



Service Manual

Innovative Concepts in Entertainment

10123 Main Street

Clarence, New York 14031

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SAFETY AND WARNINGS BEFORE YOU BEGIN

WARNING: WHEN INSTALLING THIS GAME, A GROUNDED A.C. RECEPTACLE MUST BE USED. FAILURE TO DO SO COULD RESULT IN INJURY TO YOURSELF OR OTHERS. FAILURE TO USE A GROUNDED RECEPTACLE COULD ALSO CAUSE IMPROPER GAME OPERATION, OR DAMAGE TO THE ELECTRONICS.

NOTE: THIS GAME IS INTENDED FOR INDOOR USE ONLY.

DO NOT DEFEAT OR REMOVE THE GROUNDING PRONG ON THE POWER CORD FOR THE SAME REASON AS GIVEN ABOVE. USING AN IMPROPERLY GROUNDED GAME COULD VOID YOUR WARRANTY.

HAVE A QUALIFIED ELECTRICIAN CHECK YOUR A.C. RECEPTACLE TO BE SURE THE GROUND IS FUNCTIONING PROPERLY.

THIS GAME IS DESIGNED TO DISSIPATE STATIC ELECTRICITY THROUGH THE GROUNDING PLANE OF THE GAME. IF THE A.C. GROUND DOES NOT WORK, THE GAME COULD DISCHARGE STATIC ELECTRICITY THROUGH THE GAME CIRCUITRY, WHICH COULD CAUSE DAMAGE.

THE POWER SUPPLY IS NOT VOLTAGE ADJUSTABLE. TO OPERATE THE GAME AT VOLTAGES OTHER THAN THOSE IT WAS DESIGNED FOR. PLEASE CONTACT OUR SERVICE DEPARTMENT FOR VOLTAGE CONVERSION INFORMATION.

WARNING

DO NOT remove any of the components on the main board (e.g. compact flash and eproms) while the game is powered on. This may cause permanent damage to the parts and the main board. Removing any main board component part while powered on will void the warranty.

ALWAYS REMOVE POWER TO THE GAME, BEFORE ATTEMPTING ANY SERVICE, UNLESS NEEDED FOR SPECIFIC TESTING. FAILURE TO OBSERVE THIS PRECAUTION COULD RESULT IN SERIOUS INJURY TO YOURSELF OR OTHERS.

THIS GAME IS NOT SUITABLE FOR INSTALLATION IN AN AREA WHERE A WATER JET COULD BE USED.

This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning use of the appliance by a person responsible for their safety. Children should be supervised to ensure that they do not play with the appliance.

AC Power Information

The games main fuse is accessed through the back of the game at the power mod. Above the power cord is a small panel that contains the main fuse.

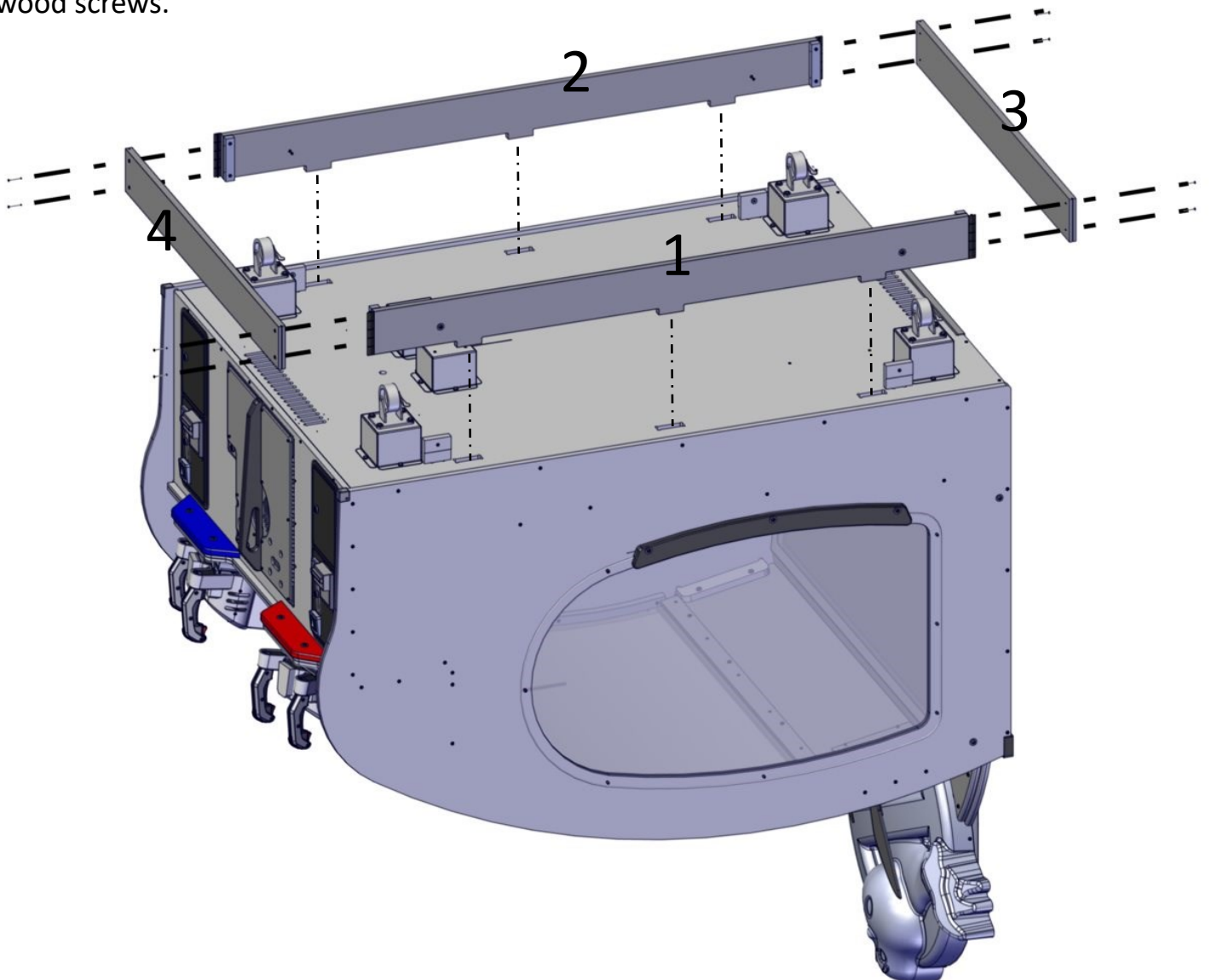
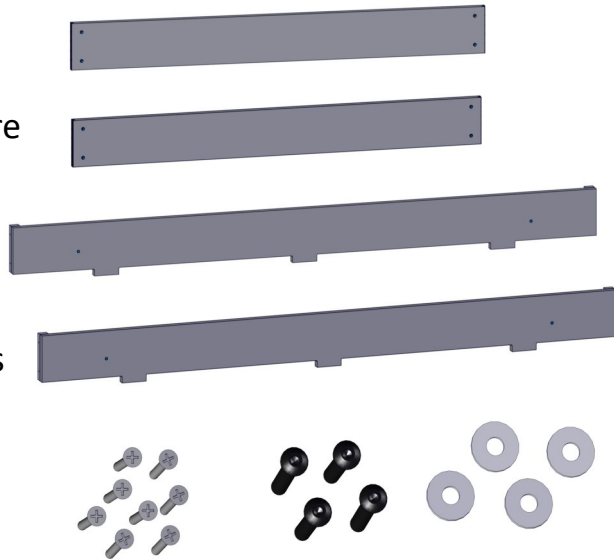
The value of the fuse for 120 volt users is 6 AMPS at 250Volt type slow blow.

The value of the fuse for 230 users is 4 AMPS at 250Volt type slow blow.

Step 1:

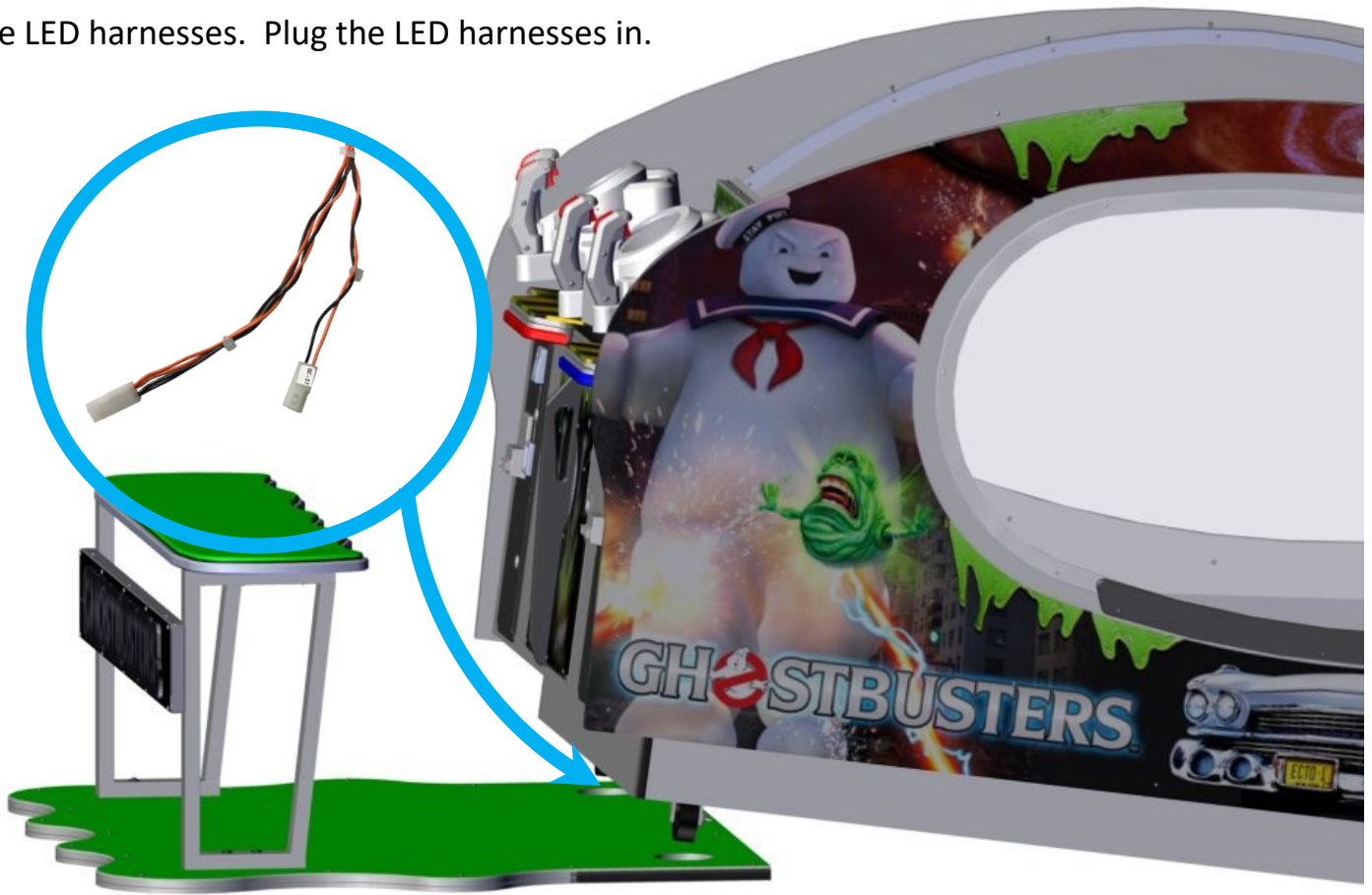
Locate the bottom skirt panels. The hardware to install the skirt is located inside the cash box.

Insert one side panel into the bottom of the cabinet. Use two 1/4-20 Allen's and washers to attach to the cabinet [1]. Then repeat for the other side [2]. Now position the back panel and attach using four wood screws [3]. Install the front panel the same using four wood screws.



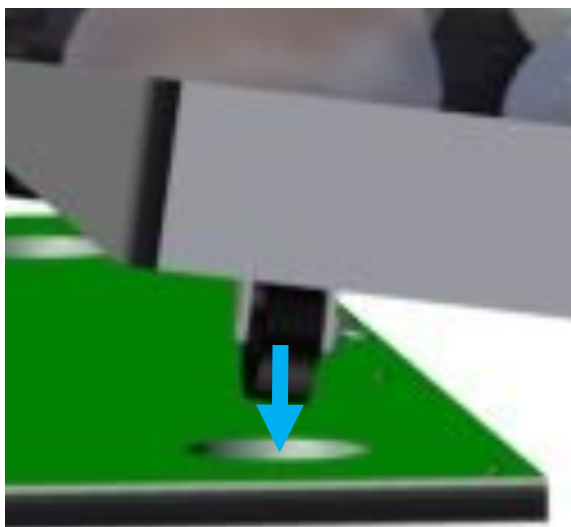
Step 2:

Lift main cabinet up slightly at the front onto the bench platform. Be careful not to damage the LED harnesses. Plug the LED harnesses in.



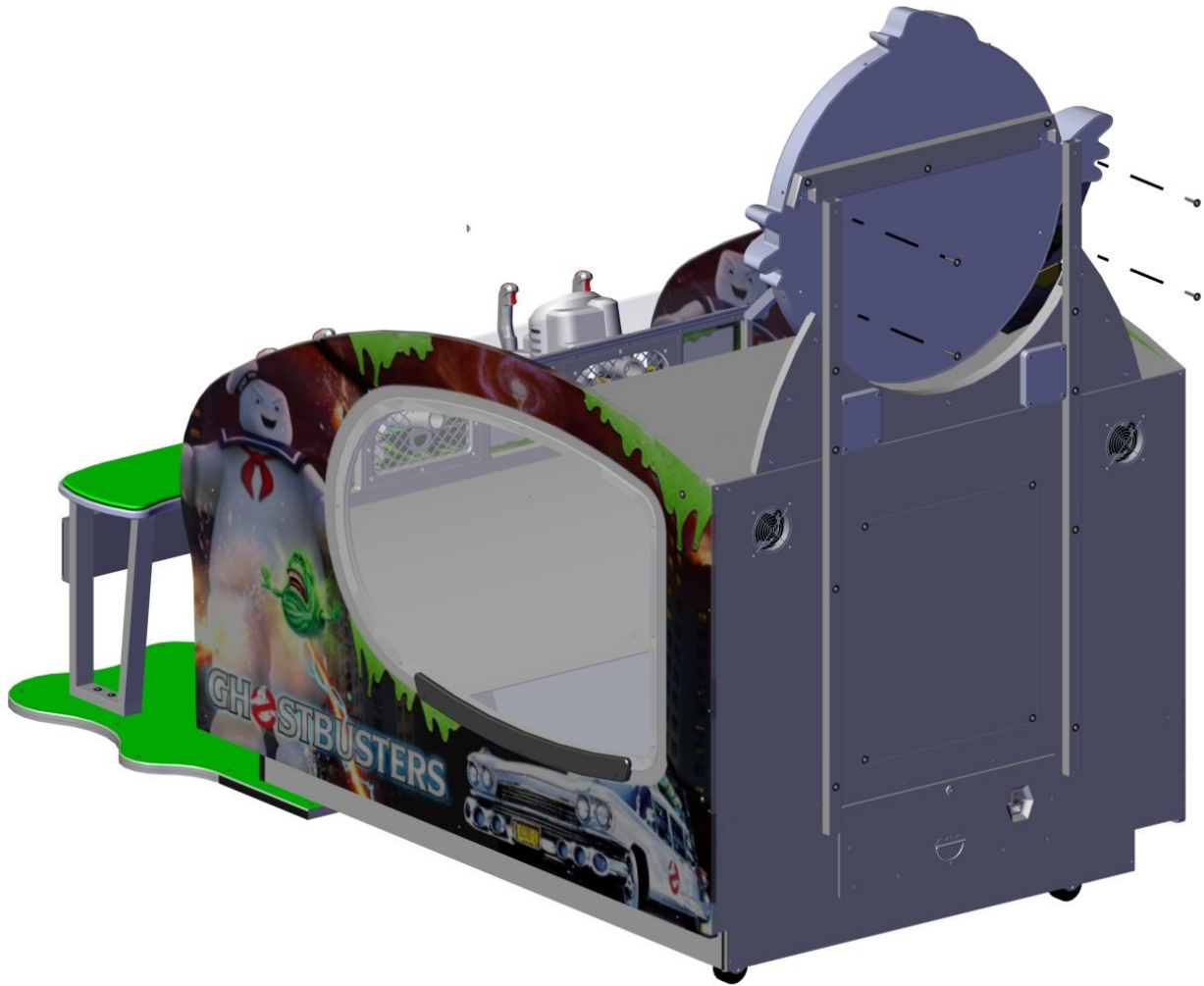
Step 3:

Lower the main cabinet into the holes at the base of the bench.



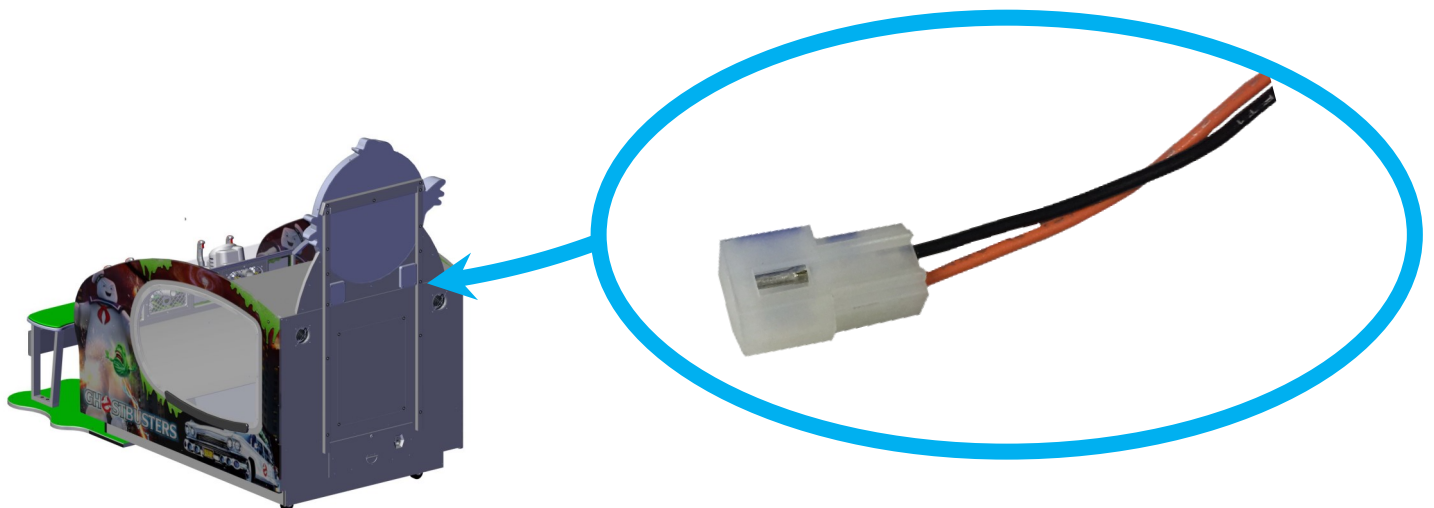
Step 4:

Install the Ghost Busters logo onto the support bars located at the back of the main cabinet.



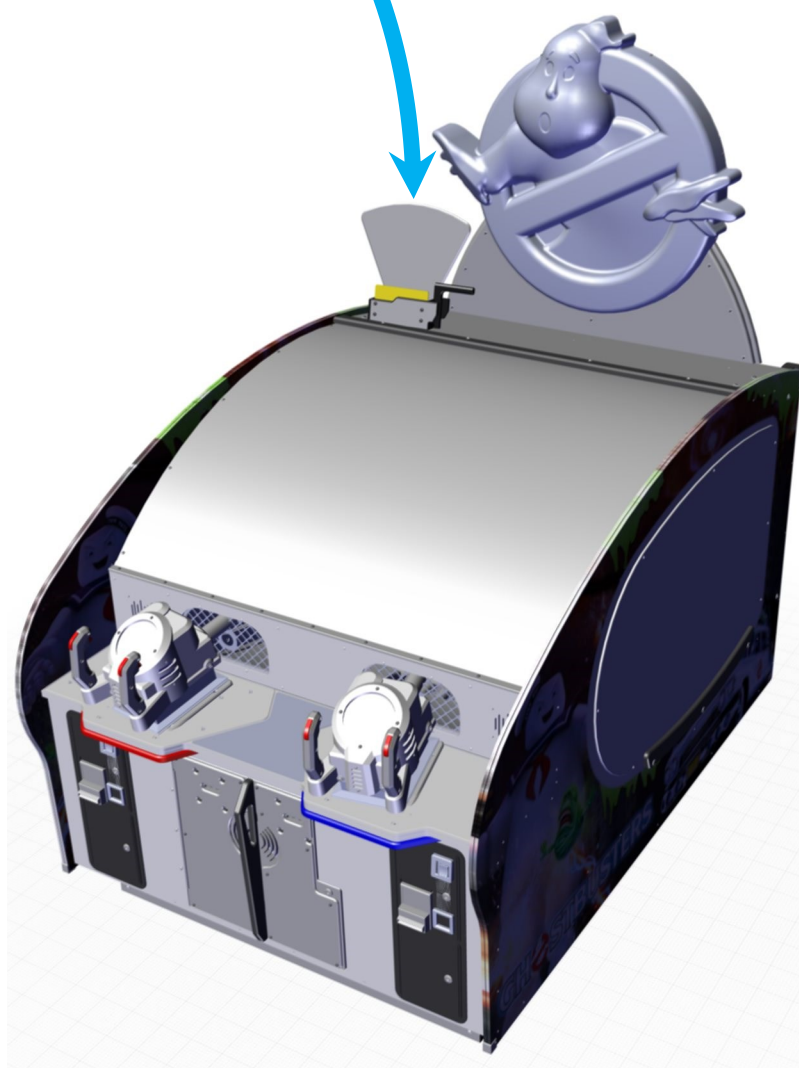
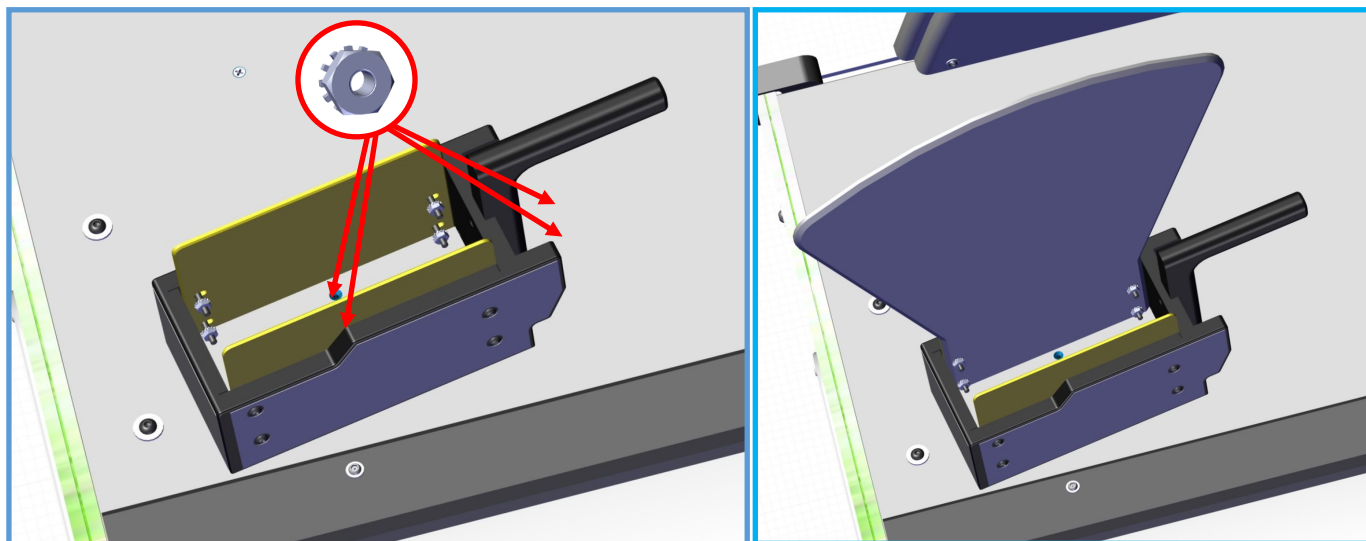
Step 5:

Connect the Marquee harness to the main cabinet.

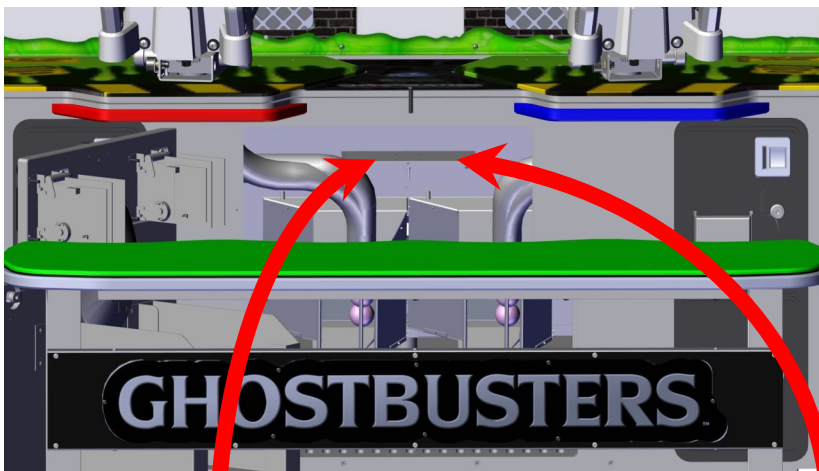
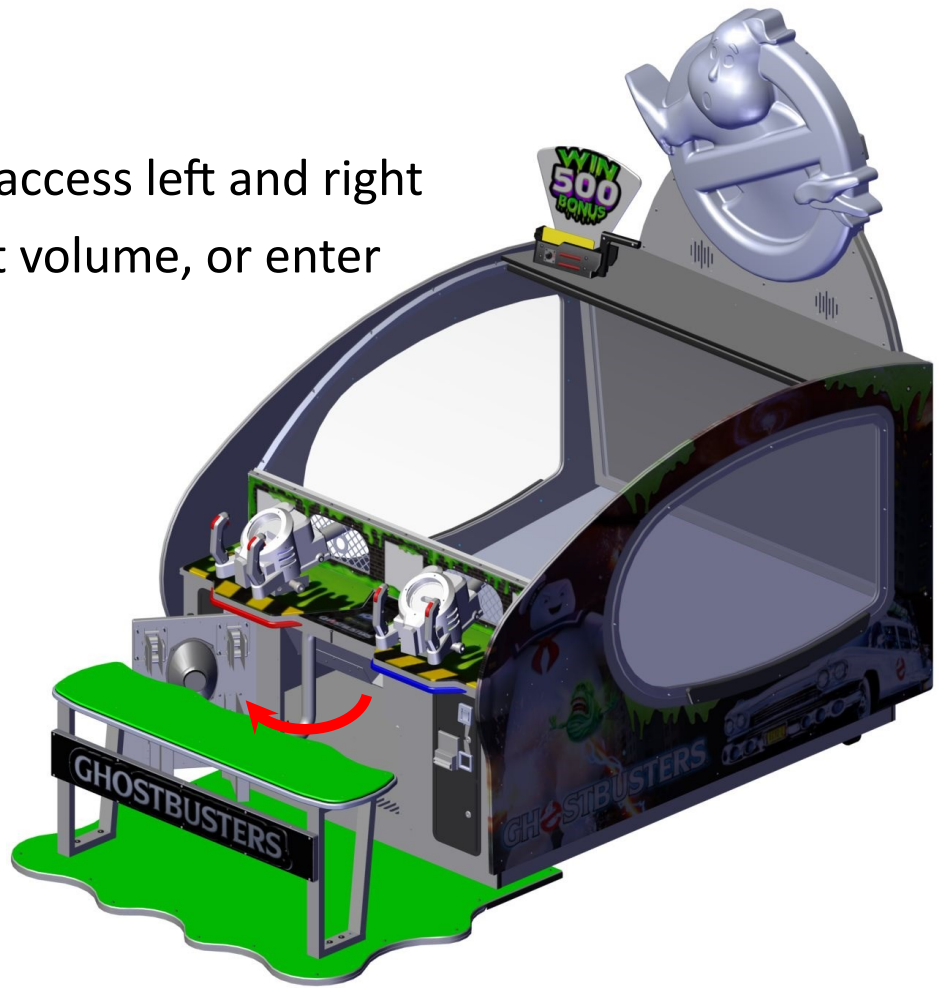


Step 6:

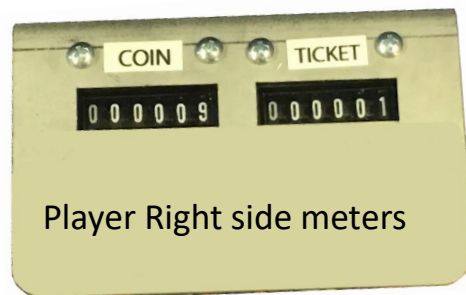
Remove the four Nuts shown. Insert the bonus sign. Reinstall the nuts.



Open Ticket door to access left and right player meters, adjust volume, or enter program options.



Player Left side meters



Player Right side meters

Unlock and open the ticket door to access the games' operator control panel. Press the "DIAG" button to enter program mode. Then navigate the menus by pressing the "Up" and "Down" buttons. Press the "DIAG" button again to select or change an option. Press the "TEST" button to exit out of a menu. You can also aim with player one shooter and shoot at the buttons on the side to select and change options.

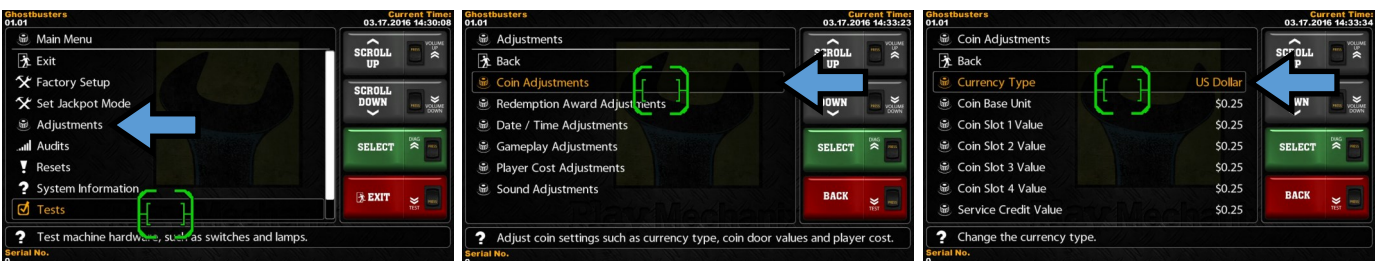
Pressing the "TEST" button when in game mode will give a credit.

Pressing the "UP" and "DOWN" buttons will also change the volume level when not in programming.

Ghost Busters Programming Options:

There are a few options that need to be configured before you can operate your Ghost Busters game.

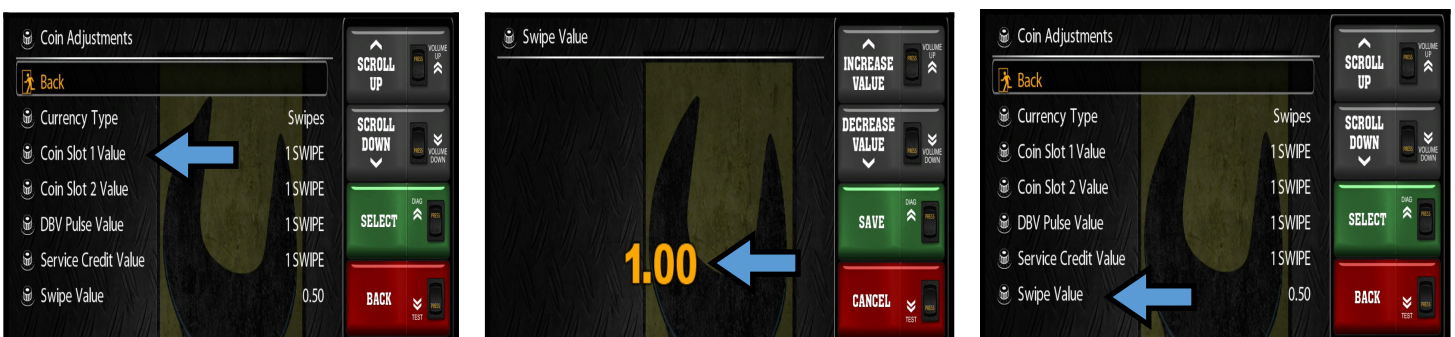
The first option you need to configure is what type of currency you will be accepting. The currency can be US Dollars, foreign currency (select your country), coins, tokens, or swipes. For each of these you need to configure what each pulse is worth. From the main menu navigate to the menu "Adjustments", and then select "Coin Adjustments". Now select "Currency Type" and pick which type of currency you will accept.



Now that you have selected the currency type you must define what it is worth to the game and how much each coin line is worth. This menu changes depending on what type of currency you have selected.

If you had selected "Swipe" as your currency, then you would select "Swipe Value" [1] and then define what each swipe is worth [2]. You would set each coin line equal to 1 Swipe [3]. So each time the game sees a pulse on any coin line, it will consider this as 1 swipe and credit the game 1.00.

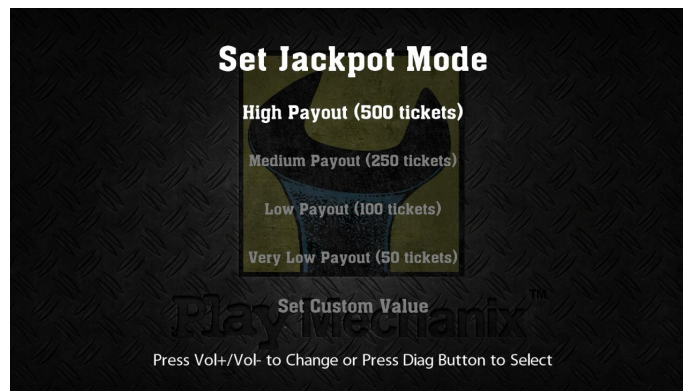
This doesn't set the cost of play! "Player Cost Adjustments" determines the cost of play!



The next option is to determine the cost of play. Under the main menu, select “Adjustments”, then “Player Cost Adjustments”, and then “Game Cost”. If you set the previous options under “Coin Adjustments” to 1 swipe per coin line and 1.00 per swipe, the game will credit each time a player swipes their card if you set Game Cost to 1.00. If you wish to charge more per play, increase the value of the swipe and then adjust the game cost to equal so that one swipe will always start a game.



The next option is to select which Jack pot you want to use. Depending on your cost of game these values can change. Select “Set Jackpot Mode”. Then select your Jackpot amount. It is recommended to use 500 tickets if charging \$1.00 per game and 1000 tickets if charging \$2.00 a game.

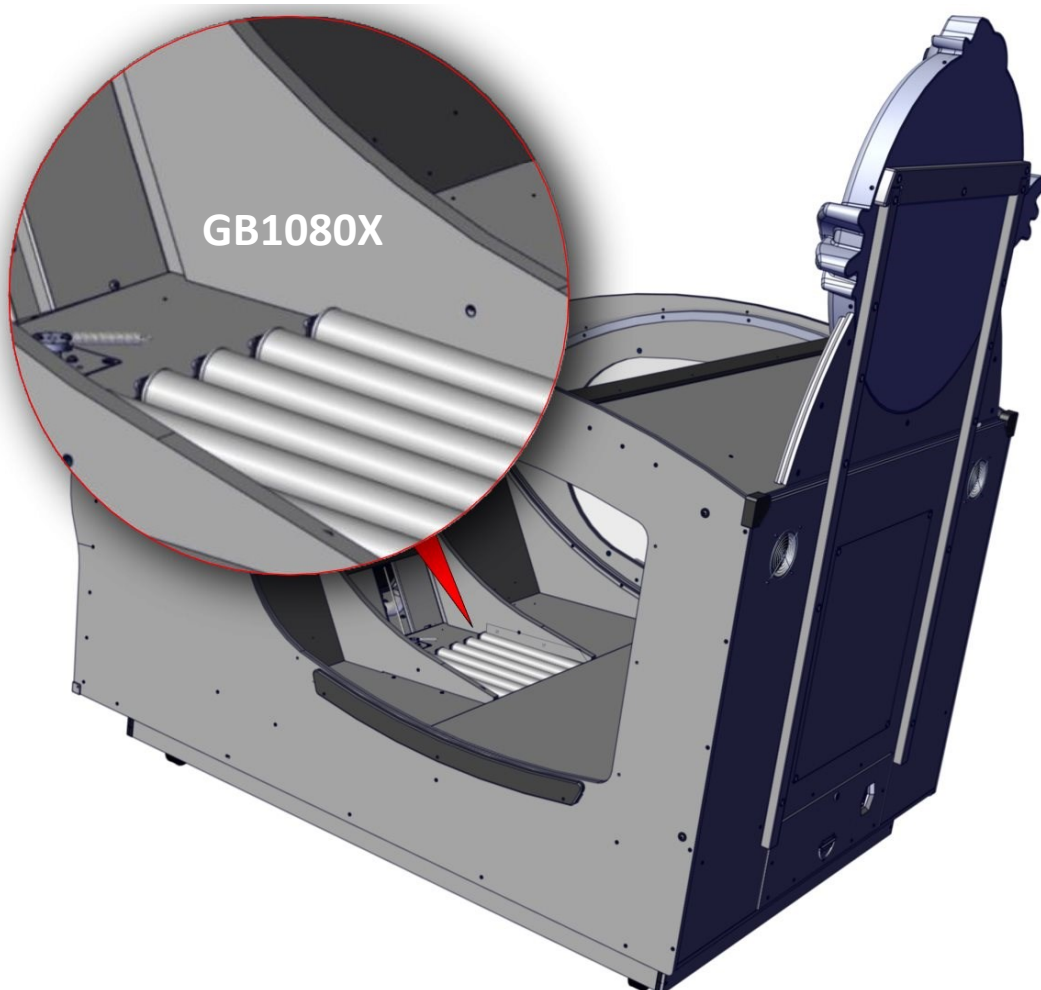
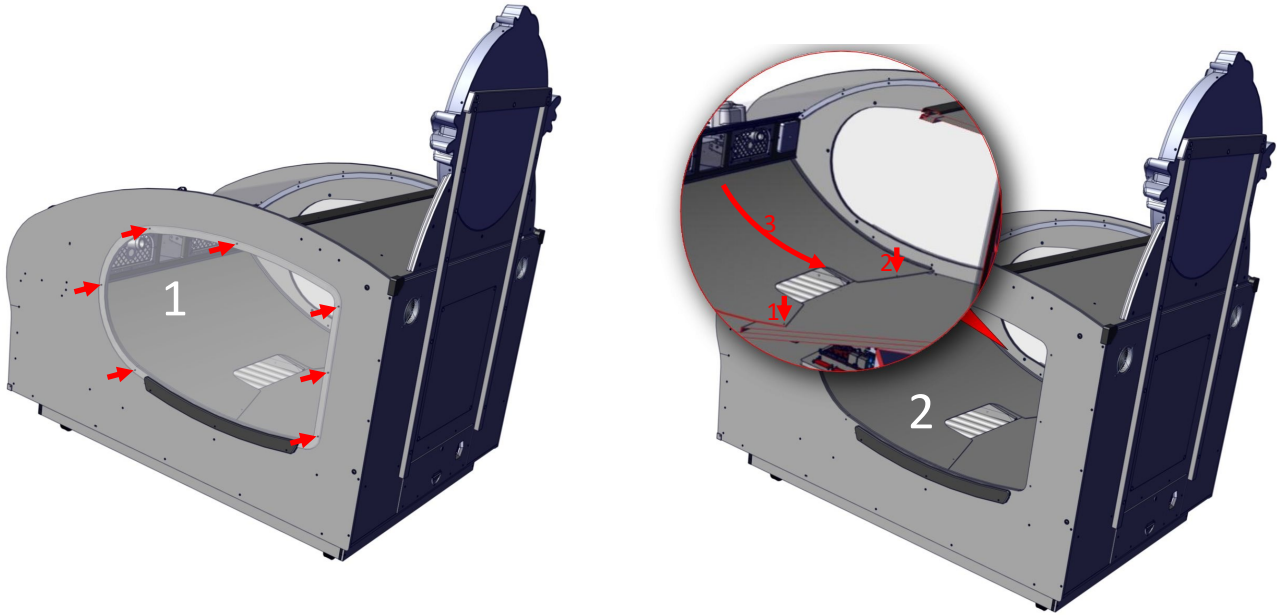


The next option to set is the game’s difficulty level. There are 10 different difficulty levels to choose from. The higher the difficulty number the more difficult the game becomes. Each difficulty level shows the average amount of tickets won on this setting. The higher the difficulty setting, the less average amount of tickets are won.



GB1080X Assembly - How to Access

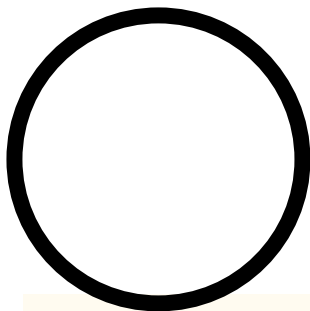
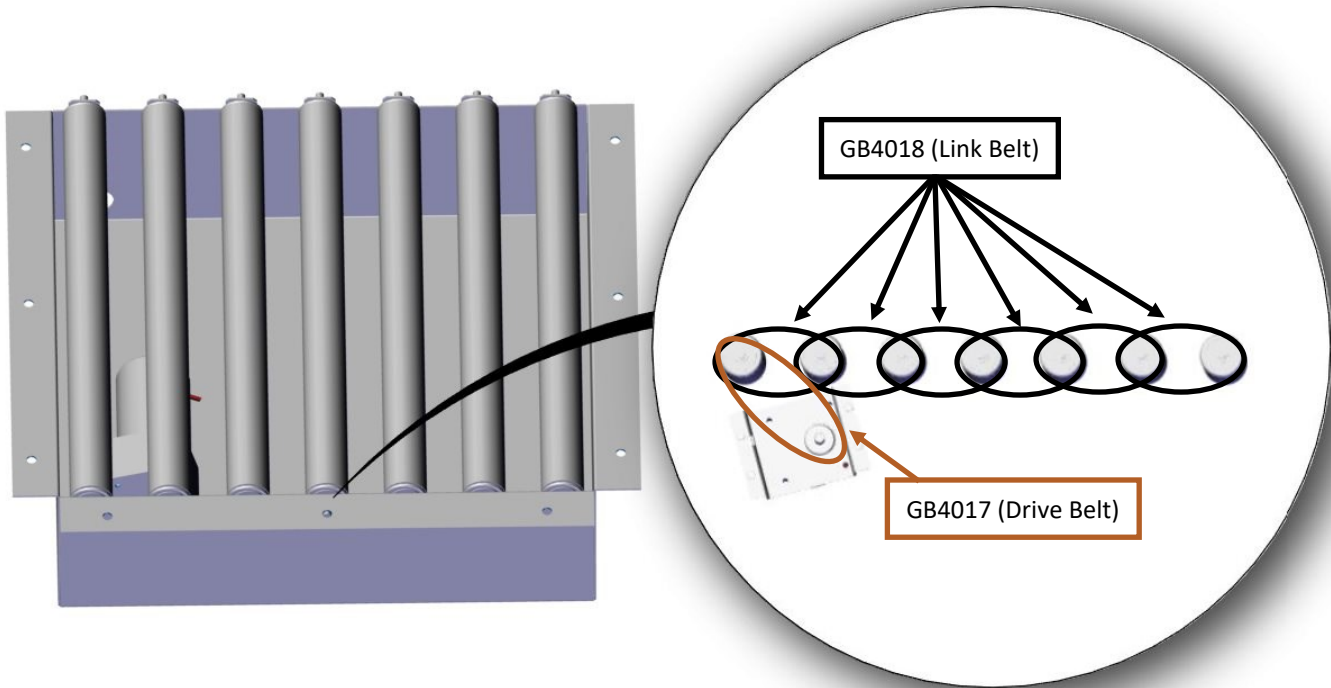
Using a #1 Phillips bit remove the 7 Phillip screws holding one clear side panel. Be careful when removing the bolts not to strip the heads [1]. Remove the ball deflector mat by removing the two bottom screws and then slide the mat out from the side grooves [2].



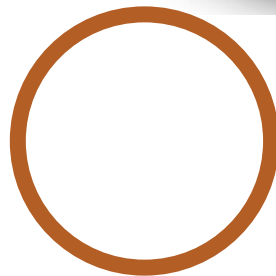
GB1080X Assembly

**** NEVER SERVICE THIS ASSEMBLY WITH THE POWER ON!**

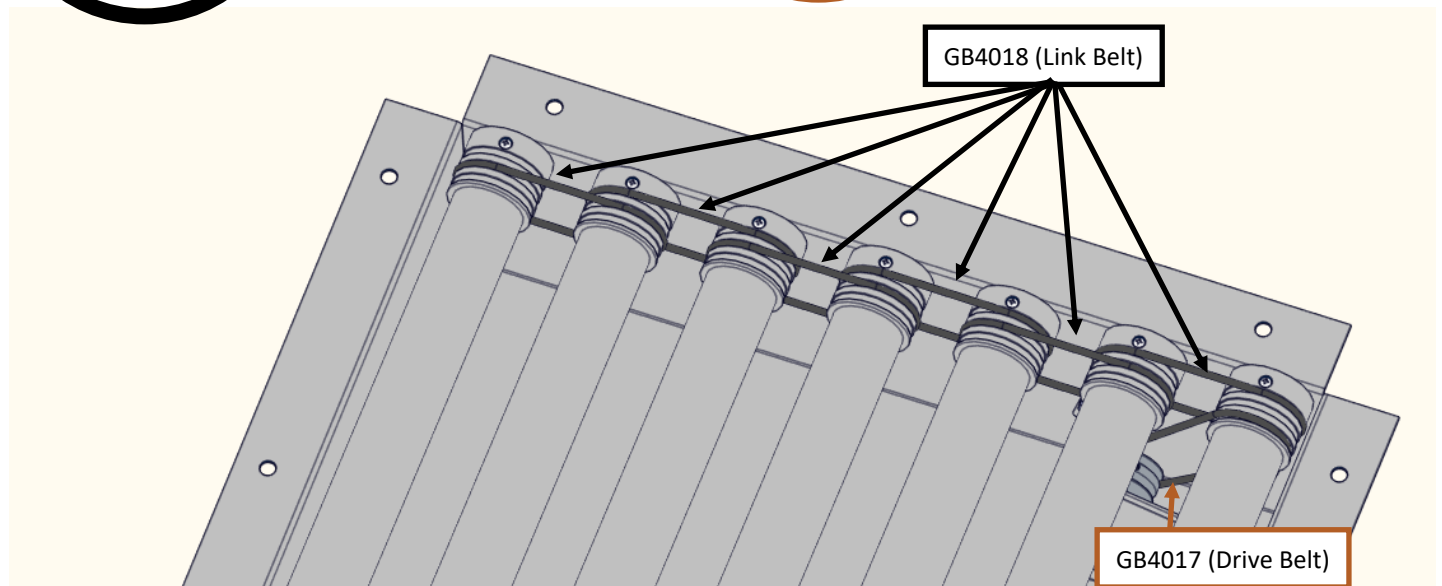
There are two different belts used to drive the GB1080X assembly. The smaller Brown belt (GB4017) is the DRIVE BELT and is connected to the motor and the first roller. The Larger Black belt (GB4018) is the LINK BELT and connects each roller to each other. The assembly will turn on and off during attract mode. It will be on all the time during game play. This assembly is to ensure no broken balls enter the shooter assembly.



GB4018



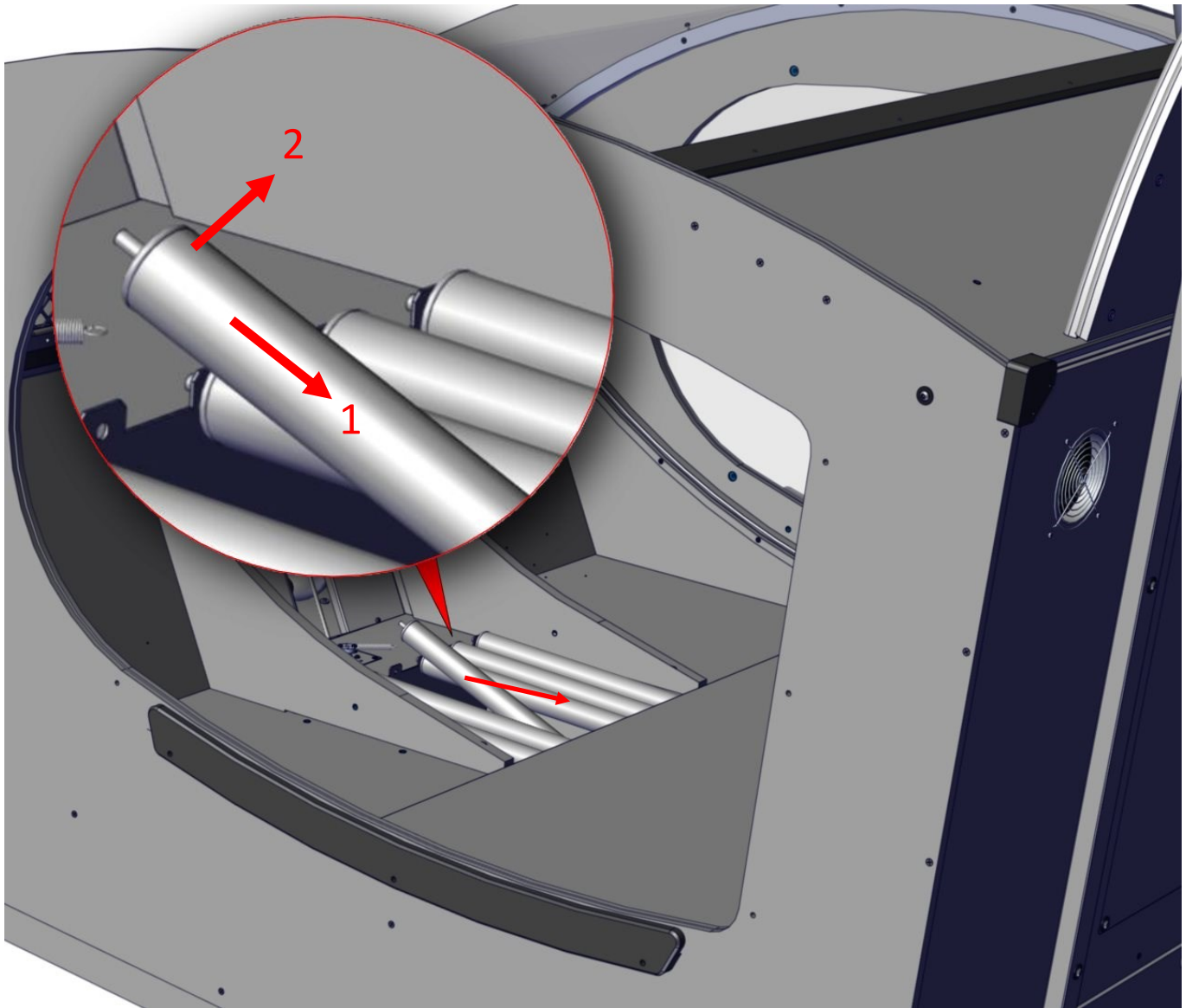
GB4017



GB1080X Assembly - Clearing broken balls

**** STOP ** DO NOT SERVICE THE ASSEMBLY WHEN THE GAME IS POWERED ON.**

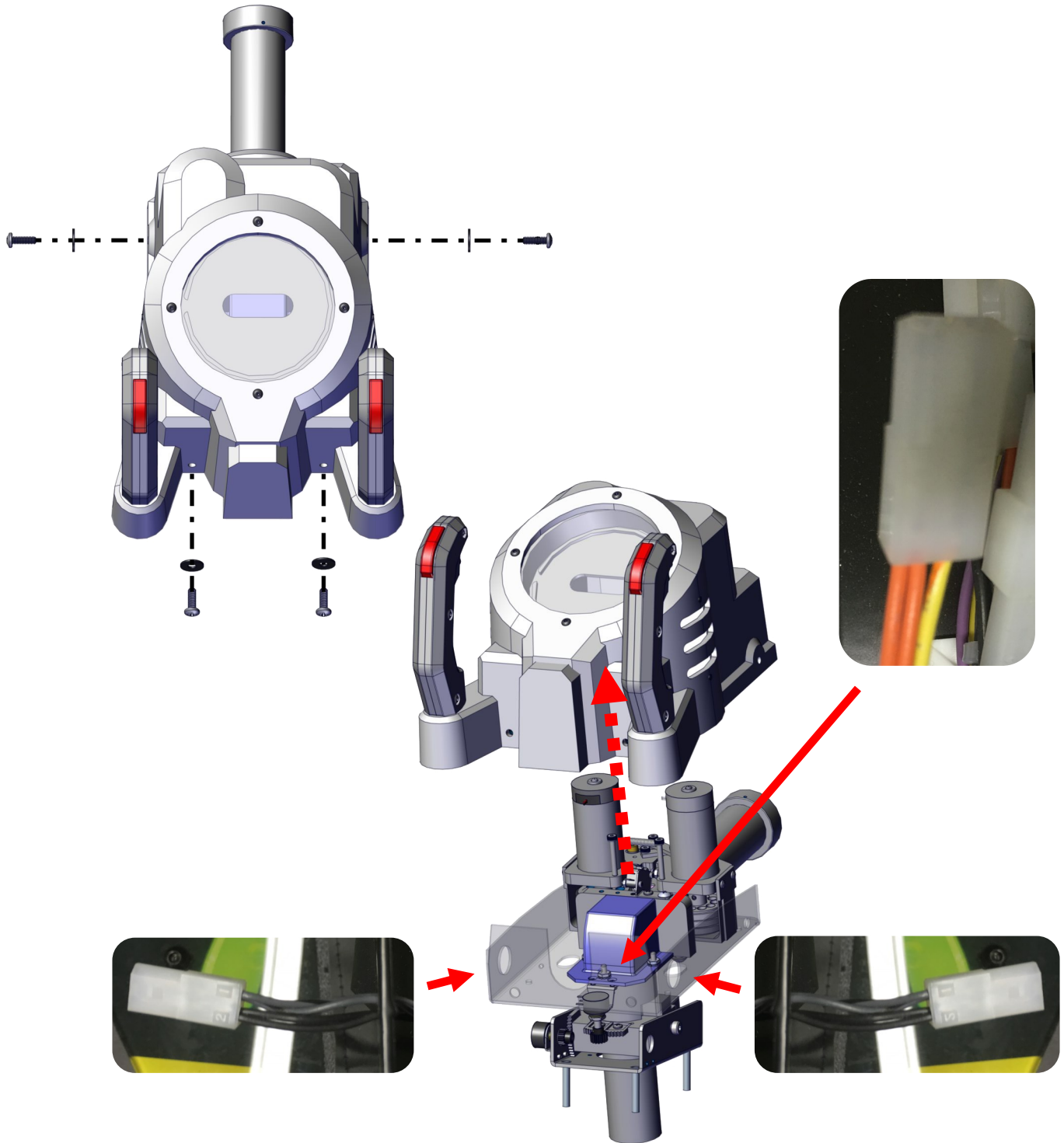
On the opposite side where the O-rings are attached the rollers are spring loaded. You can push a roller toward the O-ring [1] and lift one side up [2]. You can then insert your hand into the roller assembly to remove debris trapped below.



The GB1080X is wired in parallel with the ZS2008X agitator. A relay board determines which way the rollers will turn. See section "ZS2008X " for theory of operation.

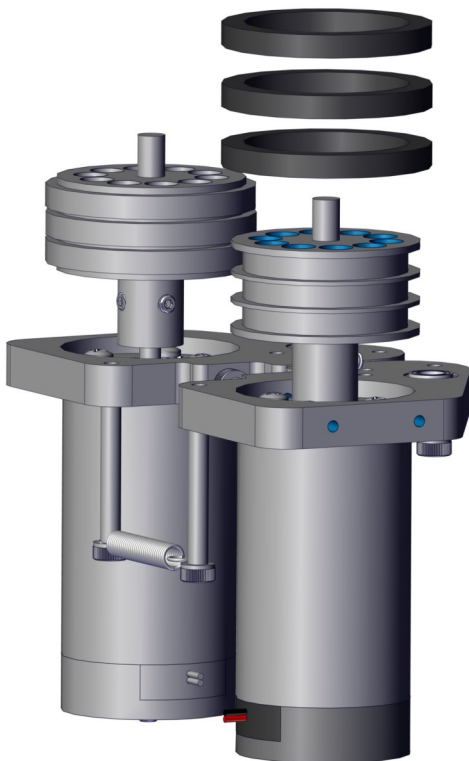
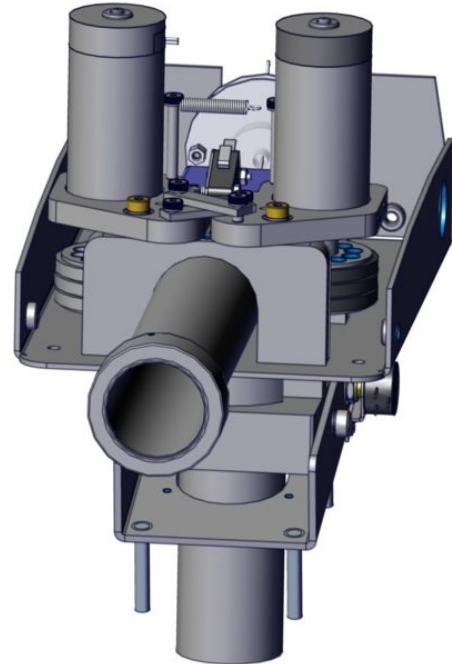
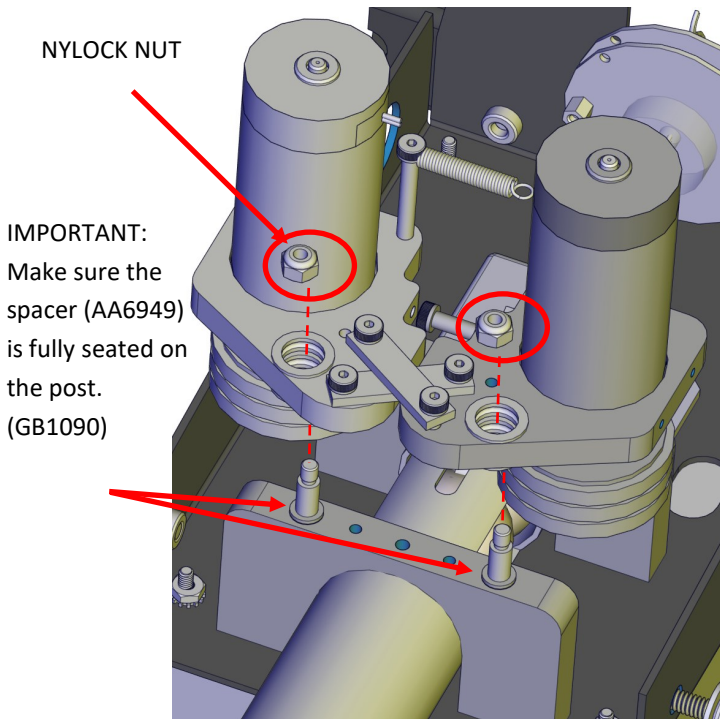
GB1011X Assembly

The game will shoot balls from the shooter assembly when a player has “locked” onto a target. The balls should follow the shooter and shoot straight at all times. Over time the ball shooter will require repair. To gain access to the internals of the shooter, remove the side screws and washers. Then remove the back two screws and washers. Lift the cover and back handle up slightly. Now you can disconnect the trigger switch harnesses and middle light connector. Put the top assembly aside.



GB1011X Assembly - CONT

When the balls no longer shoot straight out of the shooter you will need to replace the rubber rings around the motor shaft. Remove the two Nylock nuts (holding the motor assembly to the shooter base)



There are three rubber belts for each motor. It is recommended to replace all belts at the same time.

ICE part number GB4001 O Ring Square cut 1-7/80D.

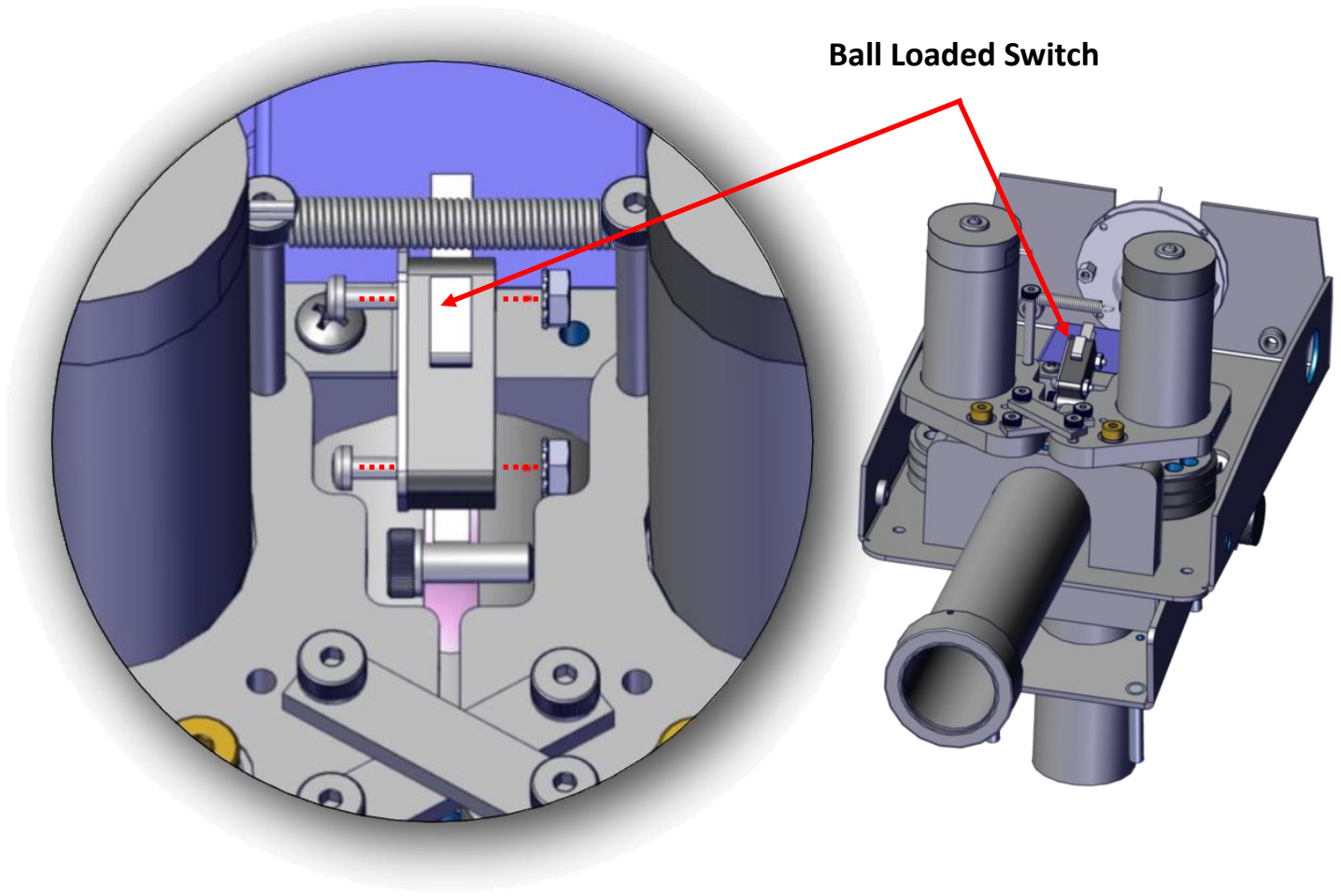
BALL switch Errors

Located inside the shooter assembly is a switch to alert the game a ball is loaded into the shooter. The switch is connected electronically normally open. If the game reports an error with the ball switch, it will report which ball switch is not working. Check the function of the ball switch both at the shooter reported bad and also at the I/O board.

To test at the I/O board, insert the red probe from your volt meter to pin 5 (for player 1) or pin 7 (for player 2) of connector P8 on the I/O board. Then place the black probe of the volt meter to pin 12 of connector P8 at the I/O board. When no ball is present it should read +5 volts of DC. When the switch is activated it should read 0 volts of DC. If no voltage is present at any time, unplug P8's harness and recheck for the presents of +5 volts of DC. If still not present, replace the I/O board ICE part number BX2034X REV H or higher.

If +5 volts of DC is present but never goes to 0 volts, unplug P8 and measure the resistance between pins 5 (for player 1) or pin 7 (for player 2) and pin 12 on the harness and not the I/O board. When the switch is activated the resistance should be less then an ohm. If not, replace the switch ICE part number E02970.

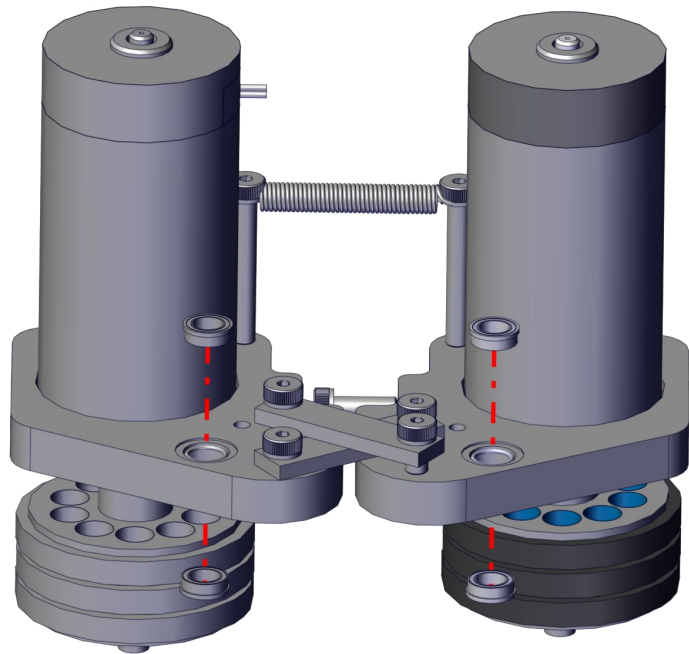
Ball Loaded Switch



Motor Bearings

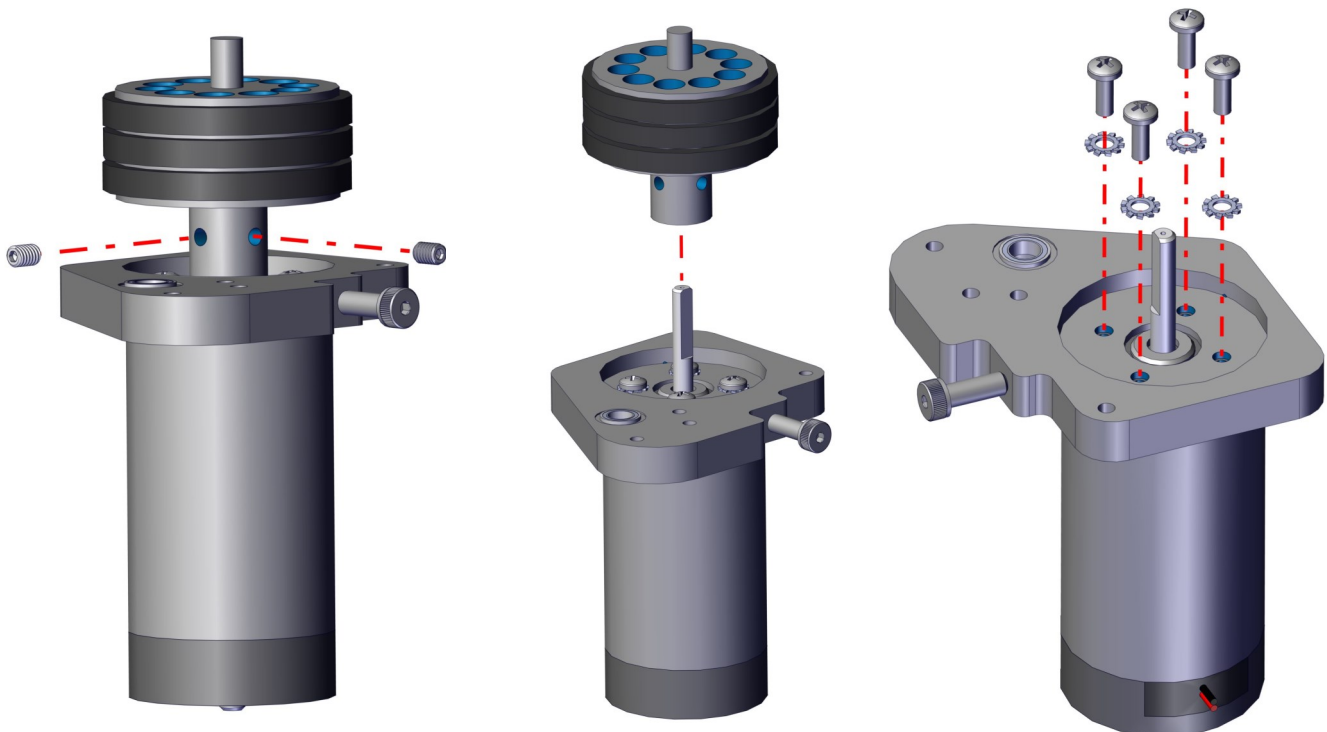
When servicing the motors be careful not to lose the four bearings shown below. They can easily fall out when removing the shoulder bolts that hold them to the shooter block.

ICE part number GB1075 Bearing.



Motor Replacement

To replace a motor, remove the two grub screws from the located at the bottom of the motor shaft. Then slide the wheel assembly off the shaft. Remove the four Phillip screws and star washers holding the motor to the motor mount. When re-installing the wheel assembly, make sure one grub screw is secured to the flat portion of the motor shaft. Replace with ICE part number GB2008 motor.



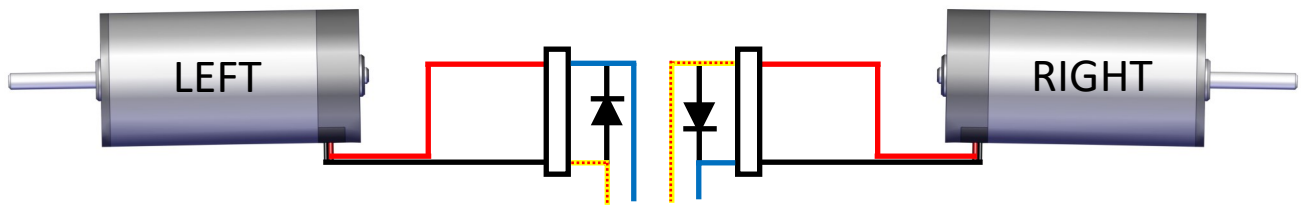
Motor Errors

The motors are turned on by the I/O board by providing a ground path to them. When a player presses either trigger, the I/O board receives this signal to turn on the motors. The motors have a constant +12 volts of DC to them at all time. This is supplied through the Fuse block board located at the back of the game. Fuse location 1 protects both players' shooter motors. If both players have a motor error then it is most likely caused by a faulty fuse.

Test the fuse by attaching your black probe to pin 4 of P1 on the I/O board and then touch one side of the Fuse. You should have +12 volts of DC. If not, check the other side. If present, replace the fuse. If both sides do not have +12 volts of DC check the output of KF2010 power supply. This supplies the +12 volts to the game.

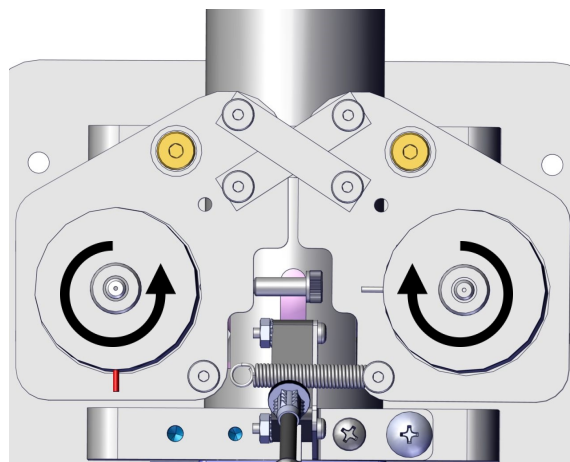
DC ground to the motor is supplied by the I/O board. On connector P8, pin 11 supplies the ground to player 1 shooter's motor and pin 12 supplies the ground to player 2 shooter's motor. This is the yellow/red wire. When testing for the presence of +12 at the motor, test both at the I/O and at the motor harnesses.

Located across the each motor connector is diode. This protects the I/O board. When a failure occurs, this diode can become shorted. Disconnect the motor from the harness at the shooter. Use your meter set to diode check. With the game power off measure the voltage one way and note. Now reverse the leads the other way and note. A good diode will display .5 to .8 volts one way and OL the other way. A bad diode will display OL both ways (open) or the same voltage drop both ways (shorted). Replace if bad using ICE part number E02163.



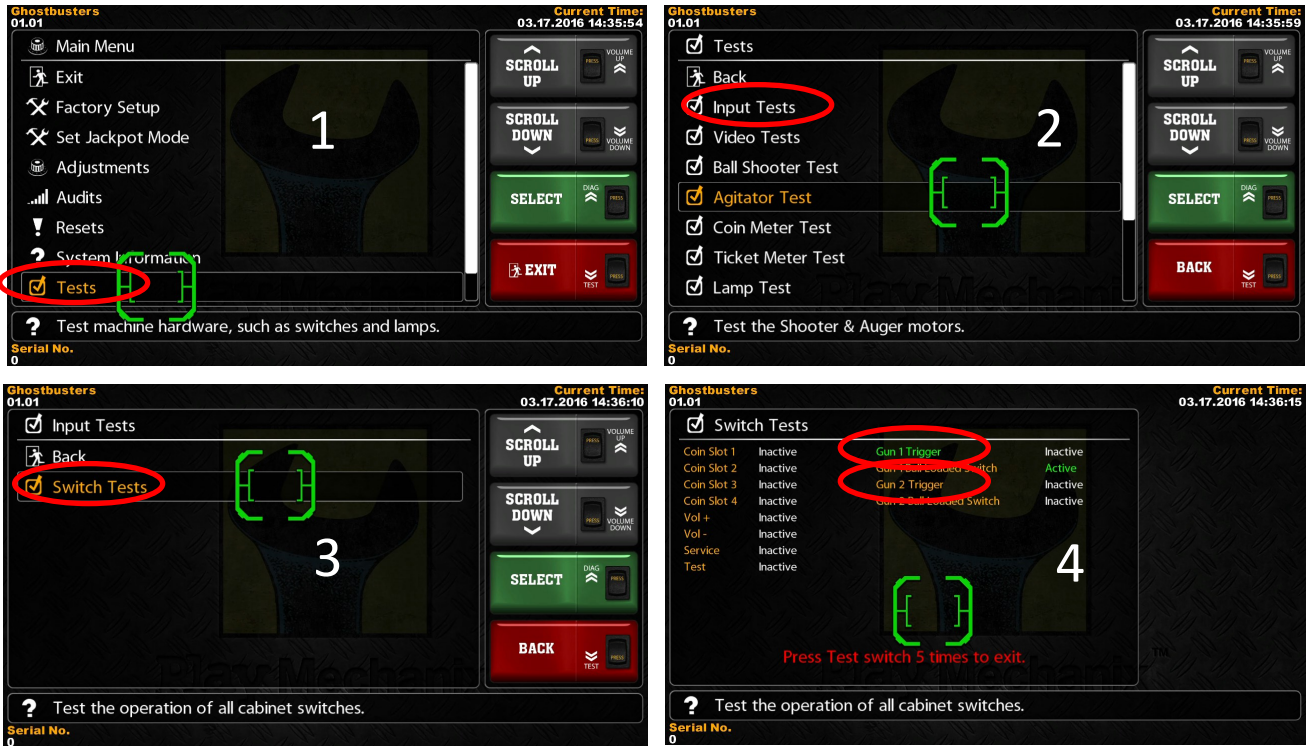
If +12 VDC is present at the motor but the motor is not running then a motor failure has occurred. To remove the motor, refer to the previous page for procedure.

Each motor connector is labeled for the right and left sides of the shooter. Each motor spins opposite directions to launch a ball. Do not switch these connectors at any time.

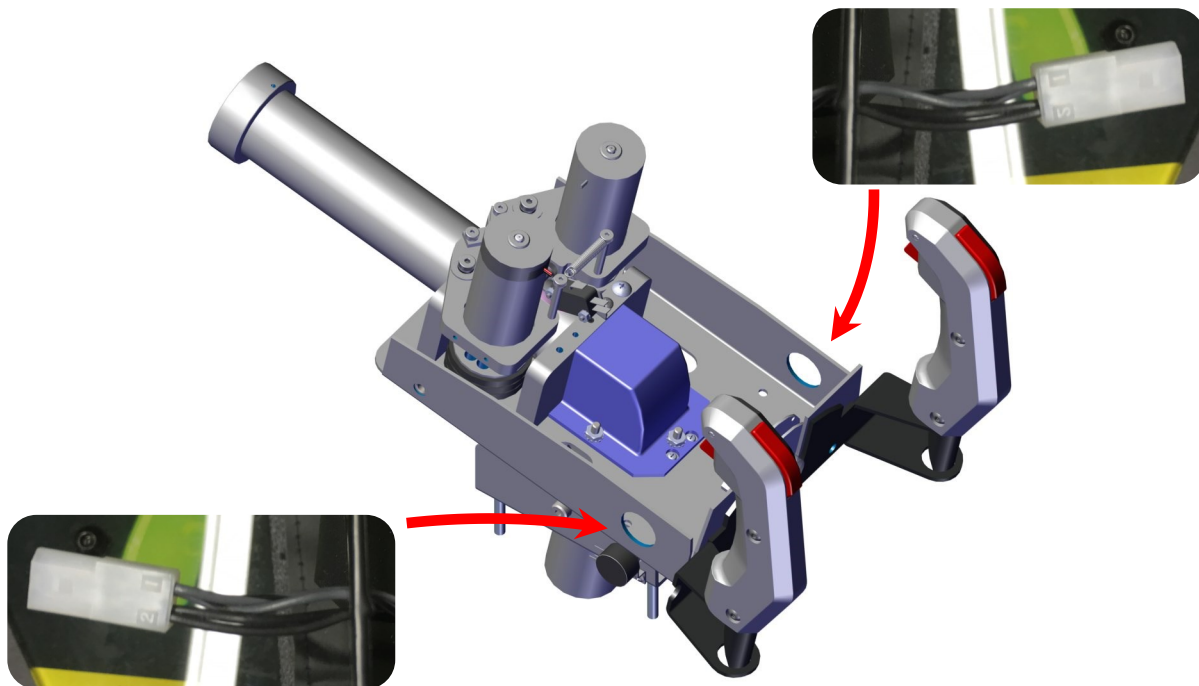


Trigger Buttons

There are two triggers on each handle of the shooter. They are common to each other meaning it doesn't matter which trigger is pressed during game play as all will complete the circuit back to the I/O board. If the top of the shooter has been removed, located at the shooter mount on either side are the connectors for the triggers. You can test the wiring back to the main board by pressing the "DIAG" button. Then select "Tests" [1]. Select "Input test" [2] and "Switch Tests" [3]. Here it will show you the various inputs you can test. Of those inputs one will be for player one trigger and another for player two trigger [4].



Shorting both connectors on at a time will verify the wiring back to the I/O board.



Trigger Buttons (continued)

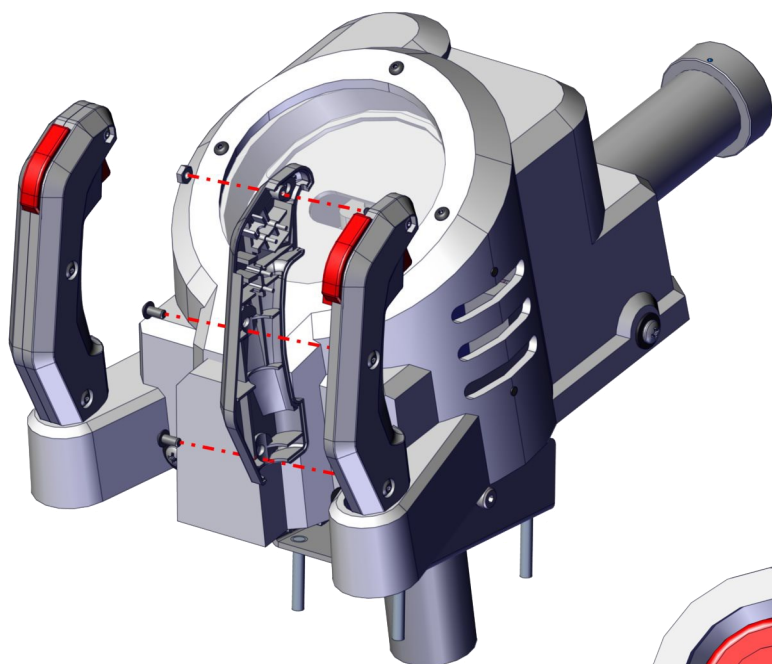
With the cover off you can plug back in the triggers to test the function of each trigger.

If a trigger is not functioning you can access the trigger by removing the left side of the handle.

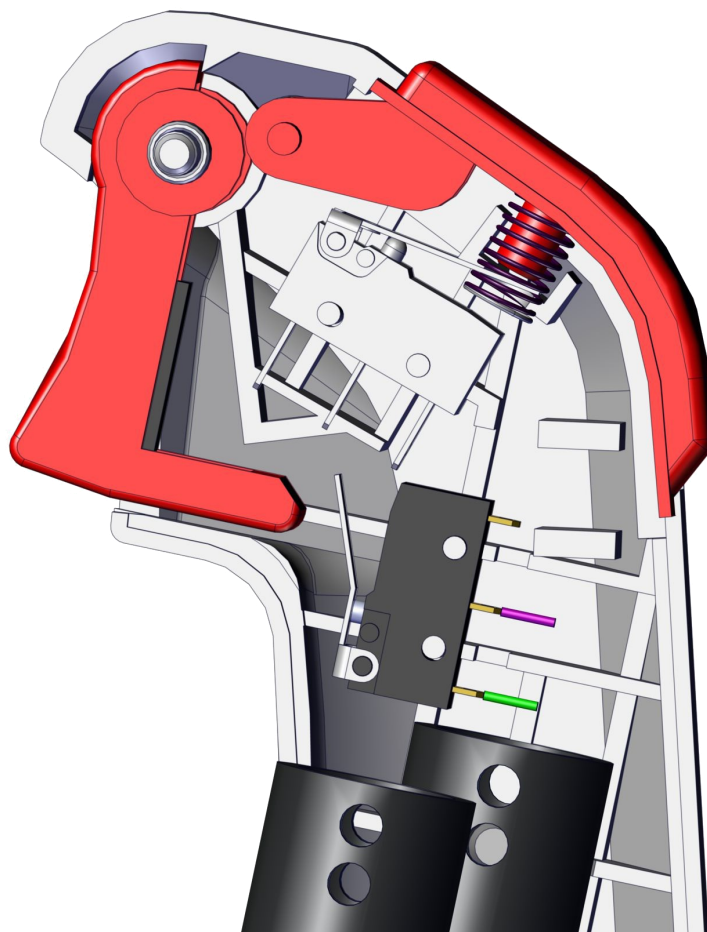
Do not remove the right side as the buttons for the trigger are mounted to this part of the handle.

With the triggers unplugged measure the resistance between each switches' "Common" and "n/o" labels.

When the trigger is pushed they should be less than an ohm.



The handle is sold complete. Its part number is GB2006. When replacing, do not remove the rubber band holding the two halves together. Slide the new handle on top and remount.

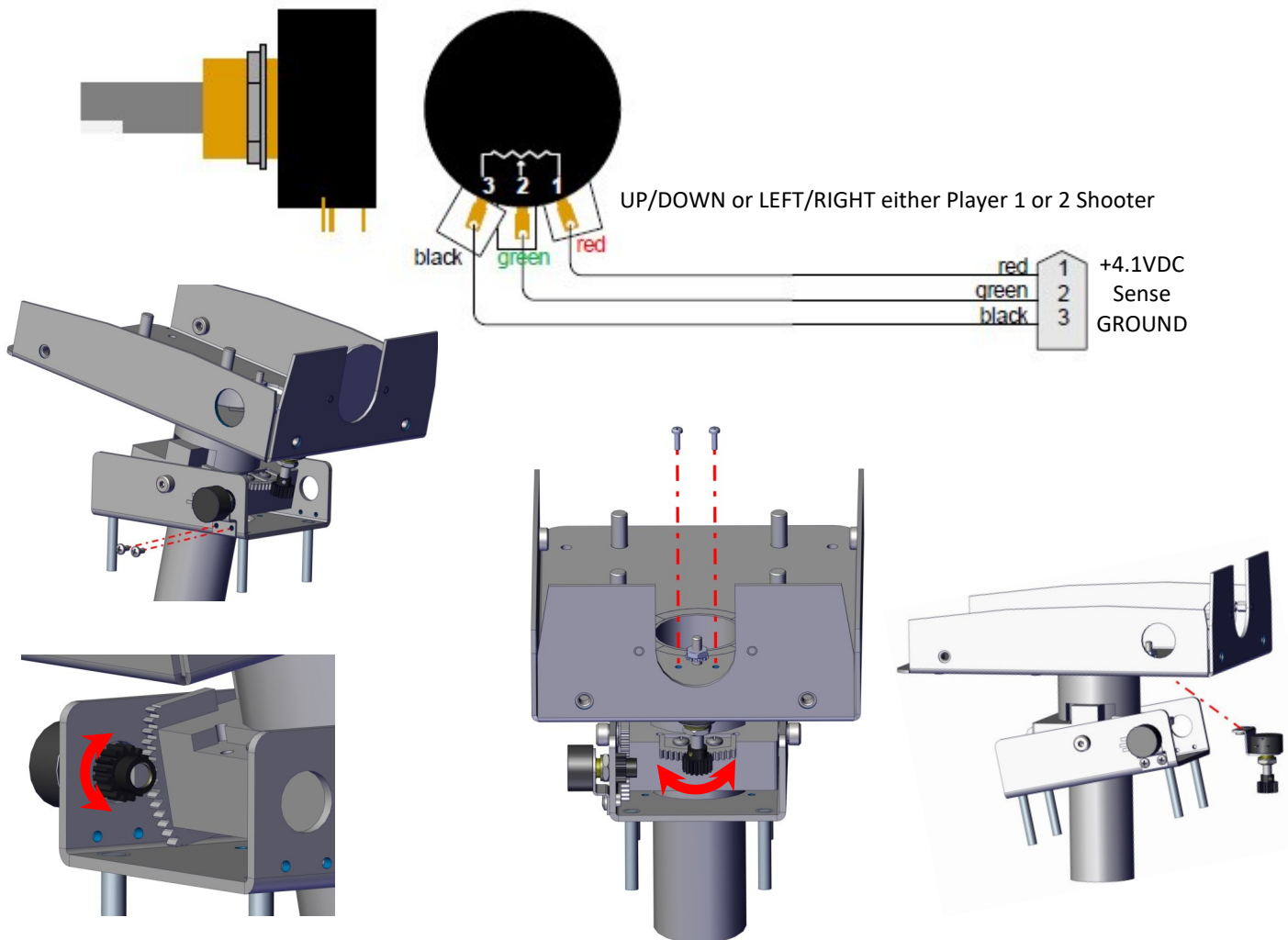


Horizontal and Vertical Tracking—Theory of Operation

Player 1 and Player 2 ball shooter's horizontal and vertical positions are determined by the position of two 5K potentiometers. As either of the ball shooters are moved around, the voltage on the center pins of the two potentiometers will change in value between 0 volts to 4.1 volts of DC.

If you experience poor tracking from your shooters the first step would be to preform a ball shooter test. See "How to preform a Ball Shooter Test" before continuing.

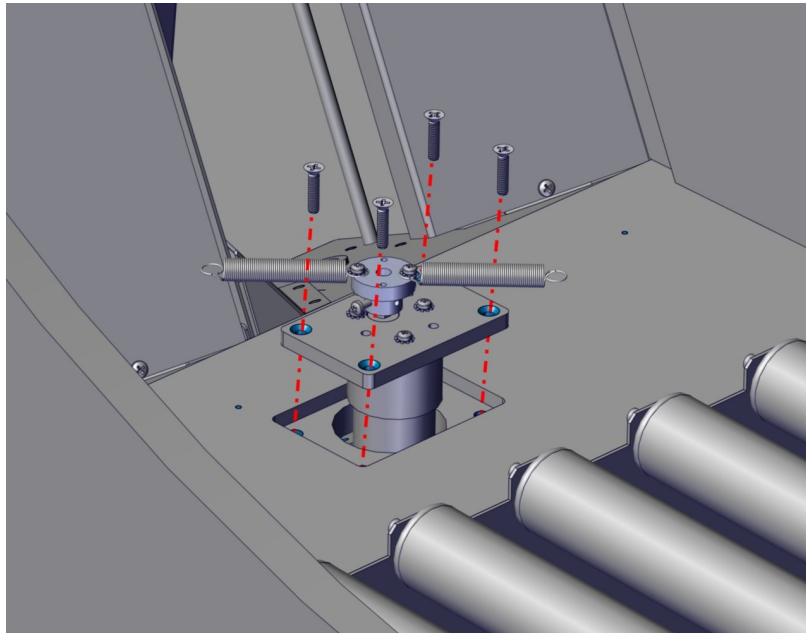
If after preforming a calibration the shooter is still experiencing poor tracking, you can test the voltages from the potentiometers to the I/O board. Using your voltage meter attach the red probe to either pin 1 for up/down on Player Shooter 1, pin 2 for left/right on Player Shooter 1, pin 3 for up/down on Player Shooter 2, or pin 4 for left/right on Player Shooter 2 of connector P6 on the I/O board. Now attach the black probe to pin 6 of P6 on the I/O board. Have someone move the shooter around and observe the voltages. You should see changes as you move the shooter around. They should not be sporadic but as the shooter is moved slowly, the voltages should also move slowly. If they are still sporadic, then replace the potentiometer. Be sure to align them so the movement of them are centered so that when the shooter is turned to the fullest in either direction it does not damage the potentiometer (end of travel). If no voltage is found check the output of the I/O board by moving the red probe to pin 5 of P6 on the I/O board. If the meter doesn't read 4.1 DC voltage, replace the I/O board. See below.



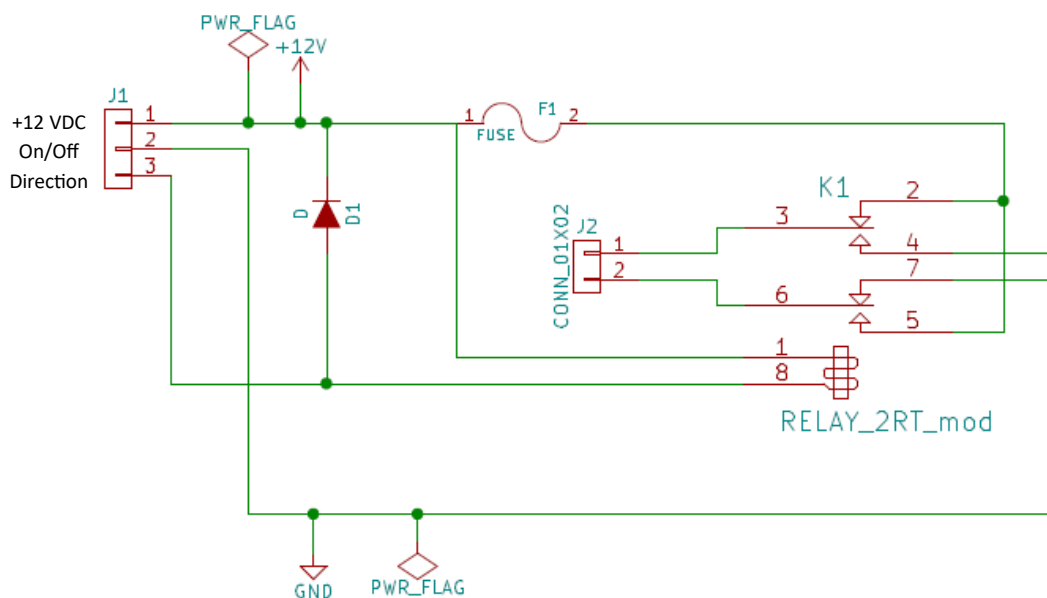
ZS2008X - Agitator Assembly

The game utilizes a ball agitator in order to prevent the balls from jamming upon entering the ball augers. It is always on whenever the ball shooter's motors are turned on. It is controlled by a relay which is turned on by the I/O board. If the ball shooters jam, check the function of the agitator. It is removed through the top of the cabinet. See the section "**GB1080X Assembly - How to Access**"

Four flat head Phillips screws hold the agitator to the cabinet.



The agitator is activated by the I/O board through a ZS2035X relay board. The relay board allows the I/O board to reverse the direction of the Agitator motor. The relay board has a three pin connector input and a two pin output. Pin 1 has always has +12 volts of DC to it. Pin 2 completes the ground and turns the relay board on which supplies voltage to the agitator motor. Pin 3 determines the direction by either setting the relay to normally open or normally close.

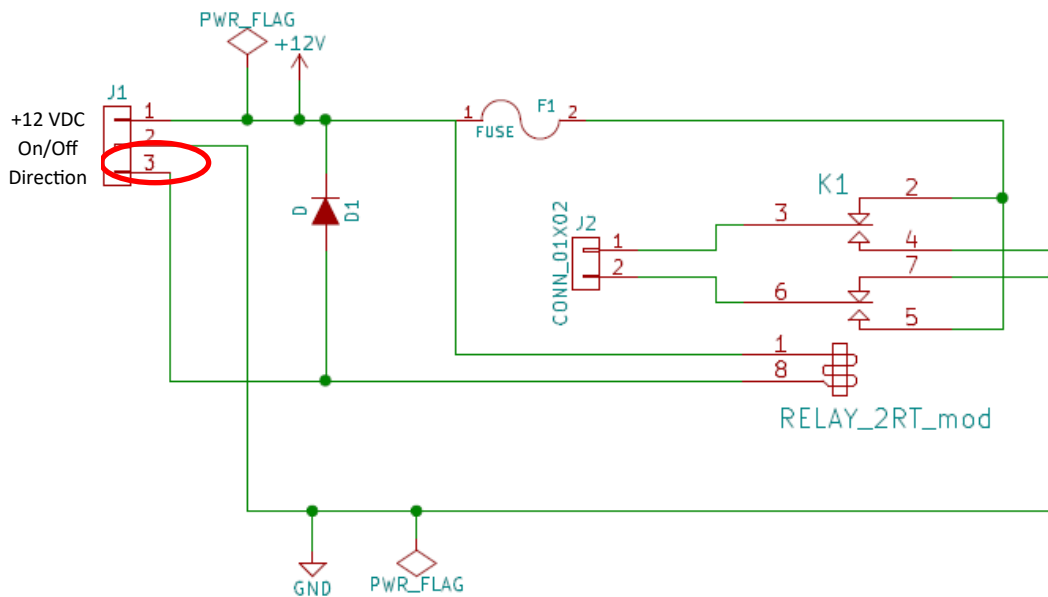


ZS2008X - Agitator Assembly - Theory of Operation

Located at the back of the game is the fuse block which supplies the +12 volts DC to both the relay and agitator. The fuse is number is F2. Test the fuse by placing your red probe on one side of the fuse and the black probe to any ground off the KF2010 power supply. Measure for the presence of +12 volts of DC. Now move the red probe to the opposite side of the fuse. Measure for the presence of +12 volts of DC. If either side is missing, replace the fuse. Next move your red probe to pin 1 of the 3 pin connector on the relay board. Measure for +12 volts of DC. If missing check wiring back to the fuse block board.

Next is the switched ground signal to the relay board. This comes from the I/O board and turns the agitator on. Connector P7, pin 19 is the output from the I/O board. Insert your red probe into pin 19 of P7 connector on the I/O board. Leave the black probe on any ground off the KF2010 power supply. Measure for DC voltage. When the agitator is off the signal will be at +12 volts of DC. When the agitator is on there will be 0 volts of DC.

The I/O board also sends a signal for which direction to spin the agitator. Off of connector P7 of the I/O board, pin 18 connects to pin 3 of the relay board. This will either have +12 volts of DC for one direction or 0 volts for the other. This turns the relay either on or off. When 0V DC is present, the relay is activated, causing the voltage to be reversed going to the agitator.



How to perform a Ball Shooter Test

Press the “DIAG” button and select “Tests” from the main menu [1]. Now select “Ball Shooter Test” [2].

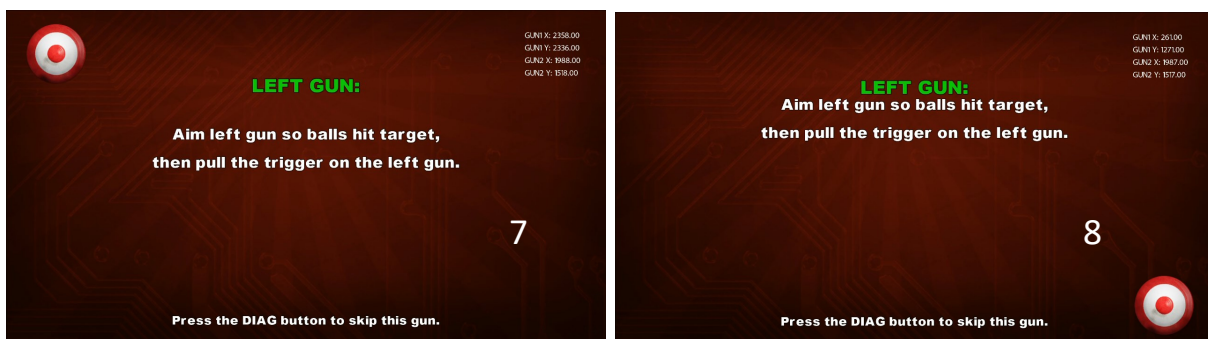
The screen will show both shooters and their current status [3]. Press the “VOL -” for the left shooter and “VOL +” for the right shooter. The two different modes are fire a ball when you press the trigger button [4] or allow the shooter to continuously fire balls [5]. Press the DIAG button to exit [6].

Select the new option “GUN CAL with Balls”.



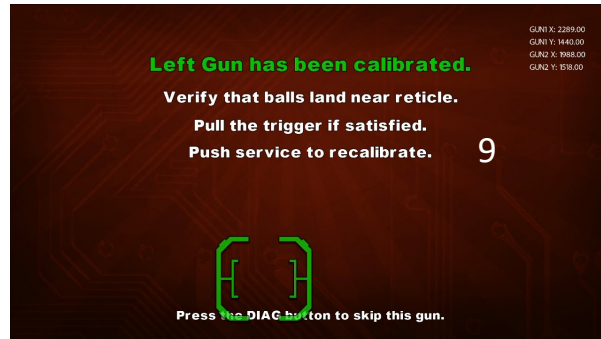
Aim the left shooter at the upper target and press the trigger [7].

Then aim the shooter at the lower corner and press the trigger button [8].



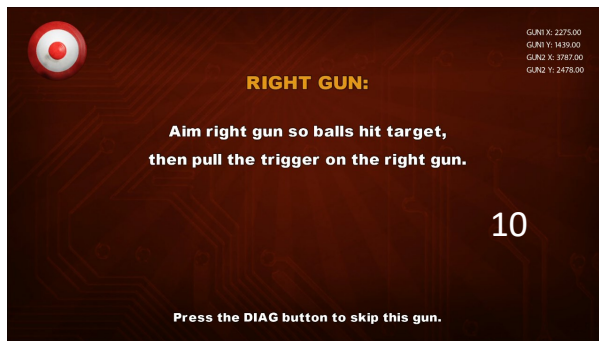
How to preform a Ball Shooter Test (continued)

Now test the left shooter to ensure that the balls land near the rectangle in all areas of the screen [9]. If not satisfied, restart the test by pressing the “TEST” button. When satisfied press the trigger to calibrate the next shooter.



Aim the right shooter at the upper right target and press the trigger [10].

Then aim the shooter at the left lower corner and press the trigger button [11].



Now test the right shooter to ensure that the balls land near the rectangle in all areas of the screen [12]. If not satisfied, restart the test by pressing the “TEST” button.

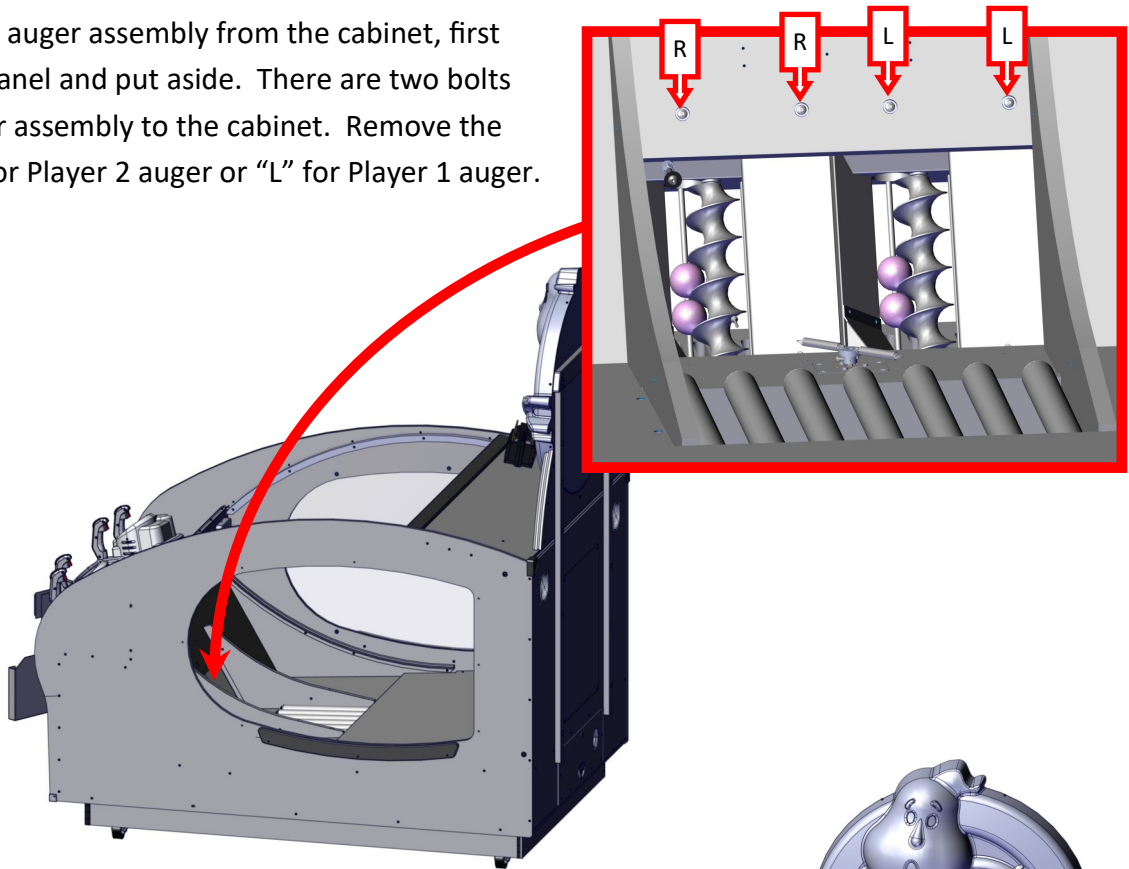
When satisfied press the trigger to exit calibration.



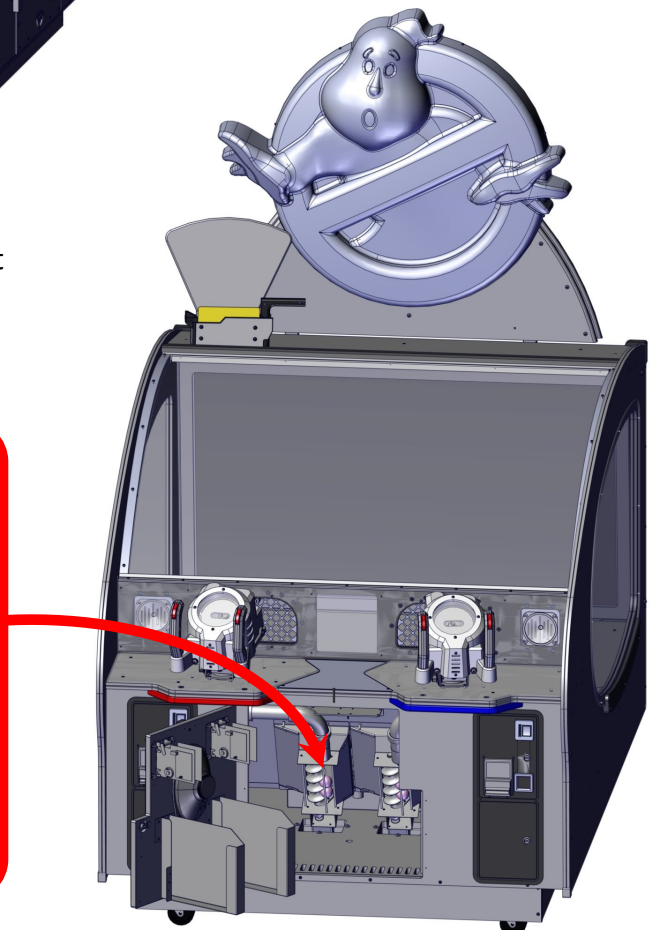
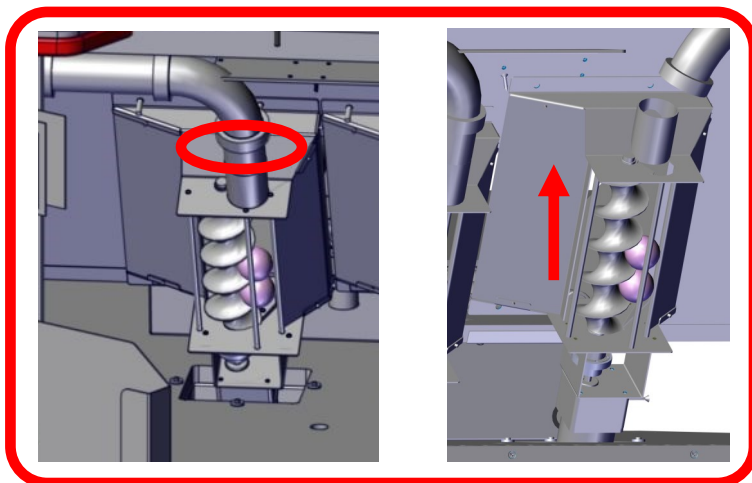
Ball Auger Assembly

The ball auger carries the balls from the lower cabinet up to the ball shooter. Each time the trigger is pressed, the ball auger will turn on until the ball switch is activated telling the shooter a ball is ready to be shot.

To remove the ball auger assembly from the cabinet, first remove one side panel and put aside. There are two bolts that hold the auger assembly to the cabinet. Remove the bolts labeled "R" for Player 2 auger or "L" for Player 1 auger.

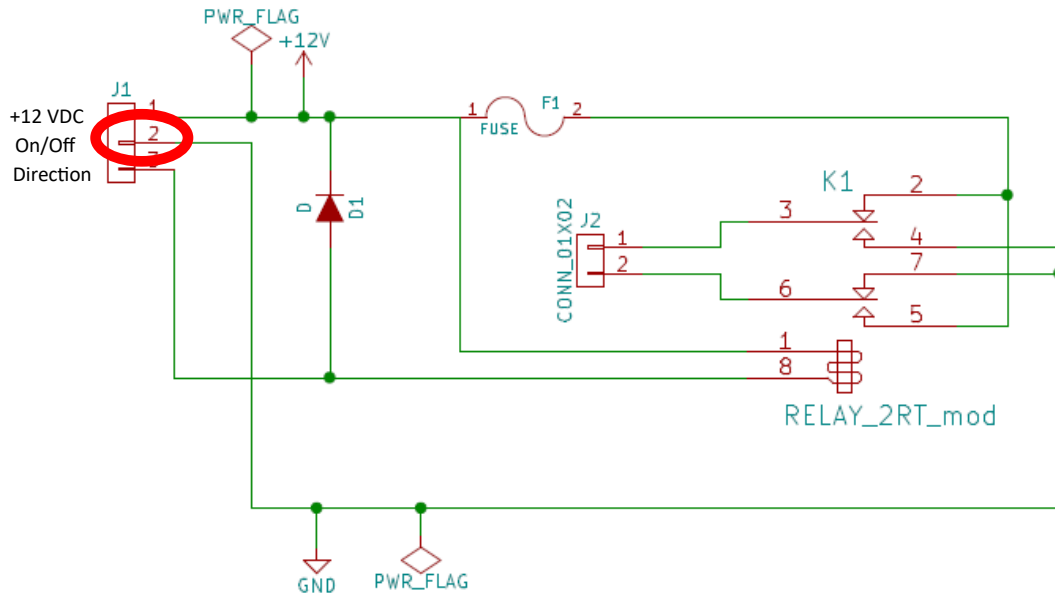


Open the front of the cabinet and loosen the 1/4 " hose clamp that holds the tube to the auger you wish to remove. Lift the tube up and out of the way. The auger assemblies sit in a slot at the bottom of the cabinet. Lift the auger up and unplug the two pin connector. Now remove the auger.

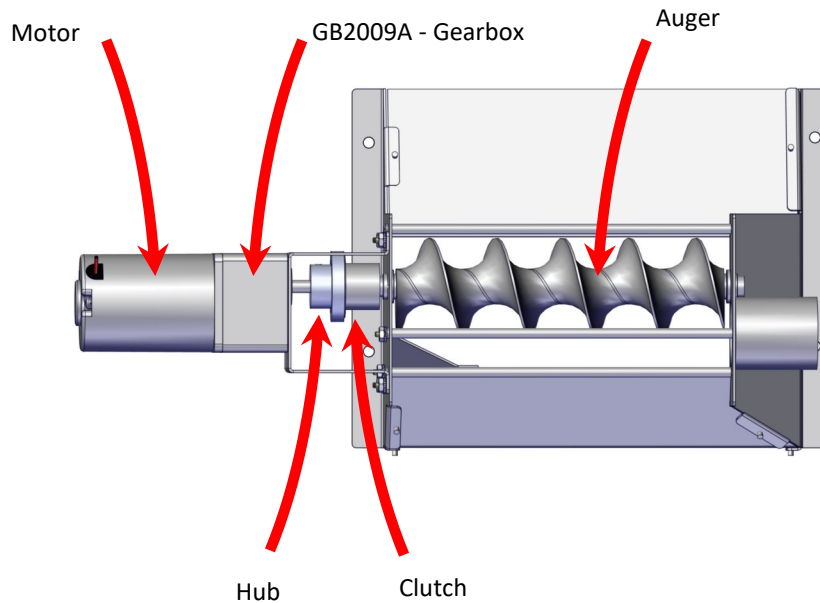


Ball Auger Assembly (Continued)

The ball auger is controlled by the I/O board and powered through a ZS2035X relay board. Pin 9 of P7 of the I/O board turns on Player's 1 auger. Pin 10 of P7 of the I/O turns on Player's 2 auger. These signals go to pin 2 of the relay boards connected to Player 1 & 2 augers.

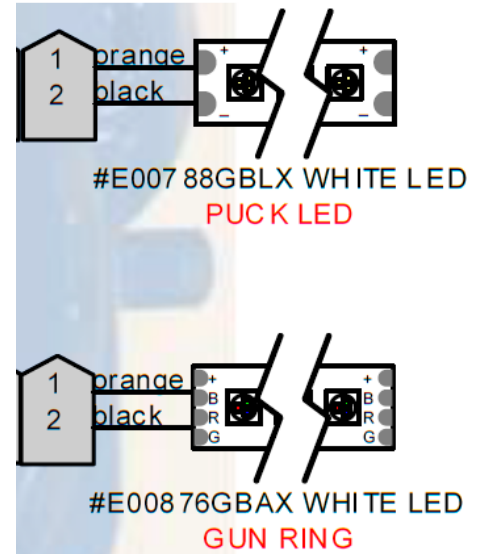
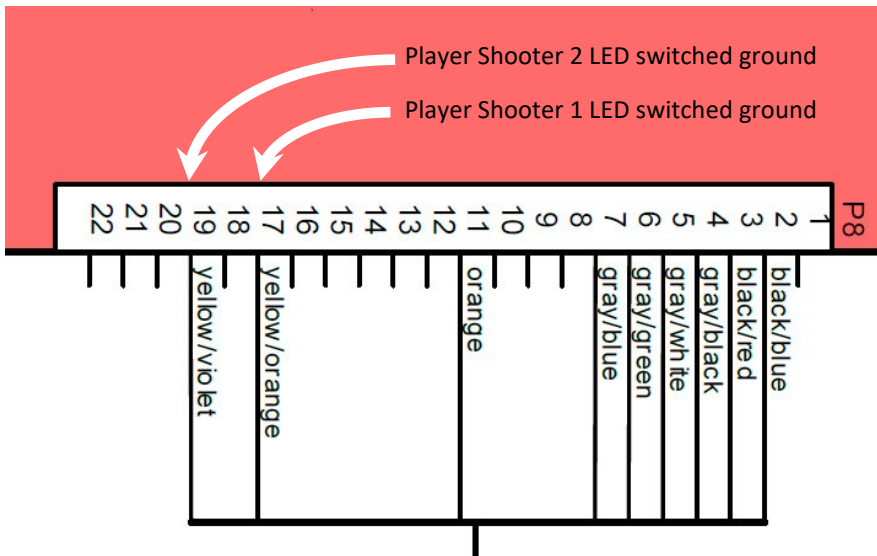


The ball auger direction is controlled by pin 20 of P7 of the I/O board for Player 1 and pin 21 of P7 of the I/O board for Player 2. This signal connects to pin 3 of the relay board. When this signal is low, it will activate the relay therefore reversing the power to the auger.



LED Light Control for Shooters

Player 1 and Player 2 shooters have LED lighting which is controlled by the I/O board P8 connector. Pin 17 is for player 1 and Pin 19 for Player 2. This signal provides the ground to the shooter's LED lights. Test by inserting your black probe into the pin which controls the shooter LED's you are testing. Now attach your red probe into any +12 volts of DC. Set your multi meter to capture the highest voltage. When the LED is fully on you will find +12 volts of power present. If no voltage is found, ground pin 2 of the LED strip (black wire) momentarily. The LED should light. This signal will vary back and fourth between +12 VDC and 0 V DC (GND).



LED Light Control for Cabinet/Bench

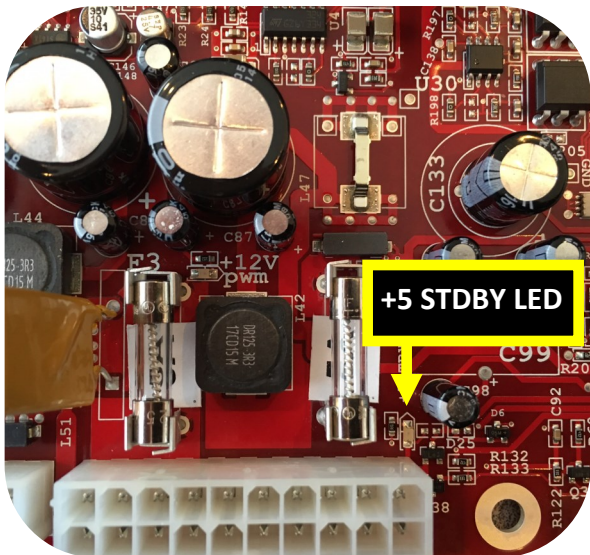
The cabinet/bench lighting is controlled by the I/O board at P8 connector. Pin 20 controls the amount of voltage that the LED will receive. This varies from 0 volts of DC (Fully on) to +12 volts of DC (Fully off). Test by placing your black probe into pin 20 of P8 on the I/O board. Place the red probe into any +12 volts of DC off the power supply. Set your multi meter to capture the highest DC voltage. When the lights are fully on you should read +12 volts of DC. If the lights are not working and you have confirmed the wiring from the I/O board under the cabinet and to the bench lights, momentary connect ground to pin 20. The LEDs should fully light.

Computer Power On **** WARNING ** HIGH VOLTAGE**

When power is applied to the game, the I/O board will power up and after a brief period switch the computer on. This allows time for the I/O to run its internal firmware before the computer boots up. This is accomplished by interrupting the AC power to the computer. Note that the computer's BIOS must be set to "power on" or "restore AC" from power loss or it will not turn on.

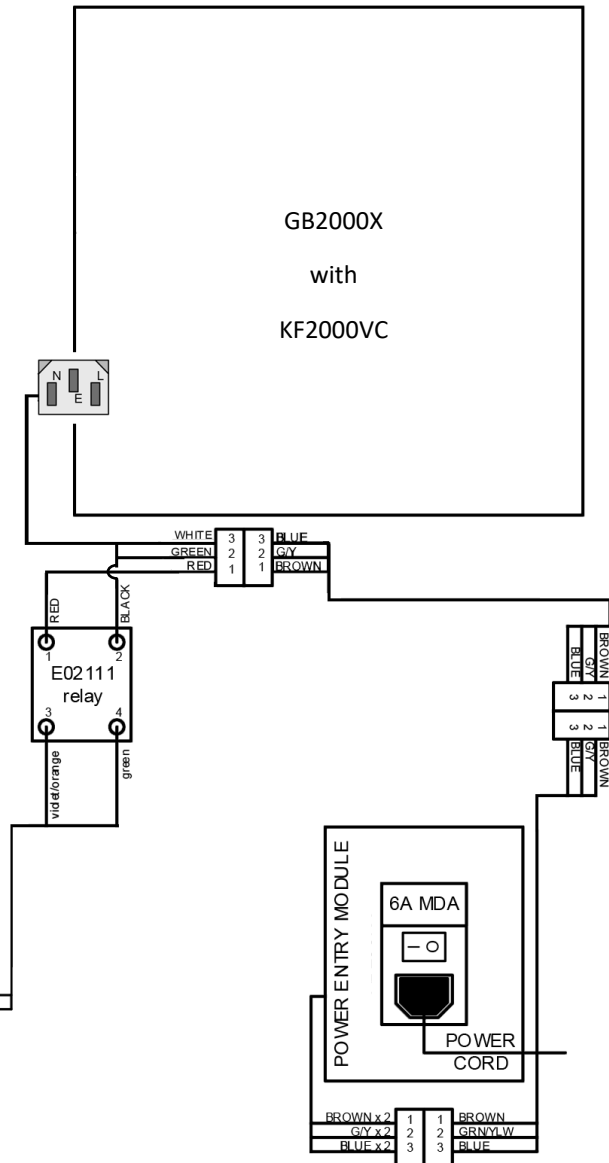
The Violet/Orange wire contains +5 volts of DC from P2, pin 19 of the I/O board and connects to one leg of the solid state relay. When the I/O board is ready for the computer to turn on it will ground pin 20 on connector P2 of the I/O board through the green wire and to the other leg of the solid state relay. This will activate the relay and connect the other side's two wires together. The red and black wires will connect completing the AC "HOT" power to the computer. The earth ground and neutral lines are already connected.

Confirm the I/O board has power by observing +5stby LED on the I/O board. Attach the black probe onto the green wire of the solid state relay. Attach the red probe on the violet/orange wire. When the I/O board activates the relay you should have +5 volts of DC. If missing replace the I/O board. If present, move the red probe to the red wire of the relay and move the black probe to the white wire coming from the AC plug of the computer. Switch the meter to AC voltage and you should read 110/220 depending on your incoming AC voltage. If no AC voltage is present but you have +5 volts of DC at the relay's input, replace the relay. If AC voltage is present then replace the computer.



I/O Board	
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10	
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13	
14	
15	
16	
17	
18	
19	violet/orange
20	green

+5 V stby-swt led
PS_ON (control signal)





WARRANTY POLICY

I.C.E. Inc warrants all components in new machines to be free of defects in materials and workmanship for the period listed below:

- 180 days on Main PCB's, Computers & Motors
- 1 year on all LCD monitor panels
- 90 days on all other electronic and mechanical components
- 30 days on all I.C.E. repairs and parts purchases

I.C.E. Inc shall not be obligated to furnish a warranty request under the following conditions:

- Equipment or parts have failed through normal wear and tear
- Equipment has been subjected to unwarranted stress, abuse or neglect
- Equipment has been damaged as a result of arbitrary repair/modification

Products will only be covered under warranty by obtaining an I.C.E. authorized RMA #. To obtain an RMA # please provide I.C.E. tech support with the game serial # or original I.C.E. invoice # and a detailed description of the failure or fault symptoms.

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Innovative Concepts in Entertainment

10123 Main St.

Clarence, NY 14031

Phone #: (716) - 759 – 0360

Fax #: (716) – 759 – 0884

www.icegame.com