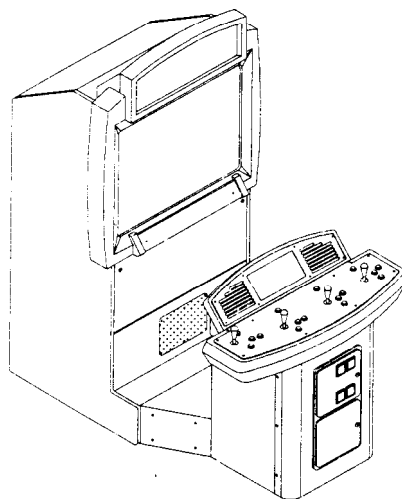




TM

**4-PLAYER
DEDICATED
39" VIDEO
GAME**



Operation Manual

*Installing @Operating ●Testing ●Parts ●Wiring Diagrams @Troubleshooting

NBA ON NBCTM

CHAPTER ONE

SAFETY, SPECIFICATIONS, INSPECTION & INSTALLATION



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

Fill out and mail in the Game Information 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 INSTRUCTIONS

The following safety instructions apply to operators and service personnel. Read these instructions before preparing your game for play. Other safety instructions appear throughout this manual.





DEFINITIONS OF SAFETY TERMS







DANGER indicates an imminent hazard. If you fail to avoid this hazard, it **WILL** cause death or serious injury.

WARNING indicates a potential hazard. If you fail to avoid this hazard, it **COULD** cause death or serious injury.

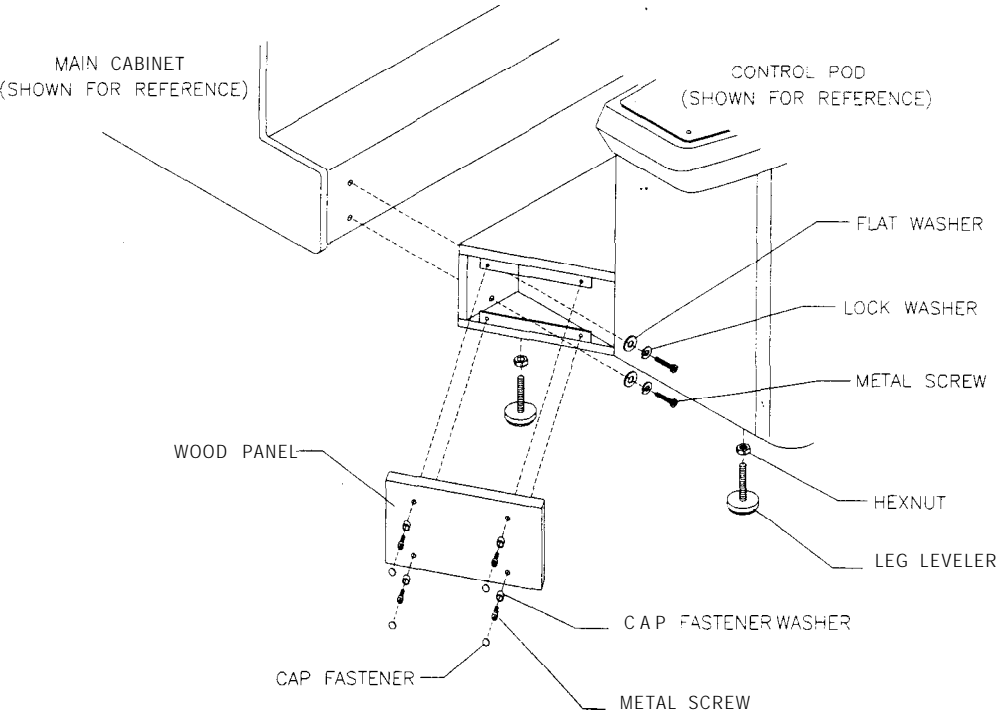
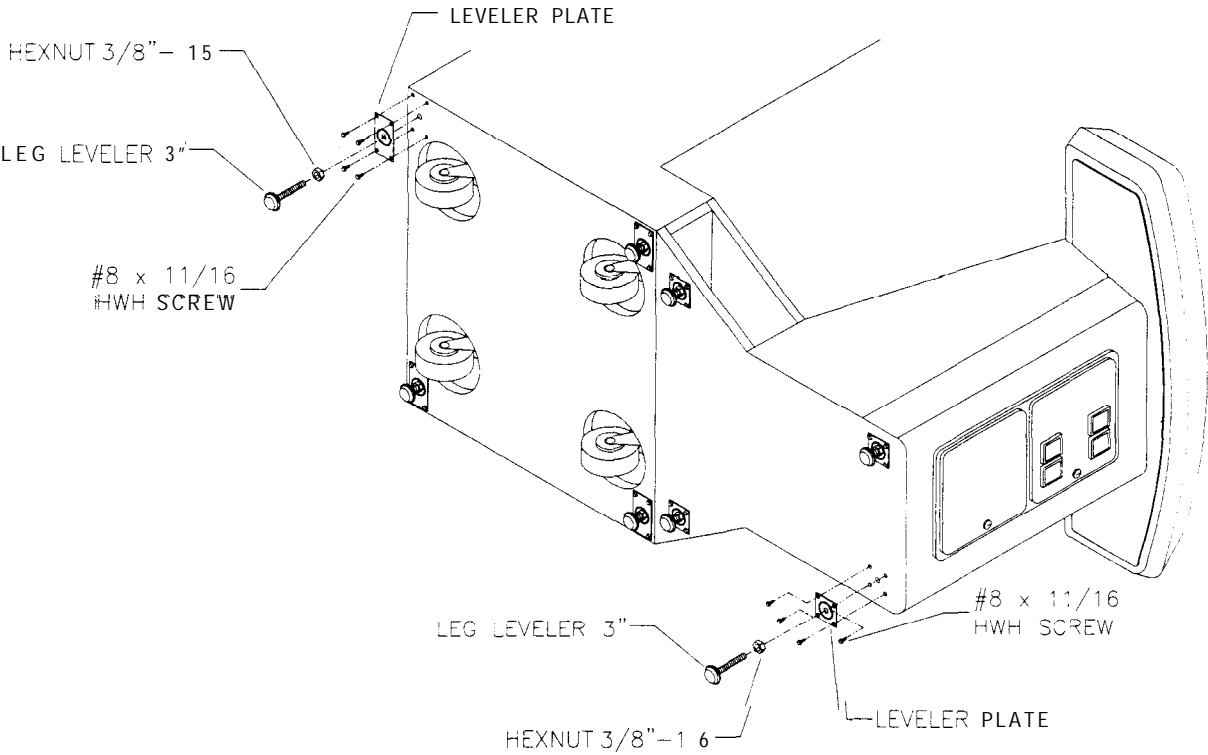
CAUTION indicates a potential hazard. If you fail to avoid this hazard, it **MAY** cause minor or moderate injury. **CAUTION** also alerts you about unsafe practices.

NOTICE indicates information of special importance.

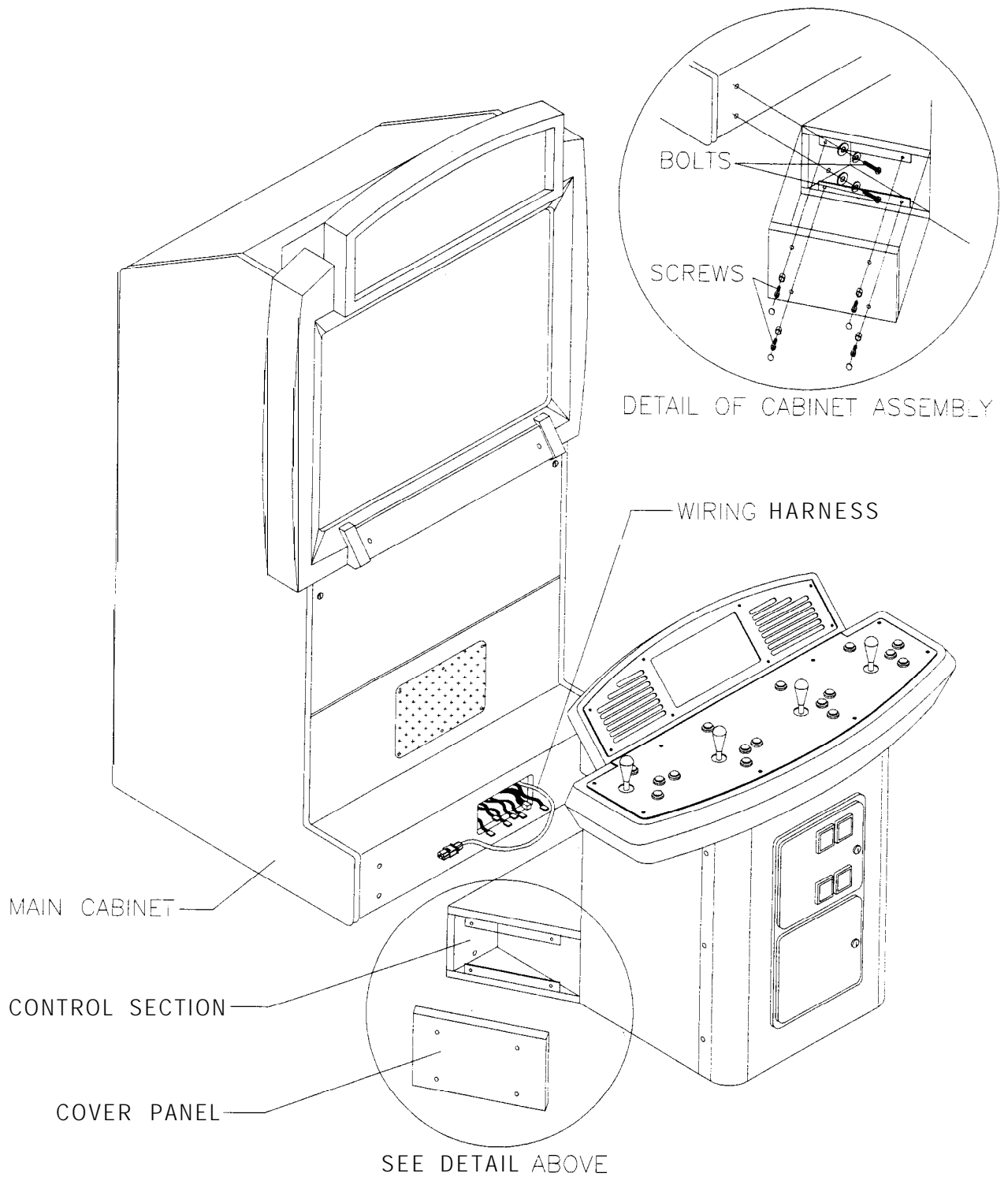
	WARNING: TRANSPORTING GAMES. This game contains glass and fragile electronic devices. Use appropriate care when transporting this game. Avoid rough handling when moving the cabinet. Do not move this game with the power on,
	WARNING: DISCONNECT POWER. Always turn the power OFF and unplug the game before attempting service or adjustments. Installing or repairing PC boards with power ON can damage components and void the warranty. Be sure that you securely install ground wires.
	WARNING: GROUND GAMES. Avoid electrical shocks! Do not plug in a game until you have inspected and properly grounded it. Only plug this game into a grounded, three-wire outlet. Do not use a "cheater" plug, or cut off the ground pin on the line cord.
	<p>WARNING: HAZARD TO EPILEPTICS. A very small portion of the population has a condition which may cause epileptic seizures or 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.</p> <p>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.</p> <p>We recommend that parents observe their children while they play video games. If you or your child experience the following symptoms: dizziness, altered vision, eye or muscle twitching, involuntary movements, loss of awareness, disorientation, or convulsions, DISCONTINUE USE IMMEDIATELY and consult your physician.</p>

	<p>WARNING: AVOID ELECTRICAL SHOCKS. This video game system does not utilize an isolation transformer. Internal, cabinet AC isn't isolated from the external, AC line.</p>
	<p>WARNING: 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.</p>
	<p>CAUTION: CHECK POWER SELECTOR. Set the 110/220VAC selector on the power supply for the correct line voltage. Check the selector setting before switching on the game.</p>
	<p>CAUTION: USE PROPER FUSE. Avoid electrical shock! Replacement fuses must be of the same type as those they replace. Fuse voltage and current ratings must match ratings on the original fuse.</p>
	<p>CAUTION: ATTACH CONNECTORS PROPERLY. Be sure that printed circuit board (PCB) connectors mate properly. If connectors do not slip on easily, do not force them. A reversed connector may damage your game and void the warranty. Connector keys only allow a connector to fit one set of pins on a board.</p>
	<p>CAUTION: TAKE CARE WHEN SHIPPING HARD DISKS. The hard disk drive must be packed in an anti-static bag. When shipping the drive for repair or replacement, pack it in an approved container (P/N 08-8068). Never stack or drop hard disk drives.</p>

SETTING UP THE CONTROL SECTION

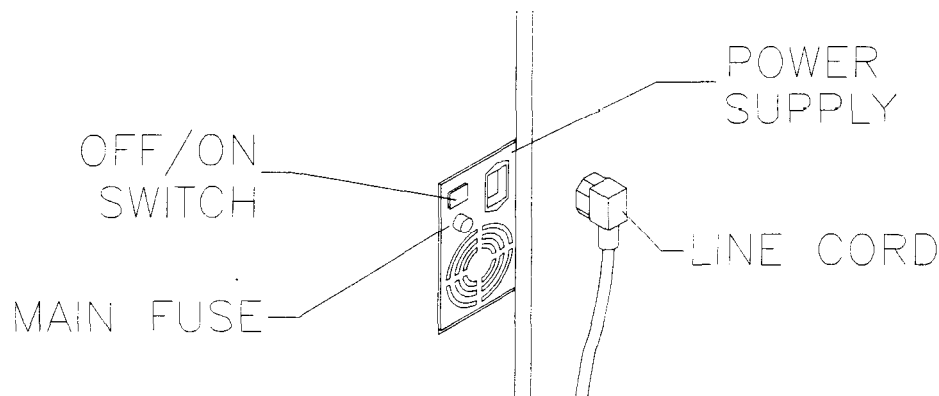


CABINET ASSEMBLY



ATTACHMENT OF CONTROL SECTION TO MAIN CABINET

4. Front door and monitor access door keys are on the rear of the monitor cabinet. Look for the key hook toward the top of the cabinet back. The cash box key is with the control section. Unlock and open the coin door. Unlock and open the cash box door. Remove the spare parts stored in the cash box.
5. Unlock the monitor section front door. Swing it open, and then allow it to rest on the support chains. Inspect the cabinet interior for any signs of damage. Check that all major assemblies are mounted securely.
6. Refer to the Cabinet Wiring Diagram (Chapter Five), and check to see that all cable connectors are correctly secured. *Do not force connectors; they are keyed to fit in **only** one location.* Bent pins and reversed connections may damage your game and void the warranty.
7. Place one lock washer and one flat washer onto each of the bolts from the spare parts bag. Align the control section holes with the main cabinet holes. Install one bolt with its washers through the control section and into each threaded cabinet hole. Tighten all bolts securely. Tighten the leveler nuts.
9. Place one cover cap washer onto each screw from the spare parts bag. Place a filler panel over the control section bolt access opening. Align filler panel holes with control section holes. Install one screw with its washer through the panel and into each control section hole. Repeat the installation for the remaining panel. Tighten all screws firmly. Snap decorative cover caps over screws.
10. The line cord is with the spare parts. Match holes on the IEC plug with the prongs in the receptacle and push firmly to seat the line cord. Route the cord away from cabinet wheels and foot traffic areas.



CAUTION: CHECK POWER SELECTOR. Set the **110/220VAC** selector on the power supply for the correct line voltage. Check the selector setting before switching on the game.

11. Plug the game into a grounded (3-terminal) AC wall outlet. Switch ON the game, using the ON/OFF switch at the center left rear of the cabinet. The game will power up and begin self-diagnostics. If no errors are found, the game will automatically enter its Attract Mode. Unlock and open the coin door. Locate the diagnostic control switches. Press TEST MODE to enter the Menu System.

NBA ON NBC

CHAPTER TWO

OPERATION, FEATURES, MAINTENANCE & SERVICING

GAME OPERATION

STARTING UP

Whenever you turn on the machine or restore power, the system executes boot ROM code. The boot ROM contains self-diagnostic tests. These tests automatically verify and report the condition of the disk drive and other hardware. The screen is blank during these tests. If the hardware fails a test, the system displays an error message. The message appears for 30 seconds or until someone presses a button.

- ◆ If nobody presses a button, the system quickly completes tests, and then loads game software.
- ◆ To skip boot ROM tests and activate the Menu System, press and hold the TEST MODE button. You'll find this button behind the coin door.

Having passed power-up tests, the system enters Attract Mode. Attract Mode consists of typical game scenes and sounds, alternating with high scores. Attract Mode continues until game play commences.

Players insert currency or tokens to start the game. Pressing a START determines which player receives the credit. Then each player selects an NBA team. The game associates one team with each joystick. Play begins after a countdown period. Play progresses like a real-life basketball game. At Game Over Mode, players may choose to begin again. If players choose not to continue, then the system returns to Attract Mode.

GAME RULES

INSTRUCTIONS

Play instructions appear on the information panel over and under the video monitor.

ONE TO FOUR PLAYERS

The player or players insert currency to start the game. Each player chooses a joystick and presses the nearest START button. Players select a team and two characters. In four-player games, each player controls one character. In games with fewer players, each player controls one character. The game computer controls remaining characters. The game displays team scores and statistics at the end of each quarter. Additional game information appears on screen as needed.

CONTROLLING CHARACTERS

The joystick and action buttons control characters on the basketball court. The joysticks respond to different amounts of deflection as well as direction.

GAME ACTION

Standard NBA basketball rules apply, except that the game only includes four active characters. Game settings determine game length and speed. The player view of the action changes automatically whenever a better camera angle becomes available. Game sounds include announcer comments and crowd noises.

SCORING

The game awards points for baskets, just as in real basketball games.

PLAYER CONTROLS

- ◆ **JOYSTICK.** Each player's joystick controls the position of that player's characters on the game screen.
- ◆ **PASS/STEAL (the blue button)** controls character actions on the game screen. Press PASS/STEAL to attempt to pass or steal the ball.
- ◆ **SHOOT/BLOCK (the red button)** controls character actions on the game screen. Press SHOOT/BLOCK to shoot or attempt to block the ball.
- ◆ **START (orange buttons).** Each START button allows the corresponding player to begin or continue play.
- ◆ **TURBO (The white button)** controls character actions on the game screen. Press TURBO to speed up the pace of a play.

OPERATOR CONTROLS

CABINET CONTROLS

- ◆ **The DIP Switches** are beneath the monitor, on the main PC board. Access these switches by opening the front door. DIP switches set some system variables. You can set other variables with diagnostic control switches.
- ◆ **The Monitor Remote Control Board** is beneath the monitor, on the main cabinet wall. Open the front door to access controls. Use monitor controls to adjust the video display for optimum viewing.
- ◆ **The POWER Switch** is on the power supply at the rear of the main cabinet. This switch turns off the game. The POWER switch does not reset game variables.

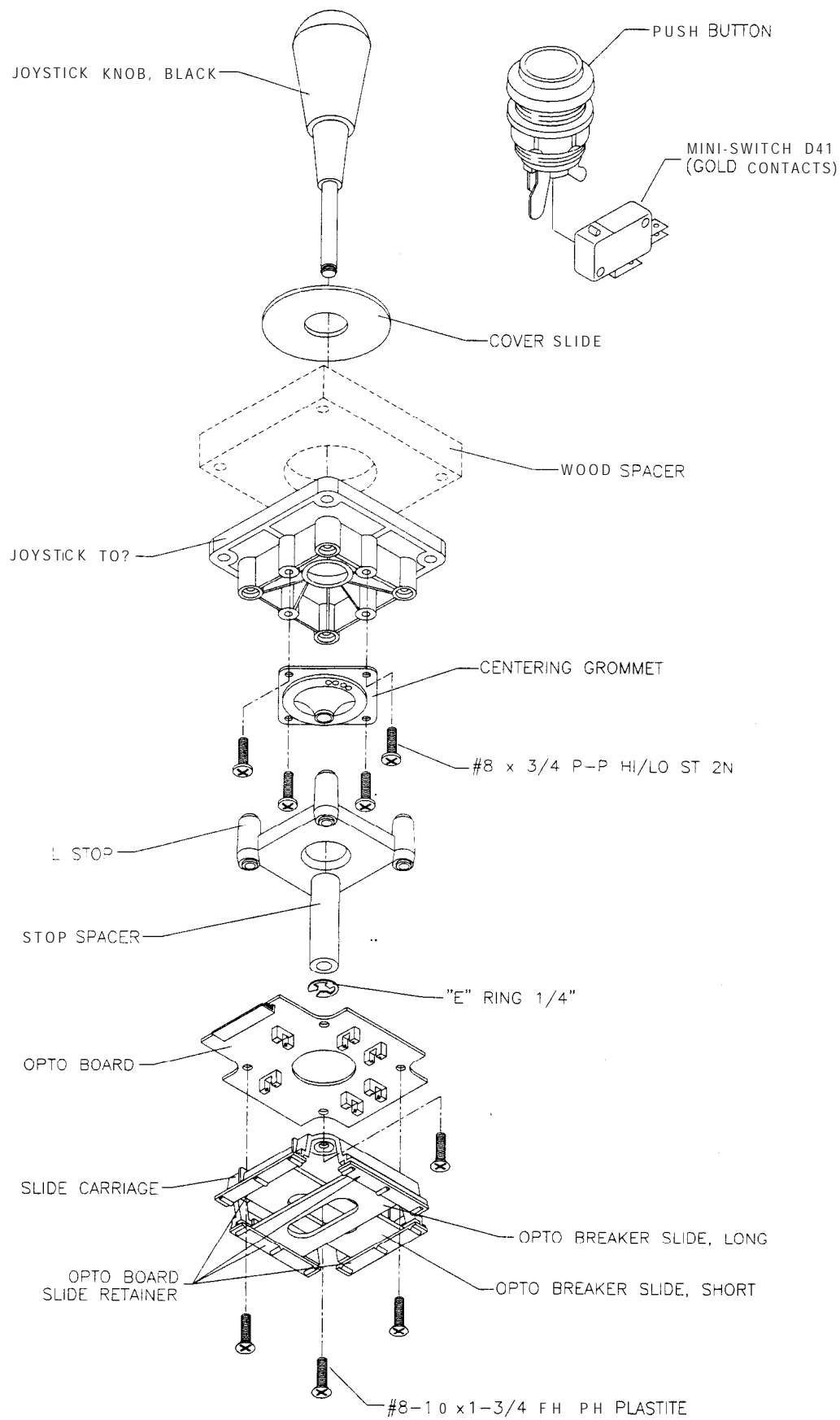
DIAGNOSTIC CONTROL SWITCHES



- ◆ **The SERVICE CREDITS Button** is behind the coin door, on a rear wall bracket. This button allots credits without changing the game's bookkeeping total. SERVICE CREDITS has no function in the menu system.
- ◆ **The TEST MODE Button** is behind the coin door, on a rear wall bracket. Actuating TEST MODE causes the game to enter the menu system. Press the TEST MODE button briefly to run automatic tests. To make game adjustments, press and hold TEST MODE until the Main Menu appears. Within the menu system, TEST MODE assumes another function. There, it selects a menu line item and calls up the item's submenu. The screen displays this submenu.
- ◆ **VOLUME DOWN and VOLUME UP Buttons** are behind the coin door. You'll find them on a rear wall bracket. These buttons set game sound levels. To make minor changes, press either button briefly. To make major changes, press and hold a button. In the menu system, VOLUME UP moves the item highlight bar up the menu. VOLUME DOWN moves the item highlight bar downward.

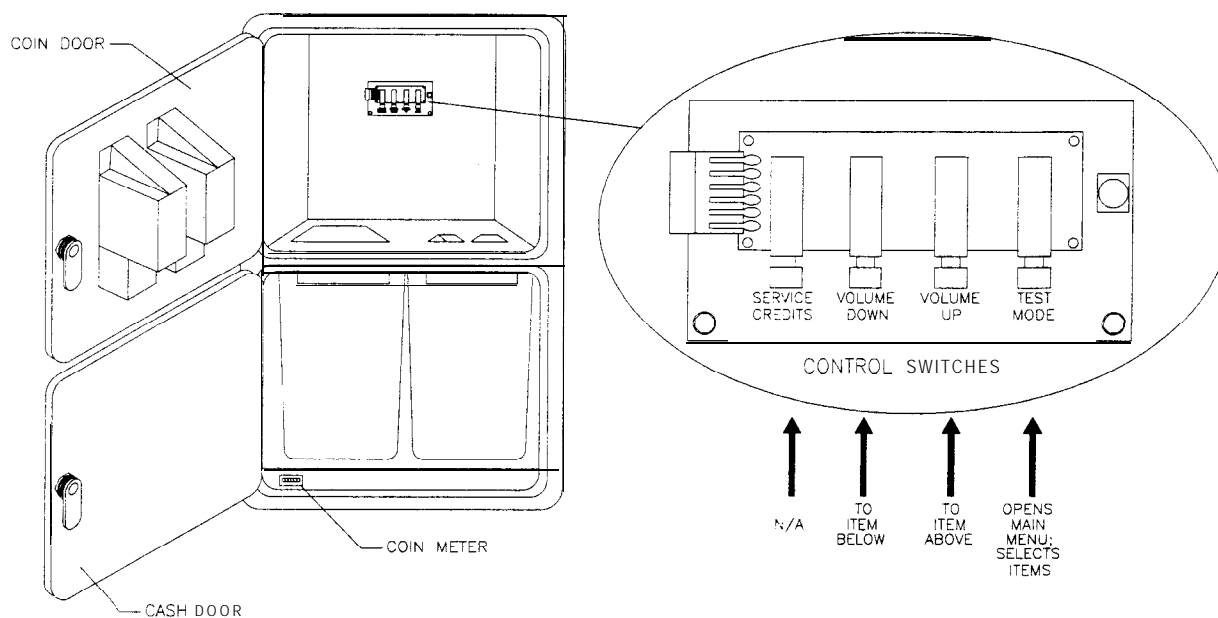


NOTICE: You must adjust Attract Mode volume independently of Game Mode volume. For greater profits, increase volume levels to draw attention to this game.

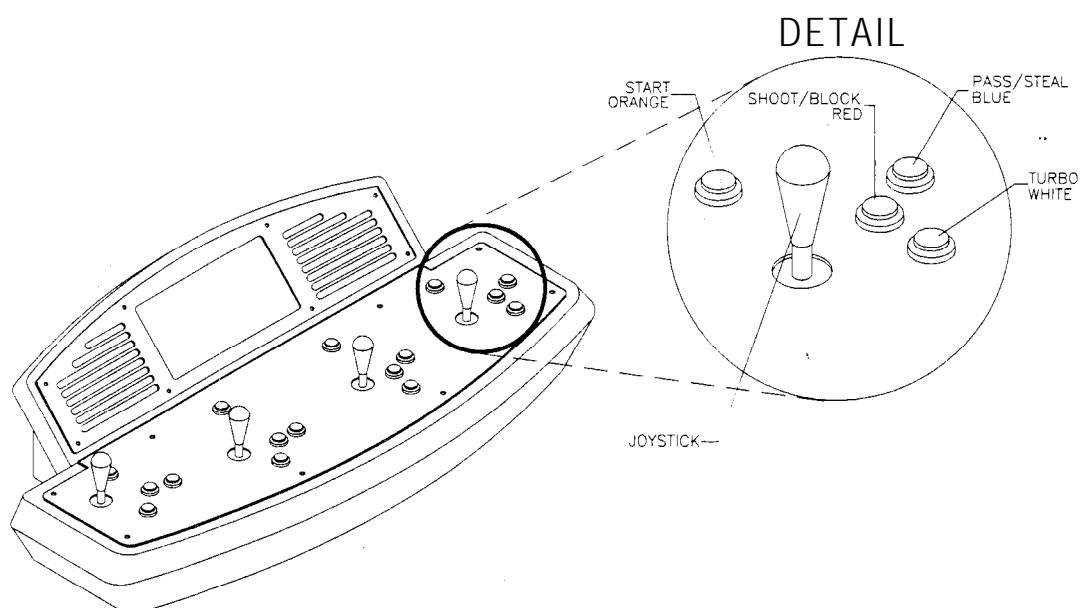
PLAYER CONTROLS



	<p>NOTICE: To reach diagnostic control switches, unlock and open the coin door.</p>
	<p>NOTICE: The 39-inch NBA on NBC machine has no factory-installed tilt switch.</p>



DIAGNOSTIC CONTROL SWITCH LOCATIONS



PLAYER CONTROL LOCATIONS

GAME FEATURES

NBA on NBC is a thrilling, two-on-two basketball game with world-class realism. Each player selects an NBA team, and then chooses a favorite character. Players can also create their own players. If fewer than four players are in the game, the computer operates the remaining characters.

The red team comprises players 1 and 2. Players 3 and **4** make up the challenging, blue team. The red and blue teams square off for the jump and the action begins. Run the ball down court! A steal! Dribble up court! A snap shot! The breathless announcer describes every pass, every shot, every block, every move!

After each quarter, new players can join the fun. Players can also switch to different characters. When the game concludes, team and individual scores appear on the screen. Top scorers may enter their initials or names with a joystick. **NBA on NBC** displays these initials in a high score table.

MAINTENANCE

◆ Cabinet

Use only non-abrasive cleaners to avoid damaging game graphics. Apply cleaner to a clean cloth or sponge. Use this to wipe the screen clean. Don't apply the cleaner direct/y on the cabinet!

◆ Control Panel

Dirt or debris on the joysticks or buttons can affect earnings. Apply the cleaner to a clean cloth. Use the cloth to wipe the controls. ***Don't apply the cleaner directly to the controls!***

◆ Viewing Glass



To clean the glass, you don't need to switch off power to the game. Apply a mild glass cleaner to a clean cloth or sponge. Use this to wipe the viewing glass. ***Don't apply the cleaner direct/y on the glass!*** Liquid could drip down into switch or motor circuits and cause erratic game operation.

SERVICING

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

◆ Circuit Board Set

The NBA on NBC game computer uses a set of three circuit boards. The three boards include the CPU Board, I/O Board and Video Board. Switch off power to the game. Open the front door. To expose the circuit boards, remove their perforated, metal cover. Note the orientation of the **JAMMA** connector and the other cables. Extract the harness and hard drive ribbon cable from board connectors. Remove circuit board mounting screws. Lift the circuit boards out of the cabinet and set them in a safe place. Use anti-static packaging from new parts to store boards that you won't reinstall.

	CAUTION: Circuit board edge connectors are fragile. Take care when separating boards in the board set. Never jam the board connectors together. Never plug them together on an extreme angle. If necessary, carefully straighten bent pins with a small, grounded flat blade screwdriver. Also, don't touch exposed foil on printed circuit boards. Skin oils are corrosive.
	NOTICE: Avoid damage to game electronics! Turn off game power before servicing circuit boards or any electronic assembly. Never "hot plug" circuit boards.

◆ Coin Mechanism

Switch off power to the game. Unlock the coin door and swing it open. To clean or replace a coin mechanism, unlatch and remove it. After reinstallation, ensure that the mechanism seats fully its bracket. Close and lock the release latch, and then close the door. Turn on the game and change the mechanism setup. Test known good and bad coins to verify operation.

◆ Coin Meter

Switch off power to the game. Unlock the cash door and swing it open. The meter is at the lower left corner of the door opening. Record the meter count before testing or replacement.

Insert a finger through the access hole under the cash tub. Locate the meter wires. Disconnect the harness at the connectors. Remove the screws from the front. Slide the meter out. Assure that the replacement unit has a diode wired across its terminals. This diode prevents driver circuit damage.

◆ Control Panel

Switch off power to the game. Remove the screws along the curved front edge of the control panel. Protect speaker grilles where joysticks will touch the grilles. Grip the center joysticks. Carefully tilt the control panel back on its hinge. Label connectors before removing controls or boards.

To return the control panel to its normal position: Slowly tilt the panel forward until it rests on the cabinet. Don't let the panel slam down onto the control base. Inspect for binding or pinched wires before reinstalling screws. Check joysticks for full range of motion before returning the game to play.

◆ Dollar Bill Validator

(Use *MARS A E24 11 -U5 U. L. Recognized currency changer*)

You can install a bill validator in a game that has an additional validator connector. Other types of currency acceptors are also compatible with this wiring connector. Switch off power to the game and unplug the AC line cord. Unlock the coin door and swing it open. Read the door label for additional information. Remove nuts, spacers, and the cover plate from the door. Change switch settings or other adjustments as necessary. If the manufacturer has supplied an adapter plate, place it over the door cutout. Install spacers on threaded studs. Align validator-mounting holes with the studs. Seat the unit in the door opening. Install the nuts and tighten them firmly. Attach the ground wire (green with a yellow stripe) lug to the door ground stud beside the hinge. Mate the wiring harnesses. Seat connectors by pressing down on them. Route wires away from the door edges and hinge. Plug in the line cord and turn on the game. Change the validator setup and pricing as required. Test known good and bad bills to verify proper operation. After you are satisfied with validator operation, close and lock the coin door.

Bill Acceptor Specifications

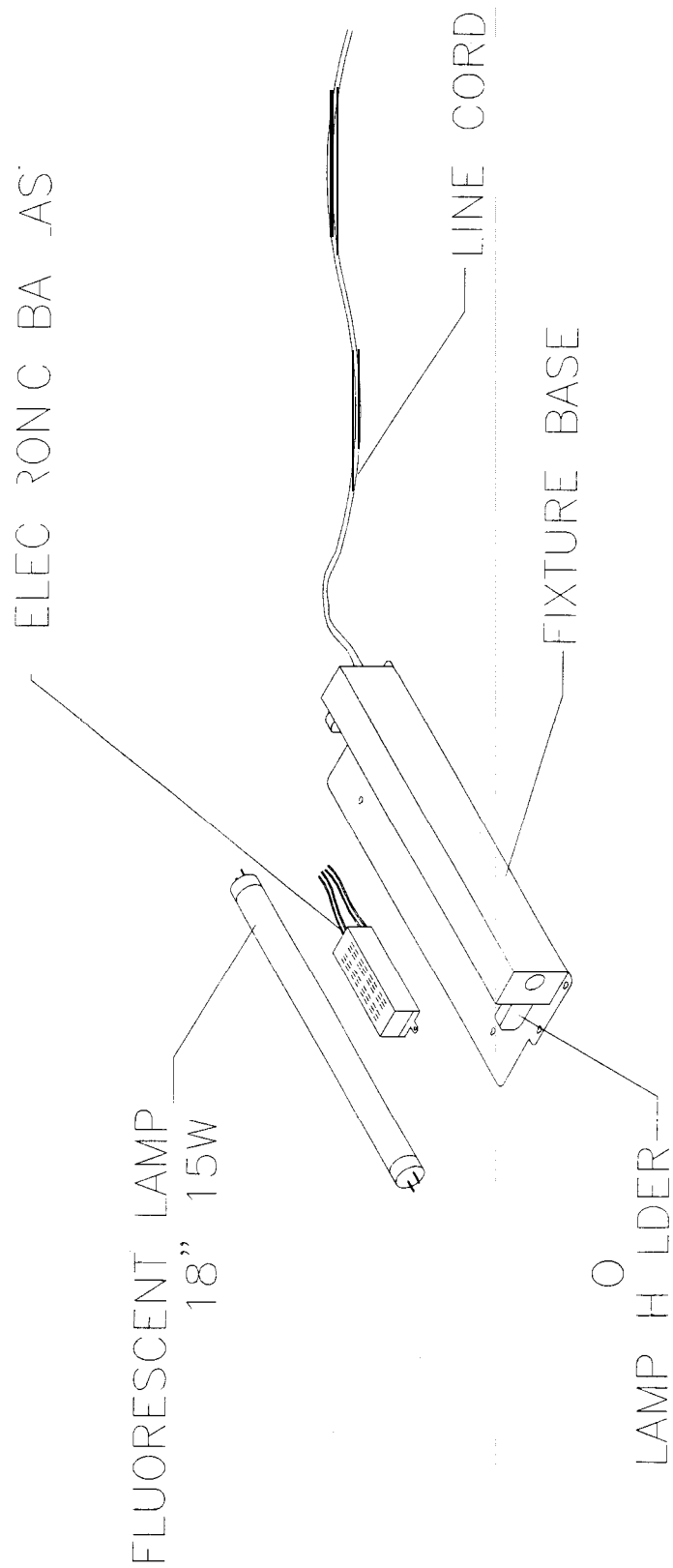
Pulse Width	50 mS minimum on; 50 mS minimum off
Pulses	1 pulse per dollar
vOL	0.4V @ 5mA
VOH	3.5V @ -0.4mA

◆ Fluorescent Light Assembly

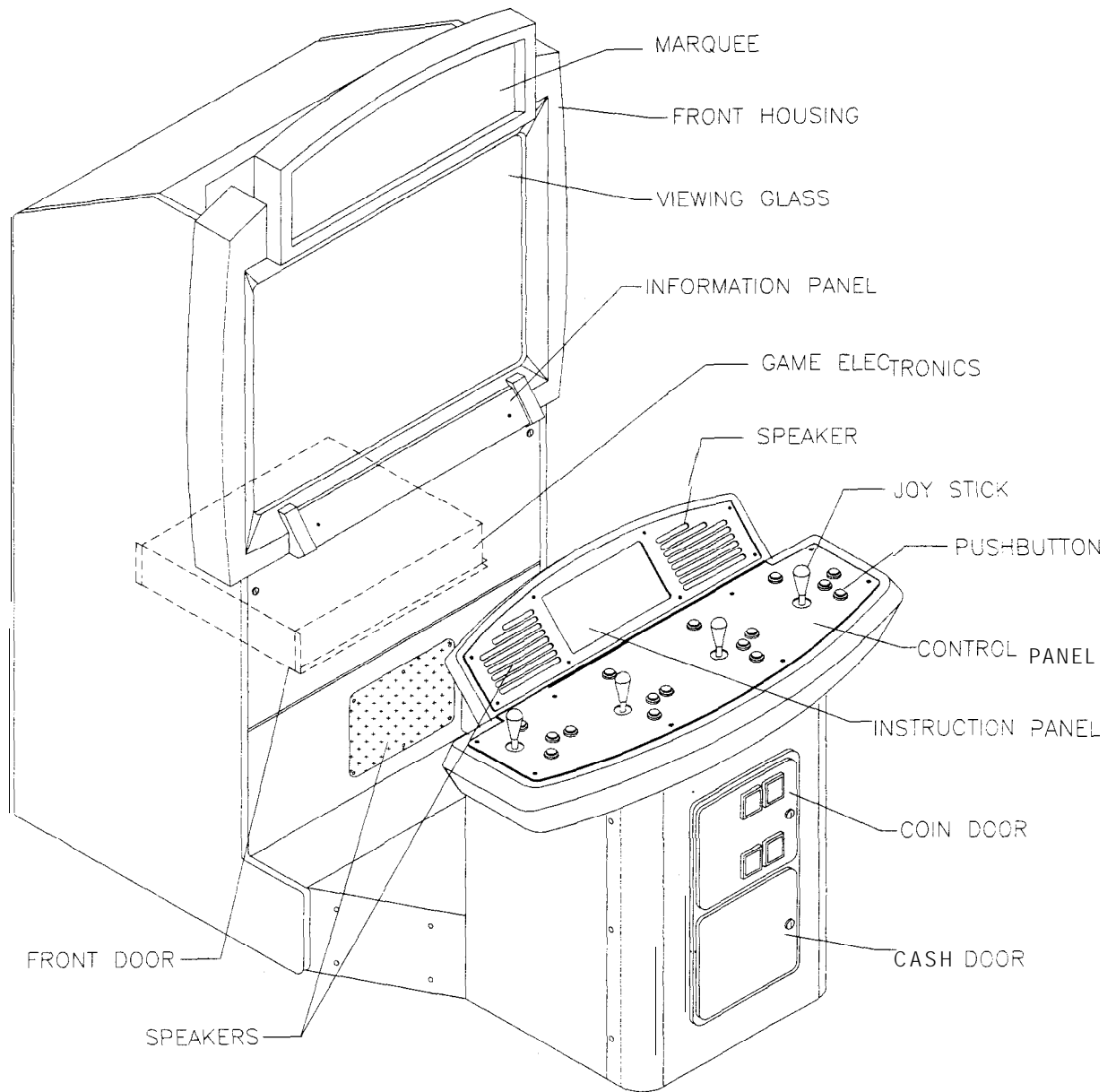
Switch off power to the game. Open the front cabinet door. Unlatch and prop up the front housing. Grasp the fluorescent tube at each end and give it a quarter turn. Gently pull the fluorescent tube straight out to remove it from its sockets. Clean fingerprints and dust off the fluorescent tube. During reinstallation, don't force the fluorescent tube. Close the housing and turn on the game. Verify that the lamp lights before locking the door.

To remove the entire lamp fixture, open the door. Unlatch and prop up the front housing. Remove the fluorescent tube. Disconnect the fluorescent lamp fixture connector from its power cable. Loosen and remove hex nuts that hold the lamp fixture to the light cover. Slide the lamp fixture keyholes up and off the mounting screws. Lift out the lamp fixture. The ballast is in the fixture base.

FLUORESCENT LAMP PARTS



CABINET VIEW 1



EXTERNAL COMPONENTS



WARNING: If you drop a fluorescent tube or a CRT and it breaks, it will implode! Use care in handling.

◆ Front Housing

Opening the Door and Housing. Switch off power to the game. Unlock the front cabinet door and swing it open until it rests on the chains. Release the latches at the corners under the front housing.

Gently pull out on the bottom of the formed front housing and swing it towards the control section. Remove the free end of the prop rod from the retainer at the left side of the monitor shelf. Swing the rod up until it rests in the rod bracket on the lower right side of the front housing. Lower the housing until the prop rod supports the housing's weight. **Closing the Door and Housing.** Snap the rod into the retainer. Close the housing. Engage latches and snap them shut. Close the front cabinet door



NOTICE: Hard disk drives are very fragile! Handle them with care. Don't stack or drop hard disk drives. Keep drives away from magnets, heat and vibration.

◆ Hard Disk Drive

Switch off power to the game. Unlock the front cabinet door. Swing it open until it rests on the chains. Remove the perforated, metal cover over the game electronics. Disconnect the DC power cable from the hard disk drive. Unplug the ribbon cable from the hard drive. Don't disconnect the cables from the CPU Board. Loosen the drive mounting screws and lift the drive out of its mounting bracket. Remove the screws. Save them for reuse in future hard drive installations. When returning a hard drive to your distributor, pack it in an anti-static bag. Box the drive in approved shipping container 08-8068.

◆ Information Panel

Remove screws from ends of information panel. Lift cover up and off to expose information overlay.

◆ Joysticks

Switch off power to the game. Open the player control panel. Mark and disconnect the wiring harness from a joystick. To separate the joystick from the player panel, first remove the joystick shaft. An E-ring secures the shaft. Disengage this E-ring with a small, flatblade screwdriver. Grasp the joystick knob. Extract the stick from the assembly. Then remove **10-32KEPS0** nuts from the corners of the joystick base. Retain fasteners for reassembly.

◆ Marquee

Switch off power to the game. Open the front cabinet door. To replace the marquee, you must completely remove the front housing from the monitor cabinet. Then you can access the marquee, and remove it from the bezel. Take the glass and artwork out of the front housing. Clean the glass before reinstalling it. Install the bracket and tighten screws. Replace the front housing on the monitor cabinet. Tighten mounting screws. Don't use excess force.

◆ Memory



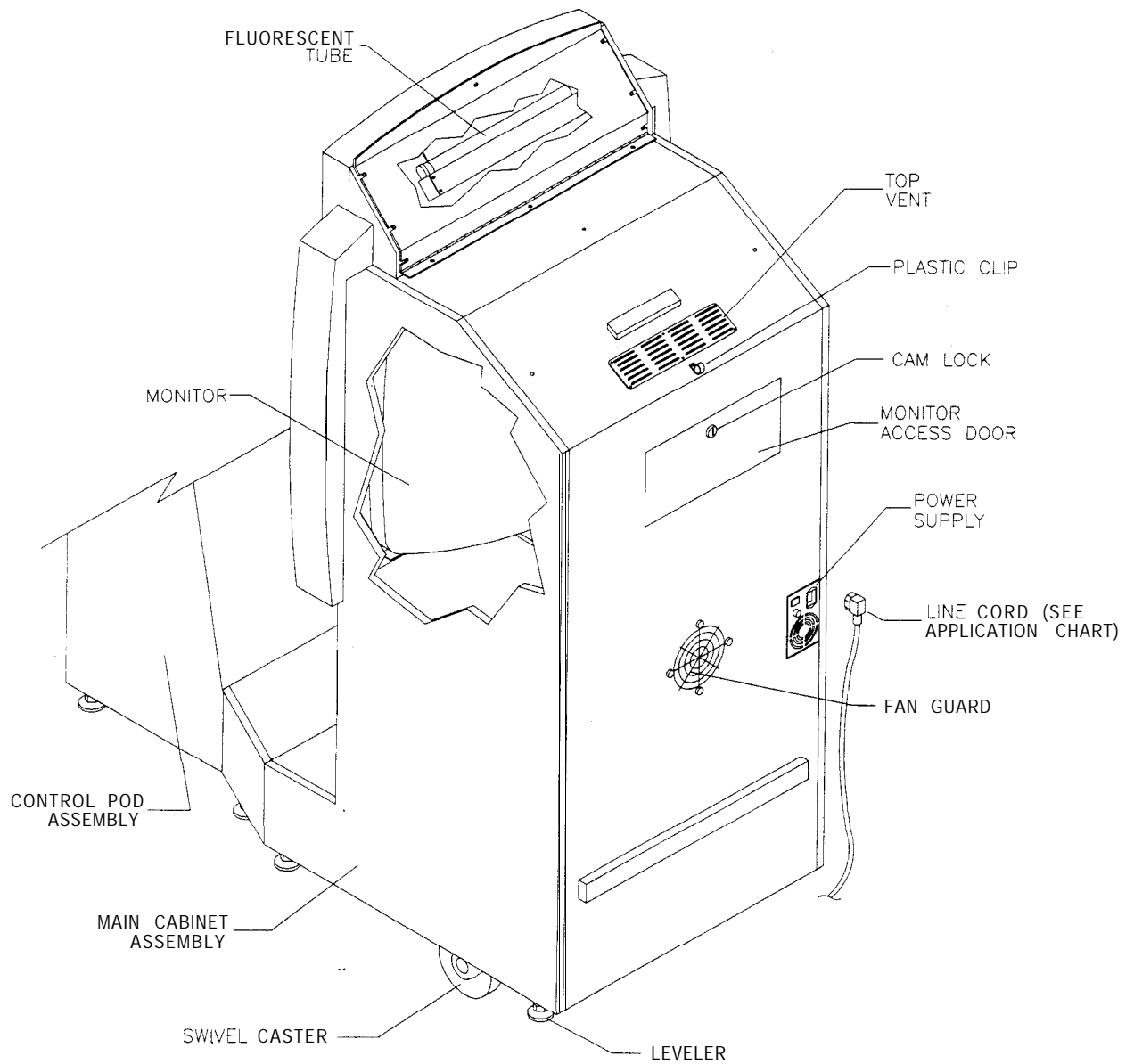
CAUTION: Static electricity builds up on your body. This static can damage or destroy sensitive the game circuits. **BEFORE** touching or handling electronic assemblies, discharge static electricity by touching the electronics mounting plate.



NOTICE: CPU Board and **SI/O** Board chips don't face same direction. When mounting chips on either board, refer only to chips on the same board for reference. Never use chips another board for reference.

ROM (Read Only Memory) circuits contain computer operating instructions for this game. Switch off power to the game. Unlock and remove the rear door. Remove the perforated metal cover. Note the



CABINET VIEW 2



REAR COMPONENTS

ROM chip position. Remove the device with a chip extraction tool. To reinstall a ROM chip, orient the device over its socket. Press the chip firmly to seat pins. Don't force *the chip into the* socket.

◆ Monitor

	CAUTION: The video monitor is heavy, with most of the weight toward the front of the assembly. Removing the monitor is a two-person task. Don't attempt to remove it by yourself. One person must support the monitor as the other removes it from the cabinet.
	WARNING: The monitor doesn't require isolation from AC line voltage during normal game operation. When operating the monitor outside the cabinet, use an isolation <i>transformer</i> . Connect <i>the transformer between the monitor and line</i> .

The monitor is very heavy and difficult to balance. Removing the monitor is a two-person task. Don't attempt to remove it by yourself. Switch off power to the game. Open the front cabinet door. Disconnect the fluorescent light assembly connector and all monitor cables. Remove the front housing hinge screws and set the housing aside. Remove the monitor bezel and both barrier panels. Remove the four flange nuts securing the monitor's mounting brackets to its **mounting** panel. Pull the monitor carefully from the cabinet and set in a safe place. The monitor remote adjustment board is behind the front door with the rest of the electronics. Clean the face of the CRT before reinstalling the barrier panels and the monitor bezel.

◆ Power Supply

Switch off power to the game and disconnect the line cord. Unlock and open the front door. Unplug the wiring harnesses from the back of the supply. Don't remove the supply mounting bracket. Remove two rear screws from the supply. Then slide the unit out of the cabinet. Verify the line VOLTAGE switch setting before reinstalling the power supply.


◆ Speakers

Switch off power to the game. The full-range speakers are mounted behind grilles at the top of the control section. Grilles and speakers come out from the front. Remove the screws and set the grilles aside. To avoid damaging a speaker, remove upper mounting screws first, and replace them last.

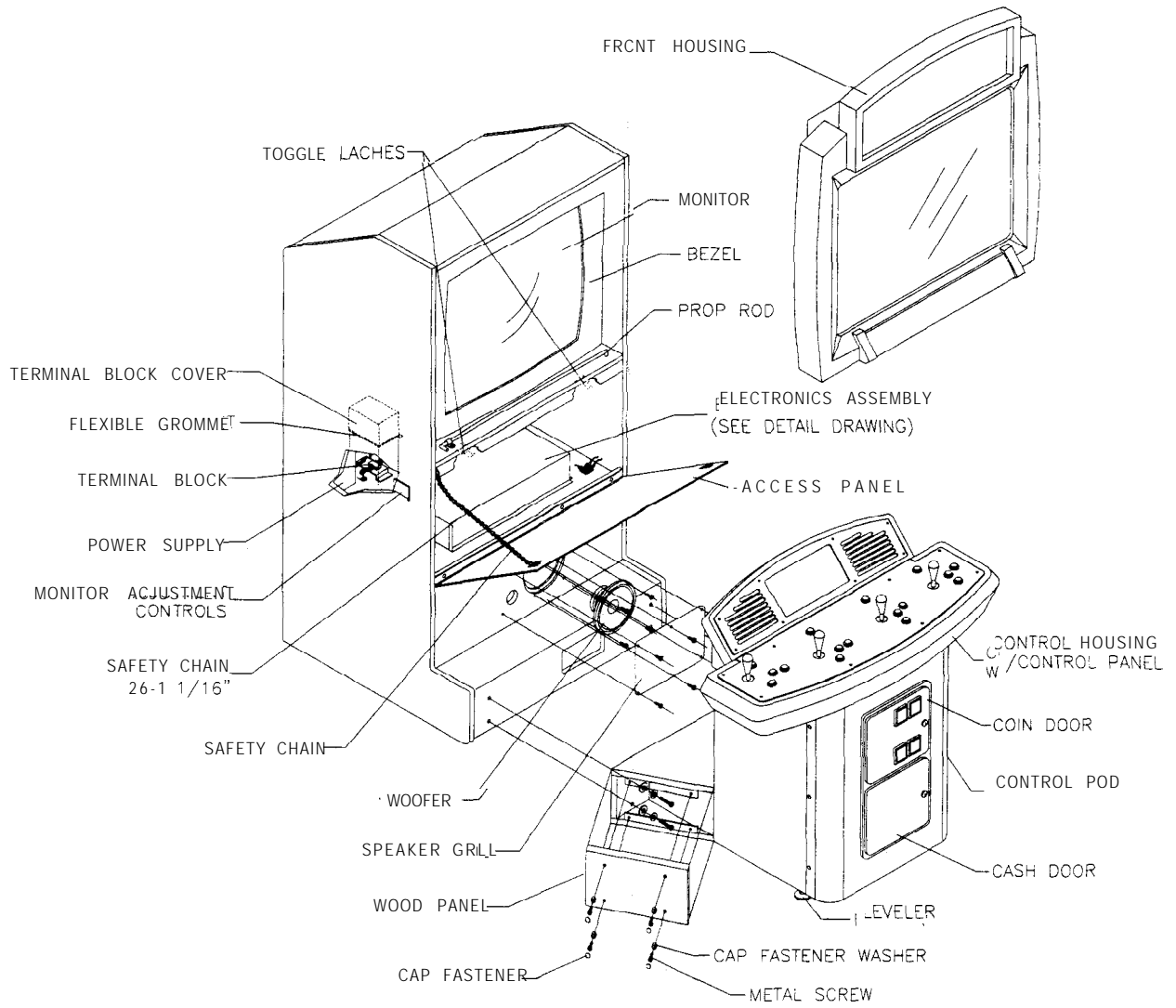
Remove the speakers from the enclosure just enough to expose the terminals. Label and disconnect the wires. Refer to the Wiring Diagram (Chapter Five) for speaker wiring information. Don't use excessive *force when removing or tightening screws threaded into plastic or particle board*.

◆ Viewing Glass

Switch off power to the game. Open the front cabinet door. To replace the viewing glass, you must completely remove the front housing from the monitor cabinet. Lift the glass out of the front housing. Clean the glass before reinstalling it. Install the bracket and tighten screws. Replace the front housing on the monitor cabinet. Tighten mounting screws. Don't use excess force.

	CAUTION: Before you replace the CRT glass, completely remove the front housing assembly from the cabinet. Glass is hazardous to handle with the housing pivoted up on the drop rod.
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CABINET VIEW 3



INTERNAL COMPONENTS

NBA ON NBC™

CHAPTER THREE

DIAGNOSTIC, AUDIT & ADJUSTMENT MENU SYSTEM



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

MENU SYSTEM

WHAT IS THE MENU SYSTEM?

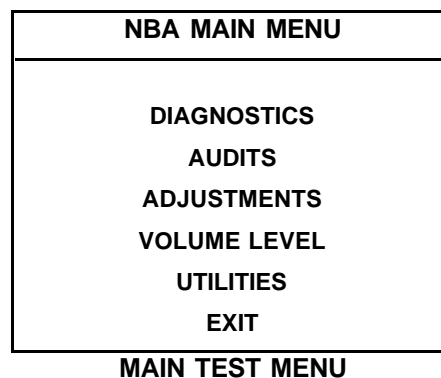
The game's Menu System is a series of auditing, game adjustment and diagnostic screens. You can easily access and apply these screens to optimize game performance. For instance.. ,

- ◆ Use game audits screens to assess game performance.
- ◆ Use adjustment screens to help you to customize game performance. For instance, you can restore factory default game settings. You can also calibrate player controls for accuracy.
- ◆ Use diagnostic screens to verify proper equipment operation.

ACTIVATING THE MENU SYSTEM

Open the coin door. Find the TEST MODE switch inside. Press TEST MODE to invoke the Menu System. The game system responds by exiting Game Mode and entering Diagnostic Mode. The system runs a brief self-test, and then displays the Main Menu. The Main Menu is the opening screen of the Menu System.

Game audits, adjustments and diagnostics are line items on the Main Menu. Selecting an item opens its submenu. Every submenu presents various options that you may act upon.



MENU LAYOUT

Menus differ, but related information tends to occupy the same screen locations.

- ◆ The block at the top, center of each screen displays the current menu title...
- ◆ Data (menu items, video signals, statistics, reports, etc.) appears in the center of the screen.
- Messages (explanations, control functions, revision levels) display at the bottom of the screen.

MENU NAVIGATION CONTROLS

Use any player panel joystick to highlight a desired menu item. You can *only* select one *highlighted item* at a time. To select a highlighted item, press any player panel button. To return the game to play, first highlight "EXIT." Then press any button.

Operator control buttons inside the coin door serve as backup menu navigation controls. Press VOLUME UP or VOLUME DOWN buttons to highlight a menu item. Press TEST MODE to select a highlighted item.

AUTOMATIC TESTS

Whenever you switch the game between Play Mode and the menu system, the self-test activates. This routine runs automatically. It can detect faults that cause game or menu system malfunctions. A self-test usually takes less than a minute. The self-test doesn't display anything. Instead, the system boot loader indicates the software revision number and serial numbers. The system boot loader also displays a sound-loading message and other useful information.

CONTROL FUNCTIONS

The Control Functions Menu appears for five seconds. Then the Menu System automatically proceeds to its next screen.

The Control Functions Menu reiterates the operation of menu navigation controls. The key point is that you can use either player or operator controls to navigate menus. Operator control switches are particularly helpful when you must troubleshoot player switches.

<p>STICK UP/VOLUME UP – MOVE UP</p> <p>STICK DOWN/VOLUME DOWN – MOVE DOWN</p> <p>STICK RIGHT – MOVE RIGHT</p> <p>STICK LEFT – MOVE LEFT</p> <p>PUSH BUTTON/TEST BUTTON- SELECT</p> <p>5 SECONDS TO DIAG ENTRY</p>

CONTROL FUNCTIONS SUBMENU

DIAGNOSTICS

Select “DIAGNOSTICS” at the Main Menu. Diagnostic tests allow you to verify the condition of the electrical and electronic hardware in the game.

Highlight a test with any player panel joystick. Select the option with any player panel button.

<p>DIAGNOSTICS</p>
<p>MONITOR SETUP</p> <p>SYSTEM INFO</p> <p>REAL TIME CLOCK</p> <p>SOUND SUBSYSTEM</p> <p>DISK TESTS</p> <p>SWITCH TESTS</p> <p>DIP-SWITCH TESTS</p> <p>SPEAKER TEST</p> <p>EXIT</p>

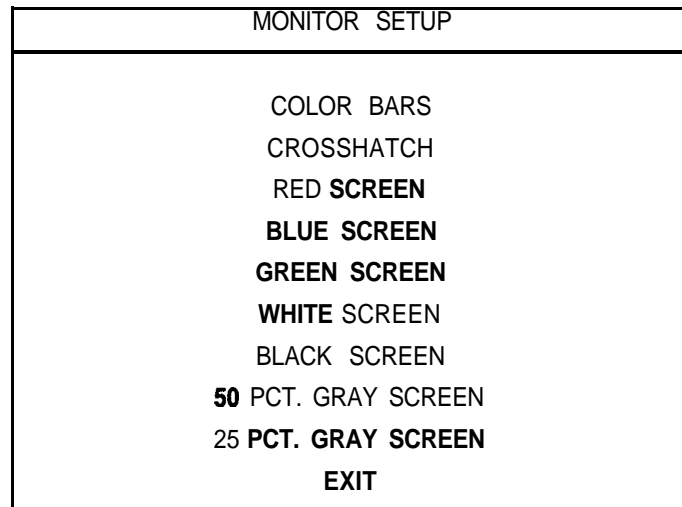
DIAGNOSTICS SUBMENU

Diagnostic tests assist you in checking and adjusting the game's major systems. By running diagnostics, you can gain an insight into both system hardware and game software. Periodically running diagnostics is a crucial part of maintaining game performance and player satisfaction. Sometimes you can improve game performance by running a diagnostic test and making appropriate adjustments.

MONITOR SETUP

Select "MONITOR SETUP" at the Diagnostics Menu. The Monitor Patterns routine provides test screens to verify monitor performance or make adjustments.

Highlight an option with any player panel joystick. Select the option with any player panel button.



MONITOR SETUP SUBMENU

Color Bars fills the screen with colored stripes. Use the color bars to help you to check or adjust monitor brightness and contrast. The color bars also expose defects in horizontal linearity. Each color bar consists of 32 intensity levels. On a properly adjusted monitor, the top 31 of these levels are visible. Each bar should appear sharp, clear and distinct from bars on either side. Incorrect adjustment can cause missing detail at the top or bottom of a bar. Bent bars indicate horizontal linearity flaws, such as pie crust, pincushion or barrel distortion. (Correct color bar colors, *left to right*: Red, Green, Blue, **Black**, White, Cyan, Yellow, *Violet*.) Set controls as follows: 1. Adjust BRIGHTNESS and CONTRAST to minimum. 2. Turn up BRIGHTNESS until the pixels in the black stripe begin to glow (turn dark gray). 3. Bring up the CONTRAST control until you can see 31 bars.

Crosshatch Patterns fill the screen with a grid and a series of dots. Crosshatch Patterns help you to check. or adjust several monitor parameters: These include convergence, linearity, active viewing area and dynamic focus. The grid and the dots should be all white in color, with no fringes or parallel images. The lines should be straight and the dots round. For more detail on these adjustments, consult service literature from the monitor manufacturer.

Color Screen tests fill the screen with 100% of the chosen color at normal intensity. The Color Screen tests help you to check or adjust monitor intensity, black level, blanking and color purity. Each screen should be absolutely uniform from top to bottom and side to side. No retrace lines or noise should be visible. Color Screens may not hold their uniformity if the monitor degaussing circuit is defective.

White, Gray and Black Screens fill the screen with black, gray or white at various intensities. These monochrome screens help you to check or adjust monitor convergence, purity, contrast and intensity. These screens also simplify black level and color gun control settings. The screens should be uniform with no color tints or distortion. No retrace lines or noise should be visible.

If tests indicate a need for adjustment, use controls on the Monitor Remote Adjustment Board.

SYSTEM INFORMATION

Select "SYSTEM INFO" at the Diagnostics Menu. The System information Menu provides the current version numbers of this game's hardware and software. Use these numbers to describe the system during parts replacement, service calls, etc.

Highlight an option with any player panel joystick. Select the option with any player panel button.

SYSTEM INFORMATION
<p>MIDWAY GAMES, INC. XXXXXXX SYSTEM</p> <p>SERIAL NUMBER: XXXXXXXXX</p> <p>GAME: NBA ON NBC</p> <p>DATE OF MANUFACTURE: XX/XX/XX</p> <p>PRESS ANY BUTTON TO EXIT</p>

SYSTEM INFORMATION SUBMENU

The System Information screen reports information, but doesn't permit you to make changes. The Title line identifies the manufacturer of this game and the electronic board set used in this product. The Serial Number, Game and Date of Manufacture identify the game name and production run.

REAL TIME CLOCK

The game's real-time clock provides the current date and time. This screen also allows you to adjust the clock. You may adjust for time zone changes, clock resets, backup battery replacements, etc.

Highlight an option with any player panel joystick. Select the option with any player panel button.

REAL TIME CLOCK
<p>DISPLAY SET</p> <p>EXIT</p>

REAL TIME CLOCK SUBMENU

The real-time clock provides accurate, time-stamped game statistics. The clock doesn't affect game operation. Once set, the clock runs until the battery fails, or service or some major fault disrupts circuits. Periodically examine the top lines of the SELF TEST screen for the correct time and date.

SOUND SUBSYSTEM TEST

Select "SOUND SUBSYSTEM" at the Diagnostics Menu. Sound Subsystem Tests verify that audio components are connected and operate properly.

Highlight an option with any player panel joystick. Select the option with any player panel button.

SOUND SUBSYSTEM TEST
BOOT VERSION: XX.XX
SDRC VERSION: XX.XX
PORT STATUS: GOOD
CHECKSUM: XXXX
SRAM: OK
DRAM: OK
TONE STATUS: GOOD
OS VERSION: XX.XX
EXIT

SOUND SUBSYSTEM SUBMENU

Version, Status, Checksum and RAM Reports are diagnostic routines. These routines analyze the digital sound circuits and can detect sound memory problems. Test results appear as numbers or messages. **Sounds** may also accompany some tests. Reports other than GOOD or OK indicate a problem.

DISK TESTS

Select "DISK TESTS" at the Diagnostics Menu. Disk Tests allow you to verify proper operation of the hard disk drive assembly.

Highlight an option with any player panel joystick. Select the option with any player panel button.

DISK TESTS
DISK INFORMATION
SEQUENTIAL READ
SEQUENTIAL CACHE READ
RANDOM READ
RANDOM CACHE READ
DATA INTEGRITY TEST
FILE SYSTEM CHECK
SURFACE SCAN
EXIT

DISK TESTS SUBMENU

Disk Information. The Disk Information routine verifies the interface between the CPU Board Assembly and hard disk drive. The processor requests disk information. Data cannot be retrieved successfully if there is a problem.

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

Sequential Cache Read. This routine tries to access every bit of data in the order it is stored in the temporary disk memory cache. If this test is not successful, the memory circuits may be faulty.

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

Random Cache Read. This routine tries to access every bit of data in no particular order from the temporary disk memory cache. If the cache fails this test, memory circuits may contain a fault.

Data Integrity Test. This test analyzes the data on the disk drive. The test determines if corrupted data is on the disk. Bad data can cause the program to falter even though the hard disk operates correctly.

File System Check. This routine performs a file-by-file check of the data stored on the hard disk.

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

SWITCH TESTS

Select "SWITCH TESTS" at the Diagnostics Menu. Switch Tests verify proper operation of the game's switches, including buttons and shotgun switches.


Activate each switch, and the indicator on the screen changes state. Release the switch and the indicator returns to its previous, normally open or closed condition. Switches may be tested in any combination. To exit the test, simultaneously press the middle two control buttons inside the coin door. The Switch Test Screen refers to these buttons as "volume buttons."

PLAYER SWITCH INPUTS TEST															
P1	UP	■	P3	UP	■	LEFT COIN	■								
P1	DOWN	■	P3	DOWN	■	RIGHT COIN	■								
P1	LEFT	■	P3	LEFT	■	P1 START	■								
P1	RIGHT	■	P3	RIGHT	■	SLAM/TILT	■								
P1	SHOOT	■	P3	SHOOT	■	TEST	■								
P1	PASS	■	P3	PASS	■	P2 START	■								
P1	TURBO	■	P3	TURBO	■	SERVICE CREDIT	■								
								CENTER COIN	■						
P2	UP	■	P4	UP	■	EXTRA COIN	■								
P2	DOWN	■	P4	DOWN	■	P3 START	■								
P2	LEFT	■	P4	LEFT	■	P4 START	■								
P2	RIGHT	■	P4	RIGHT	■	VOLUME UP	■								
P2	SHOOT	■	P4	SHOOT	■	VOLUME DOWN	■								
P2	PASS	■	P4	PASS	■										
P2	TURBO	■	P4	TURBO	■	BILL VALID.	■								
P1 49 WAY				P2 49 WAY				P3 49 WAY				P4 49 WAY			
24				24				24				24			
PRESS BOTH PLAYER 1 AND PLAYER 2 START BUTTONS TO EXIT															

SWITCH TEST SCREEN

Switches appear on the screen as colored boxes. Red boxes indicate an open state. Green indicates closed. Any other color indicates a fault condition. A single indication on the menu screen should exactly duplicate a button or shotgun..change. You'll notice a unique number for a switch recognized by game electronics.

Use Switch Tests to locate crossed wires, intermittent conditions and stuck switches.

	<p>NOTICE: Some switches may not be used with this game. If you can't find one of the listed switches, check the wiring diagram.</p>
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DIP-SWITCH TESTS

Select "DIP-SWITCH TESTS" at the Diagnostics Menu. Two **8-position** DIP switch banks reside on the CPU Board. DIP-Switch Tests allow you to check the position of the 16 switches in these banks. You can change the setting of any DIP switch without removing the CPU cover.

Highlight an option with any player panel joystick. Select the option with any player panel button. The screen displays an illustration of each switch block and the current settings.

You can change DIP-switch positions with power on. Set any switch, and then check the screen to verify that the new setting is **enabled**.

Refer to the charts for assistance in choosing switch positions. (* indicates factory defaults.) To exit the DIP-switch Test, press the left control button (inside the coin door).

DIP Switch 1 (U13)		SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
Coinage Control	DIP Switch CMOS	Off On*							
USA1 Ger1 Fr ECA1 UK1			off*	off*	off*				
USA2 Ger2 Fr ECA2 UK2			On	Off	Off				
USA3 Ger3 Fr ECA3 UK3			Off	On	Off				
USA4 Ger4 Fr ECA4 UK4			On	On	Off				
USA5 Ger5 Fr ECA5 UK5			Off	Off	On				
USA6 Ger6 Fr ECA6 UK6			On	Off	On				
USA7 Ger7 Fr ECA7 UK ECA			Off	On	On				
USA ECA / Ger ECA / Fr ECA8			On	On	On				
Free Play (All Countries)			On	On	On				
Country	USA France Germany UK**					Off* On Off On	Off* Off On On		
Unused	-- --							Off On	
Game	NBA on NBC Reserved								Off On

** Except Free Play, which is "On" for SW2 through SW6.

DIP Switch 2 (U12)		SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8
Joystick Type	8-Way 49-Way	Off On*							
Monitor Resolution	Medium Res Low Res		Off* On						
Unused	-- --			Off On					
Unused	-- --				Off On	Off On			
Unused	-- --					Off On			
Player Panel Type	2-Player 4-Player						Off On*		
Power Up Test	Active Inactive							Off On'	
Operating Mode	Game Mode Test Mode								Off On'

SPEAKER TEST

Select "SPEAKER TEST" at the Diagnostics Menu. The Speaker Test provides audio signals to test the loudspeakers.


Use tests on the Speaker Test menu to verify operation of audio system components. Highlight an option with any player panel joystick. Select the option with any player panel button.

SPEAKER TEST
LEFT CHANNEL
CENTERCHANNEL
RIGHT CHANNEL
100 HZ TONE
1 KHZ TONE
PLAY TUNE
EXIT

SPEAKER TEST SUBMENU

Channel and Tone Tests. The channel **subtests** employ voice announcements to verify speaker locations. Use the 100 Hz tone to check the speakers' bass response. Small speakers with weak magnets or poor baffles may cause poor bass response.

Play Tune repeats a series of game sounds. Use PLAY TUNE to check speaker operation and fidelity. If your game has stereo speakers, run PLAY TUNE and test speaker phasing. "Muddy," weak or distorted sound during this test may indicate crossed wires or out-of-phase speaker connections. Missing sounds may indicate audio cabling errors.

	<p>NOTICE: Check the volume setting before testing. To test the speakers thoroughly, increase the volume level. Before returning to Game-Over Mode, reset the volume level to its original setting.</p>
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AUDITS

Select “AUDITS” at the Main Menu. The Audits menus permit you to review game play statistics. Additional menus give detailed reports for each player position on game starts, ends, cabinet abuse, fault conditions, etc.

Highlight an option with any player panel joystick. Select the option with any player panel button. The screen displays a list of the statistics available to you. Select an item to view the detailed report.

AUDITS
COIN AUDITS
CREDITS AUDITS
GAME AUDITS
TEAM STATS
GAME FEATURES
GAME RESETS
EXCEPTION DUMP
CLEAR AUDITS
EXIT

AUDITS SUBMENU

Data in the Audits menus helps you to keep records of the game’s popularity and earning potential. Use the highlight bar to select the desired subject on the Audits Submenu. Each entry on the Audits Submenu is the subject for an entire screen of bookkeeping information. On these screens, you can track favorite teams, frequently used offensive and defensive plays, etc.

Some audits menus also include histograms. Histogram screens allow graphical analysis of statistics. This permits visual comparisons between games. Histograms have no bar graphs until the system acquires enough data to plot.

Examine and record all game audit values before performing game service or repairs,



NOTICE: Be careful when clearing audit information. Once you clear data, you cannot restore it.

COIN AUDITS

Select **"COIN AUDITS"** at the Audits Menu. The Coin Audits menu permits you to assess the currency collection. This report screen presents revenue quantities and other important game statistics. Coin Audits is a read-only screen.

To exit, press any player panel button.

COIN AUDITS - PAGE: 1	
LEFT SLOT COINS	XXXXXXXX
RIGHT SLOT COINS	XXXXXXXX
BILLS	XXXXXXXX
CENTER SLOT COINS	XXXXXXXX
EXTRA SLOT COINS	XXXXXXXX
GAME STARTS	XXXXXXXX
MID-GAME STARTS	XXXXXXXX
CONTINUES	XXXXXXXX
FREE QUARTERS AWARDED	XXXXXXXX
FREE GAMES AWARDED	XXXXXXXX
SERVICE CREDITS	XXXXXXXX
TOTAL PLAYS	XXXXXXXX
TOTAL PLAYS	XXXXXXXX
TOTAL PAID CREDITS	XXXXXXXX
TOTAL	XXXXXXXX
PRESS ANY BUTTON TO EXIT	

COIN AUDITS SUBMENU

The Coin Audits submenu reports total quantities of coins, bills or credits collected by **each active** device. The submenu doesn't calculate the value of the collected currency.

This screen reports information, but doesn't permit you to make changes. To reset the coin, bill and credit counters to zero, use the Clear Audits menu.

We recommend that you examine and record audit information before you make changes. Once you've cleared the counters, you can't retrieve the previous data from **the system**.

CREDITS AUDITS

Select "CREDITS AUDITS" at the Audits Menu. The Credits Audits menu permits you to assess the currency collection. This report screen presents revenue quantities and other important game statistics. Credits Audits is a read-only screen.

To exit, press any player panel button.

CREDITS AUDITS - PAGE: 1	
CREDITS AVAILABLE	XXXXXXXX
PRESS ANY BUTTON TO EXIT	

CREDITS AUDITS SUBMENU

GAME AUDITS

Select "GAME AUDITS" at the Audits Menu. The Game Audits menus permit you to review the game play statistics. Game Audits is a read-only screen.

To exit, press any player panel button.

GAME AUDITS - PAGE: 1			
MACHINE POWER-ON	x x	WENT INTO OT 3	x x
TOTAL UPTIME	x x	1 PLAYER FINISHES	x x
TOTAL PLAY TIME	x x	2 PLAYER FINISHES	xx
GAME STARTED	xx	3 PLAYER FINISHES	xx
INITIALS ENTERED	xx	4 PLAYER FINISHES	xx
<FG> PURCHASED AT START	xx	2 PV CPU FINISHES	xx
CREATE PLAYER SESSIONS	xx	H VS H LSW'S	xx
1 PLAYER	xx	CPU WINS (FG)	xx
2 PLAYER	xx	AVG H VS H TOTAL SCORE (FG)	xx
3 PLAYER	xx	AVG H VS CPU TOTAL SCORE (FG) AVG	XX
4 PLAYER	xx	H VS H WIN SCORE (FG)	xx
1 QUARTER GAMES	xx	AVG H VS H LOSS SCORE (FG)	xx
2 QUARTER GAMES	xx	BIGGEST CPU WIN MARGIN (FG)	xx
3 QUARTER GAMES	xx	BIGGEST CPU LOSS MARGIN (FG)	xx
4 QUARTER GAMES	xx		
2PV CPU	xx		
1 QUARTER GAMES	xx		
2 QUARTER GAMES	xx		
3 QUARTER GAMES	xx		
4 QUARTER GAMES	xx		
WENT INTO OT 1	xx		
WENT INTO OT 2	xx		

GAME AUDITS SUBMENU

The Game Audits menu reports information, but doesn't permit you to make changes. Examine and record information at GAME AUDITS before deleting data at the Clear Audits Menu. Once you've cleared the counters, you can't retrieve the previous data from the system.

GAME AUDIT MENU TERMS

SCREEN TERM	DEFINITION	SCREEN TERM	DEFINITION
AVG	Average	LSW	Your game computer's internal record-keeping counters
CPU	Central Processing Unit: The game computer	Machine Power-On	Number of power cycles (game turn-ons)
<FG>, (FG)	Full Game	OT	Overtime
H VS CPU	Human versus CPU: Competition that pits players against the game computer	PV	Player versus..
H VS H	Human versus human: Competition between human players	Total Uptime	Overall on-time for the game computer
		2PV	Two players versus..

TEAM STATS

Select "TEAM STATS" at the Audits Menu. Team Stats details the number of games played by each team in the league. Team Stats is a read-only screen.

To exit, press any player panel button.

TEAM STATS - PAGE: 1			
ATLANTA HAWKS	0	MINNESOTA TIMBERWOLVES	0
BOSTON CELTICS	0	NEW JERSEY NETS	0
CHARLOTTE HORNETS	0	NEW YORK NICKS	0
CHICAGO BULLS	0	ORLANDO MAGIC	0
CLEVELAND CAVALIERS	0	PHILADELPHIA 76ERS	0
DALLAS MAVERICKS	0	PHOENIX SUNS	0
DENVER NUGGETS	0	PORTLAND TRAILBLAZERS	0
DETROIT PISTONS	0	SACRAMENTO KINGS	0
GOLDEN STATE WARRIORS	0	SAN ANTONIO SPURS	0
HOUSTON ROCKETS	0	SEATTLE SUPERSONICS	0
INDIANAPOLIS PACERS	0	TORONTO RAPTORS	0
LOS ANGELES CLIPPERS	0	UTAH JAZZ	0
LOS ANGELES LAKERS	0	VANCOUVER GRIZZLIES	0
MIAMI HEAT	0	WASHINGTON WIZARDS	0
MILWAUKEE BUCKS	0		
PRESS ANY BUTTON TO EXIT			

TEAM STATS SUBMENU

GAME FEATURES

Select "GAME FEATURES" at the Audits Menu. Game Features tracks play statistics that relate characters in the game and game play. Game Features is a read-only screen.

To exit, press any player panel button.

GAME FEATURES - PAGE: 1			
NUMBER OF PLAYER RECORDS	0	CREATP AVG WEIGHT PTS	0
NUMBER OF LRU RECORDS	0	CREATP AVG PWR PTS	0
RECORDS FROM CREATE PLAYER	0	CREATP AVG SPEED PTS	0
NUMBER OF PLAYER FIRE	0	CREATP AVG 2-PT PTS	0
AVG PTS PLAYER FIRE	0	CREATP AVG STEAL PTS	0
NUMBER OF TEAM FIRE	0	CREATP AVG BLOCK PTS	0
AVG PTS TEAM FIRE	0	CREATP AVG DUNK PTS	0
NUMBER OF ALLEY OOPS	0	CREATP AVG 3-PT PTS	0
NUMBER OF DOUBLE DUNKS	0	CREATP AVG DRIBBLE PTS	0
CREATP MASCOT HEADS	0	CREATP NO TAG PRIV	0
CREATP NBA HEADS	0	STEALTH TURBO PRIV	0
CREATP FEMALE HEADS	0	BIG HEAD PRIV	0
CREATPOTHERHEADS	0	DRONE BIG HEAD PRIV	0
CREATP DEFAULT UNIFORM	0	SUPER REBOUND PRIV	0
CREATP CUSTOM UNIFORM	0	GAME WITH CREATP	0
CREATP TEAM UNIFORM	0	WIN V CPU WITH CREATP	0
CREATP NICKNAME	0	WIN V HUMAN WITH CREATP	0
CREATP AVG HEIGHT PTS	0	TOURNAMENT GAMES	00
PRESS ANY BUTTON TO EXIT			

GAME FEATURES SUBMENU

Number Of Player Records. Number of player initial sets entered in CMOS RAM.

Number Of LRU Records. Number of record slots (space for player data) left in CMOS RAM.

Records From Create Player. Number of player records produced in Create Player Mode.

Number Of Player Fire. Number of times a player has started on fire.

Avg **Pts** Player Fire. Average number of points that player scored while player was on fire.

Number Of Team Fire. Number of times that the team has started on fire.

Avg Pts Team Fire. Average number of points that the team scored while it was on fire.

Number Of Alley **Oops**. Total number of alley oops performed.

Number Of Double Dunks. Total number of double dunks performed.

Creatp Mascot Heads. Number of player-created characters with mascot heads.

Creatp NBA Heads. Number of player-created characters with NBA-personality heads.

Creatp Female Heads. Number of player-created characters with female heads.

Creatp Other Heads. Number of player-created characters with custom heads.

Creatp Default Uniform. Number of player-created characters with the selected team's **uniforms**.

Creatp Custom Uniform. Number of player-created characters with custom uniforms.

Creatp Team Uniform. Number of player-created characters with specific team uniforms.

Creatp Nickname. Number of player-created characters with nicknames.

Creatp Avg Height Pts. Average height attribute setting.

Creatp Avg Weight Pts. Average weight attribute setting.

Creatp Avg Pwr Pts. Average power attribute setting.

Creatp Avg Speed Pts. Average speed attribute setting.

Creatp Avg 2-Pt Pts. Average two-point shot attribute setting.

Creatp Avg Steal Pts. Average stealing attribute setting.

Creatp Avg Block Pts. Average blocking attribute setting.

Creatp Avg Dunk Pts. Average dunking attribute setting.

Creatp Avg 3-Pt Pts. Average three-point shot attribute setting.

Creatp Avg Dribble Pts. Average dribbling attribute setting.

Creatp No Tag Priv. Number of player-created characters with the “no-tag” privilege set.

Stealth Turbo Priv. Number of player-created characters with the “turbo” privilege set.

Big Head Priv. Number of player-created characters with the “big head” privilege set.

Drone Big Head Priv. Number of drones with the “big head” privilege set. (The game computer creates drones.)

Super Rebound Priv. Number of player-created characters with the “super rebound” privilege set.

Game With Creatp. Number of games played with player-created characters.

Win V CPU With Creatp. Number of player-won games with player-created characters.

Win V Human With Creatp. Number of computer-won games with player-created characters.

Tournament Games. Number of games played in Tournament-Scoring Mode.

Highlight an option with any player panel joystick. Select the option with any player panel button.

CLEAR AUDITS

Select "CLEAR AUDITS" at the Audits Menu. The Clear Audits menu allows you to clear individual memory counters or to reset them all at once.

Highlight an option with any player panel joystick. Select the option with any player panel button.

CLEAR AUDITS
CLEAR COIN AUDITS
CLEAR CREDITS AUDITS
CLEAR GAME AUDITS
CLEAR TEAM STATS
CLEAR GAME FEATURES
CLEAR GAME RESETS
CLEAR EXCEPTION DUMP
CLEAR ALL
EXIT

CLEAR AUDITS SUB MENU

You can reset any audit screen from the Clear Audits Menu. Choose an item and zero its counter.

Clear All simultaneously changes all audit categories to factory default values.

After you've selected an item, the system gives you the opportunity to escape this change. For example:

RESTORE ADJUSTMENTS & AUDITS?	
YES	NO

LAST CHANCE SUB MENU

After you've selected and verified a clear function, the values reset. The system can't restore the previous values. Examine and record utility values before you make changes.

ADJUSTMENTS

Select "ADJUSTMENTS" at the Main Menu. The Adjustments menus permit you to change game characteristics. Use these screens to optimize game performance and earnings.

Highlight an option with any player panel joystick. Select the option with any player panel button.

ADJUSTMENTS
PRICING
FREE PLAY
ATTRACT SOUND
ADDITIONAL ADJUSTMENTS
FULL FACTORY RESTORE
EXIT

ADJUSTMENTS SUBMENU

PRICING

Select "PRICING" at the Adjustments Menu. The Pricing menus allow you to view current settings or change the cost of games. Custom pricing allows you to select the number of coins or credits required for each game. The game restores factory default values if you exchange the CPU Board or if the backup battery fails.

Highlight an option with any player panel joystick. Select the option with any player panel button.

You may reset options to factory defaults or change an option after viewing it. We recommend examining and recording pricing options before making changes.

You may save several custom prices and then choose between them as needed. On-screen instructions guide you through the process of creating custom price settings.

PRICING
SHOW CURRENT
NORTH AMERICA
SOUTH AMERICA
EUROPE (A-G)
EUROPE (H-2)
ASIA
AUSTRALIA
CUSTOM PRICING
EXIT

PRICING SUBMENU

An additional box appears on screen to explain the available functions as you select each item.

Current Pricing

Select “SHOW **CURRENT**” at the Pricing Menu. The Current Pricing Menu is a read-only screen. Use it to check pricing parameters for the pricing table your game is using. To select a new pricing table, return to the Pricing Menu. To invent your own pricing table, select Custom Pricing on the Pricing Menu.

Press any START button to exit from the menu.

CURRENT PRICING	
LEFT SLOT UNITS	xx
RIGHT SLOT UNITS	xx
CENTER SLOT UNITS	xx
EXTRA SLOT UNITS	xx
BILL VALIDATOR UNITS	xx
UNITS PER CREDIT	xx
UNITS PER BONUS	xx
MINIMUM UNITS	xx
CREDITS TO START	xx
CREDITS TO CONTINUE	xx
MAX CREDITS	xx
COINS PER BILL	xx

CURRENT PRICING SUBMENU

The following definitions clarify the adjustments in the Pricing menus.. .

PRICING MENU TERMS

SCREEN TERM	DEFINITION
Slot or Bill Units	Inserted coins and bills accumulate units. This adjustment specifies the quantity of units given for each coin or bill in each position (“unit” is an arbitrary term).
Units per Credit	This number establishes the value of each credit for pricing calculations.
Units per Bonus	Units awarded after a player has accumulated enough points for a bonus.
Minimum Units	No credits will be awarded until this many coin or bill units have accumulated.
Credits to Start	Credits needed to begin game play. This sets the basic cost per game.
Credits to Continue	Credits required to continue a game that is already in progress.
Max Credits	Sets limits on the number of credits that the game will accept.
Coins per Bill	Establishes value for bills by comparing them to an equivalent number of coins.

Custom Pricing

Select "CUSTOM PRICING" at the Pricing Menu. The Custom Pricing Menu permits you to program and use your own pricing table. The menu heading "CREATING XXXX" allows you to input a descriptive name for your new pricing table.

Highlight an option with any player panel joystick. Change the option with any player panel button. Press any START button to save your pricing table and exit from the menu.

CREATING XXXX			
LEFT UNITS	X X	RIGHT UNITS	XX
CENTER UNITS	XX	EXTRA UNITS	XX
DBV UNITS	XX	UNITS PER CREDIT	x x
UNITS / BONUS	XX	MINIMUM UNITS	XX
CREDITS TO START	XX	CREDITS TO CONT.	XX
MAX CREDITS	XX	COINS / BILL	x x
SHOW FRACTIONS	XX	LEFT COUNT	XX
RIGHT COUNT	XX	CENTERCOUNT	x x
EXTRA COUNT	XX	DBV COUNT	x x
 USE STICK TO SELECT AN ITEM TO MODIFY PRESS ANY BUTTON TO MODIFY THE ITEM PRESS ANY START BUTTON TO SAVE AND EXIT			

CUSTOM PRICING SUBMENU

The Custom Pricing Menu employs the same terms that appear on the Current Pricing Table. See the table below for definitions of these terms.

PRICING MENU TERMS

SCREEN TERM	DEFINITION
Slot or Bill Units	Inserted coins and bills accumulate units. This adjustment specifies the quantity of units given for each coin or bill in each position ("unit" is an arbitrary term).
Units per Credit	This number establishes the value of each credit for pricing calculations.
Units per Bonus	Units awarded after a player has accumulated enough points for a bonus.
Minimum Units	No credits will be awarded until this many coin or bill units have accumulated.
Credits to Start	Credits needed to begin game play. This sets the basic cost per game.
Credits to Continue	Credits required to continue a game that is already in progress.
Max Credits	Sets limits on the number of credits that the game will accept.
Coins per Bill	Establishes value for bills by comparing them to an equivalent number of coins.

Free Play

Select "FREE PLAY" at the Adjustments Menu. Free Play is a useful feature for promotions and long-term testing under play conditions. Enable Free Play to allow players to play the game without inserting currency. Disable Free Play to sell games.

Highlight an option with any player panel joystick. Select the option with any player panel button.

Attract Sound

Select "ATTRACT SOUND" at the Adjustments Menu. The Attract Mode operates between games. It attempts to lure prospective players into trying your game. Attract Mode sound may not be appropriate for some locations. The Attract Sound Menu allows you to enable or disable the Attract Mode sound feature. You can turn Attract Mode sound on or off without changing the game volume level.

Highlight an option with any player panel joystick. Select the option with any player panel button.

ADDITIONAL ADJUSTMENTS

Select "ADDITIONAL ADJUSTMENTS" at the Adjustments Menu. Additional Adjustments menu items allow you to set the game to match player requirements. These adjustments affect speed, challenge, rewards, etc. that determine player enjoyment.

Highlight an option with any player panel joystick. Select the option with any player panel button.

ADDITIONAL ADJUSTMENTS
GAME DIFFICULTY
DISCOUNT PRICE / CREDITS
CLOCK SPEED
FREE GAME – FULL 4 PLR.
FREE GAME – FULL 1 ON 1.
FREE GAME – FULL V. CPU
FREE QUARTER – FULL 4 PLR.
FREE QUARTER – FULL 1 ON 1.
FREE QUARTER – FULL V. CPU
CLEAR PLAYER RECORDS
CLEAR WORLD RECORDS
PLAYER HEAD SIZE
TOURNAMENT MODE
COMPUTER ASSISTANCE
EXIT

ADDITIONAL ADJUSTMENTS SUBMENU

Game Difficulty allows you to alter the challenge that a game poses to players. Choose the level that most closely matches the players' skills.

Discount Price / Credits adjusts the quantity of buy-in points to encourage multiple game purchases.

Clock Speed alters how much game time that a player can purchase for one credit. Choose one of these settings: Extra slow, slow, medium, fast or extra fast.

Free Game, when enabled, allows the program to award a free game. The free game may be a four-player or a one-on-one game. The free game may also involve competition against the game computer.

Free Quarter. The program divides games into quarters, for consistency with NBA basketball rules. The Free Quarter feature, when enabled, allows the program to award a free game quarter. The free quarter may be a four-player or a one-on-one quarter. The free quarter may also involve competition against the game computer.

Clear Player Records allows you to zero out game play data. Examine and record this information before you clear it. Once you've cleared player records, you can't retrieve the previous data.

Clear World Records allows you to zero out world record data. Examine and record this information before you clear it. Once you've cleared player records, you can't retrieve the previous data.

Player Head Size allows you to alter the head size of on-screen characters. This feature determines whether the characters appear more lifelike, or more like caricatures. Choose "normal" or "big."


Tournament Mode, when enabled, adapts your game's scoring for tournament-style play.

Computer Assistance, when enabled, permits the game computer to aid players in play action.

VOLUME LEVEL

Select "VOLUME LEVEL" at the Main Menu. Music plays continuously with the Volume Level screen.

Raise or lower the game's sound level with any player panel joystick. (You can also use the volume up/down buttons on the diagnostic switch bracket.) Save your change and return to the Main Menu by pressing any player panel button.

SET VOLUME LEVEL	
MIN	MAX
	
UP / DOWN TO ADJUST VOLUME	
PRESS ANY BUTTON TO SET VOLUME AND EXIT	

VOLUME LEVEL SCREEN

Loud games attract more player interest than games with low-level sound. The Attract Mode sound level is lower than the game play sound level.

You can turn Attract Mode sound on or off without changing the game volume level (see Adjustments).



NOTICE: These adjustments affect the volume of tests as well as of game play. If you set volume levels to minimum (zero), the speakers are silent during-audio tests. **We** recommend setting volume levels to a moderately high value whenever you perform sound tests. After you complete tests, you may return sound levels to previous settings.

STANDARD PRICING TABLE

NAME	START	CONTINUE	CREDITS/COIN	COIN 1	COIN 2	COIN 3	COIN4	BILL
ANTILLIES	2	2	1/25¢, 4/1G	25¢	1G			
AUSTRALIA 1	2	2	1/3X20¢, 2/\$1.00	.20¢	\$1.00			
AUSTRALIA 2	2	2	1/5X20¢, 1/\$1.00	.20¢	\$1.00			
AUSTRIA 1	2	2	1/5Sch, 2/10Sch	5 Sch	10 Sch			
AUSTRIA 2	2	2	1/2X5Sch, 3/2X10Sch	5 Sch	10 Sch			
BELGIUM 1	2	2	1/20BF	20BF	20BF			
BELGIUM 2	2	2	3/20BF	20BF	20BF			
BELGIUM 3	2	2	2/20BF	20BF	20BF			
BELGIUM ECA	2	2	1/20BF	50BF	20BF	5BF		
CANADA 1	2	2	1 / 2 x 25¢, 3 / \$1	25¢	25¢			
CANADA 2	2	2	1 / 2 x 25¢, 3 / \$1	25¢	\$1.00			
CANADA 3	2	2	3 / \$1.00, 6 / \$2.00	\$1.00	\$2.00			
CANADA ECA	2	2	1 / 2 x 25¢, 3 / \$1	25¢		\$1.00	\$2.00	
DENMARK	2	2	1/2X1DKr, 3/5DKr, 7/2X5DKr	1DKr	5DKr			
FINLAND	2	2	1/1 Fmk	1 Fmk	1 Fmk			
FRANCE 1	2	2	2/5Fr, 5/10Fr	5Fr	10Fr			
FRANCE 2	2	1	2/5Fr, 4/10Fr	5Fr	10Fr			
FRANCE 3	2	1	1/5Fr, 3/10Fr	5Fr	10Fr			
FRANCE 4	2	1	1/5Fr, 2/10Fr	5Fr	10Fr			
FRANCE 5	2	1	2/5Fr, 5/10Fr, 11/2X 10Fr	5Fr	10Fr			
FRANCE 6	2	1	2/5Fr, 4/10Fr, 9/2 X 1 0Fr	5Fr	10Fr			
FRANCE 7	2	1	1/5Fr, 3/10Fr, 7/2X 10Fr	5Fr	10Fr			
FRANCE 6	2	1	1/5Fr, 2/10Fr, 5/2 X 10Fr	5Fr	10Fr			
FRANCE 9	2	1	1/3 X 1 Fr, 2/5Fr	1Fr	5Fr			
FRANCE 10	2	1	1/2 X 1 Fr, 3/5Fr	1Fr	5Fr			
FRANCE 11	2	1	1/3 X 1 Fr. 2/5Fr, 5/2 X 5Fr	1Fr	5Fr			
FRANCE 12	2	1	1/2 X 1 Fr, 3/5Fr, 7/2 X 5Fr	1Fr	5Fr			
FRANCE ECA 1	1	1	2/5Fr, 5/10Fr	1Fr	5Fr	10Fr	20Fr	
FRANCE ECA 2	1	1	2/5Fr, 4/10Fr	1Fr	5Fr	10Fr	20Fr	
FRANCE ECA 3	1	1	1/5Fr, 3/10Fr	1Fr	5Fr	10Fr	20Fr	
FRANCE ECA 4	1	1	1/5Fr, 2/10Fr	1Fr	5Fr	10Fr	20Fr	
FRANCE ECA 5	1	1	2/5Fr, 5/10Fr, 1 1/2 X 10Fr	1Fr	5Fr	10Fr	20Fr	
FRANCE ECA 6	1	1	2/5Fr, 4/10Fr, 9/2 X 1 0Fr	1Fr	5Fr	10Fr	20Fr	
FRANCE ECA 7	1	1	1/5Fr, 3/10Fr, 7/2X 10Fr	1Fr	5Fr	10Fr	20Fr	
FRANCE ECA 6	1	1	1/5Fr, 2/10Fr, 5/2X 10Fr	1Fr	5Fr	10Fr	20Fr	
FRANCE ECA 9	1	1	1/3 X 1 Fr, 2/5Fr	1Fr	5Fr	10Fr	20Fr	
FRANCE ECA 10	1	1	1/2 X 1 Fr, 3/5Fr	1Fr	5Fr	10Fr	20Fr	
FRANCE ECA 11	1	1	1/3 X 1 Fr. 2/5Fr, 5/10Fr	1Fr	5Fr	10Fr	20Fr	
FRANCE ECA 12	1	1	1/2 X 1 Fr. 3/5Fr, 7/10Fr	1Fr	5Fr	10Fr	20Fr	
FRANCE ECA 13	1	1	1/1 0Fr, 2/20Fr, 4/30Fr	1Fr	5 F r	10Fr	20Fr	
FREE PLAY	--	--	--	None	None	None	None	None
GERMANY 1	2	2	1/1 DM, 6/5DM	1DM	5DM			
GERMANY 2	2	1	1/1 DM, 7/5DM	1DM	5DM			
GERMANY 3	2	1	1/1 DM, 8/5DM	1DM	5DM			
GERMANY 4	2	1	1/1 DM, 5/5DM	1DM	5DM			
GERMANY 5	2	1	1/1 DM, 6/5DM	1DM	5DM			
GERMANY ECA 1	2	2	1/1DM, 2/2DM, 6/5DM	5DM	2DM	1DM		
GERMANY ECA 2	2	1	1/1DM, 2/2DM, 6/5DM	5DM	2DM	1DM		
GERMANY ECA 3	1	1	1/1 DM, 2/2DM, 6/5DM	5DM	2DM	1DM		
HUNGARY	2	2	1/2X10Ft, 3/2X20Ft	10Ft	20Ft			
ITALY	2	2	1/500Lit	500Lit	500Lit			
JAPAN 1	2	2	1/100Yen	100	100			
JAPAN 2	2	2	2/100Yen	100	100			
NETHERLANDS	2	2	1/1HfI, 3/2.5HfI	1HfI	2.5HfI			
NEW ZEALAND 1	1	1	1/3X20¢	20¢	200			
NEW ZEALAND 2	1	1	1/2X20¢	20¢	20¢			
NORWAY	2	2	1/2X1NKr, 3/5X1NKr	1NKr	1NKr			
SPAIN 1	2	2	1/100Pta, 6/500Pta	100Pta	500Pta			
SPAIN 2	2	2	1/100Pta, 5/500Pta	100Pta	500Pta			
SWEDEN	2	2	1/3X1SKr, 2/5SKr	1SKr	5SKr			
SWITZERLAND 1	2	2	1/1 SFr, 6/5SFr	1SFr	5SFr			
SWITZERLAND 2	2	2	1/1 SFr, 7/5SFr	1SFr	5SFr			
SWITZERLAND 3	2	2	1/1 SFr, 8/5SFr	1SFr	5SFr			

(Table continues on next page)

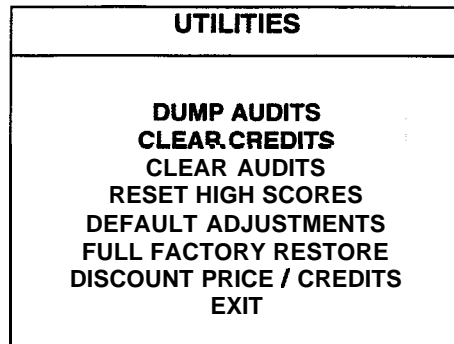
STANDARD PRICING TABLE, continued

NAME	START	CONTINUE	CREDITS/COIN	COIN 1	COIN 2	COIN 3	COIN4	BILL
UK ECA 1	1	1	1/50p, 3/£1.00	£1.00	50p	20p	10p	
UK ECA 2	1	1	1/50p, 2/£1.00	£1.00	50p	20p	10p	
UK ECA 3	1	1	1/30p, 2/50p, 5/£1.00	£1.00	50p	20p	10p	
UK 4	1	1	1/50p, 3/£1.00	£1.00	50p			
UK 5	1	1	1/50p, 2/£1.00	£1.00	50p			
UK ECA 6	1	1	1/30p, 2/50p, 4/£1.00	£1.00	50p	20p	10p	
UK ECA 7	1	1	3/£1.00	£1.00	50p	20p	10p	
UK ECA 8	1	1	1/50p, 2/£1.00, 4/£2.00	£1.00	50p	20p	10p	£2.00
USA1	2	2	1/25¢	25¢	25¢			\$1.00
USA2	2	1	1/25¢	25¢	25¢			\$1.00
USA3	1	1	1/25¢	25¢	25¢			\$1.00
USA4	1	1	1/50¢, 3/\$1.00	25¢	25¢			\$1.00
USA5	2	1	1/50¢, 4/\$1.00	25u	25¢			\$1.00
USA6	1	1	1/50¢	25u	25u			\$1.00
USA7	1	1	1/50¢, 3/\$1.00	25u	25¢			\$1.00
USA8	2	2	1/50¢, 4/\$1.00	25¢	25¢			\$1.00
USA9	3	2	1/25¢, 4/\$1.00	25u	25u			\$1.00
USA10	3	3	1/25¢, 4/\$1.00	25¢	25¢			\$1.00
USA11	4	2	1/25¢, 4/\$1.00	25¢	25¢			\$1.00
USA12	4	3	1/25¢, 4/\$1.00	25¢	25¢			\$1.00
USA13	4	4	1/25¢, 4/\$1.00	25u	25¢			\$1.00
USA ECA	3	3	1/25¢, 4/\$1.00	\$1.00	25¢	10¢	05¢	\$1.00

UTILITIES

Select "UTILITIES" at the Main Menu. Utilities Menu items allow you to clear bookkeeping totals. From the Utilities Menu, you can also restore game adjustments to factory settings.

Highlight an option with any player panel joystick. Select the option with any player panel button.



UTILITIES SCREEN

Dump Audits allows you to send data to the game computer's serial port. You can connect a serial printer to make a paper record of your audit data.

Clear Credits opens a menu that allows you to zero the game's credit data. Examine and record audit information before you make changes.


Clear Audits opens a menu that allows you to zero the game's audit data.

Reset High Scores permits you to delete player names and scores that appear in the Attract Mode. This feature may be useful if players insert inappropriate language into the high score table.

Default Adjustments opens a menu that allows you to reset game adjustments to factory settings.

Full Factory Restore allows you to reset game adjustments and audits to factory settings.

Discount Price / Credits permits you to enter special game pricing or award extra credits. You can use this feature for advertising or promotional purposes.

	<p>NOTICE: Be careful when clearing audit information. Once you clear data, you can't restore it.</p>
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NBA ON NBC™

CHAPTER FOUR

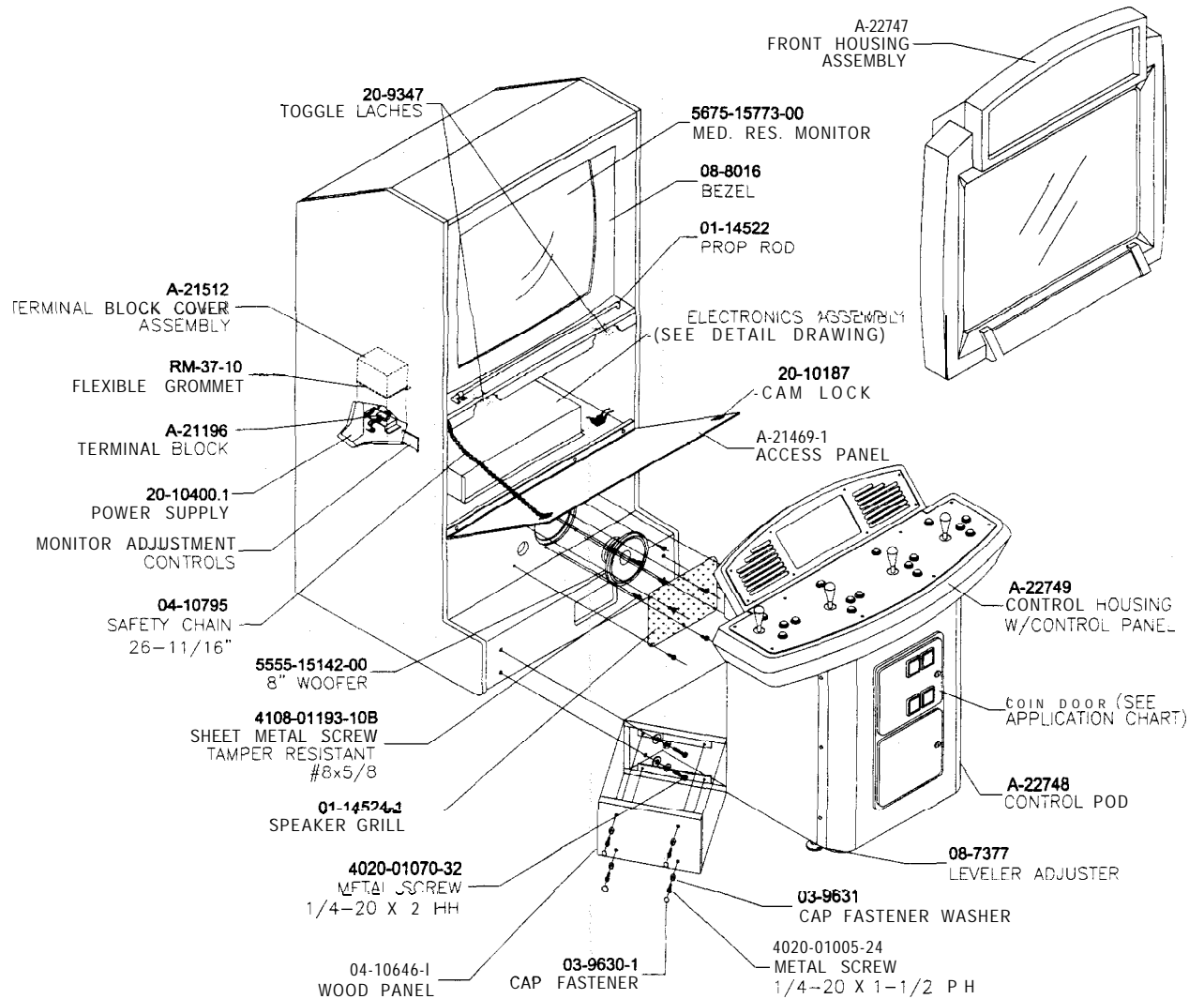
PARTS



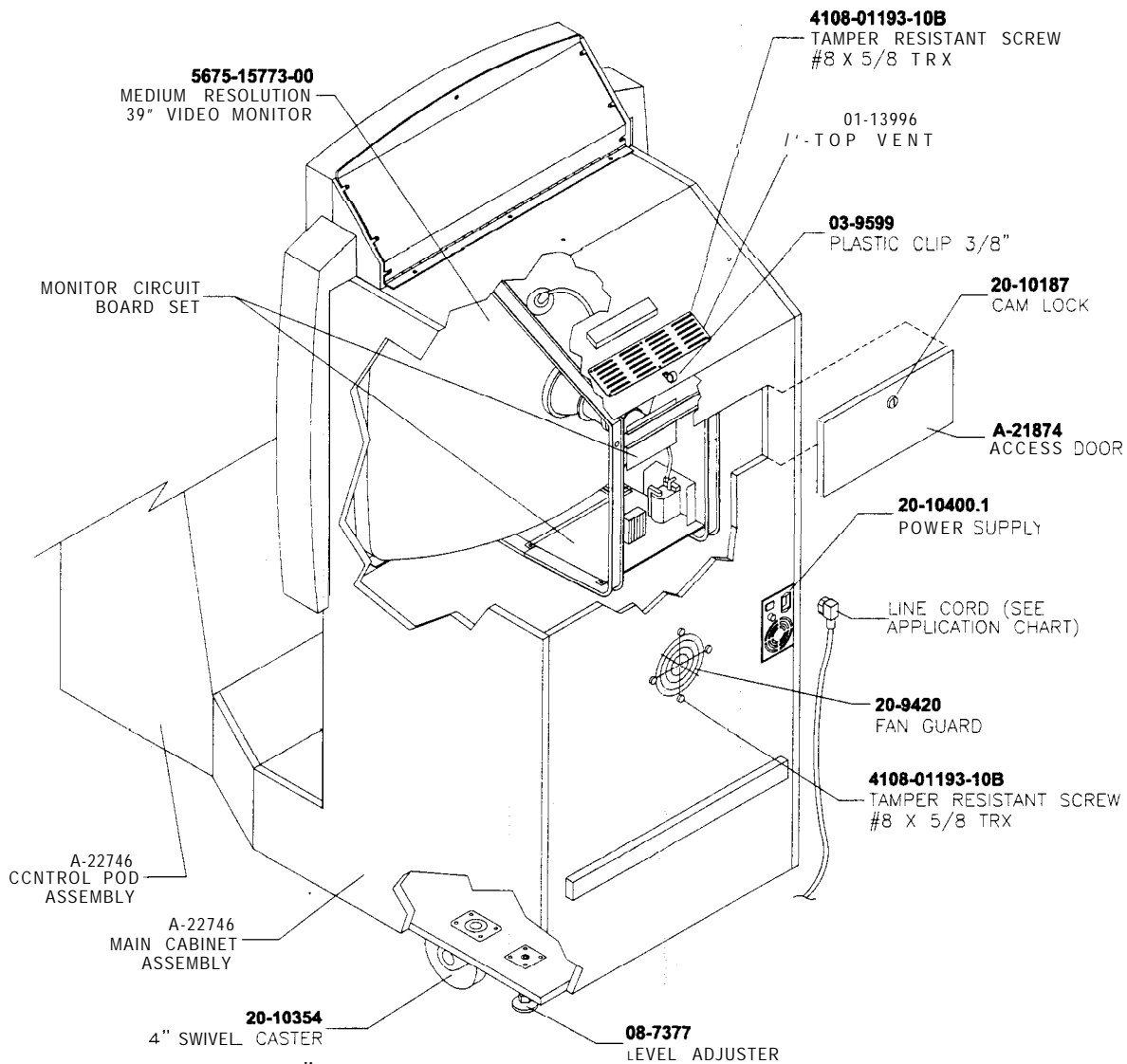
WARNING: Use of non-Midway parts or circuit modifications may cause serious injury or equipment damage! use only Midway authorized parts.

For safety and reliability, don't substitute parts or modify MIDWAY products. Substitute parts or modifications may void the game's EMC directive or FCC type acceptance.

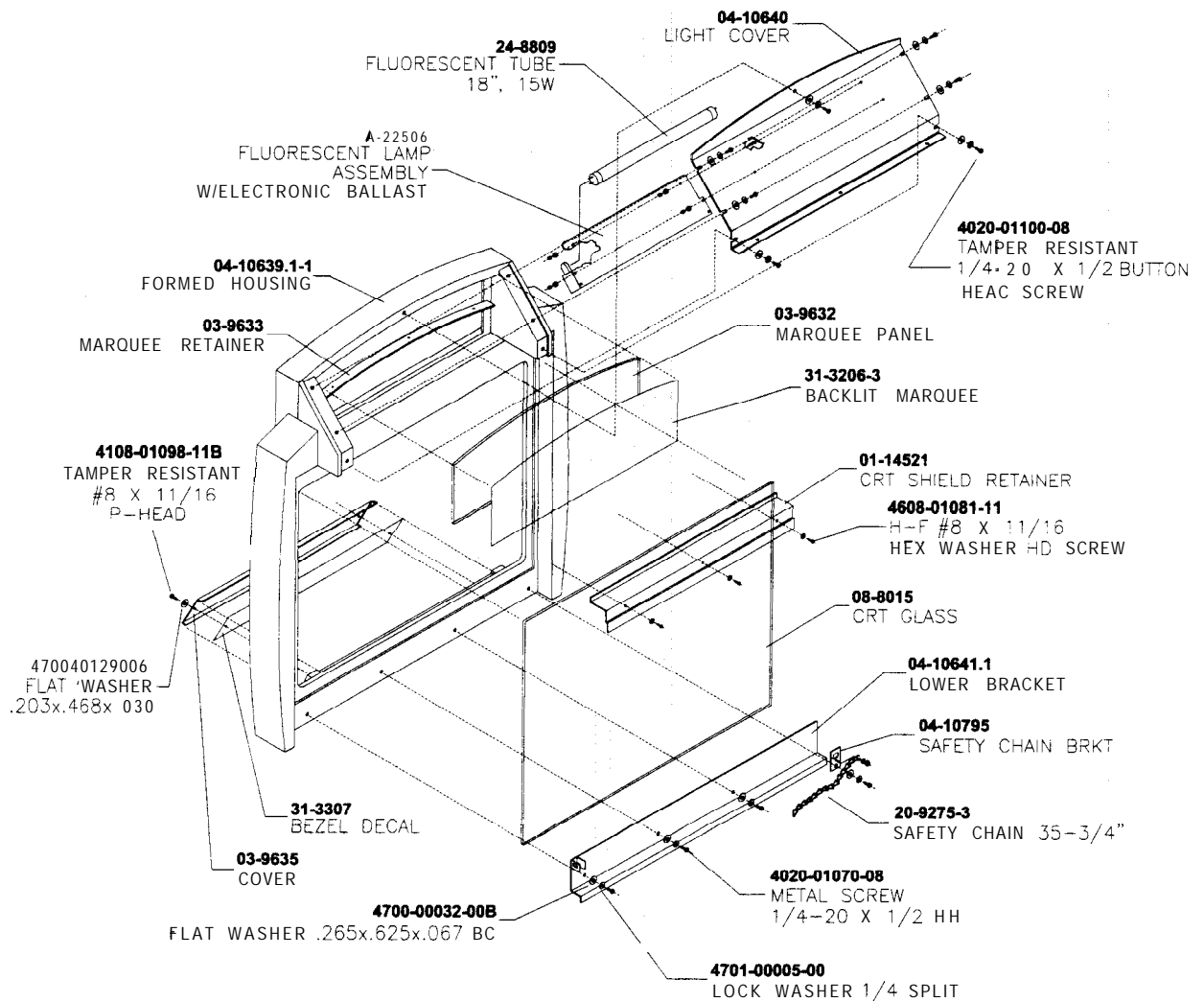
CABINET FRONT VIEW



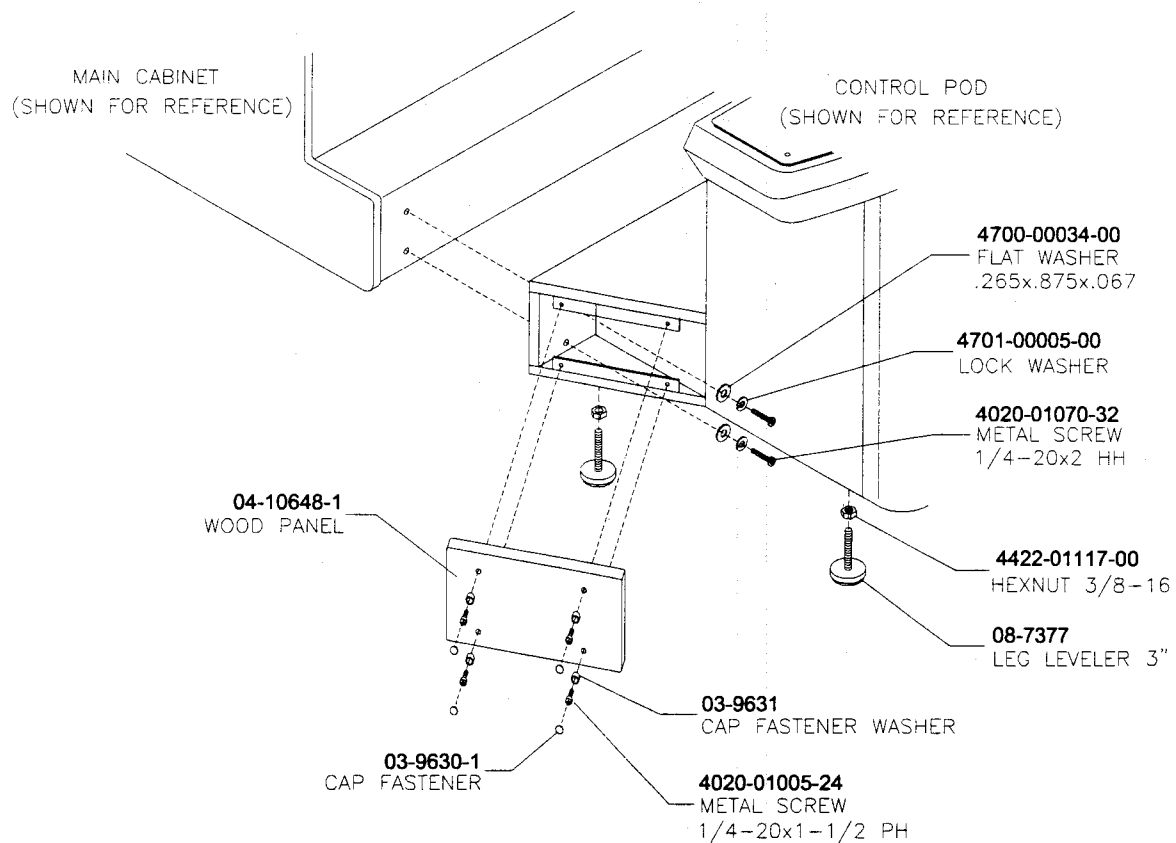
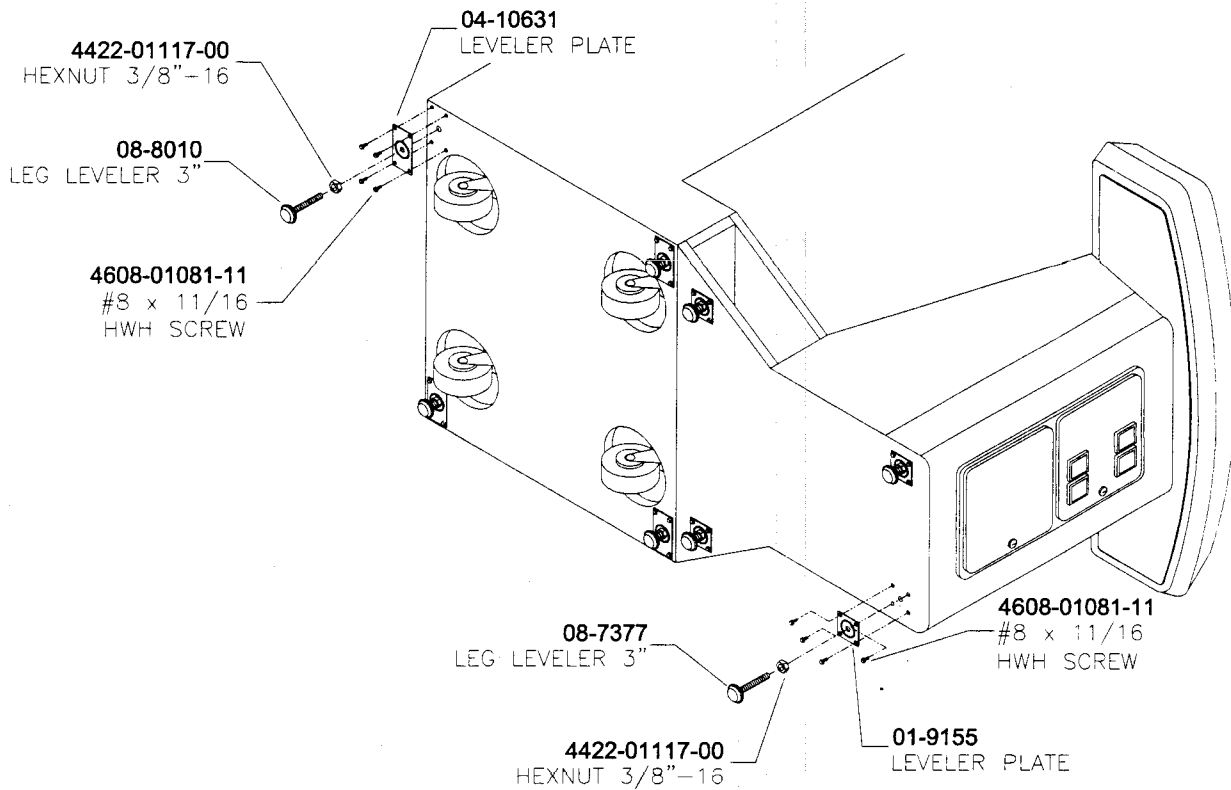
CABINET REAR VIEW



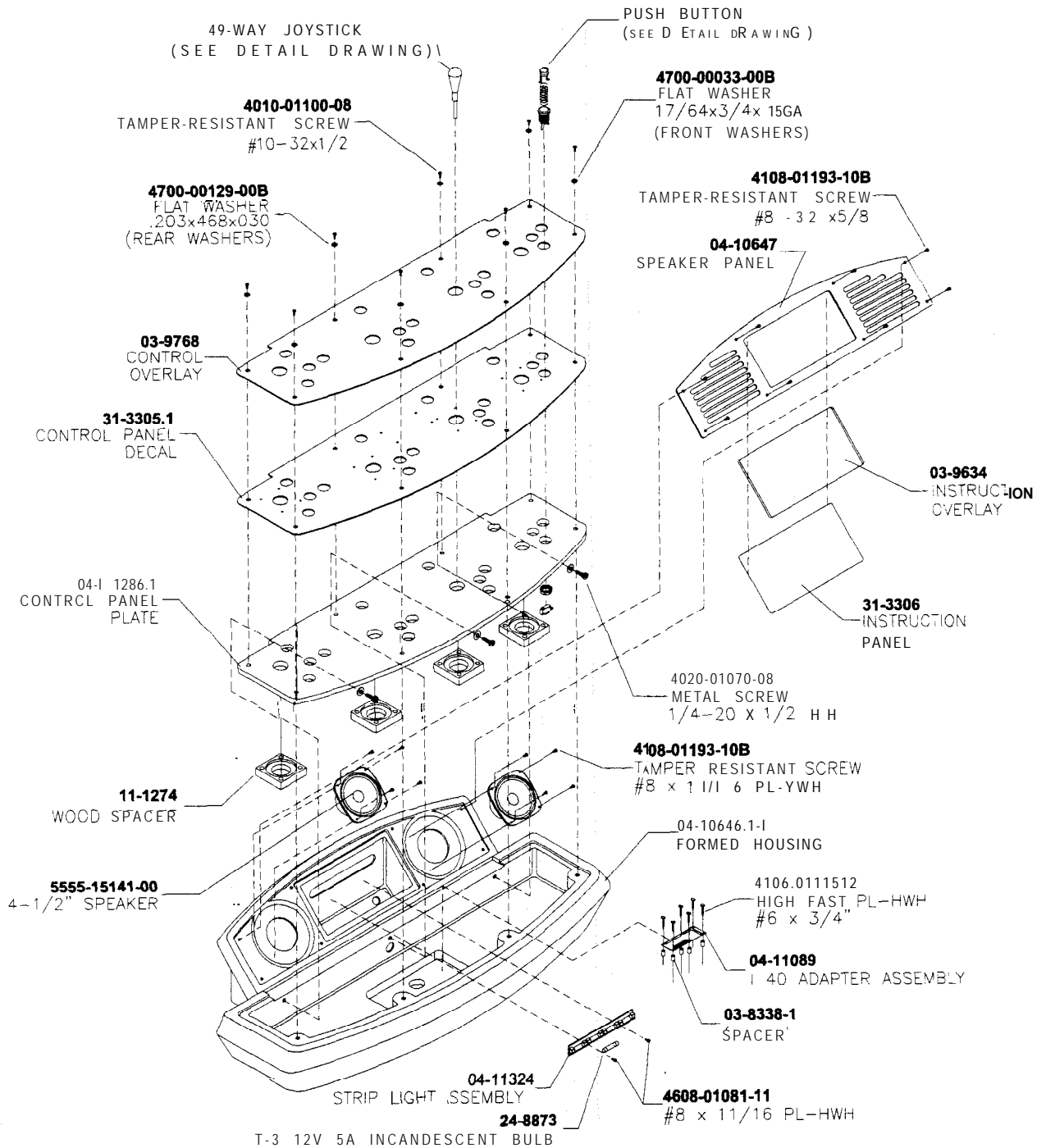
FRONT HOUSING ASSEMBLY A-22747



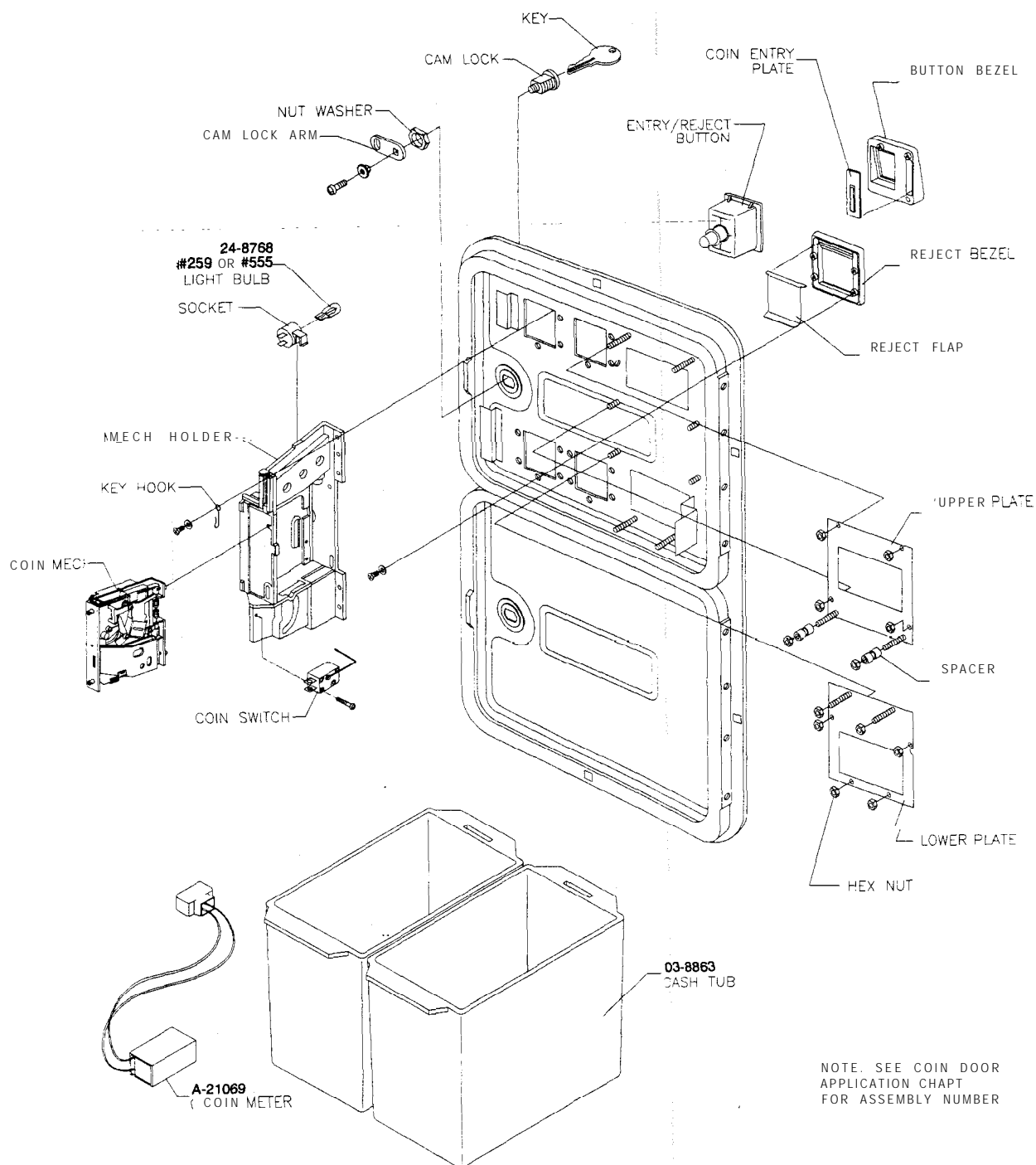
MOUNTING HARDWARE KIT A-21926



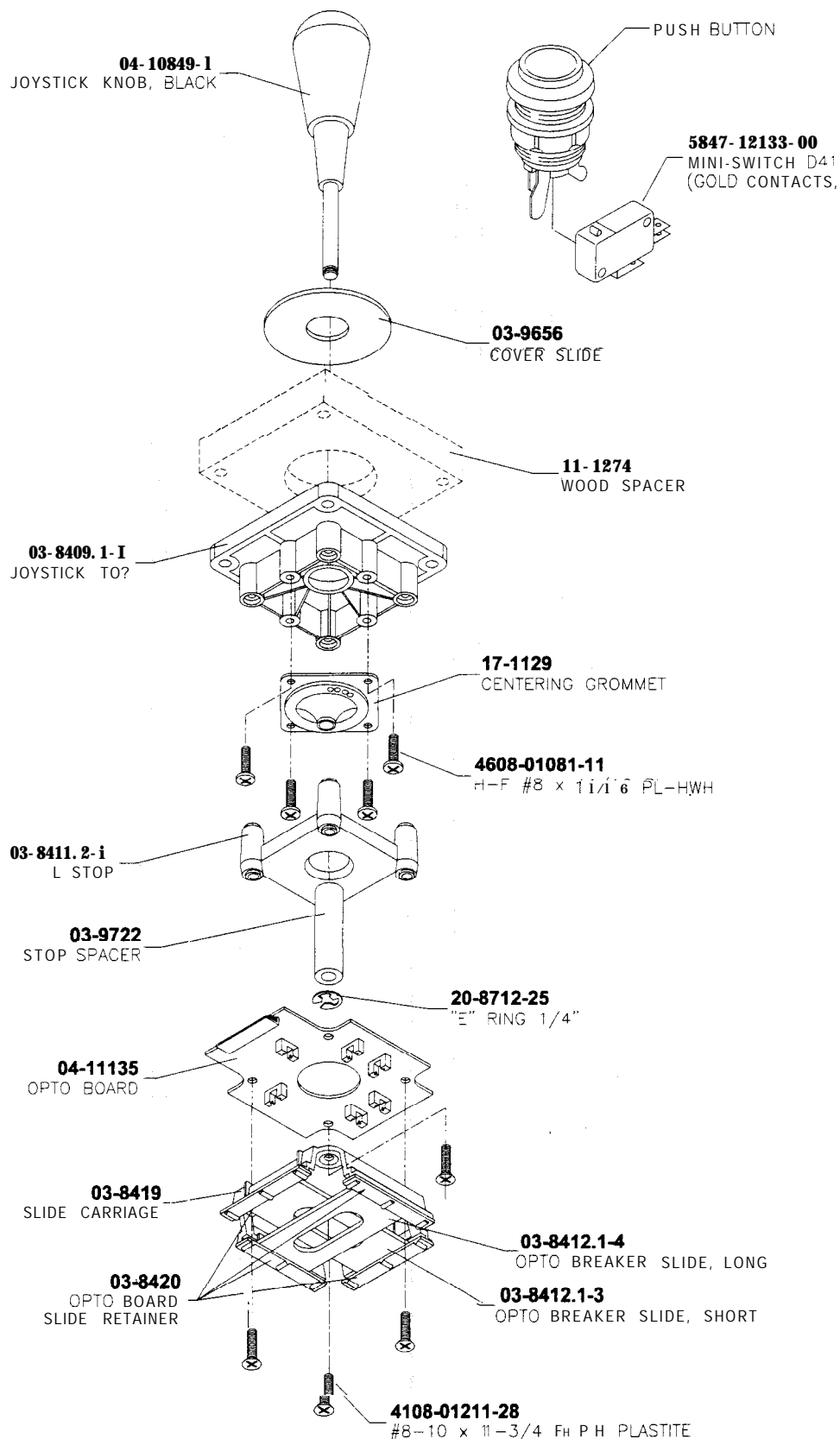
CONTROL PANEL & HOUSING ASSEMBLY A-22749



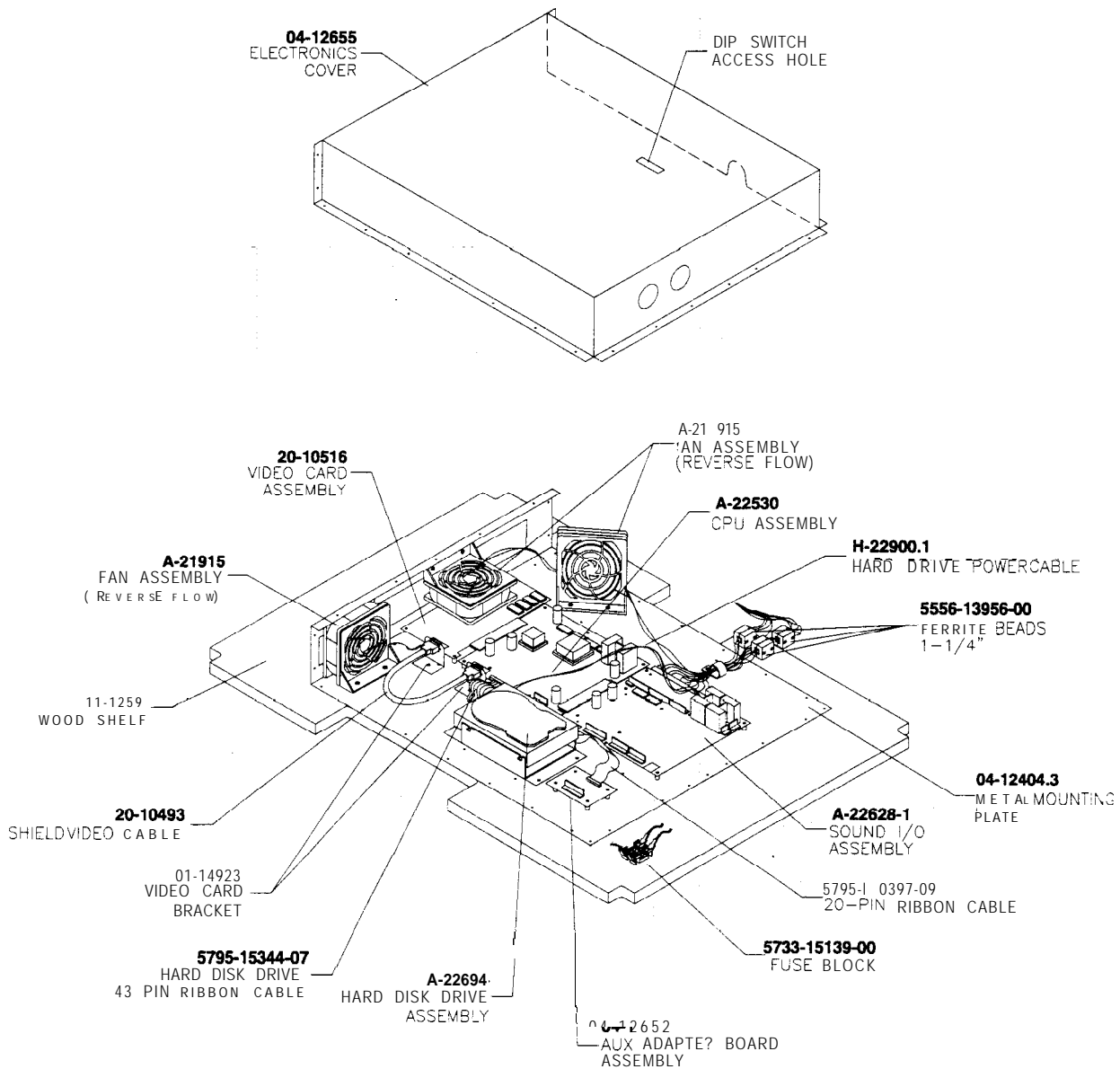
COIN DOOR ASSEMBLY



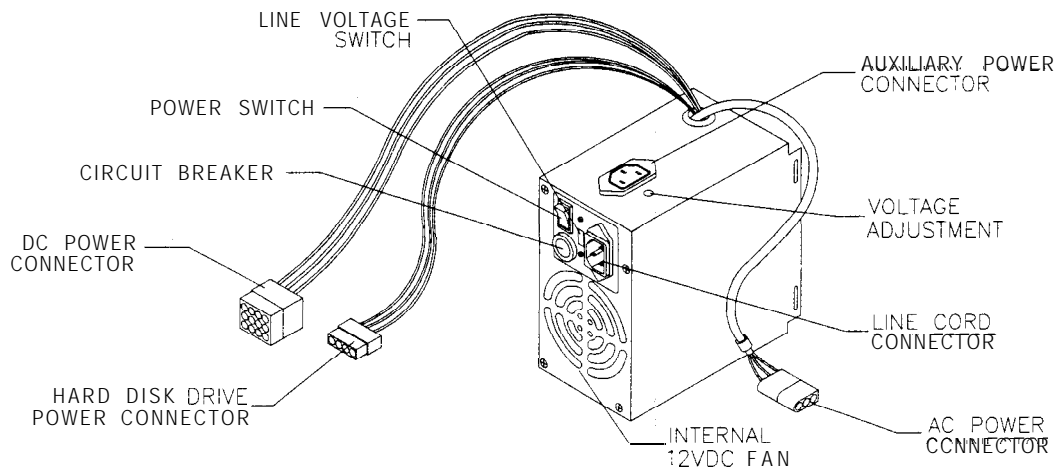
49-WAY JOYSTICK ASSEMBLY A-21939-1 AND BUTTON ASSEMBLY 20-10209-X



ELECTRONICS ASSEMBLY A-22864



POWER SUPPLY 20-I 040.1



A.C. AUXILIARY POWER CONNECTOR

PINS	FUNCTION	COLOR
1	LINE	BLACK
2	GROUND	GREEN
3	NEUTRAL	WHITE

D.C. MAIN POWER CONNECTOR

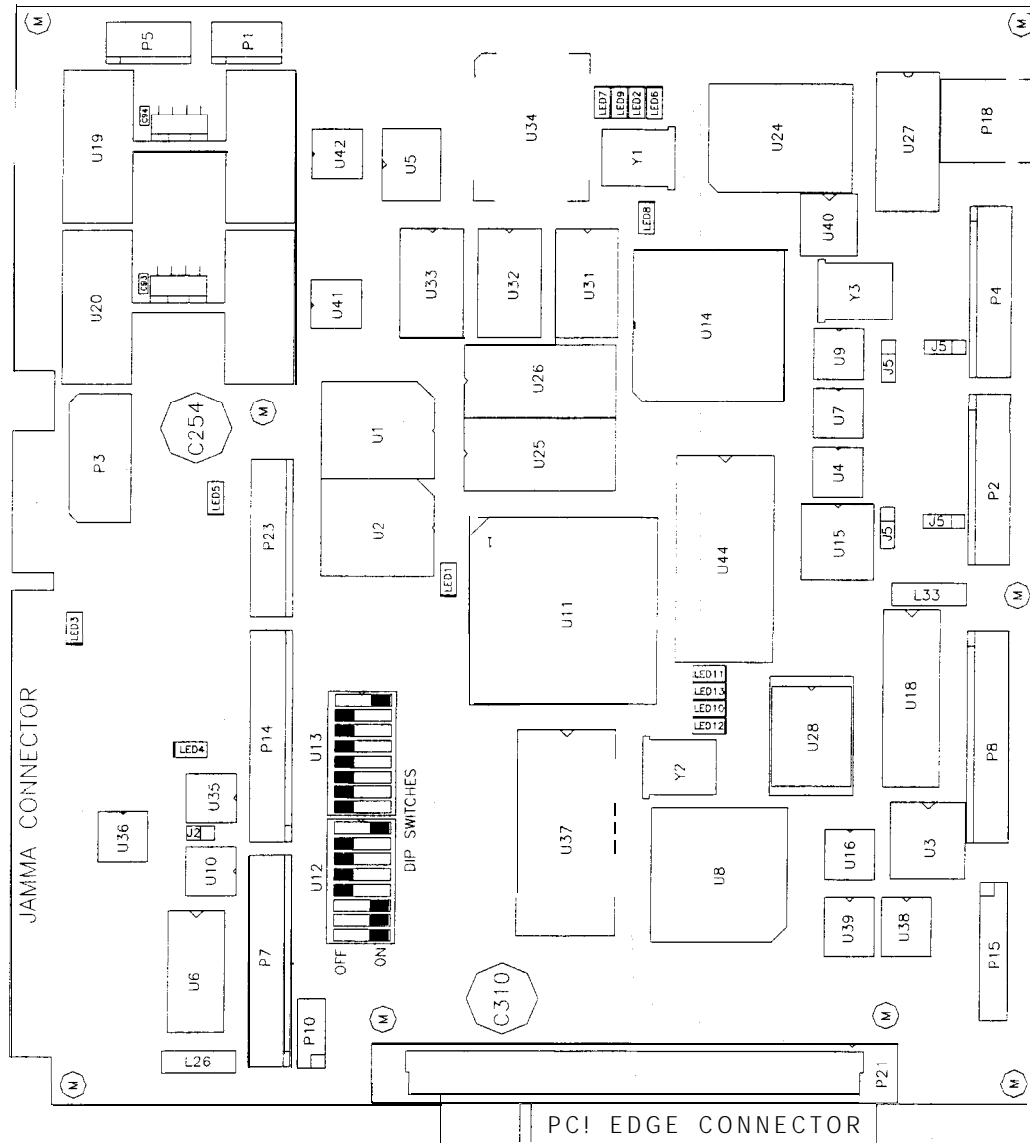
PINS	FUNCTION	COLOR
1,2,3	+5 VDC	RED
4,5,6	RETURN	BLACK
7	-5 VDC	BLUE
8	+12 VDC	YELLOW
9	-12 VDC	WHITE

HARD DISK DRIVE POWER CONNECTOR

PINS	FUNCTION	COLOR
1	+5 VDC	RED
2,3	RETURN	BLACK
4	+12 VDC	YELLOW

NOTE: Many computer grade power supplies use alternate wire colors. This is acceptable as long as the pinout is correct.

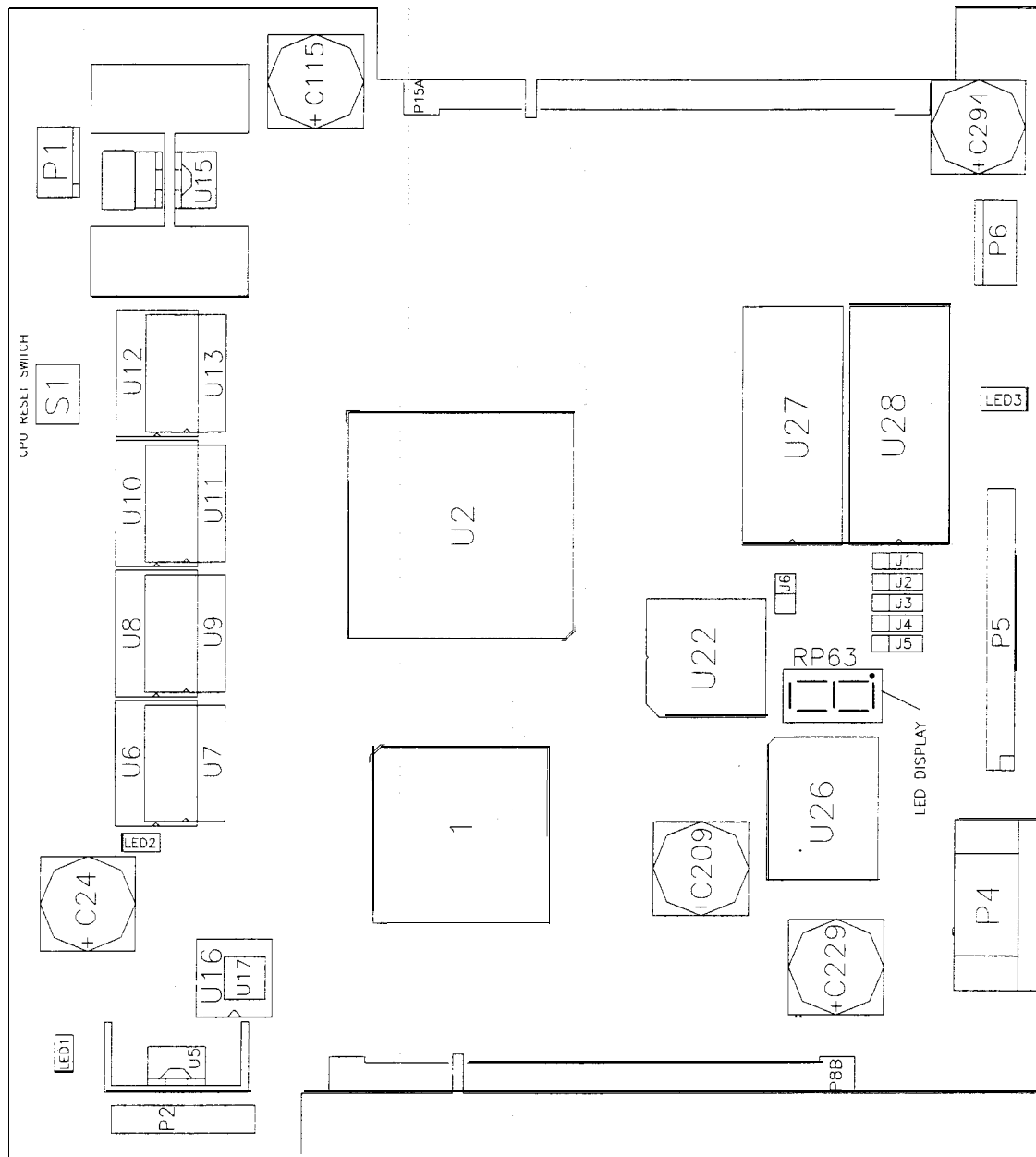
SOUND I/O CARD A-22628-I



Field Replaceable Parts

Description	Location	Part Number
Capacitor, 2200 μ F, 16V	C310	5040-15904-00
Capacitor, 2200 μ F, 25V	C254	5040-14630-00
Crystal, 4 MHz, Type HC49U	Y2	5520-14602-00
Crystal, 16 MHz, Type HC49U	Y3	5520-14595-00
Crystal, 20 MHz, 3-Lead Type	Y1	5520-15159-00
EPROM, Programmed	U44	A-5343-40067-3
Heatsink, TO-220, Type 5298b	U19, U20	5705-12638-00
IC, TDA7240V, 20W Amplifier	U19, U20	5370-14146-00
Oscillator, 33 MHZ, TTL, Tri-State	U3	5521-13806-06
ROM, Sound Boot	U44	A-22629
Shunt, 0.025" Square Pins	Any Jumper	5882-13046-00

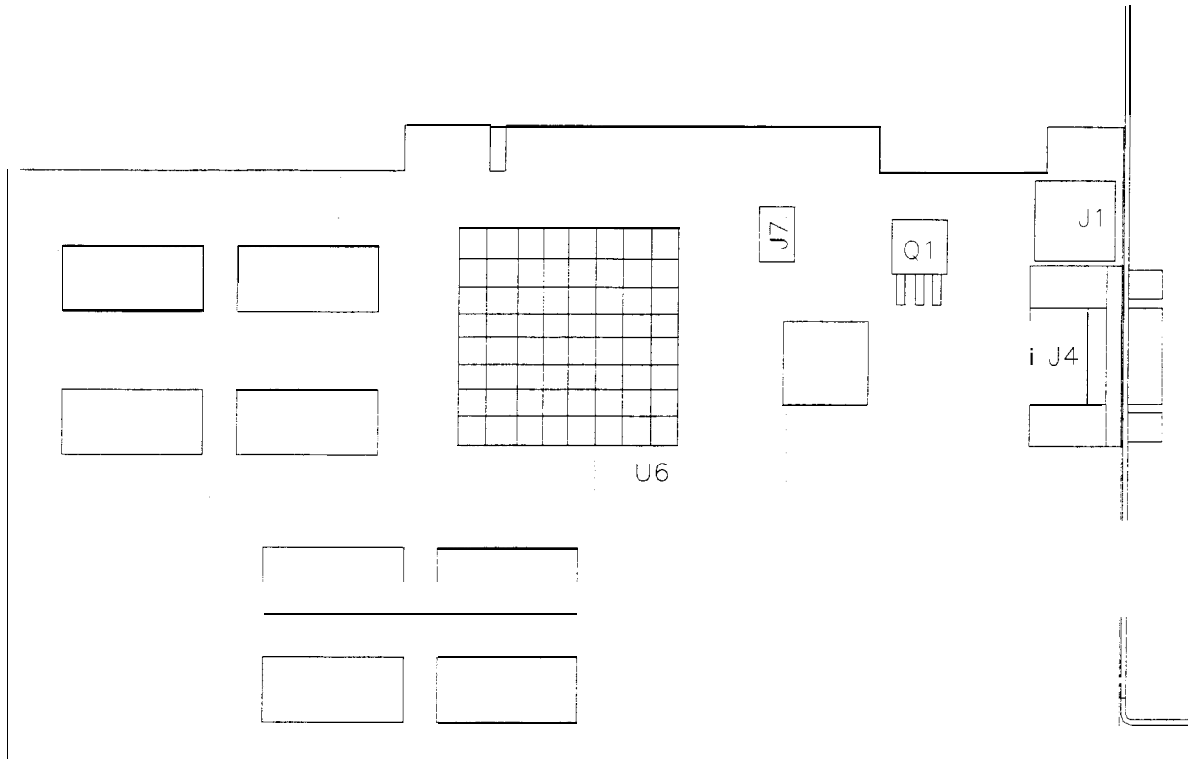
CPU BOARD ASSEMBLY A-22530



Field Replaceable Parts

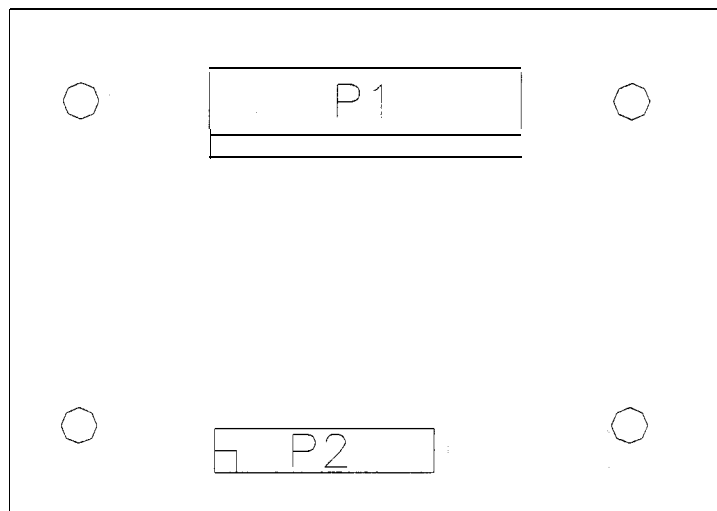
Description	Location	Part Number
Capacitor, 2200 μ F, 16V, Radial	C24, C15, C209, c229, c294	5040-I 5904-00
Heatsink, TO-220, Large	u15	5705-I 5963-00
Heatsink, TO-220, Small	U5	5705-I 4562-00
Heatsink, TO-220, Type 658-60ab		5705-I 5137-00
Heatsink, TO-220, Type 5298b		5705-I 2638-00
Regulator, CS5203a	u5	5250-I 6015-00
ROM, Boot	U27	A-5343-40067-1

BANSHEE VIDEO CARD 20-I 0516



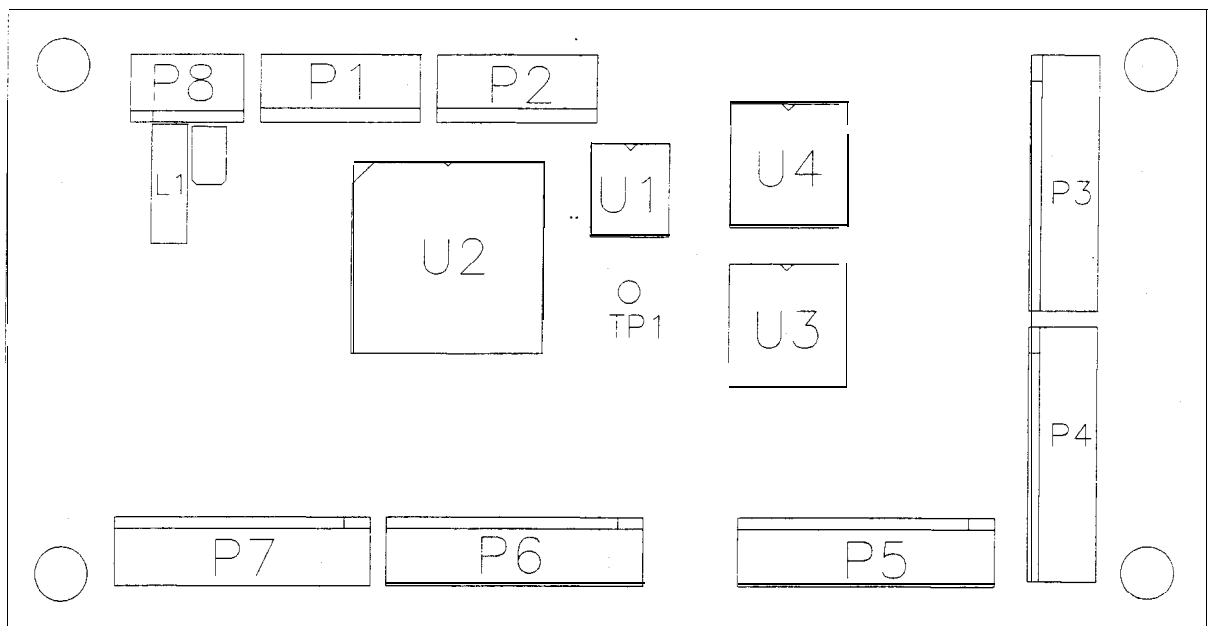
No Field-Replaceable Parts

AUXILIARY ADAPTER CARD ASSEMBLY 04-I 2652



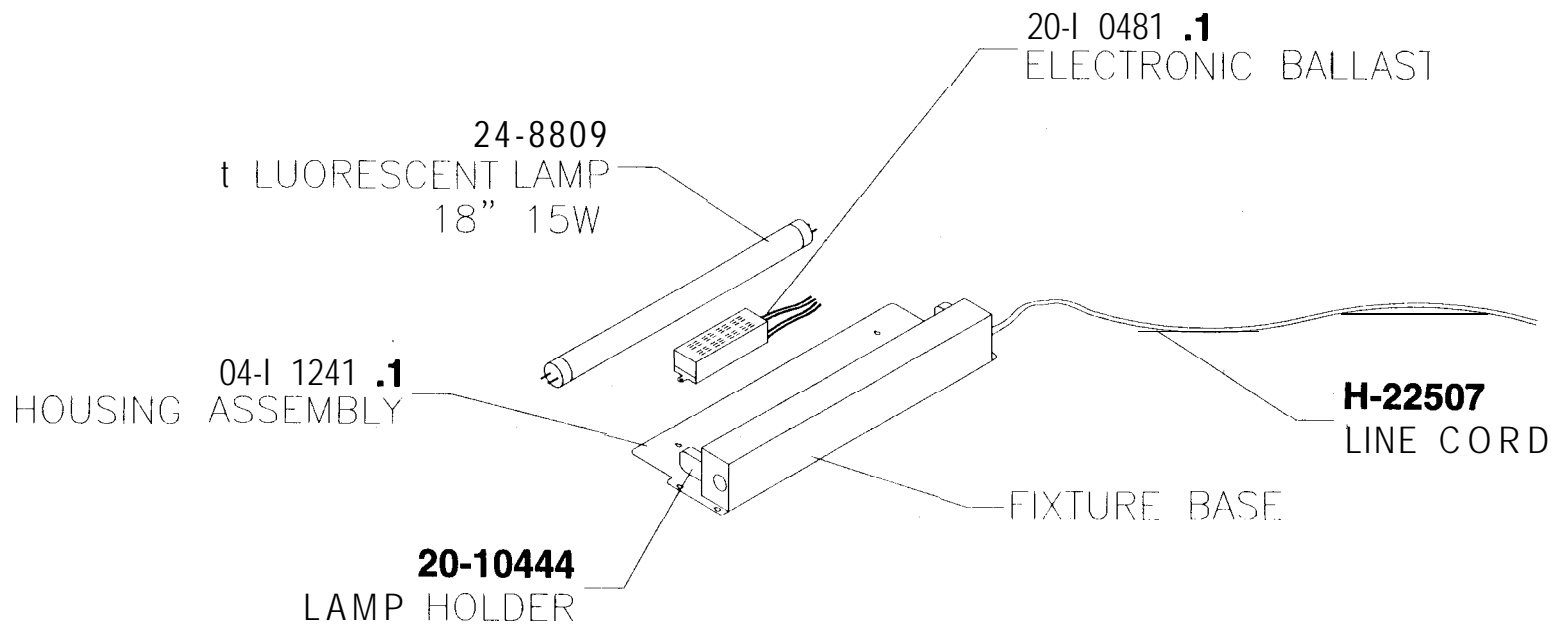
No Field-Replaceable Parts

I-40 BOARD ASSEMBLY 04-I 1089



No Field-Replaceable Parts

FLUORESCENT LAMP ASSEMBLY A-22506



OTHERPARTS

Buttons

Button, Long Shaft, Blue	20-I 0209-3
Button, Long Shaft, Orange	20-I 0209-7
Button, Long Shaft, Red	20-1 0209-1
Button, Long Shaft, White	20-I 0209-2

Cables

Cable, AC, 39" Cabinet	H-22048
Cable, Control Panel	20-22714
Cable, Hard Drive Power	20-22900.2
Cable, Main Harness (JAMMA)	H-23083.1
Cable, Ribbon, 40-Pin	5795-I 5344-07
Cable, Ribbon, 20-Pin	5795-I 0937-09
Harness, Fluorescent Lamp	H-22914
Harness, Strip Light and Speaker	H-22760

Documents

Card, Game Information	16-I 0650
Manual, NBA on NBC, 39".	16-40087-101
Manual, Product Safety	16-I 0341

Fuses

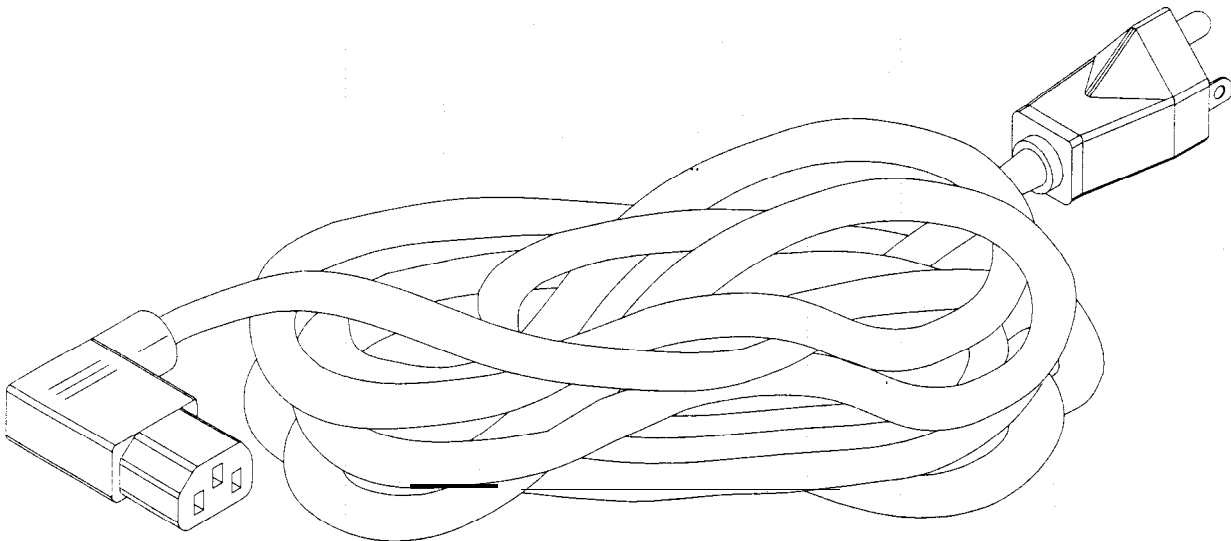
Fuse, 3AG, 1ASB , 250V	5731-06564-00
Fuse, 3ASB , 250V	5731-I 0356-00

Kit, Spare Parts

Kit, Spare Parts	A-21 925
Bulb, Incandescent, 6.3V, #555	24-8768
Fuse, 3AG, 1A , 250V	5730-I 5278-00
Wrench, T-20, Long Arm Tamper-Resistant (Torx®)20-9620
Wrench, T-25, Long Arm Tamper-Resistant (Torx®)20-1 0144
Wrench, T-27, Long Arm Tamper-Resistant (Torx®)20-1 0140

RIGHT-ANGLE LINE CORD APPLICATION TABLE

<div>Part Number</div> <div>Country</div>	5850-14699-00	5850-14699-01	5850-14699-02	5850-14699-03	5850-14699-04	5850-14699-05	5850-14699-06
USA		■					
UK				■			
Italy	■						
Japan							■
New Zealand						■	
Germany			■				
Spain			■				
Denmark			■				
Finland			■				
Holland			■				
Norway			■				
Switzerland					■		
Hungary			■				
Canada		■					
Austria			■				
France			■				
Australia						■	
Belgium			■				



TYPICAL I.E.C. LINE CORD WITH INLINE FEMALE PLUG

COIN DOOR APPLICATION TABLE

Part Number Country	09-96009-15	09-96009-17	09-96009-22	09-96009-23	09-96009-25	09-96009-33	09-96011.1-00 (Electronic)
Australia							■
Austria							■
Belgium							■
Canada						■	
Denmark							■
Finland							■
France							■
Germany							■
Holland							■
Hungary							■
Italy							■
Japan	■						
New Zealand		■					
Norway							■
Spain							■
Switzerland							■
UK							■
USA						■	

NBA ON NBC

CHAPTER FIVE

WIRING



WARNING: Failure to reconnect ground wires or replace metal shields and covers with mounting hardware installed and properly tightened may result in radio frequency interference.

JAMMA Chart

Function	Wire Color	Pin	Function	Wire Color	Pin
Ground	Black	A	Ground	Black	1
Ground	Black	B	Ground	Black	2
+5VDC	Red	C	+5VDC	Red	3
+5VDC	Red	D	+5VDC	Red	4
-5VDC	Yellow	E	-5VDC	Yellow	5
+12VDC	Orange	F	+12VDC	Orange	6
Key	N/C	H	Key	N/C	7
Coin Counter 2	Brown-Red	J	Coin Counter 1	Brown	8
Not Used	N/C	K	Not Used	N/C	9
Speaker -, Left	Brown-Gray	L	Speaker +, Left	Red-Gray	10
Speaker -, Right	Brown-White	M	Speaker +, Right	Red-White	11
Video Green	Yellow-Green	N	Video Red	Yellow-Red	12
Video Sync	Yellow-White	P	Video Blue	Yellow-Blue	13
Service Credits	White-Gray	R	Video Ground	Yellow-Black	14
Slam Tilt	Black-Green	S	Test	Black-Blue	15
Coin 2	Black-Red	T	Coin 1	Black-Brown	16
2 Start	Violet-White	U	1 Start	White	17
2 up	Violet-Black	V	1 up	White-Black	18
2 Down	Violet-Brown	W	1 Down	White-Brown	19
2 Left	Violet-Red	X	1 Left	White-Red	20
2 Right	Violet-Orange	Y	1 Right	White-Orange	21
2 Jump	Violet-Yellow	Z	1 Jump	White-Yellow	22
		a	1 Pass	White-Green	23
2 Pass	Violet-Blue	b	1 Turbo	White-Blue	24
Not Used	Violet	c	Not Used	White-Violet	25
Not Used	N/C	d	Not Used	N/C	26
Ground	Black	e	-5V Ground	Yellow-Brown	27
Ground	Black	f	Ground	Black	28
Solder Side of Circuit Board			Component Side of Circuit Board		

Control Panel Wires That Aren't Part of Main JAMMA Harness

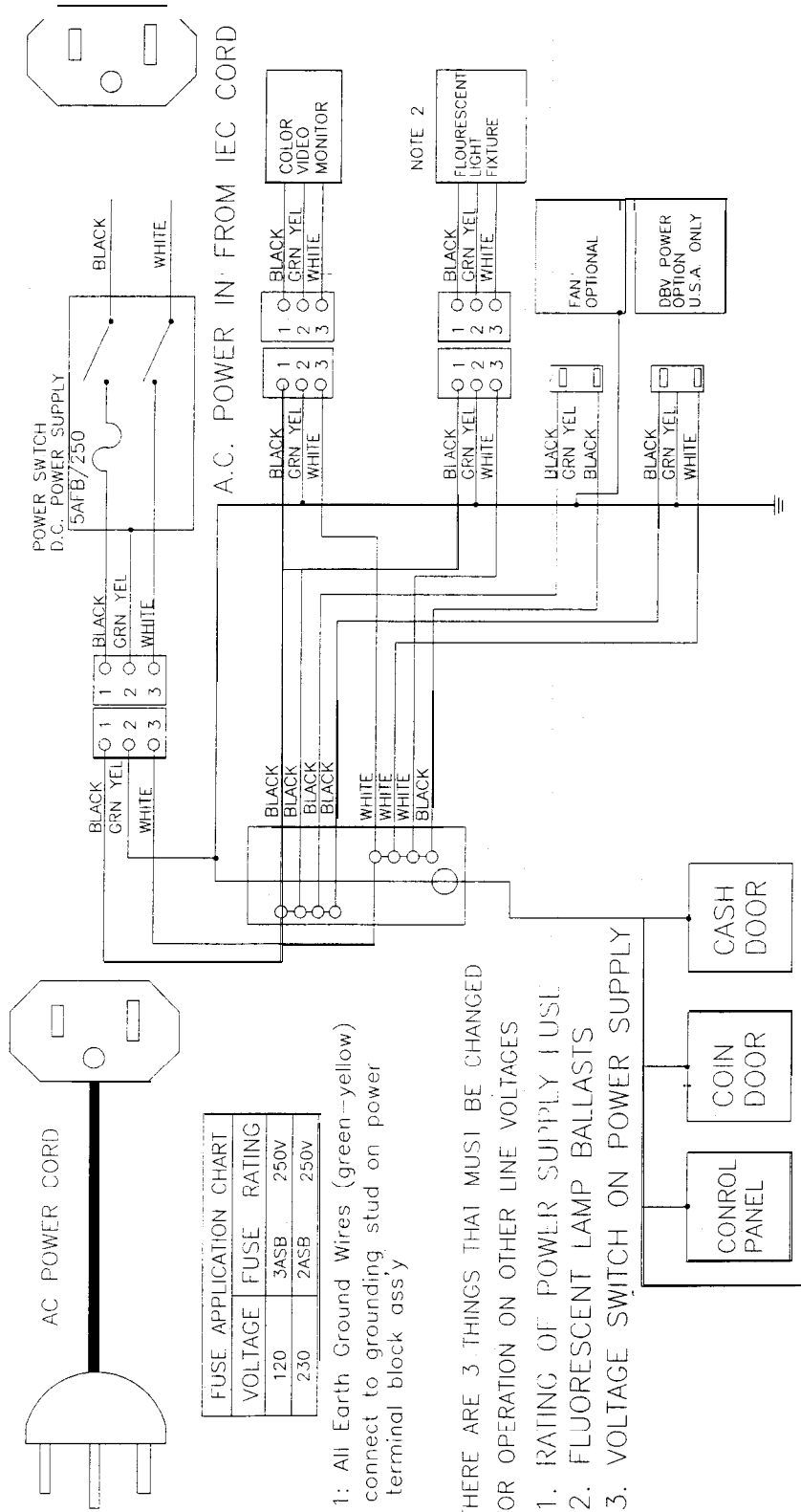
Function	Wire Color	P14-	Function	Wire Color	P7-
4 Digital Ground	Black	1	3 Digital Ground	Black	1
+5 Volts	Red	2	Unused	Not Connected	2
Unused	Not Connected	3/4/15	Unused	Not Connected	3/4/15
4 Start	Gray-White	5	3 Start	Blue-White	6
4 Stick Up, Bit 0	Gray-Black	6	3 Stick Up, Bit 0	Blue-Black	7
4 Stick Down, Bit 1	Gray-Brown	7	3 Stick Down, Bit 1	Blue-Brown	8
4 Stick Left, Bit 2	Gray-Red	8	3 Stick Left, Bit 2	Blue-Red	9
4 Stick Right, Bit 3	Gray-Orange	9	3 Stick Right, Bit 3	Blue-Orange	10
4 Button A, Jump	Gray-Yellow	10	3 Button A, Jump	Blue-Yellow	11
4 Button B, Pass	Gray-Green	11	3 Button B, Pass	Blue-Green	12
4 Button C, Turbo	Gray-Blue	12	3 Button C, Turbo	Blue	13
4 Button D (N/U)	Gray-Violet	13	3 Button D (N/U)	Blue-Violet	14

D.C. Power Source Voltage Limits

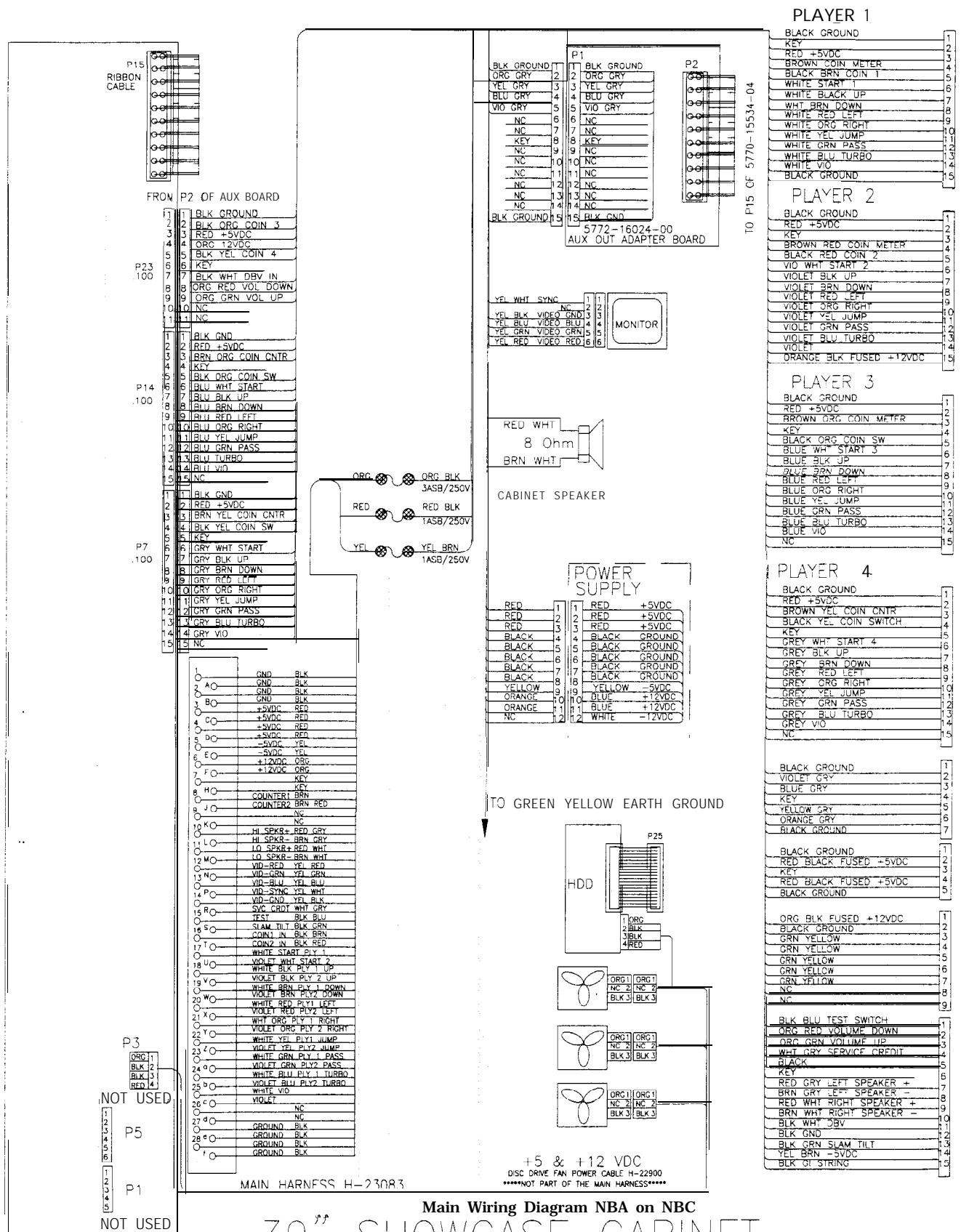
Function	Range Limits	ID	Function	Range Limits	ID
Digital Circuits	+4.90V to +5.10v	+5V	Audio, Lights	-4.75V to -5.25V	-5v
Audio, DBV	+11.5V to +12.5V	+12V	NOTE: +5V is adjustable at the Power Supply		

POWER WIRING DIAGRAM

POWER WIRING DIAGRAM 39" SHOWCASE CABINET



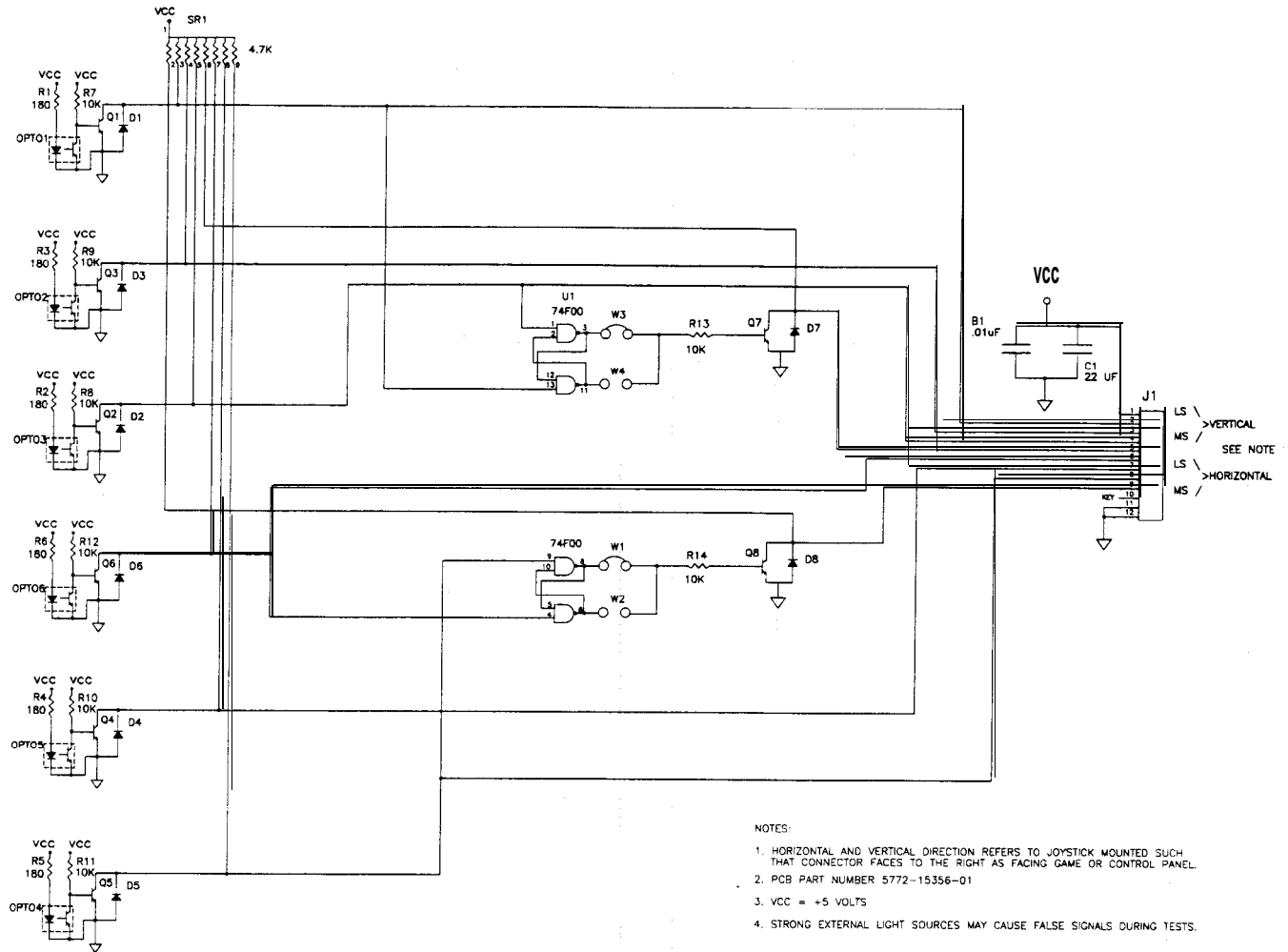
CABINET LOGIC WIRING DIAGRAM, PART 1



NOTE.)
1.) CONTROL PANEL CABLE h-22714 CONNECTS TO
THE POD CABLE H-22759 IN THE AREA INDICATED
BY DASHED LINES



CONTROL WIRING DIAGRAM (49-WAY JOYSTICK)

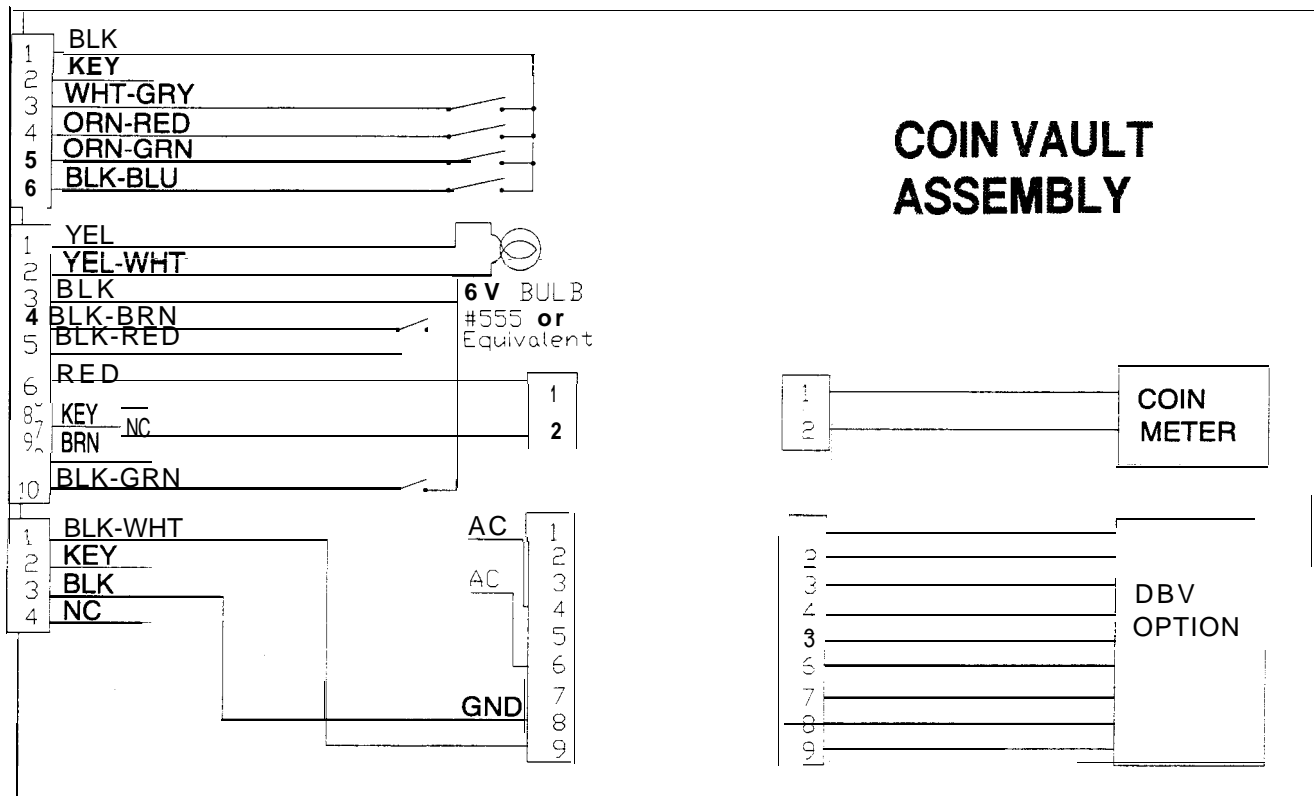


POSITION LOGIC TABLE

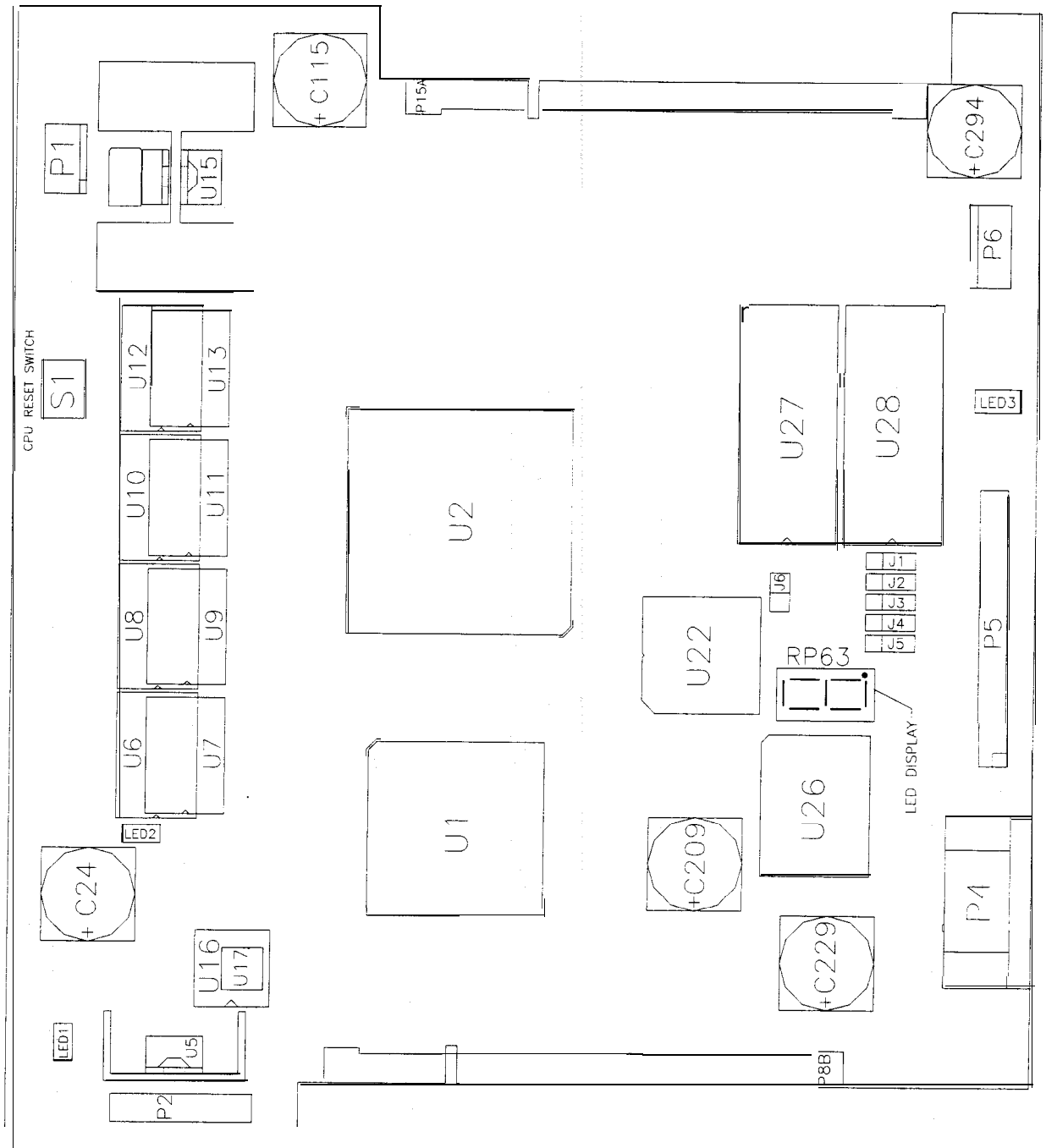
DIRECTION	FULLY LEFT	MODERATELY LEFT	SLIGHTLY LEFT	DEAD CENTER	SLIGHTLY RIGHT	MODERATELY RIGHT	FULLY RIGHT
FULLY UP	01110111 (00)	01110011 (01)	01110001 (02)	01110000 (03)	01111100 (04)	01111110 (05)	01111111 (06)
MODERATELY UP	00110111 (07)	00110011 (08)	00110001 (09)	00110000 (10)	00111100 (11)	00111110 (12)	00111111 (13)
SLIGHTLY UP	00010111 (14)	00010011 (15)	00010001 (24)	00010000 (24)	00011100 (24)	00011110 (19)	00011111 (20)
DEAD CENTER	00000111 (21)	00000011 (22)	00000001 (24)	00000000 (24)	00001100 (24)	00001110 (26)	00001111 (27)
SLIGHTLY DOWN	11000111 (28)	11000011 (29)	11000001 (24)	11000000 (24)	11001100 (24)	11001110 (33)	11001111 (34)
MODERATELY DOWN	11100111 (35)	11100011 (36)	11100001 (37)	11100000 (38)	11101100 (39)	11101110 (40)	11101111 (41)
FULLY DOWN	11110111 (42)	11110011 (43)	11110001 (44)	11110000 (45)	11111100 (46)	11111110 (47)	11111111 (48)

NOTE: 1. Connector pin sequence for the above data is as follows: 9-8-7-6-5-4-3-2, referred to ground at pin 12.
2. Numbers in parentheses appear in the Switch Test. Program does not use the "slightly" positions.

DOLLAR BILL VALIDATOR WIRING



CPU BOARD INDICATOR AND SWITCH LOCATIONS



CPU BOARD SWITCH

Switch	Location	Function	Positions	State	Meaning
S1*	Edge Near U10 and U12	Resets and Restarts Game	2	Off	Normal Operation
				On	Forced Reset

*Notes

This switch resets the CPU Board without shutting off power at the power supply.

CPU BOARD JUMPER LOCATION TABLE

Jumper	J1	J2	J3	J4	J5	J6
Located Near...	U28 & Connector P5					U22 & U27

CPU BOARD JUMPER POSITION TABLE

ROM Type	Default	Options*	J1	J2	J3	J4	J5	J6
Boot (U18)		27C080, 1M X 8, EPROM	1-2	2-3	1-2	1-2	--	--
		27C040, 512K x 8, EPROM	1-2	1-2	1-2	1-2	--	--
		27C010, 128K x 8, EPROM	1-2	1-2	1-2	2-3	--	--
		29F040, 512K x 8, Flash	2-3	1-2	2-3	1-2	--	--
		29F020, 256K x 8, Flash	1-2	1-2	2-3	1-2	--	--
		29F010, 128K x 8, Flash	1-2	1-2	2-3	1-2	--	--
Expansion (U18)		27C080, 1M x 8, EPROM	--	--	--	--	2-3	--
		27C040, 512K x 8, EPROM	--	--	--	--	1-2	--
		27C010, 128K x 8, EPROM	--	--	--	--	1-2	--
External Boot		Boot from CPU ROM	--	--	--	--	--	1-2
		Boot from SIO ROM	--	--	--	--	--	Re-moved

*Notes

1. -- = Not Applicable

2. Memory type numbers shown are for blank parts. Your game requires programmed parts.

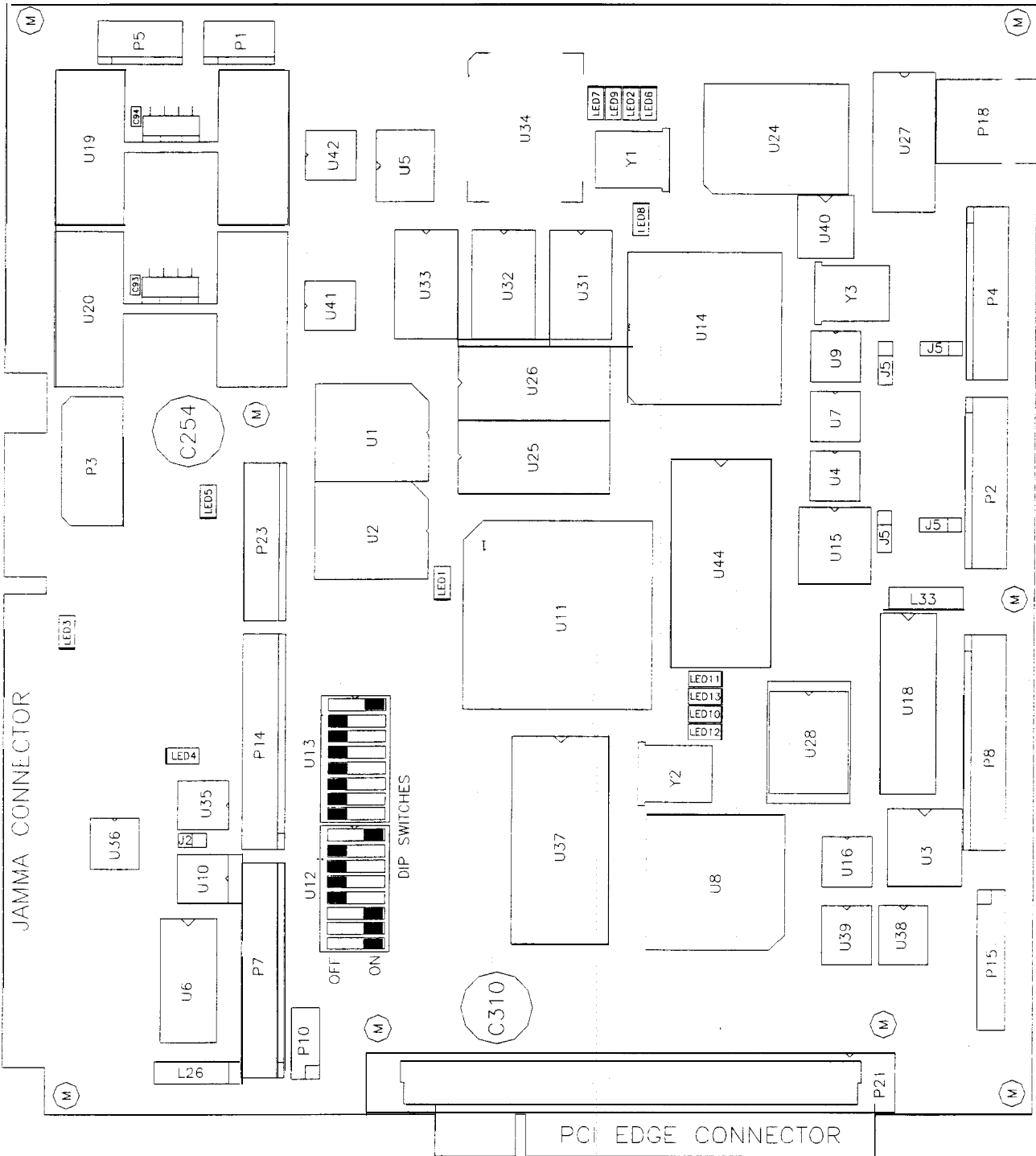
CPU BOARD LED INDICATOR STATUS TABLE

Device	Location	Function	Color	State	Meaning
LED1	Near U6, U7 & U16	3.3V CPU Power indicator	Red	Off	Insuff icient Power
				On	Power OK
				Blinking	Power Supply Fault
LED2	Near U28 & Connector P5	Hard Disk Drive Activity	Green	Off	Disk Not in Use
				On	Locked Up Disk
				Blinking	Normal Disk Activity
RP63	Near U22 & U26	Indicator	Red	Off*	See I t e 3 , B e l o w .
				On*	
				Blinking* Sequentially	

Notes

1. LED1 monitors CPU power (+3.3 volts). If his LED is off or blinking, investigate processor circuits. If other LEDs are off or blinking at the same time, check +5-volt circuits or the game power supply.
2. LED2 flashes when the hard disk is operating during game play. LED2 may light continuously during startup. If this LED remains lighted, the hard drive may be locked up or faulty.
3. Software controls RP63. In this game, RP63 initially indicates program startup stages. This LED is a seven-segment, alphanumeric display device. Normally, RP63 displays a lowercase "b," or an "O" pattern with sequentially blinking segments. During Self-Test screens, RP63 displays a "bouncing bar" that resembles a hyphen ("-").

SOUND I/O BOARD ASSEMBLY A-22628-I



SOUND I/O BOARD JUMPER POSITION TABLE *

Jumper	Location	Function	Meaning	Position	State
J1 (Note 1)	Near U9 & Crystal Y3	I/O Connector P2	Input Mode	Pins 1 & 2	
			Output Mode	Pins 2 & 3	
J2	Between U35 & U10	Video Sync	Positive Sync	Jumper Not Installed	*
			Negative Sync	Pins 1 & 2	
J3 (Note 2)	Near U15	I/O Connector P4	Input Mode	Pins 1 & 2	
			Output Mode	Pins 2 & 3	
J4	None	None	Not Used	None	
J5 (Note 2)	Between U15 & Connector P2	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	I/O Connector P2	Input Mode	Pins 1 & 2	
			Output Mode	Pins 2 & 3	

Notes

1. Configure I/O port P2 by setting both jumpers J1 and J8 to input or output mode.
2. Configure I/O port P4 by setting both jumpers J3 and J5 to input or output mode.

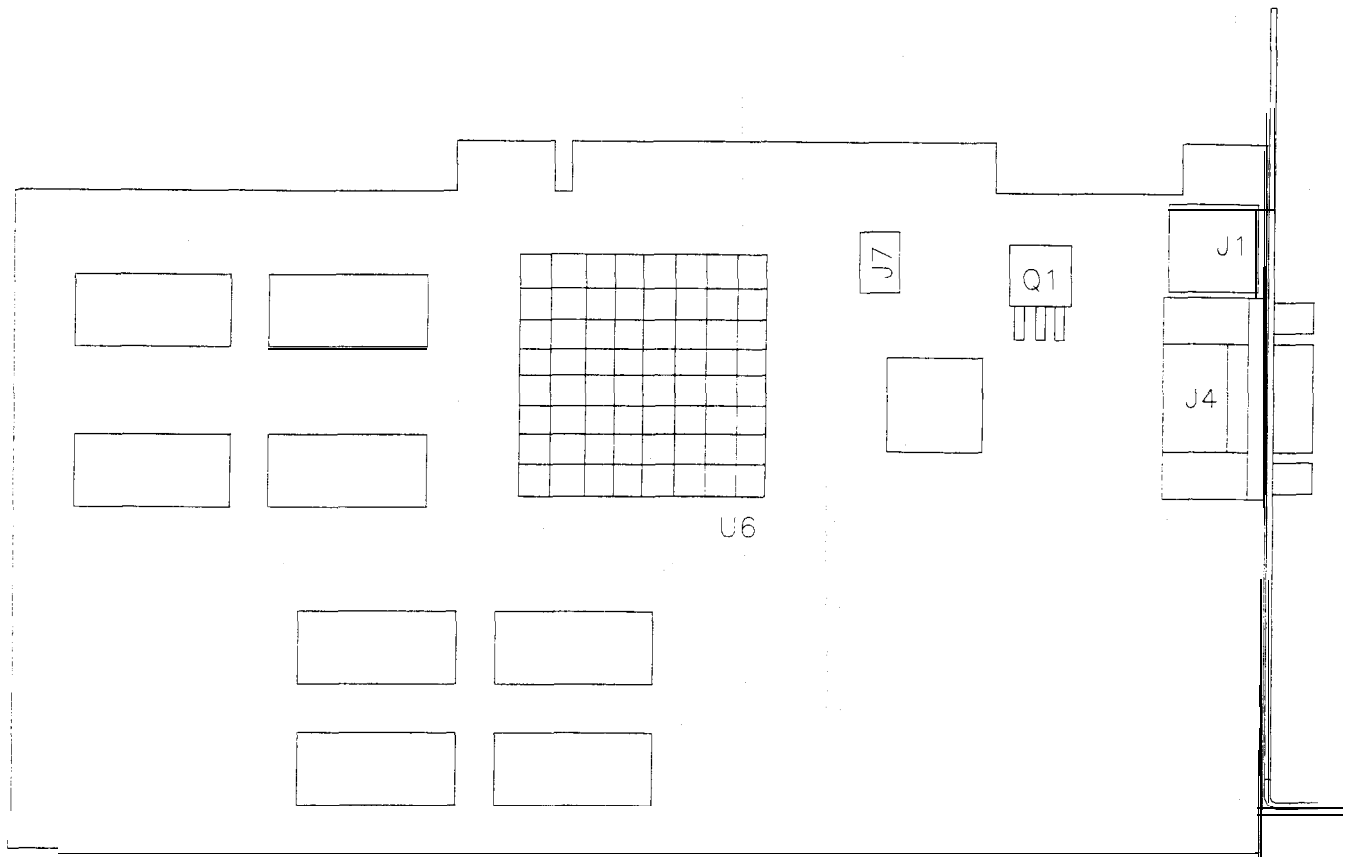
SOUND I/O BOARD LED INDICATOR STATUS TABLE

LED	Location	Function	Color	State	Meaning
LED1 (Note 1)	Near U11	Not Used (Remains Off)	Green	Off	--
				On	--
				Blinking	--
LED2 (Note 2)	Near U34 & Crystal Y1	Linking Connector Status	Green	Off	Not in Use (No Game Linking)
				On	Link Continuity Good
LED3 (Note 2)	Near the JAMMA Connector	-5V Power Indicator	Red	Off*	No Power
				On*	Normal Operation
LED4 (Note 2)	Near U35 & Connector P14	+12V Power Indicator	Red	Off	No Power
				On	Normal Operation
LED5 (Note 2)	Near Connector P23	+5V Power Indicator	Red	Off	No Power
				On	Normal Operation
LED6 (Note 2)	Near U34 & Crystal Y1	CPU Linking Activity	Red	Off	Not in Use
				On	CPU Communicating with Ethernet Controller
LED7 (Note 2)	Near U34 & Crystal Y1	Linking Transmitting Data	Red	Off	Not in Use (No Game Linking)
				On	Sending Data
				Blinking	Normal Operation
LED8 (Note 1)	Near U14 & Crystal Y1	Audio Activity	Yellow	Off	No Sound Boot ROM
				On	Locked Up
				Blinking	Normal Operation
LED9 (Note 2)	Near U34 & Crystal Y1	Linking Receiving Data	Yellow	Off	Not in Use (No Game Linking)
				On	Receiving Data
LED10 (Note 1)	Near U44 & Crystal Y2	Not Used (Remains On)	Green	Off	--
				On	--
				Blinking	--
LED11 (Note 1)	Near U44 & Crystal Y2	Not Used (Remains On)	Red	Off	--
				On	--
				Blinking	--
LED12 (Note 1)	Near U44 & Crystal Y2	Not Used (Remains On)	Yellow	Off	--
				On	--
				Blinking	--
LED13 (Note 1)	Near U44 & Crystal Y2	Not Used (Remains On)	Yellow	Off	--
				On	--
				Blinking	--

Notes

1. Software controls this LED. Indications are game and revision-specific. Changing the EPROMs on this board may alter the function of this LED. Firmware damage may also cause new or different LED behavior.
2. Hardware controls this LED. Indications depend on hard-wired circuitry. A change in normal LED behavior may indicate a circuit fault. Changing the EPROMs on this board shouldn't alter the function of this LED.

VIDEO BOARD INDICATOR AND SWITCH LOCATIONS



Note

This video board has no jumpers or LEDs.

*NBA ON NBC*TM

CHAPTER SIX

TROUBLESHOOTING

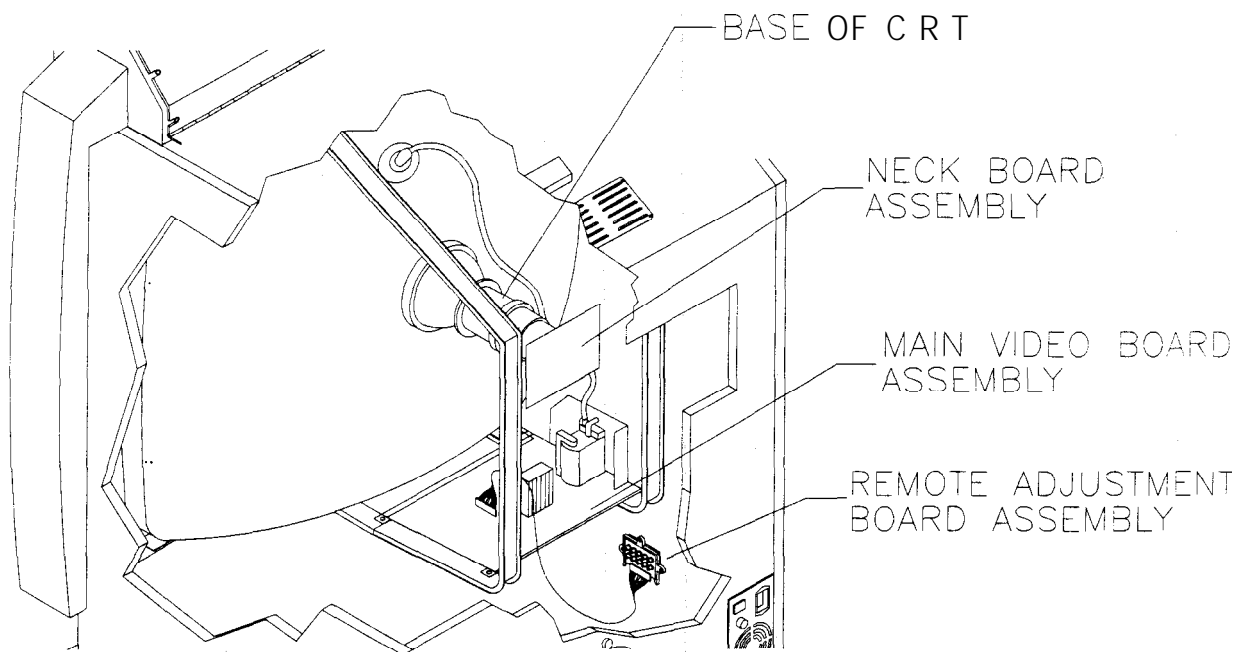


CAUTION: This game uses complex electronic components that are very SENSITIVE to static electricity. Observe the following precautions before handling game electronics. Failure to do so may void the warranty and could damage electronic assemblies.

- ◆ Before servicing electronics, turn off AC power to the game. Wait for capacitors to discharge.
- ◆ BEFORE touching or handling electronic assemblies, discharge static electricity on your body. To discharge this static, begin by connecting the line cord to a properly grounded outlet. Don't turn on the game! Next, touch the safety ground stud of the power supply chassis.
- ◆ Store electronic assemblies in an anti-static area. Use anti-static bags to store or transport the CPU Board. Transport the hard disk in its container.
- ◆ DON'T remove or connect any electronic assemblies when the cabinet power is on. Doing so will damage electronic assemblies and void the warranty.
- ◆ Replace ground wires, shields, safety covers, etc. after you complete maintenance or service. Install and firmly tighten all ground and mounting screws.

Game Startup Troubleshooting Table

SYMPTOM	REQUIRED ACTION
<p>GAME DOES NOT START</p> <ul style="list-style-type: none"> • Game appears completely non-functional. • No audio • No illumination • No video display 	<ol style="list-style-type: none"> 1. Check that power supply POWER switch is on. 2. Turn OFF game power. Unplug AC line cord. Examine power supply fuse or circuit breaker. Power Line Voltage switch must be set to agree with local AC line voltage. 3. Remove line cord from power supply. Test line cord and power plug for breaks or damage. Verify continuity of each wire in cord. Assure that supply connector is good. 4. Unlock and remove rear cabinet door. Swing door out until it rests on chains. Assure that cabinet wiring harness connectors fully seat in corresponding power supply and CPU Board. 5. Fully seat AC plug in power outlet. Verify presence of AC line voltage. Turn game power on. If fuse opens, check DC wiring harness and connectors.



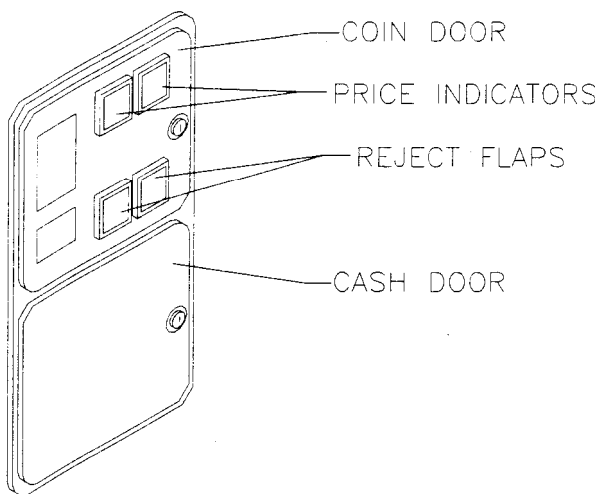
Location of Monitor Remote Adjustment Controls

Game Startup Troubleshooting Table, *continued*

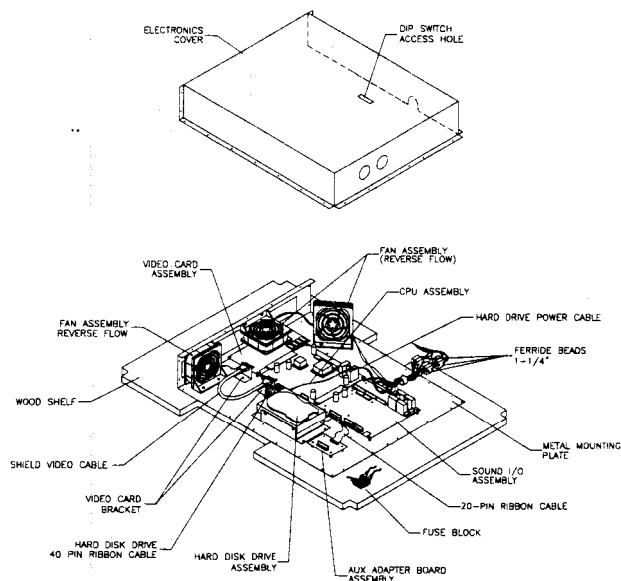
SYMPTOM	REQUIRED ACTION
<ul style="list-style-type: none"> Video game appears non-functional. Currency acceptor price indicator is illuminated. 	<ol style="list-style-type: none"> 1. Unlock and open rear cabinet door. Inspect CPU Board under low-light conditions. Light emitting diodes glow if processor circuits receive voltage. Fan should also be operating. These indications prove presence of some DC from power supply. Still, voltages or signals may not be normal. 2. Turn OFF game power. Inspect CPU Board. Assure that JAMMA Wire Harness connector is attached and fully seated onto mating board connector. Verify connection of monitor AC power. Check on wiring harness connectors in same way. 3. Verify that CPU DIP switches are set as intended. 4. Turn on game power. Using 20 Volt DC setting on digital voltmeter, measure DC voltages present at power connector pins. Adjust +5V source if necessary. 5. Using 2-volt AC setting on digital voltmeter, measure same DC voltages as above. Any reading indicates unstable supply voltages that may contain ripple or noise. 6. Verify that game runs and completes power-up self-test sequence without any errors. Note errors or failures during these tests (Game doesn't save error messages). 7. Enter game Menu System by pressing and holding TEST MODE switch inside coin door area. Select DIAGNOSTICS from Main menu. Once in Diagnostics Menu, choose MONITOR PATTERNS.



CAUTION: Don't remove or install any connector while power is turned on. Otherwise, you'll damage the CPU Board or hard disk drive, and void the warranty.



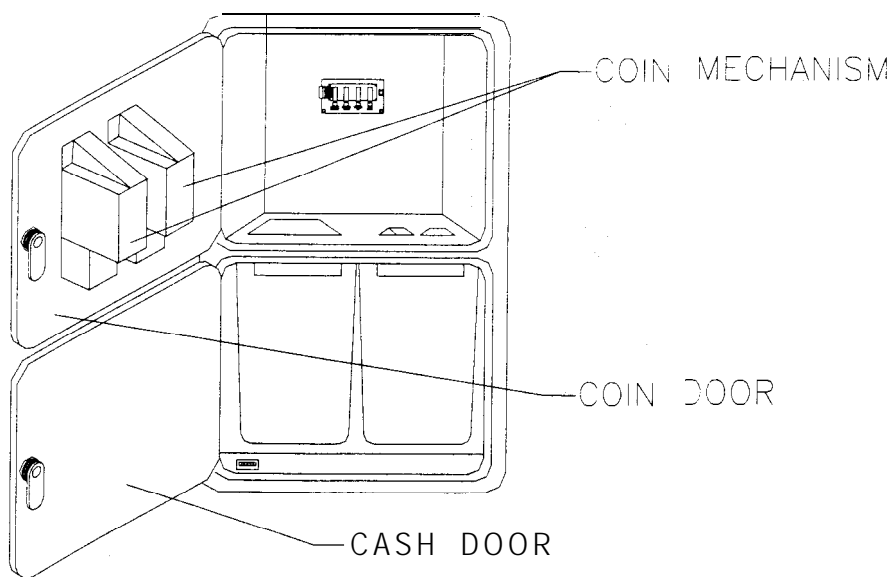
Front View of Coin Door



Interior View of Electronics

Game Startup Troubleshooting Table, *continued*

SYMPTOM	REQUIRED ACTION
<ul style="list-style-type: none"> Game won't accept currency or tokens and won't start. Audio and video are present. 	<ol style="list-style-type: none"> 1. Unlock and open cash door. Empty cash box. Inspect revenue for counterfeit currency. Check vault and remove any items that block path from mechanism. 2. Unlock and open coin door. Check each mechanism by hand to assure proper mounting. Remove mechanism and clear currency path. Reinstall mechanism and latch it. 3. Verify that mechanism is level when doors close. Repair or replace coin door if it is bent or damaged. If necessary, adjust cabinet leg levelers to keep mechanisms vertical.
<ul style="list-style-type: none"> Game accepts currency or tokens, but doesn't start. Audio and video are present. 	<ol style="list-style-type: none"> 1. Unlock and open coin door. Check each currency acceptor by hand to assure proper mounting. Verify that each of release latches is in closed and locked position. Test working and bad coins to see if mechanism accepts and rejects currency correctly. 2. Assure that no loose parts or wires are caught in hinges, latches, or switch contacts. 3. Inspect to see if external acceptor indicators (Pricing, Flashing Arrows, etc.) are illuminated. Check connectors and cables for wiring continuity from CPU Board connectors to acceptors. 4. Enter game Menu System by pressing and holding TEST MODE switch inside coin door. From Diagnostics Menu, choose SWITCH TEST. Use these tests to confirm operation of each switch used in game. 5. Check for continuity in each of suspect switch connections (Common to Normally Open or Common to Normally Closed). Replace faulty switches (bent levers, broken actuators, etc.). 6. Verify that each acceptor is operating properly by connecting it to working game.



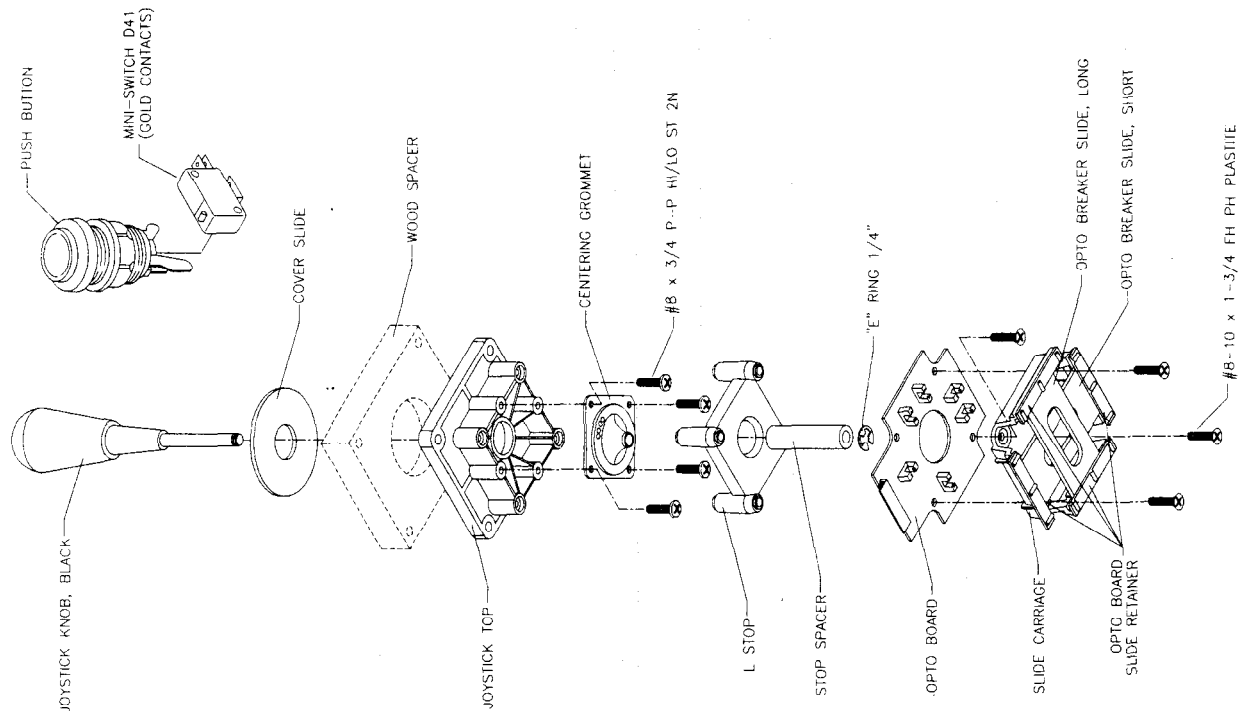
Interior View of Coin Door and Cash Door

Game Startup Troubleshooting Table, *continued*

SYMPTOM	REQUIRED ACTION
<ul style="list-style-type: none"> • Player controls are intermittent or completely non-functional. • Game starts normally. 	<ol style="list-style-type: none"> 1. Unlock and open coin door. Enter game Menu System by pressing and holding TEST MODE switch inside coin door. From Diagnostics Menu, choose SWITCH TESTS. Use these tests to confirm operation of each switch used in game. 2. Unlock and open coin door. Assure that no loose parts or wires are caught in hinges, latches, or switch contacts. Verify that harness connectors are attached and fully seated. 3. Check that cabinet wiring is correct for this game. Assure that control switches connect properly to control input wires from P3, P16 and JAMMA connector. 4. Verify continuity in each of switch connections (Common to Normally Open or Common to Normally Closed). Assure that control is operating properly by placing in working game. 5. Install the I-40 Joystick Interface Board in working game. Verify that board operates properly.
<p>Game accepts currency or tokens, but number of credits per coin or bill is incorrect.</p>	<ol style="list-style-type: none"> 1. Unlock and open coin door. Enter game Menu System by pressing and holding TEST MODE switch inside coin door. From Diagnostics Menu, choose SWITCH TESTS. Use these tests to confirm operation of each switch used in game. 2. From Adjustments Menu, choose PRICING to verify games and credits are set correctly. 3. Check that cabinet wiring is correct for this game. Assure that coin meter and coin switches connect properly to control input wires from JAMMA connector and or CPU wiring.

Joystick Troubleshooting Table

SYMPTOM	REQUIRED ACTION
<ul style="list-style-type: none"> • Players complain that joystick operates erratically or unreliably • Game starts normally 	<ol style="list-style-type: none"> 1. Enter game Menu System by pressing and holding TEST MODE switch inside coin door. From Diagnostics Menu, choose SWITCH TEST. Operate joystick in question. Check for proper readings of up, down, left and right. 2. Unlock and open control panel. Assure that no loose parts or wires are caught in hinge or switch contacts. Check joystick cable ground connections. Verify connection and proper seating of harness connectors. 3. Inspect joystick for: Missing screws, loose or damaged parts, broken cables, torn rubber T-band, etc. Replace bad parts. 4. Clean dust out of optos with a swab and cleaner. <i>Don't apply cleaner directly into opto. Never use solvents!</i> 5. Verify that joystick operates properly by installing it in working game. 6. Check fuse near I-40 Joystick Interface Board inside player control panel. If fuse is bad, replace it. 7. If joystick still doesn't work, I-40 Joystick Interface Board may be bad. Replace board and retest joystick.



Joystick Parts

Audio Troubleshooting Table

SYMPTOM	REQUIRED ACTION
<ul style="list-style-type: none"> No audio Video is present Game appears to operate normally 	<ol style="list-style-type: none"> 1. Unlock and open coin door. Enter game Menu System by pressing and holding TEST MODE switch inside coin door. From Main Menu, choose VOLUME LEVEL. Verify that volume levels have not been set at zero. Change levels if necessary to make game audible. 2. From Adjustments Menu, choose ATTRACT SOUND to see if this feature is active (on). 3. Follow on-screen instructions to return to first menu. Select DIAGNOSTICS from Main Menu. Once in Diagnostics Menu, choose SOUND SUBSYSTEM. These tests confirm sound system operation. 4. Turn off game power. Remove grilles and inspect speakers. Free speaker cones, terminals, mounting screws and magnets of loose parts or wires. 5. Verify correct cabinet wiring for this game. Assure that speakers connect properly to audio output wires from JAMMA connector. Verify that each speaker has continuity. 6. Turn on game power. Using 20 volt DC setting on digital voltmeter, measure DC voltages present at power connector pins. Verify +5V, -5V and +12V sources. 7. Using 2 Volt AC setting on digital voltmeter, measure same DC voltages as above. Any reading indicates unstable supply voltages that may contain ripple or noise. 8. Verify proper operation of game CPU Board by connecting it to working game.

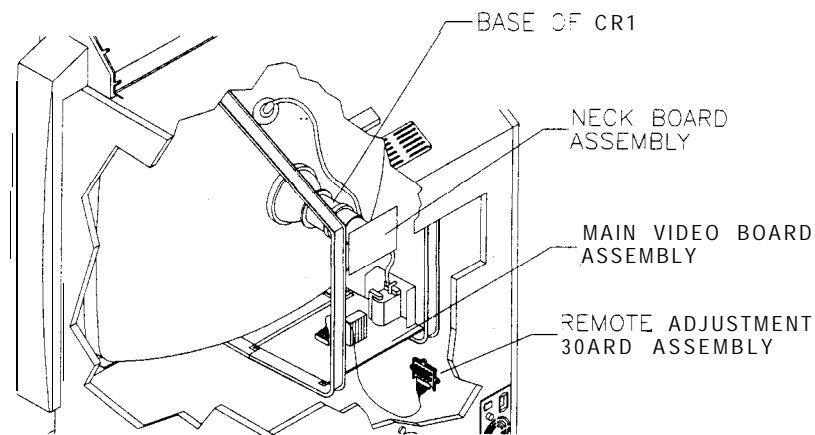
Audio Troubleshooting Table, *continued*

SYMPTOM	REQUIRED ACTION
<ul style="list-style-type: none"> Constant low hum from all speakers. 	<ol style="list-style-type: none"> Check that cabinet wiring is correct for this game. Verify that cabinet wiring provides separate wires (not common return) for each speaker. Check connection of all cabinet ground wires. Using 2 Volt AC setting on digital voltmeter, measure voltages at speaker terminals. Any reading here indicates that supply voltages are unstable and may contain ripple or noise.
<ul style="list-style-type: none"> Audio is distorted, muffled or has missing frequencies. 	<ol style="list-style-type: none"> Unlock and open coin door. Enter game Menu System by pressing and holding TEST MODE switch inside coin door. From Main Menu, choose DIAGNOSTICS from Main Menu. Once in Diagnostics Menu, choose SOUND SUBSYSTEM. Run test to confirm sound system operation. Turn off game power. Remove grilles and check speakers. This game uses two coaxial speakers. Assure that speakers are full-range type (100 to 10,000 Hz response). Speakers must be rated to handle at least 20 watts. Woofer must handle at least 25 watts. Check for reversed wires at one speaker. Weak low frequencies and thin or hollow sound quality is symptom of incorrectly phased speakers. You may not detect this condition during Sound Subsystem Test. You can hear it during normal game operation. Verify that speaker operates properly by connecting it to working game.

Video Troubleshooting Table

SYMPTOM	REQUIRED ACTION
<ul style="list-style-type: none"> • Monitor appears non-functional • Audio is present • Controls operate as expected 	<ol style="list-style-type: none"> 1. Unlock and open rear cabinet door. Verify connection of AC Power to Video Monitor. inspect CRT neck under low light conditions. You'll see glow near CRT base if voltage appears across filament circuits. This indication proves that some monitor circuits receive power. Still, voltages or signals may not be normal. 2. Turn off game power. Verify that Video Signal and Remote Adjustment Board connectors seat properly on Video Monitor Board. Check other monitor connectors in same way. 3. Examine AC line fuse on Video Monitor Board. If fuse is faulty, replace it with an identical fuse of proper voltage and current rating. 4. Assure that no loose parts or wires are caught on chassis or mounting brackets. 5. Check that brightness (intensity) and contrast have not been set to their minimum levels. 6. Verify that Video Monitor operates correctly by connecting it to working game.

<p>A</p> <p>!</p>	<p>WARNING: In normal operation, the monitor does not require isolation from the AC line voltage. During bench servicing, etc., you may need to operate the monitor outside the cabinet. If you do, YOU MUST ISOLATE THE MONITOR FROM LINE VOLTAGE WITH AN ISOLATION TRANSFORMER.</p>
<p>!</p>	<p>CAUTION: Don't operate monitor without the Remote Adjustment Board.</p>



Cutaway Rear View

Video Troubleshooting Table, continued

SYMPTOM	REQUIRED ACTION
<ul style="list-style-type: none"> • Game does not appear • No audio is present • Power-up self-test runs 	<ol style="list-style-type: none"> 1. Note and record any error messages that occur during self-test. 2. Turn off game power. Unlock and open front door. inspect CPU Board. Assure that JAMMA cable connector seats properly into mating edge connector on CPU Board. Check cable connectors for correct alignment and continuity. 3. Verify that ROM instruction set is correct for this game. Game set includes more than one ROM. Each ROM circuit is labeled with assembly number and software version. 4. Verify that CPU Board is correct for this game. Each CPU Board is marked with manufacturer name, assembly number and hardware version. 5. Verify that hard disk drive is correct for this game. Each hard disk drive is marked with manufacturer name, assembly number and program version. 6. Turn on game power. Using 20 Volt DC setting on digital voltmeter. Measure DC voltages present at power connector pins. Verify +5V source if it is adjustable. 7. Using 2 volt AC setting on digital voltmeter, measure same DC voltages as above. Any reading indicates unstable supply voltages that may contain ripple or noise. 8. Compare CPU Board jumper positions with CPU Jumper Status Chart (Chapter Five). Compare CPU Board light emitting diode states with CPU Indicator Chart (Chapter Five).



CAUTION: Don't remove or install any connector when power is turned on. Installation under power damages the CPU Board or hard disk drive and voids the warranty.



NOTICE: Before adjusting the monitor, demagnetize the CRT with an industrial grade degaussing coil.

Video Troubleshooting Table, *continued*

SYMPTOM	REQUIRED ACTION
<ul style="list-style-type: none">• Game operates normally• Video wavers, tears or rolls, or has dark bars	<ol style="list-style-type: none">1. Check connectors and cables for wiring continuity from CPU Board to video monitor.2. Assure that video monitor is correct type for this game. Video monitors with wrong resolution can't lock sync, or may display pictures with horizontal tearing.3. Assure connection of all cabinet ground wires, especially at video monitor chassis.4. Move cabinet far away from machines, appliances, or games. Some equipment emits strong electrical or magnetic fields.5. Verify that video monitor operates correctly by connecting it to working game.
<ul style="list-style-type: none">• Missing colors	<ol style="list-style-type: none">1. Check connectors and cables for wiring continuity from CPU Board to video monitor.2. Verify that video monitor operates correctly by connecting it to working game.

Software Update Troubleshooting Table

SYMPTOM	REQUIRED ACTION
<ul style="list-style-type: none"> Update did not work After update procedure, screen reports lower than latest version 	<ol style="list-style-type: none"> You skipped steps or performed them out of sequence. This kit and its instructions resemble other game updates, but updates aren't identical. Return update components to kit, reinstall original parts in cabinet, and try process again. An installation error may have damaged a device. Inspect for bent or broken pins. If you have another kit, try it. Your distributor can check your EPROMs.
<ul style="list-style-type: none"> Game does not recover Board indicators illuminate, but screen is completely blank 	<ol style="list-style-type: none"> Boot Update version and hard disk drive don't match. Once you've updated disk drive, CPU instructions must be at correct version to make use of new data stored on disk. Be certain that boot ROM device resides in socket U32. You may have installed devices in wrong sockets. Only use socket U33 for hard disk drive updates. During game play, socket U33 must be empty. After you install disk ROM and load its contents onto drive, remove it from game.



NOTICE: Someday, software updates for your game might become available. These upgrades may improve your game's performance or add new game features. Such upgrades tend to appear sometime after the factory first releases a game. Contact your distributor for information about updates.

Miscellaneous Problem Troubleshooting Table

SYMPTOM	REQUIRED ACTION
<ul style="list-style-type: none"> • Marquee lamp is intermittent or non-functional • Game starts and plays normally. 	<ol style="list-style-type: none"> 1. Open front door and formed housing. Remove fluorescent tube from its sockets. If you find cracks or darkened ends, install new lamp. Clean tube. 2. Verify that lamp pins make good connection with socket contacts. 3. Measure fluorescent lamp AC voltages. Check wiring and connector continuity from power supply connector to lamp assembly. 4. Check continuity of both fluorescent lamp filaments. Verify that lamp operates by connecting it to working game.
<ul style="list-style-type: none"> • Game operates normally • Fan is noisy 	<ol style="list-style-type: none"> 1. Check bottom and rear of cabinet for blocked air flow. Move game away from sources of heat. 2. Turn off game power. Apply high power vacuum cleaner to vent holes to remove dust. 3. Unlock and open front door under monitor. connection and operation of all fans.
<ul style="list-style-type: none"> • Error Messages appear on screen • Game does not start and has no audio. 	<ol style="list-style-type: none"> 1. Check any assembly (RAM, ROM, Battery, etc.) identified in error messages. 2. Call your authorized distributor for help with unresolved screen messages.

WARNINGS & NOTICES

WARNING

- Use of non-MIDWAY parts or circuit modifications may cause serious injury or equipment damage!
- Use only MIDWAY authorized components and parts. Failure to do so will void your warranty and may result in incorrect or unsafe operation. Substitute parts or modifications may void the EMC directive or FCC type acceptance.
- Federal copyright, trademark and patent laws protect this game. Unauthorized modifications may be illegal under Federal law. The modification ban also applies to MIDWAY GAMES INC. and game logos, designs, publications and assemblies. Moreover, facsimiles of MIDWAY equipment (or any feature thereof) may be illegal under federal law, regardless of whether or not such facsimiles are manufactured with MIDWAY GAMES INC. components:

WARNING

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

WARNING

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

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

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

NOTICE

This kit was tested. It complies with limits for a Class A digital device, under FCC Rules, Part 15. These limits provide reasonable protection against harmful interference when the equipment operates in a commercial environment. This equipment generates, uses and can radiate radio frequency energy. If not installed and used according to the instruction manual, this equipment may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference. If interference occurs, the user must correct it at his own expense.

NOTICE

When MIDWAY GAMES INC. ships a game, it complies with FCC regulations. Your label is proof of compliance. Legal repercussions to the owner or distributor may result if the label is missing or damaged. If your game does not contain an FCC compliance label, call MIDWAY GAMES INC. immediately.

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