# NBA SHOWTIME GOLD EDITION / NFL BLITZ 2000 GOLD EDITION CONVERSION KIT

**CHAPTER ONE**

# ASSEMBLY

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| | **WARNING:** Use of non-Midway parts or circuit modifications may cause serious injury or equipment damage! Use only Midway authorized parts.<br><br>For safety and reliability, don't substitute parts or modify Midway products. Substitute parts or modifications may void EMC directive or FCC type acceptance. |
| | **NOTICE:** The term VGM refers to the video game machine. |

# SAFETY INSTRUCTIONS

The following safety instructions apply to operators and service personnel. Read these instructions before preparing your video game machine *(VGM)* 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.

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| | **WARNING: DISCONNECT POWER.** Always turn the power *off* and unplug the VGM 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: GROUNDING**. Avoid electrical shocks! Don't plug in a VGM until you have inspected and properly grounded it. Only plug this VGM into a grounded, three-wire outlet. Don't use a "cheater" plug, or cut off the ground pin on the line cord. |
| | **WARNING: SALVAGED PARTS.** Kit completion requires salvaging parts from old VGMs. Salvaged parts must operate perfectly. Otherwise, the converted VGM can't perform properly or safely. Before you attempt conversion, repair circuit board malfunctions and cabinet damage. |
| | **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. |
| | **WARNING: HAZARD TO EPILEPTICS.** A small portion of the population has a condition that may cause epileptic seizures. Affected persons experience seizures while watching some television pictures or playing certain video games. People who have not had seizures may still have an undetected epileptic condition.<br><br>If anyone in your family has experienced epilepsy symptoms (e.g., seizures or loss of awareness), consult your physician before using video games.<br><br>While children play video games, a parent should observe. Be alert to the following symptoms: Dizziness, altered vision, eye or muscle twitching, involuntary movements, loss of awareness, disorientation, or convulsions. If you or your child experience these symptoms, *discontinue use immediately* and consult your physician. |

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| | **CAUTION: HANDLING ELECTRONIC DEVICES.** This kit's electronic components are *sensitive to static electricity.* Before handling electronics, observe the following precautions...<br><br>• Before servicing electronics, turn off AC power to the VGM.<br>• Before handling electronics, discharge static electricity on your body. Touch the power supply's safety ground stud before touching electronics.<br>• Store electronic assemblies in an anti-static area. Use an anti-static bag to store the CPU board assembly. After you install the new unit, reuse the same bag to protect the old CPU board.<br>• Don't remove or connect electronics when cabinet power is on. Otherwise, you'll damage VGM electronics and void your warranty. |
| | **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. |
| | **CAUTION: WIRING.** This kit uses as much of the existing wiring as possible. Avoid improper operation! After you complete the conversion, but before applying power, check the wiring. Verify that the wiring matches the diagrams. |
| | **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. |
| | **NOTICE: POWER SUPPLY.** Be sure that your old VGM's power supply can produce these voltages and currents: +5VDC at 6A, -5VDC at 1A and +12VDC at 4A. Meter these operating voltages before you disconnect the old electronics from the VGM. Power supply voltages must measure within +/-5% under load. Your power supply must be FCC approved. |
| | **NOTICE: MONITOR TYPE.** This kit isn't compatible with X-Y monitors. Suitable monitors have horizontally mounted CRTs and raster electronics. Only use a monitor with inputs for RGB video and composite, positive or negative sync. |
| | **NOTICE: COIN MECHANISMS.** Clean your VGM's coin mechanisms. Also test coin mechanisms with appropriate currency. Servicing these mechanisms is crucial to your VGM's earning potential. |
| | **NOTICE: COIN METERS.** This kit doesn't include coin meters. For your convenience, the factory provides meter wiring information. You may use salvaged meters if they operate satisfactorily. |
| | **NOTICE: 2-PLAYER CONTROL PANELS.** You can use this kit to convert VGMs with 2-player control panels. A DIP-switch setting allows two-player operation. See DIP SWITCH TESTS in chapters 3 and 4. |

# PRODUCT SPECIFICATIONS

## Equipment Characteristics

***Video Display Monitor***

- Standard or medium resolution, RGB
- Composite, positive or negative sync
- DIP switch U12-2 sets resolution
- SIO Jumper J2 sets sync polarity

***Audio System***

Digital Stereo Sound for 2 Coaxial, Full-Range Speakers

***Currency Acceptors***

- 4 Mechanical Coin Switch Inputs
- Dollar Bill Validator Input
- Electronic Coin Acceptor Input

## VGM Characteristics

***Player Variables***

- 1 to 4 players per game
- High Score Recognition
- Parental Advisory Disclosure: "Suitable for all Ages"

***Operator Variables***

Coinage, Game Options, Difficulty, Volume, Audits, Statistics

***Diagnostics, Audits, Adjustments***

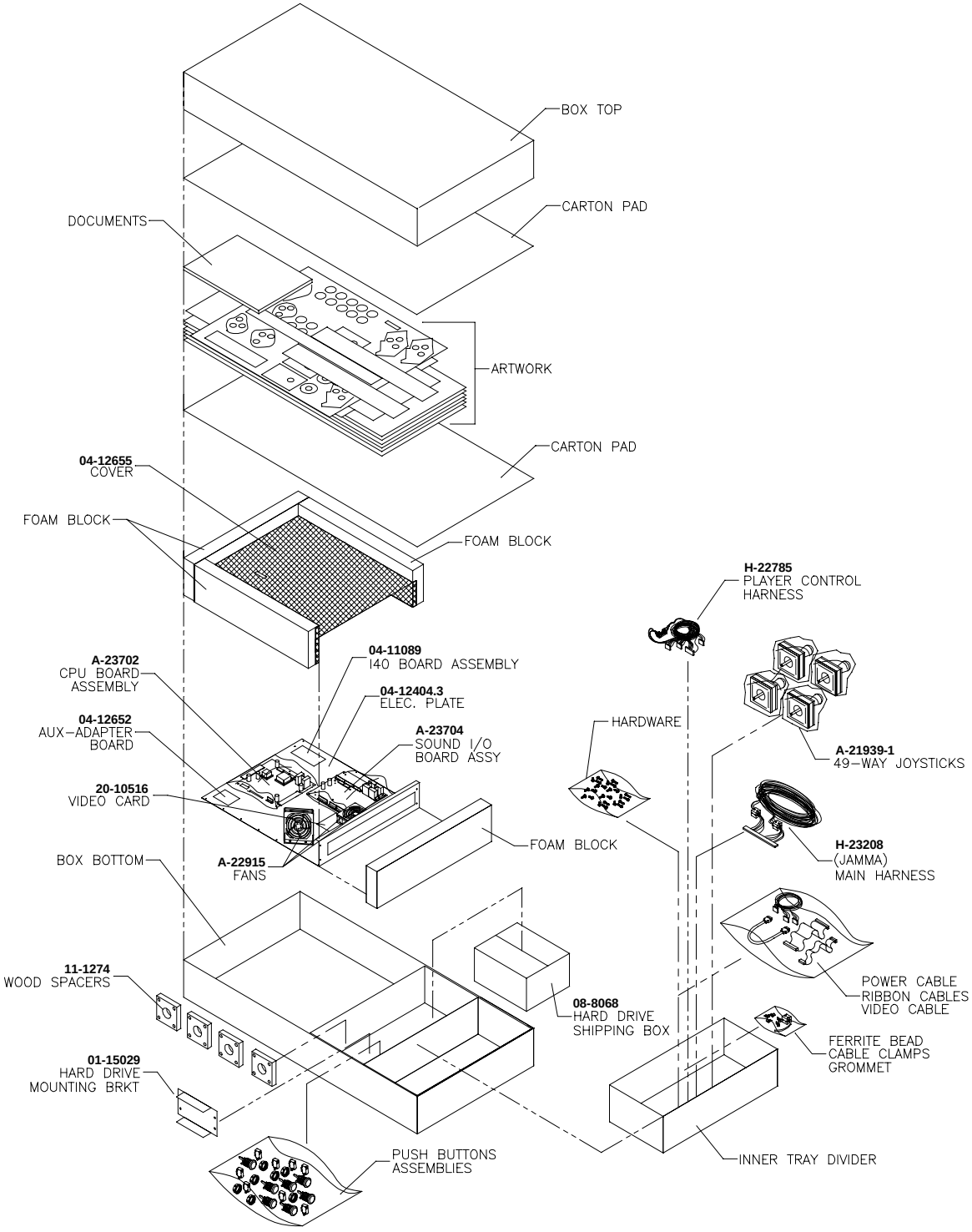
- Automatic, Power-Up Self-Test
- Manual, Multi-Level Menu System

**NOTICE: FCC COMPLIANCE.** Installation of this kit into any existing product does not guarantee compliance with FCC requirements. You are solely responsible for FCC compliance for installations in other products. You must remove any existing FCC compliance label. Don't install a new label on the converted product until you have verified FCC compliance.

# INSPECT KIT 15909

Kit 15909 includes joysticks, buttons and cables to convert a player control panel. Unpack the materials from the carton and check for obvious signs of damage. Use this checklist to be sure the kit is complete. You must supply the remainder of the materials required for this conversion.

| Item | Part # | Qty | Item | Part # | Qty |
|---|---|---|---|---|---|
| **ARTWORK** | | | **COMPONENTS, MAJOR** | | |
| ❑ Artwork, Backlit Marquee | **31-3586** | 1 | ❑ Board, Auxiliary Adapter | **04-12652** | 1 |
| ❑ Decal, Bottom Bezel Instrs | **31-3484** | 1 | ❑ Board, CPU | **A-23702** | 1 |
| ❑ Decal, Cabinet Side Panel | **31-3476** | 2 | ❑ Bd, I-40 Joystick Adapter | **04-11089** | 1 |
| ❑ Decal, NBA Hologram | **31-1768** | 1 | ❑ Board, Sound I/O | **A-23704** | 1 |
| ❑ Decal, Player Panel Add-Ons | **31-3481.1** | 1 | ❑ Bracket, Hard Drive | **01-15029** | 1 |
| ❑ Decal, Player Panel Hsg | **31-3479-1** | 2 | ❑ Drive, Hard (Assy) | **A-23703** | 1 |
| ❑ Decal, Player Pnl Hsg-Front | **31-3479-3** | 1 | ❑ Electronics (w / Video PCB) | **A-23205** | 1 |
| ❑ Decal, Player Pnl Wallpaper | **31-3480.1** | 1 | ❑ Joystick | **A-21939-1** | 4 |
| ❑ Decal, Side Panel Logo | **31-3587** | 2 | **DOCUMENTS** | | |
| ❑ Decal, Top Bezel Instructions | **31-3483** | 1 | ❑ Card, VGM Registration | **16-10650** | 1 |
| ❑ Header, Cardboard | **31-3482.1** | 1 | ❑ Label, Epilepsy Warning | **16-9922.1** | 1 |
| **BUTTONS** | | | ❑ Label, FBI Warning | **16-8587-825** | 1 |
| ❑ Button, Blue, Long Shaft | **20-10209-3** | 4 | ❑ Manual, Kit | **16-15909-101** | 1 |
| ❑ Button, Orange, Long Shaft | **20-10209-7** | 4 | ❑ Sheet, Caution, Elec Dev | **16-10077** | 1 |
| ❑ Button, Red, Long Shaft | **20-10209-1** | 4 | ❑ Template, Player panel | **16-10830** | 1 |
| ❑ Button, White, Long Shaft | **20-10209-2** | 4 | **MISCELLANEOUS** | | |
| | | | ❑ Bead, 1-1/4" Ferrite | **5556-13956-00** | 1 |
| **CABLES** | | | ❑ Cage, EMI | **04-12655** | 1 |
| ❑ Cable, Fan and Disk | **H-22900.2** | 1 | ❑ Clamp, ¼" Cable | **03-7655-4** | 6 |
| ❑ Cable, 20-Pin Ribbon | **5795-10937-09** | 1 | ❑ Container, Hard Drive Ship | **08-8068** | 1 |
| ❑ Cable, 40-Pin Ribbon | **5795-16308-12** | 1 | ❑ Cover, Plastic Ctl Panel | **03-9961** | 1 |
| ❑ Cable, Pod Extension | **H-22948** | 1 | ❑ Grommet, 7" Plastic | **RM-37-11** | 1 |
| ❑ Cable, Shielded Video | **20-10493** | 1 | ❑ Spacer, ¼" PCB Mounting | **03-8338-1** | 6 |
| ❑ Harness, Player panel | **H-22785** | 1 | ❑ Spacer, Wood | **11-1274** | 4 |
| ❑ Harness, Main Wire (JAMMA) | **H-23208** | 1 | ❑ Wrench, T-20, Tamper-Res | **20-9620** | 1 |

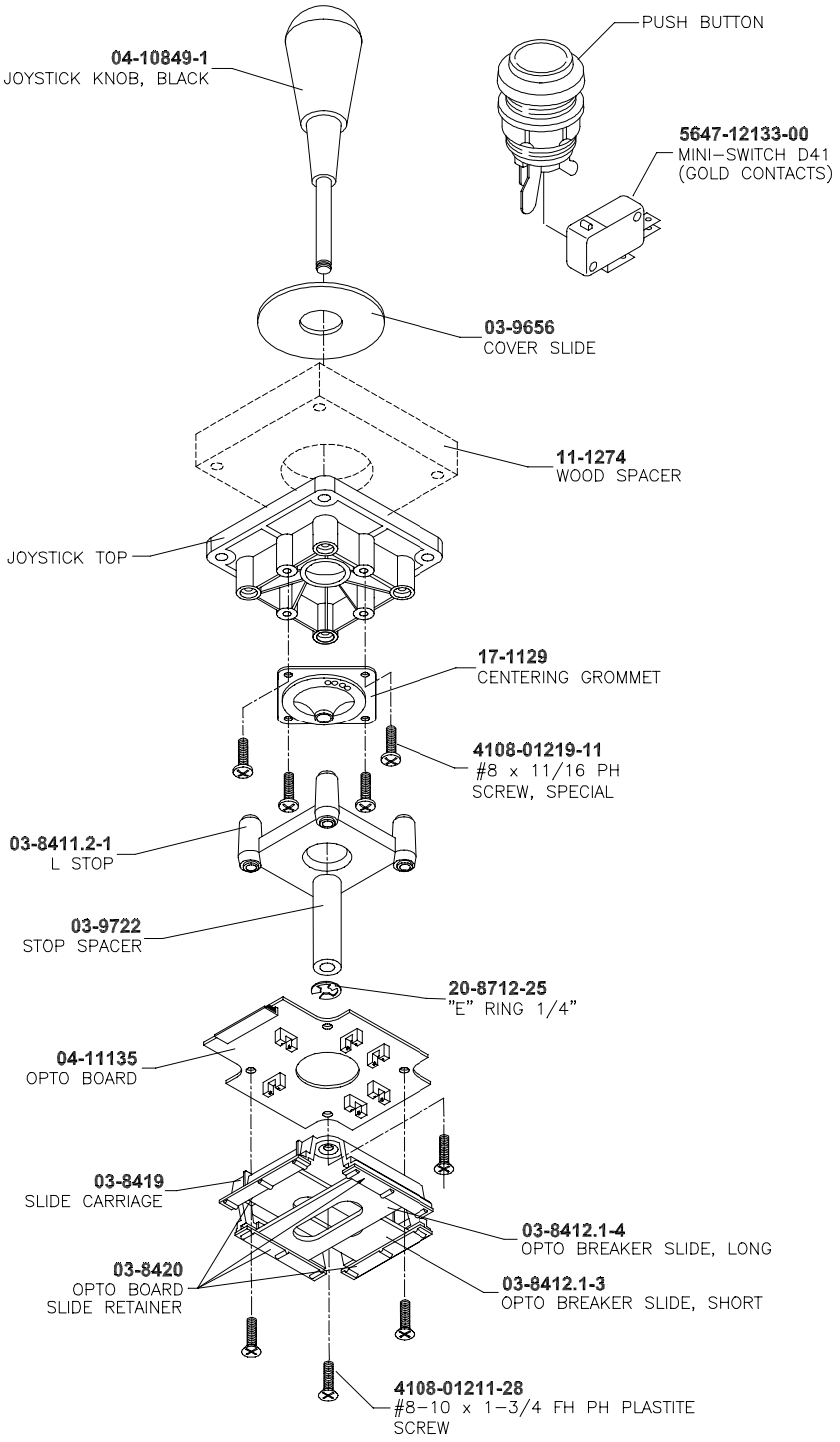



**PACKAGING DETAILS FOR KIT 15909**
***(NO PLAYER CONTROL PANEL)***

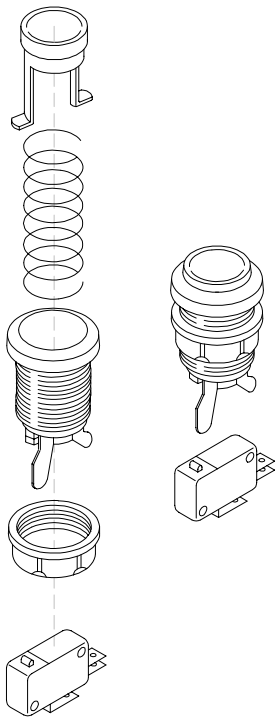
| | |
|---|---|
| | **NOTICE: PLAYER CONTROL PANEL.** Kit 15909 doesn't include a player control panel. Instead, you must convert or build a player panel. Midway Games offers a plug-and-play panel kit, including the housing. Your kit 15909 is 100 percent compatible with the optional player panel. If you want to order the optional panel, ask for kit 45494. |

## YOU'LL NEED THESE TOOLS AND SUPPLIES…

- ❑ Black, semi-gloss paint
- ❑ Electric drill and wood bit set
- ❑ Screwdrivers
- ❑ Liquid Soap (dish detergent)
- ❑ Grease pencil or marker
- ❑ 180 grit sandpaper or electrical sander
- ❑ Wood filler (putty, board, etc.)
- ❑ Electrical tape
- ❑ Small screw assortment
- ❑ Nut drivers or socket wrench set
- ❑ Razor knife
- ❑ Squeegee or soft sponge
- ❑ Soldering iron and solder
- ❑ Wire cutters
- ❑ Pliers
- ❑ Hole saw or equivalent




**JOYSTICK ASSEMBLY**



**PUSHBUTTON ASSEMBLY**

BLITZ 2000 PUSHBUTTON TABLE

| | | | |
|---|---|---|---|
| 20-10209-1 | SWITCH PUSHBUTTON | RED | B: PASS/CHANGE PLAYER |
| 20-10209-2 | SWITCH PUSHBUTTON | WHITE | TURBO |
| 20-10209-3 | SWITCH PUSHBUTTON | BLUE | A: JUMP/TACKLE |
| 20-10209-7 | SWITCH PUSHBUTTON | ORANGE | START |

SHOWTIME PUSHBUTTON TABLE

| | | | |
|---|---|---|---|
| 20-10209-1 | SWITCH PUSHBUTTON | RED | B: SHOOT/BLOCK |
| 20-10209-2 | SWITCH PUSHBUTTON | WHITE | TURBO |
| 20-10209-3 | SWITCH PUSHBUTTON | BLUE | A: PASS/STEAL |
| 20-10209-7 | SWITCH PUSHBUTTON | ORANGE | START |

# CONVERTING A TYPICAL VIDEO GAME CABINET

## PREPARE THE CABINET

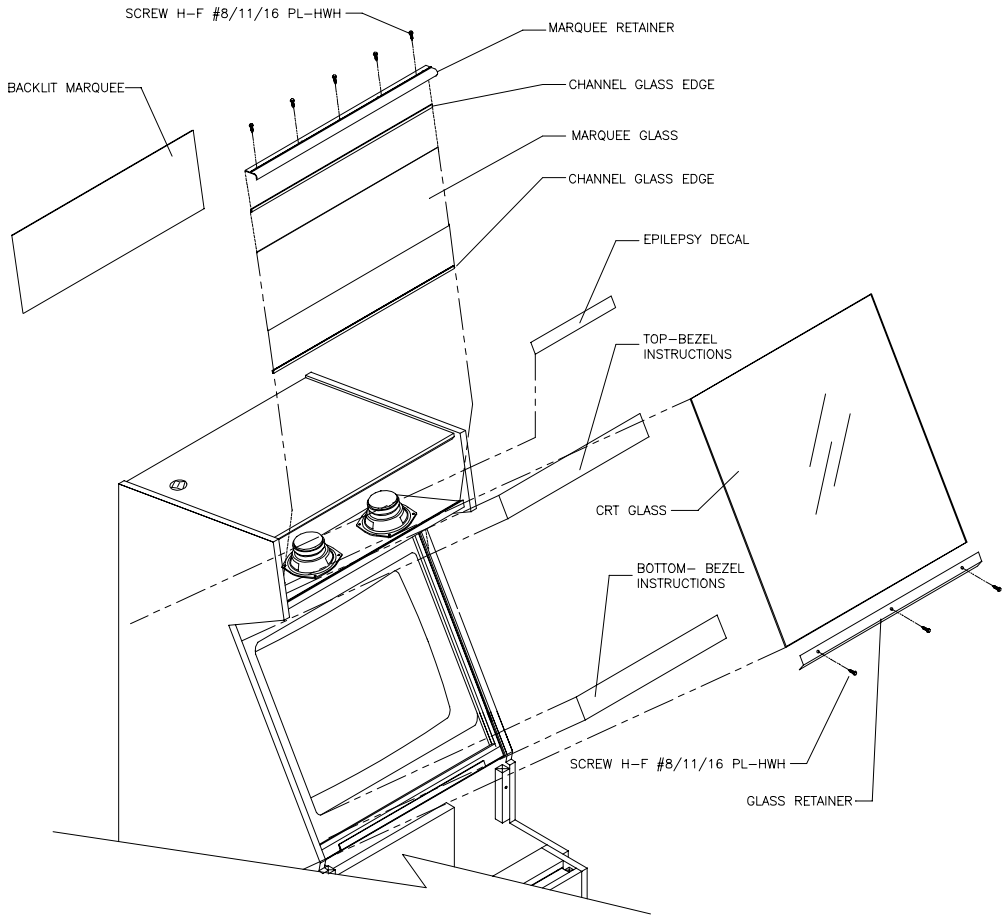
[ ] 1. Verify operation of the old VGM before making changes to the cabinet. Pay special attention to components that you will reuse. (Power supply, video monitor, currency acceptors, wiring harnesses, cabinet locks, lighted marquee, etc.)

[ ] 2. Switch off power to the VGM. Disconnect the line cord from the AC power. Clear the work area. Cover or protect non-wood items. (Marquee, monitor, coin door, brackets, line cord, etc.)

[ ] 3. Remove old decals and artwork from the cabinet sides. Clean off glue residue. Fill gouges, unused holes, etc. with quick-hardening wood putty. Sand smooth and remove dust.

[ ] 4. Evenly cover the entire cabinet with black paint. Allow the paint to dry completely before continuing.

[ ] 5. Pencil a line roughly at the top of the previous graphic. Lightly moisten the cabinet with soapy water. Remove the backing and apply the decal. Start at the top and work down. Working outward from the center of the decal, smooth down the decal. Take care to squeeze out air bubbles. If you can't remove a bubble, pop it with a knife or pin. Allow at least 12 hours for the adhesive in the decal to set.




[ ] 6. Remove the backlit marquee artwork from the old marquee on the VGM cabinet. Check the fluorescent tube. If you find cracks or darkened ends, replace the tube. Clean the inside of the marquee. Use the old marquee artwork as a guide, and trim the new artwork to size. Deburr the

edges of the new marquee artwork. Crease the new artwork as necessary to match the shape of the old artwork. Clean the new marquee artwork and the marquee glass. Install the new artwork on the VGM.

[ ] 7. Remove the viewing glass and set it in a safe place. Clean the CRT and monitor bezel. Locate the player moves and game-play instruction decals. Apply them to the top and bottom-front of the monitor bezel. Find the epilepsy warning label. Place this label on the top-front of the monitor bezel. Be sure that decals and labels don't obstruct the viewing area *Don't reinstall the viewing glass yet.*

[ ] 8. Remove and save the screws at the top and sides of the rear door. Unlock the rear door, and then lift it off of the cabinet and set it aside. Cover the VGM electronics. Use a vacuum cleaner to remove dirt or debris from inside the cabinet.

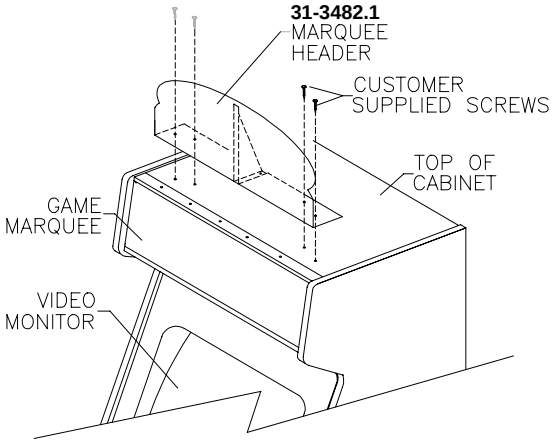
[ ] 9. Compare your player control panel to the player panel template. If the player panel and template match, then skip to the next step. Otherwise, proceed with the rest of this step. Locate the player panel latches or fasteners. Free the player panel from its operating position. Separate the control panel's earth ground (green) wiring from other control panel wiring. Cut cable ties as necessary to achieve this separation. Leave the earth ground (green) wiring in place. Disconnect and remove the remaining old wiring from the CPU Board and player controls. Remove the player panel and housing from the VGM cabinet. Save the mounting brackets and hardware for reinstallation later.

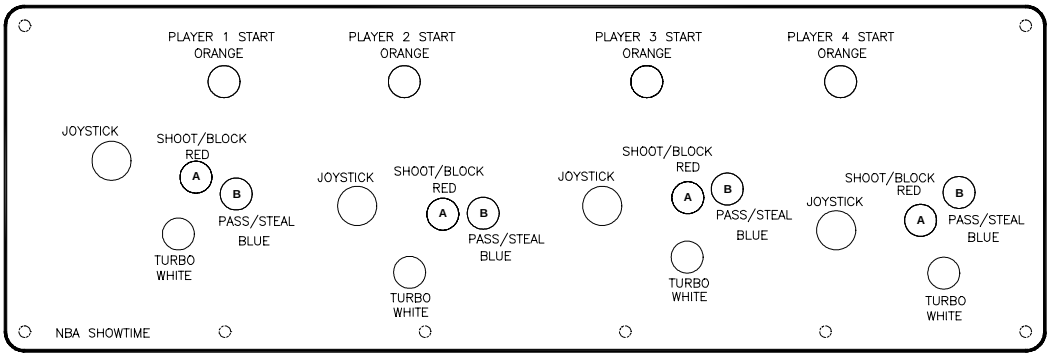
[ ] 10. Some cabinets have speakers on the player panel or other removable pieces of the cabinet. If you must disconnect speaker harnesses, mark the polarity and functions of the wires. Incorrectly phased speakers can cause weak low frequencies or a thin, hollow sound quality.

| | |
|---|---|
| | **NOTICE: FCC COMPLIANCE.** Installation of this kit into any existing product does not guarantee compliance with FCC requirements. You are solely responsible for FCC compliance for installations in other products. You must remove any existing FCC compliance label. Don't install a new label on the converted product until you have verified FCC compliance. |

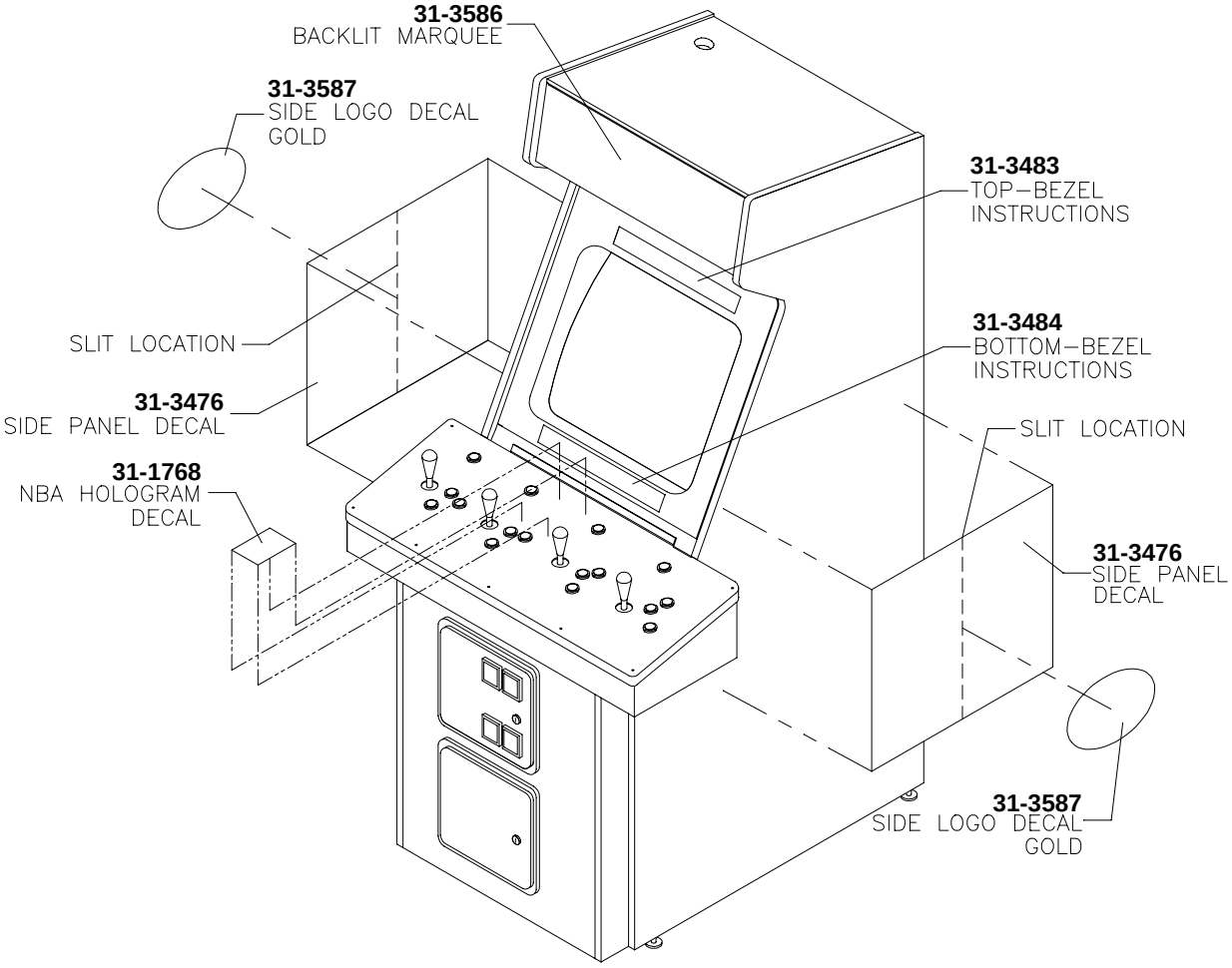
[ ] 11. Unfold the cardboard marquee header from your kit. Make sure that the triangular brace supports the middle of the marquee.

[ ] 12. Install the marquee header on top of the marquee. You must supply the four wood screws necessary for fastening down the marquee.






**PLAYER PANEL BUTTONS**




**TYPICAL DECAL MOUNTING DETAILS**

## INSTALL PLAYER CONTROLS

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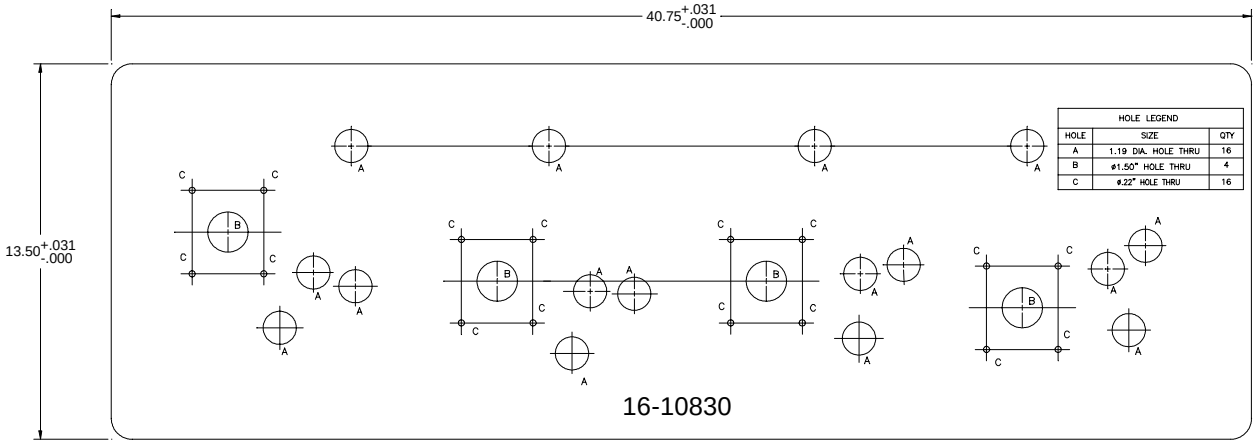
|---|---|
| | **NOTICE:** This isn't an actual-size drawing. Use the template to help you position and drill mounting holes. Don't attempt to substitute this drawing for the template. |



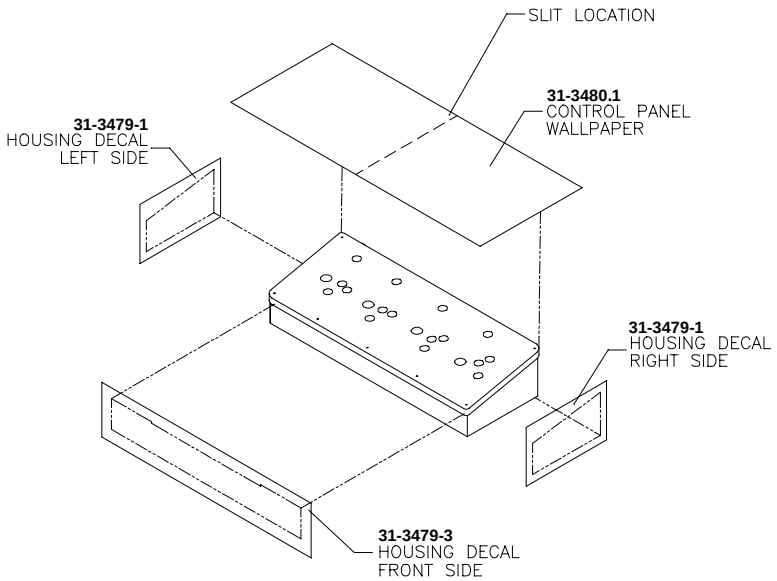

**PLAYER PANEL TEMPLATE 16-10830**

[ ] 1. If you're assembling both kit 15909 and optional player panel 45494, skip to Step 19. If you're assembling just kit 15909, proceed with the next step.

[ ] 2. Locate and unfold the player panel template. Temporarily stack newspapers, books, magazines, etc., on the template. The weight will flatten the template sufficiently for use.

[ ] 3. If necessary, remove buttons, joysticks and T-nuts from the old player panel and cabinet front. Remove the panel covering and artwork from the previous game. Remove and save hinges or mounting brackets.

[ ] 4. If necessary, fill the old player panel holes with wood, putty, glue, etc. Allow adequate time for materials to dry. Sand or file the player panel to a flat surface on both sides.



[ ] 5. Place the player panel face down on top of the clear plastic cover. Center the player panel. Mark the outside shape of the panel on the cover. Also mark hole locations. Remove the player panel and set it aside. Cut and deburr holes for player panel buttons. Trim the cover to panel shape.

[ ] 6. Lightly moisten the cabinet with soapy water. Remove the backing from the wallpaper decal. Apply the decal to the player panel. Start at the top and work down. After you've positioned the decal, smooth it outwards. Take care to squeeze out air bubbles. If you can't remove a bubble, pop it with a knife or pin. Then smooth the bubble down. Allow the decal adhesive to set.

[ ] 7. Use a sharp knife to trim edges and cut holes for player panel buttons. Position control decals next to the appropriate hole locations. Allow the decal adhesive to set.

[ ] 8. Install the NBA hologram decal on the player panel.

[ ] 9. Install the plastic cover over the decals and panel. Attach the cover and deburr the edges. Group player controls by color (orange, red, blue and white). Joysticks are black. You must disassemble controls for panel mounting.

[ ] 10. Separate the switch from the orange PLAYER 1 START (left START) button. Bend the large prong away from the switch just enough to slide the switch off the housing. Unscrew the nut from the housing. Insert the button housing through its hole from the player panel's front. Screw the nut finger-tight onto the switch housing from the panel back. Rotate the housing so that switch terminals face the panel center. Tighten nuts firmly. Snap the switch back onto the housing.

[ ] 11. Repeat the previous step with the other three start buttons.

[ ] 12. Consult this chapter's illustration *Player Panel Buttons*. Install the other buttons.

[ ] 13. Tighten the pushbutton nuts firmly. Replace player panel components and hardware that you removed earlier.

[ ] 14. Measure the thickness of the player panel. If it is less than ½ inch (13 mm), use wooden spacers to recess the joysticks below the surface. Thicker player panels don't require wooden spacers.

[ ] 15. Install a carriage bolt in each small hole near each joystick opening. If the player panel is thin, place wood spacers over the carriage bolts. The spacers correct joystick-mounting depth.

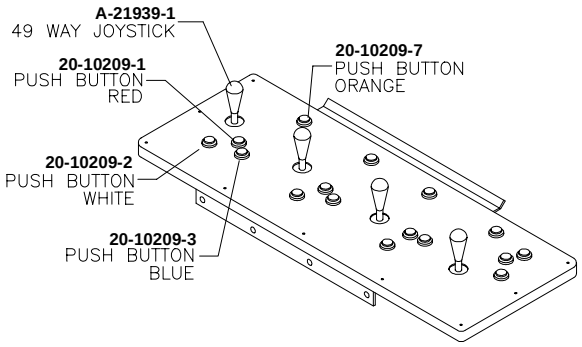
[ ] 16. Invert one joystick. Remove the "E"-ring from the shaft. Remove the handle and plastic ring (large washer) from the joystick base. *The bushings must remain in the base*. The top of the joystick base fits against the bottom of the player panel (or spacer, if used). Orient the connector toward the START buttons. Align mounting holes. Attach the base to the player panel bottom. Slide the plastic ring around the shaft so that the rough side is beside the knob handle. Slide the shaft through the player panel and base. Replace the "E"-ring. Repeat this step for the remaining joysticks.

[ ] 17. Locate the I-40 Joystick Interface Board. Insert a plastic spacer into the bottom of a mounting hole. Press the spacer to seat it fully. Repeat this procedure until all spacers attach to the board.

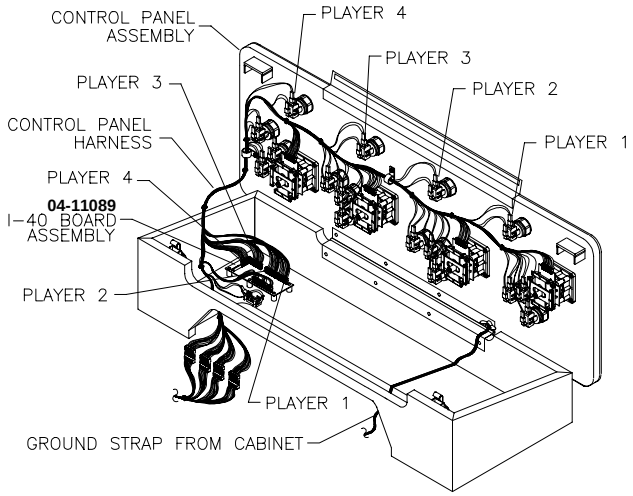
[ ] 18. Place the I-40 Interface Board inside the player panel housing. See the housing drawing. Position the I-40 Board near the housing's right side. Assure that controls don't hit components when you open and close the panel. Leave space above and beside board connectors for mating connectors. Mount the I-40 Board with a screw through each plastic spacer.

[ ] 19. The completed player panel should now resemble the illustration below. Install the modified panel housing onto the cabinet with the original mounting hardware. Firmly tighten fasteners.

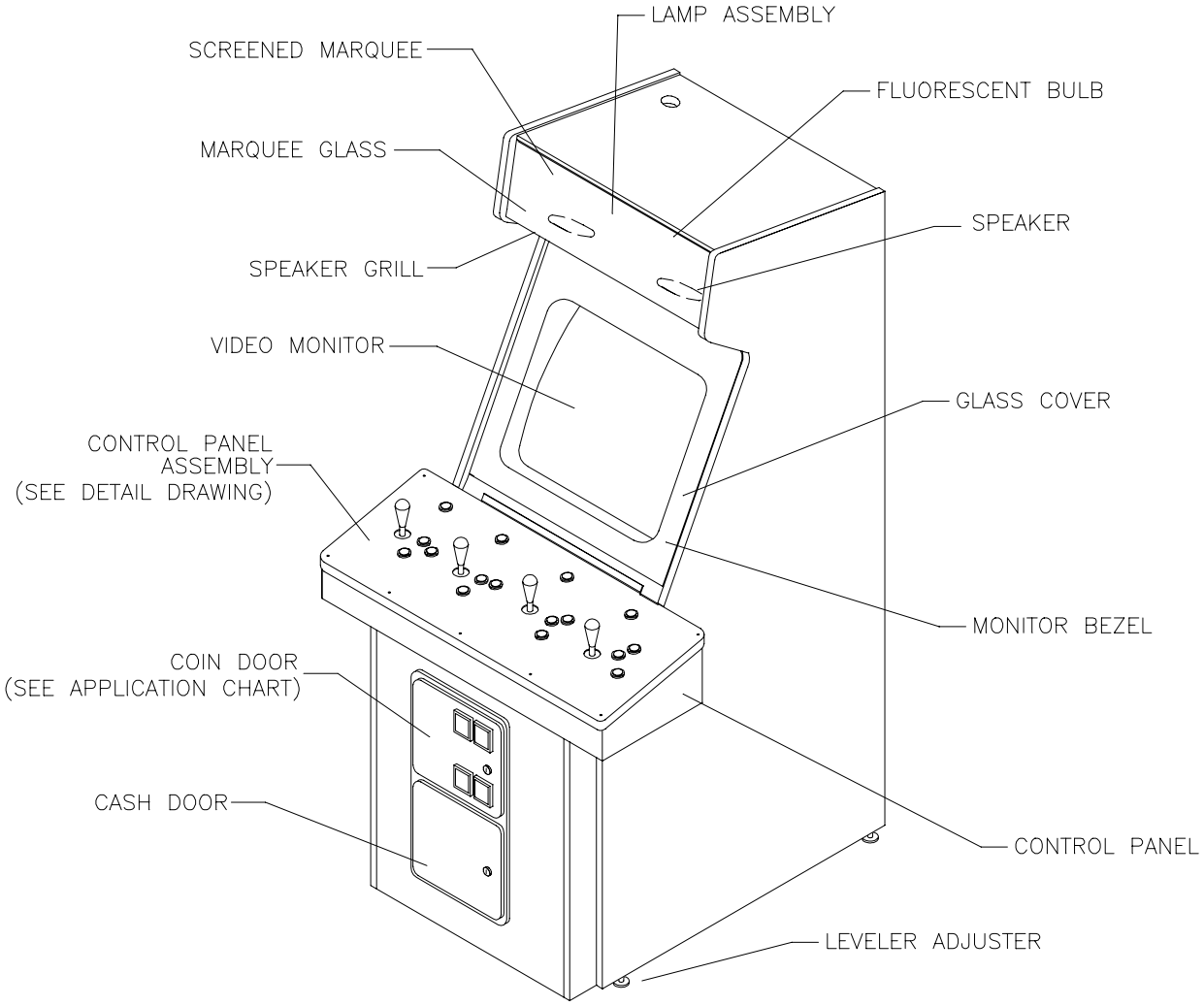
[ ] 20. Install the side and front player panel decals onto the player panel housing.




**TYPICAL MODIFIED PLAYER PANEL**




**TYPICAL PLAYER PANEL HOUSING**




**TYPICAL COMPLETED CABINET**

## INSTALL ELECTRONICS TRAY COMPONENTS

| | |
|---|---|
| | **CAUTION:** Board set electronic components are static sensitive. Prepare an anti-static work area. Ground yourself before removing circuit boards from their protective shipping materials. |
| | **WARNING:** Don't connect cables to the circuit boards or power supply when the power is on. Otherwise, you'll damage VGM electronics and void your warranty. |
| | **CAUTION:** Hard disk drives are fragile. Don't stack or drop hard disk drives. |
| | **NOTICE:** If your monitor requires positive sync, remove jumper J2 on the SIO Board. |

[ ] 1. Switch off power and disconnect the line cord from AC line voltage. Disconnect cables from the VGM's printed circuit boards. Remove the old printed circuit boards. If your VGM includes a disk drive or drive mounting plates, remove them. Store these items in anti-static packaging from new components.

[ ] 2. You can attach the new electronics directly to a cabinet wall or to a separate panel. If the cabinet doesn't have a suitable surface, install a wood piece approximately 8 inches (20 cm) from the rear door.

[ ] 3. Unpack the Electronics Tray and place it on a flat work surface. Take note of the Banshee Video Board, which is bolted to the Electronics Tray. The Banshee Video Board is a small, rectangular circuit card. You'll notice a steel header bracket at one of the Video Board's short ends.

[ ] 4. Unpack the three, unmounted circuit boards and position them over the Electronics Tray.

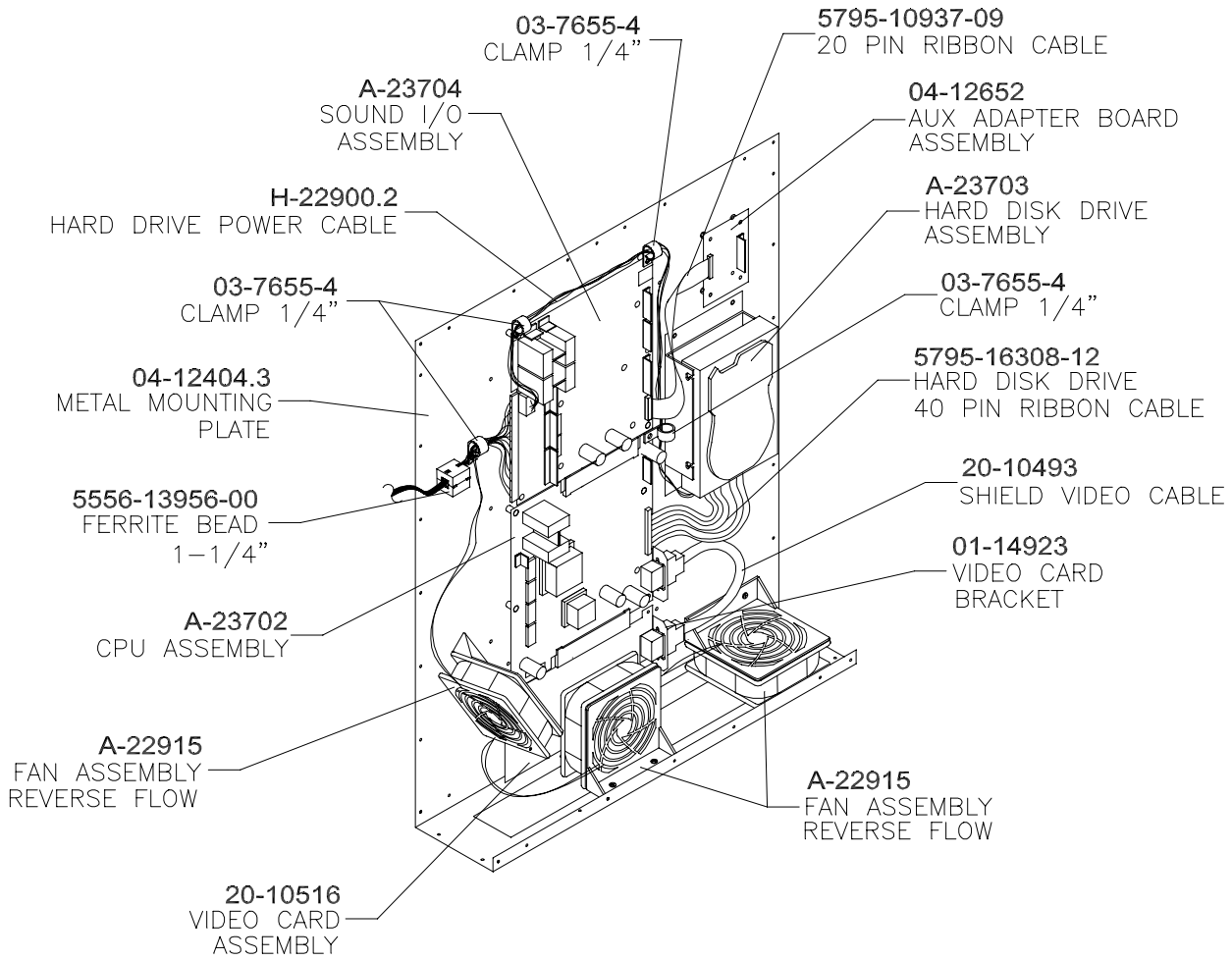
[ ] 5. Find the CPU Board. The CPU Board is a roughly square board, and has a seven-segment LED display. In the center of the CPU Board are two large, heat-sinked ICs. Position the CPU Board's 15-pin connector beside the Video Board's header bracket. Then plug the CPU Board into the Banshee Video Board.

[ ] 6. Find the Sound I/O Board. The Sound I/O Board is a roughly square board, with a JAMMA connector on one side. This board also includes the VGM's DIP-switch banks. Plug the Sound I/O Board into the CPU Board.

[ ] 7. Align circuit board mounting holes with standoff posts on the Electronics Tray. Mount the circuit boards to standoffs with 8-32 Phillips pan head screws.

[ ] 8. Find the Auxiliary Output Adapter Board. This is a small, rectangular board, with two connectors. It doesn't plug into any of the other boards. Notice the ribbon connector on the side of the Auxiliary Output Adapter Board. Position this connector close to the Sound I/O Board. Screw the Auxiliary Output Adapter Board to standoff posts on the Electronics Tray.

[ ] 9. The factory installed the fans for you. They reside beneath the board set and hard drive. If you mounted the boards vertically, the fans should blow upward, across the electronics. You'll want to check the airflow later. (For now, check fan markings that indicate airflow direction.)




**TYPICAL ELECTRONICS LAYOUT**

## WIRE THE CIRCUIT BOARDS

| | |
|---|---|
| | **NOTICE:** You must install the Main (JAMMA) Wiring Harness supplied with this conversion kit. This VGM's 49-way joysticks require wires and circuits not found in earlier VGMs. If the connectors in your cabinet don't fit onto the CPU Board or wire colors don't match the JAMMA Chart, contact your authorized distributor for assistance. |
| | **CAUTION:** Insulate unused wires within the JAMMA cable, especially red, yellow, orange and black power wires. Secure unused connectors away from the CPU Board and its cover. |
| | **CAUTION: ATTACH CONNECTORS PROPERLY.** Be sure that printed circuit board (PCB) connectors mate properly. If connectors don't slip on easily, don't force them. A reversed connector may damage your VGM and void the warranty. Connector keys allow a connector to fit only one set of pins on a board. |

[ ] 1. Connect the shielded video cable between Video Board jack J4 and CPU Board plug P4. Your video monitor requires either positive or negative sync. If necessary, add or remove the video sync jumper at SIO Board jumper block J2. The default mode is positive sync (no jumper between pins 1 and 2). For negative sync, jump pins 1 and 2.

[ ] 2. Locate disk drive power cable H-22900.2. (This cable has separate wires and plastic connectors at each end). Attach the power cable to SIO connector P3 (near a large heatsink). Mate the plug and jack. Press them firmly to seat contacts. *The connector is keyed. Don't use excessive force.*

[ ] 3. The disk drive power cable includes three plugs for the fans. Connect these plugs to the fans.

[ ] 4. Secure hard disk drive and fan cables with three cable clamps from the kit. Attach the cable clamps to standoffs at three corners of the SIO Board. Use the board's mounting screws to fasten the clamps to the standoffs: Position the first clamp near the SIO Board's large heatsink. Position the second clamp directly across from the first, near the Auxiliary Adapter Board. Position the third clamp near the hard drive.

[ ] 5. Locate the hard drive data cable, a ribbon cable. Orient the data cable connector over CPU Board plug P5. Align the connector's striped edge with Pin 1, near the video connector. (The stripe may be red, blue or another color.) Mate the connector halves. Press them firmly to seat contacts.

[ ] 6. Connect the Main Harness to the SIO Board edge (JAMMA). This cable has wires for the coin door, control buttons, I-40 Joystick Interface Board, speakers, video monitor, power supply, and so forth. Insulate and secure all extra wires (unused slam tilt switch, coin meter, etc.).

[ ] 7. Search through the Main Harness for the Player 4 and Player 3 cables. Player 4 has gray wires with stripes. Player 3 has blue wires with colored stripes. Connect Player 3's plug to SIO Board jack P14, and Player 4's plug to P7.

[ ] 8. Find the coin door power connector. (Look for the black, red and orange wire bundle.) Attach this connector to plug P23 on the SIO Board.

[ ] 9. Search through the Main Harness for the six-pin monitor connector. Plug this into your monitor.

[ ] 10. Connect the Main Harness to the Aux Out Adapter Board at connector P1.

[ ] 11. Connect the 20-pin ribbon cable to the Aux Out Adapter Board at jack P1. Connect the other end of this ribbon cable to SIO Board at jack P15.

## MOUNT THE ELECTRONICS TRAY

[ ] 1. Set the electronics against the wood panel. Use the tray as a template to mark mounting hole locations. *(If you plan to mount the electronics vertically:* Orient the Electronics Tray so that its long edges are vertical and large heatsinks are at the top.)

[ ] 2. If necessary, drill pilot holes for mounting screws. Use sheet metal screws to secure the Electronics Tray to the cabinet. Attach the tray with only four corner screws. *Don't use excessive force.*

[ ] 3. Remove the hard drive from its package. Locate the hard drive mounting bracket. Set the drive in the mounting bracket. Align screw holes and install the 6-32 screws with spring washers.

[ ] 4. Orient the drive and drive mounting bracket over threaded studs on the Electronics Tray. Align the holes. Attach the bracket with 8-32 KEPS® nuts.

[ ] 5. Temporarily hold the perforated metal cover over the electronics. Be certain that cover mounting holes are accessible. Relocate the plate if necessary. Don't install the metal cover yet.

[ ] 6. Locate the data and power connectors on the hard drive. Connect the free end of the hard drive power cable to the disk drive. Mate the plug and jack. Press them firmly to seat contacts. *Don't use excessive force.*

[ ] 7. Position the striped edge of the hard drive data cable by the power cable. Attach the cable to the drive's data connector. *The data connector is keyed. Don't use excessive force.*

## WIRE THE CABINET

**Kit 15909, Without Optional Player Panel 45494…**

**NOTICE:** This player panel uses 49-way joysticks and an I-40 Joystick Interface Board (input-multiplexer circuit). The VGM requires additional wiring harnesses. These items must be field installed to customize the unit for each kit.

[ ] 1. Locate cable H-22785. This cable includes a fuse for protection of the Joystick Interface that mounts in the player panel housing. This cable must be mounted in the player panel housing. Remove the fuse from the fuse holder and retain it for reuse.

[ ] 2. Open the player panel. Place the fuse holder beside the wall of the player panel housing. Attach the fuse holder with a #6 short sheet metal screw (not supplied). Reinstall the fuse in the holder.

[ ] 3. Connect cable H-22785 between the I-40 Joystick Interface Board and each joystick. Player 1 wire colors are mostly white, Player 2 wires are violet, Player 3 are blue, and Player four are gray. The I-40 connectors are User 0 (Player 1), User 1 (Player 2), User 2 (Player 3), and User 3 (Player 4). *This VGM doesn't use the User 4 connector*. Consult the Cabinet Wiring Diagram, and connect the cable wires to the switches. Secure wiring with a cable clamp and cable ties.

[ ] 4. Connect the Common terminal of each button on the panel with a black wire. Join this wire with the black wire from the cable. Connect the Normally Open terminals to each of the switch wires.

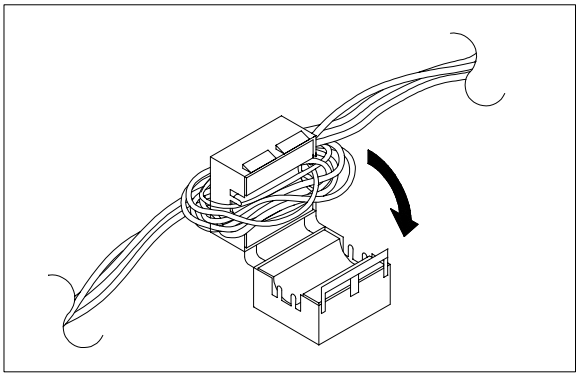
**All Kits…**

**CAUTION:** *Prevent electrical fires and power supply damage!* When attaching JAMMA pigtails to the power supply, maintain fusing from the original VGM wiring. If a line was fused before, then the new line must have a fuse, too.

[ ] 5. See the Cabinet Wiring Diagram. Connect your power supply to the pigtail leads from the Main (JAMMA) Harness. Red wires connect to +5 volts DC. Yellow wires connect to -5 volts DC. Orange wires connect to +12 volts DC. Black wires connect to ground. If necessary, solder the appropriate connector onto the Main Harness, or design your own adapter. Thoroughly insulate soldered or pigtail connections.

[ ] 6. Connect cabinet speakers to the pigtail leads from the Main Harness. Red-gray and brown-gray wires connect to the left speaker. Red-white and brown-white wires connect to the right speaker. To eliminate serious distortion, be sure to phase the speakers properly. With either speaker, connect the red wire to the speaker's positive phase terminal. On many speakers, a dot marks this terminal. To test for positive phase, connect a 1.5-volt battery to the speaker and observe the cone. If the cone moves inward, reverse the battery leads. When the cone moves outward, the positive battery lead connects to the positive phase terminal. Mark this terminal with a dot.

[ ] 7. Locate the square, split ferrite bead. The factory has installed one ferrite bead around DC power conductors (solid color heavy gauge wires with pin numbers 1-6 or A-F). A second bead encircles player panel conductors (striped color lighter gauge wires). Install the remaining ferrite beads on the video monitor cable and power supply wires. The video cable bead should trap a loop of cable. Place all beads as close to the JAMMA connector as possible. Then close and lock each bead. Assure that no wires are pinched or caught in the latches.



**LOOP VIDEO CABLE THROUGH BEAD**

[ ] 8. Locate the central power ground point for the cabinet. (Ground wires are usually green. Some may have a yellow stripe.) Assure that the previously installed ground wire from the controller port still connects to the same central point. Reconnect ground wires that you loosened or removed in previous steps (monitor, player panel, coin door, etc.).

[ ] 9. Find the electronics cover. Install plastic grommet RM-37-11 over the aperture where cables pass through the cover. This grommet part is a tough, plastic sleeve. It protects your fingers and your cables from the cover's sharp, metal edge.

[ ] 10. Locate the sheet metal screws from the kit. If necessary, drill pilot holes for the screws. Install the electronics cover. Insert a screw in every mounting hole. Fasten the Electronics Tray to the cabinet. Tighten the screws firmly. Take care not to pinch wires.

[ ] 11. Connect your coin door switches to the pigtail leads from the Main Harness. If your cabinet doesn't include diagnostic switches, you may add them now. (These momentary switches speed up routine service calls.) Refer to the cabinet wiring diagram in Chapter Five. Thoroughly insulate soldered or pigtail connections.

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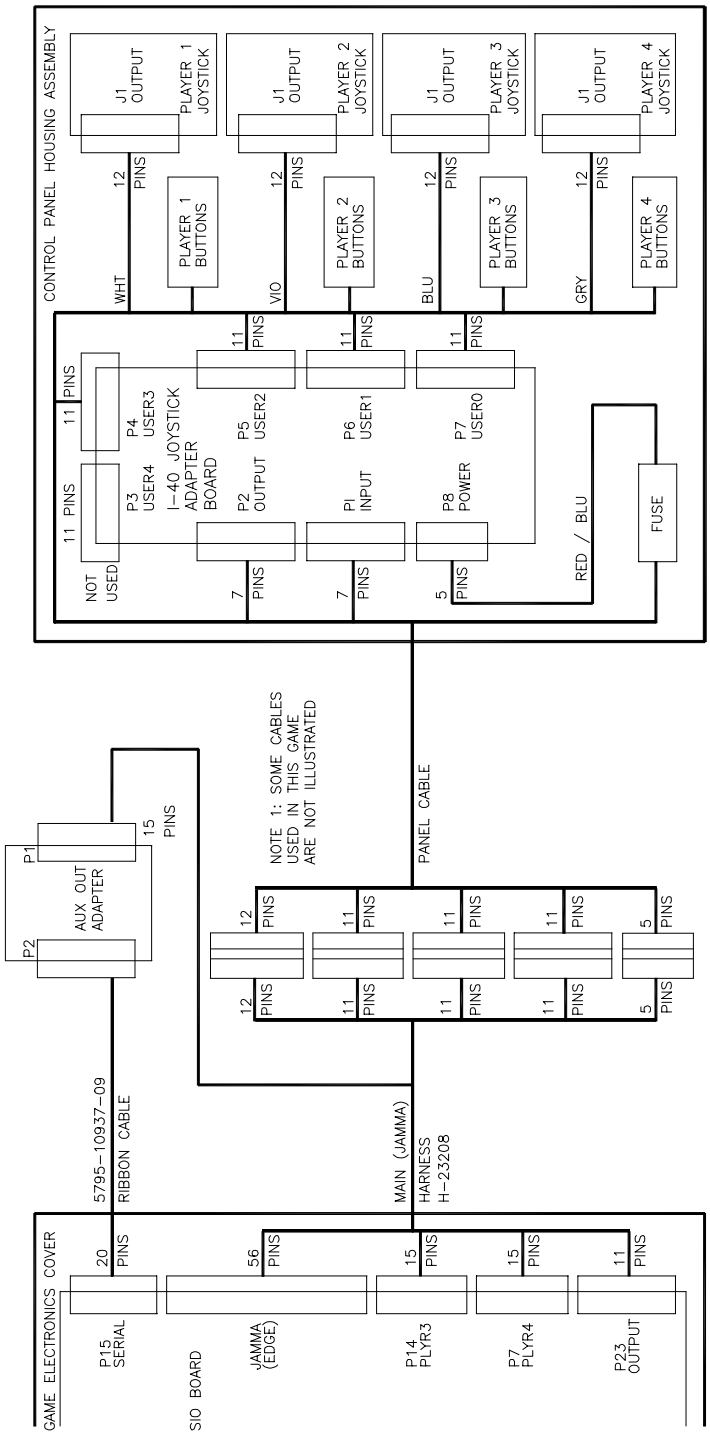
| | **NOTICE:** You can order the diagnostic switch bracket and switches as Midway part number A-19542-1. |
| | **NOTICE: IF YOU'RE INSTALLING A BILL VALIDATOR,** set the validator for 1 pulse per dollar. Also adjust the pulse width setting. The validator must generate pulses with these timing parameters: 50ms on (minimum) and 50ms off (minimum). |

## CHECK YOUR CABLING JOB

[ ] 1. Carefully inspect cables between peripherals and the board set. The main wiring harness edge connector (JAMMA) attaches to the SIO Board.

[ ] 2. The hard drive data (ribbon) cable connects the hard drive to CPU Board jack P5. Be sure that you've also connected the hard drive power connector to power cable H-22900.2. The other end of this cable should connect to the SIO Board at P3.




**CABLE BLOCK DIAGRAM**

[ ] 3. The Player 3 connector (blue wires) attaches to the SIO Board at P14. The Player 4 connector (gray wires) attaches to the SIO Board at P7. This connector links SIO circuits to the I-40 Joystick Interface Board.

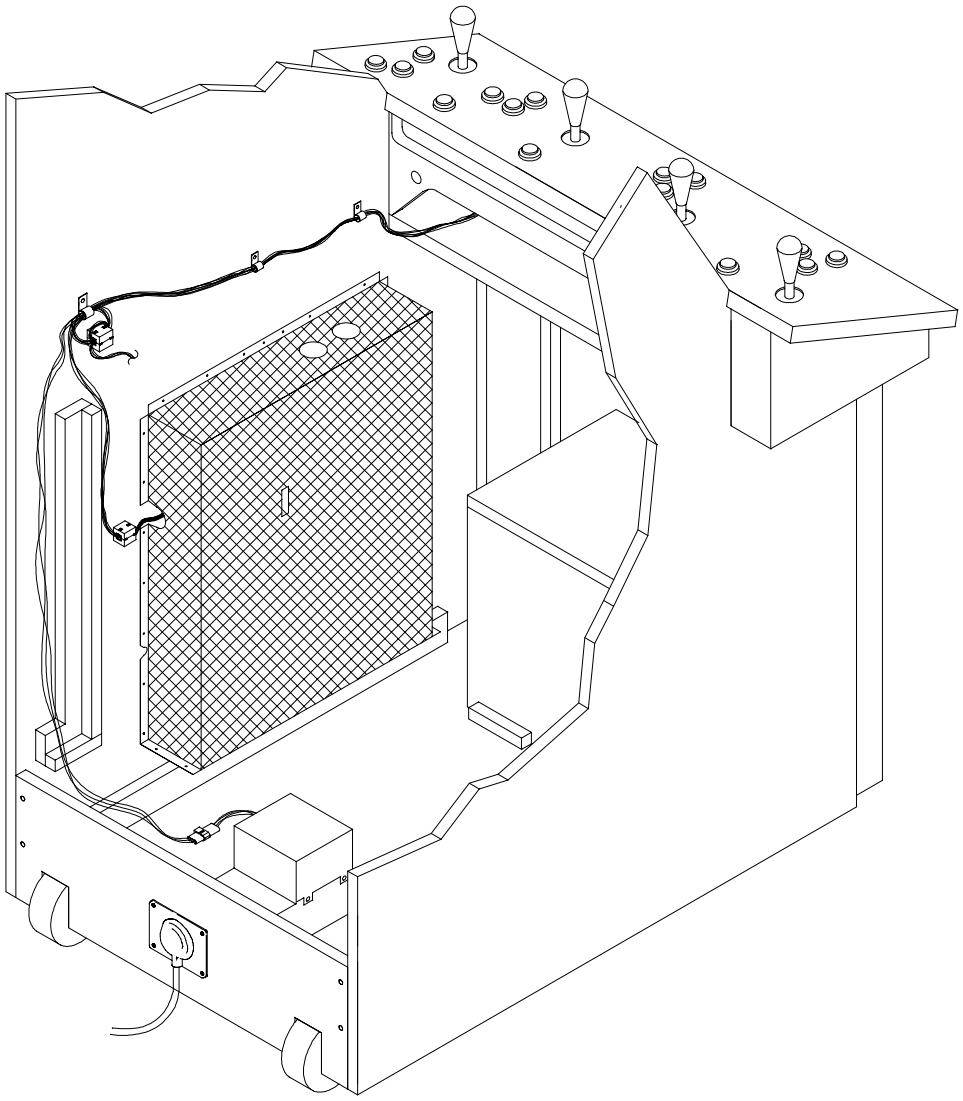
[ ] 4. Open the player control panel and locate player panel cable H-22785. This cable connects to the joysticks, switches, fuses, and I-40 adapter. Connectors designated Player 1 (mostly white wire colors) and Player 2 (violet) mate with the same color cables from the main harness. Player 3 (blue) and Player 4 (gray) connectors mate with the same color cables from the main harness. Power connectors (red and black) from player panel fuses mate with the same color cable from the main harness.

[ ] 5. Check wiring to the Auxiliary Output Adapter Board against instructions in *Wire the Cabinet.* The block diagram below also depicts this wiring.

[ ] 6. A shielded cable should join Video Board jack J4 and CPU Board plug P4.

[ ] 7. Have you connected the monitor to the Main Harness?

[ ] 8. Assure that you've reinstalled all fuses. Check that you've set DIP switches correctly (Chapter Three).



**TYPICAL REAR VIEW OF COMPLETED CABINET**

## POWER UP AND TEST THE VGM

[ ] 1. Plug the power cord into the AC line and turn on the VGM. Circuit board indicators should illuminate.

[ ] 2. The VGM system loads the program and begins self-diagnostics. If the system doesn't find any errors, the system automatically enters its Attract Mode. If problems occur, check wiring and troubleshoot the machine.

[ ] 3. Unlock and open the coin door. Press and hold the TEST MODE button until the Menu System appears on the screen.

[ ] 4. Select MONITOR SETUP at the Diagnostics Menu. Confirm proper video display operation and adjust the monitor as necessary.

[ ] 5. Select DISK TESTS at the Diagnostics Menu. Run all the tests in order to verify correct drive operation.

[ ] 6. Select SWITCH TESTS at the Diagnostics Menu. Check to be sure that all control switches work.

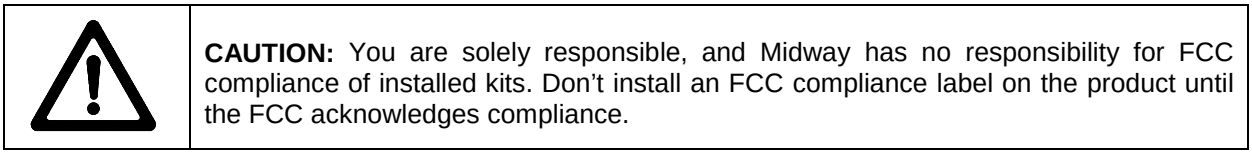
[ ] 7. Select DIP-SWITCH TESTS at the Diagnostics Menu. Verify that all switches are set to optimum positions for this VGM.

[ ] 8. Select SPEAKER TEST at the Diagnostics Menu. Verify operation of audio system components.

[ ] 9. Select EXIT at the Main Menu. The system should enter Game-Over Mode. Open the coin door and press the SERVICE CREDITS button to allow game play. Choose a joystick and press the START button to begin play. Listen to the audio while playing the game. Note sound irregularities (phase problems, no low frequencies, mono audio from stereo speakers, etc.). Check the wiring harness for internal shorts or strapped connections.

[ ] 10. Close and lock the coin door. Replace the rear cabinet door. Allow the system to operate for several hours before attempting any game changes.

[ ] 11. After you confirm proper operation, submit the VGM for FCC or other agency approval.



**CAUTION:** You are solely responsible, and Midway has no responsibility for FCC compliance of installed kits. Don't install an FCC compliance label on the product until the FCC acknowledges compliance.