

RRevo

RRevo Robot Kit Version 2

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:

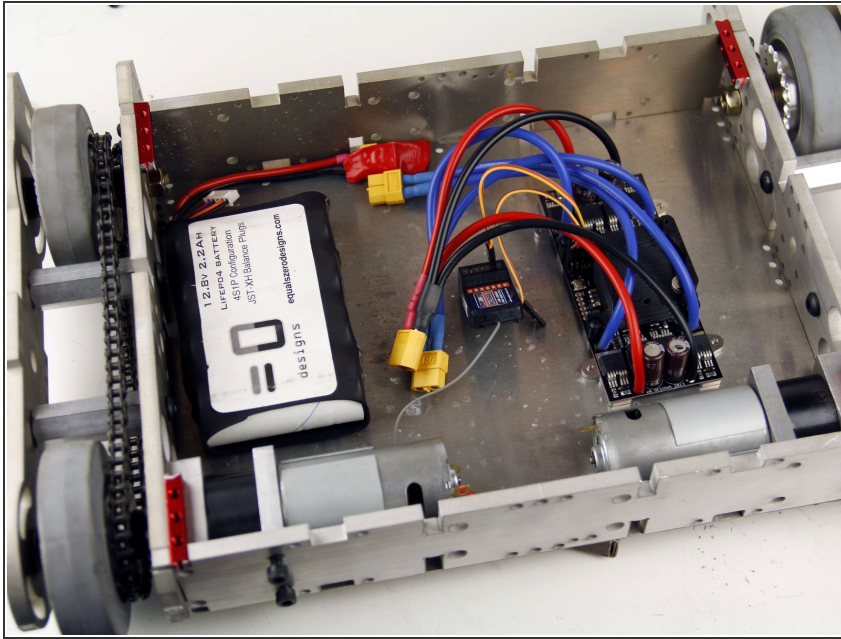
- [Set of standard allen/hex wrenches](#) (1)
- [2.5mm hex wrench](#) (1)
- [Medium Grit Sand Paper](#) (1)
- [5/16" nut driver / wrench](#) (1)



PARTS:

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

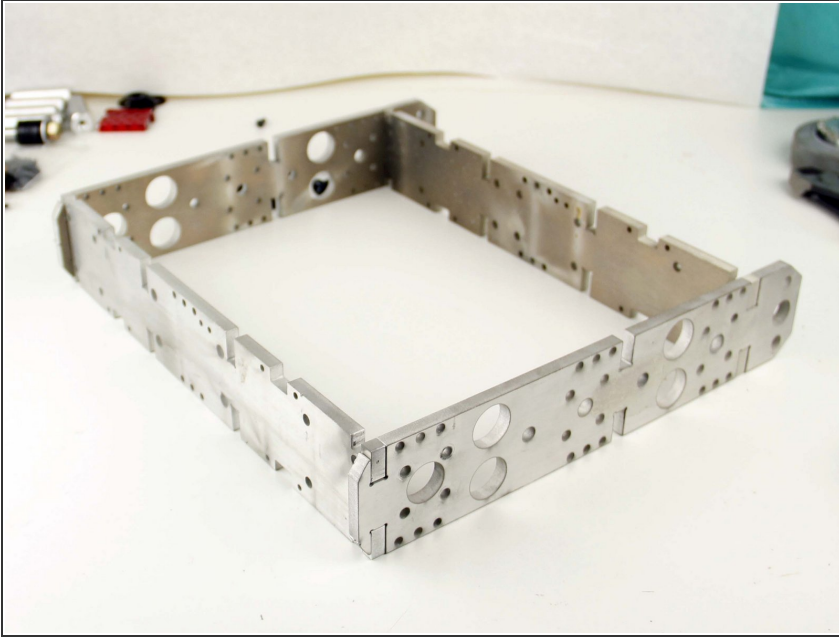
Step 1 — RRevo Robot Kit V2



⚠ 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.

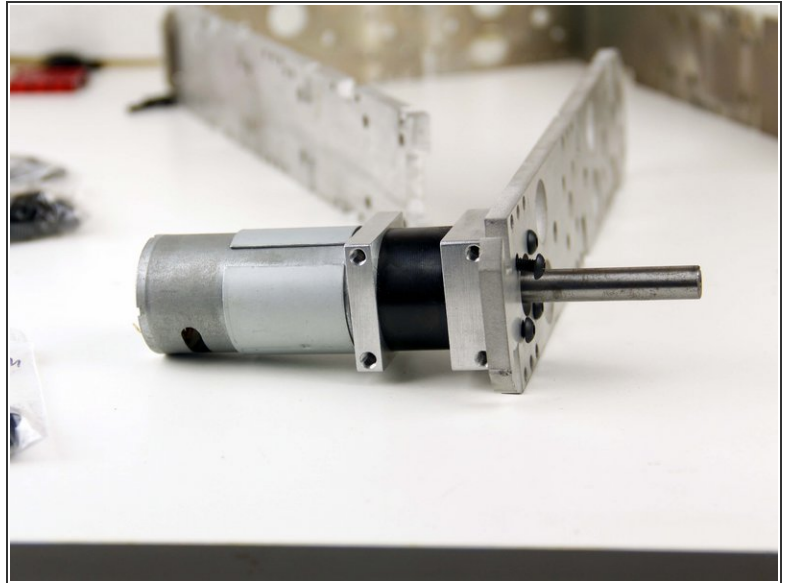
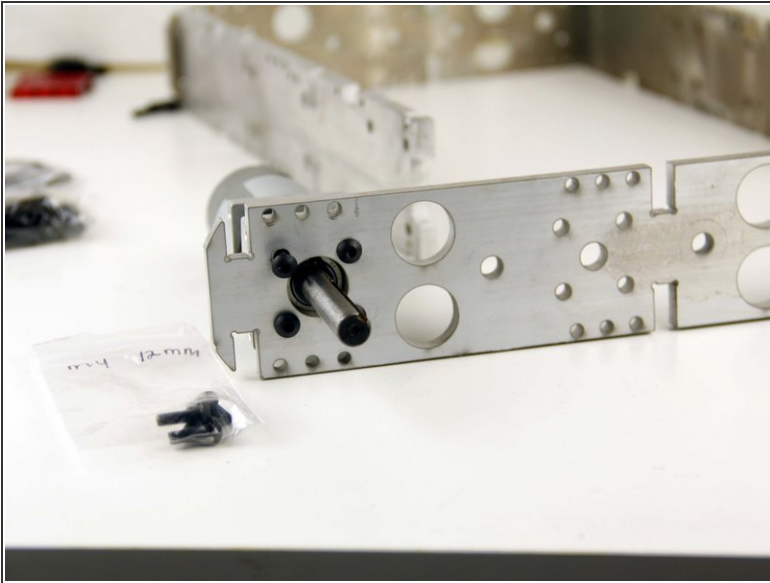
- DO NOT OPERATE ROBOT OR ATTEMPT TO CHARGE THE BATTERY UNTIL YOU HAVE GONE THROUGH THIS GUIDE AND THE ELECTRONICS/BATTERY CHARGING PORTION OF THIS GUIDE.

Step 2 — Mock-up



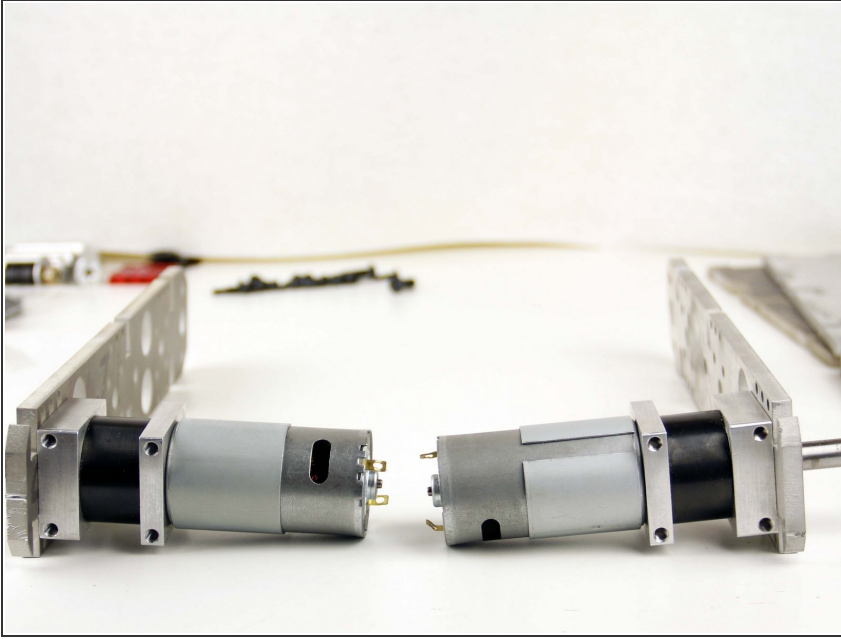
- You can begin the build by taking the aluminum frame pieces and mock them up so you have a visual on the overall final shape.
- These pieces all interconnect in a puzzle piece like system relying heavily on the strength of these connections with 6-32 nut strip blocks to lock the frame together.
- If some of the pieces do not fit or are too snug to lightly tap in with a rubber mallet, sand the edges and faces of the interlocking pieces with medium grit sandpaper. The waterjet process can produce slight offsets and differences frame to frame

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

Step 5



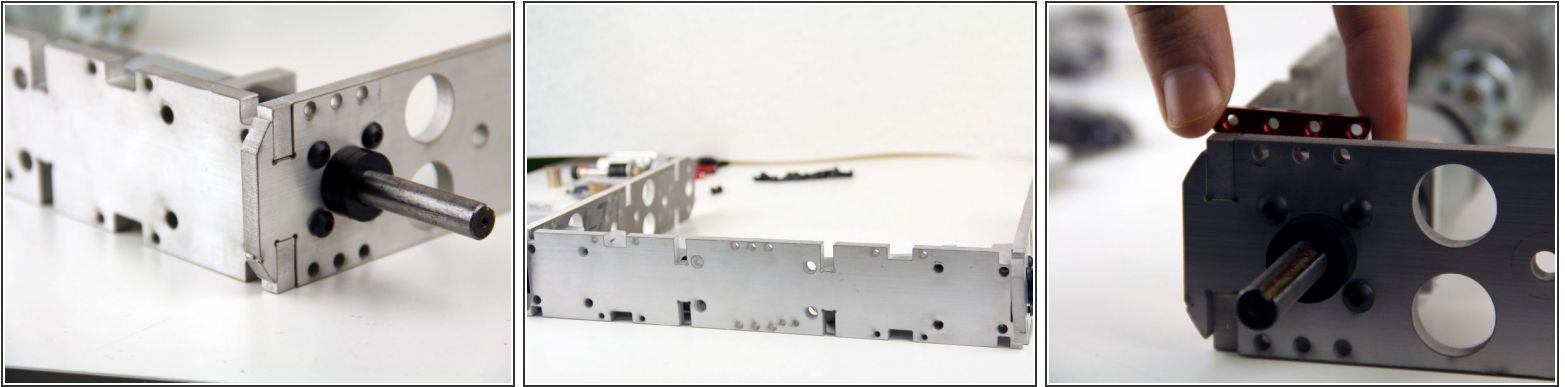
- Take this time to assembly the wheels
- There are two types of sprockets. One features a bushing that is destined for the deadshaft that is the 3/8" shoulder bolt and free spins on that shaft, the other has a 3/8" bore with keyway
- Tighten these 8-32 3/4" long screws snug and then 1/2 turn more

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

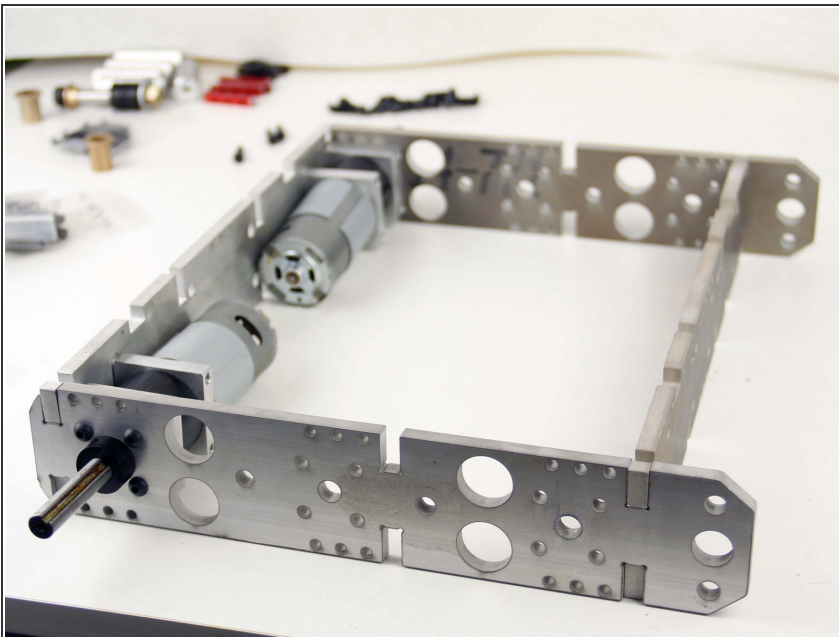


- Next we will work to link the two inner frame rails using the cross supports

⚠ 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 doesn't matter as long as you designate which direction is up.

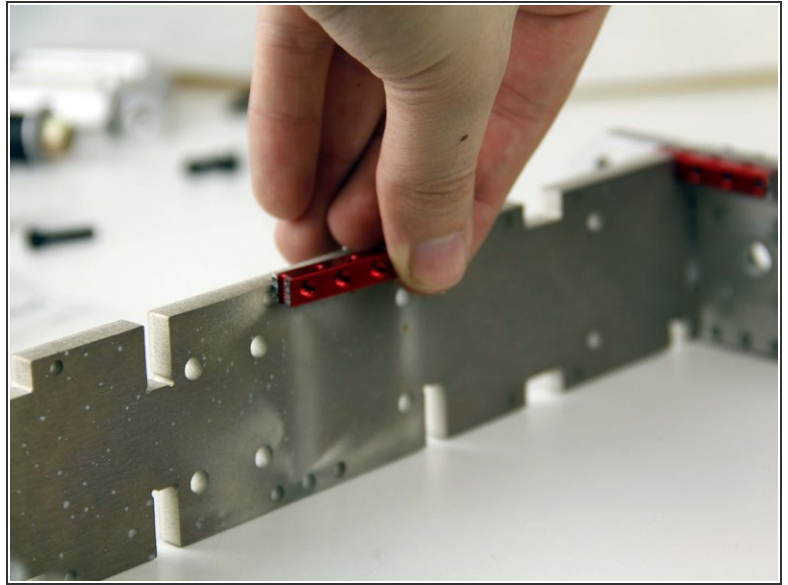
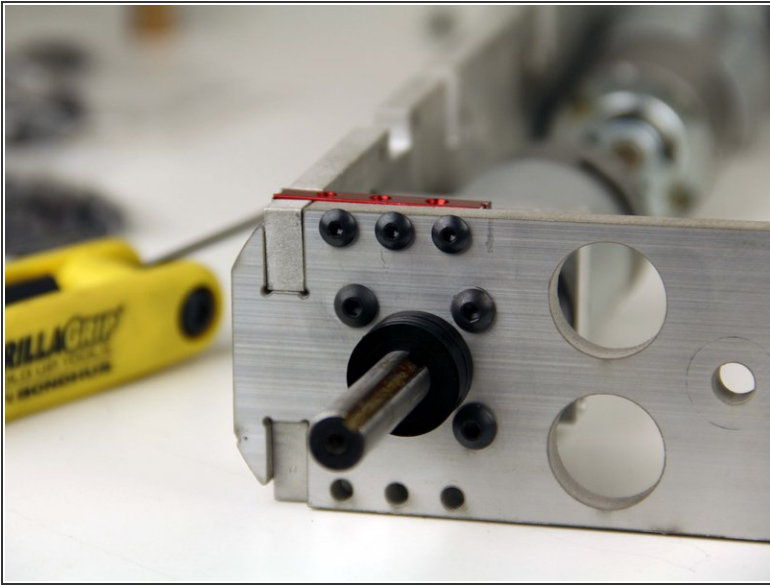
- Showing how and where these puzzle cut pieces align and 6-32 nut strip blocks sit in place

Step 8



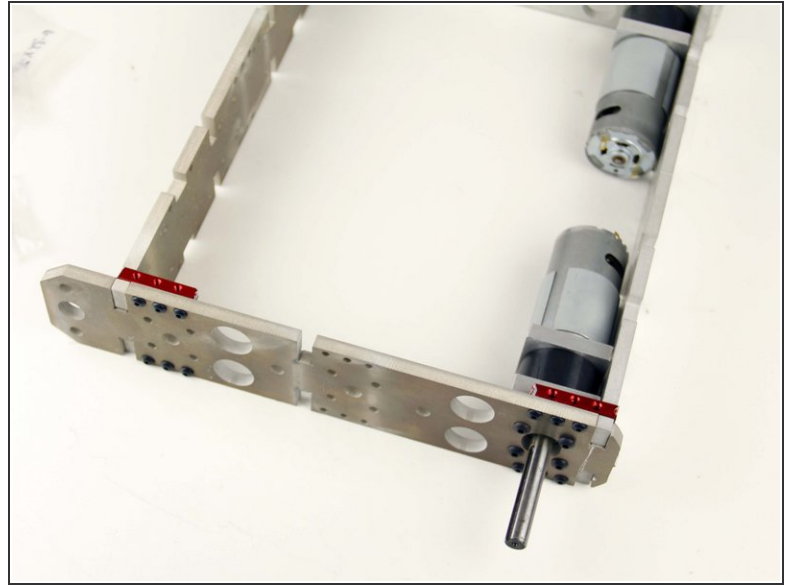
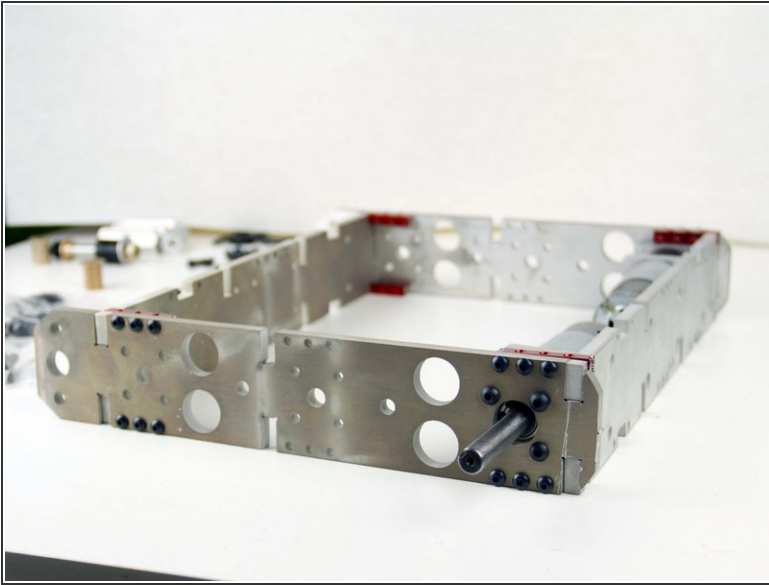
- Now align the front facing cross support with it's common position
- ① This front can also be moved back to shorten the frame or just the inner compartment
- Align all 4 main frame rail pieces

Step 9



- Time to insert all the nut strip blocks and 6-32 button head screws
- ⓘ Take note of the two smaller nut strip blocks, as they will be assigned to the "bottom" of the robot

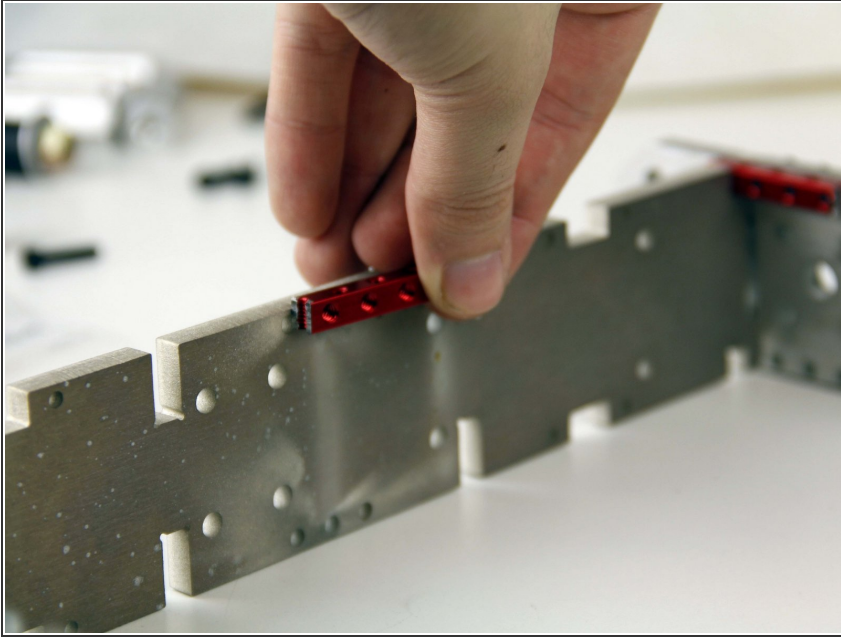
Step 10



 This process will be repeated throughout the build

- Insert a nut strip block into a corner keyway
- Align the holes of the nut strip block with the frame holes on the side rails. Take special note of the orientation by counting the number of threaded holes on the nut strip block
- Thread in the 3 6-32 button heads to each hole of the frame passing through into the nut strip block
- Repeat this step for all 8 corners of the frame

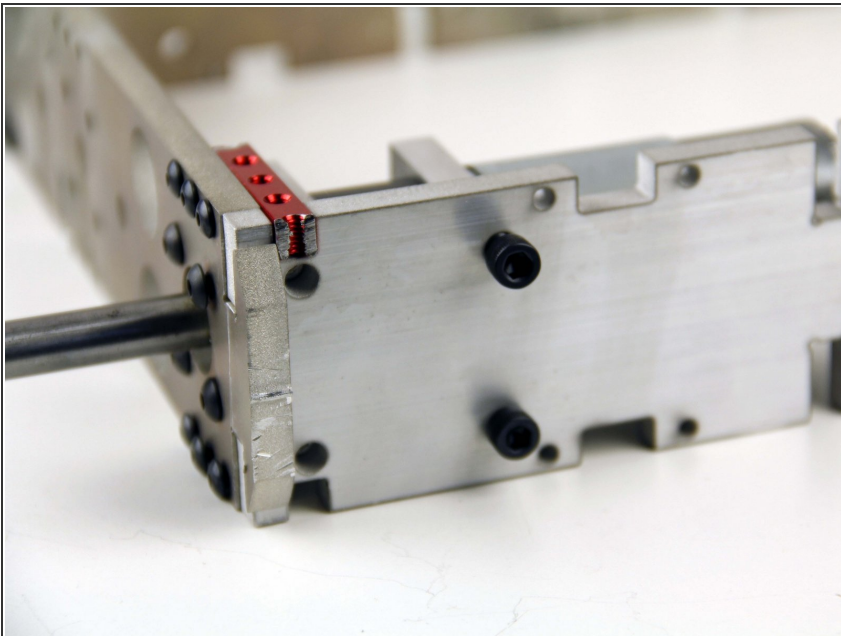
Step 11



- Take the two shorter 2 pieces of nut strip block and fasten them to the center position of the front and back frame rails considered the bottom of the robot
- The position of these nut strip blocks will be on the opposite side of the 2 asymmetric holes for the front and back frame rails

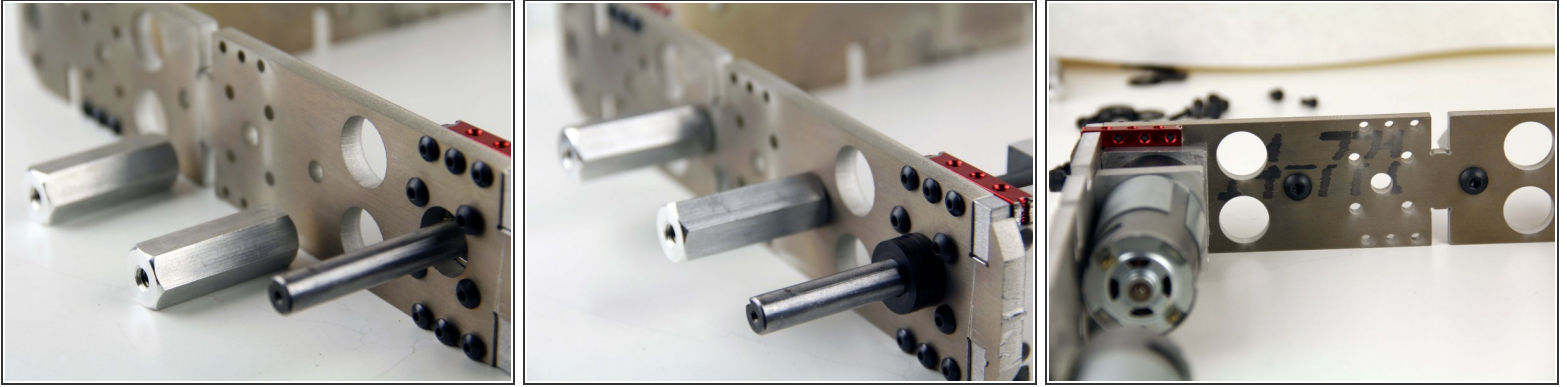
⚠ Picture shows the wrong side to put it on, use the side without the extra two holes offset (bottom of picture)

Step 12



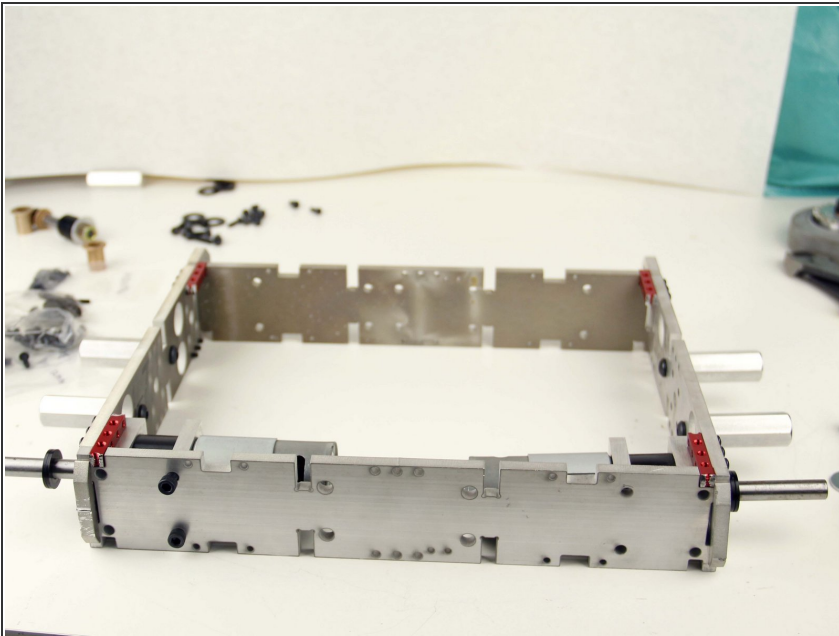
- Using 10-32 socket cap screws, thread in and loosely tighten to secure the gearboxes' additional mounting points.

Step 13



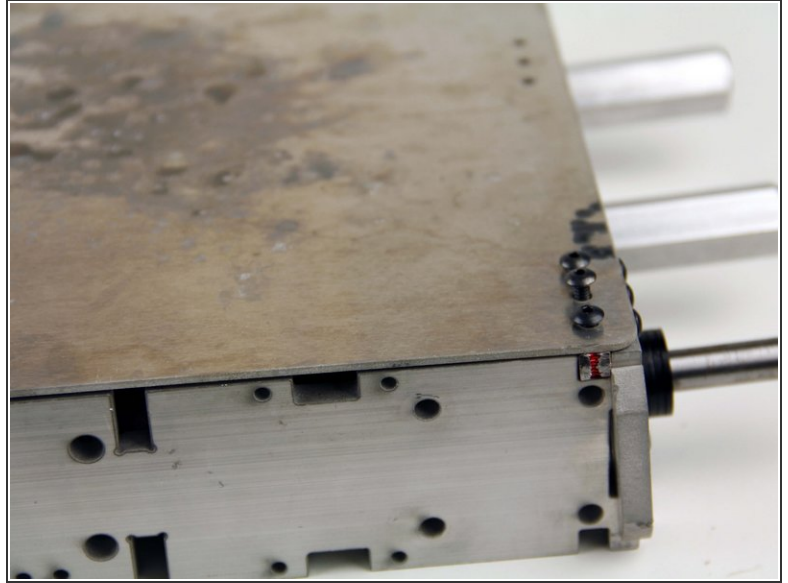
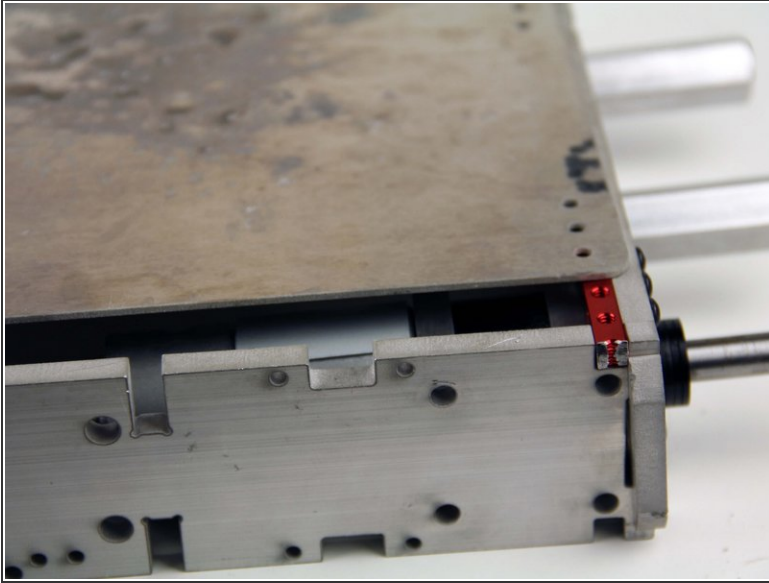
- Now take the 4 hexagonal standoffs and using 2 per side rail attach them in their positions with the 1/4-20 button heads on the inside of the frame rail
- Repeat this step to both sides of the robot

Step 14



- Should now have something that looks like the picture
- If everything is lined up properly and square, you can take this time to back out screws and use some thread locker for some additional battle hardening. Do not over-tighten screws

Step 15



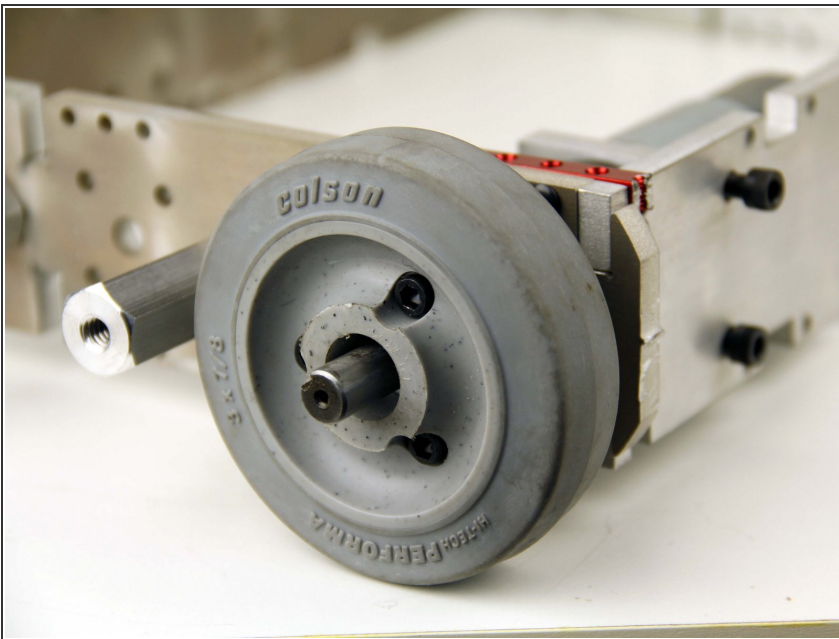
- Place the base plate and line up the mounting holes
- Start with lining up the 6-32 button cap screws by placing one screw in a corner, and go to the opposite corner for the next screw. These screws go through the base plate and into the nut strip blocks. This helps to make sure everything lines up.

Step 16



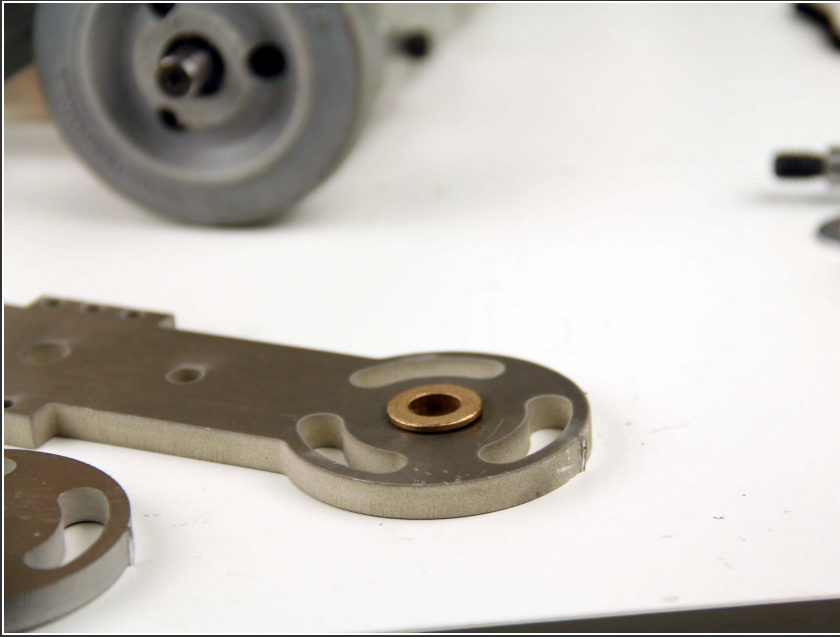
- If you haven't yet ground the keystock and fitted it inside the wheel and sprocket, now is the time to do so.
- Now place five(5) black nylon washers on the drive motor shaft and line up the sprocket and wheel and slide it on so that the sprocket faces the inside of the robot.
- Note that the keystock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

Step 17



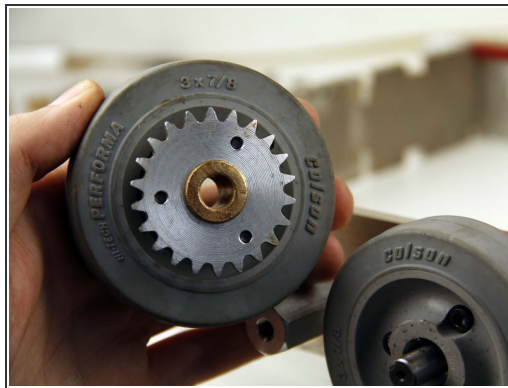
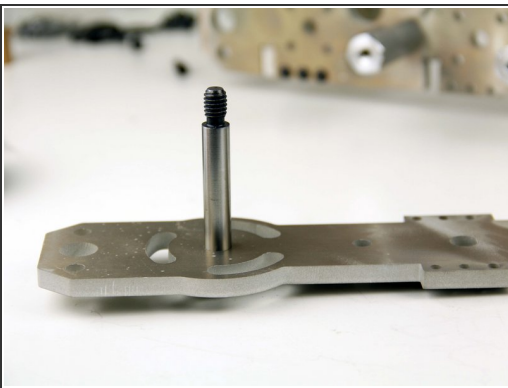
- Repeat this for the opposite side

Step 18



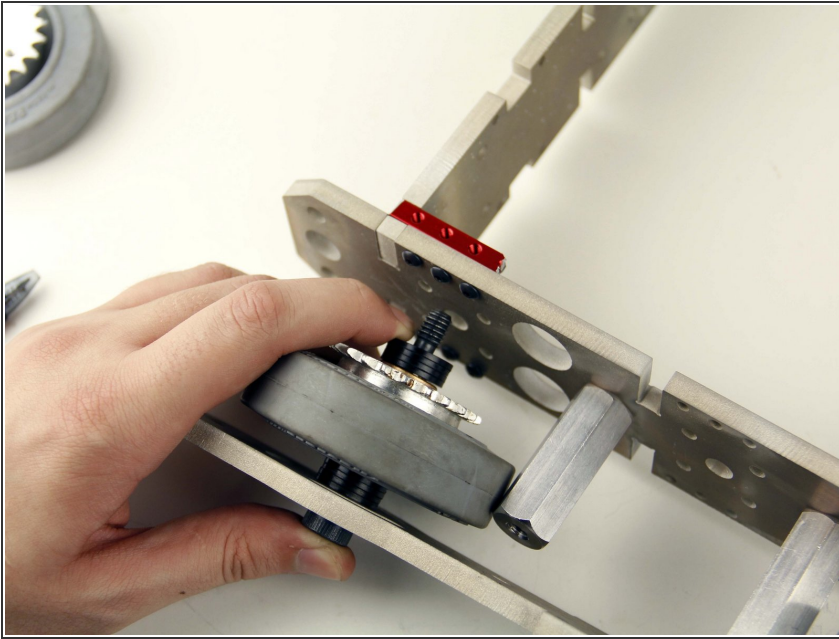
- i Depending on how well the frame pieces align, you may need to enlarge some of the outer frame rail holes.
- Take the 3/8" inner diameter bushing and place it at the back gearbox shaft support hole of the outer frame rail
- The flange, or lip of the bushing will always face inside or towards the wheels of the robot

Step 19



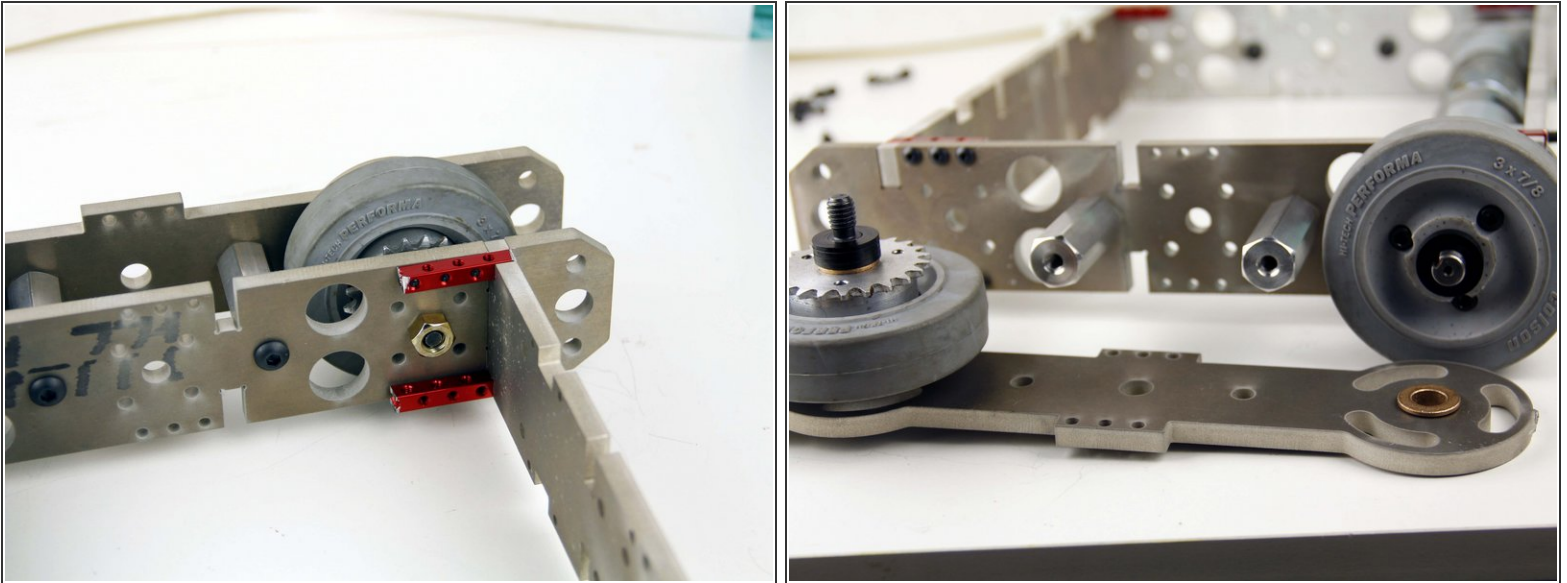
- Now remove all the remaining washers from the 3/8" shoulder bolts and slide the bolts through the outer frame rails as shown
- Insert 4 black nylon washers and then a wheel assembly with a 3/8" bushing installed. Make sure to face the bushing flange towards the inside of the robot or the inner frame rail
- Add 4 black nylon washers onto the shoulder bolt

Step 20



- Add 3 black nylon washers to the motor shaft with the keyed wheel assembly (adjust amount of washers as needed)
- 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 hexagonal standoffs earlier attached to the inner frame rail.

Step 21



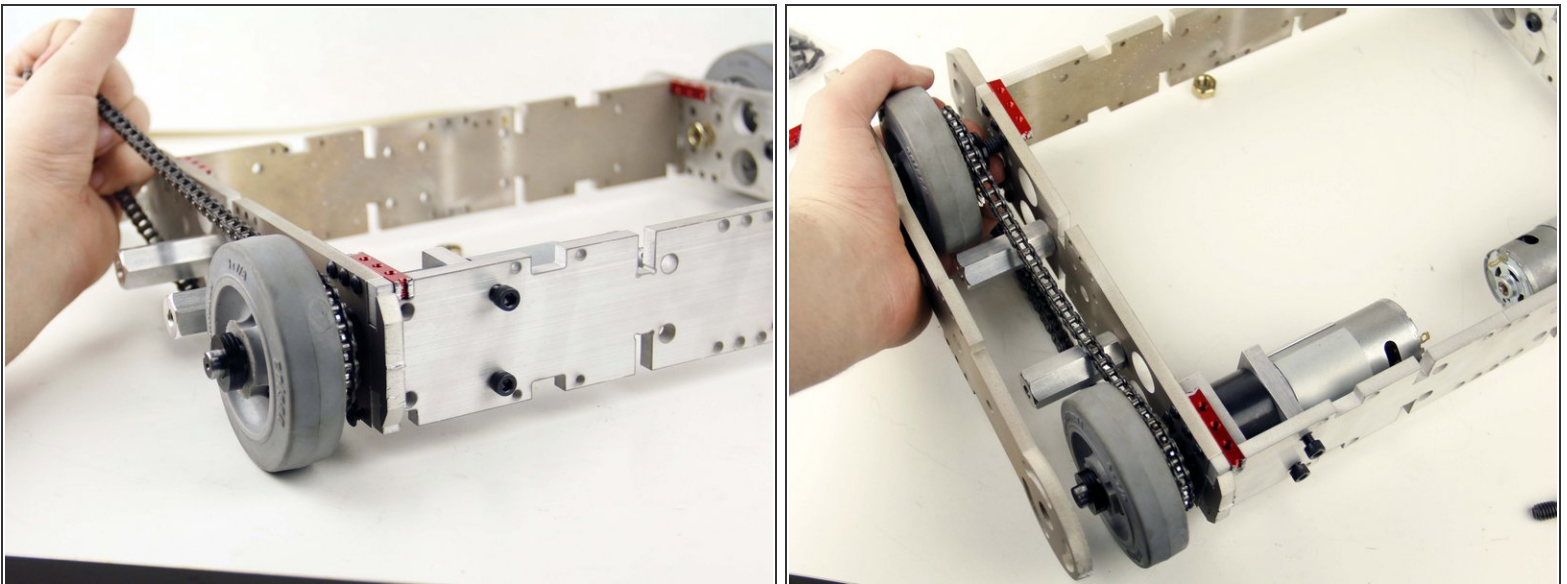
- Temporarily use the 5/16-18" nut to hold the deadshaft in position as you check the alignment with everything
- Check the alignment at this point and see if any modification is required. The front wheel should spin freely. Remove or add washers as needed
- Then remove the nut and pull the outer rail away from the frame

Step 22



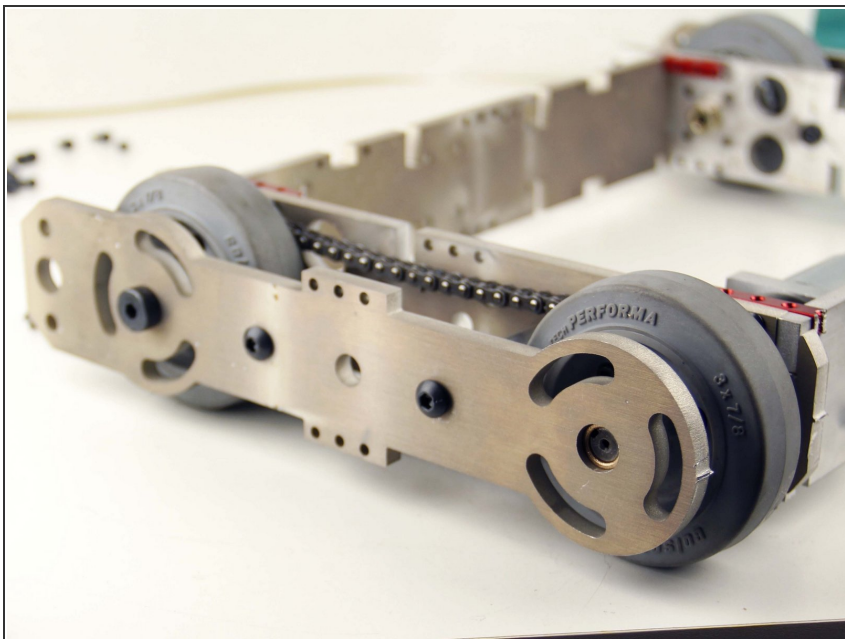
- Now take a look at the provided #25 roller chain and find the provided master link
- Un-clip the master link and slide through the ends of the chain followed by the flange and then the clip
- The side of the masterlink that has the retaining clip should always face towards the wheel, or away and to the outside of the robot.

Step 23



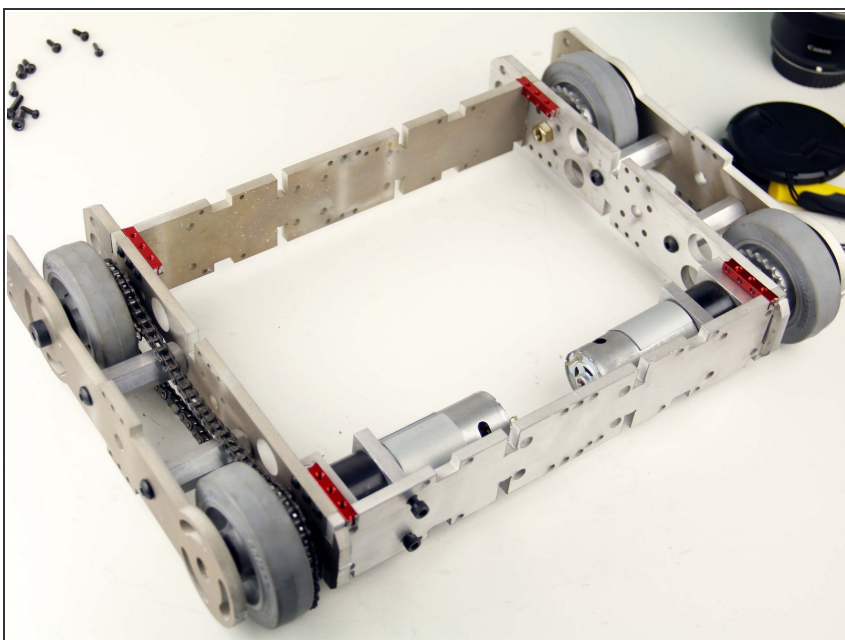
- Drape the chain over the sprocket that is attached directly to the gearbox
- Now loop the chain to the front wheel and as you let it rotate freely, re-align the outer frame rail as you did before. Hand tighten the gold colored 5/16"-18 nut to the deadshaft once more.

Step 24



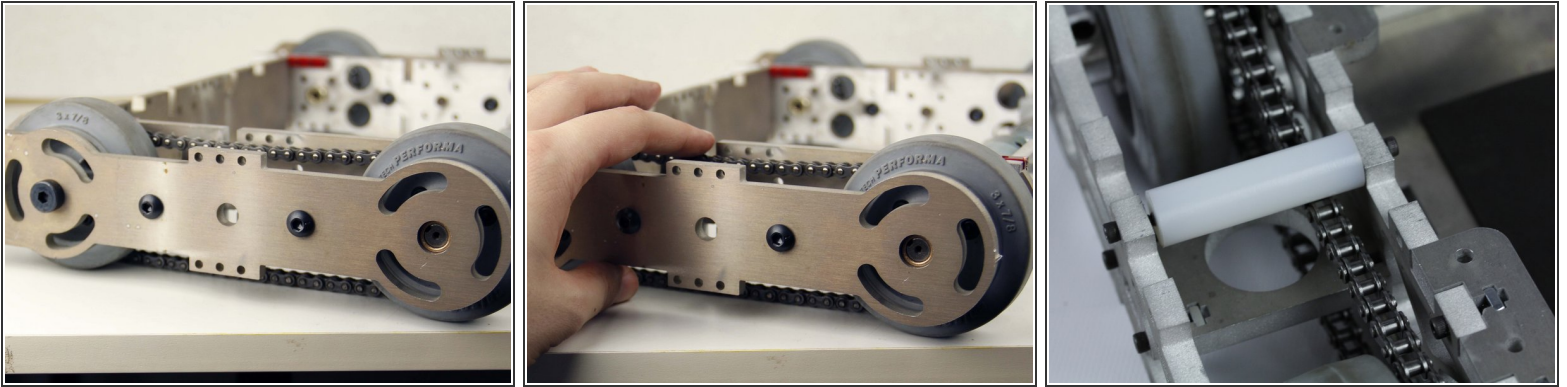
- Now use the 1/4"-20 button head screws to fasten the outer frame rail to the standoffs

Step 25



- Repeat steps 18-24 for the other side of the frame

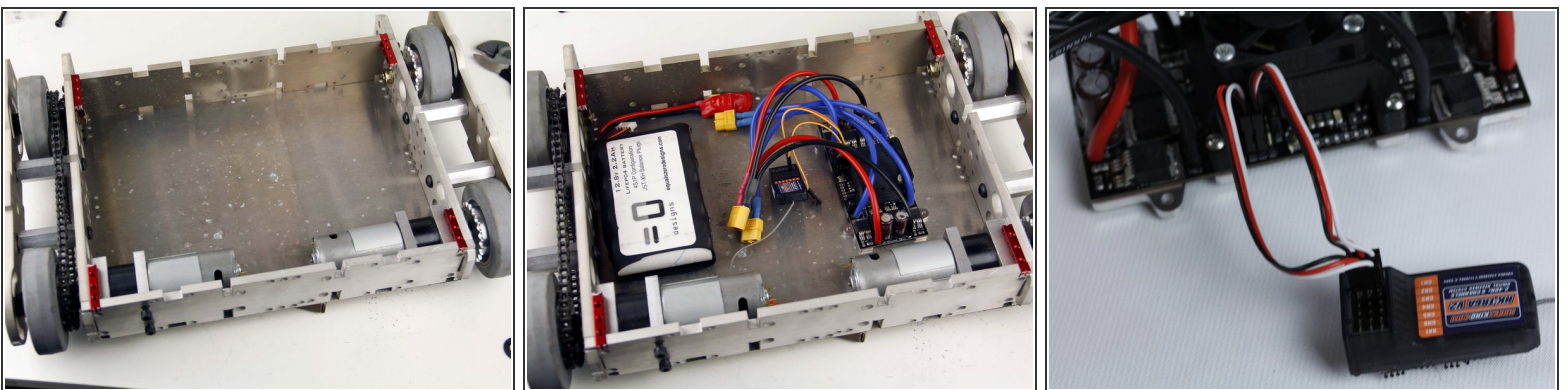
Step 26



- Check the chain tension. Depending on manufacturing of chain and the frame offsets you may need to adjust the link amounts of the chain using a combination of removing a link and/or adding a "half-link"
- Additionally there are holes in the inner and outer frame rails that align that can be used to create chain tensions out of something as simple as UHMW round stock

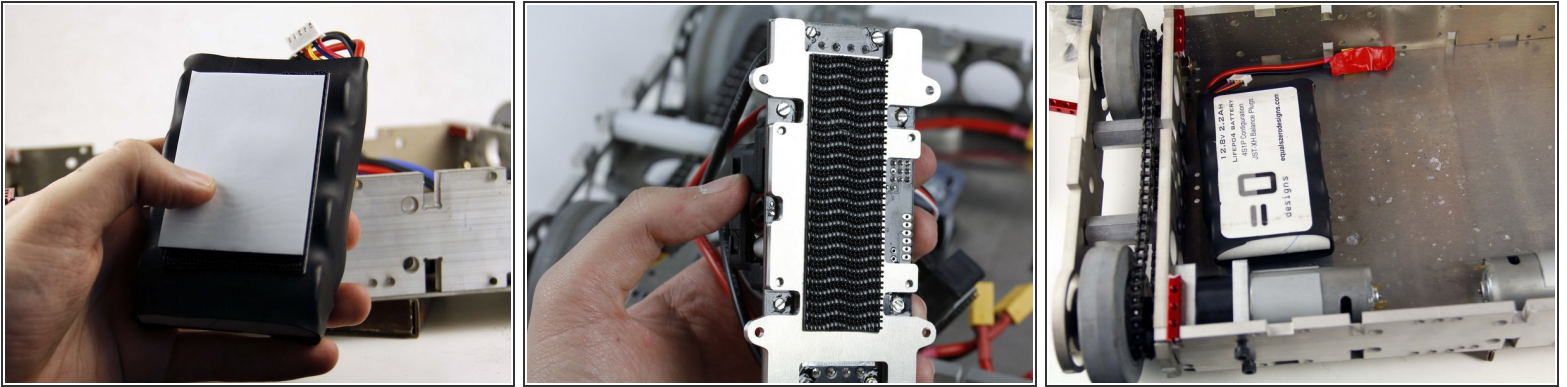
⚠ Don't allow the chain to sag too low under the robot or it may catch on something and during combat rip the chain apart

Step 27



- Now moving on to the inside of the robot, gently place all the components inside the robot to get a feel for where they will sit giving space between them while still allowing you to access as many screws/connections as possible.
- Temporarily connect the servo lines of the Ragebridge speed controller to the receiver's channel 1 and 2

Step 28



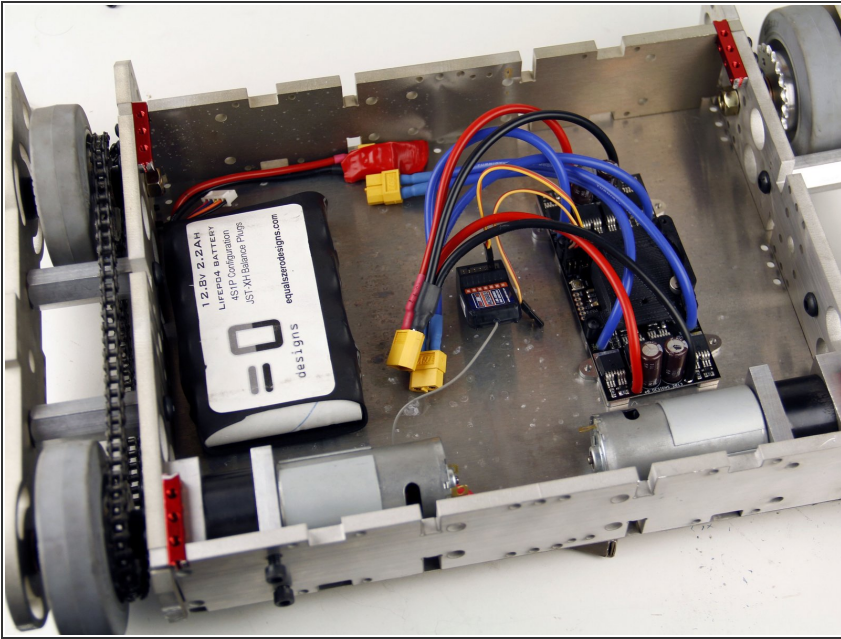
- Attach the large patch of hook-and-loop to the underside of the battery pack
- Attach the smaller strip of hook-and-loop to the underside of the Ragebridge
- Now with the alignment in mind from step 27, attach the other side of the hook-and-loop to the baseplate.
- Allow the hook-and-loop adhesive to setup before prying apart the components from the baseplate too many times

Step 29



- 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 over-tighten these screws.

Step 30



- Your RRevo robot kit is now fully mechanically 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...>