ATARI GAMES

MARCH 1999
16-30037-101

LISTED

DEDICATED GAME
25" (63 cm) COLOR MONITOR
OPERATION MANUAL

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

WARNINGS & NOTICES

WARNING

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

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

Look on our Website for more information. http://www.atarigames.com

DECLARATION OF CONFORMITY

ATARI GAMES CORPORATION

675 SYCAMORE DRIVE
MILPITAS, CA 95035
U.S.A.

WE, HEREBY DECLARE UNDER SOLE RESPONSIBILITY THAT

THE MODEL: *"WAR" 25" 30237, 30437, 31037, 31437, 32037*

TO WHICH THIS DECLARATION RELATES IS IN CONFORMITY WITH THE FOLLOWING EUROPEAN PRODUCT SAFETY

ELECTROMAGNETIC COMPATIBILITY DIRECTIVE
(89/336/EEC **AND AMENDMENTS 91/C** 162/08, 92/3 1/EEC,93/68/EEC)

ELECTRICAL EOUIPMENT DESIGNED FOR USE WITHIN CERTAIN VOLTAGE LIMITS DIRECTIVE
(73/336/EEC **AND AMENDMENTS** 88/C 168/02, 92/C2 10/01 , 93/68/EEC,94/C199/03, 95/C214/02)

AS IS VERIFIED BY COMPLIANCE WITH THE FOLLOWING STANDARDS:

EN55014: 1993	**EN61000-4-2: 1995**
IEC 801-3: 1984 (EN61000-4-3)	**EN61000-4-4: 1995**
EN61000-4-5: 1995	**EN335-1: 1995**
IEC 335-2-82 (DRAFT)	

Date issued: **FEBRUARY 3, 1999**

DAN GALARDE

CORPORATE V.P. OF QUALITY

WAR’”

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. There are specific warnings and cautions throughout this manual where they apply. 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.

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. There is no isolation 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.

Parents should 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*	*Humiditv*
Domestic	120VAC @ 60Hz 3.0 Amps	37°F to 100°F	Not to exceed 95% relative
Foreign	230VAC @ 50Hz 2.0 Amps	***(3°C*** to 38°C)	
Japan	100VAC @ 50/60Hz 3.0 Amps		

Cabinet Statistics

Shipping Dimensions	*Shipping Weiaht*	*Design Type*
Height 73" (185 cm) Width 28" (71 cm) Depth 42" (106 cm)	***400*** lbs. (148.2 kg.)	Single Dedicated Video Game with Linking capability

Equipment Characteristics

Video Display Monitor	*Audio Svstem*	*Currency Acceptors*
Standard Resolution RGB ***25" (64*** cm) CRT	2 Channel Audio 2 Full Range Speakers	Standard Coin Door 2 Coin Mechanisms, DBV ready 1 Coin Counter

Game Characteristics

Plaver Variables	*Operator Variables*	*Diaanos tics*
1 to 4 players per game (with Linking) Choice of Character Character Profile Memory	Coinage, Play Mode, Difficulty, Volume, Audits, Statistics	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. Operator menus are the same as in stand-alone games. Basic Kits connect together two cabinets electrically and mechanically. Use the Hub Linking Kit to interconnect up to four games.

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 direct/y on the g/ass!*** Liquid could drip down into the game circuits and cause erratic operation.

♦ Cabinet/Control Panel

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!*

INSTALLATION AND INSPECTION

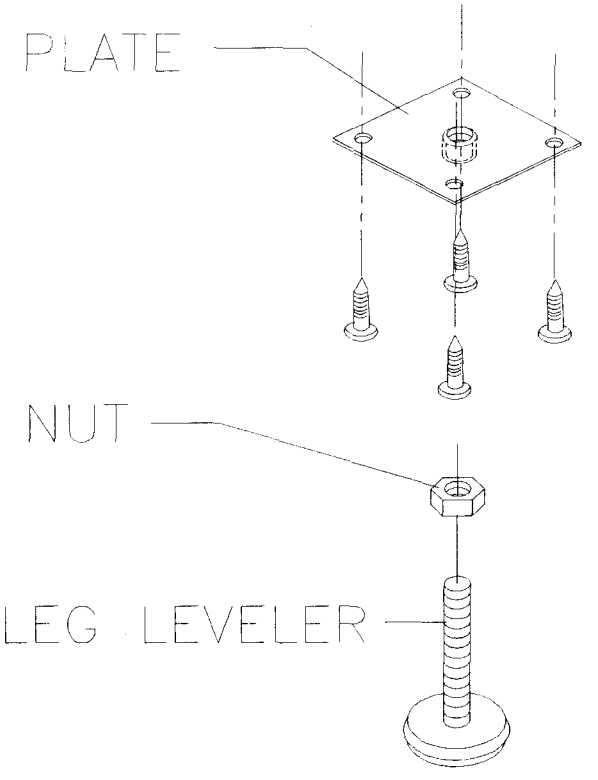
1. Remove all items from shipping containers and set aside. inspect the exterior of the cabinet for any signs of damage.

2. Remove the keys from the joystick. Unlock and open the coin and cash box doors. There are electrical cords and spare parts in the cash box.

A 1

DANGER
The cabinet is top-heavy. Use caution when tilting to install levelers.

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



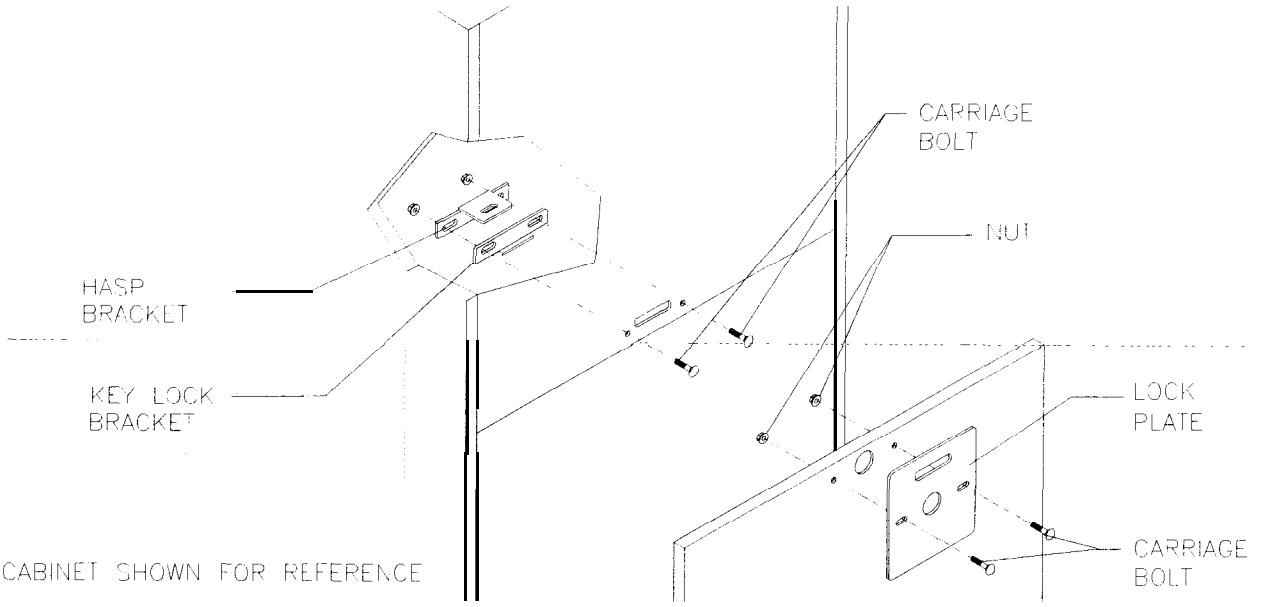
INSTALLATION OF LEG LEVELERS

4. 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. Distribute weight equally on each corner and tighten the leveler nuts.

5. 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.

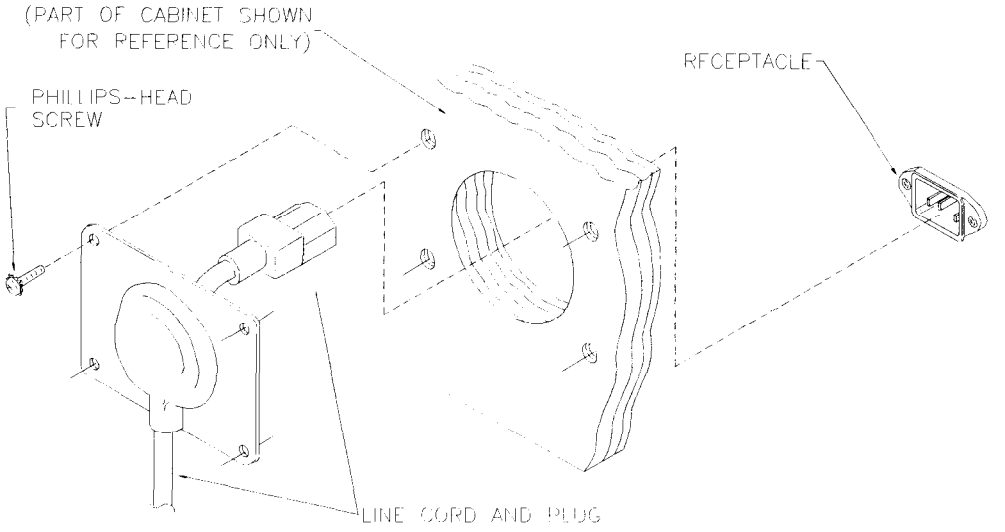
6. An extra padlock may be installed to secure the rear door. A hasp is located in the spare parts bag. Remove the two lock bracket nuts from inside the cabinet, above the rear door opening. Slide the hasp onto the bolts so that it protrudes from the hole in back of the cabinet, then reinstall the nuts.

7. 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.



HASP BRACKET AND LOCK PLATE ASSEMBLY INSTALLATION

8. 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

9. 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 and avoid making reversed connections.

10. 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 there are no errors, the game will automatically enter its "attract" mode of operation.

11. Press the BEGIN TEST button until the SELF TEST main menu appears on screen

12. Select DISK TESTS. Run the DRIVE READ TEST until at least one full test is complete. Exit the DRIVE READ TEST and return to the SELF TEST main menu.

13. Select CONTROLS TEST. Confirm that each control operates properly by following the on-screen instructions. Exit the CONTROLS TEST.

14. Select SOUND TESTS. Select AUDIO SPEAKER TEST. Confirm that both cabinet speakers are working. Exit the AUDIO SPEAKER TEST and select AUDIO HARDWARE TEST. Confirm that each test produces a PASSED result. Exit the SOUND TESTS.

15. Select MONITOR TESTS. Perform each test and confirm the proper operation of the video monitor. Use the monitor remote adjustment board to make any changes. Exit the MONITOR TESTS.

16. Select EXIT TO GAME to begin the game's "attract" mode.

17. Close and lock the coin and cash box doors. Reinstall and lock the rear cabinet doors. Lower all leg levelers until caster wheels lift off the floor, then level the cabinets.

SERVICE

Only qualified service personnel should perform maintenance and repairs. The product guidelines apply to all game operators and service personnel. There are specific notes, cautions, and warnings 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. Observe and follow these precautions 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. Do this BEFORE touching or handling the electronic assemblies.**
3. **Store the electronic assemblies in an anti-static area. Use anti-static bags 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.**

♦ Control Panel

To open the control panel, reach up into the control panel through the open coin door. Open the latches holding the control panel top to the control panel box. Lift the top of the control panel by pulling upward gently on the joystick. The control panel is hinged.

To remove the control panel assembly, open the control panel, and mark and disconnect the wiring harnesses from the player controls. Use a wrench to remove the four X-20 hex-head bolts, flat washers, and lock washers which secure the control panel to the cabinet. Close the control panel cover. Slide the control panel housing away from the cabinet. Upon reinstallation, align the gasketed control panel bracket with the bottom of the viewing glass and be sure to tighten the mounting bolts firmly. Do not over-tighten.

♦ Marquee

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

WARNING
The marquee glass could fall out of the cabinet and break when the retaining strip is removed. Hold the glass in place until it can be removed.

♦ Fluorescent Lamp

Remove the marquee housing, retaining strip, glass, and artwork. Grasp the tube, give it a quarter turn and pull it from its sockets. Carefully place a new tube into the socket and rotate it a quarter turn to reinstall. Clean the tube to remove fingerprints and dust.

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

♦ Fluorescent Light Assembly

NOTE: The fluorescent light assembly has an electronic ballast. There is no starter.

Remove the marquee housing, 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 keyhole slots. Lift out the assembly.

♦ Speakers

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

There are two 5.25" full range speakers under the marquee. Remove the marquee, glass, and artwork. Remove the speaker grille. The speakers come out from the outside 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.

♦ Joystick Assembly

Open the control panel. Disconnect the joystick wiring harness. Loosen and remove the four nuts holding the joystick to the control panel. Lift the joystick assembly out of the control panel.

To remove the potentiometers, loosen the screws holding the mounting plate to the joystick base. Loosen the set screw holding the shaft. Pull the potentiometer gently to release it. Remove the mounting nut and washer holding the potentiometer to the mounting plate. Upon reinstallation, be sure to align all mating parts correctly.

To service the DISCARD and TRIGGER buttons, switches, and springs, remove the screws holding the joystick grip together. Gently pry the sides of the joystick grip apart.

♦ Push Buttons

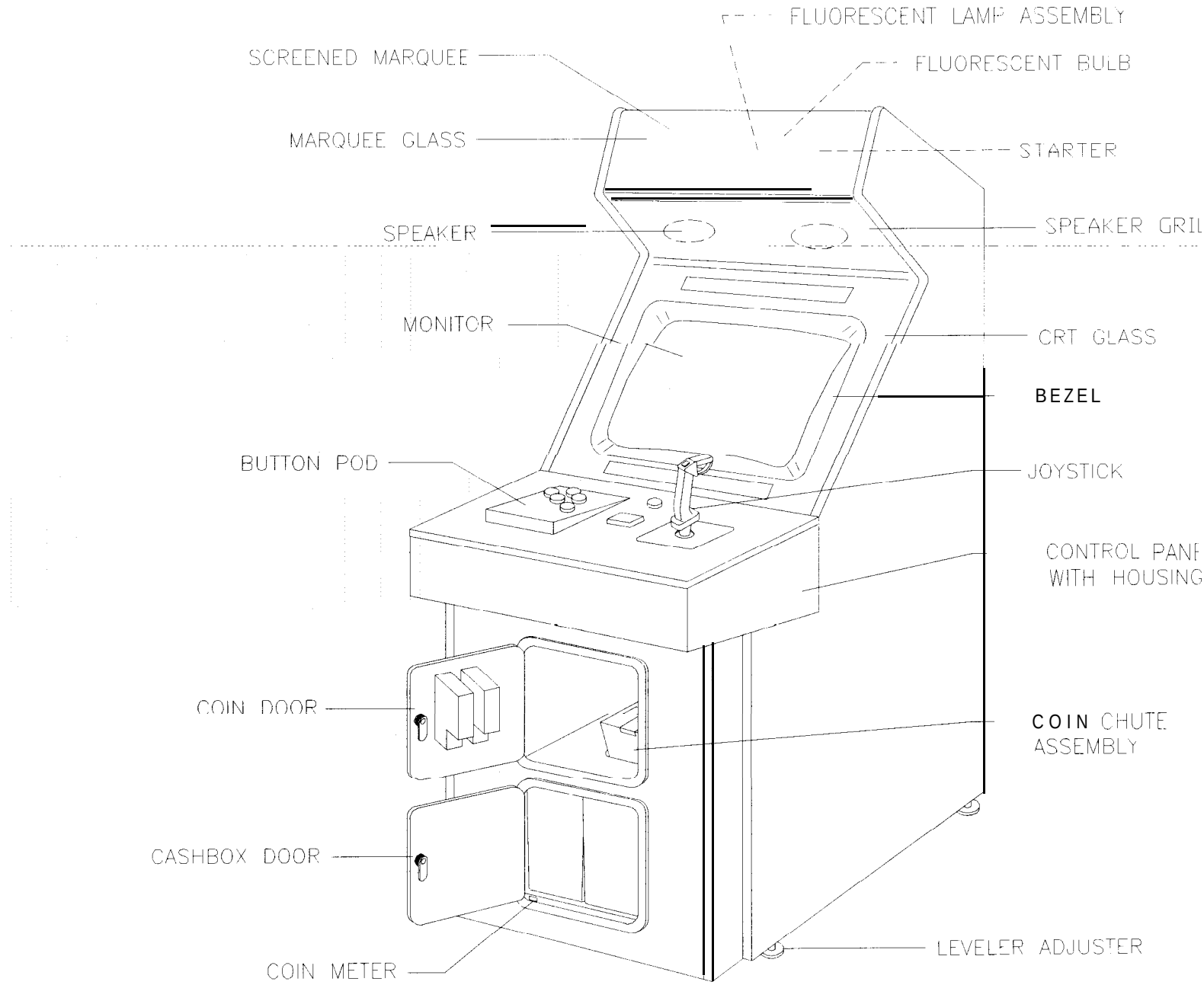
Open the control panel to expose the switches. Label and disconnect wires. Separate the switch from its push-button. Bend the large prong away from the switch just enough to slide the switch off the housing. To remove the light inside the VIEW button, pull the light bulb up and out of its socket. Unscrew the switch mounting nut and pull the entire pushbutton out from the front of the panel.

♦ Coin Meter

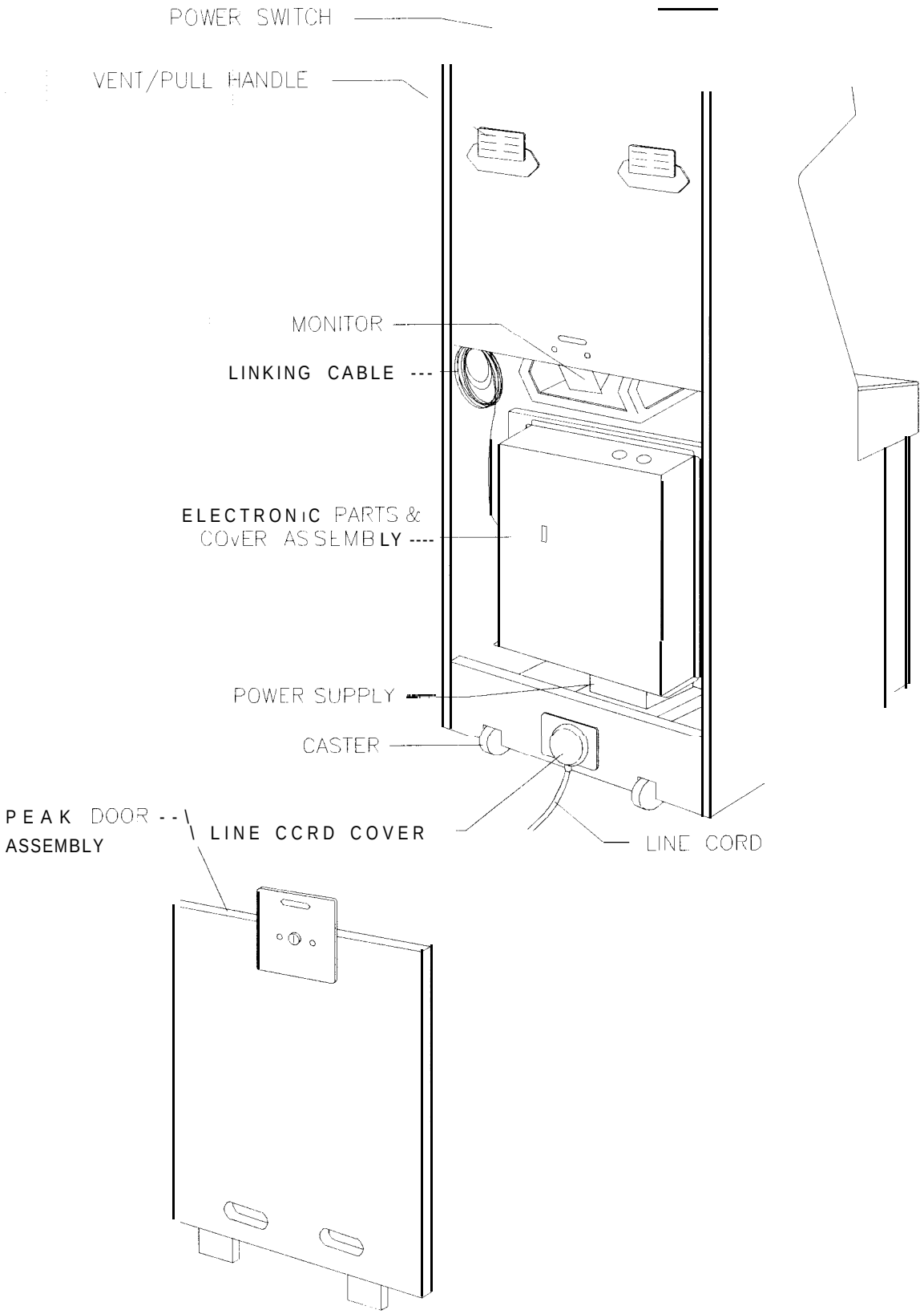
Switch off power to the game. Unlock the cash door and swing it open. Remove the cash tubs. The meter is located on a plate at the vault bottom. Remove the screws and lift the plate just enough to disconnect the meter wires from the harness. Record the meter count before testing or replacement.

♦ Coin Mechanism

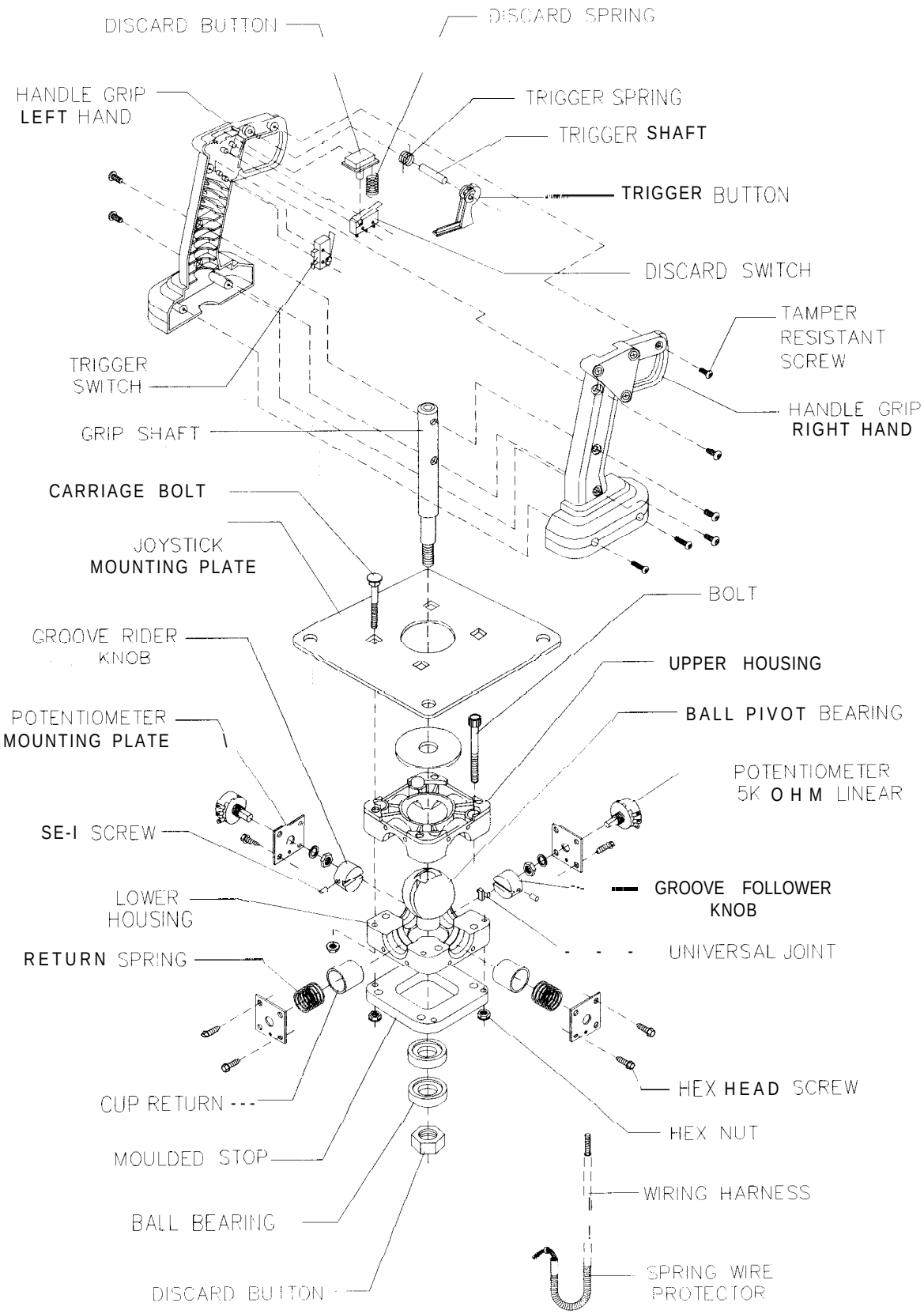
Switch off power to the game. Unlock the coin door and swing it open. Unlatch and remove each coin mechanism separately to clean or replace with a different type. Ensure that mechanism seats fully in the holder upon reinstallation. Close and lock the release latch, then close the door. Turn on the game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



CABINET ASSEMBLY COMPONENTS – FRONT VIEW



CABINET ASSEMBLY COMPONENTS – REAR VIEW



ANALOG JOYSTICK COMPONENTS DETAIL

♦ Viewing Glass

Open the coin door. Reach through the coin door to release the control panel latches. Pull the control panel upward to expose the retaining strip. Hold the viewing glass while removing the three retaining strip screws. Slide the glass upward slightly and swing it outward until it is free from the cabinet. Move the glass downward until it is free from the cabinet.

♦ Monitor Bezel

Open the control panel. Remove the viewing glass. Grasp the monitor bezel at the bottom and lift it out of the groove. Remove the bezel from the cabinet.

♦ Monitor

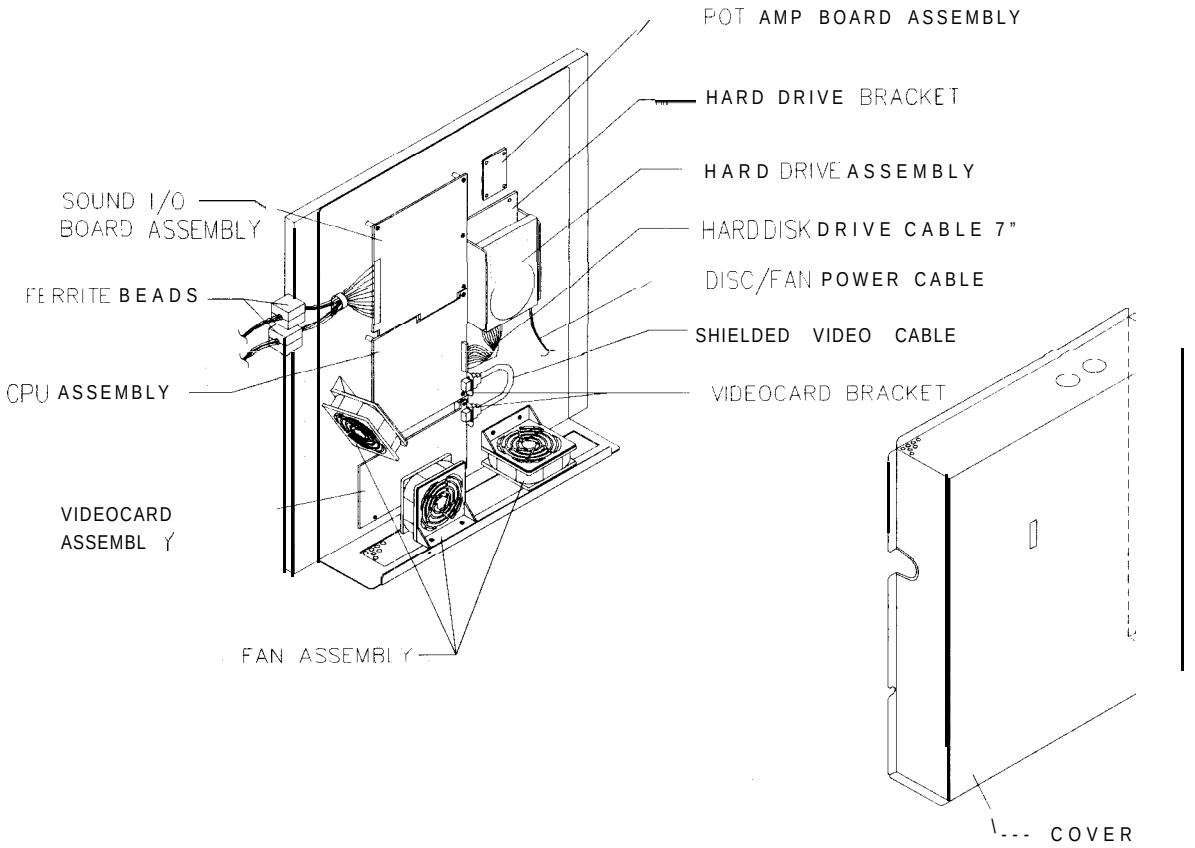
Read these precautions thoroughly before beginning this procedure.

WARNING

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.

Turn off the AC power. Remove the 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.



GAME ELECTRONICS COMPONENTS

♦ 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 the power chassis. Note AC input voltage setting.

To reinstall the power supply, set the AC 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 the cabinet rear door and perforated metal cover from the electronics assembly. To remove a fan, disconnect the power harness and remove the mounting screws. Note the orientation of the fans. Each fan has an arrow molded into its plastic case to indicate airflow direction. Remove the push rivets holding the fan grille and mounting bracket together. Make certain to reinstall the fans in the proper orientation to assure airflow over the circuit boards.

♦ Hard Disk Drive Assembly

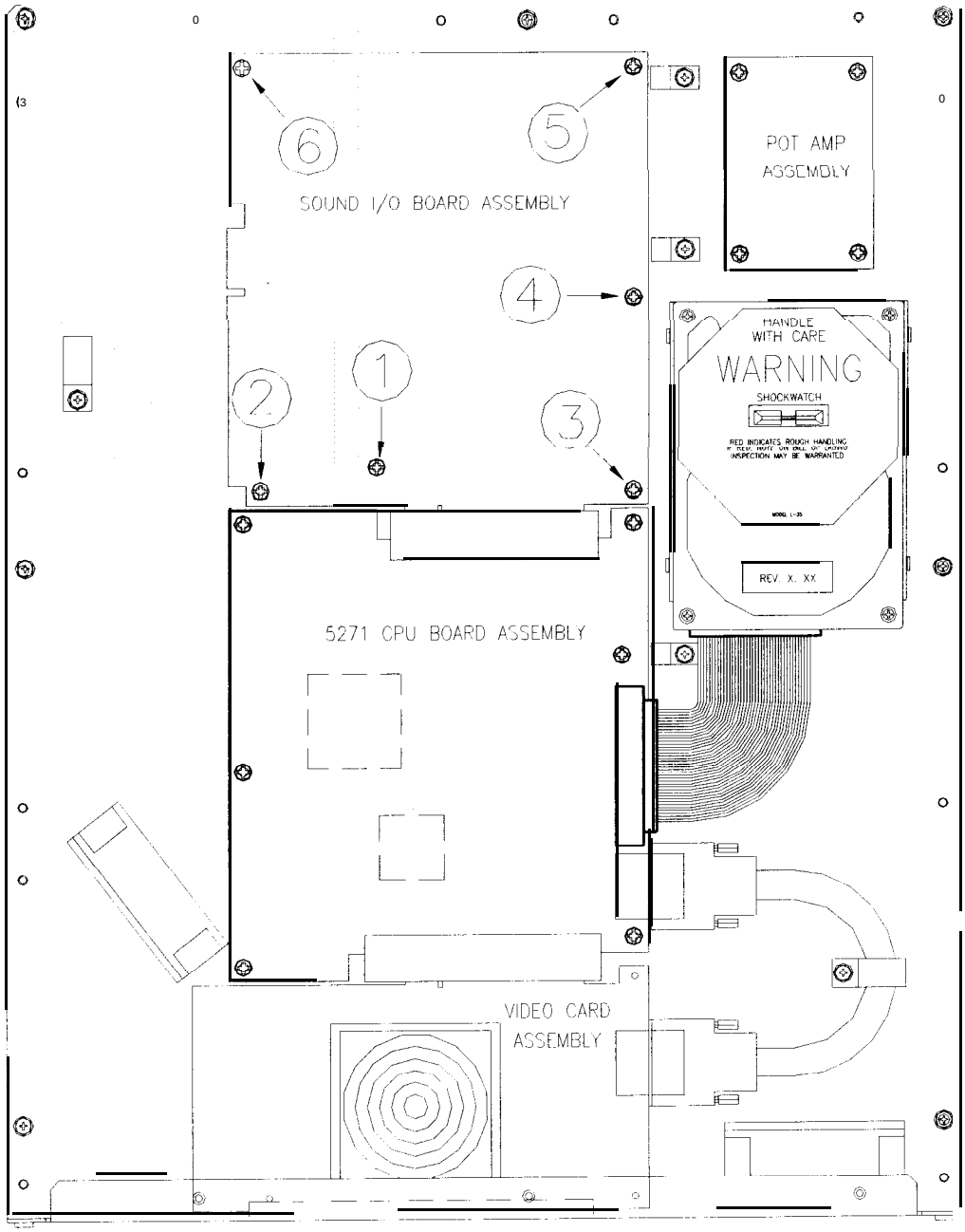
Switch off power to the game. Unlock and remove the rear door. Remove the perforated metal cover from the electronics assembly. Disconnect the D.C. power cable from the hard disk drive. Unplug the ribbon cable from the hard drive but leave it attached to the CPU board. Carefully remove the screws and lift the drive assembly out of the cabinet. *Do not stack or drop hard disk drives. Store hard disk drives in anti-static bags or approved shipping containers.*

CAUTION

Hard disk drives are very fragile! Do not move a game with the power on. Never stack or drop hard disk drives.

♦ Sound I/O Board Assembly

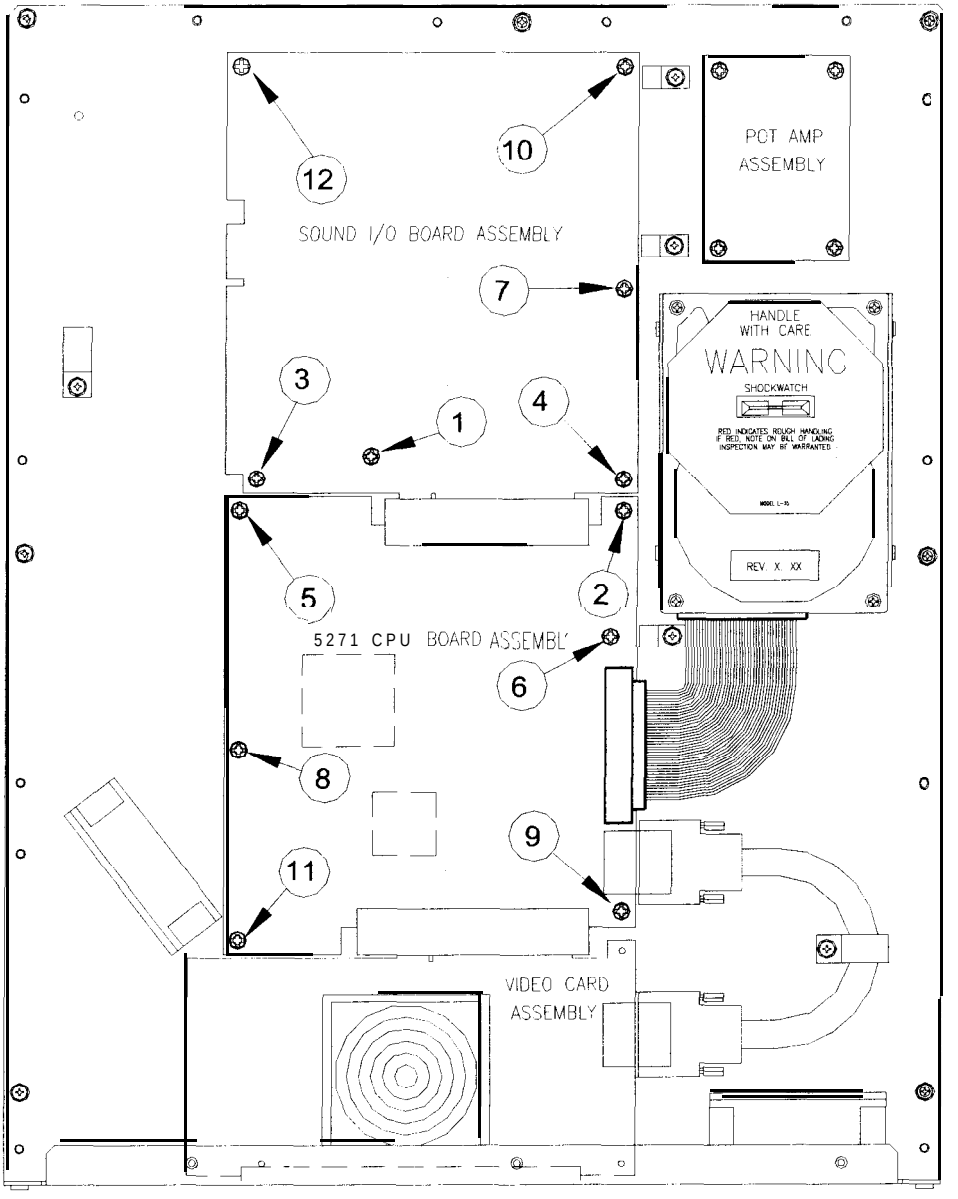
Switch off power to the game. Unlock and open the rear door and the coin door. Remove the perforated metal cover over the Game Electronics. Carefully note the orientation of the JAMMA connector and the other cables. Extract the harnesses from the board connectors. Remove the six mounting screws and washers from the Sound I/O Board Assembly. Carefully remove the Sound I/O Board Assembly, rocking it gently to separate the PCI edge connector from the CPU Board Assembly. Lift up and off. Upon reinstallation, tighten the screws in order, starting at the center and working toward the outer edge (see illustration). Use anti-static bags and protective containers from new parts to store the board if it is not reinstalled.



TIGHTEN SIO BOARD ASSEMBLY MOUNTING SCREWS
IN ORDER AS NUMBERED

♦ 5271 CPU Board Assembly

Switch off power to the game. Unlock and open the rear door and the coin door. Remove the perforated metal cover over the Game Electronics. Carefully note the orientation of the JAMMA connector and the other cables. Extract the harnesses and the hard disk drive ribbon cable from their board connectors Loosen screws and disconnect the VGA cable from the 5271 CPU Board connector. Remove the six mounting screws and washers from the Sound I/O Board Assembly. Carefully remove the Sound I/O Board Assembly, rocking it gently to separate the PCI edge connector from the 5271 CPU Board Assembly. Lift it up and out. Set the Sound I/O Assembly aside. Remove the five screws and washers holding the 5271 CPU Board Assembly to the ground plane. Carefully separate the 5271 CPU Board Assembly from the Video Card PCI connector, rocking it gently to separate the PCI edge connector from the 5271 CPU Board Assembly. Upon reinstallation, tighten the screws of both the 5271 CPU Board Assembly and Sound I/O Board Assembly in order, starting at the center and working toward the outer edges of the boards (see illustration). Use anti-static bags and protective containers from new parts to store the board if it is not reinstalled.



TIGHTEN SCREWS IN ORDER 1-12 AS NUMBERED
WHEN REINSTALLING 5271 CPU AND SOUND I/O BOARD ASSEMBLIES

♦ Pot Amp Board Assembly

Switch off power to the game. Unlock and open the rear door and the coin door. Remove the perforated metal cover. Mark and disconnect cables from the Pot Amp Board Assembly. Remove the four mounting screws and washers from the board. Lift the board from the ground plane. Use anti-static bags and protective containers to store the assembly if it is not reinstalled.

♦ Video Card Assembly

Switch off power to the game. Unlock and open the rear door and the coin door. Remove the perforated metal cover. Disconnect cables and remove the Game Electronics as described above. Disconnect and remove the Sound I/O Board Assembly and the CPU Board Assembly and set them aside. Loosen the screws and disconnect the VGA cable from the Video Card output connector. Use anti-static bags and protective containers to store the assembly if it is not reinstalled.

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 manufacturer's packaging.

NOTE: To avoid explosion, all replacement batteries must match the original in size, voltage rating, and composition. Manufacturer recommended equivalent types are acceptable. These batteries are designed for very long life. Do not attempt to recharge these batteries! Avoid direct shorts across the terminals or from terminals to ground. Remove them from their holders and store in a safe place until repairs have been completed. Dispose of used batteries

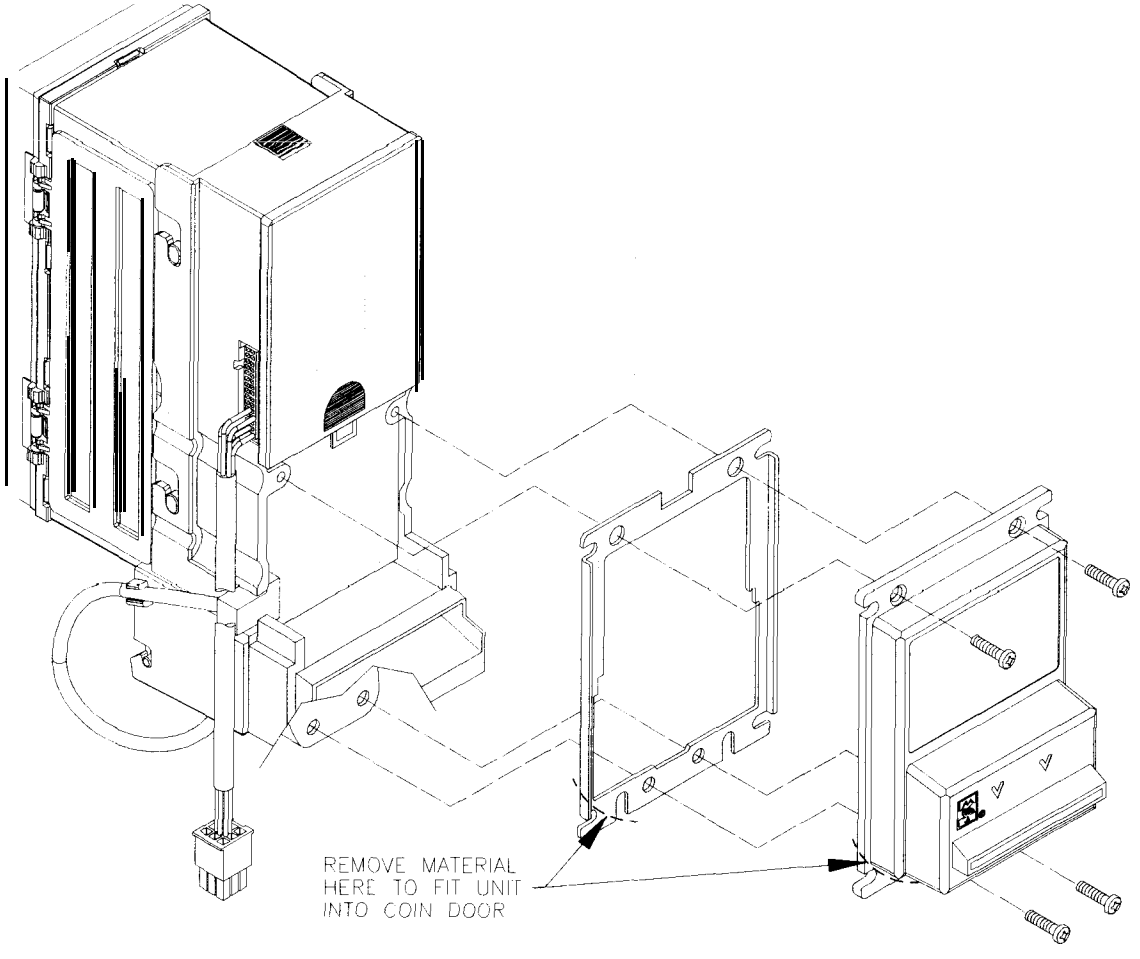
♦ Battery

Switch off power to the game. Unlock and remove the rear door. Remove the perforated metal cover. The battery is mounted on top of the integrated circuit at Sound I/O Board Assembly location U28. Use a chip extraction tool to grasp the battery edges and pull up firmly to remove the device. Set aside with pins facing up. When installing a battery, align the key with the slot in the integrated circuit.

♦ Dollar Bill Validator

(Use MARS AE241 l-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

Switch ON power to the game. The game begins to display messages while loading the software. The first time the game is turned on, it will prompt the operator to calibrate the joystick. If there are no errors, the game enters ATTRACT mode automatically.

NOTE: When the internal tests detect an error, the game halts and an error message may appear on the screen. Record any messages before attempting to service the game.

Before the game starts, the ATTRACT screens endlessly cycle through scenes and sounds from typical games. Inset-t the desired amount of coins or tokens and press START to begin.

Attract Mode

Before the game starts, the ATTRACT screens show scenes and sounds from typical games. The attraction screens cycle endlessly until a player starts the game.

During the attract mode, an advertisement periodically appears regarding the WAR t-shirt promotion. Operators may disable this announcement when the promotion ends by changing the SWEEPSTAKES setting on the GAME OPTIONS sub-menu of the SELF TEST.

Test Mode

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

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

Game Description

WAR: Final Assault is a new type of arcade game. It has the potential to build a loyal customer base. Since this game thrives on competition, operators should link multiple WAR units for optimum performance. Up to four WAR games can be linked together.

In WAR: Final Assault, players gain “points” by defeating enemies using a large variety of weapons found throughout the playfields. Players may play competitively against the computer or compete head-to-head in a “Deathmatch.”

Players can build their rank by accumulating points. The password feature allows players to save statistics about their skill over time. There are a variety of secrets hidden throughout the WAR: Final Assault game.

Game Play Modes

There are two modes of play in WAR: Final Assault: Mission and Head-to-Head.

In Mission mode, players cooperate to play through all seven levels and defeat the Boss, General Alienor.

In Head-to-Head mode, also known as “Deathmatch,” players are placed in one of a number of different arenas. When players gather all of the secret “Pentabolt” pieces hidden throughout the Mission levels, a secret level is unlocked. Players fight each other until time expires. In the default setting, the winner gets a free game. Eight arenas are eventually time-released for a total of twelve.

GAME RULES

Individual Play (Single-Player Operation)

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

1. The player decides whether to retrieve a character profile in memory, create a new character profile, or just play the game without saving any profile information.

2. The player previews general character profiles and selects one. Each character has a different skill set and strength.

3. The game begins in "Mission" mode. The "Mission" mode is complete when the player finishes all seven levels and defeats all enemies, including the Boss. Players may enter a secret eighth level after collecting all six of the hidden "Pentabolt" pieces in the Mission levels.

Head-to-Head Play (Multi-Player Linked Operation)

Choose a linked cabinet (on-screen messages and optional overhead signs identify the linked games). Insert currency at the JOIN IN message. All players at linked cabinets will participate in the same game.

1. Each player selects a character. Others are invited to participate at the JOIN IN message.

2. At least one other player must respond to the JOIN IN screen message, selecting HEAD-TO-HEAD or MISSION as required. If any player selects HEAD-TO-HEAD, then all players will engage in a DEATHMATCH.

3. If a single-player game is in progress, additional players can join in at any time. The new player may select MISSION or HEAD-TO-HEAD play.

4. If a single player is interrupted during a MISSION game, is victorious in a forced DEATHMATCH, and no other opponents join in for another DEATHMATCH, the single player will return to the original MISSION game at the same spot where it was interrupted.

GAME PLAY

1. On-screen indicators give the players information about themselves and their competitors. Across the top of the screen are indicators for number of lives, level of health, and time remaining in the current level. A "radar" display in the lower left corner of the screen shows the relative position of all competitors during game play.

2. There are many secret features built into the game. Most MISSION levels have shortcuts. Players are encouraged to find other secret features by experimentation.

3. The time-release feature will add new characters to the game at set intervals. This maintains player interest over time.

GAME FEATURES

WAR is shipped configured as a one-player game. Up to four cabinets may be linked to permit multi-player games.

Characters

Players may choose from characters by moving the joystick until the desired character is highlighted and pressing the joystick trigger to select it. Each character has particular attributes that may be advantageous depending on the level. All characters benefit from passing through HEALTH and TIME markers along each level. Players lose some HEALTH whenever they are attacked. When players achieve higher rank based on their total "kill points," they can choose from secret characters.

Passwords

The password feature allows players to save the kill points gained during play over a number of games. Players advance in rank automatically when they have accumulated enough kill points. Upon selecting a character, the screen display includes information on the character's rank and number of enemies to be defeated to advance rank.

Length of Play

Several factors affect the length of play. In DEATHMATCH mode, players can compete on each level for a set time period. In MISSION mode, each player is allotted a set amount of personal time that can be supplemented by collecting time markers left behind after defeating an opponent. If a player's time expires before the time for the level has expired, the player may purchase extra time to continue the game. If a player's time remains after a level is complete, the player progresses to the next level without needing further credits.

Weapons

Players can exchange weapons by pressing the DISCARD button on the joystick and walking through weapon indicators along each level. Each weapon has specific characteristics which make it advantageous in certain situations. Weapons have limited ammunition and revert to each character's default weapon when ammo is exhausted. A limited number of AMMO icons are scattered throughout the game. AMMO icons can replenish ammunition for any weapon.

Firing weapons successfully at an opponent advances the player toward a higher rank. Players can take the weapon of a defeated opponent by walking through the weapon, or, if they already have a weapon, by pressing the DISCARD button of the joystick and walking through the weapon.

Obstacles/Shortcuts

There are various obstacles along each level. Players must avoid these obstacles to save time and preserve health. Hidden shortcuts along the MISSION levels allow players to access secret weapons or explore different routes to the objective.

PLAYER CONTROLS

The player controls are used to guide the character and select a view of the playfield.

♦ Joystick

The joystick controls the direction a character faces and the aim of the character's weapon. Move the joystick to either side to turn the character to the left or right. Use the control panel buttons to move a character forward, backward, sideways, or to JUMP over obstacles or out of the path of ammunition. The joystick also selects certain options from the SELF TEST menus.

♦ Trigger/Discard Buttons

The trigger of the joystick controls the release of ammunition. Depending on the type of weapon, ammunition may be released immediately, or after a delay. Squeeze the trigger to release ammunition after aiming a weapon. The trigger also selects certain options from the SELF TEST menus.

The discard button, at the top of the joystick, changes a weapon during game play. Press the discard button before moving a character through a weapon icon to discard the current weapon and pick up the new one. The discard button also selects certain options from the SELF TEST menus.

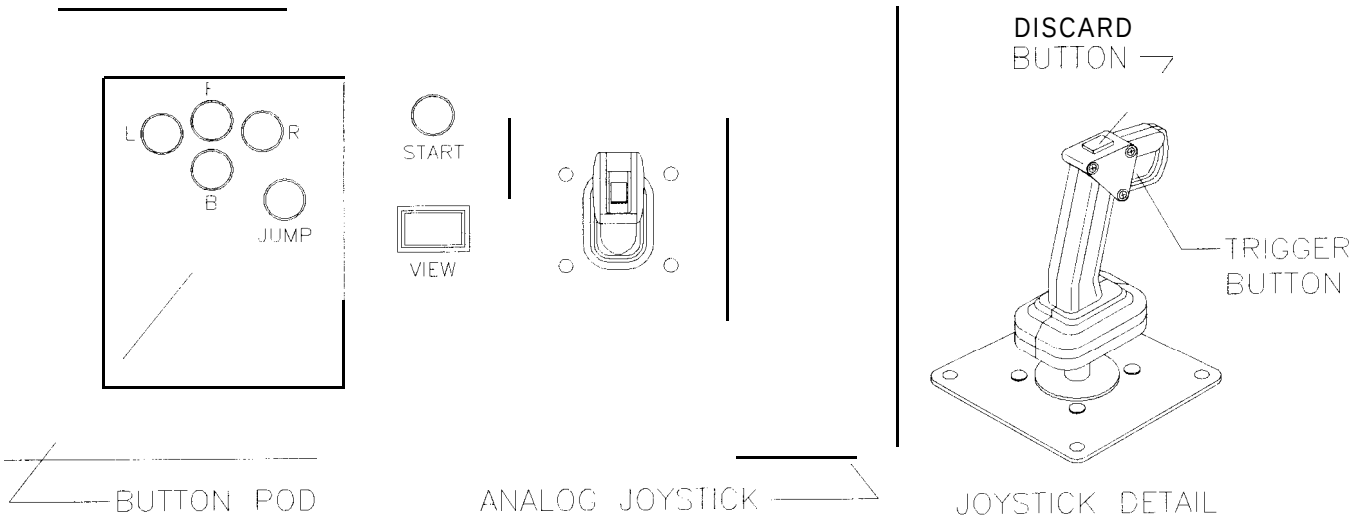
♦ Control Panel Buttons

The control panel buttons start game play selections, choose characters, and controls the player's movement during game play. Press this START button after purchasing credits to begin play.

The FORWARD, BACK, LEFT, RIGHT, and JUMP buttons move a character in the indicated direction. Use the joystick in combination with these buttons to make more precise movements. These buttons also are useful in avoiding enemy gunfire.

The VIEW button switches the playfield view between two perspectives: behind the weapon and above the playfield (1st person to 3rd person). Each press of the VIEW button instantly changes the player's perspective.

NOTE: Operators should adjust the joystick calibration from time to time to assure accurate movement. Refer to GAME OPTIONS and CONTROLS TEST in the SELF TEST menu system for instructions.



PLAYER CONTROL LOCATIONS

OPERATOR CONTROLS

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

Cabinet Switches

- The **ON/OFF SWITCH** is located on the top right of the cabinet (when viewed from the rear).

- The **MONITOR REMOTE ADJUSTMENTS** are located inside the coin vault. Use the monitor test screens with these controls to adjust the video image size, brightness, contrast, etc.

- The **SLAM TILT SWITCH** detects any forceful vibrations against the coin door. This eliminates pounding for free games. It is located on the inside of the coin door opening near the lock.

  NOTE: There is no SLAM TILT SWITCH on DBV ready coin doors.

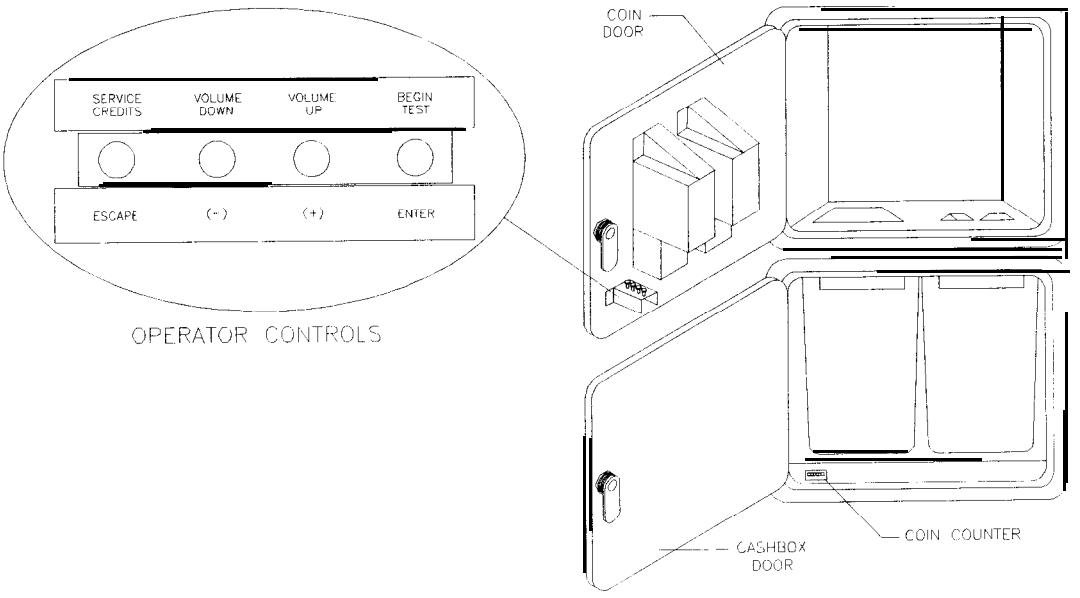
Control Buttons

- The **TEST BUTTON** activates the game SELF TEST menu system. Press the Test button to access the Main Menu and select individual diagnostics, audits, utilities, and other features.

- The **VOLUME UP BUTTON** moves up through the menu selections or adjustment items and raises the sound level in game play. The joystick also moves up through selections.

- The **VOLUME DOWN BUTTON** moves down through the menu selections or adjustment items or lowers the sound level in game play. The joystick also moves down through selections.

- The **SERVICE CREDIT BUTTON** allots credits without affecting the game's bookkeeping total. Press this button to get out of a menu selection or return to the main menu.



OPERATOR CONTROL LOCATIONS

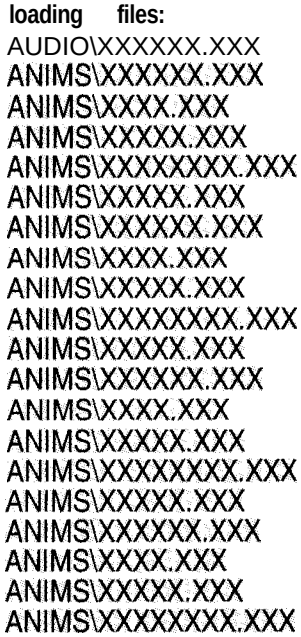
POWER ON TESTS

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

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

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

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



TYPICAL POWER ON TEST SCREEN

SELF TEST MENU SYSTEM

System Overview

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

Screen Layout

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

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

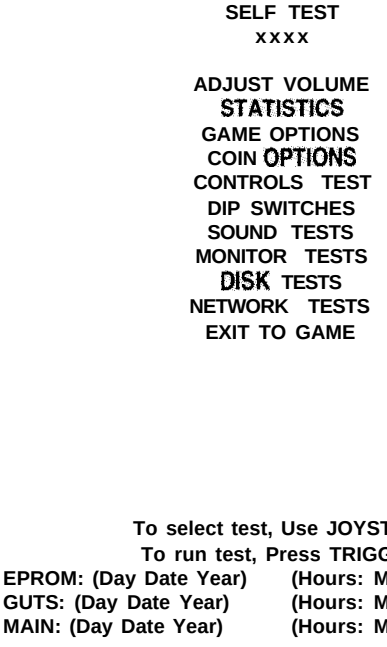
Organization

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

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

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

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



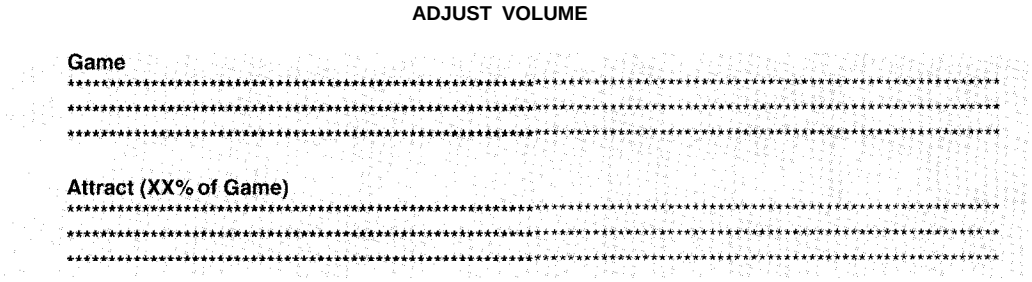
TYPICAL SELF TEST MENU SCREEN

Adjust Volume

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

The volume level can be adjusted separately for either the Attract or Game Mode. Press the TRIGGER to select Game Volume or Attract Volume. Press the VOLUME DOWN or the VOLUME UP buttons or use the JOYSTICK to adjust the volume level. Music plays continuously during this test.

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



ADJUST VOLUME. MENU SCREEN

The “Game” volume ranges from zero to maximum. The game will seem more realistic if the player experiences high volume sounds during play.

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

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

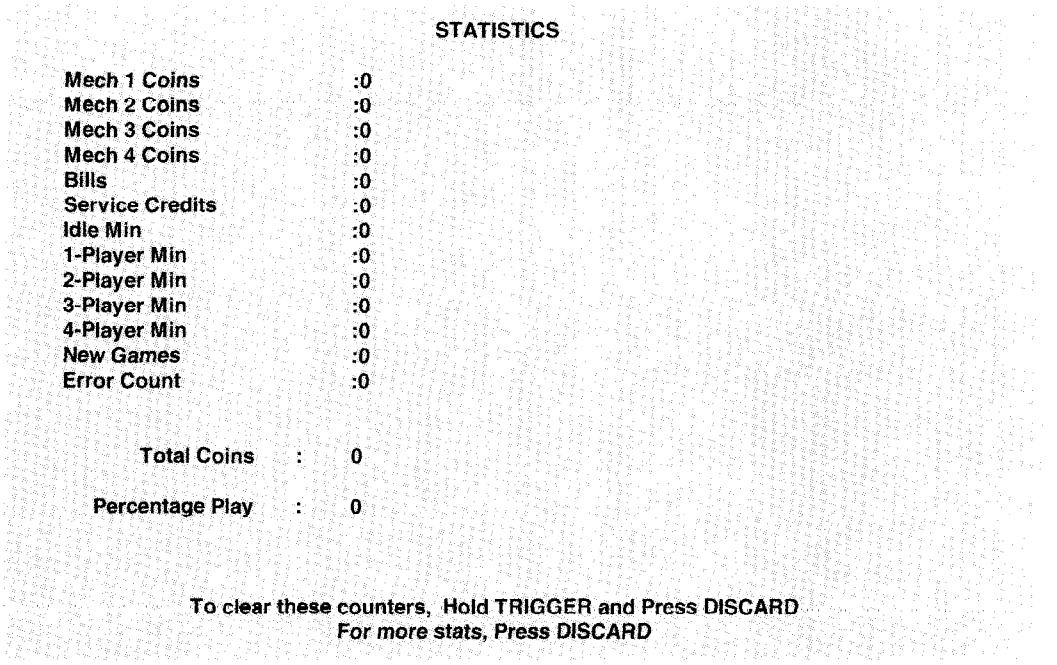
The “Attract” and “Game” volume levels may be adjusted to different values, but the “Attract” level cannot be set higher than the level chosen for normal game play. If the “Game” level is lowered, it will automatically lower the “Attract” level. Lowering the “Attract” level will not effect the “Game”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

NOTE: These adjustments affect the volume both of the tests and 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. Set the volume levels to a moderately high value each time the sound portion of the game is checked. After completing the tests, return the levels to their previous settings.

Statistics

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

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



STATISTICS REPORT MENU SCREEN

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

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

Record the Statistics before doing any service, updates, or repairs on the game.

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

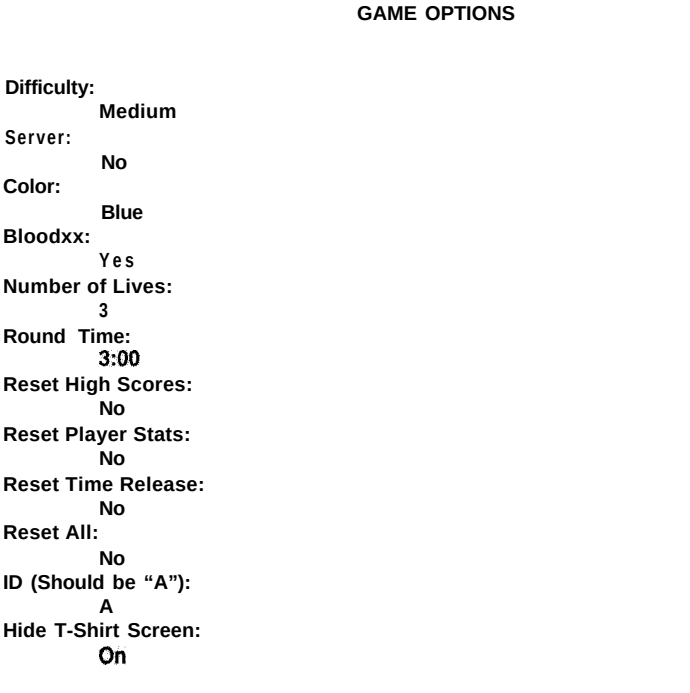
HISTOGRAMS allow graphical analysis of statistics. This permits visual comparisons between games. The HISTOGRAMS screens will have no bar graphs until the system has enough data. Press the TRIGGER button during the STATISTICS display to show a list of HISTOGRAMS.

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

Game Options

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

Use the joystick to select a particular menu item. The START button changes variables. Options may be reset to factory default values or changed after each viewing.



GAME OPTIONS MENU SCREEN

The illustration shows how this screen will look with all of the factory default settings. Move the JOYSTICK to the left or right to advance a variable through its range of choices. Some items have more options than others do. Examine all choices before selecting one. If MORE BELOW appears at the bottom of the screen, use the joystick to navigate to further options.

Difficulty ranges from Easy to Hard in several steps. Select the level of difficulty appropriate for the game location and players.

Server controls the status of the game in a linked network. If games are connected, one game must be set to be a server and all others must be set to be slaves. *On/y one game in a linked group can be a* server. Set this option to Yes if the machine is the server in a network; set this option to No if another machine in the same linked group already has been set to Yes.

Color is used in combination with Server when several games are linked in a network. All games in a network must have a unique color. Set each game in a network to a different color.

Bloodxx sets whether the game displays blood when characters are injured or killed.

Number of lives sets the number of times a character can be defeated before a player must purchase more credits to continue play. Use this option together with **Difficulty** and **Round Time** to optimize the game for the players at a particular location.

Round Time sets the length of play in any one DEATHMATCH level. The default is 3:O0.

Reset High Scores selects whether to reset the high score table. The default setting is No.

Reset Time Release resets the sequence of time release characters in the game. The default setting is No.

Release All allows players to select from all characters in the time release sequence immediately. The default setting is No.

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

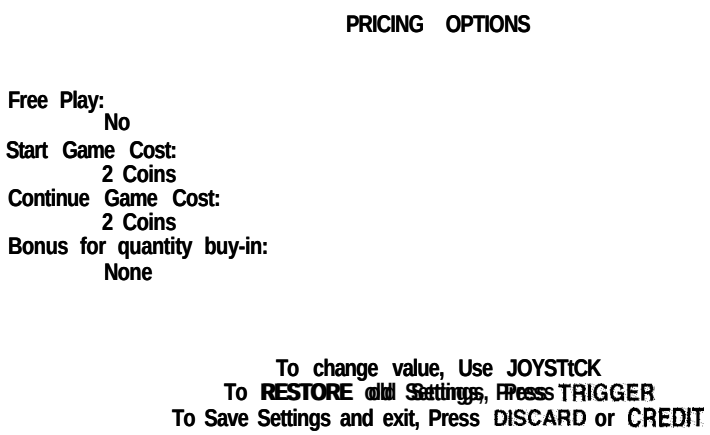
The **ID** setting for all linked games must be identical. The default setting is “A.”

Hide T-Shirt Screen controls whether a promotional announcement appears during the attract screens. Set this control to ON to include the announcement in the series of attract screens. Set this control to OFF to eliminate the announcement from the attract screens.

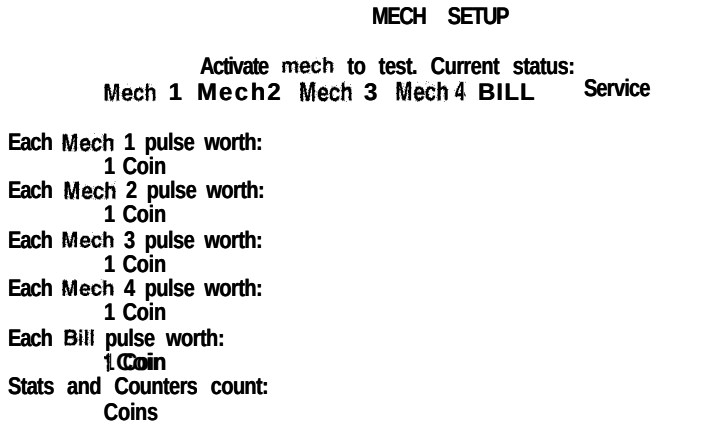
Coin Options

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

Use the joystick to select a particular menu item. Use the joystick to change variables. Options may be set to factory default values or changed after each viewing.



PRICING OPTIONS MENU SCREEN



MECH SETUP MENU SCREEN

The illustrations show how these screens will look with all of the factory default settings. Some items have more options than others do. Move the joystick left or right to view all options before selecting one.

PRICING OPTIONS

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

MECH SETUP

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

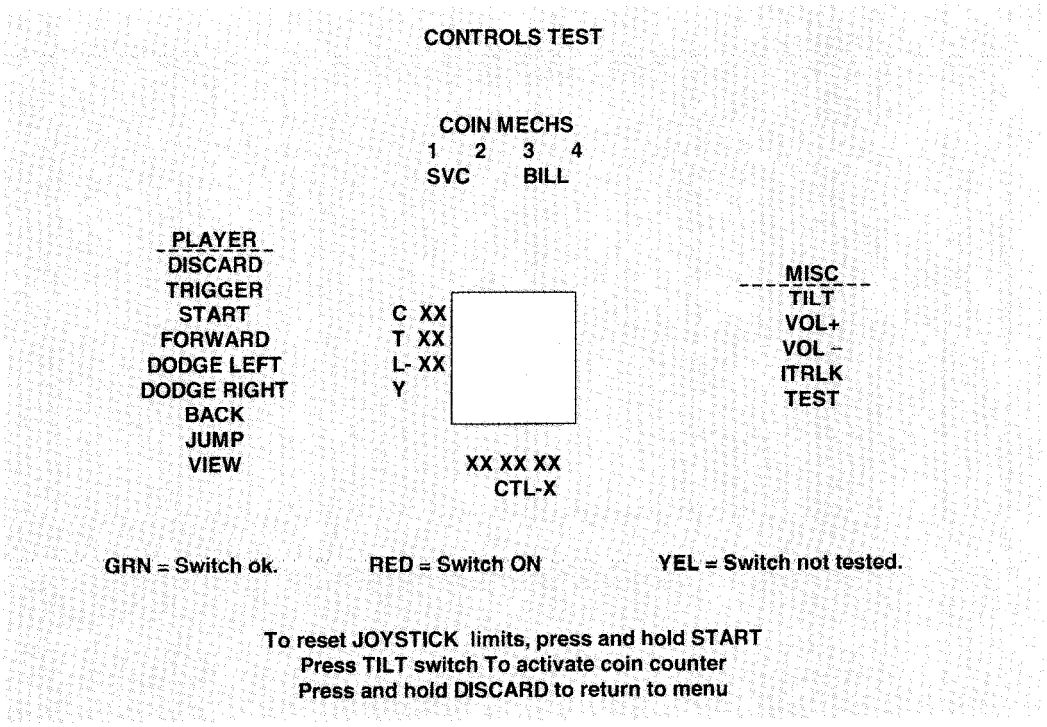
Controls Test

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

NOTE

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

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



CONTROLS TEST MENU SCREEN

The Controls on the screen appear as they are found on the dashboard, steering mechanism, and in the coin door area. Each control change should be duplicated exactly by a single indication on the menu screen.

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

Press and hold the START button to reset the joystick limits. The CTL-Y and CTL-X values should change from green to red. Push the joystick mechanism fully left, right, forward, and backward. The values should change back to green.

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

DIP Switches

The two DIP switches located at U12 and U13 on the SIO Board configure the Electronics Assembly for various input and output devices. The on screen display shows the switch status for easy reference. See Section 3 for specific information on the function of switch positions.

DIP SWITCHES

u12

1	OFF	
2	OFF	Standard 512 x 256 Resolution
3	OFF	Not Used
4	OFF	Not Used
5	OFF	Not Used
6	OFF	Not Used
7	OFF	Not Used
8	OFF	Not Used

u13

1	OFF	Not Used
2	OFF	Run game
3	OFF	Not Used
4	OFF	Not Used
5	OFF	Not Used
6	OFF	Not Used
7	OFF	Not Used
8	OFF	PM dump Watchdog resets only

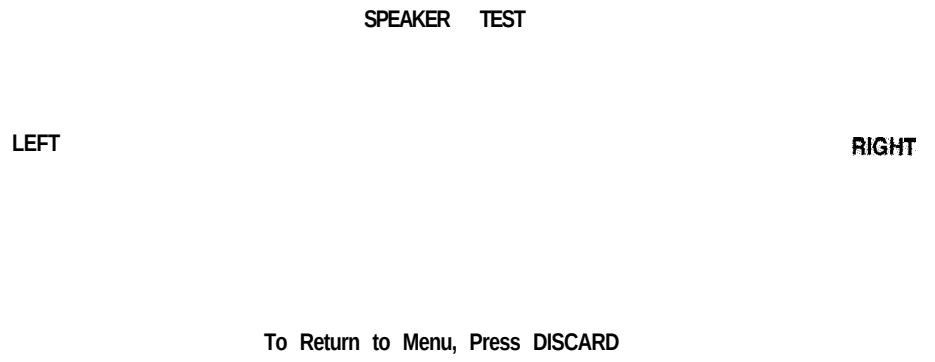
To return to Menu, Press DISCARD

Sound Tests

These tests verify the proper connection and operation of the audio components.

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

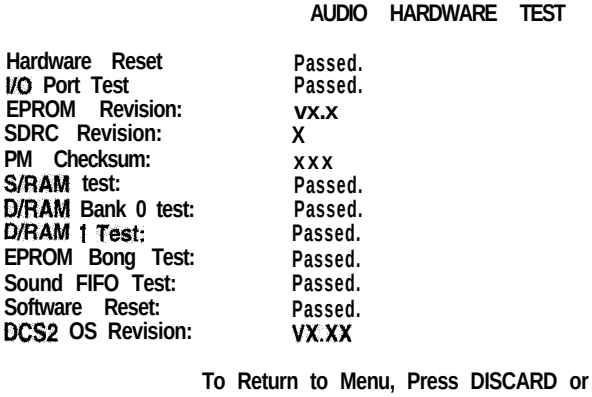
There are no custom settings or adjustable variables in these tests. The test is performed automatically.



SPEAKER TEST MENU SCREEN

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

The Audio Speaker Test screen verifies crossed connections and distortion. Press the DISCARD button to end the Audio Speaker Test and return to the SOUND TESTS menu.



AUDIO HARDWARE TEST REPORT SCREEN

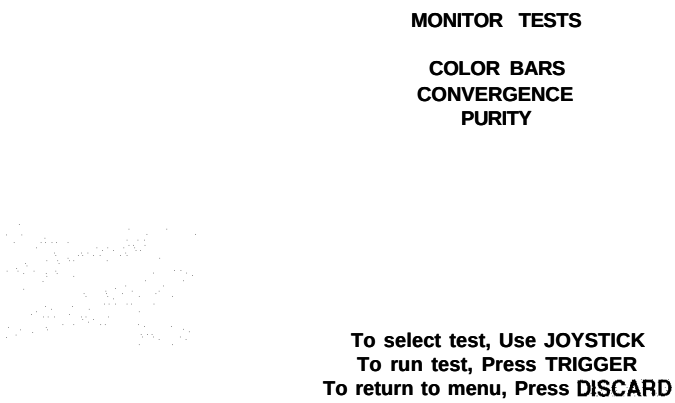
AUDIO HARDWARE TEST automatically tests the electronic components of the audio amplifier for problems and reports the results as “passed” or “failed.” Each “failed” result should be noted and referred to qualified service personnel. This test also shows the revision numbers for the audio EPROMs and other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

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

Monitor Tests

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

Use the joystick to choose a particular menu item. Press the TRIGGER to begin each test. The TRIGGER button changes variables during each test. The DISCARD button ends the test.



MONITOR TESTS MENU SCREEN

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

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

Press the TRIGGER twice to change the color of the screen border. Press DISCARD to exit.

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

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

Press the TRIGGER button to change the color of the screen grid lines. Press DISCARD to exit.

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

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

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

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

Disk Tests

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

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

DRIVE READ TEST

Hard Drive Connected: Yes

Drive ID: XXXXXX

Logical Sectors Avaiiabie: XXXXXXX

LBA	MB/sec	
12216	5.862	avg
	4,543	min
	5.917	max

Tests completed: 1

To return to menu, Press MSCARD

DRIVE TEST MENU SCREEN

Hard Drive Connected

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

Drive ID

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

Logical Sector Test

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

Tests Completed

These tests run over and over. The number increases each time the test cycle repeats (approx. every 5 minutes). After at least one cycle (“pass”) is complete, press the DISCARD or CREDIT button to end the test.

FILE SYSTEM CHECK

Disk Space Available: X.XX GB
File system occupies: X.XX GB
Total files used: XXXX
Passes completed: X

Checking File: xxxx

To return to menu, Press DISCARD

FILE SYSTEM TEST SCREEN

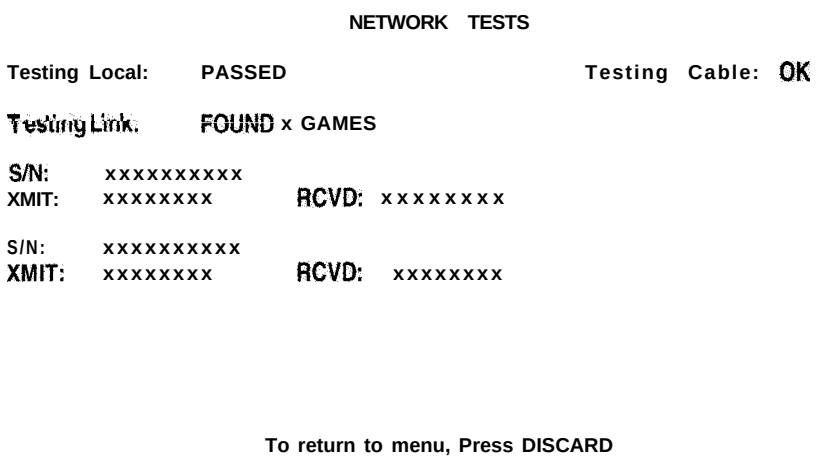
Checking File

This routine performs a file by file check of data stored on the hard disk drive and reports its findings. If there are errors, the system tries to fix them (approx. 5 minutes per cycle). The system reports on the severity of the errors and advises if they will affect game performance.

Network Tests

The NETWORK TESTS provide routines for verifying the communication circuits when games are linked. These tests are automatic and the results are reported on the menu screen as they occur. These tests test the network cable and send data out from each game and look for responses. At least two cabinets must be networked properly to pass this test. The Network Tests screen must be invoked on all cabinets during testing.

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



NETWORK TESTS MENU SCREEN

Several different options allow cabinet linking for head-to-head player competition. This screen allows the operator to determine if the linking equipment is networking or not working. The results of these tests either confirm proper operation or indicate the location of any problem. All linked games must be in network test mode to find any other games.

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

Testing Local

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

Testing Cable

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

Testing Link

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

Transmitted

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

Received

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

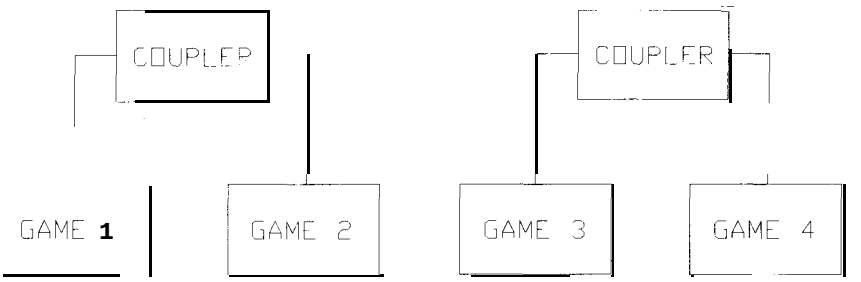
LINKED OPERATION

Equipment Requirements

Linked mode unites cabinets together and permits several players to play against each other in real time. The Linking program is player selectable so each cabinet can meet the needs of the players.

Games must be interconnected for linked operation. One cable is installed in each cabinet at the factory.

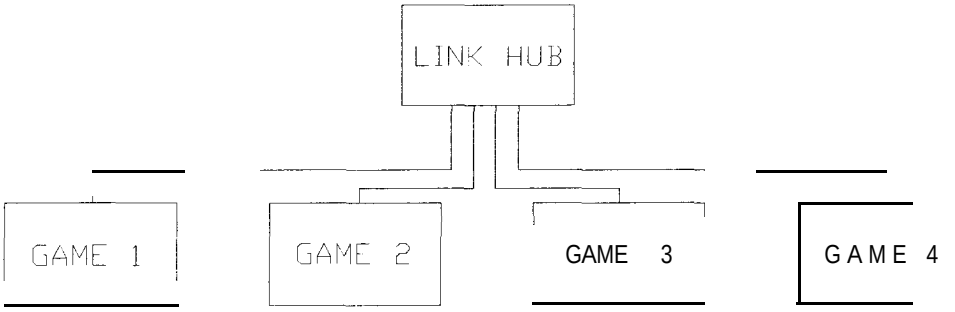
♦ **ALL GAMES** contain a crossover coupler to connect two cabinets together.



BASIC LINKING DIAGRAM

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

♦ **The DELUXE LINKING KIT (Model** 35737) contains a lighted overhead sign, a network hub, and cabinet connector brackets. The network hub active circuits allow the use of more cables of greater length.



HUB LINKING DIAGRAM

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

NOTE: It is not possible to link more than four WAR game cabinets.

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

SWITCHES AND JUMPERS

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

♦ Switches

There is one CPU Board push button switch (S1, near the heatsink). This switch resets the processor. This switch is used during service to restart the game without cycling the power off and on again.

There are two DIP Switch blocks (U12 and U13, near the center of the SIO Board Assembly). Each consists of eight Individual switches. These switches are factory set for normal game operation.

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

♦ Jumpers

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

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

ERRORS

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

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

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

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

WAR™

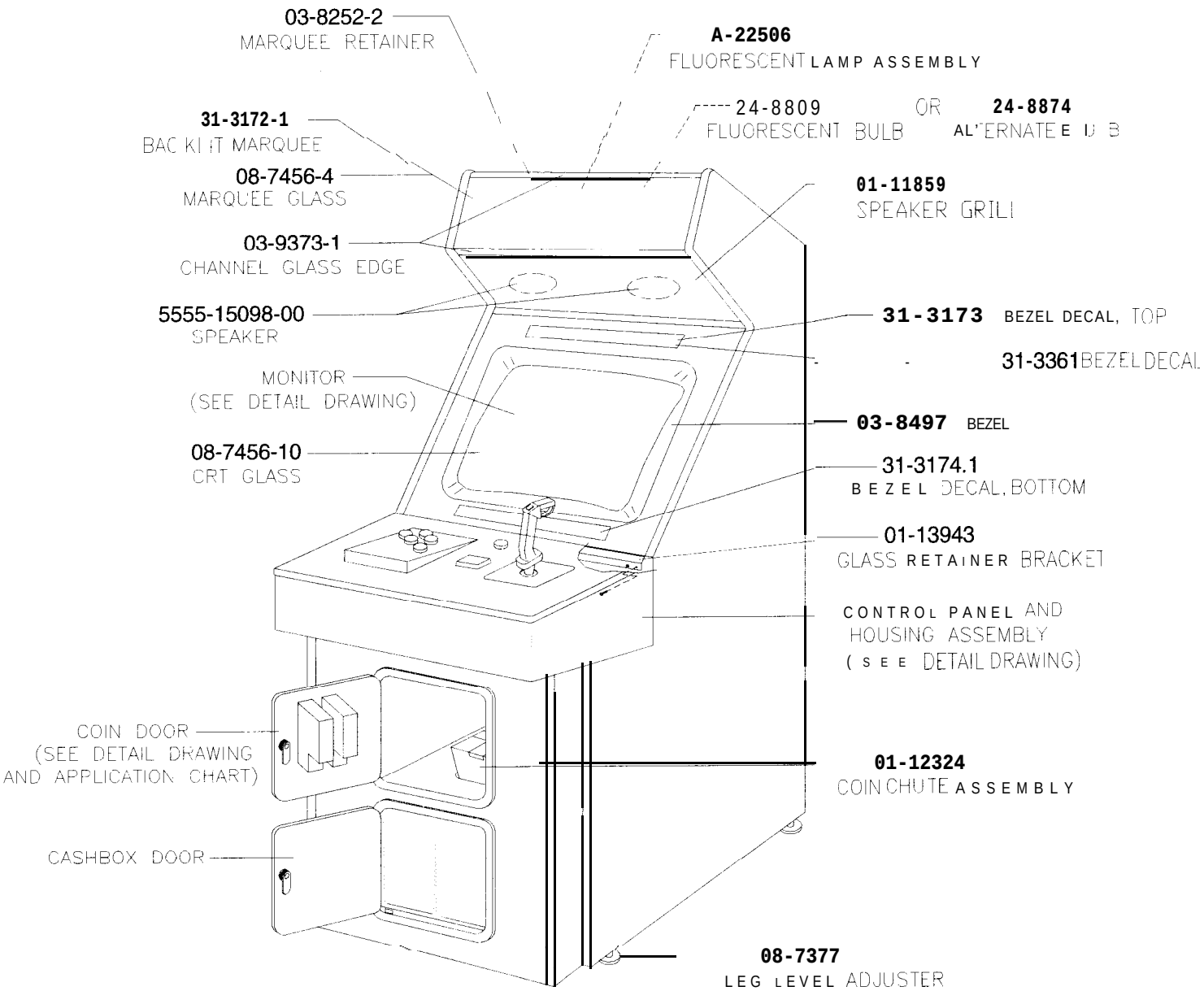
SECTION TWO

PARTS

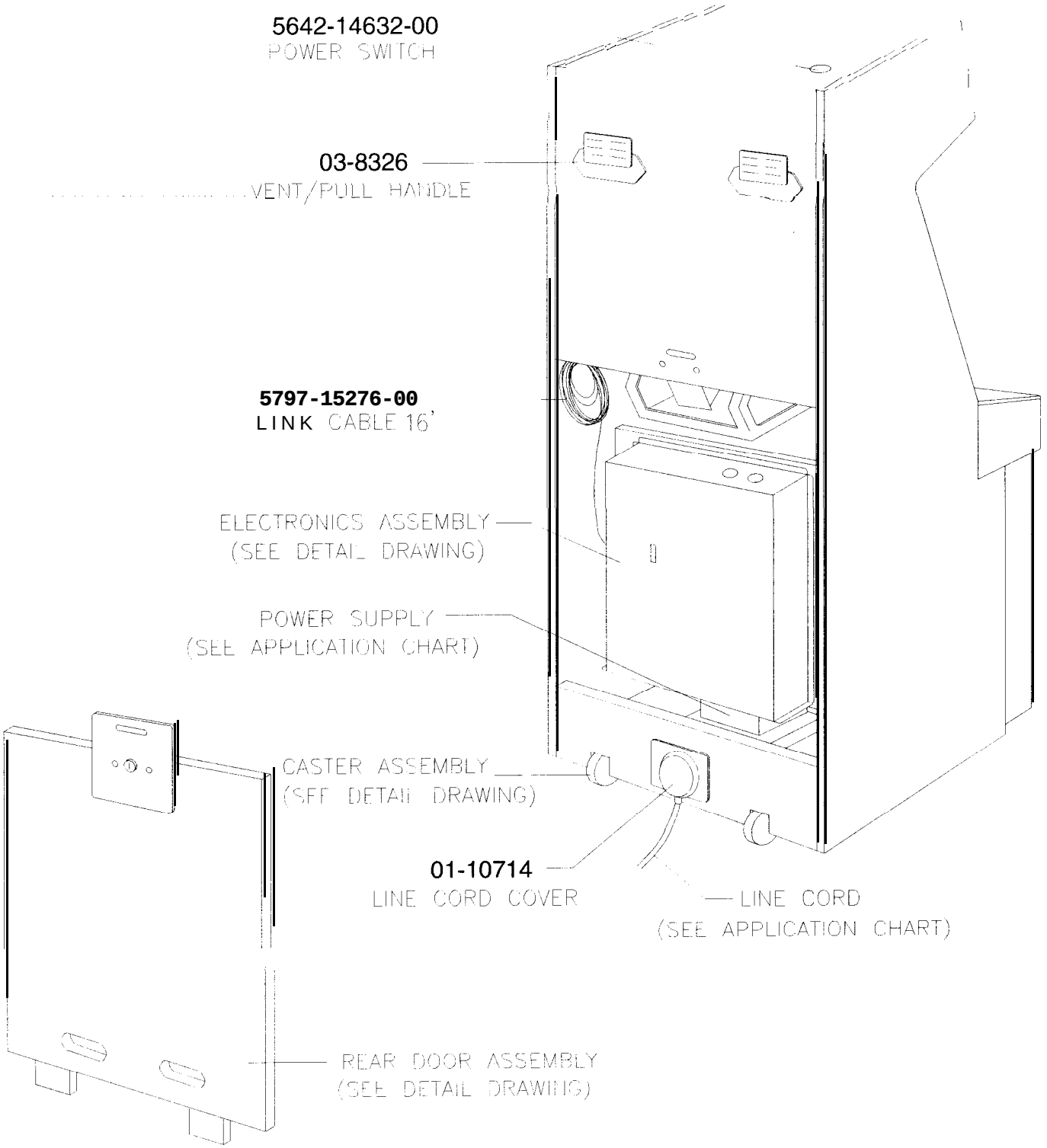
Warning
USE OF NON-ATARI PARTS OR CIRCUIT MODIFICATIONS MAY CAUSE SERIOUS INJURY OR EQUIPMENT DAMAGE! USE ONLY ATARI AUTHORIZED PARTS.

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

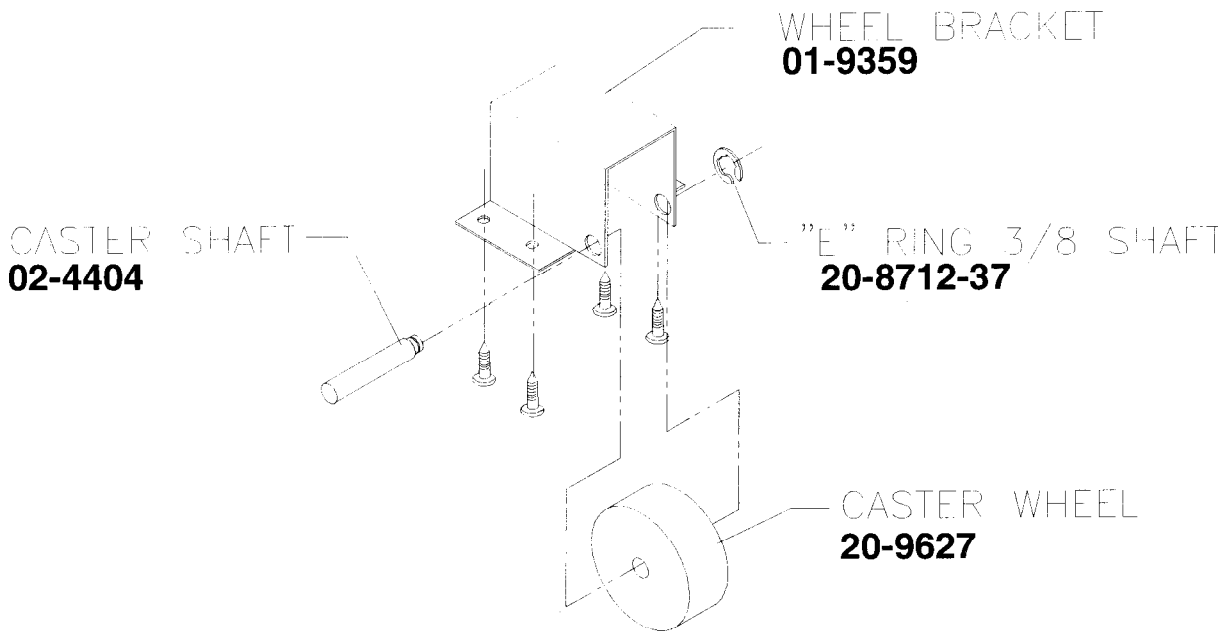
CABINET FRONT VIEW



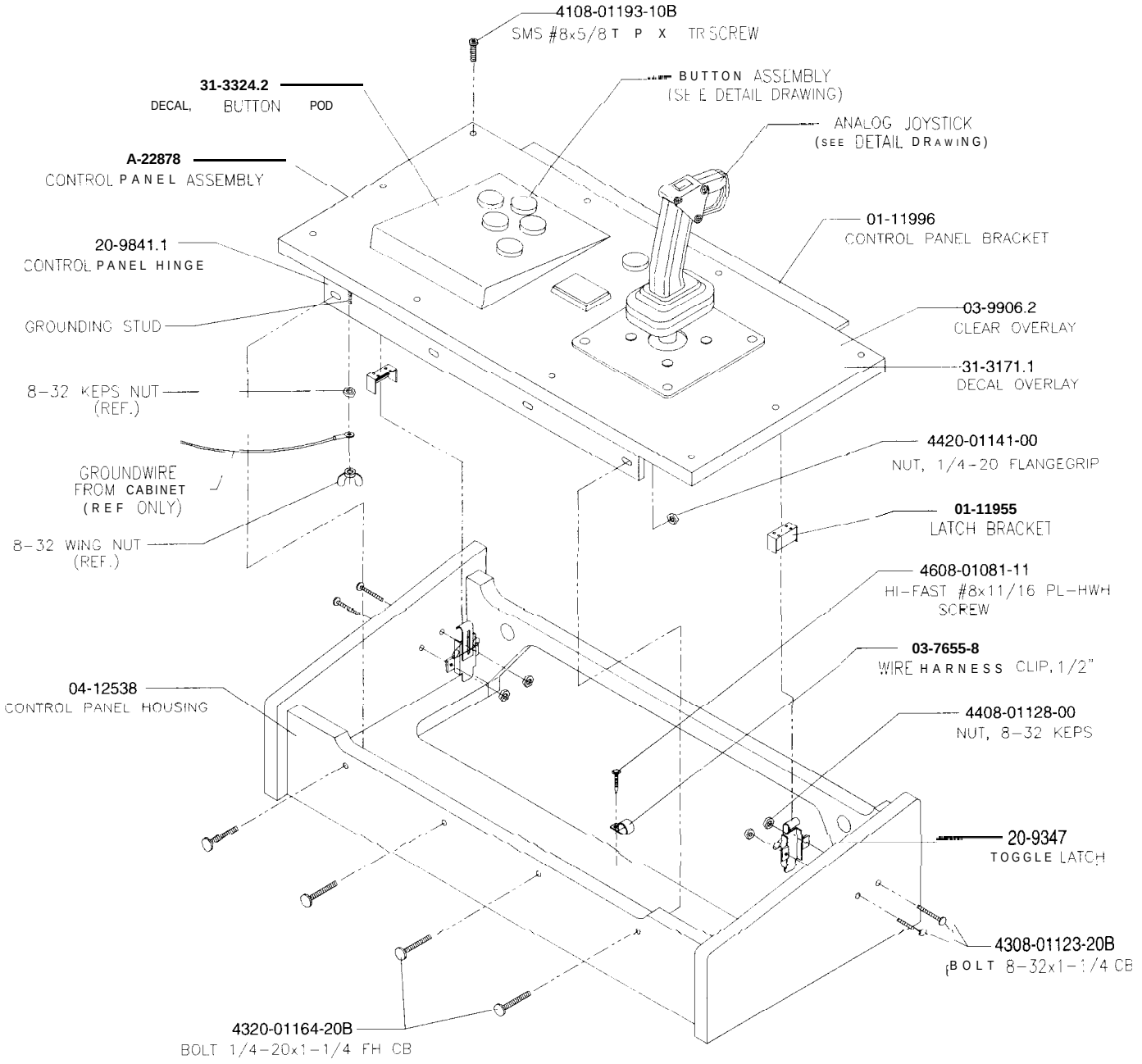
CABINET REAR VIEW



CASTER ASSEMBLY

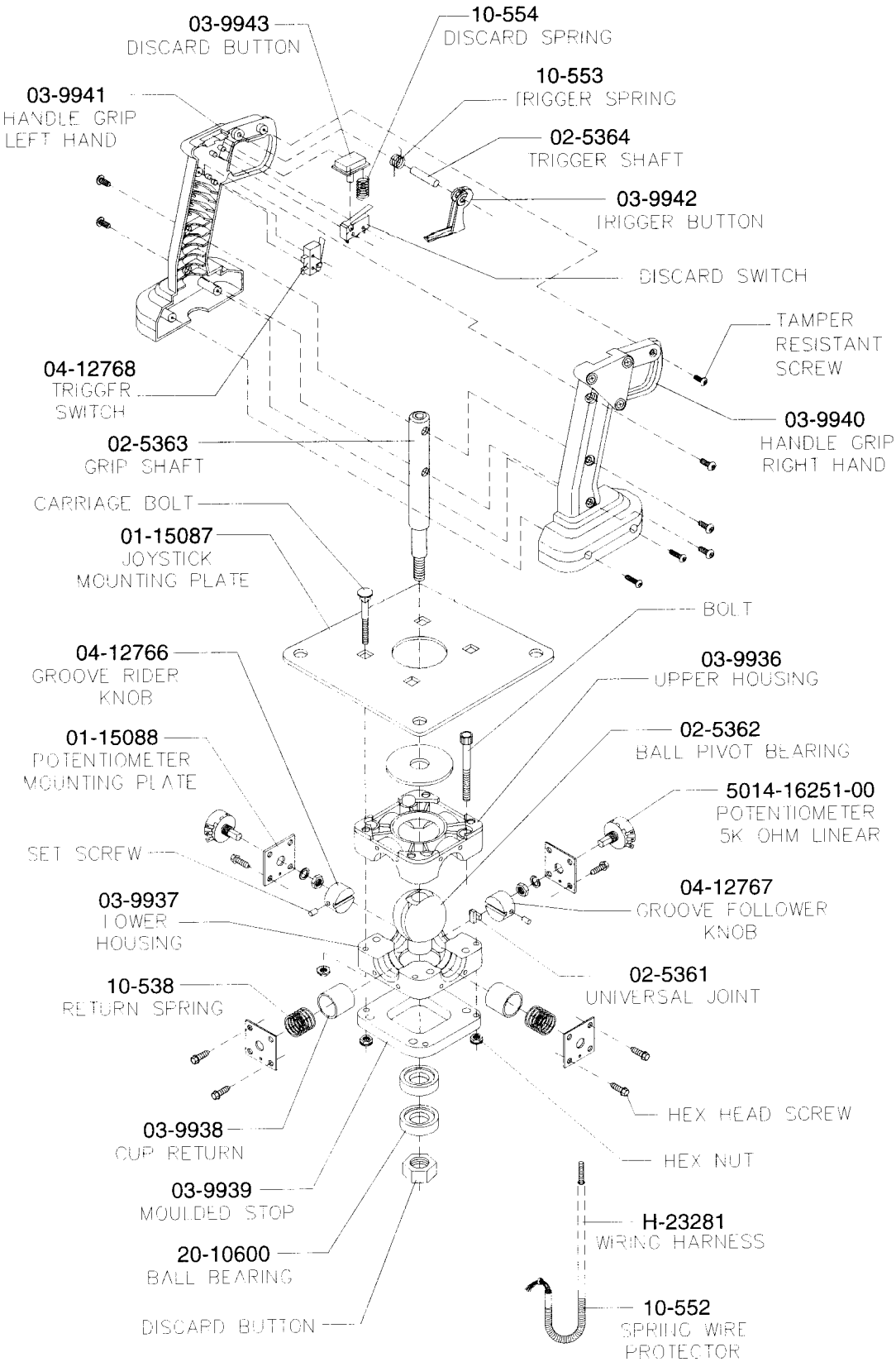


CONTROL PANEL AND HOUSING ASSEMBLY
A-22881

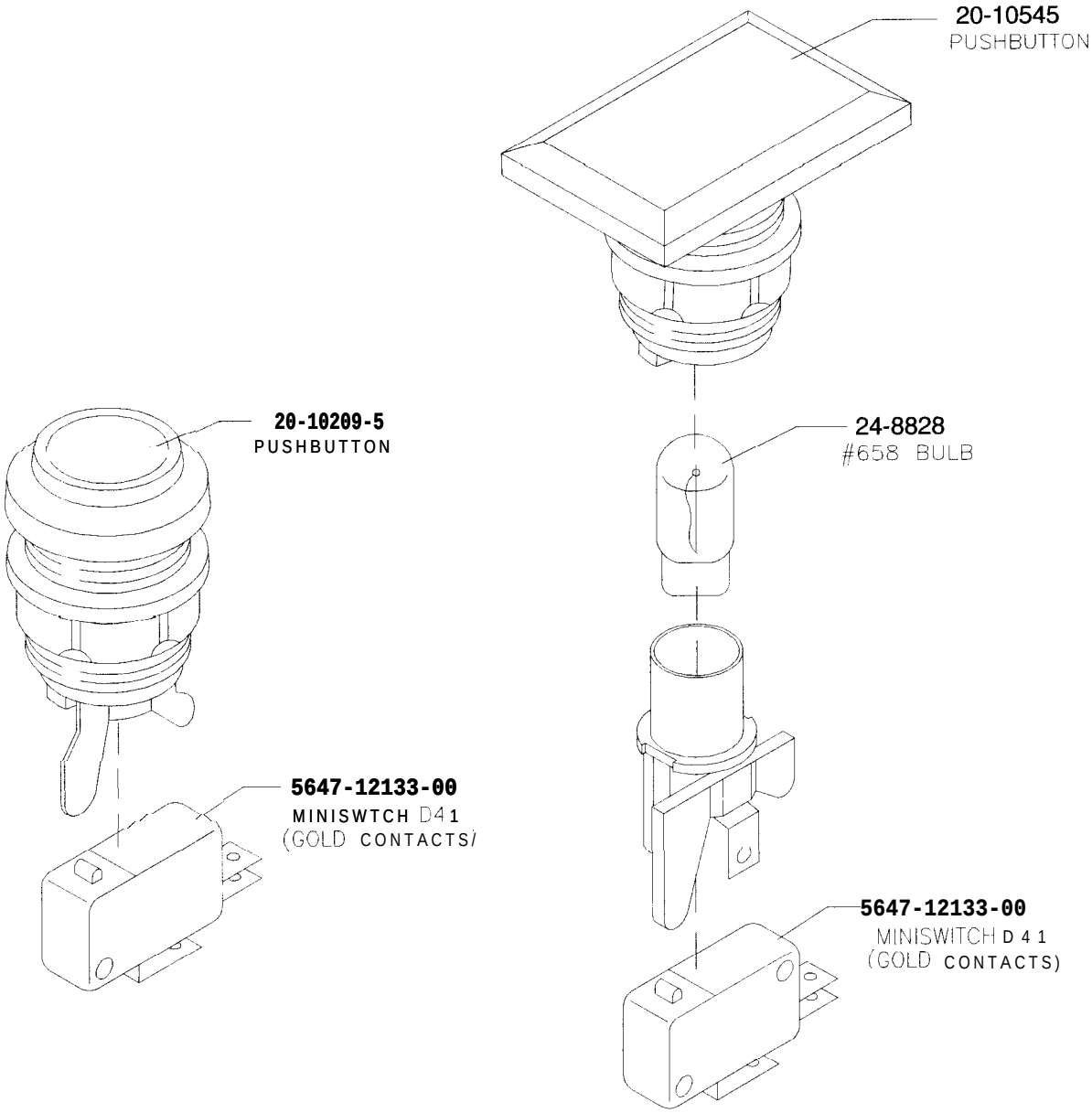


ANALOG JOYSTICK

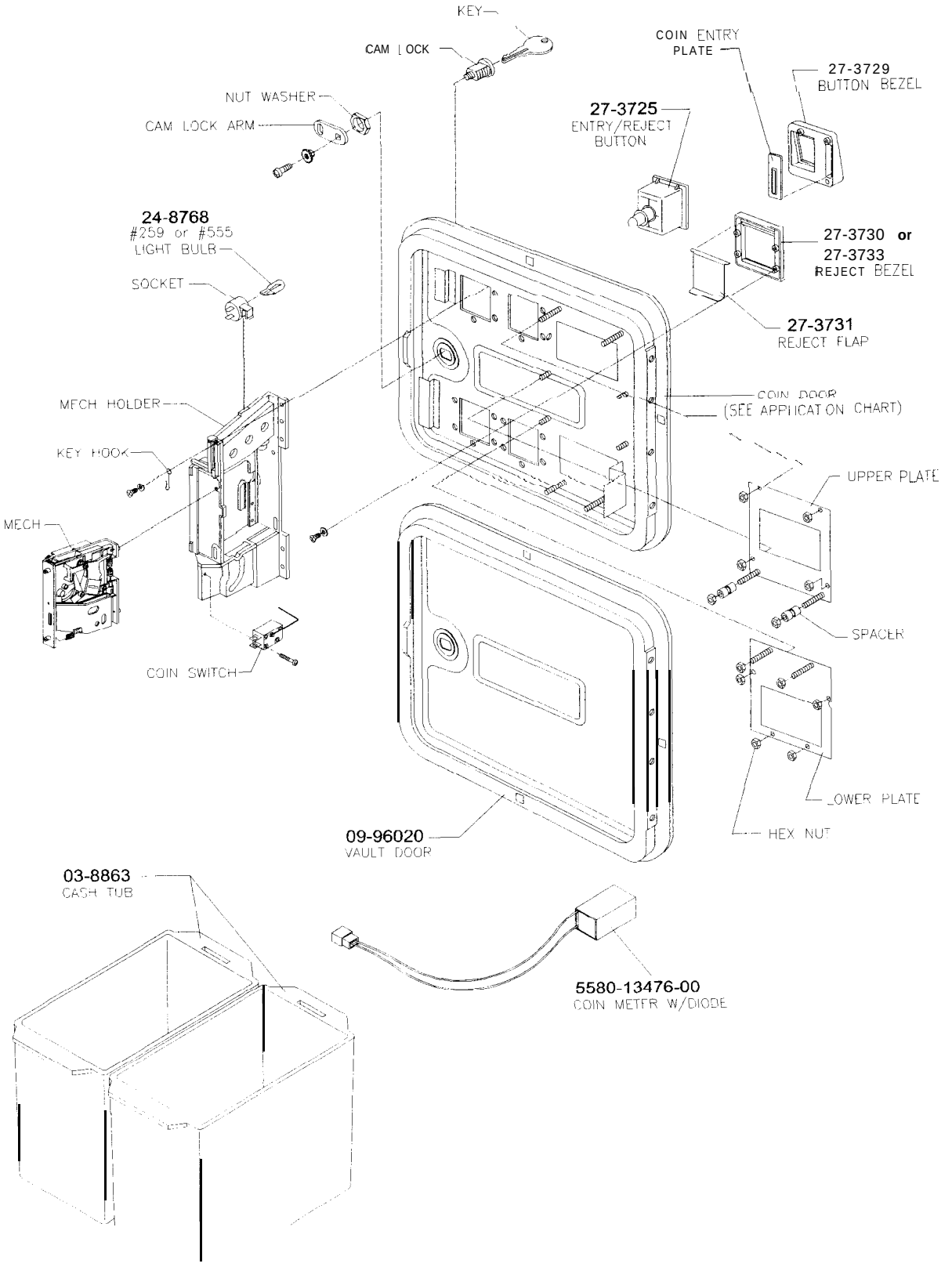
04-12450



PUSHBUTTON ASSEMBLIES

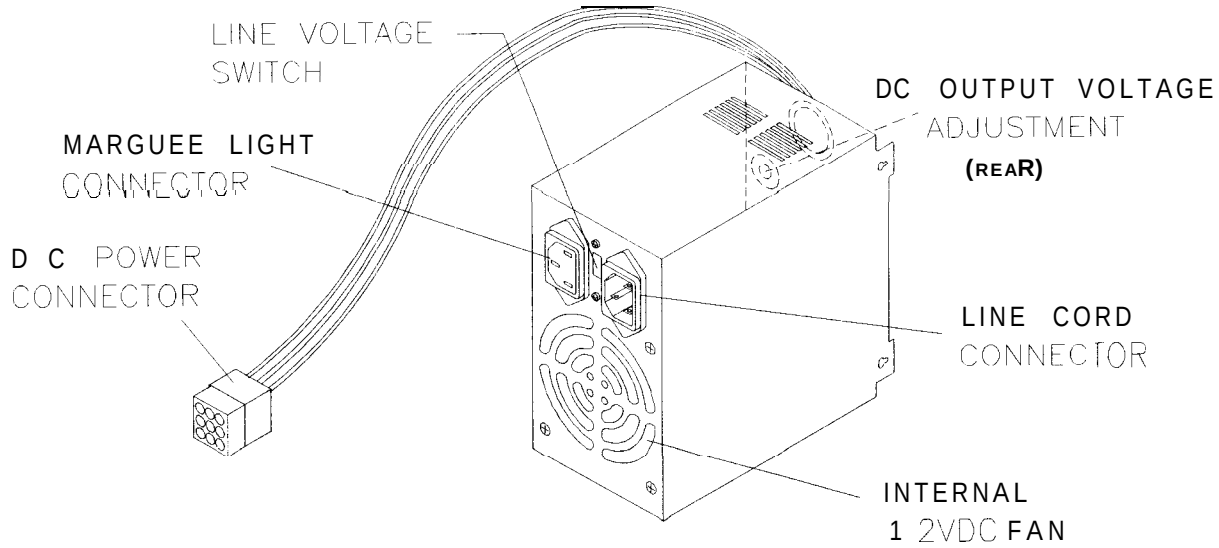


COIN DOOR ASSEMBLY



POWER SUPPLY ASSEMBLY

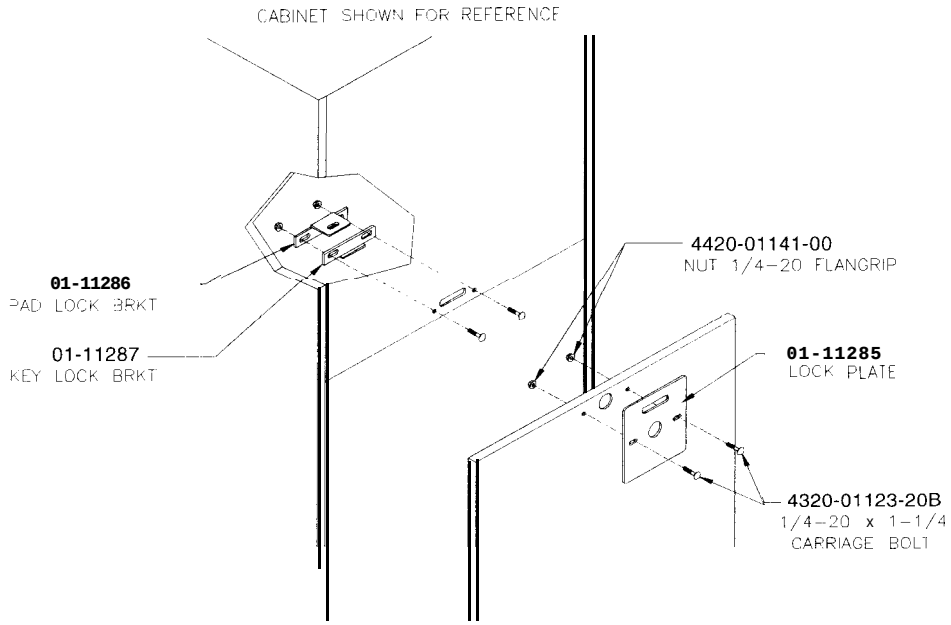
20-10167



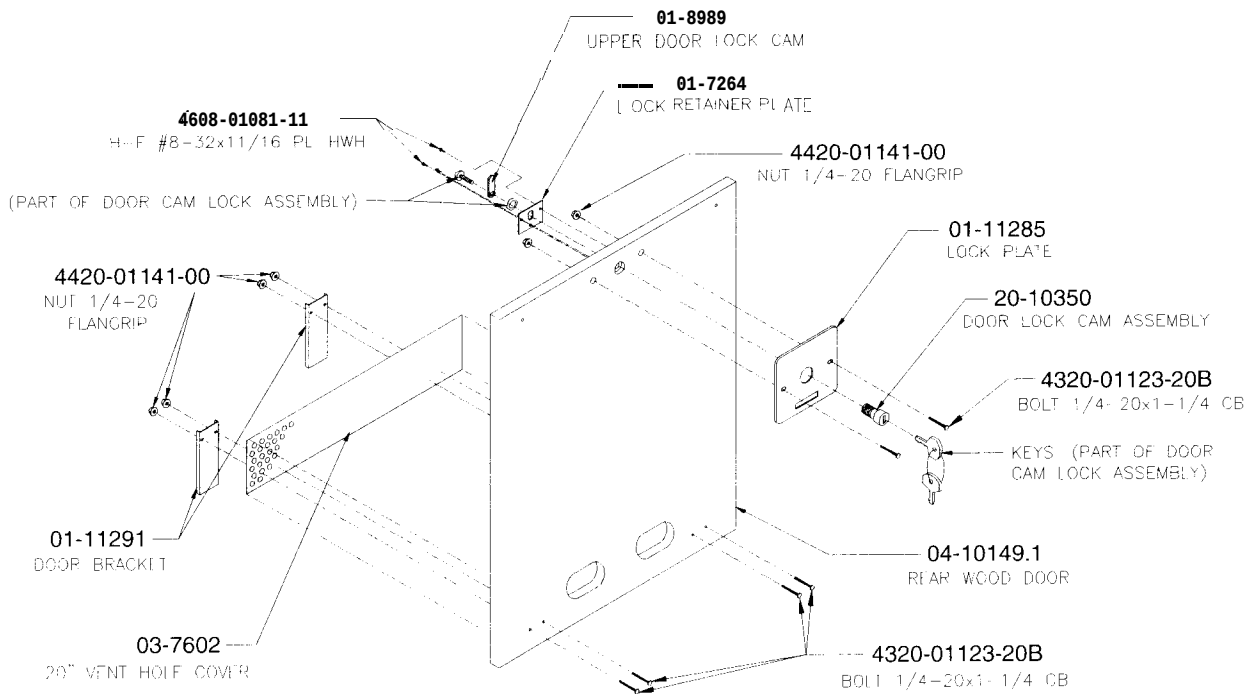
Pin #	Function	Wire Color
1, 2, 3	+5VDC	Red
4, 5, 6	Ground	Black
7	−5VDC	Yellow*
8	+12VDC	Orange*
9	−12VDC	Blue*

*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

REAR DOOR LOCK ASSEMBLY



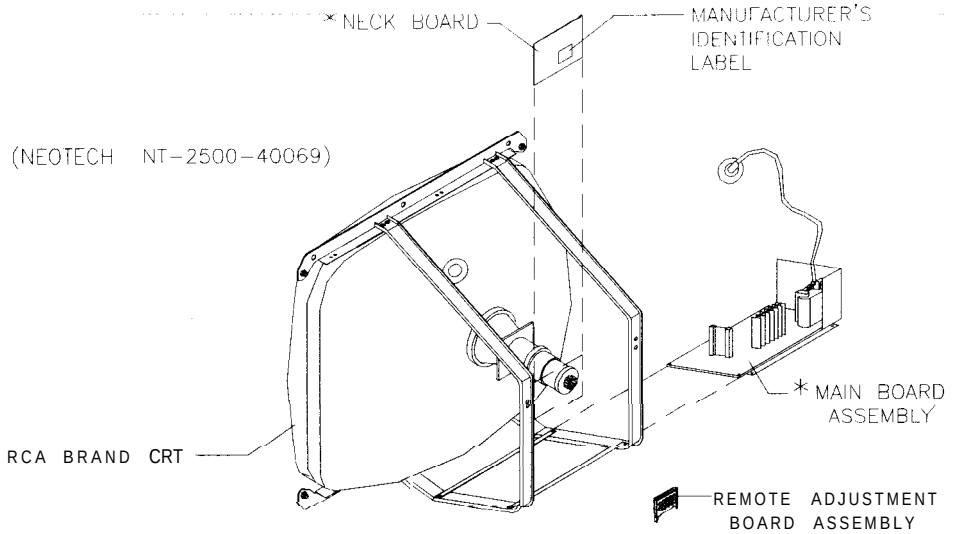
REAR DOOR ASSEMBLY
A-20281



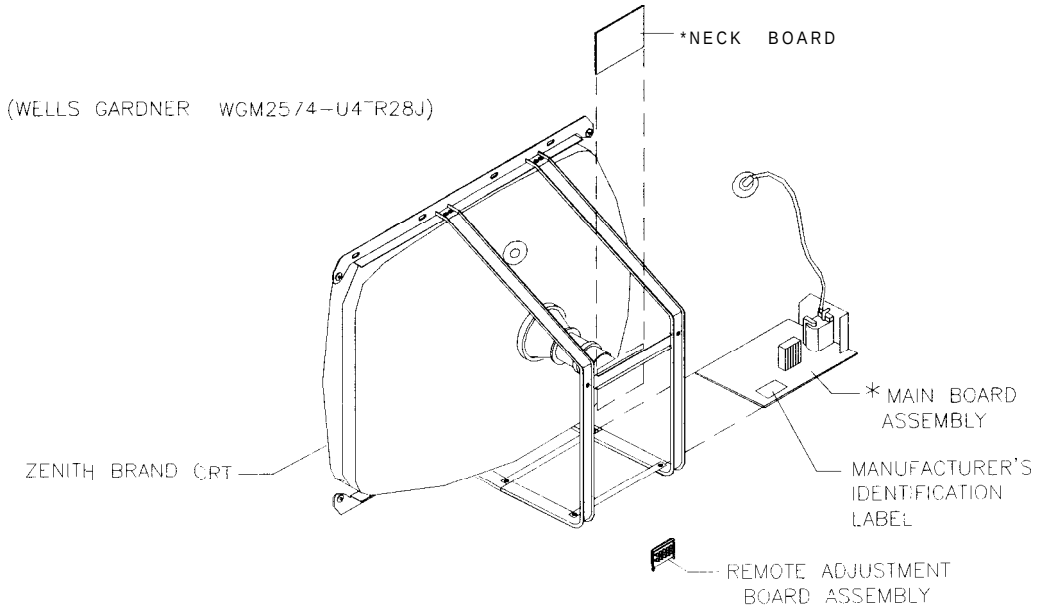
VIDEO MONITOR ASSEMBLY
5675-15215-02

NOTE: When ordering any of the individual monitor components, you must identify the monitor and CRT manufacturers. Look for a label on the neck board or main board assemblies and on the CRT near the deflection yoke.

The CRT, frame, deflection yoke, and remote adjustment board assembly are not available separately. These components are specific to each video monitor and are not interchangeable. Complete monitor assemblies (CRT with frame, yoke, neck board, and main board) are interchangeable between cabinets.

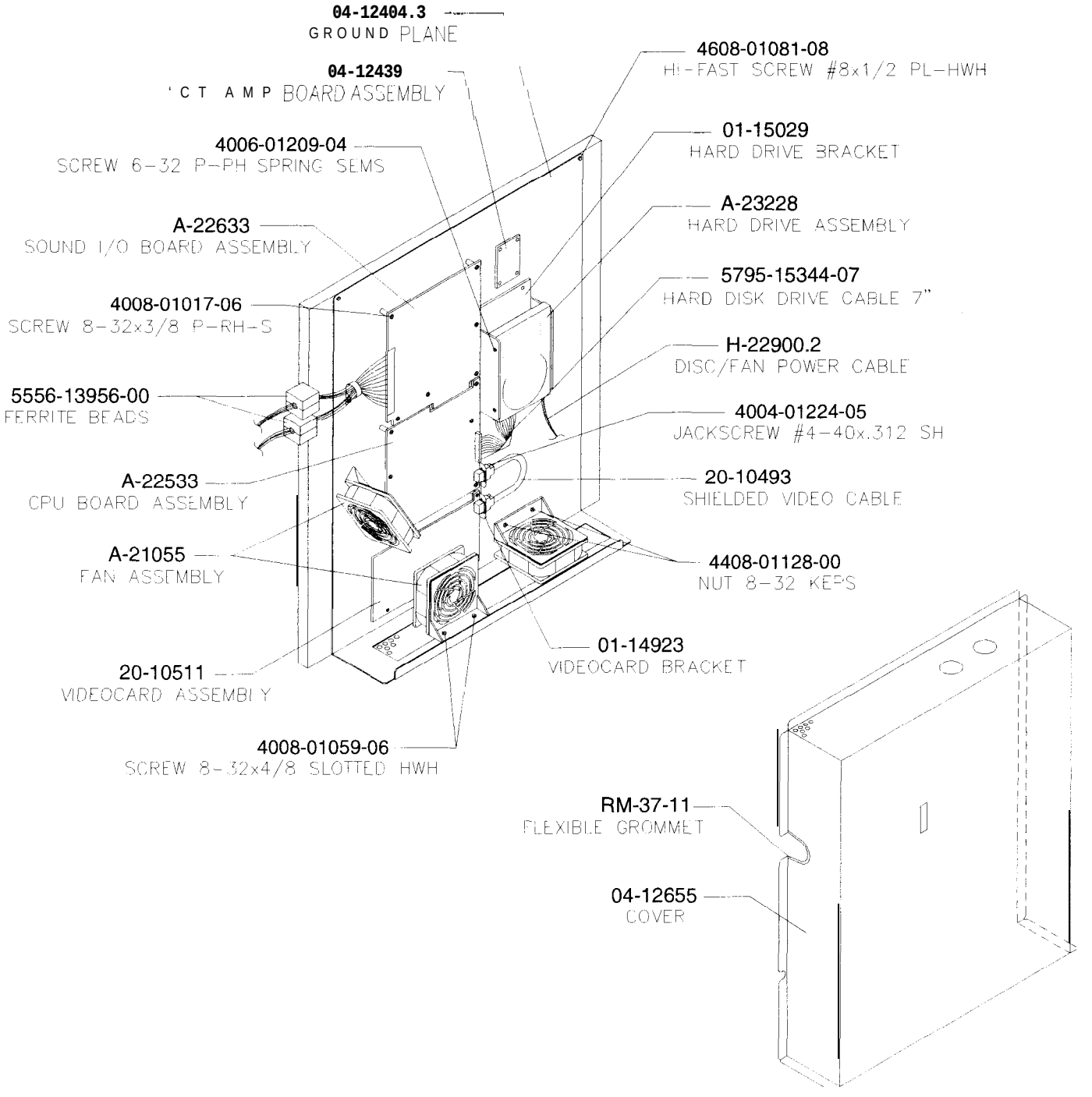


* THESE PARTS ARE AVAILABLE FOR THE CRT ONLY AS A SET UNDER PART NO. 04-10928

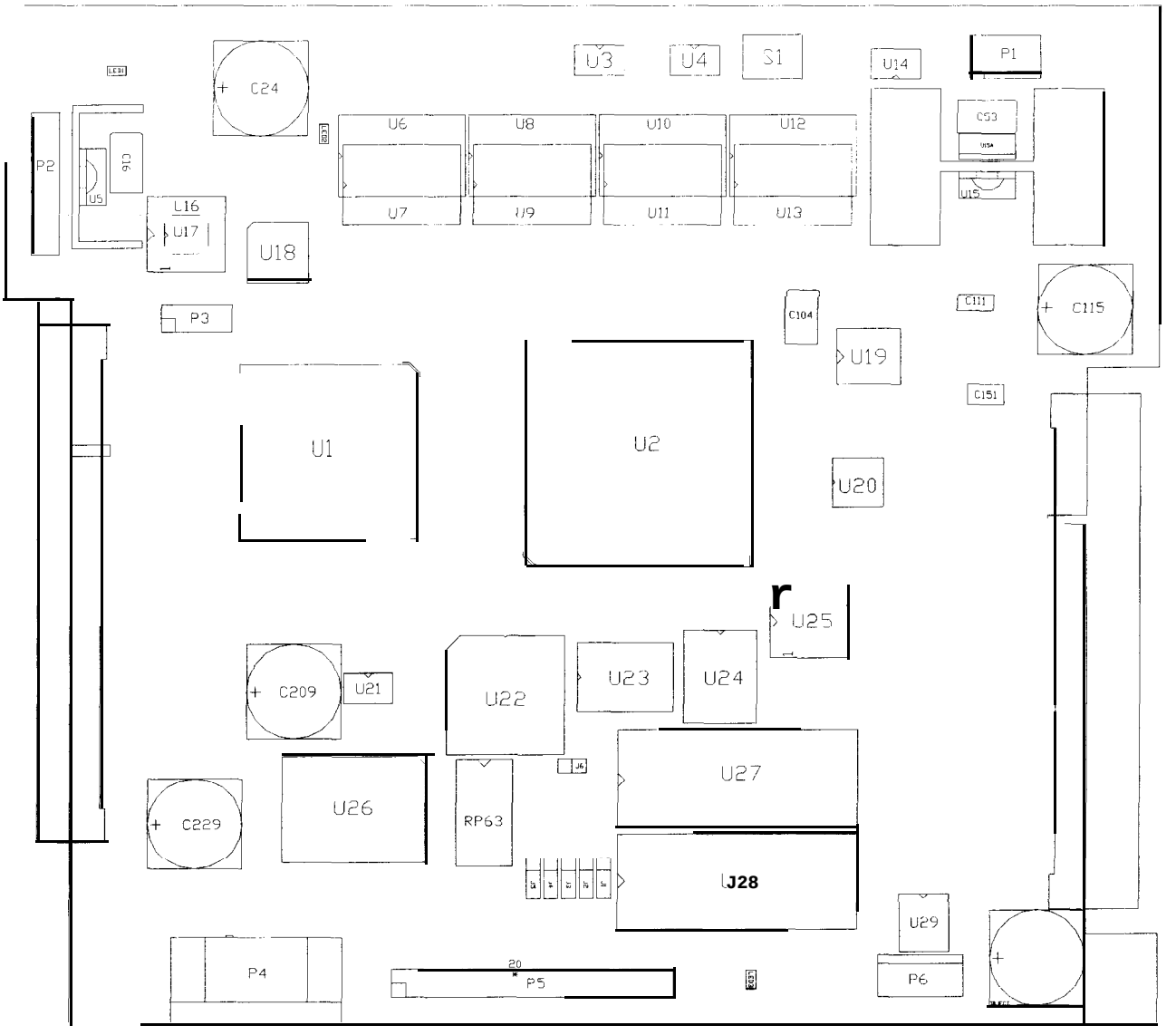


* THESE PARTS ARE AVAILABLE FOR THE CRT ONLY AS A SET UNDER PART NO. A-22215.

ELECTRONICS ASSEMBLY
A-22893



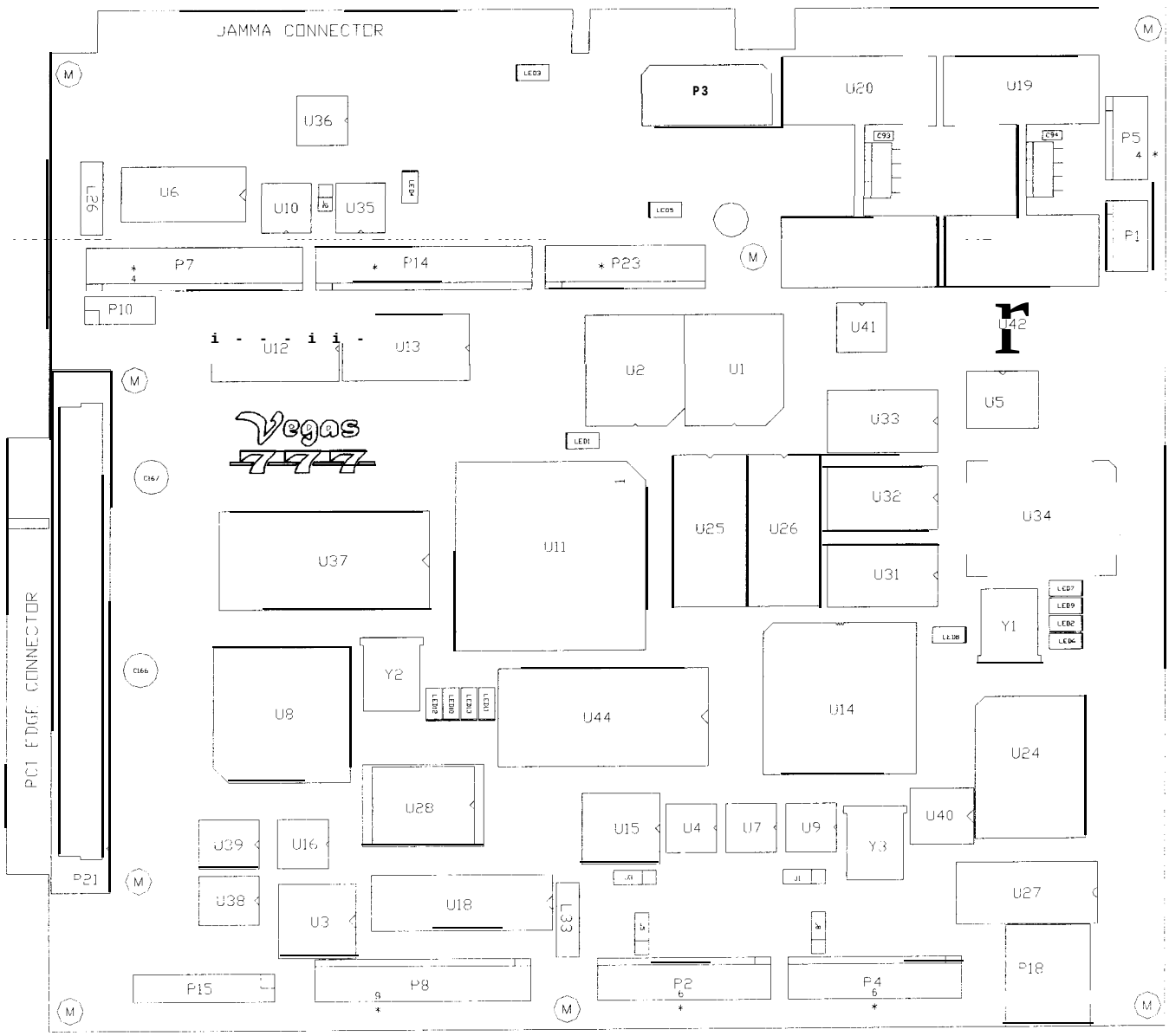
5271 CPU BOARD ASSEMBLY
A-22533



Field Replaceable Parts

DESIGNATION	PART NUMBER	FUNCTION	DESCRIPTION
u5	5250-I 601500	+2V Regulator	Voltage Regulator 2.5VDC
U15	5460-I 5671-00	+3V Regulator	Voltage Regulator 3.3 VDC
U19	A-2291 1	Bus Controller Configuration	Programmed Logic Device
u22	A-229 12	CPU Configuration	Programmed Logic Device
U27	A-5343-30022-1	CPU Boot ROM	EPROM Assembly
U28	--	CPU Expansion ROM	EPROM Assembly (empty)

VEGAS SOUND I/O BOARD ASSEMBLY
A-22633

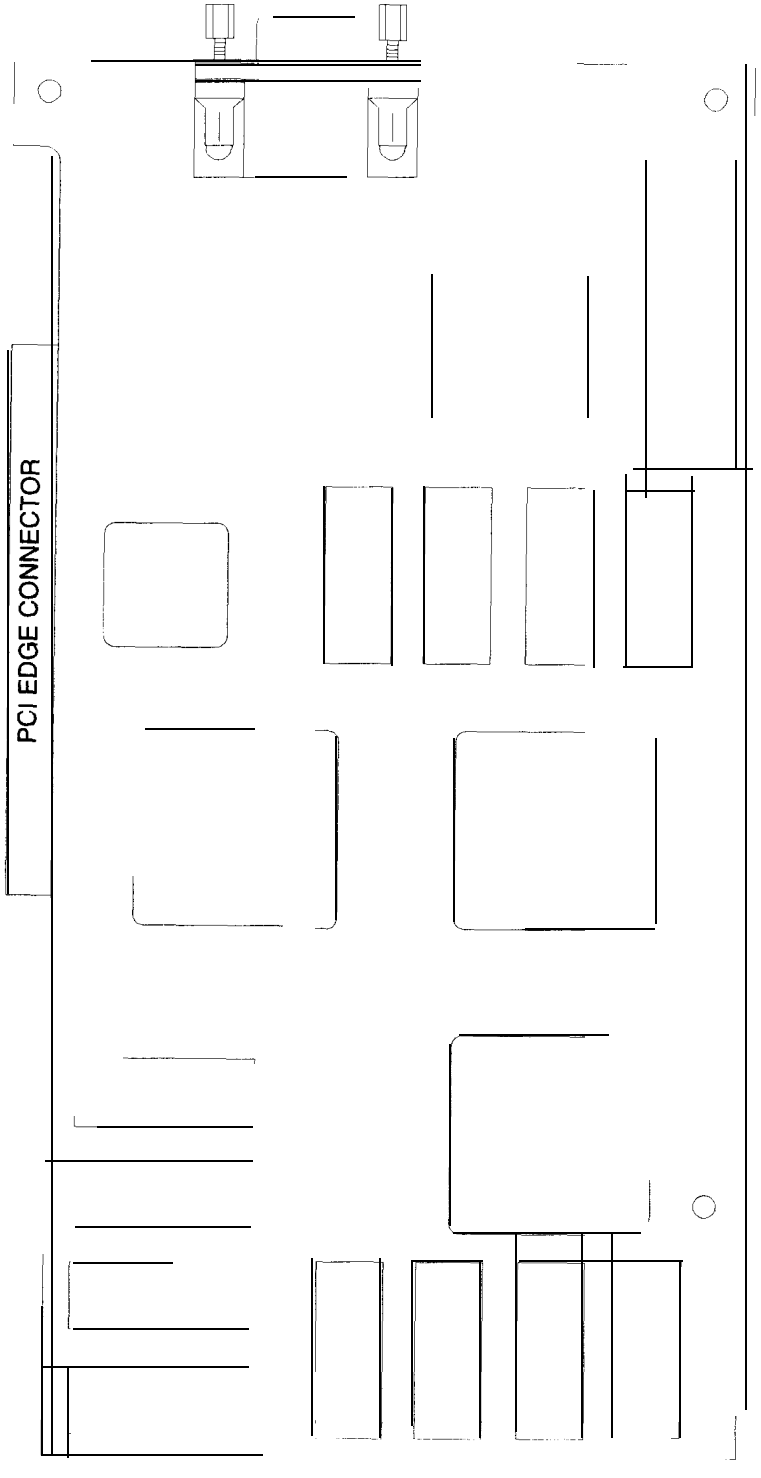


Field Replaceable Parts

DESIGNATION	PART NUMBER	FUNCTION	DESCRIPTION
U1, u2	5344-l 5764-00	FIFO Memory Circuit	AM 7201-35JC
U19, U20	5370-l 4146-00	Audio Amplifier	TDA 7204A
u37	A-22634	Game Security	PIC Assembly
u44	A-5343-30037-3	Audio Instructions	EPROM Assembly

VIDEO CARD ASSEMBLY

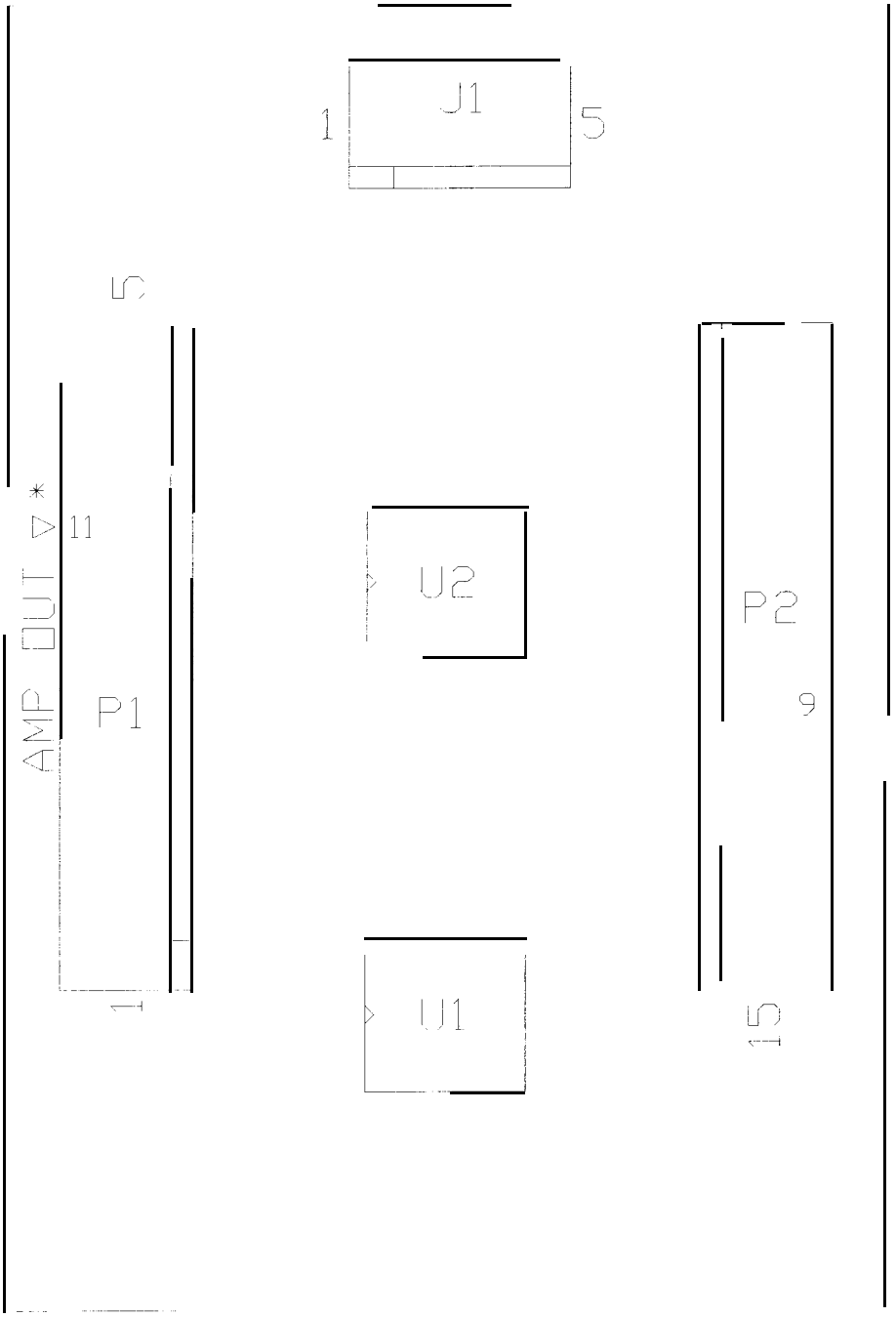
20-10511



Field Replaceable Parts

There are no field replaceable parts in the Video Card Assembly.

POT AMP BOARD ASSEMBLY
04-I 2439



Field Replaceable Parts

There are no field replaceable parts on the Pot Amp PCB Assembly.

LINE CORD APPLICATION TABLE

Part Number / Country	5850-13275-00	5850-13271-00	5850-13272-00	5850-13273-00	5850-13276-00	5850-13277-00	5850-13278-00
Australia						■	
Austria			●				
Belgium			■				
Canada		■					
Denmark			■				
Finland			■				
France			■				
Germany			■				
Holland			■				
Hungary			■				
Italy	■						
Japan							■
New Zealand						■	
Norway			■				
Spain			■				
Switzerland					■		
UK				■			
USA		■					

COIN DOOR APPLICATION TABLE

Part Number / Country	09-50000.1	09-96017-17	09-50000-33	09-50000-14	09-50000-15	09-50000-20	09-80000-10	09-50000-2
Australia								■
Austria								■
Belgium								■
Canada			■					
Denmark								■
Finland								■
France	■							
Germany								■
Holland								■
Hungary								■
Italy				■				
Japan					■			
New Zealand		■						
Norway								■
Spain						■		
Switzerland								■
JK							■	
JSA			■					

Other Parts Necessary

Protection	
Fuse, 1 A, 250V, SB	5731-06569-00
Fuse, 3A, 250V, SB	5731- 10356-00
Fuse, 2A, 250V, SB	5731-08665-00

Cables	
Bill Acceptor Cable	H-20398
DBV Harness	H-17019
IDC AC Cable	H-20353
Stereo Speaker Cable	H-22758
Coin Meter Extension Cable	H-22786
Ground Braid With Terminal	H-22327-86
Line Voltage Cable	H-22691.1
AC Distribution Cable	H-20279
Control Panel Cable	H-231 07
Fluorescent Lamp Cable	H-22507

Documents	
Game Manual	16-30037-l 01

Other Items

T-20 Tamper-Resistant Wrench	20-9620
T-27 Tamper-Resistant Wrench	20-l 0140
Light Bulb #658 14V	24-8828
Light Bulb #555 6.3V	24-8768

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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.

Edge Connector Chart

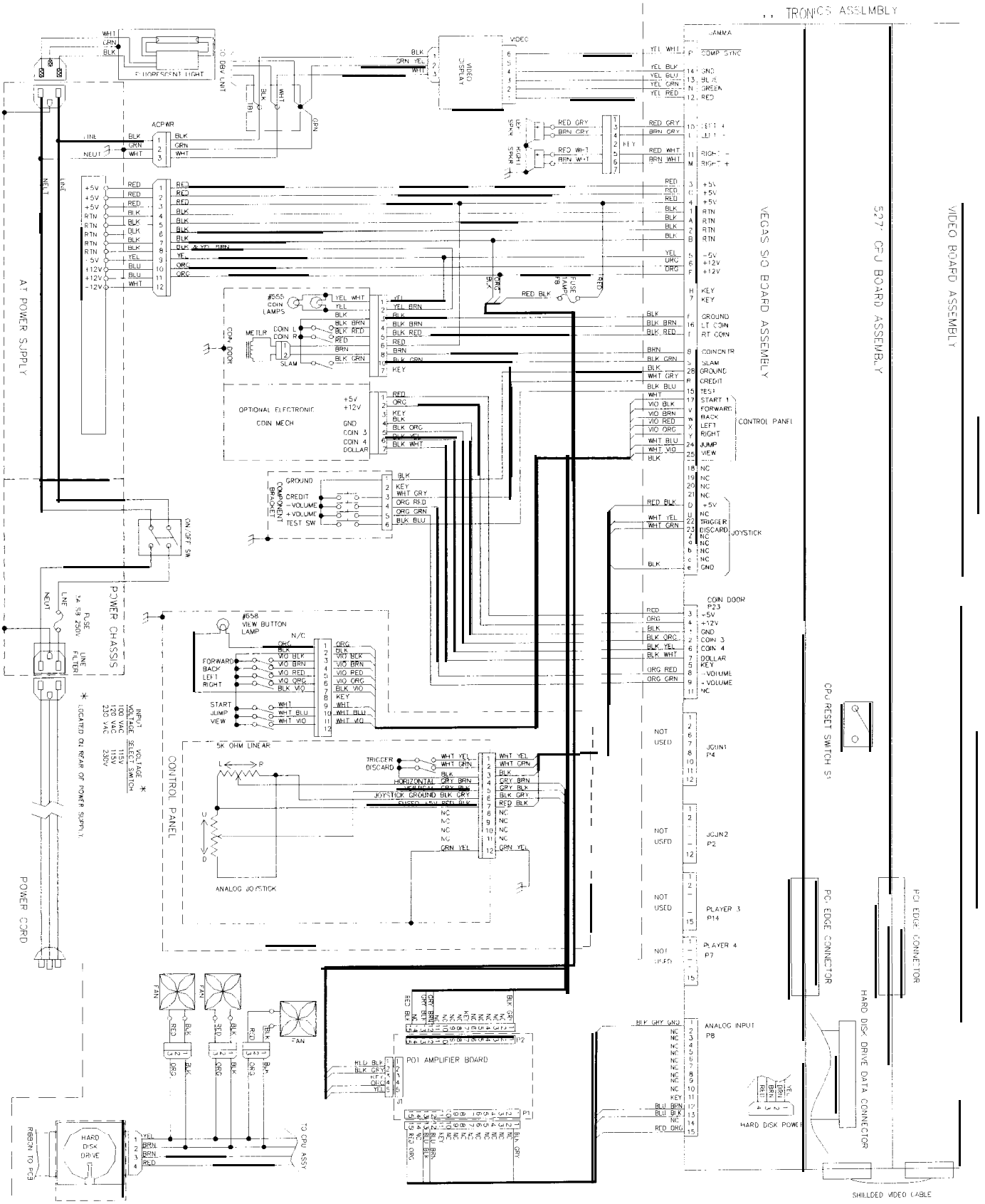
FUNCTION	WIRE COLOR	PIN	PIN	WIRE COLOR	FUNCTION
Ground	Black	A	1	Black	Ground
Ground	Black	B	2	Black	Ground
+5VDC	Red	C	3	Red	+5VDC
Fused +5VDC	Red-Black	D	4	Red	+5VDC
-5VDC	Yellow	E	5	Yellow	-5VDC
+12VDC	Orange	F	6	Orange	+12VDC
Key	N/C	H	7	N/C	Key
Coin Counter 2	Brown-Red	J	8	Brown	Coin Counter 1
Not Used	N/C	K	9	N/C	Not Used
Speaker -, Left	Brown-Gray	L	10	Red-Gray	Speaker +, Left
Speaker +, Right	Brown-White	M	11	Red-White	Speaker -, Right
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
Coin 2	Black-Red	T	16	Black-Brown	Coin 1
Not Used	N/C	U	17	White	Start
Forward	Violet-Black	V	18	N/C	Not Used
Back	Violet-Brown	W	19	N/C	Not Used
Left	Violet-Red	X	20	N/C	Not Used
Right	Violet-Orange	Y	21	N/C	Not Used
Not Used	N/C	Z	22	White-Yellow	Trigger
Not Used	N/C	a	23	White-Green	Discard
Not Used	N/C	b	24	White-Blue	Jump
Not Used	N/C	c	25	White-Violet	View
Not Used	N/C	d	26	N/C	Not Used
Ground	Black	e	27	Black	Ground
Ground	Black	f	28	Black	Ground
SOLDER SIDE			**COMPONENT SIDE**		

Joystick Control Wires				Pot Amp Signal Wires	
Trigger	White-Yellow	1	1	Black-Gray	Not Used
Discard	White-Green	2	2	N/C	Not Used
Ground	Black	3	3	N/C	Not Used
Horizontal	Gray-Brown	4	4	N/C	Not Used
Vertical	Gray-Black	5	5	N/C	Not Used
Ground	Black-Gray	6	6	N/C	Not Used
Fused +5VDC	Red-Black	7	7	N/C	Not Used
Not Used	N/C	8	8	N/C	Not Used
Not Used	N/C	9	9	N/C	Not Used
Not Used	N/C	10	10	N/C	Not Used
Not Used	N/C	11	11	N/C	Key
Ground	Green-Yellow	12	12	Blue-Brown	Horizontal
			13	Blue-Black	Vertical
			14	N/C	Not Used
			15	Red-Orange	+5VDC

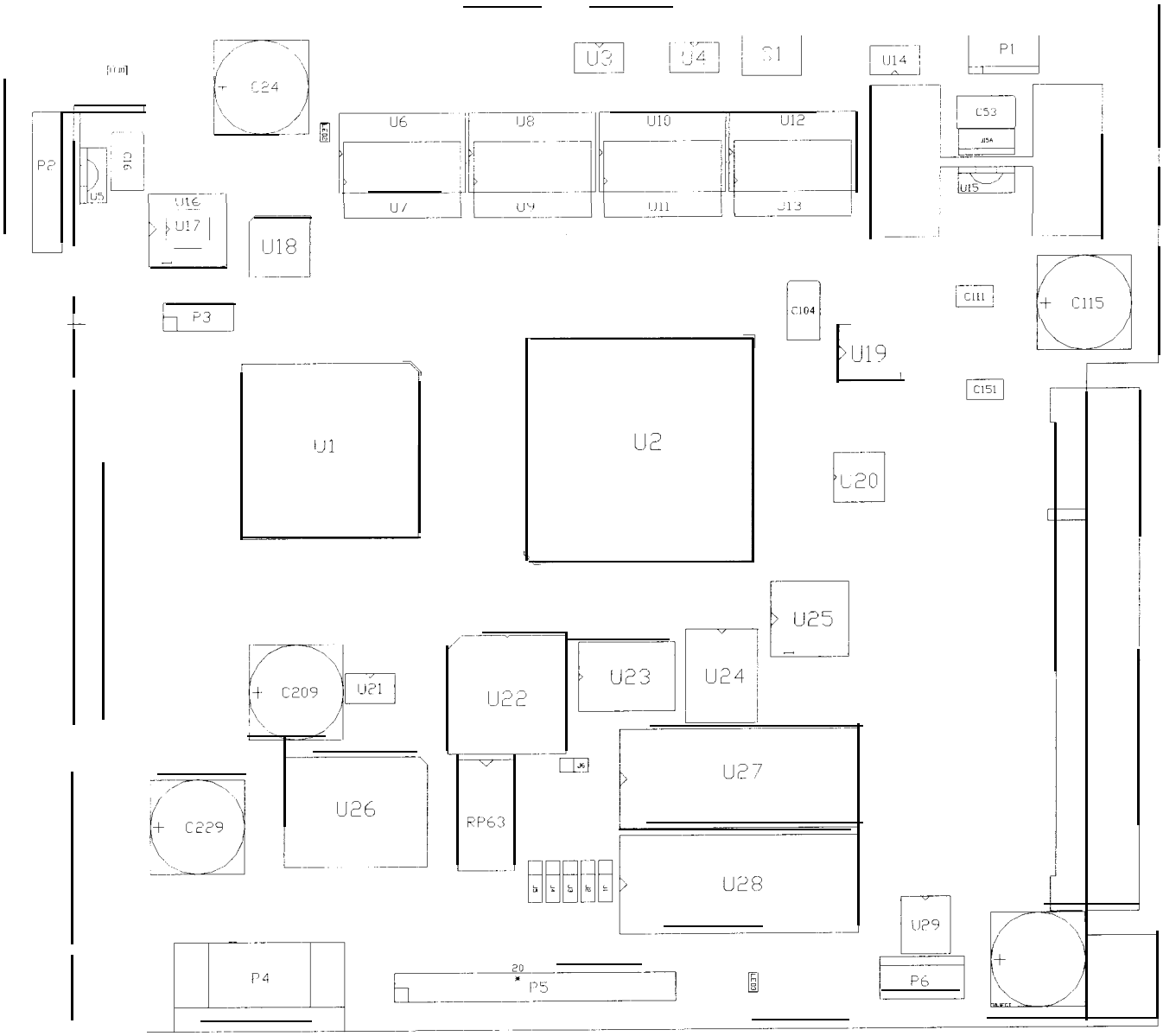
D.C. Power Source Voltage Limits

FUNCTION	RANGE LIMITS	COLOR	FUNCTION	RANGE LIMITS	COLOR
Digital Circuits	+4.90V to +5.10V	Red	Coin Lights	-4.75V to – 5.25V	Yellow
Audio, Lights	+11.5V to +12.5V	Orange	Auxiliary Power	-11.5V to -12.5V	Blue

MAIN CABINET WIRING DIAGRAM



5271 CPU BOARD ASSEMBLY



5271 CPU ASSEMBLY SWITCH

DESIGNATION	LOCATION	FUNCTION	POSITIONS	STATE	MEANING
S1	EDGE NEAR U4 AND U12	RESETS AND RESTARTS GAME	2	OFF	NORMAL OPERATION
				ON	FORCED RESET

NOTE: This switch resets the CPU Board without turning the power off at the power supply.

5271 CPU BOARD ASSEMBLY
JUMPER POSITION CHART

DESIGNATION	LOCATION	FUNCTION	MEANING	POSITION	DEFAULT
J1 (NOTE 1)	NEAR U28 & CONNECTOR P5	CPU Boot ROM Type (U18)	EPROM	PINS 1 & 2	•
			Flash ROM	PINS 2 & 3	
J2 (NOTE 2)	NEAR U28 & CONNECTOR P5	CPU Boot ROM Size (U18)	1,2, or 4Mbit Flash ROM	PINS 1 & 2	•
			8Mbit Flash ROM	PINS 2 & 3	
J3 (NOTE 1)	NEAR U28 & CONNECTOR P5	CPU Boot ROM Type	EPROM	PINS 1 & 2	•
			Flash ROM	PINS 2 & 3	
J4 (NOTE 2)	NEAR U28 & CONNECTOR P5	CPU Boot ROM Size (U18)	2Mbit ROM	PINS 1 & 2	•
			1Mbit ROM	PINS 2 & 3	
J5 (NOTE 3)	NEAR U28 & CONNECTOR P5	Expansion Boot ROM Size (U19)	4Mbit ROM	PINS 1 & 2	•
			8Mbit ROM	PINS 2 & 3	
J6	BETWEEN U22 & U27	Boot Program Location	Boot from CPU ROM	PINS 1 & 2	•
			Boot from SIO ROM	PINS 2 & 3	

NOTES:
1. Set both jumpers J1 and J3 to EPROM or Flash ROM mode to use such devices.
2. These jumpers operate independently of one another.
3. This jumper is independent of the CPU boot ROM size selected.

5271 CPU BOARD ASSEMBLY
LED INDICATOR STATUS CHART

DESIGNATION	LOCATION	FUNCTION	COLOR	STATE	MEANING
LED1 (NOTE 1)	NEAR C24 & P2	3.3V CF'U Power Indicator	RED	OFF	Insufficient Power
				ON	Power O.K.
				BLINKING	Power fault
LED2 (NOTE 2)	NEAR C24 & U6	t-lard Disk Drive Activity	GREEN	OFF	Not in use
				ON	Locked Up
				BLINKING	Normal disk activity
LED3 (NOTE 3)	NEAR U28 & P5	Indicator	RED	OFF*	*See note below.
				ON*	
				BLINKING* SEQUENTIALLY	

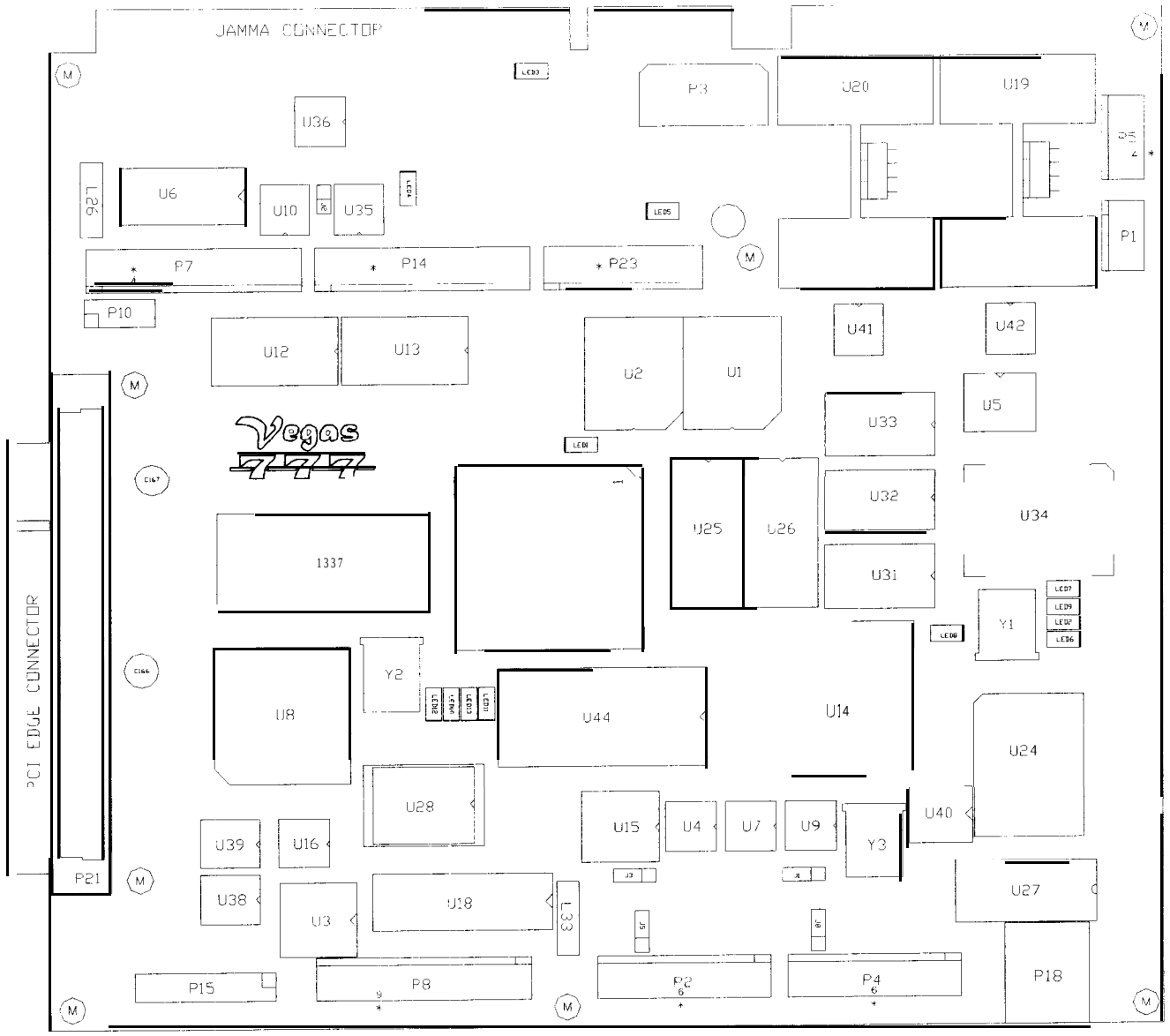
NOTES:

1. LED1 monitors CPU power (+3.3 Volts). If this LED is off or blinking, investigate the processor circuits. If other LEDs are off or blinking at the same time, check the +5 Volt circuits or the game power supply.

2. LED2 flashes when the hard disk is operating during game play. It may light continuously during startup. If this LED is lighted continuously, there may be a fault with the hard disk drive, which may be locked up.

3. LED3 initially indicates program start-up stages. It is a seven segment alpha-numeric display device. Under normal conditions, it displays a lowercase “b” or a sequentially blinking segments in an “0” pattern. During any of the self-test screens, it displays a “bouncing bar” resembling a hyphen (‘I-“).

VEGAS SOUND I/O ASSEMBLY



VEGAS SOUND MO BOARD ASSEMBLY
JUMPER POSITION CHART*

DESIGNATION	LOCATION	FUNCTION	MEANING	POSITION	STATE
J1 (NOTE 1)	NEAR U9 & CRYSTAL Y3	Gun 1 I/O Connector P2	Input Mode	PINS 1 & 2	●
			output Mode	PINS 2 & 3	
J2 (NOTE 3)	BETWEEN U35 AND U10	Video Sync	Positive Sync	PIN 1 ONLY	
			Negative Sync	PINS 1 & 2	●
J3 (NOTE 2)	NEAR U15	Gun 2 I/O Connector P4	Input Mode	PINS 1 & 2	a
			Output Mode	PINS 2 & 3	
J4	NONE	NONE	NOT USED	NONE	---
J5 (NOTE 2)	BETWEEN U15 & CONNECTOR P2	Gun 2 I/O Connector P4	Input Mode	PINS 1 & 2	●
			Output Mode	PINS 2 & 3	
J6	NONE	NONE	NOT USED	NONE	---
J7	NONE	NONE	NOT USED	NONE	---
J8 (NOTE 1)	BETWEEN U9 & CONNECTOR P4	Gun 1 I/O Connector P2	Input Mode	PINS 1 & 2	●
			Output Mode	PINS 2 & 3	

*NOTES:

1. Set the Gun 1 (P2) I/O port by setting both the J1 and J8 jumpers to input or output mode.
2. Set the Gun 2 (P4) I/O port by setting both the J3 and J5 jumpers to input or output mode.
3. Set the Sync Polarity to Positive by setting the J2 jumper on pin 1 only. Do not remove.

VEGAS SOUND I/O BOARD ASSEMBLY
LED INDICATOR STATUS CHART

DESIGNATION	LOCATION	FUNCTION	COLOR	STATE	MEANING
LED1	NEAR U11	SIO BOARD ACTIVITY	GREEN	OFF	No boot ROM
				ON	SIO board locked up
				BLINKING	Normal operation
LED2	NEAR U34 & CRYSTAL Y1	LINKING CONNECTOR STATUS	GREEN	OFF	Not in use (no game linking)
				ON	Normal linked operation
				BLINKING	Link fault
LED3	NEAR THE JAMMA CONNECTOR	-5V POWER INDICATOR	RED	OFF	No power
				ON	Normal operation
				BLINKING	Power fault
LED4	NEAR U35 & CONNECTOR P14	+12V POWER INDICATOR	RED	OFF	No power
				ON	Normal operation
				BLINKING	Power fault
LED5	NEAR CONNECTOR P23	+5V POWER INDICATOR	RED	OFF	No power
				ON	Normal operation
				BLINKING	Power fault
LED6	NEAR U34 & CRYSTAL Y1	CPU LINKING ACTIVITY	RED	OFF	Not in use
				ON	CPU linking in progress
				BLINKING	Normal operation
LED7	NEAR U34 & CRYSTAL Y1	LINKING DATA	RED	OFF	Not in use (no game linking)
				ON	Sending data
				BLINKING	Normal operation
LED8	NEAR U14 & CRYSTAL Y1	AUDIO ACTIVITY	YELLOW	OFF	No sound boot ROM
				ON	Locked up
				BLINKING	Normal operation

VEGAS SOUND I/O BOARD ASSEMBLY
LED INDICATOR STATUS CHART -CONTINUED

LED9	NEAR U34 & CRYSTAL Y 1	LINKING RECEIVING DATA	YELL0 W	OFF	Not in use (no game linking)
				ON	Receiving data
				BLINKING	Normal operation
LED10	NEAR U44 & CRYSTAL Y2	AUDIO ACTIVITY	GREEN	OFF	Not in use (no audio data)
				ON	Receiving data
				BLINKING	Normal operation
LED1 1	NEAR U44 & CRYSTAL Y2	NONE	RED	OFF	Not in use (normal)
				ON	Circuit fault
				BLINKING	Circuit fault
LED12	NEAR U44 & CRYSTAL Y2	INTERRUPT ACTIVITY	YELL0 W	OFF	Not in use (no interrupts)
				ON	Receiving data
				BLINKING	Normal operation
LED1 3	NEAR U44 & CRYSTAL Y2	DISK ACTIVITY	YELL0 W	OFF	Not in use
				ON	Processing data
				BLINKING	Normal operation

VEGAS SOUND I/O ASSEMBLY DIP-SWITCH SETTINGS

Service technicians may change DIP-switches with the power on. Refer to the charts for assistance in choosing the desired switch positions (* indicates factory defaults).

DIP Switch U12		SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
Not Used		Off* On							
Monitor Resolution	Standard 512 x 256 VGA 640 x 480		Off* On						
Not Used				Off* On					
Not Used					Off* On				
Not Used						Off* On			
Not Used							Off* On		
Not Used								Off* On	
Not Used									Off* On

DIP Switch U13		SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
Not Used		Off* On							
Diagnostic Code Source (Note 1)	Hard Disk Drive EPROM		Off* On						
Not Used				Off* On					
Not Used					Off* On				
Not Used						Off* On			
Not Used							Off* On		
Not Used								Off* On	
Debug Test Mode (Note 2)	No Yes								Off* On

NOTES:

1. **Hard disk drive diagnostic code is factory standard. Use EPROM setting for service only if directed to do so by Atari Service.**

2. **Debug Test Mode may cause extraneous error messages. Use Debug Test Mode only if directed to do so by Atari Service.**

WAR™

SECTION
FOUR

TROUBLESHOOTING

This game uses complex electronic components that are very SENSITIVE to static electricity. The following precautions must be observed and followed prior to handling any of 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 safety ground stud of the power supply chassis while the line cord is connected to a properly grounded outlet. This is to be done BEFORE touching or handling the electronic assemblies.**
3. **Store the electronic assemblies in an anti-static area. Anti-static bags are to be used to store or transport the game CPU Board Assembly.**
4. **DO NOT remove or connect any electronic assemblies when the cabinet power is ON. Doing so will damage the electronic assemblies and void the warranty.**
5. **Always replace ground wires, shields, safety covers, etc. when maintenance or service is completed. Ensure that all ground and mounting screws are installed and tightened firmly.**

GAME DOES NOT START

1. **Game appears completely non-functional; no audio, no illumination, no video display.**

A: Check that the Power Switch has been turned ON (on power supply at rear of the main cabinet).

B: Turn OFF the game power. Unplug the A.C. line cord. Examine the Power Supply fuse or circuit breaker. The Power Supply Line Voltage Switch must be set to agree with the local line voltage.

C: Remove the Line Cord. Test the line cord, power plug and I.E.C. connector for breaks or damage. Verify the continuity of each wire in the cord. Install the cord at the Power Supply and press firmly to fully seat the connector into the supply receptacle.

D: Unlock, open, and remove the rear cabinet door. Ensure that cabinet wiring harness connectors are fully seated in the corresponding power supply and board connectors (refer to Wiring Diagram, Section Three). Inspect wiring for breaks or damage.

E: Fully seat the A.C. plug in the power outlet. Verify that A.C. line voltage is present. Turn the game power ON. Check the D.C. wiring harness and connectors if fuse opens the circuit again.

2. **Video game appears non-functional, but currency acceptor price indicator is illuminated.**

A: Unlock and open, and remove the rear cabinet door. Inspect the board assemblies under low light level conditions. A glow will be seen from the Light Emitting Diodes if there is voltage in the processor circuits. This does not mean that voltages or signals are as they should be, but it does indicate that the boards are receiving some D.C. power from the power supply. The power supply fan should also be operating.

B: Turn OFF the game power. Inspect the board assemblies. Ensure that the JAMMA Wire Harness connector is attached and fully seated onto the mating board connector. Check the other wiring harness connectors in the same way.

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

C: Verify that the game switches and jumpers are set as intended. Refer to the Board Configuration Chart (Section Three) for variables and default settings.

D: Turn ON the game power. Using the 20 Volt D.C. setting on a digital voltmeter, measure D.C. voltages present at the Hard Disk Drive Power connector pins. Adjust the +5V source if it is necessary. Refer to the Cabinet Wiring Diagram (Section Three) for specific wiring information and voltage limits.

E: Using the 2 Volt A.C. setting on a digital voltmeter, measure the same D.C. voltages as above. Any reading here indicates that the supply voltages are unstable and may contain ripple or noise.

F: Verify that the game runs and completes the power-up self-test sequence without any errors. Note errors and/or failures found during these tests. Compare the CPU Board Assembly Light Emitting Diodes with the LED Indicator Status Chart (Section Three) and note any discrepancies.

G: Enter the game Menu System by pressing and holding the TEST MODE switch inside the coin door. From the SELF TEST menu, choose the MONITOR TESTS (refer to Section One for additional details). Use this set of tests to check the operation of each screen used in the game.

GAME CAN NOT BE PLAYED

1. Game will not accept currency or tokens and cannot be started. Audio and video are present.

A: Unlock and open the cash door. Empty the cash box. Inspect the revenue for any counterfeit currency. Check the vault and remove any items that block the path from the mechanism.

B: Unlock and open the coin door. Check each mechanism by hand to ensure proper mounting. Remove the mechanism and clear the currency path. Reinstall the mechanism and latch it.

C: Verify that the mechanism is level when the doors are closed. Repair or replace the coin door if it is bent or damaged. Adjust the cabinet leg levelers if necessary to keep mechanisms vertical.

D: Enter the game Menu System by pressing and holding the TEST MODE switch inside the coin door. From the SELF TEST menu, choose COIN OPTIONS (refer to Section One for additional details). Use these tests to confirm the pricing and setup of each mechanism used in the game.

E: Enter the game Menu System by pressing and holding the TEST MODE switch inside the coin door. From the SELF TEST menu, choose the CONTROL TESTS (refer to Section One for additional details). Use this set of tests to check the operation of each coin or bill mechanism.

2. Game accepts currency or tokens, but does not start. Audio and video are present.

A: Unlock and open the coin door. Check each mechanism by hand to ensure proper mounting. Verify that each of the release latches is in the closed and locked position. Test known good and bad coins to see if the mechanism accepts and rejects the currency correctly.

B: Ensure that no loose parts or wires are caught in the hinges, latches, or switch contacts.

C: Inspect to see if the external coin door indicators (pricing, flashing arrows, etc.) are illuminated. Check connectors and cables for wiring continuity from CPU Board to the coin mechanisms.

D: Enter the game Menu System by pressing and holding the TEST MODE switch inside the coin door. From the SELF TEST menu, choose COIN OPTIONS (refer to Section One for additional details). Use these tests to confirm the pricing and setup of each mechanism used in the game.

E: Check for continuity in each of the suspect switch connections (Common to Normally Open or Common to Normally Closed). Replace faulty switches (bent levers, broken actuators, etc.).

F: Verify that each coin mechanism is operating properly by placing it in a known good unit.

3. Bill validator does not function after field installation. Coin mechanisms operate properly.

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 (refer to Section One). Confirm pricing and setup. Check validator switch settings against manufacturer's instruction sheet.

B: Inspect to see if the external coin door indicators (pricing, flashing arrows, etc.) are illuminated. Ensure that no loose parts or wires are caught in the hinges, latches, or switch contacts. Verify that the harness connectors are attached and fully seated. Check for validator cable continuity.

C: Verify that the bill validator is operating properly by placing it in a known good unit.

4. Coin indicators do not light. Game operates normally.

Check the coin light fuse and coin light wiring harnesses. Replace the fuse if necessary.

AUDIO PROBLEMS

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

A: Unlock and open the coin door. Enter the game Menu System by pressing and holding the TEST MODE switch inside the coin door. From the SELF TEST menu, choose ADJUST VOLUME (refer to Section One for additional details). Verify that the attract and game volume levels have not been set at Zero. Change the levels if necessary to make the game audible.

B: Follow the on-screen instructions to return to the first menu. From the SELF TEST menu, choose SOUND TESTS. Use these tests to confirm the operation of each speaker in the cabinet.

C: Inspect the wiring harnesses and verify the connections as indicated by the wiring diagram. See Section 3 for details on cabinet wiring.

D: Turn ON the game power. Using the 20 Volt D.C. setting on a digital voltmeter, measure D.C. voltages present at the Power connector pins. Verify the +5V, -5V and +12V sources. Refer to the Cabinet Wiring Diagram (Section Three) for specific wiring information and voltage limits.

E: Using the 2 Volt A.C. setting on a digital voltmeter, measure the same D.C. voltages as above. Any reading here indicates that the supply voltages are unstable and may contain ripple or noise.

F: Verify proper operation of game CPU Board Assembly by placing it in a known good game.

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

A: Unlock and open the coin door. Enter the game Menu System by pressing and holding the TEST MODE switch inside the coin door. From the SELF TEST menu, choose SOUND TESTS. These tests will verify some of the functions of the audio circuits in this game.

B: Turn OFF the game power. Remove the grills and check the speakers. This game uses two full range speakers. Ensure that each speaker is FULL RANGE (100 to 10,000 Hz response) and rated for at least 10 WATTS.

c: Turn OFF the game power. Remove grilles and inspect speakers. Ensure that no loose parts or wires are caught in speaker cones, terminals, mounting screws, or stuck to the magnets.

D: Check that the speaker wiring is not reversed at one of the speakers. Weak low frequencies and a thin or hollow sound quality is a symptom of incorrectly phased speakers. This condition will not be detected by the SOUND TESTS, but it will be audible during normal game operation.

E: Check that the cabinet wiring is correct for this game. Verify that the cabinet wiring provides separate wires (not a common return) for each speaker. Ensure that all cabinet ground wires are connected. Refer to the Cabinet Wiring Diagram (Section Three) for specific wiring information.

F: Using the 2 Volt A.C. setting on a digital voltmeter, measure voltages at the speaker terminals. Any reading here indicates that the supply voltages are unstable and may contain ripple or noise.

G: Verify that the speaker is operating properly by placing in a known good unit.

3. The audio is monaural (it should be stereo).

A: Verify that cabinet wiring for this game is correct. Check for shorted wires.

B: Refer to the Cabinet Wiring Diagram (Section Three) for specific wiring information.

VIDEO PROBLEMS

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

A: Unlock and remove the monitor access door. Verify that A.C. Power is connected to the Video Monitor. Inspect the neck of the CRT under low light level conditions. A glow will be seen near the CRT base if there is voltage in the filament circuits. This does not mean that other voltages or signals are as they should be, but it does indicate that monitor circuits are receiving some power.

B: Turn OFF the game power. Verify that the Video Signal and the Remote Adjustment Board connectors are fully seated on the Video Monitor Board Assembly. Check the other monitor connectors in the same way. ***Do*** not operate a monitor without a ***Remote*** **Adjustment *Board.***

C: Examine the A.C. line fuse on the Video Monitor Board Assembly. If the fuse is faulty, replace it with an identical fuse of the proper voltage and current rating.

D: Ensure that no loose parts or wires are caught on the chassis or the mounting brackets.

E: Check that the brightness (intensity) and contrast have not been set to their minimum levels.

F: Verify that the Video Monitor is operating correctly by placing it in a known good unit.

2. **The power-up self-test will run, but the game does not appear. No audio is present.**

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. From the SELF TEST menu, choose DISK TESTS. These tests will verify some of the Hard Disk Drive functions in this game.

B: Turn OFF the game power. Unlock and open the front door. Inspect the board assemblies. Ensure that the Hard Disk Drive Assembly ribbon cable connector is fully seated into the mating connector on the CPU Board. Verify that all hard drive mounting screws are installed.

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

C: Check that the Hard Disk Drive Assembly is the correct part for this game. Each Hard Disk Drive is labeled with the assembly number and the software version. Refer to Parts (Section Two).

D: Verify that the ROM instruction set is correct for this game. There is more than one ROM in a game set. Each ROM circuit is labeled with the assembly number and the software version.

E: Verify that the CPU Board Assembly is correct for this game. Each CPU Board is marked with the manufacturer name, assembly number and the hardware version.

F: Turn ON the game power. Using the 20 Volt D.C. setting on a digital voltmeter, measure D.C. voltages present at the Power connector pins. Verify the +5V source if it is adjustable. Refer to the Cabinet Wiring Diagram (Section Three) for specific wiring information and voltage limits.

G: Using the 2 Volt A.C. setting on a digital voltmeter, measure the same D.C. voltages as above. Any reading indicates that the supply voltages are unstable and may contain ripple or noise.

H: Compare board assembly Light Emitting Diode states with the indicator charts (Section Three)

3. Monitor will not lock onto the signal and provide a stable picture, colors are missing, etc.

A: Check connectors and cables for wiring continuity from the CPU Board to the Video Monitor. Verify all jumpers are set correctly for this monitor. Refer to Board Configuration (Section Three).

B: Ensure that the Video Monitor Assembly is correct for this game. Use of video monitors with different resolution will result in what appears to be horizontal tearing or complete loss of sync. Check the video sync jumper on the Vegas Sound I/O Board (see Section 3 for details).

C: Verify that the Video Monitor is operating correctly by placing it in a known good unit.

4. Game operates normally, but video picture wavers or rolls, has dark bars, uneven colors, etc.

A: Check connectors and cables for wiring continuity from the CPU Board to the Video Monitor.

B: Ensure that all the cabinet ground wires are connected, especially at the Video Monitor Chassis.

C: Move the cabinet farther away from machines, appliances, other games, etc. Very strong electrical or magnetic fields are emitted from some equipment when it is operating normally.

D: Verify that the Video Monitor is operating correctly by placing it in a known good unit.

MISCELLANEOUS

1. Indicator lamps intermittent or non-functional. Game starts and plays normally.

A: Open the marquee. Remove the the fluorescent tube from the holders. Install a new lamp if cracks or darkened ends are found. Clean the tube.

B: Verify that the lamp and starter pins are making good connection with their socket contacts.

C: Measure the Fluorescent Lamp Assembly A.C. voltages (Power Wiring Diagram, Section Three). Check wiring and connector continuity from the Power Supply connector to the Lamp Assembly.

D: Ensure that the Fluorescent Lamp Ballast is rated for the local A.C. line voltage and frequency.

E: Check for continuity of both fluorescent lamp filaments, the starter, and the ballast. One at a time, verify that the lamp, starter, and ballast operate by placing each in a known good unit.

F: Examine the D.C. Fuse *on* the electronic equipment shelf. If any fuse is faulty, replace it with an identical fuse from the spare parts bag. Replace the spare fuse when repairs are complete.

2. Game operates normally, but fans are noticeably noisy.

A: Check bottom and rear of cabinet for blocked air flow. Move game away from sources of heat.

B: Turn OFF the game power. Apply high power vacuum cleaner to vent holes to remove dust.

C: Unlock and remove the rear door. Remove the Electronics Assembly cover. Locate and replace defective fans.

3. Game plays normally, then resets after a period of time.

A: Check the fan assemblies on the Electronics assemblies. Make sure they are connected to their power sources.

B: Check the cabinet and Electronics Assembly ventilation holes for obstructions. Clear obstructions and allow the ventilation holes access to fresh air.

C: Measure the +5VDC level at the hard disk drive power connector. Change the power supply output voltage adjustment, if necessary, to maintain the voltage within the range specified in the D.C. Power Source Voltage Limits table in Section 3.

4. Error Messages appear on the screen. The game does not start and there is no audio.

A: Check any assembly (RAM, ROM, Battery, etc.) identified in the Error Messasge.

B: Call your authorized distributor for help with unresolved screen messages.

5. The joystick does not work or functions erratically.

A: From the SELF TEST menu, choose CONTROLS TEST. Recalibrate the joystick limits as instructed on screen.

B: Open the control panel. Check that the wiring harness connectors are firmly seated and that no wires are broken or pinched.

c: Using a voltmeter, check the voltages at the potentiometers. The center tap should read +2.5V when the joystick is centered.

D: Open the cabinet rear door. Remove the Electronics Assembly cover. Check the wiring harnesses, connectors, and voltages at the Pot Amp Assembly Board.

E: Replace the Pot Amp Assembly Board with a known good board.