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California™ SPEED



SIT-IN DEDICATED GAME 25" (63 cm) & 31" (79 cm) COLOR MONITORS OPERATION MANUAL

Operation & Adjustments • Testing & Problem Diagnosis
Parts Information • Wiring Diagrams

WARNINGS & NOTICES

WARNING

USE OF NON-ATARI PARTS OR CIRCUIT MODIFICATIONS MAY CAUSE SERIOUS INJURY OR EQUIPMENT DAMAGE! USE ONLY ATARI AUTHORIZED PARTS.

- * For safety and reliability, substitute parts and modifications are not recommended.
- * Substitute parts or modifications may void FCC type acceptance.
- * Use only authorized components and parts. Failure to do so will void warranty and may result in incorrect and/or unsafe operation.
- * This game is protected by federal copyright, trademark and other laws. It is illegal to copy, reproduce, adapt, modify, decompile, disassemble or otherwise alter this game or any feature thereof. Unauthorized modifications may be illegal under federal law. This also applies to ATARI logo and other ATARI equipment (or any feature thereof) may not be copied, reproduced, adapted, modified, decompiled, disassembled or otherwise altered. Facsimiles of such law, regardless of whether or not such facsimiles are manufactured with ATARI components, are illegal.



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SECTION ONE

OPERATION

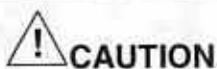
NOTICE

Information in this manual is subject to change without notice. ATARI reserves the right to make improvements in equipment function, design, or components as progress in engineering or manufacturing methods may warrant.

Fill out and mail in the Game Registration card. Include the game serial number from the label on the rear of the cabinet. For your records, write the game serial number in the manual. SERIAL NUMBER _____

SAFETY NOTICES

The following safety instructions apply to all game operators and service personnel. Specific warnings and cautions will be found throughout this manual where they apply. We recommend that you read this page before preparing your game for play.



HARD DISK DRIVE. The hard disk drive must be packed in an anti-static bag. The disk drive assembly must be packed in an approved shipping container (P/N 08-8068) in order to be sent in for repair or replacement. Do not stack or drop hard disk drives during installation or removal.

TRANSPORTING GAME. This game contains glass and fragile electronic devices. Transport this game securely. Avoid rough handling when moving cabinet. Do not move this game with power on.

AC POWER CONNECTION. Verify that the switch on the power supply is set for 110VAC or 220VAC according to local line voltage. Verify that the fluorescent lamp assembly is correct for local line voltage.

PROPERLY GROUND THE GAME. To avoid electrical shocks, do not plug in the game until it has been inspected and properly grounded. This game should only be plugged into a fixed-location grounded 3-wire outlet. Do not use a "cheater" plug or cut off the ground pin on the line cord.

POTENTIAL SHOCK HAZARD. This video game system does not utilize an isolation transformer. No isolation exists between the internal cabinet AC system and the external AC line.

DISCONNECT POWER DURING REPAIRS. To avoid electrical shock, turn off the power switch and disconnect the game from the AC power source before removing or repairing any part of the game. After servicing any parts of the unit, be sure that all of the ground wires are secure before restoring power.

PROPERLY ATTACH ALL CONNECTORS. Be sure that the connectors on each printed circuit board (PCB) are properly connected. If they do not slip on easily, do not force them. A reversed connector may damage your game and void the warranty. Connectors are keyed to fit specific pins on each board.

USE PROPER FUSE. To avoid electrical shock, all replacement fuses must match the type, voltage rating, and current rating of the original fuse.

HANDLE FLUORESCENT TUBE AND CRT WITH CARE. If you drop a fluorescent tube or CRT and it breaks, it will implode! Shattered glass can fly eight feet or more from the implosion.

EPILEPSY WARNING

A very small portion of the population has a condition which may cause them to experience epileptic seizures or have momentary loss of consciousness when viewing certain kinds of flashing lights or patterns that are present in our daily environment. These persons may experience seizures while watching some kinds of television pictures or playing certain video games. People who have not had any previous seizures may nonetheless have an undetected epileptic condition.

If you or anyone in your family has experienced symptoms linked to an epileptic condition (e.g., seizures or loss of awareness), immediately consult your physician before using any video games.

We recommend that parents observe their children while they play video games. If you or your child experience the following symptoms: dizziness, altered vision, eye or muscle twitching, involuntary movements, loss of awareness, disorientation, or convulsions, **DISCONTINUE USE IMMEDIATELY** and consult your physician.

PRODUCT SPECIFICATIONS

Operating Requirements

<u>Location</u>	<u>Electrical Power</u>	<u>Temperature</u>	<u>Humidity</u>
Domestic	120VAC @ 60Hz 4.0 Amps	32°F to 100°F (0°C to 38°C)	Not to exceed 95% relative
Foreign	230VAC @ 50Hz 2.0 Amps		
Japan	100VAC @ 50Hz 4.0 Amps		

Cabinet StatisticsShipping Dimensions**25" Cabinet**

Width 32.0" (81.3 cm)
Depth 66.5" (169 cm)
Height 76.0" (193 cm)

Shipping Weight

25" Cabinet
308 lbs. (140 kg.)
Pedestal
125 lbs. (56.8 kg.)

Design Type

Single Sit-In Dedicated Video Game with Linking capability

33" Cabinet

Width 34.0" (86.3 cm)
Depth 82.0" (208.3 cm)
Height 81.0" (205.7 cm)

33" Cabinet

570 lbs. (259 kg.)
Pedestal
125 lbs. (56.8 kg.)

Universal Pedestal

Width 22.0" (55.8 cm)
Depth 36.0" (91.4 cm)
Height 51.0" (129.5 cm)

Equipment CharacteristicsVideo Display Monitor

Medium Resolution RGB
25" (68.6 cm) CRT
33" (83.8 cm) CRT

Audio System

3 Channel Audio
2 Full Range Speakers
1 Subwoofer

Currency Acceptors

Standard Coin Door
2 Coin Mechanisms, DBV ready
1 Coin Counter

Game CharacteristicsPlayer Variables

1 to 8 players per game (with Linking)
Choice of Car style, transmission, track
Fastest Track Time Recognition

Operator Variables

Coinage, Play Mode,
Difficulty, Volume,
Audits, Statistics

Diagnostics

Automatic Power-Up Test
Manual Multi-Level Menu System

PRODUCT CONFIGURATION

♦ Stand Alone Units

Each game is ready to play right out of the box. Operators may use the menu screens in the game menu system to determine some player variables in advance or leave the choices up to the players.

♦ Linked Units

Linking allows players to compete against each other (on one track). Operator menus are the same as in stand alone games. Basic Kits connect together two cabinets electrically and mechanically. Use the optional Hub Linking Kit to interconnect up to eight games.

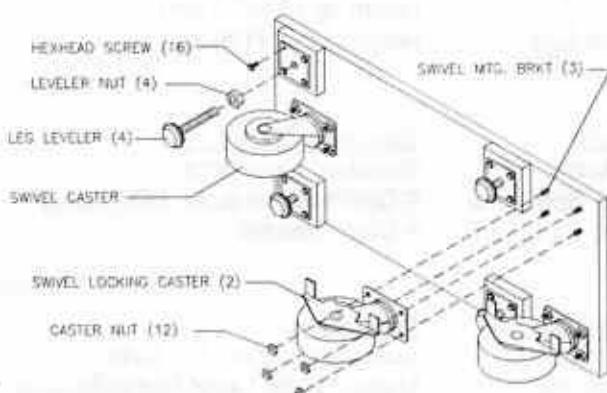
INSTALLATION AND INSPECTION

1. Remove all items from shipping containers and set aside. Casters, levelers, and mounting hardware are packed with the pedestal section. Inspect the exterior of the cabinet for any signs of damage.
2. Remove the keys from the steering wheel. Unlock and open the coin and cash box doors. Electrical cords and spare parts are stored in the cash box. Locate the casters and levelers first.

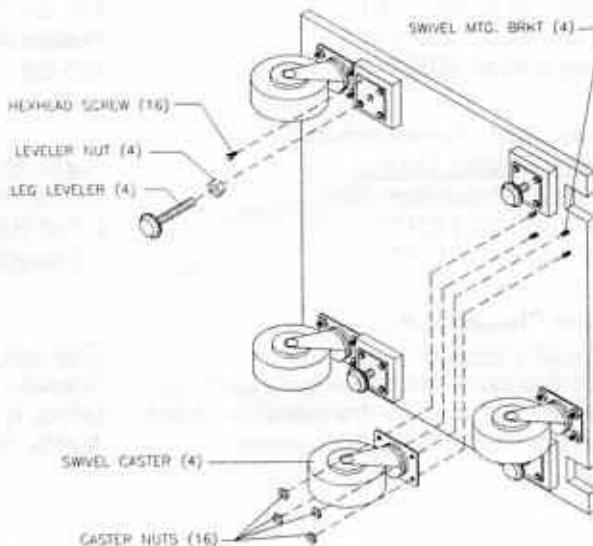
 **WARNING**
The cabinet is top heavy.

3. Install one nut onto each leg leveler. Tilt as needed to locate four threaded holes under the cabinet and three under the pedestal. Install a leveler and nut into each hole. Do not tighten nuts at this time.

BOTTOM VIEW OF PEDESTAL ASSEMBLY



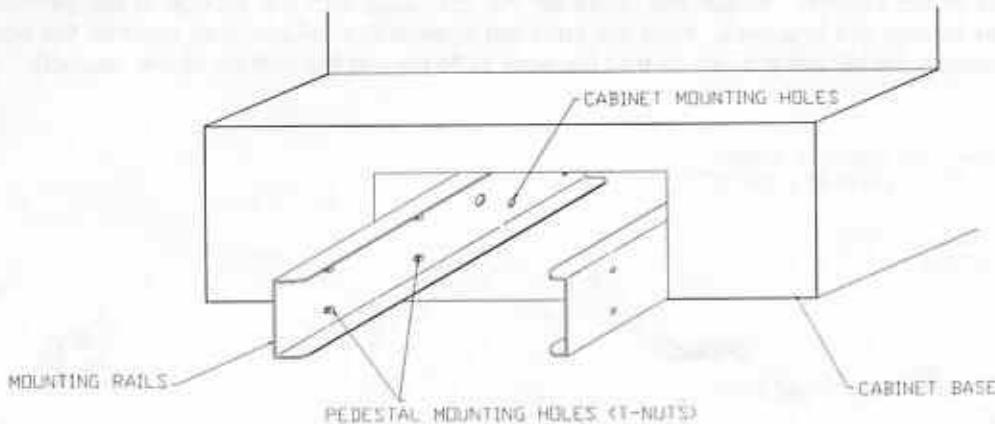
BOTTOM VIEW OF CABINET ASSEMBLY



4. Locate the caster wheel assemblies. Lay cabinet on its back or side and attach one caster onto each group of threaded studs. The cabinet uses four swivel casters, one in each corner. Repeat this for the pedestal. The pedestal uses three casters, one swivel type in front and two locking type in back.

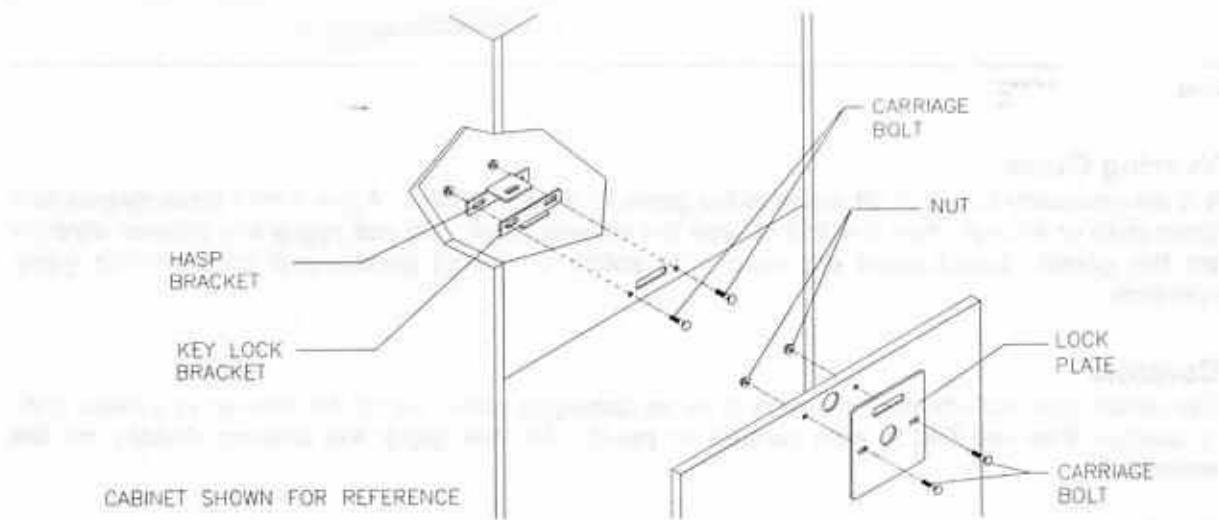


- Stand cabinet upright and make certain it is in a stable position. Move the game to its intended location and level the cabinet. This game is intended for use only in a fixed position. Ensure that the final adjustment raises the game so that the swivel caster wheels are not touching the floor. Distribute weight equally on each corner and tighten the leveler nuts.

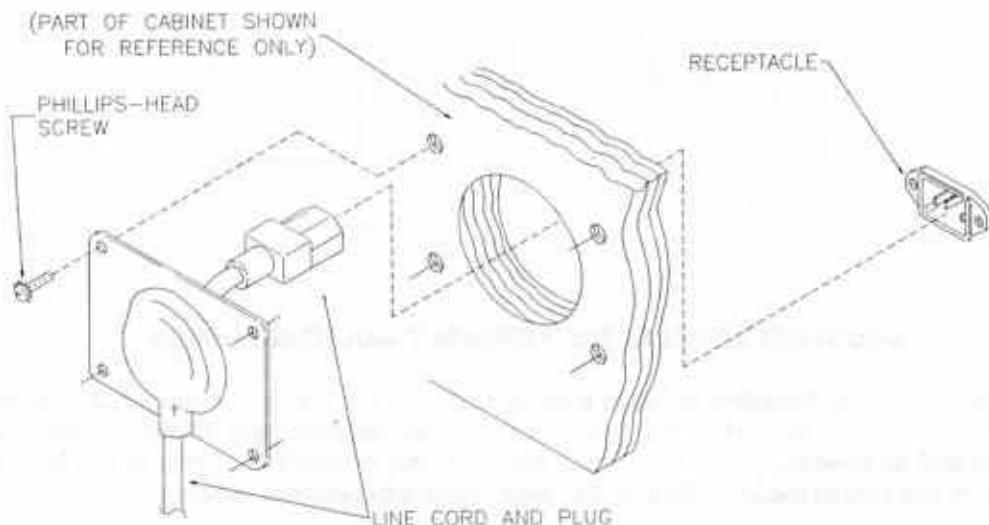


LOCATION OF PEDESTAL ASSEMBLY MOUNTING HOLES

- The pedestal assembly mounting rails are shipped bolted to the inside of the cabinet. Remove all of the 1/4-20 hex-head bolts holding the rails. Pull the rails forward (see above diagram for proper placement) and reinstall the same bolts finger tight. Do not tighten these bolts at this time, as some movement is required in the mounting rails to align holes with pedestal assembly.
- Align the opening in the pedestal with the ends of the rails. Slide the pedestal forward onto extended mounting rails and align the holes. Attach pedestal assembly using 1/4-20 tamper resistant screws and large flat washers. A T27 wrench is included with the spare parts to tighten these screws firmly. Tighten the hex head bolts after the tamper resistant screws have been tightened.
- Remove the rear door of cabinet. Inspect cabinet interior for any signs of damage. Check all major assemblies to assure that they are mounted securely. Ensure that nothing blocks fan airflow.
- An extra padlock may be installed to secure the rear door. A hasp is located in the spare parts bag. Remove the two lock bracket nuts from inside the cabinet, above the rear door opening. Slide the hasp onto the bolts so that it protrudes from the hole in back of the cabinet, then reinstall the nuts.



10. Modify the lock plate at the top of the rear door. Remove the bolts and nuts from the lock plate, then rotate the plate so that the slot will be above the door. Reinstall the bolts and nuts and tighten firmly.
11. The power cord is with the spare parts. Remove and save four screws from the line cord cover plate at the rear of the cabinet. Match the holes on the IEC plug with the prongs in the receptacle and push firmly to seat the line cord. Hold the cord flat against the cabinet and reinstall the cover plate (the indentation should point down so that the cord exits toward the bottom of the cabinet).



LINE CORD INSTALLATION

12. Refer to the game's Cabinet Wiring Diagram (Section Three of this manual) and check to see that all cable connectors are correctly secured. Inspect for damaged connectors. Be sure NOT TO FORCE CONNECTORS. Most connectors are keyed to prevent making reversed connections.
13. Plug the game into a grounded (3-terminal) AC wall outlet. Switch ON the game using the ON/OFF switch located on the upper left top of the cabinet (when viewed from the player's position). The game will power up and begin self-diagnostics. If no errors are found, the game will automatically enter its "attract" mode of operation (scenes and sounds from typical races, player's scores, messages, etc.).

MAINTENANCE

◆ Viewing Glass

It is not necessary to switch off power to the game to clean the glass. Apply a mild glass cleaner to a clean cloth or sponge, then use this to wipe the viewing glass. ***Do not apply the cleaner directly on the glass!*** Liquid could drip down into switch or control circuits and cause erratic game operation.

◆ Controls

Use plastic-safe non-abrasive cleaners to avoid damaging parts. Apply the cleaner to a clean cloth or sponge, then use this to wipe controls or panel. ***Do not apply the cleaner directly on the controls!***

◆ Cabinet

Use plastic-safe non-abrasive cleaners to avoid damage. Apply cleaner to a clean cloth or sponge, then use this to wipe the controls or cabinet. ***Do not apply cleaner directly on controls or cabinet!***

SERVICE

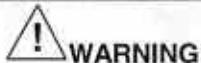
Only qualified service personnel should perform maintenance and repairs. The product guidelines apply to all game operators and service personnel. Specific notes, cautions, and warnings will be found throughout this manual where they apply. Read the SAFETY pages thoroughly before beginning service.

This game uses complex electronic components that are very SENSITIVE to static electricity. The following precautions must be observed and followed prior to handling the game electronics.

1. Ensure that the A.C. power to the game is turned OFF prior to servicing the electronics.
2. Discharge any static electricity build up in your body by touching the metal power supply chassis. This must be done BEFORE touching or handling the electronic assemblies.
3. Store the electronic assemblies in an anti-static area. Anti-static bags must be used to store or transport the hard disk drive, the CPU Board Assembly, and all other electronics.
4. DO NOT remove or connect any electronic assemblies when the cabinet power is ON. Doing so will damage the electronic assemblies and void the warranty.
5. Always replace ground wires, shields, covers, etc., when maintenance or service is completed.

◆ Marquee

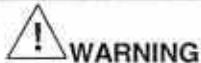
Remove five hex-head wood screws holding the marquee-retaining strip to the cabinet top. Hold the glass in place to avoid breakage. Remove the retaining strip and set it aside. Lift the marquee glass out of the top grooves and set in a safe place. Do not over tighten screws during re-installation.



The marquee glass could fall out of the cabinet and break when the retaining strip is removed.

◆ Fluorescent Lamp or Starter

Remove the marquee retaining strip, glass and artwork. Remove the fluorescent lamp locks. Grasp the tube, give it a quarter turn and pull it from its socket. The starter also requires a quarter turn for removal or installation. Carefully place a new tube into the socket and rotate it a quarter turn to reinstall. Clean the tube to remove fingerprints and dust.



If a fluorescent tube drops and breaks, it will implode and shatter glass! Use care in handling.

◆ Fluorescent Light Assembly

Remove the marquee retaining strip, glass and artwork. Disconnect the power cable from the fluorescent light assembly. Loosen but do not remove the screws fastening the assembly to the cabinet. Slide the assembly slightly forward to disengage the keyholes. Lift out the assembly.

◆ Dash Board

25" Cabinet: Use the T27 wrench to remove four tamper proof screws at the dashboard front corners. Pull the dashboard forward. Disconnect the wiring harness and ground strap. Before reinstalling the dashboard, ensure that harnesses and ground strap are reconnected.

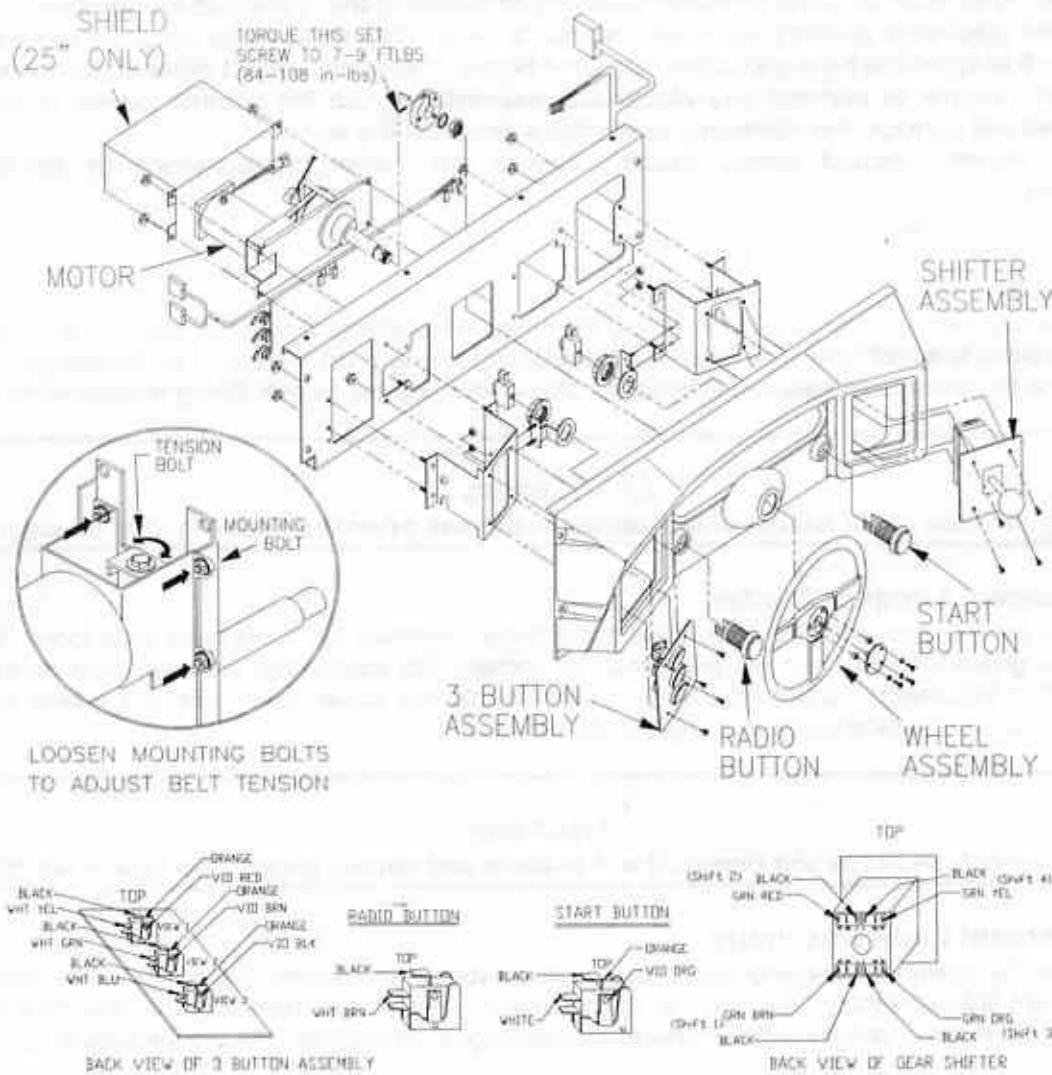
33" Cabinet: Use the T27 wrench to remove seven tamper proof screws from the top cover. Lift the top cover off of the game cabinet. Remove four tamper proof screws from the front corners of the dashboard. Pull the dash forward. Disconnect the wiring harness and ground strap. Before reinstalling the dashboard, ensure that harnesses and ground strap are reconnected.

◆ Wheel Assembly

Use the T27 wrench to remove the four tamper resistant dashboard corner screws. Pull the dashboard forward enough to expose and disconnect wires. Lift the dashboard off the cabinet and set aside. Remove three screws at the steering wheel center. Pull the wheel hoop off of the dashboard. Remove four $\frac{1}{4}$ -20 flange nuts holding the shield, motor and shaft to the wheel assembly (shield not required on 33" cabinets). Slide the motor and the shaft off of the assembly.

IMPORTANT: Apply removable anaerobic adhesive thread lock (Loctite Blue 242 or equivalent) and torque set screw to seven to nine ft.-lbs (84 to 108 in.-lbs) if it was loosened (see illustration).

While the steering mechanism is exposed, inspect the belt. Install a new belt if the existing one is loose or shows signs of wear at the edges of the teeth. Remember to calibrate after installation.

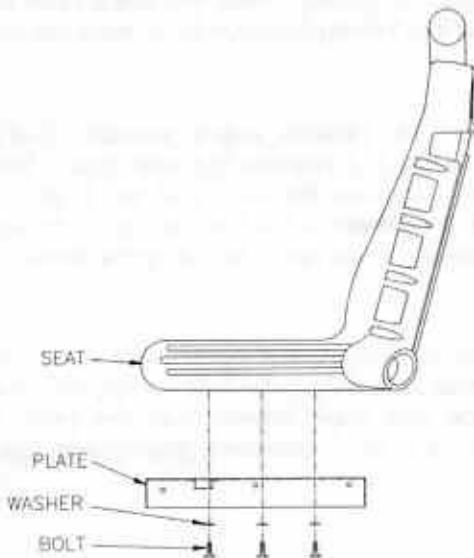


STEERING MECHANISM AND DASHBOARD ASSEMBLY DIAGRAM

♦ Seat Assembly

Use the T27 tamper proof wrench to remove three screws from each side of the seat mounting plate. Lift the seat and mounting plate assembly off the pedestal. Place the seat on its back, on a flat surface. Remove the six bolts under the mounting plate to separate the seat from the plate.

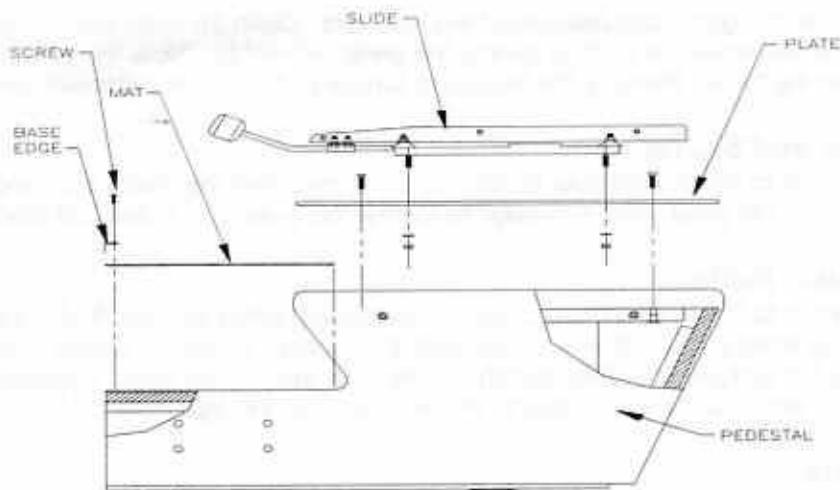
IMPORTANT: Apply removable anaerobic adhesive thread lock (Loctite Blue 242 or equivalent) and torque each bolt to seven to nine ft.-lbs (84 to 108 in.-lbs) (0.7 to 1.0 Nm) during re-assembly.



♦ Seat Slide Assembly

Use the T27 tamper proof wrench to remove three screws from each side of the seat mounting plate. Lift the seat and mounting plate off the pedestal assembly and set aside. Slide the seat assembly forward, and remove the two tamper proof torque screws from the metal panel on top of the pedestal assembly. Slide the seat back and remove the two front torque screws. Lift the metal panel out of the pedestal base and turn the unit over. Remove the four nuts holding the metal panel to the slide assembly. Set the metal panel aside and the slide assembly is exposed.

IMPORTANT: Apply removable anaerobic adhesive thread lock (Loctite Blue 242 or equivalent) and torque each bolt to seven to nine ft.-lbs (84 to 108 in.-lbs) (0.7 to 1.0 Nm) during re-assembly.



♦ **Upper Speakers**

NOTE: The speakers are magnetically shielded to prevent video monitor color impurity. Be sure that any replacement speakers are also magnetically shielded.

25" and 33" cabinets, two 5.25" full range: These speakers are under the marquee. Remove the marquee, glass and artwork. The speakers come out from the front of the cabinet. Be sure to disconnect the cabling and remove the nuts on the mounting screws before attempting to remove the speakers from the enclosure. Carefully reseat the seals upon completing any task in the speaker enclosure. Refer to the Cabinet Wiring Diagram for correct speaker polarity.

♦ **Lower Speakers**

25" cabinet, one 6" woofer; 33" cabinet, one 8" woofer: The lower speaker is located above the gas and brake pedals. Unlock and remove the rear door. Disconnect the cables that go to the electronics rack assembly. Unscrew the rack and set it aside. Reach through the cabinet and disconnect the speaker cables. Remove the nuts on the mounting screws and pull the speaker out of the cabinet. Carefully reseat the seals when replacing the speaker.

♦ **Pedal Assembly**

Switch off power to the game. Unlock and remove the rear door. Carefully note the orientation of the cables. Disconnect pedal assembly cable from wiring harness. Adjust the seat to the maximum rear position. Remove the four outer screws from the pedal plate. Pull the assembly forward enough to expose the ground wire. Disconnect ground wire and remove the pedal assembly from the cabinet.

♦ **Coin Meter**

Switch off power to the game. Unlock the cash door and swing it open. Remove the cash tubs. The meter is located on a plate at the vault bottom. Remove the screws and lift the plate just enough to disconnect the meter wires from the harness. Record the meter count before testing or replacement.

♦ **Coin Mechanism**

Switch off power to the game. Unlock the coin door and swing it open. Unlatch and remove each coin mechanism separately to clean or replace with a different type. Ensure that mechanism seats fully in the holder upon reinstallation. Close and lock the release latch, then close the door. Turn on the game and change the mechanism setup, then test known good and bad coins to verify operation.

♦ **Transformer**

Switch off power to the game and disconnect the line cord. Open the rear door. The Transformer is located under the electronics shelf and behind the pedal assembly. Note the positions of the wires before disconnecting them. Remove the mounting screws and lift the transformer out of the cabinet.

♦ **View Buttons and Shifter**

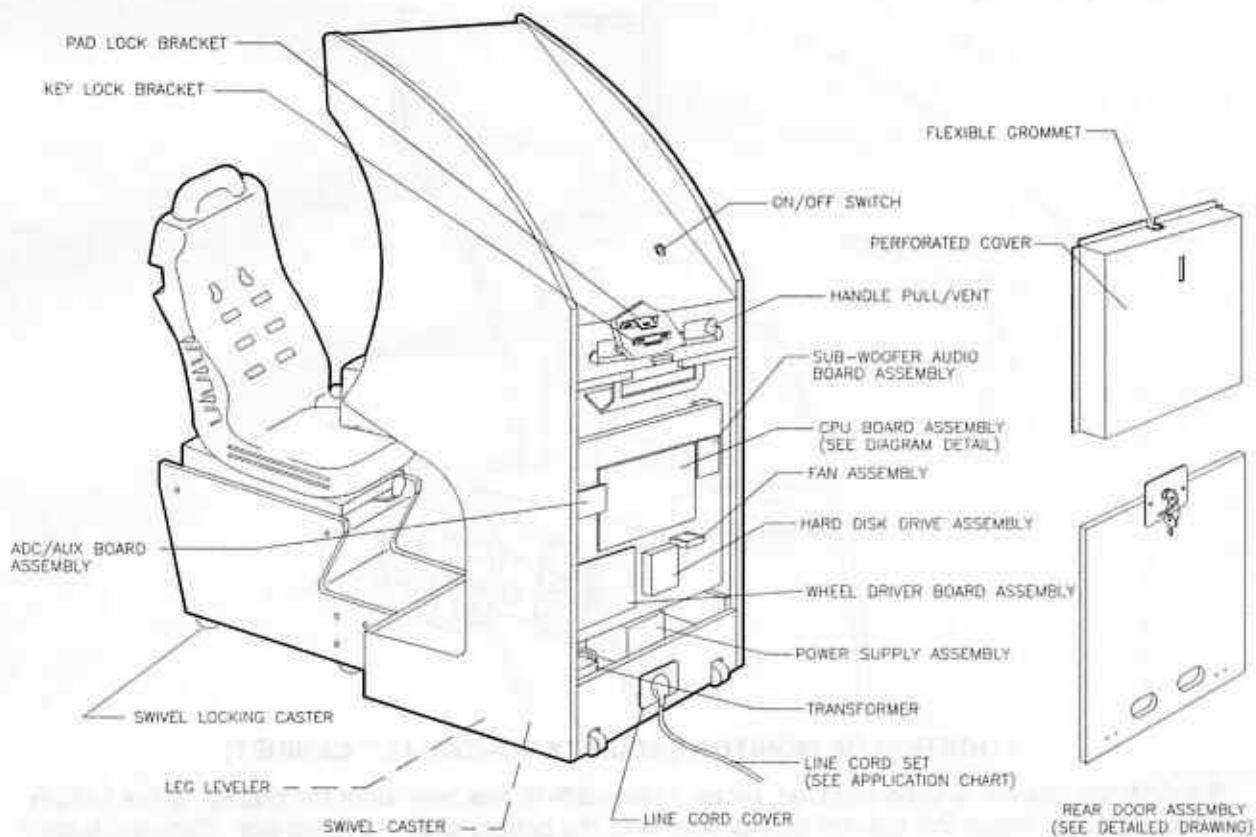
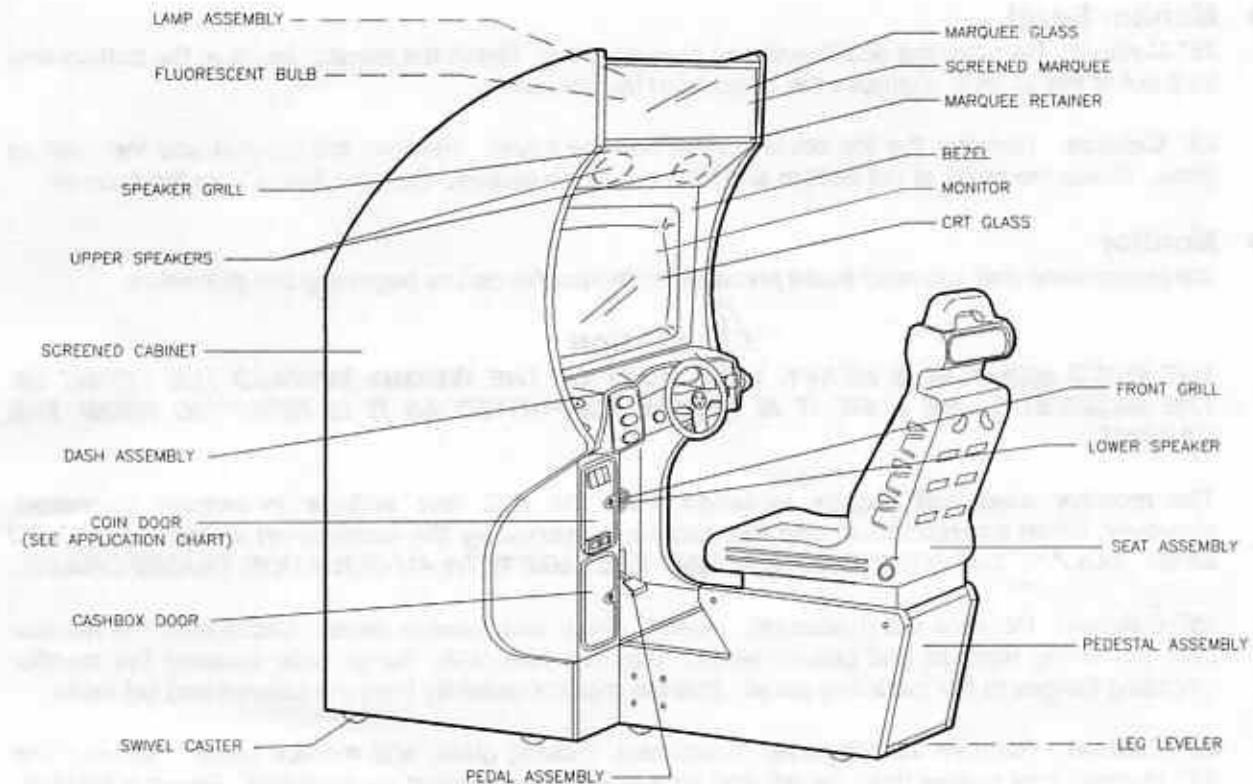
Use the T20 wrench to remove the four tamper proof screws from the plates surrounding the buttons and the shifter. Pull the plate forward enough to expose the switches. Label and disconnect wires.

♦ **Start and Music Buttons**

Use the T27 wrench to remove four tamper-proof dashboard corner screws. Pull the dashboard forward enough to expose the switches. Label and disconnect the wiring harness. Unscrew the switch mounting nut and pull the entire switch out from the front of the dash. Depress the snap locks to separate the switch assembly from pushbutton or to expose the light bulb.

♦ **Viewing Glass**

Use the T27 wrench to remove the four tamper proof screws at the dashboard corners (25" cabinet) or the top cover (33" cabinet). Pull the dash or cover forward enough to remove the retaining bracket. Grasp the edge of the glass at the bottom, then slide it out of the side grooves and lift it off the cabinet.



CABINET COMPONENTS (25" CABINET SHOWN; 33" CABINET IS SIMILAR)

♦ Monitor Bezel

25" Cabinet: Remove the dashboard and viewing glass. Grasp the monitor bezel at the bottom and lift it out of the groove. Remove the bezel from the cabinet.

33" Cabinet: Remove the top cover screws and the cover. Remove the bracket and the viewing glass. Grasp the bezel at the bottom and lift it out of the groove. Remove bezel from the cabinet.

♦ Monitor

We recommend that you read these precautions thoroughly before beginning this procedure.



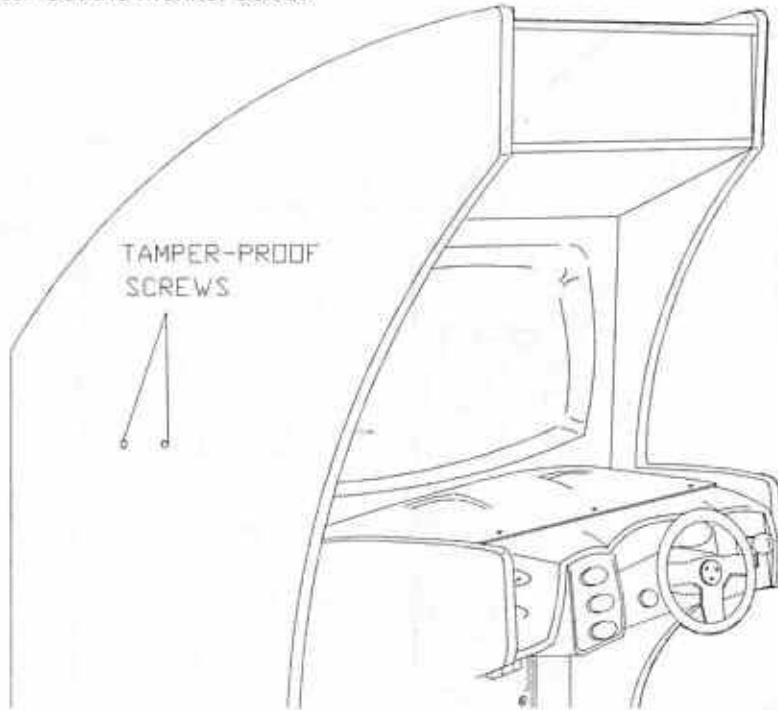
CAUTION

THE VIDEO MONITOR IS HEAVY, WITH MOST OF THE WEIGHT TOWARD THE FRONT OF THE ASSEMBLY. BE SURE IT IS FIRMLY SUPPORTED AS IT IS REMOVED FROM THE CABINET.

The monitor does not require isolation from the A.C. line voltage in normal operation. However, when operating outside the cabinet or servicing the monitor on a test bench, YOU MUST ISOLATE THE MONITOR FROM LINE VOLTAGE WITH AN ISOLATION TRANSFORMER.

25" Cabinet: Remove the dashboard, viewing glass, and monitor bezel. Disconnect the monitor from the wiring harness and ground wires. Remove four $\frac{1}{4}$ -20 flange nuts securing the monitor mounting flanges to the mounting panel. Pull the monitor carefully from the cabinet and set aside.

33" Cabinet: Remove the top cover, dashboard, viewing glass, and monitor bezel. Remove two T27 tamper-proof screws from the left and right sides of the cabinet as illustrated. Remove three $\frac{1}{4}$ -20 flange nuts located above the monitor. Tilt the monitor down from the top and pull it out of the cabinet. Set the monitor aside.

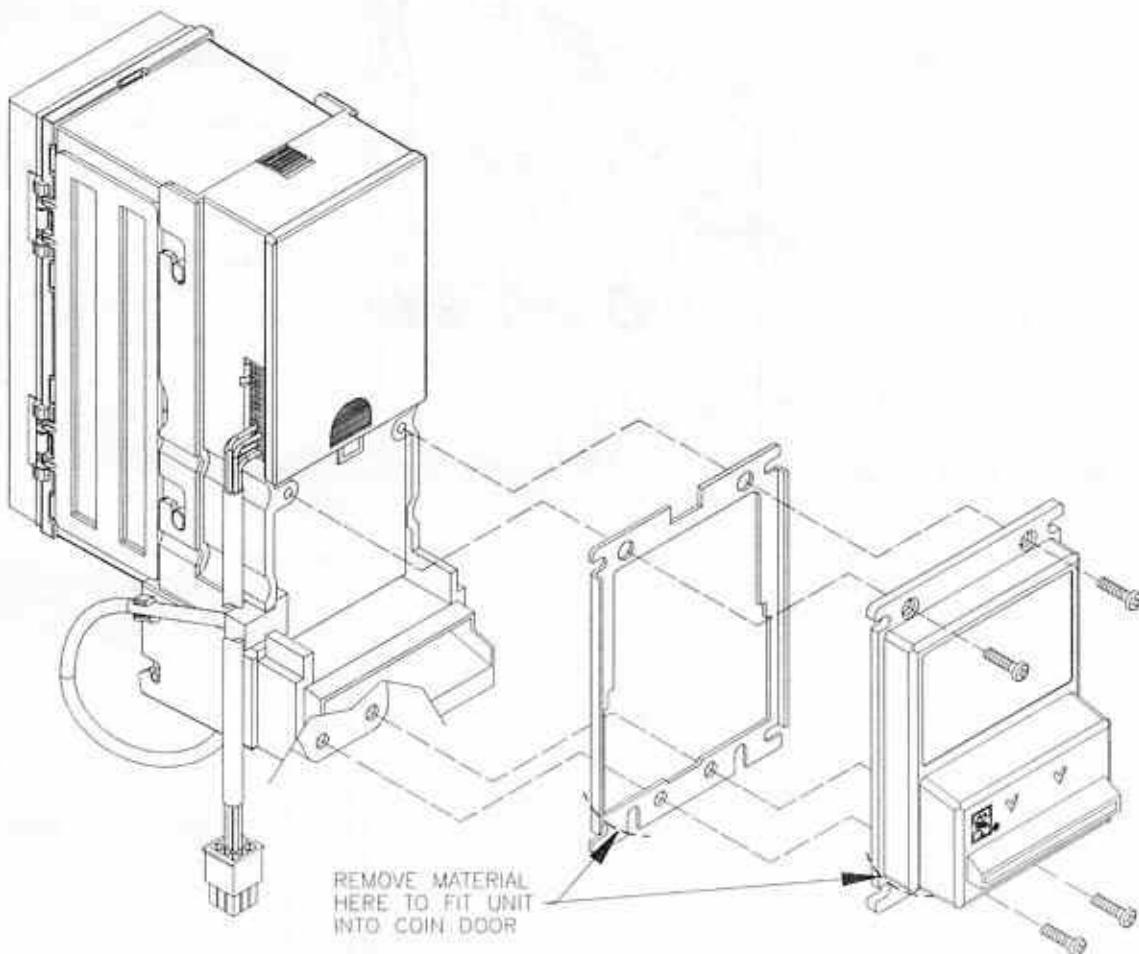


LOCATION OF MONITOR SECURITY SCREWS (33" CABINET)

If a different monitor is to be installed, remove three 3/8-16 hex bolts from the bracket at the bottom of the monitor. Install this bracket and its bolts onto the bottom of the new monitor. Slide the bottom of the monitor into the cabinet and tilt it up from the top. Replace the flange nuts at the top of the monitor, and the screws on the outside of the cabinet.

- ♦ **Dollar Bill Validator**
(Use MARS AE2411-U3 U.L. Recognized currency
changer)

Dollar bill validators or other currency acceptors may be installed in games that were manufactured with the additional wiring connector. Switch off power to the game and unplug the A.C. line cord. Unlock the coin door and swing it open. Read door label for additional information. Disassemble the validator and remove material to permit it to fit inside the coin door as illustrated, then reassemble unit.

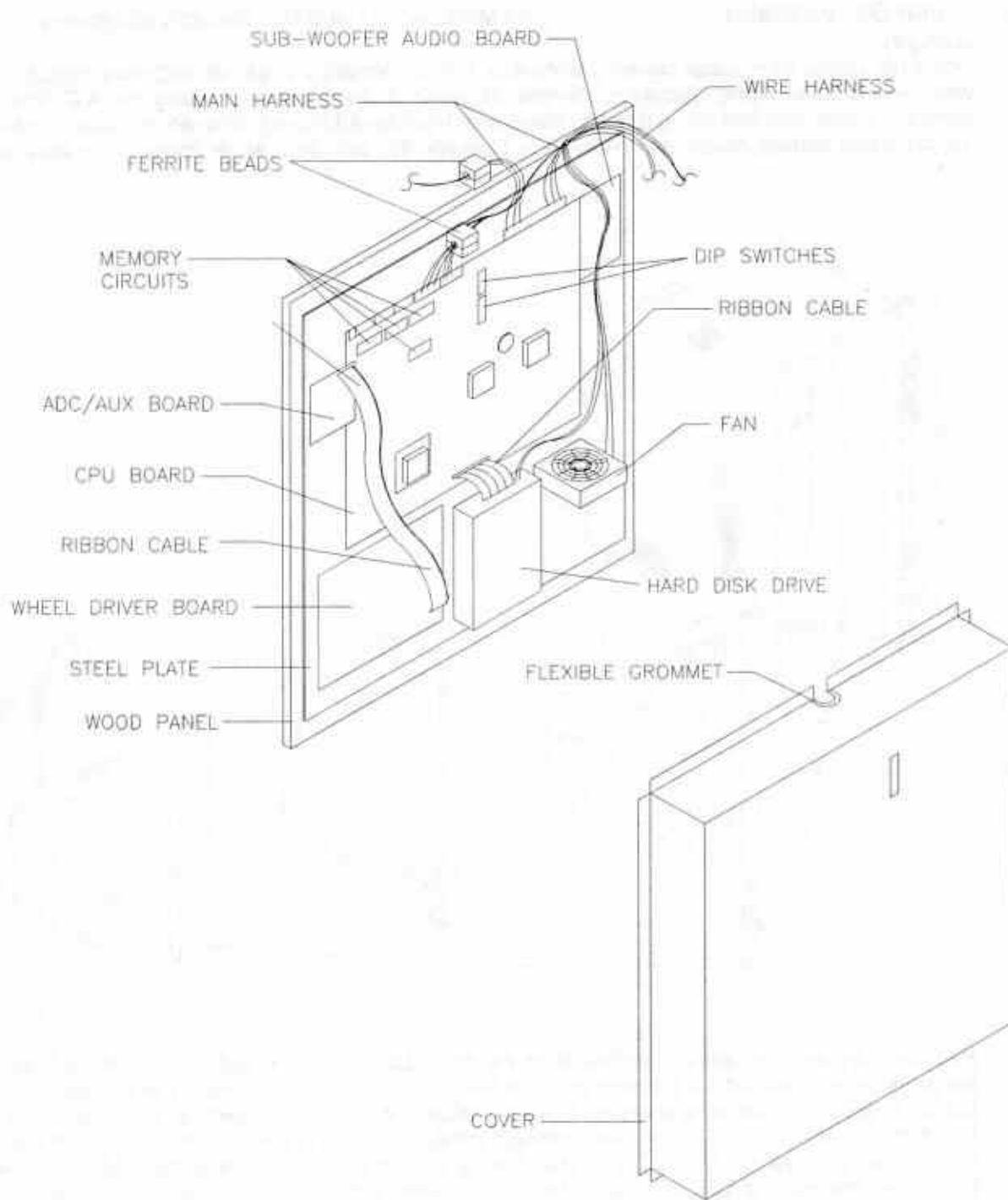


Remove nuts, spacers, and cover plate from the door. Change switch settings or make adjustments before mounting the unit. If the manufacturer has supplied an adapter plate, place it over the door cutout at this time. Install spacers on threaded studs, then align the validator mounting holes with the studs and seat the unit in the door opening. Install the nuts and tighten firmly. Attach the ground wire (green with yellow stripe) lug to the door ground stud next to the hinge. Mate the wiring harnesses and press to fully seat connectors. Route wires away from door edges and hinge. Inspect for proper bill chute alignment. Plug in the line cord and turn on the game. Change the mechanism setup and pricing, then test known good and bad bills to verify proper operation. Close and lock the coin door when correct. Reverse these steps to remove a validator for service or replacement.

- ♦ **Power Supply**

Switch off power to the game. Remove screws, then unlock and remove the rear door. Unplug the IEC A.C. connector from the rear of the supply and the D.C. connector from the front. Remove two front and two rear screws from the supply, then lift it off of the power chassis. Note voltage setting.

To reinstall the power supply, set the voltage switch to the correct value. Set the supply on the power chassis and align the mounting holes. Install the four screws and the two power connectors.



GAME ELECTRONICS COMPONENTS

◆ **Hard Disk Drive** *Do not stack or drop disk drives; store or transport in 08-8068 shipping container.*

Switch off power to the game. Unlock the rear door and lift it off of the cabinet. Remove the shield cover. Disconnect the D.C. power cable from the hard disk drive. Unplug the ribbon cable from the hard drive and leave it attached to the CPU board. Carefully loosen the screws and lift the drive assembly out of the cabinet. Remove the screws and reuse them if a different drive is installed. *Ensure that shield cover and each of its screws are installed and tightened when work is completed.*

♦ **Wheel Board Assembly**

Switch off power to the game. Unlock and remove the rear door. Carefully note the orientation of the cables. Extract the harness and other cables from the board connectors. Remove the Wheel Board Assembly mounting screws. Lift the board out of the cabinet and set in a safe place.

♦ **Subwoofer/Audio Board**

Switch off power to the game. Unlock and remove the rear door. Remove the RF Cage top to expose the CPU Board Assembly. Carefully extract each wiring harness or other cable from its connector. Remove the four silver phillips-head screws holding the board in place and retain them with their washers. Lift the board out of the cabinet and set in a safe place.

♦ **ADC/AUX Board**

Switch off power to the game. Unlock and remove the rear door. Remove the RF Cage top to expose the CPU Board Assembly. Carefully extract each wiring harness or other cable from its ADC/AUX Board connector. Remove the two brass and two silver phillips-head screws holding the board in place and retain them with their washers. Lift the board out of the cabinet and set in a safe place.

♦ **CPU Board Assembly**

Switch off power to the game. Unlock and remove the rear door. Remove the RF Cage top to expose the CPU Board Assembly. Remove the ADC/AUX Board as described above. Carefully note the orientation of the JAMMA connector and the other cables. Extract the harness, the Hard Disk Drive ribbon cable, and other cables from the board connectors. Remove the CPU Board Assembly mounting screws. Lift the board out of the cabinet and set in a safe place. Anti-static bags and protective containers from new parts may be used for storage if not to be reinstalled immediately. Be certain to reinstall the RF Cage top so that it seals tightly against the RF Cage bottom.

♦ **Memory Replacement**

The ROM (Read Only Memory) circuits contain the computer operating instructions. *Memory devices are especially sensitive to static charges. Use grounding precautions when handling these parts.*

Switch off power to the game. Unlock and remove the rear door. Remove the RF Cage top to expose the CPU Board Assembly. Carefully note each IC position, then remove using a chip extraction tool.

To reinstall memory circuits, orient a chip over its socket and press firmly to seat pins. *Do not force.*



CAUTION *Discharge any static electricity build up in your body by touching the power supply chassis. Do this BEFORE touching or handling the electronic assemblies.*

♦ **Battery**

Switch off power to the game. Carefully note the battery position, then gently lift the contact arm to release tension. *Do not bend the arm.* Slight finger pressure may be needed to pry the cell from its holder. *Avoid direct shorts across terminals or from terminals to ground.*

To reinstall the battery, orient cell near its holder and slide it in under the contact arm. *Do not force.*



CAUTION *Danger of explosion if battery is incorrectly installed. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to instructions printed on the battery or the manufacturers packaging.*

GAME OPERATION

Initial Start Up

When the game is first turned on, power is restored, or a reset occurs, it executes the boot ROM code. Automatic self-diagnostic tests verify and report condition of the hardware, memory, hard disk drive, etc. If any of the individual tests fails, then an error message displays for that particular test. Record all messages before starting a game. The message will be displayed until the ABORT button is pressed.

- ◆ If no buttons are pressed, the system will quickly complete all tests then load and run the game.
- ◆ Press and hold the coin door TEST button to skip the boot ROM tests and activate the Menu System.

Once Power-up tests have been completed, the game goes into ATTRACT MODE. Scenes and sounds from a typical game are alternated with previous track times in endless repetition until game play starts.

Attract Mode

Before the game starts, the ATTRACT screens show scenes and sounds from typical races on each of the tracks. Alternating with these scenes are views of the cars, best track times, game production team acknowledgements, etc. The attraction screens cycle endlessly until a player or operator starts the game.

The operator can choose to add more ATTRACT screens to the standard presentation, if desired.

- ◆ The "WIN RACE FOR A FREE GAME" message will display in the ATTRACT MODE if Free Game setting is chosen as the WINNER OPTIONS menu item (refer to COIN OPTIONS in this section).

Test Mode

The operator may enter the menu system at any time to analyze the game or adjust it if required.

NOTE: Do not enter the Test Mode with other linked games in progress. This may halt games.

GAME RULES

Individual Play (Stand Alone Operation)

Choose any cabinet. Insert currency to start the game. The player must choose the following variables:

1. The player selects a track. Each track has a different skill level and quantity of checkpoints.
2. The player selects a vehicle. The ROAD CAM button changes the row of vehicles. The SKY CAM button changes a vehicle's color before it is selected. Each car has different handling capabilities.
3. The player selects automatic transmission (no shifts) or manual transmission (shifting required).

Head to Head Play (Linked Operation)

Choose a linked cabinet (on-screen messages and optional overhead signs identify the linked games). Insert currency at the LINKED RACING JOIN IN NOW message. There are now some restricted choices:

1. Any player indicates linking is desired. That player selects a track. All tracks are available as before, but the first player to make a selection determines the track for the other competitors.
2. At least one other player must respond to the LINKED RACING JOIN IN NOW screen message.
3. The players select vehicles and may choose identical ones if desired. Players use the ROAD CAM or TAILGATE CAM buttons to select rows and the steering wheel to move within a row. The SKY CAM button changes the color (press the gas pedal to select an individual vehicle after selecting its color).
4. The players select automatic transmission (no shifts) or manual transmission (shifting required).
5. The WAITING FOR OTHER PLAYERS message displays until it times out or other players finish making their vehicle and shift selections.
6. After the round of head-to-head play is finished, players can join in again for the next race or can decline linked racing and revert to individual play.

NOTE: Players may decline a linked race by pressing and holding the RADIO button or waiting for the JOIN IN message to time out. If no other players accept a linked race, the games revert to individual play.

GAME PLAY

1. Players can press any button or touch the gas or brake pedal to start.
2. Any vehicle can be used on any track. Each vehicle handles and performs differently. Players will learn which vehicles are best for a given track and driving style.
3. On-screen indicators give the players information about their competitors. Across the top of the screen are indicators for race position, elapsed time, and time remaining to pass the next checkpoint. At the bottom of the screen, a scanner display coded by color shows the relative position of all vehicles during game play. Gauges show engine R.P.M., vehicle speed, and gear selected.
4. There are many secret features built into the game. For example, repeated gas pedal double stomps during high-speed pursuit causes items to be thrown at vehicles directly behind a player's position. Most tracks have shortcuts. Players are encouraged to find other secret features by experimentation.

GAME FEATURES

CALIFORNIA SPEED is shipped configured as a one-player game. Up to eight cabinets may be linked to permit player competition. A lighted overhead linking sign option is available.

Starting Up

Switch ON power to the game. The game begins internal tests (display messages about the software version and hardware test results). If there are no errors the game enters ATTRACT mode automatically.

A machine status screen will appear for about ten seconds. This is a game network activity report. The screen is used to verify and troubleshoot connections between cabinets when they are linked.

NOTE: When an error is detected during the internal tests, the game halts and an error message appears on the screen. Record any messages before attempting to service the game.

To calibrate player controls, enter the menu system and select CONTROLS TEST, then follow the on screen instructions. Refer to CONTROLS TEST later in this section for more detailed information.

Before the game starts, the ATTRACT screens endlessly cycle through scenes and sounds from typical races on each of the tracks. Insert the desired amount of coins or tokens and press start to begin.

Preview

In the ATTRACT mode, the game automatically cycles through scenes and sounds from typical races on each of the tracks. Players will be presented with lap after lap viewed from several different camera angles and driver viewpoints. Use this feature to see some of the fast grooves for the different tracks.

The Preview feature demonstrates each of the tracks in the game. This allows players to decide which track is best suited to their needs when considering head-to head competition.

Tracks

The first player selection screen permits course choices. Each track requires a different skill level. More challenging tracks decrease the time between checkpoints and increase course difficulty. This forces players to maintain higher speeds and allows fewer errors in judgement to continue racing.

If games have been connected together in a network, players will choose to accept or decline a race against other players from this screen. A LINKING message is illuminated when this type of competition is possible, and a JOIN IN message alerts other players when they get to the track selection screen.

Certain tracks allow players to take shortcuts to catch up to or pass other players. In linked races, at least one player must complete the checkpoints in the time allowed for the race to continue.

Cars

Players may choose from vehicles in any particular row by rotating the steering wheel until the desired car is highlighted. Each car has particular characteristics that may be advantageous depending on the track selected. Press and hold the ROAD CAM or TAILGATE CAM button to see the vehicles in other rows.

Shifter

Players may choose between automatic and manual transmissions. Manual shifting generally produces the fastest lap times. All gears are synchronized, so no clutch is necessary in this game.

Race Length

Several things affect the length of a race. Difficult tracks have more turns and require speed changes between the start and finish lines. Players must reach each checkpoint before time expires to continue racing. Players receive bonus time when they pass each checkpoint.

PLAYER CONTROLS

The player controls are used to guide the vehicle and optimize the view of the course.

- ◆ **Start button (green)**

The start button begins game play. In fact, any button or control will begin game play.

- ◆ **Radio button (blue)**

The radio button allows the player to change the music heard during play (no effect when linked). There are several different tunes to choose from.

- ◆ **Road Cam button (red)**

This button shows the view from the cockpit of the vehicle. This is a normal driver view.

- ◆ **Tailgate Cam button (yellow)**

This button shows the view from directly behind. The player can see the rear of the vehicle.

- ◆ **Sky Cam button (green)**

This button shows an aerial view of a vehicle. This is what a helicopter camera would see.

- ◆ **Gearshift**

All gears are synchronous, so no clutch is necessary to shift. However, improper gear selection will cause slow acceleration. There is no reverse gear, but when a player tries to drive the wrong way on the track, an Auto Reverse feature automatically re-aims the vehicle in the proper direction.

- ◆ **Pedals**

The gas and brake pedals control vehicle speed. Double gas pedal stomps cause object ejection.

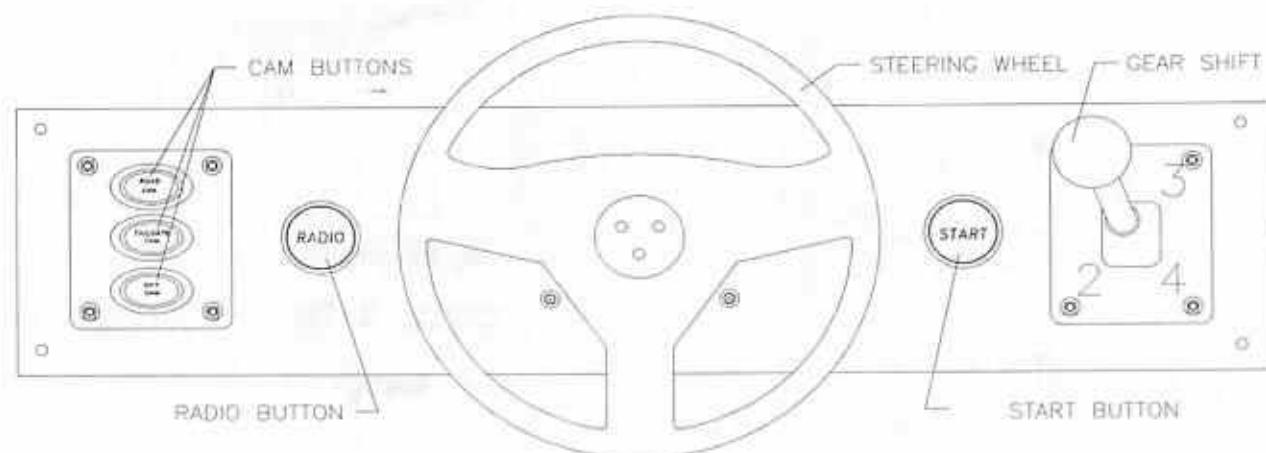
- ◆ **Seat Position Adjuster**

Pull this lever to the left while seated, slide seat forward or backward, then release the lever to lock the seat into position. Seat position may be changed at any time, even during competition.

- ◆ **Steering Wheel**

The steering wheel is used to aim the vehicle during a race. It provides road feedback to players.

Note: Operators can adjust the steering wheel force and feedback to suit any player's driving styles. Refer to GAME OPTIONS and CONTROLS TEST in the SELF TEST menu system for instructions.



PLAYER CONTROL LOCATIONS

OPERATOR CONTROLS

Operators have lock-and-key access to the menu system for statistics, adjustments, and testing to prevent tampering. On-screen messages guide the operator through menu options.

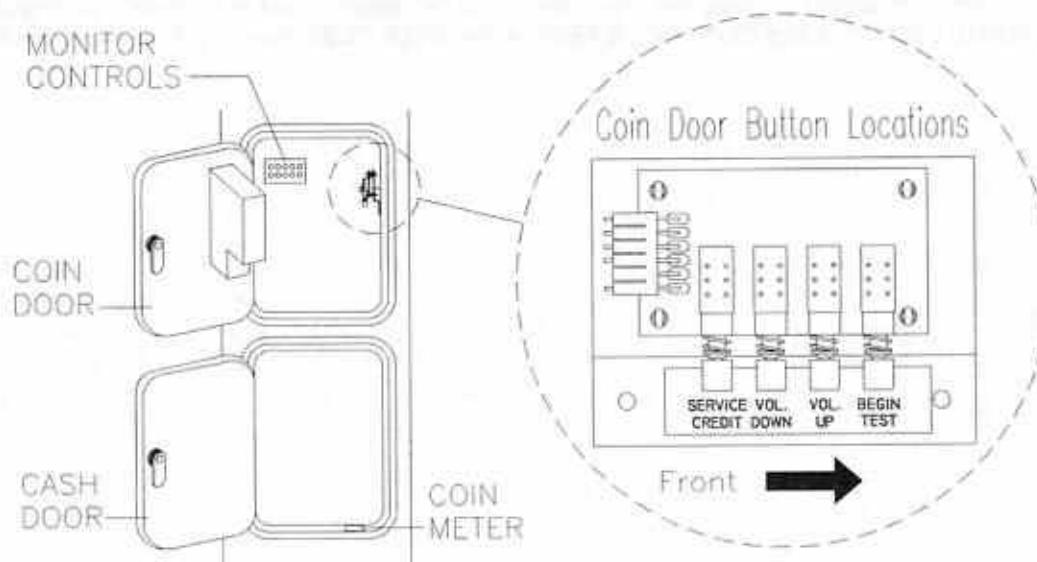
Cabinet Switches

- ◆ The **ON/OFF SWITCH** is located on the top right side of the cabinet (when viewed from the rear).
 - ◆ The **MONITOR REMOTE ADJUSTMENTS** are located inside the coin vault. Use the monitor test screens with these controls to adjust the video image size, brightness, contrast, etc.
 - ◆ The **SLAM TILT SWITCH** detects any forceful vibrations against the coin door. This eliminates pounding for free games. It is located on the inside of the coin door opening near the lock.

NOTE: The SLAM TILT SWITCH is not present on DBV ready coin doors.

Control Buttons

- ◆ The **TEST BUTTON** activates the game SELF TEST menu system. Press the Test button to access the Main Menu and select individual diagnostics, audits, utilities, etc. The **START** button also can be used to select individual items.
 - ◆ The **VOLUME UP BUTTON** moves up through the menu selections or adjustment items and raises the sound level in game play. The **ROAD CAM** button also moves up through selections.
 - ◆ The **VOLUME DOWN BUTTON** moves down through the menu selections or adjustment items or lowers the sound level in game play. The **SKY CAM** button also moves down through selections.
 - ◆ The **SERVICE CREDIT BUTTON** is used to allot credits without affecting the game's bookkeeping total. Pressing this button also gets out of a menu selection or returns to the main menu.



OPERATOR CONTROL LOCATIONS

POWER ON TESTS

The Power On Tests conduct internal checks to determine if individual components are operating properly. This routine occurs whenever the game is switched on or a press of the button on the circuit board resets the CPU. Once the hardware tests are successful, the CPU loads the software from the hard disk drive. A series of messages display briefly, indicating the version number of the software, among other things.

Turning on the power or resetting the circuit board does NOT recalibrate the player controls. Refer to CONTROLS TEST for instructions on how to calibrate player controls.

Manual testing more thoroughly diagnoses errors (refer to CONTROLS TEST in this section).

A successful self-test takes less than one minute to complete. Write down any error messages before proceeding to menus or game play. Consult Troubleshooting (Section Four) for assistance with errors.

```
Release Version X.XX MM/DD/YY HH/MM/SS
Initializing Network
>>Link ID is XX<<
My ID: X (XXXXXXXXXX)
ID X Found (XXXXXXXX)
msg: Loading Sound System
ASIC Rev. X.XX
EPROM Rev. X.XX
Reset: X
VPlus Reset: X
Version: XXX, XXX
Game Volume XX, Attract Volume XX
```

TYPICAL POWER ON TEST SCREEN

SELF TEST MENU SYSTEM

System Overview

A series of on-screen menus presents game variables and diagnostics. The Main Menu screen allows the operator to view information, make changes, or verify equipment operation. Each Sub Menu screen displays one specific group of choices. The Detail Menu presents data or runs the required test. You must be at the Detail Menu level to detect errors, make changes, or activate tests. Use either the operator controls or the player controls to move through the menus and start or stop particular routines.

Screen Layout

Each menu screen is different, but the material presented stays in the same physical location each time.

- *The color bar at the top center of each screen displays the current menu title.
- *The center of the screen displays data (menu items, video signals, statistics, reports, etc.).
- *The bottom of the screen displays messages (control functions, revision levels, etc.).

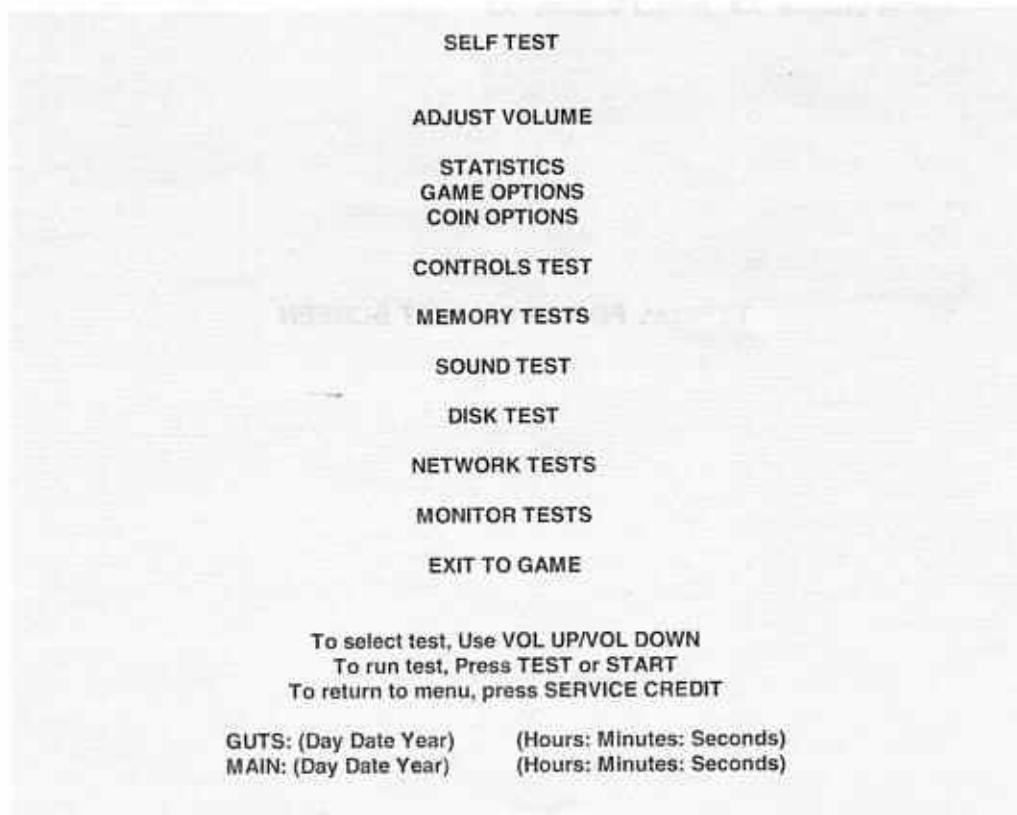
Organization

Main Menu screen items fall into two categories: options and tests. Activate each item manually.

Sub Menu screen items offer the operator choices within a category. Some items have no Sub Menu while others may have more than one. You can get back to the previous menu or go on to the next menu.

Detail Menu screen items contain specific information. The operator must interact with the system to get results or to make changes. There is always a way to go back to the previous menus from this screen.

Use the control indicated to highlight an item on any menu. *Only one highlighted item can be selected at a time.* To return the game to normal, select EXIT TO GAME, then press the indicated button.



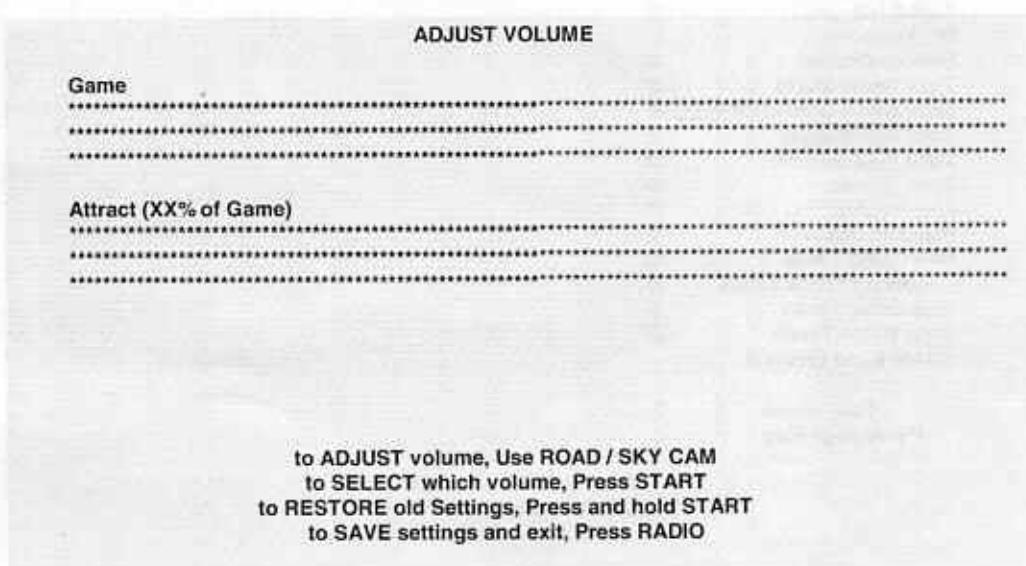
TYPICAL SELF TEST MENU SCREEN

Adjust Volume

The ADJUST VOLUME feature allows the operator to set the sound and music levels of the game.

The volume level can be adjusted separately for either the Attract or Game Mode. Press START to select Game Volume or Attract Volume. Press the VOLUME DOWN button to lower the volume level or the VOLUME UP button to raise the volume level. Music is played continuously while this screen is active.

NOTE: Open the coin door and use the VOLUME UP and VOLUME DOWN buttons to adjust the volume levels without going through the menu system during a game or when in attract mode.



ADJUST VOLUME MENU SCREEN

The "Game" volume ranges from zero to maximum. The game will seem more realistic if the player experiences high volume sounds during play (performance cars are not quiet in operation).

The "Attract" volume ranges from zero to maximum. For greater profits, adjust your volume levels to a loud setting to draw attention to this game.

The length of a bar made of asterisks represents the current volume level. A longer bar indicates a higher volume setting than a short bar.

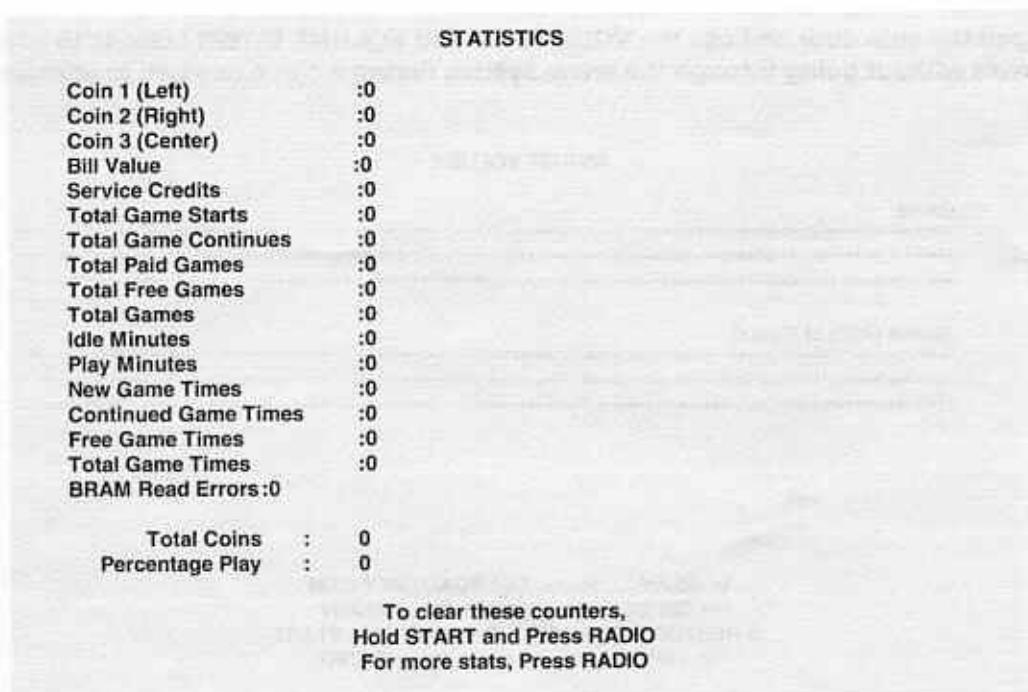
The "Attract" and "Game" volume levels may be adjusted to different values, but the "Attract" level cannot be set higher than the level chosen for normal game play. If the "Game" level is lowered, it will automatically lower the "Attract" level. Lowering the "Attract" level will not effect the "Game" volume.

NOTE: These adjustments affect the volume of the tests as well as the game play. If the volume levels are set to minimum (zero), there will be no sounds form the speakers during any of the audio tests. Set the volume levels to a moderately high value each time the sound portion of the game is checked. After completing the tests, return the levels to their previous settings.

Statistics

The STATISTICS report allows the operator to assess player skill level and game earnings. In addition to the earnings, STATISTICS tracks various game aspects to determine the players' skill level.

STATISTICS may be reset to zero or allowed to increase after each viewing. To reset statistics, hold the START or TEST button, then press the SERVICE CREDIT button. Press RADIO to see more statistics.



STATISTICS REPORT MENU SCREEN

The illustration shows how the report screen looks after the game has been reset or is first turned on. Most of the statistics will increase as the game is played. It is normal for some values to remain at zero: for example, the Earned Games count will not change if the cabinet has been set up for free games, and the Error count will not change if no errors have occurred.

Low counts in both coin and player statistics may indicate that the game is too difficult for the skill levels of the players at the game location. High counts may result if Bonus or Winner option menu items are activated. Adjust the difficulty level and other play characteristics from the Game Options menu.

Record the Statistics before any service or repairs are done on this game.

Press the RADIO button to view additional game statistics displayed in the form of Histograms. If a game has not been played before, or if the counters have been cleared, there will be no additional statistics.

HISTOGRAMS allow graphical analysis of statistics. This permits visual comparisons between games. The HISTOGRAMS screens will have no bar graphs until the system has enough data.

A USER MESSAGES screen may appear if the game has stored error codes or other useful information. As with Statistics, record these messages before any service or repairs are done on this game.

Game Options

These adjustments allow the operator to customize the game. Each of the variables will change some aspect of game appearance or play. Optimum settings cause high player interest and increase earnings.

Use the ROAD CAM or SKY CAM button to select an item. Press the TAILGATE CAM button to change variables. Options may be reset to factory default values (START) or changed after viewing (RADIO).

GAME OPTIONS

Free Play:
 No
Game Difficulty:
 3 Medium
People:
 Yes
Start and Finish Girls
 Yes
Language:
 English
Do-the-State Movie
 Spicy
Unit Number for Link:
 Unassigned
Feedback Strength:
 Weak
Auto Clear Highscores:
 After 1000 Games
Clear Highscore Table:
 No
Reset Options to Factory Defaults:
 No

To change value, Press START
To Restore old Settings, Press and hold START
To select option, Use ROAD/SKY CAM
To Save setting and exit, Press RADIO

GAME OPTIONS MENU SCREEN

The illustration shows how this screen will look with all of the factory default settings. Each press of the TAILGATE CAM button advances a variable through its range of choices. Some items have more options than others. Examine all the choices before selecting one.

Comparing statistics reports before and after making changes to options reveals their effect on game play. As players become more familiar with the game, you can add new features or increase difficulty.

Coin Options

The COIN OPTIONS set up the coin mechanisms and set the pricing of the games. Factory default values can be considered standard.

Use the ROAD CAM and SKY CAM buttons to select a particular menu item. The TAILGATE CAM button is used to change variables. Options may be set to factory default values or changed after each viewing.

PRICING OPTIONS

Free Play:
No
Game Cost to Start:
3 Coins
Game Cost to Continue:
3 Coins
Bonus for quantity buy-in:
None
Winner Plays Next Free:
Yes

To change value, Press START
To RESTORE old Settings, Press and hold START
To select option, Use ROAD / SKY CAM
To Save Settings and exit, Press RADIO

PRICING OPTIONS MENU SCREEN

MECH SETUP

Activate mech to test. Current status:

Mech 1 Mech 2 Mech 3 Mech 4 BILL Service

Each Mech 1 pulse worth:
1 Coin
Each Mech 2 pulse worth:
1 Coin
Each Mech 3 pulse worth:
1 Coin
Each Mech 4 pulse worth:
1 Coin
Each Bill pulse worth:
1 Coin
Stats and Counters count:
Coins

To change value, Press START
To RESTORE old Settings, Press and hold START
To select option, Use ROAD / SKY CAM
To Save Settings and exit, Press RADIO

MECH SETUP MENU SCREEN

The illustrations show how these screens will look with all of the factory default settings. Some items have more options than others. Press TAILGATE CAM repeatedly to view all options before selecting one.

PRICING OPTIONS

This sets the number of credits required to start and continue a game, rewards for buy-in and winning, etc. Free play eliminates all other pricing options. Free game player incentives may reduce earnings.

MECH SETUP

MECH SETUP permits the operator to add, remove, or test coin or bill mechanisms. Although values are shown for all devices, changes to unused inputs have no effect if no such mechanism is installed.

Controls Test

These tests allow the operator to check each switch in the game and to calibrate certain player controls.

NOTE

Some switches may not be used with this game. Check the wiring diagram and the mech setup items.

As switches are activated, the screen indicator changes. Releasing the switch returns the indicator to its previous condition. Switches may be tested in any combination. Press and hold RADIO to end the tests.

CONTROLS TEST

COINS	1	2	3	4	BILL
X		X	X	X	X

ROAD CAM					1	3
X					X	0
TAILGATE CAM		RADIO		XX XX XX	START	
X		X		0000	X	2 4
SKY CAM				Wheel		0 0
X						

TEST MODE		FORCE TEST 00	
X			
VOLUME UP		SET FORCE	
X			
VOLUME DOWN		XX XX XX	XX XX XX
X		0000	0000
SERVICE CREDIT		Brake	Gas
X			

To test wheel force, Press START
To reset limits, press and hold SKY CAM
To return to Menu, Press and Hold RADIO

CONTROLS TEST MENU SCREEN

The Controls on the screen appear as they are found on the dash, gearshift, coin door bracket, etc. Each control change should be duplicated exactly by a single indication on the menu screen.

The Controls Test screen is used to verify crossed wires, intermittent conditions, and stuck switches.

Press and hold START to test the Steering Wheel force. Restraining the wheel with one hand during the test. The force will increase to maximum and decrease to minimum, then change directions and repeat again until START is released. Use this test to check for looseness, binding, belt slipping, motor power, etc.

Press and hold the SKY CAM button until the gas and brake pedal force indicators reset. Release the SKY CAM button and depress the gas pedal and brake completely to reset the pedal travel. Next, turn the steering wheel fully clockwise, then fully counterclockwise. The numbers will turn green after testing to indicate that calibration has been successful.

Note and record the Coin Counter reading before beginning the test to avoid subsequent count errors. Press the Coin Door Slam Switch to increase the count by one digit. *Do not bend Slam Switch contacts.*

NOTE: If the Deluxe Linking Overhead Sign is installed, test the game controlled lamps.

The LEADER light illuminates when shifting into third gear (3) and must be off in all other gears.

The WINNER light illuminates when shifting into fourth gear (4) and must be off in all other gears.

Memory Tests

The MEMORY TESTS are used to verify some functions of the CPU Board Assembly memory circuits.

NOTE: These tests detect system errors, not game errors. The game program is on the Hard Disk Drive.

Press the ROAD CAM and SKY CAM buttons to select a particular menu item. Press START to begin the tests and RADIO to abort them. There are no custom settings or adjustable variables in these tests.

WORKING RAM TEST (QUICK)

XXXXXXX

XXXXXXX

00000000

TEST COUNT: 1

ERROR COUNT: 0

To hold display, Press and hold START
To return to Menu, Press RADIO

QUICK RAM TEST MENU SCREEN

ROM TEST

BOOT ROM (U32) PASSED

To Return to Menu, Press RADIO

ROM TEST MENU SCREEN

WORKING RAM (QUICK) performs a fast verification of the storage area for the game variables. This test takes less than 10 seconds to run. After completion, the Memory Tests screen is displayed. The results of the test will be reported as pass or fail messages; error messages may be included.

WORKING RAM (FULL) performs a more thorough check of the storage area for the game variables. This test takes less than 45 seconds to run. After completion, the Memory Tests screen is displayed. The results of the test will be reported as pass or fail messages; error messages may be included.

ROM TEST performs a fast check of the storage area for the game instruction set. This test takes less than 2 seconds to run. At completion, press RADIO to return to the previous menu. The results of the test will be reported as pass or fail messages; error messages may be included.

NOTE: The memory tested here stores data required to permit game play and video display. Audio memory is tested separately (refer to the SOUND TESTS later in this section of the manual).

Sound Tests

These tests verify that the audio components are connected and operating properly.

NOTE: Increase the VOLUME to a moderately high level to test the speakers accurately.

There are no custom settings or adjustable variables in these tests. The test is performed automatically.

AUDIO SPEAKER TEST

LEFT

RIGHT

To Return to Menu, Press RADIO

SPEAKER TEST MENU SCREEN

AUDIO SPEAKER TEST sends alternating voice sounds to the left and right speakers. The voices should be clear and distinct from each other. Each voice must come from the location identified. Refer to ADJUST VOLUME screen if necessary to increase loudness for this test.

The Audio Speaker Test screen verifies crossed connections, incorrect phase, and distortion. Press RADIO to end the Audio Speaker Test and return to the SOUND TESTS menu.

NOTE: There is no separate signal for the woofer (located just above the gas and brake pedals.) The voice sounds do not contain enough low frequencies to verify correct operation. Return to the ADJUST VOLUME menu screen; at fairly high level the music should have enough low notes to permit woofer testing. Ensure that the previous volume level is restored after finishing the test.

AUDIO HARDWARE TEST

Hardware Reset, passed.
Latch test, passed.
Eeprom Revision: VX.X
SDRC Revision: X
PM Checsum: XXX
SRAM test, passed.
DRAM bank 0 test, passed.
Boink, passed.
Software Reset, passed.
FIFO test, passed.

To Return to Menu, Press RADIO

AUDIO HARDWARE TEST REPORT SCREEN

AUDIO HARDWARE TEST automatically tests the electronic components of the audio amplifier for problems and reports the results as "passed" or "failed." Each "failed" result should be noted and referred to qualified service personnel. This test also shows the revision numbers for the audio EPROMs and other components. Press SERVICE CREDIT to return to the SOUND TESTS menu after noting and recording any errors.

NOTE: If any test reports a "failed" result, refer to Troubleshooting in Section Four.

Disk Tests

The DISK TESTS verify the functions of the Hard Disk Drive Assembly. Some files can be repaired.

These tests are automatic and the results appear on the menu screen as they occur. There are no custom settings or adjustable variables in these tests. The RADIO button aborts the tests.

DRIVE TEST

Hard Drive Connected: Yes

Drive ID: XXXXXX

Logical Sectors Available: XXXXXXXX

LBA	MB/sec	
12216	5.862	avg
	4.541	min
	5.917	max

Tests completed: 1

To return to menu, Press RADIO

DRIVE TEST MENU SCREEN

Hard Drive Connected

This test routine verifies the interface between the CPU Board Assembly and the Hard Disk Drive itself. The processor requests disk information. Data cannot be retrieved successfully if there is a problem.

Drive ID

This is an industry standard identification for Hard Disk Drive type and capacity. This is a manufacturer hardware number only; it will not identify the software or the game program stored on the drive assembly.

Logical Sector Test

This test performs a sector by sector read/verify test on the disk drive. As the status of each block of sectors is checked, the speed of the data transfer is compared to its acceptance limits.

Tests Completed

These tests run over and over. The number increases each time the test cycle repeats (approximately every 5 minutes). To end the testing cycles at any time, press the RADIO button.

FILE SYSTEM CHECK

Disk space available: XXXX

File system occupies: XXXX

Total files uses: XXXX

Checking File: XXXX

File system is A-OK

To return to menu, Press RADIO

FILE SYSTEM TEST SCREEN

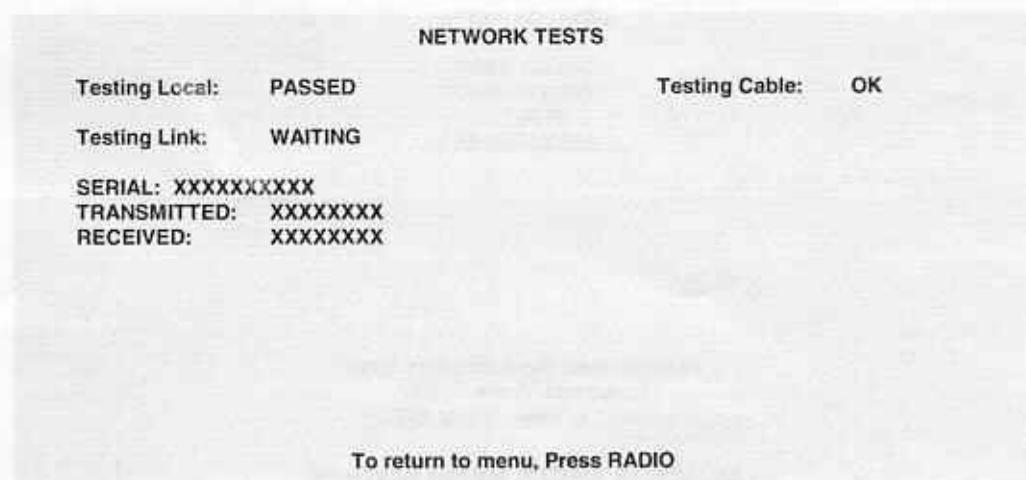
Checking File

This routine performs a file by file check of data stored on the hard disk drive and reports its findings. If errors are detected the system tries to fix them in the process (approx. 2 minutes per cycle). The system reports on the severity of the errors and advises if game performance is affected.

Network Tests

The NETWORK TESTS provide routines for verifying the communication circuits when games are linked. These tests are automatic and the results are reported on the menu screen as they occur.

There are no custom settings or adjustable variables in these tests. The RADIO button ends these tests.



NETWORK TESTS MENU SCREEN

Several different options allow cabinet linking for head-to-head player competition. This screen allows the operator to determine if the linking equipment is networking or *not* working. The results of these tests either confirm proper operation or indicate the location of any problem.

NOTE: This group of tests checks only system hardware (cables and communications circuits). Inspect for disconnected or broken cables, crossover couplers, hubs, etc. Individual games are not affected by network faults; however, network performance is critical for linked operation.

Testing Local

This test performs an internal check of the local communication circuits in the game cabinet. It does not test any cables, hubs, or the other game cabinets. An error message indicates CPU board difficulties.

Testing Cable

This verifies complete signal paths. "???" is a normal response to this test when the game is not linked. Linked games require all cabinets, couplers, hubs, etc. to be powered ON and connected to report OK.

Testing Link

This sends data out from each active game and looks for responses. At least two cabinets must be networked properly and in link testing mode for this test to report a result. The test reports the number of cabinets found. More linked games delay the test results response.

Transmitted

This number is a running count of the data packets sent by each game cabinet. It increases until you exit this screen. The local game location (your cabinet) is always listed first in the report.

Received

This number is a running count of the data packets acquired from the network. It increases until you exit. All cabinets must be receiving packets from the local cabinets or the communications network is faulty.

Monitor Tests

The MONITOR TESTS provide patterns for verifying the monitor performance or making adjustments.

Use the ROAD CAM and SKY CAM buttons to choose a particular menu item. Press START to begin each test. The START button changes variables during each test. The RADIO button ends the test.

MONITOR TESTS

COLOR BARS
CONVERGENCE
PURITY
RECTANGLES

To select test, Use ROAD/SKY CAM
To run test, Press START
To return to menu, Press RADIO

MONITOR TESTS MENU SCREEN

COLOR BARS fills the screen with shades of colors to verify red, green, blue and white level dynamic adjustments. Each color bar should appear sharp, clear, and distinct from bars on either side.

The Color Bars screen is useful in adjusting the monitor brightness and contrast.

Press the START button twice to change the color of the screen border. Press RADIO to exit.

CONVERGENCE tests fill the screen with a grid and a series of dots. The grid and the dots should be all one color, with no fringes or parallel images. The lines should be straight and the dots round.

The Convergence tests are useful in verifying the monitor convergence, linearity, and dynamic focus.

Press the START button to change the color of the screen grid lines. Press RADIO to exit.

PURITY fills the screen with 100% of the chosen color at normal intensity. Each screen should be absolutely uniform from top to bottom and side to side. No retrace lines or noise should be visible.

The Purity tests verify monitor intensity, black level, blanking and degaussing. There are eight separate color and brightness tests.

Press the START button to cycle through the tests. With each press of START, the screen briefly displays a new color and its name, then fills the screen entirely with the color. Press RADIO to exit.

RECTANGLES displays solid color boxes over a contrasting background screen. The rectangle should be centered with all four sides visible. The sides of the background should not be visible.

The Rectangles tests are useful in verifying scan size and screen uniformity.

Press the START button to change the color of the screen. Press RADIO to exit.

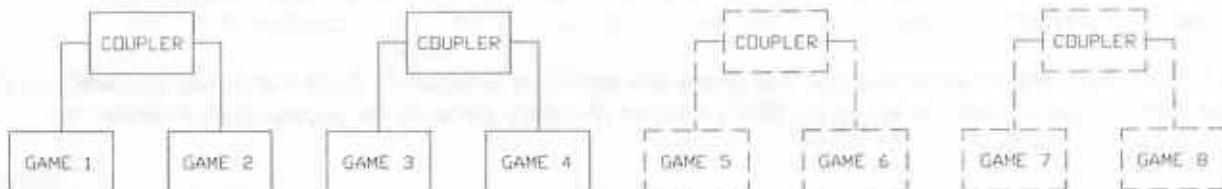
NOTE: If any of the tests shows a need for correction, use the Monitor Remote Adjustment Board.

LINKED OPERATION

Equipment Requirements

Linked mode unites cabinets together and permits several players to race against each other in real time. As with single games, drone cars can be eliminated for head-to-head competition. The Linking program is player selectable so each cabinet can meet the needs of the players.

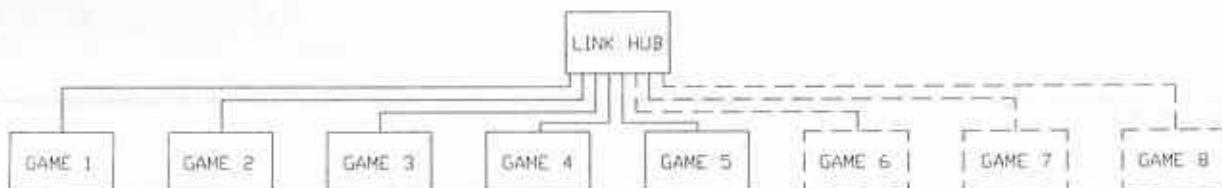
Games must be interconnected for linked operation. One cable is installed in each cabinet at the factory. The crossover coupler used to connect the linking cables is shipped in with the spare parts.



BASIC LINKING DIAGRAM

Each kit connects one pair of games. Passive electronics limit the cable length and the number of games. Cabinets are usually attached, but may be separated up to 30 ft. Linked pairs may be added as required.

HUB KITS contain a network hub. The active circuits allow the use of more cables of greater length. Contact your distributor for availability of these kits.



HUB LINKING DIAGRAM

Each kit connects from two to eight cabinets together. Active electronics permit use of larger networks. Cabinets are usually attached, but may be separated up to 300 ft. More cabinets can be added as needed.

Cabinets must communicate without errors before activating Linked Mode (refer to NETWORK TESTS).

Head-to-Head Racing

As a player selects a track, the opening screen LINKING indicator illuminates. A JOIN IN message offers subsequent players a linked race. If others do not begin their selection process before this message disappears from the screen, their games do not link (games operate independently for those players).

If other players begin the selection process while the JOIN IN message is visible, the cabinets begin sending and receiving information on the network. Each additional game gets data from active cabinets in exchange for its own packet containing a unique identity, car color, player preferences, etc. A WAITING message indicates that other individuals are still selecting options for this race. When the last player is done selecting or the waiting period has elapsed, all linked players see the START screen simultaneously.

Late arriving players cannot participate in an ongoing linked race, but they may begin an independent race. The link automatically breaks when the game ends, permitting another linked or solo race for each player.

SWITCHES AND JUMPERS

The CPU Board has a number of hardware variables that can be changed to adapt this assembly to other uses. Jumpers determine which circuit paths are active, and DIP switches select instructions.

Switches

There is one CPU Board push button switch (S2, near the battery). This switch resets the processor. This switch is used during service to restart the game without cycling the power off and on again.

There are two DIP Switch blocks (U8 and U9, near the JAMMA connector) on this CPU Board set. Each consists of eight individual switches. These switches are factory set for normal game operation.

NOTE: All instruction variables for this game are software selectable from the menu system. Each DIP Switch should be set to its OFF position (Factory default) for proper game operation.

Jumpers

Jumpers on the CPU Board match various system characteristics to optimize the memory circuits and video signals. These jumpers may require adjustment to accommodate future upgrades or service.

NOTE: The circuit paths are optimized at the factory during the board test procedure. Each jumper should be left in its original position to avoid error messages or video sync problems.

ERRORS

The system detects errors at start up or during various diagnostic tests or operations and reports them on the screen. Some errors, such as minor disk data faults, are automatically repaired by the system. Other errors, such as player control calibration, are fixed by manually resetting the values in game memory. In most cases, the game will continue to operate with reduced performance after discovering minor errors.

Always record error messages before attempting to correct any problem. The USER MESSAGES report may store some additional temporary messages (refer to STATISTICS earlier in this section).

After recording the error messages, turn off the game's power, wait a few minutes, then turn the power back on again. Pay attention to the start-up screens and note any error messages during the Power On Tests. If possible, enter the SELF TEST MENU SYSTEM and run all of tests related to where the errors occurred. Record any new error messages and compare them to those previously recorded to determine whether the errors are random or continuous in nature.

NOTE: Do not ignore error messages when the game can be forced to start and operate. Games with errors may generate reduced earnings due to poor performance.

CALIFORNIA SPEED™

SECTION TWO

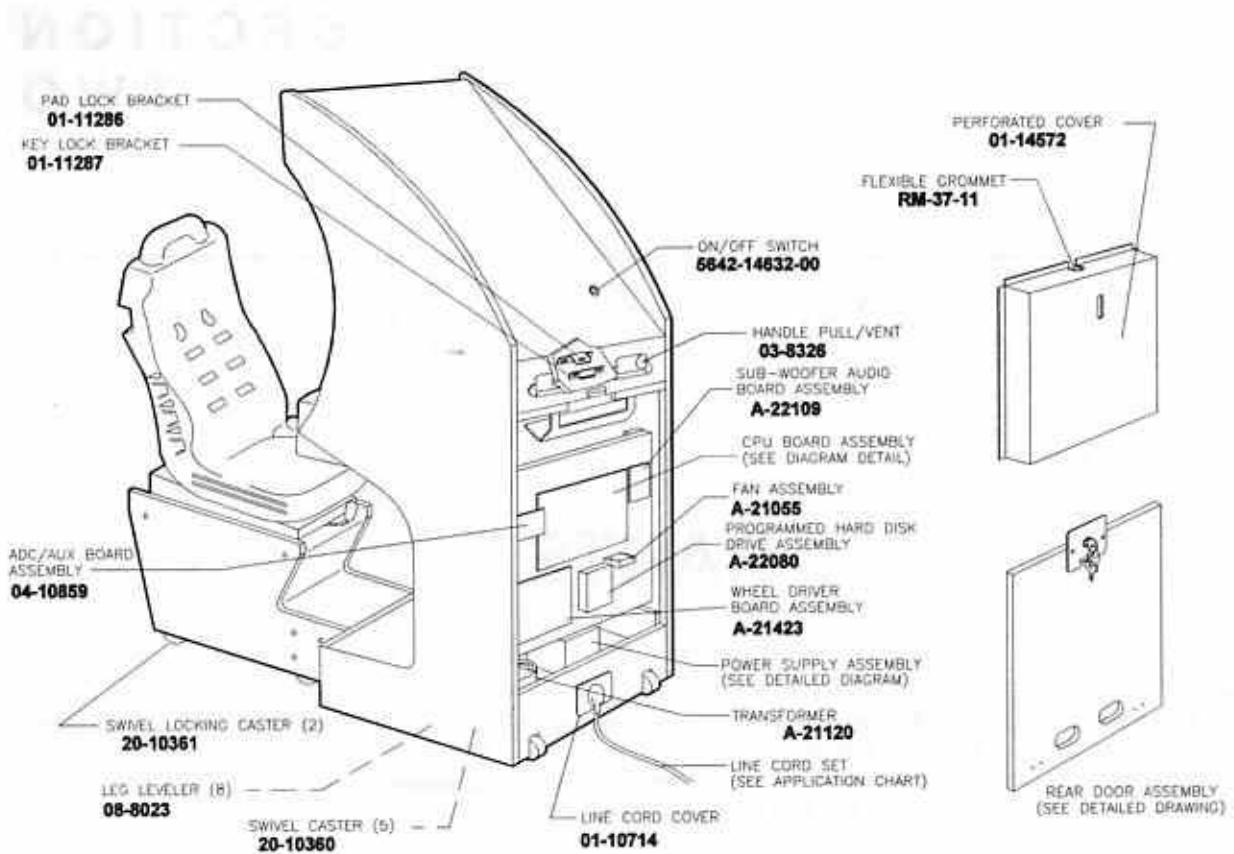
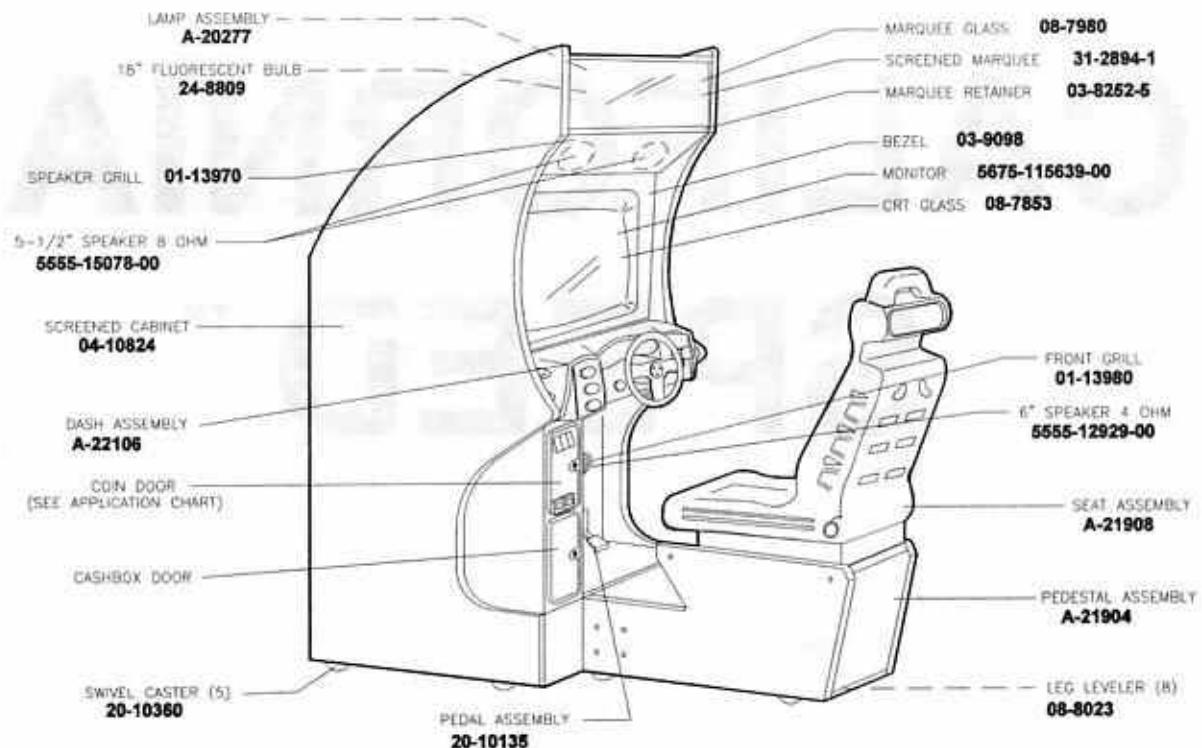
PARTS

Warning

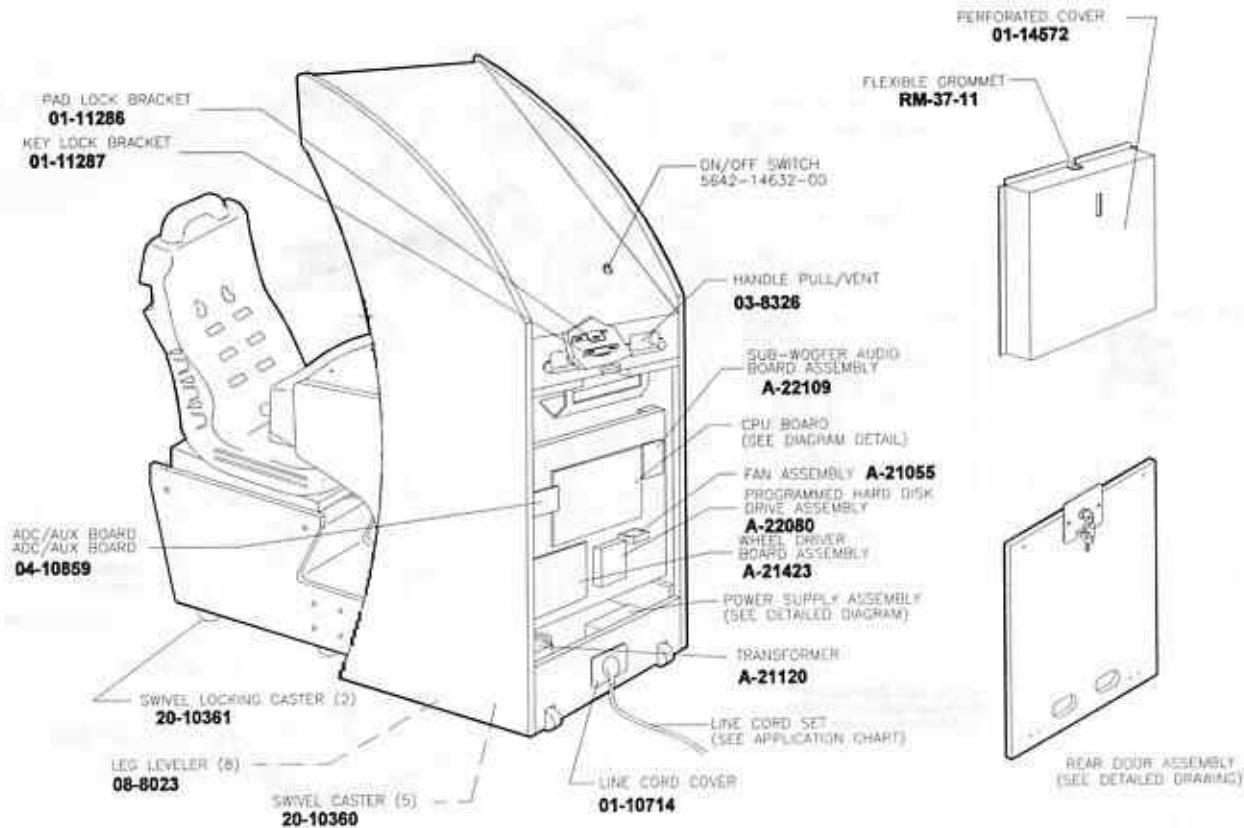
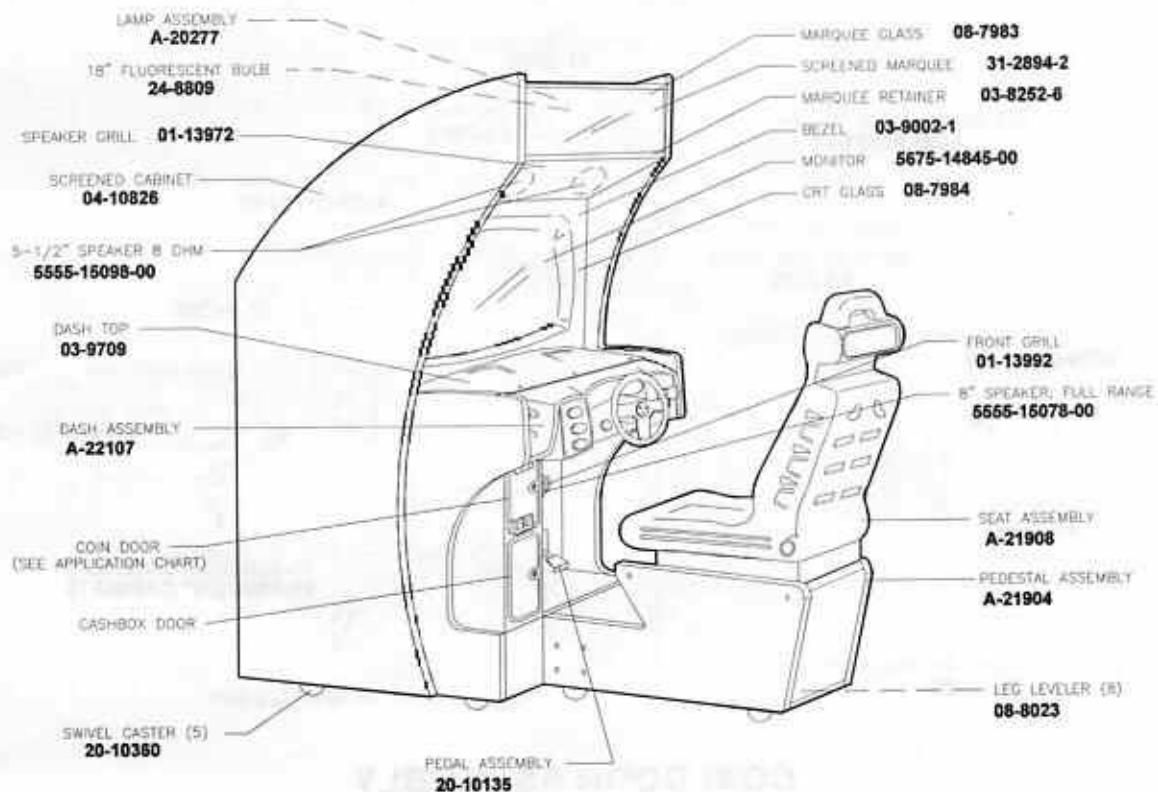
USE OF NON-ATARI PARTS OR CIRCUIT MODIFICATIONS MAY CAUSE SERIOUS INJURY OR EQUIPMENT DAMAGE! USE ONLY ATARI AUTHORIZED PARTS.

- For safety and reliability, substitute parts and modifications are not recommended.
- Substitute parts or modifications may void FCC type acceptance.

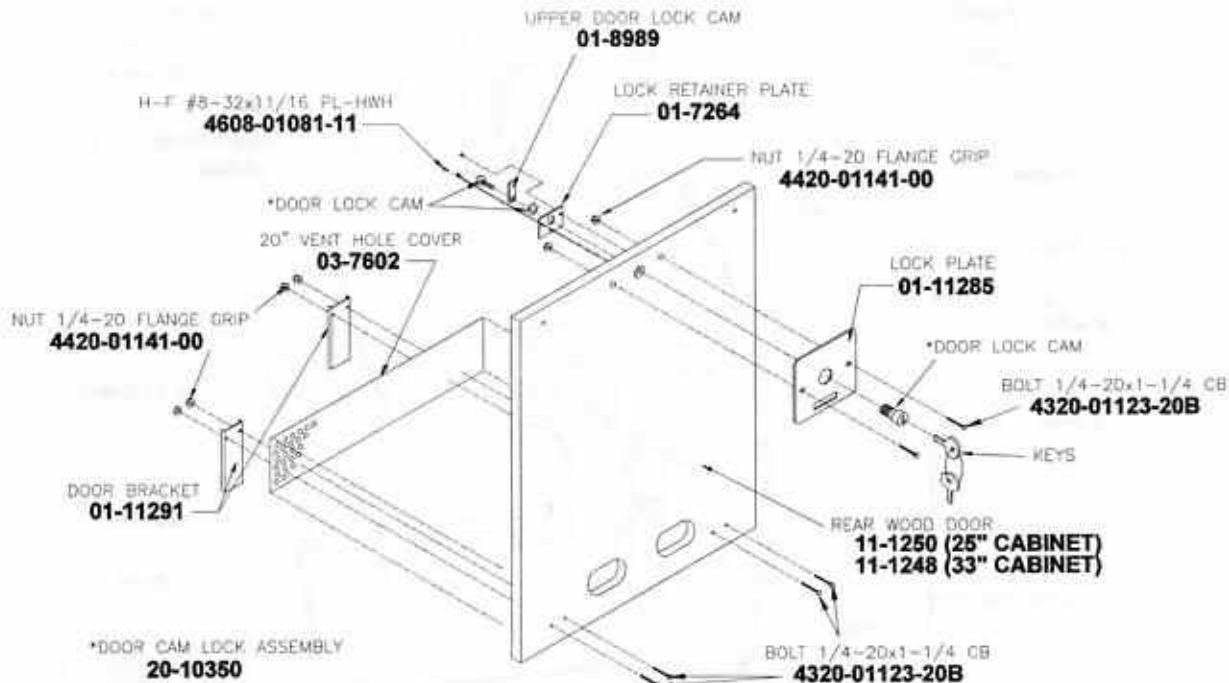
CALIFORNIA SPEED (30028) 25"



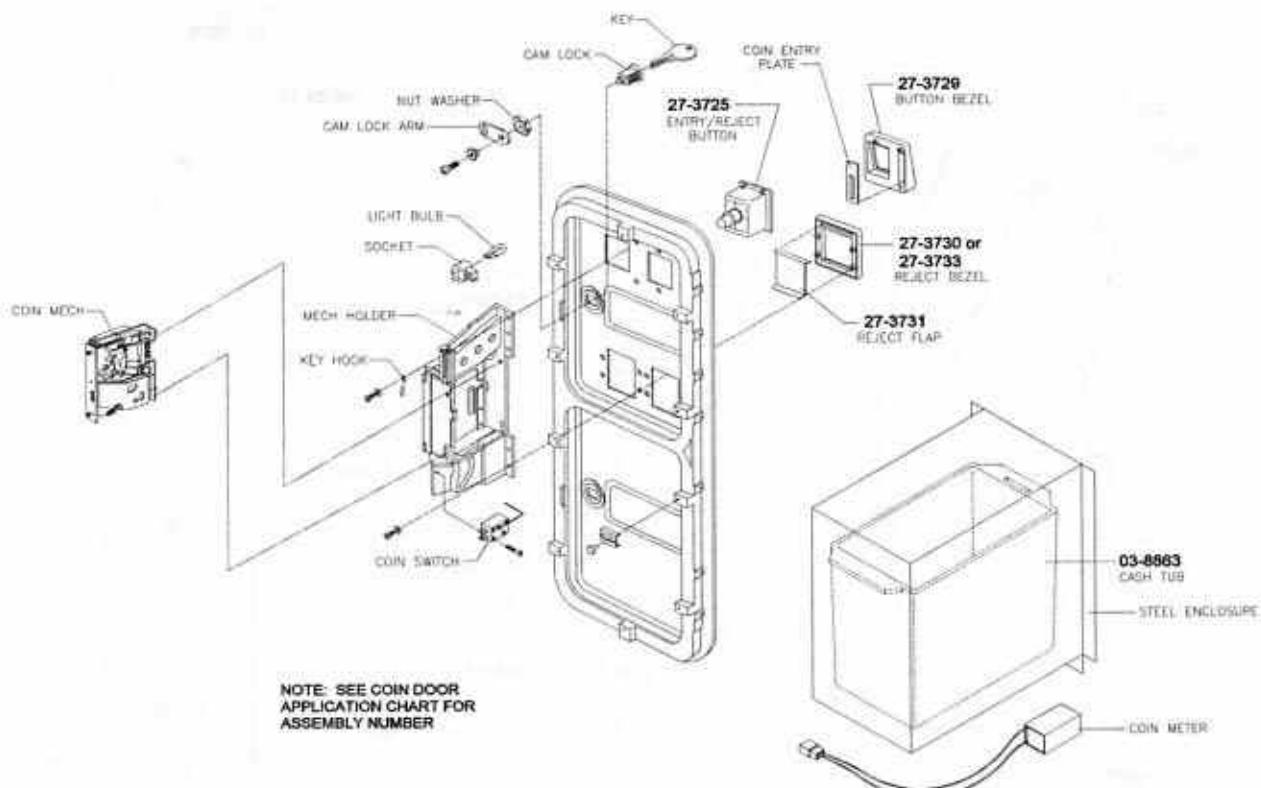
CALIFORNIA SPEED (30029) 33"



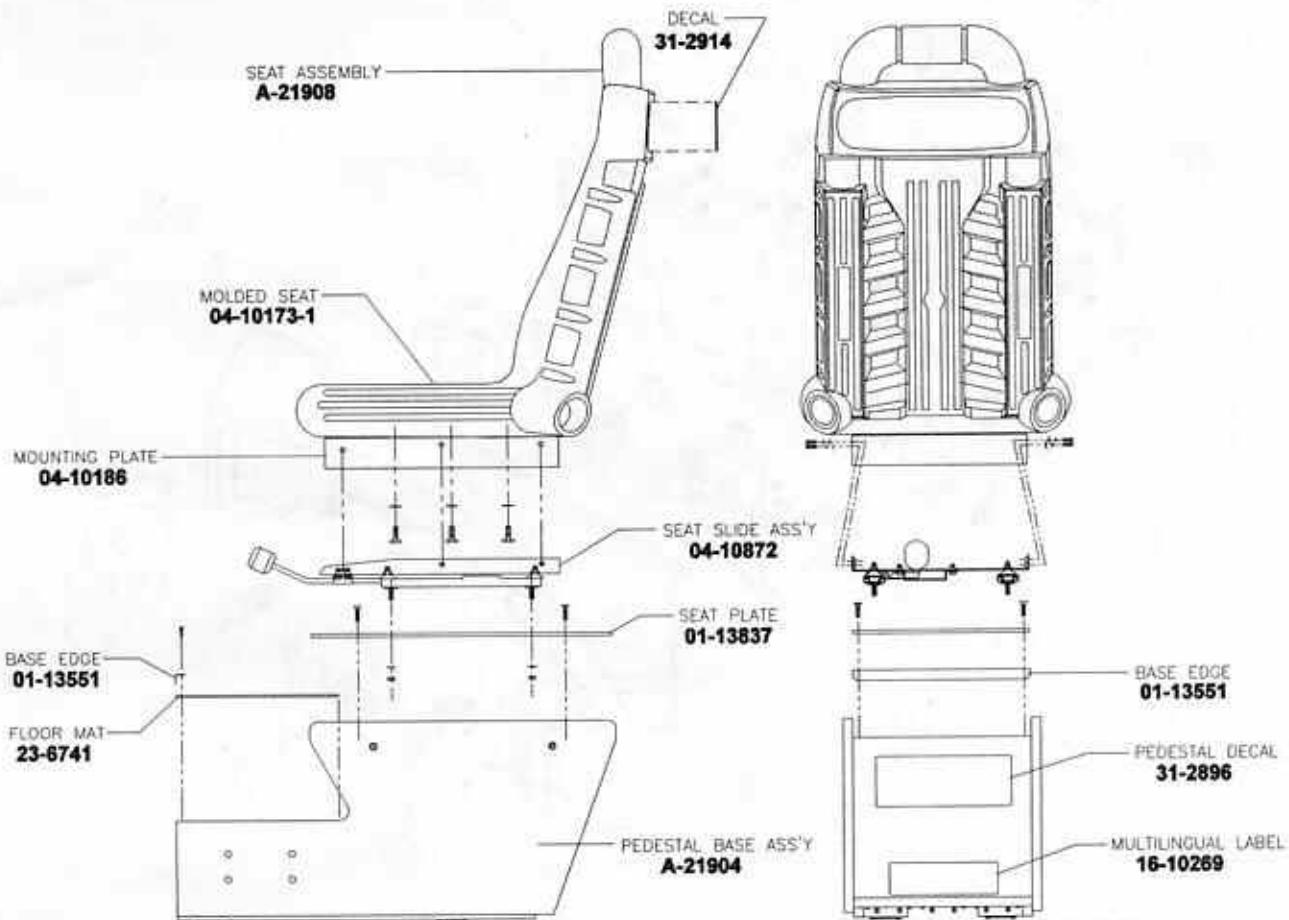
**A-21071 REAR DOOR ASSEMBLY (25" CABINET)
A-21093 REAR DOOR ASSEMBLY (33" CABINET)**



COIN DOOR ASSEMBLY



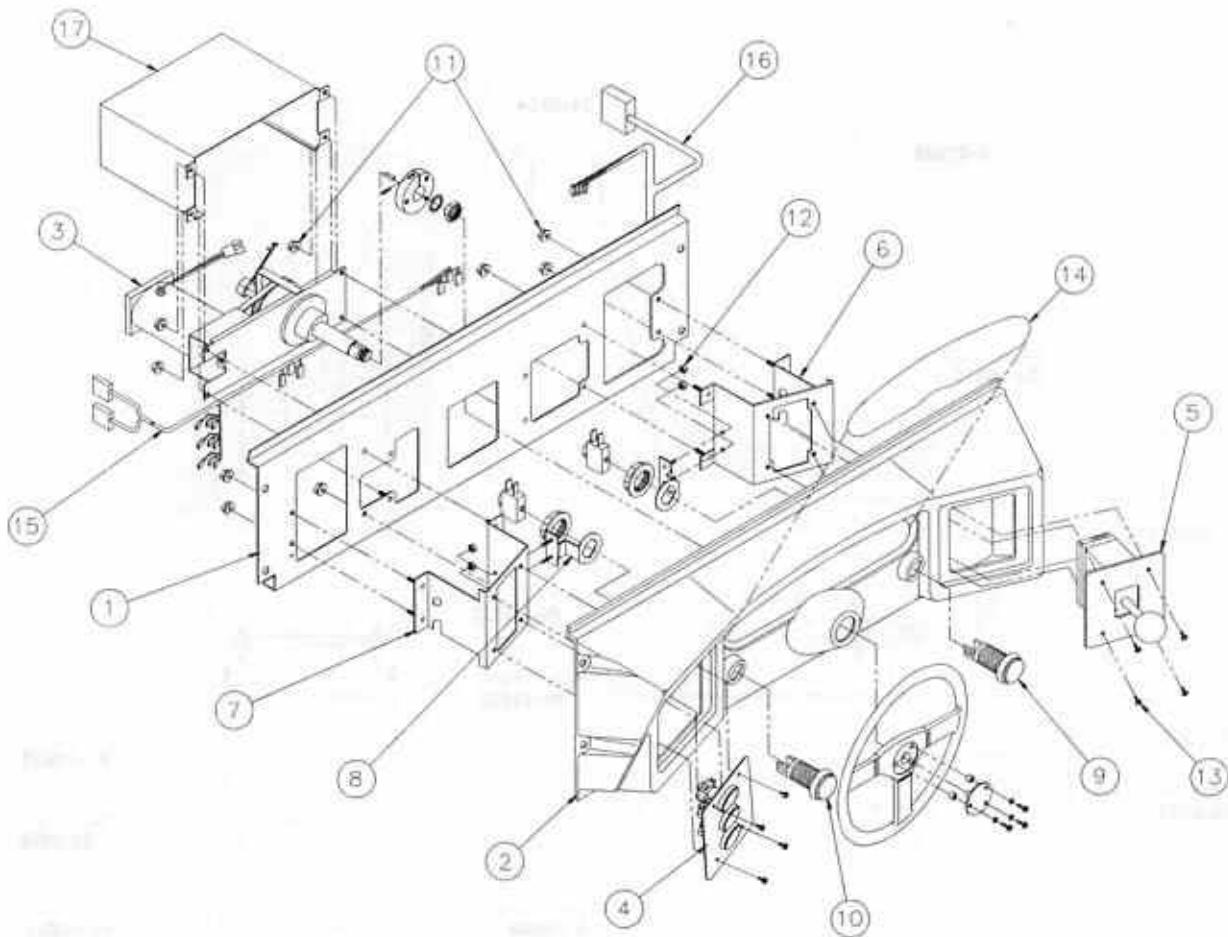
A-21907 PEDESTAL & SEAT ASSEMBLY



HARDWARE:

PART NUMBER	DESCRIPTION
4020-01100-08	TR TX 1/4-20x 1/2 BH (6)
4020-01148-20	TR TX 1/4-20x1-1/4 FH (4)
4108-01042-12	SMS #8 x 3/4 P-FH (3)
4324-01124-12	BOLT 5/16-18x3/4 HH (6)
4700-00072-00	FW .265 x .500 x .032 (6)
4700-00091-00	FW .343 x .875 x .059 (6)
4702-00014-00B	LW 1/4-20 INTERNAL TOOTH, BLACK (6)

DASH ASSEMBLY



DASH ASSEMBLY 25"
A-22106

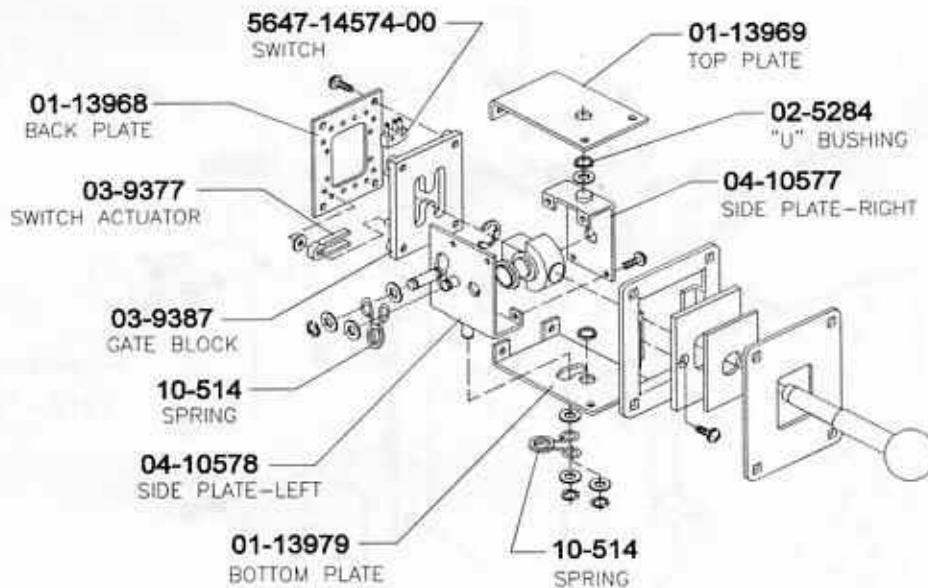
1	04-10145.1	DASH PLATE
2	03-9708-1	PLASTIC MOLDED DASH
3	20-10401-1	STEERING MECHANISM
4	A-21906	PUSH BUTTON SWITCH ASSEMBLY
5	20-10253.1	4-SPEED SHIFTER
6	04-10146	SHIFT MOUNTING BRACKET
7	04-10147	BUTTON MOUNTING BRACKET
8	04-10184.1	START BUTTON BRACKET (2)
9	20-10129-9	PUSH BUTTON START SWITCH
10	20-10129-10	PUSH BUTTON RADIO SWITCH
11	4420-01141-00	NUT 1/4-20 FLANGRIP (12)
12	4408-01128-00	NUT 8-32 KEPS (4)
13	4008-01093-10B	MS 8-32x5/8 TR PH (8)
14	31-2893	DECAL-CONTROL PANEL PLUS
15	H-21090.1	CONTROL PANEL CABLE
16	H-21124.1	GEAR SHIFT W/DUAL GROUND CBL
17	01-14529	MOTOR SHIELD

DASH ASSEMBLY 33"
A-22107

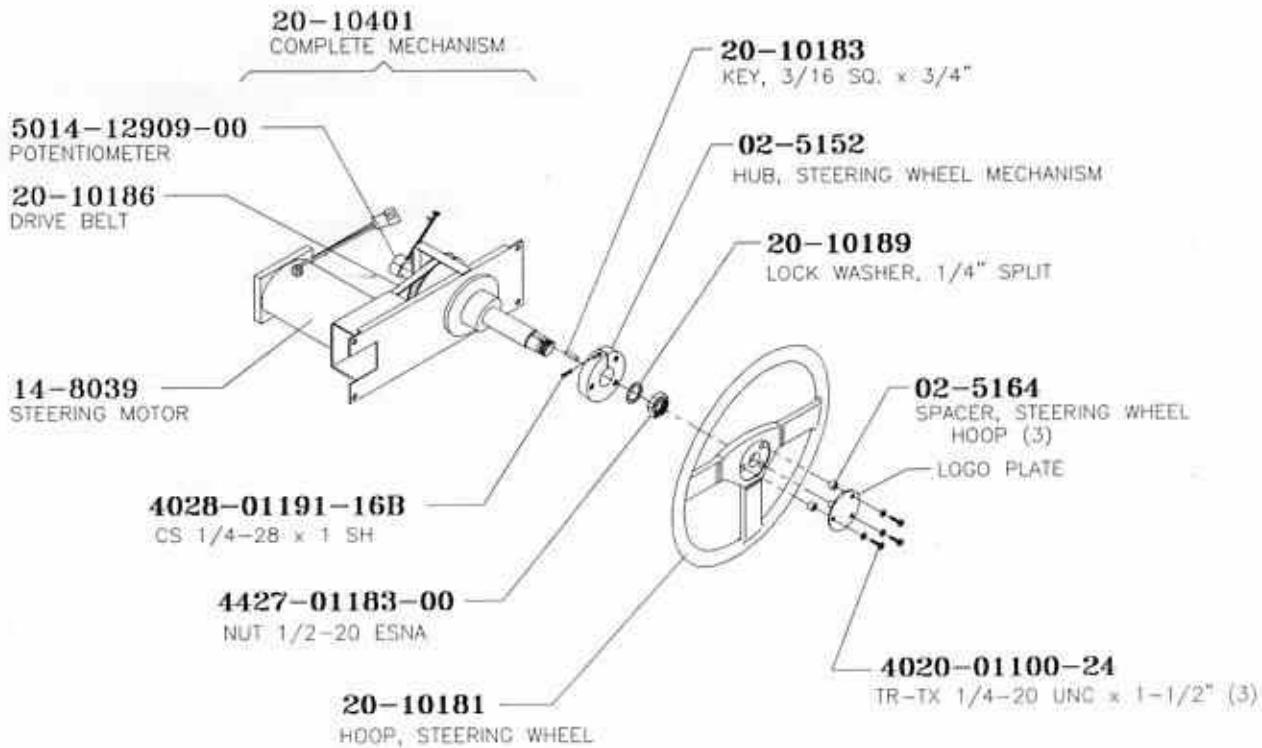
1	04-10192.1	DASH PLATE
2	03-9708-2	PLASTIC MOLDED DASH
3	20-10401-1	STEERING MECHANISM
4	A-21906	PUSH BUTTON SWITCH ASSEMBLY
5	20-10253.1	4-SPEED SHIFTER
6	04-10146	SHIFT MOUNTING BRACKET
7	04-10147	BUTTON MOUNTING BRACKET
8	04-10184.1	START BUTTON BRACKET (2)
9	20-10129-9	PUSH BUTTON START SWITCH
10	20-10129-10	PUSH BUTTON RADIO SWITCH
11	4420-01141-00	NUT 1/4-20 FLANGRIP (12)
12	4408-01128-00	NUT 8-32 KEPS (4)
13	4008-01093-10B	MS 8-32x5/8 TR PH (8)
14	31-2893	DECAL-CONTROL PANEL PLUS
15	H-21090.1	CONTROL PANEL CABLE
16	H-21124.1	GEAR SHIFT W/DUAL GROUND CBL
17	-	Not used.

4-SPEED SHIFTER

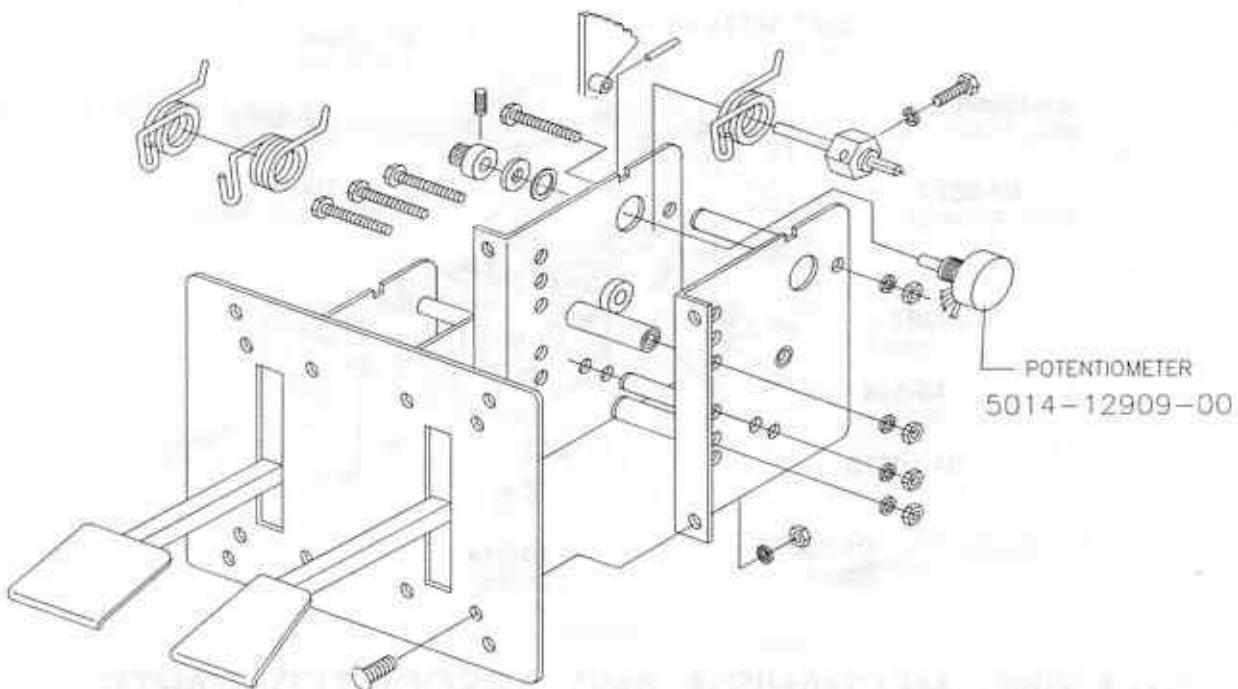
20-10253.1



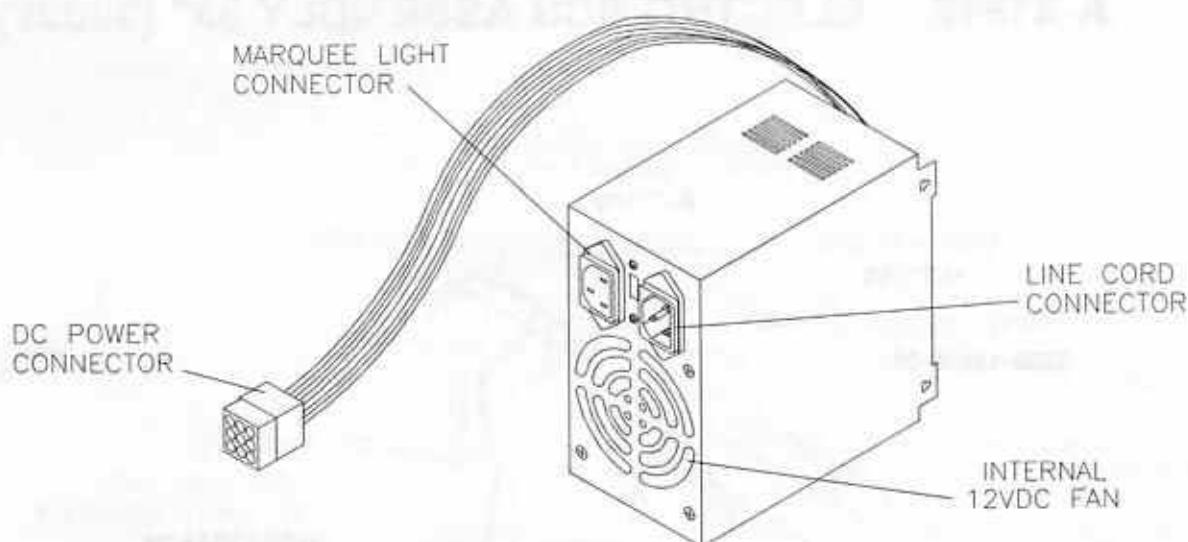
STEERING MECHANISM AND ASSOCIATED PARTS



20-10135 PEDAL ASSEMBLY



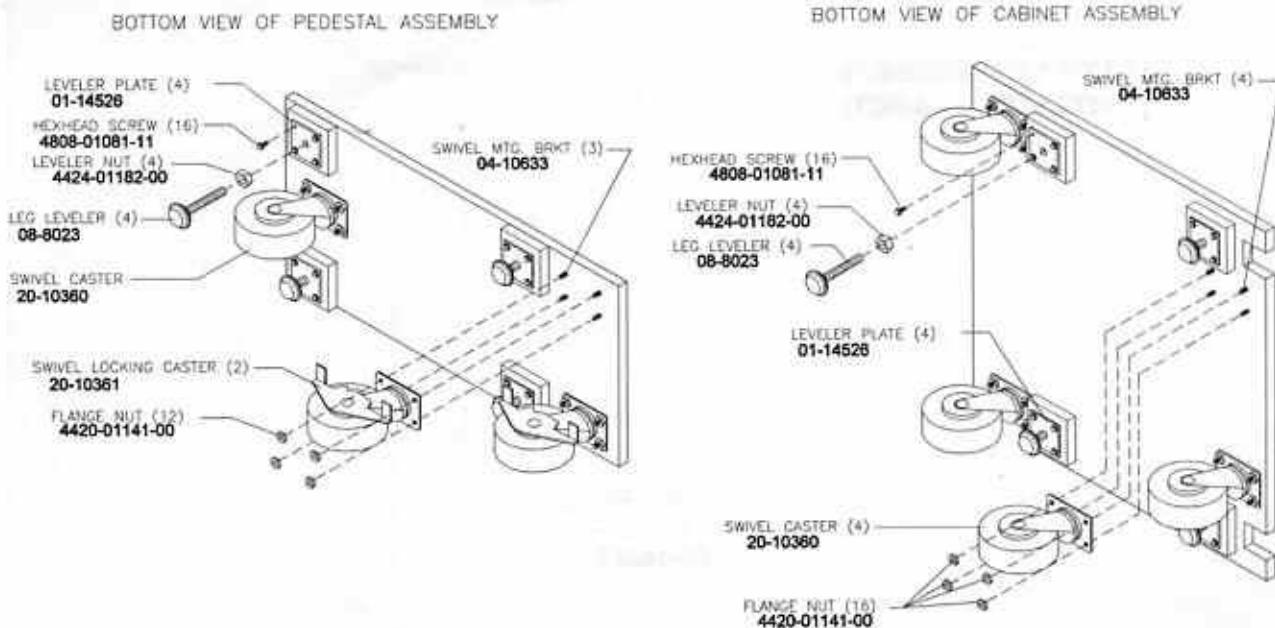
20-10167 POWER SUPPLY ASSEMBLY



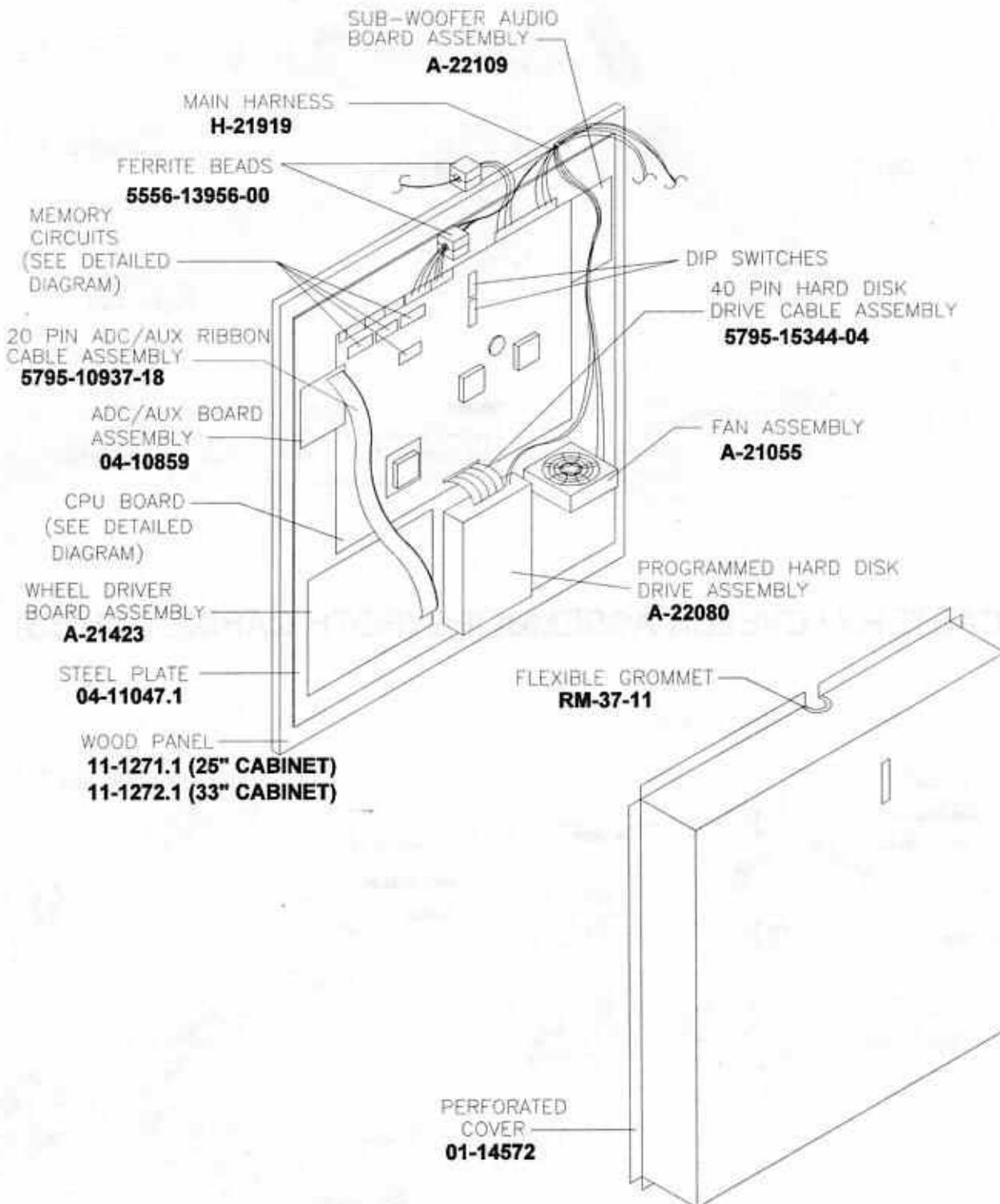
Pin #	Function	Wire Color
1, 2, 3	+5VDC	Red
4, 5, 6	Ground	Black
7	-5VDC	Yellow*
8	+12VDC	Orange*
9	-12VDC	Blue*

***Note:** Many computer grade power supplies use yellow for +12V, blue for -5V, and white for -12V. This is acceptable as long as the pinout is correct.

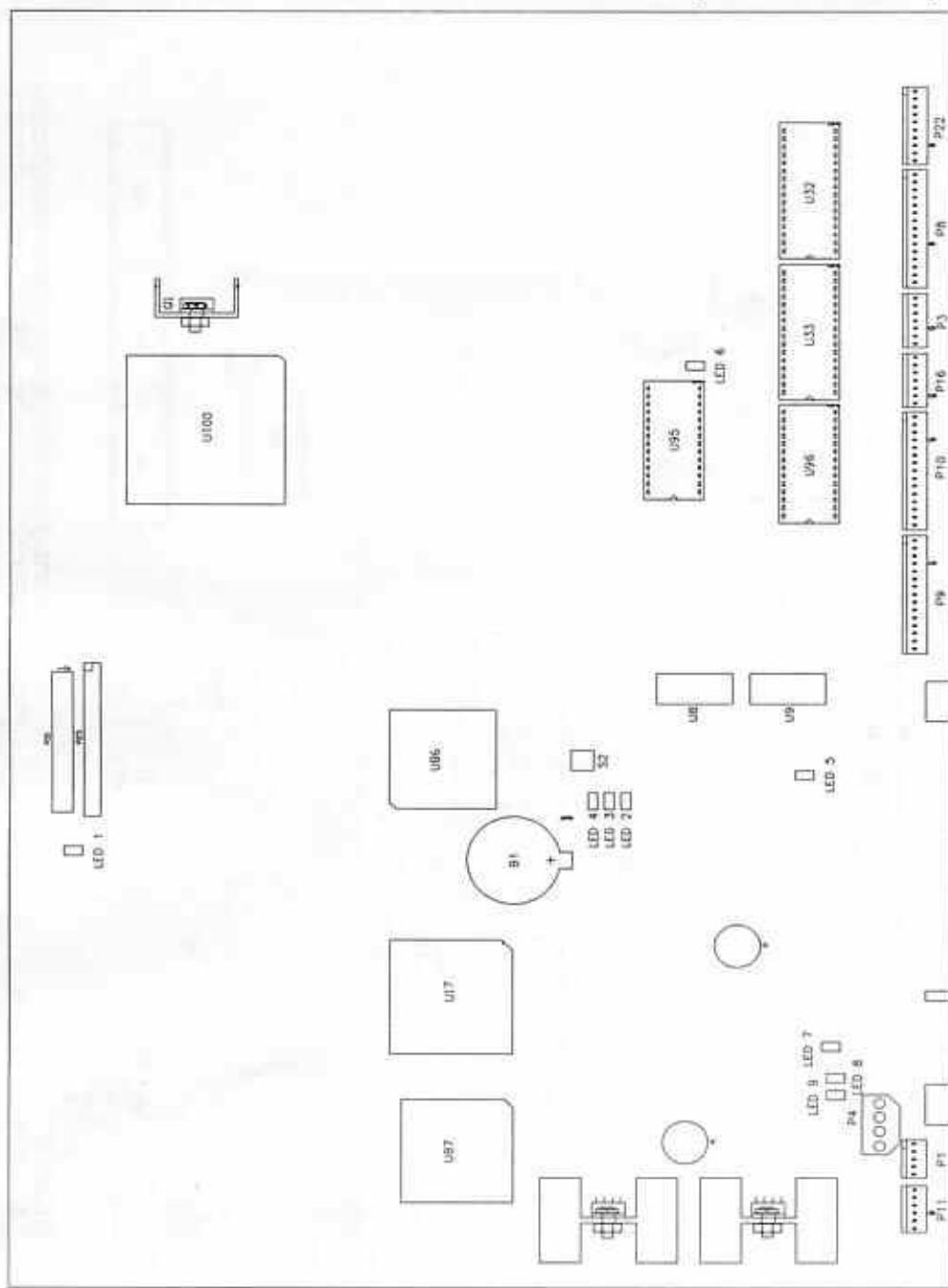
CASTER / LEVELER ASSEMBLIES (BOTH CABINET SIZES)



A-21915 ELECTRONICS ASSEMBLY 25" (30028)
A-21918 ELECTRONICS ASSEMBLY 33" (30029)



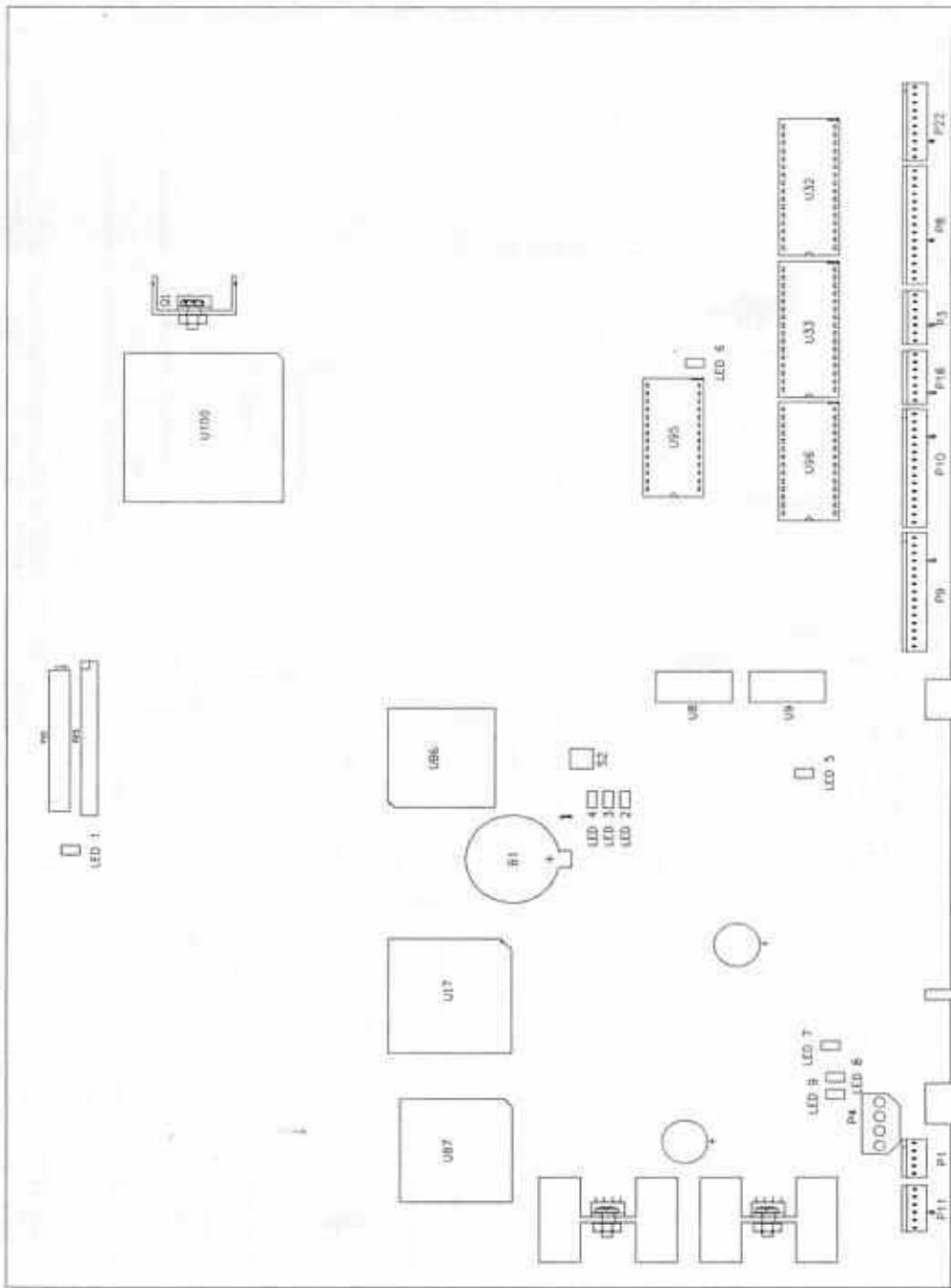
A-21870.4-3 CPU BOARD ASSEMBLY (25" CABINET)



Field Replaceable Parts

DESIGNATION	PART NUMBER	FUNCTION	DESCRIPTION
B1	5880-11056-00	Memory Backup	3 Volt Lithium Battery
U32	A-5343-30028-1	CPU Boot ROM	EPROM Assembly
U33	--	Boot Expansion ROM	EPROM Assembly
U95	A-5343-30028-2	Sound Boot ROM	EPROM Assembly
U96	A-21865	Video PIC	EPROM Assembly
U100	5400-15135-00	Microprocessor	CPU Assembly

A-21870.4-4 CPU BOARD ASSEMBLY (33" CABINET)

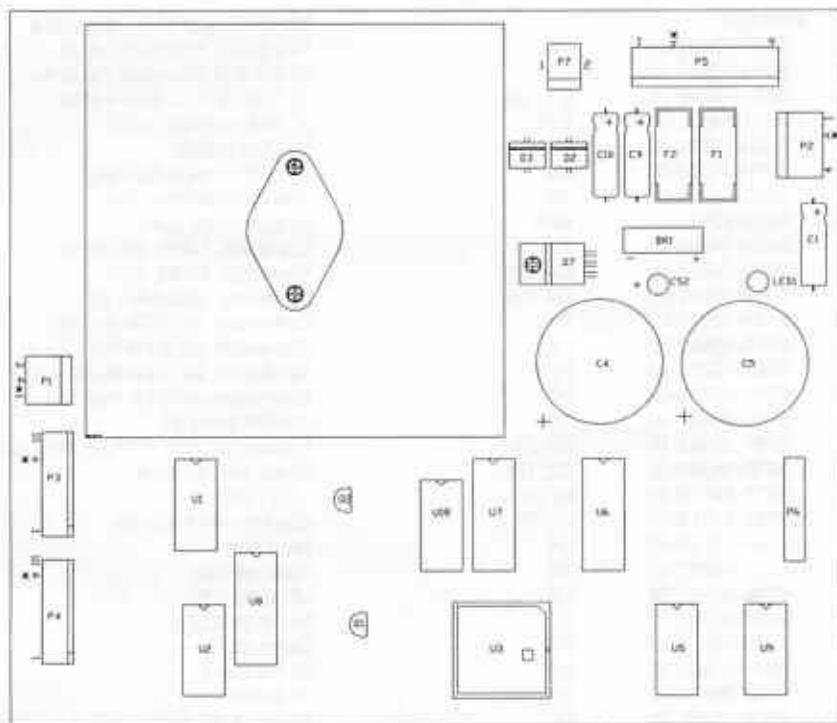


Field Replaceable Parts

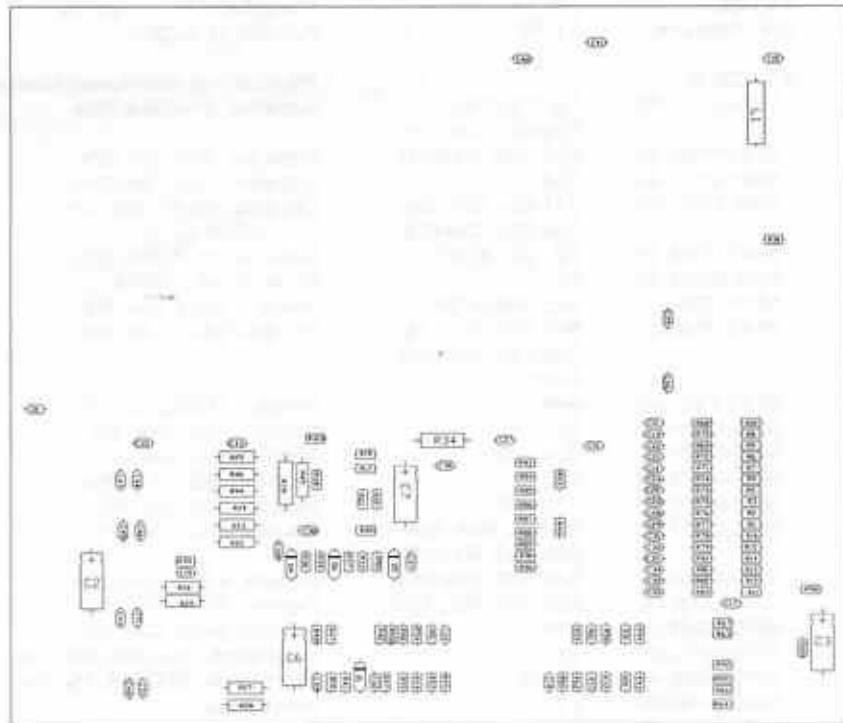
DESIGNATION	PART NUMBER	FUNCTION	DESCRIPTION
B1	5880-11056-00	Memory Backup	3Volt Lithium Battery
U32	A-5343-30028-1	CPU Boot ROM	EPROM Assembly
U33	--	Boot Expansion ROM	EPROM Assembly
U95	A-5343-30028-2	Sound Boot ROM	EPROM Assembly
U96	A-21890	Video PIC	EPROM Assembly
U100	5400-15135-00	Microprocessor	CPU Assembly

WHEEL DRIVER BOARD ASSEMBLY

A-21423



Wheel Driver Board Subassembly (Large Components)



Wheel Driver Board Auto-Insert Assembly (Small Components)

Wheel Driver Board Parts List

PART NUMBER	DESIGNATOR	DESCRIPTION
A-21422		Wheel Driver Sub-Assembly
5340-12958-00	U9	IC 26LS31 Balanced Driver
5340-12959-00	U5	IC 26LS32 Balanced Receiver
5311-14068-00	U7, U8	IC 74HC574 Octal D-Latch
5371-14070-00	U18	IC D/A converter 8 Bit
5370-12602-00	U1, U2	IC ULN 2064B
5370-14069-00	U4	IC LM12 Power Op Amp
5160-10269-00	Q2	Trans 2N390404 NPN
5100-13945-01	BR1	Bridge Diode SIP
5040-08986-00	C1	Capacitor, 100M, 10v, 20%
5040-12298-00	C9, C10	Capacitor, 100M, 40v
5040-15317-00	C4, C5	Capacitor, 10000MF, 35v
5791-12273-01	P1	Connector, 3H STR Pin .156
5791-10862-09	P5	Connector, 9H STR Pin .156
5791-12273-02	P7	Connector, 2H STR Sq. Pin .156
5791-12273-04	P2	Connector, 4H STR Pin .156
5791-09437-00	P6	20HCN 2x10 ST
5791-12461-10	P3, P4	Connector, 10H STR Sq. Pin .100
5070-14526-00	D2, D3	Diode MR751 3.0A.
5671-14516-00	LED1	LED RED
5733-14113-00	F1, F2	Fuse Holder 5x20mm
5705-15102-00	U4	Heat Sink
5701-14092-00	U4	Thermal Pad
4006-01003-08	U4	MS 6-32 x ½"
4406-01128-00	U4	Nut 6-32 KEPS
5070-15115-00	D7	Diode MUR1605
5281-12887-00	U6	IC 74LS541
5162-08976-00	Q1	Transistor
4004-01003-04	D7	Screw, 4-40 x ¼"
4404-01124-00	D7	Nut 4-40
5700-13173-00	U3	Socket
20-10345	U4	Teflon Tubing ¼"
03-9129	U4	Spacer
A-21436	U3	Wheel Driver Plfd Assembly
5731-14094-00	F1, F2	Fuse SB 4A 5x20mm
A-21422-AI		Wheel Driver Auto-Insert Assembly
5043-08980-00	C8, C15-C20, C25-C27, C36, C43	Capacitor, .01M, 50v, 20%
5043-08996-00	C37, C38, C40-C42	Capacitor, .1µF, 50v, 20%
5048-12577-00	C39	Capacitor, .47µF, 50v, 20%
5048-13375-00	C11-C14, C21-C24, C28-C35, C44-C51	Capacitor, 100PF, 50v, 20%
5040-09343-00	C2, C3, C6, C7	Capacitor, 10µF, 16v, 20%
5070-08919-00	D1	Diode 1N4148 150MA
5010-13363-00	R65, R99-R101	Resistor, 100Ω, 1/8w, 5%
5010-13593-00	R17, R19-R21, R33, R38-R40, R51, R54, R102	Resistor, 10KΩ, 1/8w, 5%
5010-10271-00	R46	Resistor, 110KΩ, 1/4w, 5%
5010-13594-00	R18	Resistor, 1KΩ, 1/8w, 5%
5010-08931-00	R34, R35	Resistor, 1KΩ, 1/2w, 5%
5010-13372-00	R32	Resistor, 220Ω, 1/8w, 5%
5010-09999-00	R22-R29	Resistor, 2KΩ, 1/4w, 5%
5010-13364-00	R1-R16, R49, R55-R64, R66, R67, R91-R97	Resistor, 33Ω, 1/8w, 5%
5010-13365-00	R42, R43, R68-R90	Resistor, 4.7KΩ, 1/8w, 5%
5010-13366-00	R30, R31, R36, R50	Resistor, 470Ω, 1/8w, 5%
5010-09342-00	R45	Resistor, 36KΩ, 1/4w, 5%
5075-09135-00	D6	Zener Diode, 1N4740A, 10v, 1w
5075-14066-00	D4, D5	Zener Diode, 1N4744A, 15v, 1w
5556-14181-00	L1	Ferrite Bead
5048-11028-00	C101	Capacitor, 22PF, 20%
5010-15209-00	R103	Resistor, 30K, 1/8w, 5%

Other Parts Necessary

Power and Protection

A.C. Distribution Assembly	A-20278-A
A.C. Power Chassis	04-10103.1
A.C. Line Filter, 6A, 250V	5102-14240-00
Fuse, 4A, 250V, Slow Blow	5731-06314-00
Fuse, 3A, 250V, 5 x 22 mm	5731-14468-00
Fuse, 4A, 250V, 5 x 20 mm	5731-14094-00
Fuse, 2.5A, 250V, 5 x 20 mm	5731-14532-00
Bulb, Incandescent, 12V, #161	24-8840
Bulb, Incandescent, 6.3V, #555	24-8768

Cables

Dixie-Mars Adapter Cable	H-17019
USA DBV Acceptor Cable	H-20398
Main Harness (JAMMA) Cable	H-21867.2
AC Distribution Cable	H-20279
Line Voltage Cable Assembly	A-20331
Upper Speaker Cable Assembly	H-20346
Lower Speaker Cable Assembly	H-21128
Fluorescent Lamp Cable Assembly	H-20330
Control Panel Cable Assembly	H-21868
IDC A.C. Cable Assembly	H-20353
Ground Braid Cable Assembly	H-22327-86

Documents

Product Registration Card	16-9478.2
DBV Installation Instructions	16-9637
Hard Drive Handling Guide	16-10076
Electronic Device Caution Sheet	16-10077
Product Safety Manual*	16-10341

Tools

T-20 Torx key	20-9620
T-27 Torx key	20-10140

*Product Safety Manual required for European units

NOTES

CALIFORNIA SPEED™

SECTION THREE

WIRING

Warning

Failure to reconnect all ground wires or replace metal shields and covers with each mounting screw installed and securely tightened may result in radio frequency interference.

JAMMA Chart

FUNCTION	WIRE COLOR	PIN	PIN	WIRE COLOR	FUNCTION
DC Ground	Black	A	1	Black	DC Ground
Coin Switch Ground	Black	B	2	Black	Test Switch Ground
+5VDC	Red	C	3	Red	+5VDC
+5VDC	Red	D	4	Red	+5VDC
-5VDC	Yellow	E	5	Yellow	-5VDC
+12VDC	Orange	F	6	Orange	+12VDC
Key		H	7	Key	
	N/C	J	8	Brown	Coin Counter 1
	N/C	K	9	N/C	
Speaker -, Right	Brown-Gray	L	10	Red-Gray	Speaker +, Right
Speaker -, Left	Brown-White	M	11	Red-White	Speaker +, Left
Video Green	Yellow-Green	N	12	Yellow-Red	Video Red
Video Sync	Yellow-White	P	13	Yellow-Blue	Video Blue
Service Credits	White-Gray	R	14	Yellow-Black	Video Ground
Slam Tilt	Black-Green	S	15	Black-Blue	Test Switch
Coin 2	Black-Red	T	16	Black-Brown	Coin 1
	N/C	U	17	White	Start Button Switch
	N/C	V	18	N/C	
	N/C	W	19	White-Brown	Radio Button Switch
	N/C	X	20	N/C	
	N/C	Y	21	N/C	
1 st Gear Switch	Green-Brown	Z	22	White-Yellow	Road Cam Switch
2 nd Gear Switch	Green-Red	a	23	White-Green	Tail Cam Switch
3 rd Gear Switch	Green-Orange	b	24	White-Blue	Sky Cam Switch
4 th Gear Switch	Green-Yellow	c	25	N/C	
	N/C	d	26	N/C	
Pedal/Steer Ground	Black	e	27	Yellow-Brown	Coin Lamp Ground
Gear Switch Ground	Black	f	28	Black	Gear Switch Ground
SOLDER SIDE OF CIRCUIT BOARD			COMPONENT SIDE OF CIRCUIT BOARD		

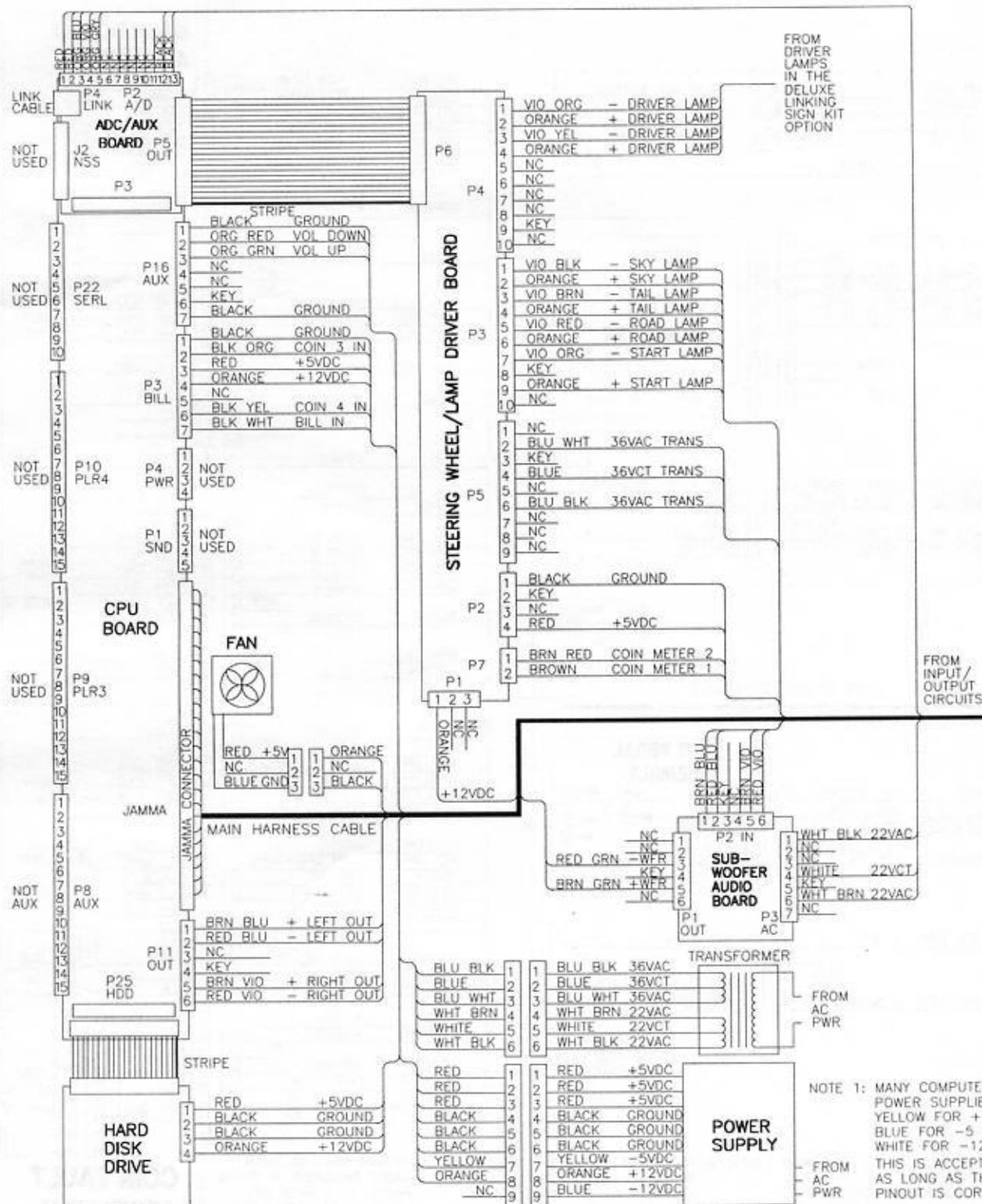
Dash Board wires that are not part of the Main JAMMA Harness

Start Button Lamp	Violet-Orange	-	NC	Green-Brown	1 st Gear Switch
Start Button Lamp	Orange	+	NC	Green-Red	2 nd Gear Switch
Road Cam Lamp	Violet-Red	-	NC	Green-Orange	3 rd Gear Switch
Road Cam Lamp	Orange	+	NC	Green-Yellow	4 th Gear Switch
Tail Cam Lamp	Violet Brown	-	C	Black	Gear Switch Ground
Tail Cam Lamp	Orange	+	+	Red	+5V Pedal/Steer
Sky Cam Lamp	Violet-Black	-	Wiper	Orange-Blue	Steering Position
Sky Cam Lamp	Orange	+	Wiper	Orange-Violet	Gas Position
Wheel Motor	Brown-White	-	Wiper	Orange-Gray	Brake Position
Wheel Motor	Brown	+	-	Black	Pedal/Steer Ground

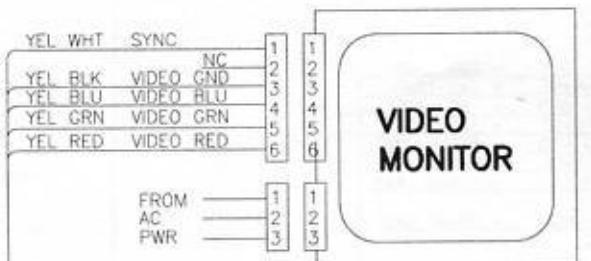
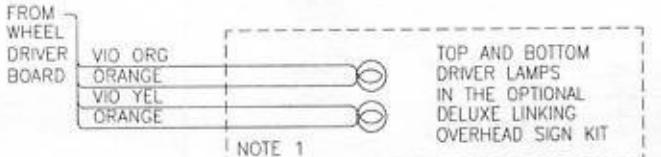
Power Source Voltage Limits

FUNCTION	RANGE LIMITS	ID	ID	RANGE LIMITS	FUNCTION
Digital Circuits	+4.90V to +5.10V	+5VDC		NOTE: +5VDC is adjustable at the Power Supply	
L/R Audio, DBV	+11.5V to +12.5V	+12VDC	±36VAC	±32.0V to ±40.0V	Steering Driver
Audio, Lights	-4.75V to -5.25V	-5VDC	±22VAC	±20.0V to ±24.0V	Woofer Audio

CABINET WIRING DIAGRAM (PRINTED CIRCUIT BOARDS)

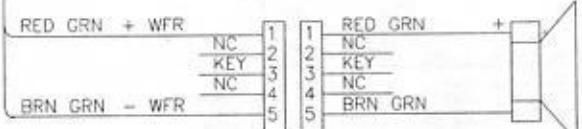
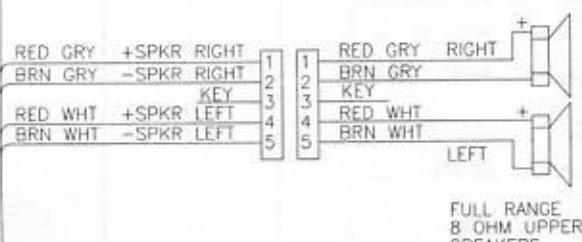


CABINET WIRING DIAGRAM (USER INTERFACE)



FROM GAME CIRCUIT BOARDS

MAIN HARNESS CABLE



NOTE 1: DRIVER LAMPS CABLE WITH DELUXE LINKING OVERHEAD SIGN KIT, PURCHASE KIT FROM YOUR DISTRIBUTOR.

NOTE 2: GEAR SHIFT SWITCHES ARE WIRED AS N.C. (NORMALLY CLOSED). OTHER SWITCHES ARE N.O. (NORMALLY OPEN).

NOTE 3: DOLLAR BILL VALIDATOR CABLE INCLUDED IN SPARE PARTS. PURCHASE DBV FROM YOUR DISTRIBUTOR.

VIO BLK	- SKY LAMP	1
ORANGE	+ SKY LAMP	2
VIO BRN	- TAIL LAMP	3
ORANGE	+ TAIL LAMP	4
VIO RED	- ROAD LAMP	5
ORANGE	+ ROAD LAMP	6
VIO ORG	- START LAMP	7
KEY	+ START LAMP	8
ORANGE	NC	9
		10

WHITE	START	1
WHT BLU	SKY CAM	2
WHT GRN	TAIL CAM	3
WHT YEL	ROAD CAM	4
	NC	5
WHT BRN	RADIO	6
	NC	7
BLACK	GROUND	8
	NC	9
NC	NC	10
NC	NC	11
NC	NC	12

RED	+5VDC	1
ORG BLU	STEERING	2
BLACK	GROUND	3
	KEY	4
GRN BRN	GEAR 1	1
GRN RED	GEAR 2	2
GRN ORG	GEAR 3	3
GRN YEL	GEAR 4	4
BLACK	GROUND	5
	KEY	6
BRN WHT	- WHEEL MOTOR	7
BROWN	+ WHEEL MOTOR	8

DASH BOARD ASSEMBLY

VIO BLK	1
ORANGE	2
VIO BRN	3
ORANGE	4
VIO RED	5
ORANGE	6
VIO ORG	7
KEY	8
ORANGE	9
NC	10

WHITE	1
KEY	2
NC	3
WHT BLU	4
WHT GRN	5
WHT YEL	6
NC	7
WHT BRN	8
NC	9
BLACK	10
NC	11
NC	12

RED	STEERING	1
ORG BLU	5 K OHM	2
BLACK	2	
	KEY	3
GRN BRN	1	
GRN RED	2	
GRN ORG	3	
GRN YEL	4	
KEY	5	
BLACK	6	
	KEY	7
BLACK	8	
RED	MOTOR	9

BLACK	1
KEY	2
WHT GRY	3
ORG RED	4
ORG GRN	5
BLK BLU	6

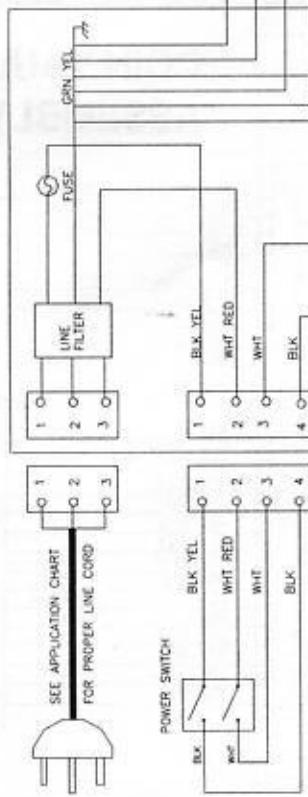
YELLOW	COIN LAMP GND	1
YEL BRN	GROUND	2
BLACK	3	
BLK BRN	COIN 1 IN	4
BLK RED	COIN 2 IN	5
RED	+5VDC	6
	KEY	7
BROWN	COIN METER 1	8
BRN RED	COIN METER 2	9
BLK GRN	SLAM TILT	10

RED	COIN METER	1
KEY	2	
BRN	3	
NC	4	
BLK GRN	5	

NC	1	
AC	2	
PWR	3	
KEY	4	
BLK	5	
NC	6	
BLK WHT	7	
	DBV	8
	OPTION	9
	NOTE 3	10
	8	11
	9	12
	9	13
	9	14
	9	15
	9	16
	9	17
	9	18
	9	19

COIN VAULT ASSEMBLY

POWER WIRING DIAGRAM



NOTE: THERE ARE 4 ITEMS THAT MUST BE CHANGED
FOR OPERATION ON OTHER LINE VOLTAGES:
1. RATING OF POWER SUPPLY FUSE
2. FLUORESCENT LAMP ASSEMBLY
3. VOLTAGE SWITCH ON POWER SUPPLY
4. A.C. POWER TRANSFORMER

FUSE APPLICATION CHART		LINE VOLTAGE	FUSE RATING
1. O	1. O	120	3A SB 250V
2. O	2. O	230	2A SB 250V

BLK	1 O	BLK	1 O
GRN YEL	0.1	GRN YEL	0.1
WHT	0.2	WHT	0.2
RED	0.3	WHT	0.3

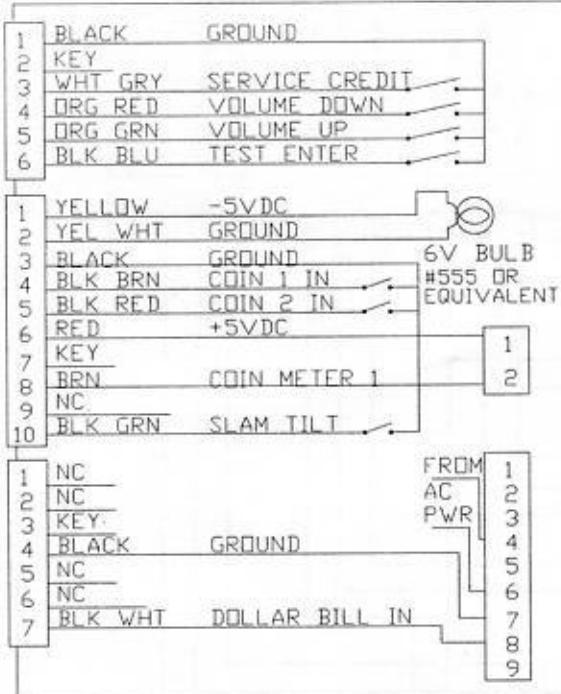
BLK	1 O	BLK	1 O
GRN YEL	0.1	GRN YEL	0.1
WHT	0.2	WHT	0.2
WHT	0.3	WHT	0.3

BLK	1 O	BLK	1 O
GRN YEL	0.1	GRN YEL	0.1
WHT	0.2	WHT	0.2
WHT	0.3	WHT	0.3

BLK	1 O	BLK	1 O
GRN YEL	0.1	GRN YEL	0.1
WHT	0.2	WHT	0.2
WHT	0.3	WHT	0.3

BLK	1 O	BLK	1 O
GRN YEL	0.1	GRN YEL	0.1
WHT	0.2	WHT	0.2
WHT	0.3	WHT	0.3

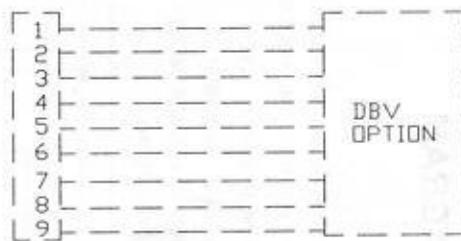
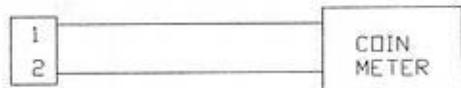
DOLLAR BILL VALIDATOR WIRING



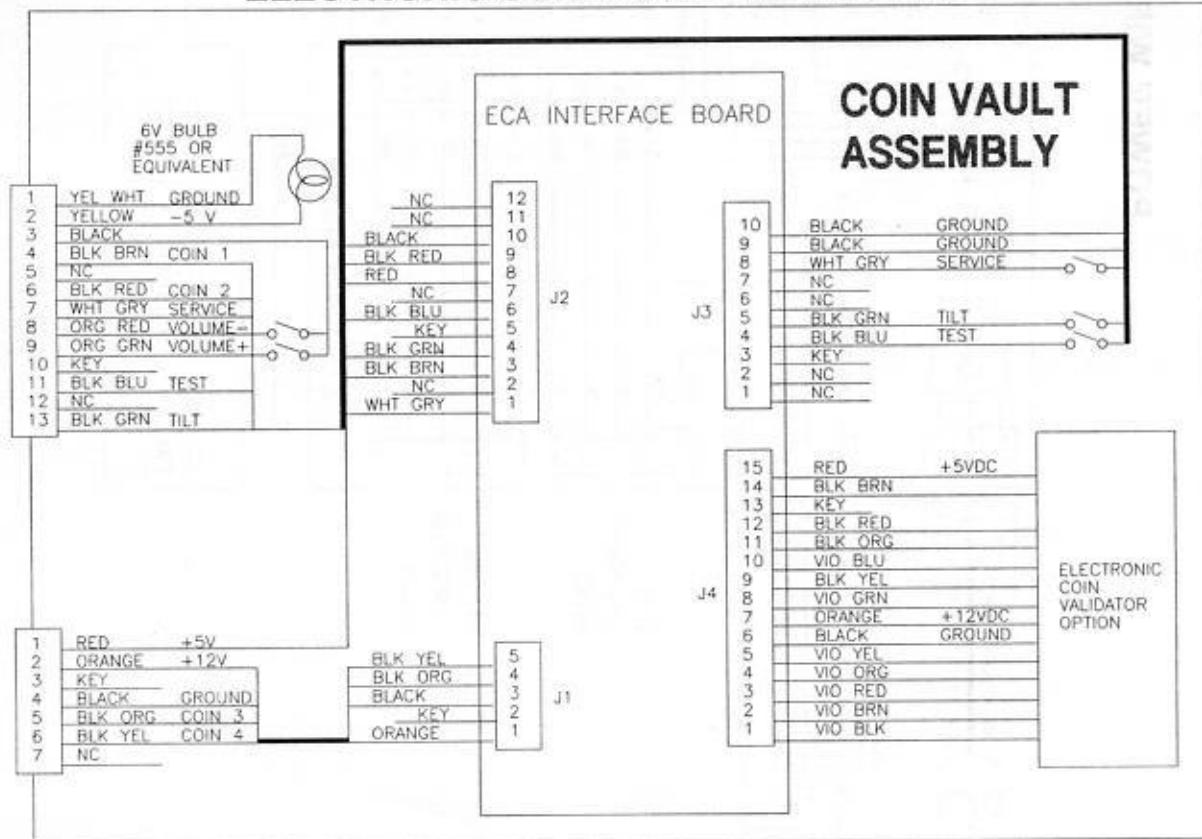
COIN VAULT ASSEMBLY

NOTE 1: DAMAGE MAY RESULT FROM REVERSED COIN METER WIRES

NOTE 2: DOLLAR BILL VALIDATOR CABLE IN SPARE PARTS



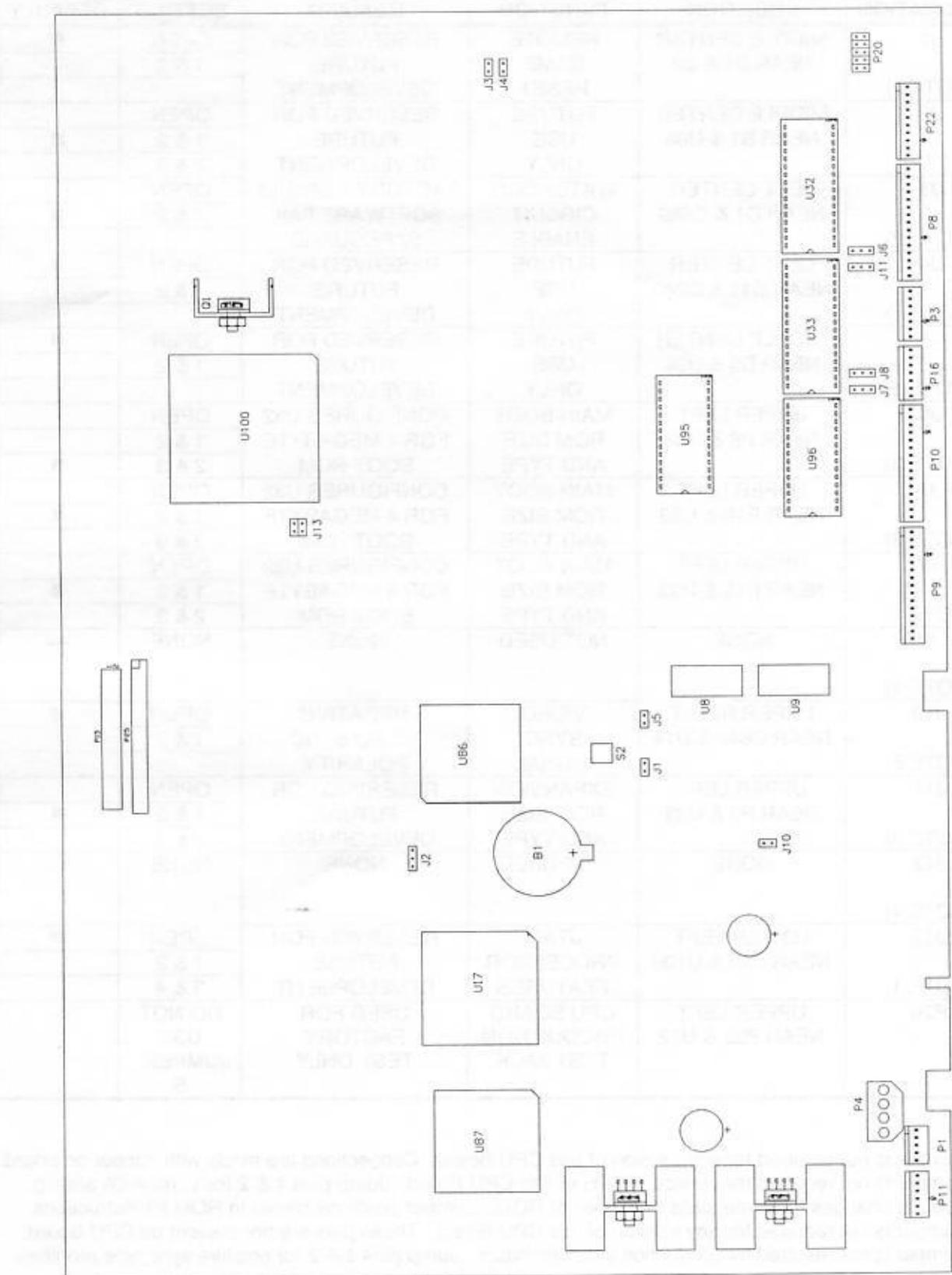
ELECTRONIC COIN ACCEPTOR WIRING



COIN VAULT ASSEMBLY

ELECTRONIC COIN VALIDATOR OPTION

CPU BOARD INDICATOR AND SWITCH LOCATIONS



CPU BOARD JUMPER STATUS CHART

DESIGNATION	LOCATION	FUNCTION	MEANING	SETTING	DEFAULT
J1 (NOTE 1)	MIDDLE CENTER NEAR B1 & S2	REMOTE GAME RESET	RESERVED FOR FUTURE DEVELOPMENT	OPEN	■
				1 & 2	
J2 (NOTE 1)	MIDDLE CENTER NEAR B1 & U86	FUTURE USE ONLY	RESERVED FOR FUTURE DEVELOPMENT	OPEN	
				1 & 2	■
				2 & 3	
J3 (NOTE 2)	LEFT CENTER NEAR C1 & C589	WATCHDOG CIRCUIT ENABLE	FACTORY DEFAULT SOFTWARE FAIL SAFEGUARD	OPEN	
				1 & 2	■
J4 (NOTE 1)	LEFT CENTER NEAR C11 & C240	FUTURE USE ONLY	RESERVED FOR FUTURE DEVELOPMENT	OPEN	■
				1 & 2	
J5 (NOTE 1)	MIDDLE CENTER NEAR D6 & U64	FUTURE USE ONLY	RESERVED FOR FUTURE DEVELOPMENT	OPEN	■
				1 & 2	
J6 (NOTE 3)	UPPER LEFT NEAR P8 & U32	MAIN BOOT ROM SIZE AND TYPE	CONFIGURES U32 FOR 4 MEGABYTE BOOT ROM	OPEN	
				1 & 2	
				2 & 3	■
J7 (NOTE 3)	UPPER LEFT NEAR P10 & U33	MAIN BOOT ROM SIZE AND TYPE	CONFIGURES U32 FOR 4 MEGABYTE BOOT ROM	OPEN	
				1 & 2	■
				2 & 3	
J8 (NOTE 3)	UPPER LEFT NEAR P16 & U33	MAIN BOOT ROM SIZE AND TYPE	CONFIGURES U32 FOR 4 MEGABYTE BOOT ROM	OPEN	
				1 & 2	■
				2 & 3	
J9 (NOTE 4)	NONE	NOT USED	NONE	NONE	---
J10 (NOTE 5)	UPPER RIGHT NEAR C640 & U14	VIDEO SYNC SIGNAL	NEGATIVE VIDEO SYNC POLARITY	OPEN	■
				1 & 2	
J11 (NOTE 3)	UPPER LEFT NEAR P3 & U33	EXPANSION ROM SIZE AND TYPE	RESERVED FOR FUTURE DEVELOPMENT	OPEN	
				1 & 2	■
				2 & 3	
J12 (NOTE 4)	NONE	NOT USED	NONE	NONE	---
J13 (NOTE 1)	LOWER LEFT NEAR U25 & U100	JTAG PROCESSOR FEATURES	RESERVED FOR FUTURE DEVELOPMENT	OPEN	■
				1 & 2	
				3 & 4	
P20	UPPER LEFT NEAR P22 & U32	CPU BOARD PRODUCTION TEST JACK	USED FOR FACTORY TEST ONLY	DO NOT USE JUMPER S	---

NOTES:

1. Jumper is not required for any version of this CPU Board. Connections are made with copper on board.
2. Jumper is not required for versions 01-05 of this CPU Board. Jump pins 1 & 2 for version 06 and up.
3. Jumper changes for some sizes and types of ROM. Jumper positions shown in ROM kit instructions.
4. Jumper is not required for any version of this CPU Board. These pins are not present on CPU Board.
5. Jumper is not required for production video monitors. Jump pins 1 & 2 for positive sync type monitors.

CPU SWITCHES

DESIGNATION	LOCATION	FUNCTION	POSITIONS	STATE	MEANING
S2	MIDDLE CENTER NEAR U41 & B1	WARM START RESET	1	OFF	NORMAL OPERATION
				ON	FORCED CPU RESET
U8	MIDDLE CENTER NEAR U20 & U94	SOFTWARE GAME MODES	8	OFF	STANDARD SETTINGS
				ON	CUSTOM SETTINGS
U9	MIDDLE CENTER NEAR U20 & U94	SOFTWARE GAME MODES	8	OFF	STANDARD SETTINGS
				ON	CUSTOM SETTINGS

NOTES:

1. Use S2 during testing or troubleshooting. This restart is faster than switching power off and on again.

CPU BOARD LED INDICATOR STATUS CHART

DESIGNATION	LOCATION	FUNCTION	COLOR	STATE	MEANING
LED 1 (HDD)	BOTTOM CENTER NEAR P15 & P25	HARD DISK ACTIVITY	RED	OFF	NOT IN USE
				ON	LOCKED UP (NOTE 1)
				BLINKING	NORMAL OPERATION
LED 2	MIDDLE CENTER NEAR B1 & S2	CPU RESET INDICATOR	RED	OFF	NORMAL OPERATION
				ON	PROCESSOR RESET
				BLINKING	RESET LOOP (NOTE 2)
LED 3	MIDDLE CENTER NEAR B1 & S2	INDICATOR	YELLOW	OFF	NORMAL OPERATION
				ON	PROCESSOR RESET
				BLINKING	RESET LOOP (NOTE 3)

NOTES:

1. Hard Disk Drive LED 1 only active in short bursts during game. May appear continuous during start up. If this LED is always on, there may be a fault that has caused the drive to be in a locked up condition.
2. LED 2 monitors a part of the ROM boot instruction set. Must be active only during power on or reset.
3. LED 3 monitors a part of the ROM boot instruction set. Must be active only during power on or reset.

CPU BOARD LED INDICATOR STATUS CHART (continued)

DESIGNATION	LOCATION	FUNCTION	COLOR	STATE	MEANING
LED 4	MIDDLE CENTER NEAR B1 & S2	INDICATOR	GREEN	OFF	NO BOOT ROM (NOTE 4)
				ON	PROCESSOR RESET
				BLINKING	NORMAL OPERATION
LED 5 (IOA)	UPPER CENTER NEAR U8 & U9	CONTROL ACTIVITY	GREEN	OFF	NO I/O FUNCTIONS PRESENT
				ON	NORMAL OPERATION
				BLINKING	I/O ASIC FAULT (NOTE 5)
LED 6 (SND)	UPPER LEFT NEAR U95 & U101	SOUND ACTIVITY	YELLOW	OFF	NO AUDIO ROM (NOTE 6)
				ON	READING ROM INSTRUCTIONS
				BLINKING	NORMAL OPERATION
LED 7 (+12V)	UPPER RIGHT NEAR C409 & L1	+12V POWER INDICATOR	RED	OFF	NO POWER
				ON	NORMAL OPERATION
				BLINKING	POWER FAULT (NOTE 7)
LED 8 (-5V)	UPPER RIGHT NEAR L2 & P4	-5V POWER INDICATOR	RED	OFF	NO POWER
				ON	NORMAL OPERATION
				BLINKING	POWER FAULT (NOTE 8)
LED 9 (+5V)	UPPER RIGHT NEAR P14 & R571	+5V POWER INDICATOR	RED	OFF	NO POWER
				ON	NORMAL OPERATION
				BLINKING	POWER FAULT (NOTE 9)

NOTES:

4. Boot ROM is only active in short bursts during start up. May appear very irregular during circuit reset.
5. I/O ASIC is only active in short bursts during start up. Must be on continuously during game play.
6. Sound is only active in short bursts during start up. Must be on continuously during game play.
7. LED 7 monitors a regulated power supply voltage source. Must be on continuously at all times.
8. LED 8 monitors a regulated power supply voltage source. Must be on continuously at all times.
9. LED 9 monitors a regulated power supply voltage source. Must be on continuously at all times.

CALIFORNIA SPEEDTM

SECTION FOUR

TROUBLESHOOTING

This game uses complex electronic components that are very SENSITIVE to static electricity. The following precautions must be observed and followed prior to handling game electronics.

1. Ensure that the A.C. power to the game is turned OFF prior to servicing the electronics.
2. Discharge any static electricity build up in your body by touching the safety ground stud of the power supply chassis while the line cord is connected to a properly grounded outlet. This is to be done BEFORE touching or handling the electronic assemblies.
3. Store the electronic assemblies in an anti-static area. Anti-static bags are to be used to store or transport the game CPU Board Assembly.
4. DO NOT remove or connect any electronic assemblies when the cabinet power is ON. Doing so will damage the electronic assemblies and void the warranty.
5. Always replace ground wires, shields, safety covers, etc. when maintenance or service is completed. Ensure that all ground and mounting screws are installed and tightened firmly.

GAME DOES NOT START

1. Game appears completely non-functional; no audio, no illumination, no video display.
 - A: Check that the Power Switch has been turned ON (top left rear corner of the game cabinet).
 - B: Turn OFF the game power. Unplug the A.C. line cord. Unlock and remove the cabinet rear door. The Power Supply Line Voltage Switch must be set to agree with the local A.C. line voltage.
 - C: Remove the Line Cord Cover Plate. Test the line cord, power plug and I.E.C. connector for breaks or damage. Verify the continuity of each wire in the cord. Fully seat the I.E.C. connector into the mating receptacle of the cabinet. Replace the cover plate and all four screws.
 - D: Ensure that cabinet wiring harness connectors are fully seated in the corresponding A.C. Power Chassis Assembly connectors (refer to Power Wiring Diagram, Section Three). Check the "Y" cable supplying power to the fluorescent lamps if a Deluxe Linking Overhead Sign Kit is installed.
 - E: Examine the A.C. Line Fuse on the A.C. Power Chassis. If the fuse is faulty, replace it with an identical fuse from the spare parts bag. Replace the spare fuse when repairs are complete.
 - F: Fully seat the A.C. plug in the outlet. Verify that A.C. line voltage is present. Turn the game power ON. Check the D.C. wiring harness and connectors if the fuse opens the circuit again.
- 2: Video game appears non-functional, but coin door price indicator is illuminated.
 - A: Unlock and hold the cabinet rear door partially open. Inspect the CPU Board Assembly under low light level conditions. A glow will be seen from the Light Emitting Diodes if there is voltage in the processor circuits. This does not mean that voltages or signals are as they should be, but it does indicate that the CPU Board is receiving some D.C. power from the Power Supply.
 - B: Turn OFF game power. Remove the cabinet rear door. Remove the cover and inspect the CPU Board Assembly. Ensure that the JAMMA Wire Harness connector is attached and fully seated onto the mating board connector. Check the other wiring harness connectors in the same way.

 **CAUTION: DO NOT REMOVE OR INSTALL ANY CONNECTOR WHEN POWER IS TURNED ON. DOING SO WILL DAMAGE THE GAME CPU BOARD ASSEMBLY AND VOID THE WARRANTY.**

 - C: Verify that the game CPU DIP Switches are set as intended. Refer to the Switch Configuration Chart (Section One) for variables and default settings.
 - D: Turn ON the game power. Using the 20 Volt D.C. setting on a digital voltmeter, measure D.C. voltages present at the Power connector pins. Adjust the +5V source only if necessary. Refer to the Cabinet Wiring Diagram (Section Three) for specific wiring information and voltage limits.
 - E: Using the 2 Volt A.C. setting on a digital voltmeter, measure the same D.C. voltages as above. Any reading here indicates that the supply voltages are unstable and may contain ripple or noise.
 - F: Verify that the game runs and completes the Power On Test sequence without any errors. Note errors and/or failures found during these tests. *Do not touch the steering wheel during testing.*
 - G: Enter the game Menu System by pressing and holding the TEST MODE switch inside the coin door. From the SELF TEST menu, choose the MONITOR TESTS (refer to Section One for additional details). Use this set of tests to check the operation of each screen used in the game.

GAME CAN NOT BE PLAYED

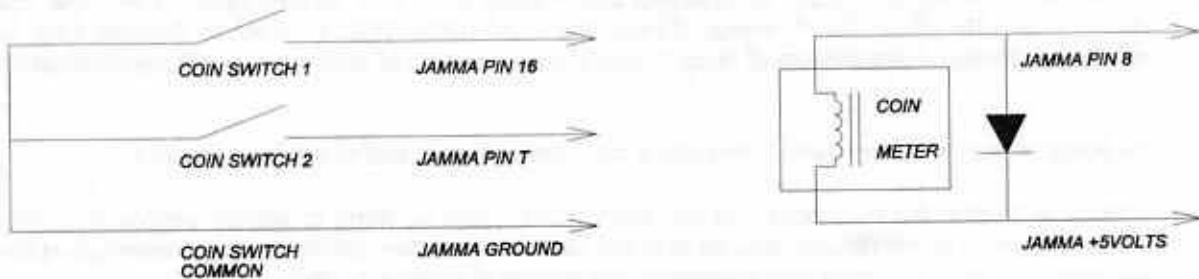
- 1. Game will not accept currency or tokens and cannot be started. Audio and video are present.**
 - A: Unlock and open the cash door. Empty the cash box. Inspect the revenue for any counterfeit currency. Check the vault and remove any items that block the path from the mechanism.
 - B: Unlock and open the coin door. Check each mechanism by hand to ensure proper mounting. Remove the mechanism and clear the currency path. Reinstall the mechanism and latch it.
 - C: Verify that the mechanism is level when the doors are closed. Repair or replace the coin door if it is bent or damaged. Adjust the cabinet leg levelers if necessary to keep mechanisms vertical.
 - D: Enter the game Menu System by pressing and holding the TEST MODE switch inside the coin door. From the SELF TEST menu, choose COIN OPTIONS (refer to Section One for additional details). Use these tests to confirm the pricing and setup of each mechanism used in the game.
 - E: Enter the game Menu System by pressing and holding the TEST MODE switch inside the coin door. From the SELF TEST menu, choose the CONTROL TESTS (refer to Section One for additional details). Use this set of tests to check the operation of each coin or bill mechanism.
- 2. Game accepts currency or tokens, but does not start. Audio and video are present.**
 - A: Unlock and open the coin door. Check each mechanism by hand to ensure proper mounting. Verify that each of the release latches is in the closed and locked position. Test known good and bad coins to see if the mechanism accepts and rejects the currency correctly.
 - B: Ensure that no loose parts or wires are caught in the hinges, latches, or switch contacts.
 - C: Inspect to see if the external coin door indicators (pricing, flashing arrows, etc.) are illuminated. Check connectors and cables for wiring continuity from CPU Board to the coin mechanisms.
 - D: Enter the game Menu System by pressing and holding the TEST MODE switch inside the coin door. From the SELF TEST menu, choose COIN OPTIONS (refer to Section One for additional details). Use these tests to confirm the pricing and setup of each mechanism used in the game.
 - E: Check for continuity in each of the suspect switch connections (Common to Normally Open or Common to Normally Closed). Replace faulty switches (bent levers, broken actuators, etc.).
 - F: Verify that each coin mechanism is operating properly by placing it in a known good unit.
- 3. Game does not accept paper currency. Coin mechanism operates properly.**
 - A: Dollar bill validators or other currency acceptors may be installed in games manufactured with the additional wiring connector (DBV ready). Some units may require modification to fit the coin door; the recommended installation procedure is elsewhere in this manual (refer to Servicing in Section One). The Power Wiring Diagram (Section Three) shows the DBV power and signal connections.
 - B: Ensure that the electronic signals from the Dollar Bill Validator are recognized by the game. Enter the game Menu System by pressing and holding the TEST MODE switch inside the coin door. From the SELF TEST menu, choose COIN OPTIONS (refer to Section One for additional details). Consult the manufacturer's information if changes are needed at the validator assembly.

4. Game accepts currency or tokens, but number of credits per coin or bill is incorrect.

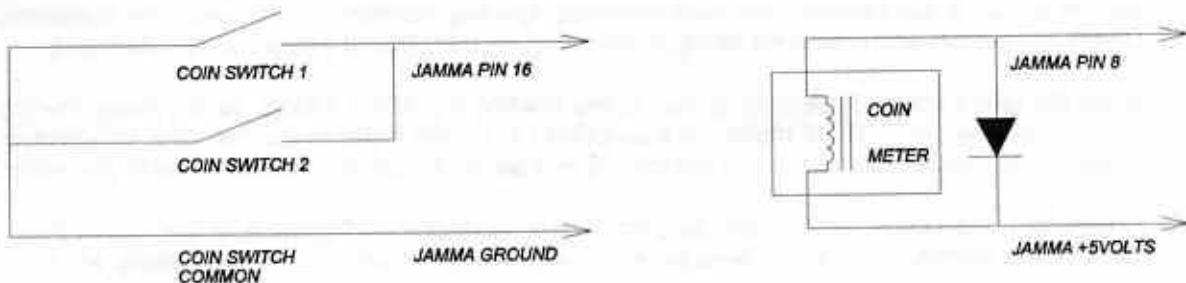
- A: Enter the game Menu System by pressing and holding the TEST MODE switch inside the coin door. From the SELF TEST menu, choose COIN OPTIONS and MECH SETUP (refer to Section One for additional details). Use these tests to confirm the operation of each coin switch.
- B: From the GAME ADJUSTMENTS menu, choose CUSTOM PRICING to verify units and credits.
- C: Check that the cabinet wiring is correct for this game. Ensure that the coin meter and coin switches are properly connected to the control input wires from the JAMMA connector and other CPU wiring. Refer to the Power Wiring Diagram (Section Three) for specific wiring information.

COIN SWITCH AND METER WIRING

FACTORY STANDARD

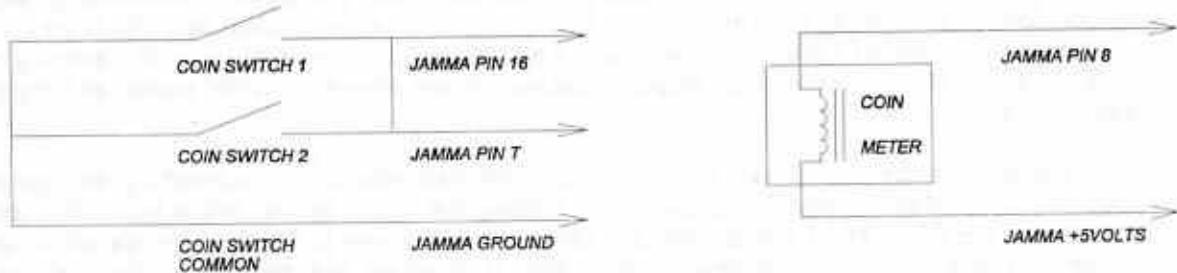


OPTIONAL WIRING



INCORRECT WIRING

A connection between JAMMA coin input pins will cause twice the desired credits for each coin inserted. A coin meter with a defective or missing diode may eventually damage driver circuits on the CPU Board.



LINKING PROBLEMS

1. Cannot connect games together. Linking cables are present in each game.

- A: Linking kits are required to set up interconnection. Basic Linking Kits contain a crossover coupler, brackets, and spacers necessary to link two cabinets. Each kit connects two games (one pair).
- B: A concentrator hub is needed to set up a local network. Hub Link Kits permit up to eight game connections. Basic kit brackets and spacers are required to construct a complete game array.
- C: This linking system uses 10Base-T ETHERNET type Category 5 twisted pair communications wiring for the game data exchanges. *Do not substitute other cables without factory authorization.*

2. Game functions correctly by itself, but does not recognize other players in linking operation.

- A: Note and record any error messages that occur during self-test. Open the coin door. Press and hold the TEST MODE switch to enter the menu system. On the SELF TESTS menu, check that the car is different for each cabinet. A unique vehicle is required for each car in a linked race.
- B: From the SELF TESTS menu, choose NETWORK TESTS. These tests will verify some of the communication functions in this game. Verify that power is applied if a Hub is in use (a Hub may be located inside one of the game cabinets, behind the games, or mounted in a remote location).
- C: Inspect the hub indicator lights. Each active port should have an illuminated indicator. If a cable is connected and there is no indicator lit for that position, check for cable continuity from hub to game. Ensure that no loose parts or wires are caught in the hinges, doors, or under the cabinet.
- D: Unlock and open the rear door. Verify that the linking cable is connected to the CPU Board. Compare the CPU Board LED Indicator Status Chart (refer to Section Three) against the CPU network indicators, particularly LED 6 (Receiving), LED 10 (Linking), and LED 12 (Transmitting).
- E: Verify that each linking cable is operating properly by placing it in a known good unit.

3. Some games in a group link properly while others do not.

- A: All linked cabinets require the same software version. Unlock the coin door and press the TEST MODE button. The software version has two dates at the bottom of the menu screen: GUTS and MAIN. It does not matter which revision level is installed, only that all games must be the same.
- B: Coupled games require crossover connections. Standard couplers appear identical to the devices supplied with Basic Link Kits, but they do not have the internal crossover. Verify that each linking crossover coupler is operating properly by placing it in a known good link between two games.
- C: Networked games do not require a crossover (the hub has an electronic crossover function). Ensure that the switches on the hub are set correctly according to the Hub Link Kit instructions. Inspect the hub indicator lights for link activity. Consult manufacturer's literature for diagnostics.
- D: *Do not use an additional crossover connector and another cable to extend a Basic or a Hub Link connection.* Two crossovers will cancel out and cause the same problem as no link crossover. The transmit and receive line pairs must interconnect in order for data to be exchanged.
- E: Separate communications wiring from other wiring, especially line cords. If unavoidable, cross at right angles to limit noise pickup. *Do not bundle network cables with any other wires.*

PLAYER CONTROL PROBLEMS

1. Player controls are intermittent or completely non-functional. Game starts normally.
 - A: Turn off power for one minute and turn the game on again. The automatic game POWER ON TESTS routine will test electronics and controls. The screen will report any errors on completion. *Do not touch the steering wheel or pedals during this calibration routine unless directed to do so.*
 - B: Unlock and open the coin door. Enter the game Menu System by pressing and holding the TEST MODE switch inside the coin door. From the SELF TEST menu, choose the CONTROLS TEST (refer to Section One for additional details). Use these tests to confirm the operation of each switch and light used in the game.
 - C: Check that the cabinet wiring is correct for this game. Ensure that the controls are properly connected to the control input wires from the JAMMA connector. Refer to the Power Wiring Diagram (Section Three) for specific wiring information.
 - D: Ensure that no loose parts or wires are caught in the hinges, latches, or switch contacts. Check continuity in each of the switch connections (Common to Normally Open or Common to Normally Closed). Verify that the control is operating properly by placing in a known good unit.
 - E: Verify that dashboard switch light bulbs are the type specified in the parts listing. Other bulbs will light, but the higher heat level can cause the switches to bind or stick after hours of operation.
 - 2: Steering wheel is partly functional, but video is present and game appears to start normally.
 - A: Turn off power for one minute and turn the game on again. The automatic game POWER ON TESTS routine will test electronics and controls. The screen will report any errors on completion. *Do not touch the steering wheel or pedals during this calibration routine unless directed to do so.*
 - B: With the game power ON, check the flow of air from each of the fans at the rear of the cabinet.
 - C: Unlock and hold the cabinet rear door partially open. Inspect the Motor Board Assembly under low light level conditions. A glow will be seen from the Light Emitting Diodes if there is voltage in the motor driver circuits. This does not mean that voltages or signals are as they should be, but it does indicate that the Motor Board is receiving some A.C. power from the transformer.
 - D: Turn OFF the game power. Adjust the seat to its maximum rear position. Open the dashboard. Support the steering wheel and remove the outer mounting screws. Remove the support and gently lower the wheel mechanism to the floor. Inspect for faulty belts, bearings, couplings, etc.
-  **WARNING:** *Motor Driver Board heatsink, power resistors, and other components may be very HOT. The D.C. Motor in the Steering Wheel Assembly may also have become HOT.*
- E: Examine the fuses and cables on the Motor Driver Board. If any fuse is faulty, replace it with an identical fuse from the spare parts bag. Replace the spare fuse when repairs are complete.
 - F: Using a digital voltmeter, verify that A.C. voltage between each fuse holder and ground is approx. 25V. Refer to the Power Wiring Diagram (Section Three) for wiring information and voltage limits.
 - G: Using the 2 Volt A.C. setting on a digital voltmeter, measure the same D.C. voltages as above. Any reading here indicates that the supply voltages are unstable and may contain ripple or noise.
 - H: Verify proper operation of game Motor Board Assembly by placing it in a known good game.

AUDIO PROBLEMS

1: Audio is non-functional, but video is present and game appears to operate normally.

- A: Unlock and open the coin door. Enter the game Menu System by pressing and holding the TEST MODE switch inside the coin door. From the SELF TEST menu, choose ADJUST VOLUME (refer to Section One for additional details). Verify that the attract and game volume levels have not been set at zero. Change the levels if necessary to make the game very loud.
- B: Follow the on-screen instructions to return to the first menu. From the SELF TEST menu, choose SOUND TESTS. Use these tests to confirm the operation of each speaker in the cabinet.
- C: Turn OFF the game power. Inspect each speaker and its wiring harness. Ensure that no loose parts or wires are caught in speaker cones, terminals, mounting screws, or stuck to the magnets. Do not use excess force when removing or tightening mounting screws threaded into plastic.
- D: Verify correct cabinet wiring for this game. Ensure that speakers are properly connected to audio output wires from the speaker connector. Verify speaker continuity. Check Subwoofer Audio Board fuses. Refer to the Power Wiring Diagram (Section Three) for specific wiring information.
- E: Turn ON the game power. Using the 20 Volt D.C. setting on a digital voltmeter, measure D.C. voltages present at the Power connectors. Verify the +12V source at the Audio board. Refer to the Power Wiring Diagram (Section Three) for specific wiring information and voltage limits.
- F: Using the 2 Volt A.C. setting on a digital voltmeter, measure the same D.C. voltages as above. Any reading here indicates that the supply voltages are unstable and may contain ripple or noise.

2: The audio is distorted, muffled or missing frequencies. A constant low hum may be present.

- A: Unlock and open the coin door. Enter the game Menu System by pressing and holding the TEST MODE switch inside the coin door. From the SELF TEST menu, choose SOUND TESTS. These tests will verify some of the functions of the audio circuits in this game.
- B: Turn OFF the game power. Remove the grills and check the speakers. This game uses two speakers and one woofer. Ensure that all small speakers are 8Ω FULL RANGE (100-10,000 Hz response) and rated for at least 15 WATTS. The 4Ω bass speaker must rate at least 25 WATTS.
- C: Check that the speaker wiring is not reversed at one of the speakers. Weak low frequencies and a thin or hollow sound quality are symptoms of incorrectly phased speakers. This condition will not be detected by the SOUND TESTS, but it will be audible with the ADJUST VOLUME music.



WARNING: Do not connect speaker wires or components to ground during measurements!

- D: Using a digital voltmeter, verify that A.C. voltage between each fuse holder and ground is approx. 16V. Refer to the Power Wiring Diagram (Section Three) for wiring information and voltage limits.
- E: Check that the cabinet wiring is correct for this game. Verify that the cabinet wiring provides separate wires (not a common return) for each speaker. Ensure that all cabinet ground wires are connected. Refer to the Power Wiring Diagram (Section Three) for specific wiring information.
- F: Using the 2 Volt A.C. setting on a digital voltmeter, measure voltages at the speaker terminals. Any reading here indicates that the supply voltages are unstable and may contain ripple or noise.
- G: Verify operation of suspect speakers, Audio or CPU Boards by placing in a known good game.

VIDEO PROBLEMS

1. Monitor appears non-functional, but audio is present and controls operate as expected.

- A: Unlock and open the rear door. Verify that A.C. Power is connected to the Video Monitor. Inspect the neck of the CRT under low light level conditions. A glow will be seen near the CRT base if there is voltage in the filament circuits. This does not mean that other voltages or signals are as they should be, but it does indicate that some of the monitor circuits are receiving power.
- B: Turn OFF the game power. Verify that the Video Signal and the Remote Adjustment Board connectors are fully seated on the Video Monitor Board Assembly. Check the other monitor connectors in the same way. ***Do not operate a monitor without a Remote Adjustment Board.***



WARNING: CRT and Video Monitor Board may store voltage after power is turned off.

- C: Examine the A.C. line fuse on the Video Monitor Board Assembly. If the fuse is faulty, replace it with an identical fuse of the proper voltage and current rating.
- D: Ensure that no loose parts or wires are caught on the chassis or the mounting brackets.
- E: Unlock and open the coin door. The monitor adjustment controls are mounted on the rear wall. Check that the brightness (intensity) and contrast have not been set to their minimum levels.
- F: Verify that the Video Monitor is operating correctly by placing it in a known good unit.

2: The Power On Tests will run, but the game does not appear. No audio is present.

- A: Note and record any error messages that occur during the Power On Test. Open the coin door. Press and hold the TEST MODE switch to enter the menu system. From the SELF TESTS menu, choose DISK TESTS. These tests will verify some of the game Hard Disk Drive functions.
- B: Turn OFF the game power. Unlock and remove the rear door. Inspect the CPU Board Assembly. Ensure that Hard Disk Drive Assembly ribbon cable and power connectors are fully seated into the mating connectors on the CPU Board. Verify that all disk drive mounting screws are installed.

CAUTION: DO NOT REMOVE OR INSTALL ANY CONNECTOR WHEN POWER IS TURNED ON. THIS WILL DAMAGE THE CPU BOARD OR HARD DISK DRIVE AND VOID THE WARRANTY.

- C: Check that the Hard Disk Drive Assembly is the correct part for this game. Each Hard Disk Drive is labeled with the assembly number and the software version. Refer to Parts (Section Two).
- D: Verify that the ROM instruction set is correct for this game. There is more than one ROM in a game set. Each ROM circuit is labeled with the assembly number and the software version.
- E: Verify that the CPU Board Assembly is correct for this game. Each CPU Board is marked with the manufacturer name, assembly number and the hardware version.
- F: Turn ON game power. Using the 20 Volt D.C. setting on a digital voltmeter, measure D.C. voltages present at the drive power connector pins. Verify the +5V source if it is adjustable. Refer to Power Wiring Diagram (Section Three) for specific wiring information and voltage limits.
- G: Using the 2 Volt A.C. setting on a digital voltmeter, measure the same D.C. voltages as above. Any reading indicates that the supply voltages are unstable and may contain ripple or noise.
- H: Compare CPU Board Light Emitting Diode states with the CPU Indicator Chart (Section Three).

- 3. Monitor will not lock onto the signal and provide a stable picture, colors are missing, etc.**
 - A: Unlock the coin door. Adjust vertical and horizontal hold controls at the remote adjustment board.
 - B: Check connectors and cables for wiring continuity from the CPU Board to the video monitor. Check connectors and cables for wiring continuity from the adjustment board to the video monitor.
 - C: Ensure that the Video Monitor Assembly is correct for this game. Use of video monitors with different resolution will result in what appears to be horizontal tearing or complete loss of sync.
 - D: Verify that the Video Monitor is operating correctly by placing it in a known good unit.

- 4: Game operates normally, but video picture wavers or rolls, has dark bars, uneven colors, etc.**
 - A: Check connectors and cables for wiring continuity from the CPU Board to the Video Monitor. Ensure that all the cabinet ground wires are connected, especially at the Video Monitor Chassis.
 - B: Move the cabinet farther away from machines, appliances, other games, etc. Very strong electrical or magnetic fields are emitted from some equipment when it is operating normally.
 - C: Verify that the Video Monitor is operating correctly by placing it in a known good unit.

MISCELLANEOUS

- 1: Marquee lamp is intermittent or non-functional. Game starts and plays normally.**
 - A: Open the marquee and remove the glass. Remove the plastic lamp locks and the fluorescent tube from the holders. Install a new lamp if cracks or darkened ends are found. Clean the tube.
 - B: Verify that the lamp and starter pins are making good connection with their socket contacts.
 - C: Measure the Fluorescent Lamp Assembly A.C. voltages (Power Wiring Diagram, Section Three). Check wiring and connector continuity from the A.C. Power Chassis to the Lamp Assembly.
 - D: Ensure that the Fluorescent Lamp Assembly is rated for the local A.C. line voltage and frequency.
 - E: Check for continuity of both fluorescent lamp filaments, the starter, and the ballast. One at a time, verify that the lamp, starter, and ballast operate by placing each in a known good unit.

- 2. Game operates normally, but fan is noticeably noisy. Cabinet may become very warm.**
 - A: Check bottom and rear of cabinet for blocked air flow. Move game away from sources of heat.
 - B: Turn OFF the game power. Apply high power vacuum cleaner to vent holes to remove dust.
 - C: Unlock and remove the rear door. Ensure that the fan is connected to wiring harness.

- 3. Error Messages appear on the screen. The game does not start and there is no audio.**
 - A: Check any assembly (RAM, ROM, Battery, etc.) identified in the Error Message.
 - B: Call your authorized distributor for help with unresolved screen messages.

NOTES

1. When you are writing a note, make sure that the handwriting is legible and the note is clear.

2. When writing a note, make sure that the handwriting is legible and the note is clear.

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WARNINGS & NOTICES

WARNING

USE OF NON-ATARI PARTS OR CIRCUIT MODIFICATIONS MAY CAUSE SERIOUS INJURY OR EQUIPMENT DAMAGE! USE ONLY ATARI AUTHORIZED PARTS.

- * For safety and reliability, substitute parts and modifications are not recommended.
- * Substitute parts or modifications may void FCC type acceptance.
- * Use only authorized components and parts. Failure to do so will void warranty and may result in incorrect and/or unsafe operation.
- * This game is protected by federal copyright, trademark and patent laws. Unauthorized modifications may be illegal under federal law. This also applies to ATARI logos, designs, publications and assemblies. Moreover, facsimiles of ATARI equipment (or any feature thereof) may be illegal under federal law, regardless of whether or not such facsimiles are manufactured with ATARI components.

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generated, uses and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

When ATARI ships a game, it is in compliance with FCC regulations. Your sticker is proof. If the sticker is missing or damaged, legal repercussions to the owner or distributor of the game may result. If your game does not contain an FCC sticker, call ATARI immediately.

WARNING

Plug this game into a properly grounded outlet to prevent shock hazards and assure proper game operation. Do not use a cheater plug to defeat the power cord's grounding pin. Do not cut off the ground pin.

WARNING

A very small portion of the population has a condition which may cause them to experience epileptic seizures or have momentary loss of consciousness when viewing certain kinds of flashing lights or patterns that are present in our daily environment. These persons may experience seizures while watching some kinds of television pictures or playing certain video games. People who have not had any previous seizures may nonetheless have an undetected epileptic condition.

If you or anyone in your family has experienced symptoms linked to an epileptic condition (e.g. seizures or loss of awareness), immediately consult your physician before using any video games.

We recommend that parents observe their children while they play video games. If you or your child experience the following symptoms: dizziness, altered vision, eye or muscle twitching, involuntary movements, loss of awareness, disorientation, or convulsions, DISCONTINUE USE IMMEDIATELY and consult your physician.

NOTICE

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FOR SERVICE: CALL YOUR AUTHORIZED ATARI DISTRIBUTOR.