# Section 2
# Normal Procedures

The Pro Flight Trainer PUMA is a HID USB Device that Plug & Play to any compatible Operating System. It will be recognized as a USB Input Device with 8 axis, 6 buttons, 1 Zone Switch 1 On-Off-ON Button (equal 2 buttons) and 1 hat-switch. All you need is to plug in the USB Cable to a free USB slot on your computer, and it will be automatically recognized and installed by your compatible operating system.

The following section introduces suggested procedures and settings for well know flight simulators software. It doesn't mean that the controls are limited to those programs, and the manual will be extended and revised as needed to add additional software.

The actual product may vary slightly from the pictures. Design and specifications are subject to change without notice. 

**NOTE!**

Make sure to perform a calibration before starting to train with the controls, as each unit will have slightly different raw data outputs on maximum and minimum control range and center position. You can follow our calibration guide listed in this section, or use the method you are already familiar with.

## 2.1 Assembling the unit

### 2.1.1 Assembling the frame

After carefully unpacking all pieces, make sure to check the content as described below, and overall condition of all parts. Make sure to react fast if you find visual damages to any parts, because most shipment companies have very limited complain reaction time.

All Bolts and Nuts are torqued at standard value. Don't over torque or damage will occur to the tube assemblies.

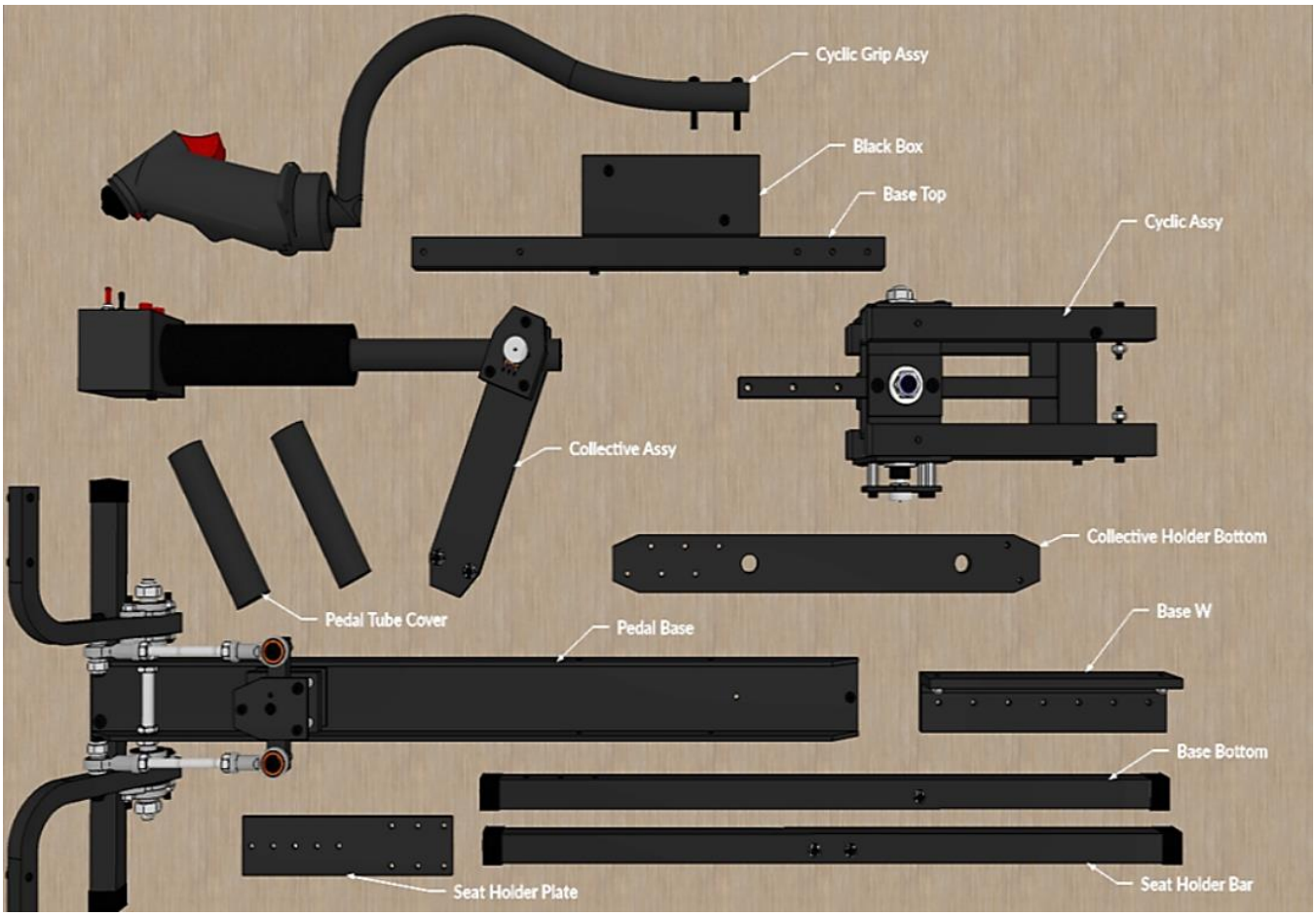
M4 Socket Cap Screw: 3 Nm

If you do not have any measurement tool, proceed as follow:

M4 Socket Cap Screws: tighten till no free room, then an additional 0.25 - 0.5 complete turn.

Other Screws: tighten just enough to prevent movement during flight.

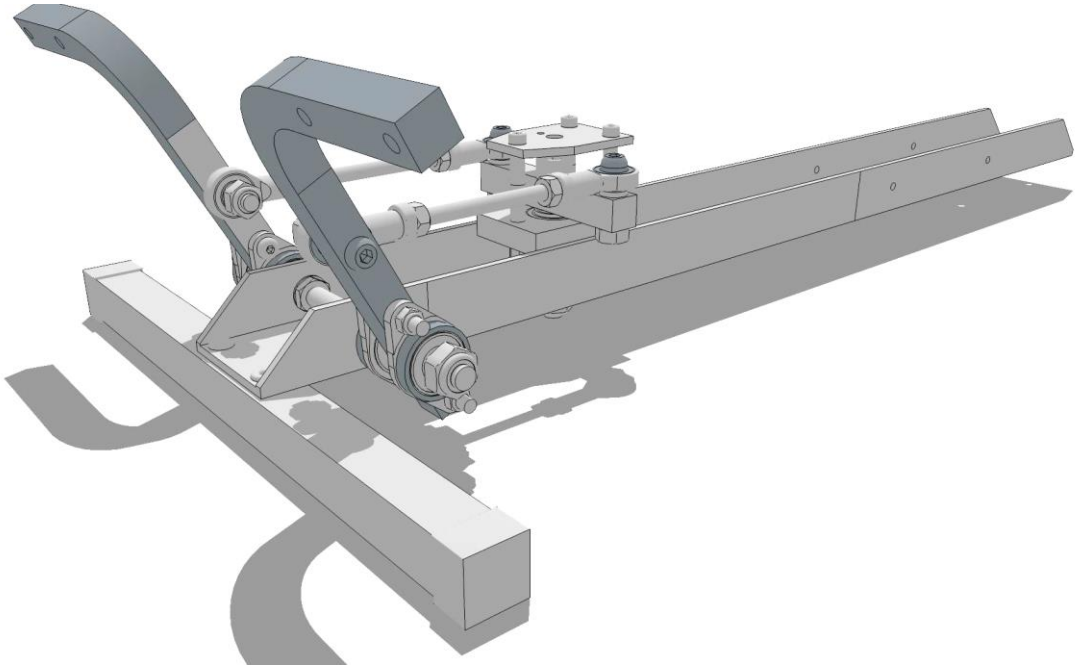
Box content - PUMA - (PAS version) :



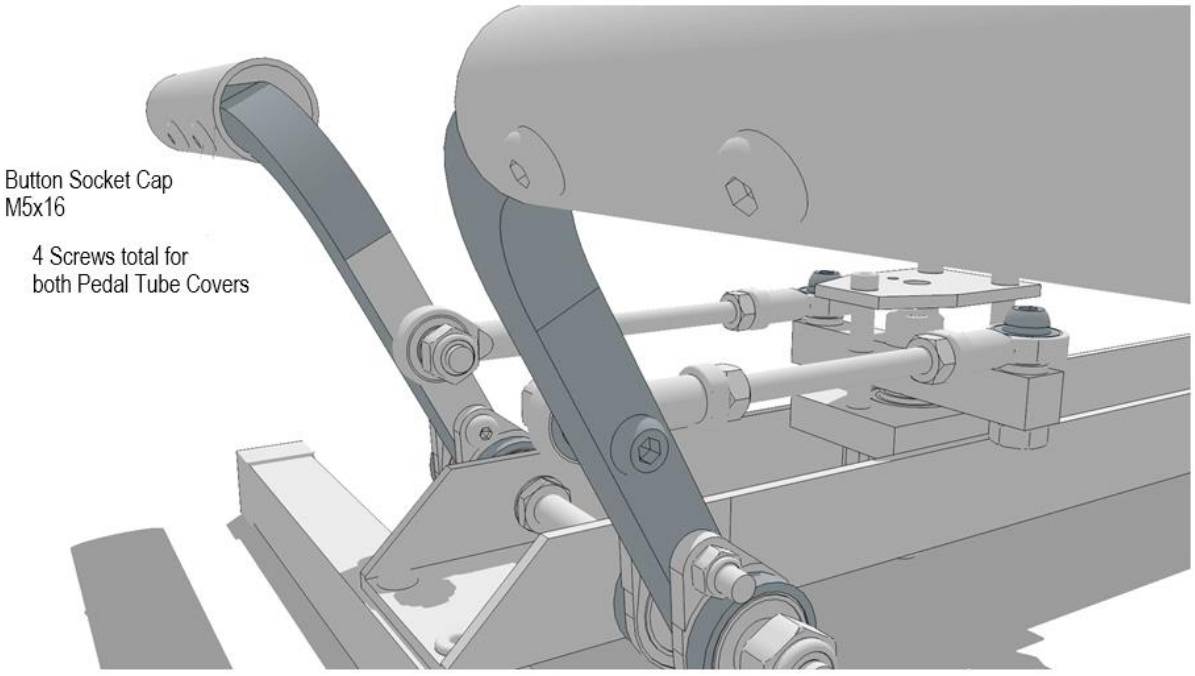

- USB Cable, Socket Cap Screws and other Tools

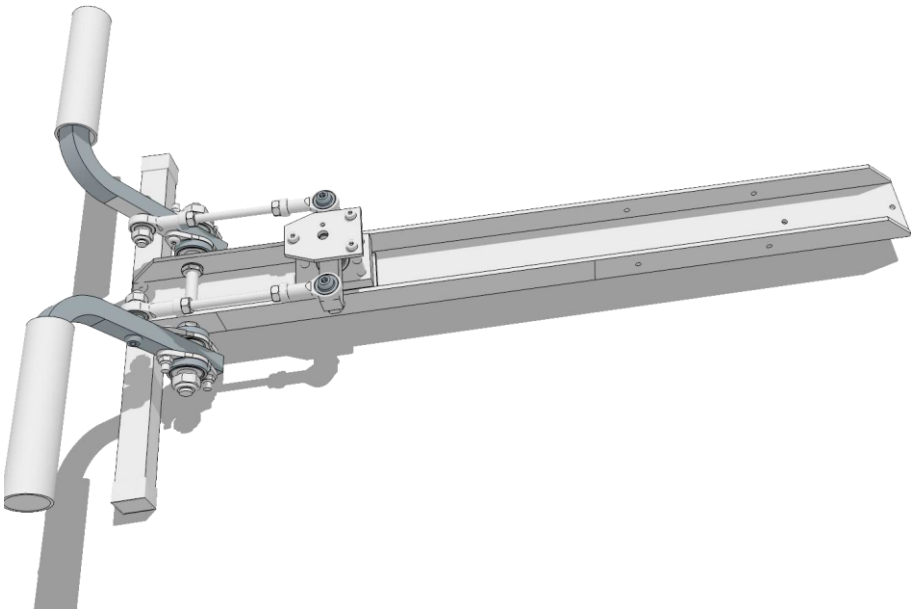
- Flight Manual, might also include CD or flash drive with general usage recommendations

Follow the instruction below to assemble the flight controls.



Attach 2 pedal tube covers with 4 M5 screws, 2 screw each side

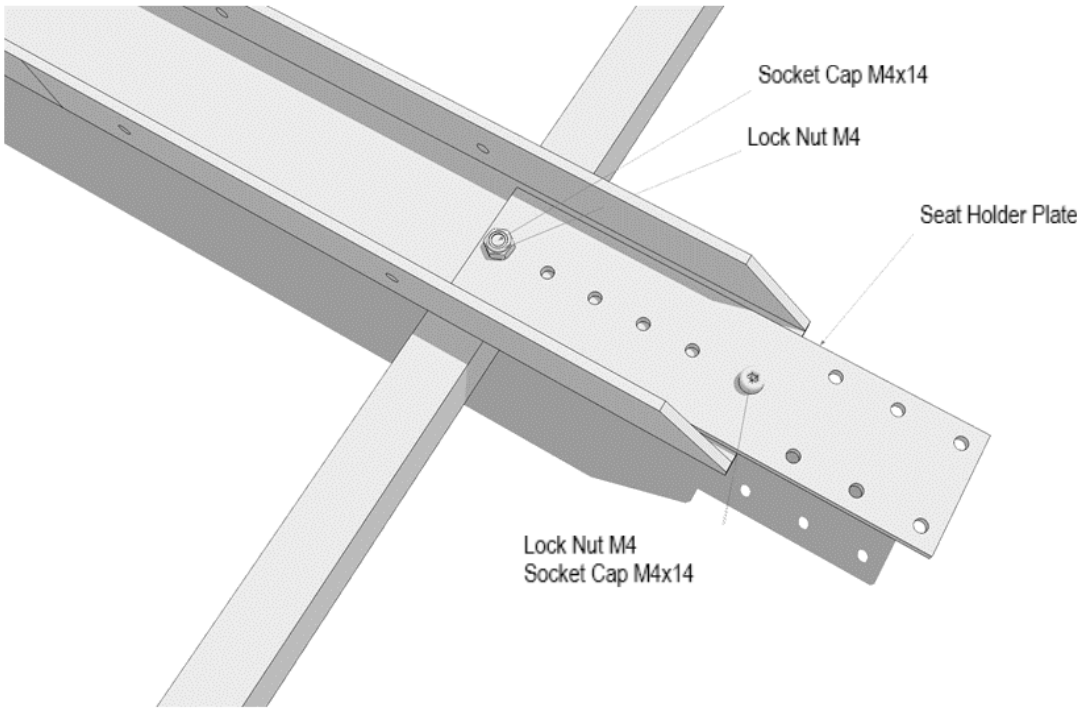


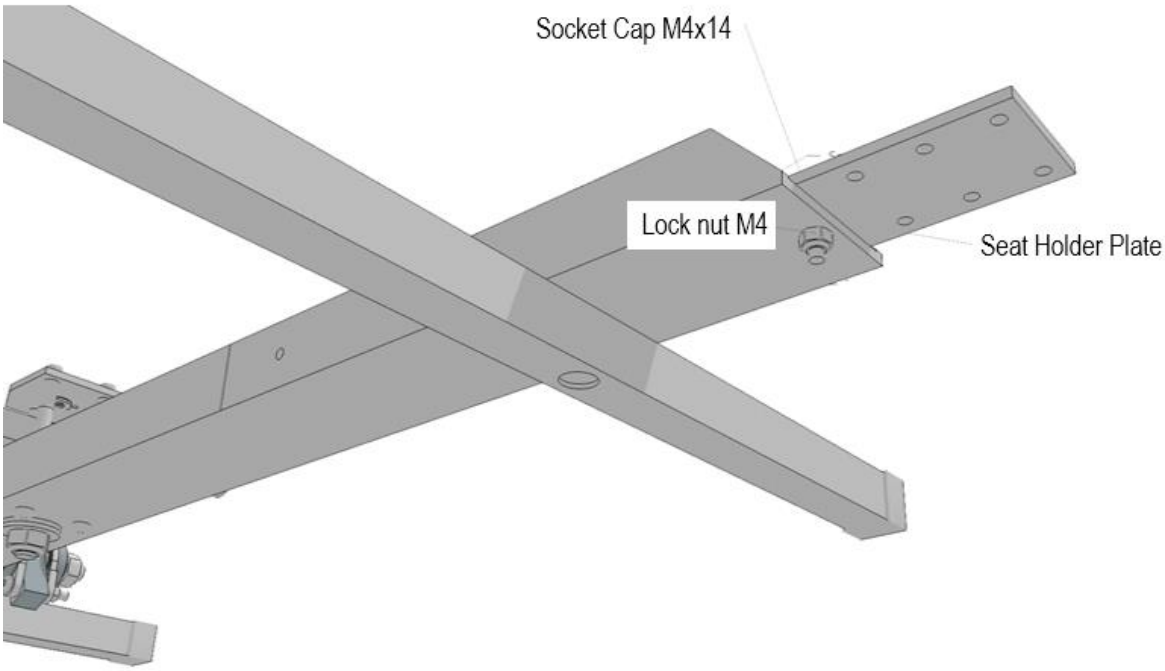


Attach seat holder plate, and bottom base tube to rear of pedal frame

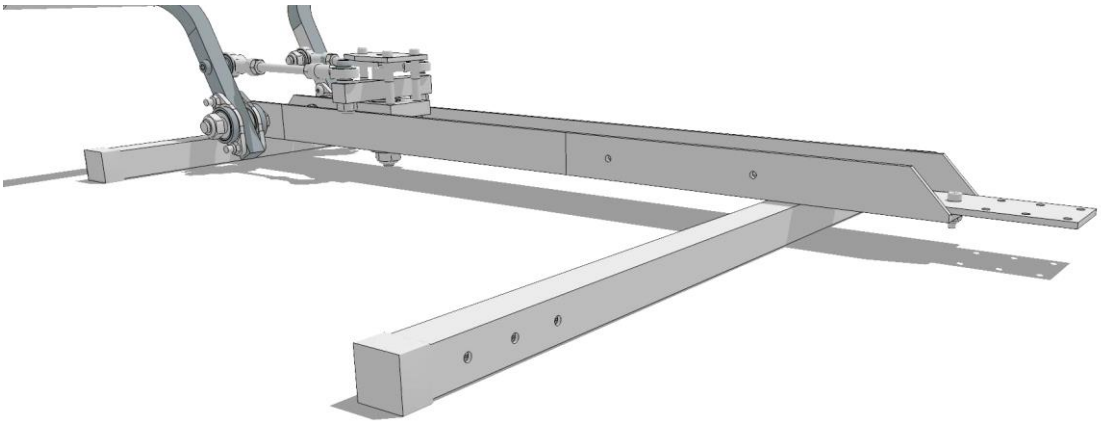
Recommended start position is shown below. Start one position further forward for very short legs.

Don’t’ tighten those screw/bolts for now! You might need to slightly adjust position while attaching the next parts.

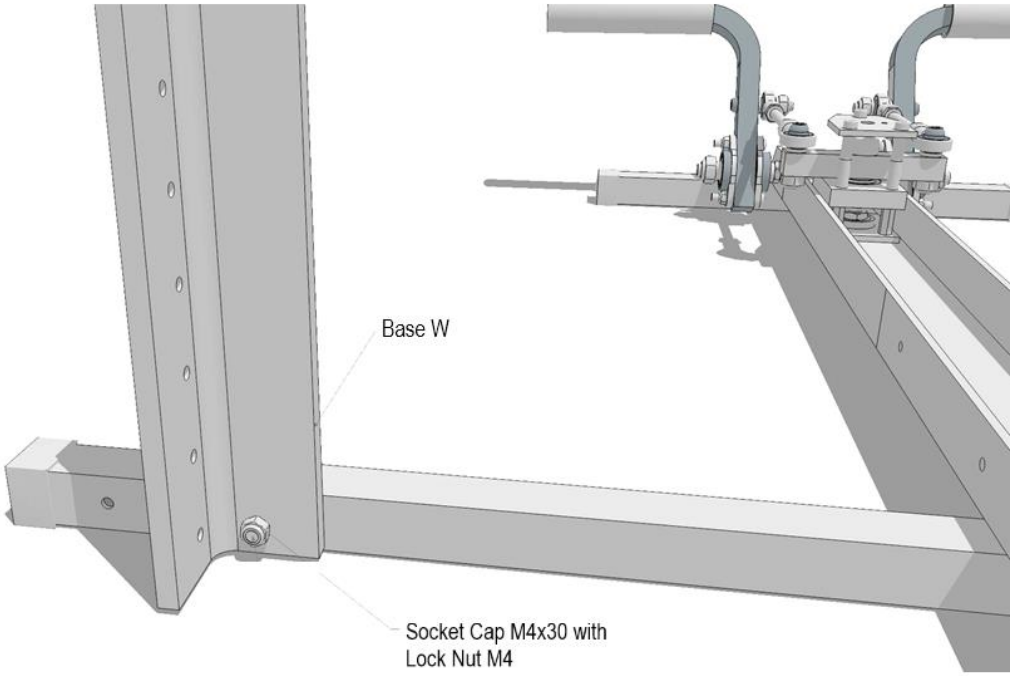




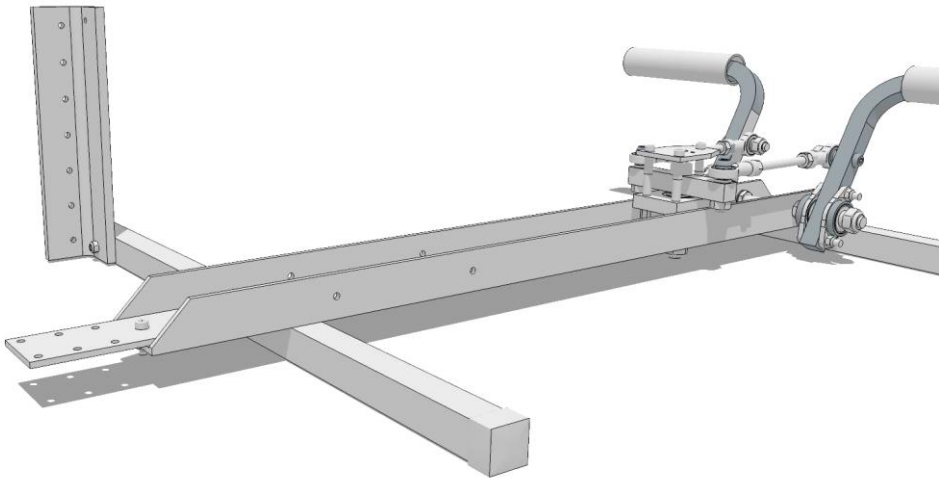

The Seat Holder Plate screw is attached the regular way.

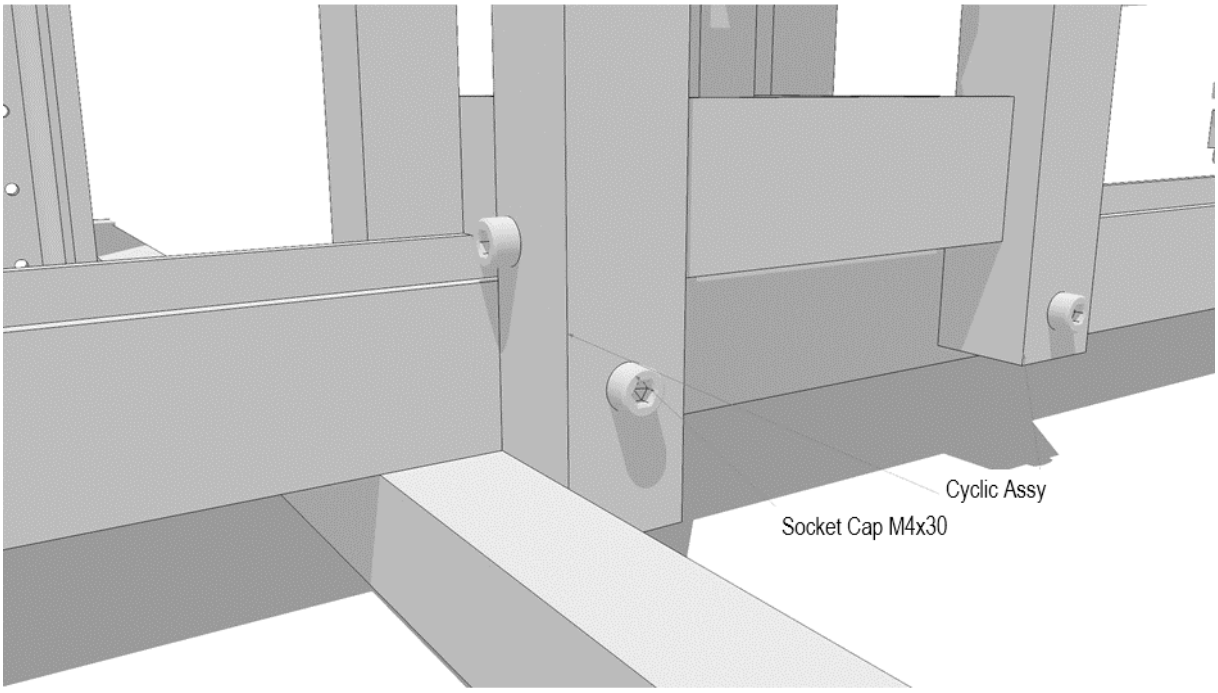


Attach Base W



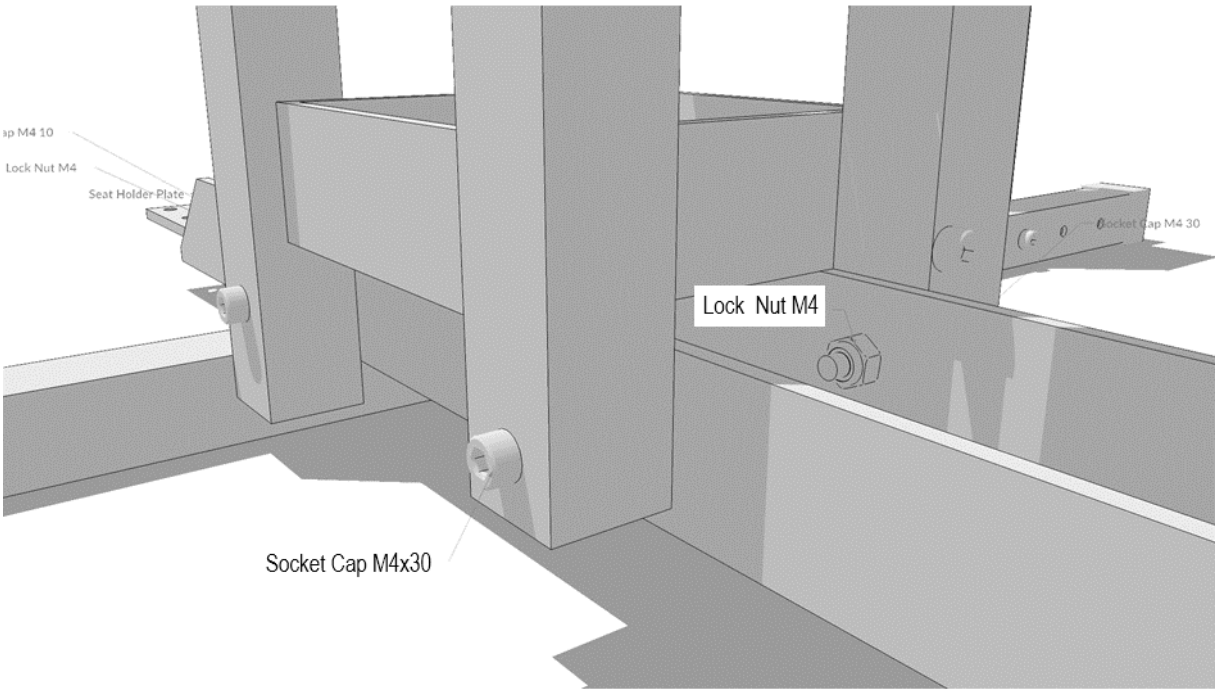

Don’t’ tighten those screw/bolts for now! You might need to slightly adjust position while attaching the next parts.

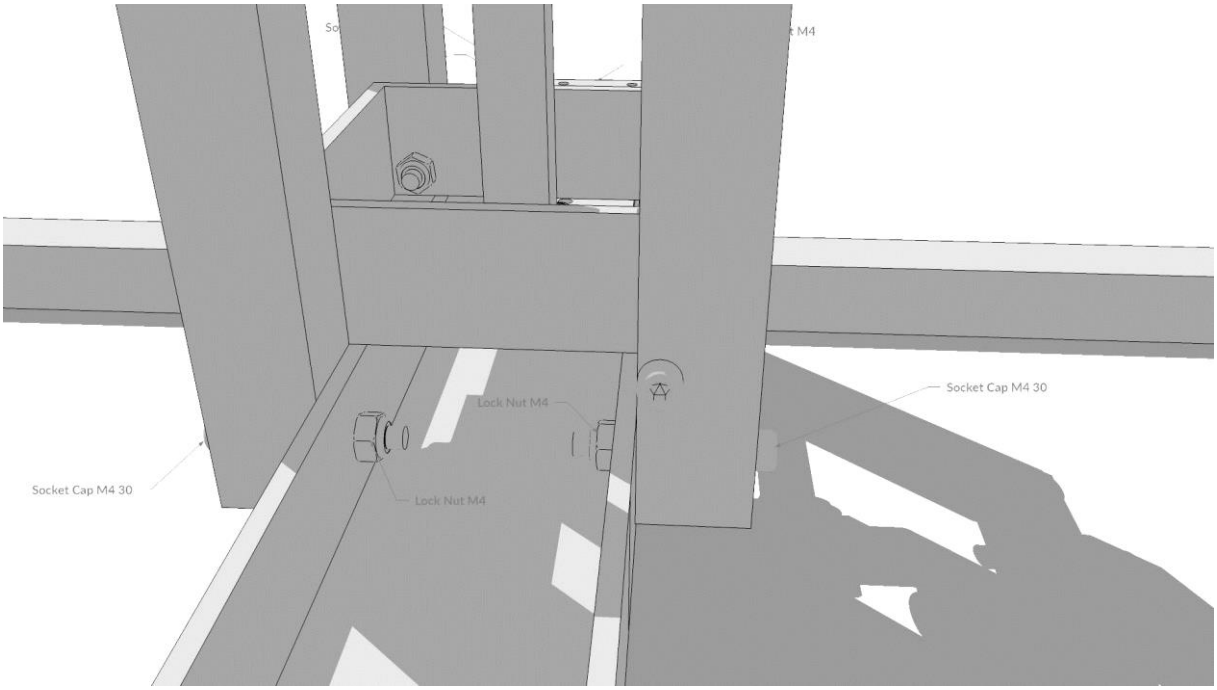




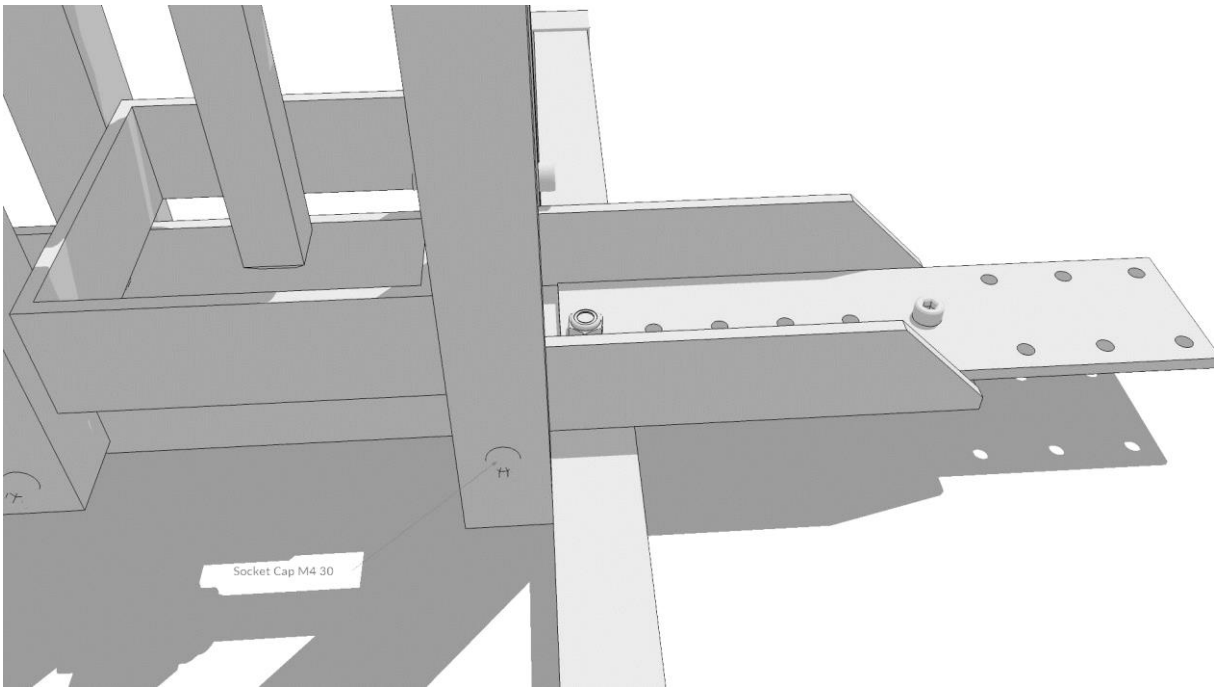

Attach Cyclic Assy as shown using 4 screws, 1 one each base tube / each corner

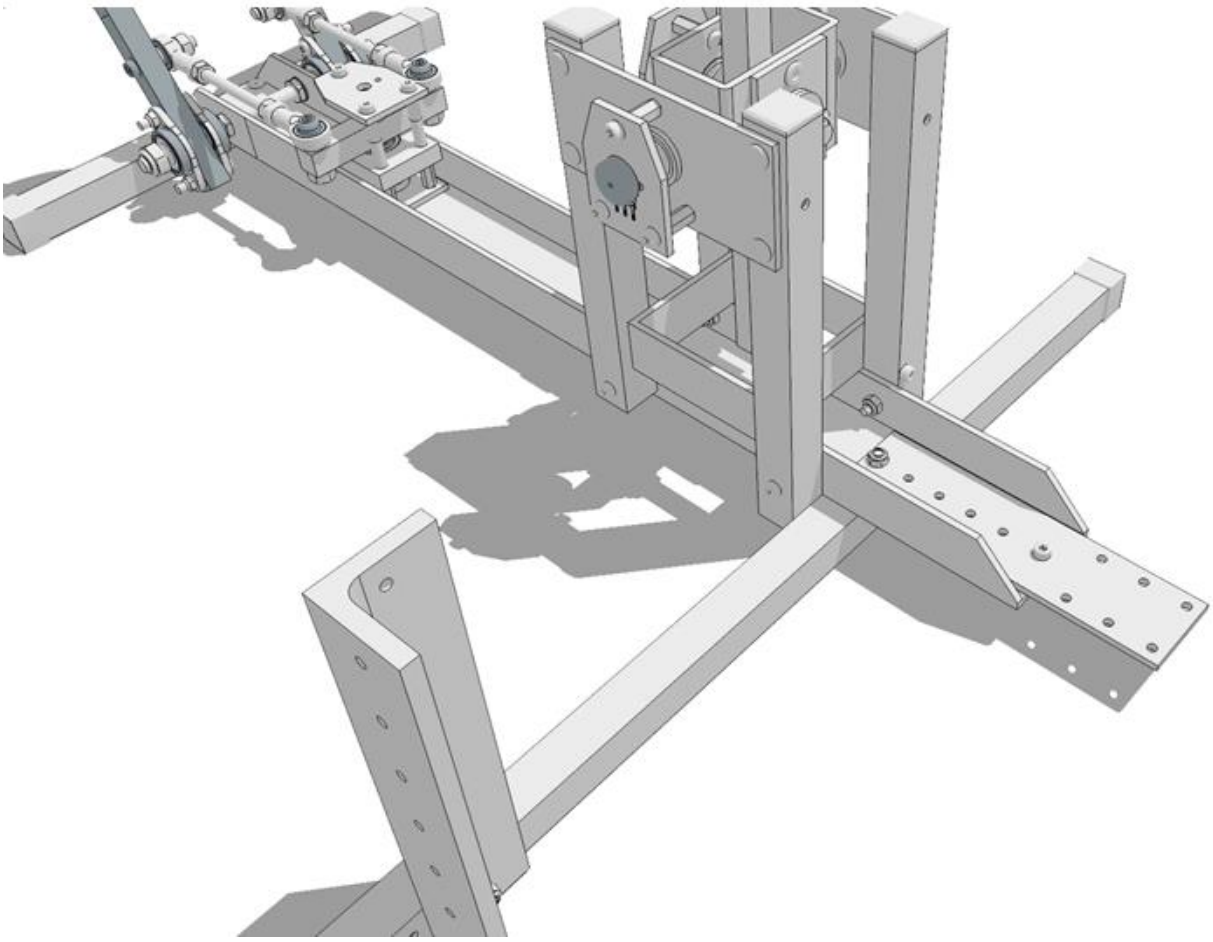
Don’t’ tighten those screw/bolts for now! You might need to slightly adjust position while attaching the next parts.



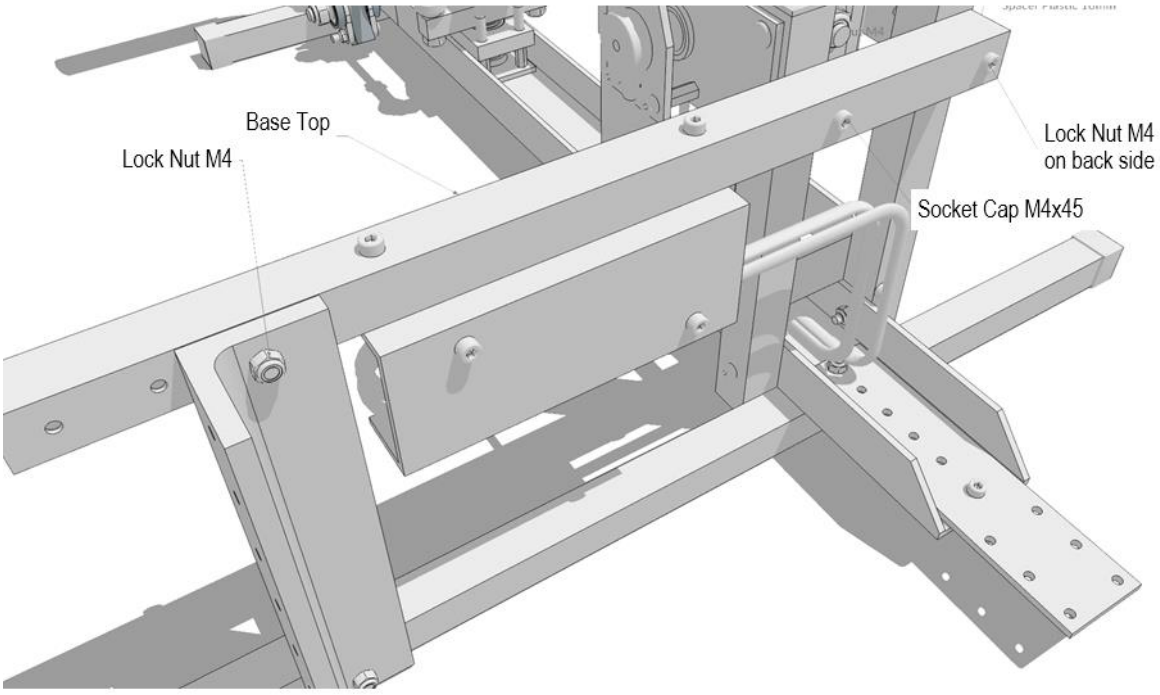


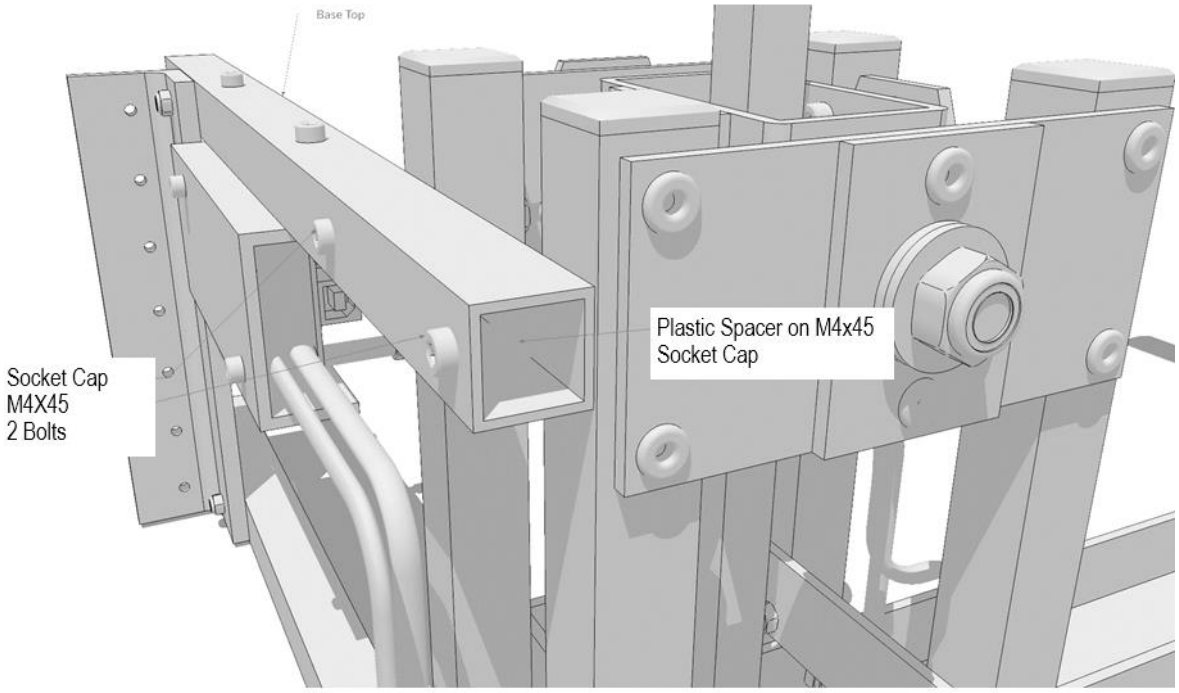

North and East View of screws used to attach Cyclic Assy





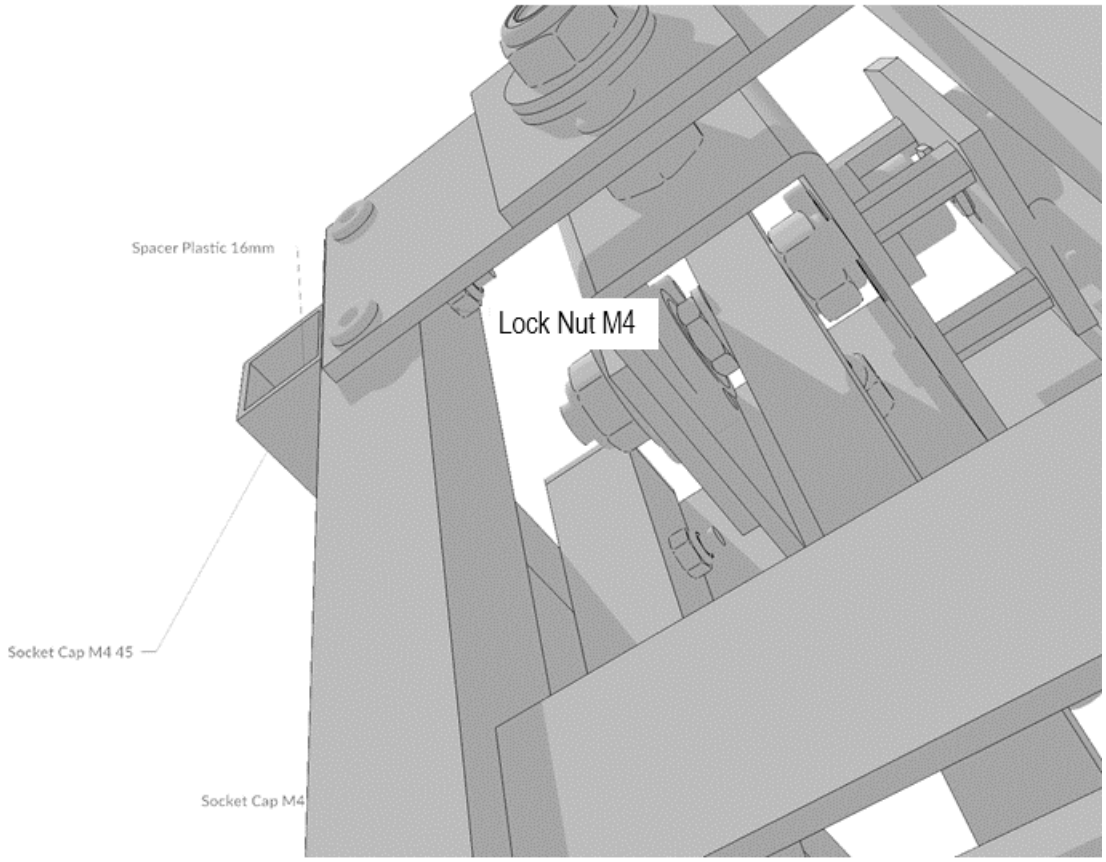
Attach Base Top (With Black Box / USB Board Box) with 3 screws

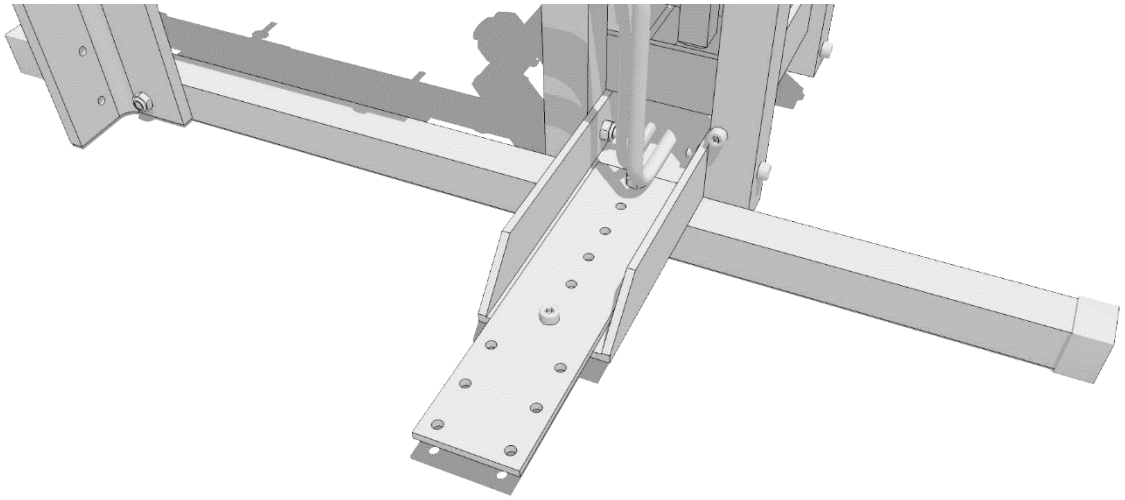




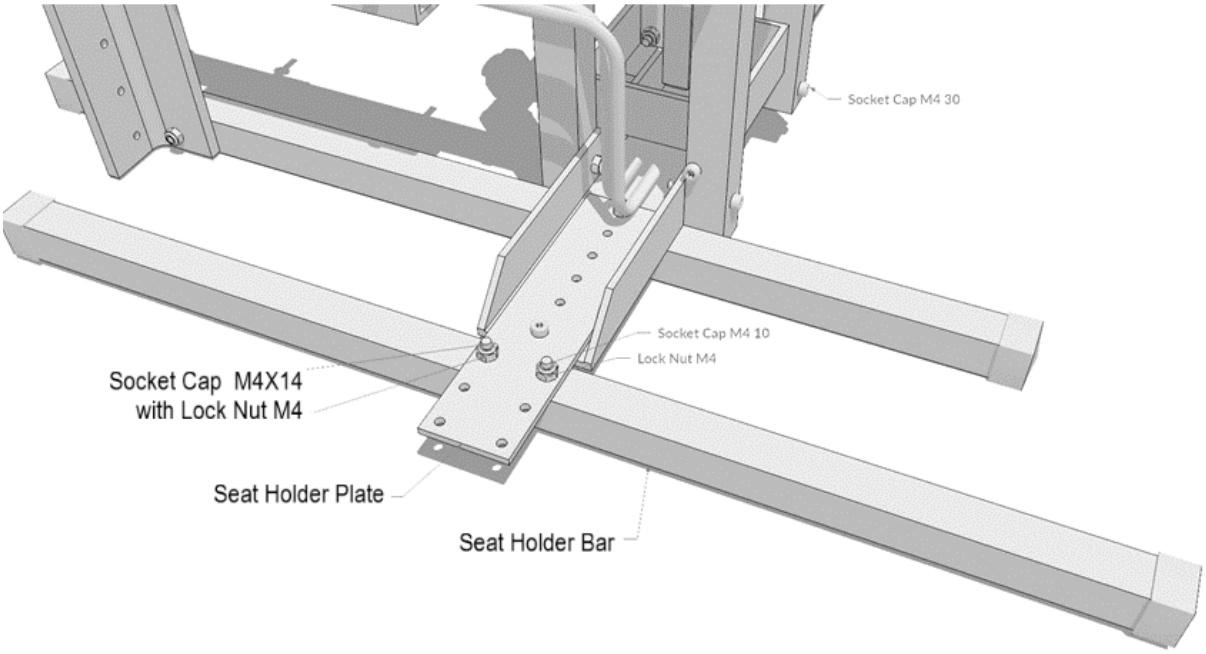

Don’t lose the plastic spacer on the screw right side!

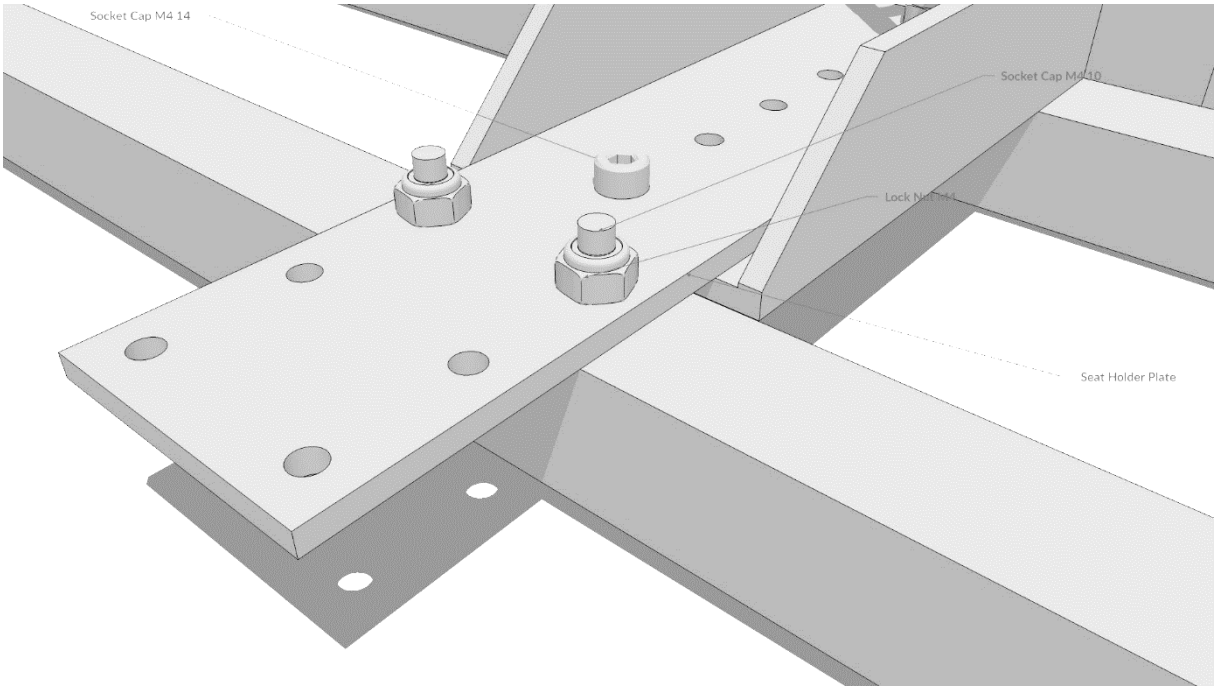
The spacer will prevent damage to the tube when tightening the screw.





Attach Seat Support Bar, Hex Head from bottom is the easiest way.

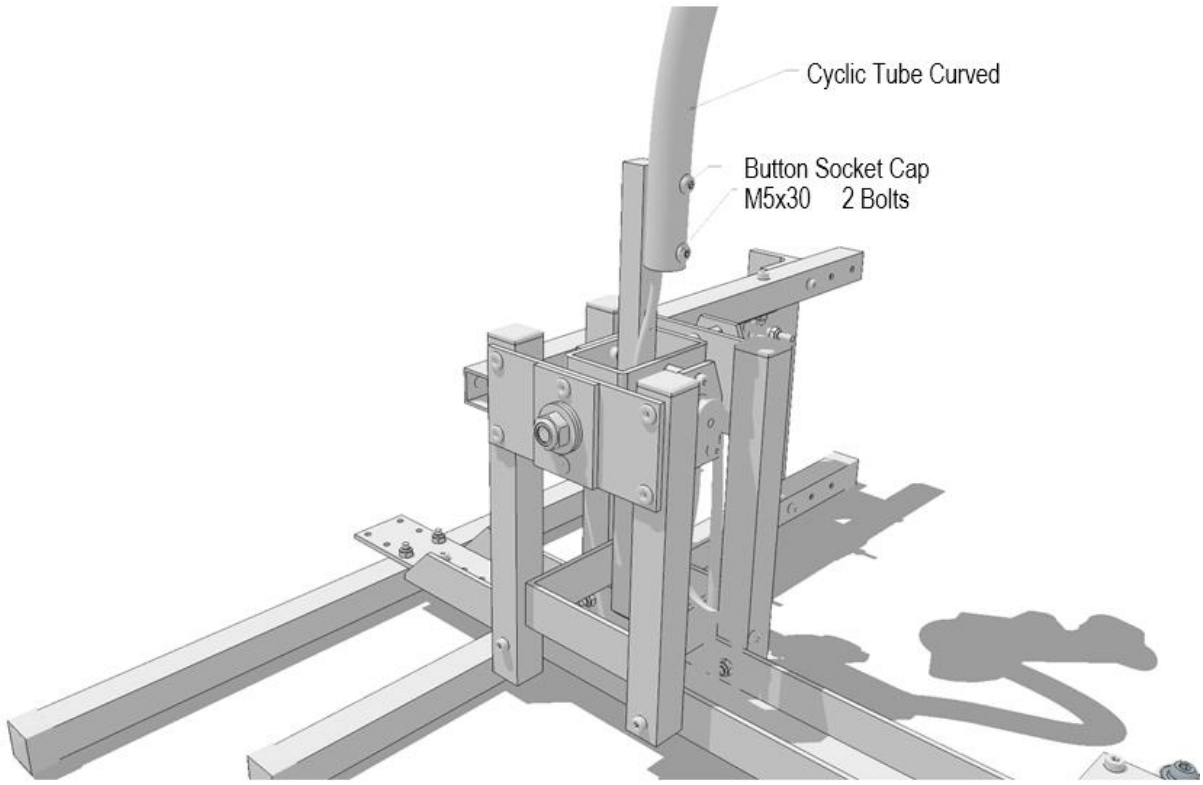




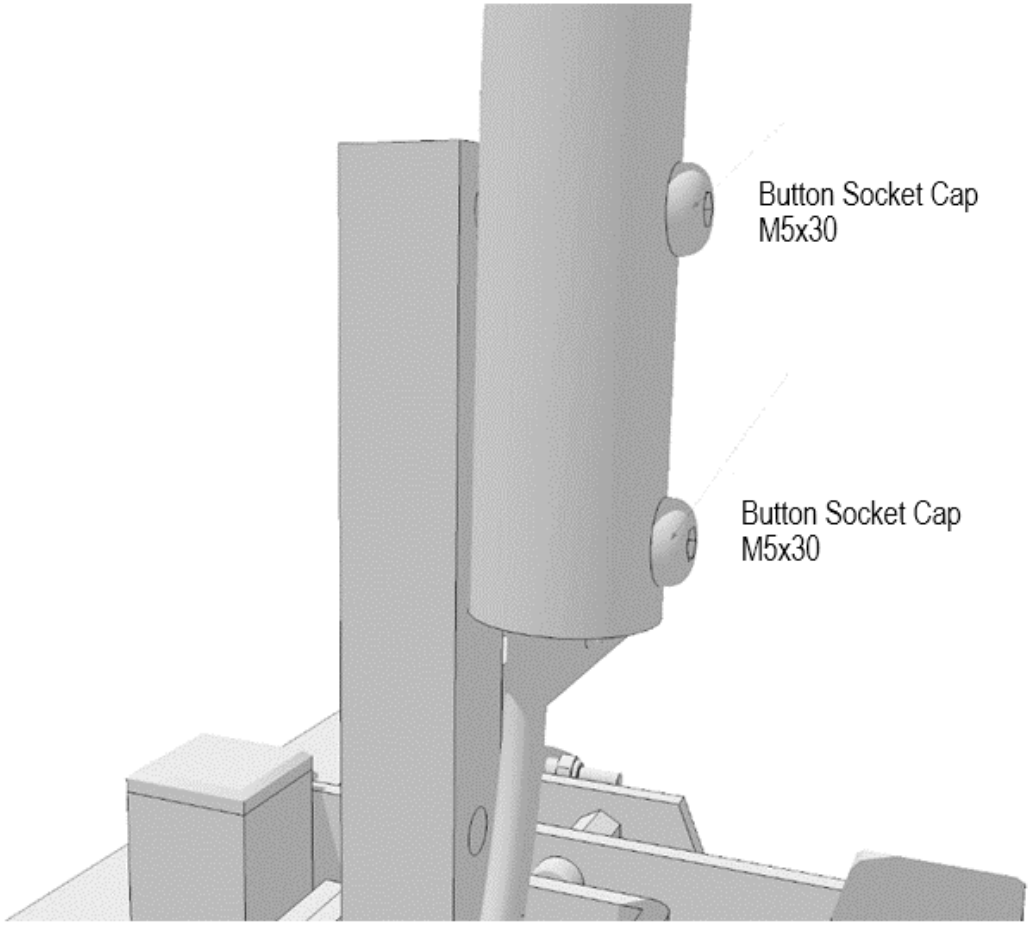

You can now tighten all bolts/screws used till that step, pay attention not to overtight the screws!

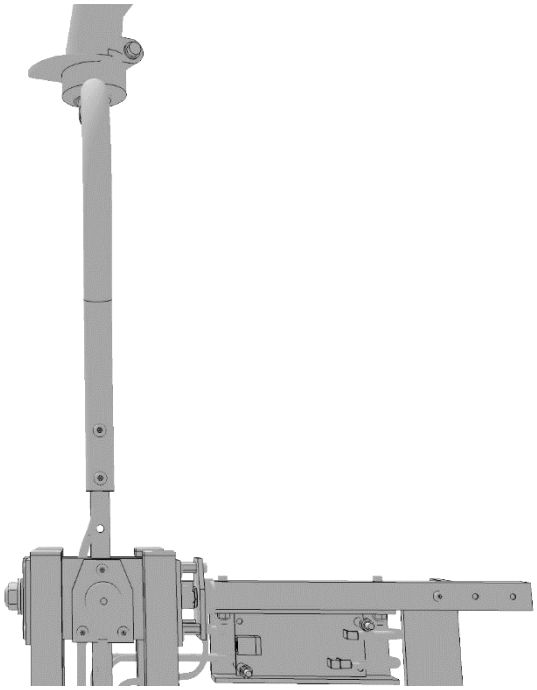
The easiest way is the following order:

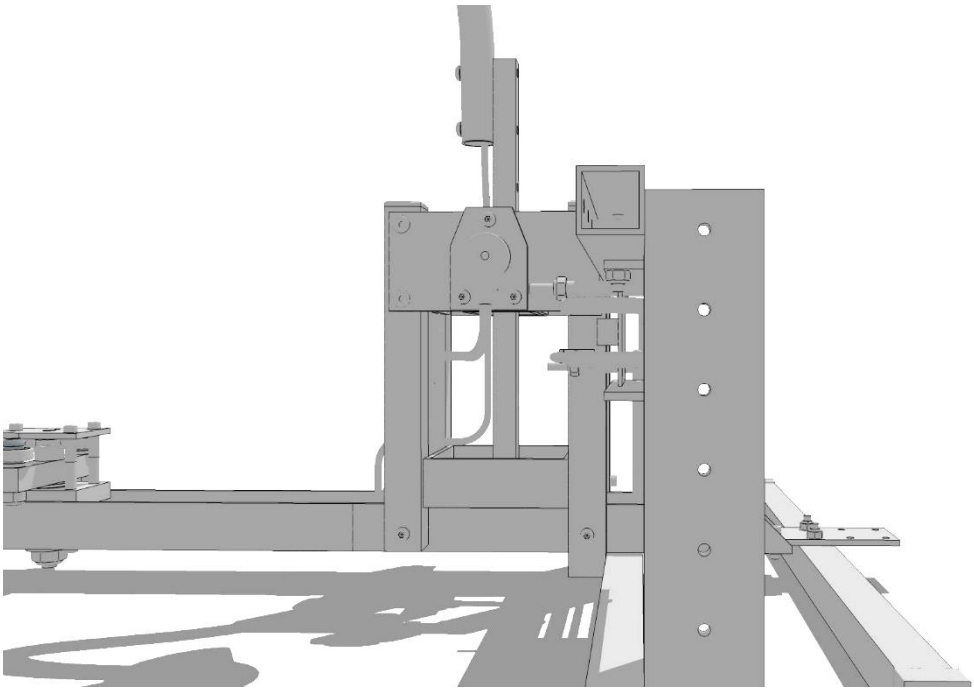
- 4 screws from Cyclic Assy on pedal frame, 1 each corner
- 2 screws Base top on cyclic Assy
- 2 screws on base W on Base top and Base bottom

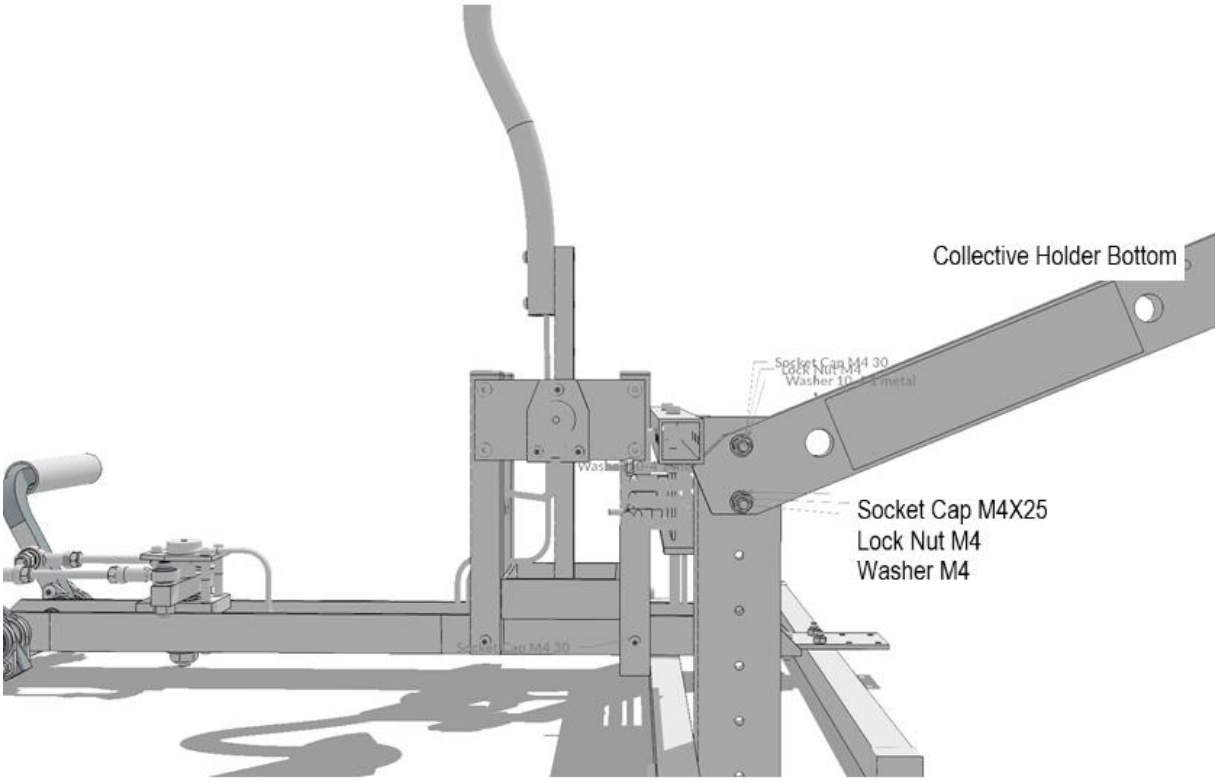



Attach Cyclic Grip Assy – just lightly tighten at first – check to ensure Cyclic is vertical, then tighten

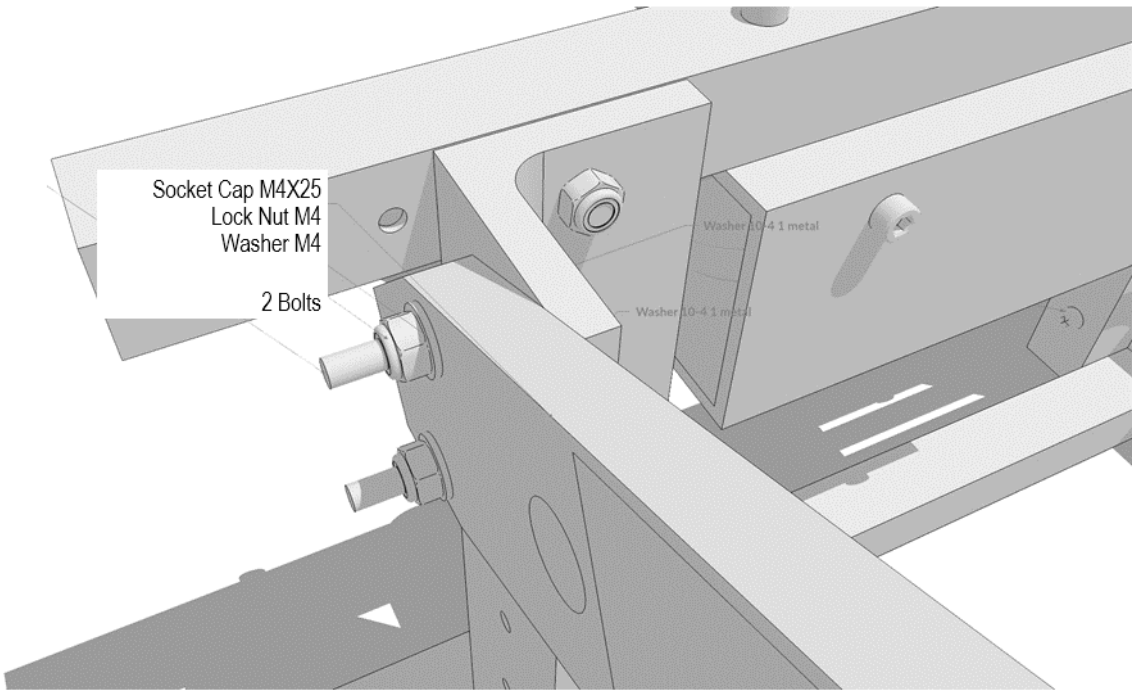


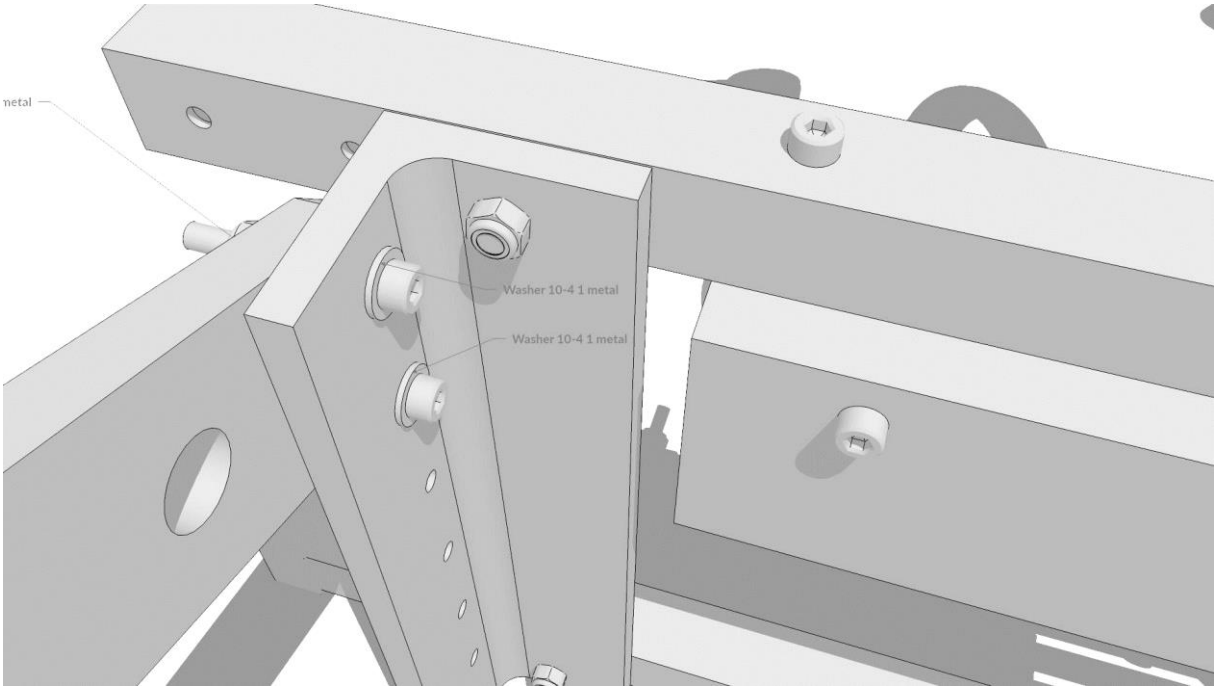




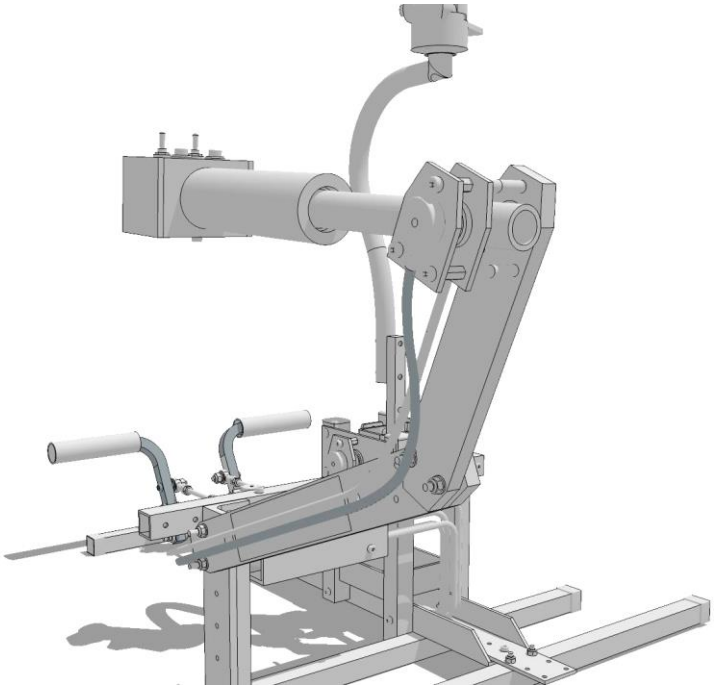


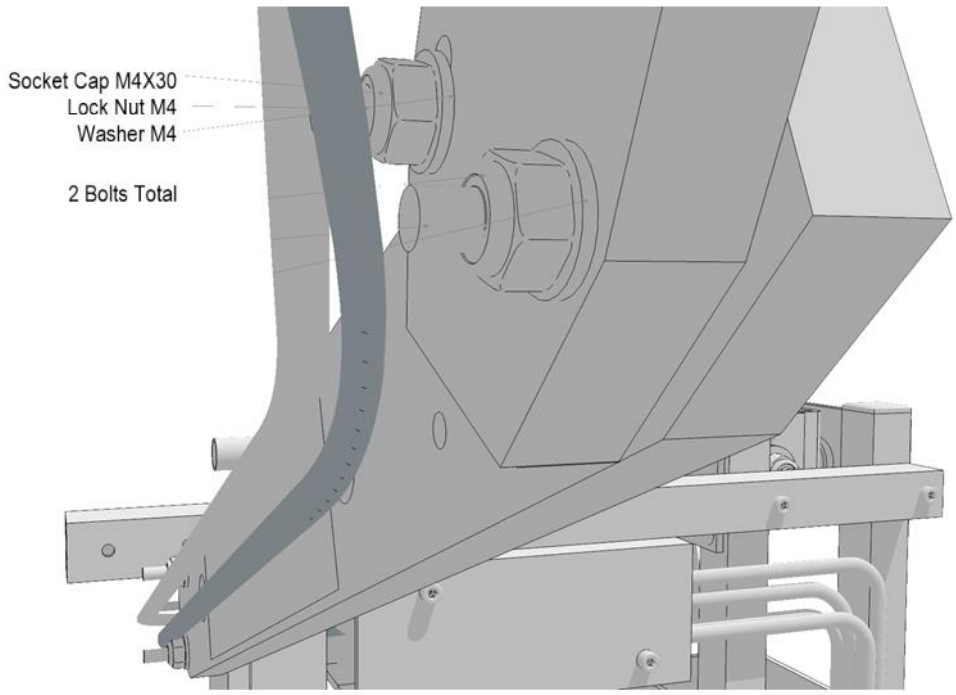

Attach Collective Holder Bottom to Base W. 1 washer per side

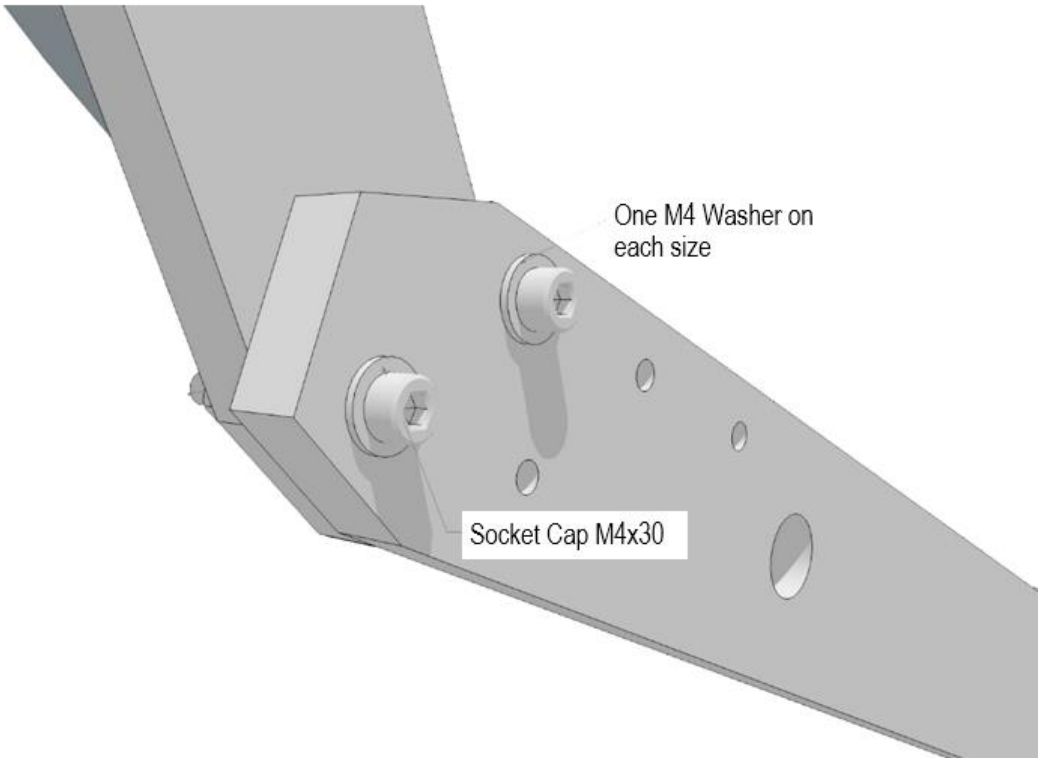




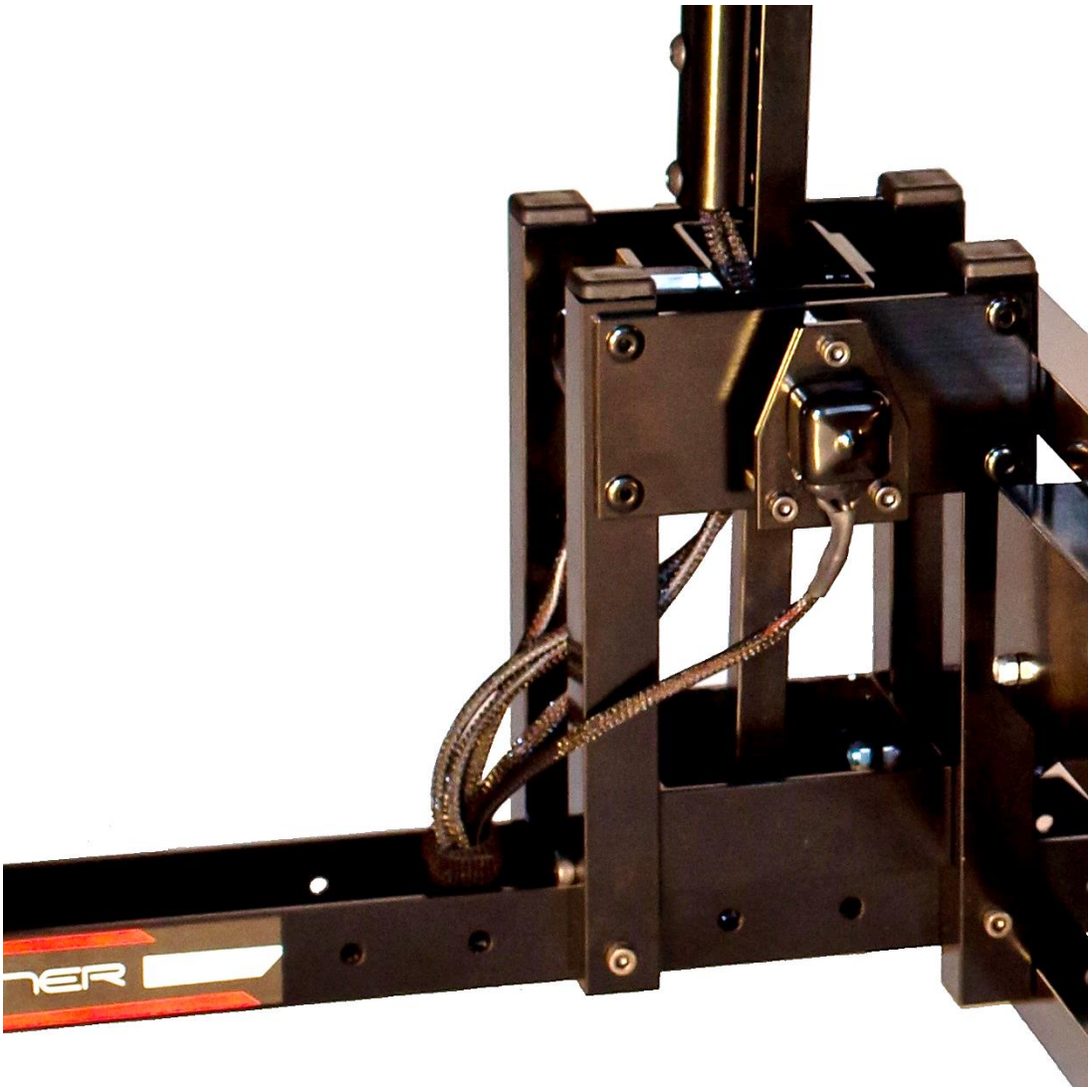

Attach Collective Assy, nuts away from Pilot, Screw head on pilot side

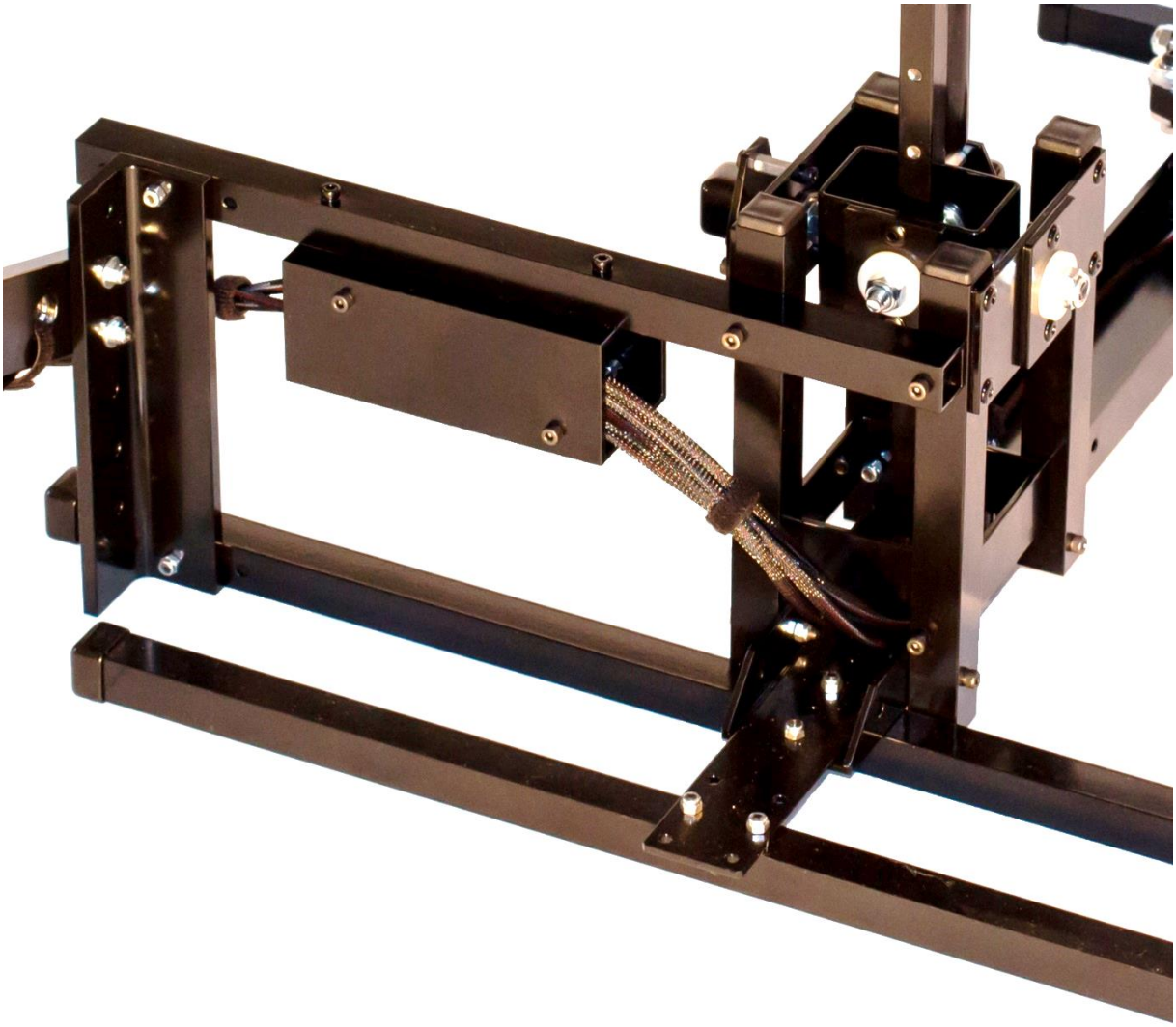



Socket Cap M4X30
Lock Nut M4
Washer M4
2 Bolts Total


One M4 Washer on each size
Socket Cap M4x30

Route wires as shown in picture



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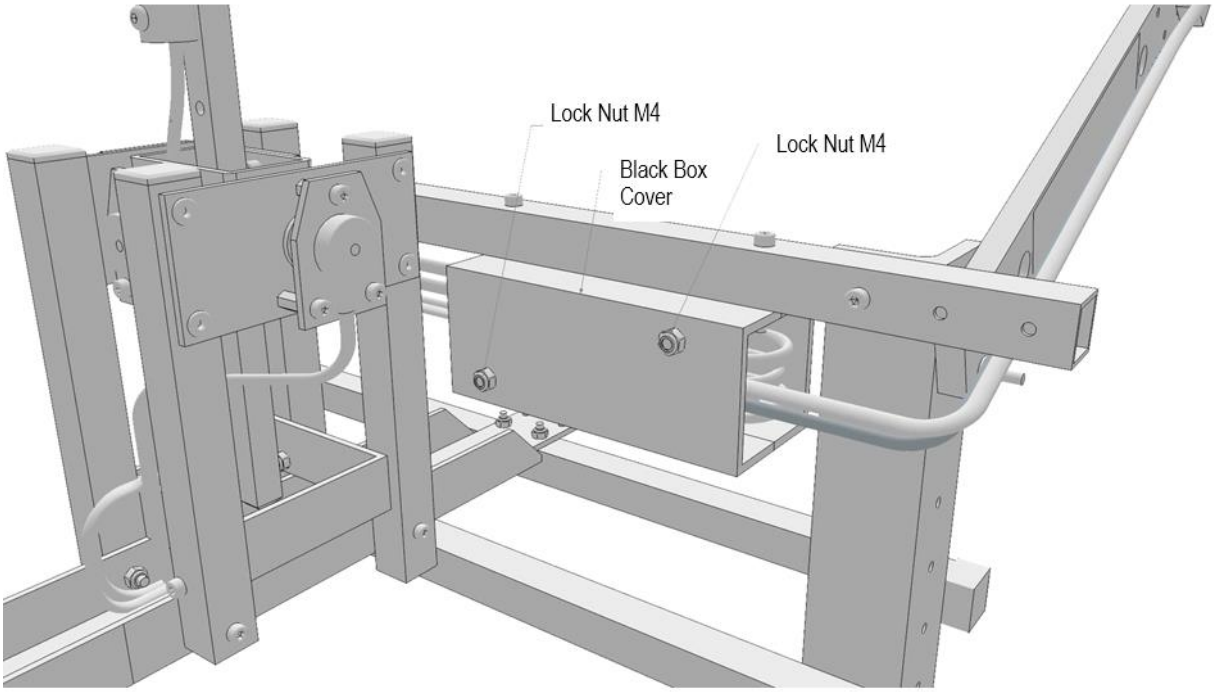
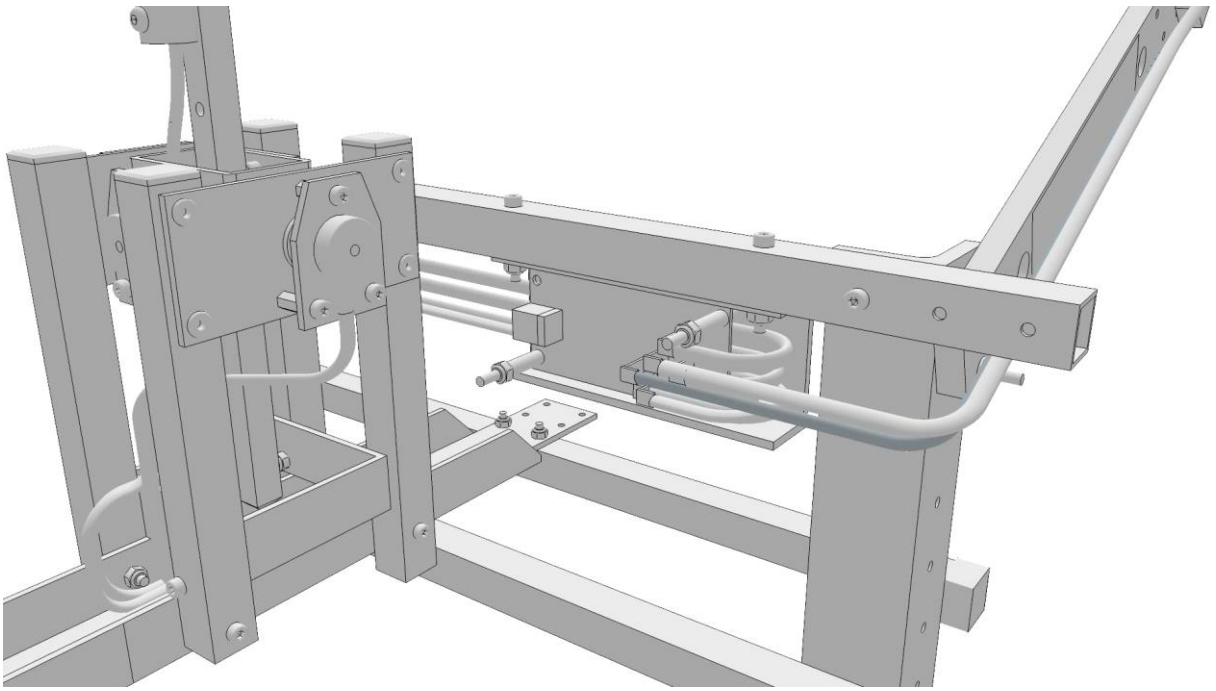
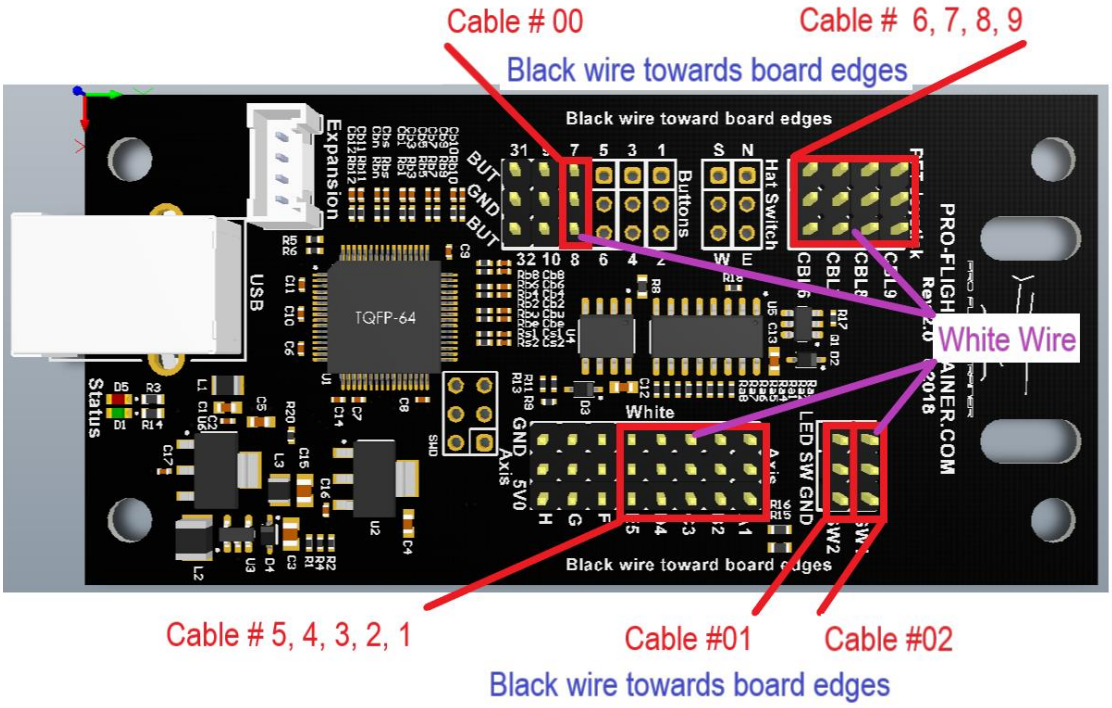
2.1.2 Wiring the Black Box



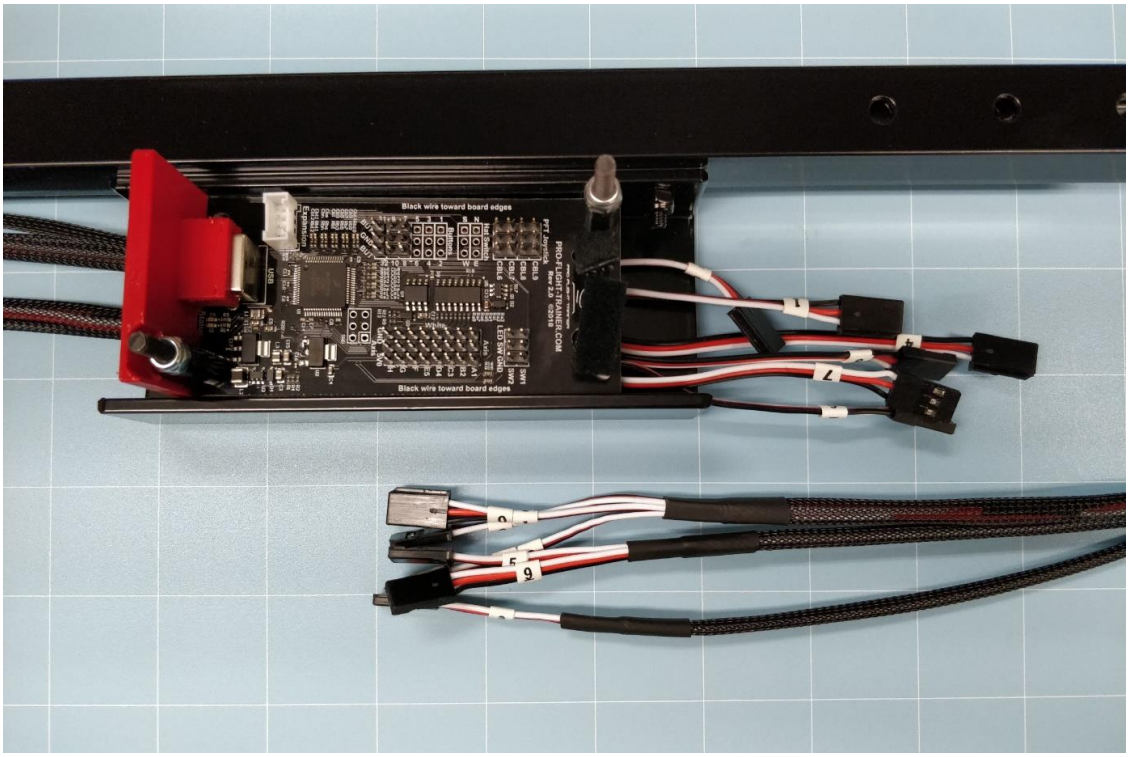

Open the Black Box (on the Base Top) to proceed with the wiring of all cables, removing 2 M4 nuts



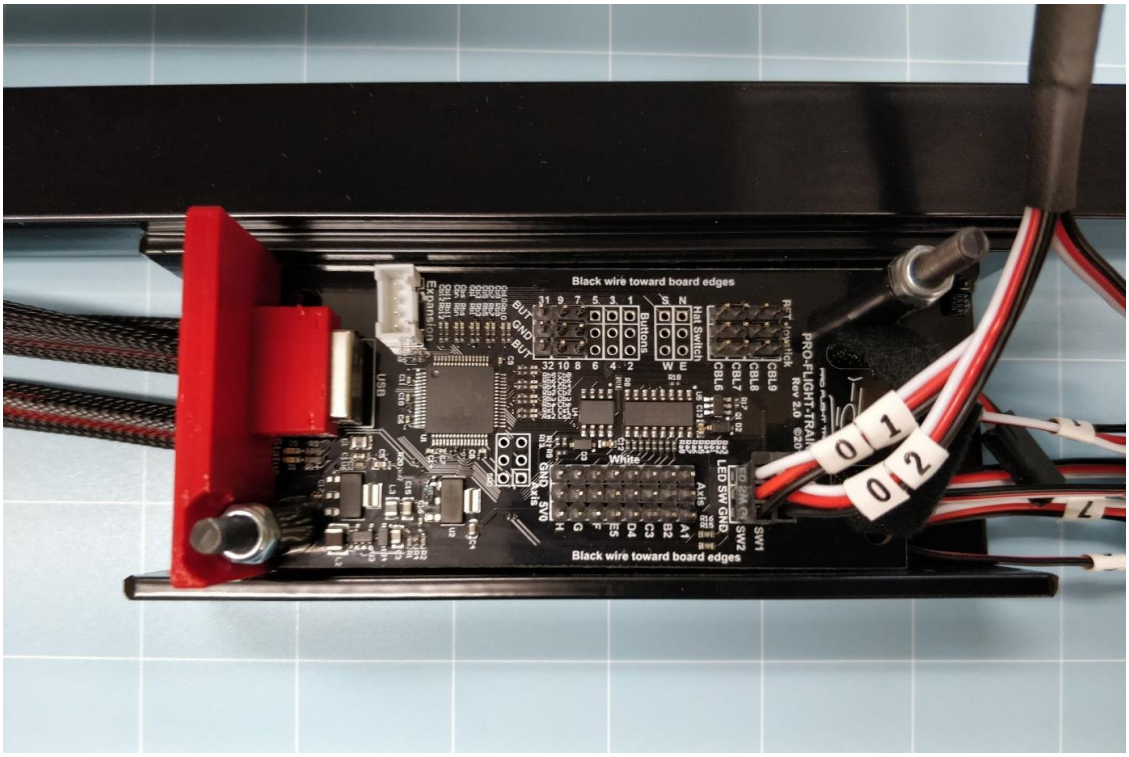



| Cable # | Location | Description |
|---|---|---|
| 1 | Cyclic Axis | X Axis |
| 2 | Cyclic Axis | Y Axis |
| 3 | Collective Axis | Z Axis |
| 4 | Pedal Axis | X Rotation |
| 5 | Collective Throttle Axis | Y Rotation |
| | | |
| 6 | Cyclic Buttons/Hat Switch | Button # 1 & 3, Hat Switch East |
| 7 | Cyclic Buttons/Hat Switch | Hat Switch North & West, Ground Wire |
| 8 | Cyclic Buttons/Hat Switch | Button # 2 & 4, Hat Switch South |
| 9 | Buttons (red) Collective | Momentary Button #5 Left, #6 Right |
| 00 | Left Toggle Switch Collective | Button # 7 or 8 (Always on switch) |
| | | |
| 01 | Right Toggle Switch Collective | Mode 2 (buttons change to #11-20) |
| 02 | Right Toggle Switch Collective | Mode 3 (buttons change to #21-30) |

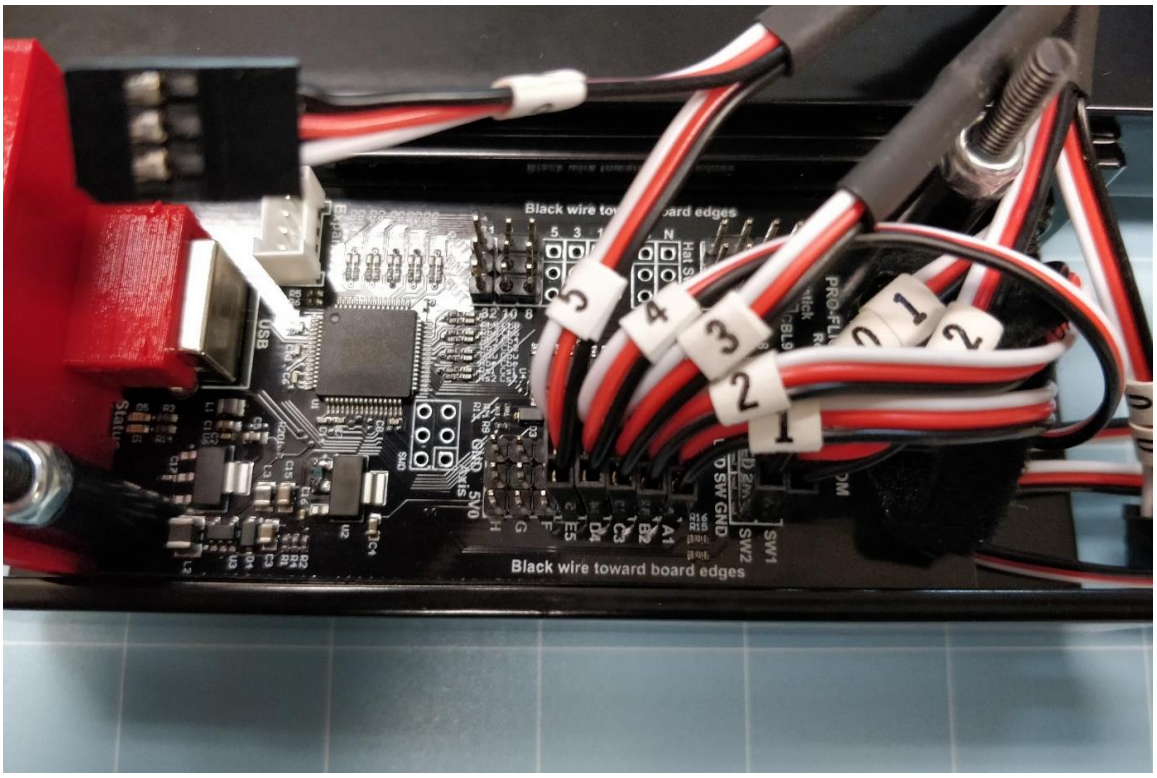
Plug in the cables in the following order. Cables from the cyclic, pedals and grip go under the PC board from the left side as per picture. Cables from the collective go directly to the PC board from the right side.



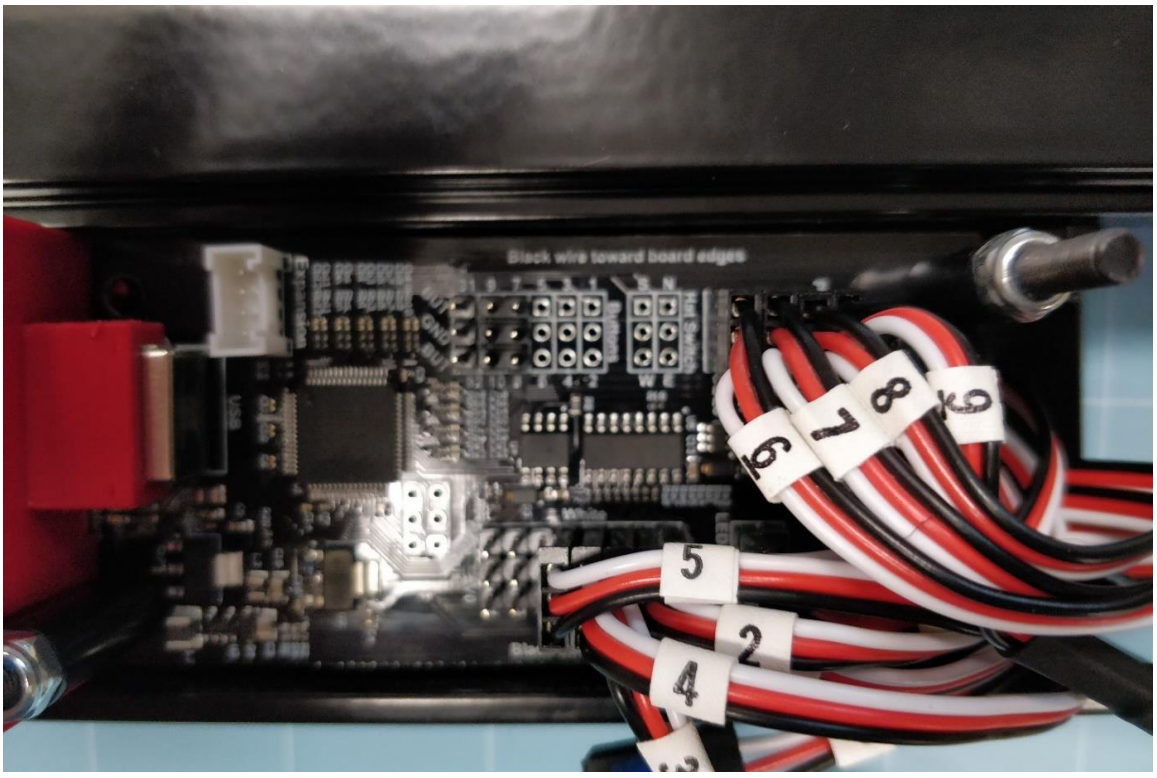

Plug in Cables #01 and 02 (black wire facing down towards edge of board)



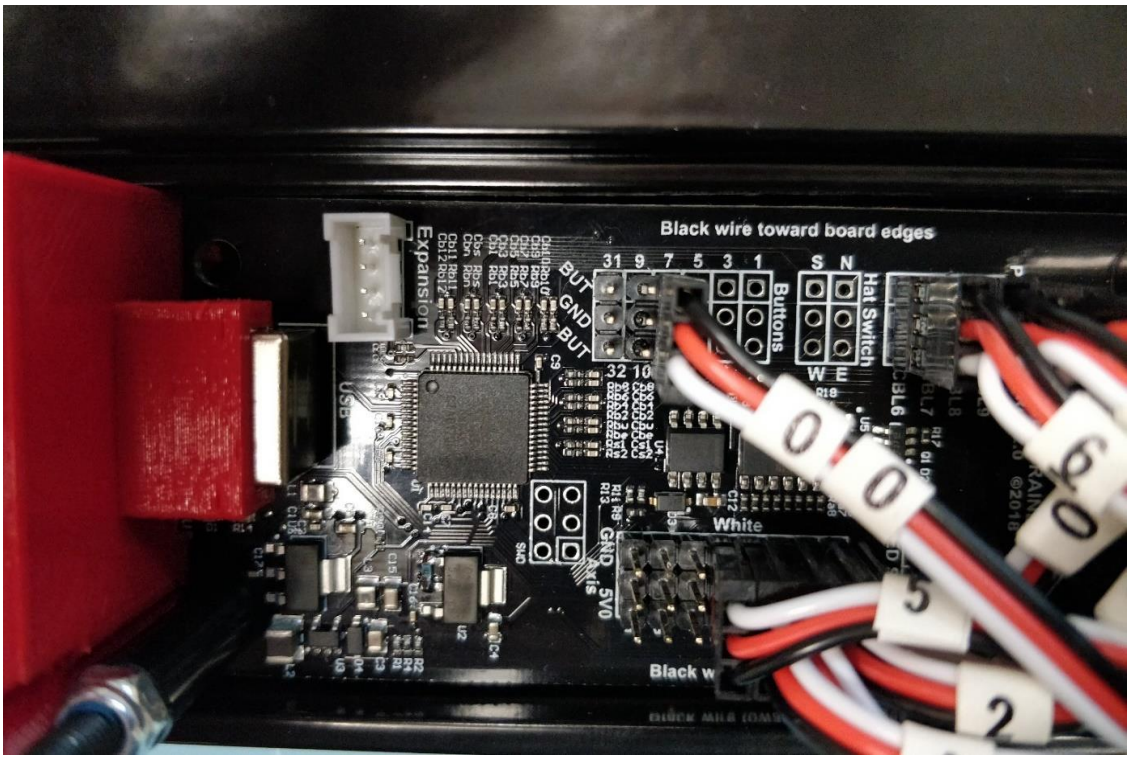
Plug in Cables #1 to 5 (black wire facing down towards edge of board). Three connectors left of wire #5 not used.



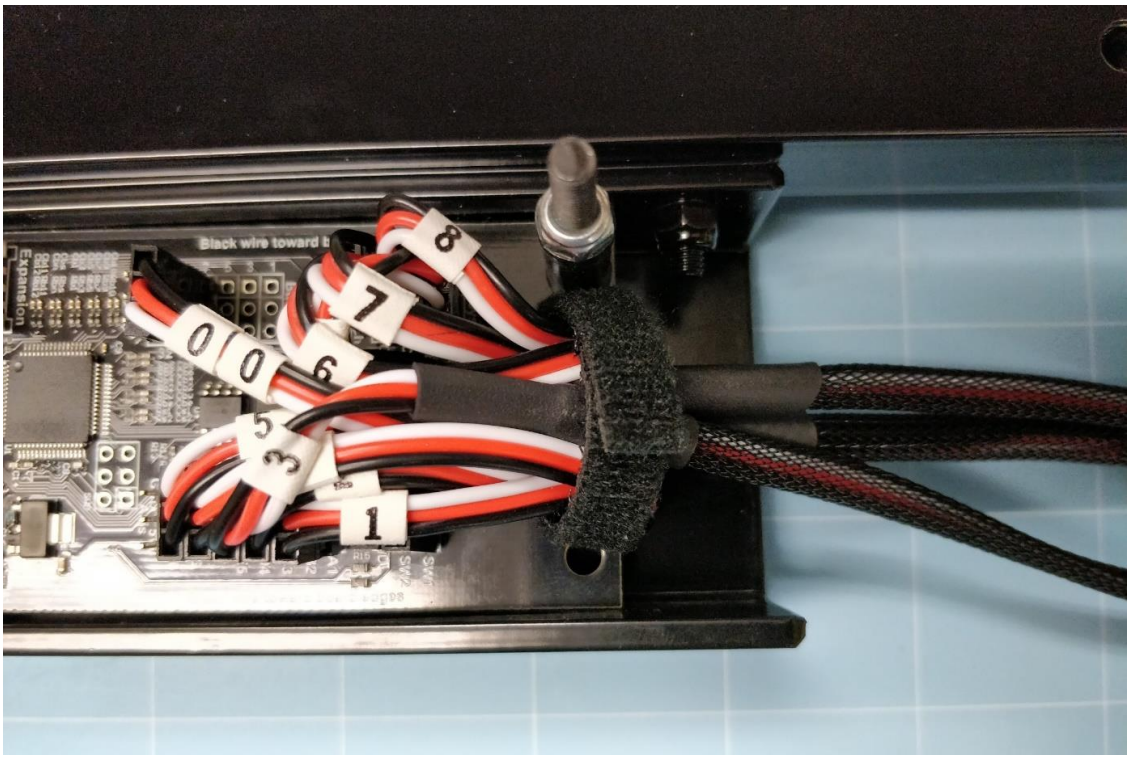

Plug in Cables #6 to 9 (black wire facing up towards edge of board).



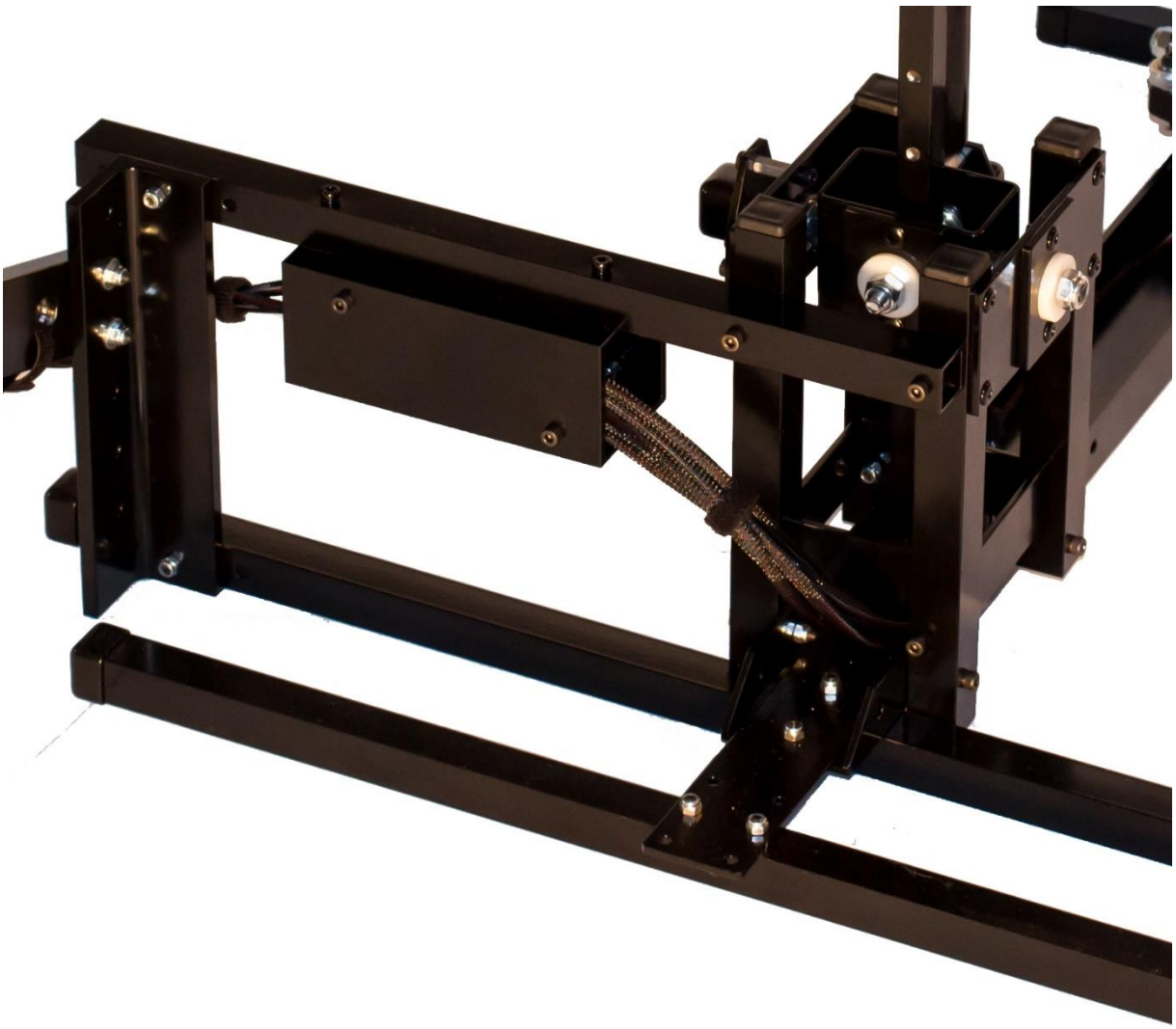
Plug in Cables #00 (black wire facing up towards edge of board). Connectors labeled on PC board 9,10,31,32 are not used.




Secure wires with Velcro as per picture.



Secure all cables using the provided Velcro bands

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## 2.2 Adjustments

### 2.2.1 Adjusting Friction

Tool needed:

- 13 mm wrench or ½ inch wrench

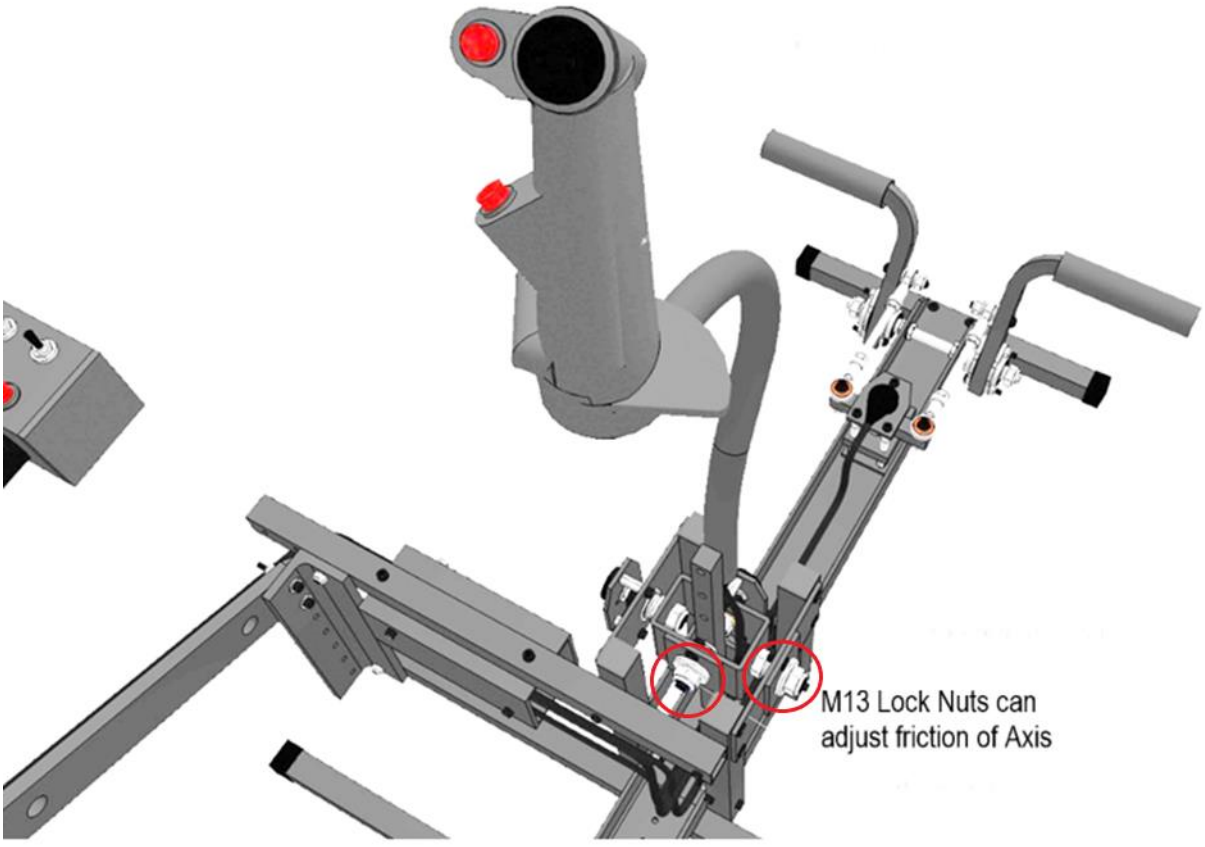
The friction can be adjusted by tightening or un-tightening the adjustment lock nut located at the end of the axis. Pedal, Cyclic, and Collective Friction can be freely adjusted. The throttle Axis has a fixed friction.

**WARNING!**

Be gentle when adjusting the friction nut. Never pull more than necessary and never force the nut. Only gentle pressure should be needed to adjust it. Never adjust a full turn at a time; 90 degrees is usually more than enough to almost completely block the axis.

Locate the adjustment lock nut at the end of the axis you wish to adjust and slowly tighten it (clockwise), in case you need to increase friction; anti-clockwise or unscrew it to decrease/release friction.

The following picture shows the location of the adjustment lock nut on the cyclic axis.



## 2.2.2 Adjusting Control Distance and Position

The controls can be adjusted by un-tightening and removing the lock nut and screws shown as follow:

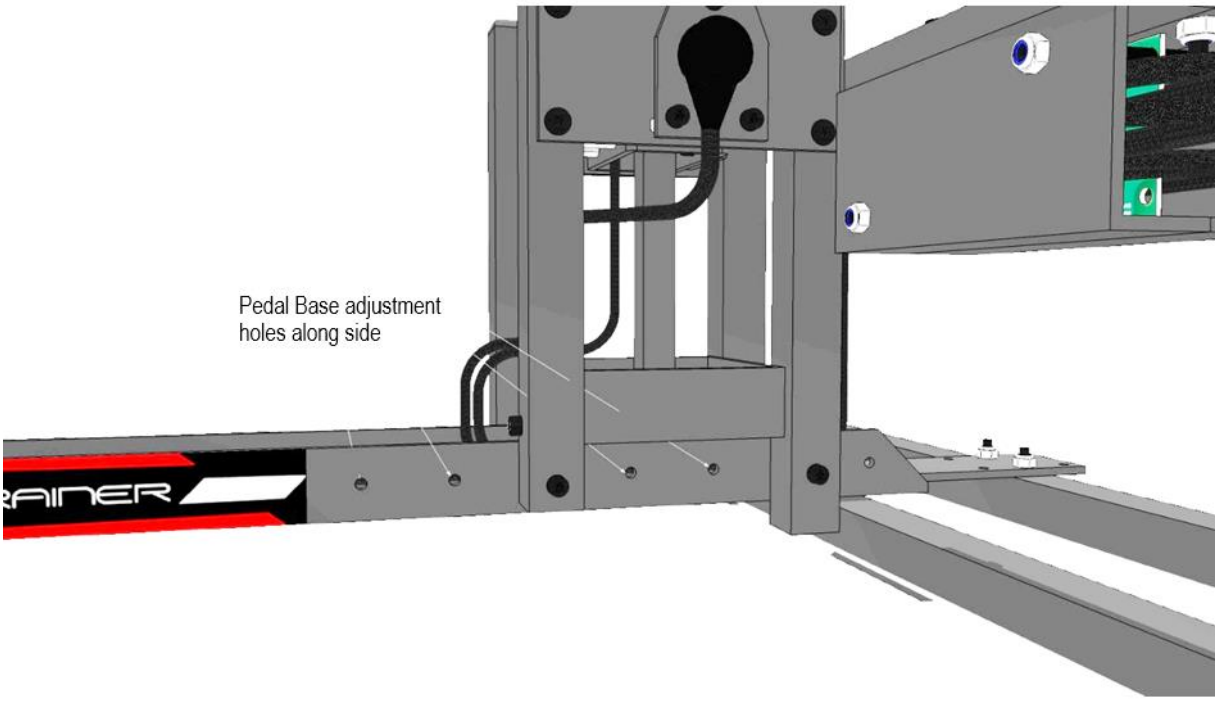
The friction can be adjusted by tightening or un-tightening the adjustment lock nut located at the end of the axis.

**WARNING!**

Be gentle when tightening the lock nut. Never pull more than necessary and never force the nut. Only gentle pressure should be needed to tighten it. Tightening the lock nut with too much torque could damage the controls or cause unsmooth friction and movement on the axis.

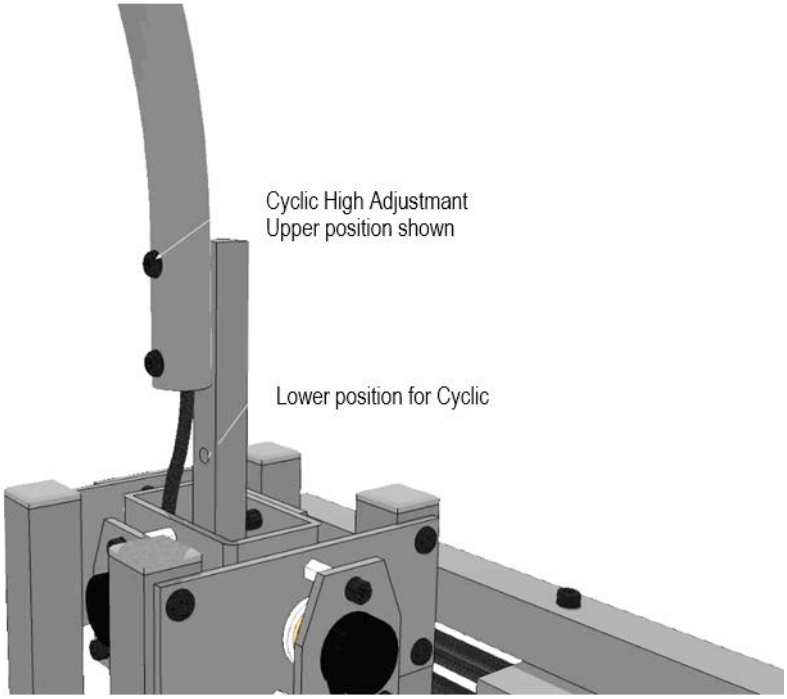
Pedal adjustment

Pedal Distance can be adjusted moving the Cyclic Assy and Base bottom forward/backwards.



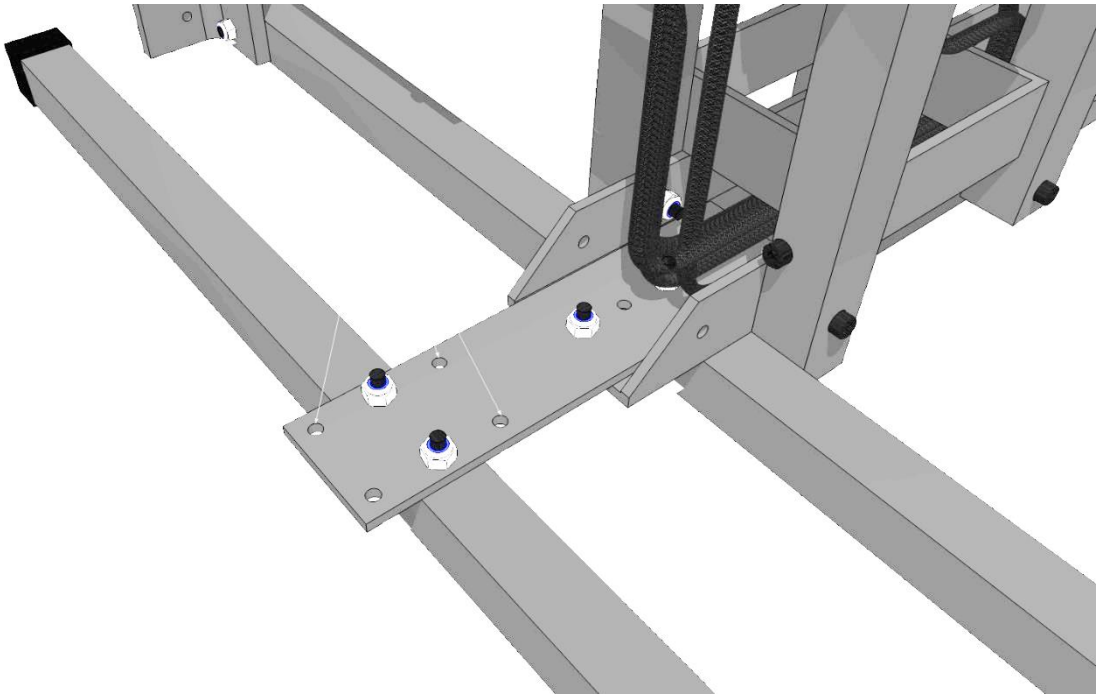
Cyclic Grip Adjustment

Cyclic Height can be adjusted using the 2 screws that attach the cyclic grip on the cyclic assy



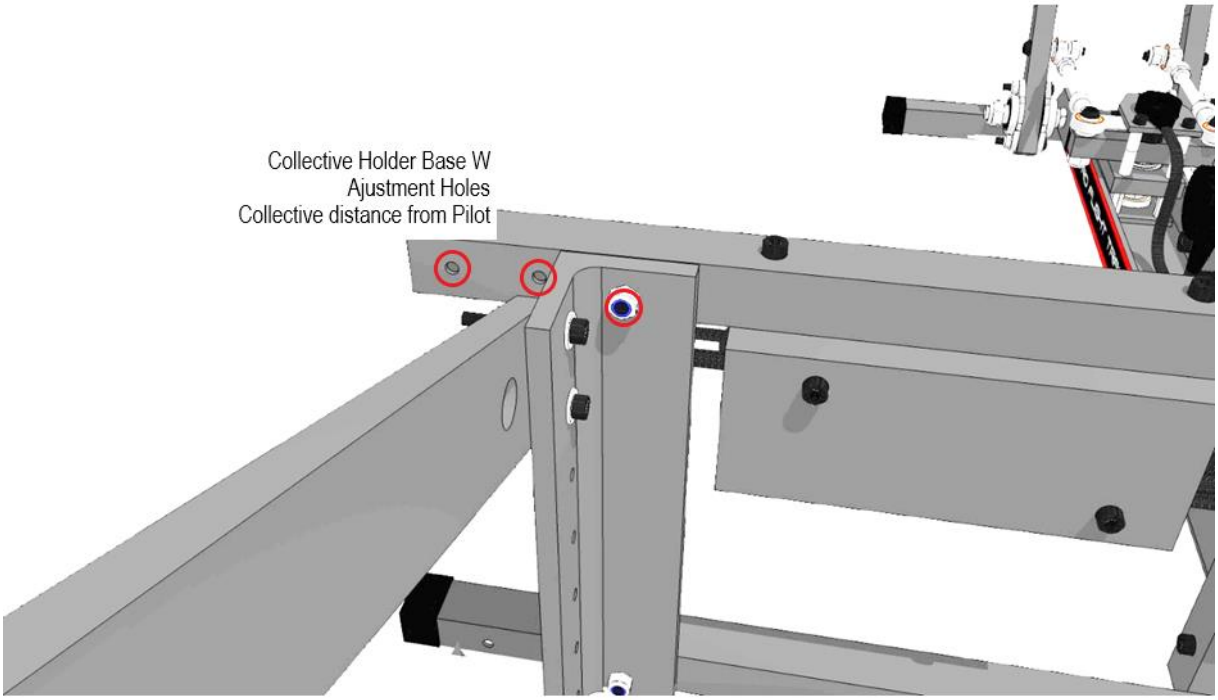

Seat Distance Adjustment

Seat Distance to all controls can be adjusted using the provided Seat Plate and Bar



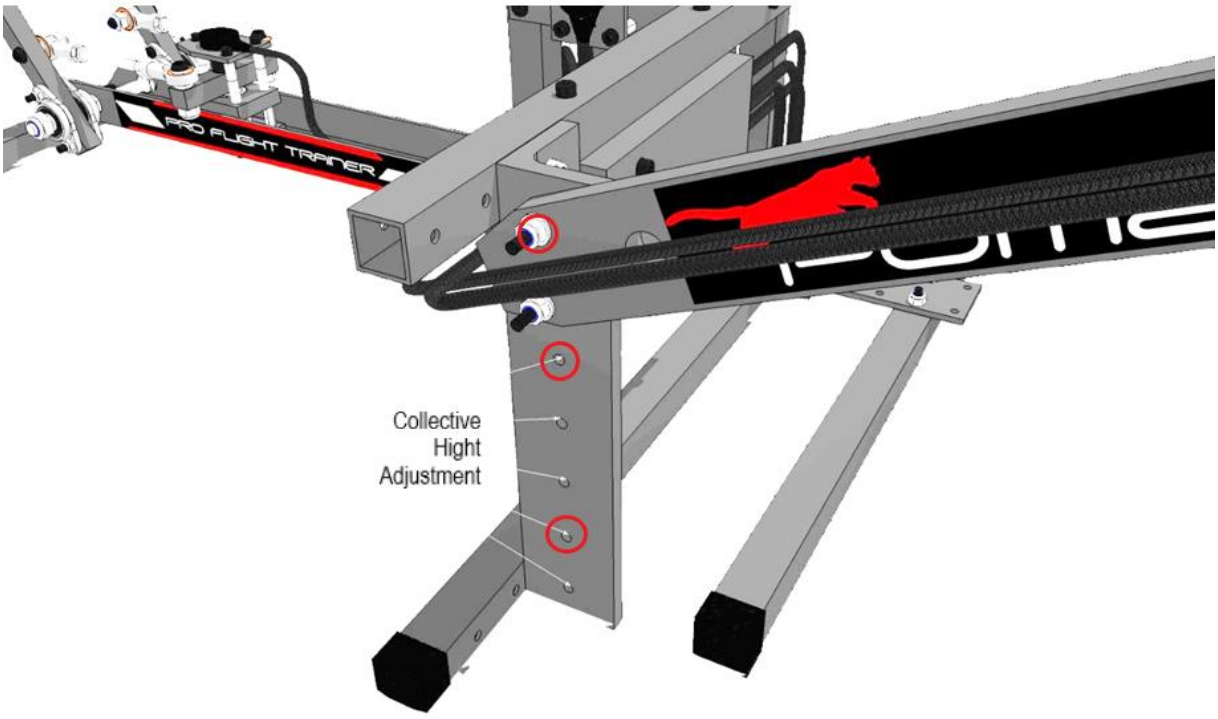
Collective Sideways Adjustments

Collective side distance can be adjusted using the holes on the left side of the Base Top (shown in picture underneath) and Base Bottom.

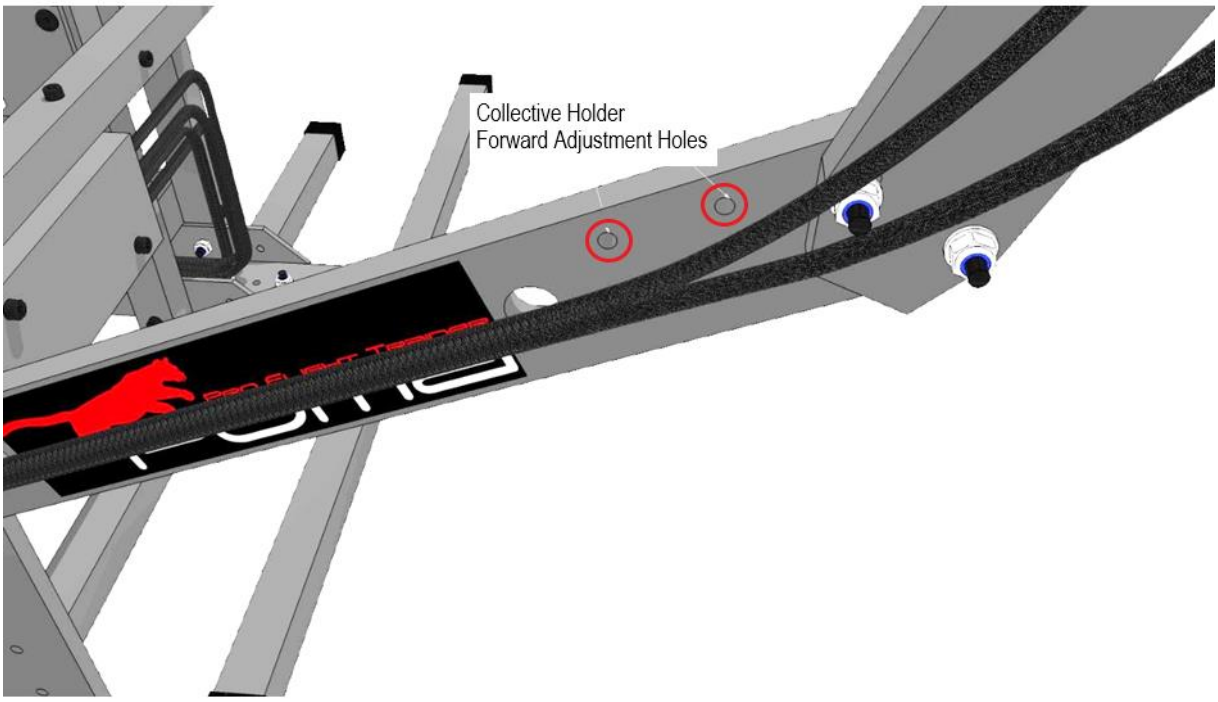



Collective Height Adjustments

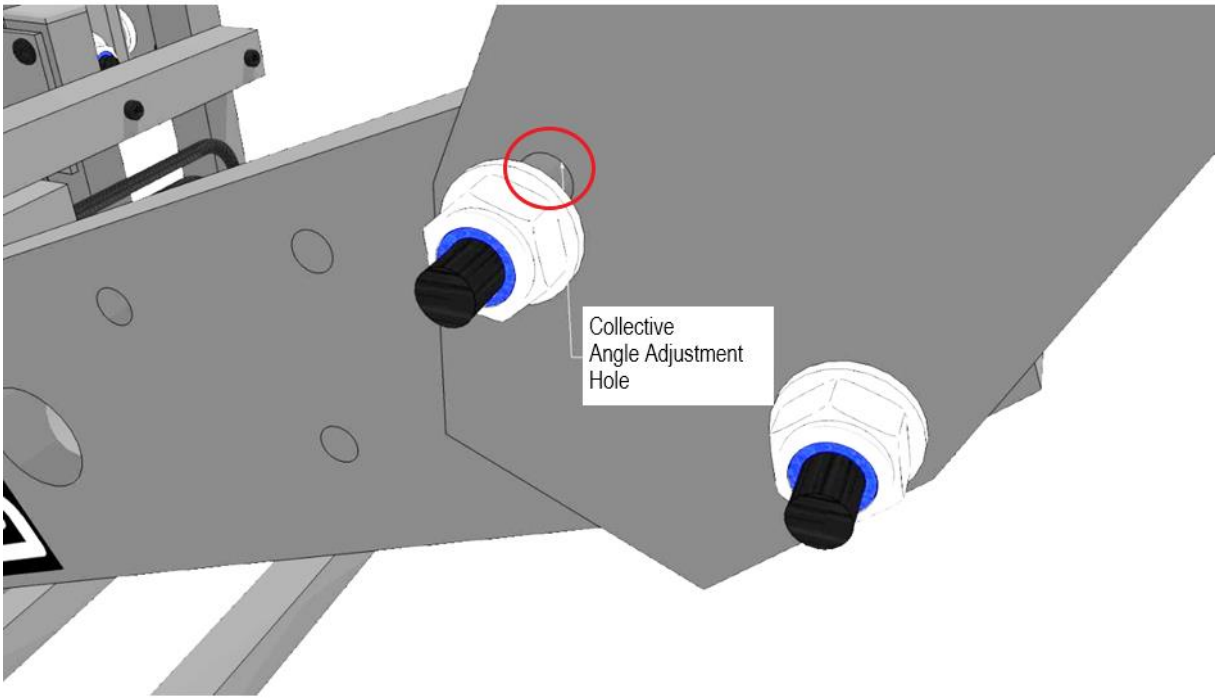
Multiple adjustments can be done on the Collective Arm, as shown in the following pictures



Collective Forward Adjustments




Collective Resting Angle Adjustments



## 2.3 Calibration Procedures

### 2.3.1 Main calibration under Windows

The main calibration is not related to any simulator software and enables accurate axis information for the operating system. Since the controls won't use the standard maximum and minimum range defined automatically after the Plug&Play process, the calibration is critical to the precision of the unit.

Once you have plugged the USB cable into a free USB port of your computer, you will need to access the properties of the Pro Flight Trainer PUMA device.

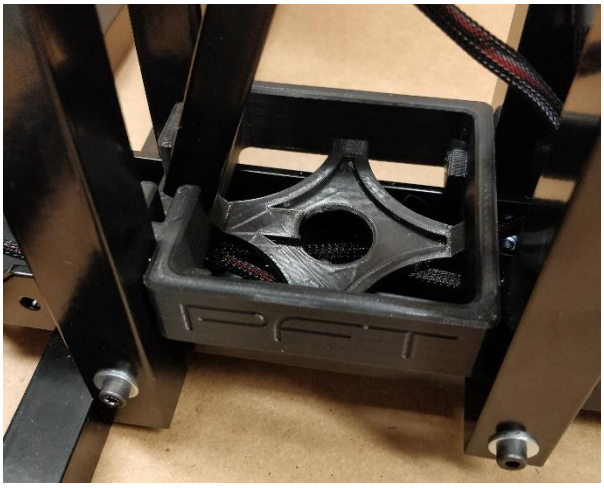
If you are struggling with our "quick-start" guide below, watch a full calibration movie on our website under: www.pro-flight-trainer.com or on our Youtube channel

**NOTE!**

Omitting this procedure will result in poor flying sensitivities and bad axis responses.

Your unit has been upgraded with our new calibration square. Please use these drawings for reference during calibration.


Place the calibration arm in this position during calibration of the unit. Position shown is for determining the center position.

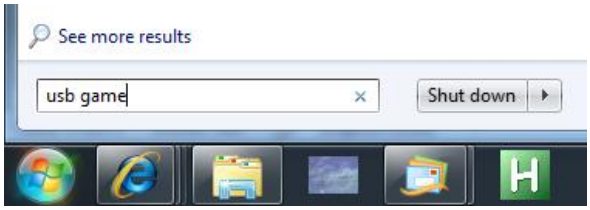


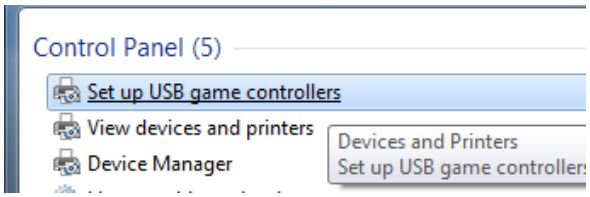
Remove the calibration arm and move the cyclic bar through the opening for unit storage.

Place the calibration arm in this position for normal operation of the unit.

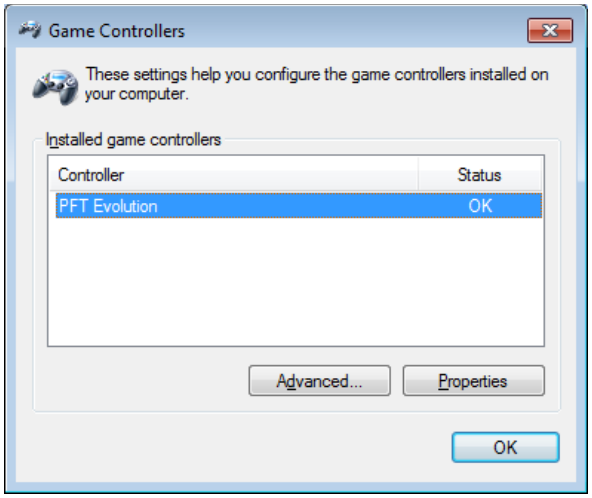
“Quick-start guide” windows 7 (and newer windows versions) users

-> Hit the start Button (or Windows key), enter “usb game” in the “search programs and files” and select “Set up USB game controllers”

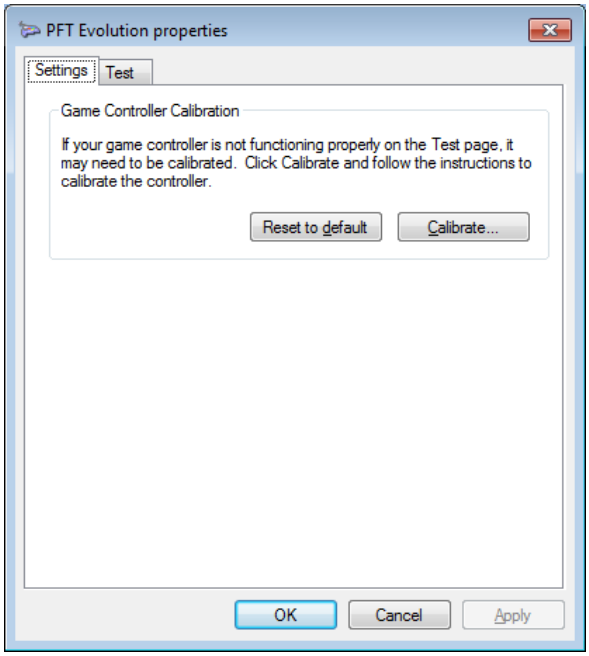



-> Choose the Pro Flight Trainer controller (usually listed as “PFT and Version”) and select “Properties”



-> Select “Settings”




-> Select “Calibration” and follow the instructions. Make sure to read the instruction carefully and to follow each step as instructed.

## 2.4 Recommended Settings under FSX

**NOTE!**

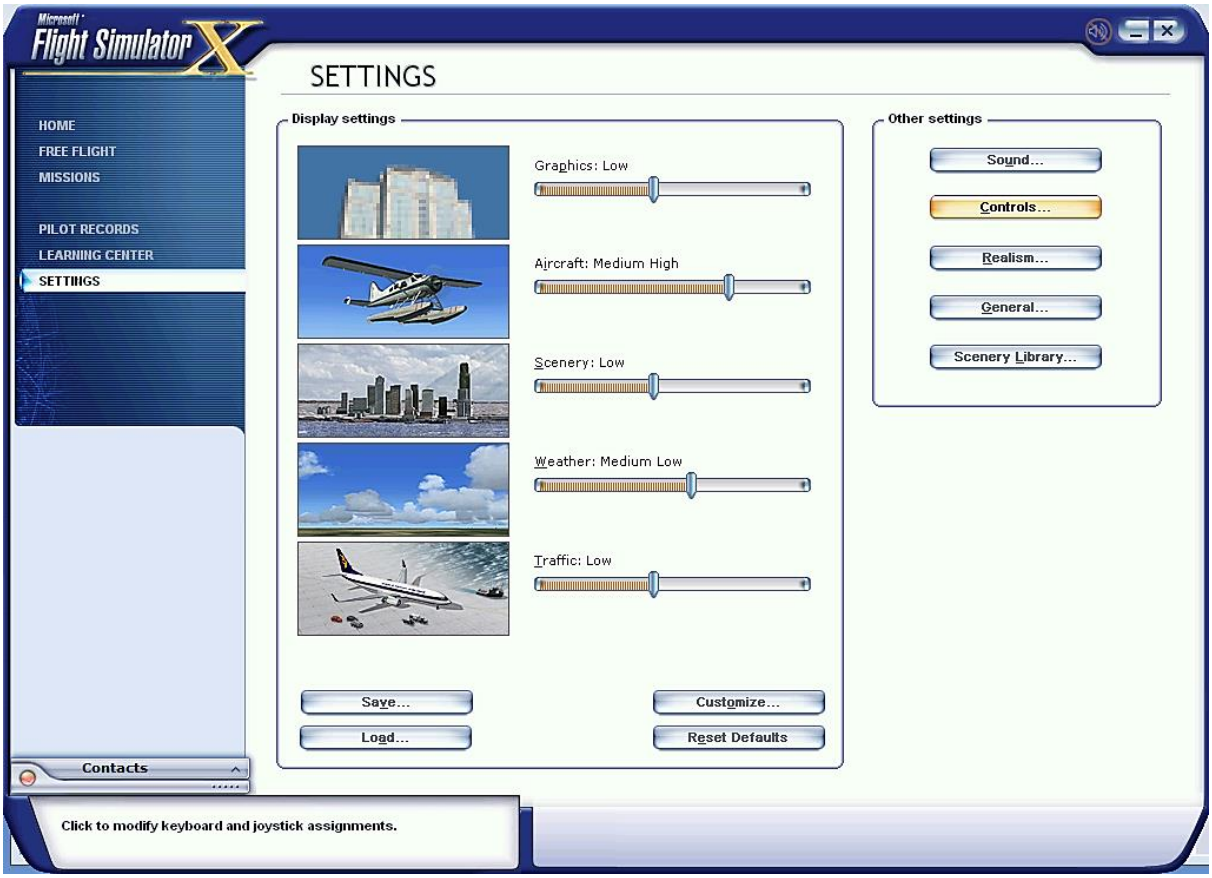
The preinstalled rotorcraft under FSX and FSX Acceleration do not have advanced aerodynamic settings, neither make use of throttle input axis. Make sure to install an advanced add-on to make use of the full potential of the controls. Check our website for current FSX recommended setup.

Make sure to read the user manual when using add-on Software to find out what exact axis needs to be assigned on your particular software model and version.

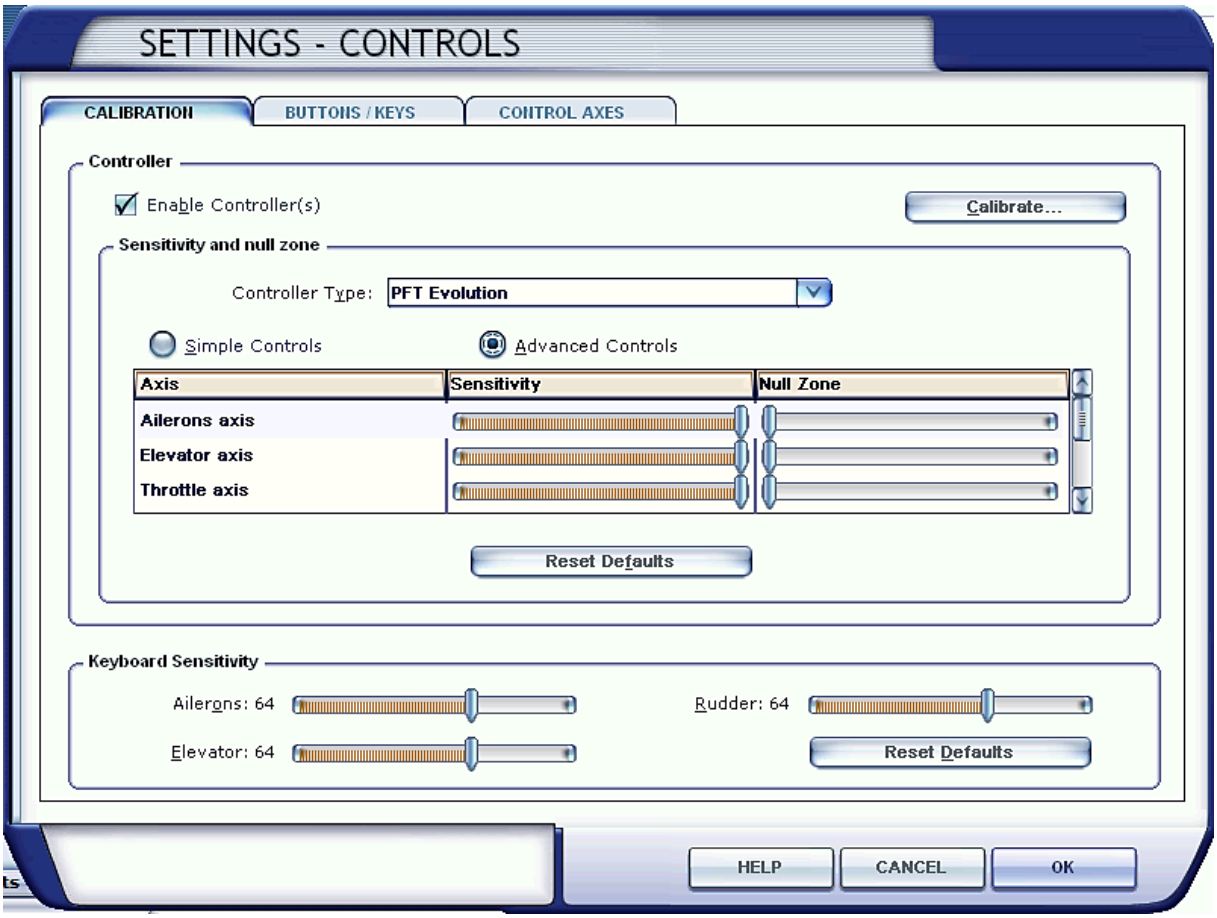
Pro Flight Trainer and PFT Manufacturing doesn't take any responsibilities towards damages to your settings or computer due to the change suggested here; those suggestions are hints from our high-time pilots and designers and shared in a "free to follow" basis.

### 2.4.1 Sensitivity Settings

Select "Settings" and select "Controls"



Make sure that the correct Controller Type is selected and that the option “Advanced Controls” is selected. (example showing PFT Evolution, select your type of controls)




Adjust the axis sensitivity and Null Zone as follow:

Ailerons axis Sensitivity – full right Null Zone – full left

Elevator axis Sensitivity – full right Null Zone – full left

Throttle axis Sensitivity – full right Null Zone – full left


Rudder axis Sensitivity – full right, then 10 steps left Null Zone – full left, then 5 steps right

**NOTE!**

Feel free to adjust to your own wishes and feelings once you get familiar with the controls and the software model you are flying with. Having the Null Zone all the way left prevent response delays in the inputs, and best meet realistic flight controls inputs, but some software might be too responsive with those settings.

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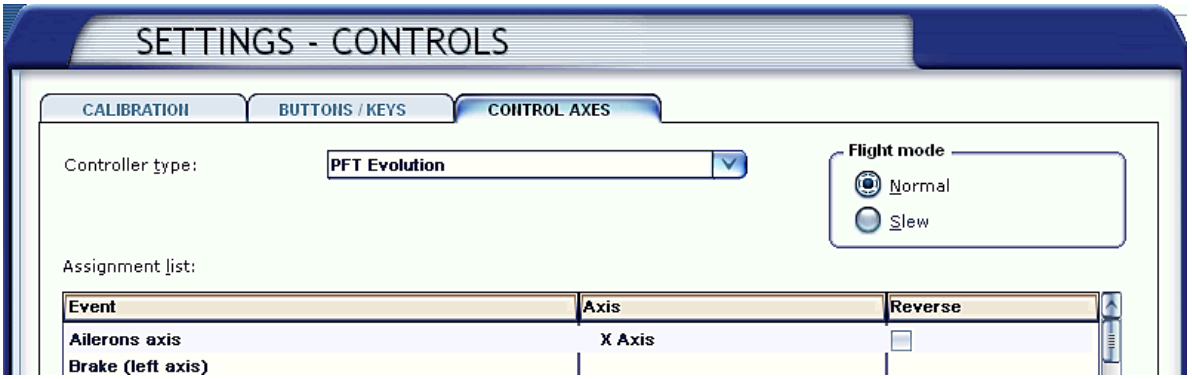
## 2.4.2 Axis assignment

The best way to make sure that all axis for your particular model in FSX have been assigned correctly is to switch to Virtual Cockpit View (standard Key assignment is “A” and “S” for view changes), Zoom out to at least “0.40 Zoom” (standard Key assignment is “-“) or at least enough to see all Controls, make sure FSX is not in pause mode, and move the controls around. Check if every single axis moves in the virtual cockpit when moved on the controls, if they move the right way (axis might be reversed), and seems to move the full way.

Be aware that some preinstalled helicopter in FSX and X-plane do not include true throttle axis simulation, there for this axis will never react the realistic expected way, if working at all.

If any axis doesn’t move the right way, you’ll need to assign them under the FSX Settings, Controls, Control axes. If the axis is reversed, hit the “reverse” option to change the way the axis reacts to your inputs.



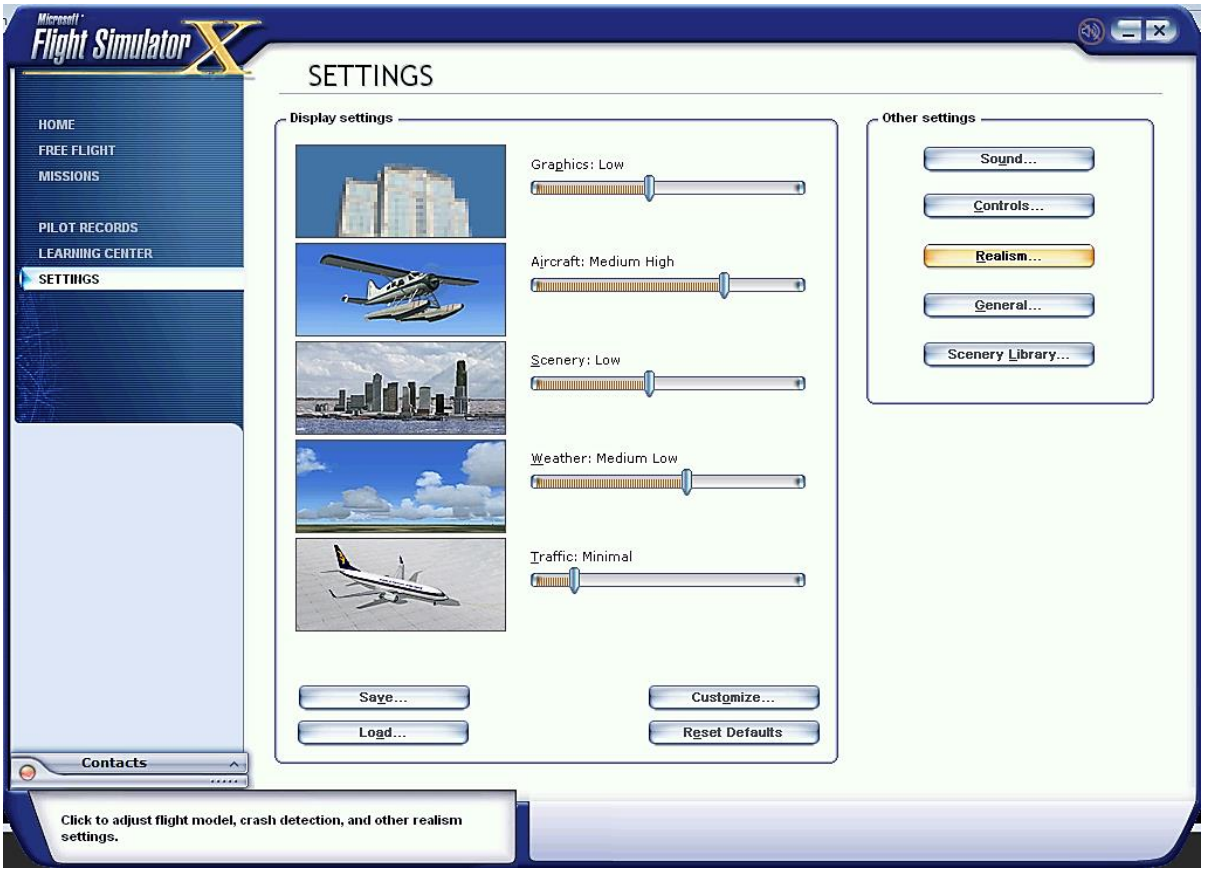
Set the axis as follow (refer to “software add-on” user manual as it might be different from standard assignment)

Select “Ailerons axis”, select “Change Assignment” and move the corresponding control axis. Select “OK” to accept change.

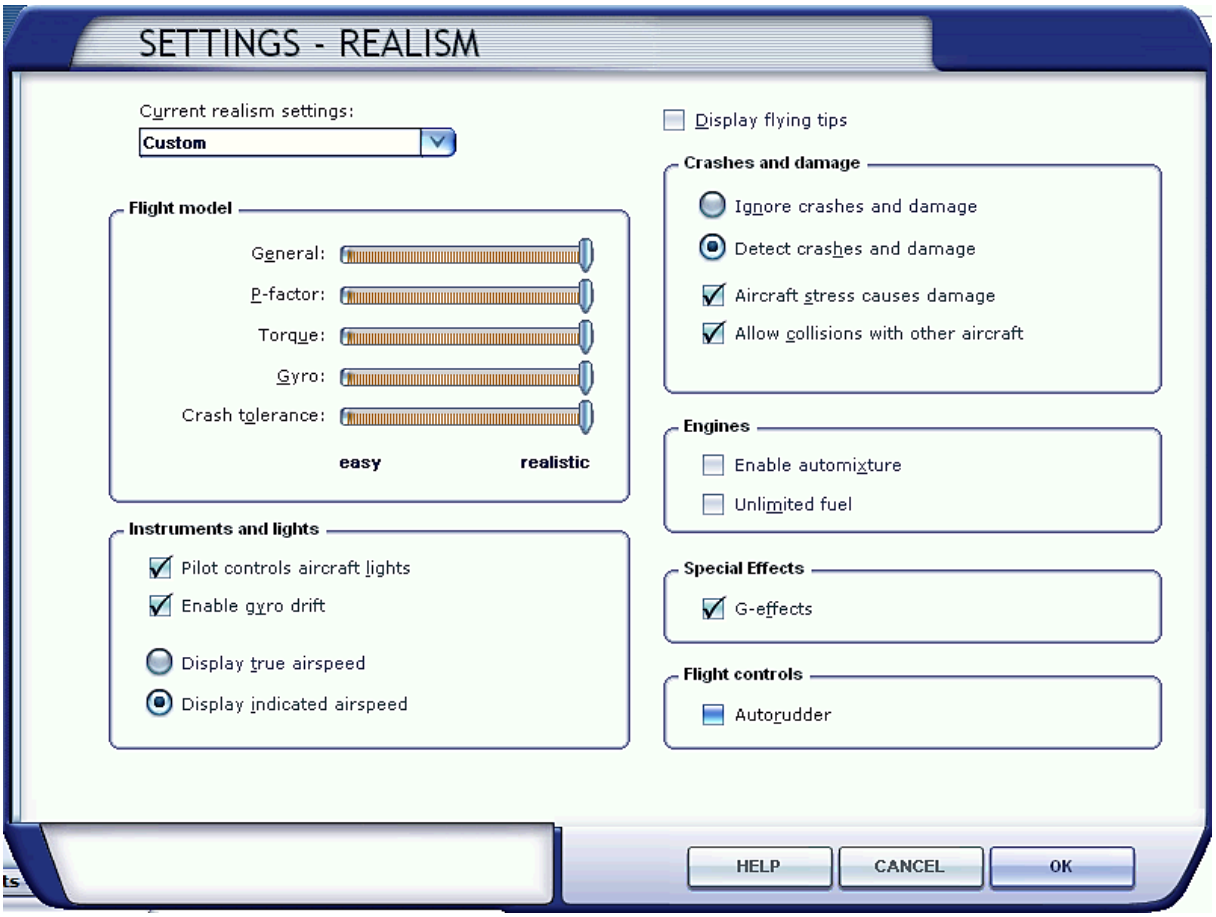
Follow the same procedure for all other axis needing new assignment. Most Rotorcraft model will use the “Throttle axis” as collective axis, the “Propeller axis” as throttle axis, and the “Rudder axis” as pedal axis.

## 2.4.3 Realism Settings

Select “Settings” and select “Realism”



Select the option you wish to enable. We suggest high “realistic” settings. The most important setting is to disable “Autorudder” on the low right corner.




## 2.4.4 Display Settings

They are no specific Settings that need to be adjusted towards using the flight controls.

**NOTE!**

Be aware that having maximum visual settings might decrease the frame rate during flight, affecting the responsiveness of the controls. Be careful when setting them to maximum level, and reduce those settings anytime you feel some delay in control response. It is a good reference to allow your computer to have at least 25 FPS during flight sessions. (Make sure you have FSX Service Pack 2 installed if you do not use the Acceleration Pack, as this will increase your FPS performance. The most recent FSX-SE (Steam Edition) further increases performance in most configuration and is highly recommended.

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## 2.5 Recommended Settings under X-Plane (most version, menu labels might slightly vary from version to version)

**NOTE!**

The preinstalled rotorcraft under X-Plane do not all have advanced aerodynamic settings; neither make use of throttle input axis. Make sure to install an advanced add-on to make use of the full potential of the controls. Also, the preinstalled rotorcraft have very limited 3d cockpit viewing capabilities. The installation of 3rd party add-on is highly recommended. Check our Website for current setup recommendations.

Make sure to read the user manual when using add-on Software to find out what exact axis needs to be assigned on your particular software model and version.

## 2.5.1 Sensitivity Settings

Select “Settings” and select “Joystick & Equipment”

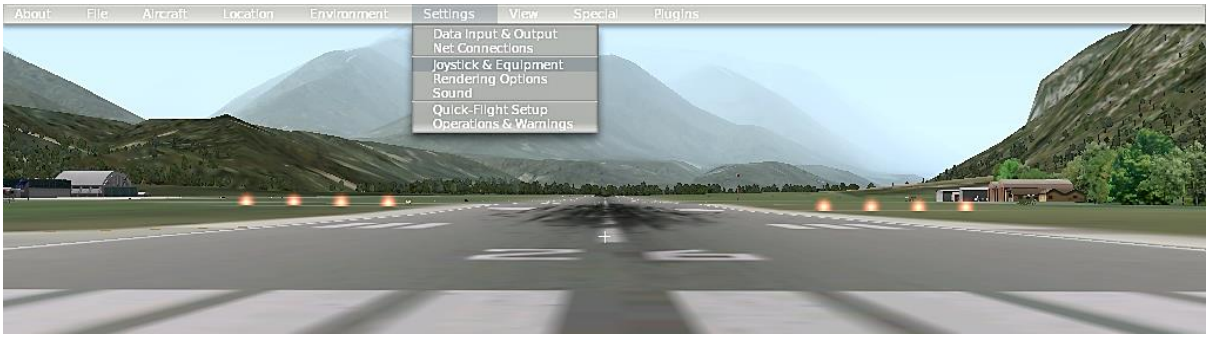
Select “Center” and adjust slider as shown.


**NOTE!**

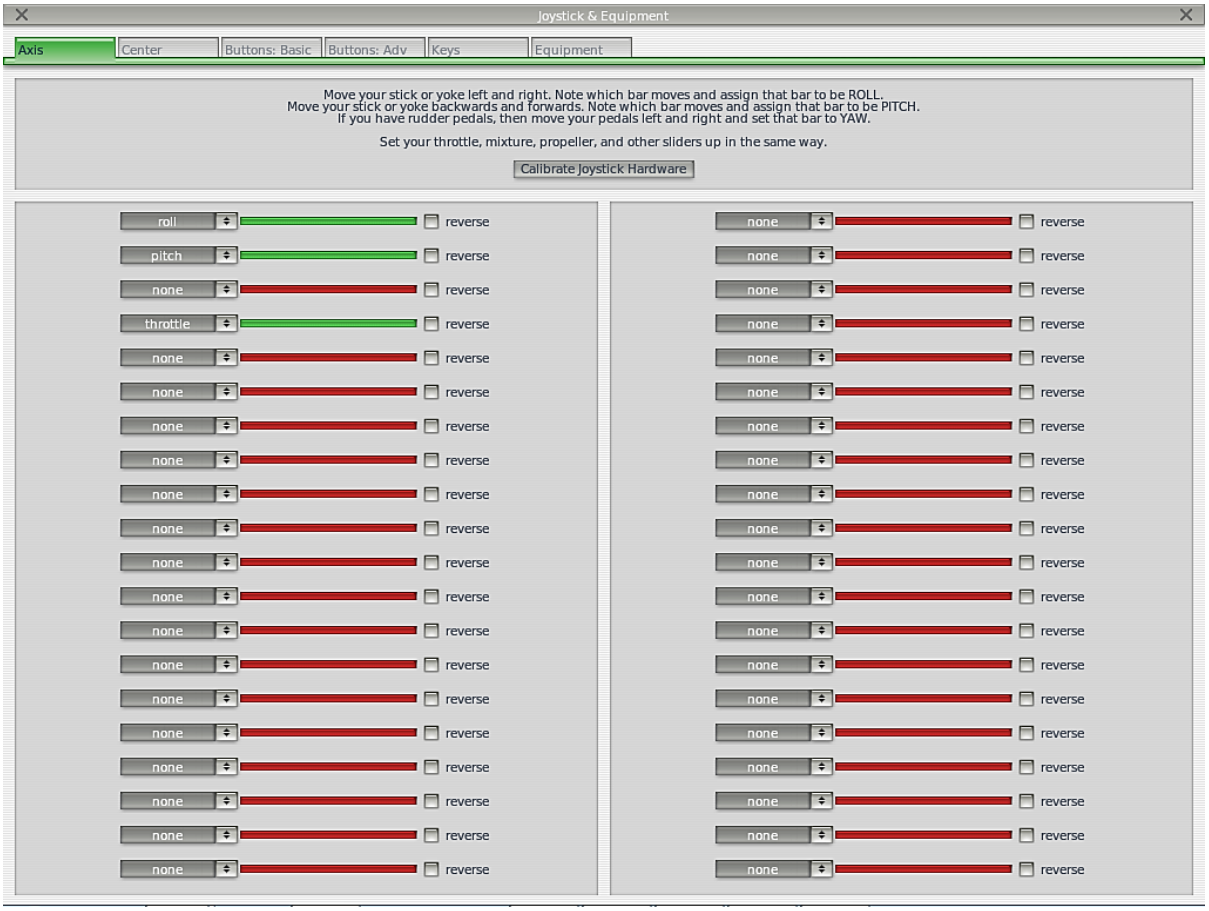
Feel free to adjust to your own wishes and feelings once you get familiar with the controls and the software model you are flying with. Having the stability-augmentation all the way left prevent response delays in the inputs, and best meet realistic flight controls inputs. However, some software package might need different settings, feel free to adjust as suggested in the manufacturer guide or as needed to meet your specific wishes.

## 2.5.2 Axis assignment

Select “Settings” and select “Joystick & Equipment”




Select “Axis” and follow the detailed instruction on the top portion of the screen




**NOTE!**

Don’t forget to perform a calibration and set the center point as instructed, as this is critical to precise and accurate flight control inputs.

### 2.5.3 Realism Settings

Some Add-On Software have adjustable realism settings for their model. Refer to the manufacturer User/Flight Manual for additional information.

### 2.5.4 Rendering Options

They are no specific Settings that need to be adjusted towards using the flight controls.

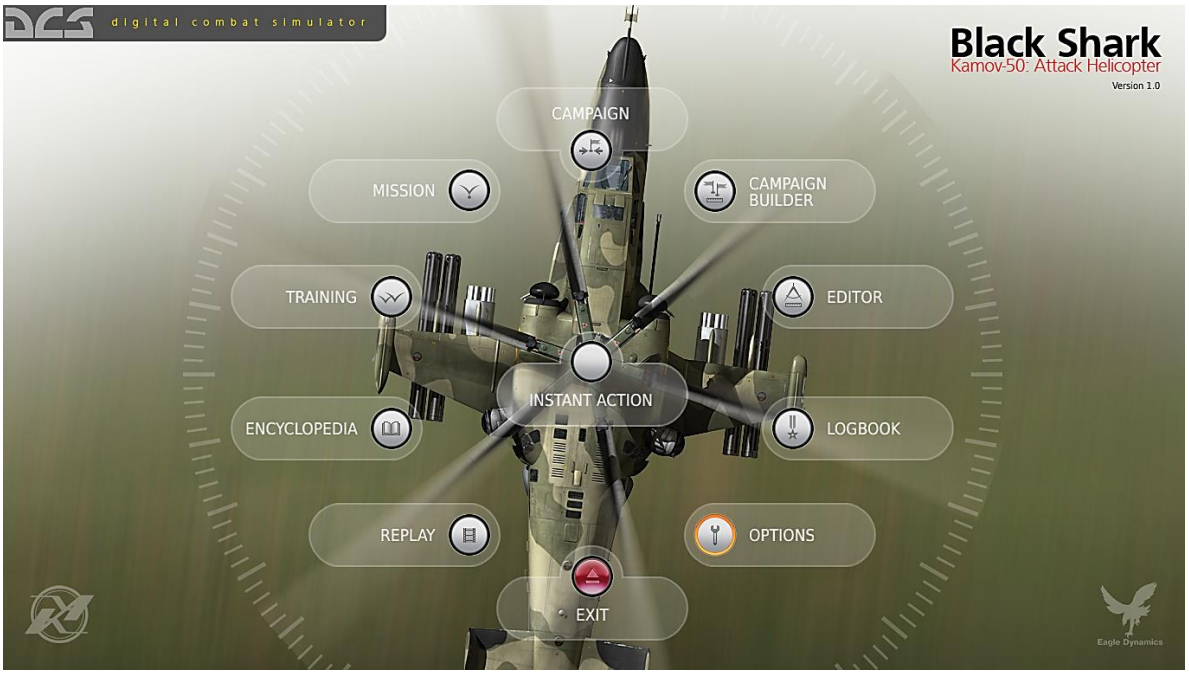
**NOTE!**

Be aware that having maximum visual settings might decrease the frame rate during flight, affecting the responsiveness of the controls. Be careful when setting them to maximum level, and reduce those settings anytime you feel some delay in control response. It is a good reference to allow your computer to have at least 25 FPS during flight sessions.

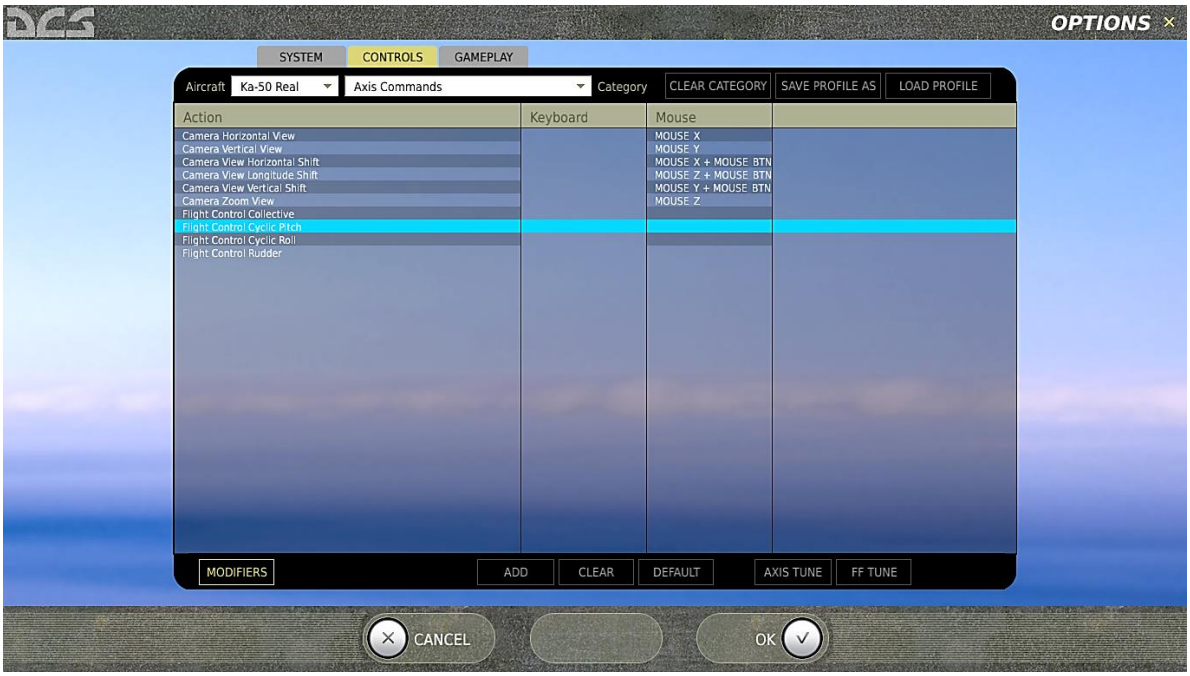
## 2.6 Recommended Settings under DCS Black Shark

### 2.6.1 Axis assignment

Select “Options” in the root menu




Select “Controls”, select the category “Axis Commands” and follow the instructions




### 2.6.2 Sensitivity Settings

No specific adjustment needed for the Pro Flight Trainer controls.

### 2.6.3 Realism Settings

No specific adjustment needed for the Pro Flight Trainer controls.

### 2.6.4 Display Settings

No specific adjustment needed for the Pro Flight Trainer controls.

**NOTE!**

Be aware that having maximum visual settings might decrease the frame rate during flight, affecting the responsiveness of the controls. Be careful when setting them to maximum level, and reduce those settings anytime you feel some delay in control response. It is a good reference to allow your computer to have at least 25 FPS during flight sessions.