



Need for Speed™ Underground **Motion Deluxe**

Operation & Service Manual

040-0129-01 Rev. B

- **Read this manual before use.**
- **Keep this manual with the machine at all times.**



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Table of Contents

Preface.....	4	Chapter 5 — Service and Repair.....	30
Safety.....	4	General Precautions.....	30
Warnings.....	5	Routine Inspection Schedule.....	30
Environmental Conditions.....	5	Opening the Back of the Display Cabinet.....	32
FCC Notices (United States).....	5	Servicing the Motion Base.....	32
Chapter 1 — Introduction.....	6	Opening the Bellows (Skirt).....	32
Specifications.....	7	Replacing the Bellows (Skirt).....	32
Motion Base Specs.....	7	Motor and Potentiometer Calibration.....	32
Display Cabinet Specs.....	7	Potentiometer Assembly Replacement.....	34
Chapter 2 — Installing a New Cabinet.....	8	Push Rod Assembly Replacement.....	34
Installation Kit.....	8	Motor Drive Box Replacement.....	35
Unpacking the Motion Base.....	8	Force-Feedback Steering System Service.....	36
Unpacking the Display Cabinet.....	8	5 K Ω Steering Pot (Potentiometer)	
Precautions for Installation.....	8	Replacement.....	37
Cabinet Set-Up Procedure.....	9	Force-Feedback Belt or Steering Motor	
Connecting Coin Tower to Motion Base.....	9	Replacement.....	37
Connecting Display Cabinet to Motion Base.....	9	Force-Feedback PCB Replacement.....	38
Game Test Procedure.....	10	Driving Control Panel Button Service.....	38
Linking Multiple Games.....	11	Six-Speed Shifter and E-Brake Service.....	39
Checking the Game Dongle.....	12	Six-Speed Shifter Replacement.....	39
Chapter 3 — Playing a Game.....	13	Six-Speed Shifter Micro Switch Service.....	39
Starting the Game.....	13	Shifter Bottom Plate Replacement.....	40
Game Play.....	14	E-Brake Button Service.....	40
Modes of Play.....	15	Audio Amp and Speakers Service.....	40
Chapter 3 — Operator Menu and Game		Audio Amp PCB Replacement.....	41
Setup.....	16	Front (Marquee) Speaker Replacement.....	41
Navigating the Operator Menu Screens.....	16	Rear (Seat) Speaker or Subwoofer	
Machine Information Menu.....	18	Replacement.....	41
Game and Coin Options Menu.....	19	Computer Replacement.....	42
Reset Stats/Settings Screen.....	20	Cold-Cathode Florescent Light Service.....	42
Accounting Screens.....	21	Tear-Down Procedure.....	43
Current Location Income Screen.....	22	Repacking the Motion Base.....	43
Game Statistics Screens.....	22	Repacking the Display Cabinet.....	43
Play Control Test Screen.....	23	Setting the Computer BIOS (CMOS).....	44
Monitor Calibration Screen.....	24	Chapter 6 — Troubleshooting.....	46
Sound Test.....	25	General Troubleshooting.....	46
System Test.....	26	Video Troubleshooting.....	47
Link Status.....	27	Audio Troubleshooting.....	48
Registration Options.....	27	Control Troubleshooting.....	48
Chapter 4 — Software Restoration.....	28	Cabinet Linking Troubleshooting.....	50
Run the System Recovery CD.....	28	Motion Base Troubleshooting.....	51
Run the InstaCal CD.....	28	Chapter 7 — Drawings & Schematics.....	53
Enable InstaCal.....	29	LIMITED WARRANTY.....	65
Run the Game Install CDs.....	29	Warranty Service.....	65
		Technical Support.....	66

List of Figures

Figure 1. Securing the Interconnect Bridge	10	Figure 25. Replacing Button Lamps	39
Figure 2. AC Power Plate	10	Figure 26. Shifter Pattern and Micro Switch	
Figure 3. Linking Cabinets Without		Actuation	39
Broadband	11	Figure 27. Audio Amp Connections, Volume	
Figure 4. Checking Link Status	12	Adjustment, and Speaker Locations	40
Figure 5. USB Game Dongle	12	Figure 28. Cold-Cathode Florescent Light	
Figure 6. Selecting Track and Car Options	13	(CCFL)	42
Figure 7. Driving Screen Functions	14	Figure 29. Motion Control System Simplified	
Figure 8. Setting Cabinet Volume	16	Block Diagram	53
Figure 9. Game Operator Menu Flowchart	17	Figure 30. Display Cabinet Components	54
Figure 10. Machine Information Screen	18	Figure 31. Cooling Fan Locations	55
Figure 11. Game and Coin Options Screen	19	Figure 32. Motion Base with Seat and Coin	
Figure 12. Reset Stats/Settings Menu	20	Tower	56
Figure 13. Accounting Info Screens	21	Figure 33. Control Panel Detail	56
Figure 14. Current Location Income Screen	22	Figure 34. Cabinet Artwork	57
Figure 15. Game Stats Menu Screens	22	Figure 35. Motion Base Components Photo	57
Figure 16. Play Control Test Screen	23	Figure 36. Motion Base Components	58
Figure 17. Monitor Calibration Test Screen	24	Figure 37. Motion Drive Components	59
Figure 18. Sound Test Screen	25	Figure 38. Motor Assembly	60
Figure 19. System Test Screen	26	Figure 39. Six-Speed Shifter Exploded View	
Figure 20. Cabinet Link Status Screen	27	and Parts	61
Figure 21. Motor Pot Detail	33	Figure 40. Simplified Wiring—Driving	
Figure 22. Force-Feedback Steering System		Controls	62
Harnessing Diagram	36	Figure 41. Detailed Wiring—Driving Controls	63
Figure 23. Replacing the 5 K Ω Steering Pot	37	Figure 42. Computer Rear Panel Diagram	64
Figure 24. Servicing the Steering Motor	38		

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Preface

Safety

Please read this page before preparing your arcade cabinet for game play.

The following safety instructions apply to all game operators and service personnel. Specific warnings and cautions will be included throughout this manual.

Use the following safety guidelines to help protect the system from potential damage and to ensure your personal safety:

- Make sure that the switch on the back of the computer is set to match the AC power in use at your location:
 - 1.1 115 volts / 60Hz in most of North and South America and some Far Eastern countries such as Japan, South Korea and Taiwan
 - 1.2 230 volts / 50Hz in most of Europe, the Middle East and the Far East
- To help prevent electric shock, plug the system into a properly grounded power source. These cables are equipped with 3-prong plugs to help ensure proper grounding. Do not use adapter plugs or remove the grounding prong from a cable. If you must use an extension cable, use a 3-wire cable with properly grounded plugs.
- To help protect your system from sudden increases and decreases in electrical power, use a surge suppressor, line conditioner or Uninterruptible Power Supply (UPS).
- Be sure nothing rests on the system's cables and that the cables are not located where they can be stepped on or tripped over.
- Keep your system far away from radiators and other heat sources.
- Do not block cooling vents.

Precautions for Game Operation

- To avoid injury and accidents, people who fall under the following categories should not play the game:
 - 1.3 Those who need assistance when walking.
 - 1.4 Those who have high blood pressure or a heart problem.
 - 1.5 Those who have experienced muscle convulsions or loss of consciousness when playing a video game or similar activities.
 - 1.6 Those who have trouble in the neck or spinal cord.
 - 1.7 Intoxicated persons.
 - 1.8 Pregnant women.
 - 1.9 Persons susceptible to motion sickness.
 - 1.10 Persons who do not abide by the warning labels on the game.
- A player who has never been adversely affected by light stimulus might experience dizziness or headache when playing the game. Small children can be especially susceptible to these conditions. Caution guardians of small children to keep watch over their children during play.
- Instruct those who feel sick during play to see a doctor.
- To avoid injury from falling objects, and electric shock due to spilled drinks, instruct players not to place heavy items, food, or drinks on the product.
- To avoid electric shock or short circuit, do not allow customers to put hands and fingers or extraneous matter in the openings of the product.
- To avoid risk of injury from falling, immediately stop customers from leaning against or climbing on the product.

Warnings



To avoid electrical shock, unplug the cabinet before performing installation or service procedures.
If the power cord is damaged, it must be replaced by the equivalent power cord available from GLOBAL VR or your distributor.



GLOBAL VR® assumes no liability for any damages or injuries incurred while setting up or servicing the cabinet. Only qualified service personnel should perform installation or service procedures!

Environmental Conditions

Cabinet is intended for indoor use only. Be sure to keep the cabinet dry and maintain operating temperatures of 59°—86°F (15°—30°C).

FCC Notices (United States)

Electromagnetic Interference (EMI) is any signal or emission radiated in free space or conducted along power or signal leads, that endangers the functioning of radio navigation or other safety service, or that seriously degrades, obstructs, or repeatedly interrupts a licensed radio communications service. Radio communications services include, but are not limited to, AM/FM commercial broadcast, television, cellular services, radar, air-traffic control, pager, and Personal Communication Services (PCS). These licensed services, along with unintentional radiators such as digital devices (including computer systems) contribute to the electromagnetic environment.

Electromagnetic Compatibility (EMC) is the ability of items of electronic equipment to function properly together in the electronic environment. While this computer system has been designed and determined to be compliant with regulatory agency limits for EMI, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference with radio communications services, which can be determined by turning the equipment off and on, you are encouraged to try to correct the interference by one or more of the following measures:

- Re-orient the receiving antenna.
- Relocate the cabinet relative to the receiver.
- Plug the game into a different outlet so that the computer and the receiver are on different branch circuits.

If necessary, consult a Regulatory EMC representative of GLOBAL VR® or an experienced radio/television technician for additional suggestions. You may find the [FCC Interference Handbook](#), to be helpful. It is available from the U.S. Government Print Office, Washington, DC 20402.

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

Operation is subject to the following conditions:

- This device may not cause harmful interference.

This device must accept any interference received, including interference that may cause undesired operation.

Chapter 1 — Introduction

Need for Speed™ Underground Motion Deluxe is a fully interactive coin-operated motion simulator, capable of an awesome three degrees of freedom (pitch, roll and heave) movement for real-life driving simulation.

The Unit is powered by electric motors, rather than the higher maintenance pneumatic or hydraulic actuators used in many motion simulators. The heart of the Motion System is Tsunami's patented Ballista™; a powerful Mini Motion Platform using real-time physics-based dynamics. Players will experience all the thrills of the race as they are jolted, moved, and bumped in synchronization with intense driving action.

Build and race the ultimate urban exotic with *Need for Speed™ Underground Motion Deluxe*.

Take control of top import street tuners like Toyota Celica, Nissan 350Z, Mitsubishi Eclipse and the exclusive Nissan Skyline GT-R. Play Career and customize your car with licensed aftermarket parts to build your own unique ride.

Force-feedback steering, surround sound and a 6-speed shifter make *Need for Speed™ Underground* a truly engaging driving experience.

Own the Streets

- **Linkable** – allowing up to 4 players to compete in blistering head-to-head competition.
- **Career Mode** – allows players to choose their car and compete in a series of 81 races, earning custom performance parts and upgrades along the way. Players can store 4 Careers on one Players' Card!
- **GLOBAL VR Players' Card Compatible** – thousands of registered players are ready to drive, and new players can purchase a SmartCard format Players' Card to store their data.

Specifications

Note: Specifications are subject to change without prior notification. Power requirements are shown for 110 VAC.

Installed Dimensions (L x W x H)	104" x 54" x 88" (264 x 137 x 224 cm)
Approximate Weight	850 lbs (386 kg)
Voltage & Power Requirements	Display Cabinet: 110 VAC, 5 Amps, 50/60 Hz Motion Base: 220 VAC, Converted from 110 VAC, 12 amps, 50/60 Hz input voltage (Converted by power transformer in back of display cabinet.)

Motion Base Specs

Seat	High-back seat with built-in speakers for surround-sound effect
Motion System	3 degrees of freedom (DOF) Mini Motion Base: 220 VAC, 3 phase motor-driven actuators
Control Inputs and Outputs/feedback:	Force-Feedback Steering Assembly, Control Panel Buttons, 6-Speed Shifter, E-Brake Button, Gas & Brake pedals
Player Weight Limit	300 lbs.
Motors	3 Motors: 220VAC, 50/60Hz, 1/2 Hp 3phase
Approximate Weight	450 lbs (204kg)

Display Cabinet Specs

Monitor	Widescreen DLP Monitor, DVI to HDMI
Computer System	<ul style="list-style-type: none"> • Windows XP Embedded Operating System • Pentium® 4 Computer • Nvidia® GeForce Graphics Card
Approximate Weight	400 lbs (181 kg)



Note: This game has 2 separate power cords! These cords should be connected to a dedicated 20 Amp circuit. No other appliance or game should share the circuit with this game.

Chapter 2 — Installing a New Cabinet

Installation Kit

Locate the following items for setting up your cabinet:

Description	Qty
Operation & Service Manual (This Document)	1
Spacer Block (Fits between Coin Tower & Motion Base)	1
Interconnect Bridge (Fits between Display Cabinet & Motion Base)	1
Mounting Bracket, Bridge to Display Cabinet	2
Mounting Bracket, Bridge to Motion Base	2
Mounting Hardware (Nuts, Bolts, & Washers) Located in Cash Box	

Unpacking the Motion Base

Refer to Figure 36 on page 58 for Motion Base components.

1. Remove the bolts holding the plywood sheet in place behind the motion base on the pallet.
2. Position the plywood sheet to use as a ramp for rolling the motion base off the pallet.
3. Release the strap that holds the motion base in place.
4. Raise the leg levelers located on the undersides of the motion base and roll it down the ramp.
5. Keep the pallet and ramp in case you need to transport the unit in the future.

Unpacking the Display Cabinet

1. Cut the shipping straps and remove packaging material.
2. Gently slide or lift the Cabinet off the pallet. **(Using a Forklift is recommended.)**

Precautions for Installation



WARNING:
AVOID FIRE HAZARD: Do not install in an area where the game would be an obstacle in case of an emergency (i.e. Near Fire Equipment or Emergency Exits).

This game cabinet was designed for **indoor use only**. To ensure trouble free and safe operation, the following conditions must be met:

- The game must not be exposed to direct sunlight, high humidity, dust, salt mist, high heat, or extreme cold. If installed in an unusually hot location, allow additional clearance between ventilation slots in the game and any structure or object that would tend to restrict air circulation.

- During game operation, forces are produced that may cause the Motion Base to travel if not properly installed. Before operating the game, make sure that the Motion Base and Display Cabinet are properly mounted and firmly secured to the Interconnect Bridge, as described in the sections that follow.

Cabinet Set-Up Procedure

Once the Display Cabinet and the Motion Base are safely removed from the packaging, move them to the location selected for installation.

Note: The Motion Base is very heavy. It is easier to move the Display Cabinet than the Motion Base.

Connecting Coin Tower to Motion Base

1. The Coin Tower Assembly can be installed on the left or the right side of the Motion Base.
2. Line up the Coin Tower Assembly as shown in Figure 32 on page 56.
3. Connect the cable from the Coin Tower to the Motion Base
4. Secure the Coin Tower Assembly with the nuts, bolts, and washers located in the Cash Box, as shown in Figure 32 on page 56.

Connecting Display Cabinet to Motion Base

Refer to Figure 1 on page 10, and Figure 36 on page 58 and perform the following steps:

1. Move the Display Cabinet so it is about 15" from the Motion Base. Open the front access door on the Display Cabinet.
2. Install the Mounting Brackets on the Interconnect Bridge and secure them with the hardware provided in the Cash Box. Place the bridge between the Display Cabinet and Motion Base.
3. Connect the cables between the Motion Base and Display Cabinet, routing them through the Interconnect Bridge.
4. Before securing the mounting brackets between the Motion Base, Display Cabinet, and Interconnect Bridge, power ON and thoroughly test the game. (See *Game Test Procedure* on page 10.)
5. If everything is working properly, secure the Interconnect Bridge between the Motion Base and Display Cabinet, using the Mounting Brackets and hardware provided in the Cash Box, as shown in Figure 1.
6. Lower the six (6) leg levelers so that the Caster wheels are lifted from the floor. After the Caster wheels are lifted off the floor, lock them in place with the jam nuts.

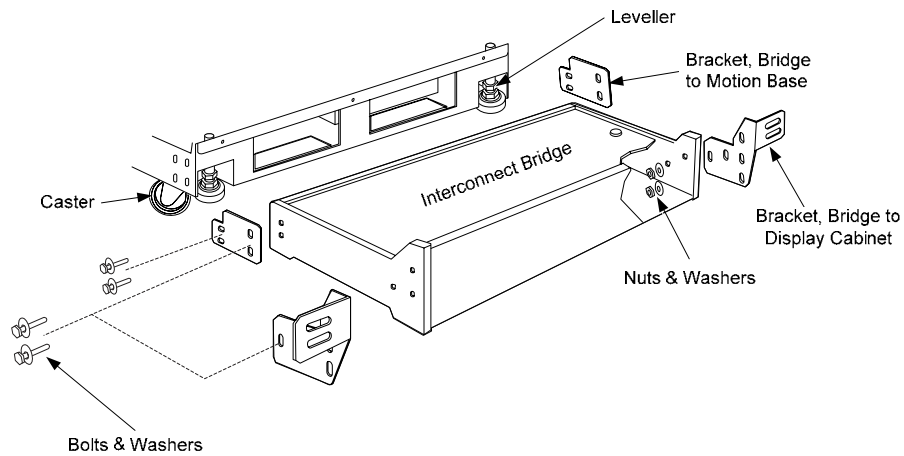


Figure 1. Securing the Interconnect Bridge

7. Measure the AC line voltage (LINE to GND and LINE to NEUT) and verify that it is between 110 and 125 VAC. NEUT to GND voltage should be less than 1 VAC.

IMPORTANT: This game requires a dedicated **20 Amp** circuit. Do not connect anything else to this circuit.

8. Connect the two power cables to the power plate on the rear of the display cabinet, and then connect them to AC power outlets.



Figure 2. AC Power Plate

Game Test Procedure

1. Turn ON the Display Cabinet ON/OFF Switch and Motion Base Power Breaker, located on the AC Power Plate on the rear of the Display Cabinet. Make sure that the motion base and display cabinet both power up, and all of the cooling fans are operating. See Figure 31 on page 55 for fan locations.

Note: The steering system will self-calibrate. Do not touch the wheel while it is calibrating.

2. Pull up the red Motion STOP Button and verify that the motion seat remains level.
3. Press the Operator button and test all functions from the Operator Menu:
 - Select **Controls** to test steering, pedals, buttons, shifter and card reader.
 - Select **Sound Test** to test audio.
 - Select **System Test** to test the Players' Card reader.
4. Play a game to verify everything is working properly.

Linking Multiple Games

You can link up to four Motion Deluxe and/or Standard cabinets together for head-to-head competition, as long as all cabinets are running the same software version. Once the cabinets are linked in hardware and software, the Attract Mode movies will synchronize, and players can choose to play individually or race against other players.

Each cabinet ships with an Ethernet cable and a cross-over coupler. The cross-over coupler is used to link two cabinets. An Ethernet hub or switch is required to link more than two cabinets.

Take care to protect the cables used for game linking from foot traffic around the game. Use a conduit or wire way to protect the cables as needed. Avoid routing the linking cables near sources of heat, moisture, or electrical energy such as neon lights, compressor motors, transformers etc. To avoid confusion, it is advisable to mark the cables if similar cables are used in the vicinity.

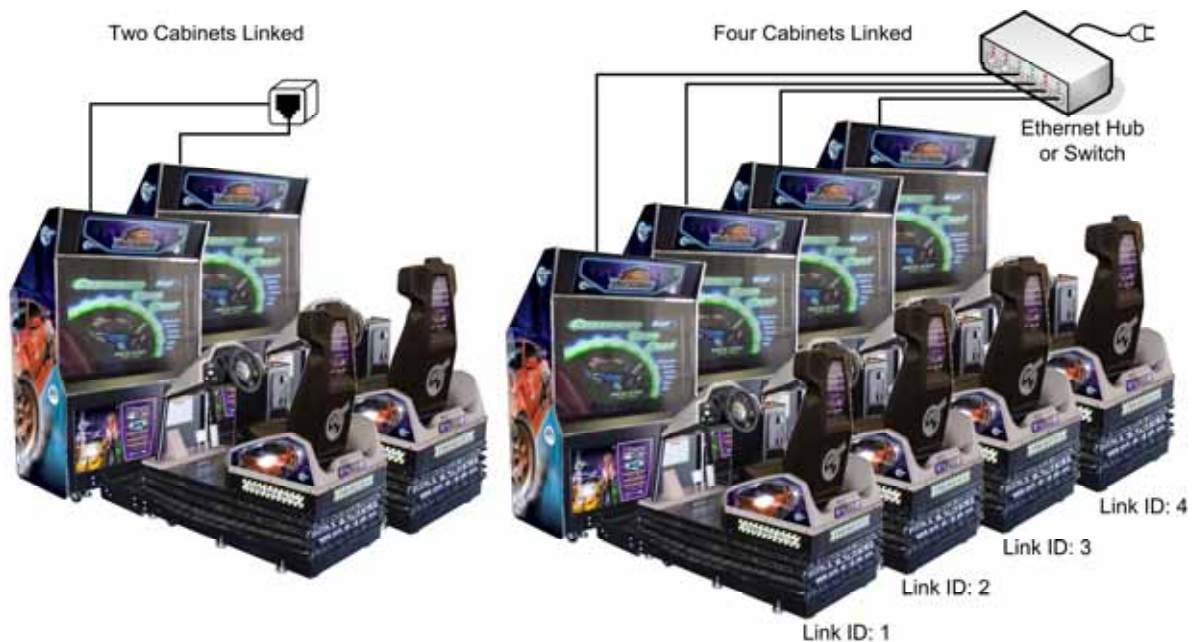


Figure 3. Linking Cabinets Without Broadband

1. **Before connecting the Ethernet cables**, go into the Operator Menu on each cabinet, and set the Cabinet Link ID number, as shown by the arrow in Figure 4. Each cabinet must have a unique number: 1, 2, 3, or 4. Cabinets should be numbered from left to right. Exit the Operator Menu to reset the number in the software. All linked cabinets must run the same software version.
2. Locate the 10' Ethernet cable and Ethernet crossover coupler in the cash box of each cabinet.
3. Connect the Ethernet cable to the Ethernet connector on the power plate of each cabinet. Neatly route the linking cable through the notch on the back of the cabinet.
 - To link two cabinets: Connect the two Ethernet cables to one cross-over coupler. Do not use two couplers.
 - To link three or four cabinets: Connect the Ethernet cables to an Ethernet hub or switch (not included). Connect the hub or switch to AC power and make sure it is powered ON. Do not use cross-over couplers with a hub or switch.

4. If more than one cabinet has the same Cabinet Link ID number, each cabinet with a duplicate ID number will display an error message, as shown below on the left. Repeat Step 1 to correct any duplicate Cabinet Link ID numbers.



Figure 4. Checking Link Status

Checking the Game Dongle

The cabinet uses a Game Dongle to activate the game software. If the dongle is missing, the game will not run. When a USB Game Dongle is installed and working properly, a **red** LED will illuminate inside the dongle. If the software does not recognize the Game Dongle, make sure the Dongle is connected properly, and then power cycle the cabinet.

If the dongle comes out while the game is running, a NO DONGLE screen will appear the next time a **START** button is pressed. Re-install the dongle; there is no need to reboot the game.

Note: The dongle supplied with the cabinet is specific to the game and software version. Future software upgrades may require a new dongle.

Important: Some of your cabinet information is stored in the dongle, so if you replace your computer, **remove the dongle and keep it with the cabinet.**



Figure 5. USB Game Dongle


Chapter 3 — Playing a Game

Starting the Game

With the proper number of coins inserted, press the red **Start** button to begin the game. First select your mode of play, Race or Career, (see page 15). Next a series of screens will appear, as shown below, allowing you to select options for the game.



Figure 6. Selecting Track and Car Options

1. **Track Select:** Turn the steering wheel to highlight each track displayed at the top of the screen. The track map and difficulty (*Easy, Medium, or Hard*) are displayed as you highlight each track. Press the gas pedal to select a track.
2. **Car Select:** Turn the steering wheel to highlight each car displayed at the top of the screen, and press the gas pedal to select your car.
3. **Customize:** Turn the steering wheel to highlight each customization shown at the top of the screen. Your car is displayed in each highlighted color. Press the gas pedal to make a selection.
4. **Transmission:** Select either automatic or manual transmission. Manual transmission (using the 6-speed shifter) may result in better speed control and faster race times for experienced drivers. No clutch is used, only the shifter.
5. **Other Options:** At any time during the car, customization, or transmission selection screens, you can press a control panel button for other options. These options are set through pop-up menus that display for five seconds.
 - Press NOS to turn AI on or off. In a linked race, any player can turn AI off for all cabinets. Turning AI off removes computer-controlled cars from the track. For a driver racing solo, this also activates Shadow Attack Mode, in which the driver races against a shadow of the track leader.
 - Press Look Back to turn Handicap (catch-up) on or off (default is on) for one driver only. Handicap helps a driver catch up with other cars.
 - Press  to toggle the Force-Feedback level through Light, Medium, or Heavy.

Once you have selected your options, the game will begin to load.

Game Play

Once the game starts, **pull up on the red Motion STOP button** to start the motion. A prompt appears onscreen to remind you if you haven't activated motion.

As in any driving game, use the Steering Wheel, Gas, Brake and Shifter to control the car.

The **Look Back** button lets you look behind the car. The **View** button toggles the view between inside and outside the car. Tap the **♪** button to turn the music off; tap it again to change songs. Press the **NOS** button for an extra burst of speed—but quantities are limited! Tap the **E-Brake** button to start a drift.



Figure 7. Driving Screen Functions

During the race, useful information is displayed onscreen:

1. Shows the number of the current lap, and the total laps to complete the race.
2. Shows your current time for the lap and the best recorded lap time.
3. Shows your position (green triangle) relative to the other cars (red triangles) on a track map.
4. Shows your car's turbo level.
5. Shows the number of seconds you have to cross the next checkpoint. A Shadow Attack icon is displayed above this number if you are in Shadow Attack mode.
6. Shows your position in the race out of the total number of cars.
7. Shows the time gap between you and the leader, or the car behind you if you are in the lead.
8. Shows style points earned for advanced driving techniques.
9. Tachometer, shows your engine RPM in thousands.
10. Shows your current gear. In manual, the gear position in the shift pattern is also displayed.
11. Shows your speed in either km/h or MPH (set in Game Operator menu).

Additional information will appear onscreen depending on the race mode and options selected. At the end of the race, the time and position for each driver is displayed.

Modes of Play

Race Mode (amusement): This is normal racing, requiring no Players' Card. If cabinets are linked, players can race against each other head-to-head.

Using a Players' Card in Race Mode makes another car available for the player to drive. Also, a player can track miles on a Players' Card, and after 300 miles, another car becomes available.

Career Mode: In this mode, players drive a series of races. For each race they finish within a specified time, they win a customization or performance upgrade for their car. Players save their car and points on their Players' SmartCards. Players who complete a career (81 different races) can re-race any Career Mode race. Players can also use their customized Career Mode car in Race Mode.

Chapter 3 — Operator Menu and Game Setup

This chapter describes how to use the Game Operator menu to set up the game or diagnose problems. Game audits, accounting features, settings, and control diagnostics, are accessed from the Game Operator Menu.





Note: Motion features are **not** accessed from the Game Operator Menus.

The Operator Menu screens are described in detail on the following pages. Refer to *Game Operator Menu Flowchart*, on the following page, for a list of the Game Operator menu screens and available settings.

Press the Operator button inside the coin door to enter the Game Operator menu.

Navigating the Operator Menu Screens








Use the buttons on the driving control panel to navigate, select, and change options, as described in the table below. Onscreen instructions will provide additional information on using each menu.

Button	Function	Comments
	Up	Scroll through lists or settings.
	Down	
	Select	Confirm a setting.
	Back or Exit	Navigate back to the menu list or exit the menu.

The following is an example of how to change a menu option:



Figure 8. Setting Cabinet Volume

- Use the  and  buttons to navigate and highlight a menu option.
- Press the  button to select the highlighted option. The game option will turn to red when it is selected.
- Use the  and  buttons to rotate through the available settings for the selected option, as shown by the arrows in steps 2 and 3 of the picture above.
- When you reach the setting you want, press  again. The game option will now turn back to yellow, and will display the new setting, as shown in step 4 of the picture above.
- Press the  button to go back to the main menu.

The flowchart below shows the function of each menu in the Game Operator Menu.

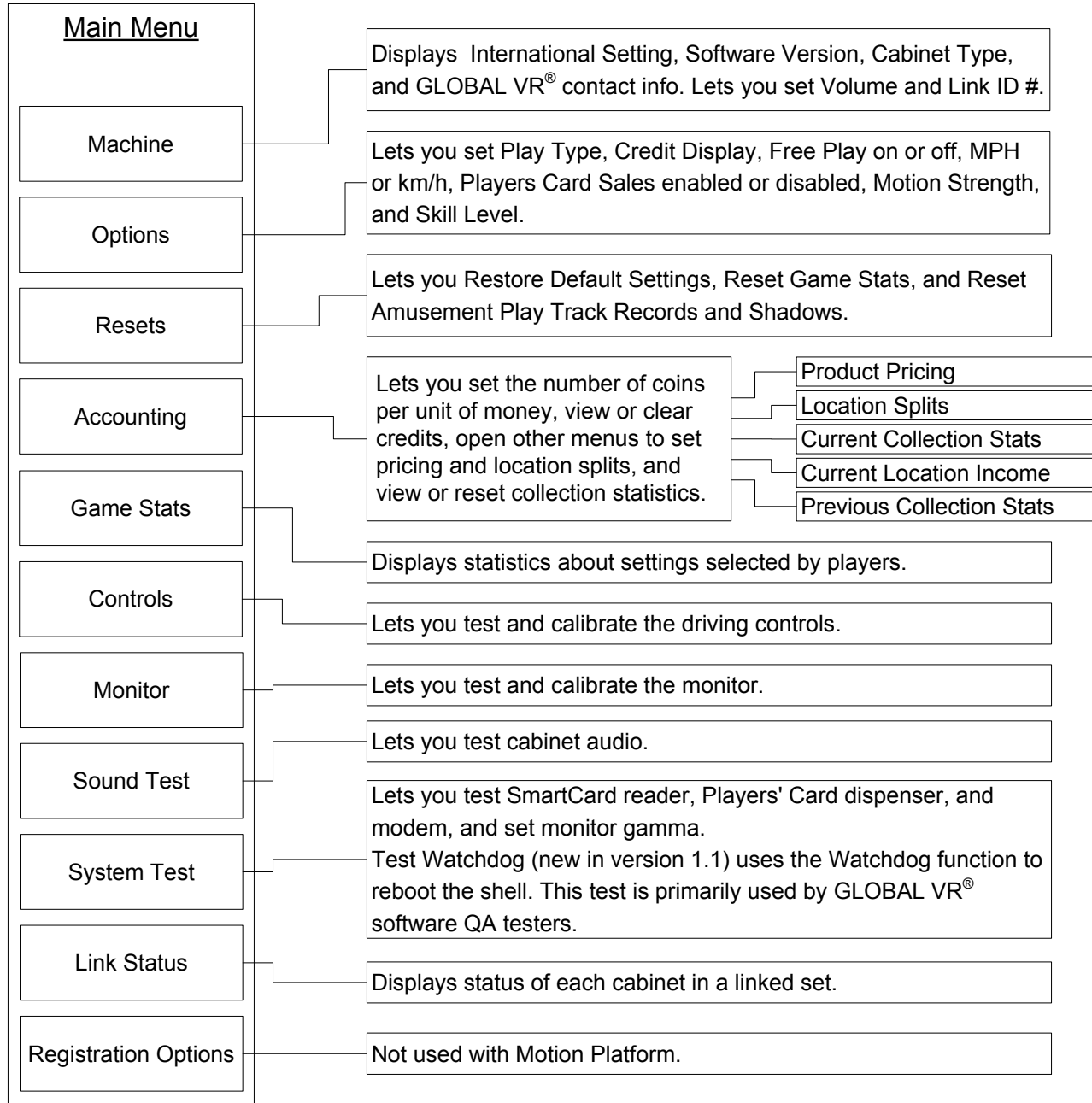


Figure 9. Game Operator Menu Flowchart

Machine Information Menu



Figure 10. Machine Information Screen

The Machine Information menu is the default screen displayed when you press the Operator Button. It displays important information about the cabinet.

Menu Item	Description	Default Value (as applicable)
International Setting	Displays international location (e.g. USA or UK) as read from the game dongle.	(Set by Dongle)
Game Version	Displays the game software version installed.	
OS Version	Displays the operating system software version installed.	
Cabinet Type	Displays cabinet type (Motion, Sit-Down, or Up-Right).	(Set by Dongle)
Cabinet Volume Setting	Sets the game audio volume form 0—100% in increments of 5.	55%
Attract Volume	Sets the Attract mode audio volume as a percentage of cabinet volume.	95%
Attract Sound Mode	Sets Attract mode sound to Always, Sometimes, or Never. The <i>Sometimes</i> setting will play sound in attract mode one third of the time.	Always
Cabinet Link ID#	Sets the ID number used for linking cabinets. Each linked cabinet must have a unique Cabinet Link ID number (1, 2, 3, or 4).	1
Contact Info	Displays GLOBAL VR contact information.	

Game and Coin Options Menu



Figure 11. Game and Coin Options Screen

The Game and Coin Options menu is used to set up the type of money or credits used at your location, game pricing, and game-play difficulty.

Menu Item	Description	Default Value (as applicable)
Play Type	Sets Play Type to Player's Choice or Race Only. (Race Only disables Career mode.)	Player's Choice
Credit Display	Sets whether <i>Money</i> or <i>Credits</i> are used to play the cabinet. (This setting affects the display of other items.)	Money
Free Play	Sets free play <i>ON</i> or <i>OFF</i> .	OFF
Display Speed in	Sets the speedometer to MPH or km/h.	MPH
Players' Card Sales	Sets Players' Card sales to Enabled or Disabled. This gives Operators the option of allowing card sales only from cabinets with dispensers. (Card Dispensers are not supported on Motion cabinets.)	Enabled
Motion Strength	Sets the strength of the motion to Weak, Normal, or Strong.	Normal
Skill Level (Checkpoint Difficulty)	Lets you set the Skill Level , by track, from A (easiest) through E (hardest). Easier settings mean players have more time to reach each checkpoint; harder settings mean less time. # Laps/Drags lets you set how many laps or drags players get for each racetrack. Options are 1–5.	C (Medium) # Laps/Drags varies by track

Reset Stats/Settings Screen



Figure 12. Reset Stats/Settings Menu

Menu Item	Description
Restore Default Settings	Sets the cabinet to the factory default settings. Settings that are reset include Credit Display, Coins per \$, Cost Per Play, Game Volume, Attract Volume, and Skill Level.
Reset Collection Stats	Resets the Coin Statistics for the cabinet.
Reset Game Stats	Resets the Game Statistics for the cabinet.
Reset Amusement Track Records & Shadows	Resets the amusement (Race mode) track records and shadows. You can select Reset All Tracks , or reset tracks individually.

Accounting Screens

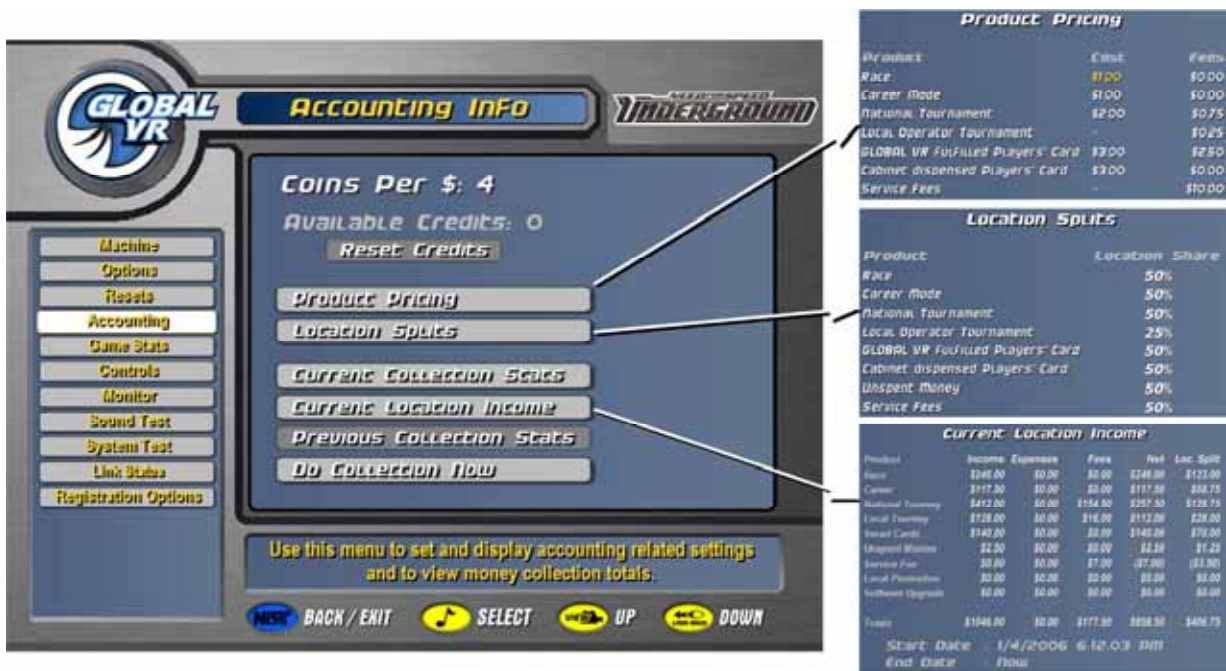


Figure 13. Accounting Info Screens

Menu Item	Description
Coins Per \$ (Symbol varies internationally)	Sets how many coin drops it takes to reach a unit of money, typically 4 in the US (4 quarters per \$) or 1 in the UK and Europe.
Available Credits	Displays the number of credits inserted.
Reset Credits	Highlight and select this button to reset the Available Credits to 0.
Product Pricing	Brings up the Product Pricing screen where you can set the price for each mode of play and Players' Cards (either dispensed or fulfilled by GLOBAL VR via mail). Also displays applicable fees paid to GLOBAL VR.
Location Splits	Brings up the Location Splits screen that displays the location's share of income for each mode of play, Players' Card sales, and unspent money, plus the location's share of fees paid to GLOBAL VR. Note that in the example above, all items are set to 50% (50/50 split) except Local Operator Tournament (not available on motion platform), which is set to pay the location 25%.
Current Collection Stats	Brings up the Current Collection Stats screen, which displays income, expenses, fees, and net earnings for each mode of play. It also displays the start date for the current stats.
Current Location Income	Brings up the Current Location Income screen, which displays all of the information in Current Collection Stats, plus the Location Split calculations. Note that in the example above, the location gets 50% of income and pays 50% of fees in all categories except Local Tourney. For this item, the Operator has set the Location Share at 25% on the Location Split screen.
Previous Collection Stats	Brings up the Previous Collection Stats screen, which was saved last time Do Collection Now was selected. It also displays the start and end dates for the displayed stats.
Do Collection Now	Deletes the Previous Collection Stats and replaces them with the current collection stats. Resets all Current Collection Stats to 0.00.

Current Location Income Screen



Figure 14. Current Location Income Screen

The Current Location Income screen, accessed via the Accounting menu, is a useful tool for operators who split the cabinet income with a location. The Operator sets the location's share of each income and expense item in the Location Splits screen, and the software calculates the location's split based on these settings. The example above shows 50/50 splits for everything except Local Journey, which is set to give the location 25%.

Game Statistics Screens



Figure 15. Game Stats Menu Screens

The Game Statistics menu lets you cycle through three screens with statistics about the options players have selected in Race mode, and their average times for each track. The screens are: Car and Track, Average Times, and Game Features Usage. Press **View** or **Look Back** to move through the pages. You can reset the Game Statistics through the Resets menu.

Play Control Test Screen




Note: A red dot on the lower left corner of the Attract screen indicates a hardware malfunction. Use the Play Control Test screen to determine which hardware component is not working.

The image below shows that the software cannot detect the gas and brake pedal.



Figure 16. Play Control Test Screen

The Play Control Test screen displays pictures of each driving control, and allows you to test each control, as described below. To exit from this menu, press the **Start** and **View** buttons together. If a component is not detected, a  symbol will be displayed over it, as shown above.

- **Buttons:** When you press a control panel button, it will light up on the screen.
- **SmartCard Reader:** Indicates whether a SmartCard reader is installed and working.
- **SmartCard Dispenser:** Not applicable to Motion cabinets.
- **Steering Wheel:** When you turn the steering wheel to the left or right, the numbers above the graphic should change to indicate the steering wheel position. Full left position should be about "-127" and full right position should be about "127". As you turn the wheel, the number change should be smooth and linear. A sudden jump in the numbers, or a different range of numbers, can indicate a bad pot.
- **Gas & Brake Pedal:** When you step on the pedals you will see the same action on-screen. The numbers displayed near the pedals show the value when the pedal is full up, full down, and the current value. The difference between the full up and full down values should be about 80 (± 5). As you press and release the pedals, the number change should be smooth and linear. A sudden jump in the numbers can indicate a bad pot.
- **Calibration:** To calibrate the steering wheel and pedals, press the Start and NOS buttons together. The steering wheel will turn by itself during calibration; do not touch it during this process. When prompted, step on the gas and brake pedals to calibrate them.
- **Shifter:** When you shift through the gears, the current gear number appears on the screen. The screen also displays which shifter micro switches are actuated for each gear. For example, "2 LT DN" means the left and down micro switches are actuated in gear 2. "3 UP" means that only the up micro switch is actuated in gear 3. For more information, refer to *Six-Speed Shifter and E-Brake Service* on page 39.
- **E-Brake:** If you press the E-Brake button, it will light up on the screen.
- **Credits:** When you insert money into the coin mech or bill validator, the word "CREDITS" will flash, and "OK" will highlight on the screen.
- **Nytric Card Version:** Indicates version of Nytric USB/I/O card installed in the computer.
- **Start Button, Leader Light and Brake Light:** When you enter the Controls Menu, the Start button, Leader Light and Brake Lights on the cabinet will blink for several seconds. If any of these lights fails to blink, check the bulb and wiring for the light.

Monitor Calibration Screen



Figure 17. Monitor Calibration Test Screen

Press the **♪** button to start the monitor calibration test, and the **View** or **Look Back** button to scroll through the screens. To exit the Monitor Calibration Test, press the **NOS** button or the Operator button.

The monitor calibration test cycles through a series of monitor calibration screens. Various screens are designed to help you align the horizontal or vertical sync, or adjust the white balance and color hues.

To adjust the monitor, use the remote control to access the setup menus.

Sound Test



Figure 18. Sound Test Screen

The Sound Test menu tests the speakers. Once you press the **♪** button to enter the sound test, each speaker will call out its name, one at a time. You should hear the words “Front Left Channel” from the left front speaker, followed by “Front Right Channel” from the right, and so on. The subwoofer will emit a thumping sound. The Sound Test will continue to automatically rotate through each speaker until you press the **NOS** button to exit the test. While the sound test is running, the picture on the screen shows the location of each speaker as it is tested.

Note: The onscreen picture will show a center speaker, but this is not used on the Deluxe Motion system.

Press the **View** or **Look Back** button to stop the sound rotation and test one speaker at a time. Press **View** to rotate to the next speaker, or **Look Back** to rotate to the previous speaker. Press the **NOS** button to exit the test.

If any sound comes from the wrong speaker, or any speakers are not working, check the connections to the speakers, audio amp, and PC (see *Audio Amp and Speakers Service* on page 40).

System Test



Figure 19. System Test Screen

- **Set Video Gamma:** Adjusts the overall brightness of the video. Default is 1.00.
- **Test Card Reader:** Insert an Operator or Players' SmartCard, and then select this option. If the SmartCard reader is working properly, the screen will indicate the type of card inserted and the card number. For Players' Cards, the name of the owner will also be shown. This can be useful for finding the owners of lost cards.
- **Test Card Dispenser:** Not applicable to Motion cabinets.
- **Test Modem:** Not applicable on Motion cabinets.
- **Test Watchdog:** Uses the Watchdog function to reboot the shell. This test is primarily used by GLOBAL VR software QA testers.

Link Status



Figure 20. Cabinet Link Status Screen

This screen shows the link status of each cabinet in a linked set. The cabinet you are using to view the Link Status screen will be shown as BUSY, while the other cabinets will be shown as either AVAILABLE or BUSY if they are linked properly, or UNCONNECTED if they are not linked.

For example, in the picture above:

- Cabinet 1 is **not** linked properly, **or** Link ID 1 is not being used.
- Cabinet 2 is linked properly, and is busy because the Operator is viewing the menu.
- Cabinet 3 is linked properly, and is busy because a player is driving a race.
- Cabinet 4 is linked properly, and is available for play.

Registration Options

This menu is not applicable to the Motion cabinets.

Chapter 4 — Software Restoration



Important: Only use software with **Motion Support**, Version 1.1A or later.

Important: Check for any Patch Disks and/or special instructions for your monitor.

Follow the instructions below if you need to re-install the *Need for Speed™ Underground* software on your cabinet. **Total installation time is about 30 minutes.**

Run the System Recovery CD


Important: When you use the System Recovery Disk, you will erase all game settings and history for the coin and game audits that are stored in the game software. It is advisable to contact Technical Support before using the System Recovery Disk to resolve a problem.

1. If the cabinet is linked, disconnect the Ethernet cable from the back of the cabinet.
2. Open the back of the display cabinet (as described on page 32) to access the System Computer, and connect a keyboard and mouse.
3. Insert the **System Recovery Disk** in the CD-ROM drive and power the cabinet OFF and then ON. When the computer reboots, the CD should run automatically (wait about 30 seconds). You will see the hard-drive image process screen.
4. When prompted, remove the CD and reboot the computer. **Do not** insert any other CD yet! Wait for about 2 minutes while the software finishes the installation. When you see a desktop screen with the GLOBAL VR logo, the Operating System installation is complete. Proceed to run the Game Install CDs.
5. When a **Found New Hardware** wizard window appears onscreen, use the keyboard or mouse to select **Cancel** and close the screen.

Run the InstaCal CD

1. Insert the disk labeled **InstaCal** in the CD-ROM drive. An **Install Shield Wizard** window will appear.
2. Select **Next** in the Install Shield Window. The Destination Folder window will appear.
3. Select **Next** in the Destination Folder window. The Ready to Install window will appear.
4. Select **Install** in the Ready to Install window.
5. Once the program is installed, select **Finish** in the Install Shield Completed window.
6. When a dialog box prompts you to restart the system, select **Yes** to restart.

Enable InstaCal

1. After the cabinet reboots, press the Windows flag key  on the keyboard (between the *Ctrl* and *Alt* keys) and select **Programs** from the menu.
2. From the program list, select **Measurement Computing** → **InstaCal**.
3. The Plug and Play Board Detection dialog box will appear. Select **OK**.
Note: The directory structure should be populated with the following:
 Board # 0 – PCI – DAC6702 (dev # 10)
4. From the InstaCal window, select **File** → **EXIT** to close the window.

Run the Game Install CDs

Important: All linked cabinets must run the same game software version.

1. With the cabinet powered ON and the computer booted, insert the CD labeled **Game Install Disk 1 of 2**. The CD will automatically run (wait about 30 seconds). You will see a series of screens as the software copies components and files to the hard drive. The process will take about 10 minutes.
2. When the first CD is complete, the computer will eject the CD and prompt you to insert Disk 2. Insert **Game Install Disk 2 of 2**. The computer will automatically copy the remaining files from Disk 2 and reboot the computer when finished. You may see a blank screen for about a minute.
3. Once the game has restarted, remove the CD. Keep the three CDs in a safe place in case you need them in the future.
4. When the game starts it will need to calibrate the gas, brake, and steering pots. The steering will self-calibrate (do not touch the wheel while it is calibrating). When prompted, press and hold the gas and brake for five seconds to set the calibration limits. Once the calibration is complete, the attract movie will begin. Start and play one game to finalize hardware calibration.
5. Once the software install is complete, press the Operator button and set the sound volume levels, cabinet Link ID Numbers, and other Operator settings. For linked cabinets, reconnect the Ethernet cables *after* you set the Link ID Numbers.

Note on display resolution: When you run the Game Install CDs, the game seeks to use the highest resolution possible based on the capabilities of the monitor. The installation process starts with a resolution of 1600 x 900 since this is the highest resolution supported by the factory-installed display. If the computer detects that the display does not support 1600x900, then the software steps down to lower resolutions until a supported resolution is found. The sequence is: 1600x900, 1280x1024, 1280x960, 1280x720, 1024x768 and 800x600. Attract Mode and Game Selection screens, and Operator Menu screens normally operate in 800x600 mode. The game uses the higher resolutions in the game play mode.

Chapter 5 — Service and Repair

General Precautions



CAUTION: GLOBAL VR assumes no liability for any damage or injuries incurred while servicing the cabinet. Only qualified service personnel should perform service and installation of cabinet hardware.

Do not connect or disconnect any cables or connectors with the power on. Doing so could potentially damage the game.

To prevent electrostatic discharge (ESD) damage, handle PCBs by the edges only and use a grounding wrist strap or similar precaution.

Please read the service instructions before working on the cabinet.



Always turn the cabinet OFF and disconnect both AC power cords before performing any repair work. Wait 5 minutes before replacing any electrical part or parts on the Motion System to avoid the risk of shock.

- **Do not** open the system computer without direct authorization from GLOBAL VR Technical Support. Doing so can void your warranty.
- The Display Cabinet and Motion Base have components that produce **high voltage**. Repairs must be performed by authorized personnel only.
- Do not tamper with the original wiring configuration, or the positioning of ferrite shields and clamps. Alteration of game wiring may result in faulty operation.
- Always return the leg levelers to the extreme up position before moving the game.
- Always separate the Display Cabinet from the Motion Base before moving the game.

Routine Inspection Schedule

Item	Task	When	Comments
Display Cabinet and Marquee Plexiglas®	Visually inspect for fingerprints, smudges, etc., and wipe clean.	Daily	CAUTION! Use only mild detergent solutions approved for use on Plexiglas. Do not use chemical solvents or cleaners containing abrasives.
Bellows (around motion base)	Visually inspect for tears, rips, and loose or missing retaining screws. Replace if damaged.	Daily	The bellows is important for player safety and prevents debris from getting inside the motion system mechanisms.
Resting motion inspection	Visually inspect game to make sure it is not moving in attract mode. Make sure the Red Motion STOP Button is up.	Daily	The Motion Base should not move during Attract Mode. This is very important for the life expectancy of your motion base. If it moves while in Attract Mode, contact Technical Support immediately.
Bellows Retaining Screws	Visually inspect for loose or missing retaining screws. Replace if damaged.	Weekly	Missing screws encourage vandalism and theft. All screws must be in place to ensure player safety.

Item	Task	When	Comments
Motion Diagnostics (Bellows up, function test only)	Make sure the game is level during attract mode. If it is not, this can indicate one or more motors are out of calibration.	Weekly	If you have reason to believe that one or more motors are out of calibration, refer to <i>Motor and Potentiometer Calibration</i> on page 32.
Motion Diagnostics (Bellows down)	Visually inspect motion drive components for alignment and wear. Make sure motion appears normal.	Every Two Months	Refer to <i>Motor and Potentiometer Calibration</i> on page 32 to check motor calibration.
Steering controls, pedals, and dash buttons	<ol style="list-style-type: none"> 1. Inspect for loose or damaged parts. Replace as needed. 2. Select Controls in Operator Menu; test buttons, pedals & steering. Calibrate steering & pedals as needed. 	Weekly	Regular diagnostics will prolong the operational life of your game and enhance the feel of the game. Calibration of the components is critical. If controls are out of calibration, the game will not function properly.
Connecting Brackets	Make sure all bolts are tight between the display cabinet, interconnect bridge, and motion base.	Weekly	The powerful jolts may cause the unit to “travel” after extensive use. Make sure it stays in the desired/original location.
Push Rod Assembly	<ol style="list-style-type: none"> 1. Check the entire Push Rod Assembly and Motion Plate for loose hardware. 2. Check Rod End connections for signs of wear. 3. If any of these items are worn excessively, stop using the game immediately and contact Technical Support. 	Monthly	Continuing to run the game with damaged or worn components may cause severe damage to the motion base, and may void the warranty. See Figure 38 on page 60 for motor assembly components.
Cooling Fans	Verify that all fans in the Display Cabinet and Motion Base are working (see Figure 31 on page 55 for fan locations). Clean ventilation grills & filters. Also check the fan in the System Computer. If any of the fans stop working, check the power connection. Replace a non-working fan immediately.	Monthly	Important: The fans in the Motion Base operate on 220 VAC. It is essential to maintain proper ventilation to the display cabinet, motion base, and computer. Failure to do so may decrease the performance and/or the life span of your game. Always make sure all cooling fans are working properly, all vents are clear of debris, and air can flow freely.
Leg Levelers	Make sure the game is sitting flat on all of the leg levelers, and not on the casters.	Monthly	

Opening the Back of the Display Cabinet

There are three interlocked panels on the back of the display cabinet. To remove the panels, first remove the screws securing the lowest panel and remove that panel. Next remove the middle panel, and finally remove the upper panel, if necessary.

Servicing the Motion Base

Opening the Bellows (Skirt)

1. Do the following to open the Bellows:
 - a. Remove the Retaining Screws that secure the top of the Bellows.
 - b. Move the Bellows down.
2. Do the following to close the Bellows:
 - a. Lift the Bellows into place.
 - b. Line up the holes in the Bellows and secure with the Retaining Screws.

Replacing the Bellows (Skirt)

Do the following if you need to replace the bellows assembly:

1. Remove the Retaining Screws at the top and bottom of the bellows.
2. Remove the bellows by lifting it over the motion base.
3. Reverse these steps to install the new bellows.



Motor and Potentiometer Calibration



WARNING:

Secure all loose clothing, jewelry, and hair before working around the motors. Lose items could get caught in the moving parts of the motors.

Perform the following steps **only** if the motion platform is not level during Attract Mode, or after replacing a motor or pot. Refer to Figure 21 on page 33, and Figure 38 on page 60 to identify motor components.

1. Remove the retaining screws at the top of the Bellows, and lower the Bellows.
2. Connect a keyboard and mouse to the System Computer. (Reboot the computer if using a PS2 mouse or keyboard. USB devices do not require a reboot.)
3. With the game running in Attract mode, press the Windows flag key  on the keyboard (between the *Ctrl* and *Alt* keys) to launch the Windows Start Menu.
4. Use the arrow keys to select **GVR Shutdown** from the Start Menu and press **Enter**. This will shut down the game shell and allow you to access other programs.
5. Press the Windows flag key  and use the arrow keys to select **Motion Calibration** from the Start menu. The Calibration Dialog Box will appear.

6. Press any key on the keyboard until the motion platform moves to the **down** position. Look at each of the motors and verify that the push rod mechanisms are at the lowest point in their vertical travel.
7. Press any key on the keyboard until the motion platform moves to the **up** position. Look at each of the motors and verify that the push rod mechanisms are at the highest point in their vertical travel.

Note: If your game is running software build 25, press **A** on the keyboard to step the motors through Up, Center, and Down positions. This build also allows motors to be stepped through Up, Center, and Down positions individually. Type **1** on the keyboard to step motor 1 (Front), **2** to step motor 2 (right rear), and **3** to step motor 3 (left rear). This feature was removed from later software builds.

8. If any motor is not stopping at the full up and full down positions, refer to Figure 21 that follows, and perform the following steps to calibrate the motor potentiometer:

Note: Motors are numbered starting with the front-most motor (**1**) and proceeding in a clockwise sequence.

- a. Press any key on the keyboard until the motion platform moves to the **down** position.
- b. With the motion platform in the **down** position, loosen (do not remove) the Pot Alignment Set Screw that attaches the Pot L-Bracket to the Pot Alignment Disk.
- c. Rotate the Pot Alignment Disk slightly clockwise or counter-clockwise to adjust the angle of the Cams. Make sure the surfaces of the Cams and Push Rod are parallel and the Push Rod is at its lowest vertical position.
- d. Re-tighten the Pot Alignment Set Screw.

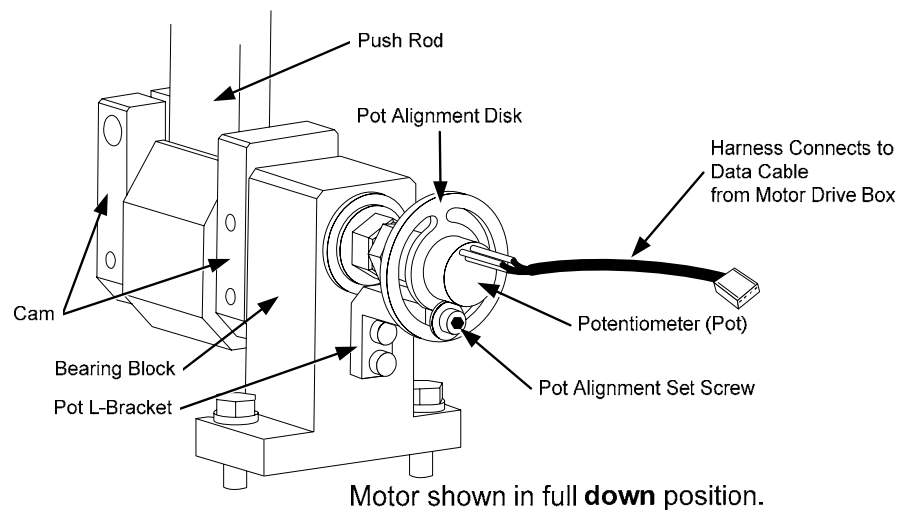



Figure 21. Motor Pot Detail

9. Proceed to the next motor and repeat the procedure until all three pots are calibrated.
10. Test the calibration by repeatedly pressing any key on the keyboard and observing as the platform moves. The entire platform should remain level, with no wobble, as it moves up and down.

11. Press the Windows flag key  and use the arrow keys to select **Shut Down** from the Start menu. Make sure **Restart** is selected, and press **Enter**. The game will reboot and start in the Attract Mode.
12. Verify that the motion platform is level both **front-to-back** and **left-to-right** when the game is running the Attract Mode.
13. Lift the Bellows into place and secure them with the Retaining Screws.

Potentiometer Assembly Replacement

Refer to Figure 21 on page 33, and Figure 38 on page 60 to identify motor components, and perform the following steps:

1. Turn off power and disconnect both AC power cords.
2. Remove the retaining screws at the top of the Bellows, and lower the Bellows.
3. Disconnect the potentiometer 4-pin Molex[®] connector from the motor drive box cable.
4. Remove the two bolts that secure the Pot L-Bracket to the Bearing Block.
5. The coupler on the shaft has four set screws. Loosen the two set screws that are closest to the potentiometer.
6. Reverse these steps to install the new Potentiometer Assembly. Make sure there is some play in the Pot L-Bracket.
7. Calibrate Motor and Potentiometer Assembly as described in the previous section.

Push Rod Assembly Replacement

Refer to Figure 21 on page 33, Figure 38 on page 60, and Figure 35 on page 57 and perform the following steps:

1. Turn off power and disconnect both cabinet AC power cords.
2. Remove the retaining screws at the top of the Bellows, and lower the Bellows.
3. **For Push Rod on Motor 1**, remove the nuts and washers from the four studs that secure the platform to the Motion Plate. Carefully disconnect the harnesses that run between the base and platform and remove the platform with the seat assembly attached.
4. **For Push Rod on Motor 2 or 3**, remove the screws that secure the seat assembly to the platform. Disconnect the harnesses that run into the seat and remove the seat assembly.
5. Remove the two (2) bolts that secure the Bearing Block to the tray (the bottom of the motion platform).
6. Loosen the Bell Crank bolt on the motor shaft (not shown in Figure 38), and use a mallet or puller to disengage the Bell Crank. **Be careful not to lose the Motor Key** (a long rectangular piece of metal on the motor shaft).
7. Remove the two M8x125 bolts with lock washers that secure the Push Rod assembly to the Motion Plate. The Push Rod Assembly may now be removed.
8. Reinstall the top portion of the Push Rod to the Motion Plate. Install the lock washer and nut. Use a small amount of Loctite[®] Red and tighten to 16 ft/lbs.
9. Using a torque wrench, tighten the Bell Crank bolt to 75 ft/lbs, and visually inspect the crease on the Bell Crank.

10. Fasten the bearing block to the tray. Use a small amount of Loctite Red and tighten to 16 ft/lbs.
11. Calibrate the Motor and Potentiometer Assembly as described on page 32.

Motor Drive Box Replacement

Refer to Figure 37 on page 59 for a drawing of the Motor Drive Box and connectors.

WARNING



PREVENT INJURY OR DEATH: Never open any of the control boxes or power boxes. These boxes are powered by 220 VAC, and attempts to improperly service may cause serious injury or death.

For safe handling, disconnect the main power plug.

The power must be off for at least 60 seconds prior to handling.

1. Turn off power and disconnect both cabinet AC power cords.
2. Remove the retaining screws at the top of the Bellows, and lower the Bellows.
3. To be sure that no power is left in Motor Drive Box, you must **wait 1 minute** after powering down before performing the next step.
4. Disconnect the four cables from the Motor Drive Box. (There is a main power cable, a braided metal power cable that goes to the motor, and two data cables.)

Important: Do not pull on the cables to disconnect them; grip the connectors only.

5. The Motor Drive Box is held in place by a metal clamp. Unscrew the bolts that secure the clamp and lift the box out.
6. Reverse these steps to install the new Motor Drive Box.

Important: Make sure all cables are firmly connected and straight. Improperly connected cables can cause problems such as the motor spinning constantly.

Force-Feedback Steering System Service

The major components of the steering system are listed below. Figure 22 shows the harnessing of the force-feedback steering system.

- Steering Wheel
- Force-Feedback PCB (part # COEM-GCE-H2P5A)
- +24 VDC Power Supply
- Steering Motor
- 5 K Ω Steering Pot (Potentiometer)

Note: Earlier non-motion cabinets use a dual-board force-feedback system consisting of a Force-Feedback PCB (blue board, part # COEM-6040-245), Force-Feedback Motor Controller PCB (green board, part # COEM-6052), and a ribbon cable connecting the two boards. The single and dual-board systems are completely interchangeable for use as replacement parts.

The Force-Feedback PCB manages communications between the 5 K Ω steering pot and the computer (via a USB connection). The steering pot sends the computer the steering wheel position as the player drives, and the computer sends back instructions for controlling the steering motor by regulating the power. The force-feedback steering motor is powered by the +24 VDC power supply via the Force-Feedback PCB.

Caution: Do not connect the power supply directly to the steering motor. Doing this will damage the motor and the power supply.

A faulty cable or steering-system component can cause steering problems. Refer to the *Troubleshooting* chapter for help with diagnosing steering problems.

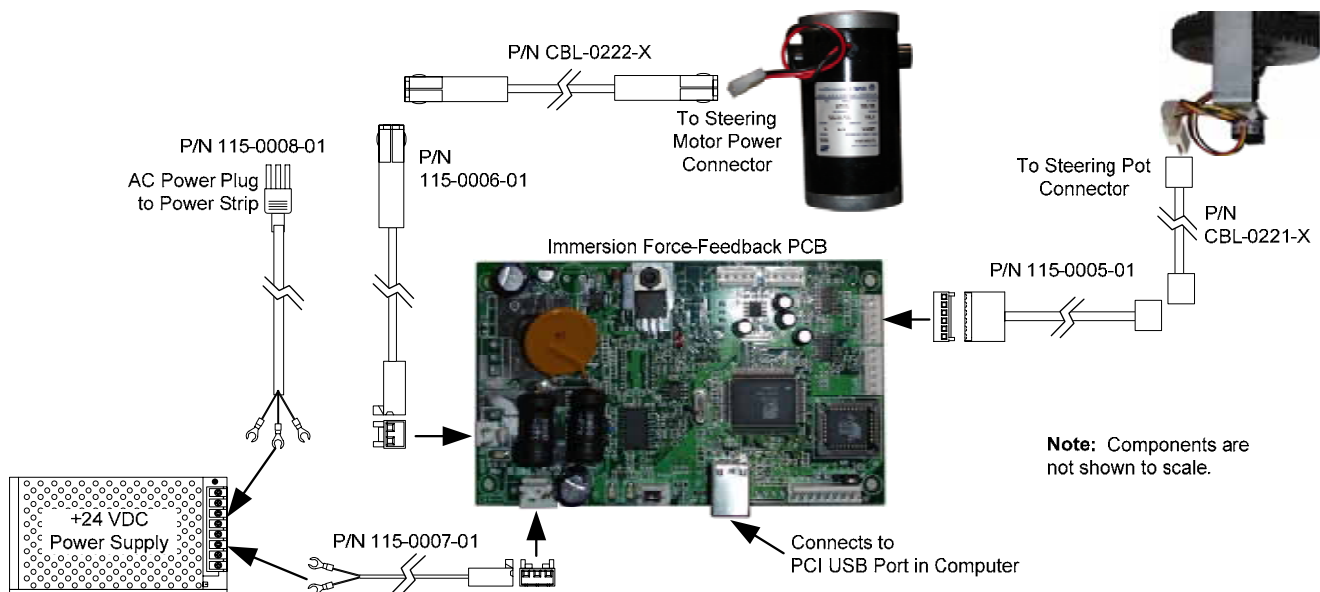


Figure 22. Force-Feedback Steering System Harnessing Diagram

5 K Ω Steering Pot (Potentiometer) Replacement

To test a pot, use the Play Control Test in the Operator Menu (see page 23). While turning the wheel, the change in the numbers displayed onscreen should be smooth and linear, with no jumps.

1. You can also power off the game and test resistance at the pot. While turning the wheel, you should see a steady linear increase or decrease in resistance, with no jumps.
2. To replace a pot, refer to Figure 23 and perform the following steps:
3. Using a 7/64 Allan wrench, loosen the set screw from the steering column and remove the bracket with the 5 K Ω steering pot attached.
4. Using a 1/2-inch wrench, remove the nut and lock washer from the bracket and remove the pot.
5. Reverse these steps to install the new pot. Install the pot with the plastic pin through the small hole in the bracket, as shown in Figure 23 below. Make sure the installed bracket has some play.
6. Calibrate the steering from the Play Control Test in the Operator Menu after replacing the pot.

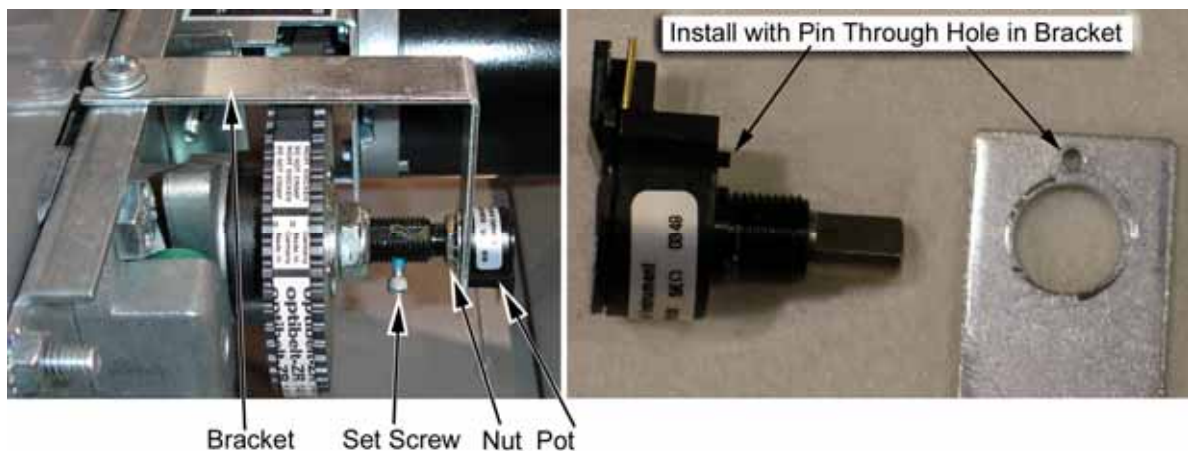


Figure 23. Replacing the 5 K Ω Steering Pot

Force-Feedback Belt or Steering Motor Replacement

Refer to Figure 23 above, and Figure 24, and perform the following steps to remove the force-feedback belt for repair. Always replace the belt if it looks cracked or worn.

1. Using a 7/64 Allan wrench, loosen the set screw from the steering column and remove the bracket with the pot attached (see Figure 23).
2. Loosen the four (4) 3/8" motor mount Kep nuts that secure the steering motor to the frame (see Figure 24).
3. Using a 10mm socket wrench, loosen the belt tension adjustment bolt several turns until you can slip the belt off of the motor and steering gears (see Figure 24).
4. To replace the motor, remove the four (4) 3/8" Kep nuts that you loosened in step 2, and remove the motor.

5. Reverse these steps to re-install the motor and belt. When installing the belt, tighten the tension adjustment bolt until the belt is fully stretched, and then loosen the bolt by ½ turn.
6. Calibrate the steering from the Operator Menu after servicing the belt or motor.

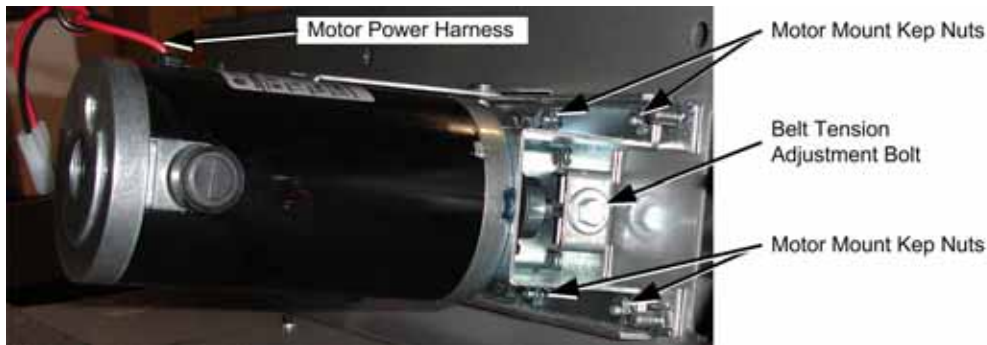


Figure 24. Servicing the Steering Motor

Force-Feedback PCB Replacement

Caution: To prevent electrostatic discharge (ESD) damage, handle PCBs by the edges only and use a grounding wrist strap or similar precaution.

If the steering pulls to one side, this could indicate a bad force-feedback PCB. Use the following steps to replace the PCB.

Important: Part # COEM-GCE-H2P5A is completely interchangeable with the dual PCB system consisting of COEM-6052, COEM-6040-245, and the ribbon cable that connects these two PCBs. The dual-PCB system was used on some non-motion cabinets.

1. Disconnect the cabinet from AC power.
2. Disconnect all cables from the PCB.
3. Remove the four screws that secure the PCB to the cabinet.
4. Reverse these steps to install the new PCB.
5. Calibrate the steering from the Operator Menu after replacing the PCB.

Driving Control Panel Button Service

The buttons on the cabinets are illuminated with 5-volt C555 bulbs. Refer to Figure 25 and perform the following steps to replace the buttons, bulbs, and micro switches:

1. Disconnect the cabinet from AC power.
2. Remove the screws that secure the dash cover in place over the driving control panel.
3. To remove a micro switch, gently rock it to the side and remove it from the housing. Remove the wires and install them on the same connectors on the new micro switch.
4. To replace a bulb, gently rock the white plastic bulb housing from side to side to pop it out of the button housing.
5. To remove a bulb, pull it straight out of the bulb housing.

Caution: Do not connect the 5-volt lamp power wire to the micro switch. This can damage the USB I/O card in the computer.

- When connecting the wiring to the micro switch and bulb, refer to the labels on the wires to make sure the connections are correct.



Figure 25. Replacing Button Lamps

Six-Speed Shifter and E-Brake Service

The sections that follow describe repair and replacement of the six-speed shifter.

Six-Speed Shifter Replacement

Perform the following steps to remove the shifter from the seat for replacement or repair.

- Remove the four (4) T-10H Security Torx screws from the top of the shifter assembly and carefully pull the shifter up out of the housing.
- Disconnect the Molex connector from the shifter.
- Reverse these steps to re-install the shifter.

Six-Speed Shifter Micro Switch Service

The shifter uses four miniature micro switches to relay the shifter position to the computer. Figure 26 shows micro switch placement, and which micro switches are actuated for each gear. By using the chart, you can determine which switch may be faulty. For example, if gears 1 and 2 stop working, the problem is probably with the Left micro switch.

The Controls screen in the Operator Menu also displays which micro switches are actuated as you shift through the pattern.

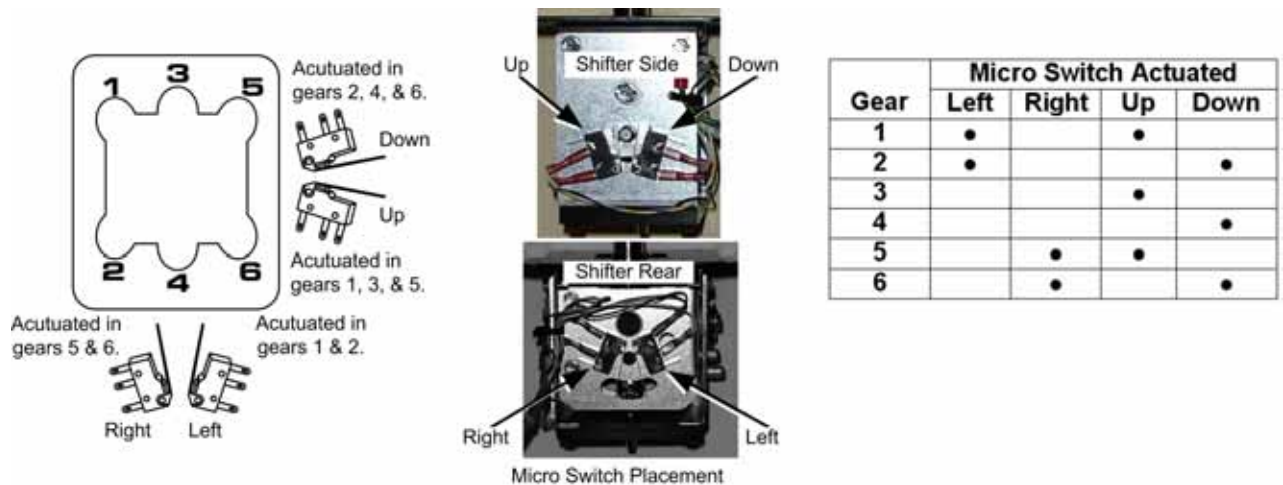


Figure 26. Shifter Pattern and Micro Switch Actuation

Perform the following steps to replace a shifter micro switch:

1. Remove the shifter assembly from the housing as described on page 39.
2. Disconnect the two wires from the micro switch.
3. Remove the two screws that secure the micro switch to the shifter and remove the switch.
4. Reverse these steps to install the new micro switch.

Shifter Bottom Plate Replacement

If the shifter does not go into certain gears, or slips out of gear, the bottom plate may be worn. Perform the following steps to replace the bottom plate:

1. Remove the shifter assembly from the housing as described on page 39.
2. Remove the four screws that secure the bottom plate and remove the plate.
3. Reverse these steps to install the new bottom plate.

E-Brake Button Service

1. Remove the four screws that secure the small metal plate in place below the E-Brake button. This gives you access to the micro switch and bulb under the button.
2. To replace the button or change the bulb, refer to *Driving Control Panel Button Service* on page 38. The E-Brake button is assembled the same as the control panel buttons.

Audio Amp and Speakers Service

The u5.1 audio amp supports 6-channel 5.1 Surround Sound. The audio amp is powered by the +5/+12 volt DC power supply through a standard PC power connector.

The volume level for each channel on the audio amp can be manually adjusted using a small screwdriver to turn the pots, shown in Figure 27. For best results, turn each pot counterclockwise to turn the volume levels all the way down. Next, turn each pot 1/5 of a turn clockwise to bring the volume levels up. Fine-tune the sound levels for your location from this point.

Use the Sound Test screen in the Operator Menu to test each speaker on the cabinet.

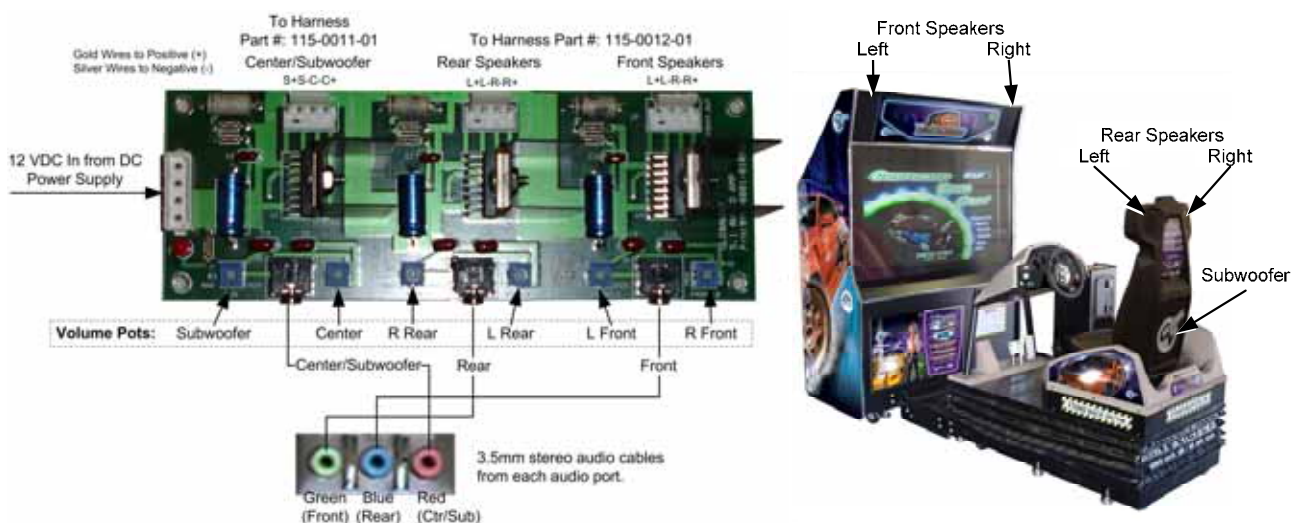


Figure 27. Audio Amp Connections, Volume Adjustment, and Speaker Locations

Three 3.5 mm stereo audio cables connect the computer audio ports to the audio amp. Each audio port on the computer is color coded to help identify the channel.

- The **green** audio port is for front speakers, left and right.
- The **blue** (middle) audio port is for rear speakers, left and right.
- The **red** audio port is for bass speaker (subwoofer).

Each speaker is connected to the corresponding speaker output on the audio amp. The figure above shows the location of each speaker.

Audio Amp PCB Replacement

Caution: To prevent electrostatic discharge (ESD) damage, handle PCBs by the edges only and use a grounding wrist strap or similar precaution.

1. Remove the front access panel from the display cabinet.
2. Disconnect the power harness, speaker wires, and 3.5mm audio cables from the audio amp PCB.
3. Use a small Phillips screwdriver to remove the four (4) screws holding the PCB to the cabinet. Always keep the audio amp PCB inside an ESD anti-static bag when not installed in the cabinet to prevent electrical damage.
4. Reverse these steps to re-install the audio amp PCB.

Front (Marquee) Speaker Replacement

The front speakers are located on either side of the marquee.

1. Remove the five (5) screws that secure the retaining bracket above the marquee. Remove the bracket, marquee clear plastic, and speaker grills.
2. Remove the four (4) screws that secure the speaker to the cabinet.
3. Remove the wires from the speaker and install them to the same connectors on the replacement speaker.
4. Reverse these steps to re-install the speaker.

Rear (Seat) Speaker or Subwoofer Replacement

The rear speakers are located behind the two small grills at the top rear of the seat. The subwoofer is located behind the large grill at the center rear of the seat.

1. Remove the four (4) 1/4-20H Torx security screws that secure the speaker grill to the back of the seat.
2. Remove the four (4) screws that secure the speaker or subwoofer to the seat.
3. Remove the wires from the speaker or subwoofer and install them to the same connectors on the replacement speaker or subwoofer.
4. Reverse these steps to re-install the speaker or subwoofer.

Computer Replacement

Caution: The computer is serviced as one unit. YOU WILL VOID YOUR WARRANTY if you open the computer without direct authorization from the GLOBAL VR Technical Support staff.

Perform the following steps to remove the computer from the cabinet:

1. Disconnect both cabinet AC power cords and open the back of the display cabinet (see page 32).
2. Disconnect all of the cables from the computer.
3. Remove the Game Dongle and keep it with your cabinet. **Do not** ship the game dongle with the computer. It contains information that needs to stay with the cabinet.
4. The computer is secured in place with a U-bracket. Remove the two (2) screws at each end of the U-bracket and remove the bracket and the computer.
5. Reverse these steps to replace the computer. Make sure that the computer air vents are not blocked. There is an air vent under the bottom front panel of the computer that is easily blocked by padding or debris. Be sure to reconnect your Game Dongle.
6. After replacing a computer, be sure to calibrate the pedals and steering (see page 23). Set up your cabinet from the Operator Menu (see Chapter 5).

When shipping the computer, always use plenty of padding and protection. GLOBAL VR recommends shipping the computer in a box with three inches of foam padding on all sides.

Caution: Shipping the computer without enough padding can VOID THE WARRANTY if the computer is visibly damaged from shipping.

Cold-Cathode Florescent Light Service

Cold-Cathode Florescent Lights (CCFLs) are used to illuminate the control panel and the floor under the motion base. CCFLs are powered by +12 VDC from the DC Power Supply. Perform the following steps to replace a CCFL:

1. For the Motion Base CCFLs, lower the bellows. For the Control Panel CCFLs, remove the screws that secure the upper cowling over the control panel assembly. Locate the light tubes and inverters inside the assembly.
2. To replace a light tube, disconnect the tube from the power inverter and then remove the screw-down cable ties that secure the cold-cathode tube to the cabinet.
3. To replace an inverter, disconnect the power connector and light tubes and remove the inverter from the cabinet.
4. Reverse these steps to install the new tube or inverter.

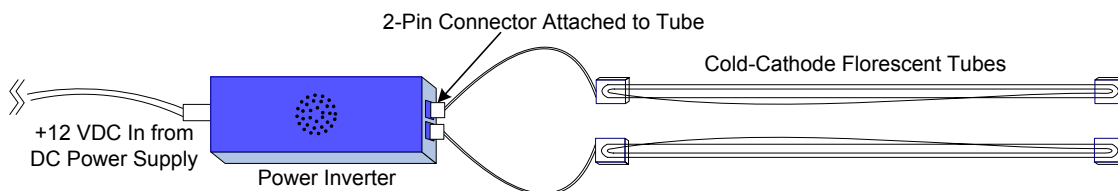


Figure 28. Cold-Cathode Florescent Light (CCFL)

Tear-Down Procedure

Perform the following steps if you need to disassemble the cabinet.

1. Turn off the Display Cabinet ON/OFF Switch and Motion Base Power Breaker and disconnect both cabinet AC power cords.
2. Remove the nuts and bolts that secure the Coin Tower Assembly and Spacer Block to the Motion Base.
3. Disconnect the Coin Tower cables.
4. Store the Assembly Hardware and Bracket where they will not get lost.
5. Remove the nuts and bolts that secure the Motion Base and Display Cabinet to the Interconnect Bridge. Store all hardware and brackets where they will not get lost.
6. Disconnect the Cables between Motion Base and Display Cabinet.
7. Open the front access door on the Display Cabinet, and secure and store all cables inside.
8. Lower the Caster wheels to the floor and raise the Leg Levelers.
9. After raising the Leg Levelers, the Display Cabinet and Motion Base are ready for repacking.

Repacking the Motion Base

1. The Motion Base is delivered on a custom-built pallet. This pallet should be used if you need to ship the motion base. A plywood sheet is provided to use as a ramp.
2. Roll the Motion Base onto the pallet using the plywood ramp.
3. Refasten the plywood ramp to the shipping position.
4. Fasten the Motion Base to the pallet with the two ratchet strap.
5. Cover and wrap the Motion Base to prevent damage.

Repacking the Display Cabinet

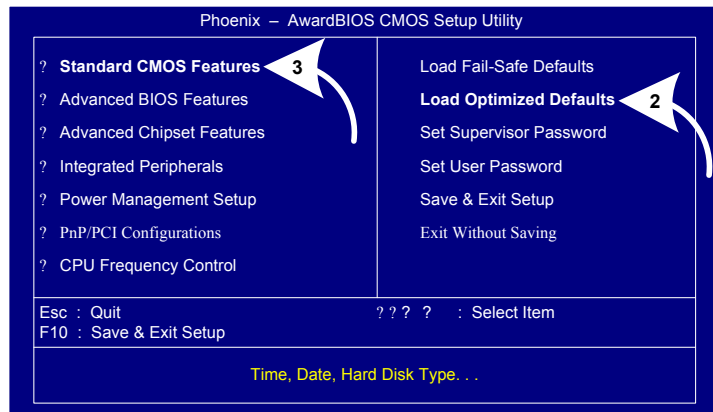
1. Lift or slide the Display Cabinet onto a pallet (using a forklift is recommended).
2. Place the Spacer Block inside the bottom of the Coin Tower, and place the Coin Tower and Interconnect Bridge on the pallet with the Display Cabinet.
3. Fasten the Display Cabinet to the pallet with ratchet straps.
4. Cover and wrap the Cabinet to prevent damage.
5. Secure the cabinet to the pallet with straps.

Setting the Computer BIOS (CMOS)

These steps apply only to the DFI PS35-BL Motherboard.

Important: Your screens may not look exactly like the screens in the pictures that follow, and some settings in the pictures may be different from your system. **Do not change any settings that are not specifically described in this document.**

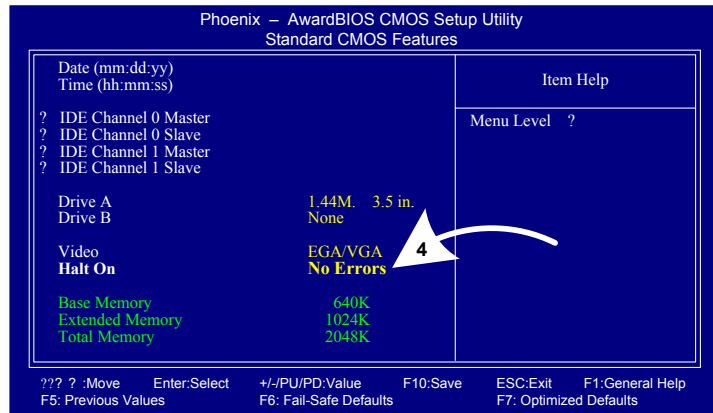
1. Press the **DEL** key during boot. The CMOS Setup Utility Main Menu will appear:
2. Use the Arrow keys ($\uparrow\downarrow\rightarrow\leftarrow$) to select **Load Optimized Defaults**, and press **Enter**.
Press **Y** and **Enter** when prompted to confirm the change.
3. Use the Arrow keys to highlight **Standard CMOS Features**, and then press **Enter**.



A screen similar to the following will appear:

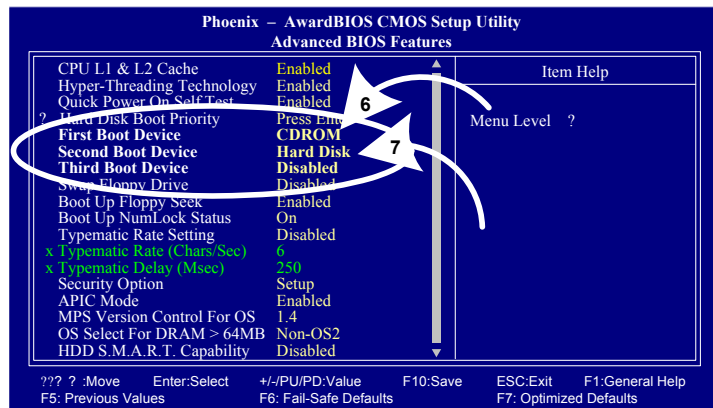
4. Use the Arrow keys to highlight the setting for **Halt On** and press **Enter**.
Use the **Page Up** and **Page Down** keys to change the setting to **No Errors**.

Press **ESC** to go back to the Main Menu.



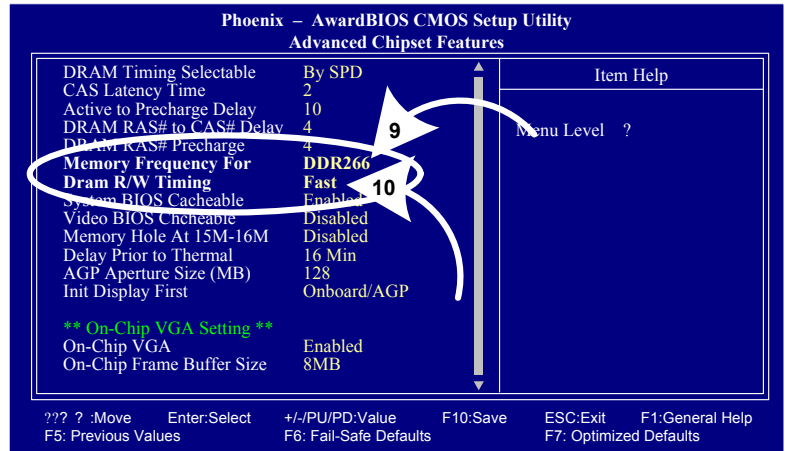
5. Now use the Arrow keys to highlight **Advanced BIOS Features** and press **Enter**. A screen similar to the following will appear:
6. Use the Arrow keys to highlight the setting for **First Boot Device** and press **Enter**.
Use the **Page Up** and **Page Down** keys to change the setting to **CDROM**.
7. Set **Second Boot Device** to **Hard Disk** and **Third Boot Device** to **Disabled** the same way.

Press **ESC** to go back to the Main Menu.



8. Now use the Arrow keys to highlight **Advanced Chipset Features** and press **Enter**. A screen similar to the following will appear:

9. Use the Arrow keys to highlight the setting for **Memory Frequency For** and press **Enter**. Use the **Page Up** and **Page Down** keys to change the setting to **DDR266**.

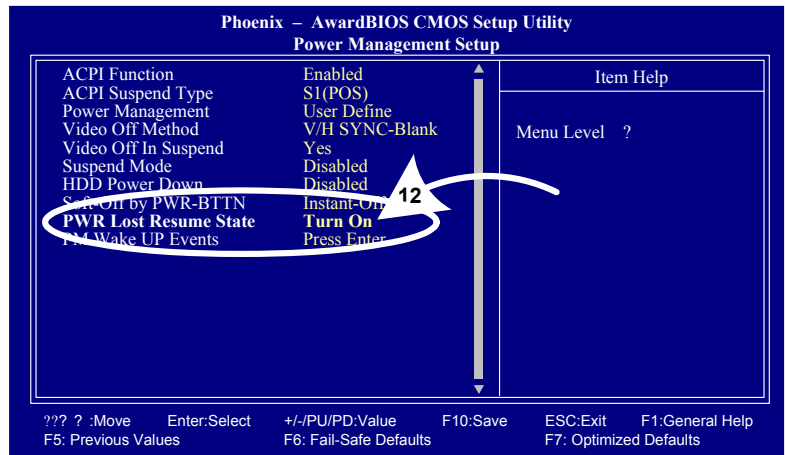


10. Use the Arrow keys to highlight the setting for **Dram R/W Timing** (if listed) and press **Enter**. Use the **Page Up** and **Page Down** keys to change the setting to **Fast**.

Press **ESC** to go back to the Main Menu.

11. Now use the Arrow keys to highlight **Power Management Setup** and press **Enter**. A screen similar to the following will appear:

12. Use the Arrow keys to highlight the setting for **PWR Lost Resume State** and press **Enter**. Use the **Page Up** and **Page Down** keys to change the setting to **Turn On**.



13. Now that all settings are correct, press **F10**. The following prompt will appear:

Save to CMOS and EXIT (Y/N) Y

14. Make sure "Y" shows at the end of the prompt (use the arrow keys to select, if necessary), and press **Enter** to save the settings and exit.

Chapter 6 — Troubleshooting



Do not connect or disconnect any cables or connectors on this game with the power on. Doing so could potentially damage the game.

General Troubleshooting

Problem	Cause	Possible Solution
No power	Cabinet not connected to AC power, or turned off	Make sure both AC power cords are firmly connected to the power plate and active AC outlets. Make sure the Display Cabinet ON/OFF Switch and Motion Base Power Breaker are both ON.
	Blown fuse or breaker	Check the breakers for the AC wall outlets.
No power to monitor, lights, or audio	Power strip not plugged in or turned off	Make sure the power indicator light on the power strip is on. If it is off, make sure the connections to the AC power plate terminals are firm and the power strip ON/OFF switch is ON.
Game dongle not found by system computer	Game dongle not connected	Make sure the game dongle is securely connected. Power the cabinet off and then on.
	Faulty game dongle	Make sure the dongle is connected properly. (USB dongles illuminate when recognized by the computer.) Contact Tech Support if you need a new dongle.
	Faulty USB port	Try connecting the dongle to a different USB port.
Game Freezes	Computer overheating due to poor ventilation	Check computer fan operation and airflow. See also <i>Cabinet gets very warm</i> , directly below.
Cabinet gets very warm	Faulty cooling fan	Verify that all cooling fans are working. Replace any fan that is worn or spinning slowly. See Figure 31 on page 55 for fan locations.
	Cabinet ventilation holes are blocked	Make sure you have proper clearance between the cabinet rear and the wall. Make sure the vent holes are clear of dust and debris and that air can flow freely.
Marquee lamp does not light or is intermittent	Faulty florescent tube	Check the florescent tube for darkened or cracked ends. Replace the florescent tube if it looks worn.
	Faulty florescent fixture	Verify the florescent tube pins make a good connection with the lamp fixture. Check the ballast for proper operation. Replace fixture if faulty.
Game will not accept coins	Faulty coin mech	Verify the coin mech is not jammed. Make sure the coin mech is properly aligned and latched to the coin door.
	Faulty ground wire	Check the ground wire to the coin door.

Problem	Cause	Possible Solution
Bill Acceptor will not accept bills	Faulty Bill Acceptor	Verify the Bill Acceptor is powered on and working. If the bill validator is faulty it will usually blink an error code on the inside of the coin door.
	Incorrect dipswitch setting	Set dipswitches for Long Pulse or Gaming (not Short Pulse or Vending).
Bill Acceptor rejects too many bills	Poor ground	Verify the cabinet is properly grounded. If the bill validator has a ground wire, make sure it is properly connected to ground.
Wrong number of credits given when money is inserted	Incorrect setting	Adjust settings from the Operator Menu.
	Faulty wiring	Disconnect cabinet power cords. Check all coin mech wiring. Verify no wires are frayed or shorting to ground.

Video Troubleshooting

Problem	Cause	Possible Solution
No picture on monitor	Patch Disk Required	Some monitors require special drivers. Check for any patch disks and/or special instructions for your monitor.
	Power problem	Verify the power connection to the monitor.
	Loose or faulty video cable	Verify that the video cable is firmly connected from the monitor to the video card on the computer. While the monitor is powered ON, disconnect the video cable. You should see a message on-screen saying <i>No Signal</i> if the monitor is working. Check the video cable and make sure it is not pinched or frayed.
	Loose or faulty video card	When the computer boots up, it performs a PC self-diagnostic test. If you hear 3 beeps from the computer, this indicates a problem with the video card. If the video card is faulty, contact Technical Support.
Picture is dim or faded	Gamma needs adjustment	Use the monitor remote control to adjust the brightness and contrast settings. Adjust the monitor gamma setting from the Operator Menu to increase overall brightness (see page 26).
Color is poor	Color needs adjustment	Use the monitor remote control to adjust the red, green, and blue color settings.
Picture is misaligned	Geometry needs adjustment	Use the monitor remote control to adjust the picture height and width as well as other geometric adjustments.
No video and no audio (Note: It may take nearly 2-1/2 minutes to boot and start the game.)	No power to computer	Verify the computer is ON by the green LED on the front of the computer. Verify the line voltage switch on the back of the computer is set to the correct voltage for your area: 115V or 230V. Make sure the AC power cord is firmly connected to the computer and the power strip. Turn off the power strip, wait 20 seconds, and then turn it back on to reboot the computer.
	Corrupted software	Restore the Software (see Chapter 4 on page 28). If you continue to have problems, you may have a faulty hard drive.

Problem	Cause	Possible Solution
<i>(Continued)</i>	Faulty hard drive	If you continue to have problems after you reload the software, you may have a faulty hard drive. Contact Technical Support.

Audio Troubleshooting

Problem	Cause	Possible Solution
No audio	Volume set too low	Enter the Operator Menu and adjust Audio Settings to raise the volume. Verify that the Master Volume is set high enough. Verify the volume is not turned all the way down at the Audio Amp PCB (see Figure 27 on page 40).
	Faulty wiring	Turn off the game. Verify that all the wires are firmly connected to the speakers and Audio Amp PCB. Verify that each wire is connected to the correct port. Verify that no wires are frayed or improperly shorting to ground. (See Figure 27 on page 40).
	Blown speakers	Remove the grills and inspect each speaker for visible damage. Run the Speakers Test from the Operator Menu to verify each speaker is working.
	Faulty audio amp PCB	Connect stereo headphones to the audio ports on the computer to verify that sound is working at the computer. You can test the Audio Amp PCB by installing it in another working cabinet.
Poor sound from one or more speakers	Blown speakers	Remove the grills and inspect each speaker for visible damage. Run the Speakers Test from the Operator Menu to verify each speaker is working.
	Reversed wires	A weak or low muffled sound is a sign of reversed speaker wires. Swap the wires on one speaker. (See Figure 27 on page 40 for audio wiring).
	Faulty audio amp PCB	Connect stereo headphones to the audio ports on the computer to verify that sound is working at the computer. You can test the Audio Amp PCB by installing it in another working cabinet.
	Faulty wiring	Verify that all the wires are firmly connected to each speaker and the Audio Amp PCB. Verify that no wires are frayed or improperly shorting to ground.
Audio hum	Faulty power supply	A constant low hum in the speakers can be caused by a faulty power supply.

Control Troubleshooting

Problem	Cause	Possible Solution
Buttons do not work	Faulty micro switch	Replace the micro switch on the button and re-test. Verify that the wires are connected to the correct spades on the micro switch.
	Faulty wiring	Disconnect the cabinet from AC power. Verify that all wires are firmly connected to each button. Check connections to USB I/O PCB. Verify that no wires are frayed or improperly shorting to ground.

Problem	Cause	Possible Solution
(Continued)	Faulty USB I/O PCB	Make sure that all connections to the USB I/O PCB are firm. Replace PCB if advised by Tech Support.
Steering pulls to one side	Faulty force-feedback PCB	Verify that the force-feedback PCB is getting 24 volts DC power. Test the PCB in a working cabinet.
	Faulty force-feedback power supply	Use a volt meter to verify that the force-feedback power supply is putting out 24 volts DC.
Sloppy or poor steering	Poor calibration	Calibrate the steering from the Play Control Test in the Operator Menu.
	Faulty 5 K Ω steering pot	Test the steering calibration from the Play Control Test in the Operator Menu. Replace pot if faulty (see page 37).
	Loose or worn drive belt	Turn off the cabinet. Open the driving control panel and check the belt on the steering motor and steering column. Check for loose or worn parts on the force-feedback assembly (see page 37).
	Faulty force-feedback PCB	Verify that the PCB is getting 24 volts DC power. Test the PCB on a working cabinet.
No force-feedback in the steering wheel	Faulty force-feedback power supply	Use a voltmeter to verify that the force-feedback power supply is putting out 24 volts DC.
	Steering motor not properly grounded	Make sure the steering motor frame is properly grounded. Static shock can stop the steering wheel from responding during game play. Power the cabinet OFF and then ON to correct this problem.
	Faulty force-feedback PCB	Verify that the PCB is getting 24 volts DC power. Test the PCB on a working cabinet.
	Force-feedback PCB connected to wrong USB port	The force-feedback PCB must be connected to a PCI USB port, not to a motherboard USB port. See Figure 42 on page 64 for a diagram of the computer ports.
Steering does not auto-calibrate	Faulty USB cable or PCI USB card	Test by connecting to one of the USB ports on the computer motherboard and rebooting twice. Re-connect to the PCI USB port and reboot after testing to avoid intermittent steering loss during game play.
	Faulty force-feedback PCB	Verify that the PCB is getting 24 volts DC power. Test the PCB on a working cabinet.
Steering wheel shakes	Faulty 5 K Ω steering pot	Test pot for smooth resistance. If you replace the pot, be sure to calibrate it from the Play Control Test in the Operator Menu.
Steering stops working (Intermittent)	USB cable in wrong port	The USB cable must be connected to the PCI USB port, not the USB port on the computer motherboard (see Figure 42 on page 64).
Shifter does not work in some gears	Faulty micro switch or switches	Replace the faulty micro switch. See the Play Controls screen in the Operator menu, or page 39 of this manual to determine which micro switch to replace.
Shifter does not work	Faulty USB I/O PCB	Make sure that all connections to the PCB are firm. Replace PCB if faulty.

Problem	Cause	Possible Solution
Gas and brake do not work properly	Pedals out of calibration	Calibrate the pedals from the Play Control Test in the Operator Menu. If you replace a pot or the computer, always recalibrate the pedals. (Pedals do not auto-calibrate when you reboot the game.)
	Faulty 5 K Ω pot	Test pot for smooth resistance. If you replace the pot, be sure to calibrate it from the Play Control Test in the Operator Menu.

Cabinet Linking Troubleshooting

Problem	Cause	Possible Solution
Cabinet will not Link	Faulty wiring	Verify that an Ethernet cable is connected between the Ethernet port on the AC power plate and the computer. While the cabinet is powered on and connected to another cabinet, verify the green LED on the Ethernet card is lit to verify a good hardware connection. If you are using an Ethernet hub or switch, verify the LEDs light for each Ethernet port used.
	Wrong hardware being used	To connect two cabinets, you must use one crossover coupler (or use a hub or switch). Do not run an Ethernet cable between two cabinets without a crossover coupler. Do not use more than one coupler or use the coupler with a hub or switch. To connect more than two cabinets, you must use a hub or switch. Do not use a crossover coupler with a hub or switch.
	Faulty Ethernet hub or switch	Verify the LEDs on the Ethernet hub or switch are lit for each port used. If possible, verify the hub or switch is working by connecting it to a known working computer network or set of linked cabinets.
	Mixed software version	Verify that all cabinets are running the same software version.
Link ID Errors	Duplicate link ID numbers	If you get a duplicate Link ID number error on-screen, go into the Operator Menu and correct the Link ID number for each cabinet that displays the error message. Each cabinet in the networked group must have a unique link ID number.

Motion Base Troubleshooting

Problem	Cause	Possible Solution
Player Seat is not level during Attract Mode	Motors not calibrated	Calibrate the motors as described on page 32.
There is no power to the Motion Base None of the Fans are working	Base not plugged in	Check the AC power cords from the wall outlets to the Display Cabinet, and from the Display Cabinet to the Motion Base.
	Tripped Breaker on Cabinet	Check the Cabinet Breaker Switches: - Breaker on the power plate at the rear of the Display Cabinet - Power reset button at the front of the Motion Base near where the power cord connects
	Tripped Breaker for AC Wall Outlet	Check the Breaker Switch for the AC Outlet.
	No Voltage output at the Transformer's Secondary Winding	Check the power input to the Primary Winding of the Transformer, located in the Display Cabinet. Check power output at the Transformer's Secondary Winding.
No power to any of the Motors There <i>IS</i> Power to the Motion Base The Fans are running	Motion STOP Button cable faulty or not connected properly	Check the cable connections to the Motion STOP Button and Data Distribution Box (see Figure 37).
	RED Motion STOP Button is faulty	Check continuity across the Motion STOP Button.
NONE of the Motors are responding There <i>IS</i> Power to the Motion Base and there is power to All Motors	Loose or faulty cable (CBL-0207-X)	Check the connections between the computer and Data Distribution Box (see Figure 37).
	Loose or faulty cable (CBL-0056-X)	Check cables from Data Distribution Box to Motor Drive Boxes (see Figure 37).
	D/A Card loose inside Computer Case	Contact Technical Support for assistance. Reseat the card if advised.
	Faulty Data Distribution Box (DDB)	Contact Technical Support for assistance.
SOME of the Motors are not responding There <i>IS</i> Power to the motors	Faulty Motor or Drive Box (MDB)	Connect the suspected MDB to a Motor that is proven to work. If the good Motor will not work with the suspected MDB, the MDB is faulty.
	Loose or faulty cable (CBL-0207-X)	Check the connections between the computer and Data Distribution Box (see Figure 37).
	Loose or faulty cable (CBL-0056-X)	Check Cables from Data Distribution Box to Motor Drive Boxes (see Figure 37).
	Loose power cords (CBL-0055-X) (CBL-0059-X)	Check Power Cords from the Power Distribution Box to the Motor Drive Box. Check the Power Cable to the Motor (silver braided cable) (see Figure 37).
	Faulty Motor	Check to see if the Motor Shaft will rotate by hand (with no power to the Motor). If it will not, your Motor is faulty. If it will rotate, then check the Motor Cable (see the next item below).

Problem	Cause	Possible Solution
<i>(Continued)</i>	Faulty Motor Cable (CBL-0059-X)	Check continuity across the lines. The three voltage lines should have continuity. Next check the continuity from the Voltage Lines to Ground Line. Replace if faulty.
Motion Base moves during attract mode	Bad positioning device (pot) (ELC-0018-X)	Disable Motion Base. Contact Technical Support for a replacement pot.
Motor cannot find home position or Appears to move out of control	Bad positioning device (pot)	Disable Motion Base. Contact Technical Support for a replacement pot.
	Pot wired to the wrong Motor Drive Box	This usually happens to a pair of Motors. Switch the cables connecting to the pots of the Motors that are out of control.
	Motor wired to the wrong Motor Drive Box	Usually happens to a pair of Motors. Switch the silver Motor power cables at the Motor Drive Box.
	Pot wired wrong	Compare the wiring of the suspected bad pot to the wiring of the other pots.
Cooling Fans do not work Motors are functional	Pulley to Motor or pot is Loose	Reset setscrews on the pulley. If not repairable, contact Technical Support for a replacement.
	Loose Cable	Make sure the Power Cord to the 12 VDC Power Supply is securely connected to the Power Distribution Box.
	Faulty Power Supply	Check to see if Voltage is getting to the Fan. Contact Technical Support for a replacement.
	Faulty Fan	Replace faulty fan immediately.
	Faulty wiring	Check the power cord connection to the Fan.

Chapter 7 — Drawings & Schematics

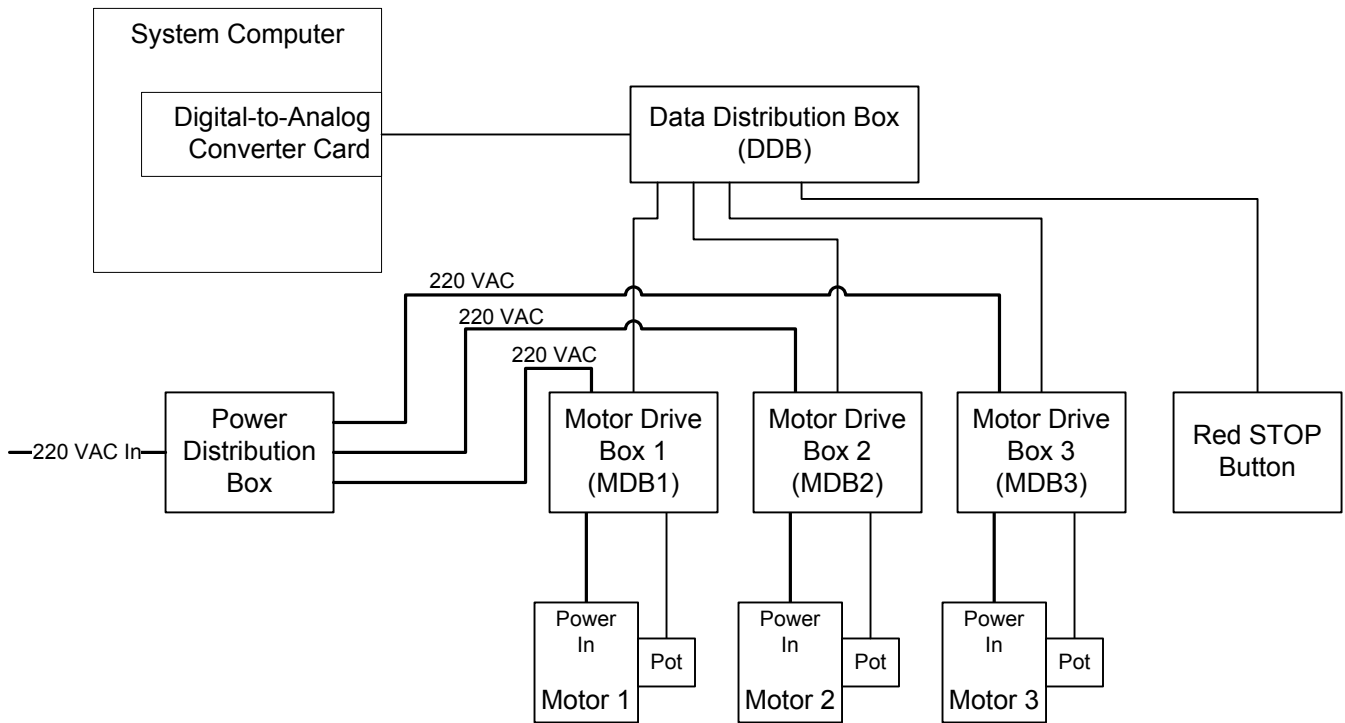


Figure 29. Motion Control System Simplified Block Diagram

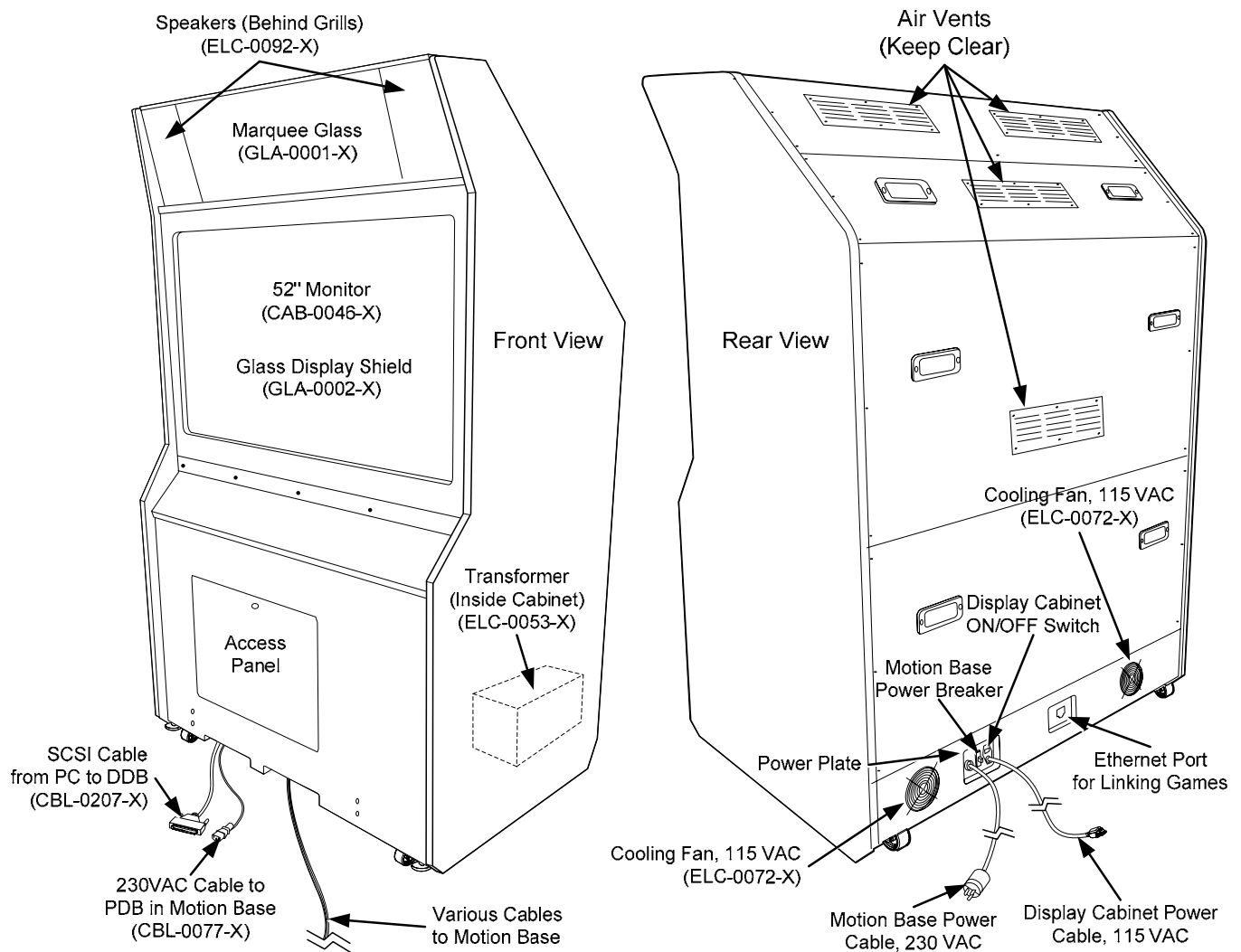


Figure 30. Display Cabinet Components

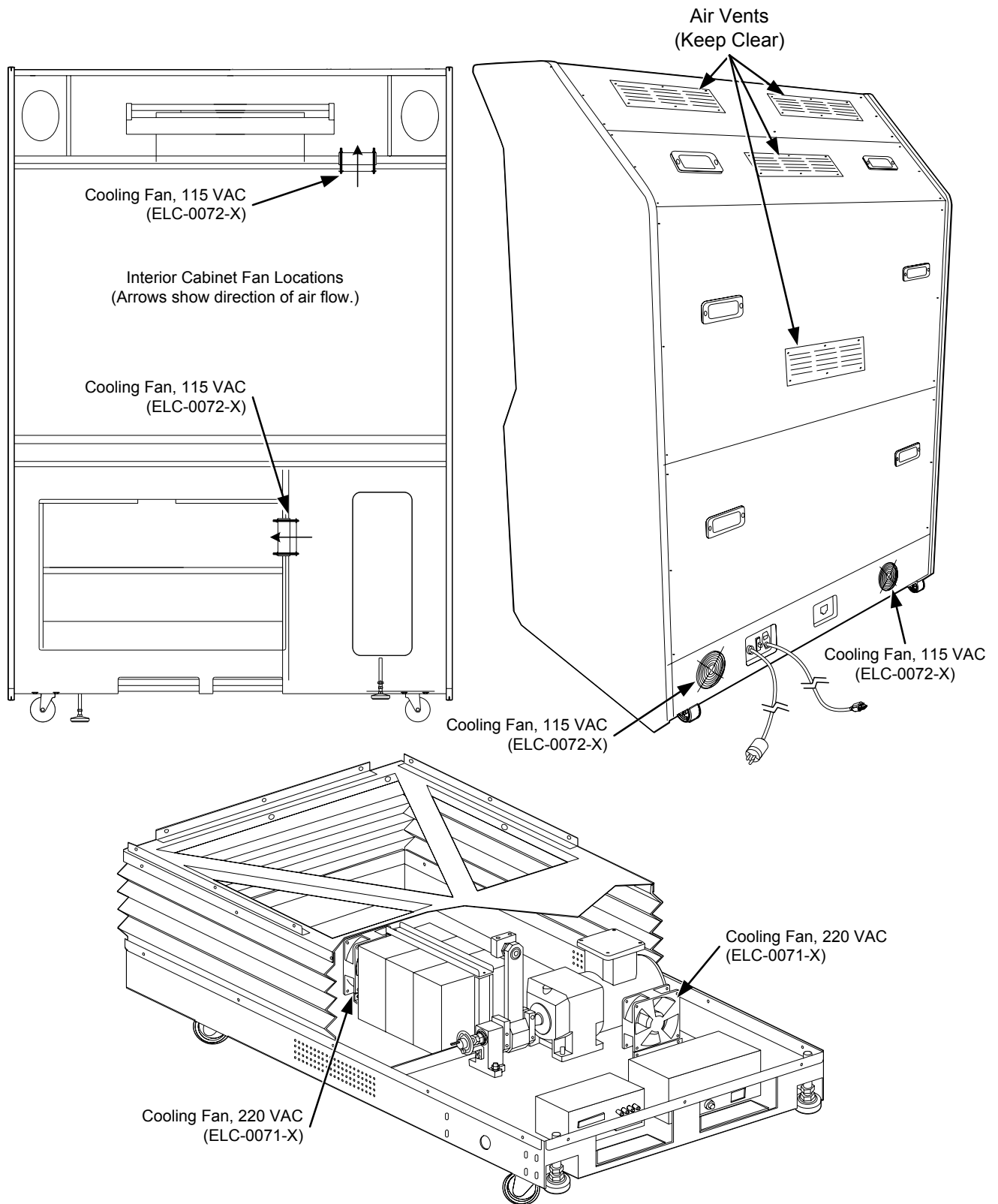


Figure 31. Cooling Fan Locations

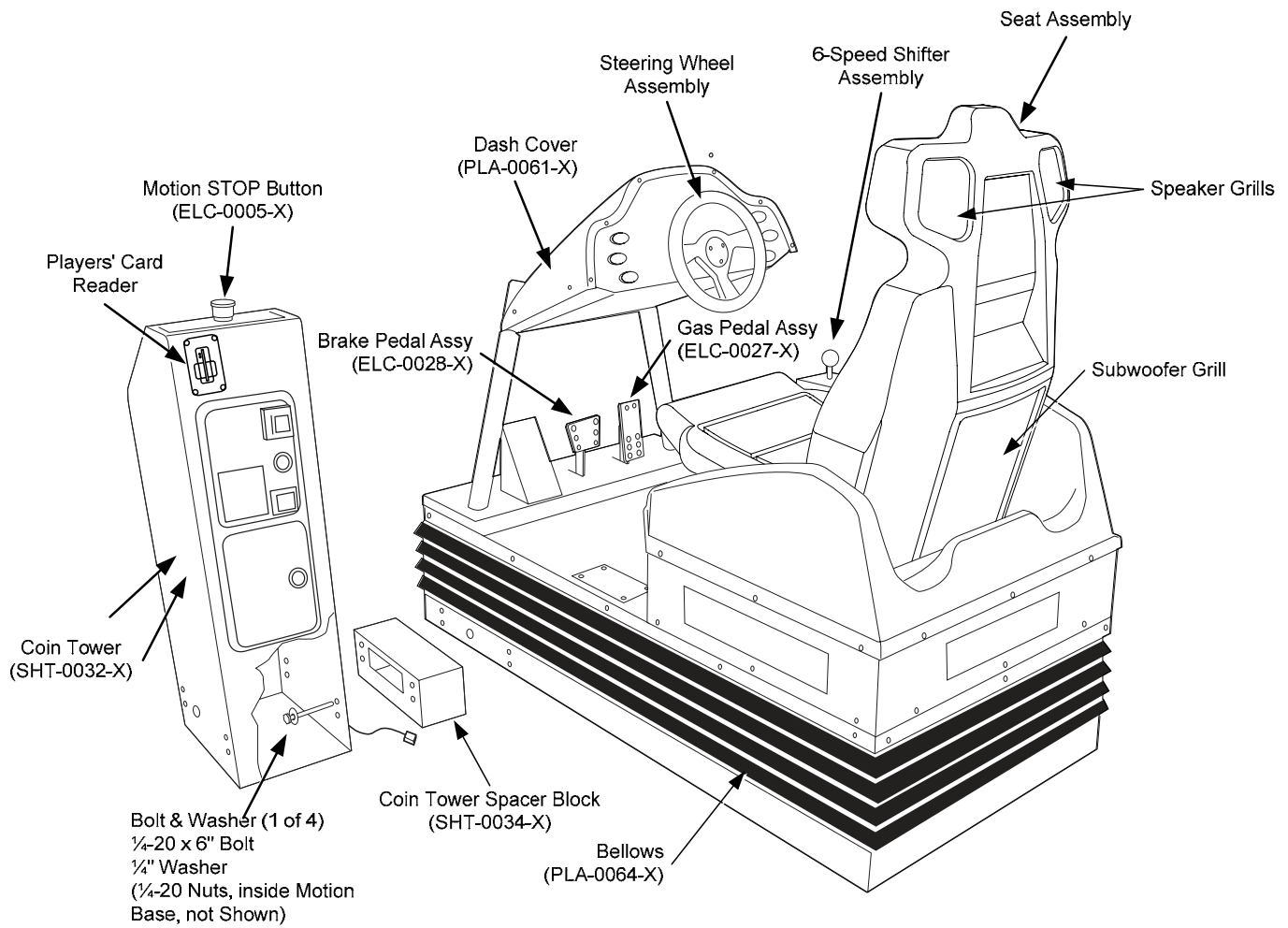


Figure 32. Motion Base with Seat and Coin Tower

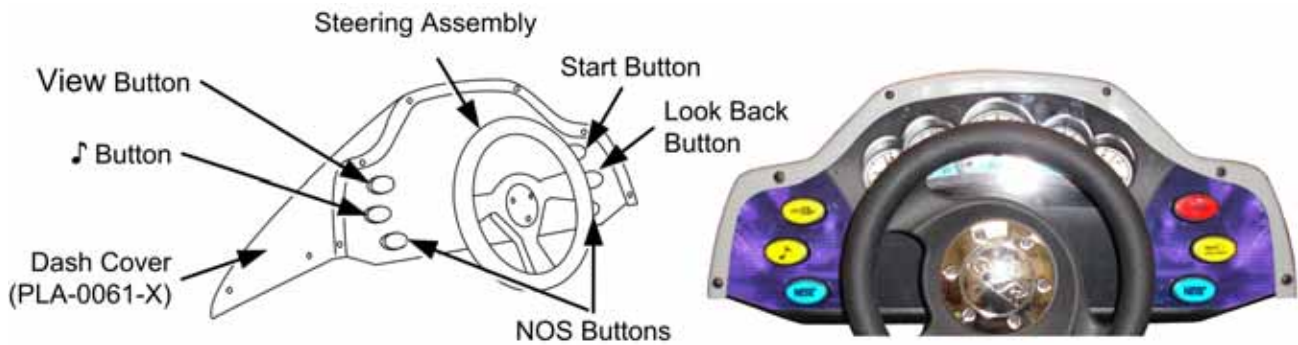


Figure 33. Control Panel Detail



Figure 34. Cabinet Artwork

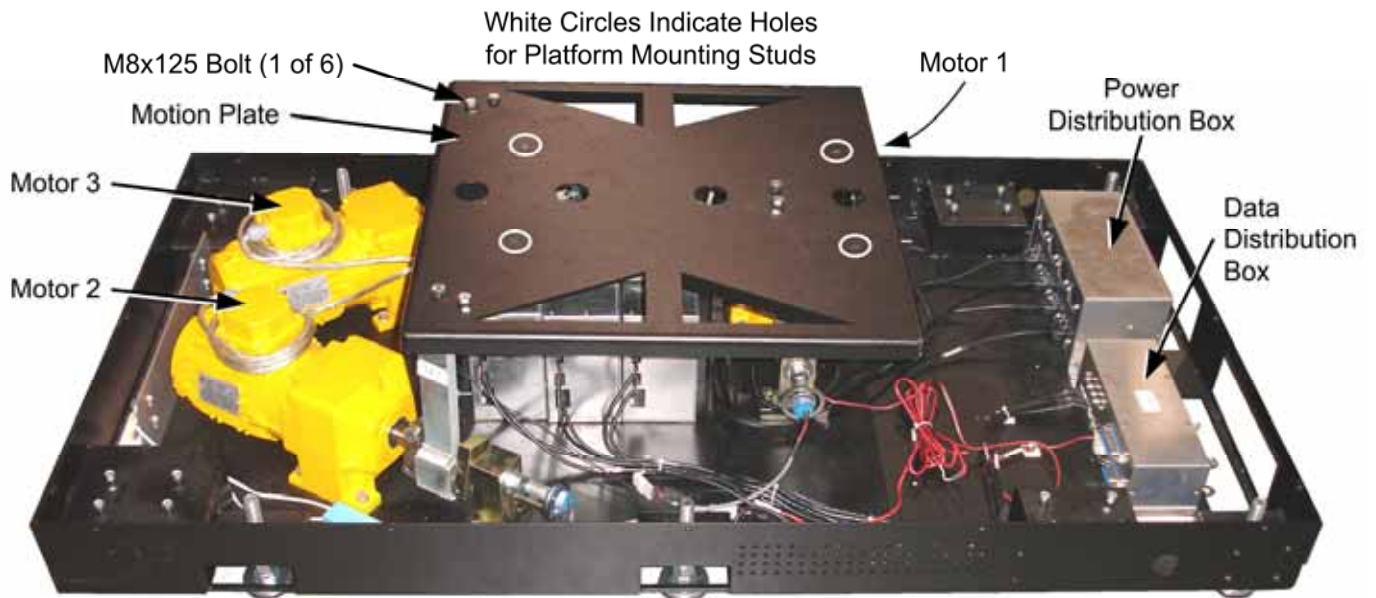


Figure 35. Motion Base Components Photo

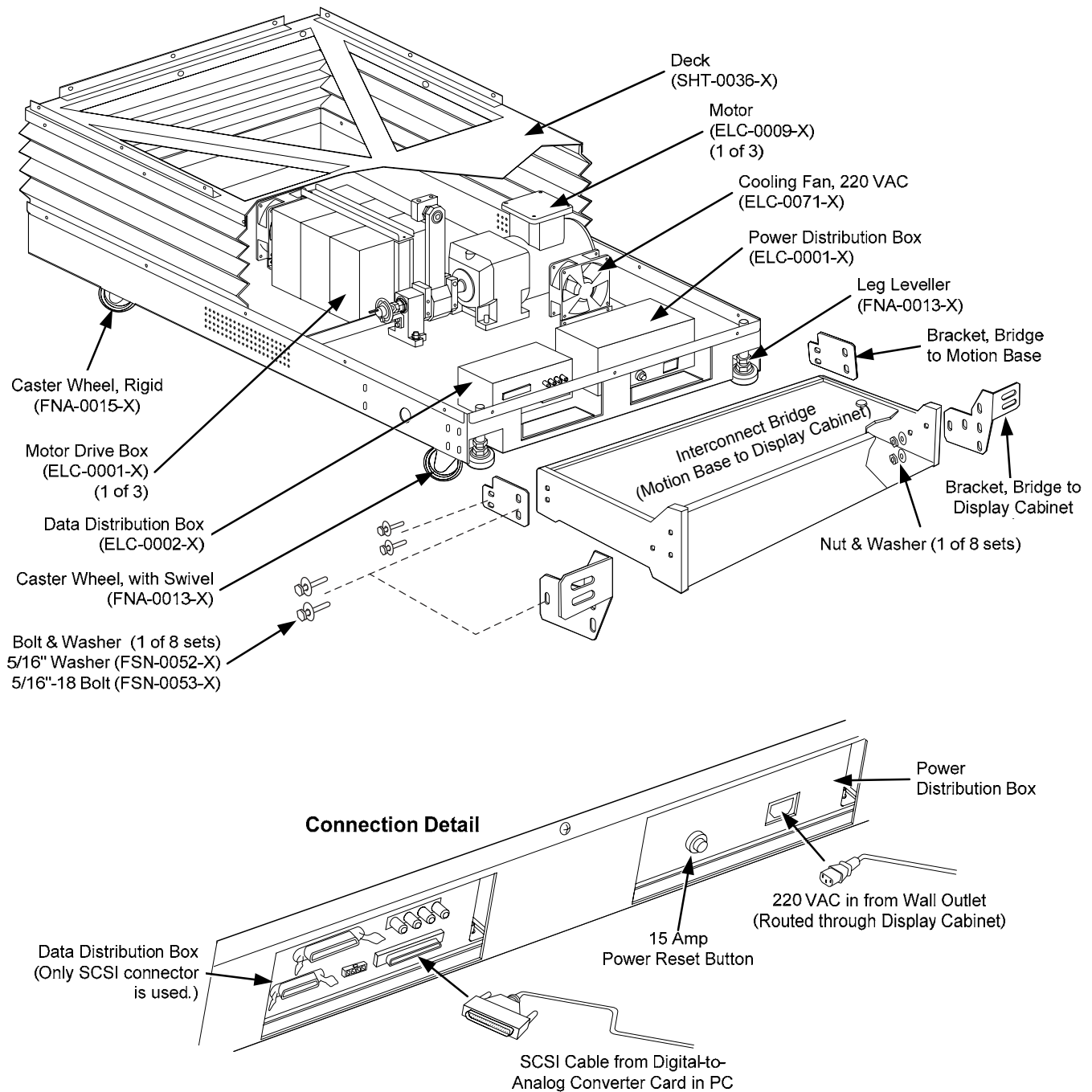


Figure 36. Motion Base Components

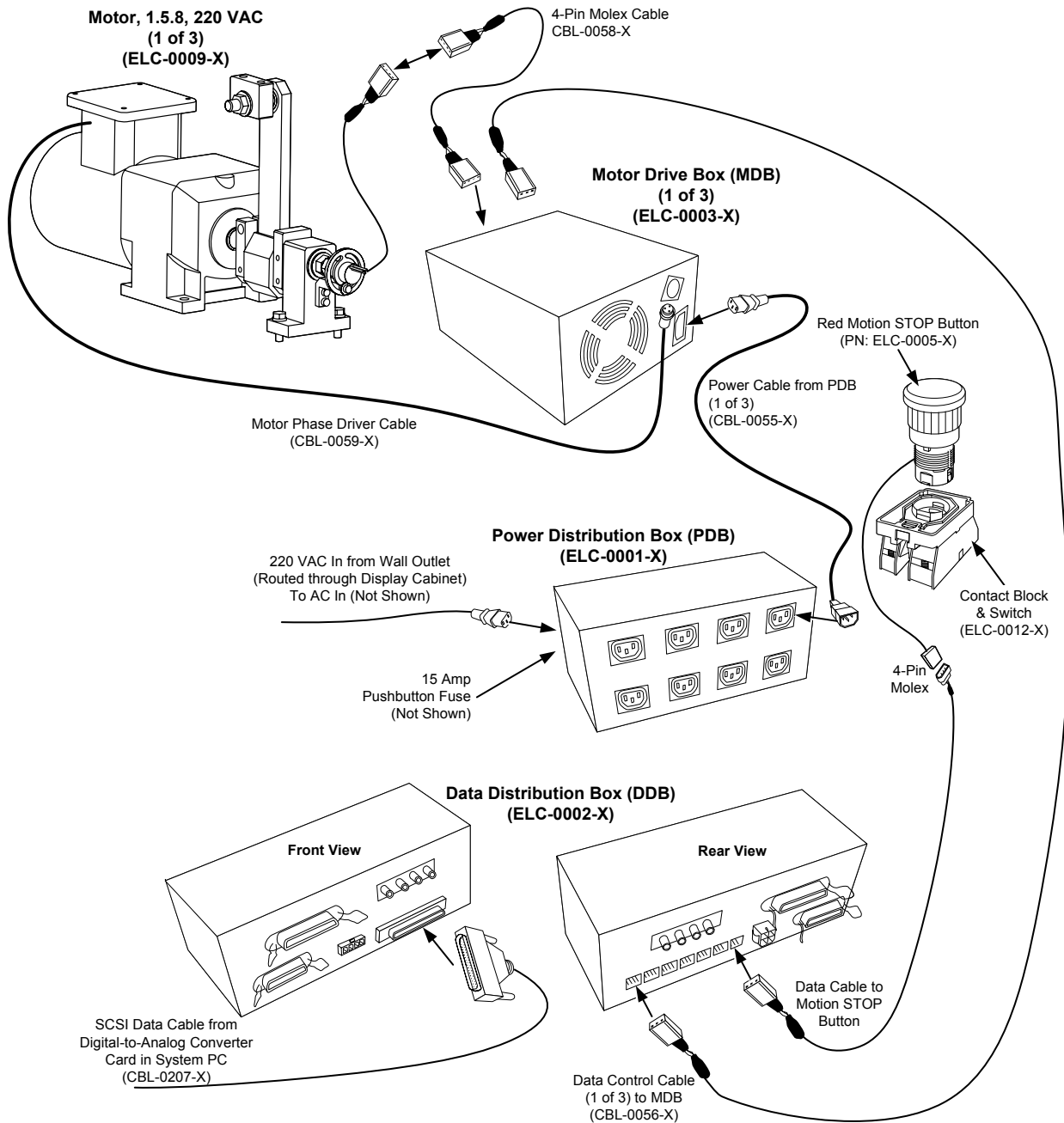


Figure 37. Motion Drive Components

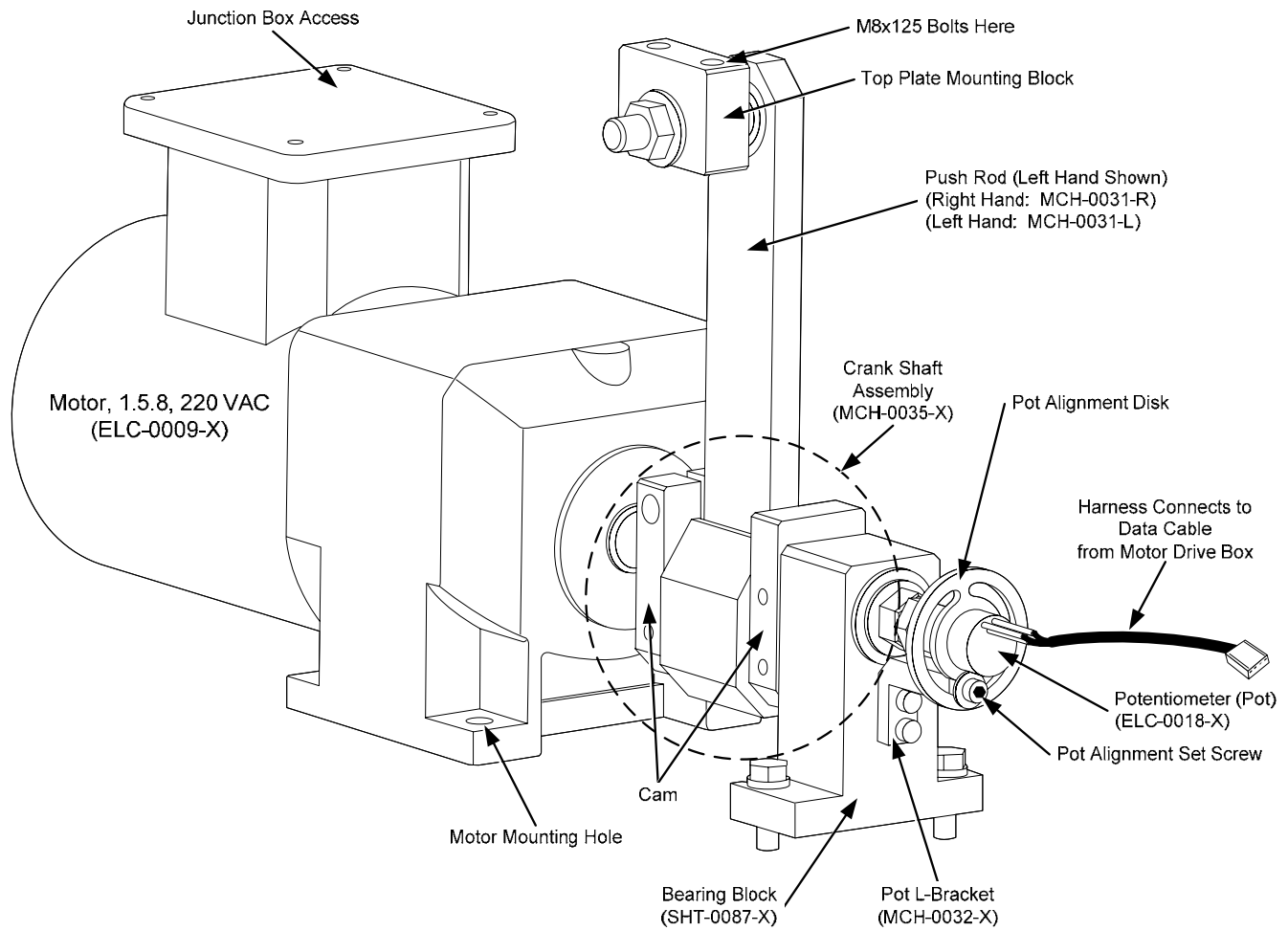
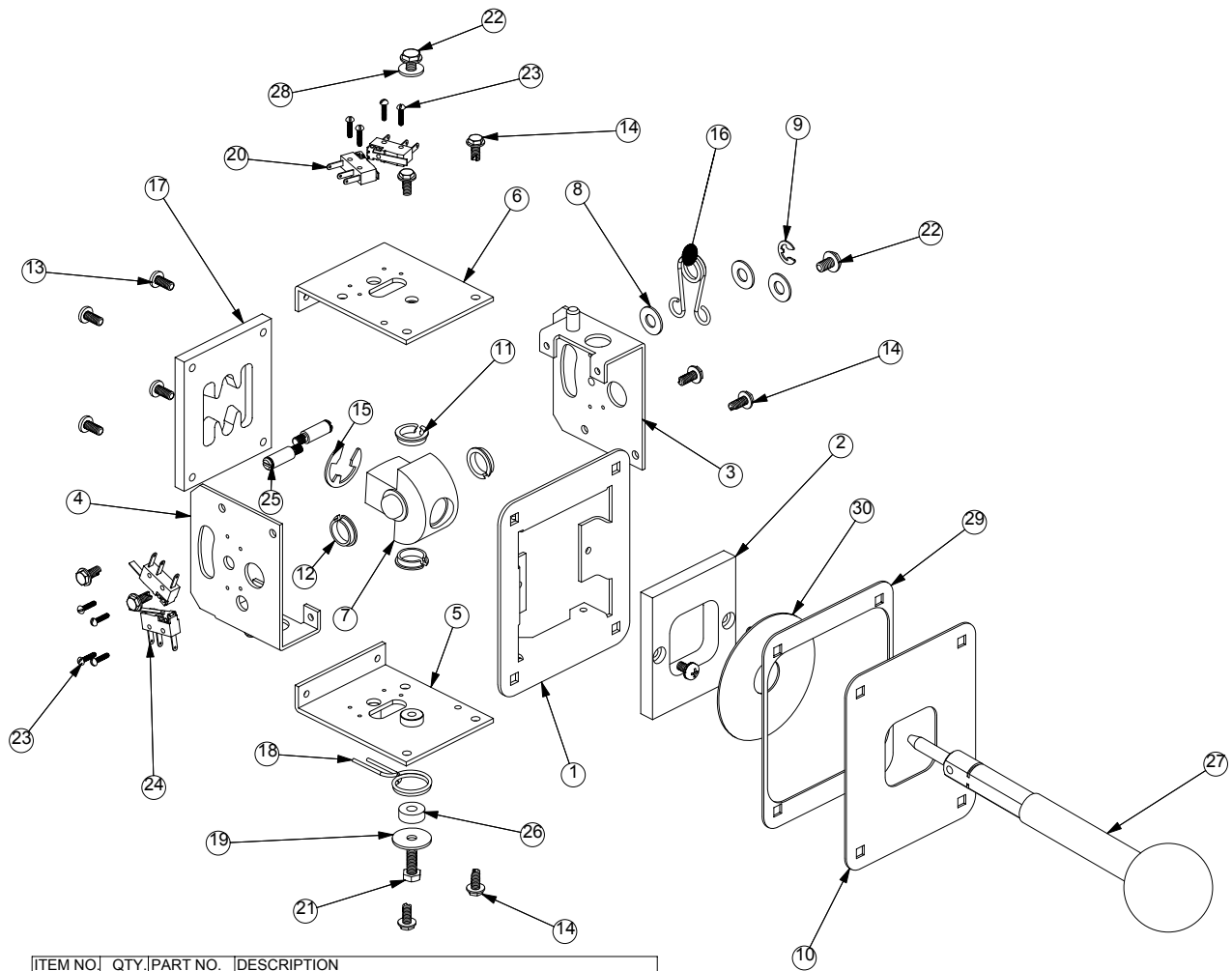


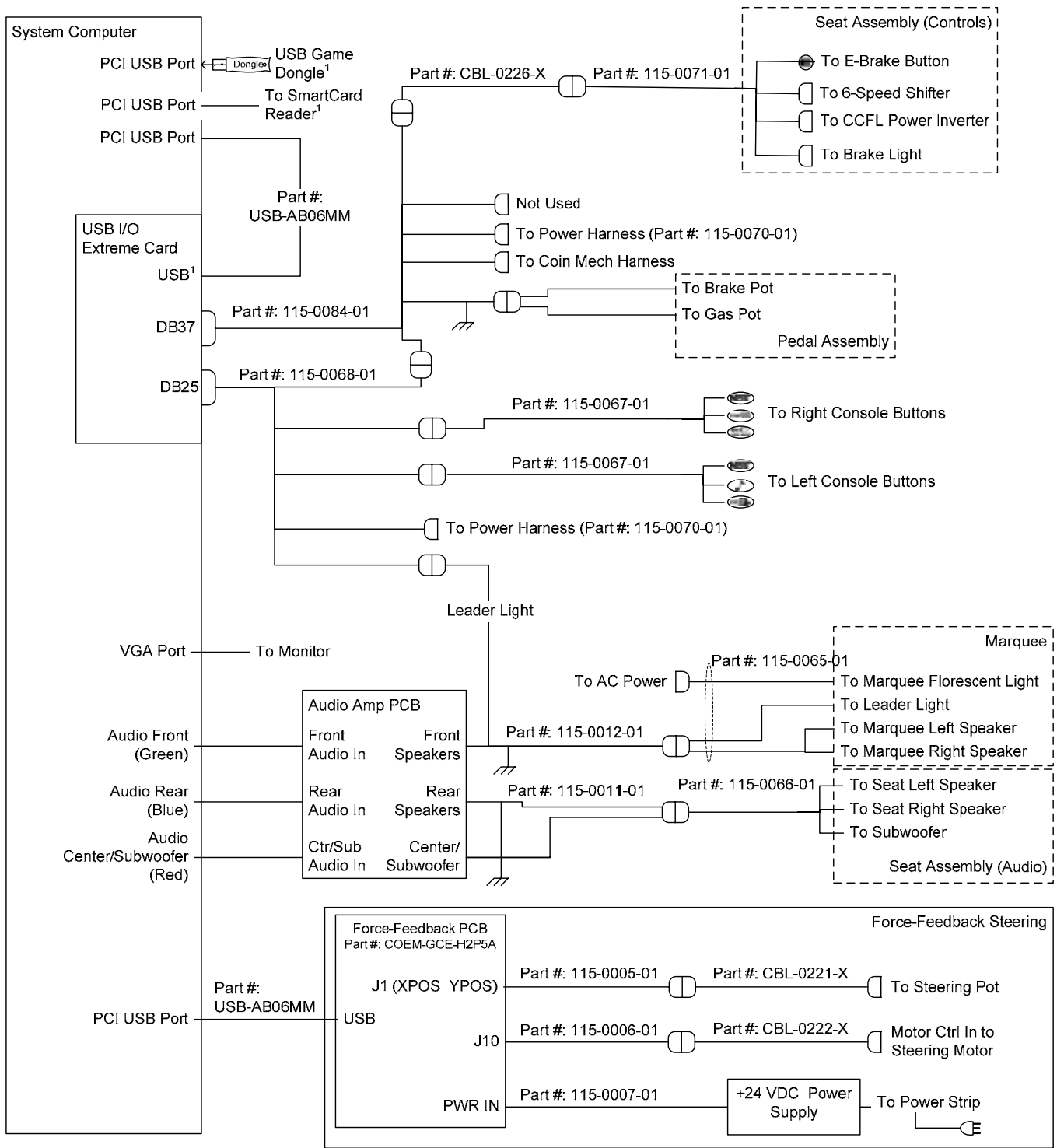
Figure 38. Motor Assembly



ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	96-0094-00	BASE PLATE 4 SPD SHFT BLK
2	1	95-2535-00	GATE BLOCK UPPER MOLDED F/6-SPD SHIFTER
3	1	95-2537-00	PIVOT PLATE F/SHIFTER W/FRONT STANDOFF & SIDE PIN
4	1	95-2537-10	PIVOT PLATE F/SHIFTER W/SIDE PIN ONLY
5	1	95-2538-00	SIDE PLATE W/HOLDING PIN
6	1	95-2538-10	SIDE PLATE NO HOLDING PIN
7	1	50-8346-00	TRUNNION, FOR I.L. TURBO SHIFTER
8	3	43-0133-00	#14S BRS FLAT WSH .26X.56X.04
9	1	43-0118-00	E-RING, 1/4" SHAFT DIA
10	1	50-0416-00	TOP PLATE, PAINTED, 6-SPD SHFT
11	2	50-8408-00	BUSHING, NYLINER, F/.078 THK MAT.
12	2	50-8491-00	BUSHING NYLINER F/.072/.135 THK MAT.
13	4	43-1319-00	SCREW 8-32 X 3/8 PPHMS ZINC
14	8	43-0252-00	SCREW, #8-32 x 3/8 HEX HEAD
15	1	50-8118-00	E-RING FOR GEAR SHIFTER M15
16	1	50-8294-00	SPRING, HAIRPIN, HLR SHFTR, SHORT
17	1	95-2536-00	GATE BLOCK LOWER MOLDED F/6-SPD
18	1	95-1392-10	TORSION SPRING
19	1	43-0997-00	FENDER WASHER .75x.19x.05 ZINC
20	2	95-4194-00	SWITCH, W/SHORT ACTUATOR
21	1	43-0062-00	10-32 X 1/2 HEX HD CAP SCREW
22	2	43-1152-00	SCREW 10-32 X 5/16 HWHCS ZINC PLATED
23	8	43-0013-00	2-56 X 3/8 SCR SLOTTED ROUND HEAD MS ZINC
24	2	95-4369-00	SWITCH ASSY DA3 95-4118-00 & 95-4130-07
25	2	50-8299-10	ANCHOR PIN, HANDLE BLK OXD.
26	1	43-0559-00	WASHER NYLON 1/2 OD X .20 ID X .185 THK
27	1	96-0090-10	KNOB & SHAFT ASSY 1-3/4 BLK BALL KNOB
28	1	43-0995-00	#10 FLAT WASHER
29	1	95-2674-00	BASE PLATE 4 SPD SHFT BLK
30	1	95-2557-00	GUIDE WASHER FOR 6-SPEED SHIFTER

Drawing © Happ Controls

Figure 39. Six-Speed Shifter Exploded View and Parts



Notes:

¹If a 2-port PCI USB card is installed, the SmartCard Reader, USB Port on USB I/O Extreme Board, and USB Game Dongle will connect through a USB Hub.

Figure 40. Simplified Wiring—Driving Controls

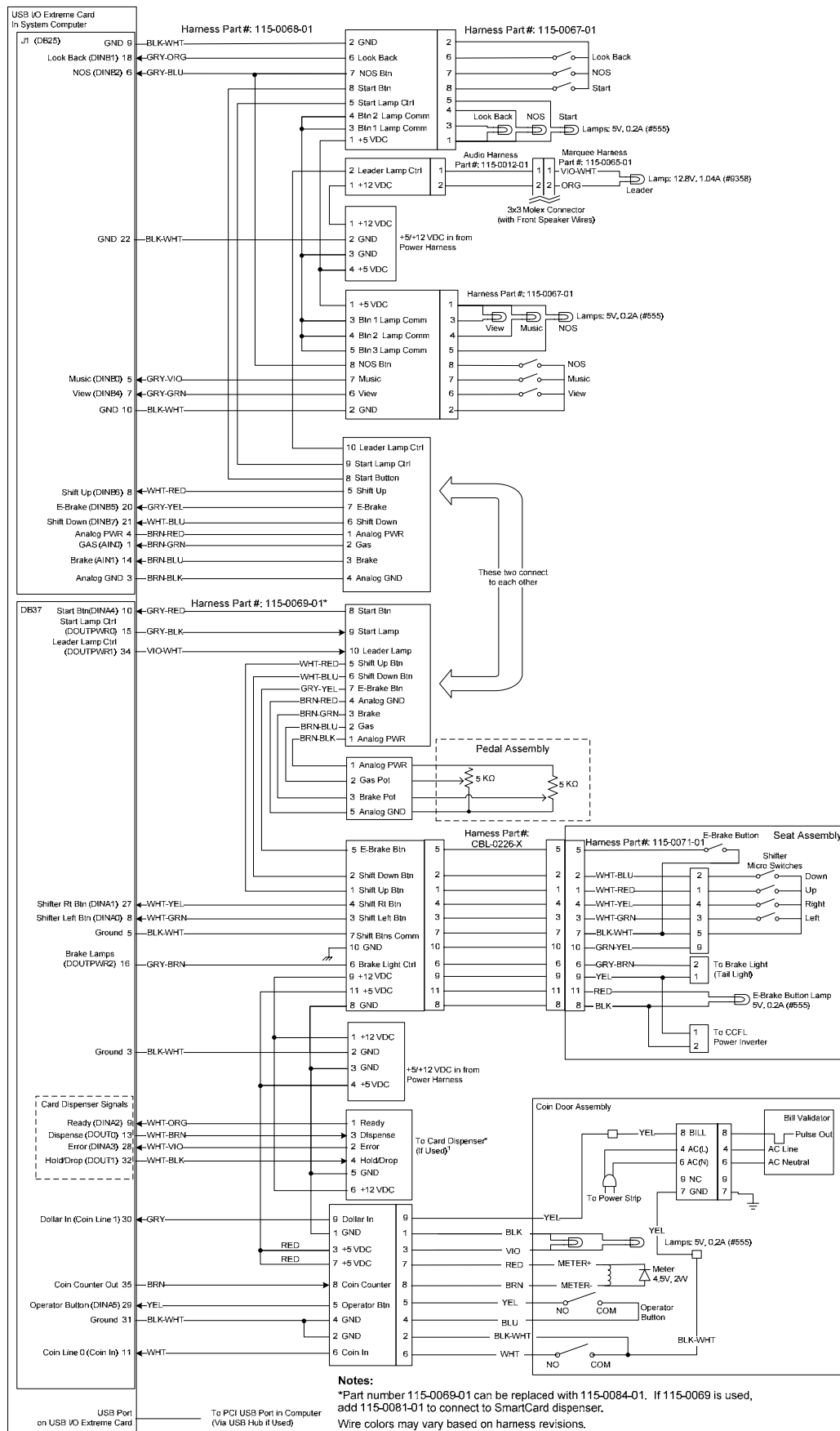


Figure 41. Detailed Wiring—Driving Controls

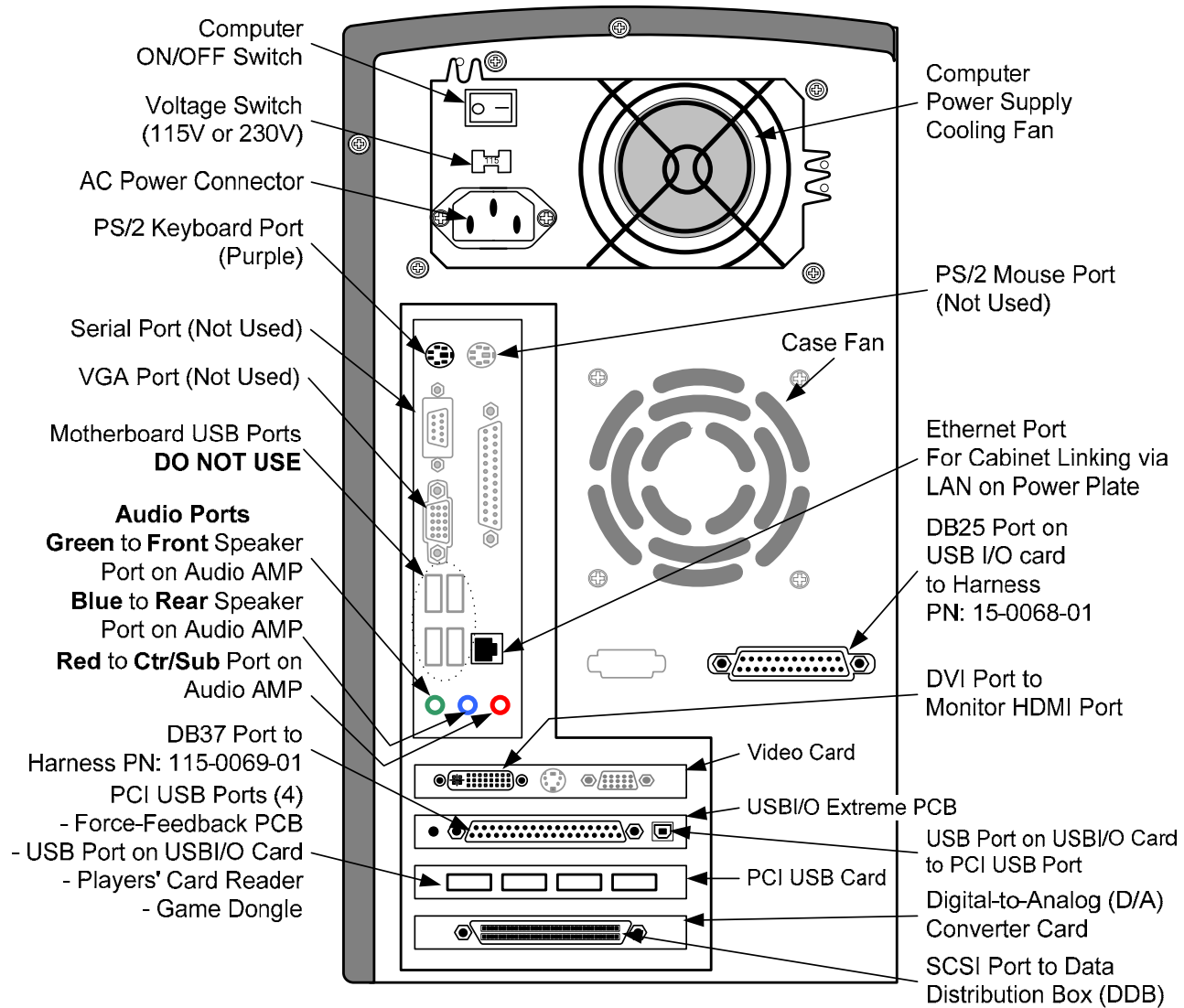


Figure 42. Computer Rear Panel Diagram

LIMITED WARRANTY

GLOBAL VR® warrants that its computer circuit boards, hard drives, power supplies, monitors, displays, controls, sensors, and mechanical structures are free from defects in materials and workmanship under normal use and service for a period of ninety (90) days from the date of shipment.

All software and accompanying documentation furnished with, or as part of the Product, is supplied "AS IS" with no warranty of any kind except where expressly provided otherwise in any documentation or license agreement furnished with the Product.

During the warranty period, GLOBAL VR® will, at no charge, repair the Product, provided:

- Purchaser believes that the Product is defective in material or workmanship and promptly notifies GLOBAL VR® in writing with an explanation of the claim;
- All claims for warranty service are made within the warranty period;
- Products are returned adequately packed and freight prepaid to GLOBAL VR®'s designated service center;
- GLOBAL VR®'s inspection or test of the Product verifies to GLOBAL VR®'s satisfaction that the alleged defect(s) existed and were not caused by accident, misuse, neglect, unauthorized or attempted repair or testing, unauthorized modification, incorrect installation, vandalism, failure to follow the maintenance schedule or procedures; or operation in out-of-specification environmental conditions.

GLOBAL VR® will return the repaired Product freight prepaid to the Purchaser. All freight costs associated with replacement of warranty parts after expiration of the original warranty period are the responsibility of the Purchaser. GLOBAL VR® is not obligated to provide the Purchaser with a substitute unit or on-site service during the warranty period or at any time. If after investigation GLOBAL VR® determines that the reported problem was not covered by the warranty, Purchaser shall pay GLOBAL VR® for the cost of investigating the problem at its then prevailing per incident billing rate. No repair or replacement of any Product or part therein shall extend the warranty period as to the entire Product. The warranty on the repaired part only shall be in effect for a period of ninety (90) days following the repair or replacement of that part or the remaining period of the Product parts warranty, whichever is greater.

Purchaser's exclusive remedy and GLOBAL VR®'s sole obligation is to supply or pay for all labor necessary to repair any Product found to be defective within the warranty period and to supply, at no extra charge, new or rebuilt replacements for defective parts. If repair or replacement fails to remedy the defect, then, and only in such event, shall GLOBAL VR® refund to Purchaser the purchase price for said Product. Purchaser's failure to make a claim as provided above or continued use of the Product shall constitute an unqualified acceptance of said Product and a waiver by Purchaser of all claims thereto.

IN NO EVENT SHALL GLOBAL VR® BE LIABLE FOR LOSS OF PROFITS, LOSS OF USE, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM OPERATION OF THE GAME IN ANY CONDITION. GLOBAL VR® SHALL NOT BE RESPONSIBLE FOR THE SUITABILITY, PERFORMANCE, OR SAFETY OF ANY NON- GLOBAL VR® PART OR ANY MODIFICATION PERFORMED BY ANY PRODUCT DISTRIBUTOR UNLESS SUCH WORK IS EXPRESSLY AUTHORIZED IN ADVANCE BY GLOBAL VR®.

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Warranty Service

If at some point you require warranty service, contact your authorized GLOBAL VR distributor.

Technical Support

GLOBAL VR Service & Parts

Hours: 7:00AM–5:00PM Pacific Time, Monday–Friday

Phone: 408.597.3435

Fax: 408.597.3437

E-mail: techsupport@globalvr.com

Website: <http://service.globalvr.com>

Extended Service Hours: Monday–Friday 5pm—Midnight
Saturday & Sunday 7:00am—Midnight Pacific Time

Tsunami Visual Technical Support

Hours: 8:00AM–5:00PM Pacific Time, Monday–Friday

Phone: 510.661.9588

Fax: 510.661.9587

E-mail: support@tsunamivisual.com

Free telephone, e-mail, and online support are provided for systems during the warranty period. GLOBAL VR Technical Support can help you troubleshoot problems and diagnose defective parts. We can also answer questions about the operation of your game.

When you contact Technical Support, please provide the information listed below, as applicable, to assist the Technical Support representative in solving your problem quickly. For your convenience, space is provided to write important numbers.

- Cabinet Serial Number: _____
- Motion Base Serial Number: _____
- Version and Build from Operator Menu: _____
- Proof of Purchase information
- Your mailing address and telephone number
- A summary of the question or a detailed description of the problem
- Specific error message
- Date of latest install or upgrade
- Any changes made to the system
- For game-play issues, the track and number of players

To comment on this document, please e-mail: techpubs@globalvr.com