, Ceramic-Disc Capacitor	120008-223
C46	22 μ F, 16 V, Tantalum Capacitor	121027-226
C47, C48	0.002 μ F, 25 V, Ceramic-Disc Capacitor	120008-223
C49	22 μ F, 16 V, Tantalum Capacitor	121027-226
C50-C71	0.002 μ F, 25 V, Ceramic-Disc Capacitor	120008-223
C72	470 μ F, 25 V, Electrolytic Axial-Lead Capacitor	24-250477
C73	1000 μ F, 16 V, Electrolytic Axial-Lead Capacitor	24-160108
C75-C83	0.002 μ F, 25 V, Ceramic-Disc Capacitor	120008-223
C85-C96	0.002 μ F, 25 V, Ceramic-Disc Capacitor	120008-223
C97	22 μ F, 16 V, Tantalum Capacitor	121027-226
C98-C121	0.002 μ F, 25 V, Ceramic-Disc Capacitor	120008-223
Diodes		
D1	Type-1N4148 Diode	131033-001
D2	Type-1N4002 Diode	31-1N4002
ZD1	Type-1N748 Diode	131000-002
Integrated Circuits		
IC1-IC5	Type-TZ1119 Gate Array Integrated Circuit	137369-001
IC6, IC7	Static RAM Integrated Circuit (Acceptable substitute is part no. 137278-001)	137375-001
IC8-IC21	Type-74LS374 Flip-Flop Integrated Circuit	37-74LS374
IC22	PROM Integrated Circuit	137276-250
IC23	Static RAM Integrated Circuit	137211-001
IC24	Type-74LS374 Flip-Flop Integrated Circuit	37-74LS374
IC25-IC28	Type-TZ1119 Gate Array Custom Integrated Circuit	137369-001
IC29	Type-2764-25 PROM Integrated Circuit	137276-250
IC30	Static RAM Integrated Circuit	137211-001
IC31	Type-74LS273 Flip-Flop Integrated Circuit	37-74LS273
IC32	Type-74LS153 Data-Select Integrated Circuit	37-74LS153
IC33	Type-28S42 Integrated Circuit	136027-138
IC34	Type-74LS283 4-Bit Binary Integrated Circuit	137204-001
IC35	Type-TZ0116 Flip-Flop PAL Integrated Circuit	136027-107
IC36	Type-74LS157 Data-Select Integrated Circuit	37-74LS157
IC37	Type-74LS374 Flip-Flop Integrated Circuit	37-74LS374
IC38	Type-74LS273 Flip-Flop Integrated Circuit	37-74LS273
IC39	Type-74LS153 Data-Select Integrated Circuit	37-74LS153
IC40	Type-28S42 Integrated Circuit	136027-139
IC41	Type-74LS283 4-Bit Binary Integrated Circuit	137204-001
IC42	Type-TZ0116 PAL Integrated Circuit	136027-107
IC43	Type-74LS157 Data-Select Integrated Circuit	37-74LS157
IC44	Type-74LS374 Flip-Flop Integrated Circuit	37-74LS374
IC45	PROM Integrated Circuit	137328-004
IC46	Static RAM Integrated Circuit	137211-001
IC47	Type-74LS273 Flip-Flop Integrated Circuit	37-74LS273
IC48	Type-74LS153 Data-Select Integrated Circuit	37-74LS153
IC49	Type-28S42 Integrated Circuit	136027-140

(continued on next page)

TX-1 Main PCB Assembly Parts List, continued

Designator	Description	Part No.
IC50	Type-28S42 Integrated Circuit	136027-141
IC51	Type-TZ0116 PAL Integrated Circuit	136027-107
IC52	Type-74LS157 Data-Select Integrated Circuit	37-74LS157
IC53	Type-74LS374 Flip-Flop Integrated Circuit	37-74LS374
IC54	PROM Integrated Circuit	137328-004
IC55	Static RAM Integrated Circuit	137211-001
IC56	PROM Integrated Circuit	137276-300
IC57	Type-74LS153 Data-Select Integrated Circuit	37-74LS153
IC58	Type-TZ0113 Gate Array Custom PAL Integrated Circuit	136027-104
IC59	Type-74LS157 Data-Select Integrated Circuit	37-74LS157
IC60, IC61	Type-74LS00 NAND Gate Integrated Circuit	37-74LS00
IC62	Type-74LS174 Flip-Flop Integrated Circuit	37-74LS174
IC64	CRT Controller Integrated Circuit	137381-001
IC65	Type-74LS373 Octal D-Type Integrated Circuit	37-74LS373
IC66	PROM Integrated Circuit	137276-300
IC67	Type-74LS161 4-Bit Counter Integrated Circuit	37-74LS161
IC68	Type-TZ0115 PAL Integrated Circuit	136027-106
IC69	Type-TZ0114 PAL Integrated Circuit	136027-105
IC70	Microprocessor Integrated Circuit	137379-001
IC71	Type-74LS373 Octal D-Type Integrated Circuit	37-74LS373
IC72	Type-74LS157 Data-Select Integrated Circuit	37-74LS157
IC73	Type-74LS04 Hex Inverter Integrated Circuit	37-74LS04
IC74	Microprocessor Integrated Circuit	137379-001
IC75	Type-74LS375 4-Bit Bistable Integrated Circuit	137286-001
IC76	PROM Integrated Circuit	137276-300
IC77	Type-74LS157 Data-Select Integrated Circuit	37-74LS157
IC78	Type-74LS161 4-Bit Counter Integrated Circuit	37-74LS161
IC80	Type-74LS373 Octal D-Type Integrated Circuit	37-74LS373
IC81	Type-74LS245 Tri State Octal-Bus Integrated Circuit	37-74LS245
IC82	Type-74LS04 Hex Inverter Integrated Circuit	37-74LS04
IC83	Type-74LS02 NOR Gate Integrated Circuit	37-74LS02
IC84	Type-74LS74 Flip-Flop Integrated Circuit	37-74LS74
IC85	Type-74LS240 Integrated Circuit	137251-001
IC86	Type-74LS10 Flip-Flop Integrated Circuit	37-74LS10
IC87	Type-74LS51 AND-OR-Invert Gate Integrated Circuit	137266-001
IC88, IC89	Type-74LS161 4-Bit Counter Integrated Circuit	37-74LS161
IC90	Type-74LS373 Octal D-Type Integrated Circuit	37-74LS373
IC91	Type-74LS245 Tri State Octal-Bus Integrated Circuit	37-74LS245
IC92	Type-74LS02 NOR Gate Integrated Circuit	37-74LS02
IC93	Type-74LS10 Flip-Flop Integrated Circuit	37-74LS10
IC94	Type-74LS367 Integrated Circuit	37-74LS36
IC95	Type-74LS74 Flip-Flop Integrated Circuit	37-74LS74
IC96	Type-74LS161 4-Bit Counter Integrated Circuit	37-74LS161
IC97	Type-74LS27 NOR Gate Integrated Circuit	37-74LS27
IC98, IC99	Type-74LS161 4-Bit Counter Integrated Circuit	37-74LS161
IC100	Type-74LS367 Integrated Circuit	37-74LS367

(continued on next page)

TX-1 Main PCB Assembly Parts List, continued

Designator	Description	Part No.
IC101	Type-74LS32 OR Gate Integrated Circuit	37-74LS32
IC102	Type-74LS74 Flip-Flop Integrated Circuit	37-74LS74
IC103	Type-74LS27 NOR Gate Integrated Circuit	37-74LS27
IC104, IC105	Type-74LS02 NOR Gate Integrated Circuit	37-74LS02
IC106	Type-74LS175 Flip-Flop Integrated Circuit	37-74LS175
IC107	Type-74LS10 Flip-Flop Integrated Circuit	37-74LS10
IC108, IC109	Type-74LS161 4-Bit Counter Integrated Circuit	37-74LS161
IC111, IC112	Type-74LS32 OR Gate Integrated Circuit	37-74LS32
IC113	Type-74LS00 NAND Gate Integrated Circuit	37-74LS00
IC114	Type-74LS139 Integrated Circuit	37-74LS139
IC115	Type-74LS74 Flip-Flop Integrated Circuit	37-74LS74
IC116	Type-74LS04 Hex Inverter Integrated Circuit	37-74LS04
IC117, IC118	Type-74LS161 4-Bit Counter Integrated Circuit	37-74LS161
IC119	Type-74LS27 NOR Gate Integrated Circuit	37-74LS27
IC120	Type-74LS10 Flip-Flop Integrated Circuit	37-74LS10
IC121	Type-74LS138 Integrated Circuit	137177-001
IC122	Type-7400 NAND Gate Integrated Circuit	37-7400
IC123	Type-74LS174 Flip-Flop Integrated Circuit	37-74LS174
IC124	Type-74LS266 Integrated Circuit	37-74LS266
IC125-IC127	Type-74LS161 4-Bit Counter Integrated Circuit	37-74LS161
IC128	Type-74LS374 Flip-Flop Integrated Circuit	37-74LS374
IC129	Type-74LS00 NAND Gate Integrated Circuit	37-74LS00
IC130	Type-74LS161 4-Bit Counter Integrated Circuit	37-74LS161
IC131	Type-74S113 Integrated Circuit	137373-001
IC132	PROM Integrated Circuit	137328-004
IC133	Type-74LS266 Integrated Circuit	37-74LS266
IC135	Type-74LS161 4-Bit Counter Integrated Circuit	37-74LS161
IC137	Type-74LS175 Flip-Flop Integrated Circuit	37-74LS175
IC138	Type-74LS10 Flip-Flop Integrated Circuit	37-74LS10
IC139	Type-74LS04 Hex Inverter Integrated Circuit	37-74LS04
IC140, IC141	Type-74LS161 4-Bit Counter Integrated Circuit	37-74LS161
IC142	Type-74LS02 NOR Gate Integrated Circuit	37-74LS02
IC143	Type-74LS175 Flip-Flop Integrated Circuit	37-74LS175
IC144	Type-74LS32 OR Gate Integrated Circuit	37-74LS32
IC145	Type-74LS107 Flip-Flop Integrated Circuit	137169-001
IC146	PROM Integrated Circuit	137328-004
IC147	Type-74LS27 NOR Gate Integrated Circuit	37-74LS27
IC148	Type-74LS00 NAND Gate Integrated Circuit	37-74LS00
IC149	Type-74LS27 NOR Gate Integrated Circuit	37-74LS27
IC150	Type-74LS10 Flip-Flop Integrated Circuit	37-74LS10
IC151	Type-74LS74 Flip-Flop Integrated Circuit	37-74LS74
IC152	Type-74LS375 4-Bit Bistable Integrated Circuit	137286-001
IC153, IC154	Type-74LS245 Tri State Octal-Bus Integrated Circuit	37-74LS245
IC155	Type-TZ0111 PAL Integrated Circuit	136027-101
IC156	Type-74LS164 Integrated Circuit	37-74LS164
IC157	Type-74S04 Hex Inverter Integrated Circuit	37-74S04

(continued on next page)

TX-1 Main PCB Assembly Parts List, continued

Designator	Description	Part No.
IC158	Static RAM Integrated Circuit	137211-001
IC159	Type-74LS373 Octal D-Type Integrated Circuit	37-74LS373
IC161	Type-TZ0110 PAL Integrated Circuit	136027-102
IC162	Type-TZ1113 Gate Array Custom Integrated Circuit	137368-001
IC163	Type-8284A Integrated Circuit	137383-001
IC164	Type-74LS04 Hex Inverter Integrated Circuit	37-74LS04
IC165, IC166	Type-74LS244 Driver/Receiver Integrated Circuit	37-74LS244
IC167	Type-8284A Integrated Circuit	137383-001
IC168	Type-74LS373 Octal D-Type Integrated Circuit	37-74LS373
IC169	Static RAM Integrated Circuit	137211-001
IC170	Type-74LS04 Hex Inverter Integrated Circuit	37-74LS04
IC171, IC172	Type-TZ1113 Gate Array Custom Integrated Circuit	137368-001
IC173, IC174	Type-74LS158 Data-Select Integrated Circuit	137203-001
IC175	Type-74LS157 Data-Select Integrated Circuit	37-74LS157
IC176	Type-74LS51 AND-OR-Invert Gate Integrated Circuit	137266-001
IC177, IC178	Type-TZ1113 Gate Array Custom Integrated Circuit	137368-001
IC179-IC182	Type-74LS158 Data-Select Integrated Circuit	137203-001
IC183	Type-74LS374 Flip-Flop Integrated Circuit	37-74LS374
IC184, IC185	PROM Integrated Circuit	137328-004
IC186	Type-74198 Shift Register Integrated Circuit	137350-001
IC187	Type-74LS02 NOR Gate Integrated Circuit	37-74LS02
IC188	Type-74LS32 OR Gate Integrated Circuit	37-74LS32
IC189	Type-74LS245 Tri State Octal-Bus Integrated Circuit	37-74LS245
IC190, IC191	Type-74LS158 Data-Select Integrated Circuit	137203-001
IC192	Type-74LS374 Flip-Flop Integrated Circuit	37-74LS374
IC193	Type-74LS32 OR Gate Integrated Circuit	37-74LS32
IC194	Type-74LS245 Tri State Octal-Bus Integrated Circuit	37-74LS245
IC195	Static RAM Integrated Circuit	137211-001
IC197	Type-74S516 Multiplier/Divider Integrated Circuit	137370-001
IC198	Type-74LS157 Data-Select Integrated Circuit	37-74LS157
IC199	Type-74198 Shift Register Integrated Circuit	137350-001
IC200	Type-74LS08 AND Gate Integrated Circuit	37-74LS08
IC201	Type-74LS244 Driver/Receiver Integrated Circuit	37-74LS244
IC202	Type-74LS245 Tri State Octal-Bus Integrated Circuit	37-74LS245
IC203	Type-74LS42 Integrated Circuit	37-74LS42
IC204	Type-74LS273 Flip-Flop Integrated Circuit	37-74LS273
IC205	Type-TZ0112 PAL Integrated Circuit	136027-103
IC206	Type-74LS74 Flip-Flop Integrated Circuit	37-74LS74
IC207	Type-74LS157 Data-Select Integrated Circuit	37-74LS157
IC208	Type-74LS04 Hex Inverter Integrated Circuit	37-74LS04
IC209	Type-74LS244 Driver/Receiver Integrated Circuit	37-74LS244
IC210	Static RAM Integrated Circuit	137211-001
IC211	Type-74LS245 Tri State Octal-Bus Integrated Circuit	37-74LS245
IC212	Type-74LS273 Flip-Flop Integrated Circuit	37-74LS273
IC213	Type-28S42 Integrated Circuit	136027-142
IC214	Type-74LS08 AND Gate Integrated Circuit	37-74LS08

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TX-1 Main PCB Assembly Parts List, continued

Designator	Description	Part No.
IC215	Type-74LS32 OR Gate Integrated Circuit	37-74LS32
IC216	Type-74LS166 Integrated Circuit	37-74LS166
IC217	Type-74LS175 Flip-Flop Integrated Circuit	37-74LS175
IC218	Type-74LS00 NAND Gate Integrated Circuit	37-74LS00
IC219	Type-74LS27 NOR Gate Integrated Circuit	37-74LS27
IC220	Type-74LS10 Flip-Flop Integrated Circuit	37-74LS10
IC221	Type-74LS245 Tri State Octal-Bus Integrated Circuit	37-74LS245
IC222	Type-74LS02 NOR Gate Integrated Circuit	37-74LS02
IC224	Type-74LS161 4-Bit Counter Integrated Circuit	37-74LS161
IC226	Type-74LS00 NAND Gate Integrated Circuit	37-74LS00
IC227	Type-74LS175 Flip-Flop Integrated Circuit	37-74LS175
IC229	Type-74LS107 Flip-Flop Integrated Circuit	137169-001
IC230	Type-74LS08 AND Gate Integrated Circuit	37-74LS08
IC231	Type-74LS74 Flip-Flop Integrated Circuit	37-74LS74
IC232, IC233	Type-74LS02 NOR Gate Integrated Circuit	37-74LS02
IC234, IC236	Type-74LS378 Flip-Flop Integrated Circuit	137305-001
IC235	Type-74LS377 Flip-Flop Integrated Circuit	37-74LS377
IC237	Type-74LS32 OR Gate Integrated Circuit	37-74LS32
IC238	Type-74LS04 Hex Inverter Integrated Circuit	37-74LS04
IC239	Type-74LS74 Flip-Flop Integrated Circuit	37-74LS74
IC240	Type-74LS02 NOR Gate Integrated Circuit	37-74LS02
IC241	Type-74LS174 Flip-Flop Integrated Circuit	37-74LS174
IC242	Type-74LS107 Flip-Flop Integrated Circuit	137169-001
IC243-IC246	Type-74LS253 Data-Select Integrated Circuit	37-74LS253
IC247	Type-74LS02 NOR Gate Integrated Circuit	37-74LS02
IC248	Type-74LS00 NAND Gate Integrated Circuit	37-74LS00
IC249	Type-74LS32 OR Gate Integrated Circuit	37-74LS32
IC250	Type-74LS107 Flip-Flop Integrated Circuit	137169-001
IC251	Type-74LS157 Data-Select Integrated Circuit	37-74LS157
IC253-IC256	Type-74LS253 Data-Select Integrated Circuit	37-74LS253
IC257	Type-74LS74 Flip-Flop Integrated Circuit	37-74LS74
IC258	Type-74LS00 Integrated Circuit	37-74LS00
THY-R1	Hybrid Integrated Circuit	137637-001
Resistors		
MR3	1 k Ω \times 8, $\frac{1}{8}$ W Single-Inline-Package Resistor	118002-102
MR4-MR6	10 k Ω \times 8, $\frac{1}{8}$ W Single-Inline-Package Resistor	118002-103
MR8-MR10	4.7 k Ω \times 8, $\frac{1}{8}$ W Single-Inline-Package Resistor	118002-472
MR11, MR12	10 k Ω \times 8, $\frac{1}{8}$ W Single-Inline-Package Resistor	118002-103
MR13	4.7 k Ω \times 8, $\frac{1}{8}$ W Single-Inline-Package Resistor	118002-472
MR14-MR17	10 k Ω \times 8, $\frac{1}{8}$ W Single-Inline-Package Resistor	118002-103
R1	470 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-471
R2	1 k Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-102
R3	22 k Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-223
R4	330 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-331

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TX-1 Main PCB Assembly Parts List, continued

Designator	Description	Part No.
R5	1 k Ω , $\pm 5\%$, ¼ W Resistor	110000-102
R6, R7	2.2 k Ω , $\pm 5\%$, ¼ W Resistor	110000-222
R8	1 k Ω , $\pm 5\%$, ¼ W Resistor	110000-102
R10	1 k Ω , $\pm 5\%$, ¼ W Resistor	110000-102
R14	1 k Ω , $\pm 5\%$, ¼ W Resistor	110000-102
R16–R19	1 k Ω , $\pm 5\%$, ¼ W Resistor	110000-102
R20, R21	510 Ω , $\pm 5\%$, ¼ W Resistor	110000-511
R22	1 k Ω , $\pm 5\%$, ¼ W Resistor	110000-102
Transistors		
TR1	Type-2N3904 Transistor	34-2N3904
TR2	Type-2N3906 Transistor	33-2N3906
VR1	10 k Ω Variable Resistor	119002-103
Sockets		
IC1–IC5	28-Pin Medium Insertion Integrated Circuit Socket	79-42C28
IC6, IC7	24-Pin Medium Insertion Integrated Circuit Socket	79-42C24
IC22	28-Pin Medium Insertion Integrated Circuit Socket	79-42C28
IC23	24-Pin Medium Insertion Integrated Circuit Socket	79-42C24
IC25–IC29	28-Pin Medium Insertion Integrated Circuit Socket	79-42C28
IC30	24-Pin Medium Insertion Integrated Circuit Socket	79-42C24
IC45	28-Pin Medium Insertion Integrated Circuit Socket	79-42C28
IC46	24-Pin Medium Insertion Integrated Circuit Socket	79-42C24
IC54	28-Pin Medium Insertion Integrated Circuit Socket	79-42C28
IC55	24-Pin Medium Insertion Integrated Circuit Socket	79-42C24
IC56	28-Pin Medium Insertion Integrated Circuit Socket	79-42C28
IC58	28-Pin Medium Insertion Integrated Circuit Socket	79-42C28
IC64	40-Pin Medium Insertion Integrated Circuit Socket	79-42C40
IC66	28-Pin Medium Insertion Integrated Circuit Socket	79-42C28
IC70	40-Pin Medium Insertion Integrated Circuit Socket	79-42C40
IC74	40-Pin Medium Insertion Integrated Circuit Socket	79-42C40
IC76	28-Pin Medium Insertion Integrated Circuit Socket	79-42C28
IC132	28-Pin Medium Insertion Integrated Circuit Socket	79-42C28
IC146	28-Pin Medium Insertion Integrated Circuit Socket	79-42C28
IC158	24-Pin Medium Insertion Integrated Circuit Socket	79-42C24
IC162	28-Pin Medium Insertion Integrated Circuit Socket	79-42C28
IC169	24-Pin Medium Insertion Integrated Circuit Socket	79-42C24
IC171, IC172	28-Pin Medium Insertion Integrated Circuit Socket	79-42C28
IC177, IC178	28-Pin Medium Insertion Integrated Circuit Socket	79-42C28
IC184, IC185	28-Pin Medium Insertion Integrated Circuit Socket	79-42C28
IC195	24-Pin Medium Insertion Integrated Circuit Socket	79-42C24
IC197	24-Pin Medium Insertion Integrated Circuit Socket	79-42C24
IC210	24-Pin Medium Insertion Integrated Circuit Socket	79-42C24

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**TX-1 Main PCB Assembly
Parts List, continued**

Designator	Description	Part No.
Miscellaneous		
	50-Circuit Header Connector	179206-050
	2-Circuit Connector Receptacle	179178-002
	60-Circuit Header Connector	179206-060
	8-Circuit Header Connector	179207-008
	3-Circuit Header Connector	179048-003
	3.6 V Battery	171069-001
XL1	15 MHz Crystal	144002-002

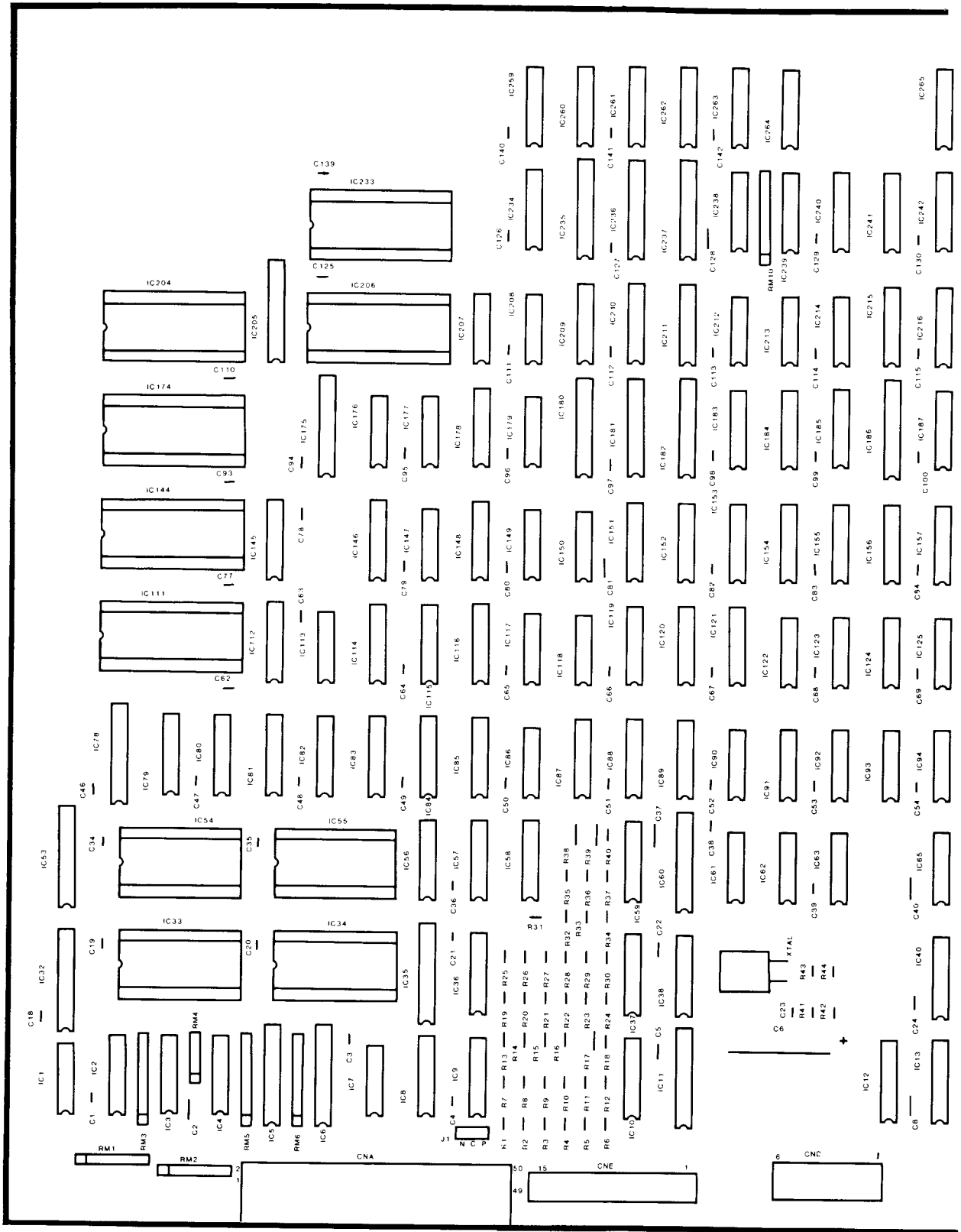


Figure 4-13 TX-1 Graphics PCB Assembly
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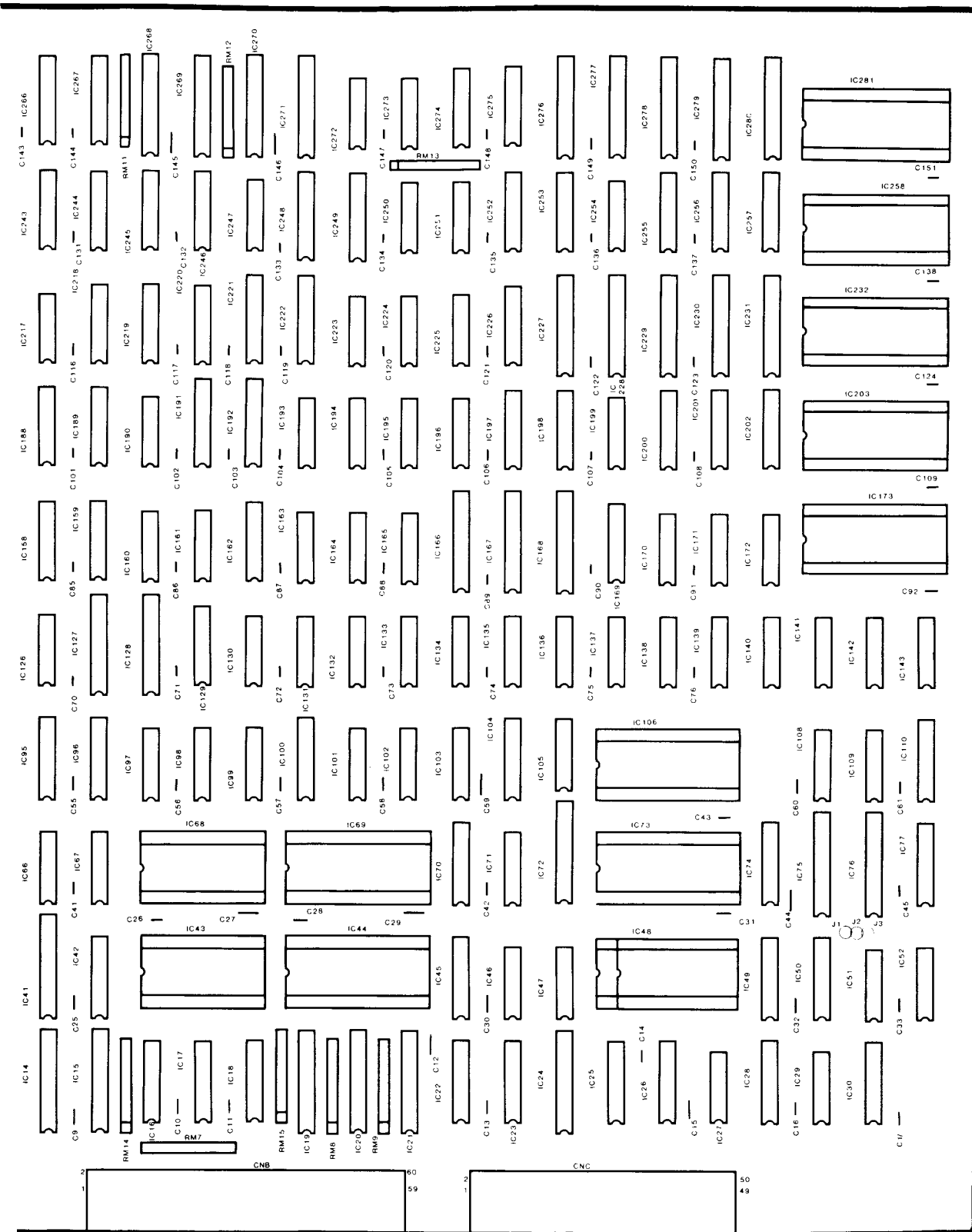


Figure 4-13 TX-1 Graphics PCB Assembly, continued
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TX-1 Graphics PCB Assembly Parts List

Designator	Description	Part No.
Capacitors		
C1-C5	0.002 μ F, 25 V, Ceramic-Disc Radial-Lead Capacitor	120008-223
C6	1000 μ F, 16 V, Electrolytic Axial-Lead Capacitor	24-160108
C7-C22	0.002 μ F, 25 V, Ceramic-Disc Radial-Lead Capacitor	120008-223
C23	100 pF, 50 V, Ceramic-Disc NPO Capacitor	121020-101
C24-C149	0.002 μ F, 25 V, Ceramic-Disc Radial-Lead Capacitor	120008-223
Connectors		
J1	2-Circuit Receptacle Connector	179178-002
J1	3-Circuit Header Connector	179048-003
CNA, CNC	50-Circuit Header Connector	179206-150
CNB	60-Circuit Header Connector	179206-160
CND	6-Circuit Header Connector	179207-006
CNE	15-Circuit Header Connector	179205-015
Crystal		
Y1	18 MHz Crystal	144002-003
Integrated Circuits		
IC1	Type-74LS74 Dual D-Type Flip-Flop Integrated Circuit	37-74LS74
IC2-IC4	Type-74LS257 Data Select/Multiplexer Integrated Circuit	37-74LS257
IC5, IC6	Type-74LS245 Transceiver Integrated Circuit	37-74LS245
IC7	Type 74LS04 Hex Inverter Integrated Circuit	37-74LS04
IC8	PROM Integrated Circuit	136027-133
IC9	PROM Integrated Circuit	136027-134
IC10	PROM Integrated Circuit	136027-135
IC11	Type-74LS273 Octal D-Type Flip-Flop Integrated Circuit	37-74LS273
IC12	Type-74LS157 Quad Data Select/Multiplexer Integrated Circuit	37-74LS157
IC13	Type-74LS85 Comparator Integrated Circuit	37-74LS85
IC14	Type-74LS273 Octal D-Type Flip-Flop Integrated Circuit	37-74LS273
IC15	Type-74LS244 Line Driver/Receiver Integrated Circuit	37-74LS244
IC16-IC18	Type-74LS157 Quad Data Select/Multiplexer Integrated Circuit	37-74LS157
IC19, IC20	Type-74LS245 Transceiver Integrated Circuit	37-74LS245
IC21	Type-74LS244 Line Driver/Receiver Integrated Circuit	37-74LS244
IC22, IC23	Type-74LS42 Decoder Integrated Circuit	37-74LS42
IC24	Type-74LS273 Octal D-Type Flip-Flop Integrated Circuit	37-74LS273
IC25	PROM Integrated Circuit	136027-123
IC26	Type-74LS174 Hex D-Type Flip-Flop Integrated Circuit	37-74LS174
IC27	Type-74LS27 NOR Gate Integrated Circuit	37-74LS27
IC28	Type-74LS174 Hex D-Type Flip-Flop Integrated Circuit	37-74LS174
IC29	Type-74LS74 Dual D-Type Flip-Flop Integrated Circuit	37-74LS74
IC30	Type-74LS157 Quad Data Select/Multiplexer Integrated Circuit	37-74LS157
IC32	Type-74LS374 Octal Flip-Flop Integrated Circuit	37-74LS374
IC33, IC34	Type-4016-3 Static RAM Integrated Circuit	137211-001
IC35	Type-74LS273 Octal D-Type Flip-Flop Integrated Circuit	37-74LS273
IC36	PROM Integrated Circuit	136027-133
IC37	PROM Integrated Circuit	136027-134

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TX-1 Graphics PCB Assembly Parts List, continued

Designator	Description	Part No.
IC38	PROM Integrated Circuit	136027-135
IC40	Type-74LS85 Comparator Integrated Circuit	37-74LS85
IC41	Type-74LS377 Octal D-Type Flip-Flop Integrated Circuit	37-74LS377
IC42	Type-74LS375 4-Bit Bistable Latch Integrated Circuit	137286-001
IC43	Type-4016-3 Static RAM Integrated Circuit	137211-001
IC44	TX-1 Custom Gate Array Integrated Circuit	137368-001
IC45	Type-74LS161 4-Bit Counter Integrated Circuit	37-74LS161
IC46, IC47	Type-74LS30 8-Input NAND Gate Integrated Circuit	37-74LS30
IC48	PROM Integrated Circuit	136027-113
IC49	Type-74LS161 4-Bit Counter Integrated Circuit	37-74LS161
IC50	Type-74LS157 Quad Data Select/Multiplexer Integrated Circuit	37-74LS157
IC51	Type-74LS74 Dual D-Type Flip-Flop Integrated Circuit	37-74LS74
IC52	Type-74LS00 NAND Gate Integrated Circuit	37-74LS00
IC53	Type-74LS374 Octal Flip-Flop Integrated Circuit	37-74LS374
IC54, IC55	Type-4016-3 Static RAM Integrated Circuit	137211-001
IC57	PROM Integrated Circuit	136027-133
IC58	PROM Integrated Circuit	136027-134
IC59	PROM Integrated Circuit	136027-135
IC60	Type-74LS273 Octal D-Type Flip-Flop Integrated Circuit	37-74LS273
IC61	Type 74LS04 Hex Inverter Integrated Circuit	37-74LS04
IC62, IC63	Type-74S04 Hex Inverter Integrated Circuit	37-74S04
IC65	Type-74LS00 NAND Gate Integrated Circuit	37-74LS00
IC66	Type-74LS74 Dual D-Type Flip-Flop Integrated Circuit	37-74LS74
IC67	Type-74LS02 NOR Gate Integrated Circuit	37-74LS02
IC68	Type-4016-3 Static RAM Integrated Circuit	137211-001
IC69	TX-1 Custom Gate Array Integrated Circuit	137368-001
IC70	Type-74LS175 Quad D-Type Flip-Flop Integrated Circuit	37-74LS175
IC71	Type-74LS86 XOR Gate Integrated Circuit	37-74LS86
IC72	Type-74LS377 Octal D-Type Flip-Flop Integrated Circuit	37-74LS377
IC73	PROM Integrated Circuit	136027-120
IC74	Type-74LS161 4-Bit Counter Integrated Circuit	37-74LS161
IC75, IC76	Type-74LS377 Octal D-Type Flip-Flop Integrated Circuit	37-74LS377
IC77	Type-74LS379 Quad D-Type Flip-Flop Integrated Circuit	137374-001
IC78	Type-12L6 PAL Integrated Circuit	136027-111
IC79-IC81	Type-74LS163A Sync 4-Bit Counter Integrated Circuit	37-74LS163A
IC82	Type-74LS42 Decoder Integrated Circuit	37-74LS42
IC83, IC84	Type-74LS174 Hex D-Type Flip-Flop Integrated Circuit	37-74LS174
IC85	PROM Integrated Circuit	136027-124
IC86	Type-74LS00 NAND Gate Integrated Circuit	37-74LS00
IC87-IC89	Type-74LS153 4-to-1 Data Select/Multiplexer Integrated Circuit	37-74LS153
IC90, IC91	Type-74S113 Dual J-K Flip-Flop Integrated Circuit	137373-001
IC92	Type-74LS10 NAND Gate Integrated Circuit	37-74LS10
IC93	Type-74LS107 Dual J-K Flip-Flop Integrated Circuit	137169-001
IC94	Type-74S74 Dual D-Type Flip-Flop Integrated Circuit	37-74S74
IC95	Type-74LS163A Sync 4-Bit Counter Integrated Circuit	37-74LS163A
IC96	Type-74LS161 4-Bit Counter Integrated Circuit	37-74LS161

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TX-1 Graphics PCB Assembly Parts List, continued

Designator	Description	Part No.
IC97	Type-74LS74 Dual D-Type Flip-Flop Integrated Circuit	37-74LS74
IC98	Type-74LS20 Dual 4-Input NAND Gate Integrated Circuit	37-74LS20
IC99	Type-74LS00 NAND Gate Integrated Circuit	37-74LS00
IC100	Type-74LS368 Hex Bus Driver Integrated Circuit	137168-001
IC101	Type-74LS02 NOR Gate Integrated Circuit	37-74LS02
IC102	Type-74LS74 Dual D-Type Flip-Flop Integrated Circuit	37-74LS74
IC103	Type-74LS10 NAND Gate Integrated Circuit	37-74LS10
IC104	Type-74LS161 4-Bit Counter Integrated Circuit	37-74LS161
IC105	Type 74LS04 Hex Inverter Integrated Circuit	37-74LS04
IC106	PROM Integrated Circuit	136027-119
IC108	Type-74LS107 Dual J-K Flip-Flop Integrated Circuit	137169-001
IC109	Type-74LS00 NAND Gate Integrated Circuit	37-74LS00
IC110	Type-74LS378 Hex D-Type Flip-Flop Integrated Circuit	137305-001
IC112	Type-74LS166 Counter Register Integrated Circuit	37-74LS166
IC113	Type-74LS74 Dual D-Type Flip-Flop Integrated Circuit	37-74LS74
IC114, IC115	Type-74LS174 Hex D-Type Flip-Flop Integrated Circuit	37-74LS174
IC116	PROM Integrated Circuit	136027-124
IC117	Type-74LS00 NAND Gate Integrated Circuit	37-74LS00
IC118	Type-74LS10 NAND Gate Integrated Circuit	37-74LS10
IC119-IC121	Type-74LS153 4-to-1 Data Select/Multiplexer Integrated Circuit	37-74LS153
IC122	Type-74LS02 NOR Gate Integrated Circuit	37-74LS02
IC123	Type 74LS04 Hex Inverter Integrated Circuit	37-74LS04
IC124	Type-74LS107 Dual J-K Flip-Flop Integrated Circuit	137169-001
IC125, IC126	Type-74LS10 NAND Gate Integrated Circuit	37-74LS100
IC127	Type-10H8 PAL Integrated Circuit	136027-109
IC128	Type-14H4 PAL Integrated Circuit	136027-108
IC129	Type-74LS161 4-Bit Counter Integrated Circuit	37-74LS161
IC130	Type-74LS107 Dual J-K Flip-Flop Integrated Circuit	137169-001
IC131	Type-74LS02 NOR Gate Integrated Circuit	37-74LS02
IC132, IC133	Type-74LS107 Dual J-K Flip-Flop Integrated Circuit	137169-001
IC134	Type-74LS32 OR Gate Integrated Circuit	37-74LS32
IC135	Type 74LS04 Hex Inverter Integrated Circuit	37-74LS04
IC136	Type-74S00 NAND Gate Integrated Circuit	37-74S00
IC137	Type-74LS02 NOR Gate Integrated Circuit	37-74LS02
IC138	Type-74S02 NOR Gate Integrated Circuit	37-74S02
IC139	Type-74S113 Dual J-K Flip-Flop Integrated Circuit	137373-001
IC140	Type-74LS86 XOR Gate Integrated Circuit	37-74LS86
IC141	Type-74LS00 NAND Gate Integrated Circuit	37-74LS00
IC142	Type-74LS10 NAND Gate Integrated Circuit	37-74LS10
IC143	Type 74LS04 Hex Inverter Integrated Circuit	37-74LS04
IC145	Type-74LS166 Counter Register Integrated Circuit	37-74LS166
IC146	Type-74LS378 Hex D-Type Flip-Flop Integrated Circuit	137305-001
IC147	Type-74LS00 NAND Gate Integrated Circuit	37-74LS00
IC148	PROM Integrated Circuit	136027-124
IC149	Type-74LS00 NAND Gate Integrated Circuit	37-74LS00
IC150	Type-74LS10 NAND Gate Integrated Circuit	37-74LS10

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TX-1 Graphics PCB Assembly Parts List, continued

Designator	Description	Part No.
IC151-IC153	Type-74LS153 4-to-1 Data Select/Multiplexer Integrated Circuit	37-74LS153
IC154	Type-74S112 Dual J-K Flip-Flop Integrated Circuit	137334-001
IC155-IC157	Type-74S163 Schottky Counter Integrated Circuit	137274-001
IC158, IC159	Type-74174 Hex D-Type Flip-Flop Integrated Circuit	37-74174
IC160	Type-74LS107 Dual J-K Flip-Flop Integrated Circuit	137169-001
IC161	Type-74LS08 AND Gate Integrated Circuit	37-74LS08
IC162	Type-74S169 Binary Counter Integrated Circuit	137347-001
IC163	Type-74S64 AND-OR-INVERT Gate Integrated Circuit	137372-001
IC165	Type-74S10 NAND Gate Integrated Circuit	137236-001
IC165	Type-74S51 AND-OR-INVERT Gate Integrated Circuit	137382-001
IC166	Type-74LS273 Octal D-Type Flip-Flop Integrated Circuit	37-74LS273
IC167, IC168	Type-74S374 Octal Flip-Flop Integrated Circuit	137206-001
IC169	Type-7497 Multiplier Integrated Circuit	37-7497
IC170	Type-74S64 AND-OR-INVERT Gate Integrated Circuit	137372-001
IC171	Type-74S00 NAND Gate Integrated Circuit	37-74S00
IC172	Type-74S10 NAND Gate Integrated Circuit	137236-001
IC173	PROM Integrated Circuit	136027-115
IC174	PROM Integrated Circuit	136027-155
IC175	Type-74LS273 Octal D-Type Flip-Flop Integrated Circuit	37-74LS273
IC176	Type 74LS04 Hex Inverter Integrated Circuit	37-74LS04
IC177	Type-74LS32 OR Gate Integrated Circuit	37-74LS32
IC178	Type-74LS375 4-Bit Bistable Latch Integrated Circuit	137286-001
IC179	Type-74LS51 AND-OR-INVERT Gate Integrated Circuit	137266-001
IC180-IC182	Type-74LS374 Octal Flip-Flop Integrated Circuit	37-74LS374
IC183	Type-74LS399 Multiplexer Integrated Circuit	37-74LS399
IC184	Type-74S174 Hex D-Type Flip-Flop Integrated Circuit	137209-002
IC185	Type-74LS399 Multiplexer Integrated Circuit	37-74LS399
IC186	Type-74LS374 Octal Flip-Flop Integrated Circuit	37-74LS374
IC187	Type-74LS399 Multiplexer Integrated Circuit	37-74LS399
IC188, IC189	Type-74LS157 Quad Data Select/Multiplexer Integrated Circuit	37-74LS157
IC190	Type 74LS04 Hex Inverter Integrated Circuit	37-74LS04
IC193	Type-74S113 Dual J-K Flip-Flop Integrated Circuit	137373-001
IC194	Type-74S00 NAND Gate Integrated Circuit	37-74S00
IC195	Type-74S113 Dual J-K Flip-Flop Integrated Circuit	137373-001
IC196	Type-74S02 NOR Gate Integrated Circuit	37-74S02
IC197	Type-74LS157 Quad Data Select/Multiplexer Integrated Circuit	37-74LS157
IC198	Type-74S174 Hex D-Type Flip-Flop Integrated Circuit	137209-002
IC199	Type 74LS04 Hex Inverter Integrated Circuit	37-74LS04
IC200, IC201	Type-74LS151 1-to-8 Data Select/Multiplexer Integrated Circuit	37-74LS151
IC202	Type-74LS175 Quad D-Type Flip-Flop Integrated Circuit	37-74LS175
IC203	PROM Integrated Circuit	136027-114
IC204	PROM Integrated Circuit	136027-156
IC205	Type-74LS273 Octal D-Type Flip-Flop Integrated Circuit	37-74LS273
IC206	TX-1 Custom Gate Array Integrated Circuit	137369-001

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TX-1 Graphics PCB Assembly Parts List, continued

Designator	Description	Part No.
IC208	Type-74LS00 NAND Gate Integrated Circuit	37-74LS00
IC209-IC211	Type-74LS157 Quad Data Select/Multiplexer Integrated Circuit	37-74LS157
IC212	Type-74LS51 AND-OR-INVERT Gate Integrated Circuit	137266-001
IC213	Type-74S02 NOR Gate Integrated Circuit	37-74S02
IC214	Type-74LS02 NOR Gate Integrated Circuit	37-74LS02
IC215, IC216	Type-74LS399 Multiplexer Integrated Circuit	37-74LS399
IC217	Type 74LS04 Hex Inverter Integrated Circuit	37-74LS04
IC218-IC220	Type-74LS157 Quad Data Select/Multiplexer Integrated Circuit	37-74LS157
IC223-IC225	Type-74S74 Dual D-Type Flip-Flop Integrated Circuit	37-74S74
IC226	Type-74S175 Quad D-Type Flip-Flop Integrated Circuit	37-74S175
IC227	Type-74LS273 Octal D-Type Flip-Flop Integrated Circuit	37-74LS273
IC228	Type-12L6 PAL Integrated Circuit	136027-110
IC229, IC230	Type-74LS273 Octal D-Type Flip-Flop Integrated Circuit	37-74LS273
IC231	Type-74LS373 Octal D-Type Latch Integrated Circuit	37-74LS373
IC232	PROM Integrated Circuit	136027-117
IC233	TX-1 Custom Gate Array Integrated Circuit	137369-001
IC234	Type-74LS157 Quad Data Select/Multiplexer Integrated Circuit	37-74LS157
IC235-IC237	Type-74LS377 Octal D-Type Flip-Flop Integrated Circuit	37-74LS377
IC238, IC239	Type-74LS399 Multiplexer Integrated Circuit	37-74LS399
IC240	Type-74LS163A Sync 4-Bit Counter Integrated Circuit	37-74LS163A
IC241, IC242	Type-74LS161 4-Bit Counter Integrated Circuit	37-74LS161
IC243-IC246	Type-74LS157 Quad Data Select/Multiplexer Integrated Circuit	37-74LS157
IC247	Type-74S00 NAND Gate Integrated Circuit	37-74S00
IC250, IC251	Type-74S00 NAND Gate Integrated Circuit	37-74S00
IC252	Type-74LS157 Quad Data Select/Multiplexer Integrated Circuit	37-74LS157
IC253	Type-74S174 Hex D-Type Flip-Flop Integrated Circuit	137209-002
IC254	Type-74LS32 OR Gate Integrated Circuit	37-74LS32
IC255, IC256	Type-74LS151 1-to-8 Data Select/Multiplexer Integrated Circuit	37-74LS151
IC257	Type-74LS175 Quad D-Type Flip-Flop Integrated Circuit	37-74LS175
IC258	PROM Integrated Circuit	136027-116
IC259	Type-74LS157 Quad Data Select/Multiplexer Integrated Circuit	37-74LS157
IC260-IC262	Type-74LS378 Hex D-Type Flip-Flop Integrated Circuit	137305-001
IC263, IC264	Type-74LS399 Multiplexer Integrated Circuit	37-74LS399
IC265	Type-74LS174 Hex D-Type Flip-Flop Integrated Circuit	37-74LS174
IC268-IC271	Type-74LS244 Line Driver/Receiver Integrated Circuit	37-74LS244
IC272, IC273	Type 74LS04 Hex Inverter Integrated Circuit	37-74LS04
IC274, IC275	Type-74S174 Hex D-Type Flip-Flop Integrated Circuit	137209-002
IC276	PROM Integrated Circuit	136027-136
IC277	PROM Integrated Circuit	136027-136
IC278, IC279	Type-74LS377 Octal D-Type Flip-Flop Integrated Circuit	37-74LS377
IC280	Type-74LS373 Octal D-Type Latch Integrated Circuit	37-74LS373
IC281	PROM Integrated Circuit	136027-118
Resistors		
R1	1 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-102
R2	470 Ω , $\pm 5\%$, 1/4 W Resistor	110000-471

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TX-1 Graphics PCB Assembly Parts List, continued

Designator	Description	Part No.
R4, R5	100 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-101
R7	2.2 k Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-222
R8	220 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-221
R9	1 k Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-102
R10	470 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-471
R11	220 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-221
R12	2.2 k Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-222
R13	470 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-471
R14, R15	2.2 k Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-222
R16	1 k Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-102
R17	220 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-221
R18	470 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-471
R19	220 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-221
R20	1 k Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-102
R21	2.2 k Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-222
R22	220 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-221
R23	470 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-471
R24, R25	1 k Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-102
R26, R27	2.2 k Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-222
R28	1 k Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-102
R29	220 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-221
R30	470 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-471
R31	220 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-221
R32	470 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-471
R33	220 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-221
R34	470 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-471
R35	2.2 k Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-222
R36	1 k Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-102
R37	2.2 k Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-222
R38	1 k Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-102
R39	470 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-471
R40	220 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-221
R41	560 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-561
R42, R43	220 Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-221
R44	1.8 k Ω , $\pm 5\%$, $\frac{1}{4}$ W Resistor	110000-182
RM1, RM2	1 k Ω \times 6, $\frac{1}{8}$ W, Single-Inline-Package Resistor	118004-102
RM3	1 k Ω \times 8, $\frac{1}{8}$ W, Single-Inline-Package Resistor	118002-102
RM4	1 k Ω \times 4, $\frac{1}{8}$ W, Single-Inline-Package Resistor	118000-102
RM5–RM13	1 k Ω \times 8, $\frac{1}{8}$ W, Single-Inline-Package Resistor	118002-102
RM14, RM15	10 k Ω \times 8, $\frac{1}{8}$ W, Single-Inline-Package Resistor	118002-103
Sockets		
IC33, IC34	24-Pin Medium-Insertion-Force Integrated Circuit Socket	79-42C24
IC43	24-Pin Medium-Insertion-Force Integrated Circuit Socket	79-42C24
IC44	28-Pin Medium-Insertion-Force Integrated Circuit Socket	79-42C28
IC48	28-Pin Medium-Insertion-Force Integrated Circuit Socket	79-42C28

(continued on next page)

**TX-1 Graphics PCB Assembly
Parts List, continued**

Designator	Description	Part No.
IC54, IC55	24-Pin Medium-Insertion-Force Integrated Circuit Socket	79-42C24
IC68	24-Pin Medium-Insertion-Force Integrated Circuit Socket	79-42C24
IC73	28-Pin Medium-Insertion-Force Integrated Circuit Socket	79-42C28
IC106	28-Pin Medium-Insertion-Force Integrated Circuit Socket	79-42C28
IC173, IC174	28-Pin Medium-Insertion-Force Integrated Circuit Socket	79-42C28
IC203, 204	28-Pin Medium-Insertion-Force Integrated Circuit Socket	79-42C28
IC206	28-Pin Medium-Insertion-Force Integrated Circuit Socket	79-42C28
IC232	28-Pin Medium-Insertion-Force Integrated Circuit Socket	79-42C28
IC233	28-Pin Medium-Insertion-Force Integrated Circuit Socket	79-42C28
IC258	28-Pin Medium-Insertion-Force Integrated Circuit Socket	79-42C28
IC281	28-Pin Medium-Insertion-Force Integrated Circuit Socket	79-42C28
IC691	28-Pin Medium-Insertion-Force Integrated Circuit Socket	79-42C28

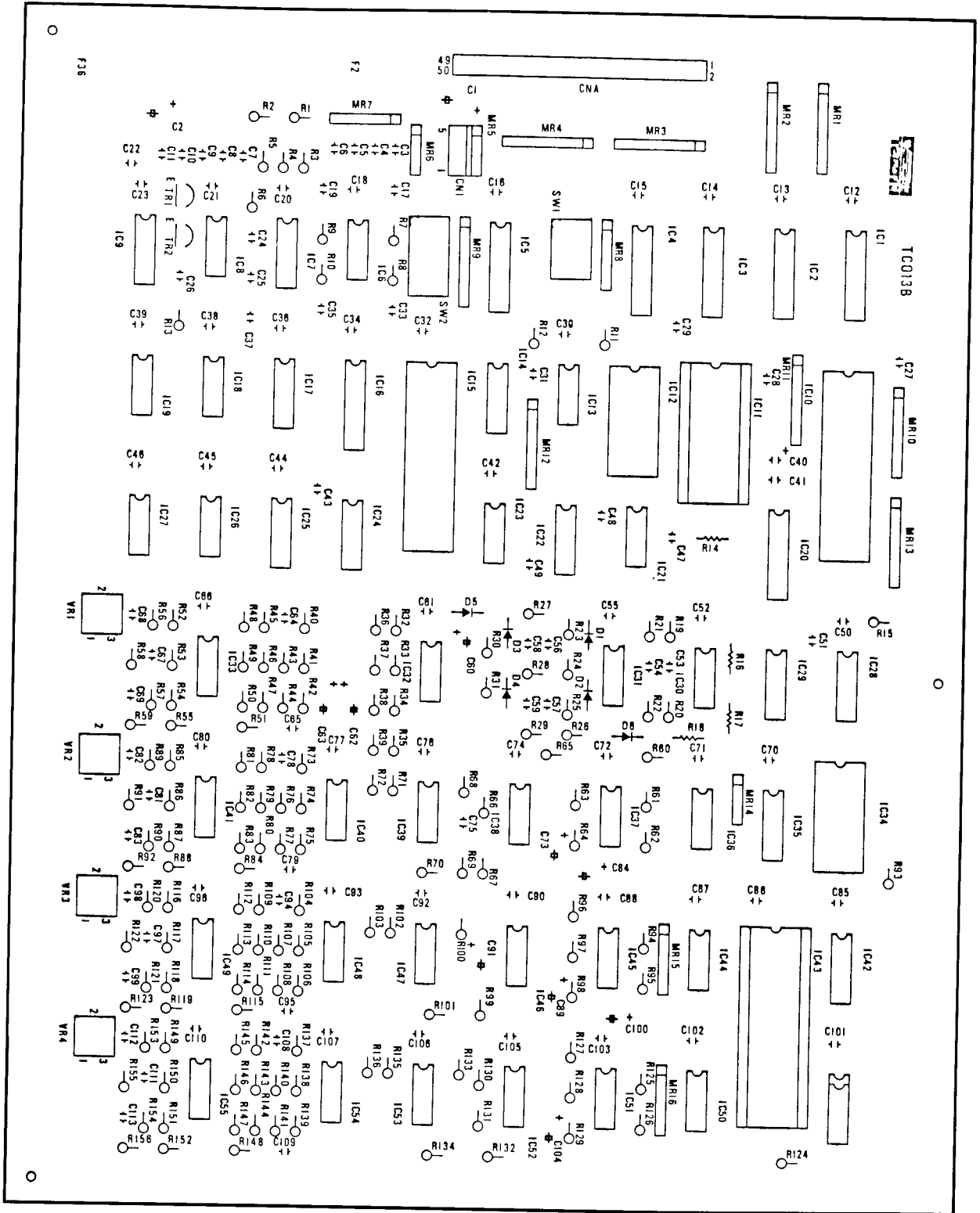


Figure 4-14 TX-1 Sound PCB Assembly
A042020-21 A

TX-1 Sound PCB Assembly Parts List

Designator	Description	Part No.
Capacitors		
C1	470 μ F, \pm 10%, 10 V, Electrolytic Capacitor	123013-477
C2	470 μ F, 25 V, Electrolytic Capacitor	123003-477
C3-C6	0.001 μ F, \pm 10%, 50 V, Ceramic-Disc Capacitor	121020-102
C7-C9	0.01 μ F, 25 V, Ceramic-Disc Capacitor	120008-103
C10-C16	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C17	0.01 μ F, 25 V, Ceramic-Disc Capacitor	120008-103
C18	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C19	0.01 μ F, 25 V, Ceramic-Disc Capacitor	120008-103
C20-C23	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C24, C25	0.01 μ F, 25 V, Ceramic-Disc Capacitor	120008-103
C26-C32	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C33	0.01 μ F, 25 V, Ceramic-Disc Capacitor	120008-103
C34	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C35	0.01 μ F, 25 V, Ceramic-Disc Capacitor	120008-103
C36	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C37	0.01 μ F, 25 V, Ceramic-Disc Capacitor	120008-103
C38, C39	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C40	22 μ F, 16 V, Tantalum Capacitor	121027-226
C41-C48	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C49	470 pF, \pm 10%, 50 V, Ceramic-Disc Capacitor	121020-471
C50-C52	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C53	0.001 μ F, \pm 10%, 50 V, Ceramic-Disc Capacitor	121020-102
C54	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C55	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C56	0.047 μ F, 25 V, Ceramic-Disc Capacitor	120008-473
C57-C59	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C60	10 μ F, 50 V, Electrolytic Capacitor	123001-106
C61	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C62, C63	1 μ F, 50 V, Electrolytic Capacitor	123001-105
C64-C66	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C67	470 pF, \pm 10%, 50 V, Ceramic-Disc Capacitor	121020-471
C68-C72	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C73	10 μ F, 50 V, Electrolytic Capacitor	123001-106
C74	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C75	0.01 μ F, 25 V, Ceramic-Disc Capacitor	120008-103
C76-C80	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C81	470 pF, \pm 10%, 50 V, Ceramic-Disc Capacitor	121020-471
C82, C83	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C84	10 μ F, 50 V, Electrolytic Capacitor	123001-106
C85-C88	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C89	10 μ F, 50 V, Electrolytic Capacitor	123001-106
C90	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C91	10 μ F, 50 V, Electrolytic Capacitor	123001-106
C92	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104

(continued on next page)

TX-1 Sound PCB Assembly Parts List, continued

Designator	Description	Part No.
C93-C96	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C97	470 pF, \pm 10%, 50 V, Ceramic-Disc Capacitor	121020-471
C98, C99	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C100	10 μ F, 50 V, Electrolytic Capacitor	123001-106
C101-C103	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C104	10 μ F, 50 V, Electrolytic Capacitor	123001-106
C105-C110	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
C111	470 pF, \pm 10%, 50 V, Ceramic-Disc Capacitor	121020-471
C112, C113	0.1 μ F, 25 V, Ceramic-Disc Capacitor	120008-104
Diodes		
D1-D6	Type-1N4148 Diode	131033-001
Integrated Circuits		
IC1, IC2	Type-74LS244 Driver/Receiver Integrated Circuit	37-74LS244
IC3	Type-74LS245 Tri-State Octal Bus Integrated Circuit	37-74LS245
IC4, IC5	Type-74LS244 Driver/Receiver Integrated Circuit	37-74LS244
IC6	Type-74LS14 Hex Inverter Integrated Circuit	37-74LS14
IC7	Type-74LS193 Up-Down Integrated Circuit	37-74LS193
IC8	Type-74LS14 Hex Inverter Integrated Circuit	37-74LS14
IC9	Type-ULN2003 Logic Array Integrated Circuit	37-MC1413P
IC10	Z80A Microprocessor Integrated Circuit	137194-001
IC11	Type-2764 PROM Integrated Circuit	137276-250
IC12	Type-4016-3 Static RAM Integrated Circuit	137211-001
IC13	Type-74LS74 Flip-Flop Integrated Circuit	37-74LS74
IC14	Type-74LS368 Integrated Circuit	137168-001
IC15	Type-8255A-5 Programmed Interface Integrated Circuit	137385-001
IC16	Type-74LS273 Flip-Flop Integrated Circuit	37-74LS273
IC17	Type-74LS193 Up-Down Integrated Circuit	37-74LS193
IC18, IC19	Type-74LS10 Flip-Flop Integrated Circuit	37-74LS10
IC20	Type-TZ0131 PAL Integrated Circuit	136027-112
IC21	Type-74LS74 Flip-Flop Integrated Circuit	37-74LS74
IC22	Type-74LS42 Decoder Integrated Circuit	37-74LS42
IC23	Type-74LS08 AND Gate Integrated Circuit	37-74LS08
IC24	Type-74LS175 Tri-State Octal Bus Integrated Circuit	37-74LS175
IC25	Type-74LS169A Up/Down Binary Integrated Circuit	137109-001
IC26	Type-74LS02 NOR Gate Integrated Circuit	37-74LS02
IC27	Type-74LS74 Flip-Flop Integrated Circuit	37-74LS74
IC28	Type-74LS157 Data Select Integrated Circuit	37-74LS157
IC29	Type-74LS175 Tri-State Octal Bus Integrated Circuit	37-74LS175
IC30	Type-4070 Integrated Circuit	37-4070
IC31	Type-4069UB Integrated Circuit	137309-001
IC32	Type-LM2902 Quad Low-Power Integrated Circuit	137376-001
IC33	Type-LM3900 Quad Op-Amp Integrated Circuit	137377-001
IC34	Type-8253-5 Programmed Timer Integrated Circuit	137384-001
IC35	Type-ULN2003 Logic Array Integrated Circuit	37-MC1413P
IC36	Type-4006B Static Shift Register Integrated Circuit	137378-001

(continued on next page)

TX-1 Sound PCB Assembly Parts List, continued

Designator	Description	Part No.
IC37	Type-4066 Quad Analog Integrated Circuit	37-4066
IC38	Type-4011B Integrated Circuit	137380-001
IC39, IC40	Type-4013B Flip-Flop Integrated Circuit	37-4013B
IC41	Type-LM3900 Quad Op-Amp Integrated Circuit	137377-001
IC42	Type-4020 Integrated Circuit	37-4020
IC43	Type-8910 Programmed Sound Generator Integrated Circuit	137222-001
IC44	Type-7406 Hex Inverter Integrated Circuit	37-7406
IC45	Type-4066 Quad Analog Integrated Circuit	37-4066
IC46	Type-LM2902 Quad Low-Power Integrated Circuit	137376-001
IC47, IC48	Type-4013B Flip-Flop Integrated Circuit	37-4013B
IC49	Type-LM3900 Quad Op-Amp Integrated Circuit	137377-001
IC50	Type-7406 Hex Inverter Integrated Circuit	37-7406
IC51, IC52	Type-4066 Quad Analog Integrated Circuit	37-4066
IC53, IC54	Type-4013B Flip-Flop Integrated Circuit	37-4013B
IC55	Type-LM3900 Quad Op-Amp Integrated Circuit	137377-001
Resistors		
MR1-MR4	1 k Ω \times 8, $\frac{1}{8}$ W, Single-Inline-Package Resistor	118002-102
MR5	10 k Ω \times 4, $\frac{1}{8}$ W, Single-Inline-Package Resistor	118005-103
MR6	560 Ω \times 4, $\frac{1}{8}$ W, Single-Inline-Package Resistor	118001-561
MR8	1 k Ω \times 6, $\frac{1}{8}$ W, Single-Inline-Package Resistor	118004-102
MR9	1 k Ω \times 8, $\frac{1}{8}$ W, Single-Inline-Package Resistor	118002-102
MR10-MR13	10 k Ω \times 8, $\frac{1}{8}$ W, Single-Inline-Package Resistor	118002-103
MR14	4.7 k Ω \times 4, $\frac{1}{8}$ W, Single-Inline-Package Resistor	118001-472
MR15, MR16	10 k Ω \times 6, $\frac{1}{8}$ W, Single-Inline-Package Resistor	118006-103
R1-R10	100 Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-101
R11, R12	1 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-102
R14	270 Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-271
R15	10 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-103
R16	560 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-564
R17	270 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-274
R18	27 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-273
R19	10 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-103
R20	56 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-563
R21	10 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-103
R22	1 M Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-105
R23	33 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-333
R24-R26	10 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-103
R27, R28	1 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-102
R29	33 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-333
R30, R31	47 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-473
R32	10 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-103
R33, R34	100 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-104
R35	10 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-103
R36-R39	100 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-104
R40	47 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-473
R41	10 k Ω , \pm 5%, $\frac{1}{4}$ W Resistor	110000-103

(continued on next page)

TX-1 Sound PCB Assembly Parts List, continued

Designator	Description	Part No.
R42	33 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-333
R43	100 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-104
R44	22 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-223
R45	220 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-224
R46, R47	100 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-104
R48, R49	220 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-224
R50	100 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-104
R51-R53	220 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-224
R54	100 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-104
R55	22 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-223
R56	390 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-394
R57	220 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-224
R58	56 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-563
R59	33 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-333
R60	100 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-104
R61	56 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-563
R62	100 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-104
R63	180 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-184
R64	22 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-223
R65	100 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-104
R66	180 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-184
R67	10 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-103
R68	390 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-394
R69	33 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-333
R70	10 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-103
R71	390 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-394
R72	180 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-184
R73	33 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-333
R74, R75	10 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-103
R76	100 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-104
R77	33 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-333
R78	220 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-224
R79	100 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-104
R80	100 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-104
R81, R82	220 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-224
R83	100 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-104
R84-R86	220 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-224
R87	100 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-104
R88	22 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-223
R89	390 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-394
R90	220 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-224
R91	100 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-104
R92	2.2 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-222
R93	10 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-103
R94	100 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-104
R95	56 k Ω , $\pm 5\%$, 1/4 W Resistor	110000-563

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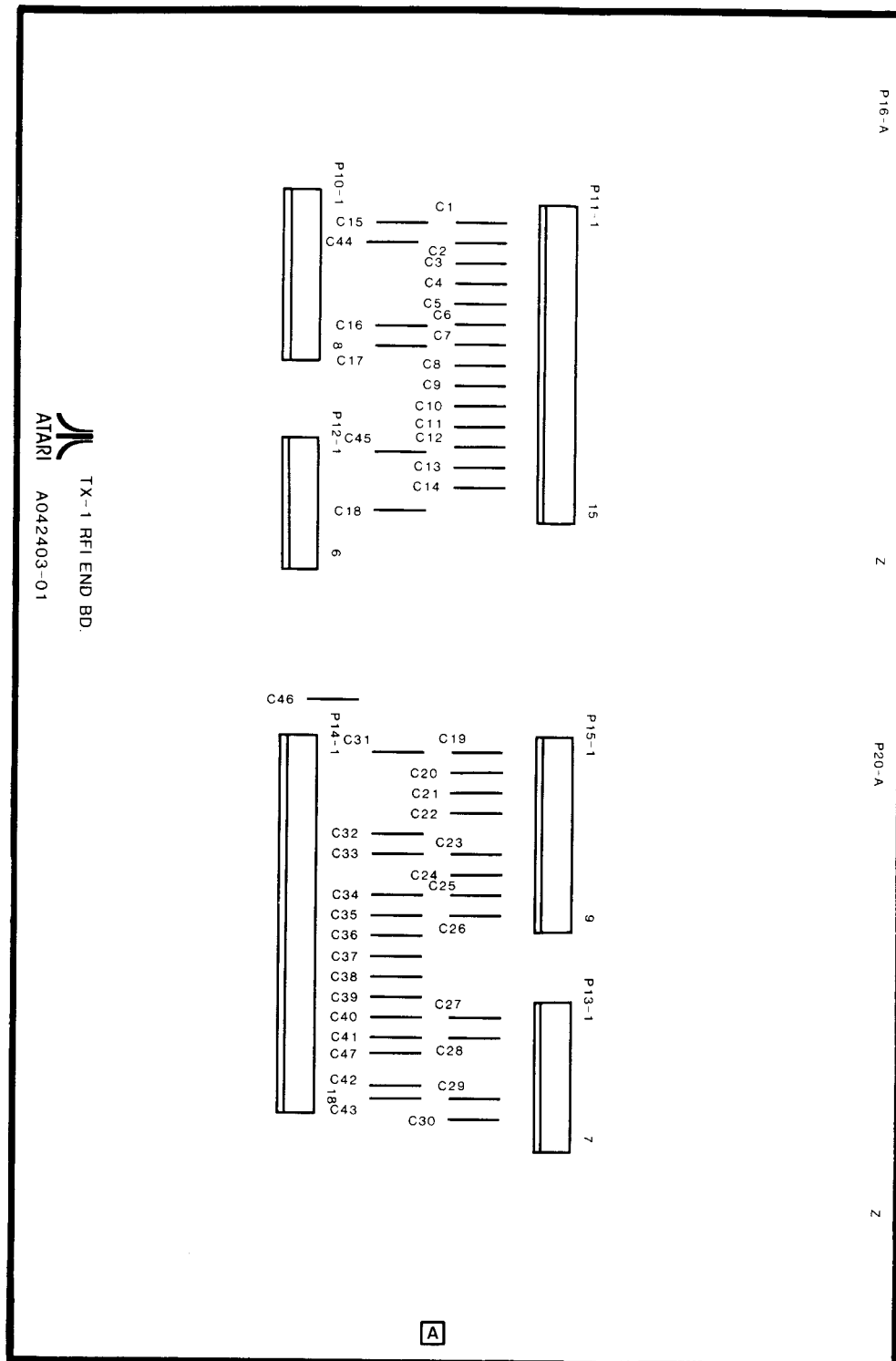
TX-1 Sound PCB Assembly Parts List, continued

Designator	Description	Part No.
R96	180 k Ω , $\pm 5\%$, ¼ W Resistor	110000-184
R97	22 k Ω , $\pm 5\%$, ¼ W Resistor	110000-223
R98-R100	180 k Ω , $\pm 5\%$, ¼ W Resistor	110000-184
R101	10 k Ω , $\pm 5\%$, ¼ W Resistor	110000-103
R102, R103	390 k Ω , $\pm 5\%$, ¼ W Resistor	110000-394
R104	33 k Ω , $\pm 5\%$, ¼ W Resistor	110000-333
R105, R106	10 k Ω , $\pm 5\%$, ¼ W Resistor	110000-103
R107	100 k Ω , $\pm 5\%$, ¼ W Resistor	110000-104
R108	33 k Ω , $\pm 5\%$, ¼ W Resistor	110000-333
R109	220 k Ω , $\pm 5\%$, ¼ W Resistor	110000-224
R110, R111	100 k Ω , $\pm 5\%$, ¼ W Resistor	110000-104
R112, R113	220 k Ω , $\pm 5\%$, ¼ W Resistor	110000-224
R114	100 k Ω , $\pm 5\%$, ¼ W Resistor	110000-104
R115-R117	220 k Ω , $\pm 5\%$, ¼ W Resistor	110000-224
R118	100 k Ω , $\pm 5\%$, ¼ W Resistor	110000-104
R119	22 k Ω , $\pm 5\%$, ¼ W Resistor	110000-223
R120	390 k Ω , $\pm 5\%$, ¼ W Resistor	110000-394
R121	220 k Ω , $\pm 5\%$, ¼ W Resistor	110000-224
R122	100 k Ω , $\pm 5\%$, ¼ W Resistor	110000-104
R123	2.2 k Ω , $\pm 5\%$, ¼ W Resistor	110000-222
R124, R132	1 k Ω , $\pm 5\%$, ¼ W Resistor	110000-102
R125	22 k Ω , $\pm 5\%$, ¼ W Resistor	110000-223
R126, R127	180 k Ω , $\pm 5\%$, ¼ W Resistor	110000-184
R128	100 k Ω , $\pm 5\%$, ¼ W Resistor	110000-104
R129	56 k Ω , $\pm 5\%$, ¼ W Resistor	110000-563
R130, R131	10 k Ω , $\pm 5\%$, ¼ W Resistor	110000-103
R132	1 k Ω , $\pm 5\%$, ¼ W Resistor	110000-102
R133	56 k Ω , $\pm 5\%$, ¼ W Resistor	110000-563
R134	10 k Ω , $\pm 5\%$, ¼ W Resistor	110000-103
R135	180 k Ω , $\pm 5\%$, ¼ W Resistor	110000-184
R136	390 k Ω , $\pm 5\%$, ¼ W Resistor	110000-394
R137	33 k Ω , $\pm 5\%$, ¼ W Resistor	110000-333
R138	22 k Ω , $\pm 5\%$, ¼ W Resistor	110000-223
R139	33 k Ω , $\pm 5\%$, ¼ W Resistor	110000-333
R140	100 k Ω , $\pm 5\%$, ¼ W Resistor	110000-104
R141	33 k Ω , $\pm 5\%$, ¼ W Resistor	110000-333
R142	220 k Ω , $\pm 5\%$, ¼ W Resistor	110000-224
R143, R144	100 k Ω , $\pm 5\%$, ¼ W Resistor	110000-104
R145, R146	220 k Ω , $\pm 5\%$, ¼ W Resistor	110000-224
R147	100 k Ω , $\pm 5\%$, ¼ W Resistor	110000-104
R148-R150	220 k Ω , $\pm 5\%$, ¼ W Resistor	110000-224
R151	100 k Ω , $\pm 5\%$, ¼ W Resistor	110000-104
R152	22 k Ω , $\pm 5\%$, ¼ W Resistor	110000-223
R153	390 k Ω , $\pm 5\%$, ¼ W Resistor	110000-394
R154	220 k Ω , $\pm 5\%$, ¼ W Resistor	110000-224
R155	100 k Ω , $\pm 5\%$, ¼ W Resistor	110000-104

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**TX-1 Sound PCB Assembly
Parts List, continued**

Designator	Description	Part No.
R156	2.2 k Ω , \pm 5%, 1/4 W Resistor	110000-222
VR1-VR4	47 k Ω , \pm 5%, 1/4 W Resistor	110000-473
Sockets		
IC10	40-Pin Medium Insertion Integrated Circuit Socket	79-42C40
IC11	28-Pin Medium Insertion Integrated Circuit Socket	79-42C28
IC12	24-Pin Medium Insertion Integrated Circuit Socket	79-42C24
IC15	40-Pin Medium Insertion Integrated Circuit Socket	79-42C40
IC34	24-Pin Medium Insertion Integrated Circuit Socket	79-42C24
IC43	40-Pin Medium Insertion Integrated Circuit Socket	79-42C40
	50-Circuit Header Connector	179206-050
SW1	6-Position Dual-Inline Package Switch	66-116P1T
SW2	8-Position Dual-Inline Package Switch (Acceptable substitute is part no. 66-118P1T)	160031-008



**Figure 4-15 TX-1 EMI Shield PCB Assembly
A042403-01 A**

TX-1 EMI PCB Assembly Parts List

Designator	Description	Part No.
Capacitors		
C1-C3	470 pF, 50 V, Ceramic-Disc Axial-Lead Capacitor	122016-471
C4	0.1 μ F, 50 V, Ceramic-Disc Axial-Lead Capacitor	122002-104
C5	1000 pF, 50 V, Ceramic-Disc Axial-Lead Capacitor	122016-102
C6-C8	470 pF, 50 V, Ceramic-Disc Axial-Lead Capacitor	122016-471
C9	0.1 μ F, 50 V, Ceramic-Disc Axial-Lead Capacitor	122002-104
C10	1000 pF, 50 V, Ceramic-Disc Axial-Lead Capacitor	122016-102
C11-C13	470 pF, 50 V, Ceramic-Disc Axial-Lead Capacitor	122016-471
C14-C19	0.1 μ F, 50 V, Ceramic-Disc Axial-Lead Capacitor	122002-104
C20	0.01 μ F, 50 V, Ceramic-Disc Axial-Lead Capacitor	122005-103
C21	0.1 μ F, 50 V, Ceramic-Disc Axial-Lead Capacitor	122002-104
C22	0.01 μ F, 50 V, Ceramic-Disc Axial-Lead Capacitor	122005-103
C23	0.1 μ F, 50 V, Ceramic-Disc Axial-Lead Capacitor	122002-104
C24	0.01 μ F, 50 V, Ceramic-Disc Axial-Lead Capacitor	122005-103
C25	0.1 μ F, 50 V, Ceramic-Disc Axial-Lead Capacitor	122002-104
C26	0.01 μ F, 50 V, Ceramic-Disc Axial-Lead Capacitor	122005-103
C27-C31	0.1 μ F, 50 V, Ceramic-Disc Axial-Lead Capacitor	122002-104
C32	0.01 μ F, 50 V, Ceramic-Disc Axial-Lead Capacitor	122005-103
C33	0.1 μ F, 50 V, Ceramic-Disc Axial-Lead Capacitor	122002-104
C34-C43	0.01 μ F, 50 V, Ceramic-Disc Axial-Lead Capacitor	122005-103
C44-C46	0.1 μ F, 50 V, Ceramic-Disc Axial-Lead Capacitor	122002-104
C47	0.01 μ F, 50 V, Ceramic-Disc Axial-Lead Capacitor	122005-103
Connectors		
P10	8-Circuit Header Connector	179014-008
P11	14-Circuit Header Connector	179014-014
P12	6-Circuit Header Connector	179014-006
P13	7-Circuit Header Connector	179014-007
P14	18-Circuit Header Connector	179014-018
P15	9-Circuit Header Connector	179014-009

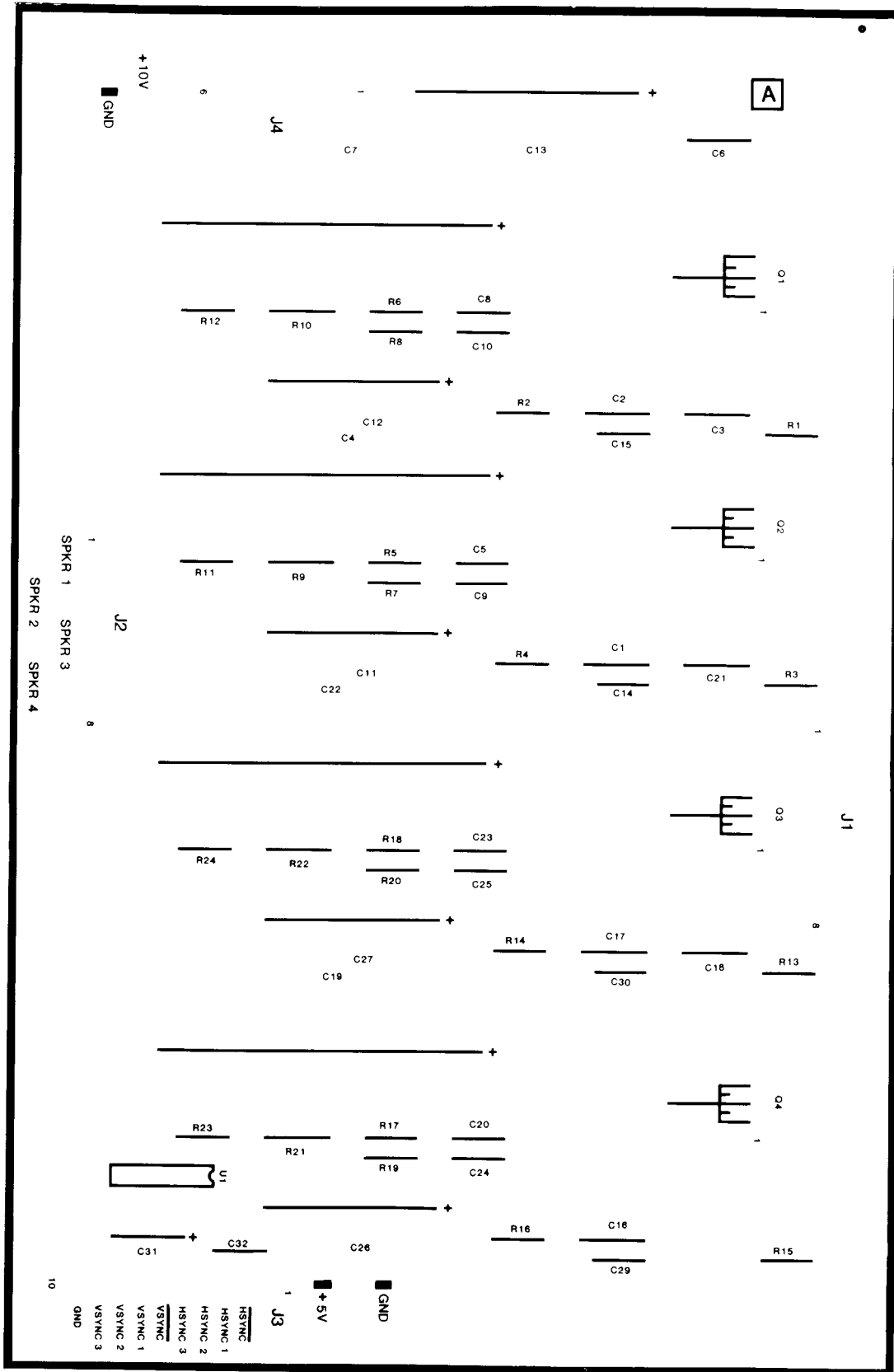


Figure 4-16 TX-1 Audio PCB Assembly
A042016-01 A

TX-1 Audio PCB Assembly Parts List

Designator	Description	Part No.
Capacitors		
C1-C3	0.22 μ F, 25 V, Ceramic Capacitor	122004-224
C4	3300 μ F, 35 V, Electrolytic Capacitor	24-350338
C5	0.1 μ F, 50 V, Ceramic-Disc Capacitor	122002-104
C6	0.22 μ F, 25 V, Ceramic Capacitor	122004-224
C7	3300 μ F, 35 V, Electrolytic Capacitor	24-350338
C8	0.1 μ F, 50 V, Ceramic-Disc Capacitor	122002-104
C9, C10	0.01 μ F, 25 V, Ceramic-Disc Capacitor (Acceptable substitute is part no. 122005-103)	100015-103
C11, C12	470 μ F, 25 V, Electrolytic Capacitor	24-250477
C13	1000 μ F, 25 V, Electrolytic Capacitor	24-250108
C14, C15	0.001 μ F, 50 V, Ceramic Capacitor	122002-102
C16-C18	0.22 μ F, 25 V, Ceramic Capacitor	122004-224
C19	3300 μ F, 35 V, Electrolytic Capacitor	24-350338
C20	0.1 μ F, 50 V, Ceramic-Disc Capacitor	122002-104
C21	0.22 μ F, 25 V, Ceramic Capacitor	122004-224
C22	3300 μ F, 35 V, Electrolytic Capacitor	24-350338
C23	0.1 μ F, 50 V, Ceramic-Disc Capacitor	122002-104
C24, C25	0.01 μ F, 25 V, Ceramic-Disc Capacitor (Acceptable substitute is part no. 122005-103)	100015-103
C26, C27	470 μ F, 25 V, Electrolytic Capacitor	24-250477
C29, C30	0.001 μ F, 50 V, Ceramic Capacitor	122002-102
C31	47 μ F, 25 V, Electrolytic Capacitor	24-250476
C32	0.1 μ F, 50 V, Ceramic-Disc Capacitor	122002-104
Integrated Circuit		
U1	Type-7404 Integrated-Circuit	37-7404
Resistors		
R1	10 k Ω , \pm 5%, 1/4 W Resistor	110000-103
R2	1 k Ω , \pm 5%, 1/4 W Resistor	110000-102
R3	10 k Ω , \pm 5%, 1/4 W Resistor	110000-103
R4	1 k Ω , \pm 5%, 1/4 W Resistor	110000-102
R5, R6	10 Ω , \pm 5%, 1/4 W Resistor	110000-010
R7, R8	100 Ω , \pm 5%, 1/4 W Resistor	110000-001
R9, R10	1 k Ω , \pm 5%, 1/4 W Resistor	110000-102
R11, R12	10 Ω , \pm 5%, 1/4 W Resistor	110000-010
R13	10 k Ω , \pm 5%, 1/4 W Resistor	110000-103
R14	1 k Ω , \pm 5%, 1/4 W Resistor	110000-102
R15	10 k Ω , \pm 5%, 1/4 W Resistor	110000-103
R16	1 k Ω , \pm 5%, 1/4 W Resistor	110000-102
R17, R18	10 Ω , \pm 5%, 1/4 W Resistor	110000-010
R19, R20	100 Ω , \pm 5%, 1/4 W Resistor	110000-001
R21, R22	1 k Ω , \pm 5%, 1/4 W Resistor	110000-102
R23, R24	10 Ω , \pm 5%, 1/4 W Resistor	110000-010

(continued on next page)

**TX-1 Audio PCB Assembly
Parts List, continued**

Designator	Description	Part No.
Miscellaneous		
J1, J2	8-Circuit Connector Assembly	179037-008
J3	10-Circuit Connector Assembly	179037-010
J4	6-Circuit Connector Assembly	179037-006
Q1-Q4	8 W Audio Amplifier	137151-001
	Heat Sink	178063-003
	Test Point (Acceptable substitute is part no. 179051-001)	179051-002
	Thermal Insulator	78-16014