MIDWAY

MAY 1998
16-40071-101





SIT-IN DEDICATED GAME
25" (63 cm) & 33" (84 cm) COLOR MONITORS
OPERATION MANUAL

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

WARNINGS & NOTICES

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

* Substitute parts or modifications may void EMC directive or 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. For safety and reliability, substitute parts and modifications are not recommended.
* This game is protected by federal copyright, trademark and patent laws. Unauthorized modifications may be illegal under federal law. This also applies to MIDWAY logos, designs, publications and assemblies. Moreover, facsimiles of MIDWAY equipment (or any feature thereof) may be illegal under federal law, regardless of whether or not such facsimiles are manufactured with MIDWAY components.

HYPERDRIVE™

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.

⚠ CAUTION

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

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

Cabinet Statistics

Shipping Dimensions

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

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

Shipping Weight

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

33" Cabinet
570 lbs. (259 kg.)
Pedestal
125 lbs. (56.8 kg.)

Design Type

Single Sit-In Dedicated Video Game with Linking capability

Universal Pedestal with Seat
Width 22.0" (55.8 cm)
Depth 36.0" (91.4 cm)
Height 51.0" (129.5 cm)

Equipment Characteristics

Video 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 Characteristics

Player Variables
1 to 4 players per game (with Linking)
Choice of Ship style, track, thrust
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. Crossover couplers and linking cables to permit linking of two games are factory installed. Use the optional Hub Linking Kit to interconnect up to eight games.

INSTALLATION AND INSPECTION

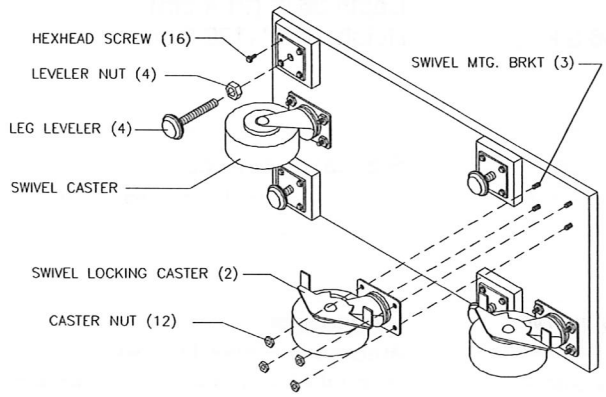
1. Remove all items from shipping containers and set aside. Casters, levelers, and mounting hardware are packed with the pedestal section. Inspect the exterior of the cabinet for any signs of damage.

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.

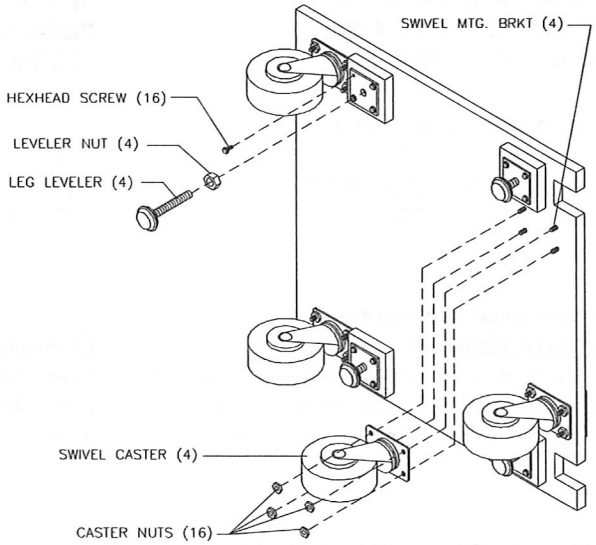
WARNING
The cabinet is top heavy.

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.

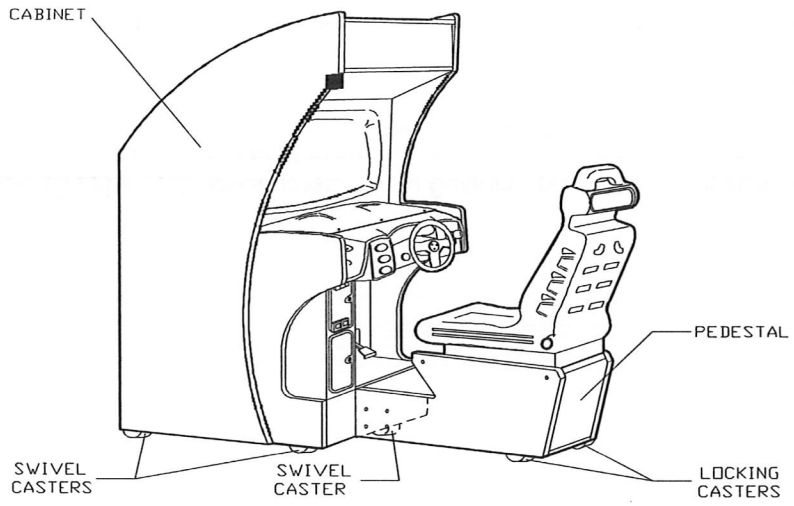
BOTTOM VIEW OF PEDESTAL ASSEMBLY



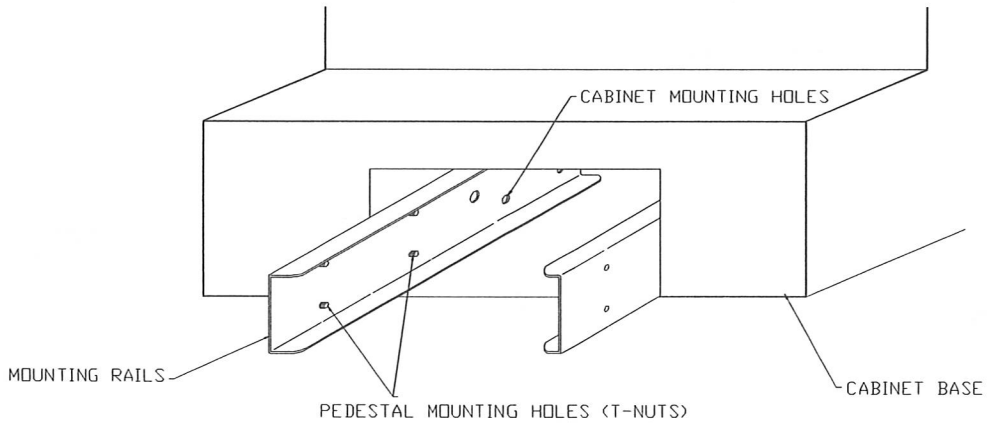
BOTTOM VIEW OF CABINET ASSEMBLY



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.



5. 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.



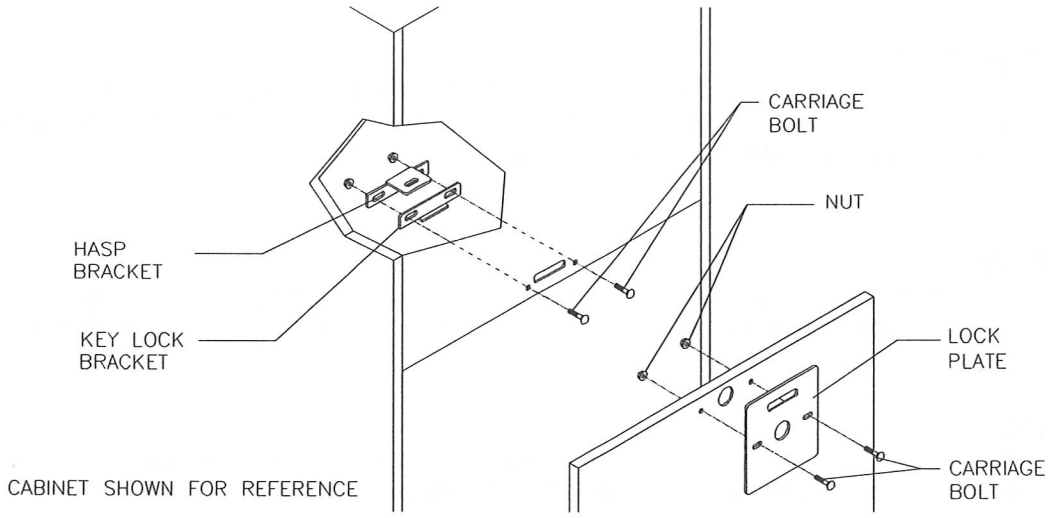
LOCATION OF PEDESTAL ASSEMBLY MOUNTING HOLES

6. 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.

7. 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.

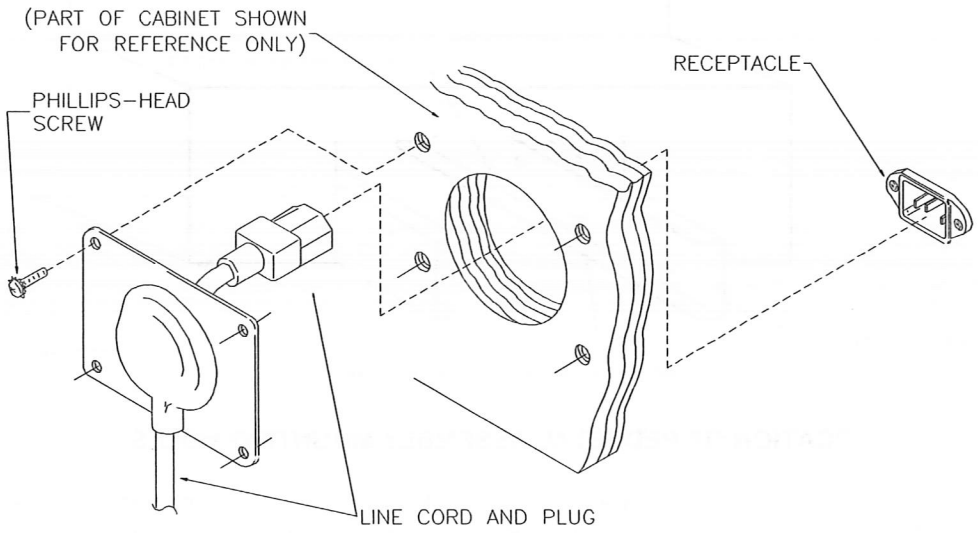
8. Remove the rear door of cabinet. Inspect cabinet interior for any signs of damage. Check all major assemblies to assure that they are mounted securely. Ensure that nothing blocks fan airflow.

9. 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 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 glass and artwork out of the top grooves and set in a safe place. Do not over-tighten screws upon reinstallation.

⚠ WARNING

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

♦ Fluorescent Lamp or Starter

Remove marquee retaining strip, glass and artwork (see above). Grasp the tube, give it a quarter turn and pull it from its sockets. Replace any tube with cracks or darkened ends. The starter also requires a quarter turn for removal or installation. Carefully insert a new tube into the sockets and rotate it a quarter turn to reinstall. Clean the tube to remove fingerprints and dust. Reinstall art, glass, and strip.

⚠ WARNING

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

♦ Fluorescent Light Assembly

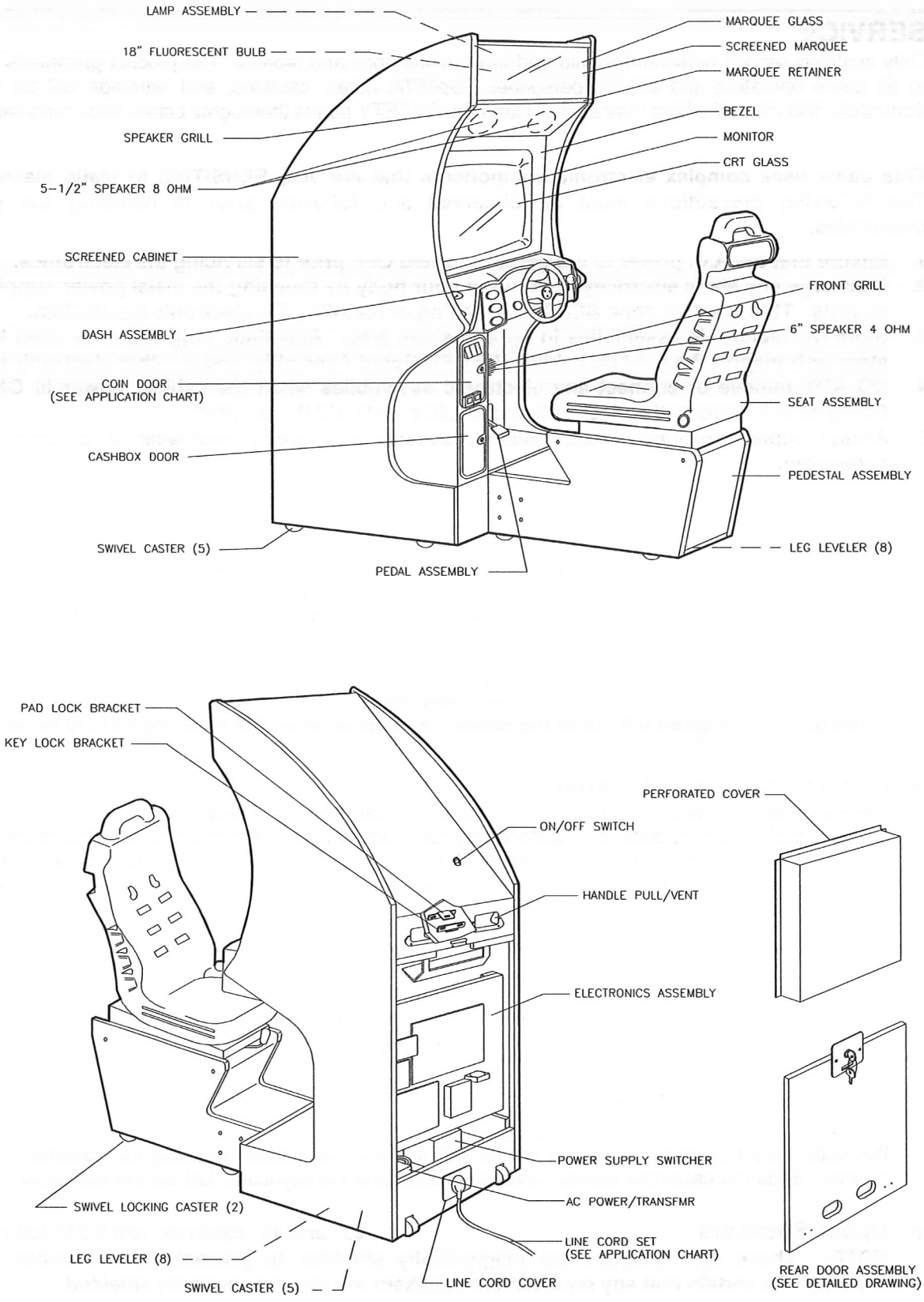
Remove the marquee retaining strip, glass and artwork. Disconnect the power cable from the fluorescent light assembly. Loosen but do not remove the screws fastening the assembly to the cabinet. Slide the assembly slightly forward to disengage the keyholes. Lift out the assembly.

♦ Upper Speakers:

25" and 33" cabinets, two 5.25" full range

NOTE: These two speakers are magnetically shielded to prevent video monitor color impurity. Be certain that any replacement speakers are also magnetically shielded.

These speakers are mounted on the grille located just under the marquee. Remove the retaining strip, 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.



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

- **Lower Speaker: 25" cabinet, one 6" woofer; 33" cabinet, one 8" woofer**

  The lower speaker is located on the panel just above the accelerator 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. Refer to the Cabinet Wiring Diagram for correct speaker polarity.

- **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 nuts and lift the transformer out of the cabinet.

- **Left or Right Control Pods**

  Remove four tamper-resistant screws holding the control pod (left pod, four front screws; right pod, two front, one top, one bottom screw) onto its dashboard mounting bracket. Pull the cover forward just enough to clear the bracket. Grasp each switch assembly and lamp socket firmly and pull it from the pushbutton assembly. Remove six hex-head screws to release the Indicator Board Assembly.

- **View Buttons or Start Button**

  Remove the Control Pod from the dashboard. Grasp each switch assembly and lamp socket firmly and pull it from the pushbutton assembly. Disconnect the wiring harness and mark the wires if switch removal is required. Gently bend the large prong of the holder just enough to slide the switch off of the holder. Unscrew the nut from the pushbutton housing and remove it from the Control Pod cover.

  Do not substitute brighter light bulbs. The higher heat can cause the buttons to bind or stick.

- **Indicator Board Assembly**

  Remove the Control Pod from the dashboard. Remove six hex-head screws to release the Indicator Board Assembly from the Control Pod cover. Unlock and remove the cabinet rear door. Reach in through the cabinet to disconnect the short ribbon cable at the connector just behind the dashboard. Gently fold the cable connector along the length of the ribbon and slide it through the access hole. Ensure that the ribbon cable connector is correctly aligned with the pins during installation.

♦ Dash Board

25" Cabinet: Remove four tamper-resistant screws at the dashboard front corners. Remove the viewing glass retaining strip. Pull the dashboard forward just enough to expose the connectors. Disconnect the wiring harnesses, ribbon cable, and ground strap. Before reinstalling the dashboard, ensure that harnesses, ribbon cable, and ground strap are reconnected.

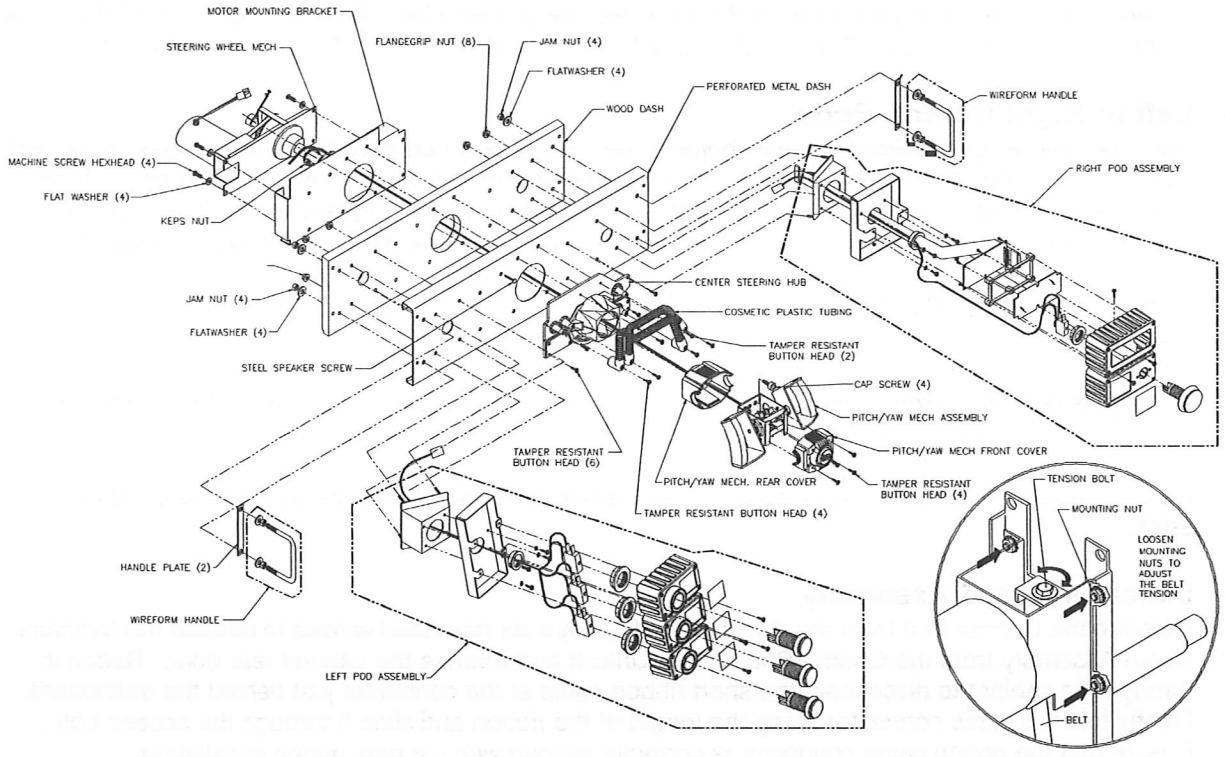
33" Cabinet: Remove four front and three rear tamper-resistant screws from the top cover. Lift the top cover off of the game cabinet. Remove the four tamper-resistant screws from the front corners of the dashboard. Remove the viewing glass retaining strip. Pull the dash forward just enough to expose the connectors. Disconnect the wiring harnesses, ribbon cable, and ground strap. Before reinstalling the dashboard, ensure that harnesses, ribbon cable, and ground strap are reconnected.

♦ Pitch and Yaw Yoke Assembly

Remove four tamper-resistant screws from front corners of the dashboard. Pull dashboard forward just enough to expose connectors. Disconnect wiring harness, ribbon cable, and ground strap. Lift dashboard off the cabinet and set aside. Remove four tamper-resistant screws at the yoke center. Remove the yoke cover, nut, and lockwasher. Pull the yoke off of the dashboard carefully to avoid damage to wiring. Remove four ¼-20 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 (0.7 to 1.0 Nm) if it was loosened for removal (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 recalibrate after installation.

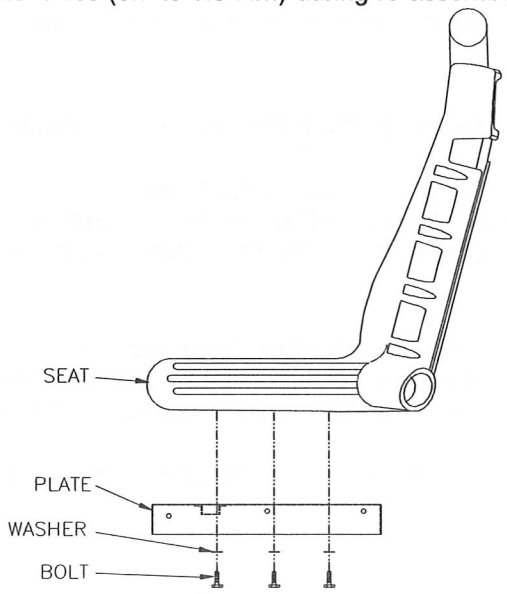


PITCH AND YAW YOKE MECHANISM, PODS, AND DASHBOARD ASSEMBLY

♦ Seat Assembly

Remove three tamper-resistant 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.

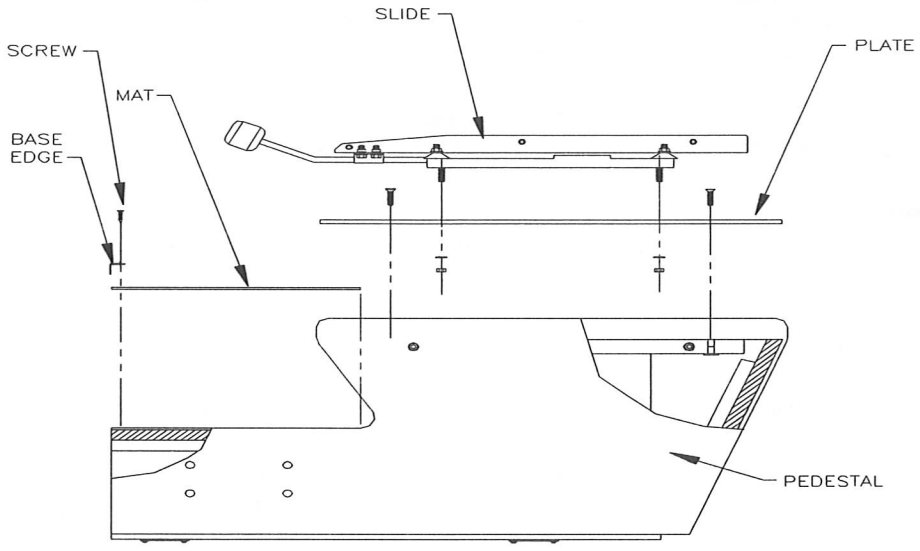
IMPORTANT: Apply removable anaerobic adhesive thread lock (Loctite Blue 242 or equivalent) and torque each bolt to seven to nine ft.-lbs (0.7 to 1.0 Nm) during re-assembly.



♦ Seat Slide Assembly

Remove three tamper-resistant 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-resistant screws from the metal panel on top of the pedestal assembly. Slide the seat back and remove the two front tamper-resistant 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 (0.7 to 1.0 Nm) during re-assembly.



♦ Monitor Bezel

25" Cabinet: Remove the two tamper resistant screws holding the viewing glass retaining strip. Lift the viewing glass out of its holder from the bottom center through the access area. Swing the glass out of the cabinet and set it aside. Grasp the monitor bezel at the bottom and lift it out of the groove. Remove the bezel from the cabinet. Replace dirty or damaged labels before reinstalling the bezel.

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

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 ¼-20 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 ¼-20 flange nuts located above the monitor. Tilt the monitor down from the top and pull it out of the 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.

♦ 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.

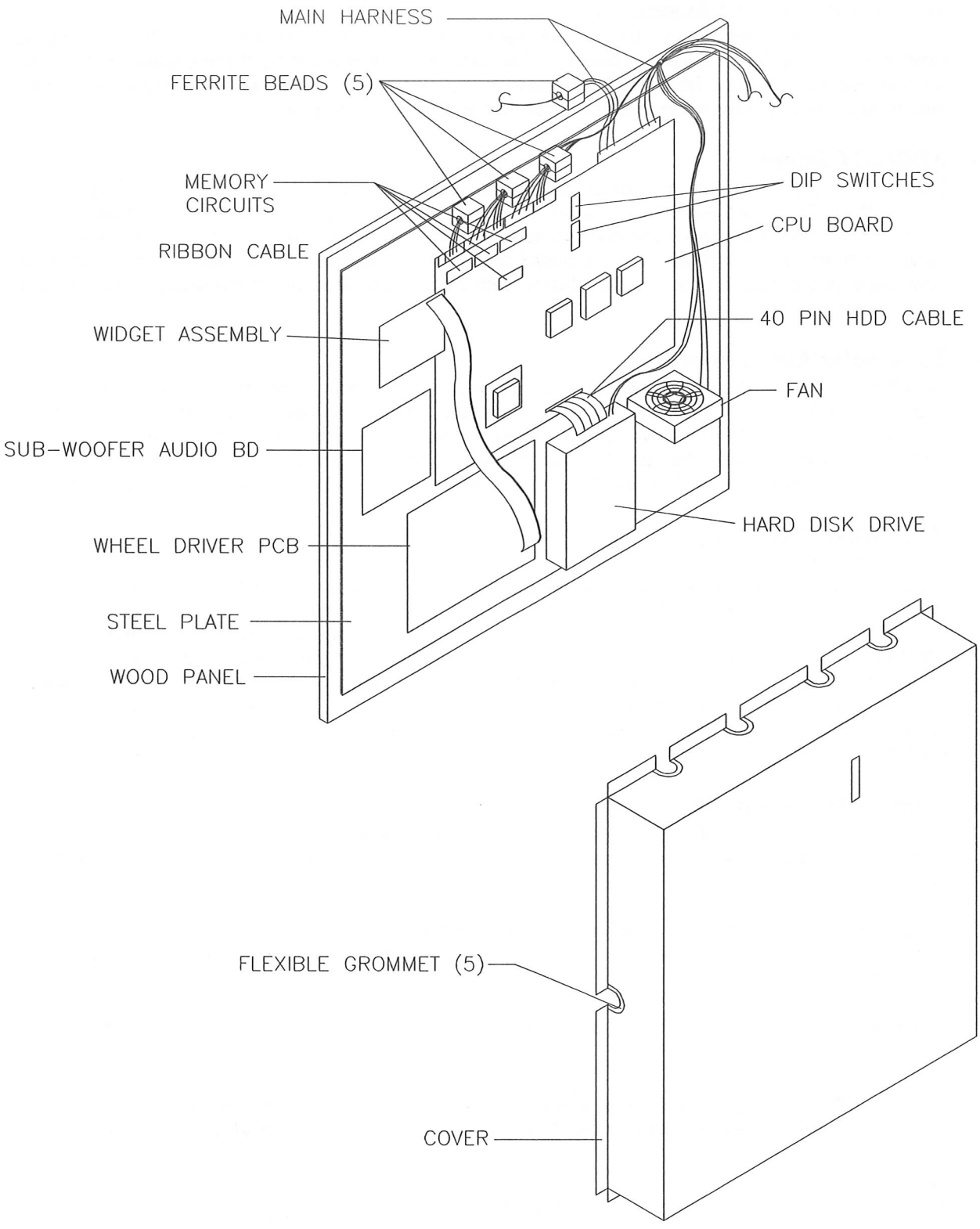
♦ Fan Assembly

Switch off power to the game. Remove screws, then unlock and remove the rear door. Remove the shield cover. Unplug the fan power connector from the wiring. Remove two screws, then lift fan out.

♦ Hard Disk Drive Assembly

Do not stack or drop the Hard Disk Drives. Store or transport them in 08-8068 shipping containers.

Switch off power to the game. Remove screws, then unlock and remove the rear door. 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 disk drive is installed.



GAME ELECTRONICS COMPONENTS

♦ Wheel Driver Board Assembly

Switch off power to the game. Unlock and remove the rear door. Remove the RF Cage top to expose the Wheel Driver Board Assembly. Carefully note the orientation of the cables. Extract the harness and other cables from the board connectors. Remove the Wheel Driver Board Assembly mounting screws. 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 connector. Remove the two brass and two steel 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. Place the new board on the mounting posts and refasten with the screws. Reconnect the wiring harnesses and other cables.

♦ 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. Place the new board on the mounting posts and refasten with the screws. Reconnect the wiring harnesses and other cables.

♦ 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 by removing the two brass and two steel phillips-head screws holding the board in place and retain them with their washers. Lift the ADC/AUX board out of the cabinet and set in a safe place. Carefully note the orientation of the JAMMA connector and the other cables. Extract the harness 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. Reinstall the RF Cage top so that it seals tightly against the 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.*

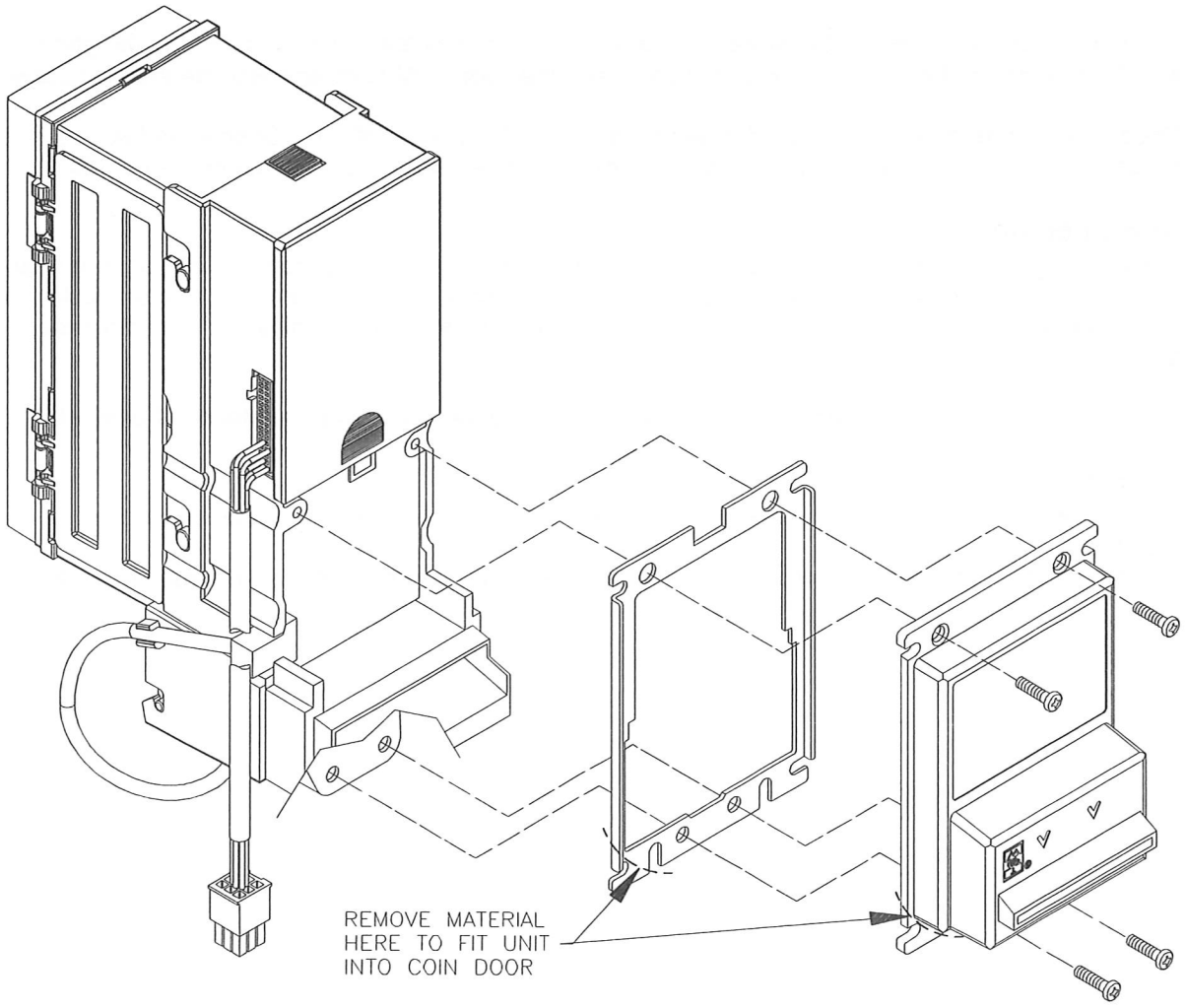
To reinstall the battery, orient cell near its holder and slide it in under the contact arm. *Do not force.*

⚠ **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.***

♦ 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.

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 START 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 are complete, the game begins its 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.

Test Mode

The operator may enter the menu system at any time to analyze the game or make adjustment 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 by turning the wheel to highlight it, then pressing the gas pedal to confirm the selection. Each vehicle has different handling capabilities.

Head to Head Play (Linked Operation)

Choose a linked cabinet (on-screen messages and optional overhead signs identify the linked games). Insert currency to start the game. Linked operation is possible only after the CHALLENGERS WAITING JOIN NOW message is seen on the screen. There are now some restricted choices:

1. Any player indicates linking is desired. That player selects a track. Challengers select their choice of track. The track with the lowest skill level requirement becomes the track for all players. Holding VIEW 1 during selection sets the track in "mirror" mode.

2. At least one other player must respond to the CHALLENGERS WAITING JOIN NOW screen message (if this does not happen, the games revert to their Individual Play mode of operation.

3. The players select vehicles. They may choose identical ones if desired. Each vehicle has a unique color and number so the games can identify the players.

4. The WAITING FOR OTHERS message displays until it times out or other players finish making their track and vehicle selections. If the time elapses, additional players must wait for the next game.

5. 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 game during the selection process by 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. 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 flying style.

2. 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 shows the relative position of all vehicles during game play. A virtual control panel shows relative speed, thrust, weight, and handling characteristics for each of the vehicles. The Pitch and Yaw Yoke provides steering feedback to improve control.

3. There are many secret features built into the game. For example, repeated gas pedal double stomps cause a temporary power boost to the vehicle speed. Most tracks have shortcuts. Vehicle speed is related to altitude. Players are encouraged to find other secret features by experimentation.

GAME FEATURES

HYPERDRIVE 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 occurs 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 CONTROL CALIBRATION, then follow the on screen instructions. Refer to CONTROL CALIBRATION later in this section for more detailed information. To set wheel feedback strength, go to WHEEL STRENGTH under the ADDITIONAL ADJUSTMENTS section of the ADJUSTMENTS sub menu.

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 can view lap after lap from several different camera angles and pilot 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 track choices. Each track requires a different skill level. More challenging tracks decrease the time between checkpoints and increase the course difficulty. This forces players to maintain higher speeds and allows fewer errors in judgement to continue racing.

Linking games together in a network allows players to choose to accept or decline a race against other players. 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.

Vehicles

Players may choose from several vehicles by rotating the steering mechanism until the desired vehicle is highlighted. Each vehicle has particular characteristics that are advantageous depending on the track selected. Turn the yoke to view vehicle choices, then press the gas pedal to select a particular vehicle. Holding VIEW 1 while selecting a vehicle eliminates drone vehicles from the track.

Race Length

Several things affect the length of a race. Difficult tracks have more turns and obstacles. Advanced tracks require more track corrections in rapid order. Players much 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 track during game play.

- **Start button**
  The start button begins game play. Press START and insert currency or tokens to select options.

- **View 1 button**
  This button shows the view from the cockpit of the vehicle. This is a normal pilot view.

- **View 2 button**
  This button shows the view from directly behind. The player can see the rear of the vehicle.

- **View 3 button**
  This button shows an aerial view of a vehicle. This is what a helicopter camera would see.

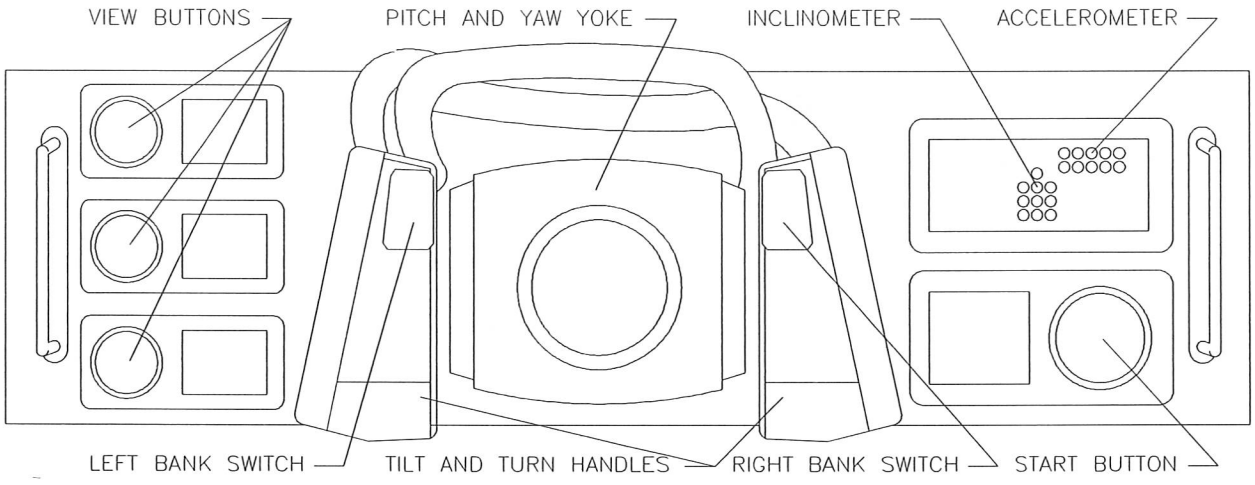
- **Indicator Panel**
  The indicators illuminate during flight to provide pilots with direction and power status conditions.

- **Pedals**
  The gas and brake pedals control vehicle speed, functioning the same as if the vehicle were a car. Double gas pedal stomps cause a temporary power boost.

- **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.

- **Pitch and Yaw Yoke**
  The yoke is used to aim the vehicle during a race. It provides track and obstacle feedback to players. Tilt the yoke forward and back to change altitude. Turn the yoke left and right to change direction. Press yellow buttons to bank the vehicle to one side or the other during tight high-speed maneuvers.

  Note: Operators can adjust the pitch and yaw yoke force and feedback to suit any player's needs. Refer to CONTROL CALIBRATION and ADJUSTMENTS in the MAIN MENU system for instructions.



PLAYER CONTROL LOCATIONS

OPERATOR CONTROLS

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

CABINET SWITCHES

- **Power Switch**
  The **Power ON/OFF Switch** turns off the game during service. It does not reset the game variables.

- **Slam Tilt Switch**
  The **Slam Tilt** switch prevents game abuses such as pounding to obtain free games.

- **Monitor Remote Adjustments** (inside the cabinet under the monitor)
  The **Monitor Remote Adjustment Board** sets the video display for optimum viewing.

CONTROL SWITCHES

- **Volume Down and Volume Up Buttons**
  The **Volume Down** and **Volume Up** push-button switches increase or decrease game sound levels. Press either button briefly to make minor changes. Press and hold a button to make major changes. Volume may also be changed with the joysticks and buttons when the menu system is active.

NOTE

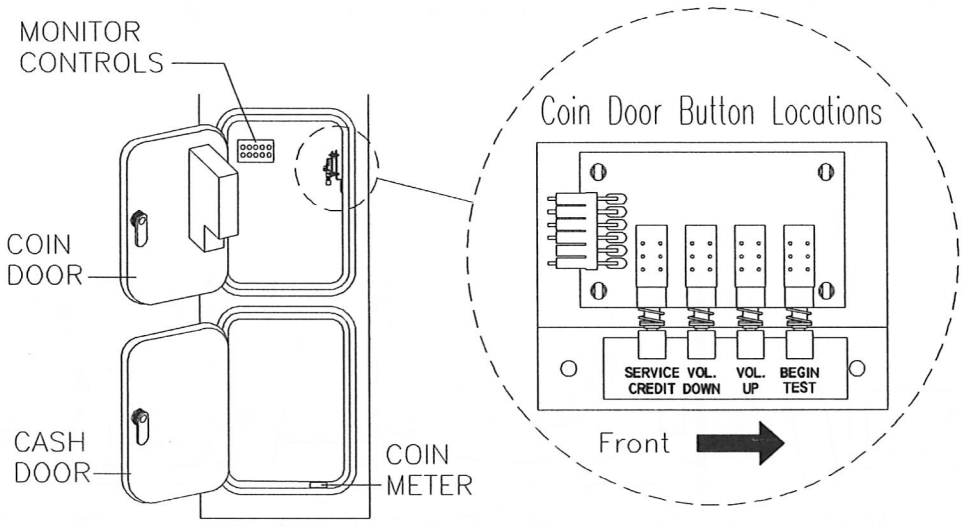
For greater profits, adjust your volume levels to a loud setting to draw attention to this game.

- **Begin Test Button**
  The **Begin Test** push-button switch enters the menu system. Press the Begin Test button briefly to run the automatic tests. Press and hold the Test button to get to any of the menu selections.

- **Service Credit Button**
  The **Service Credit** push-button switch allots credits without changing the game's bookkeeping total.

NOTE

The coin door must be open to reach the control switches.



CONTROL SWITCH LOCATIONS

MENU SYSTEM

SYSTEM OVERVIEW

A series of on-screen menus present 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. Both the operator controls and the player controls are used to move through the menus and start or stop particular routines.

Each time the game is switched from normal play mode to the menu system and back, the self-diagnostic routine is activated. These basic tests run automatically; their purpose is to detect those faults that would prevent the game or the menu system from operating properly. Messages appear on the screen as each item is run, along with any errors detected. A successful self-test usually takes less than one minute to complete. Write down any messages before proceeding to the menus or game play.

SCREEN LAYOUT

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

The color bar at the top center of each screen displays the current menu title.
The center of the screen is used for data (*e.g.* menu items, video signals, statistics, reports)
The bottom of the screen is for messages (*e.g.* explanations, control functions, revision levels)

ORGANIZATION

The menu system must be activated manually. It must also be deactivated manually to play the game.

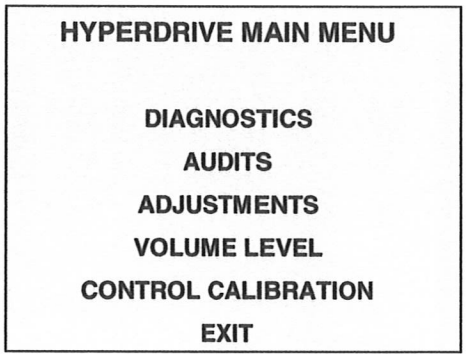
Main Menu screen items are divided into categories: tests, statistics, audits, adjustments, etc.

Tests can verify proper operation of the many equipment assemblies one at a time.
Other items allow operators to assess game performance and customize options or return to defaults.

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 command the system to get results or to make changes. There is always a way to go back to the previous menus from this screen.

Control functions are listed on screen. Use the VIEW 1 and VIEW 2 buttons to move through items on any menu. *Only one highlighted item can be selected at a time.* Press the START button to select a highlighted item. To return game to normal, use the buttons to select EXIT, then press the START button.

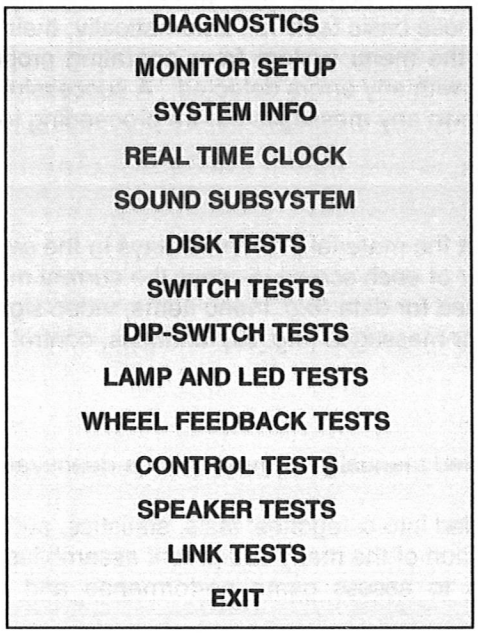


MAIN TEST MENU

DIAGNOSTICS

These tests allow the operator to verify the condition of the electrical and electronic hardware in the game.

To select these tests, use the VIEW 1 or VIEW 2 buttons to move up or down to any DIAGNOSTICS test. When the item is highlighted, press the START button to activate it. The screen displays the sub menu. Use the same steps to activate any one of the items listed.



DIAGNOSTICS SUB-MENU

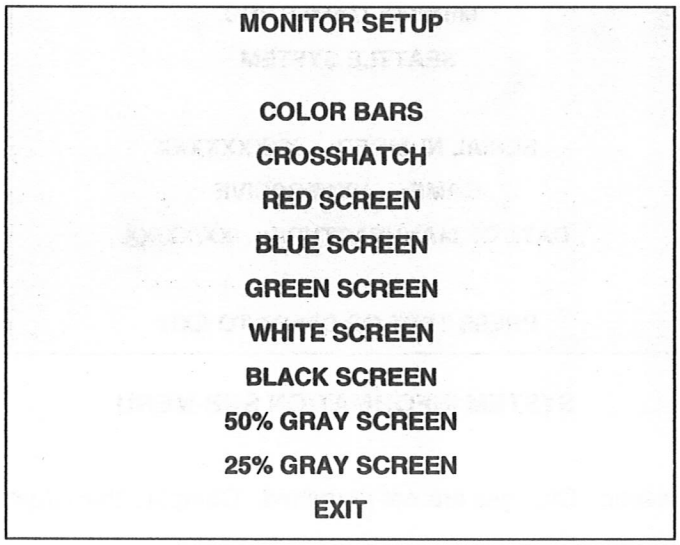
Detail menus are described on the following pages. Return to this menu and EXIT to begin game play.

MONITOR SETUP

The Monitor Setup routines provide test screens to verify monitor performance or make adjustments.

NOTE: This game uses a medium resolution monitor. The increased resolution means that more video information is displayed on the screen. If screen uniformity is incorrect, use an industrial grade degaussing coil on the monitor before attempting any corrections to monitor adjustments.

Highlight the test by using VIEW 1 or VIEW 2 to select the option; then press START to activate it.



MONITOR SETUP SUB-MENU

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.

There are 31 levels of intensity displayed in each color bar. Incorrect adjustment can cause detail to be missing at the top or bottom of a bar. Set the controls so that all levels are visible in every color bar.

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

CROSSHATCH fills the screen with a grid pattern and a series of dots. The grid and the dots should be all white, with no fringes or parallel images. The lines should be straight and the dots round.

Consult the monitor manufacturer's service literature for details on these adjustments.

The Crosshatch patterns are useful in verifying the monitor convergence, linearity, and dynamic focus.

Color Screen tests (red, green, blue) fill 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. Keep external magnetic fields away from the game during these tests.

The Color Screen tests are useful in verifying monitor intensity, black level, blanking and color purity.

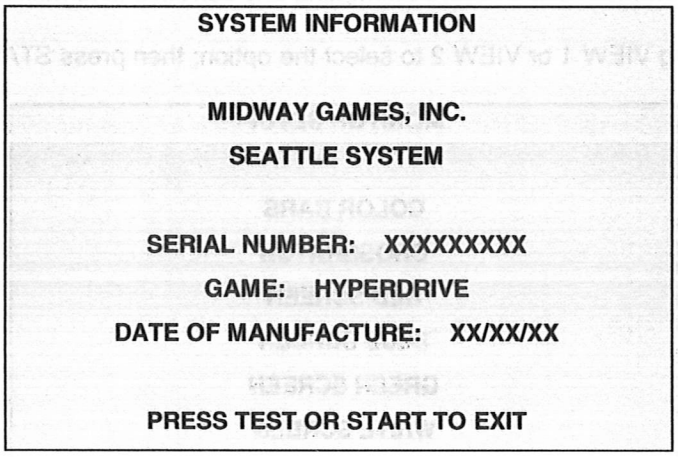
Color Screens may not hold their uniformity if the monitor degaussing circuit is defective.

WHITE, GRAY AND BLACK SCREENS fill the screen with black, gray or white at various intensities. The screens should be uniform with no color tints or distortion. There should be no retrace lines or noise.

If any of the tests shows a need for adjustment, use the indicated controls on the Monitor Controls board.

SYSTEM INFORMATION

The System Information screen shows the current version numbers of the hardware and software installed in this game. Use these numbers to describe the system during parts replacements, service calls, etc.



SYSTEM INFORMATION SUB-MENU

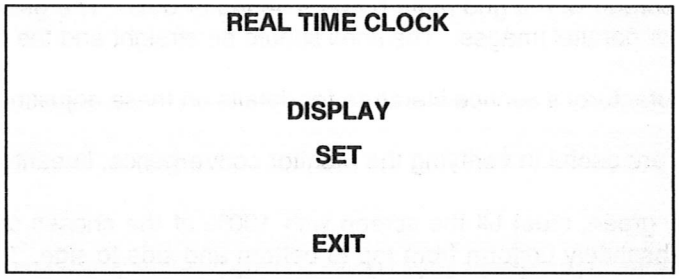
This screen reports information. Changes are not permitted. Compare this information for linked games.

The title line identifies the manufacturer of this game and the electronic board set used in this product.

The Serial Number, Game, and Date of Manufacture identify the game name and production run.

REAL TIME CLOCK

The Real Time Clock provides the current date and time for the game. This screen also allows operators to adjust the clock for changes in time zones, clock resets, etc.



REAL TIME CLOCK SUB-MENU

The clock is used to provide accurate game statistics. The clock does not affect the game operation.

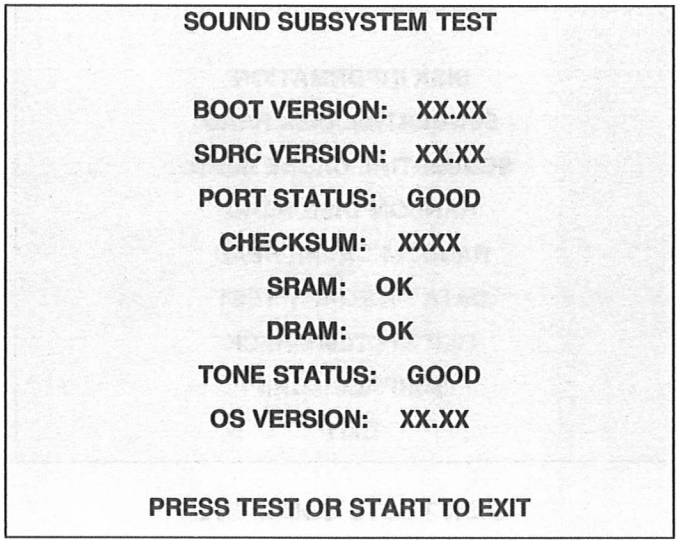
Select DISPLAY to view the current system time. Choose SET to change the time to a different value.

Once set, the clock will run until the battery dies, or circuits are disrupted by service or some major fault. Periodically examine the top lines of the SELF TEST screen for the correct time and date.

SOUND SUBSYSTEM TEST

The Sound Subsystem Tests verify that the audio components are connected and operating properly.

NOTE: Check the volume setting before testing. Increase the volume level to fully test the speakers. Remember to return the volume to its previous level after the sound tests are concluded.



SOUND SUBSYSTEM SUB-MENU

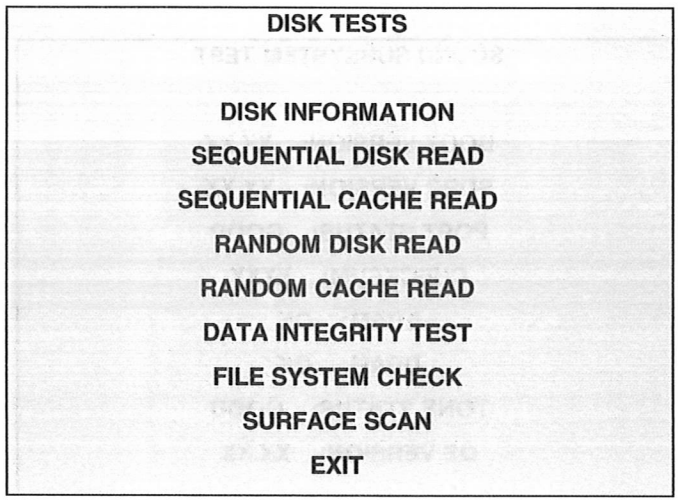
Version, status, checksum, and RAM reports are a series of diagnostic routines that analyze the digital sound circuits. The results of the tests will be reported as numbers or messages; sounds may also accompany some of the tests. Reports other than GOOD or OK may indicate a problem has been found.

The Sound Subsystem Tests are useful in locating digital circuit difficulties, especially when there is no sound from the speakers with the volume set at high levels. These tests detect sound memory problems.

DISK TESTS

The Disk Tests allow the operator to verify the functions of the Hard Disk Drive Assembly.

Highlight the test by using a View button to select the option; then press the Start button to activate.



DISK TESTS SUB-MENU

Disk Information

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.

Sequential Disk Read

This routine tries to access every bit of data in the order it is stored directly on the disk. The hard disk drive media may be defective if this routine cannot be completed successfully.

Sequential Cache Read

This routine tries to access every bit of data in the order it is stored in the temporary disk memory cache. There may be a fault in the memory circuits if this test is not successful.

Random Disk Read

This routine tries to access every bit of data in no particular order directly from the disk. This test may detect problems with ability to position the drive heads accurately over the requested data.

Random Cache Read

This routine tries to access every bit of data in no particular order from the temporary disk memory cache.
There may be a fault in the memory circuits if this test is not successful.

Data Integrity Test

This test will analyze the data on the disk drive. This test determines if corrupted data is on the disk. Bad data can cause the program to falter even though the hard disk drive is operating correctly.

File System Check

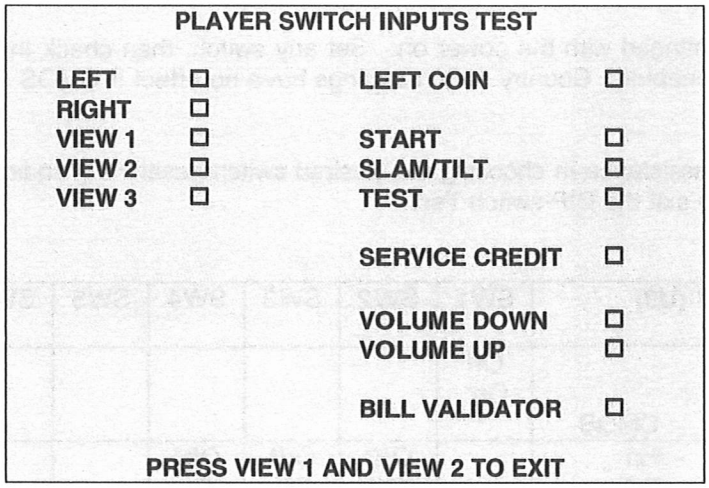
This routine will perform a file-by-file check of the data stored on the hard disk drive. If errors are detected the system tries to fix them, then checks the files again. A Surface Scan may remove some of the errors.

Surface Scan

The magnetic material on the disk can become damaged, causing data to be unreadable. This routine locates unusable areas on the disk and marks them for future reference.

SWITCH TESTS

To enter the test, use a joystick to select the Switch Test and the Start button to begin testing. Activate each switch and the indicator on the screen changes state. Release the switch and the indicator returns to its previous normally open or closed condition. Test the switches in any combination.



SWITCH TEST SUB-MENU

Player Controls are shown on the screen as colored boxes. Red boxes indicate an open switch state, green indicates closed switch contacts; any other color indicates a fault condition. Each control change should be exactly duplicated by a single indication on the menu screen.

The Player Controls Tests are used to verify crossed wires, intermittent conditions, and stuck switches.

Operator Controls are shown on the screen as they are found on the coin door. Colors are the same as above. Each switch change should be exactly duplicated by a single indication on the menu screen.

The Operator Controls Tests are used to verify crossed wires, intermittent conditions, and stuck switches.

The Coin and Cabinet Switches are shown on the screen without regard for their actual game location. Each switch change should be exactly duplicated by a single indication on the menu screen.

These Switch Tests are used to verify crossed wires, intermittent conditions, and stuck switches.

DIP-SWITCH TEST

The DIP-Switch Test allows operators to check the position of the two 8-position DIP-switches on the CPU Board. The operator can also change the setting of any DIP-switch without removing the metal cover.

To enter the test, use a View button to select the DIP-switch Test and the Start button to activate it. The screen displays an illustration of each switch block and the current settings.

DIP-switches may be changed with the power on. Set any switch, then check the screen to verify that the new setting is now enabled. Country switch settings have no effect if CMOS Coinage Control is set to On.

Refer to the charts for assistance in choosing the desired switch positions (* indicates factory defaults). Press the Start button to exit the DIP-switch Test.

DIP Switch 1 (U9)	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
Coinage DIPSwitch Control CMOS	Off On*							
USA1 Ger1 Fr1 USA2 Ger2 Fr2 USA3 Ger3 Fr3 USA4 Ger4 Fr4 USAECA GerECA FrECA N/U N/U N/U N/U N/U N/U Free Play Free Play Free Play		Off* Off Off Off On On On On	Off* Off On On Off Off On On	Off* On Off On Off On Off On				
USA French German Unused					Off* On Off On	Off* Off On On		
Unused Unused							Off* On	
Power Up Test Loop One Time Power Up Test Loop Continuous								Off* On

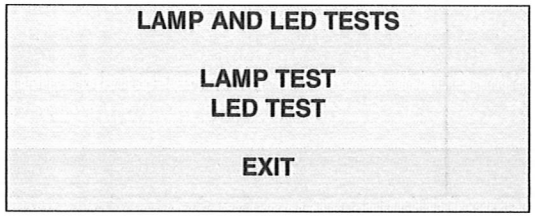
DIP Switch 2 (U8)	SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
Unused Unused	Off On*							
Graphics Mode 400 x 256 15KHz Graphics Mode 512 x 256 15KHz		Off On	Off Off					
Graphics Mode 512 x 384 25KHz Graphics Mode 512 x 384 31KHz		Off* On	On* On					
Graphics Speed 51MHz Graphics Speed 49MHz				Off On	Off Off			
Graphics Speed 47MHz				Off On*	On On*			

Graphics Speed 45MHz						
Unused Unused				Off* On		
Power Up Test Active Power Up Test Inactive					Off* On	
Game Manual Mode Fixed						Off* On

LAMP AND LED TESTS

The LAMP and LED tests verify the operation of the indicators in the dashboard assembly. If an optional Deluxe Linking Overhead Sign Kit has been installed, the incandescent indicators can also be checked.

Select either of the tests and follow the on-screen instructions. Press the START button to end the tests.



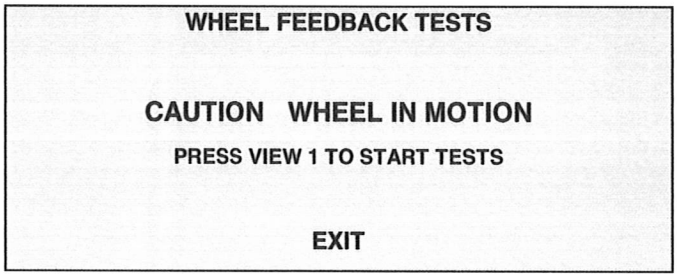
LAMP AND LED TEST SUB-MENU

The LAMP TEST illuminates the incandescent lamps while displaying the game location on-screen. Indicators may be tested individually or all at one time. The group test allows brightness comparisons.

The LED TEST illuminates each of the control pod LEDs while displaying the LED number on screen. Indicators may be tested individually or all at one time. The group test allows brightness comparisons.

WHEEL FEEDBACK TESTS

The WHEEL FEEDBACK TEST allows the operator to test the responsiveness of the steering mechanism.



WHEEL FEEDBACK TEST SUB-MENU

This test should be run periodically to ensure that the mechanism is providing the correct amount of steering force to suit the players. Use this test to assess the effects of feedback strength adjustments.

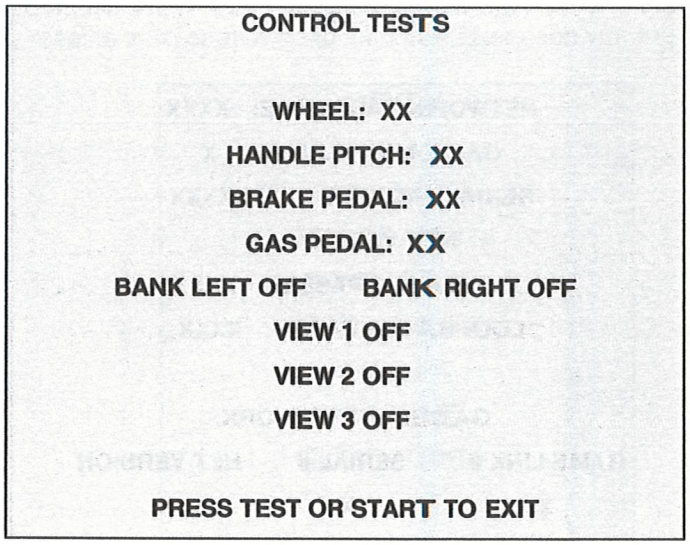
Before proceeding, make sure hands and any other objects are clear of the steering mechanism. After one full left/right cycle, the operator may restrain the mechanism by hand to assess the feedback force. If adjustments to force are made, repeat this test to confirm the strength setting is optimum for players.

Press VIEW 1 to begin the WHEEL FEEDBACK TEST. The wheel will turn full right and full left. The test takes about one minute to complete. When finished, a "Test Completed" message appears on screen.

CONTROL TESTS

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

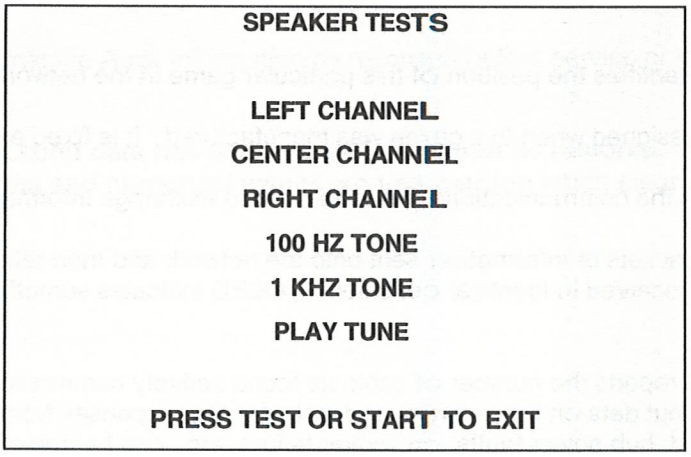
As controls are activated, the screen indicator changes. Releasing the control returns the indicator to the previous condition. Controls may be tested in any combination. Press TEST or START to end the tests.



CONTROL TEST SUB-MENU

SPEAKER TESTS

The SPEAKER TESTS provide audio signals to test the loudspeakers. Use these tests to verify operation of the audio system components. Select one of the tests and press START to begin the test.



SPEAKER TEST SUB-MENU

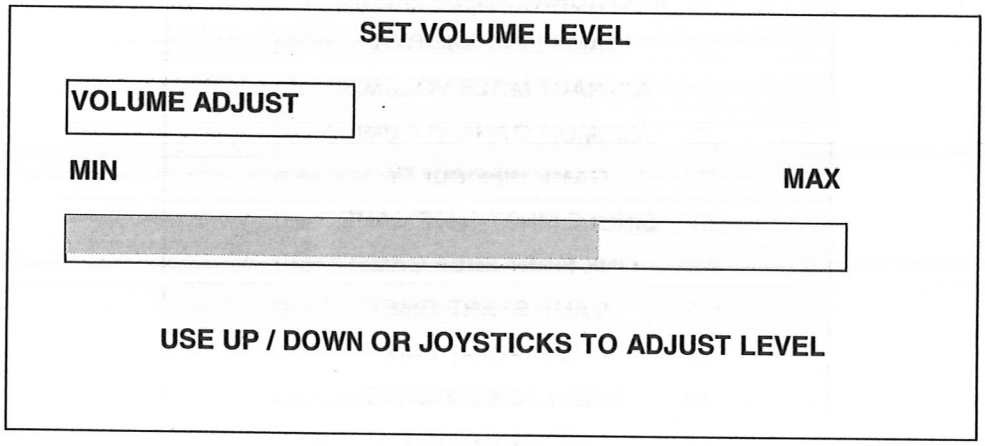
The channel tests use voices to verify speaker locations. Use the 100 Hz tone to check the sub-woofer.

PLAY TUNE test uses game sounds to check that the speakers are correctly phased. "Muddy", weak or distorted sound quality during this test may indicate crossed or out-of-phase connections to the speakers.

NOTE: Check the volume setting before testing. Increase the volume level to fully test the speakers. Remember to return the volume to its previous level after the sound tests are concluded.

VOLUME LEVEL

Activating this screen causes music to play continuously. Use VIEW 1 and VIEW 2 or the volume buttons to change the sound level of the game. Press START to save the setting and return to the Main Menu.



VOLUME LEVEL SCREEN

Loud games attract more player interest than low levels. The Attract sound level is lower than game play level; however, this relationship may be changed if desired (refer to Additional Adjustments).

The Attract sound can be turned On or Off without changing the game volume level (see Adjustments).

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 from the speakers during any of the audio tests. It is recommended that the volume levels be set to a moderately high value each time the sound portion of the game or the speakers are checked. The levels may be returned to their previous settings after the tests have been completed.

CONTROL CALIBRATION

The CONTROL CALIBRATION sets the travel limits for the steering, tilt, gas pedal, brake pedal, etc. Press START to begin. The controls must be calibrated in the sequence shown.

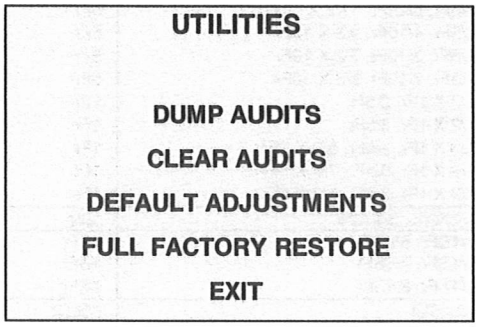
Follow the on-screen instructions. Remove hands and feet from all controls. Move the indicated control to the requested position and hold it steady while the computer records this data. The values will be stored in memory as a reference for the game program to use during actual play.

It is important to recalibrate the controls regularly to keep the vehicles handling well. Top players are only as good as their equipment lets them be. Inaccurate controls frustrate players and reduce profits.

UTILITIES

The Utilities menu items are used to clear the game bookkeeping memory and to reset factory defaults.

Highlight Utilities by using a VIEW button to select this option. Press the START button to activate it.



UTILITIES SUB-MENU

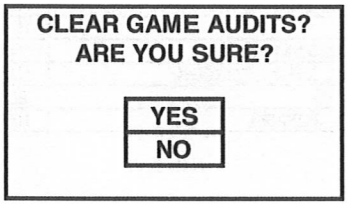
DUMP AUDITS is used to extract data during factory tests. It does not change any audit information.

CLEAR AUDITS allows individual or all audit information to be reset. Record the data before clearing it.

DEFAULT ADJUSTMENTS removes any custom settings and returns all adjustments to factory values.

FULL FACTORY RESTORE changes every game variable back to its original setting. All data is lost.

After an item has been selected, you are given the opportunity to escape from this change. For example:



LAST CHANCE SUB-MENU

Once any clear function is selected and verified, the values are immediately reset and cannot be restored.

Examine and record all game audit values before making any changes.

STANDARD PRICING TABLE

NAME	START	CONTINUE	CREDITS/COIN	COIN 1	COIN 2	COIN 3	COIN4	BILL
USA1	2	2	1/25¢	.25¢	.25¢			$1.00
USA2	2	1	1/25¢	.25¢	.25¢			$1.00
USA3	1	1	1/25¢	.25¢	.25¢			$1.00
USA4	1	1	1/50¢, 3/$1.00	.25¢	.25¢			$1.00
USA5	2	1	1/50¢, 4/$1.00	.25¢	.25¢			$1.00
USA6	1	1	1/50¢	.25¢	.25¢			$1.00
USA7	1	1	1/50¢, 3/$1.00	.25¢	.25¢			$1.00
USA8	2	2	1/50¢, 4/$1.00	.25¢	.25¢			$1.00
USA9	3	2	1/25¢, 4/$1.00	.25¢	.25¢			$1.00
USA10	3	3	1/25¢, 4/$1.00	.25¢	.25¢			$1.00
USA ECA	3	3	1/25¢, 4/$1.00	$1.00	.25¢	.10¢	.05¢	$1.00
GERMAN1	2	2	1/1DM, 6/5DM	1DM	5DM			
GERMAN2	2	1	1/1DM, 7/5DM	1DM	5DM			
GERMAN3	2	1	1/1DM, 8/5DM	1DM	5DM			
GERMAN4	2	1	1/1DM, 5/5DM	1DM	5DM			
GERMAN5	2	1	1/1DM, 6/5DM	1DM	5DM			
GERMAN ECA	2	2	1/1DM, 2/2DM, 6/5DM	5DM	2DM	1DM		
FRANCE1	2	2	2/5Fr, 5/10Fr	5Fr	10Fr			
FRANCE2	2	1	2/5Fr, 4/10Fr	5Fr	10Fr			
FRANCE3	2	1	1/5Fr, 3/10Fr	5Fr	10Fr			
FRANCE4	2	1	1/5Fr, 2/10Fr	5Fr	10Fr			
FRANCE5	2	1	2/5Fr, 5/10Fr, 11/2 X 10Fr	5Fr	10Fr			
FRANCE6	2	1	2/5Fr, 4/10Fr, 9/2 X 10Fr	5Fr	10Fr			
FRANCE7	2	1	1/5Fr, 3/10Fr, 7/2 X 10Fr	5Fr	10Fr			
FRANCE8	2	1	1/5Fr, 2/10Fr, 5/2 X 10Fr	5Fr	10Fr			
FRANCE9	2	1	1/3 X 1Fr, 2/5Fr	1Fr	5Fr			
FRANCE10	2	1	1/2 X 1Fr, 3/5Fr	1Fr	5Fr			
FRANCE11	2	1	1/3 X 1Fr, 2/5Fr, 5/2 X 5Fr	1Fr	5Fr			
FRANCE12	2	1	1/2 X 1Fr, 3/5Fr, 7/2 X 5Fr	1Fr	5Fr			
FRANCE ECA	2	2	1/3 X 1Fr, 2/5Fr, 5/2 X 5Fr	1Fr	5Fr	10Fr	20Fr	
CANADA	2	2	1/2X25¢, 3/$1.00	.25¢	$1.00			$1.00
SWISS1	2	2	1/1SFr, 6/5SFr	1SFr	5SFr			
SWISS2	2	2	1/1SFr, 7/5SFr	1SFr	5SFr			
SWISS3	2	2	1/1SFr, 8/5SFr	1SFr	5SFr			
ITALY	2	2	1/500Lit	500Lit	500Lit			
UK ECA1	1	1	1/50p, 3/£1.00	£1.00	50p	20p	10p	
UK ECA2	1	1	1/50p, 2/£1.00	£1.00	50p	20p	10p	
UK ECA3	1	1	1/30p, 2/50Pta, 5/£1.00	£1.00	50p	20p	10p	
UK4	1	1	1/50p, 3/£1.00	£1.00	50p			
UK5	1	1	1/50p, 2/£1.00	£1.00	50p			
SPAIN1	2	2	1/100Pta, 6/500Pta	100Pta	500Pta			
SPAIN2	2	2	1/100Pta, 5/500Pta	100Pta	500Pta			
AUSTRALIA1	2	2	1/3X20¢, 2/$1.00	.20¢	$1.00			
AUSTRALIA2	2	2	1/5X20¢, 1/$1.00	.20¢	$1.00			
JAPAN1	2	2	1/100Yen	100 Yen	100 Yen			
JAPAN2	2	2	2/100Yen	100 Yen	100 Yen			
AUSTRIA1	2	2	1/5Sch, 2/10Sch	5 Sch	10 Sch			
AUSTRIA2	2	2	1/2X5Sch, 3/2X10Sch	5 Sch	10 Sch			
BELGIUM1	2	2	1/20BF	20BF	20BF			
BELGIUM2	2	2	3/20BF	20BF	20BF			
BELGIUM3	2	2	2/20BF	20BF	20BF			
BELGIUM ECA	2	2	1/20BF	50BF	20BF	5BF		
SWEDEN	2	2	1/3X1SKr, 2/5SKr	1SKr	5SKr			
NEW ZEALAND1	1	1	1/3X20¢	20¢	20¢			
NEW ZEALAND2	1	1	1/2X20¢	20¢	20¢			
NETHERLANDS	2	2	1/1HFI, 3/2.5HFI	1HFI	2.5HFI			
FINLAND	2	2	1/1Fmk	1Fmk	1Fmk			
NORWAY	2	2	1/2X1NKr, 3/5X1NKr	1NKr	1NKr			
DENMARK	2	2	1/2X1DKr, 3/5DKr, 7/2X5DKr	1DKr	5DKr			
ANTILLIES	2	2	1/25¢, 4/1G	.25¢	1G			
HUNGARY	2	2	1/2X10Ft, 3/2X20Ft	10Ft	20Ft			

HYPERDRIVE™

SECTION TWO

PARTS

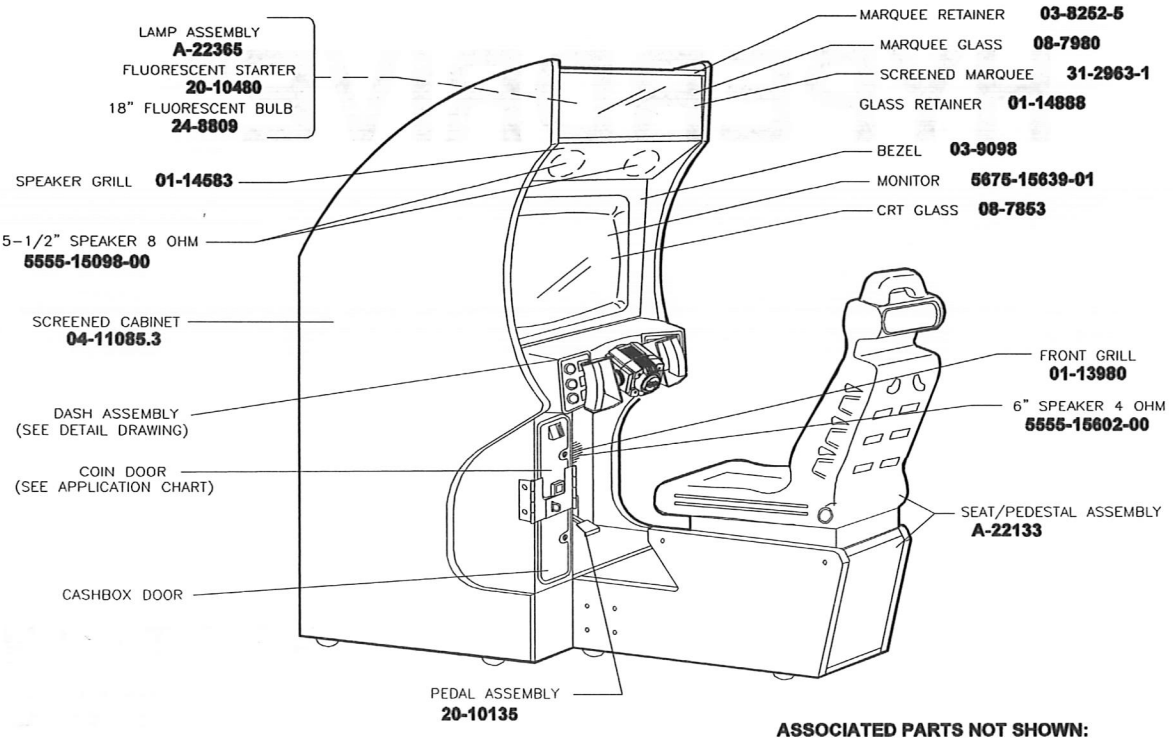
Warning

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

* For safety and reliability, substitute parts and modifications are not recommended.

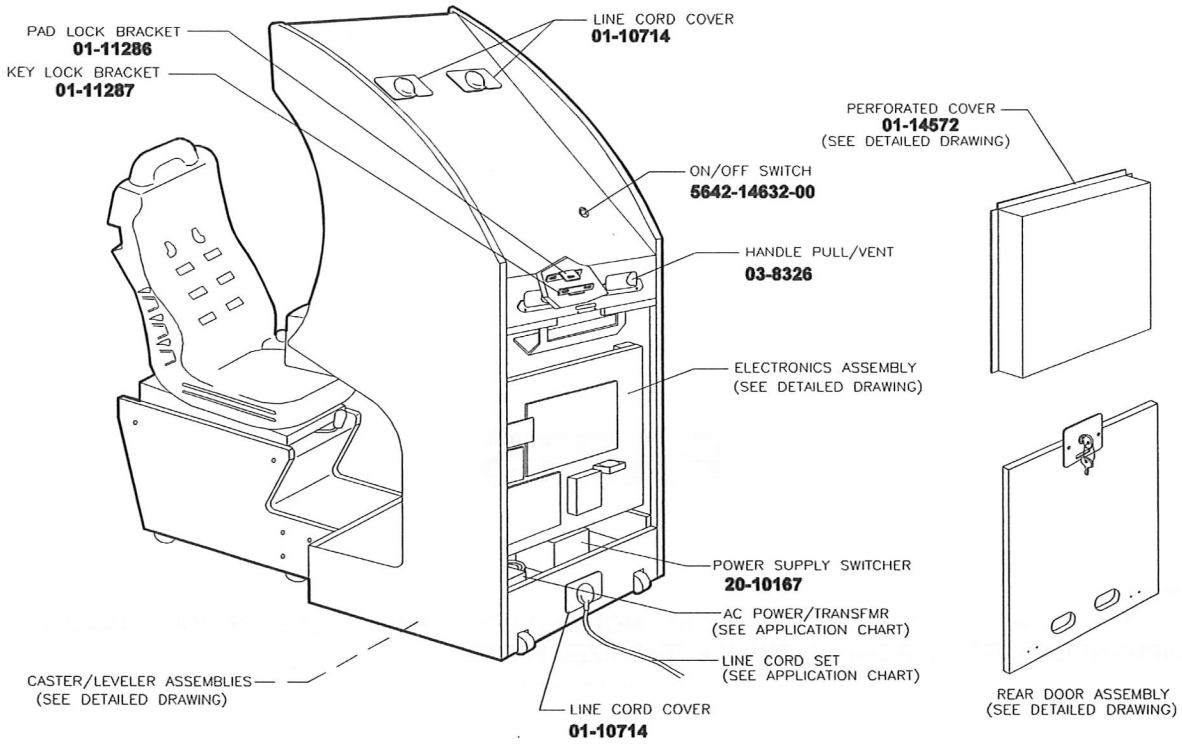
- Substitute parts or modifications may void FCC type acceptance.

HYPERDRIVE (40071) 25"

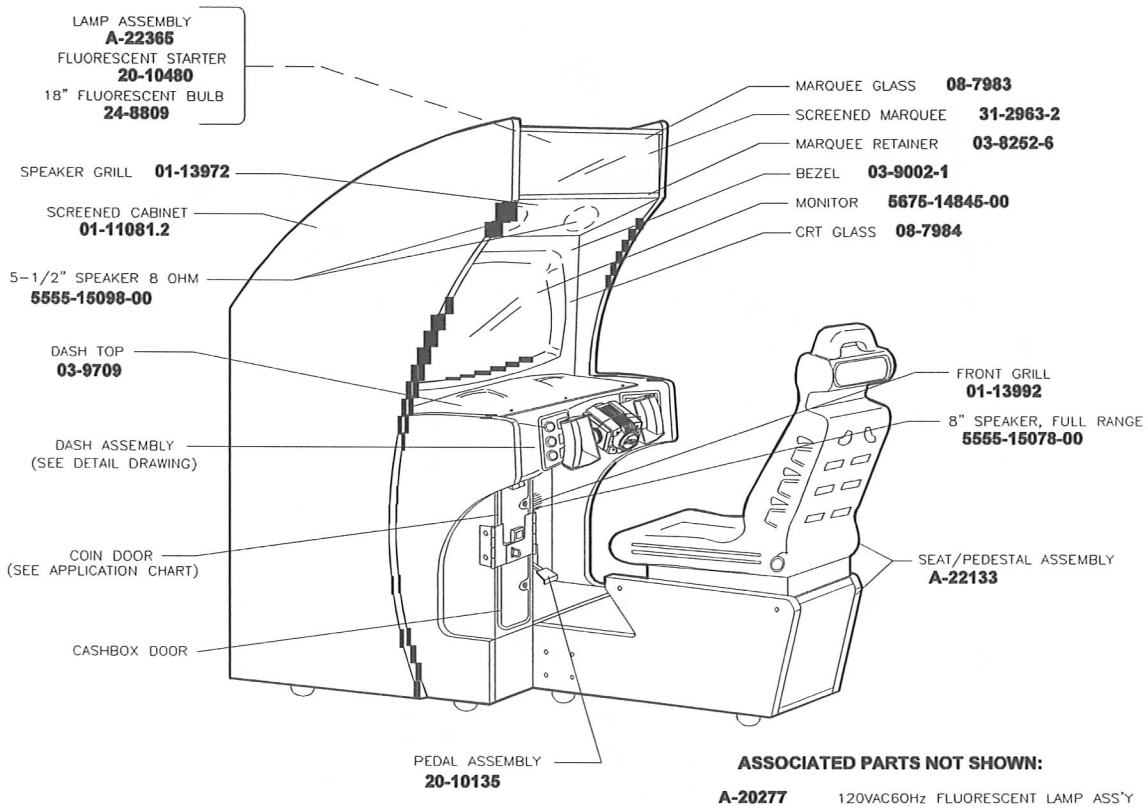


ASSOCIATED PARTS NOT SHOWN:

A-20277	120VAC60Hz FLUORESCENT LAMP ASS'Y
A-22365-3	230VAC50Hz FLUORESCENT LAMP ASS'Y
A-22365-4	100VAC60Hz FLUORESCENT LAMP ASS'Y
24-8874	ALTERNATE FLUORESCENT BULB

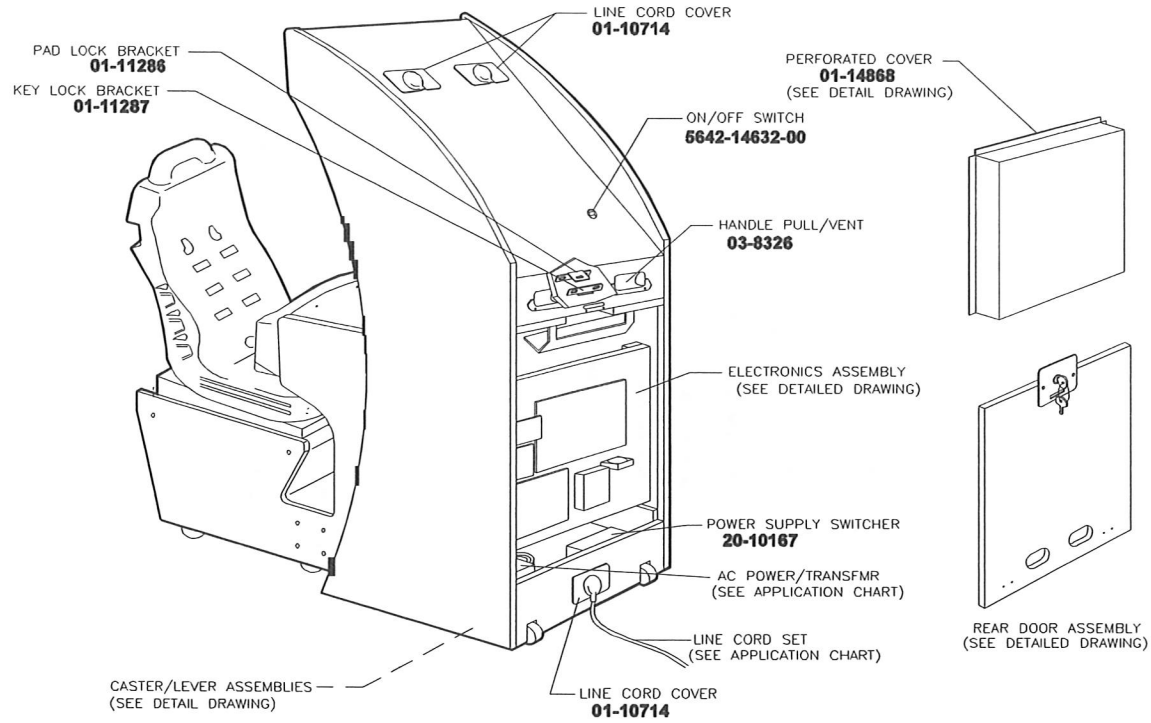


HYPERDRIVE (40079) 33"

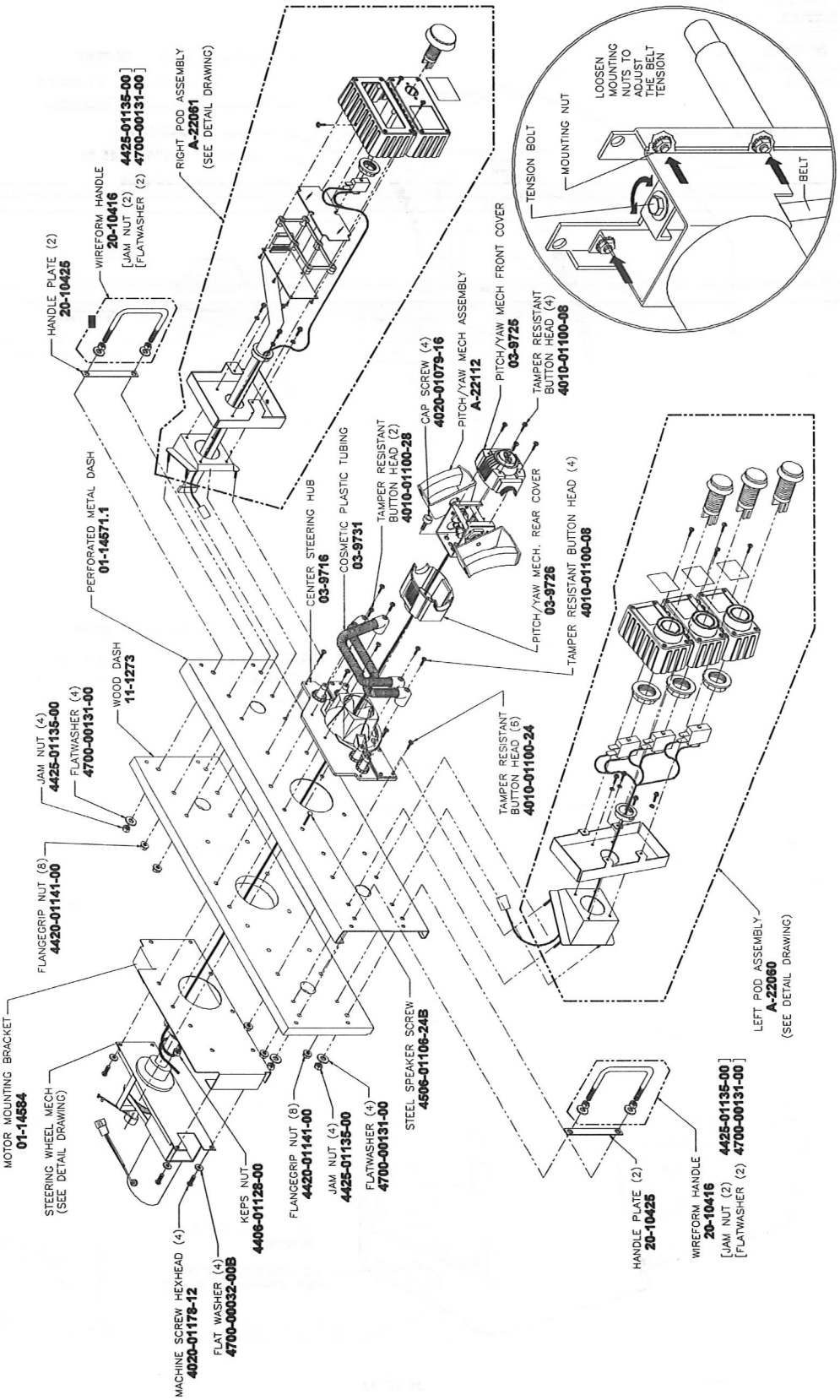


ASSOCIATED PARTS NOT SHOWN:

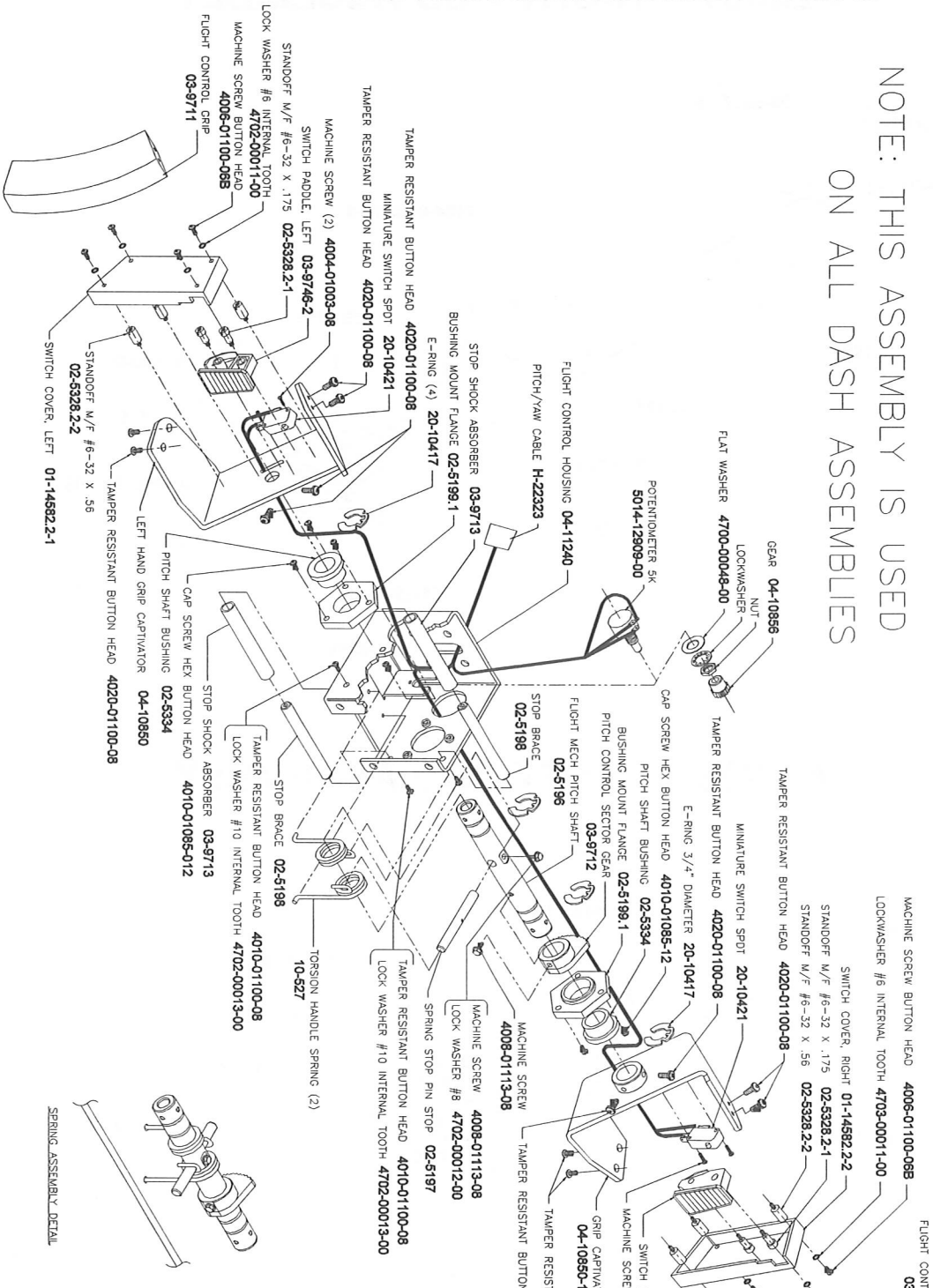
A-20277	120VAC60Hz FLUORESCENT LAMP ASS'Y
A-22365-3	230VAC50Hz FLUORESCENT LAMP ASS'Y
A-22365-4	100VAC60Hz FLUORESCENT LAMP ASS'Y
24-8874	ALTERNATE FLUORESCENT BULB



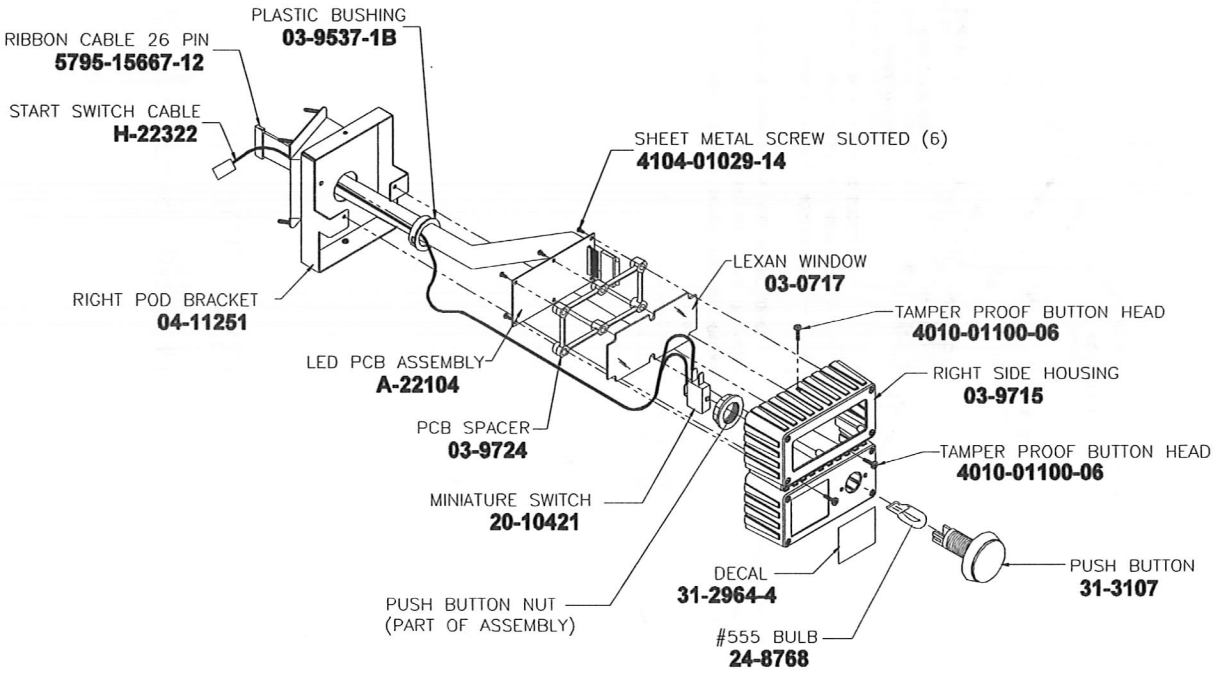
HYPERDRIVE 25" DASH ASSEMBLY A-22059
HYPERDRIVE 33" DASH ASSEMBLY A-22310



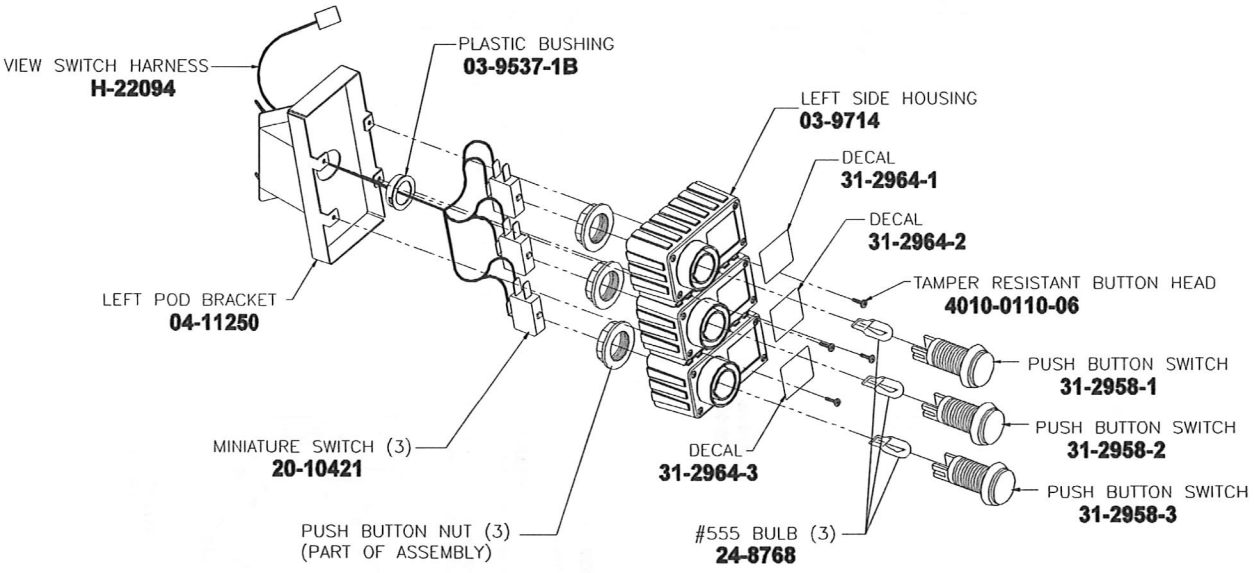
PITCH AND YAW YOKE MECHANISM ASSEMBLY A-22112



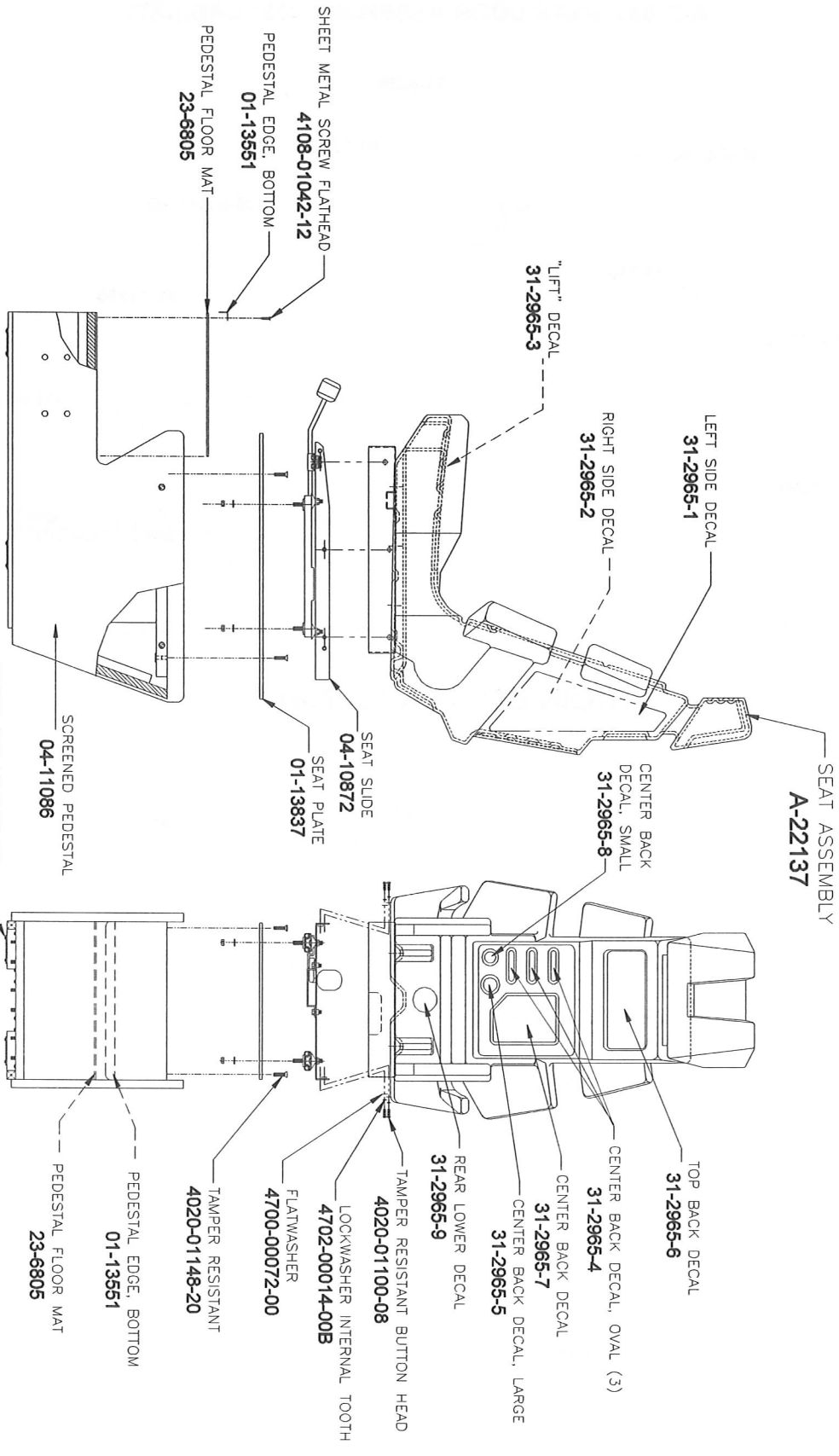
A-22061 RIGHT POD ASSEMBLY



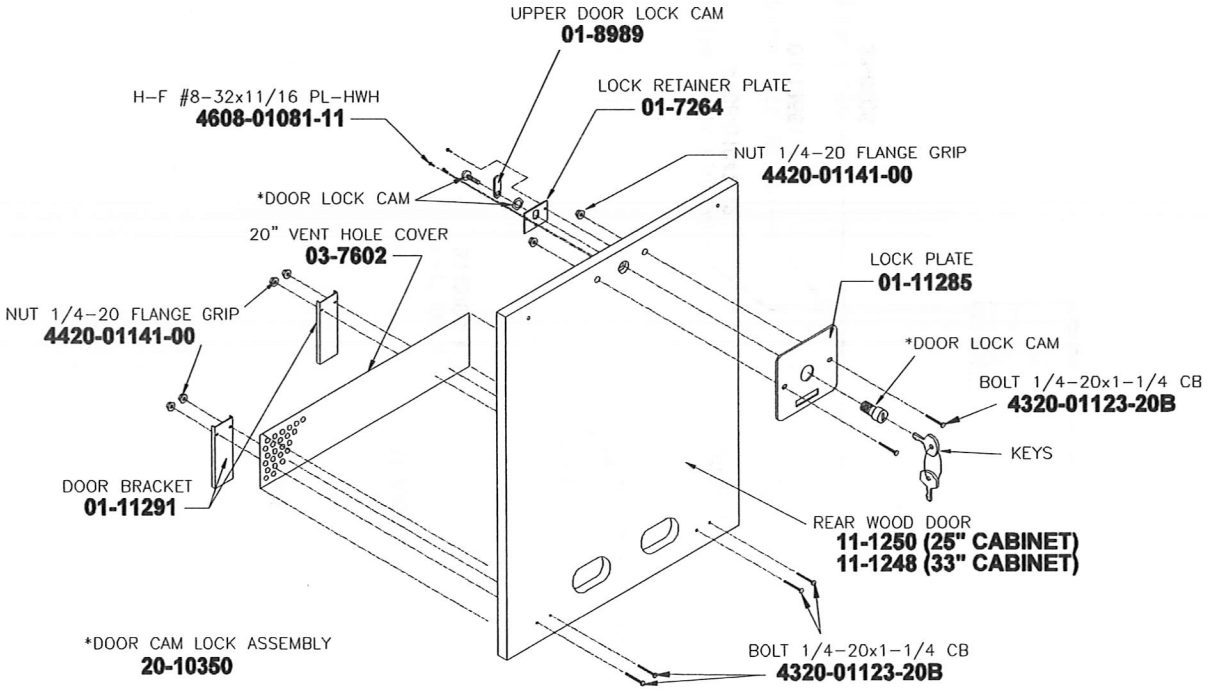
A-22060 LEFT POD ASSEMBLY



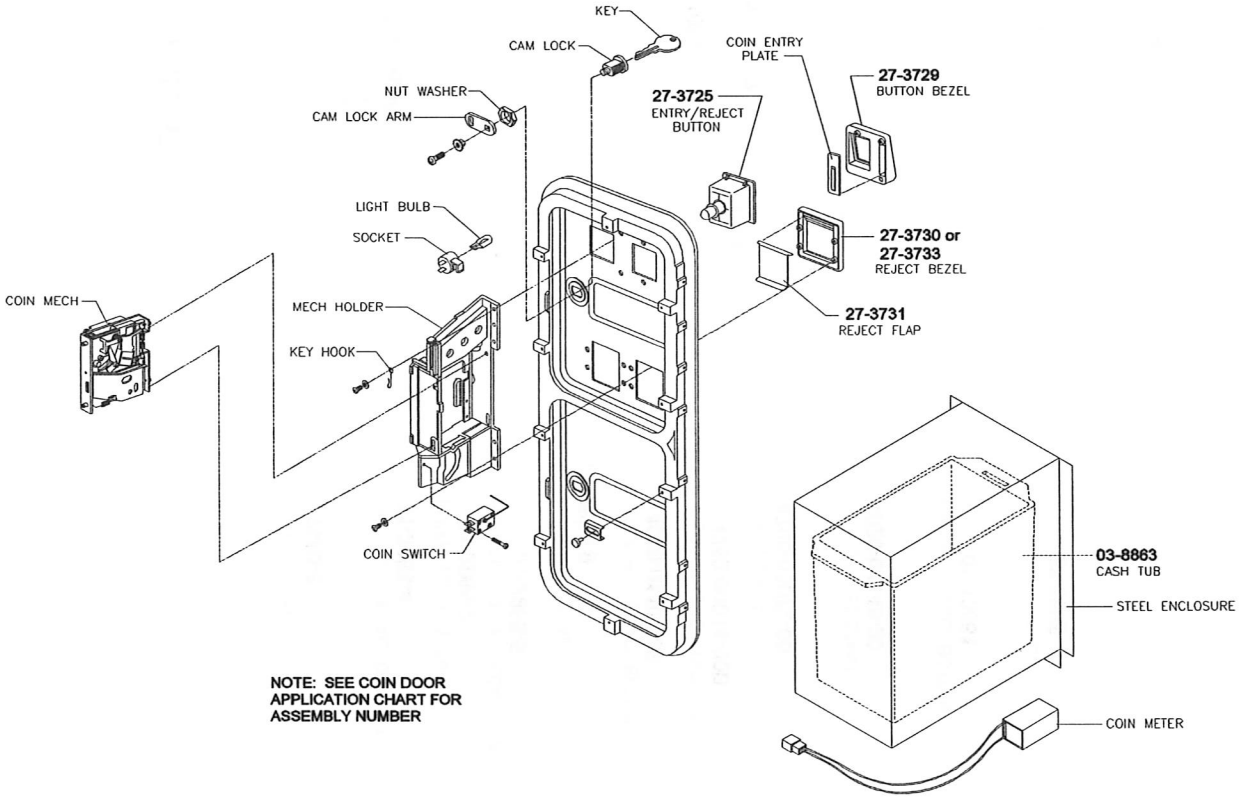
SEAT AND PEDESTAL ASSEMBLY A-22133



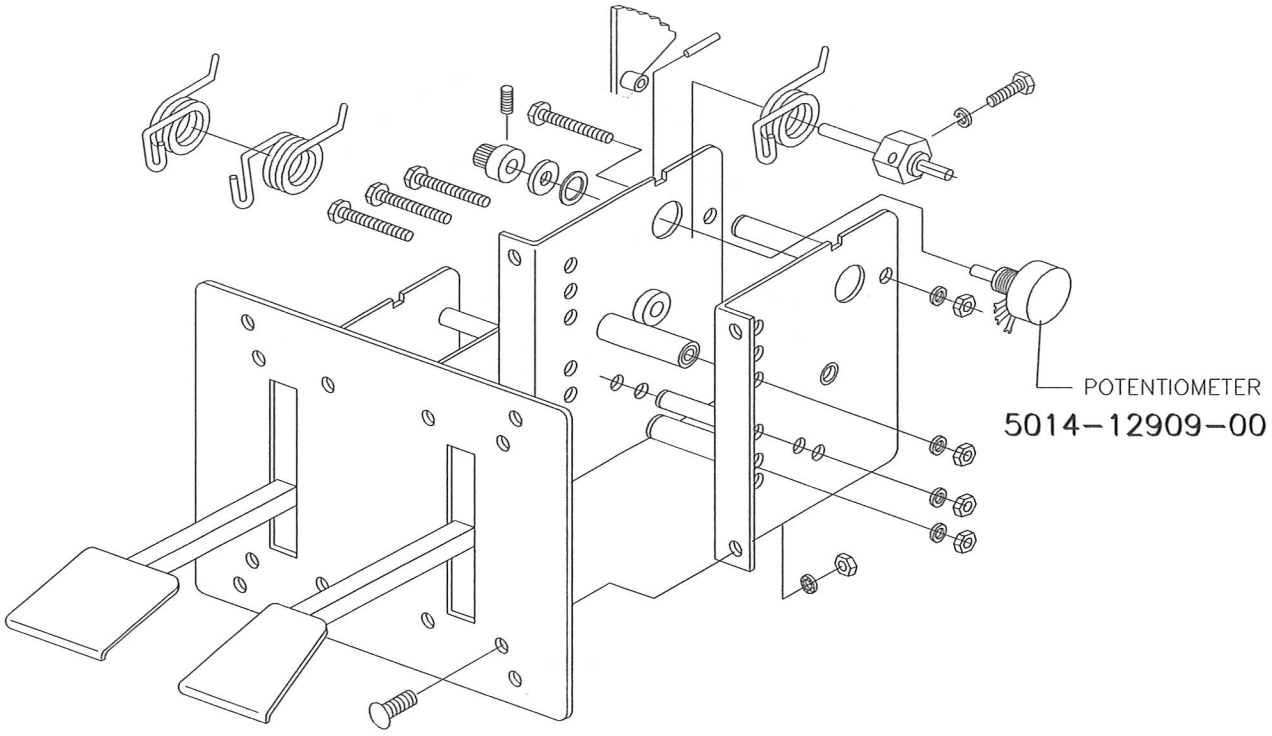
A-21071 REAR DOOR ASSEMBLY (25" CABINET)
A-21093 REAR DOOR ASSEMBLY (33" CABINET)



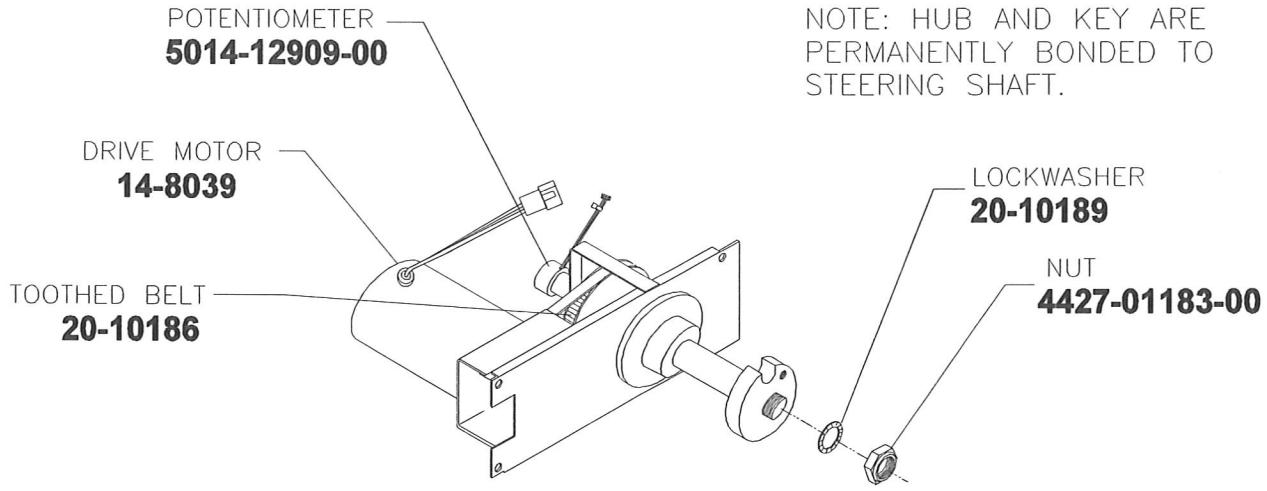
COIN DOOR ASSEMBLY



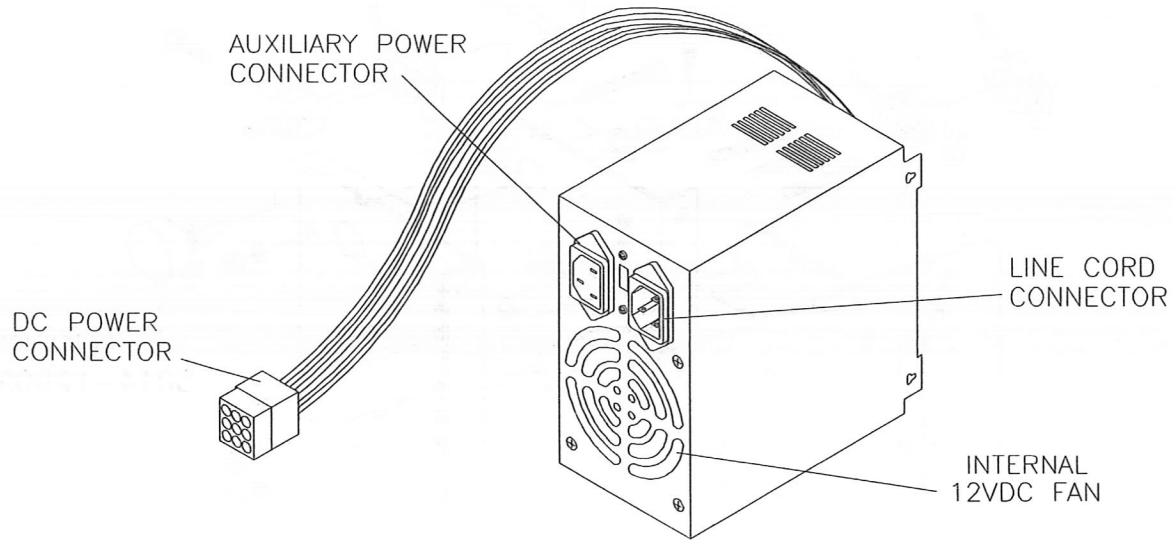
20-10135 PEDAL ASSEMBLY



STEERING MECHANISM



20-10167 POWER SUPPLY ASSEMBLY

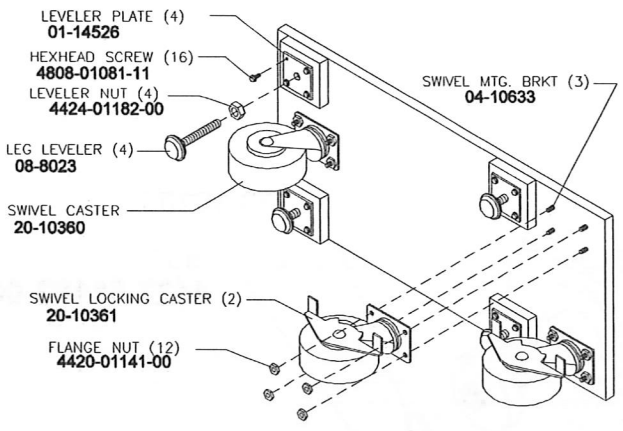


Pin #	Function	Wire Color
1, 2, 3	+5VDC	Red
4, 5, 6	Ground	Black
7	−5VDC	Yellow*
8	+12VDC	Orange*
9	−12VDC	Blue*

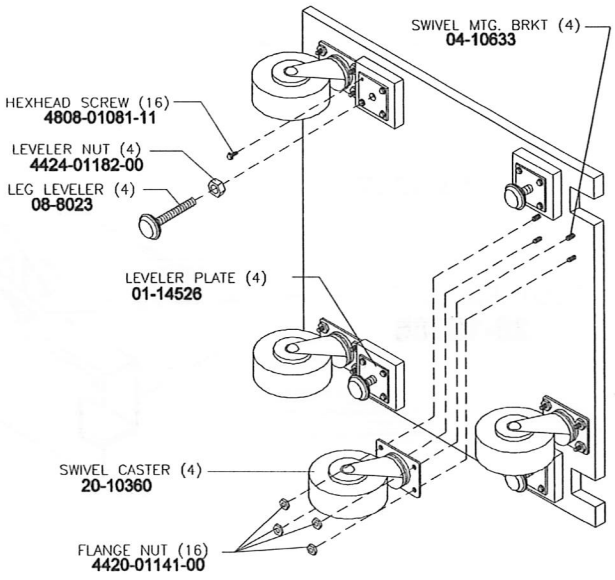
***Note:** Many computer grade power supplies use yellow for +12V, blue for −5V, and white for −12V. This is acceptable as long as the pinout is correct.

CASTER / LEVELER ASSEMBLIES (BOTH CABINET SIZES)

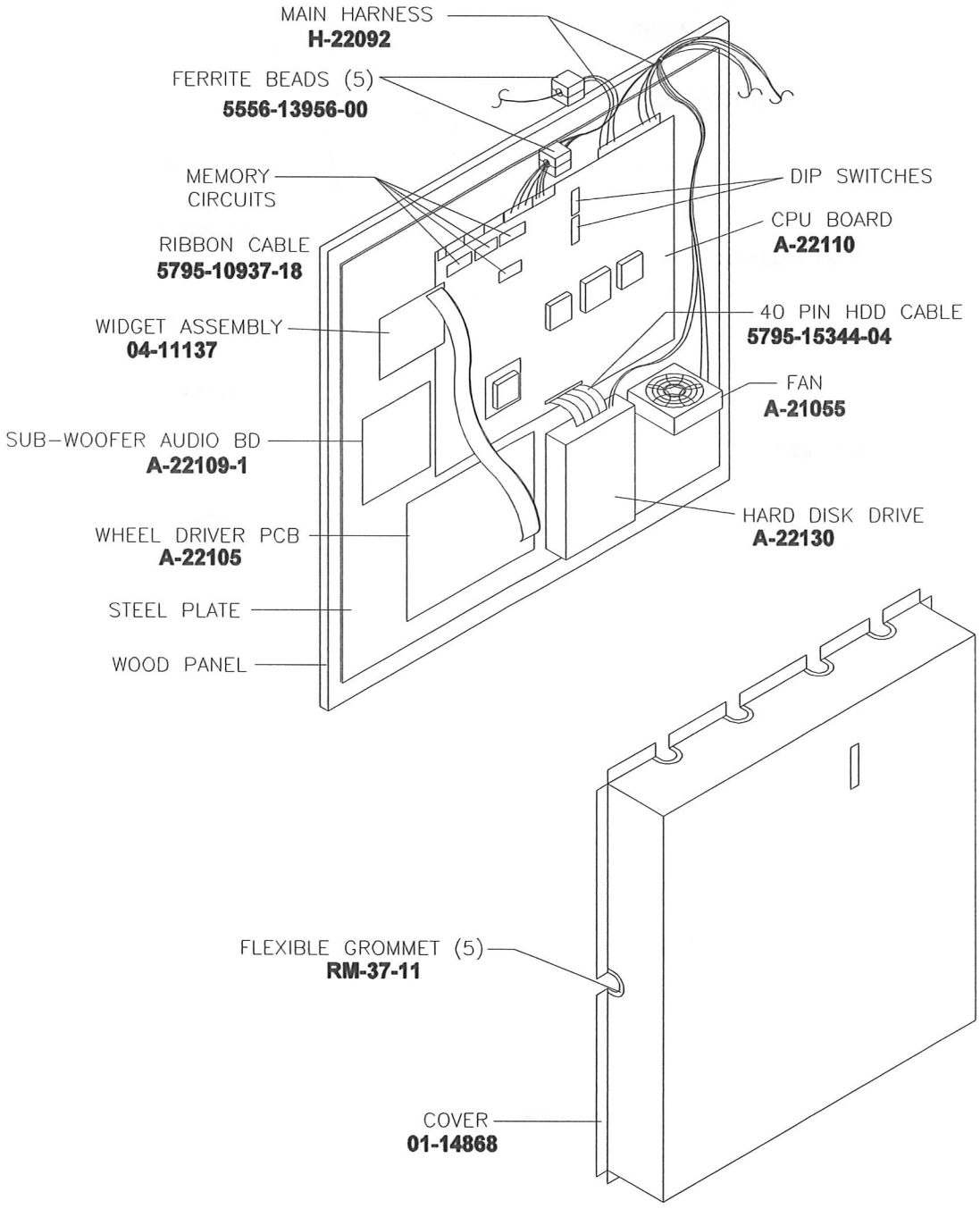
BOTTOM VIEW OF PEDESTAL ASSEMBLY



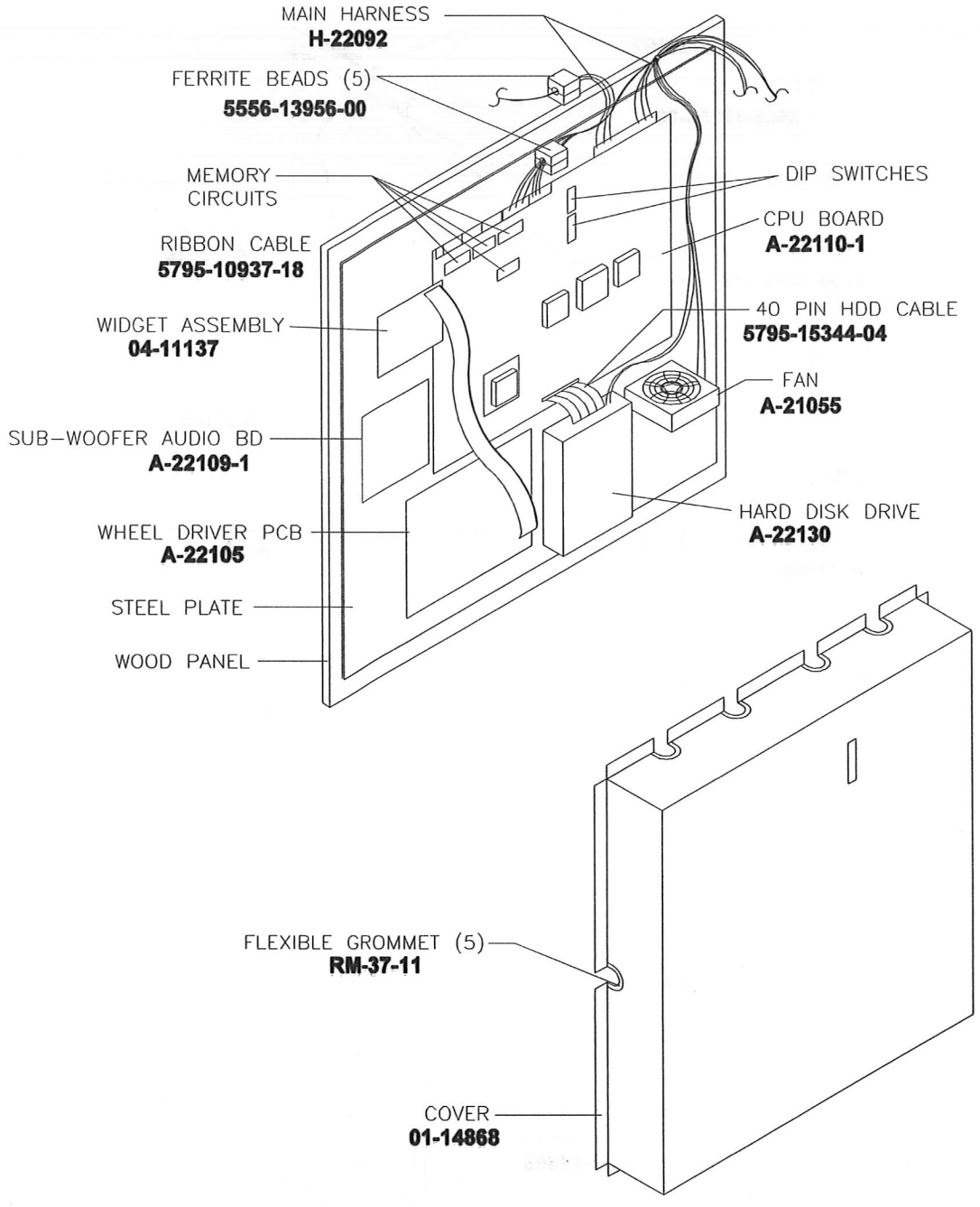
BOTTOM VIEW OF CABINET ASSEMBLY



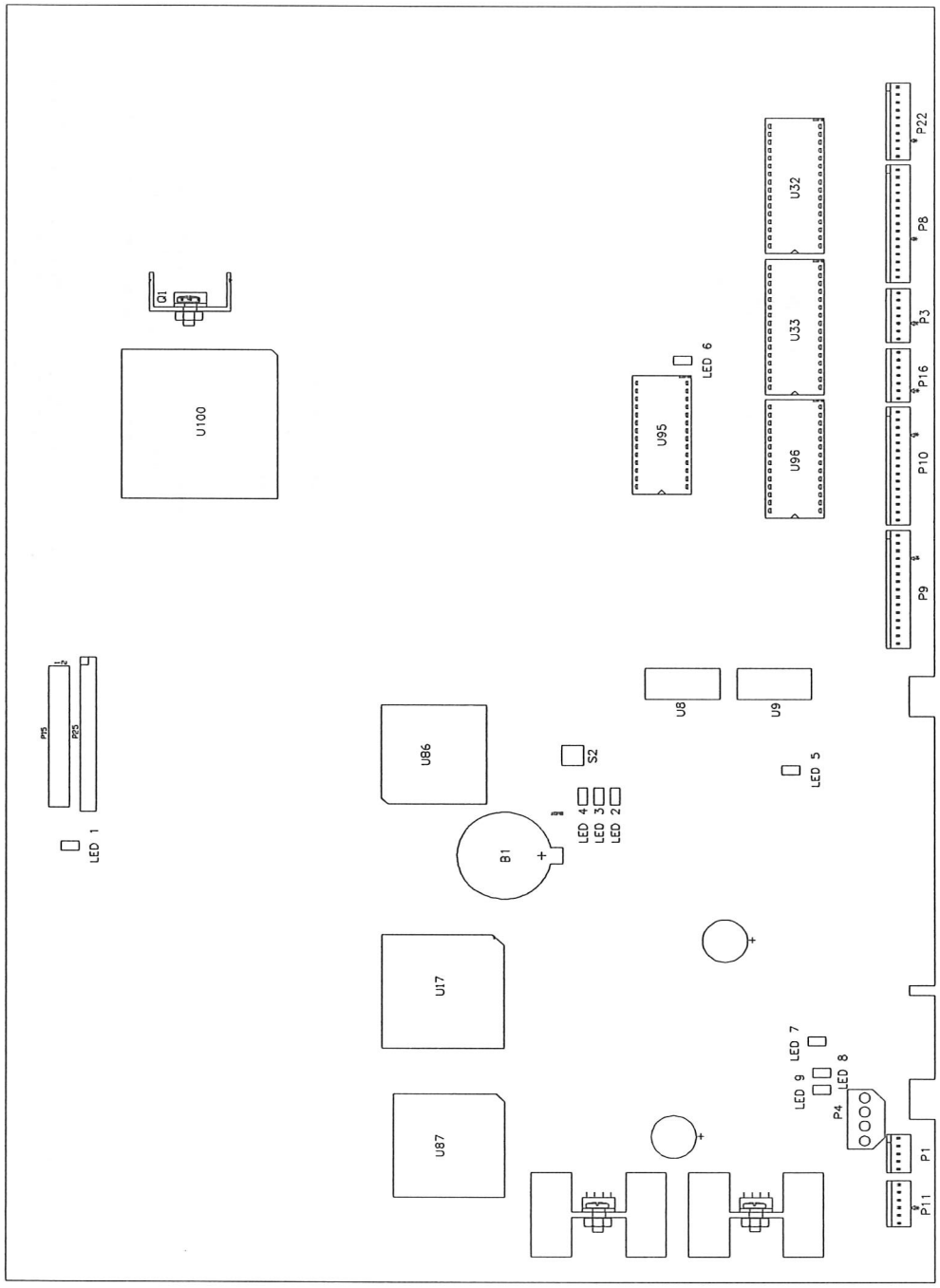
ELECTRONICS ASSEMBLY 25" A-22129



ELECTRONICS ASSEMBLY 33" A-22311



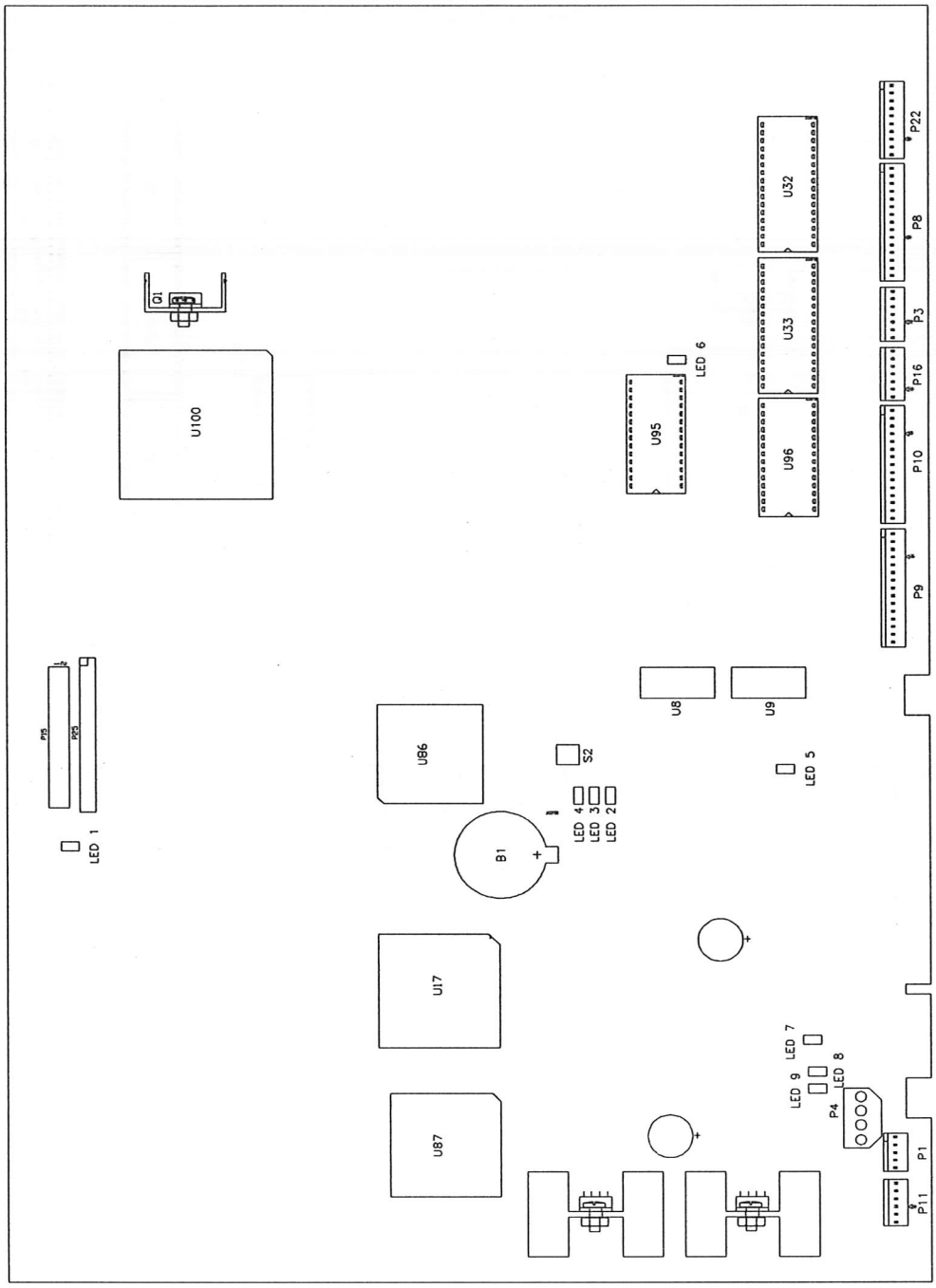
A-22110 CPU BOARD ASSEMBLY (25" CABINET)



Field Replaceable Parts

DESIGNATION	PART NUMBER	FUNCTION	DESCRIPTION
B1	**5880-11056-00**	Memory Backup	3Volt Lithium Battery
U32	**A-5343-40071-1**	CPU Boot ROM	EPROM Assembly
U33	**---**	Boot Expansion ROM	EPROM Assembly
U95	**A-5343-40071-2**	Sound Boot ROM	EPROM Assembly
U96	**A-21865**	Video PIC	EPROM Assembly
U100	**5400-15135-00**	Microprocessor	CPU Assembly

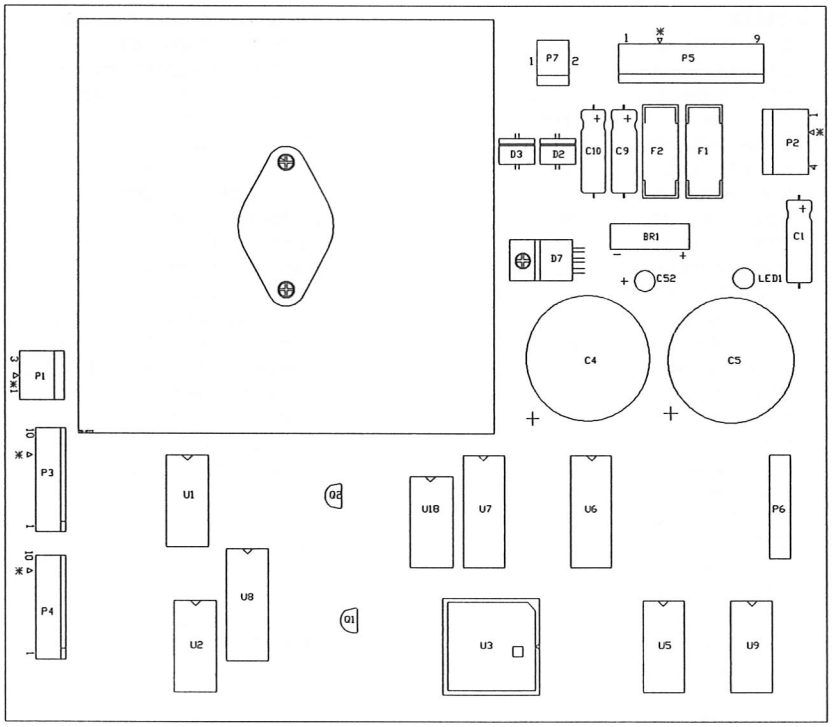
A-22110-1 CPU BOARD ASSEMBLY (33" CABINET)



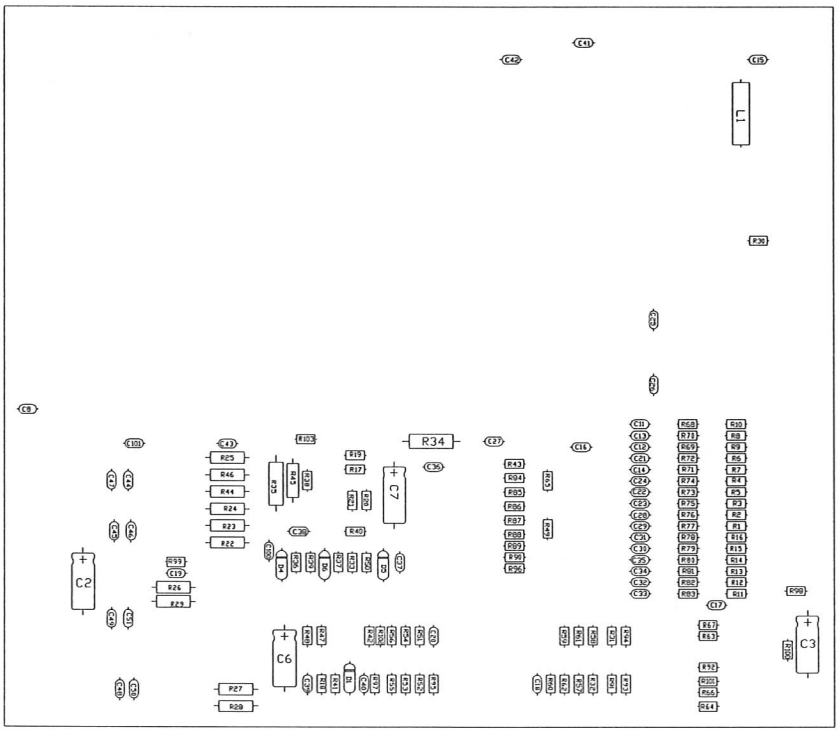
Field Replaceable Parts

DESIGNATION	PART NUMBER	FUNCTION	DESCRIPTION
B1	**5880-11056-00**	Memory Backup	3Volt Lithium Battery
U32	**A-5343-40079-1**	CPU Boot ROM	EPROM Assembly
U33	**---**	Boot Expansion ROM	EPROM Assembly
U95	**A-5343-40079-2**	Sound Boot ROM	EPROM Assembly
U96	**A-21890**	Video PIC	EPROM Assembly
U100	**5400-15135-00**	Microprocessor	CPU Assembly

WHEEL DRIVER BOARD ASSEMBLY
04-11134



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, ¼w, 5%
5010-13594-00	R18	Resistor, 1KΩ, 1/8w, 5%
5010-08931-00	R34, R35	Resistor, 1KΩ, ½w, 5%
5010-13372-00	R32	Resistor, 220Ω, 1/8w, 5%
5010-09999-00	R22-R29	Resistor, 2KΩ, ¼w, 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-22369-A**
A.C. Power Chassis	**04-11112**
A.C. Line Filter, 6A, 250V	**5102-15658-00**
Fuse, 1A, 250V, Fast Blow, 3AG	**5730-15278-00**
Fuse, 4A, 250V, Slow Blow, 3AG	**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	
USA DBV Acceptor Cable	**H-18136.1**
Main Harness (JAMMA) Cable	**H-22093**
AC Distribution Cable	**H-20279**
Line Voltage Cable Assembly	**A-21155.1**
Upper Speaker Cable Assembly	**H-20346**
Lower Speaker Cable Assembly	**H-21128**
Fluorescent Lamp Cable Assembly	**H-22384**
Pitch and Yaw Yoke Cable Assembly	**H-22323**
IDC A.C. Cable Assembly	**H-20353**
Ground Braid Cable Assembly	**H-22327-93**

Documents	
Game Information Card	**16-10650**
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

HYPERDRIVE™

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	
1st Gear Switch	Green-Brown	Z	22	White-Yellow	Road Cam Switch
2nd Gear Switch	Green-Red	a	23	White-Green	Tail Cam Switch
3rd Gear Switch	Green-Orange	b	24	White-Blue	Sky Cam Switch
4th 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**		

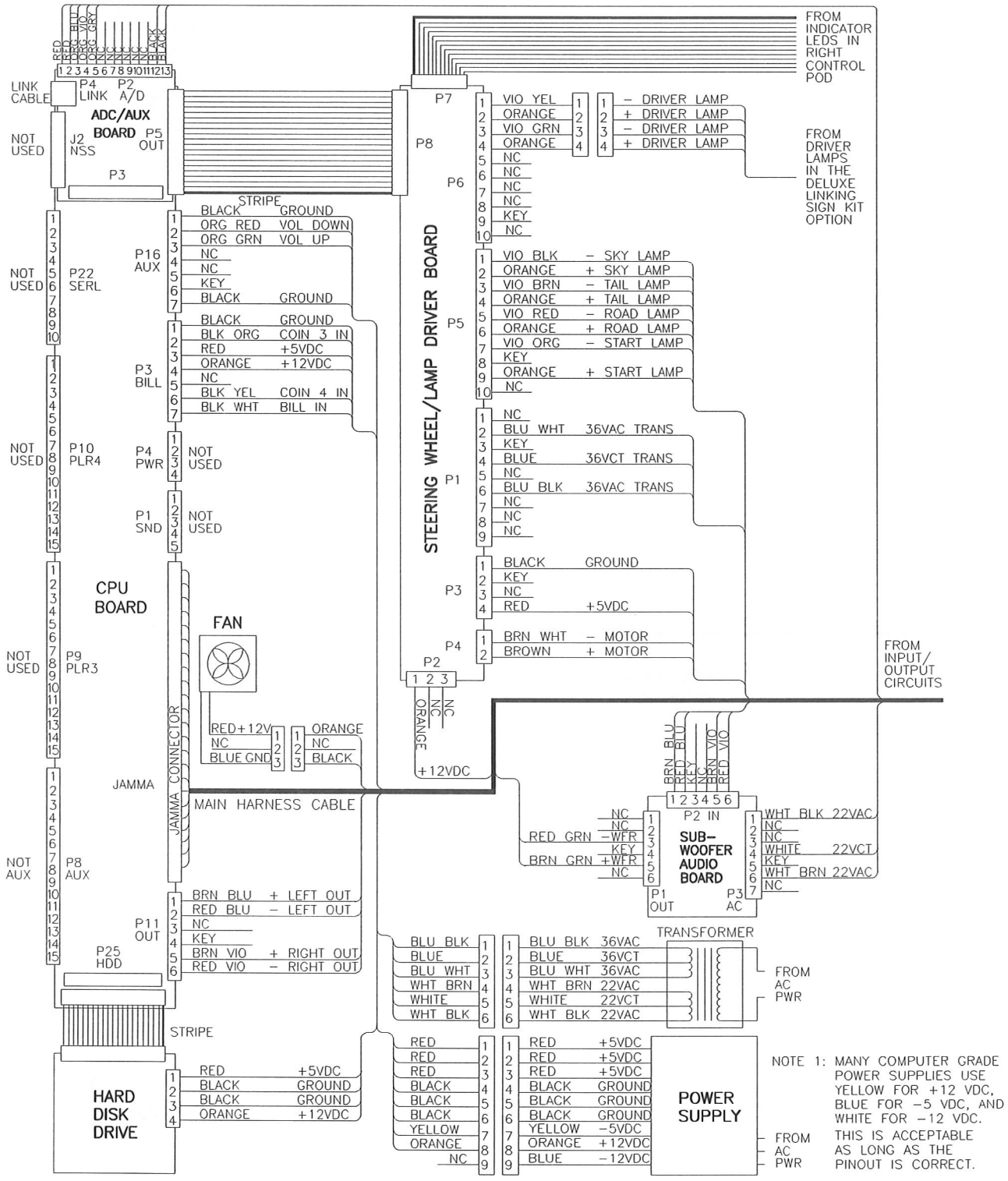
Dash Board wires that are not part of the Main JAMMA Harness

Start Button Lamp	Violet-Orange	-	NC	Green-Brown	1st Gear Switch
Start Button Lamp	Orange	+	NC	Green-Red	2nd Gear Switch
Road Cam Lamp	Violet-Red	-	NC	Green-Orange	3rd Gear Switch
Road Cam Lamp	Orange	+	NC	Green-Yellow	4th 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

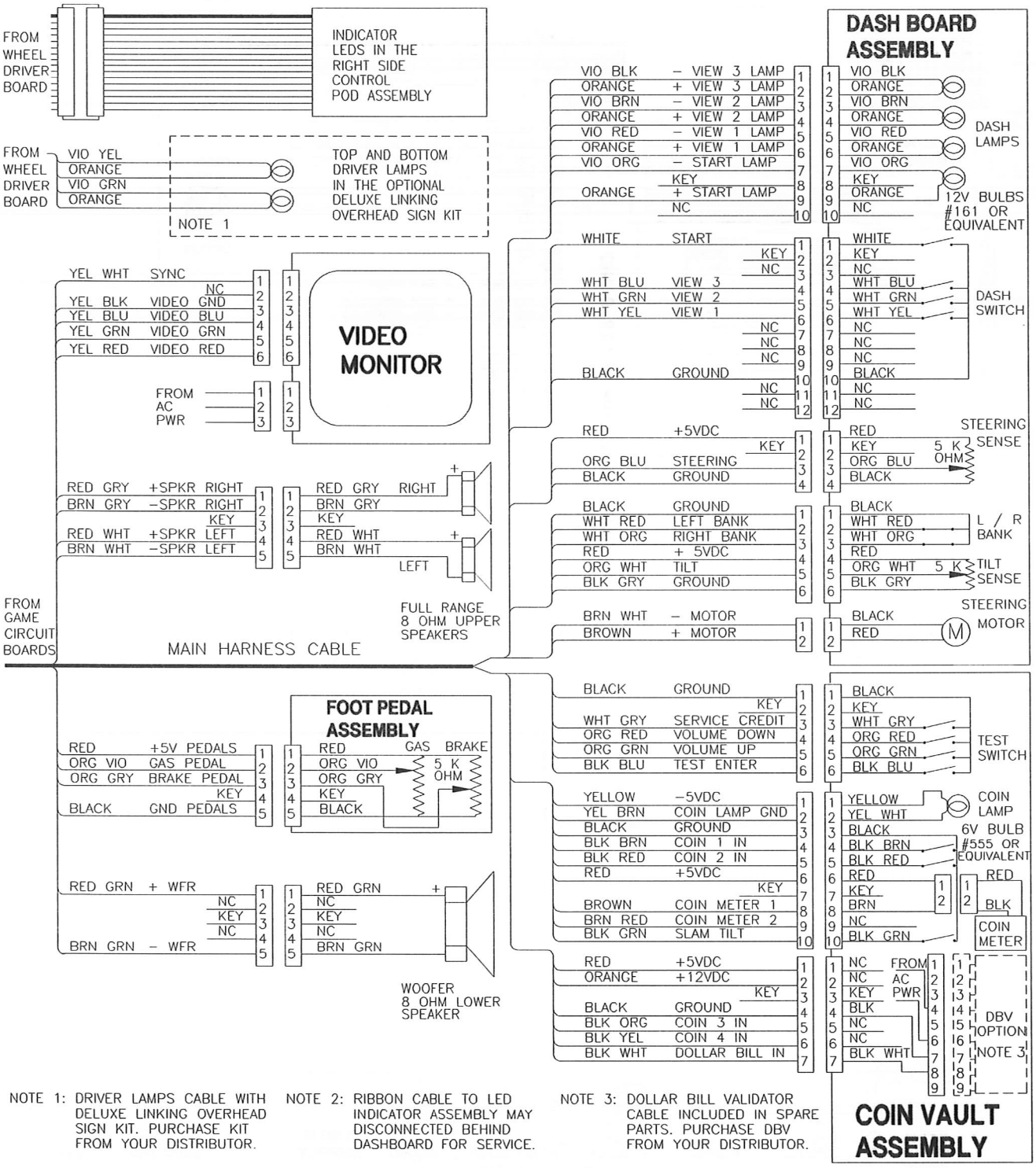
Power Source Voltage Limits

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)

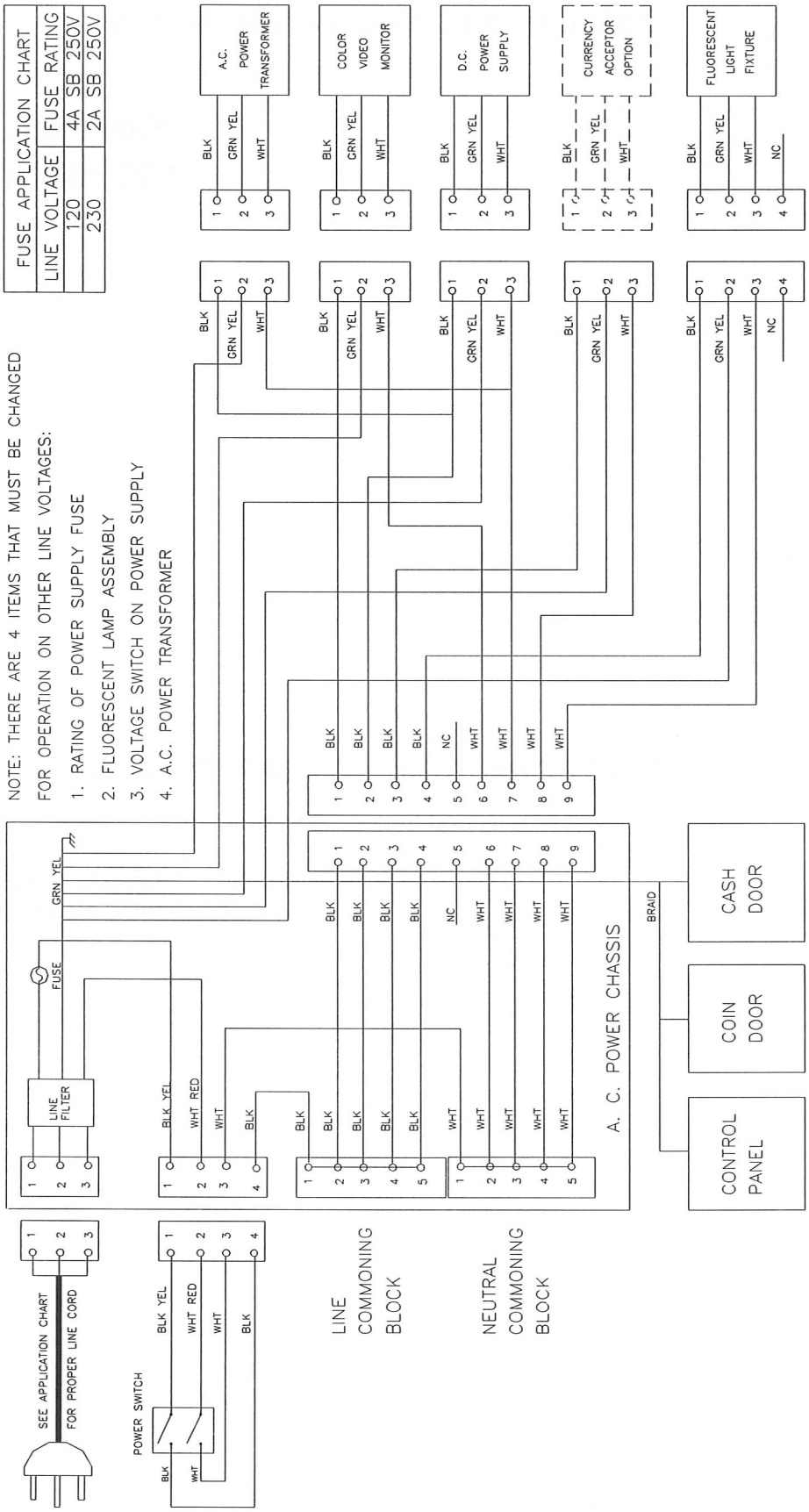


NOTE 1: DRIVER LAMPS CABLE WITH DELUXE LINKING OVERHEAD SIGN KIT. PURCHASE KIT FROM YOUR DISTRIBUTOR.

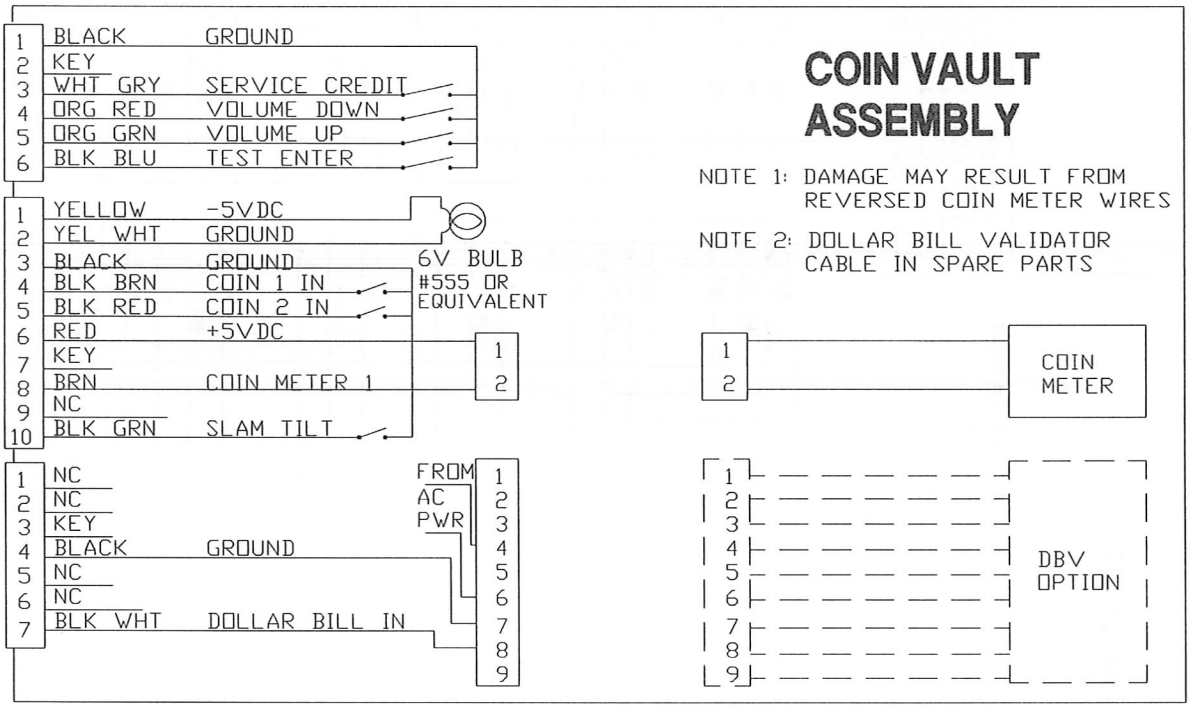
NOTE 2: RIBBON CABLE TO LED INDICATOR ASSEMBLY MAY DISCONNECTED BEHIND DASHBOARD FOR SERVICE.

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

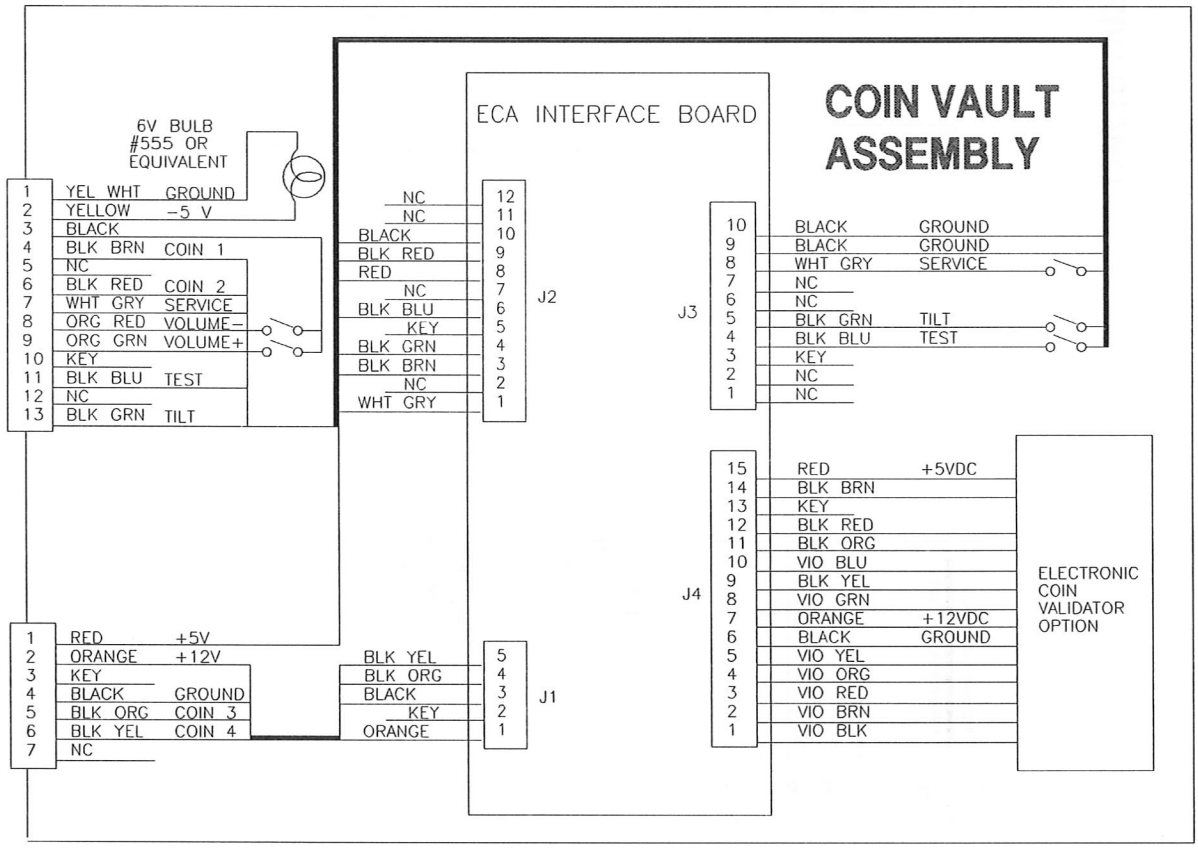
POWER WIRING DIAGRAM



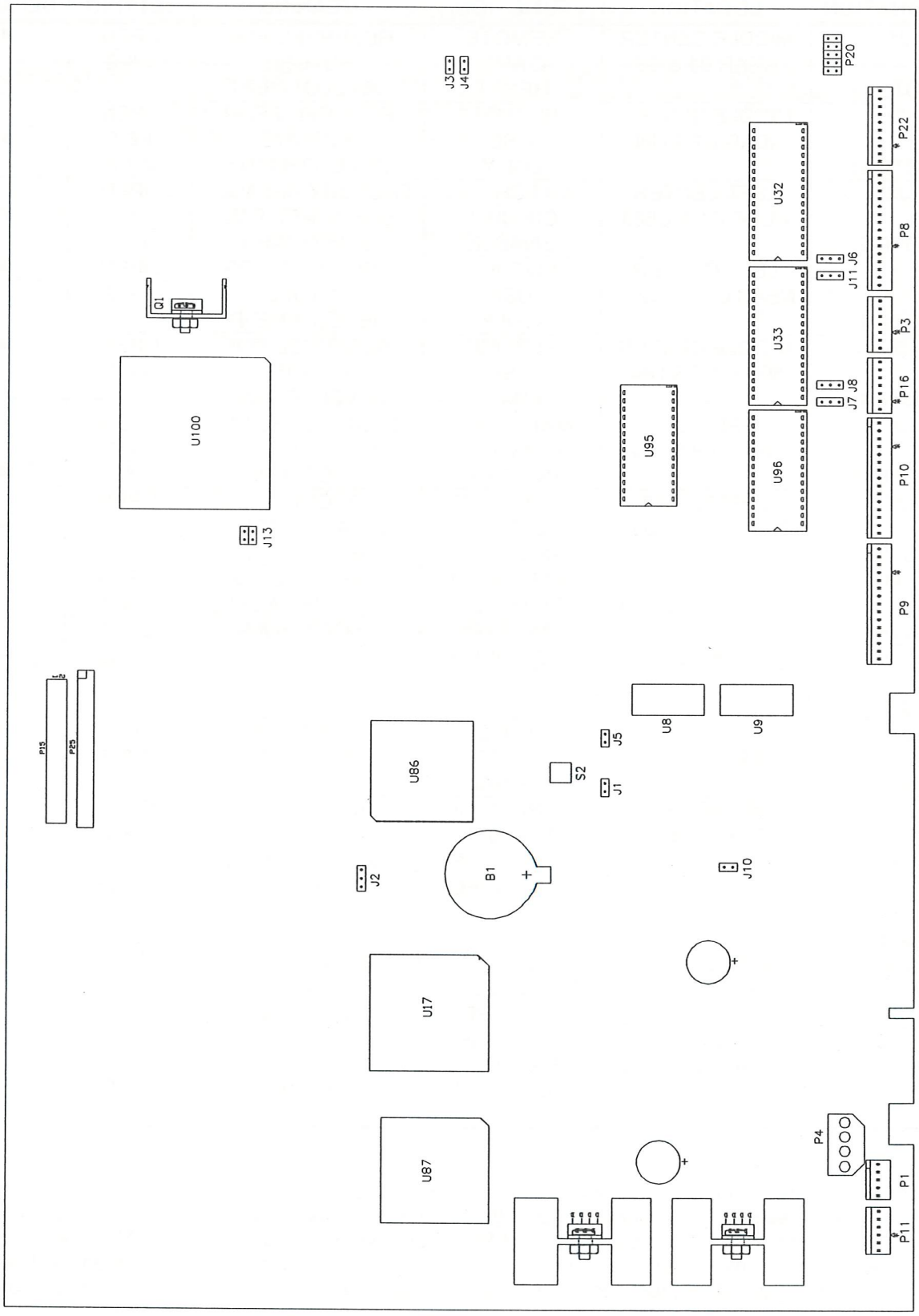
DOLLAR BILL VALIDATOR WIRING



ELECTRONIC COIN ACCEPTOR WIRING



CPU BOARD INDICATOR AND SWITCH LOCATIONS



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

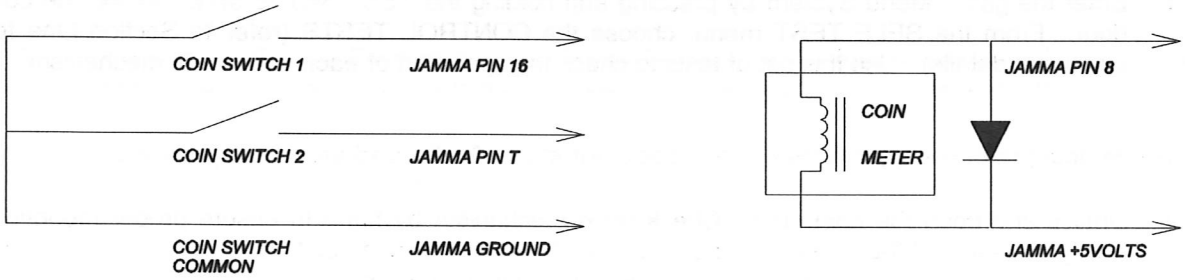
A: Enter the game Menu System by pressing and holding the TEST MODE switch inside the coin door. From the SELF TEST menu, choose COIN OPTIONS and MECH SETUP (refer to Section One for additional details). Use these tests to confirm the operation of each coin switch.

B: From the GAME ADJUSTMENTS menu, choose CUSTOM PRICING to verify units and credits.

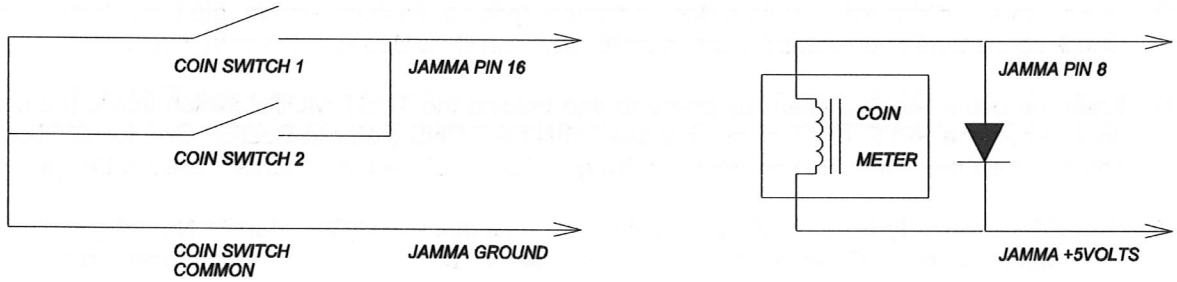
C: Check that the cabinet wiring is correct for this game. Ensure that the coin meter and coin switches are properly connected to the control input wires from the JAMMA connector and other CPU wiring. Refer to the Power Wiring Diagram (Section Three) for specific wiring information.

COIN SWITCH AND METER WIRING

FACTORY STANDARD

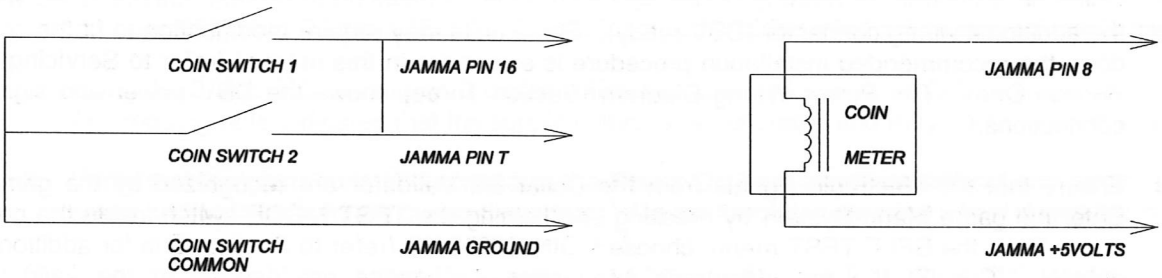


OPTIONAL WIRING



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 LEDs 3, 4, and 5.

   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. Select DIAGNOSTICS, then choose the SYSTEM INFORMATION menu screen. 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 the games, 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 Game 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 grips 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 grips are 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 grips 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 in the rear cabinet area.

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 grips 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 Grip 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.

WARNINGS & NOTICES

WARNING

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

* Substitute parts or modifications may void EMC directive or 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. For safety and reliability, substitute parts and modifications are not recommended.
* This game is protected by federal copyright, trademark and patent laws. Unauthorized modifications may be illegal under federal law. This also applies to MIDWAY logos, designs, publications and assemblies. Moreover, facsimiles of MIDWAY equipment (or any feature thereof) may be illegal under federal law, regardless of whether or not such facsimiles are manufactured with MIDWAY 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 MIDWAY ships a game, it is in compliance with FCC regulations. Your label is proof. If the label is missing or damaged, legal repercussions to the owner or distributor of the game may result. If your game does not contain an FCC label, call MIDWAY 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

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

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WELLS-GARDNER
ELECTRONICS CORPORATION

MODEL 25K7501

MODEL 27K7501

ISO 9001 REGISTERED QUALITY
certificate № 941111

REPLACEMENT PARTS LIST

Main, Neck & Control PCB Assembly Parts List

DIODES		
DESIGNATION	DESCRIPTION	PART NO.
Z500	ZENER DIODE 12V 5% 1.0W	066X0040-050
Z601	ZENER DIODE 12V 5% 0.5W	066X0040-046
Z700	ZENER DIODE 5.1V 5% 0.5W	066X0040-028
Z701	ZENER DIODE 5.6V 5% 0.5W	066X0040-022
Z702	ZENER DIODE 13V 6.5% 1.0W	066X0040-017
Z804	ZENER DIODE 9.1V 5% 0.5W	066X0040-020
Z802	ZENER DIODE 24V 3% 0.5W	066X0040-031
Z800	ZENER DIODE 75V 5% 0.5W	066X0040-048
D101, D102, D103, D104	DIODE 1N5406	066X0135-001
D105	DIODE 1N4007	066X0095-001
D106A, D106B, D106C	DIODE 200V 3.5V BYV28-200	066X0097-001
D107	DIODE MUR490	066X0126-002
D108, D112, D113, D310, D301, D302, D303	DIODE RU-2 1A 600V FAST REC	066X0090-001
D114, D603	DIODE 1N4001	066X0071-001
D117	DIODE DAMP 1A 600V GI RGP10J	066X0144-001
D501, D502, D503, D507	DIODE 1N914B	066X0070-001
D504, D505, D506, D803, D807	DIODE SANYO GMA02	066X0062-001
D600, D601, D602, D604, D700	DIODE 1N914B	066X0070-001
D702, D709, D711, D800, D804	DIODE 1N914B	066X0070-001
D707	DIODE DD54RC SANYO	066X0150-001
D708	DIODE MUR 460	066X0126-005
D810	DIODE 1N4005	066X0075-001

INTEGRATED CIRCUITS		
DESIGNATION	DESCRIPTION	PART NO.
U101	IC PWM UC3842AN	086X0257-001
U500	IC LM1203N RGB VID AMP	086X0270-001
U601	IC VERT DEFL TDA1771	086X0326-001
U701	IC LA7850 H/V PROC SANYO	086X0274-001
U702	IC QUAD 2-INPUT X OR 2N74LS136	086X0333-001

TRANSFORMERS		
DESIGNATION	DESCRIPTION	PART NO.
T101	TFMR SMPS	053X0649-001
T700	TFMR FLBK	053X0651-001
L701	COIL LINEARITY	009A2813-010
L703	COIL PINCUSHION CORRECTION	009A2838-003

TRANSISTORS		
DESIGNATION	DESCRIPTION	PART NO.
Q502, Q506, Q507, Q508, Q601, Q700	TRSTR 2N3904 MOT	086X0113-501
Q509, Q510, Q511	TRSTR 2N3906 MOT	086X0114-501
Q800, Q802, Q803	TRSTR MPSA92 MOT	086X0133-501
Q602	TRSTR 2SC2275 NEC	086X0176-001
Q703	TRSTR 2SC2482 TOSH	086X0185-501
Q709	TRSTR 2N4403	086X0211-501
Q704	TRSTR 2SC3688	086X0321-001
Q503, Q504, Q505	TRSTR NPN SANYO 2SC3782	086X0287-001
Q101	TRSTR N-MOSFET 6N60	086X0334-001
Q710	TRSTR BDX53A SGS NPN DAR	086X0335-001

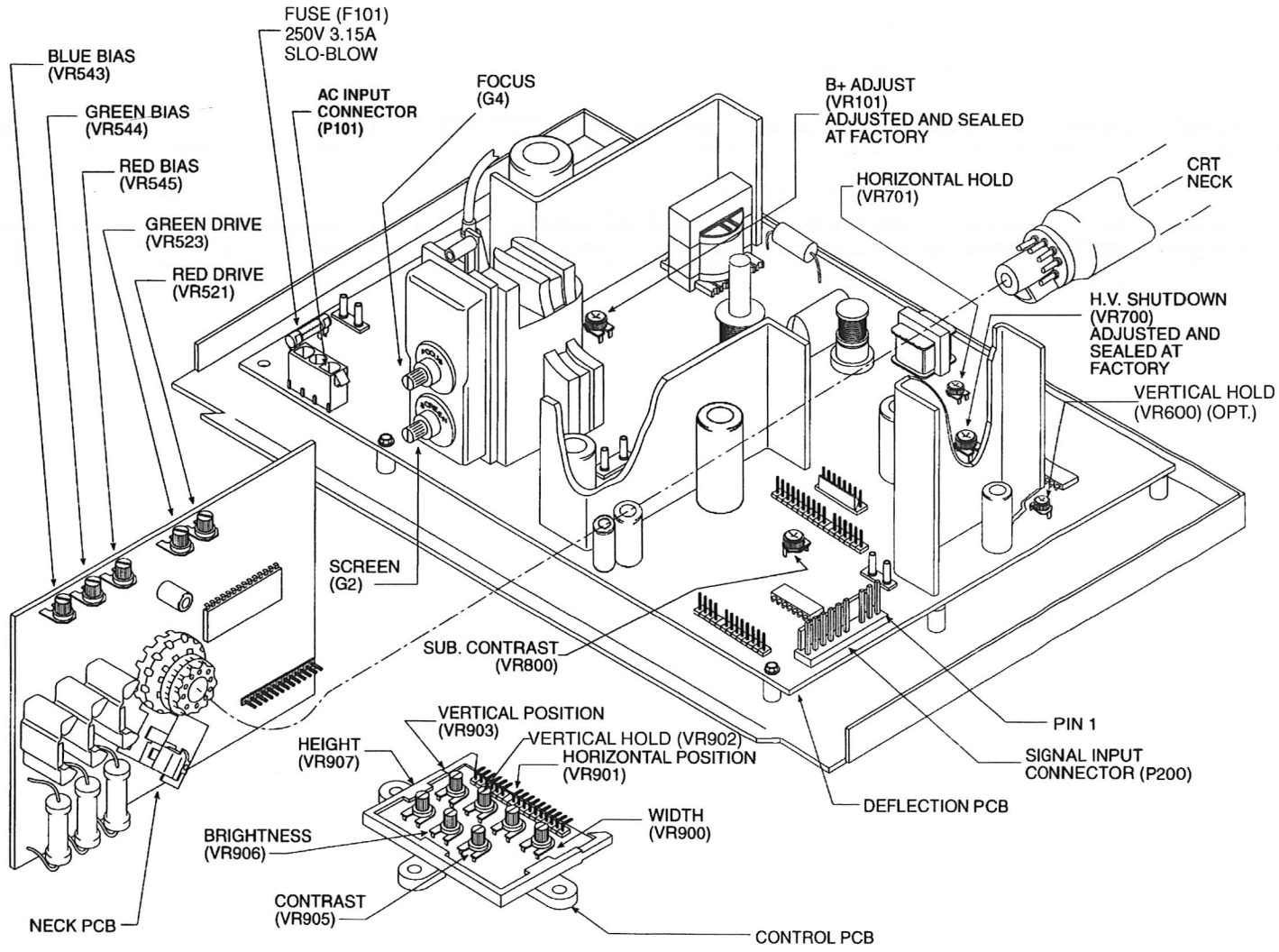
VARIABLE POTENTIOMETERS		
DESIGNATION	DESCRIPTION	PART NO.
VR900	TRIM POT 5K OHM .15W	040X0714-007
VR901	TRIM POT 20K OHM .15W	040X0714-009
VR903	TRIM POT 2K OHM .15W	040X0714-006
VR905	TRIM POT 10K OHM .15W	040X0714-008
VR906	TRIM POT 50K OHM .15W	040X0714-010
VR907, VR902	TRIM POT 200K OHM .15W	040X0714-012

MISCELLANEOUS		
DESIGNATION	DESCRIPTION	PART NO.
F101	FUSE 3.15A 5 X 20 IEC/UL SLO BLOW	016X0211-009
CRT	CRT 25 INCH	088X0373-506
CRT	CRT 27 INCH	088X0375-506
R108	RES 0.33 OHM 5% 2W MF	420X5339-323

WELLS-GARDNER
ELECTRONICS CORPORATION

MODELS 25K7501 AND 27K7501

ISO 9001
certificate № 941111



AC INPUT CONNECTOR: P101

AMP 350760-4
Mating AMP type 1-480700-0

Pin	Description
1	AC hot
2	Earth ground
3	AC neutral

INPUT SIGNAL CONNECTOR: P200

AMP 1-640445-0
Mating AMP type 1-640250-0

PCB Connector Pin	Description	Mating Connector Pin
10	Red	1
9	Green	2
8	Blue	3
7	Gnd	4
6	± Vertical Sync	5
5	± Horz/Comp Sync	6
4	Key	7
3	Gnd	8
2	± Vertical Sync	9
1	± Horz/Comp Sync	10