# DIY Simulator racing pedals build guide

High Precision Simulator pedals

Jason Winfield

# Introduction

Welcome to the comprehensive guide on constructing your own set of 3D-printed pedals for sim racing! This step-by-step guide combines 3D printing technology with everyday hardware like nuts and bolts to create a fully functional and customizable pedal system. Utilizing a Hall effect sensor for precise movement detection, coupled with an Arduino for seamless integration, this guide walks you through the entire process—from assembly to programming and tuning. Whether you're a racing enthusiast or a DIY enthusiast, embark on this journey to craft your personalized sim racing pedals and elevate your virtual racing experience to new heights!

This download should contain all the 3D printer files required to assemble your pedals or handbrake. In the appendix of this guide is a bill of materials for all the required parts in the project.

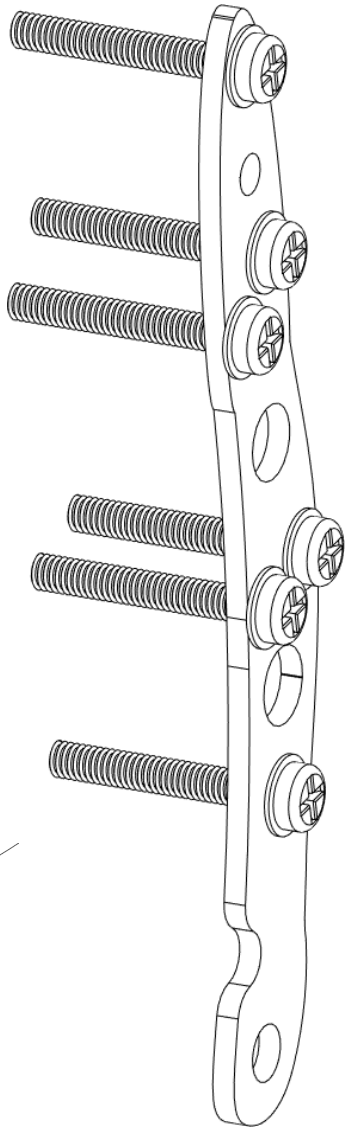
The choice of plastic used is completely up to you. I have used PLA, which has proven strong enough to endure the rigors of sim racing.

No prior programming knowledge is required to get these pedals up and running, as this guide will step you through all the necessary procedures.

You will need some tools that you would usually find in any workshop, such as spanners and screwdrivers. While a soldering iron is not required, I suggest having one on hand.

Collect your parts together and lets get on with it!

# Step 1



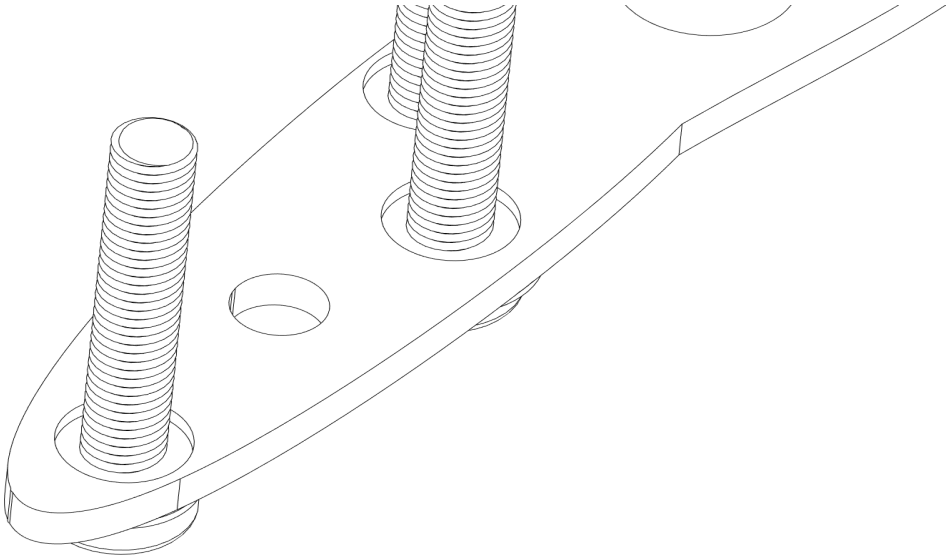
The initial phase of our assembly focuses on constructing the main body of the pedal. This component consists of both left and right sides, each crafted from 3D-printed materials. To complete the structure, we will incorporate 3x45mm screws, washers, bolts, and aluminum tubes.

**Gather Materials:**
Begin by collecting the necessary materials. You'll need 6 6x45mm screws, along with corresponding washers and bolts. Additionally, ensure you have the 3D-printed left and right pedal sides and the aluminum tubes on hand.

**Positioning the Screws:**
Take one of the 3D-printed sides and position it for assembly. Insert 6x45mm screws through designated points on this side. Be sure to include a washer with each screw.

**Consider the Countersunk Side:**
Note that the screws should pass through the side that is not countersunk. The countersunk side is reserved for securing the aluminum tubes in the middle of the pedal assembly.

This initial step lays the foundation for the pedal assembly, setting the stage for the integration of 3D-printed components and aluminum tubes in subsequent stages. Ensure a secure fit by following these instructions diligently.



# Step 2

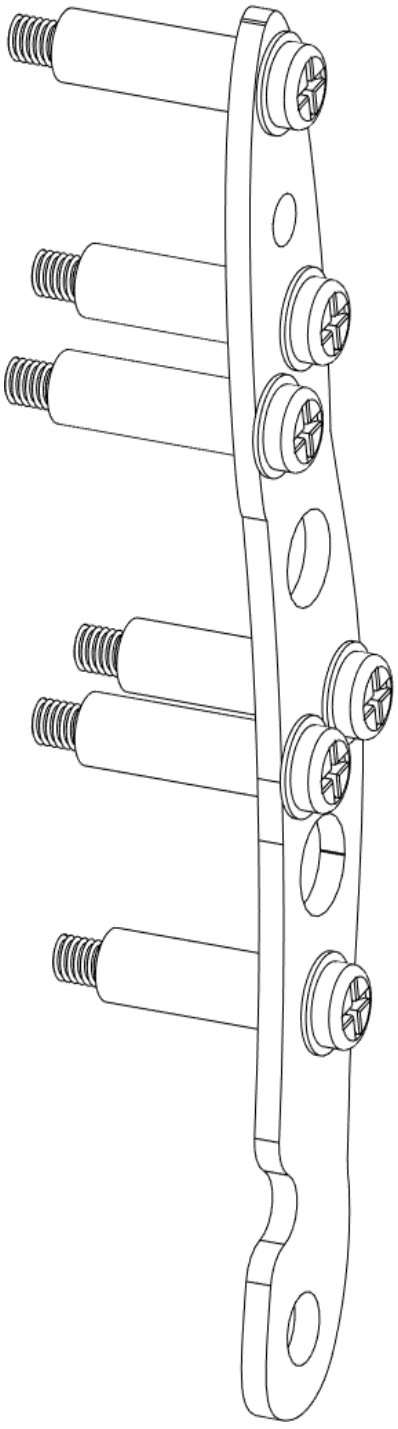
With the screws securely in place on one of the 3D-printed frames, the next step involves integrating the aluminum tubes into the assembly. Follow these steps to ensure a precise fit:

**Collect Aluminum Tubes:**
Gather 6 of the 10x32mm aluminum tubes. These tubes will be slid over the screws inserted into the 3D-printed frame.

**Align and Slide:**
Position each aluminum tube over the corresponding screw, ensuring that they align with precision. Slide the tubes snugly into the countersunk cutouts on the frame.

**Secure Fit:**
Confirm that the tubes fit securely into the countersunk cutouts, providing stability to the structure. The snug fit ensures proper alignment and functionality.

By incorporating the aluminum tubes, you enhance the structural integrity of the pedal assembly. This step sets the stage for the subsequent stages of the construction process, bringing you one step closer to completing your custom race simulator pedal.



# Step 3

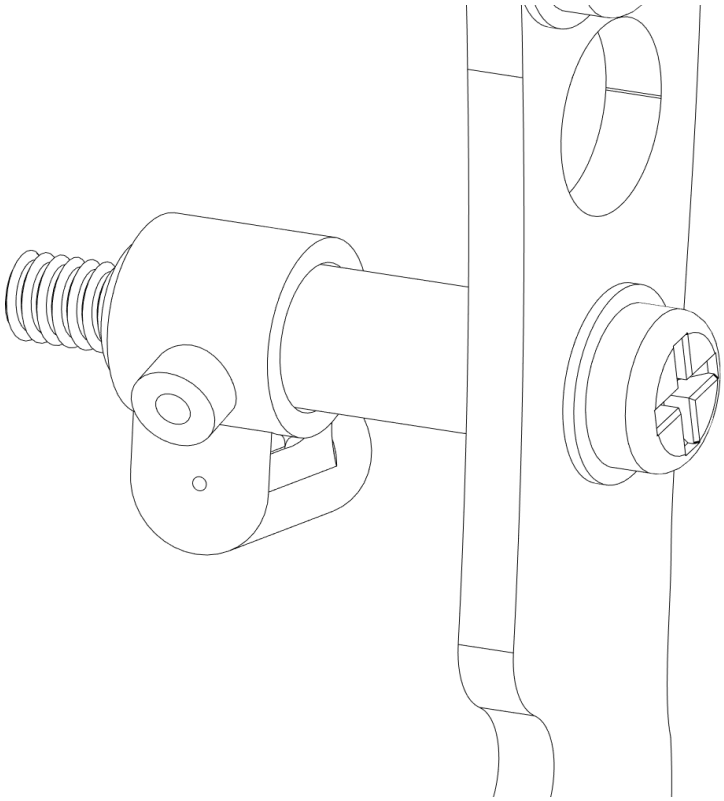
Now that the aluminum tubes are in place, proceed to attach the magnet holder to the assembly. Follow these steps for a seamless integration:

**Identify the Magnet Holder:**
Locate the magnet holder among your 3D printed parts. This specific component is designed to hold a magnet for sensor functionality.

**Select the Lowest Screw:**
Choose the lowest screw on the assembled pedal structure. This is where the magnet holder will be affixed.

**Slide on the Magnet Holder:**
Slide the magnet holder onto the selected screw, ensuring a secure fit. Pay attention to the orientation of the magnet holder, aligning it according to the diagram provided below.

By attaching the magnet holder at this stage, you are incorporating a crucial element for sensor-related features in your race simulator pedal. Proceed with precision to achieve the desired alignment and functionality.



# Step 4

As we move forward, it's time to cmplete the pedal assembly by adding the other 3D print of the pedal. Follow these steps to finalize the structure:

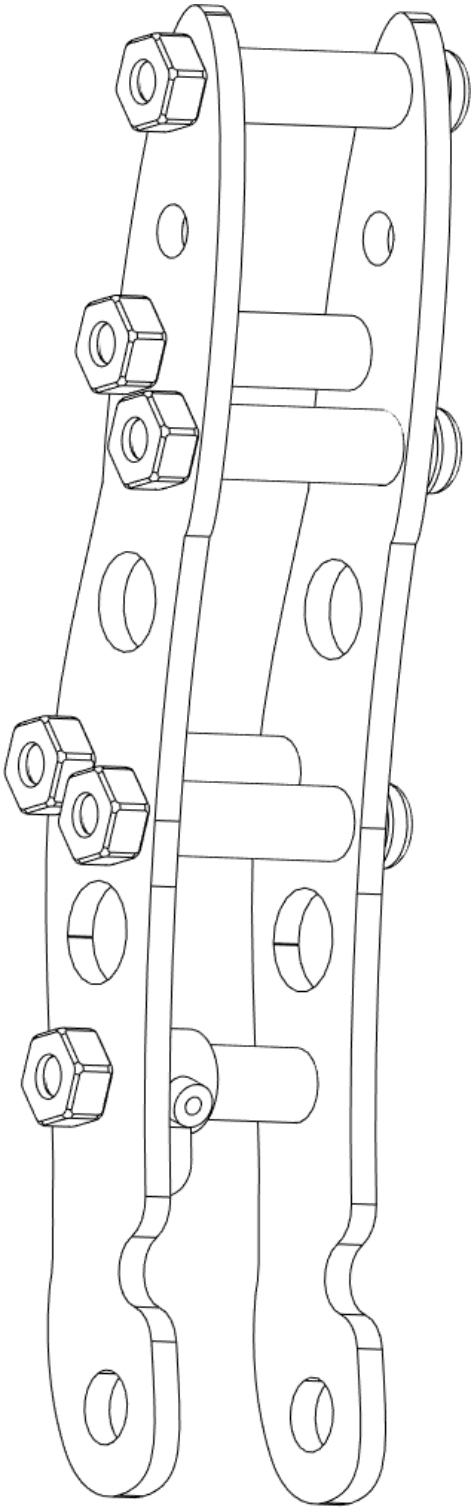
**Retrieve the adjacent print:**
Obtain the second 3D print component of the pedal, designed to complement the first part in completing the pedal assembly.

**Position Over Screws and Tubes:**
Carefully position the second 3D print over the screws and aluminum tubes that you've assembled in the previous steps. Ensure that the screws align with the corresponding holes in the 3D print, and the aluminum tubes fit into the countersinks in the PLA.

**Add Nut and Washer:**
For each screw, add a washer and nut to secure the second 3D print in place. Ensure that the washers provide a smooth surface for tightening.

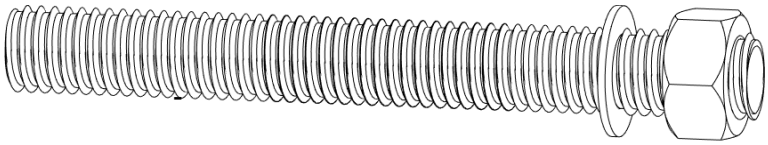
**Tighten Securely:**
Using appropriate tools, tighten the nuts securely. Be cautious not to overtighten, ensuring a snug fit without compromising the integrity of the materials.

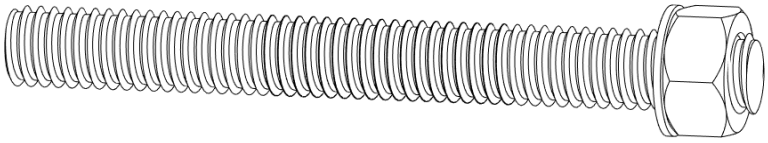
By completing this step, you enclose the aluminum tubes within the 3D-printed frame, creating a robust and cohesive pedal assembly. Move forward with confidence, knowing that each component is securely fastened and aligned as intended.



# Step 5

Gather the 2 8x80mm rod. Add a nut and washer to one end of each thread.



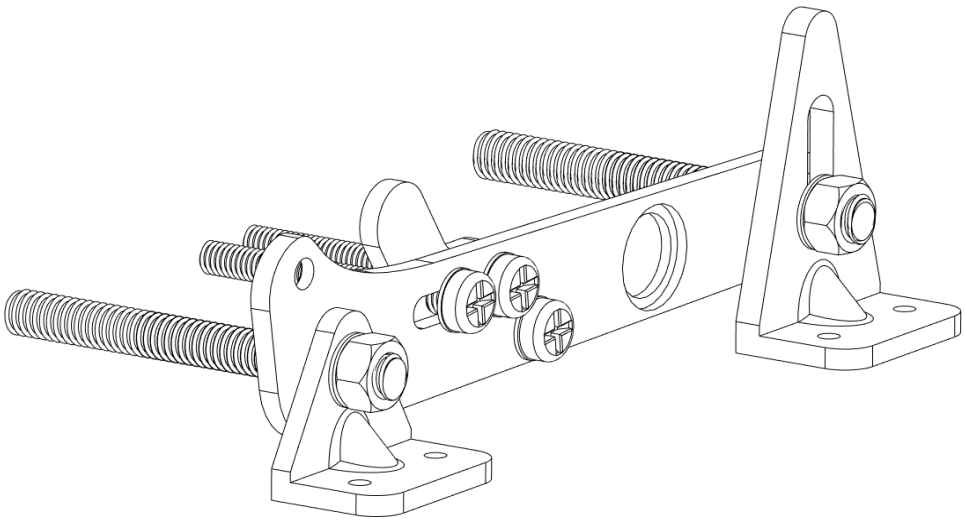


**Collect Components:**
Gather the right-hand side of the pedal base, the front (short) mount, and the rear (tall) mount point. Additionally, have the 8mm threaded rod, 3 6x55mm screws, washers, and the right side pedal stopper ready.

**Thread the 8mm Threaded Rod:**
Begin by threading the 8mm threaded rod through the mount he front (short) and rear (tall) mounts. Continue by passing it through the the pedal base with the tall mount at the rear. Ensure that the rod runs smoothly through each component.

**Insert 6x55mm Screws and Washers:**
Take 3 of the 6x50mm screws along with corresponding washers. Thread these screws through designated points on the pedal base, securing the components together. Refer to the provided picture for guidance on the correct placement.

**Attach Pedal Stopper:**
Focus on the two 6mm screws that go through the slotted hole in the pedal base. Add the pedal stopper to these screws. This stopper will play a crucial role in defining the pedal's range of motion.

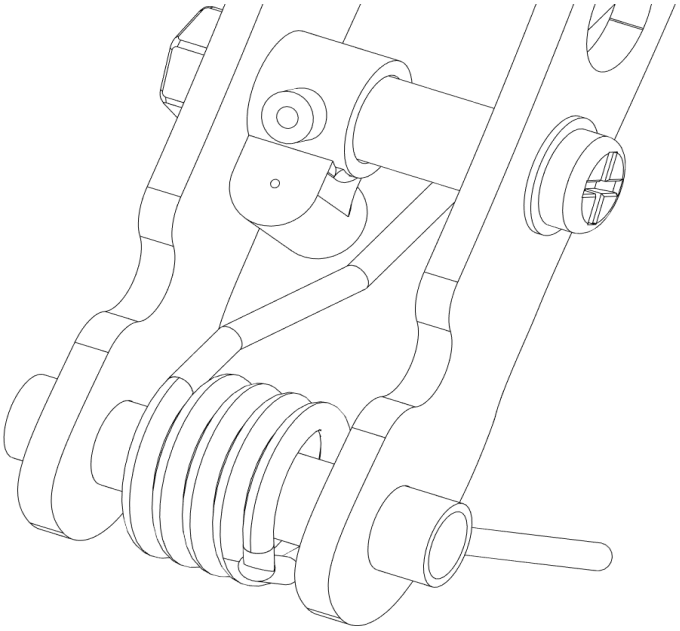


# Step 6

**Retrieve the Torsion Spring:**
Gather the torsion spring, a crucial component for providing tension and resistance to the pedal mechanism.

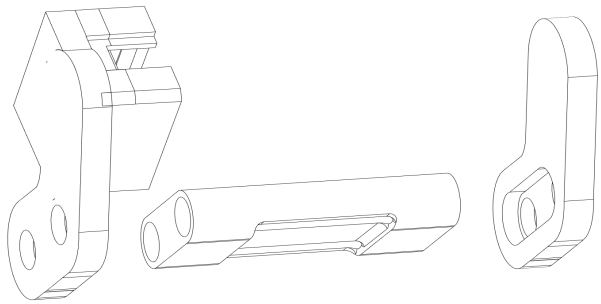
**Prepare the 50x10mm Tube:**
Take the 50x10mm tube and thread it through the bottom of the pedal then the middle of the torsion spring. This arrangement is vital for incorporating the spring into the pedal assembly.

**Refer to the Diagram:**
Follow the diagram provided to ensure the correct orientation and positioning of the torsion spring and the tube. The diagram serves as a visual guide for proper assembly.



# Step 7

Gather the parts for the pedal stopper. This is made of 3 parts, one you have already installed the middle section is shown in the diagram below along with the sensor holder.

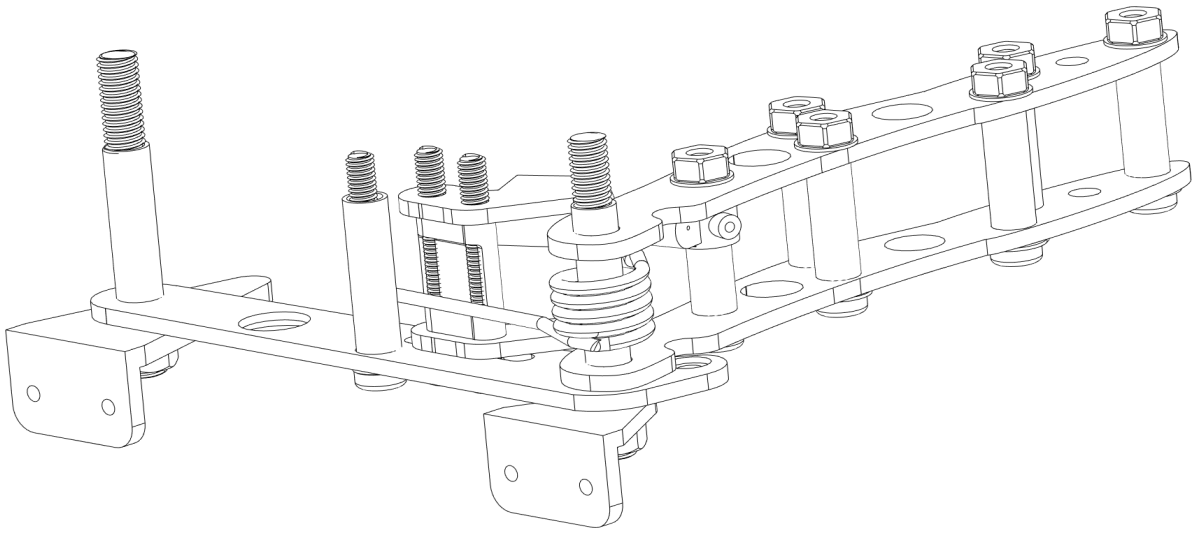


**Orientation Check:**
Carefully tip the pedal assembly onto its side to access the lower part. Take note of the orientation of the pedal stopper parts, ensuring that the threads of the screws are exposed at the bottom of the pedal stopper.

**Slide on Pedal Stopper Parts:**
Slide the pedal stopper parts onto the assembly according to the provided diagram. This addition is crucial for limiting the pedal's range of motion.

**Add Remaining Aluminum Tubes:**
Attach the remaining aluminum tubes to the remaining screws on the assembly. As with previous steps, make sure the tubes fit snugly into the countersinks in the PLA, providing stability to the structure.

**Confirm Pedal Stopper Orientation:**
Double-check that the pedal stoppers are oriented correctly, with the exposed threads at the bottom. This orientation is essential for the proper functioning of the pedal stopper.



# Step 8

**Add the Last Remaining Side:**
Affix the last remaining 3D-printed side to the lower part of the pedal assembly. Align the screws with the corresponding holes, ensuring a precise fit. This step closes off the lower section of the pedal assembly.

**Attach Rear and Front Mounting Brackets:**
Integrate the rear and front mounting brackets as indicated in the diagram below. These brackets contribute to the overall stability.

**Use Washers with Nuts:**
For each nut securing the brackets and the last remaining side, add a washer before tightening. Washers help distribute the pressure evenly and provide additional support.

**Secure with Nuts:**
Using the appropriate tools, securely tighten the nuts on each screw. Ensure that the entire lower pedal assembly is firm and stable.

By completing these steps, you finalize the construction of the lower pedal assembly, incorporating the last 3D-printed side and mounting brackets. The addition of washers ensures a secure and balanced attachment. Take a moment to inspect the assembly, confirming that all components are correctly aligned and tightened before proceeding to the next phase of your pedal construction.