

# BLAZING ANGELS™

★★★ SQUADRONS OF WWII ★★★

## Upright Cabinet Operation & Service Manual

040-0245-01 Rev. A

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



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## Preface

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### 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:

- Electronic components in the game cabinet run on 115 VAC. The voltage switch on the back of the computer must be set to 115. If you power up the computer outside of the cabinet, set the switch to match the local AC voltage:
  - 115 volts / 60Hz in most of North and South America and some Far Eastern countries such as Japan, South Korea and Taiwan
  - 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

GLOBAL VR® assumes no liability for injuries incurred while playing our games.

Operators should be aware that certain health and physical conditions may make people susceptible to injury when playing video games, particularly when the game moves or creates a sense of motion.

### 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.**

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**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!**

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### 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<sup>®</sup> 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

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### Green Label WWII Arcade Action Comes to Life in Blazing Angels: Squadrons of WWII

Take to the skies in a WWII fighter plane and test your combat skills in World War II battles.

Test your mettle as a fighter pilot in a Dogfight or six WWII Campaigns (easy, medium or hard difficulty) that include London, Africa, Pearl Harbor, Midway, Rabaul and Ardennes.

Beat a medium or hard scenario and fly an amazing bonus level...Berlin.

#### Game Features:

- Fly realistic WWII planes
- Flight model is realistic yet easy to control...Perfect for beginners or experienced pilots
- Clearly marked targets make it easy to locate enemies
- 360 degree battlefield gives players a full flight model
- Multiple mission objectives are communicated to players via text and chatter
- Unlimited ammo.....no reloading Machine Guns

#### Cabinet Specifications



Figure 1. Cabinet Dimensions

#### Hardware Features:

- 42" HD LCD monitor
- Nvidia® GeForce® graphics
- Enhanced audio with subwoofer
- Realistic controls
- State-of-the-art cabinet design with unique edge-lit control panel
- Supports dollar bill validator

#### Power Requirements (Approximate)

##### 115 VAC

- Inrush AC Current: 8 Amps
- Operating AC Current: 5 Amps

##### 230 VAC

- Inrush AC Current: 4 Amps
- Operating AC Current: 3 Amps

## Chapter 2 — Installing a New Cabinet

Use the following procedure to install a new cabinet:

1. Carefully remove the cabinet from the shipping container, giving yourself plenty of space around the cabinet. Inspect the exterior of the cabinet for any damage.
2. Remove the keys from the coin return slot. Open the coin door to locate the second set of keys (see the figure below).

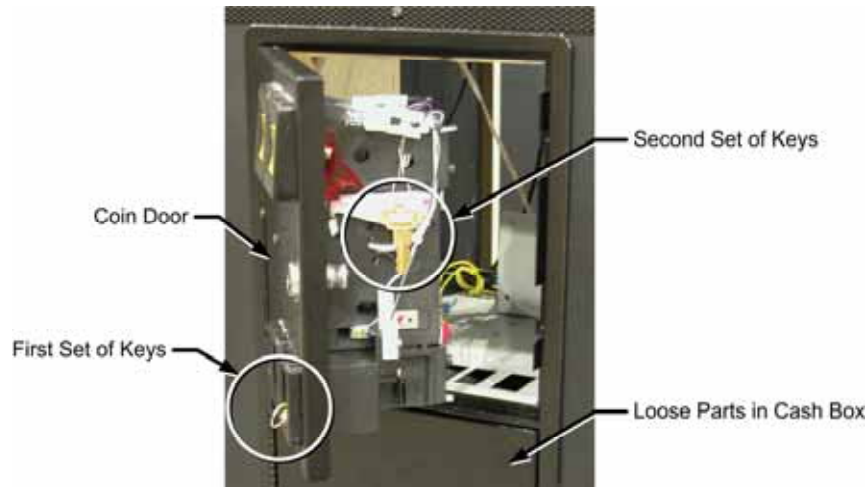


Figure 2. Coin Door with Key Locations

3. Unpack the Marquee artwork and clear Plexiglas<sup>®</sup>. The nuts, washers, and standoffs for mounting the artwork are shipped installed in the marquee housing on the cabinet. Remove the five (5) nuts and washers but leave the standoffs in place. Use this hardware to secure the Marquee artwork in place as shown in the figure below.

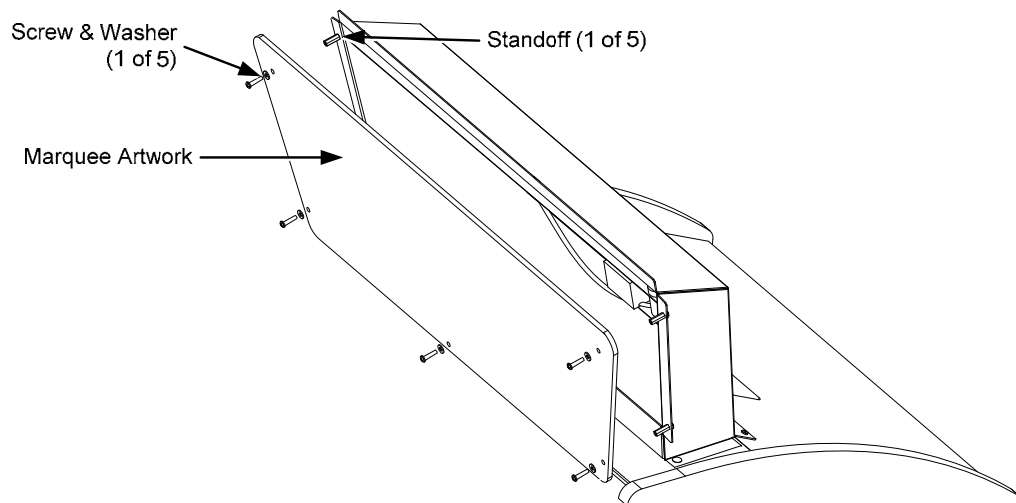


Figure 3. Marquee Installation

4. Connect the AC power cord to a grounded outlet and power on the game.
5. Play a game to verify everything is working properly.
6. Refer to *Chapter 4 — Operator Menu and Game Setup* for information on using the Operator menus to set up your game.

## 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.

For a Game Dongle to be recognized correctly, it should be connected before the cabinet is powered ON. If the software does not recognize the Game Dongle, make sure the Dongle is connected properly, and then power cycle the cabinet to see if this resolves the problem.

If the dongle should come out while the game is running, a NO DONGLE screen will appear. If this happens, the dongle can be re-installed without rebooting the game.

**Note:** The dongle supplied with the cabinet is specific to the game 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 4. USB Game Dongle*

## Chapter 3 — Flying a Mission

Coin up the game and then pull the trigger; the **Select Mission** screen will appear. Each mission is rated by difficulty.

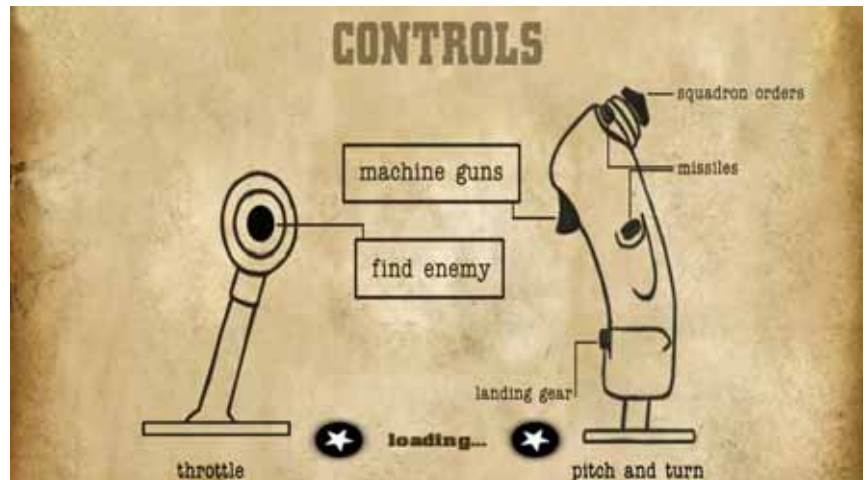
Move the joystick to highlight a **Campaign** mission, or select **Dogfight**, and then pull the trigger to select your choice.



If you select **Dogfight**, the Dogfight menu will appear. Use the joystick to select your plane, and pull the trigger. Each plane is rated by the difficulty of the mission.

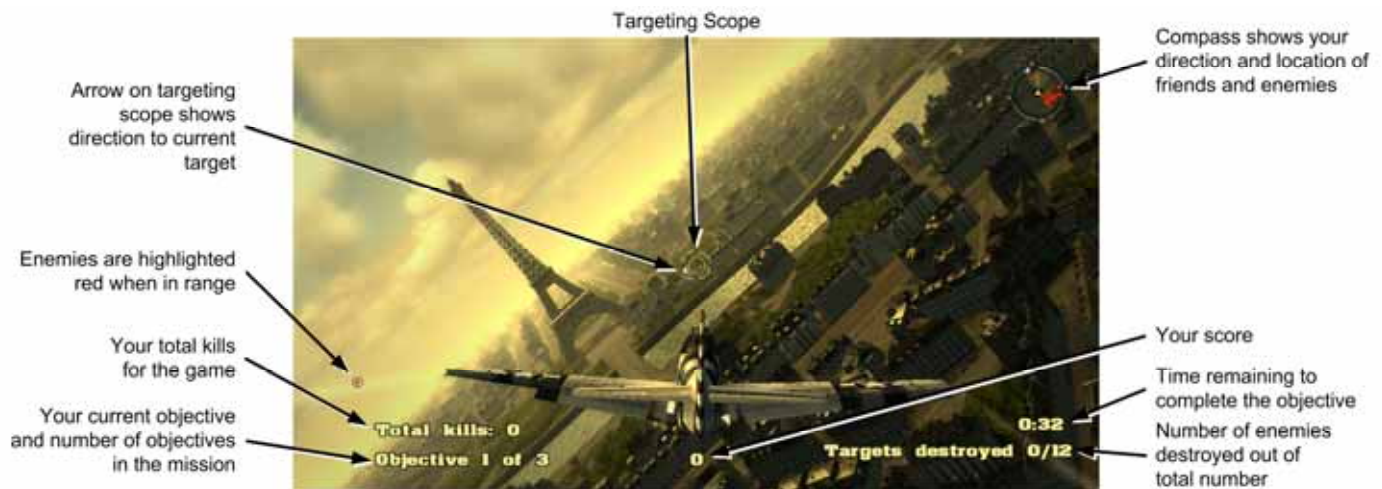


As the game loads, the **Controls** screen will appear, showing the function of the buttons on the joystick and throttle.

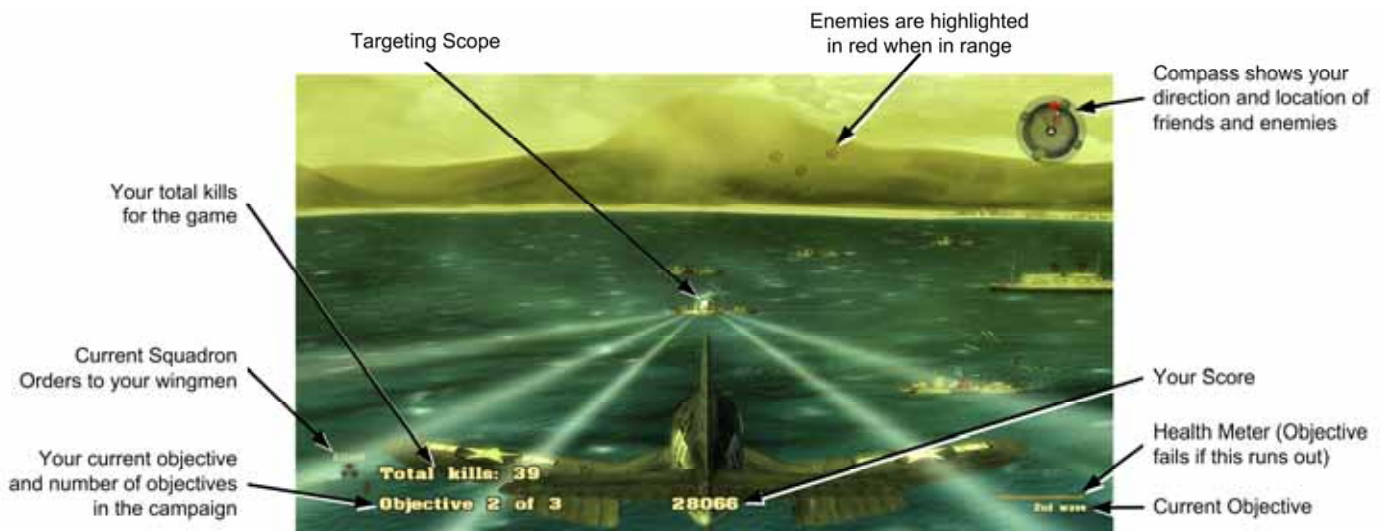


- Once the game loads, use the Joystick and throttle to control your flight and speed.
- Line up enemies in the targeting scope and pull the trigger. You have unlimited machine gun ammo so you never need to reload. You can have up to eight missiles loaded, but once fired there is a delay before they reload.
- Press the button on the throttle to change the view and show you your current target. (A hint screen will appear to explain this function if the player doesn't use it.)
- Targets that are out of range are highlighted in yellow. They change to red when in gun range. (Friends are highlighted in green.)
- You can use the joystick "hat" (the top button) to send "squadron orders" to your wingmen, for Formation, Attack, or Defense.
- If time runs out before you complete the mission, or if you are shot down, you will have 15 seconds to insert coins and continue.
- Players who do well can enter their names for the high score screen.

The screen below shows the information that appears onscreen during a **Dogfight** mission:



The screen below shows the information that appears onscreen during a **Campaign** mission:



## Chapter 4 — Operator Menu and Game Setup

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This chapter describes how to use the Game Operator menu to set up the game, diagnose problems, and view gameplay and earnings statistics.

### Navigating the Operator Menu

1. With the game running in Attract Mode, open the coin door and press the **TEST/BACK** button on the Operator Button Panel to open the Operator **Main Menu**.
2. Use the **UP** and **DOWN** buttons to move through the list and highlight a submenu, and then press the **SRVC/SEL** button to open the submenu.
3. Note the onscreen instructions at the bottom of each menu screen. This text will change to help you use the menu items.
4. To change a setting, highlight the item, press **SERV/SEL**, and then use the **UP** and **DOWN** buttons to cycle through the available settings. Press **SERV/SEL** to accept the selected setting.
5. When you wish to exit, highlight **Back to Main Menu** and press **SRVC/SEL**, and then highlight **Exit to Game** on the Main Menu and press **SRVC/SEL**. (**Hint:** Pressing **TEST/BACK** from any menu will automatically take you to the last item in the list.)



*Figure 5. Operator Button Panel*

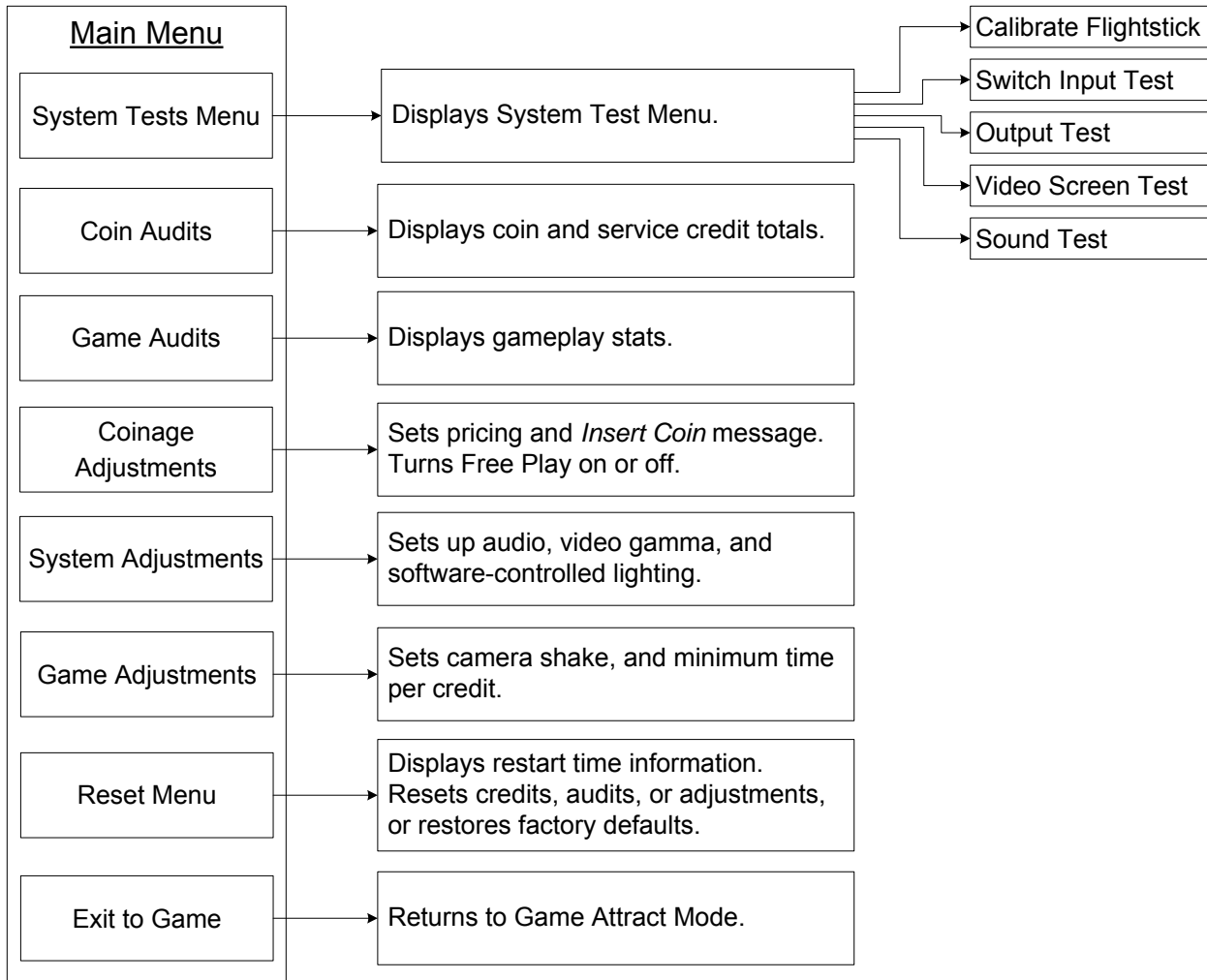


Figure 6. Operator Menu Flowchart

## Operator Main Menu

This screen displays information about the game and provides access to the other menus.

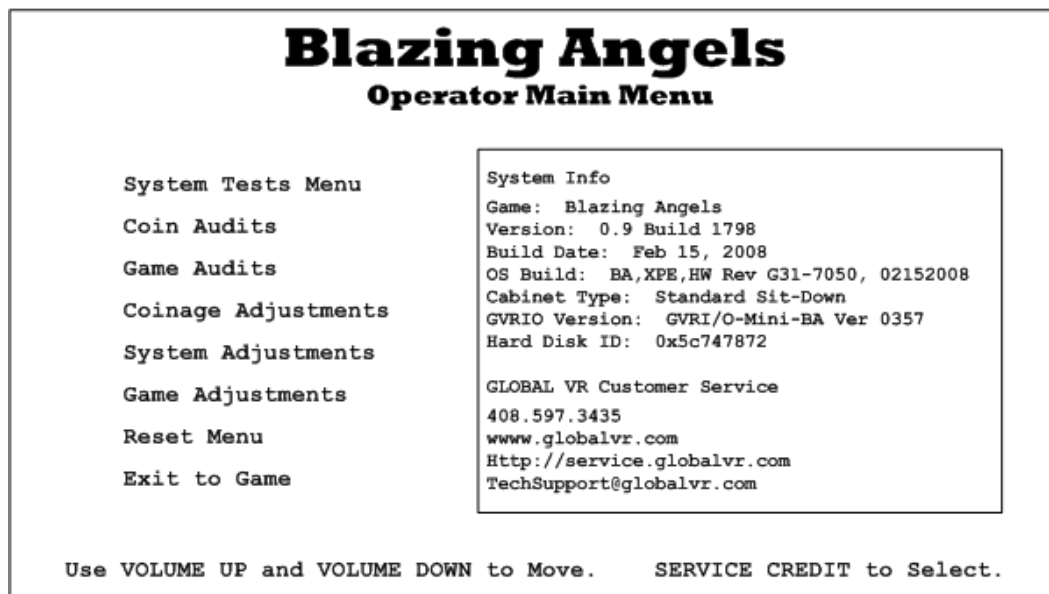


Figure 7. Operator Main Menu

Menu Item	Description
System Tests Menu	Lets you calibrate the joystick and test controls and audio (see page 14).
Coin Audits	Displays coin count stats (see page 17).
Game Audits	Displays stats on games and levels played (see page 18).
Coinage Adjustments	Lets you set pricing and change the Insert Coin message (see page 19).
System Adjustments	Lets you adjust audio settings, video gamma, and set lights below instrument panel to flicker or stay on (see page 20).
Game Adjustments	Lets you adjust ramp time to maximum game difficulty, camera shake, and minimum time per credit (see page 21).
Reset Menu	Lets you reset high scores, stats, credits, adjustments, or restore factory default settings (see page 22). Displays software restart information.
Exit to Game	Exits to Game Attract Mode.
<b>System Info</b>	This box displays information about the cabinet software and hardware.
Game	Name of the game installed.
Version	Game software version and build.
Build Date	Date of software build.
OS Build	Name and date of the Operating System build.
Cabinet Type	This will say "Standard Sit-Down" on an Upright Cabinet.
GVRIO Version	Version of GVRI/O Mini PCB installed. The letters "BA" indicate that the firmware is for Blazing Angels. The game will not work with a PCB that does not have Blazing Angels firmware and Version 0357 or later.
Hard Disk ID	ID of the hard disk in the system computer.
GLOBAL VR Customer Service	Contact info for Customer Service, as well as the GLOBAL VR website URLs.

## System Test Menu

This screen opens various system test menus. These menus are shown on the pages that follow.

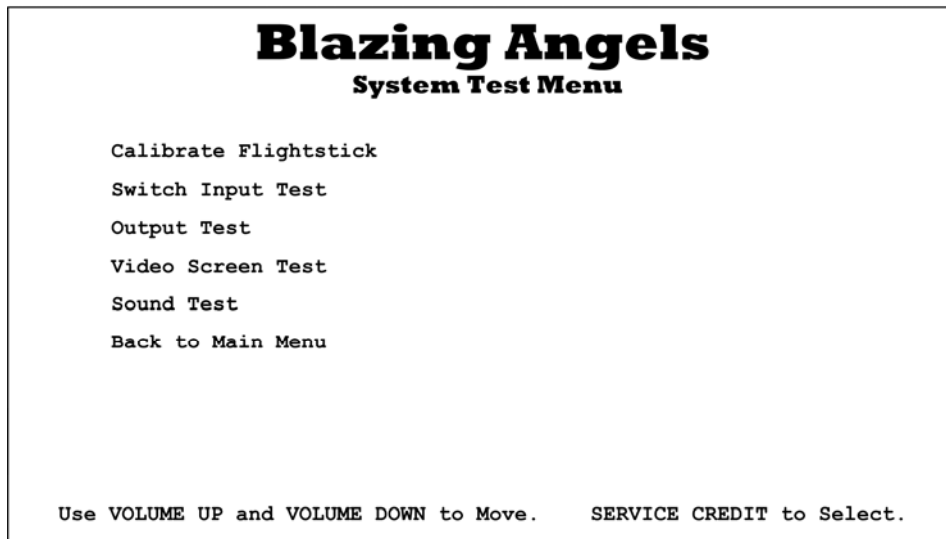
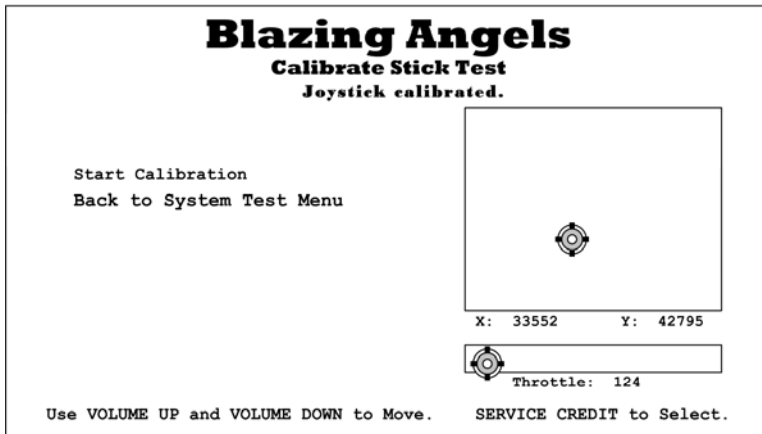


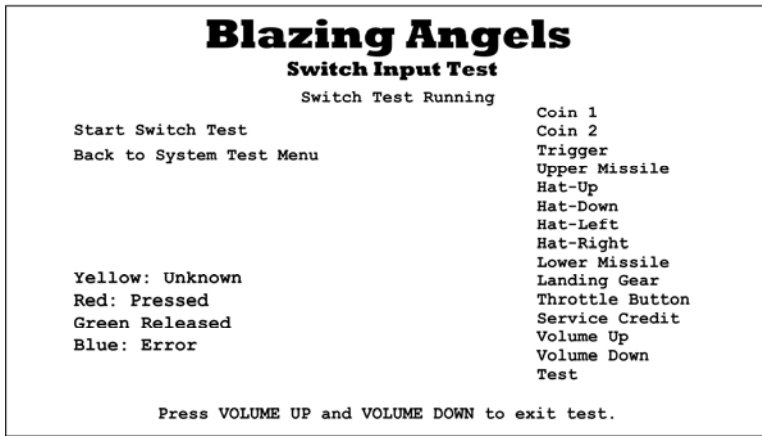
Figure 8. System Test Menu

Menu Item	Description
Calibrate Flightstick	Opens the <b>Calibrate Stick Test</b> menu where you can calibrate the joystick and throttle.
Switch Input Test	Opens the Switch Input Test menu where you can test the switches on the game controls and operator buttons.
Output Test	Opens the Switch Output Test menu where you can test the software-controlled lights below the control panel.
Video Screen Test	Opens a menu with a list of Video Test Screens that you can select to help you test or adjust the monitor. Press the <b>SERV/SEL</b> button to exit from any Video Test Screen.
Sound Test	Opens the Sound Test menu where you can test the audio.
Back to Main Menu	Returns to the Operator Main Menu.

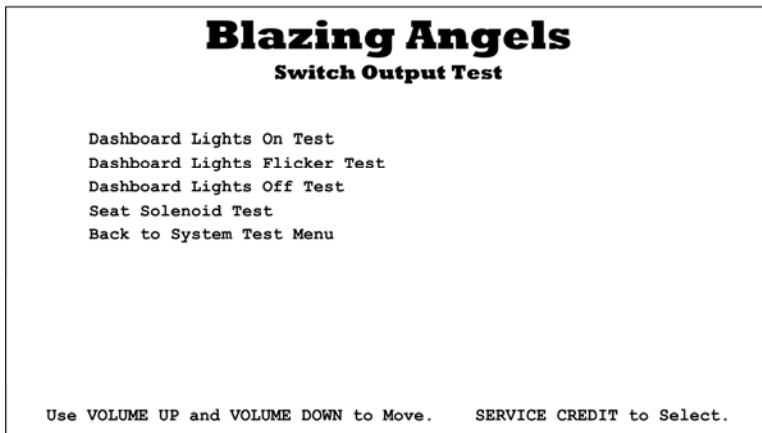


This screen lets you calibrate the joystick and throttle. Highlight **Start Calibration**, press **SERV/SEL**, and then follow the onscreen prompts.

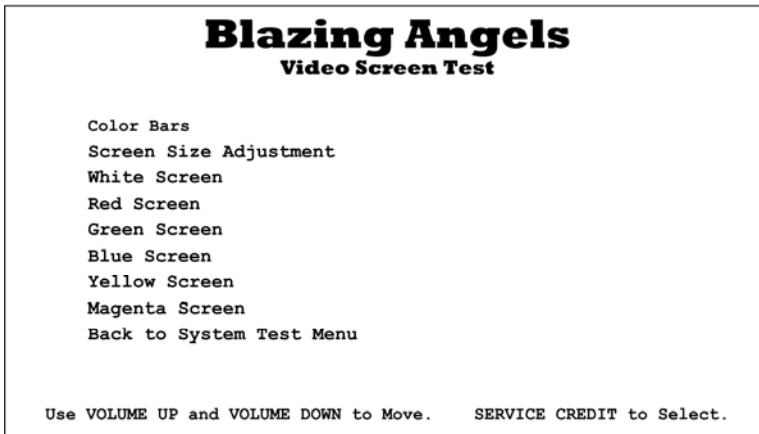
See page 24 for detailed calibration instructions.



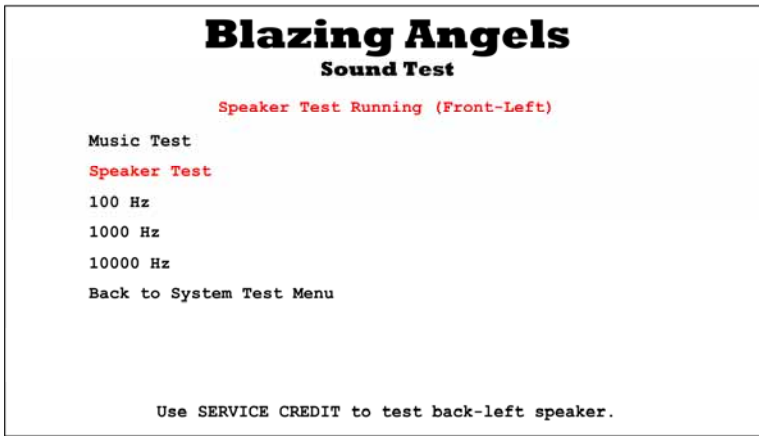
This menu lets you test all of the switches on the player controls and operator buttons. The name of each switch is displayed in yellow first, and then changes to red when the switch is activated and green when released. Blue text indicates the switch is stuck in the ON position.



This menu lets you test the software-controlled dashboard lights, located under the control panel, that flicker. The seat solenoid is not used on Upright cabinets.



This menu lets you open a series of Video Test Screens that you can use to adjust the image using the monitor remote control board. Press **SERV/SEL** to exit from any Video Test Screen.



This menu lets you test cabinet audio.

Music Test plays music so you can hear overall audio performance.

Speaker Test plays sound from each speaker, one by one.

The remaining items emit a test tone at the indicated frequency. This lets you confirm that the system is playing the full range of sound frequencies.

## Coin Audits Menu

This screen displays earnings stats. To clear these audits, except for Lifetime totals, select **Reset Coin and Game Audits** from the Reset Menu.

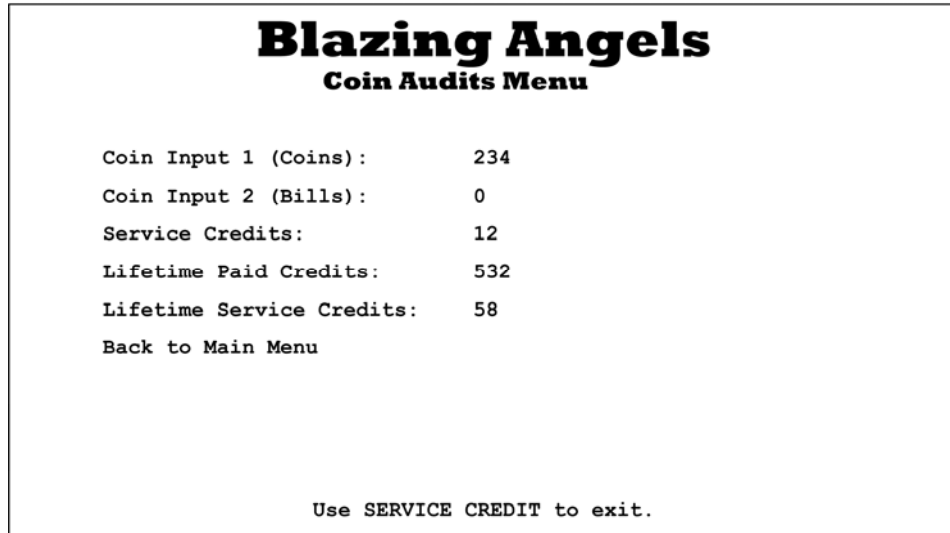


Figure 9. Coin Audits Menu

Menu Item	Description
Coin Input 1 (Coins)	Displays total coins from Coin Input 1, normally used for coin mechs, since the last time <b>Reset Coin and Game Audits</b> was selected from the Reset Menu.
Coin Input 2 (Bills)	Displays total coins from Coin Input 1, normally used for the bill validator, since the last time <b>Reset Coin and Game Audits</b> was selected from the <b>Reset</b> Menu.
Service Credits	Displays available service credits. Clear service credits by selecting <b>Reset Available Total Credits</b> from the <b>Reset</b> menu.
Lifetime Paid Credits	Displays lifetime paid credits inserted since the software was installed. This number is never reset unless you reinstall the software.
Lifetime Service Credits	Displays lifetime service credits used since the software was installed. This number is never reset unless you reinstall the software. Service Credits are not counted if they are cleared and not used. <b>Note:</b> The Lifetime Service Credits starts at 58 when software is installed. Subtract 58 to get your actual total.
Back to Main Menu	Returns to the Operator Main Menu.

## Game Audits Menu

This screen displays stats about game play. To clear these audits, select **Reset Coin and Game Audits** from the Reset Menu.

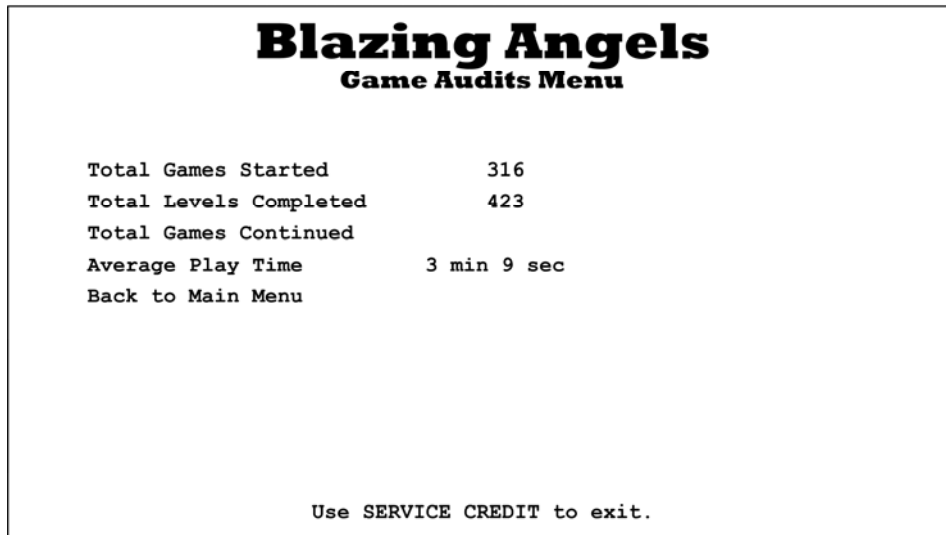


Figure 10. Game Audits Menu

Menu Item	Description
Total Games Started	Displays the total number of games started since the last time <b>Reset Coin and Game Audits</b> was selected from the Reset Menu.
Total Levels Completed	Displays the total levels completed since the last time <b>Reset Coin and Game Audits</b> was selected from the Reset Menu.
Total Games Continued	Displays the number of games continued since the last time <b>Reset Coin and Game Audits</b> was selected from the Reset Menu.
Average Play Time	Displays the average time a player plays, including continues, since the last time <b>Reset Coin and Game Audits</b> was selected from the Reset Menu.
Back to Main Menu	Returns to the Operator Main Menu.

## Coinage Adjustments Menu

This screen lets you set pricing, turn free play on or off, and change the message displayed in Attract Mode telling players to Insert Coins.

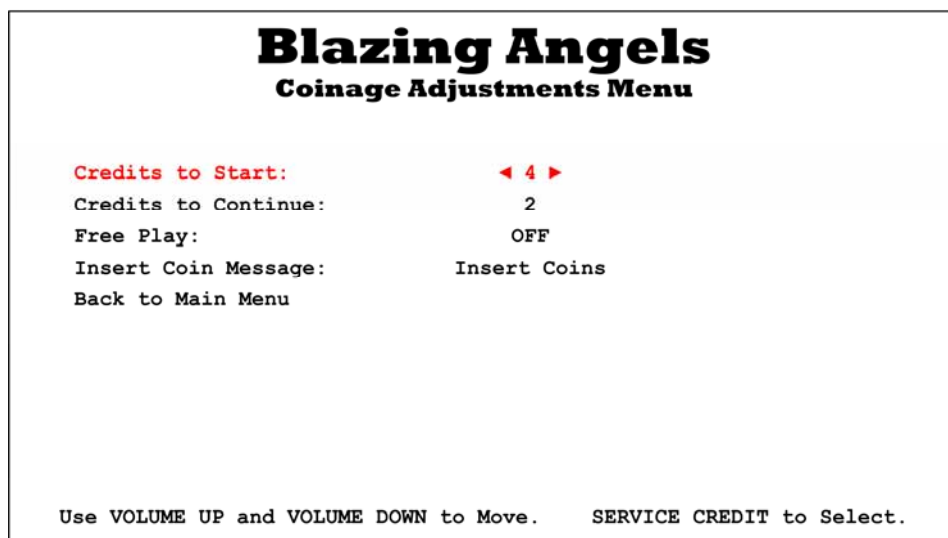


Figure 11. Coinage Adjustments Menu

Menu Item	Description
Credits to Start	Sets the number of credits to start a game.
Credits to Continue	Sets the number of credits to continue a game.
Free Play	Turns Free Play ON or OFF.
Insert Coin message	Selects the message displayed during the Attract Loop. Options are: <i>Insert Coins</i> , <i>Insert Card</i> , <i>Insert Credits</i> , or <i>Swipe Card</i> .
Back to Main Menu	Returns to the Operator Main Menu.

## System Adjustments Menu

This screen lets you adjust audio, video gamma, and turn the control panel light flicker on or off.

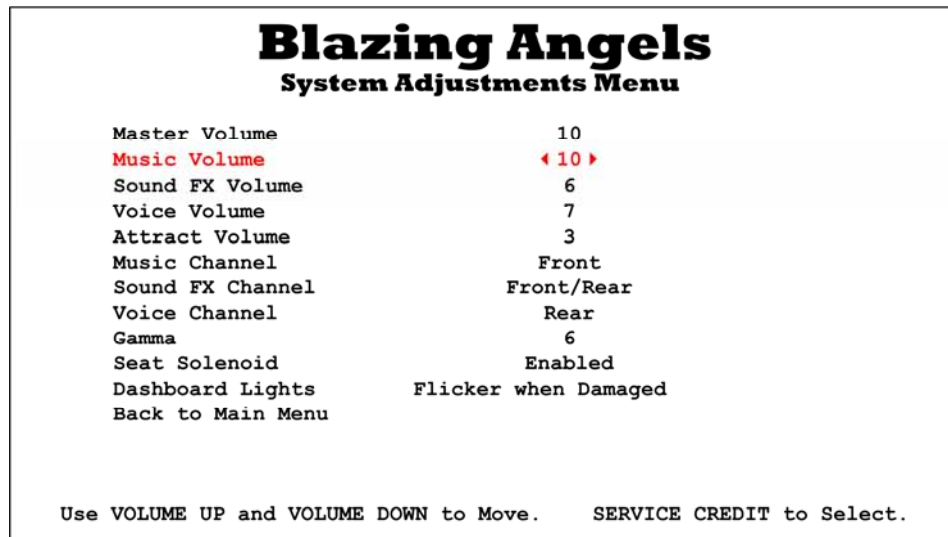


Figure 12. System Adjustments Menu

Menu Item	Description
Master Volume	Sets Master Volume from 0 to 10. This setting affects music, sound FX, voice, and attract audio equally.
Music Volume	Sets Music volume from 0 to 10.
Sound FX Volume	Sets sound effects (engines, guns, etc.) volume from 0 to 10.
Voice Volume	Sets voice volume from 0 to 10.
Attract Volume	Sets Attract Mode volume from 0 to 10.
Music channel	Selects the speakers that will play music.
Voice Channel	Selects the speakers that will play voices.
Sound FX Channel	Selects the speakers that will play sound effects.
Gamma	Sets Video Gamma from 0 to 10. Increasing Gamma increases the overall brightness of the screen.
Seat Solenoid	Not used on Upright cabinets.
Dashboard Lights	Sets dashboard lights, located under the control panel, to flicker or stay on constantly.
Back to Main Menu	Returns to the Operator Main Menu.

## Game Adjustments Menu

This menu lets you adjust game play difficulty settings, camera shake, and minimum time. Settings that show time can be changed in 15 second increments.

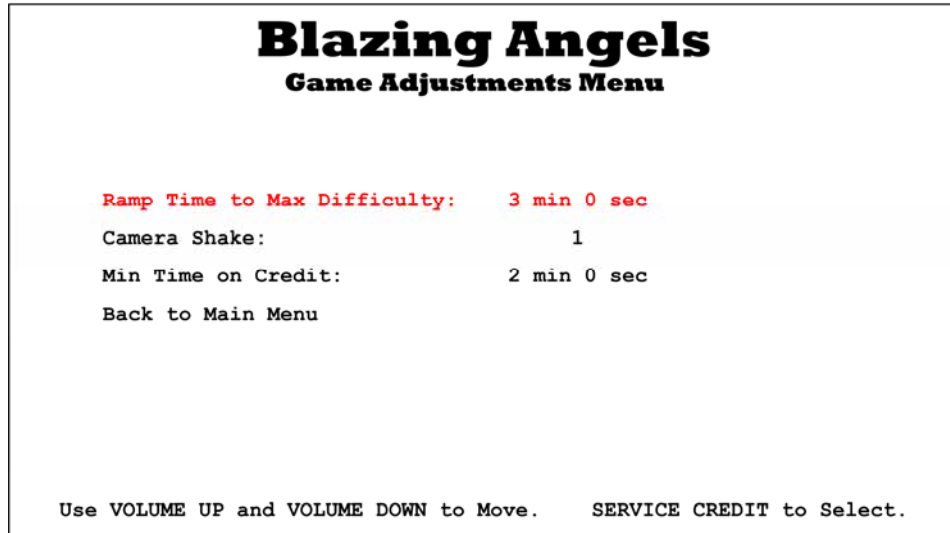


Figure 13. Game Adjustments Menu

Menu Item	Description
Ramp Time to Max Difficulty	Sets the amount of time after Dynamic Difficulty starts to when Maximum Difficulty is reached. For example, if Dynamic Difficulty Start Time is set to 2 minutes, and Ramp Time to Max Difficulty is set to 3 minutes, Maximum Difficulty is reached after 5 minutes of game play.
Camera Shake	Sets the camera shake effect from 0 to 10.
Min Time on Credit	Sets the minimum time a game will last, no matter how poor the player's skills are.
Back to Main Menu	Returns to the Operator Main Menu.

## Reset Menu

This menu displays information about the power cycle and available credits, and lets you reset high scores, available credits, statistics and settings.

To reset an item, highlight it and press the **SERV/SEL** button. A confirmation prompt will appear to the right of the item saying, *Are you sure? Yes*, as shown below for Reset High Scores. Press **SERV/SEL** again to reset the item. If you don't want to reset the item, press the **UP** button to change the prompt to *Are you Sure? No*, and then press **SERV/SEL** again.

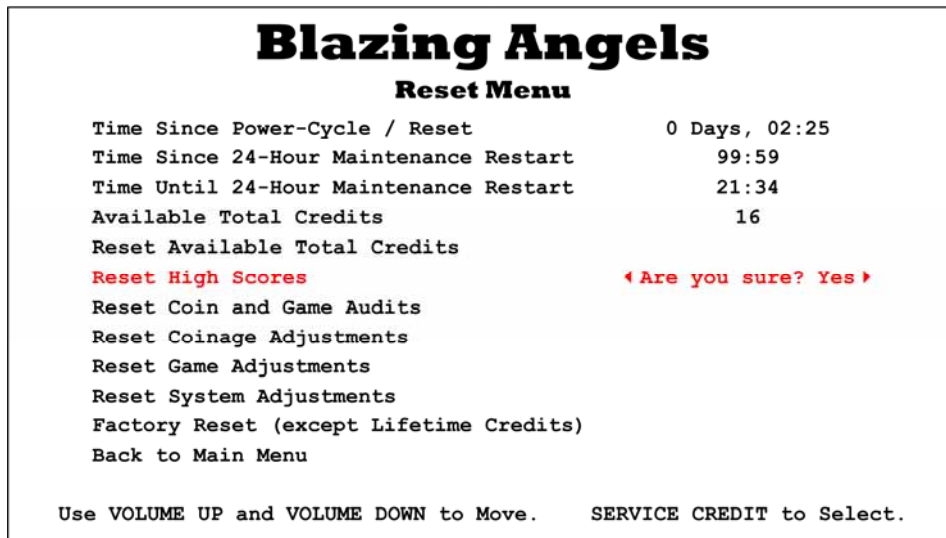


Figure 14. Reset Menu

Menu Item	Description
Time Since Power-Cycle / Reset	Displays time since the game was last powered on.
Time Since 24-Hour Maintenance Restart	Displays time since the game was automatically rebooted by the software.
Time Until 24-Hour Maintenance Restart	Displays time until the game will be automatically rebooted by the software, unless it is powered off manually.
Available Total Credits	Displays total Coin and Service credits currently available.
Reset Available Total Credits	Resets Coin and Service credits to zero (0).
Reset High Scores	Resets all high scores saved in the software.
Reset Coin and Game Audits	Resets all Coin and Game Audits displayed on the Audits screens.
Reset Coinage Adjustments	Resets all adjustments set from the Coinage Adjustments Menu.
Reset Game Adjustments	Resets all adjustments set from the Game Adjustments Menu.
Reset System Adjustments	Resets all adjustments set from the System Adjustments Menu.
Factory Reset (except Lifetime Credits)	Restores the game to Factory Default Settings. Does not affect Lifetime Credits displayed in the Coin Audits Menu.
Back to Main Menu	Returns to the Operator Main Menu.

## Chapter 5 — Software Restoration



The operating system and game software are provided on a single DVD labeled **System & Game Install Disk**.

**Note:** Older versions of the software do not support the motherboard and video card used in the Upright Cabinet.

**Important:** When you use the System & Game Install Disk, you will erase all game settings, statistics, and collections data stored in the game software. It is advisable to contact Technical Support before using the Disk to resolve a problem.

Perform the following steps to restore software:

1. Insert the disk in the DVD-ROM Drive and power cycle the game. When the game reboots the computer will automatically read the disk and begin copying files and configuring the hard drive.
2. When prompted, remove the disk and power cycle the cabinet.

When the computer reboots, it will continue to install and set up the software. When it finishes, it will automatically reboot again and bring up the **Calibrate Stick Test** screen.

3. Calibrate the joystick and throttle as described on page 24.
4. Set the sound volume levels, pricing, and other Operator settings from the Operator Menus.
5. Exit from the Operator Menus and play a game to verify proper operation.

## Chapter 6 — Service and Repair



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.

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.

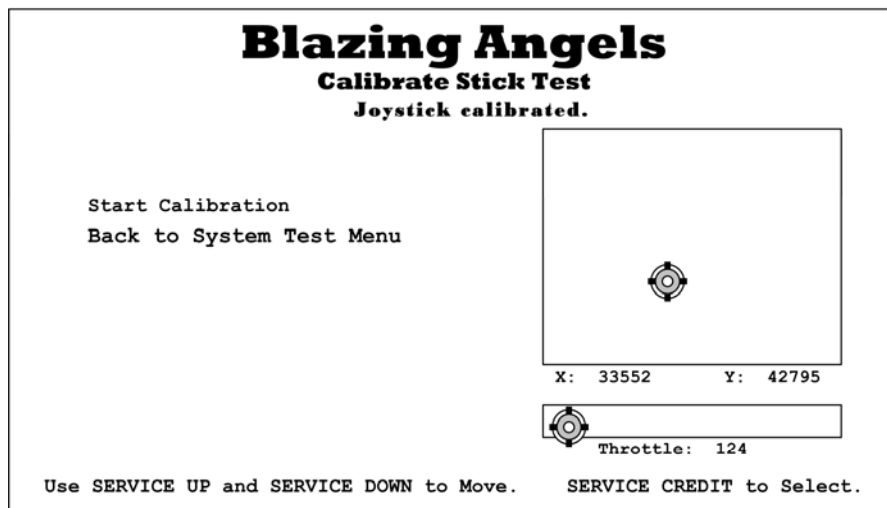


Always turn the cabinet OFF and disconnect the AC power cord before performing any repair work.

### Calibrating the Joystick and Throttle

For optimal performance, the joystick and throttle should be calibrated once a month to ensure that the flight experience is normal and the weapons fire accurately. If the software detects a calibration problem at boot it will enter the calibration screen automatically, but it will not detect the gradual slip in calibration over time.

Follow the steps below to calibrate the controls:



1. To enter the Calibrate Stick Test screen, select **System Tests Menu** from the Operator Main Menu, and then select **Calibrate Flightstick** from the System Test Menu.
2. Once in the Calibrate Stick Test menu, highlight **Start Calibration** and press the Operator **SERV/SEL** button to start the calibration process.
3. Follow the instructions of the onscreen prompt in the upper part of the screen. When you finish, the prompt will say "Joystick calibrated."

**Note:** When prompted to center the joystick, put it in the neutral (resting) position (the marker may not be centered on the screen).

When you calibrate the throttle, push the trigger button, not the throttle button.

4. When finished, use the operator **DOWN** or **TEST/BACK** button to highlight **Back to System Test Menu**, and press the **SERV/SEL** button.

## Joystick Service

The joystick controls the direction of flight and operates the weapons. See Figure 23 on page 46 for an exploded view of the joystick. Perform the following steps to replace the Joystick:

1. Remove the four (4) T-25 Torx screws that secure the Joystick assembly in place.
2. Carefully lift the assembly straight up and disconnect the two wire harnesses and the ground wire.
3. Reverse these steps to install the new Joystick. Be sure to reconnect the ground wire.

## Replacing Joystick Grip

See page 46 for an exploded-view drawing. The grip assembly is designed to be replaced easily, with no need to remove the joystick from the cabinet. Do the following to open and remove the grip assembly:

1. Remove the four (4) Torx security screws from the left side of the assembly, and remove the left half of the grip assembly (see Figure 15).
2. Disconnect the Molex connector inside the assembly.
3. Remove the Torx screw on the right side of the assembly, and remove the assembly.
4. Reverse these steps to replace the grip assembly.
5. Refer to the Exploded View drawing on page 46 if you wish to replace grip assembly components.

## Replacing Joystick Pots

The joystick uses two pots (potentiometers) to relay its position to the software. Refer to Figure 15 and perform the steps below to replace a pot. See page 46 for an exploded-view drawing.

**To test a pot**, either observe the numbers for **X** and **Y** in the **Calibrate Stick Test** screen, or power off the game and test resistance at the pot. While moving the joystick, you should see a steady linear increase or decrease in resistance or X and Y numbers, with no jumps.

1. Remove the joystick from the cabinet as described above.
2. Determine which pot to replace. The pot on the side reads the Up/Down motion. The pot on the front reads Left/Right, as shown in Figure 15.
3. Make a note of the orientation of the pot and mounting plate; the mounting plate is mounted with the straight side up for the Left/Right pot, and the angled side up for the Up/Down pot. The pot has a small metal tab (key) that fits into a small hole in the plate. One of the mounting screws is also used to secure the joystick harness, as shown in Figure 15.
4. Use a 3/16" socket or small Phillips screwdriver to remove the four (4) screws that secure the pot mounting plate to the joystick assembly, and remove the pot and mounting plate assembly.
5. Note the orientation of the cam on the shaft, and remove the 1/16" Allen screw and the cam.
6. Remove the 1/2" nut and lock washer from the shaft and remove the pot.
7. Make a note of which wire is soldered to each terminal, and be sure to solder them to the same terminals on the replacement pot.
8. Reverse the removal steps to replace the pot. Move the joystick as necessary to align the key and slot on the cam and the ball. Use Blue Loctite<sup>®</sup> on the Allen screw for a secure hold.

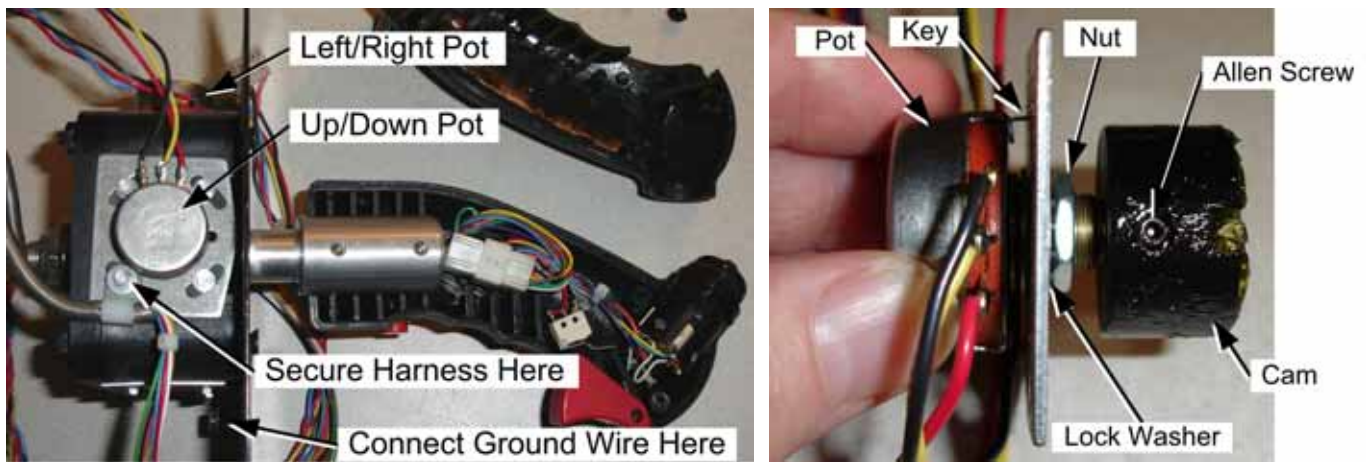


Figure 15. Joystick Assembly Details

## Throttle Service

The throttle controls airspeed and lets you change the view to find enemy aircraft. See Figure 24 on page 47 for an exploded view of the throttle. Perform the following steps to replace the throttle:

1. Remove the four (4) Torx screws that secure the Throttle assembly in place and lift the assembly straight up.
2. Disconnect the two wire harnesses and the ground wire that is clipped to the frame.
3. Reverse these steps to install the new Throttle. Be sure to reconnect the ground wire. Install with the button toward the inside of the cabinet.

## Replacing the Throttle Pot or Gear Wheel

The Throttle uses one pot (potentiometer) to relay its position to the software. Refer to Figure 16 and perform the steps below to replace the pot or the gear wheel. See page 47 for an exploded view drawing.

**To test the pot**, either observe the numbers next to **Throttle** in the **Calibrate Stick Test** screen, or power off the game and test resistance at the pot. While moving the throttle, you should see a steady linear increase or decrease in resistance or numbers, with no jumps.

1. Remove the throttle from the cabinet as described above.
2. Make a note of the orientation of the pot. The pot has a small metal tab (key) that fits into a small hole in the plate.
3. Remove the 5/64" Allen screw from the gear wheel and remove the gear wheel.
4. Remove the 1/2" nut and lock washer from the shaft and remove the pot.
5. Make a note of which wire is soldered to each terminal, and be sure to solder them to the same terminals on the replacement pot.
6. Reverse the removal steps to re-install the pot and gear wheel. Be sure to install the pot with the key in the hole in the plate.

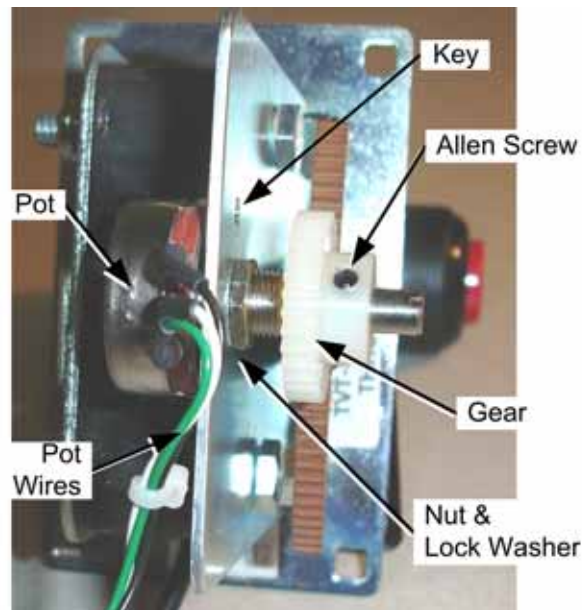


Figure 16. Throttle Pot and Gear Assembly

### Replacing the Throttle Handle

See page 47 for an exploded view drawing. To remove the handle from the throttle, note the orientation of the handle for reassembly and remove the 3/16" Allen screw, shown below. Thread the throttle button wires out through the hole.



Figure 17. Replacing the Throttle Handle

## GVRI/O Mini PCB Service

**Important:** This game requires a GVRI/O Mini PCB with **Blazing Angels Firmware**, version 3.57 or later. You cannot use a PCB programmed for a different game. The PCB version is displayed under **System Info** on the **Operator Main Menu** (see page 13).

The GVRI/O Mini PCB relays signals between the system computer and player controls. Each connector on the GVRI/O Mini PCB is keyed to fit only to the correct harness connector. The PCB is powered by the +5/+12 volt DC power supply through a standard PC power connector. Refer to the picture below to locate the connectors on the PCB. See Figure 27 on page 50 for a detailed wiring diagram.

The GVRI/O Mini PCB should always be connected to a PCI USB port on the system computer, **not** to a motherboard USB port. This will minimize the possibility of static shock interrupting game operation.



**Disconnect the cabinet from AC power before changing any connections to the GVRI/O Mini PCB.**

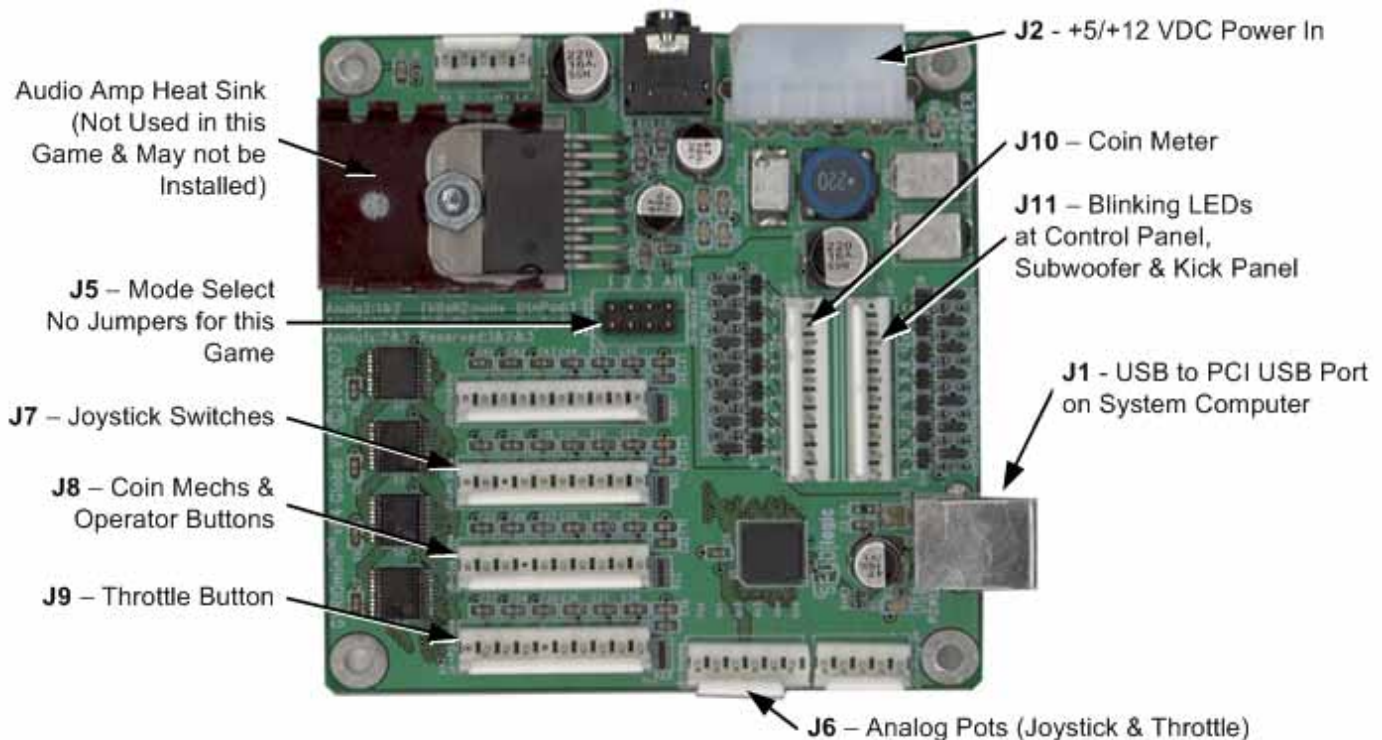


Figure 18. GVRI/O Mini PCB

Perform the following steps to replace the GVRI/O Mini PCB:

**Note:** Do not use Mode Select jumpers with this game.



To prevent electrostatic discharge (ESD) damage, handle PCBs by the edges only and use a grounding wrist strap or similar precaution. Always keep the PCB in an ESD anti-static bag when not installed in the cabinet to prevent electrostatic damage.

1. Turn off power and disconnect the cabinet AC Power Cord.
2. Remove the electronics access panel from the rear of the cabinet.
3. Make sure that all wire harnesses are labeled for ease of reconnection, and then disconnect them from the PCB.
4. Remove the four screws that secure the PCB to the mounting feet.
5. Reverse these steps to install the new PCB.

## Audio System Service

The figure below shows the wiring for the Audio System. Please refer to this figure to check audio connections or troubleshoot the audio system.

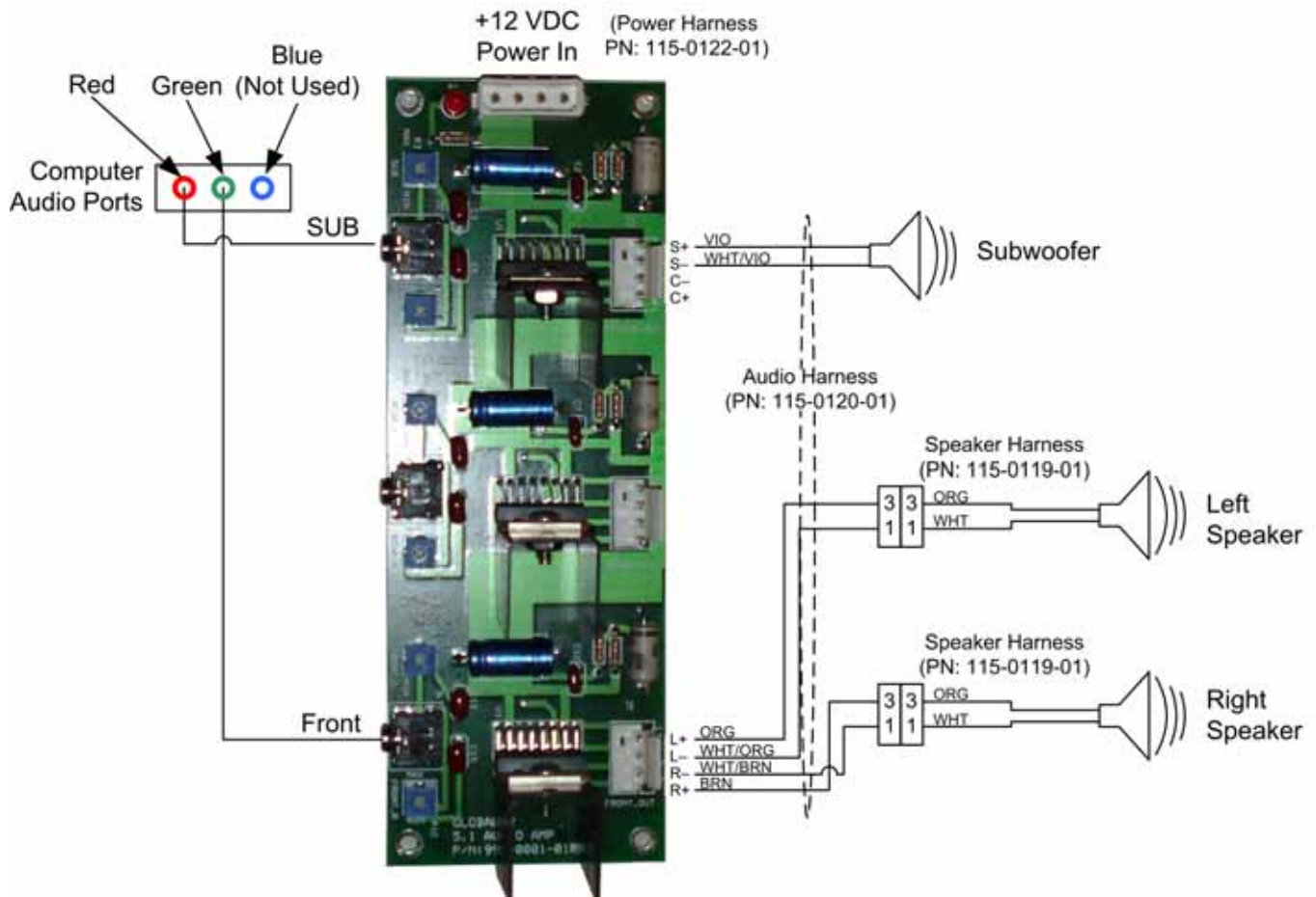


Figure 19. Audio Wiring

## Speaker Replacement

If you need to replace the left or right speaker, do the following:

1. Remove the lower door from the back of the cabinet.
2. Inside the cabinet, disconnect the Molex® connector that secures the speaker harness to the main audio harness.
3. Inside the cabinet, remove the two (2) nuts and washers that secure the speaker in place.
4. Outside the cabinet, remove the two wood screws that secure the speaker under the monitor housing.
5. Remove the speaker with the mounting bracket.
6. Remove the two (2) screws that secure the speaker to the mounting bracket.
7. Reverse these steps to install the new speaker.

## Subwoofer Replacement

The subwoofer is located behind the grill below the monitor.

1. Remove the four (4) Torx® security screws that secure the speaker grill to the cabinet.
2. Remove the four (4) screws that secure the subwoofer to the cabinet.
3. Remove the wires from the subwoofer and install them to the same connectors on the replacement subwoofer.
4. Reverse these steps to re-install the subwoofer.
5. Run the **Sound Test** from **System Tests** in the Operator Menu to verify proper operation.

## LCD Monitor Service

The 42" LCD Monitor is powered by a dedicated 24 VDC power supply. This power supply plugs into the AC power strip.

If you should need to replace the LCD monitor, do the following:

1. Disconnect the cabinet from AC power.
2. Remove the four (4) screws that secure the rear cover plate to the back of the cabinet behind the LCD monitor.
3. Disconnect the power and video cables from the back of the monitor.
4. Remove the four (4) screws that secure the monitor to the cabinet.
5. Remove the seven (7) screws that secure the bezel in place around the front of the monitor.
6. Carefully lift the bezel away from the cabinet, with the glass inside the bezel frame. Be very careful as the glass is not secured in the frame.
7. Carefully lift the monitor out through the front of the cabinet.
8. Reverse these steps to install the new monitor.

## Monitor Power Supply

**Note:** Some monitor assemblies do not use an external power supply.

The 24 VDC monitor power supply, if used, is located in the lower part of the cabinet. Do the following if you need to replace the power supply:

1. Disconnect the cabinet from AC power.
2. Remove the four (4) screws that secure the rear cover plate to the back of the cabinet behind the LCD monitor.
3. Make sure all wires connecting to the power supply are properly labeled for reconnection, and then disconnect them from the terminals.
4. Remove the two (2) screws that secure the power supply mounting bracket in place.
5. Reverse the removal steps to install the new power supply.

**Note:** If the monitor does not function properly, verify the power supply is putting out +24 VDC.

## Computer Replacement



**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.**

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

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

1. Disconnect all of the cables from the computer.
2. Remove the Game Dongle and keep it with your cabinet. **Do not** ship the game dongle with the computer.
3. Note the position of the computer for re-installation. Open the buckle on the strap that secures the computer in place and carefully remove the computer from the cabinet.
4. 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.

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.

## Coin Mech Replacement

Perform the following steps to remove the coin mech. You can replace the coin mech with any standard arcade coin mech.

1. Unscrew the thumbscrews on the latches as shown by the arrows in step 1 of the figure below.
2. Slide the latches apart from each other and remove the Coin Mech as shown in steps 2 and 3.
3. Reverse these steps to re-install a coin mech. It is important to verify the operation of the newly installed coin mech with both good and bad coins.

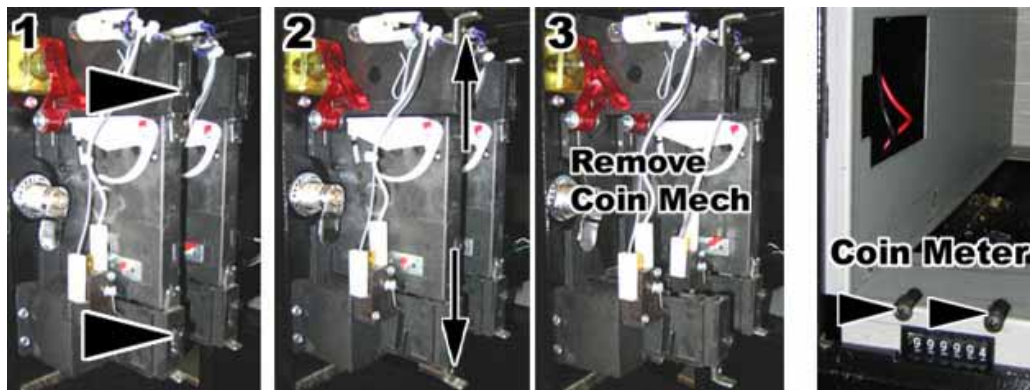


Figure 20. Servicing the Coin Mech and Coin Meter

## Coin Meter Replacement

The coin meter is located in the bottom left-hand corner of the coin vault. It receives the coin count signal through the GVRI/O Mini PCB.

1. Turn the cabinet OFF and disconnect the AC power cord.
2. Remove the two Phillips screws securing the coin meter to the cabinet and remove the coin meter.
3. Cut the two wires from the coin meter and strip the ends of the wires to attach the new meter.
4. Use two butt splices to connect the wires to the new coin meter.
5. Secure the new coin meter with the two screws removed previously.

## Power Distribution Service

### AC Power Plate

The AC power plate provides the external AC power connection. An AC EMI Filter in the power plate removes electrical noise that can cause interference with the hardware inside the cabinet.

AC power from the power plate is connected to a 7-outlet AC power strip/surge suppressor in the cabinet.



The cabinet must be connected to a secure ground to function properly. Ground wires from system components must be securely connected to the ground lug on the power plate, as shown below and in Figure 28 on page 51. Components must not be grounded to the power plate mounting bolts.

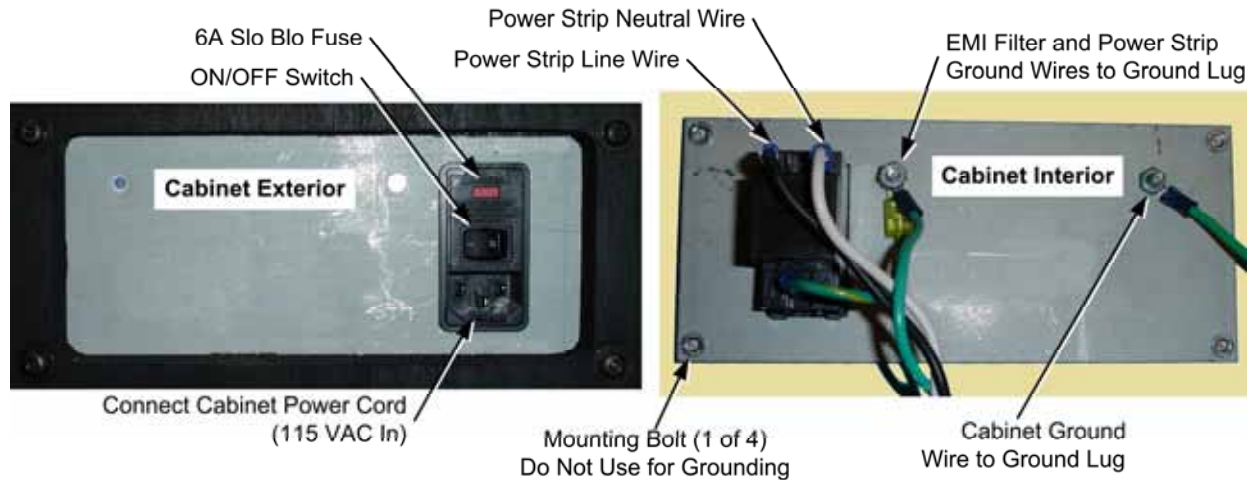


Figure 21. AC Power Plate (Shown Without Labels)

### AC Power Strip Replacement

The AC power strip provides power to all of the components in the cabinet. If the cabinet has no power, check the 6A Slo Blo fuse in the power plate (see AC Power Plate (Shown Without Labels)) and replace if blown. Perform the following steps to replace the power strip:

1. Turn the cabinet OFF and disconnect the AC power cord.
2. Disconnect all components from the power strip.
3. Disconnect the power strip from the AC power plate terminals shown in Figure 21 on page 33.
4. Remove the power strip; it is held in place with Velcro<sup>®</sup>.
5. Replace the power strip with an appropriate unit from GLOBAL VR (part # 49-0963-40). Do not attempt to use a different power strip. Be sure to connect each wire to the correct terminal (See Figure 28 on page 51.)



Be sure to connect each wire to the correct terminal. The ground wire must be securely connected to the ground lug on the power plate or the game will not function properly.

## DC Power Supply Replacement

The DC power supply provides +12 VDC power to the LED lighting, ventilation fan, Audio Amp PCB, and GVRI/O Mini PCB and +5 VDC to the coin door. Perform the following steps to replace the DC power supply:

1. Turn the cabinet OFF and disconnect the AC power cord.
2. Make sure that all wires connected to the DC power supply are properly labeled for easy re-assembly, and then disconnect the wires from the terminals on the DC power supply.
3. Remove the four (4) screws that secure the power supply to the cabinet.
4. Reverse these steps to install the new power supply. Adjust the +5V output to 5.4V **before** connecting the power supply to the cabinet harnesses (use 5.2V if the power supply is connected). If the voltage is too high it will damage electronic components. If it is too low, the game will not work properly.
5. Be sure to connect the wires to the correct terminals. Refer to Figure 28 on page 51 for a diagram.

## Marquee Florescent Light Service

The marquee is lit by a florescent fixture. To gain access to the marquee fixture, remove the five (5) nuts and washers that secure the marquee artwork and clear plastic in place and remove the artwork and plastic.

Replace the florescent tube with another 18" florescent tube.

To remove the fixture, disconnect the cabinet from AC power. Disconnect the AC power cord from the fixture. Remove the two Phillips screws that secure the fixture to the cabinet and remove the fixture. Replace the fixture with part # 49-1001-00 from GLOBAL VR.

## LED Light Service

LED Light Tubes are used to add dramatic lighting effects to the cabinet. The light assemblies connect to a DC power cable using a standard PC power connector.

Refer to the table below if you need to replace an LED Light Tube. The tubes are secured to the cabinet with cable ties. Snip the cable ties to remove the LED tubes and secure the new tube with new cable ties.

Light Location	Qty, Size & Color	Changing Tube(s)
Subwoofer	One 12" Red Tube	Remove the four (4) screws that secure the grill in place over the subwoofer.
Kick Panel	One 12" Red Tube	Remove the four (4) screws that secure the clear plastic plate above the kick panel.
Area Below Control Panel	Four 6" Red Tubes, Two on Each Side (Alternately, white LEDs can be used.)	To replace a control panel LED, remove the metal housing from below the control panel. It is held in place by two (2) screws and two (2) bolts with nuts and washers. Open the coin door to remove the two nuts from the bolts.

## Setting the Computer BIOS (CMOS), DG41TY Motherboard

**This procedure applies only to systems with the Intel® DG41TY Motherboard.** If your system has a different motherboard, check <http://service.globalvr.com> for updated information.

If you are comfortable using the CMOS Setup Utility, connect a keyboard to the computer and press the **F2** key during boot to run the Utility, select **Load Optimal Defaults** from the Main Menu, and then change the settings shown in the table below. For more help, refer to the detailed instructions that follow.

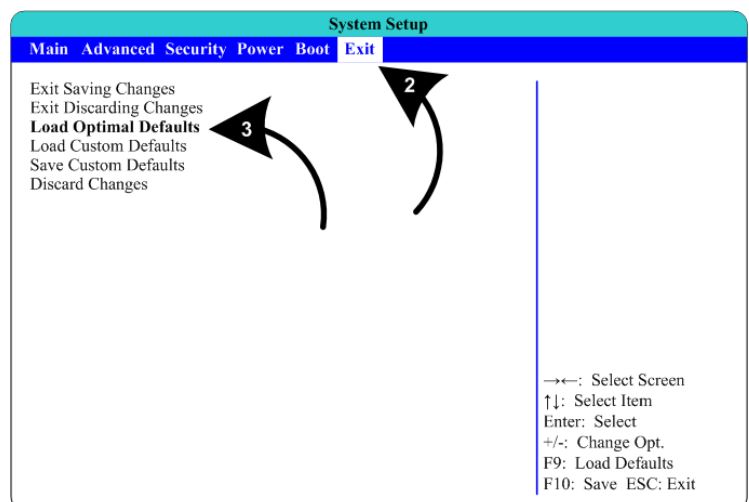
Menu	Submenu (If Applicable)	Item	Setting
Exit		Load Optimal Defaults	
Main		System Date	Set to Current Date
		System Time	Set to Local Time
Advanced	Boot Configuration	CPU Fan Control	Disable
		System Fan Control	Disable
		Display F10 to Enter Boot Menu	Disable
	Floppy Configuration	Diskette Controller	Disabled
Power		After Power Failure	Power On
		Processor Power Management	Disable
Boot		Boot Device Priority	CD/DVD-ROM drive Hard Disk Drive Floppy Drive Ethernet
		Boot to Network	Disable

**Important:** Your screens may not look exactly like the screens shown in this document, and some settings shown on the screens pictures may be different from your system.

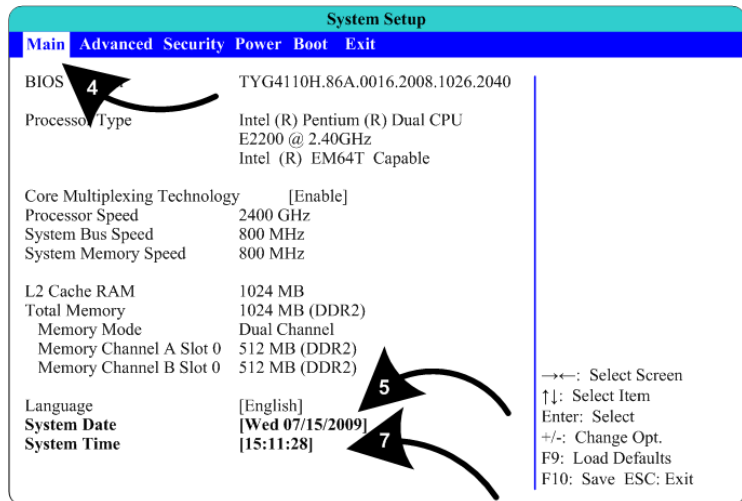
**Do not change any settings that are not specifically described in this document.**

**Note:** Use the left and right arrow keys (→←) to move between the menus listed at the top of the screen, and the up and down arrow keys (↑↓) to move up and down between menu items. Use the + and – keys to change settings for selected items.

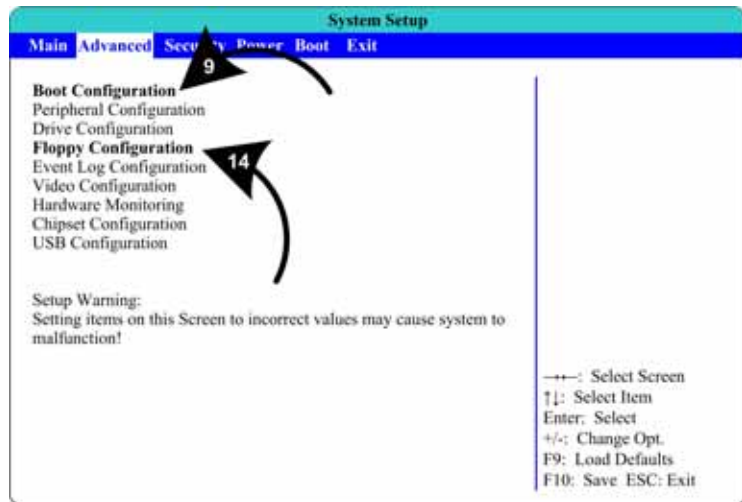
1. Press the **F2** key during boot. The System Setup Utility Main Menu will appear.
2. Use the left and right arrow keys (→←) to select the **Exit** menu.
3. Use the up and down arrow keys (↑↓) to select **Load Optimal Defaults**, and press **Enter**. A confirmation box will appear. With **Yes** selected, press **Enter**.



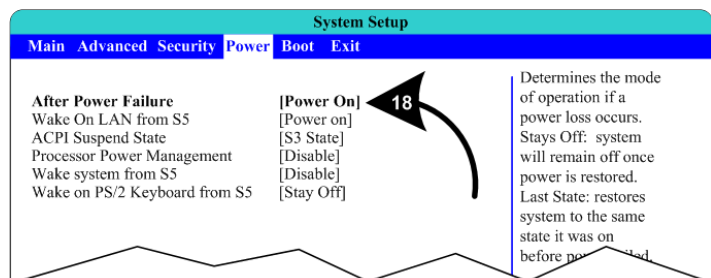
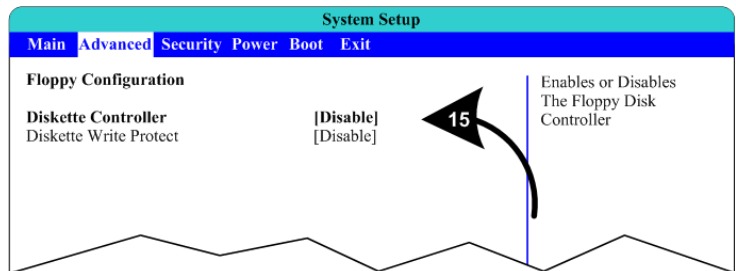
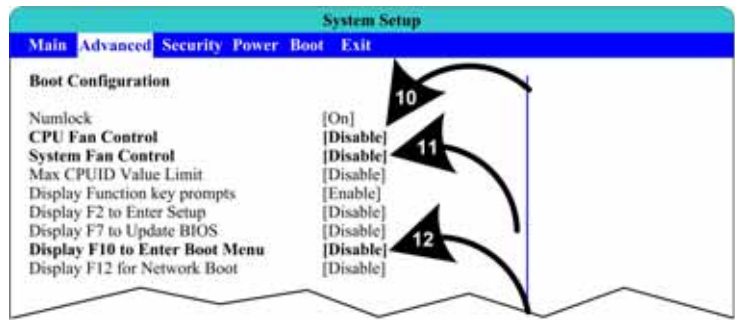
4. Use the left and right arrow keys (→←) to select the **Main** menu.
5. Use the up and down arrow keys (↑↓) to select **System Date**. The month will be highlighted.
6. Use the + and – keys to set the month. Press the **Tab** key to move to the day, and set it the same way. Repeat for the year.
7. Use the up and down arrow keys (↑↓) to select **System Time**, and then use the +, –, and **Tab** keys to set the time the same way you set the date.



8. Use the left and right arrow keys (→←) to select the **Advanced** menu.
9. Use the up and down arrow keys (↑↓) to select **Boot Configuration**, and press **Enter**. The **Boot Configuration** menu will appear.



10. Use the up and down arrow keys (↑↓) to select **CPU Fan Control**, and then use the (+-) keys to change the setting to **Disable**.
11. Use the up and down arrow keys (↑↓) to select **System Fan Control**, and then use the (+-) keys to change the setting to **Disable**.
12. Use the up and down arrow keys (↑↓) to select **Display F10 to Enter Boot Menu**, and then use the (+-) keys to change the setting to **Disable**.
13. Press the **Esc** key to exit back to the **Advanced** menu.
14. Use the up and down arrow keys (↑↓) to select **Floppy Configuration**, and press **Enter**.
15. Follow the same steps as before to select **Diskette Controller** and change the setting to **Disable**.
16. Press the **Esc** key to exit back to the **Advanced** menu.
17. Use the left and right arrow keys (→←) to select the **Power** menu.
18. Use the up and down arrow keys (↑↓) to select **After Power Failure**, and then use the (+-) keys to change the setting to **Power On**.



19. Use the left and right arrow keys (→←) to select the **Boot** menu.

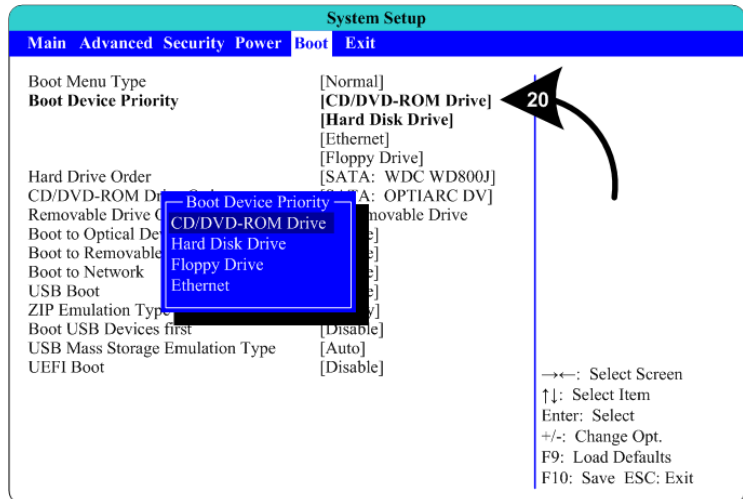
20. Use the up and down arrow keys (↑↓) to select **Boot Device Priority**, and press **Enter**.

21. A pop-up window will appear listing available drives. Use the up and down arrow keys (↑↓) to select **CD/DVD-ROM Drive**, and then use the (+-) keys to move the drive to the top of the list.

22. Use the up and down arrow keys (↑↓) to select **Hard Disk Drive**, and then use the (+-) keys to move the drive to the second position. Press **Enter**.

23. Use the up and down arrow keys (↑↓) to select **Boot to Network**, and then use the (+-) keys to change the setting to **Disable**.

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



25. Make sure **Yes** is selected (use the arrow keys to select if necessary) and press **Enter**.

## Chapter 7 Troubleshooting

### Video Troubleshooting

Problem	Cause	Possible Solution
No picture or Corrupted picture on monitor  You hear the audio	Power problem	Check the Power On LED on the monitor power supply. Make sure the power cord is connected to the power strip and the power strip is on.
	Loose or faulty video cable	Verify that the video cable is firmly connected from the monitor PCB to the video card in the computer. With the monitor powered ON, disconnect the video cable. You should briefly see a message on-screen saying <i>No Input Signal</i> if the monitor is working. Check the video cable and make sure it is not pinched or frayed. Connect the cable to a different monitor to verify video output.
	Loose or faulty connections between LCD Panel and Control PCB	Make sure that all harnesses between the control PCB and LCD panel are connected properly. Inspect for damage or broken wires. Check the DVI video cable and power connector. If you hear Alert beeps from the System PC, contact Technical Support for assistance.
	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. If instructed by Technical Support, open the computer and check the following: <ul style="list-style-type: none"> <li>• Make sure the video card is seated properly in the motherboard. Reseat the video card as needed.</li> <li>• Check the power connector to the video card inside the computer. Make sure it is connected properly and is not connected backwards.</li> <li>• Power on the computer and make sure the fan on the video card is spinning fast.</li> </ul>
No video and no audio	BIOS setting has changed	If the computer does not power on, make sure the On/Off switch on the back of the computer is in the On (I) position and <i>After Power Failure</i> in the BIOS is set to <i>Power On</i> (see <i>Setting the Computer BIOS (CMOS)</i> on page 35).
	No power to computer	Verify the computer is ON by the LED on the front of the computer. Verify the line voltage switch on the back of the computer is set to 115V. Make sure the AC power cord is firmly connected to the computer and the power strip, and the power strip LED is on. Turn off the power strip, wait 20 seconds, and then turn it back on to reboot the computer.  Verify the fan in the PC power supply is working. If the fan is off, the power supply may be faulty.

Problem	Cause	Possible Solution
No video and no audio (Continued)	Corrupted software or Faulty hard drive	Reload the software from the DVD. If you continue to have problems, you may have a faulty hard drive. Contact Technical Support.
Picture is dim or faded	Gamma and/or Vibrance needs adjustment	Adjust the monitor Gamma from the Operator Menu <b>System Adjustments</b> screen (see page 20). If this does not give adequate results, increase brightness using the monitor remote control board mounted to the back of the monitor.
Red or green horizontal lines on monitor	Faulty LCD control PCB	Contact Technical Support for assistance.

### Audio Troubleshooting

Problem	Cause	Possible Solution
No audio	Volume set too low	Use the <b>VOL UP</b> button on the Operator Button Panel to raise the volume. Check audio settings in the Operator Menu <b>System Adjustments</b> menu, and verify that the Master Volume is set high enough. Verify the volume pots are not turned all the way down on the Audio Amp PCB
	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.
	Blown speakers	Remove the grills and inspect each speaker for visible damage. Run <b>System Tests: Sound Test</b> from the Operator Menu to verify each speaker is working.
	Faulty audio amp PCB	To verify audio is working at the computer, connect stereo headphones to each computer audio port. Test the Audio Amp PCB in another cabinet.
	No power to audio amp PCB	Make sure the power harness is firmly connected to the Audio Amp PCB and the LED is lit on the PCB.
Poor sound from one or more speakers	Blown speakers	Remove the grills and inspect each speaker for visible damage. Run <b>System Tests: Sound Test</b> 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. Check for reversed wires on each speaker.
	Faulty audio amp PCB	To verify audio is working at the computer, connect stereo headphones to each computer audio port. Test the Audio Amp PCB in another working cabinet.
	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.
Audio hum	Fault in AC Wiring	A constant low hum in the speakers can be caused by a ground loop, or reversed AC line and neutral wires to a component such as a power supply.

## Control Troubleshooting

Problem	Cause	Possible Solution
Guns aim poorly or Throttle doesn't work properly	Controls need calibration	Calibrate the Joystick and Throttle as described on page 24.
Controls do not work at all	USB cable disconnected	Make sure the USB cable is firmly connected from the GVRI/O Mini PCB to a PCI USB port on the computer.
	Faulty USB port or cable	Try connecting to a motherboard USB port as a test. Try a different USB cable. Reboot the game. Replace PCI USB card if faulty.
	Faulty PCB	Make sure that all connections to the GVRI/O Mini PCB are secure. Test PCB in a different cabinet. Replace PCB if faulty.
Joystick up/down and/or left/right motions do not work	Faulty pots	See <i>Replacing Joystick Pots</i> on page 25 for information on testing and replacing the pots.
	Faulty wiring	Check the harness connectors to the Joystick, and <b>J6</b> on the GVRI/O Mini PCB.
Joystick buttons do not work	Faulty wiring	Check the harness connectors to the Joystick, and <b>J7</b> on the GVRI/O Mini PCB.
Throttle does not work	Faulty pot	See <i>Replacing the Throttle Pot or Gear Wheel</i> on page 26 for information on testing and replacing the pot.
	Faulty wiring	Check the harness connectors to the Joystick, and <b>J6</b> on the GVRI/O Mini PCB.
Throttle button does not work	Faulty wiring	Check the harness connectors to the Joystick, and <b>J9</b> on the GVRI/O Mini PCB.
	Faulty micro switch	Replace the Throttle Handle as described on page 27.

## Miscellaneous Troubleshooting

Problem	Cause	Possible Solution
No power	Power strip not plugged in or turned off	Make sure the power strip ON/OFF switch is ON, and the light on the power strip is on. If the light is off, make sure the connections to the AC power plate and power transformer terminals are secure.
	Cabinet not connected or turned off	Make sure the AC power cord is firmly connected to the power plate and an active AC outlet, and the cabinet 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. It will light-up red when recognized by the computer. Contact Tech Support to exchange a faulty dongle.
	Faulty USB port	Test the dongle in a different USB port or a different Blazing Angels cabinet. (Upright and sit-down cabinets use the same game dongle)

<b>Problem</b>	<b>Cause</b>	<b>Possible Solution</b>
Cabinet gets very warm	Faulty ventilation fan	Verify that the ventilation fan is working. It is located above the monitor access door on the back of the cabinet. Replace the fan if it is worn or spinning slowly.
	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 is freely blowing out of the cabinet.
Marquee lamp does not light or is intermittent	Faulty florescent tube	Check the florescent tube for darkened or cracked end. 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 and is properly aligned and latched to the coin door.
	Faulty ground wire	Check the ground wire to the coin door.
Wrong number of credits shown	Incorrect setting	Adjust settings from the Operator Menu.
	Faulty wiring	Disconnect cabinet power cord. Check all coin mech wiring. Verify no wires are frayed or shorting to ground.
Optional DBA not working	Incorrect dipswitch setting	Set dipswitches for Long Pulse or Gaming ( <b>not</b> Short Pulse or Vending).
Red Dot appears on screen in Attract Mode	A button may be stuck	The red dot appears if a button gets stuck during a game, but can also occur if a player holds a button down while the game exits. If you reboot the cabinet, the Switch Input Test screen will automatically appear, with the affected button shown in blue.
Instrument panel lights don't come on right away	This is normal	Instrument panel and exhaust port lights are software controlled and don't come on until the Attract Mode starts.

## Chapter 8 — Replacement Parts

If you need replacement parts, please reference these part numbers when contacting GLOBAL VR<sup>®</sup> technical support or your distributor.

You can purchase parts from our online store: <http://parts.globalvr.com>

**Notes:** Part numbers may change due to hardware or software revisions.  
Qty column refers to quantity used per cabinet.

### Documents and Software

Part Number	Qty	Description
040-0245-01	1	Operation & Service Manual (This Document)
040-0169-01, Rev. C	1	Software Restore Guide
050-0202-01*	1	System and Game Install Disk (DVD)

\*Part number may change due to software revisions.

### Cables

Part Number	Qty	Description
115-0008-01	2	Cable, 110VAC to Power Supply
115-0049-01	1	Cable, Power Plate Ground Cable 3.5" Long
115-0119-01	2	Cable, Front Speakers
115-0120-01	1	Cable, Audio Amp to Speakers
115-0157-01	1	Cable, Marquee Florescent Light Assembly
115-0168-01	1	Cable, Transformer, Complete Harness Assembly (220V Systems Only)
115-0173-01	1	Cable, Earth Ground
115-0174-01	1	Cable, DC Power
115-0175-01	1	Cable, LEDs, Control Panel, Subwoofer & Kick Panel
115-0176-01	1	Cable, GVR I/O PCB to Coin Box
115-0180-01	1	Cable, Player Controls, Joystick, Throttle, Ground
115-DVINPUT-CBL	1	Cable Digital Video Input to Monitor
96-0539-00	2	Cable, Stereo, 3.5 mm 6'
GLO-PWRCORD	1	Cable, Marquee Florescent Light Power
USB-AB06MM	1	Cable, USB Cable, 6', USB2-AB06
80-0213-00	2	Power Cord 6', SJT UL Recognized

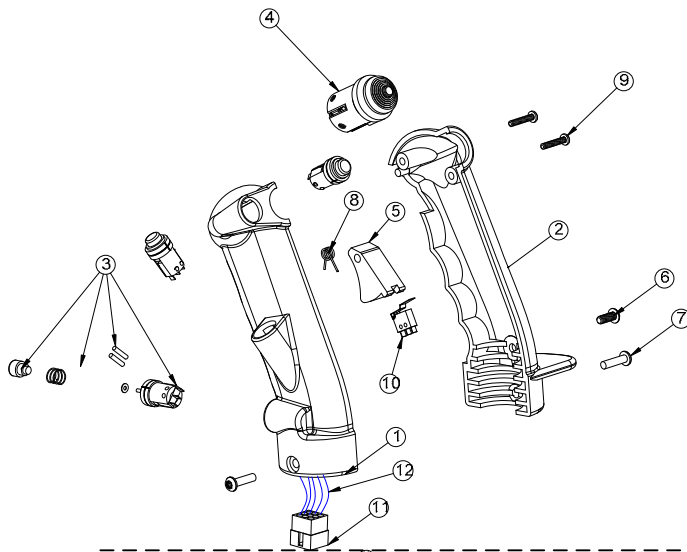
### Cabinet Hardware

Part Number	Qty	Description
<b>Electronics</b>		
45075-00	1	Computer Assembly
60039-00	1	Computer Mounting Strap
990-0014-BA	1	GVR/I/O Mini PCB with Blazing Angels Firmware
40-0740-6V	1	Coin Door Assembly w/ 6V Lamps, Meter, & 4 Service Buttons
44-1100-01	1	Power Supply, 5/12 VDC 115 W (PCBs, Lights, & Coin Door)
37117-01	1	Power Plate Assembly
0001.2512	1	Power Plate Fuse, 6A, 5mm X 20mm
CCM1600-ND	1	Power Entry Module, EMI Filter
49-0963-40	1	Power Strip, 7-Outlet Surge Protect, 6', 15 AMP, 1500 Joules
2-30-2434	1	Power Transformer, 115-230V, 500W (220V Systems Only)
115-0025-01	1	Fan, 110 VAC, with Grill and Cord
137657	1	Power Supply, 24 VDC, 10 A, (for Monitor)
USB-KQRTG-HL-BA-US	1	Game Dongle (Exchange Only)
<b>Player Controls</b>		
50-8184-00	1	Throttle with Harness
95-0251-BA	1	Analog Joystick

<b>Part Number</b>	<b>Qty</b>	<b>Description</b>
<b>Monitor</b>		
EI-420W02-001-AOD	1	42" LCD Monitor with Control PCB
26126-00	1	42" Glass Display Shield
<b>Lighting</b>		
49-1001-00	2	Florescent Light Fixture, 18"
METL12R	2	Red LED Light Tube, 12", Subwoofer and Kick Panel
METL6R (or METL6W)	4	Red LED Light Tube, 6", Below Control Panels (or White LED Tube)
<b>Audio</b>		
50-9986-00	1	Speaker Pair, 3-Way, 50 Watt (Left and Right Speakers)
5555-15142-00	1	8" Subwoofer
990-0001-01	1	5.1 Audio Amp PCB
<b>Brackets &amp; Misc. Parts</b>		
1556A15	2	Corner Bracket to Brace Computer, 3", Zink Plated
26092-00-BA	2	Red Plastic Below Control Panels
37101-00	2	Caster Weldment
37102-00	2	Control Panel Base Cover
37103-00	1	Marquee Weldment
37165-00	4	42 Inch LCD Monitor Mount
37166-00	2	Speaker Box Mount
37167-00	1	Subwoofer Grill

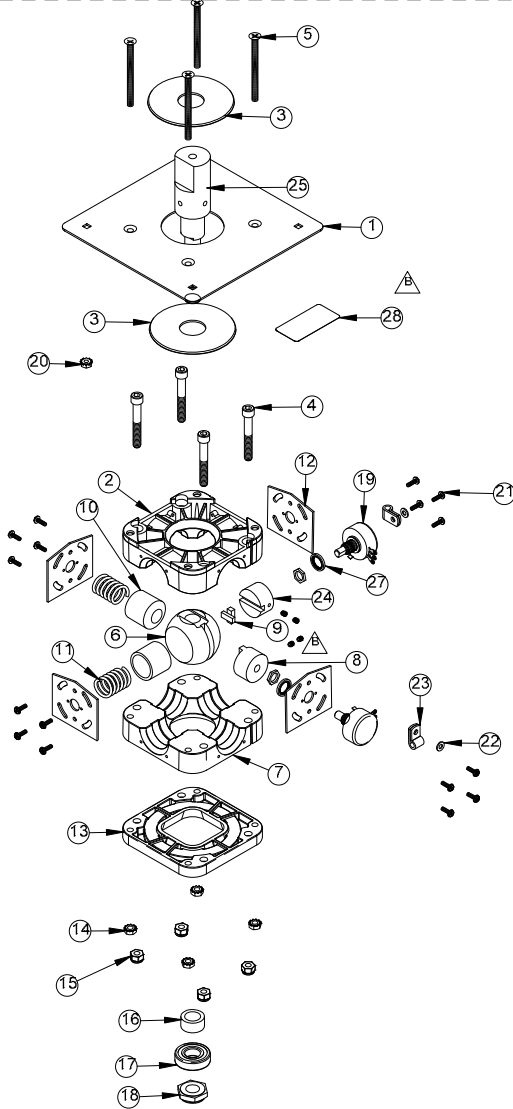


Figure 22. Artwork Locations and Part Numbers



**Grip Assembly Parts**

ITEM NO.	QTY.	PART NO.	DESCRIPTION
1	1	95-0208-00	HOUSING LEFT B-8 GRIP
2	1	95-0209-00	HOUSING RIGHT B-8 GRIP
3	3	12-0012-00	PUSHBUTTON FOR B/8 GRIP
4	1	12-0010-00	SWITCH 4-WAY FOR B/8 GRIP
5	1	12-0015-00	TRIGGER ONLY B/8 GRIP RED
6	1	43-1081-00	SCREW 10-32 X 1/2 BH TORX TAMP PRF
7	2	43-0376-00	SCREW 10-32x3/4 TORX TAMPER PROOF STEEL BLK-OXIDE
8	1	95-0678-00	TORSION SPRING B8 GRIP ASSY .23 ID
9	2	96-2519-00	#6 X 3/4 HIGH/LOW SCREW
10	1	95-0692-00	SWITCH ACTUATOR ASSY TRIGGER ASSY B8 GRIP
11	1	43-0472-00	PLUG MALE 9 PIN MOLEX .062 MOLEX #03-06-2092
12	1	96-0100-00	HARNES



**Main Assembly Parts**

ITEM #	QTY.	PART NO.	DESCRIPTION
1	1	95-3301-00	MOUNTING PLATE
2	1	95-7022-00	HOUSING UPPER ANALOG J/S
3	2	95-7007-00	GUIDE WASHER 2.75 X .084 X .06
4	4	43-0231-00	SCREW,SOC HD CAP 1/4-20 x 1.75" BLK OXIDE
5	4	43-0098-00	10-24 X 2.5 FLAT PHMS
6	1	95-0171-00	BALL PIVOT BEARING
7	1	95-7021-00	HOUSING LOWER ANALOG J/S
8	1	95-7009-90	GROOVE RIDER "MACHINED"
9	1	95-7010-01	UNIV. JOINT, ANALOG.
10	2	95-0170-00	CUP RTRN-HARD CNTR F/ATARI ANA J/S
11	2	43-0310-00	RETURN SPRING HEAVY F/RETURN TO CENTER J/S
12	4	95-7011-01	POT MOUNTING PLATE
13	1	96-4114-00	STOP MOLDED F/CONICAL RETURN J/S
14	4	90-1204-00	NUT, KEPS 10-24
15	4	43-0097-00	NYLOCK JAM NUT 1/4-20 .218 HGT
16	1	95-7028-00	SPACER .75 OD X .51 ID .375 LG
17	1	95-7027-00	BEARING,BALL,5 ID X 1.13 OD .38 THK.
18	1	43-0232-00	NUT, HEX NYLOCK 1/2-20
19	2	50-2064-00	POT 5K "S" TAPER, W/3/4" SHAFT
20	1	42-0056-00	NUT SEMS 6-32 ZINC PLATED
21	16	43-1003-00	SCREW,SPL F/PLAST, #4 X .42/.39 SPL HI THD, B TIP PH HEX W HD
22	2	43-0004-00	#6 FLAT WASHER .03T ZINC PLTD
23	2	90-1021-00	CABLE CLAMP .187 DIA PANDUIT CCS19-S8
24	1	95-7008-90	GROOVED FOLLOWER "MACHINED"
25	1	50-3071-00	SHAFT F/B-8 GRIP HALVES J/S W/HARD CNTR
26	1	50-3072-00	B-8 GRIP WL & R HSNGS & UPPER CABLE
27	2	43-0018-00	LOCKWASHER, INT. 3/8" x 9/16"
28	1	95-2129-00	LABEL F/CLARIFIC. OF SET SCWS USED ON JS

**NOTES:**

PARTS NOT SHOWN:  
 96-0102-00 HARNES SWITCH B-8 J/S  
 90-1013-00 TIE WRAP 4" LENGTH QTY (3)  
 96-0105-00 CONNECTOR 10 CIRCUIT .100 CTR IDC PANDUIT PK-100  
 96-0106-00 POLARIZING KEY F/.100 CTR IDC PANDUIT CE100F24-10  
 50-9055-00 SPRING, STRAIN RELIEF 7/32 X 1/4 X 7.5" LONG  
 96-0703-01 TUBING, HEAT SHRINK 1/8" X .62 QTY (6)  
 96-0747-00 HARNES B-8 J/S UGCI TYPE  
 50-0440-RW JUMPER WIRE QTY 1  
 50-0440-YW JUMPER WIRE QTY 1  
 Drawing ©2008 Happ Controls.

Figure 23. Joystick Exploded View and Parts

ITEM NO	QTY	PART NO.	DESCRIPTION
1	1	50-8263-00	BRACKET, RIGHT SIDE F/TURBO THROTTLE
2	1	50-8267-00	LEFT SIDE, TURBO THROTTLE
3	1	50-8339-00	PLATE, HIGH/LOW, FOR I.L. SHIFTER
4	1	50-8071-02	HANDLE MOD F/TURBO THROTTLE MOD.
5	1	50-8268-00	TRUNNION, TURBO THROTTLE
6	1	50-8054-00	PUSHBUTTON FOR IL TURBOSHIFTER
7	2	43-0154-00	SPACER PLASTIC 1/2" OD X 1/4" ID 1 INCH
8	2	50-8401-00	BUMPER F/SHIFTER, RUBBER
9	1	50-8026-00	POT, 5K, 1.125 LG SHFT PEC W/NUT & WSH.
10	1	43-0992-00	SCREW, 1/4-20 X 1" SOCKET CAP SCW
11	2	43-0155-00	SCREW HHCS 1/4-20 X 1-5/8" GRD 5
12	4	43-0121-00	NUT, 1/4-20 NYLOCK
13	2	50-8406-00	BUSHING, NYLINER, F/.078 THK MAT.
14	2	43-1324-00	ROLL PIN 3/32 X 3/16
15	2	43-0156-00	SCREW, 1/4-20 x 1/2 HHCS
16	2	43-0002-00	SCREW 10-32x3/8" HEX WASH HEAD YLW ZINC CHRMT
17	2	43-0037-00	LOCKWASHER, EXT #10
18	1	50-8092-00	SPACER PLASTIC, .56 I.Dx.63 O.D X .50 LONG
19	1	50-8569-00	SPRING F/WIRE HARNESS
20	1	50-8295-00	GEAR SEGMENT ASSY, 32DP, 128T
21	1	50-8266-00	TENSION BRACKET F/TURBO THROTTLE
22	1	96-2531-10	GEAR ASSY 32DP 32 TEETH .25 BORE .62 HUD DIA W/SET SCREW

NOT SHOWN:

95-2085-00 QTY 1 JUMPER WIRE BLACK 16" LONG AND

95-2086-00 QTY 1 JUMPER WIRE RED 16" LONG

Drawing ©2008 Happ Controls.

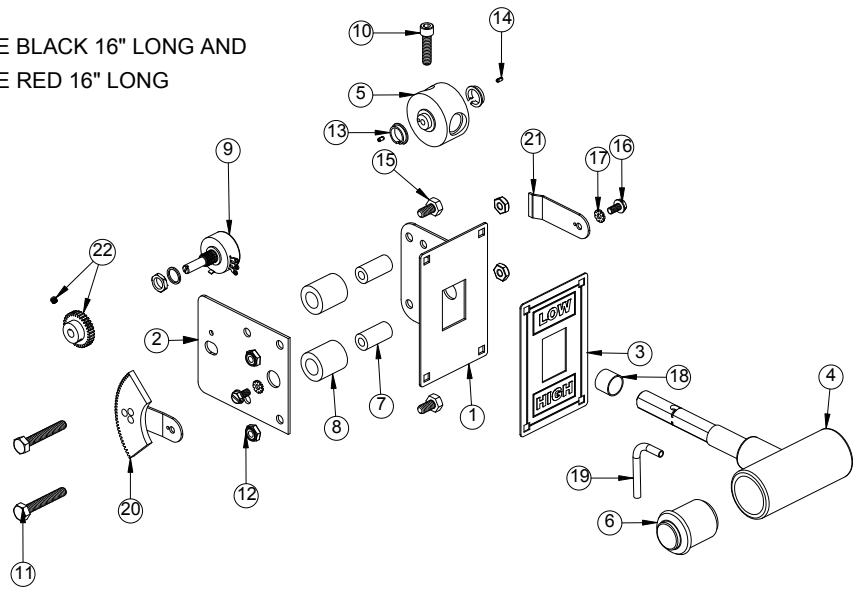


Figure 24. Throttle Exploded View and Parts

## Chapter 9 — Diagrams and Schematics

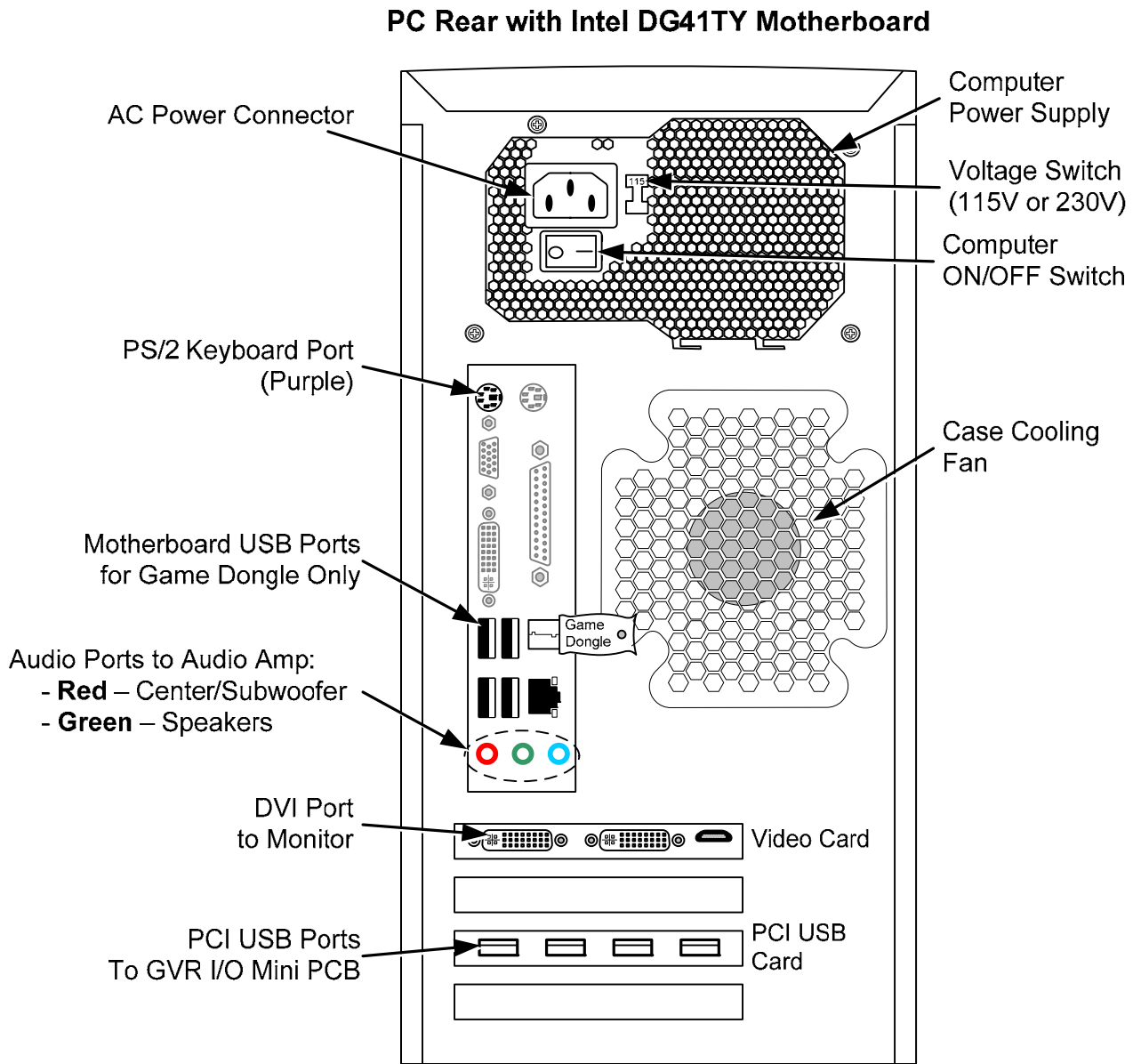


Figure 25. Computer Rear Panel Diagram

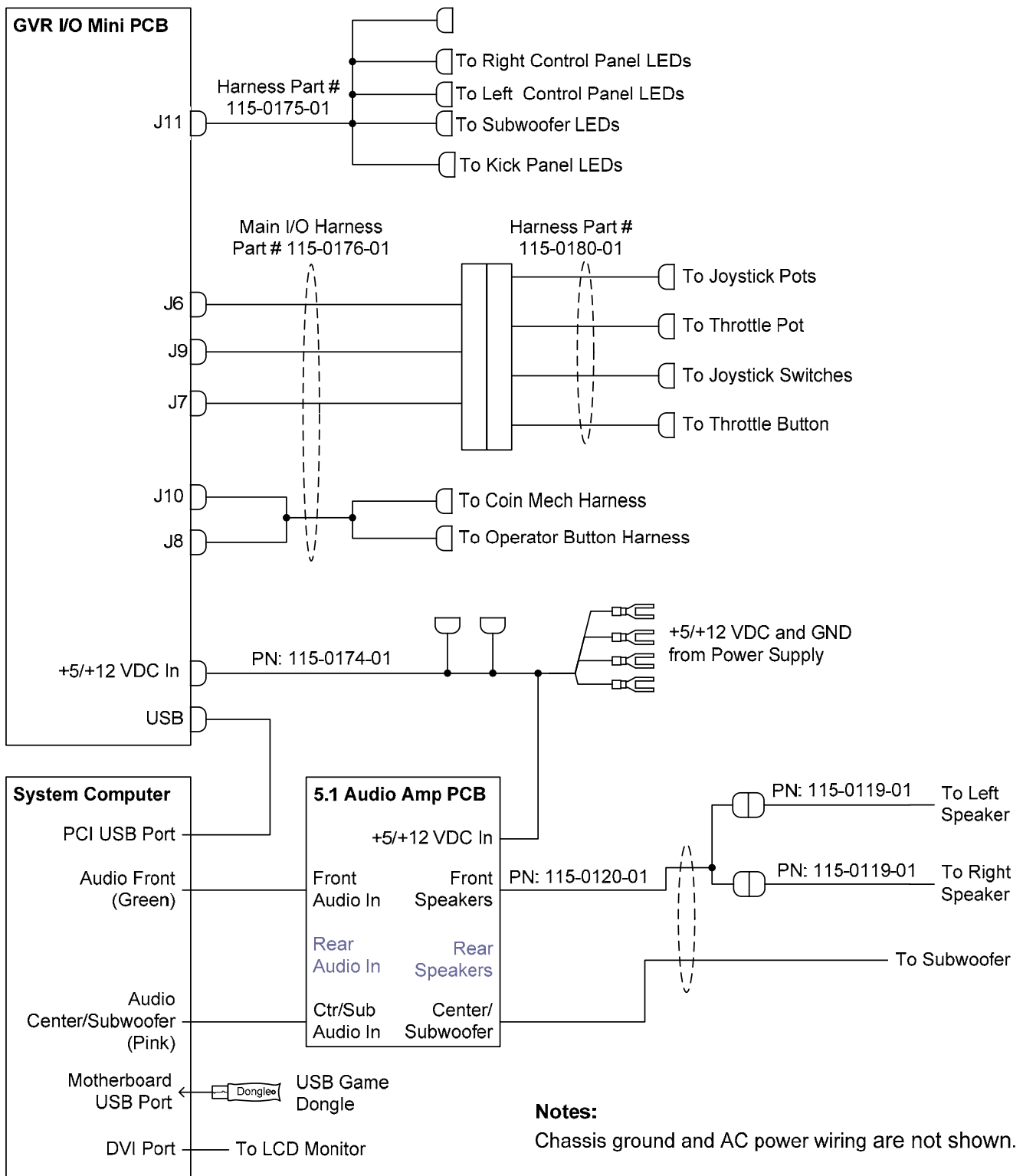


Figure 26. Simplified Wiring Diagram

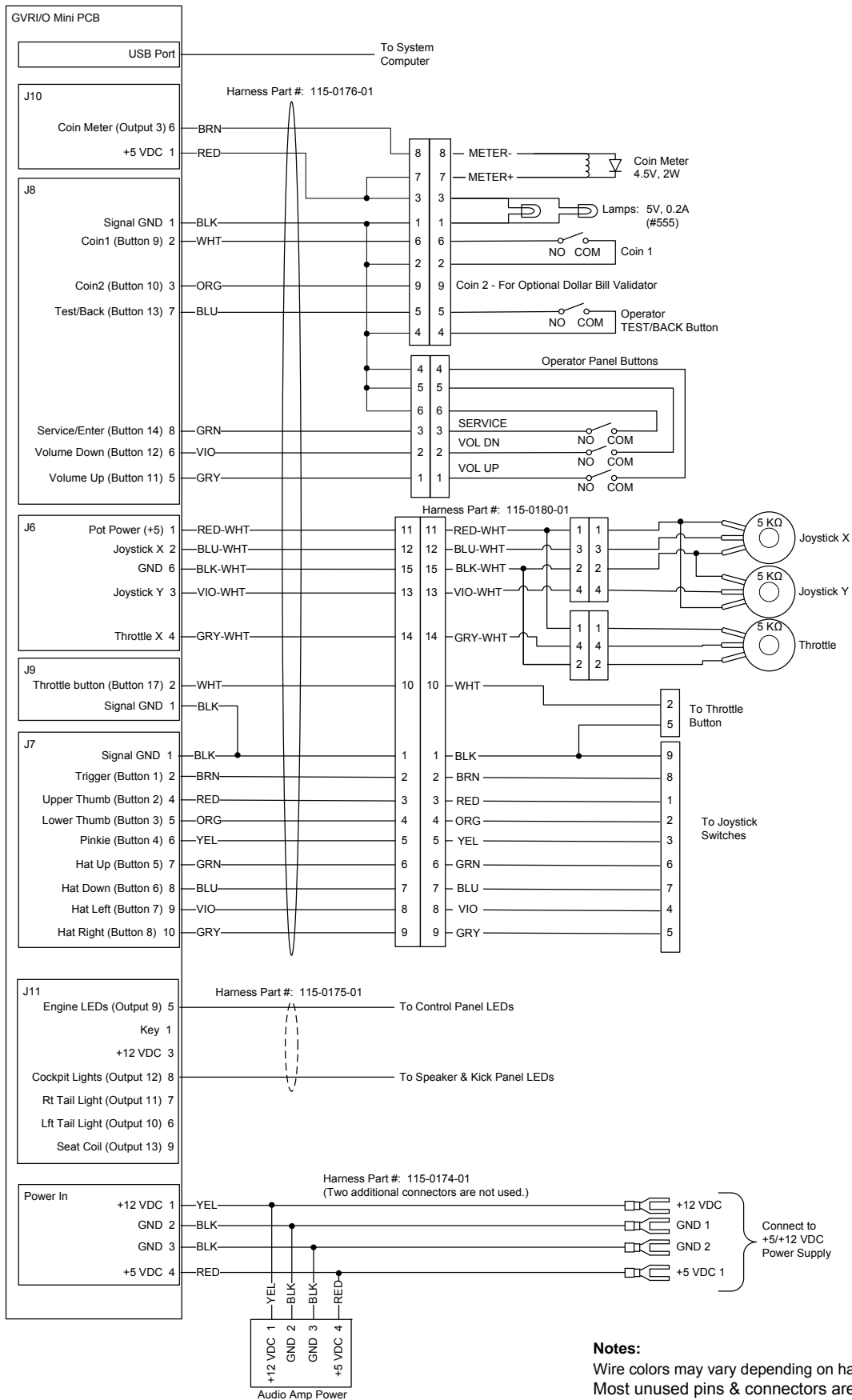


Figure 27. Detailed Wiring Diagram

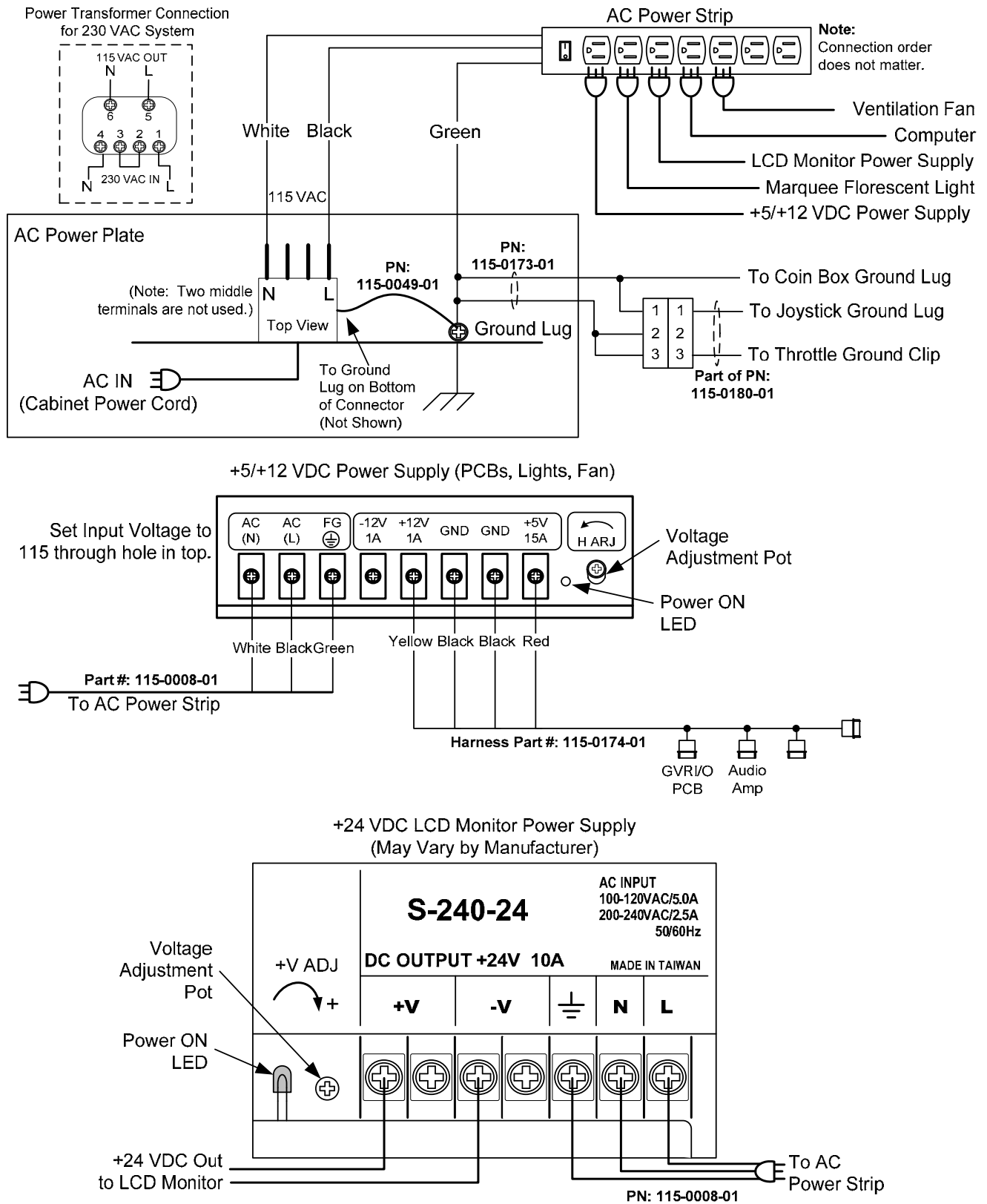


Figure 28. Power Distribution Diagram

## Warranty Service

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If you should require warranty service, please contact your authorized GLOBAL VR<sup>®</sup> distributor.

### LIMITED WARRANTY

LIMITED WARRANTY FOR BLAZING ANGELS (North America Only)

GLOBAL VR<sup>®</sup> warrants that its Major Electronic Components are free from defects in materials and workmanship under normal use and service for a period of one (1) year from the date of sale.

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<sup>®</sup> will, at no charge, repair the Product, provided:

- Purchaser believes that the Product is defective in material or workmanship and promptly notifies GLOBAL VR<sup>®</sup> 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<sup>®</sup>'s designated service center;
- GLOBAL VR<sup>®</sup>'s inspection or test of the Product verifies to GLOBAL VR<sup>®</sup>'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<sup>®</sup> 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<sup>®</sup> 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<sup>®</sup> determines that the reported problem was not covered by the warranty, Purchaser shall pay GLOBAL VR<sup>®</sup> 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 shall be in effect for the remainder of the original warranty period, but will not exceed the original warranty period.

Purchaser's exclusive remedy and GLOBAL VR<sup>®</sup>'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<sup>®</sup> 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<sup>®</sup> BE LIABLE FOR LOSS OF PROFITS, LOSS OF USE, INCIDENTAL OR CONSEQUENTIAL DAMAGES RESULTING FROM OPERATION OF THE GAME IN ANY CONDITION. GLOBAL VR<sup>®</sup> SHALL NOT BE RESPONSIBLE FOR THE SUITABILITY, PERFORMANCE, OR SAFETY OF ANY NON- GLOBAL VR<sup>®</sup> PART OR ANY MODIFICATION PERFORMED BY ANY PRODUCT DISTRIBUTOR UNLESS SUCH WORK IS EXPRESSLY AUTHORIZED IN ADVANCE BY GLOBAL VR<sup>®</sup>.

THIS WARRANTY IS IN LIEU OF ALL OTHER EXPRESSED OR IMPLIED WARRANTIES, INCLUDING THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, AND ALL OTHER OBLIGATIONS OR LIABILITIES ON GLOBAL VR<sup>®</sup>'S PART, EXCEPT FOR ANY EXPRESS WARRANTY SET FORTH IN A WRITTEN CONTRACT BETWEEN GLOBAL VR<sup>®</sup> AND PURCHASER CONTAINING SPECIFIC TERMS WHICH SUPERSEDE THE TERMS HEREIN. THIS WARRANTY DOES NOT AUTHORIZE ANY OTHER PERSON TO ASSUME OTHER LIABILITIES, IF ANY, CONNECTED WITH THE SALE OF PRODUCTS BY GLOBAL VR<sup>®</sup>.



# Technical Support

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## Service & Parts

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

**Phone:** 408.597.3435

**Fax:** 408.597.3437

**E-mail:** [techsupport@globalvr.com](mailto:techsupport@globalvr.com)

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

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

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: \_\_\_\_\_
- Software Version from Operator Menu: \_\_\_\_\_
- OS Build from Operator Menu: \_\_\_\_\_
- GVRIO Version 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 level and number of players

To comment on this document, please e-mail: [techpubs@globalvr.com](mailto:techpubs@globalvr.com)