Last Updated: January 2020

FMX, MCX, SD, and LD User Guide

Purpose: This document provides step-by-step instructions for using Redbird Flight Simulator models FMX, MCX, SD and LD.

Audience: This document is meant to be used by instructors and pilots who need to use a Redbird Flight Simulator.

System Requirements: Installation of Redbird Aviation Training Devices should be completed by a Redbird Installation Manager or Redbird Certified Technician. Units should be installed on a level surface in a climate controlled environment. As a general rule, wherever people are comfortable, the training device will be comfortable. The main computer should be placed directly in front of the simulator. Once assembled, plug the simulator into a single standard 120 volt outlet.

Assumptions: Users are student pilots or pilots, and have received basic instruction on turning the simulator on and off (including the motion platform, if applicable) from Redbird Flight personnel, or someone who was trained by Redbird Flight personnel.

Instructions:

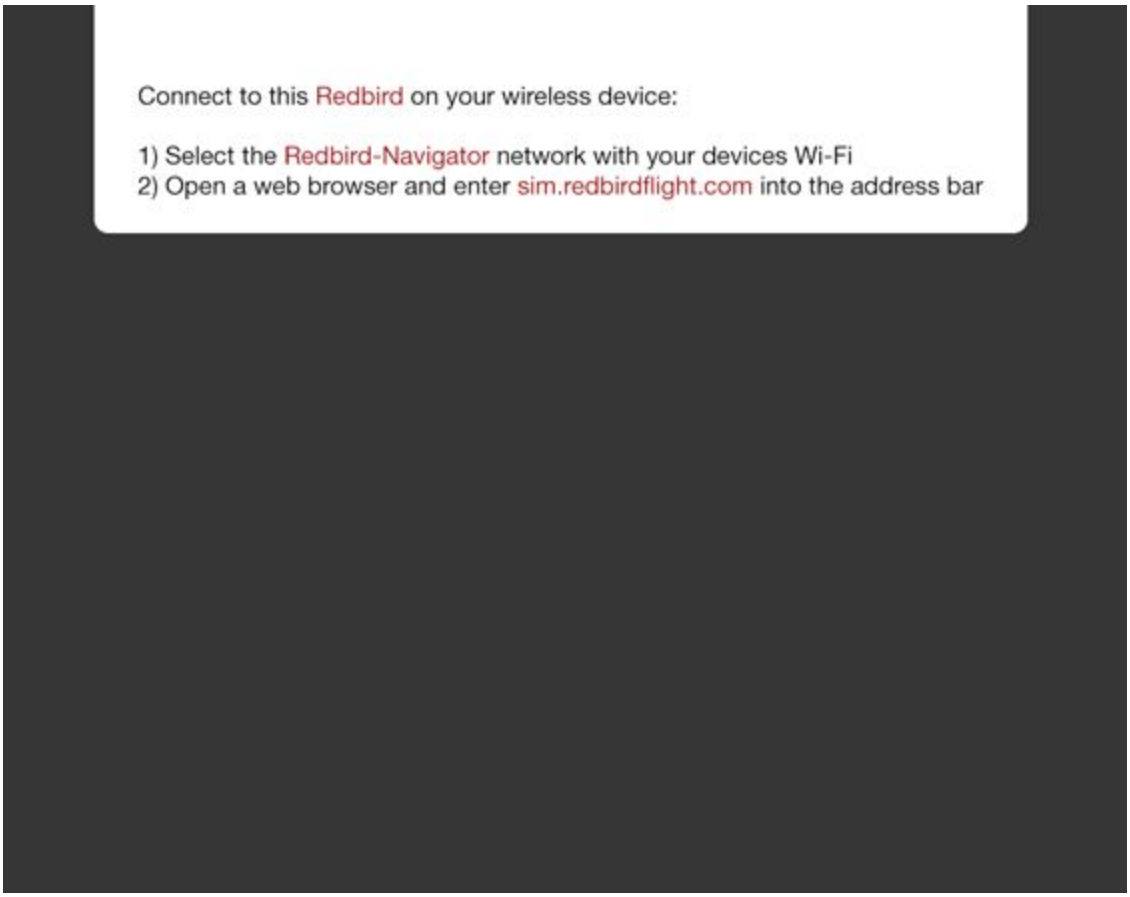
Startup

NOTE: The circuit for the simulator must be properly grounded and provide the recommended voltage. Improper grounding or incorrect voltage can cause injuries and damage to the device. If you have a motion platform, the circuit cannot contain a ground fault circuit interrupter (GFCI). Redbird is not responsible for damage caused by improper grounding or improper voltage provided by the facility.

NOTE: Make sure the provided surge protector is plugged into the wall and the power cables are plugged into it.

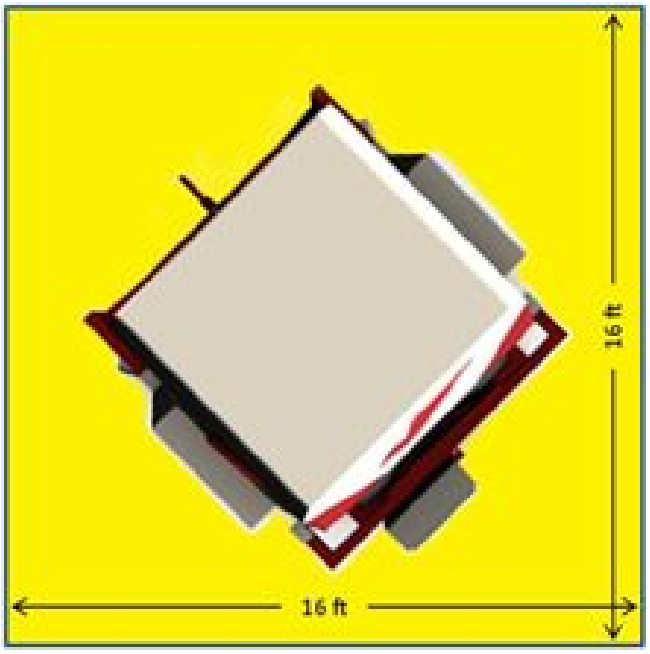
CAUTION: If you're using a power converter, it should be installed between the surge protector and the wall outlet. Make sure all cables from the simulator go through the power converter. And make sure that the input switch on the converter is set to the correct input for your electrical system before turning on the surge protector

1. Turn the surge protector on. You should hear the cooling fan in the enclosure start.
2. Turn the computer on by pressing the power button. You should hear the computer boot up along with seeing the fans and lights on the computer chassis.
3. After a few minutes, the following screen will appear on the simulator display.



CAUTION: When operating the device, make sure that the area around the simulator is clear of persons, equipment or other hazards. Also, be aware of possible pinch

points created by simulator movements (if applicable). See image below for clearance dimensions.



Motion platform clearance area

NOTE: If your simulator has a motion platform, the motion platform does not need to be powered on to use the simulator. If you intend on flying without motion, you do not need to turn on the motion platform. Otherwise, if you plan to use motion during your training session, you'll need to turn the motion platform on.

4. If your simulator has a motion platform, turn the motion platform on by pressing the green button on the push button station. When the motion platform turns on it will slowly yaw to the right and then quickly return to center. Keep people and objects away from the path of the simulator.

Push button station

CAUTION: Do not climb into the enclosure until the simulator has returned to center.

5. Verify that the motion platform is powered on. If the red stop button on the push button station is illuminated, the platform has power.

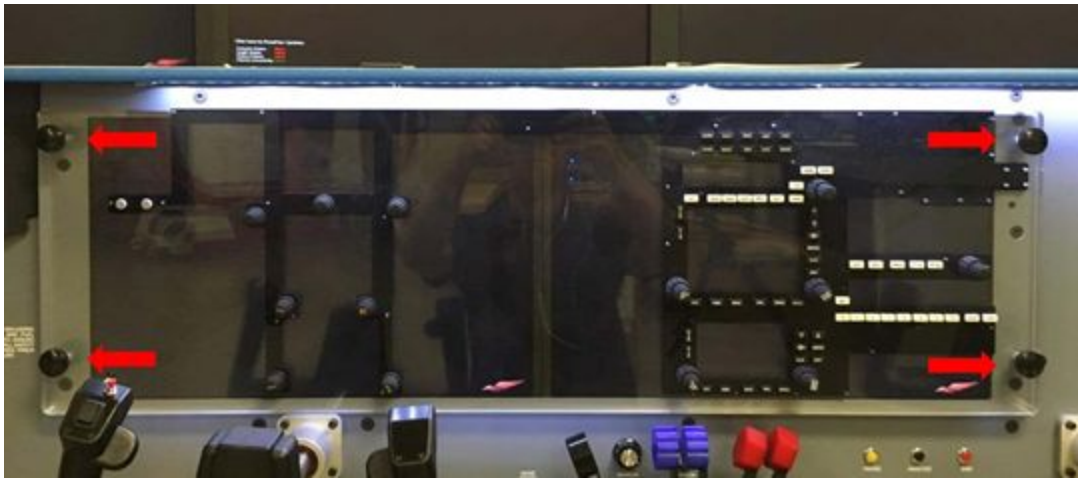
NOTE: A flashing yellow light on the push button station indicates the motion platform is moving or attempting to move.

NOTE: Refer to the Mission Loading section later in this document, or refer to the Navigator User Guide to launch a flight.

Changing Aircraft Configurations

Changing the Acrylic Panel

1. Remove the four (4) thumbscrews located at the corners of the acrylic panel.



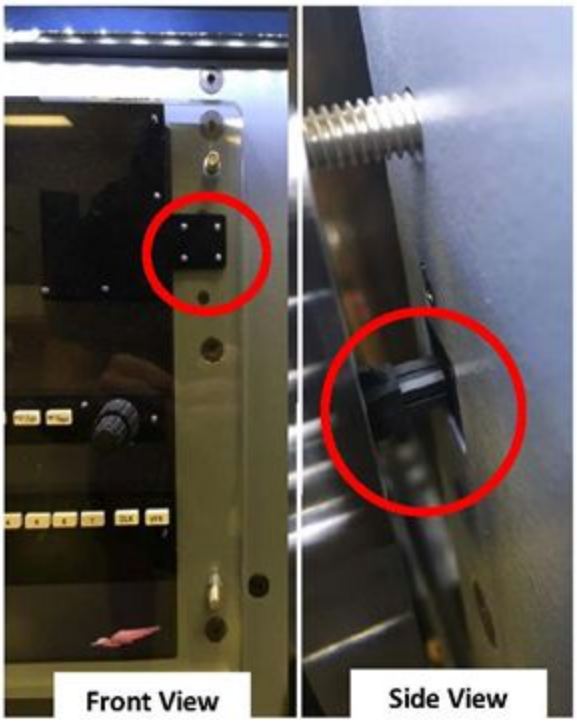
2. Holding the panel at both ends, pull it directly away from the switch panel.

CAUTION: Pulling one side of the panel off at a time can cause damage to the panel and/or the switch panel.

3. Store the panel safely and then retrieve the replacement panel.
4. Holding the new panel at both ends, line up the holes at each corner of the panel with the four corresponding posts on the switch panel.

5. Slide the panel onto the posts flush against the switch panel, ensuring that the connector on the rear of the panel slides smoothly into the port.

CAUTION: If you feel any resistance sliding the new panel in, stop. Do not force the panel in place. Forcing a panel may cause damage to the panel.

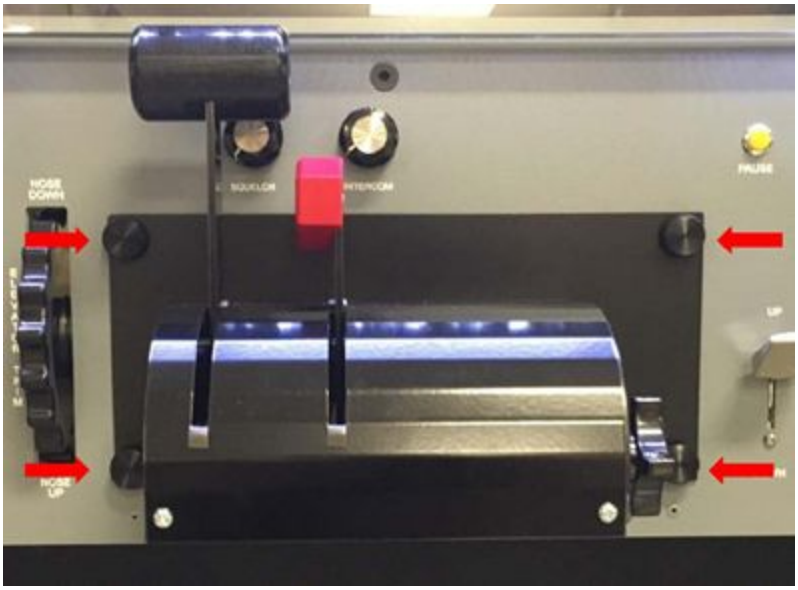


CAUTION: Do not overtighten the thumbscrews as this can damage the acrylic panel.

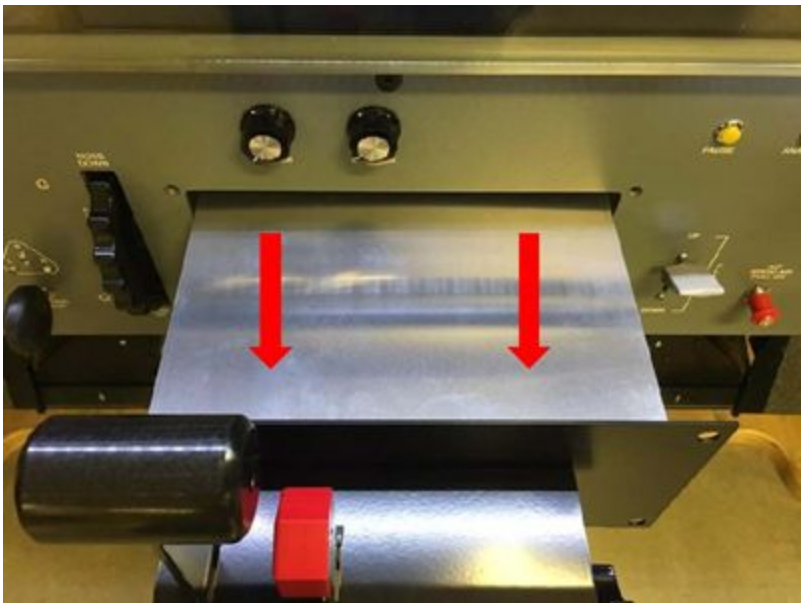
6. Screw all four (4) thumbscrews onto the posts at each corner of the acrylic panel.

Changing Throttles

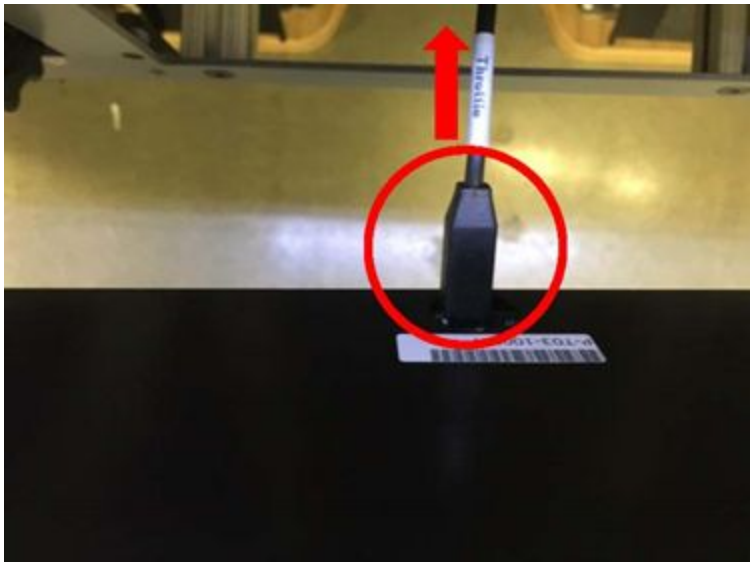
1. Remove the four (4) thumbscrews located at the corners of the throttle faceplate.



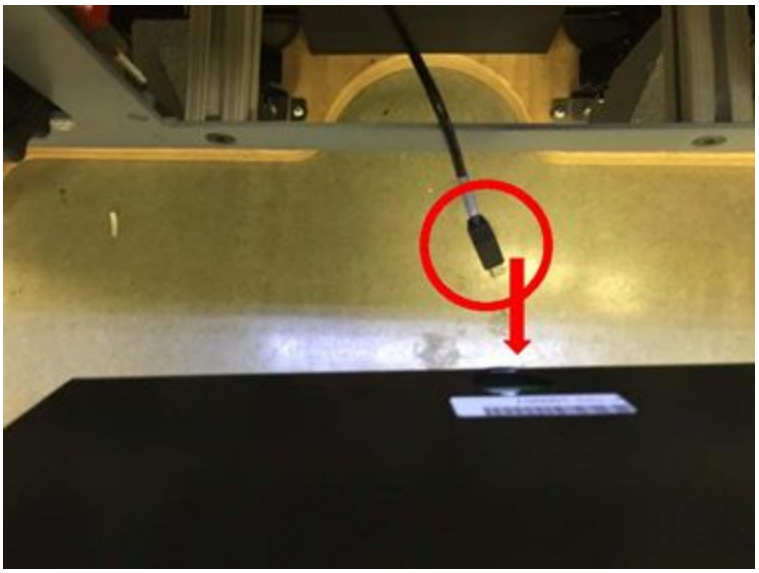
2. Pull the throttle directly out from the switch panel.



3. Unplug the USB cable from the back of the throttle and leave it hanging outside of the switch panel.

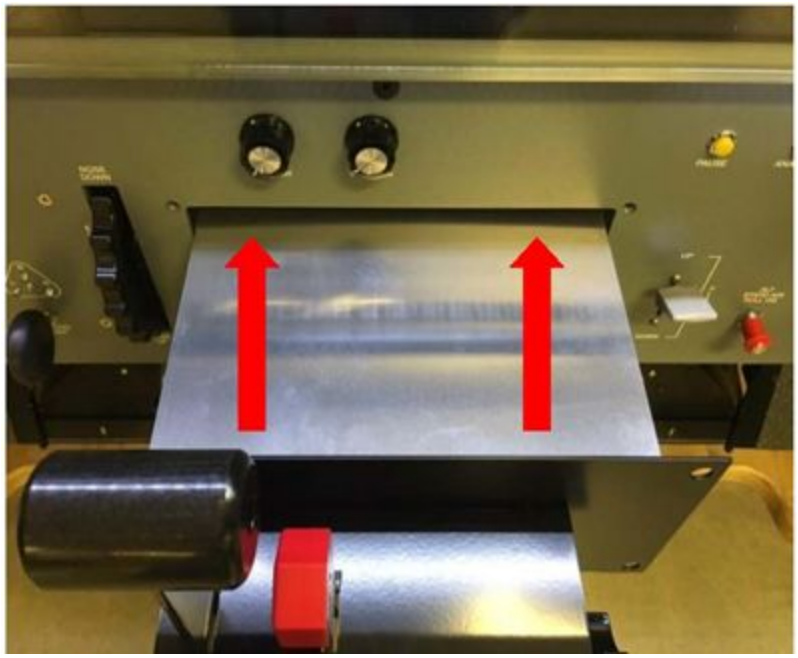


4. Store the throttle safely and then retrieve the replacement throttle.
5. While holding the throttle near the switch panel, plug the USB cable into the throttle.



6. Line the throttle up with the hole and then slide it into the switch panel until the faceplate is flush with the switch panel.

NOTE: Slightly angling up the back of the throttle can help prevent the USB cable from getting caught beneath the throttle. Be careful to avoid catching the top of the throttle on the monitor cables directly above the throttle.



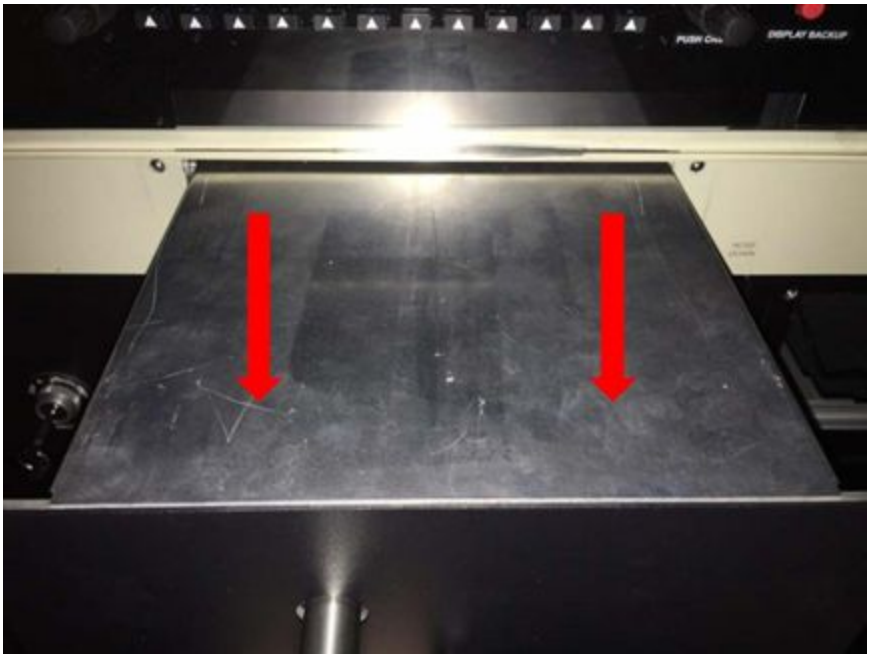
7. Screw in all four (4) thumbscrews at each corner of the throttle faceplate.

Removing a Yoke

NOTE: The following images depict a center yoke, but the instructions apply to both center yokes and side yokes.

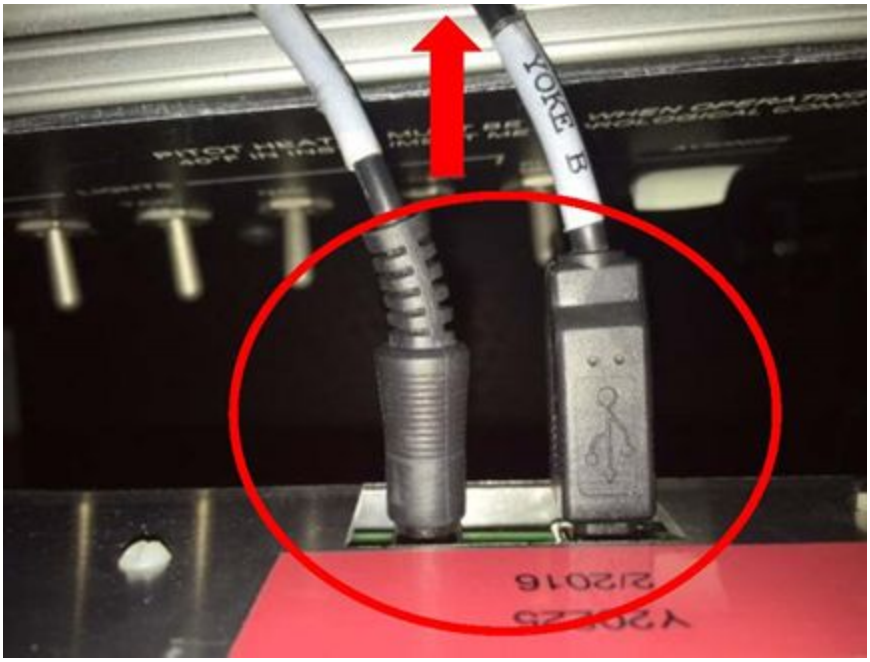
1. Remove the four (4) thumbscrews located at the corners of the yoke faceplate.

2. Pull the yoke directly out from the switch panel.



NOTE: A control loading yoke has a power cable. A standard yoke does not.

3. Unplug the USB cable from the back of the yoke.
4. If you have a control loading (CL) yoke, unplug the power cable from the back of the yoke also.

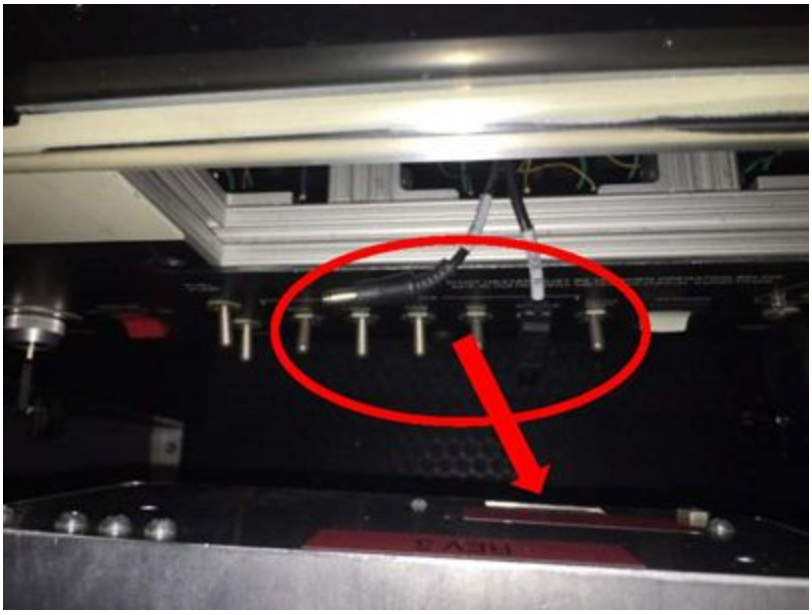


5. Store the yoke safely.

Installing a Yoke

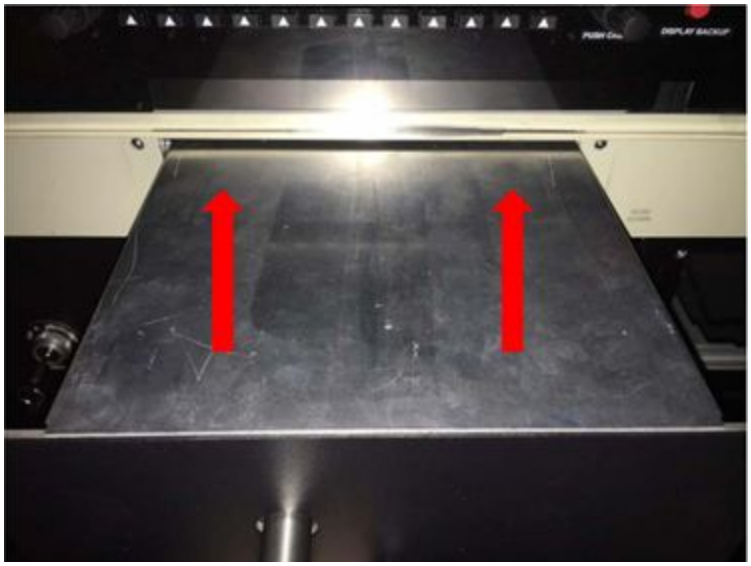
NOTE: The following images depict a center yoke, but the instructions apply to both center yokes and side yokes.

1. While holding the new yoke near the switch panel, plug the USB cable (and the power cable if you have a CL yoke) into the back of the yoke.



2. Line the yoke up with the hole and then slide it into the switch panel until the faceplate is flush with the switch panel.

NOTE: Slightly angling up the back of the yoke as it slides in can prevent the cables from being caught beneath the yoke.



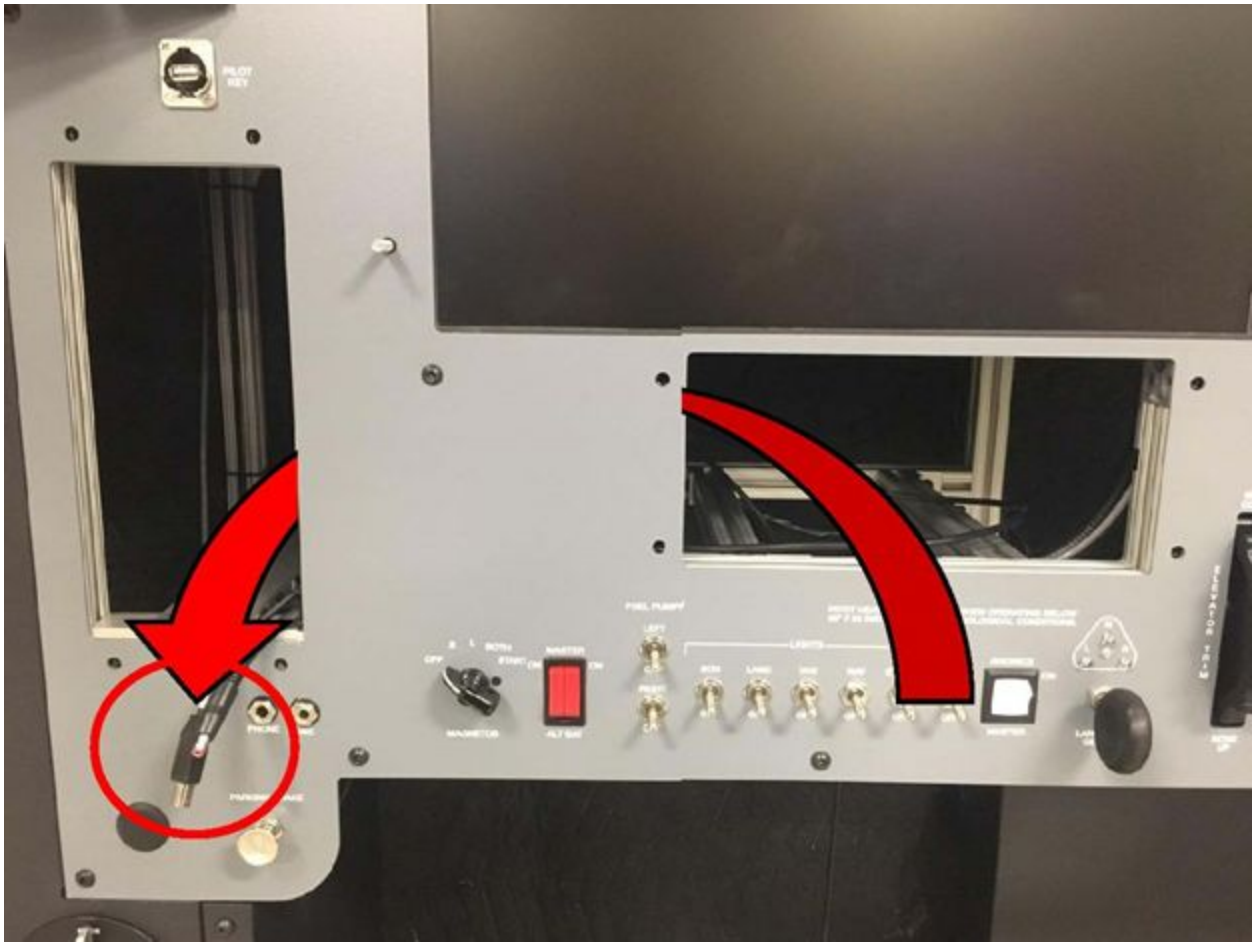
3. Screw in all four (4) thumbscrews at each corner of the yoke faceplate.

NOTE: When installing a CL yoke, once the yoke has power it will begin self-calibration. The calibration takes approximately 30 seconds to complete. Wait until the yoke finishes calibration and returns to center before starting a flight.

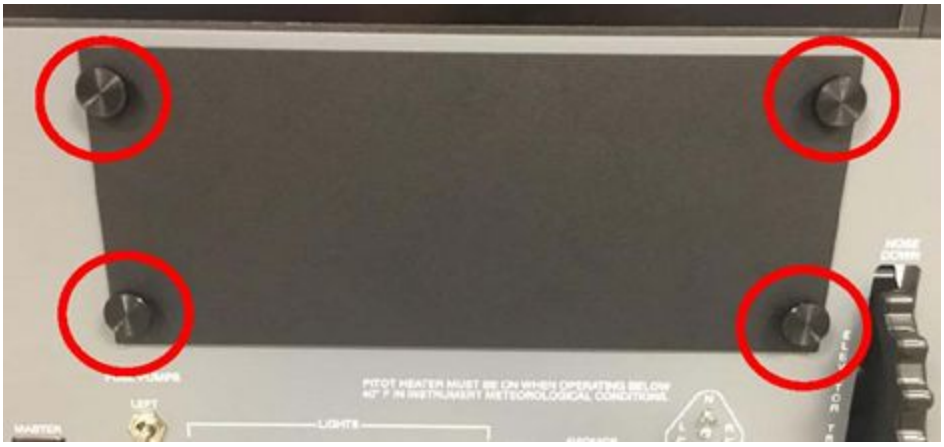
Swapping a Center Yoke for a Side Stick

1. Follow the steps above in the “Removing a Yoke” section to remove the center yoke.
2. Remove the panel cover from the side stick hole on the left side of the switch panel by removing the four (4) thumbscrews.

3. Reach into the side stick hole, grab the USB and power cable hanging in the center yoke hole, and pull them up to the side hole.



4. Install the panel cover over the center yoke hole using four (4) thumbscrews.



5. Complete the steps listed in Installing a Yoke section above to install the side stick.

NOTE: To swap a center yoke for a side stick, follow the same procedure above but in the opposite direction.

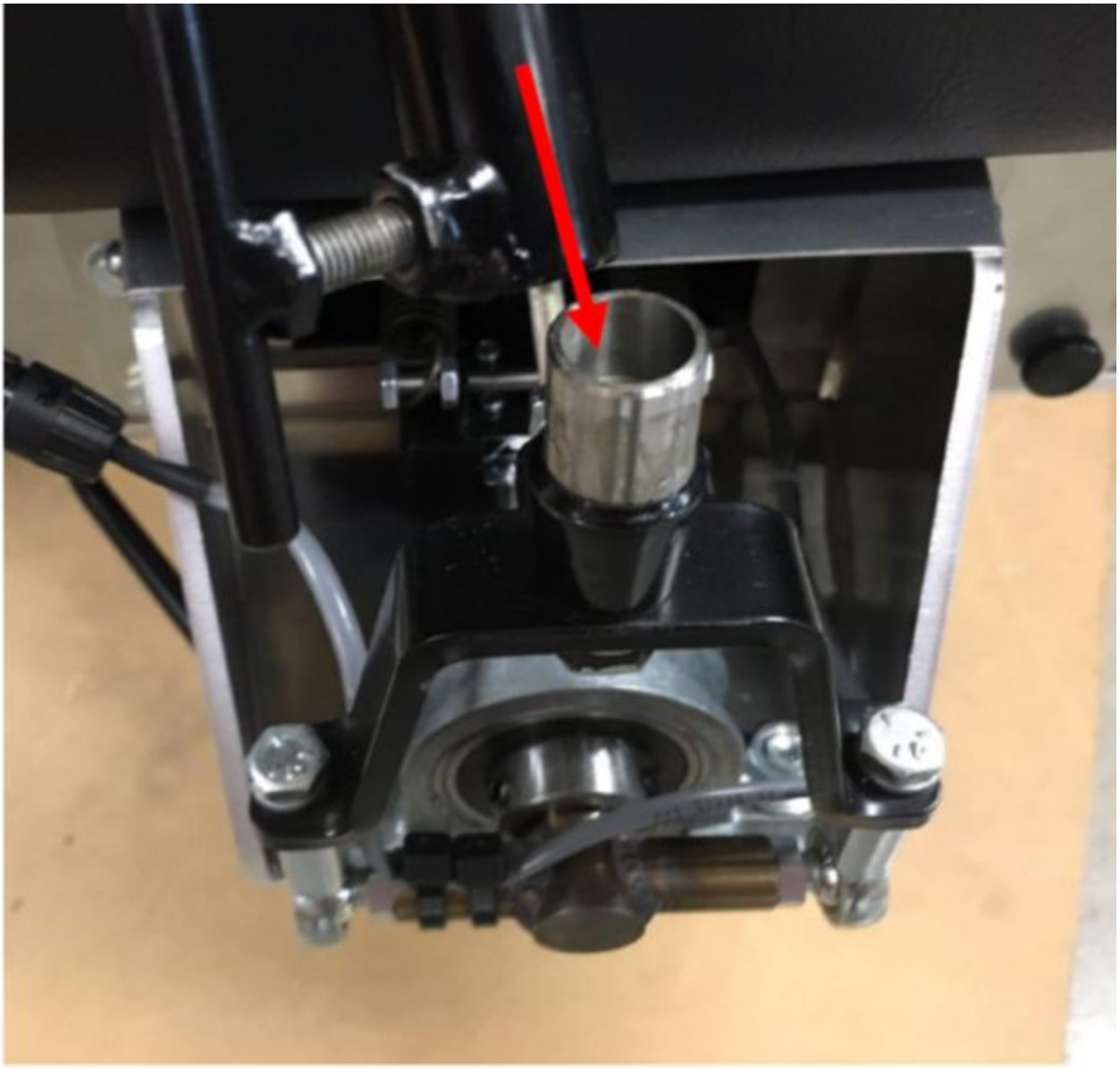
Swapping a Stick for Another Pitch/Roll Control

1. Follow the steps in Removing a Yoke section above to remove the center/side yoke.

NOTE: If you have an additional panel cover, you can install it over the center/side yoke hole.

2. Take the USB cable (and the power cable if it's a control loading yoke) coming through the seat pedestal beneath the pilot's seat and connect it to the stick yoke connector located on the left side of the box beneath the pilot's seat.

3. Place the stick yoke onto the stick mount located at the front of the pilot’s seat.



4. Rotate the stick until it is oriented correctly (the PTT button should be pointed towards the switch panel) and then secure the stick by tightening the set screw.

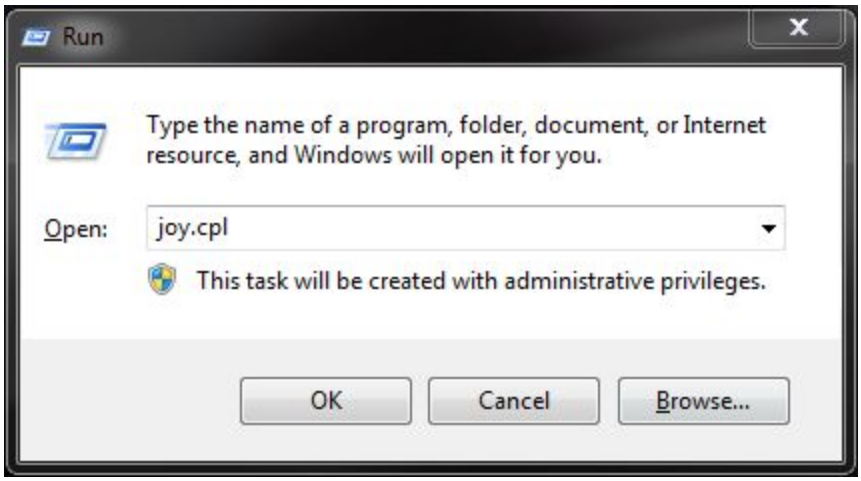
5. Connect the cable, located at the base of the stick to it’s mate located below the stick mount, ensuring that you turn the connector until it locks into place.

Mission Loading

Step-by-step instructions for starting a mission can be found in the *Redbird Navigator User Guide*.

Calibrating the Controls

1. Open the Microsoft Windows Game Controller window.
2. Plug the USB keyboard into the USB slot on the cockpit instrument panel.
3. Depress the Windows key on the keyboard and simultaneously tap the R key to open the Run command.
4. Enter **joy.cpl** into the Open text box.

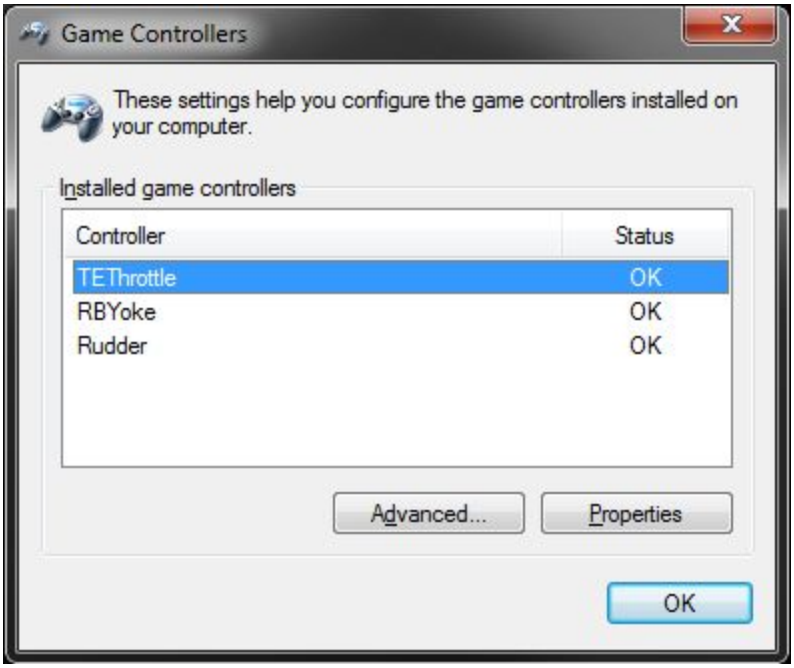


5. Click **Ok**.

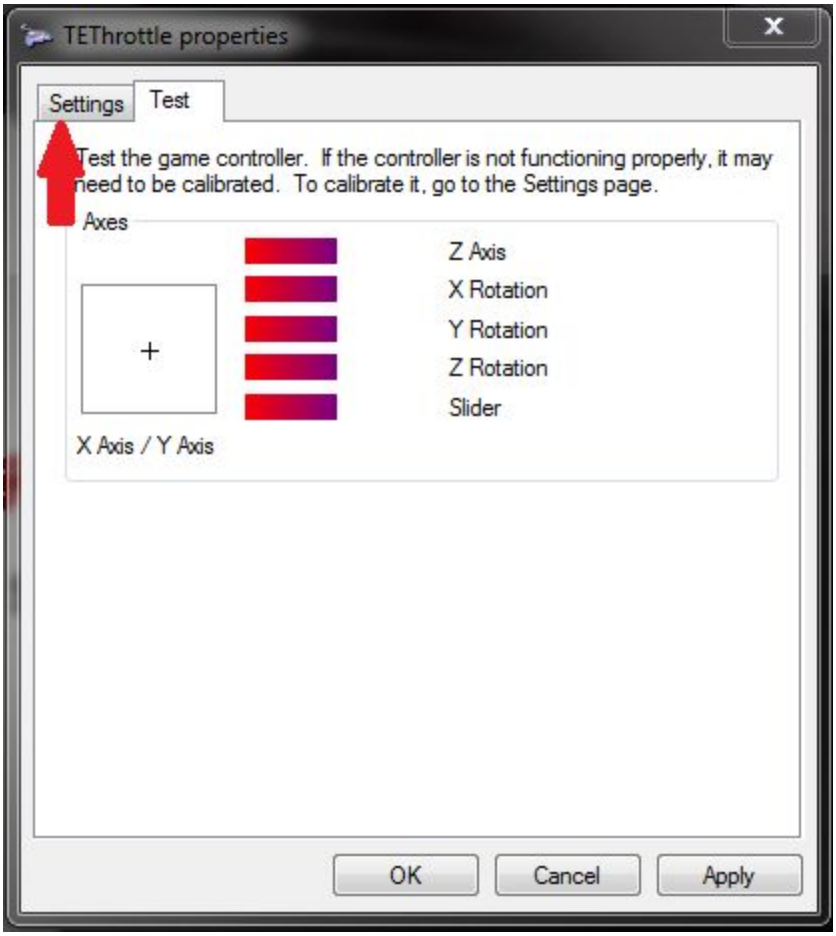
Calibrate the Throttle Quadrant

1. Select the throttle quadrant from the list of available game controllers.

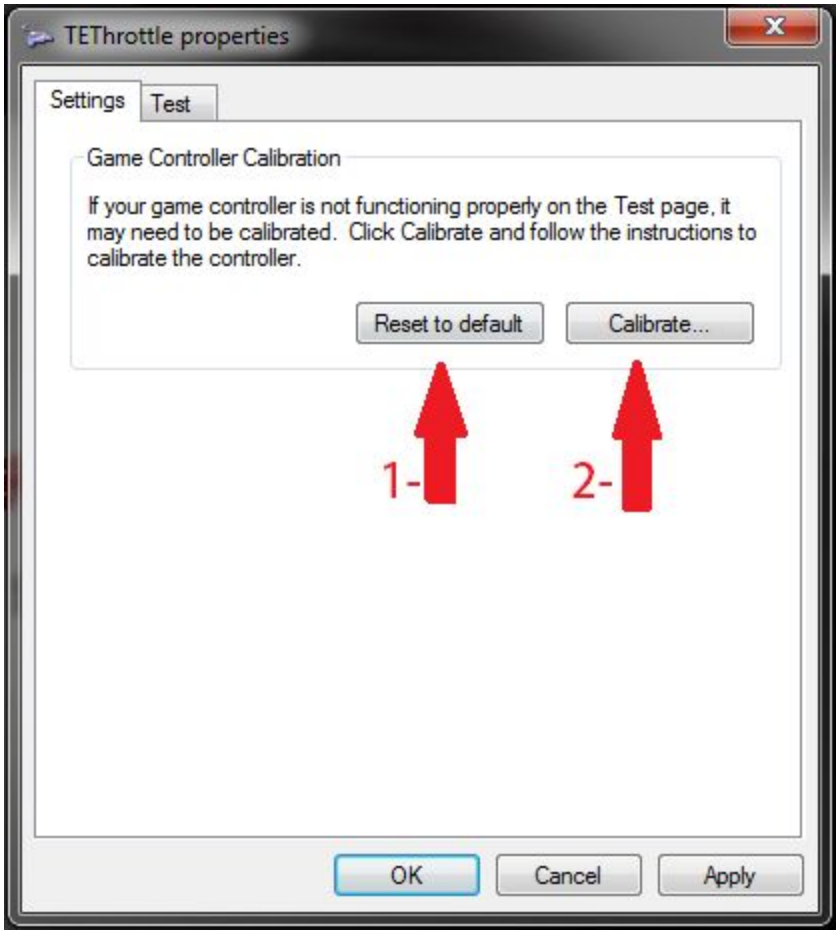
NOTE: Each game controller/peripheral has to be calibrated individually.



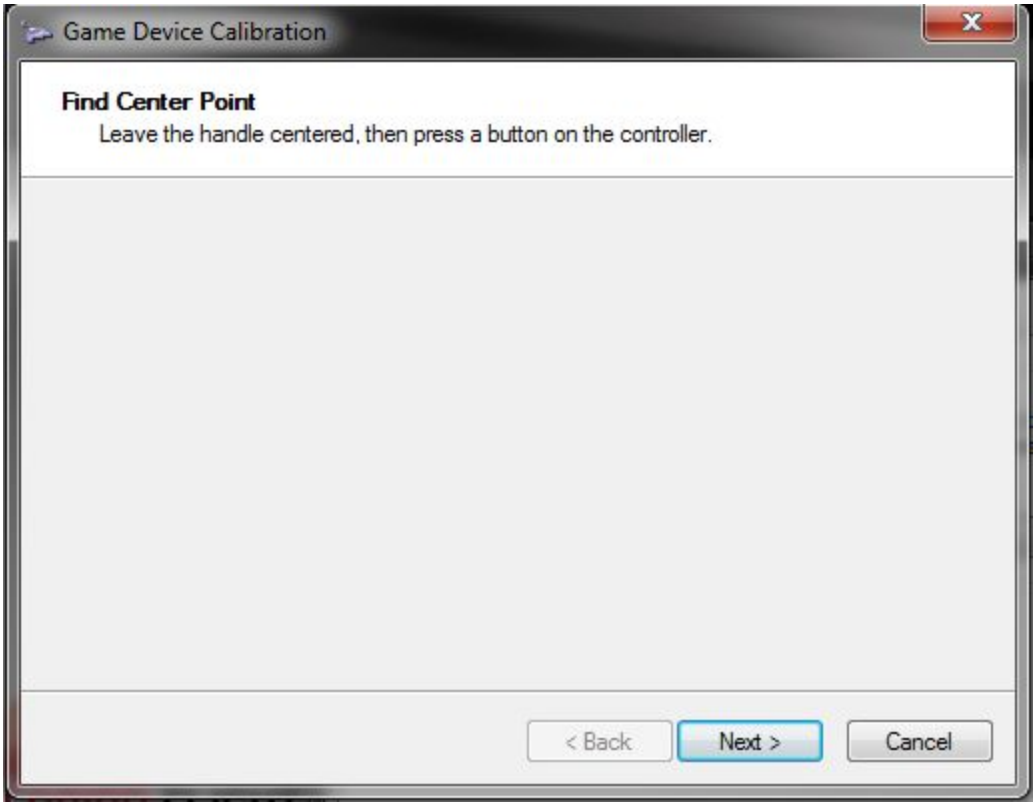
2. Click the **Properties** button.
3. Select the **Settings** tab.



4. Click the **Reset to default** button and then click the **Calibrate** button.

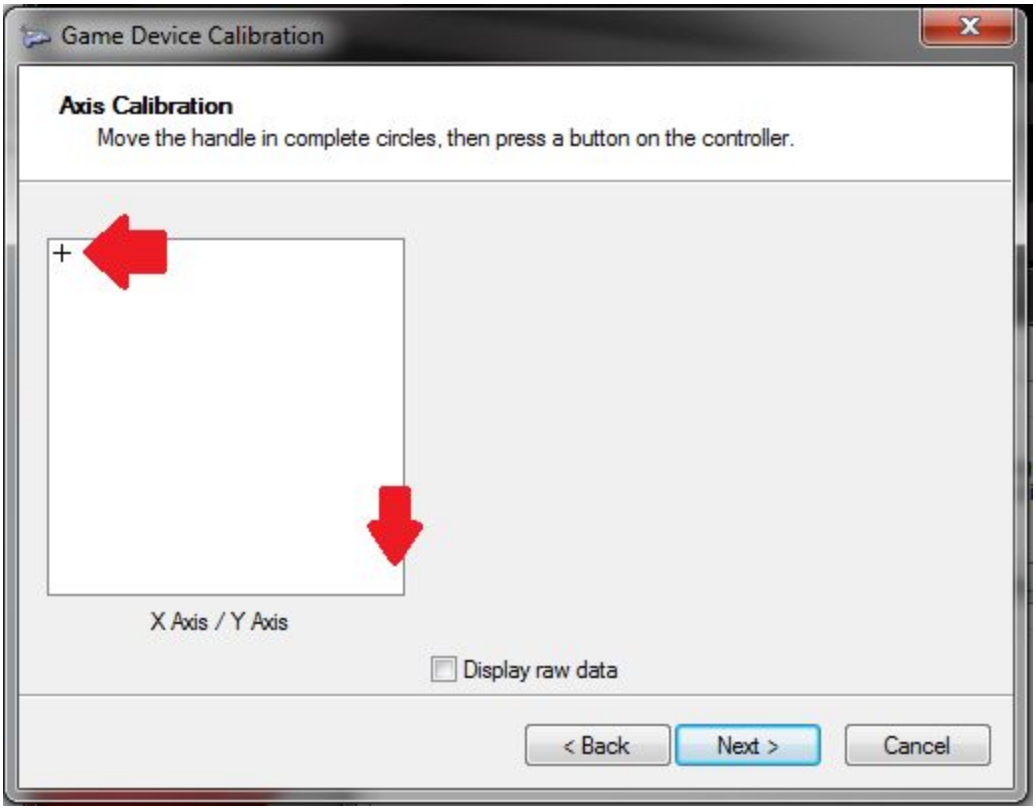


5. Follow the instructions in the Game Device Calibration Wizard.
6. At the Find Center Point window, adjust the power lever, propeller lever and/or condition lever to the approximate center of the range of motion.
7. When all levers are centered click **Next**.

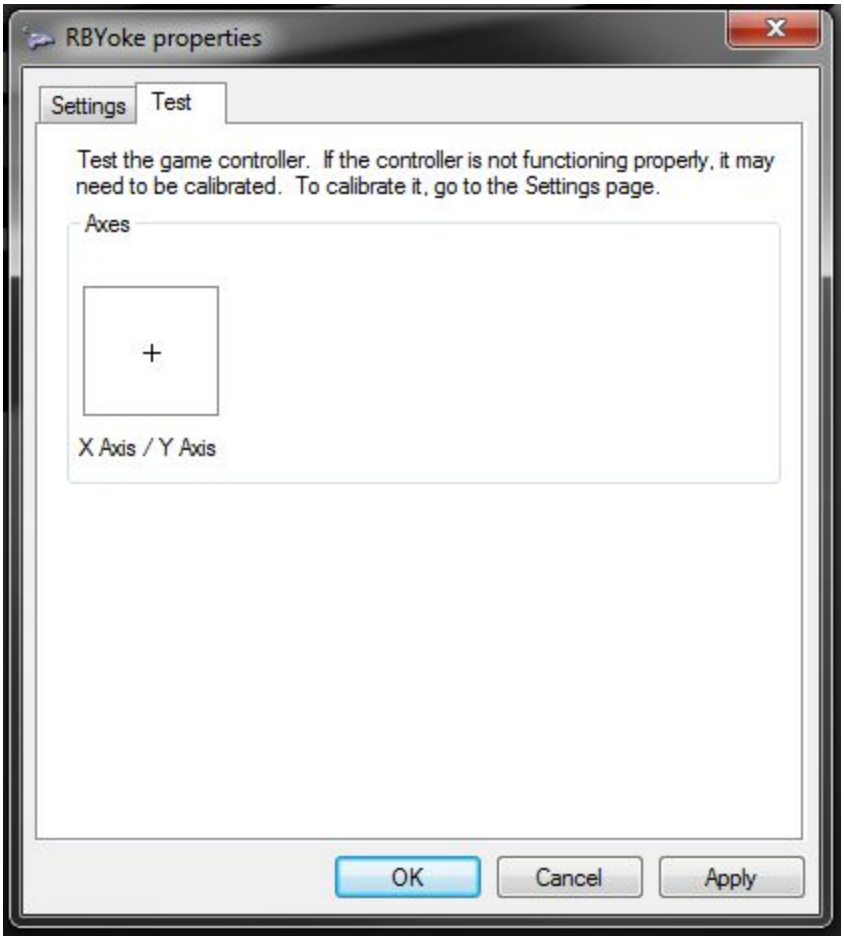


8. On the Axis Calibration page, move the power lever full forward to open and retard to close. Repeat twice.
9. Click **Next** when finished.

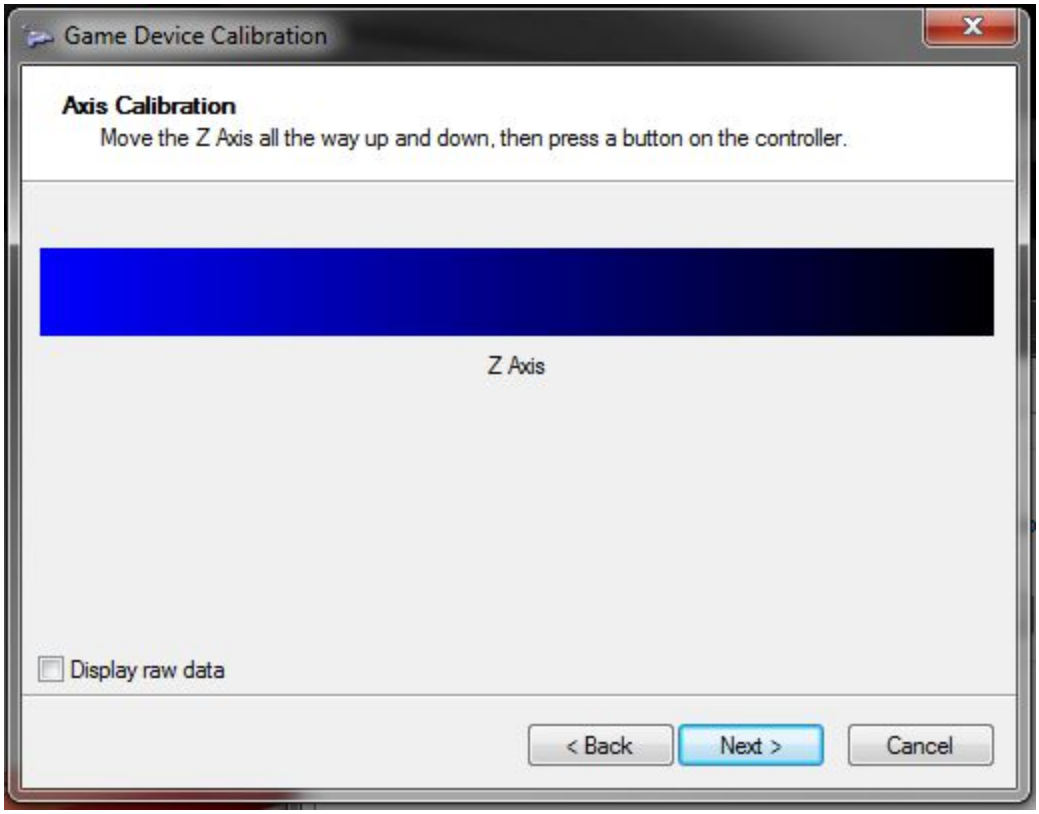
NOTE: During calibration, the crosshair should move between the top left corner and the bottom right corner of the white box when both levers are moved simultaneously.



10. The next page is another Find Center Point screen. Center the propeller lever and condition lever and click **Next**.



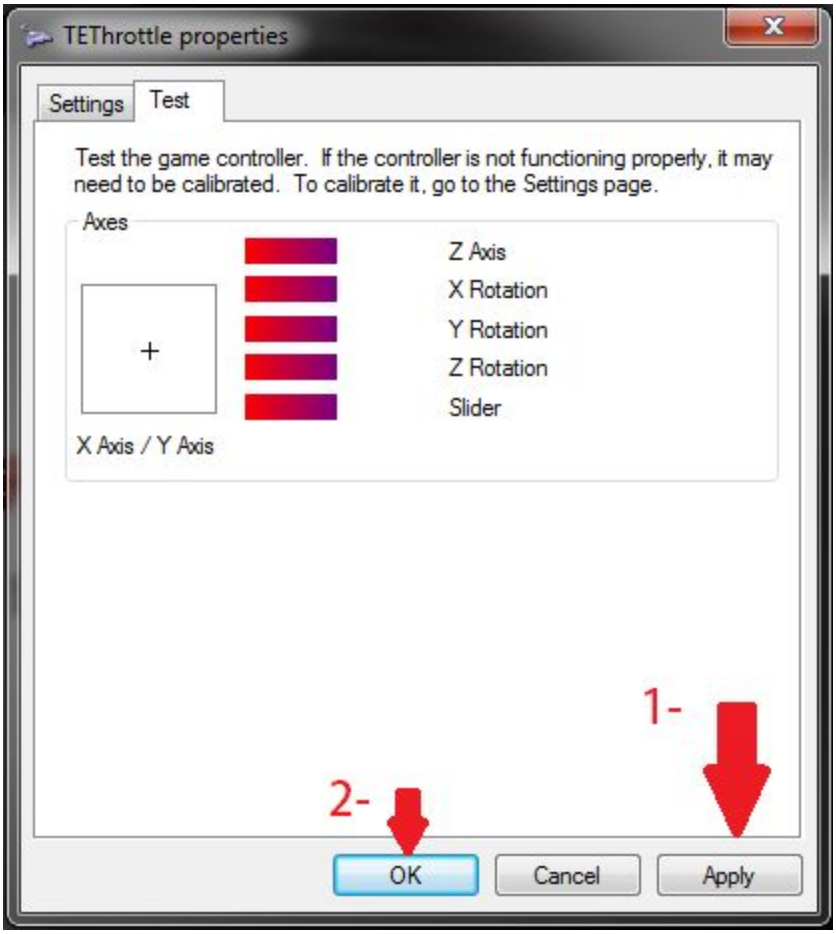
11. The next few windows will calibrate the propeller levers and condition levers. For each Axis Calibration window, find the corresponding lever and move it full forward then retard to close. Repeat twice then click **Next** to progress to the next Axis.



NOTE: There will be an axis for each lever. Repeat the steps above for each axis. The Slider Axis page will be used to calibrate Rudder Trim if installed.

12. Click **Finish** on the final window of the Game Device Calibration Wizard to close the wizard.
13. On the Test tab of the Throttle Properties window click **Apply** and then click **Ok**.

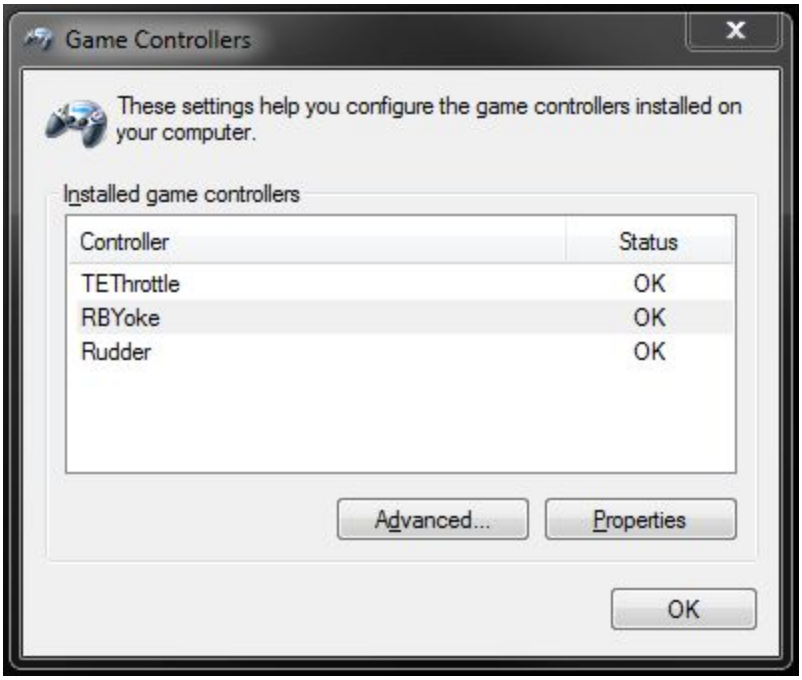
NOTE: If Apply is not clicked first, Windows may not apply the calibration settings properly.



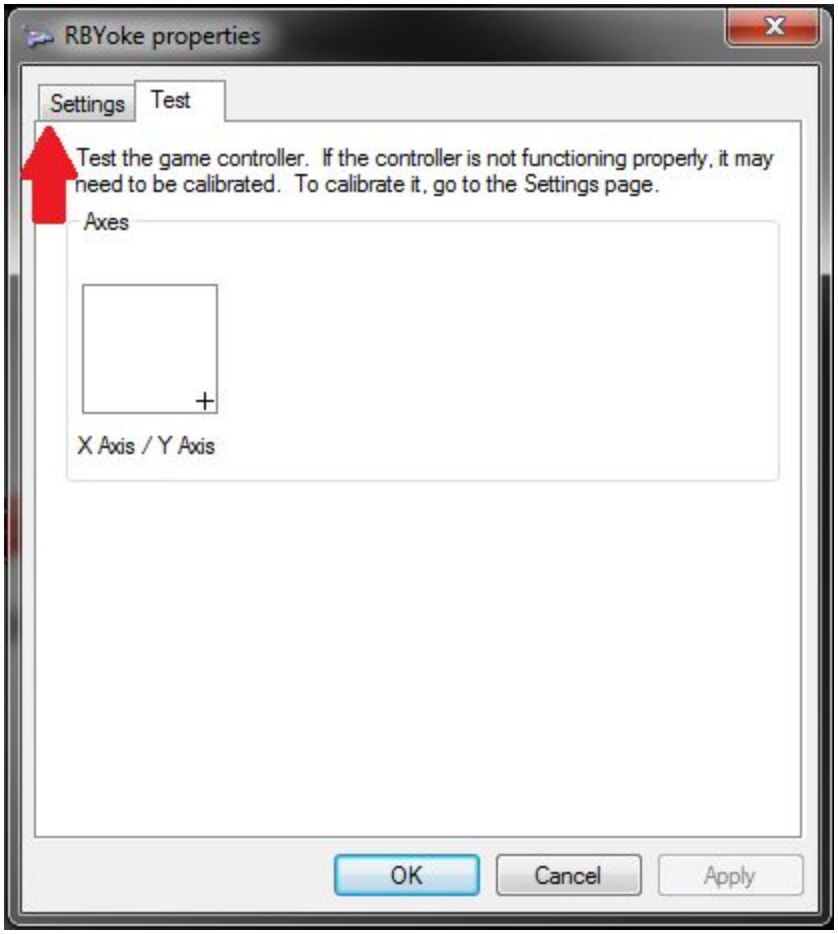
Calibrating the Yoke

1. Select the Yoke from the list of available *Game Controllers*.

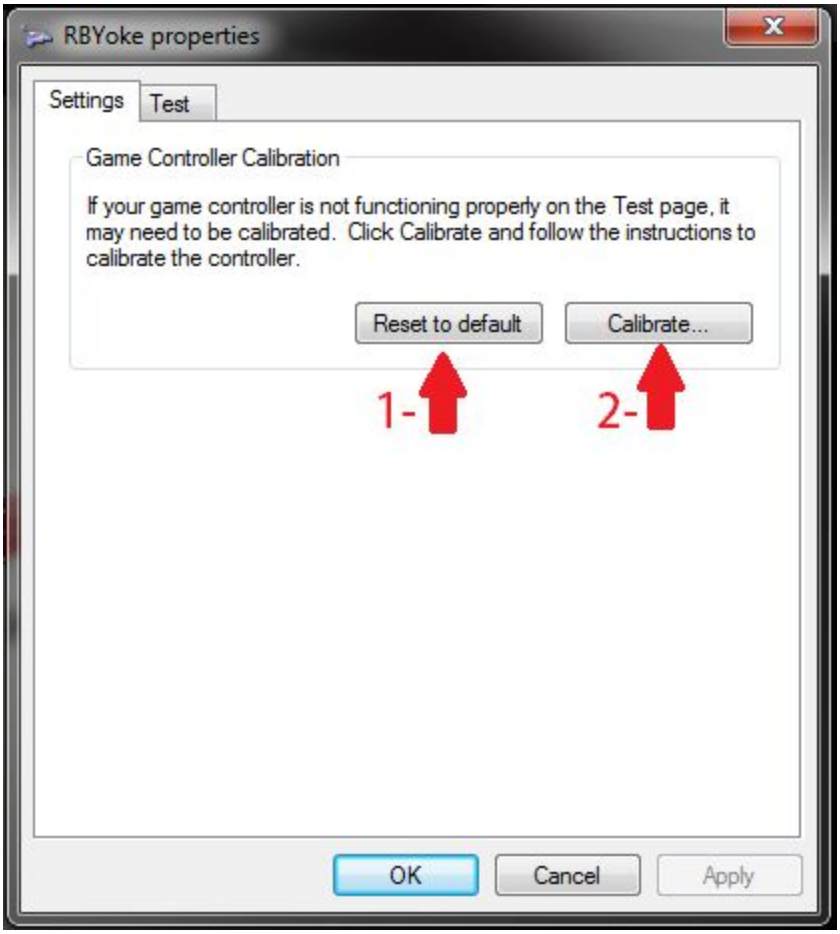
NOTE: If Sim has multiple yokes, the calibration process will need to be completed for each of them prior to using the Sim.



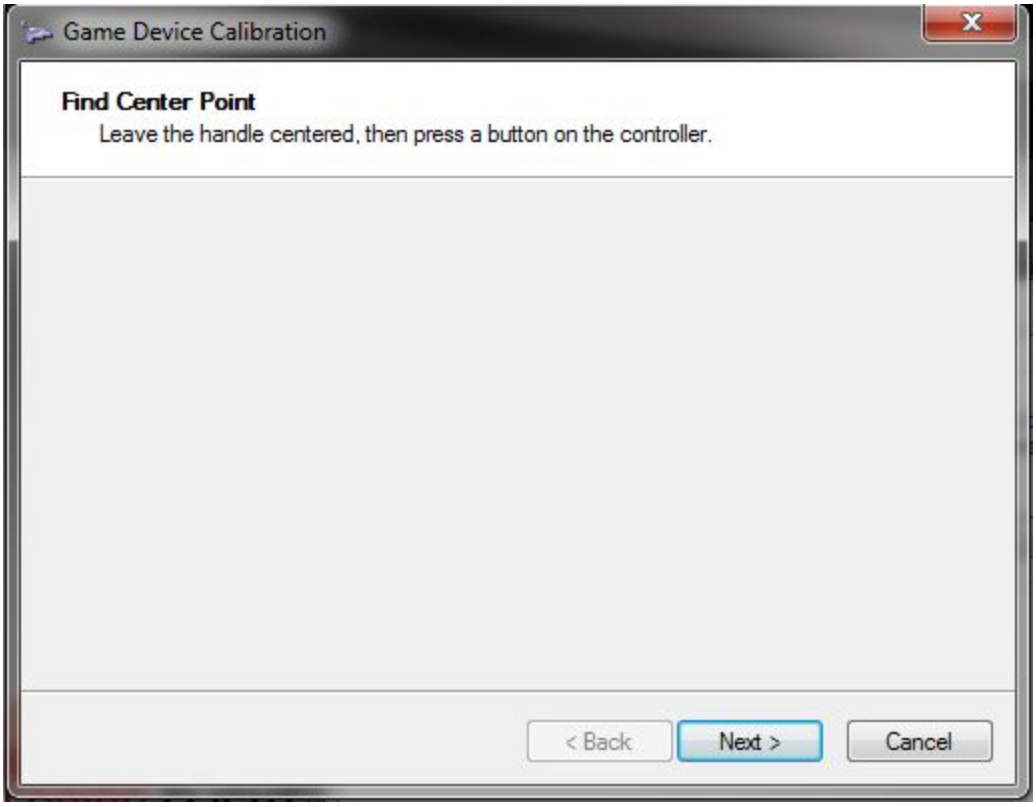
2. Click **Properties**.
3. Select the **Settings** tab.



4. Click the **Reset to default** button and then click the **Calibrate** button.

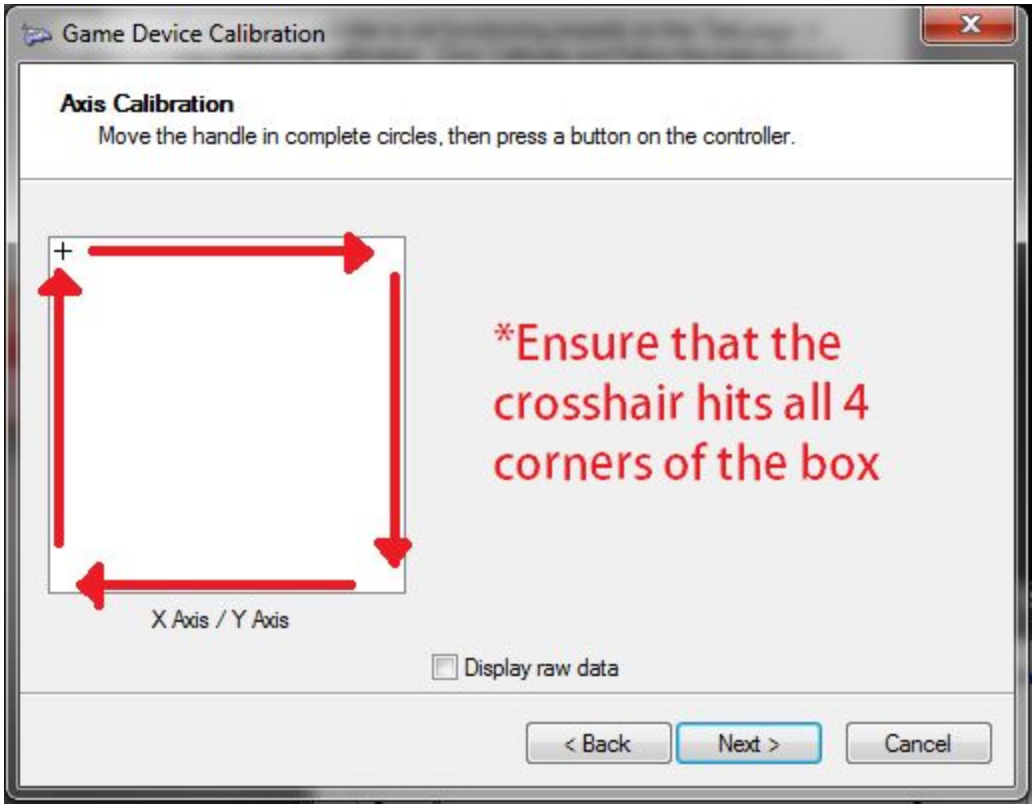


5. Follow the instructions in the Game Device Calibration Wizard.
6. At the Find Center Point window, approximately center the yoke handle (i.e., leave your hands off the yoke handle) and then click **Next**.



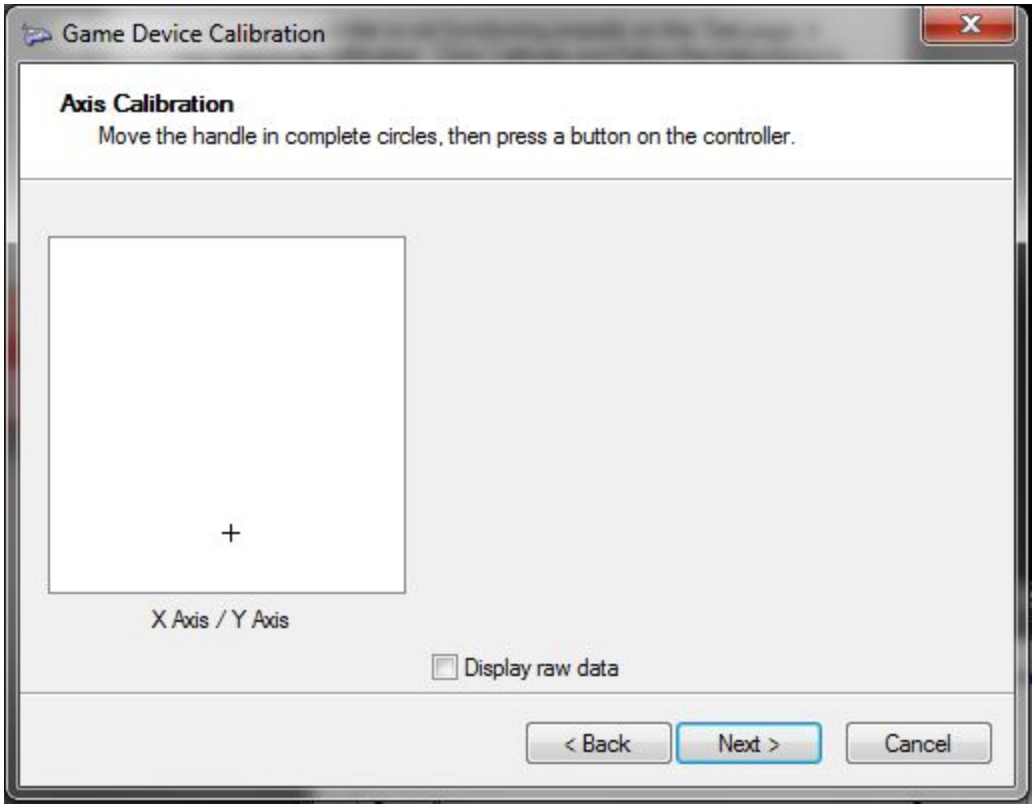
7. In the Axis Calibration window, you're going to move the yoke to the corners of its range of motion. Start by pushing the yoke full forward, and turn it full right.

NOTE: Ensure that the crosshair hits all 4 corners of the white box.

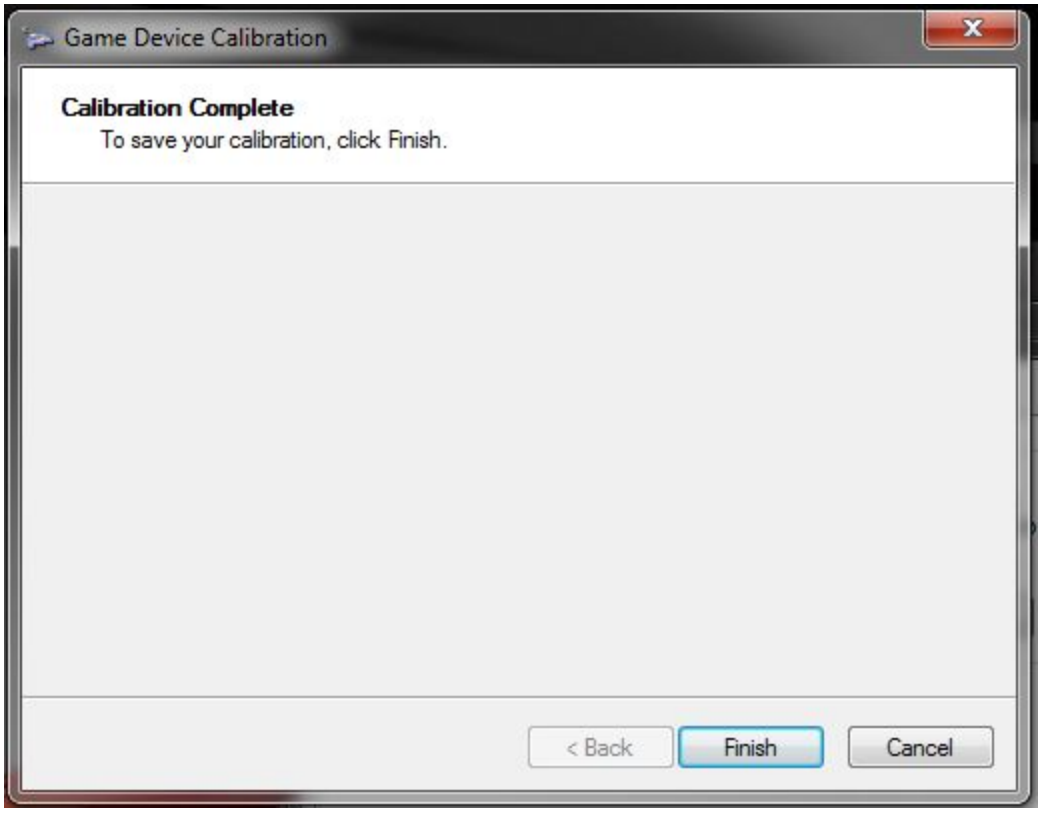


8. While holding full right, pull the yoke full back.
9. While holding full back, turn the yoke full left.
10. While holding full left, push the yoke full forward.
11. While holding full forward, turn the yoke full right.
12. Repeat above steps 7 – 11 one more time.
13. Release the yoke handle.
14. Ensure that your yoke is at rest (i.e., leave your hands off the yoke handle) and click **Next**.

NOTE: The crosshair may not be in the center of the box when the yoke handle is released. This is normal behavior and the yoke will still calibrate properly.

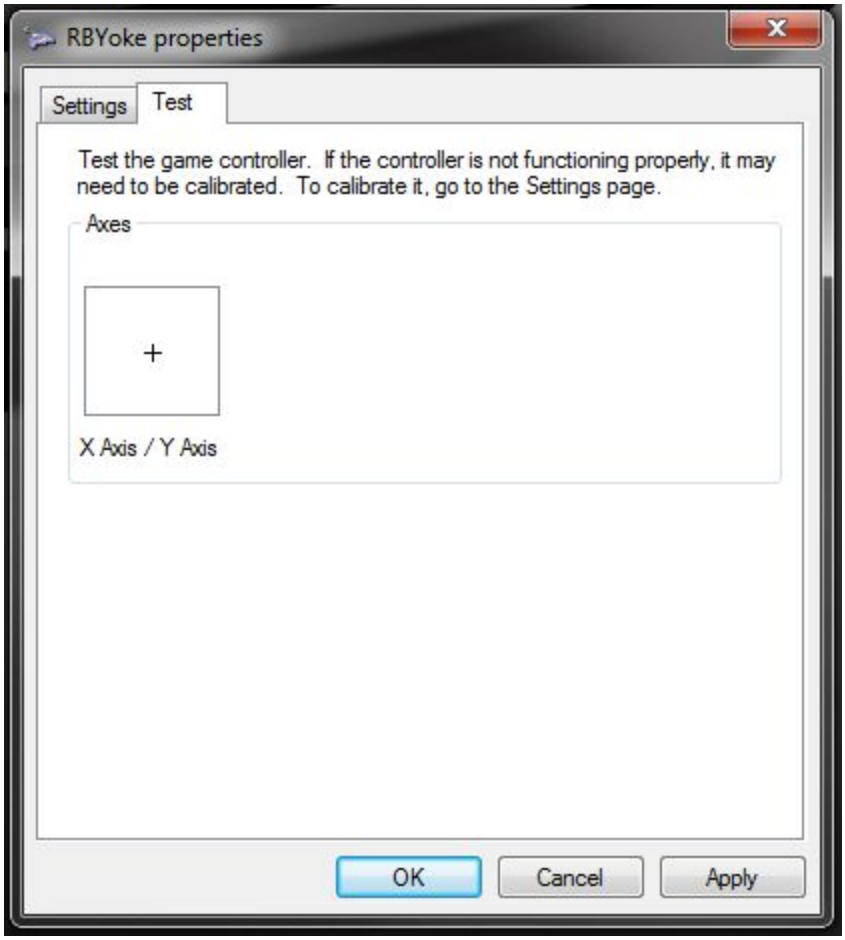


15. When the Find Center Point window appears, leave the yoke handle centered (i.e., at rest) and click **Next**.
16. On the final page of the Game Device Calibration Wizard click **Finish**. That will close the wizard.



17. Back at the Yoke Properties window, click **Apply** and then click **Ok**.

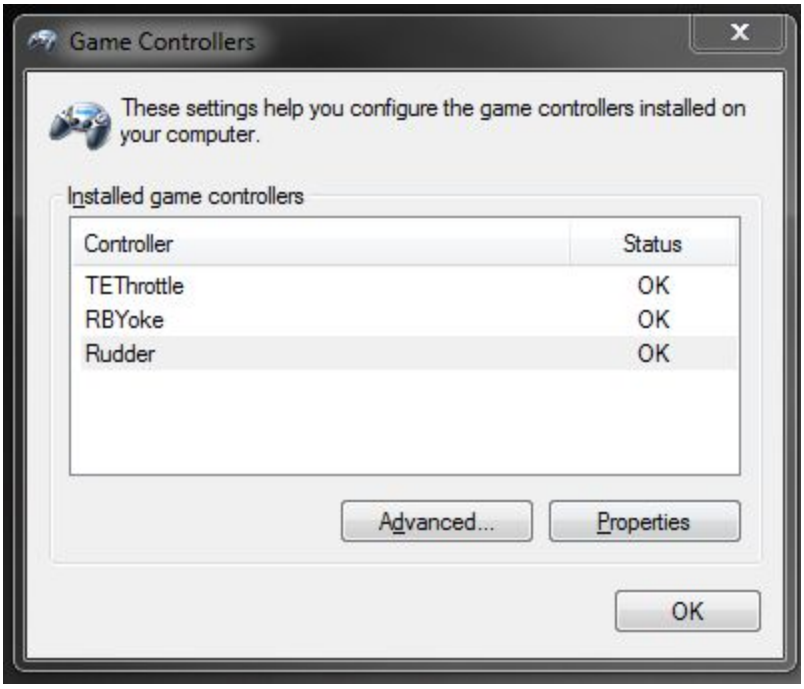
NOTE: If Apply is not clicked first, Windows may not apply calibration settings properly.



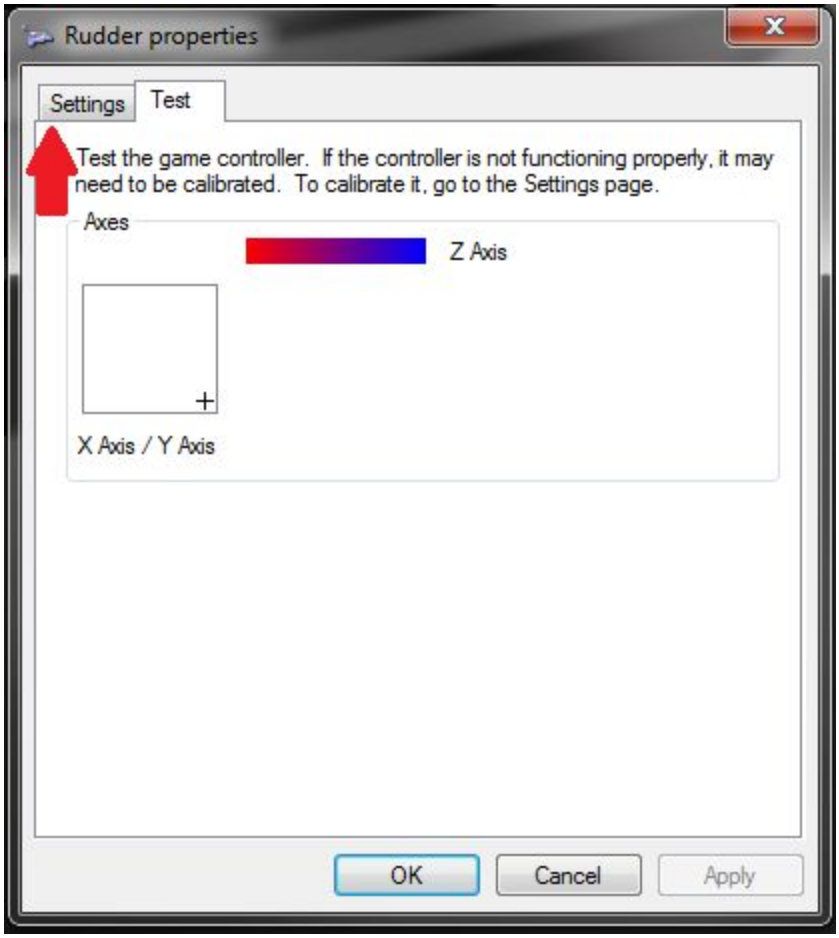
Calibrating the Rudder Pedals

1. Select Rudder Pedals from the list of available Game Controllers.

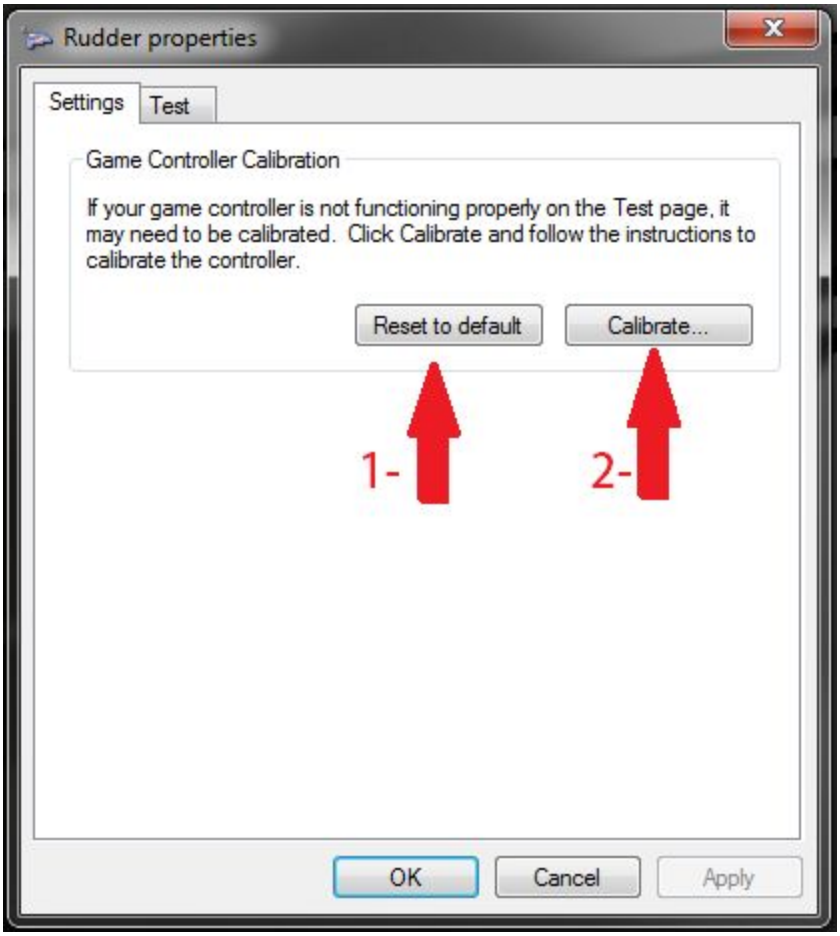
NOTE: The Toe-Brake calibration process will need to be completed for both Pilot and Copilot rudder pedals prior to using the Sim (if simulator is equipped with copilot rudder pedals). However, the Rudder Axis calibration for the Copilot side will be skipped because of the rudder linkage.



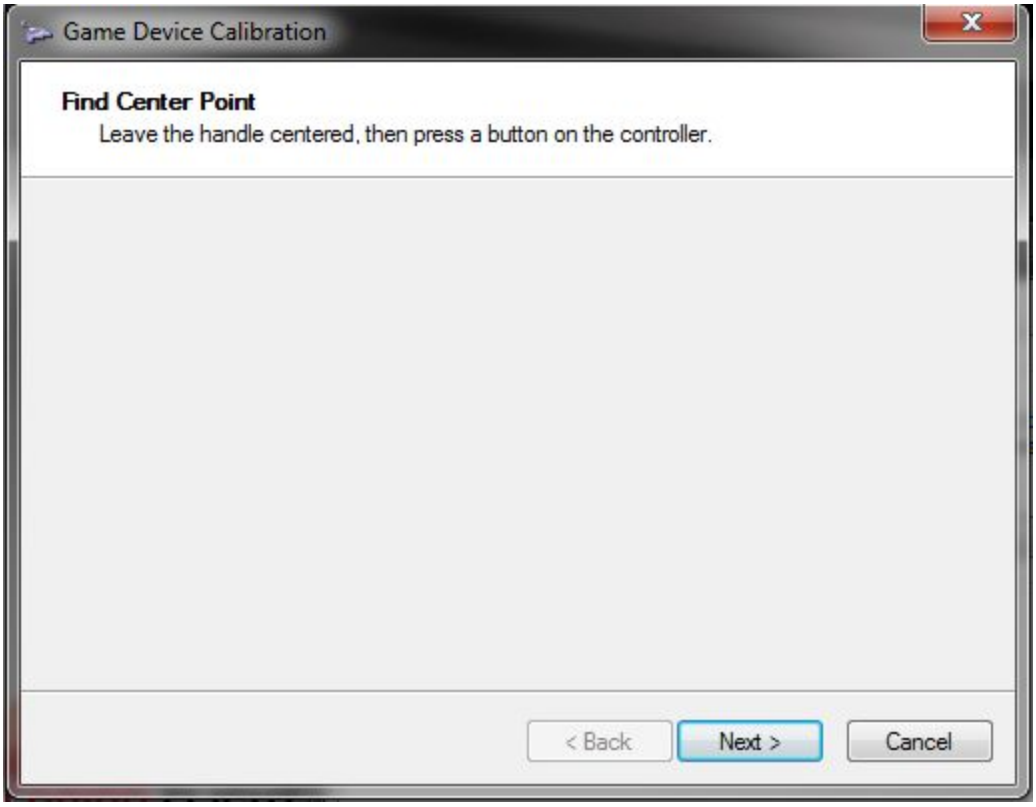
2. Click the **Properties** button.
3. Select the **Settings** tab.



4. Click the **Reset to Default** button and then click the **Calibrate** button.

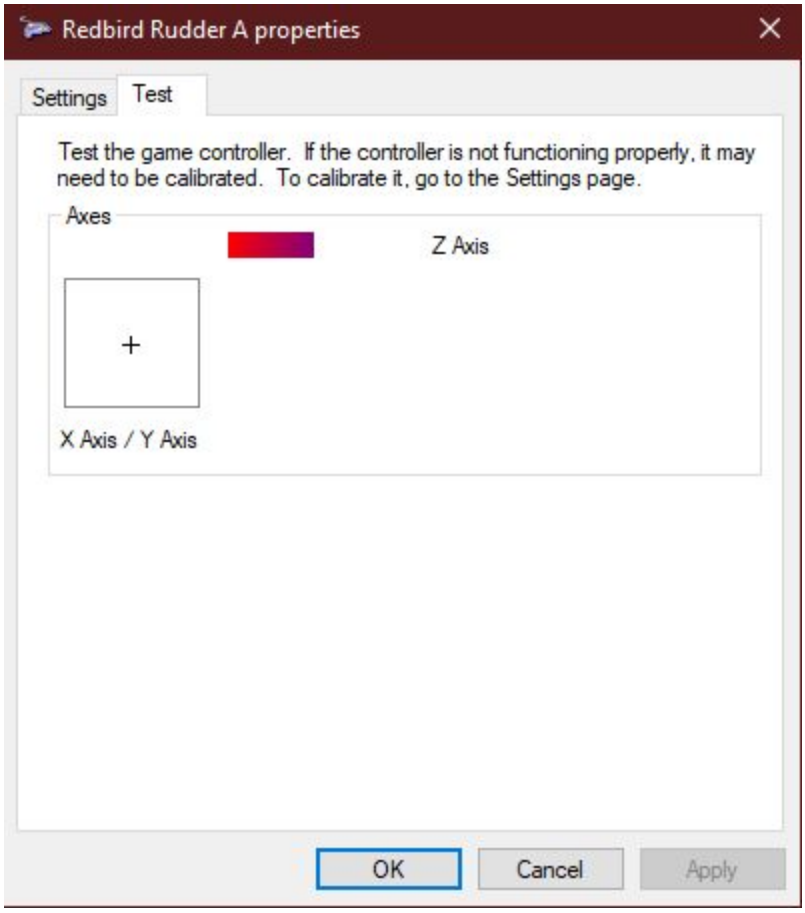


5. Follow the instructions in the Game Device Calibration Wizard.
6. At the first Find Center Point screen, leave the rudders at rest (i.e., leave your feet off the pedals) and click **Next**.



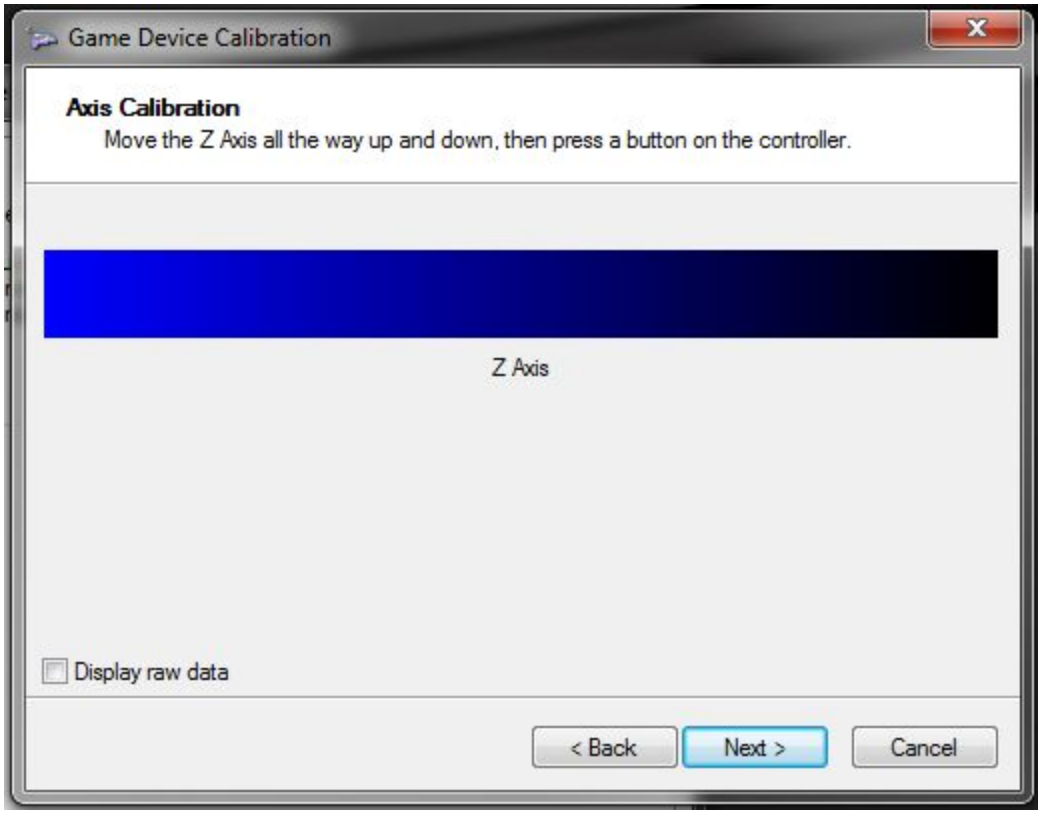
7. At the first Axis Calibration page, you'll move the toe-brakes to the corners of their range of motion. Start by applying full right toe-brake.
8. While holding full right, apply full left toe-brake.
9. While holding full left, release the right toe-brake.
10. Release the left toe-brake.
11. Repeat steps 7 - 10 one more time. Ensure that the toe-brakes hit their maximum range of motion.
12. Using the toe-brakes, center the crosshair in approximately the middle of the white box and click the **Next** button twice.

NOTE: If the toe-brakes aren't halfway down while you click Next through the Verify Center Point screen, the toe-brakes will not perform correctly.



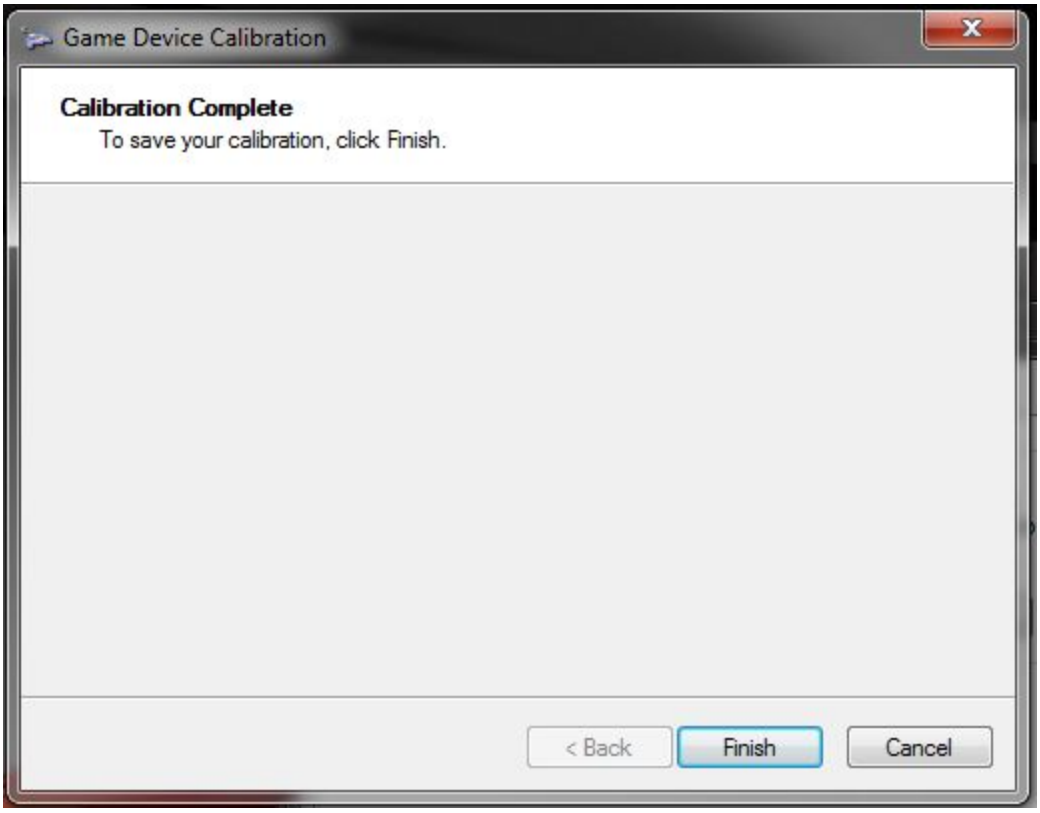
13. The next Axis Calibration page will be for your Rudder axis. Apply full left and full right rudder twice, and ensure that the rudder axis hits both ends of its range of motion.

NOTE: If you are at this step on a Co-Pilot Rudder Pedal quadrant, the “Z Axis” bar will not move when you shift the rudder pedals (due to the rudder link). Disregard the above step and click Next to progress to the final step.



14. On the final page of the Game Device Calibration wizard click **Finish**. That will close the wizard.
15. In the Rudder Properties window, click **Apply** and then click **Ok**.

NOTE: If Apply is not clicked first, Windows may not apply calibration settings properly.



16. Test your peripherals in a flight to see if they are properly calibrated.

NOTE: Contact Redbird Support if you require assistance or run into any issues with the calibration process on your Redbird simulator.

Shutdown

1. When you're ready to shut down the simulator, write the Hobbs time down for logging and billing purposes.
2. Either push the **End** button to end the mission or end it in Navigator and you'll be returned to the start screen.
3. Step out of the cockpit enclosure and push the red **Stop** button on the push button station.
4. Walk around to the computer and push the power button on the front once. Do not hold the power button down. You should hear the standard Windows shutdown chime.
5. After the computer is fully powered off, turn off the surge protector.

6. If your simulator is equipped with a step down converter, turn off the step down converter.

Emergency Shutdown

There are three ways to power off the Motion Platform in an emergency situation:

1. Press the red **Stop** button on the push button station.
2. Press the **Emergency Stop** button on the lower left side of the instrument panel.
3. Unplug the motion platform from the surge protector.

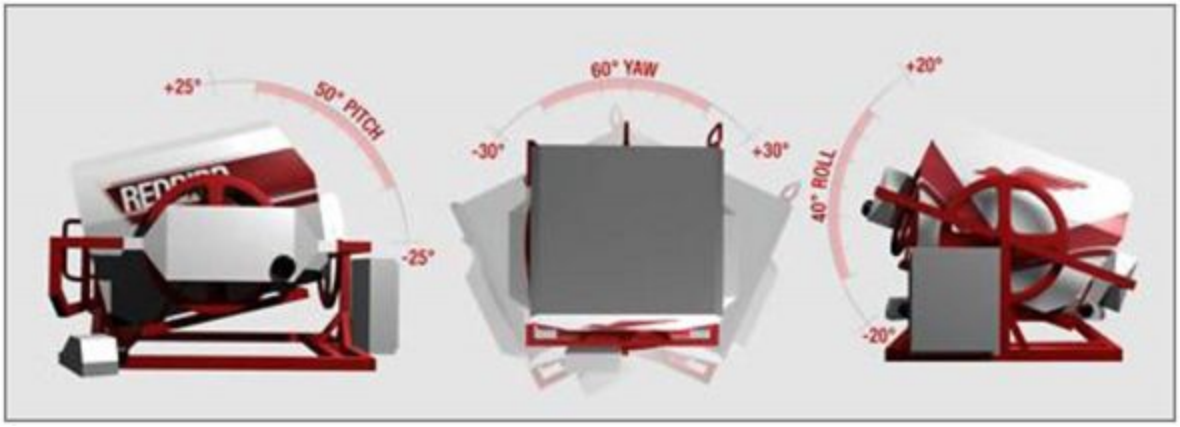
Appendix 1 Safety Information

- Before attempting service on the Aviation Training Device (ATD), contact Redbird Service and Support for guidance.
- Become familiar with the controls and the proper use of the motion platform before turning it on.
- Inspect the motion platform before you operate it. Take a cursory look to verify that you do not see anything out of place.
- Be sure to notify Redbird Support if you find anything that needs attention.
- Check the hydraulic locks by attempting to rock the Advanced Aviation Training Device (AATD) before entering the cockpit. Have the locks adjusted or serviced as necessary.
- Stop the motion platform if anyone enters the safety area.
- If abnormal vibration occurs, stop the motion platform and inspect it. Make repairs before you operate it. Keep the motion platform properly maintained and in good working order.
- Do not leave motion platform unattended when it is running.
- Use only accessories and attachments approved by Redbird Flight Simulations.
- Understand service procedure before attempting to repair the device. Never lubricate, service or adjust the motion platform while it's moving.
- Keep safety devices in place and in good working condition.
- Do not modify the motion platform or safety devices. Unauthorized modifications may impair its function and safety.
- Never allow more than two people to occupy the cockpit enclosure while the motion platform is moving.
- Never stand, climb or jump on the motion platform.
- It is recommended to secure safety belts while using the motion platform.

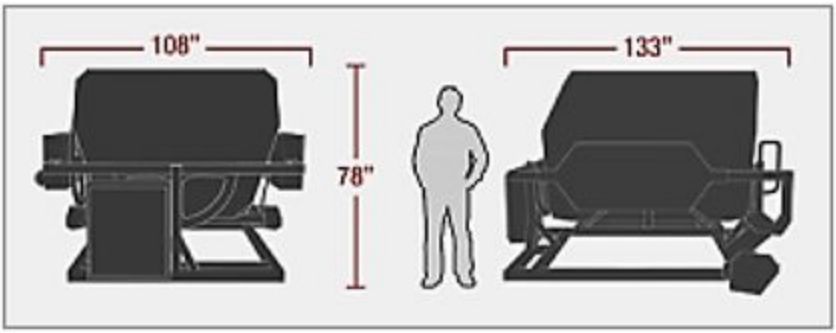
- Keep hands, feet, clothing, jewelry and long hair away from any moving parts to prevent them from getting caught.
- Do not enter or exit the platform while the platform is in motion.

Appendix 2 Simulator Descriptions

Models FMX and MCX

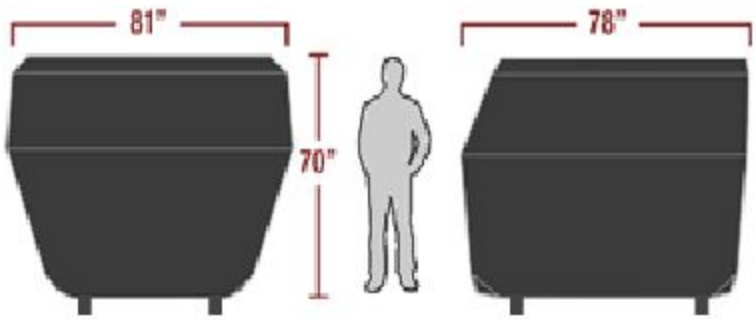


Item	Description
Room Size	At least 16' x 16' with a ceiling that is at least 8' high.
Electrical	US standard 110 volt, 15 amp wall outlet.
Internet	A high-speed connection is highly recommended to allow remote support and added functionality.



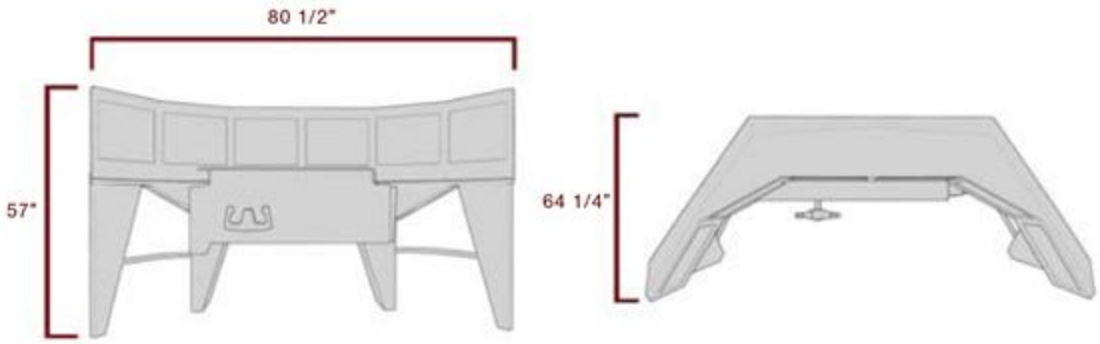
Model SD

Item	Description
Room Size	At least 8.5' x 7' with a ceiling that is at least 8' high.
Electrical	US standard 110 volt, 15 amp wall outlet.
Internet	A high-speed connection is highly recommended to allow remote support and added functionality.



Model LD

Item	Description
Room Size	At least 9.5' x 5'.
Electrical	US standard 110 volt, 15 amp wall outlet.
Internet	A high-speed connection is highly recommended to allow remote support and added functionality.



Appendix 3 Motion Platform Operation & Troubleshooting

When initializing the motion platform, you may occasionally encounter the following issues:

- Motion platform will not power up
- Motion platform will not perform initial calibration
- Motion platform will not return to center

Basic Troubleshooting

1. Make sure that the motion control box is plugged into the surge protector.
2. Make sure that the surge protector is turned on.
3. Make sure that the simulator is centered.
4. Make sure that the Emergency Stop, located in the cockpit, is released.

Red Light Doesn't Illuminate

1. Make sure that the push button station cable is plugged into the motion control box.
2. When you first power up the motion platform, if the red light does not start blinking during initial calibration, then the light bulb is burned out and needs to be replaced. Contact Redbird Support and they can provide a price or part number for the light bulb.
3. When you first power up the motion platform and nothing happens, contact Redbird Support for further diagnosis (lock combination may be necessary).

Red Light Turns Off Immediately

1. Make sure that the emergency stop button is not engaged inside the cockpit. Turn clockwise to release the red emergency stop button which is located on the left side of the switch panel on the pilot side.
2. Make sure that the E-stop cable is plugged into the motion control box.

3. If you continue to experience the red light shutting off, contact Redbird Support for further diagnosis.

Yellow Light not Blinking After Releasing the Green Button

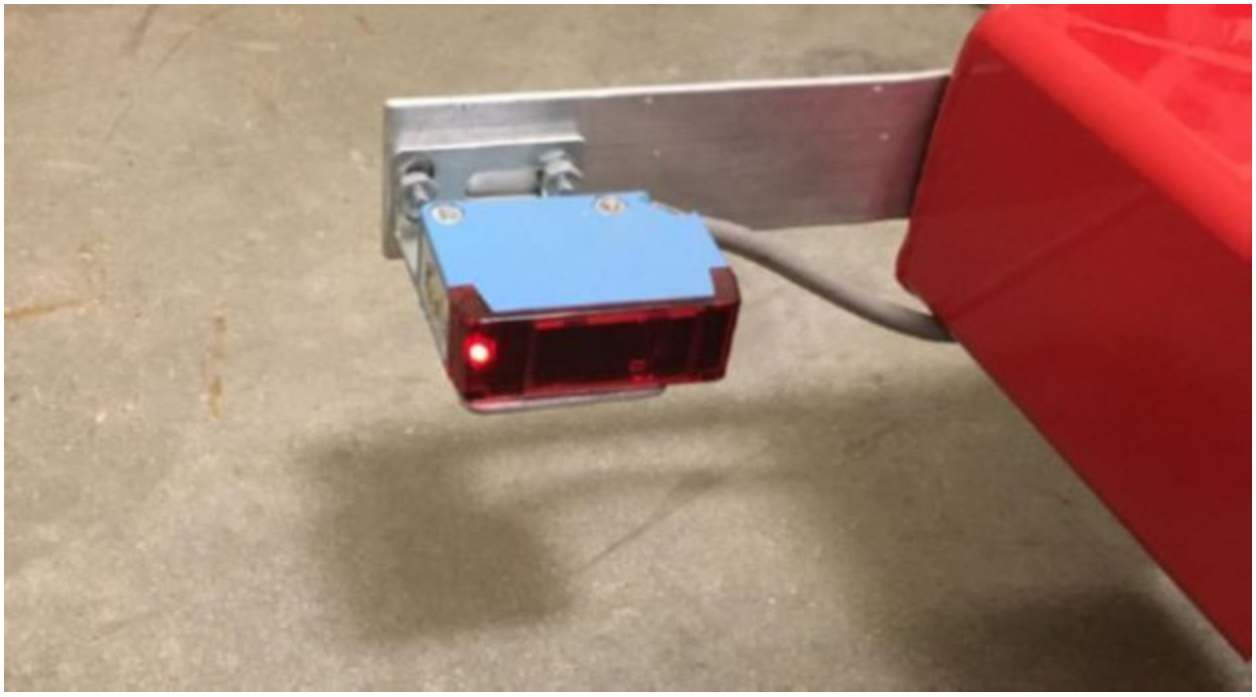
1. Make sure that the simulator is centered. If it is not centered, turn off the motion platform, manually move it to center and try again.
2. On the motion control box, check the fault light. Count how many times the fault light blinks and then call Redbird Support for further diagnosis.

3. If the simulator has excessive pitch or roll, call Redbird Support for further diagnosis.

Yellow Light Blinking After Releasing the Green Button

1. Make sure that there aren't any obstructions on either side of the simulator. If there is an obstruction, remove it and restart motion.
2. Make sure that both pathway sensors are illuminated by aligning them with the reflectors on the rear wheel covers.

NOTE: Blue pathway sensors will show a red light when they are aligned.



NOTE: Black pathway sensors will show one light for power and a second light when it is aligned

NOTE: Silver rectangular pathway sensors will show one light for power and a second light when it is aligned

3. If one pathway sensor is not illuminated, re-align the sensor or reflector and attempt to restart.

4. If the simulator does not move after checking the previous steps, call Redbird Support for further diagnosis.