

RRevo Robot Kit

Complete build and setup guide for the RRevo Robot Kit. From 15 pound combat to robot hockey, this kit is designed to be the perfect starting platform to get in the competition with robust parts that are intended to last you into your own designed bot!

Written By: Bradley Hanstad





TOOLS:

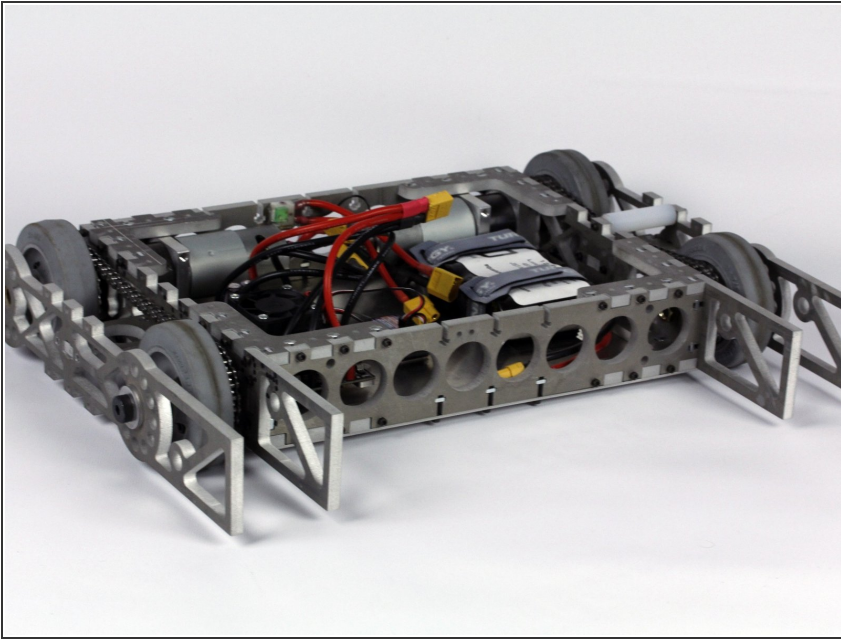
- [Set of standard allen/hex wrenches](#) (1)
- [2.5mm hex wrench](#) (1)
- [Medium Grit Sand Paper](#) (1)
- [8-32 Thread Tap](#) (1)
- [5/16" nut driver / wrench](#) (1)



PARTS:

- [AA Batteries](#) (8)
- [Top cover/plate](#) (1)
- [Armor!](#) (1)
- [Weapon!](#) (1)

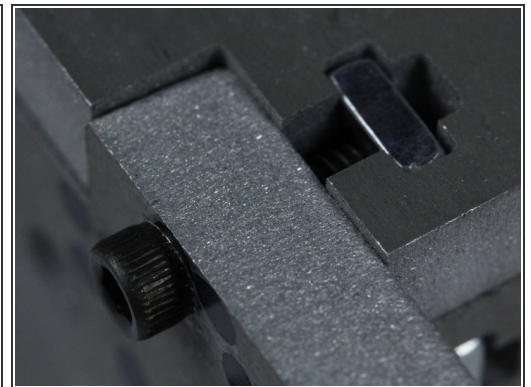
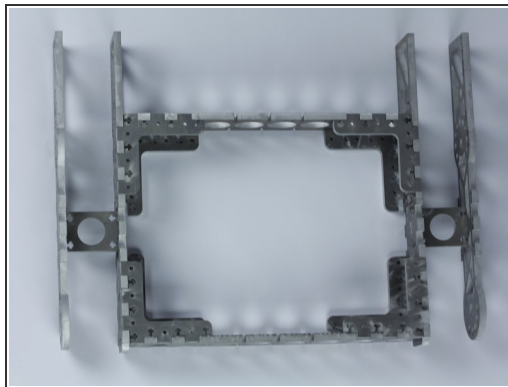
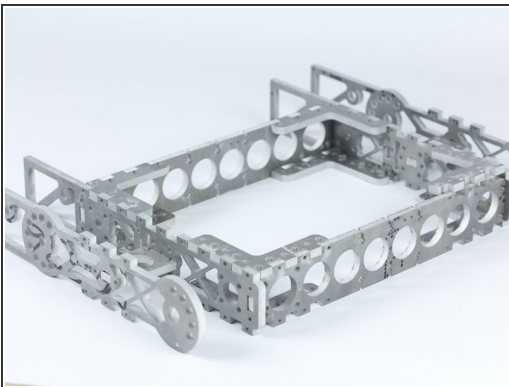
Step 1 — RRevo Robot Kit



⚠ Robots can be dangerous to yourself and others, always work with others and use personal safety gear at all times to prevent injury. Never test a robot outside of a safety box.

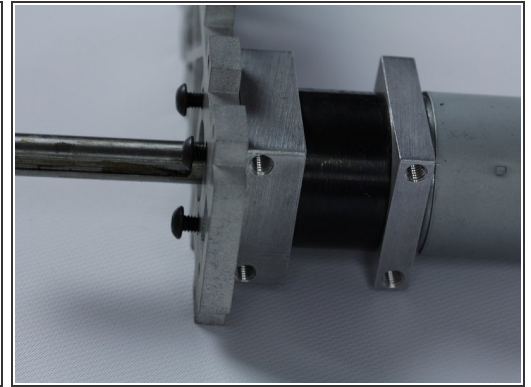
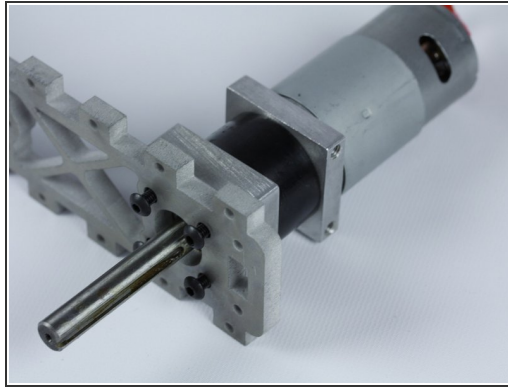
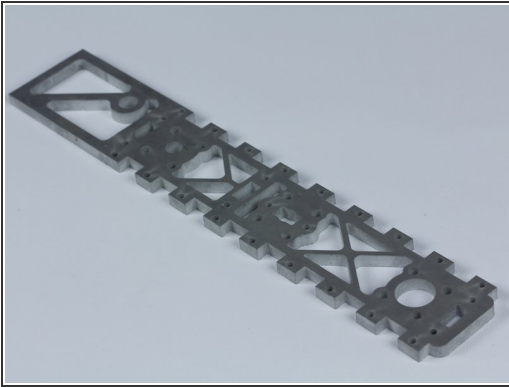
- DO NOT OPERATE ROBOT OR ATTEMPT TO CHARGE THE BATTERY UNTIL YOU HAVE GONE THROUGH THIS GUIDE AND THE ELECTRONICS/BATTERY CHARGING PORTION OF THIS GUIDE.

Step 2



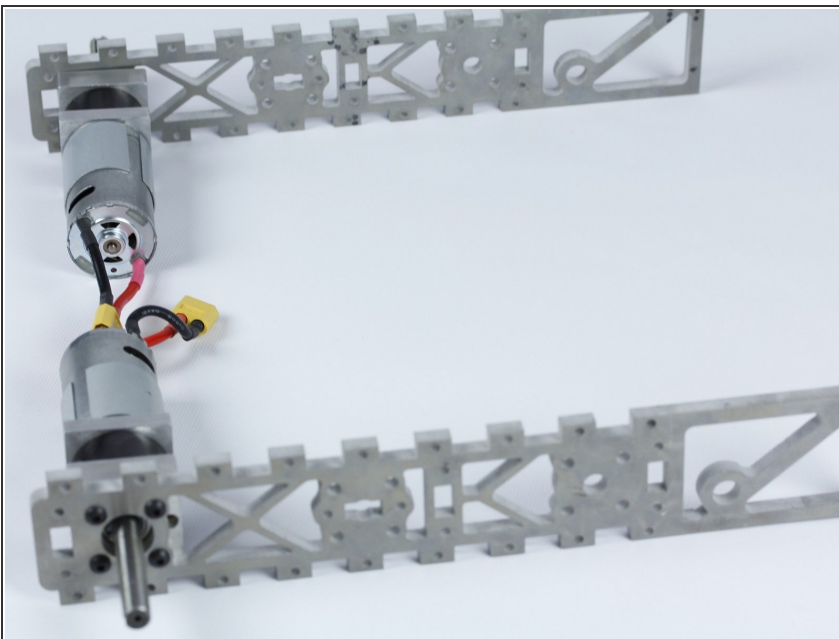
- You can begin the build by taking the aluminum frame pieces and mock them up so you have a visual on the overall final shape.
- These pieces all interconnect in a puzzle piece like system relying heavily on the strength of these connections with 4-40 machine nuts and screws to retain them

Step 3



- Start with an inner frame rail as shown in the picture.
 - Align a gearmotor with the back of the frame rail piece making sure to position the 10-32 threaded holes face the back of the robot.
 - Use 4 of the M4 1/2" long button head screws to fasten the motor in place.
- ☒ Only tighten these, and ever fastener for the rest of the build, hand tight to allow for wiggle room.

Step 4



- Repeat with the other inner frame rail making sure to note the front angle and bolt hole so they will line up later

Step 5



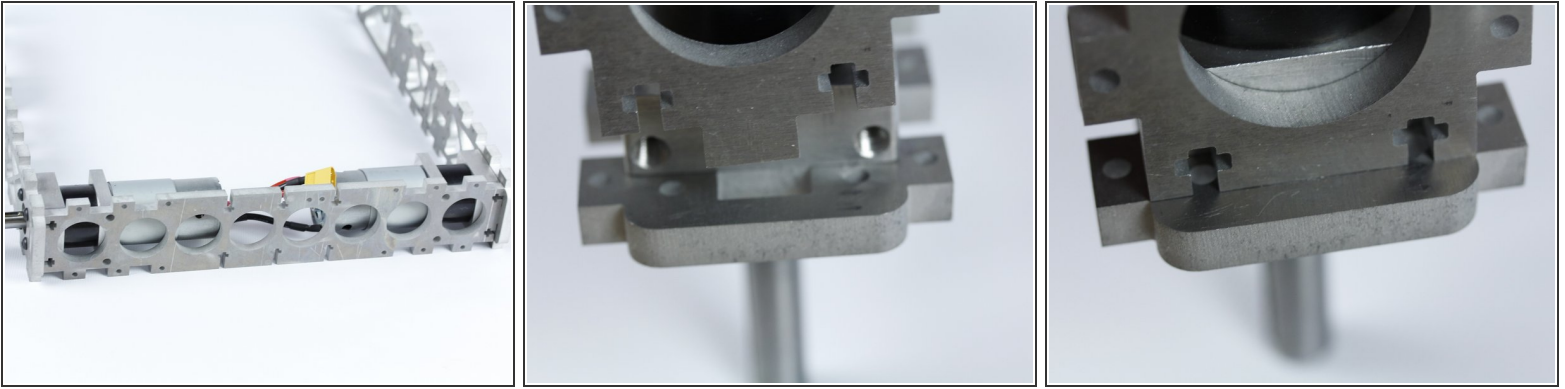
- Take this time to assembly the wheels
- There are two types of sprockets. One features a bushing that is destined for the deadshaft that is the 3/8" shoulder bolt and free spins on that shaft, the other has a 3/8" bore with keyway
- Tighten these 8-32 3/4" long screws snug and then 1/2 turn more

Step 6



- Take one of the 3/8" shoulder bolt and unscrew the nut and obtain five(5) black nylon washers and put them on a motor shaft
- Next we need to see how the wheel sits on the motor's shaft. You can see that with the keyways lined up you need to get your keystock ground to snugly fit in this position.
- ⓘ Traditionally the keystock fits more tightly in the shaft's keyway, but due to some manufacturing quality issues the keystock sits in the opposite position of the sprocket's keyway
- It can be a little time consuming to properly file/grind/sand the keystock to fit properly in the sprocket, but if building the kit with multiple people this task should be started as the rest of the kit comes together

Step 7

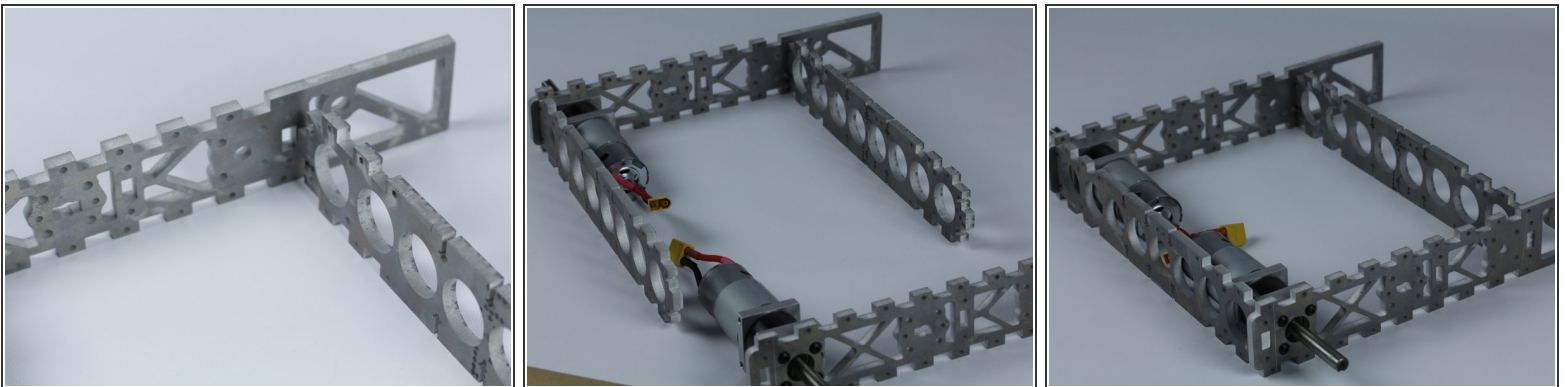


- Next we will work to link the two inner frame rails using the cross supports

⚠ Make sure the two small holes that are asymmetric on the cross support rail pieces are facing up or to the top of the robot. The orientation of the robot is based on the front of the inner frame rails and their 45degree cut and bolt hole which can be seen in the first picture.

- Showing how and where these puzzle cut pieces align and sit in place

Step 8



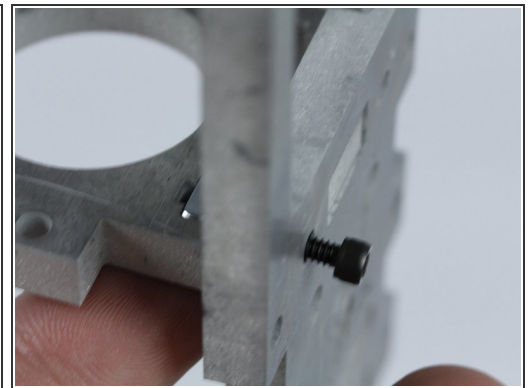
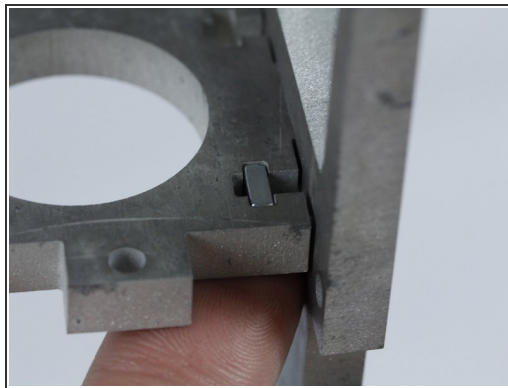
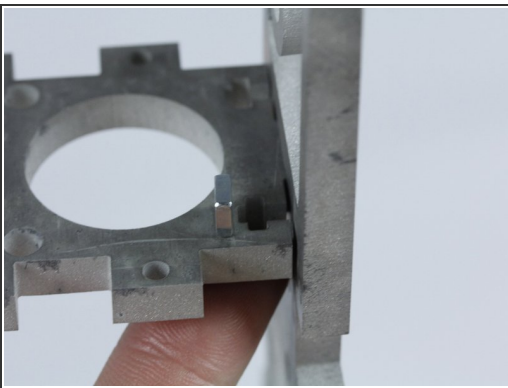
- Now align the front facing cross support with it's common position
- (i)** This front can also be moved back to shorten the frame or just the inner compartment
- Align all 4 main frame rail pieces

Step 9



- Time to get out your 4-40 screws and 4-40 square machine nuts

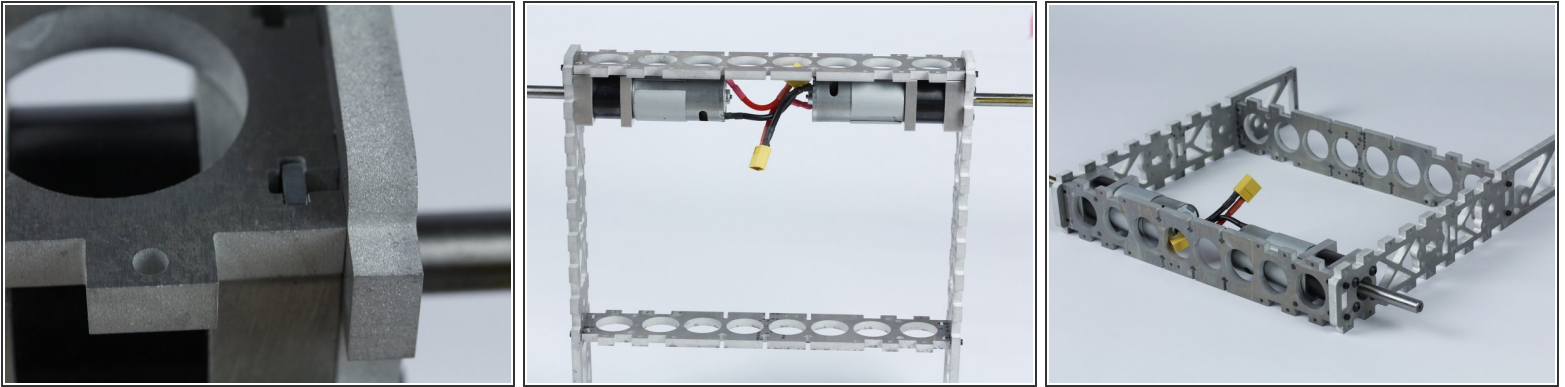
Step 10



This process will be repeated throughout the build

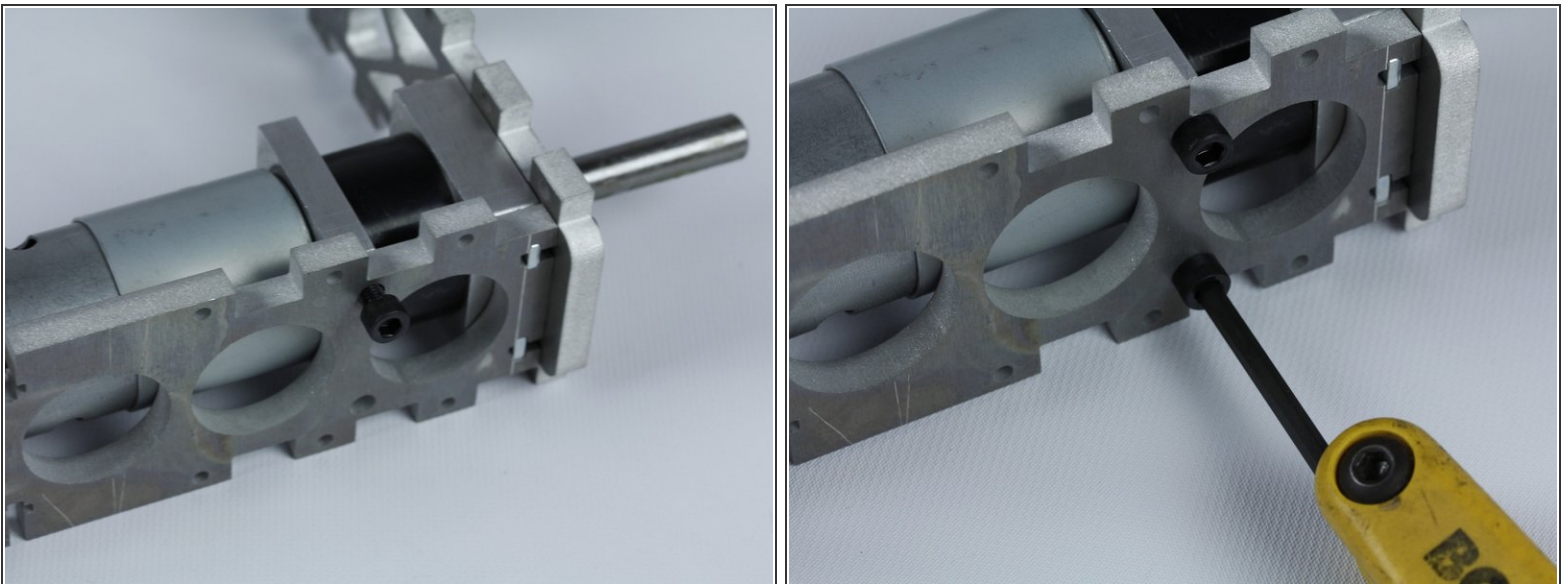
- Using your finger and gravity, block the pathway of a 4-40 square machine nut slot and drop in a 4-40 machine nut.
- Alternatively you can use masking (or other) tape to block the pathways temporary until you get the screws to mate with the nuts
- Thread in a 4-40 screw to each of the 8 nut location on the front and back cross support frame rails

Step 11



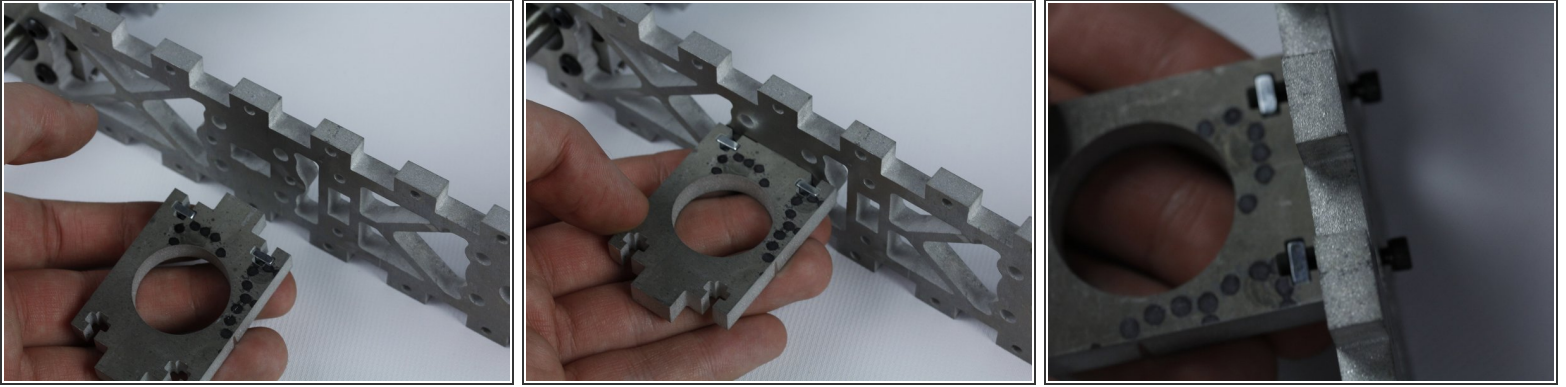
- The nuts on the back cross support frame rails can be dropped in and they will sit against the gearboxes surface making it easy to fasten
- Use gravity to your advantage on these machine nut placements
- Should now have all the inner frame rails connected. Keep the screws still slightly loose to allow for a little play needed for the upcoming steps.

Step 12



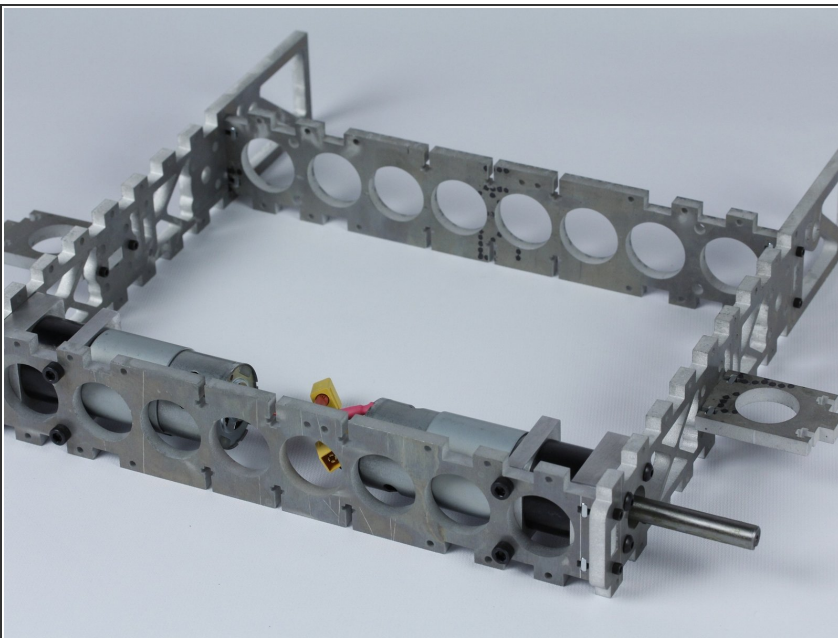
- Using 10-32 socket cap screws, thread in and loosely tighten to secure the gearboxes' additional mounting points.

Step 13



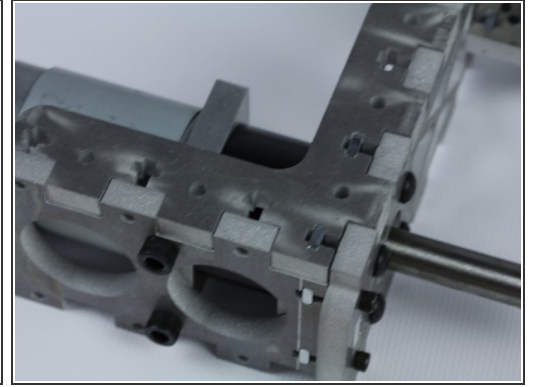
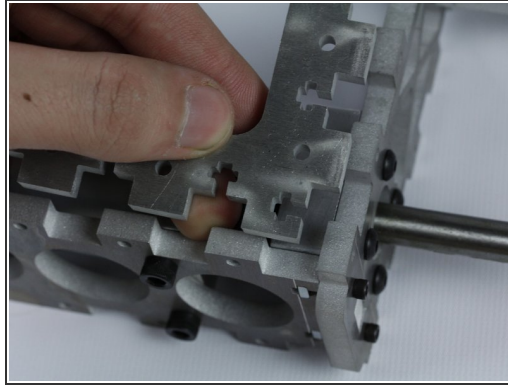
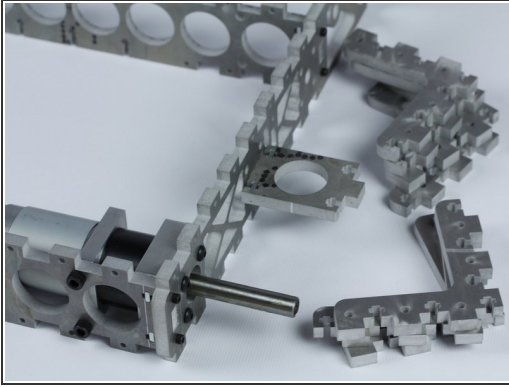
- Take the small frame rail supports and find it's mounting spot on the horizontal plane of the bot in the middle of the inner frame rail
- Using your finger to block the pathway of the 4-40 square nuts, place the piece into it's position and thread in some 4-40 screws from the inside of the robot

Step 14



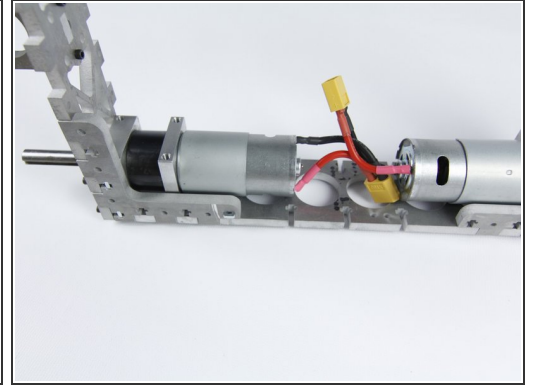
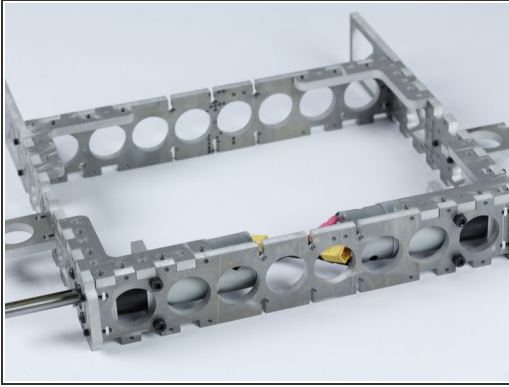
- Repeat the last step
- Should now have something that looks like the picture

Step 15



- Next pull out all of the corner support pieces, there should be 8 in total. If your kit happens to have any threaded holes in these, assign those to the bottom of the robot
- Align the corner supports making note of the position shown in the picture so that all holes line up to a square nut pathway
- The gearboxes side corner support have two nut pathways that are supported by the gearbox itself and can just be put in normally

Step 16

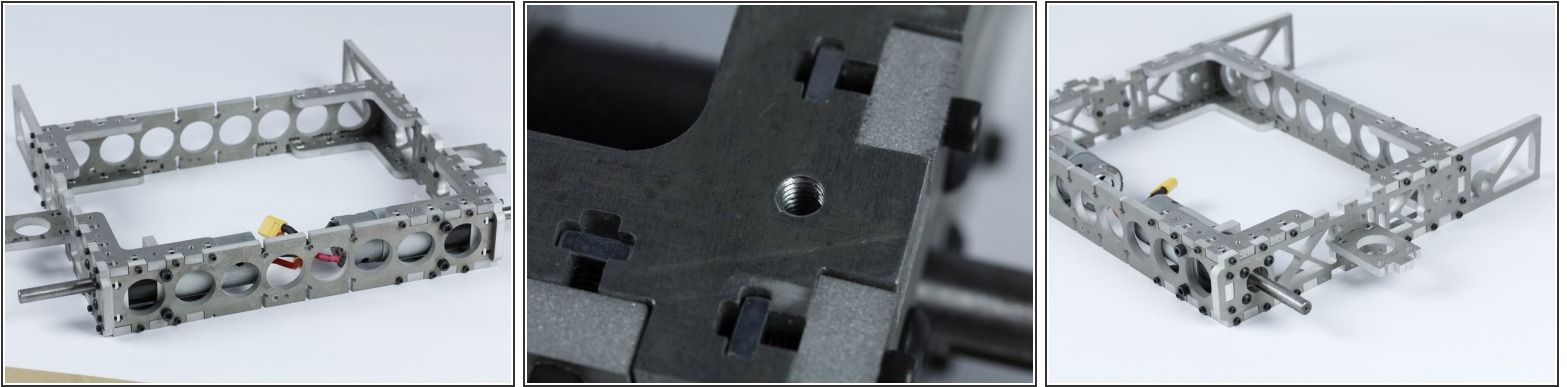


- Place one side of the corner pieces to make sure that they all align together before tightening any screws.

⚠ If any of these corner pieces are off, either the front/back frame rail supports need to be ground on the support tabs or the corner supports themselves. This is a common problem with the waterjet frames.

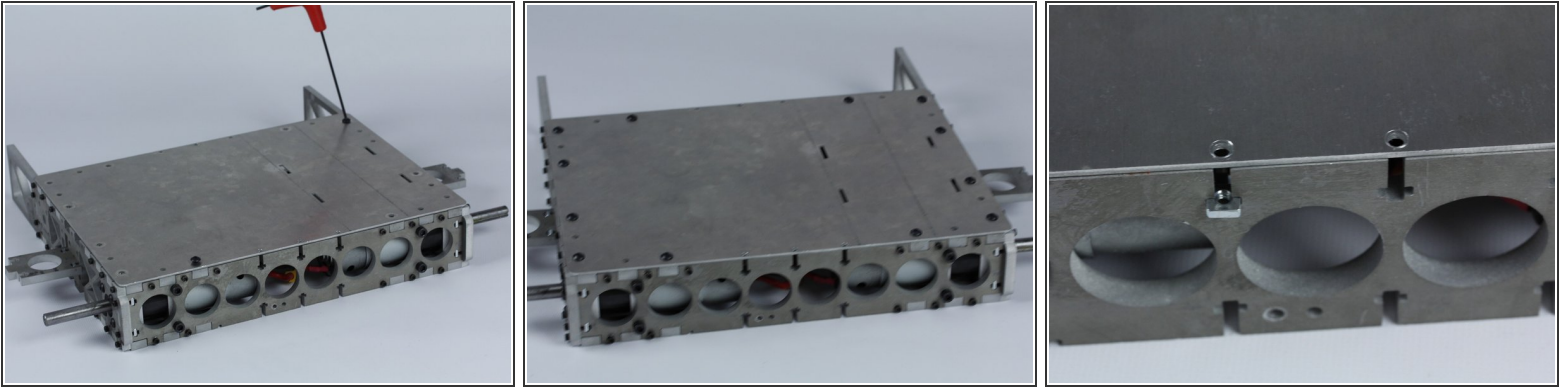
- Position the frame to make it easier for insertion of the square nuts in their pathways

Step 17



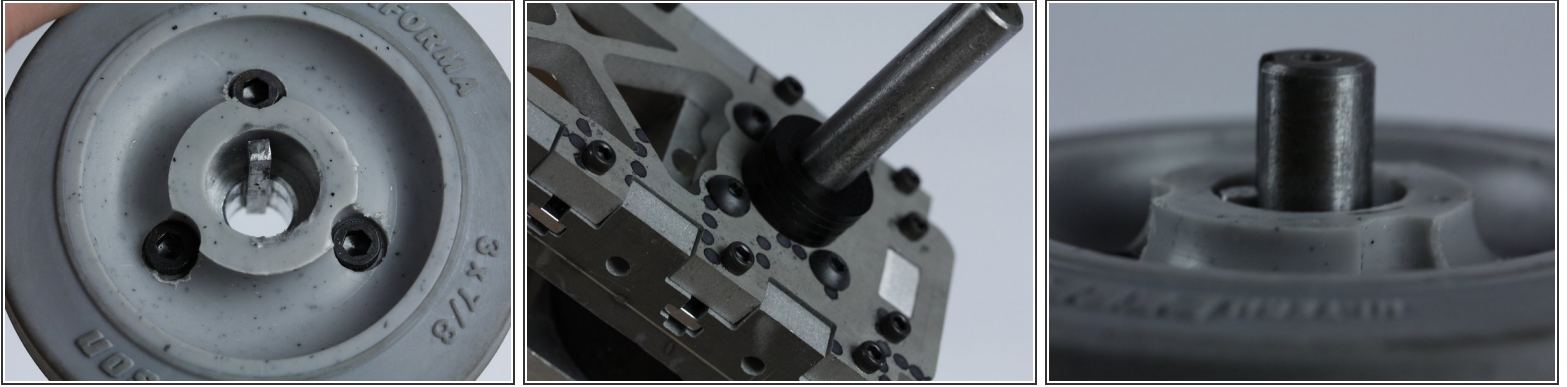
- Flip the frame over and repeat the process
 - Now is a perfect time to thread the holes of the corner supports on the bottom of the robot so that we can securely fasten the baseplate
 - You will need a 8-32 tap, a little cutting oil (WD-40 if nothing else), and some patience as to not break the tap.
 - The third picture shows the robot with his bottom facing up. The font 45degree angle cuts and their bolt holes is how you can confirm the orientation of the frame
- ⚠ Once all of the pieces of the inner frame are aligned and attached, you may begin tightening all the screws. Tighten a little at a time and go around the robot to make sure everything stays in alignment. If the corner supports start lifting off the frame, you are over-tightening those 4-40 joints. Using a clamp in the corners may aid you.**
- If everything looks good, thread lock may be applied to the screws to make sure they don't vibrate loose.

Step 18



- Place the base plate and line up the mounting holes
- If you have threaded the corner supports start with lining up the 8-32 button cap screws. Place one screw in a corner, and go to the opposite corner for the next screw. This helps to make sure everything is lined up.
- Also use the 4-40 machine nut and screw mounting positions that the front and back cross frame rails provide. I would not advise only relying on one or the other screw connection point. A combination of both is best.

Step 19



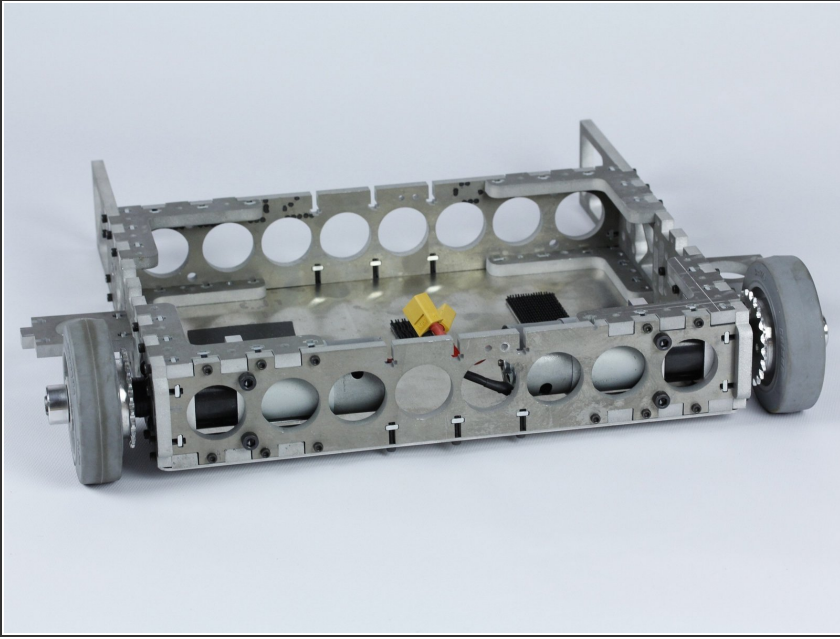
- If you haven't yet ground the keystock and fitted it inside the wheel and sprocket, now is the time to do so.
- Now place five(5) black nylon washers on the drive motor shaft and line up the sprocket and wheel and slide it on so that the sprocket faces the inside of the robot.
- Note that the keystock should not stick out on either side of the wheel and sprocket union.

Step 20



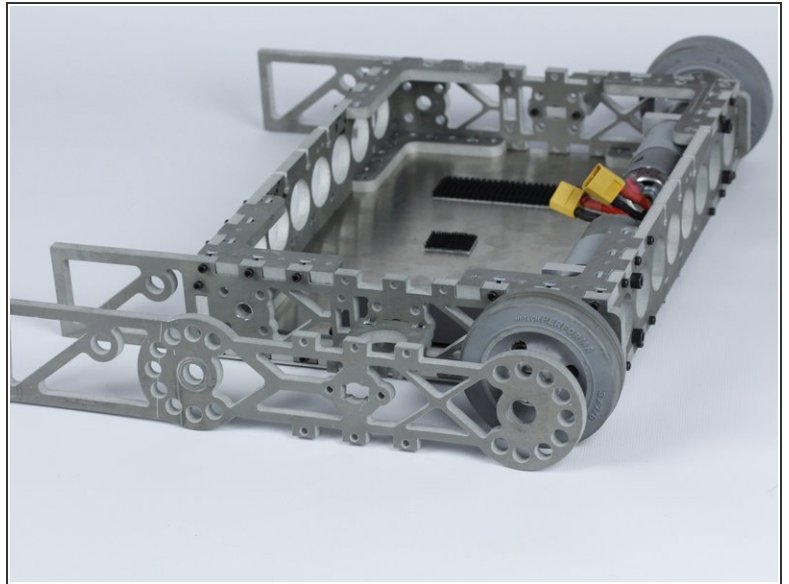
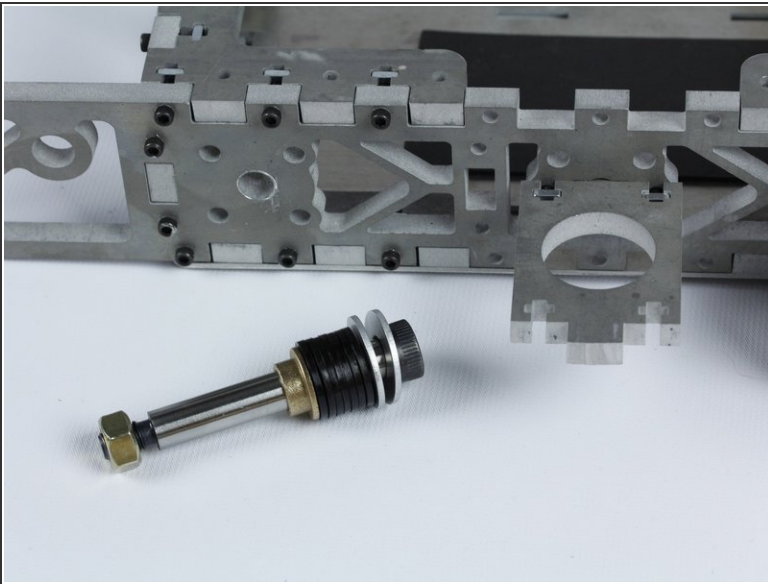
- Now take your 3/8" bore lock collar and make sure the grub/set screw is backed out and slide it over the end of the drive motor shaft
- Make sure that the grub/set screw is not over the keyway of the gearbox shaft and tighten it down thus locking this wheel to the gearbox's shaft allowing the union to rotate.
- ⓘ You can lightly sand or grind down the outer faces of this shaft collar as necessary to gain clearance for the outside frame rail.

Step 21



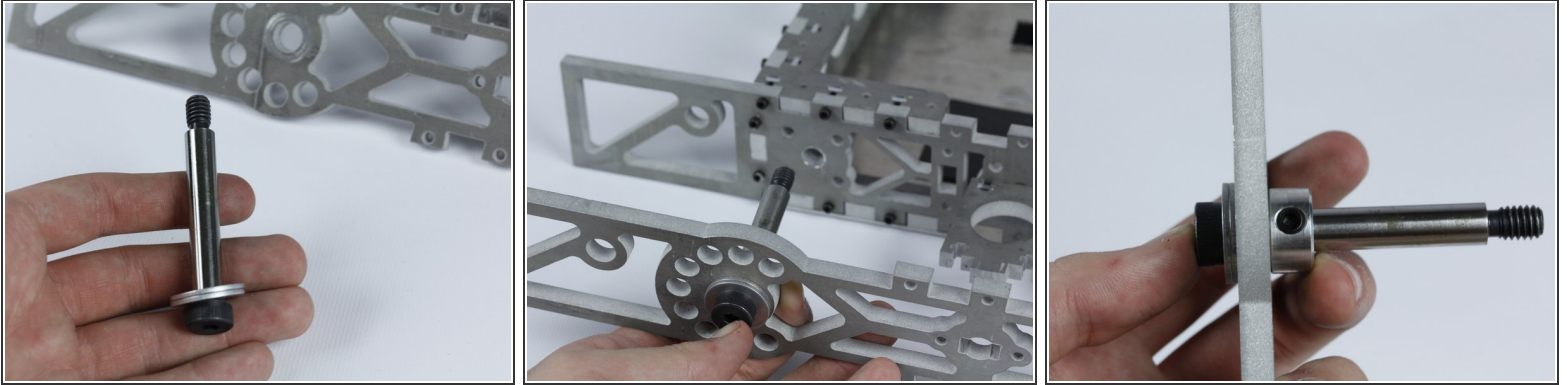
- Repeat this for the opposite side

Step 22



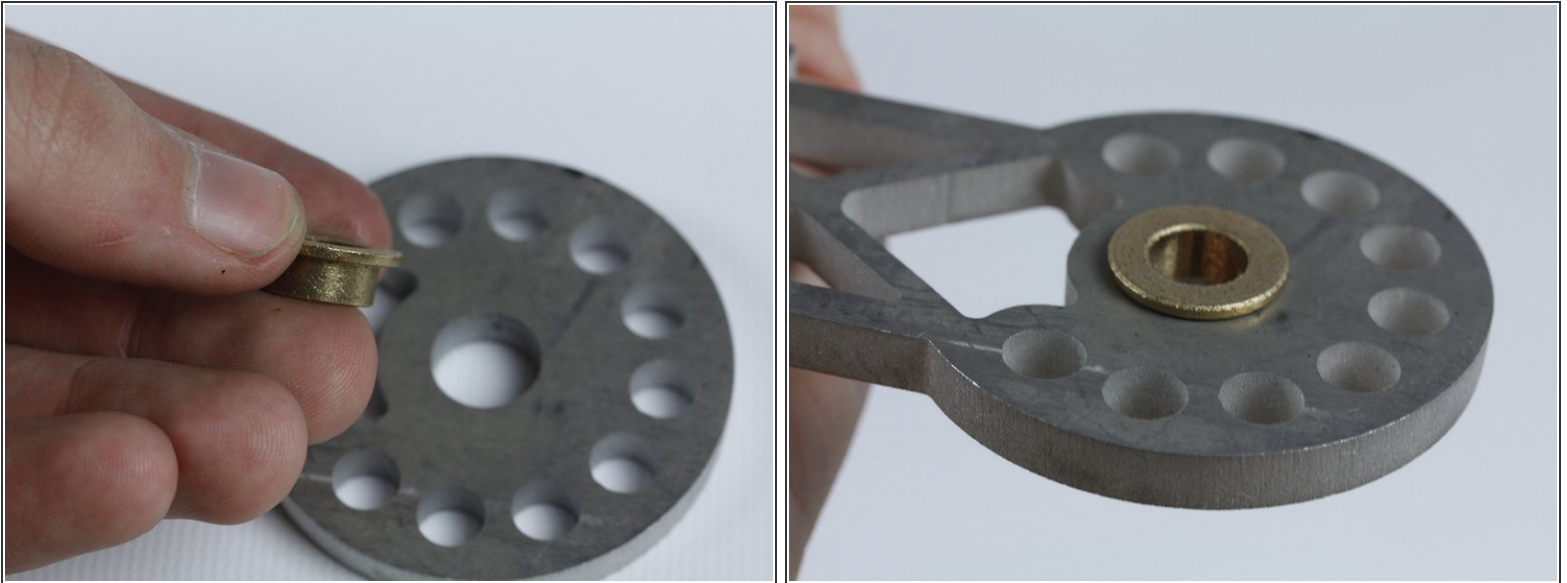
- Now remove all the remaining washers from the 3/8" shoulder bolts
- Take the outer frame rails and line them up to where they should sit. Note the continued alignment of the 45 degree cut outs and bolt holes at the very front of the rails.

Step 23



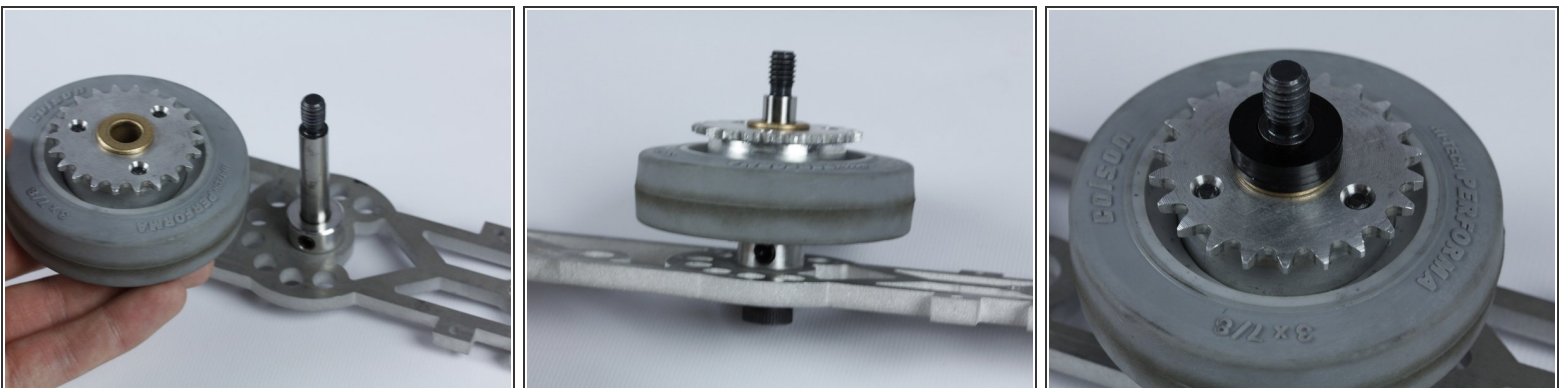
- Place two metal washers on the 3/8" shoulder bolt
- Put the bolt with washers through it's mounting position on the outer frame rail
- Take the other 3/8" bore lock collars and with a bit of force squeeze the union together and tighten the grub/set screw of the lock collar to hold the 3/8" shoulder bolt in place on the outer frame rail

Step 24



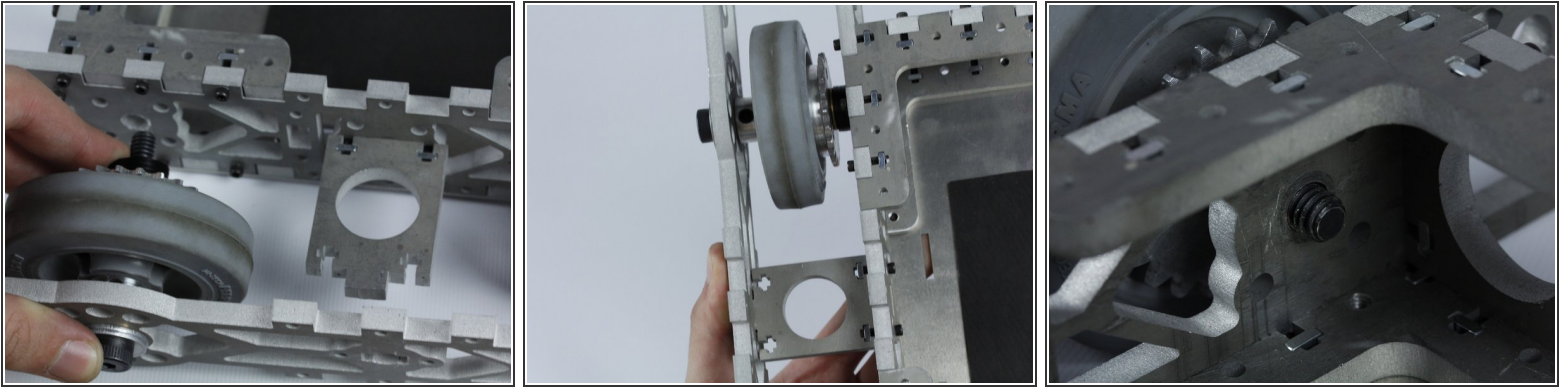
- i** Depending on how well the frame pieces align, you may need to enlarge some of the outer frame rail holes.
- Take the 3/8" inner diameter bushing and place it at the back gearbox shaft support hole of the outer frame rail
- If necessary this step can be left out if they simply do not line up well enough.

Step 25



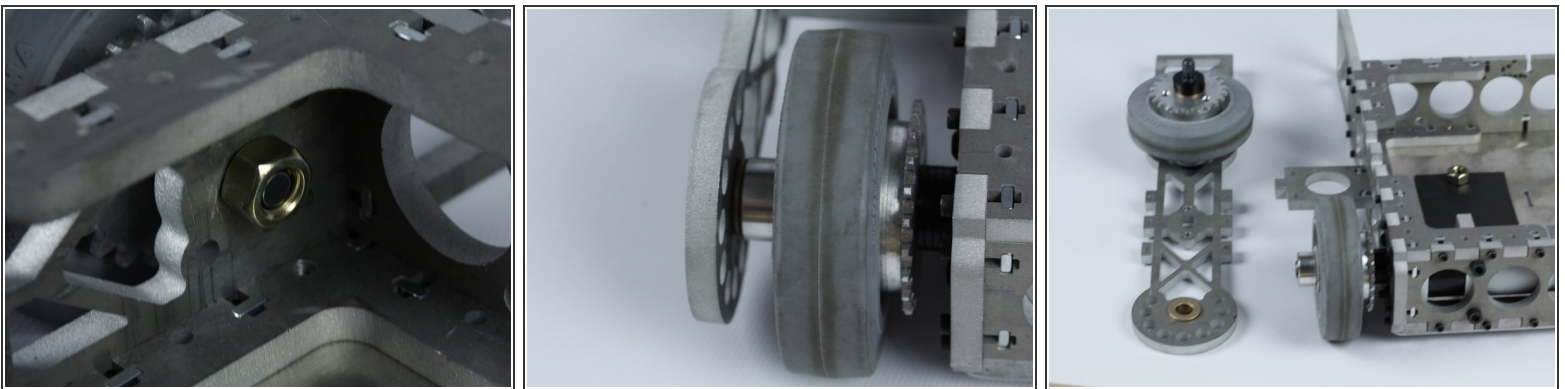
- Now take the wheel and sprocket union that comes with a bushing already inserted and place it on the newly formed deadshaft that is the 3/8" shoulder bolt.
- Add 4 black nylon washers

Step 26



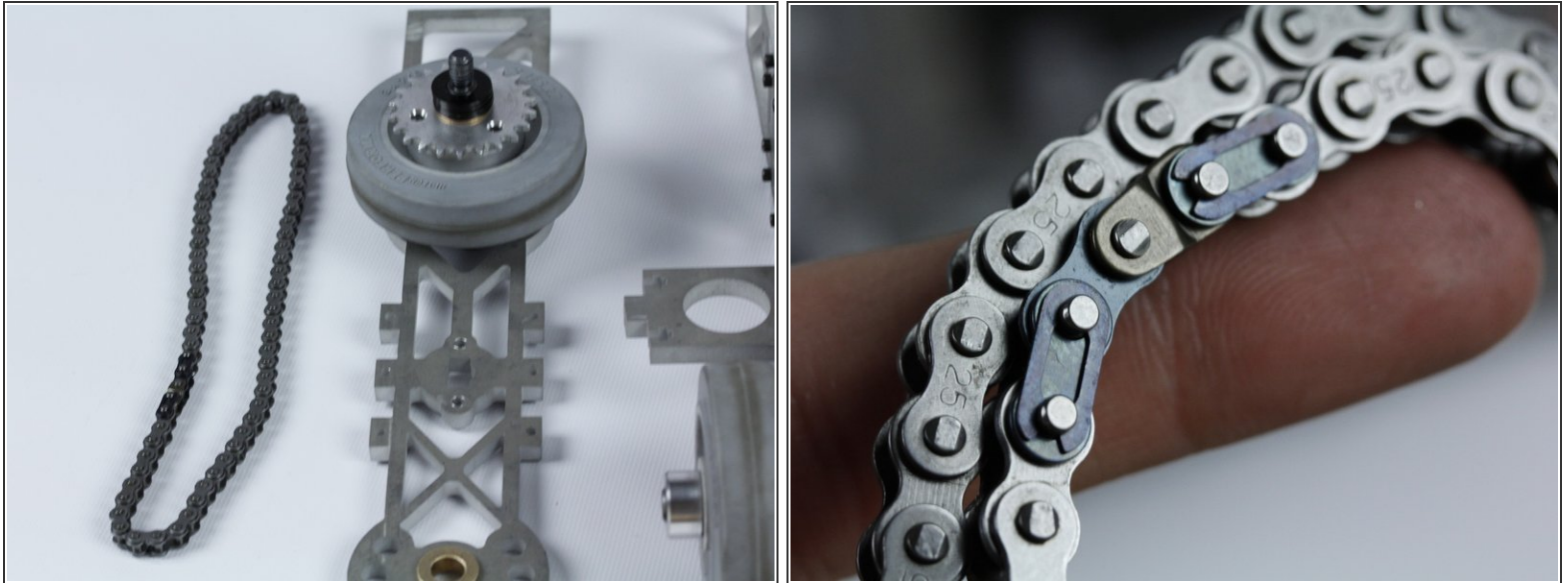
- Using your finger to hold the nylon washers in place, align the outer frame rail with the hole for the threads of the 3/8" shoulder bolt as well as the small rail support piece earlier attached to the inner frame rail.

Step 27



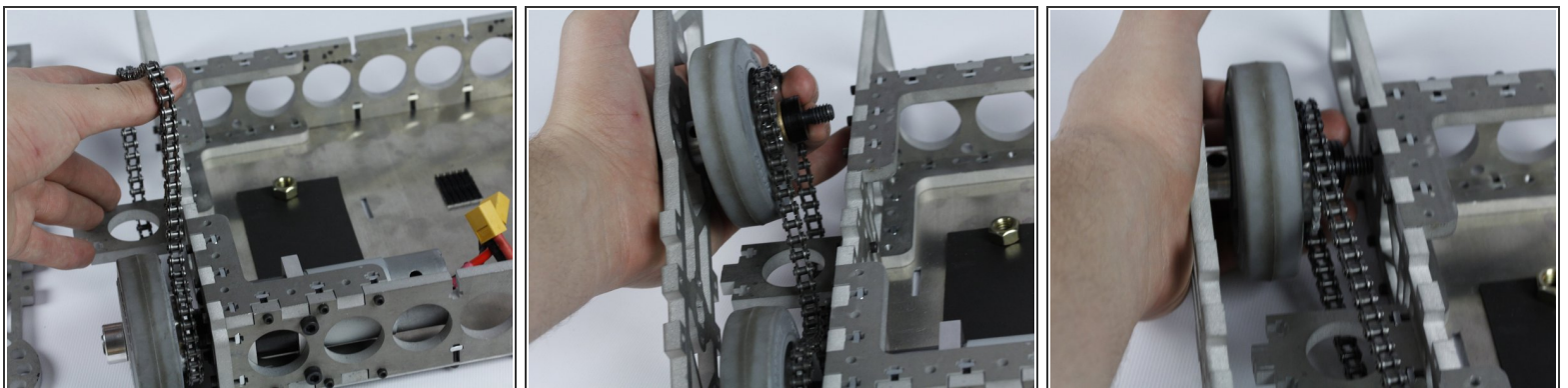
- Temporarily use the 5/16-18" nut to hold the deadshaft in position as you check the alignment with everything
- Check the alignment at this point and see if any modification is required
- Then remove the nut and pull the outer rail away from the frame

Step 28



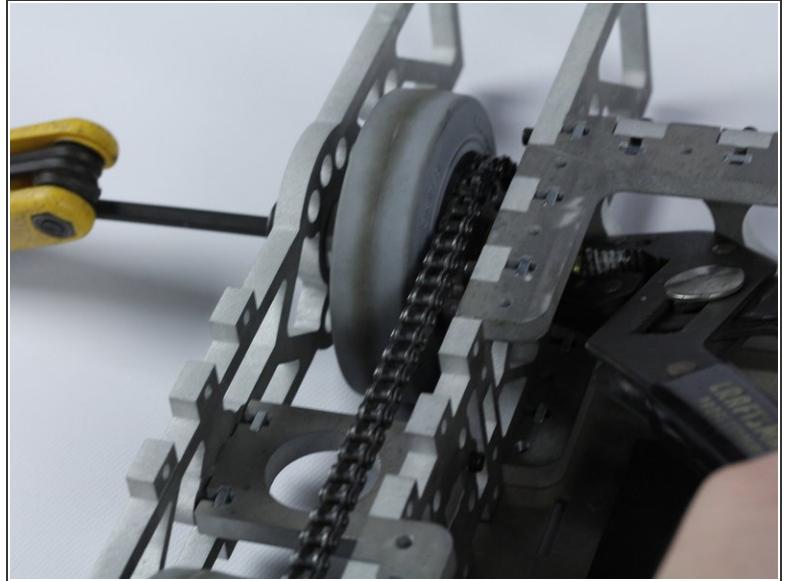
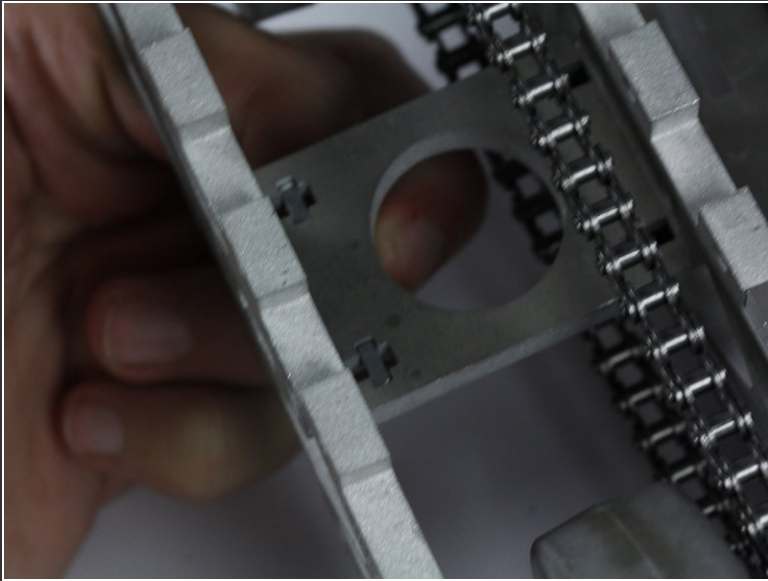
- Now take a look at the provided #25 roller chain already assembled
- Find the two master links that are used to assemble the chain. Two were used in combination with a half-link to make the total length of the chain as close as possible to ideal.
- The side of the masterlink that has the retaining clip should always face towards the wheel, or away and to the outside of the robot.

Step 29



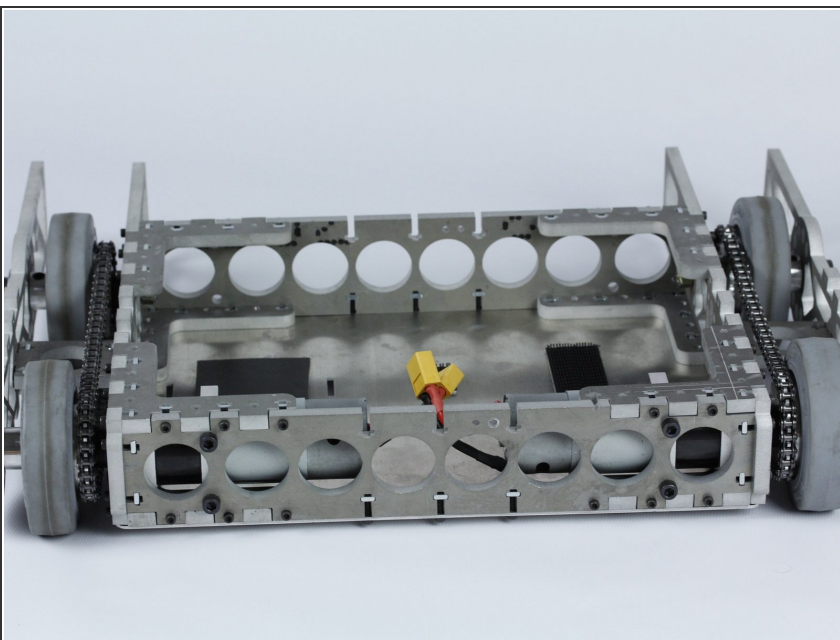
- Drape the chain over the sprocket that is attached directly to the gearbox
- Now loop the chain to the front wheel and as you let it rotate freely, re-align the outer frame rail as you did before. Hand tighten the gold colored 5/16"-18 nut to the deadshaft once more.

Step 30



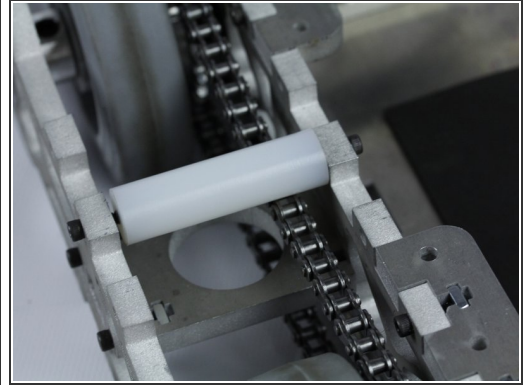
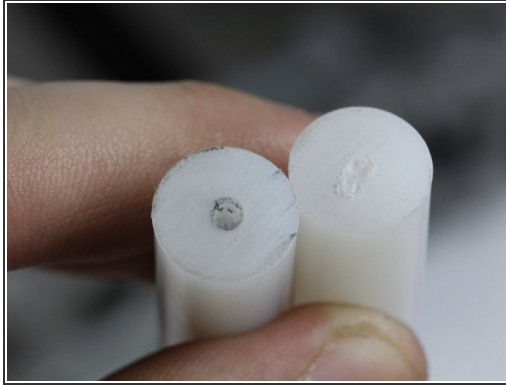
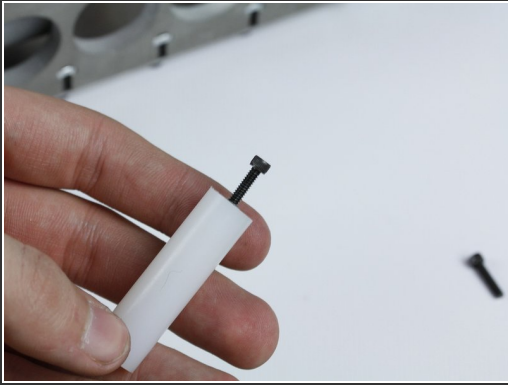
- Using your finger once more to retain the 4-40 nuts that go into the frame rail support piece and thread in 4-40 screws and tighten them down
- Using an allen/hex wrench on the 3/8" shoulder bolt and a wrench (as pictured robogrips) tighten that 5/16-8" nut by turning the allen/hex wrench as you hold the nut stationary.

Step 31



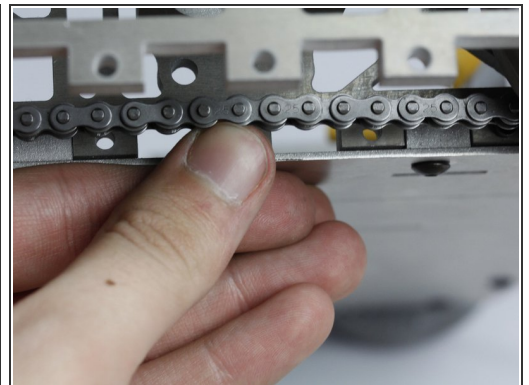
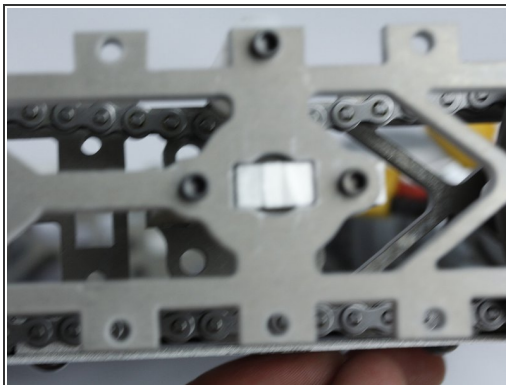
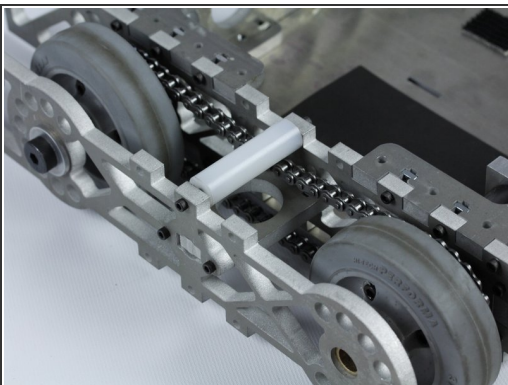
- Repeat steps 22-30 for the other side of the frame

Step 32



- Now take the round uhmw chain tensioner pieces and use a 4-40 screw to clean up the threads before trying to mount in place.
- 4 total are provided, but you may only need 1 per side. This all varies with each robot, but you may grind or cut these tensioners to better fit each robot's needs for proper chain tension.
- They mount in the center most hole between the outer and inner frame rails

Step 33



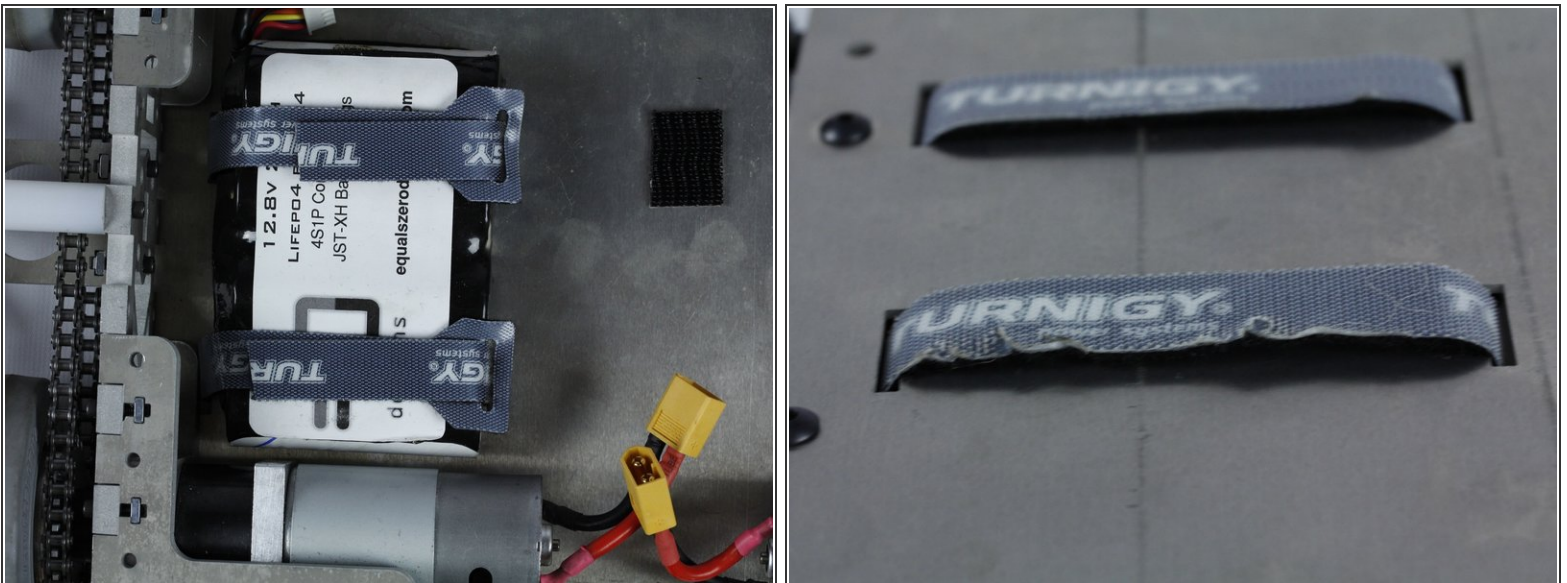
- With the uhmw chain tensioners in place, check the tension with a finger and make sure that it only has a little play.

Step 34



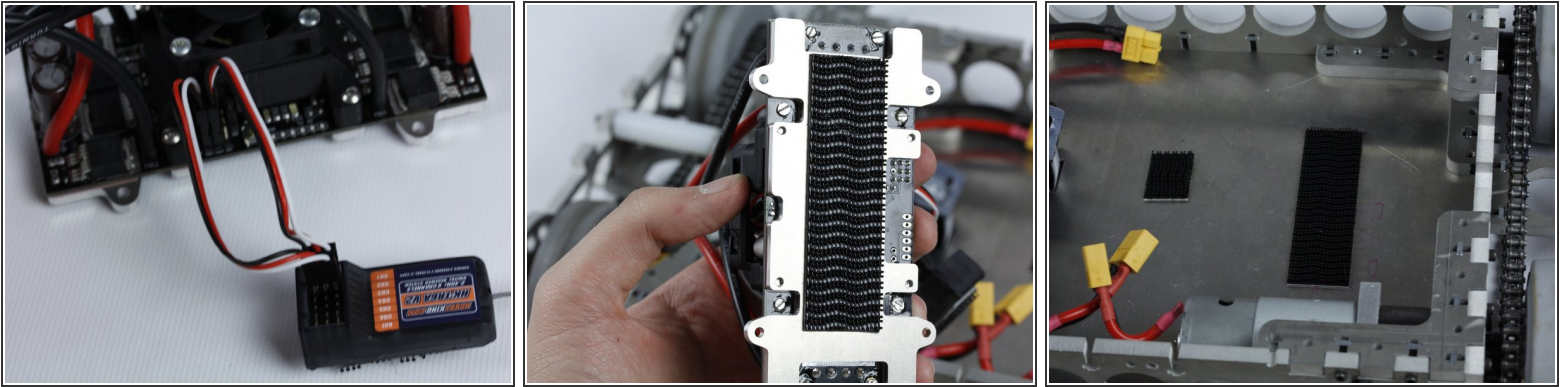
- Now moving on to the inside of the robot, place the adhesive foam pad between the battery strap slots in the base plate.
- Loop the velcro battery straps through the frame and pull tight.

Step 35



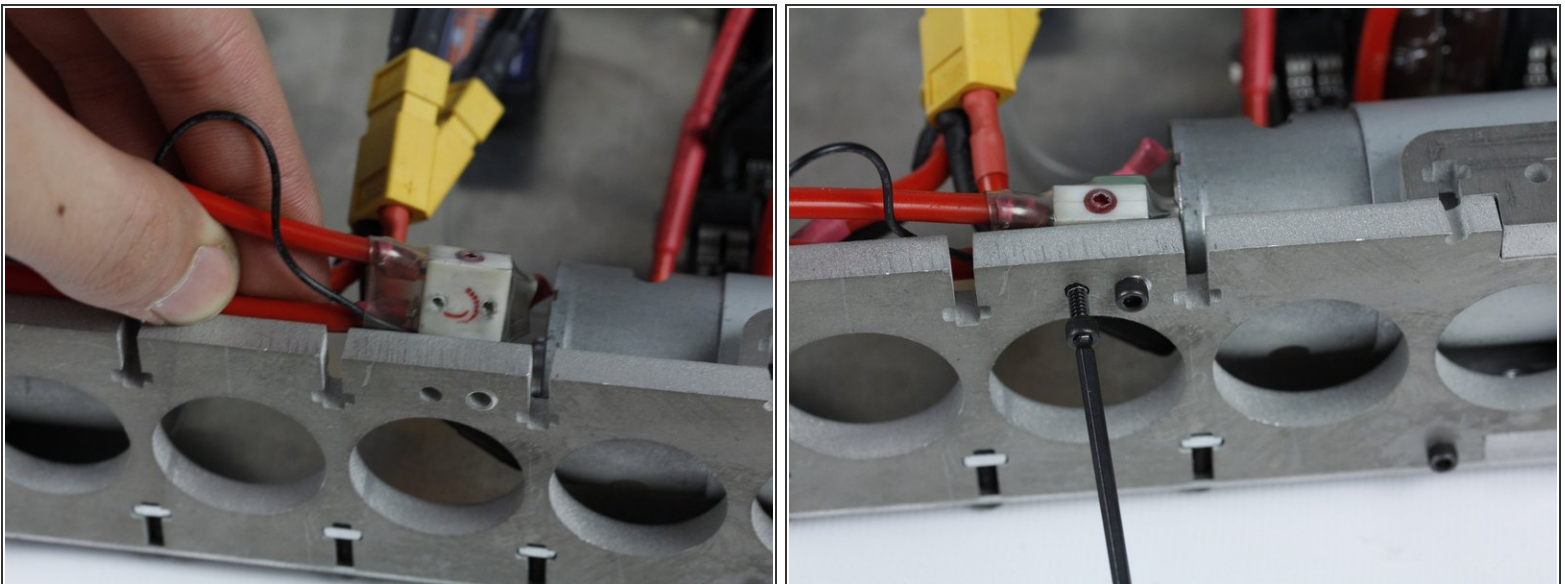
- Put the battery in place and velcro down. You can then clip the ends as shown.
- Note what happens if you happen to leave these battery straps loose. They can snag on various things!

Step 36



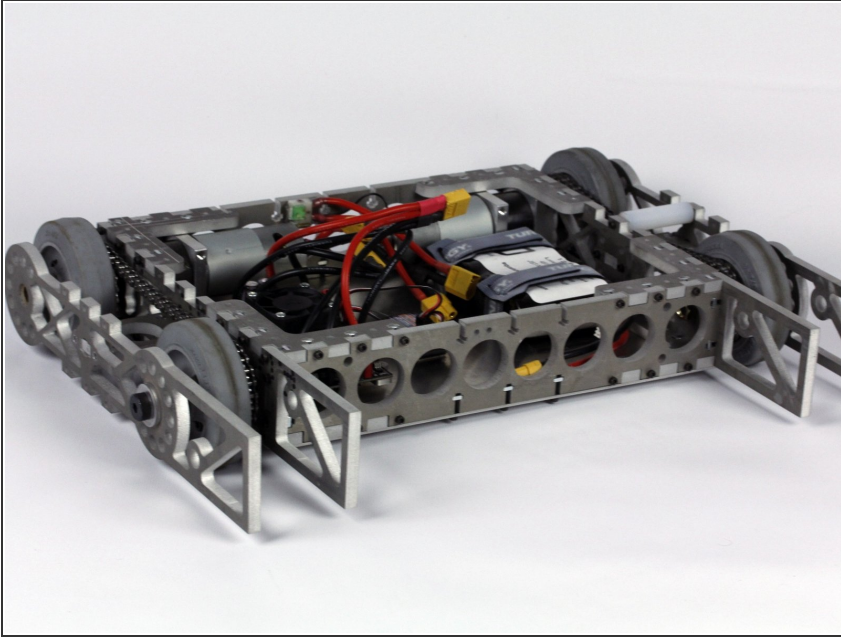
- Temporarily connect the servo lines of the Ragebridge speed controller to the receiver's channel 1 and 2
- Attach the heavy duty hook and loop to the underside of the Ragebridge for mounting to the base plate.

Step 37



- Take your main power switch and orientate just as the picture indicates
- Use two 4-40 screws to attach it to the back of the cross support frame rail. Do not overtighten these screws.

Step 38



- Your RRevo robot kit is now fully assembled!

⚠ PLEASE watch videos of Electronics hook-up/ Radio Binding/ Battery charging as well as a short video on potential quick modifications.

- Videos can be viewed at <http://www.youtube.com/playlist?list=PLC...>