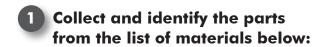
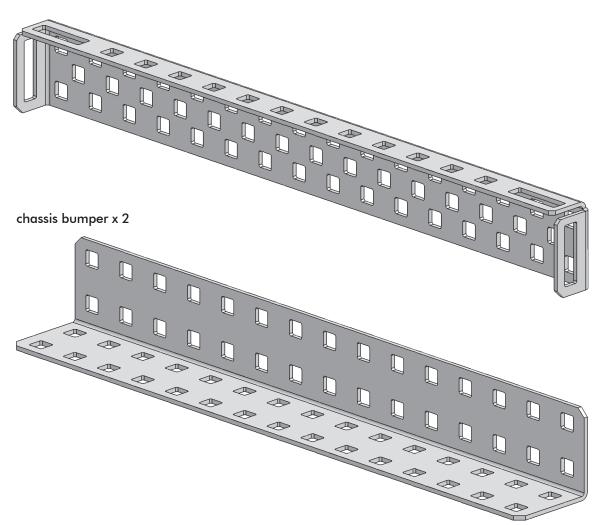
Squarebot 2.0 Building Instructions

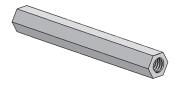


	materials	qty
structure subsystem	bearing flat	12
	panel	1
	chassis rail	4
	chassis bumper	2
	partially threaded beams, 2"	4
	keps nut	38
	8-32 hex screw, 1/4"	26
	8-32 hex screw, ½"	20
>		
motion subsystem	motor	2
	2.75" removable tire	4
	1.895" detachable hub	4
	36-tooth gear	4
	60-tooth gear	2
	collar w/ threaded set screw	10
rion Tion	collar w/ inreaded set screw	10
motion	square bar, 2"	2
motion		

chassis rail x 4



2" partially threaded beam x 4



8-32 hex screw, 1/4" x 26



keps nut x 38

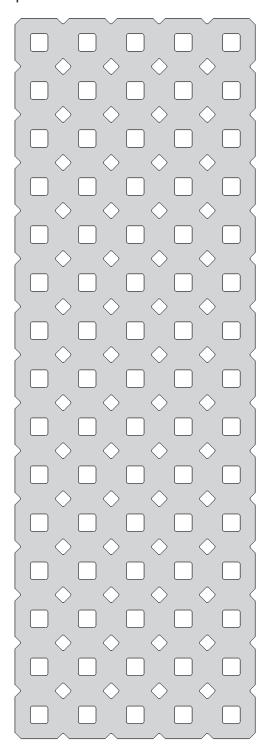




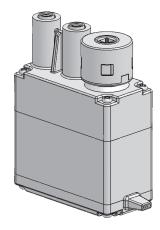
6-32 hex screw, 1/2" x 4



panel x 1



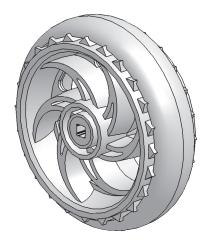
motor x 2



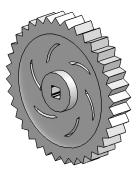
2.75" removable tire x 4



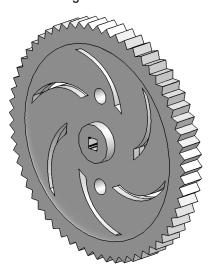
1.895" detachable hub x 4



36 tooth gear x 4



60 tooth gear x 2



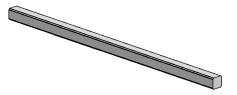
collar w/threaded set screw x 10



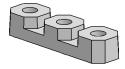
square bar, 2" x 2



square bar, 3" x 4

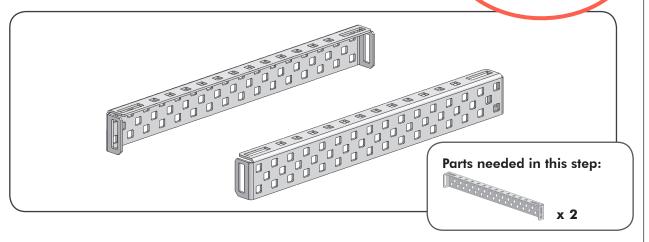


bearing flat x 12

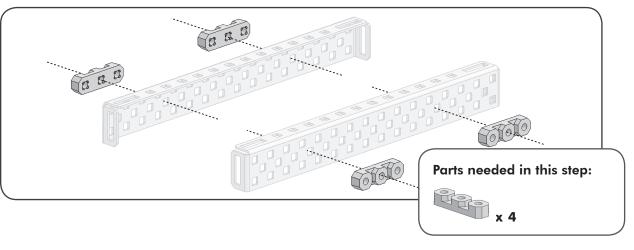


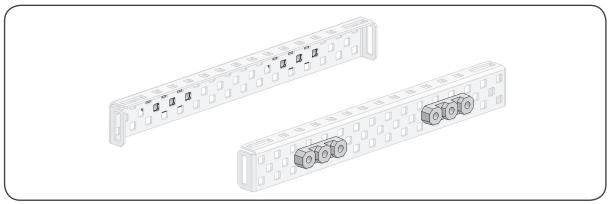
Inner chassis rails

You will need two chassis rails, one for the right side and one for the left side. Orient them as shown, so that the narrow face is pointing up and the "open" sides are facing each other.



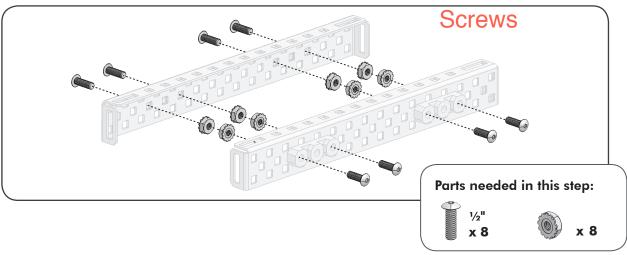
Add four bearing flats to the chassis rails (two per rail, on the outward-facing sides). Be sure to position the bearing flats such that the central hole of each bearing flat is aligned with the fourth hole from the respective end of the chassis rail, as shown.



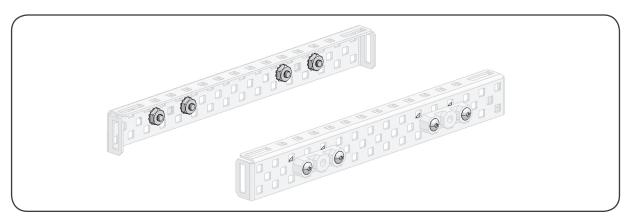


2 Inner chassis rails, continued
Secure the bearing flats to the chassis rails using two ½" 8-32 screws and two keps nuts per bearing flat, as shown.

Use Pop Rivets on barings instead of

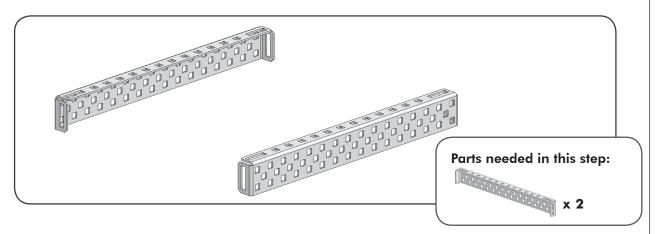


Your completed inner chassis rails should look like this when you're done:



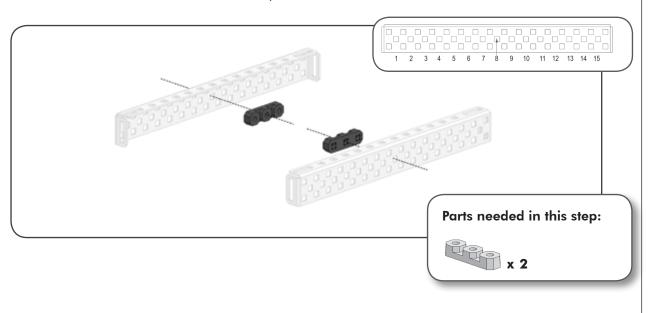
2 Outer chassis rails

Position two more chassis rails as shown, just as you did for the inner chassis rails.



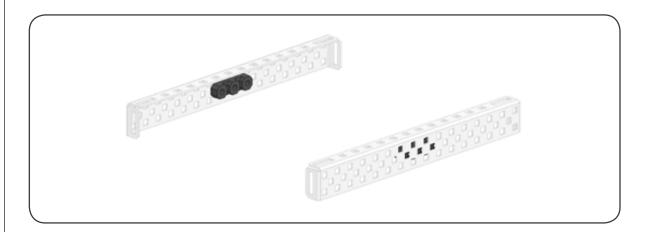
Outer chassis rails, continued

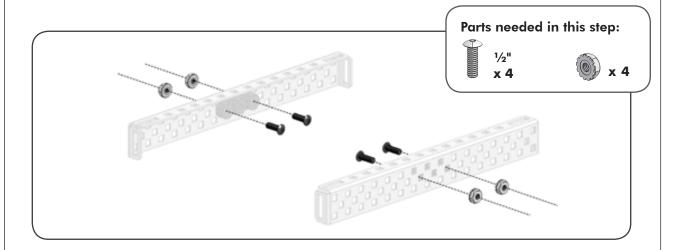
Add bearing flats to the inner faces of the two chassis rails. The center hole of the bearing flat should be aligned with the eighth hole from the front end of the chassis rail, in the middle row of holes.



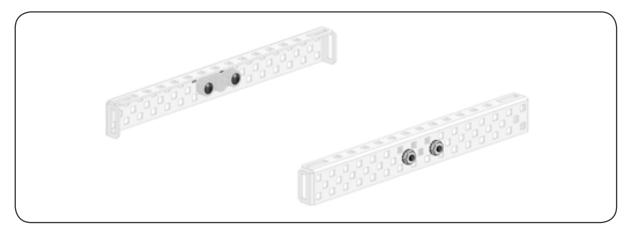
2 Outer chassis rails

Secure each bearing flat with two ½" 8-32 screws and two keps nuts.

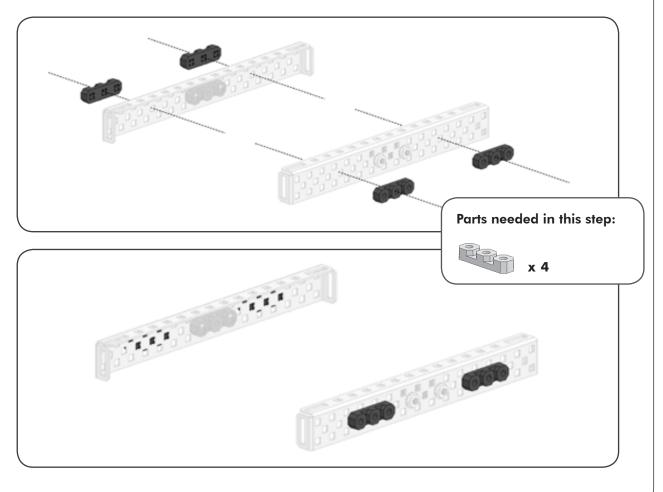




Outer chassis rails, continued
Your outer chassis rails should now look like this:

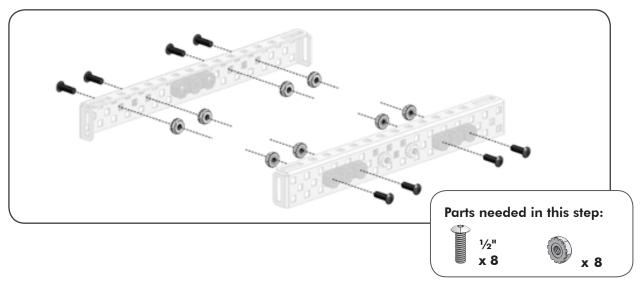


Now add two bearing flats to the outer surface of each chassis rail, so the center hole of each bearing flat is over the fourth hole from the respective end of the chassis rail, as shown. These are the same positions as the bearing flats you put on the inner chassis rails earlier.

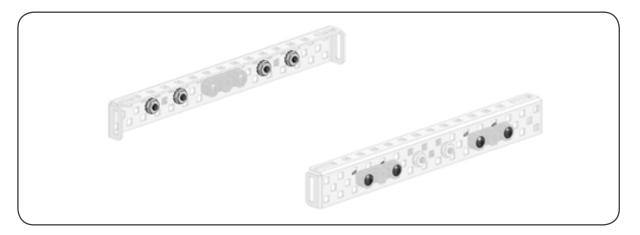


2 Outer chassis rails, continued

Again, secure the bearing flats to the chassis rails using two two $\frac{1}{2}$ " 8-32 screws and two keps nuts per bearing flat.

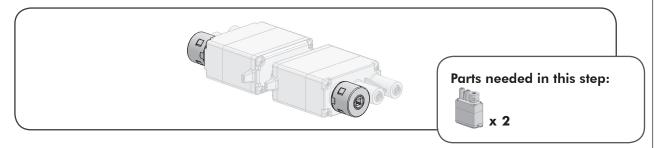


Your outer chassis rails should now look like this:

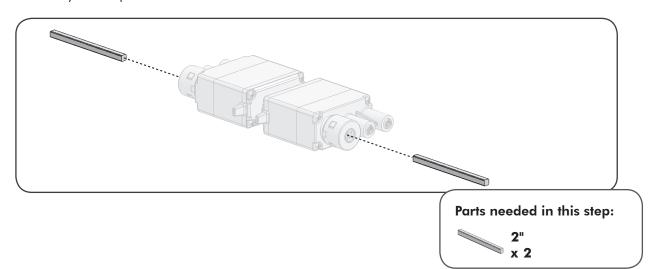


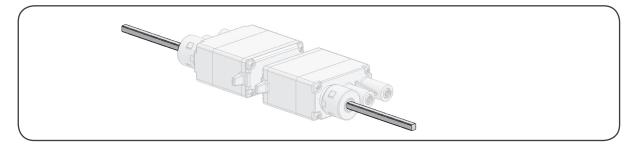
3 Motor Subassembly

Before starting on the motor subassembly, make sure that the clutch is installed in the motor, as shown.



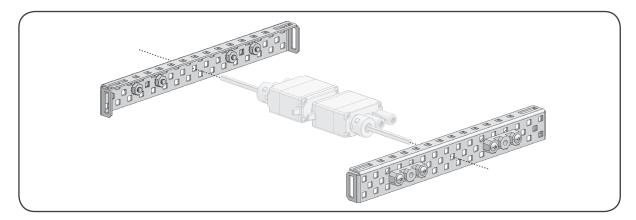
Insert a 2" square beam into each clutch, making sure that they seat firmly. The square bar will act as the motor's drive shaft.

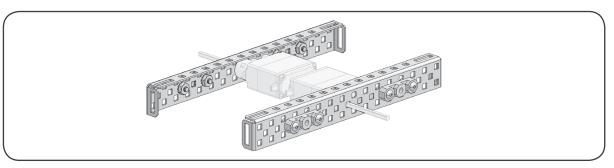




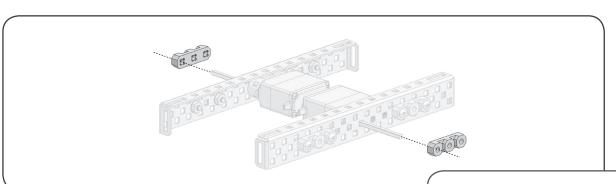
3 Motor Subassembly, continued

Slide the pre-assembled inner chassis rails onto the square bar motor shafts, so that the shafts go through the middle hole in the middle row of each rail.





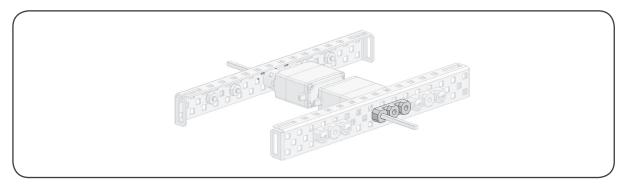
Install one bearing flat on the outward-facing side of each chassis rail, with the front hole of the bearing flat sliding onto the motor shaft as shown.



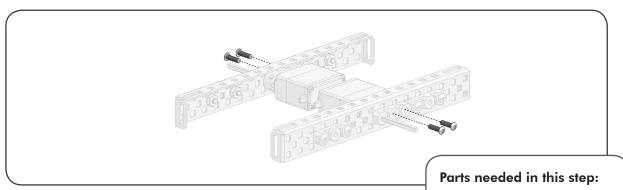
Parts needed in this step:



Motor Subassembly, continued Your assembly should now look like this:

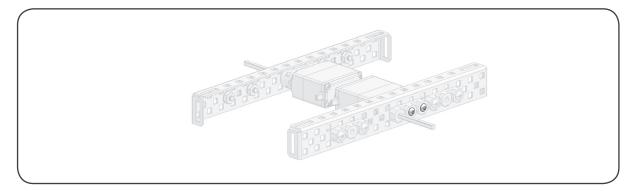


Secure the bearing flat to the inner chassis rail and motor using two $\frac{1}{2}$ " 6-32 screws per motor. Note that these are the thinner screws, not the usual 8-32 ones.



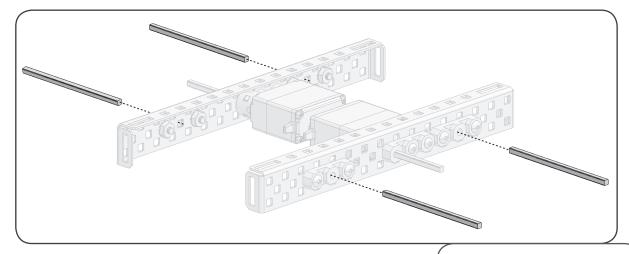


Your assembly should now look like this:



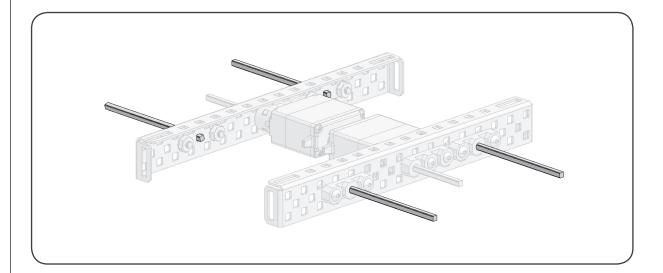
3 Chassis Subassembly

Insert a 3" square bar through the center hole of each unoccupied bearing flat, as shown. Don't push them all the way through. Push the end of the bar about 1/8" through the rail.



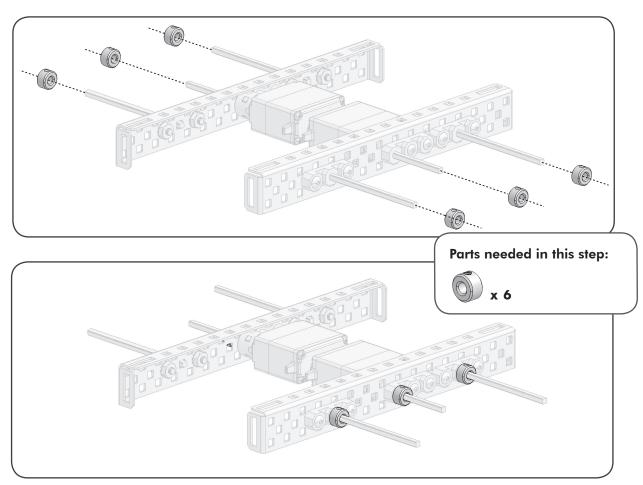
Parts needed in this step:



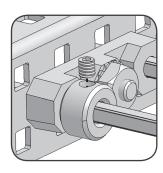


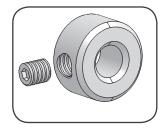
4 Chassis Subassembly, continued

Slide metal collars (with threaded screws) onto each of the 2" and 3" square bars, mounting them flush with the surface of the bearing flat against which they will sit. Be sure the square bars don't get pushed too far in while you put the collars on, or you will not have enough bar sticking out to mount the wheels later.



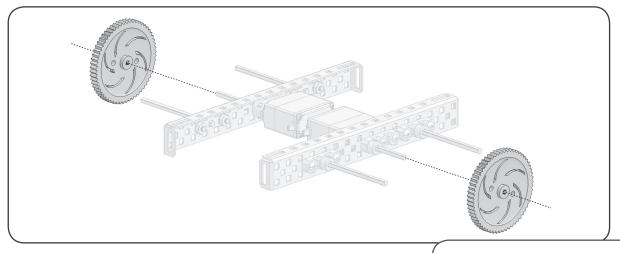
Once the collars and bars are in position, tighten the threaded screws with the smaller 5/64" hex L wrench to keep the collars from sliding out of place.





4 Chassis Subassembly, continued

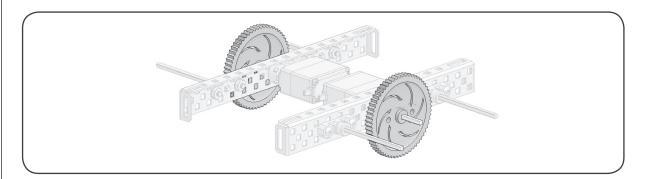
Slide a 60-tooth gear onto the drive axle of each motor, pushing it flush against the collar that you added in the previous step.



Parts needed in this step:

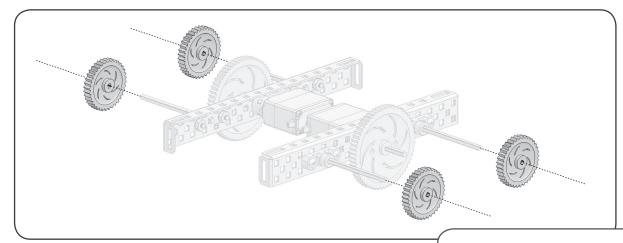


60-tooth x 2



Chassis Subassembly, continued

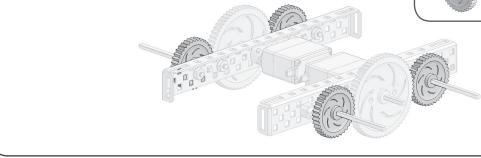
Slide a 36-tooth gear onto each of the remaining square bars, pushing them flush against the collars.



Parts needed in this step:



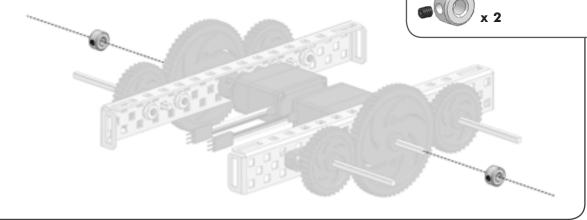
36-tooth



Add another collar to the end of the 2" shafts (the ones directly connected to the motor). Slide them down so that they are flush with the larger gear. Make sure they are tightened.

Parts needed in this step:





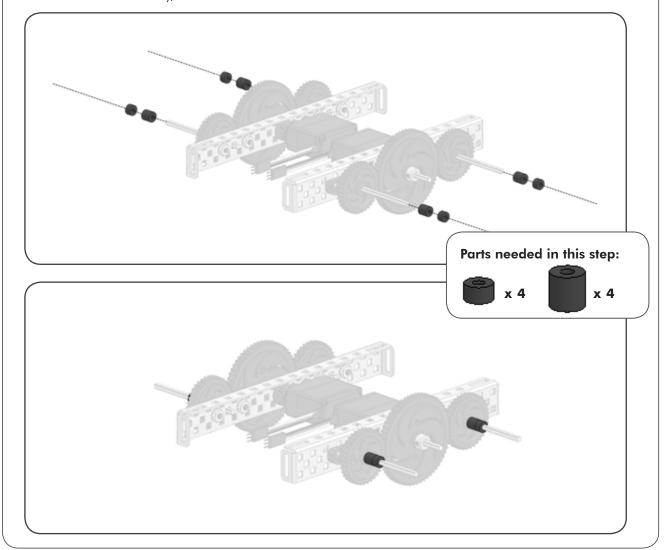
4 Chassis Subassembly, continued

Tighten the threaded screws with a 35/64" hex L wrench.



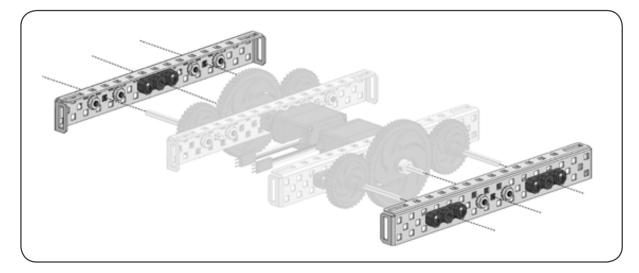


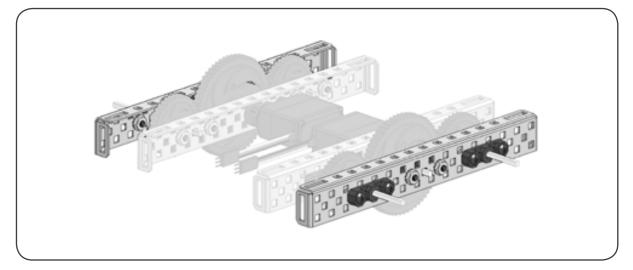
Your kit includes two differently sized black spacers. Slide one of each onto the shafts with the smaller gears (those not directly connected to the motors), as shown.



4 Chassis Subassembly, continued

Install the pre-assembled outer chassis rails onto the current assembly. All three of the square bars sticking out of the inner rail should go neatly through bearing flats on the outer rail.

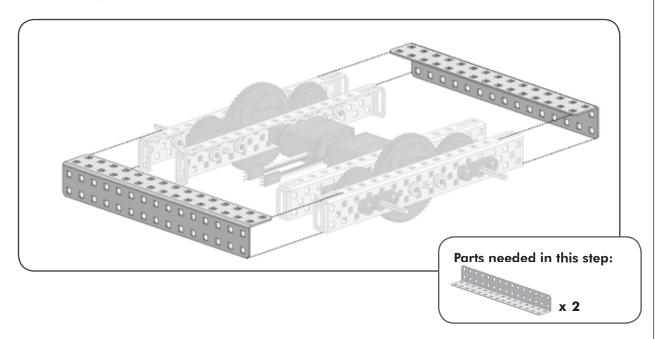


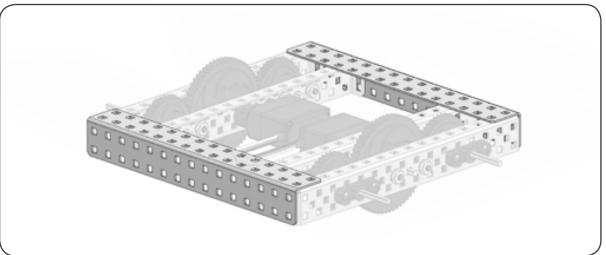


Note: If you find that your gears are sliding on the axles, you can insert the 0.182" and 0.318" plastic spacers included in the kit to block them into place.

4 Chassis Subassembly, continued

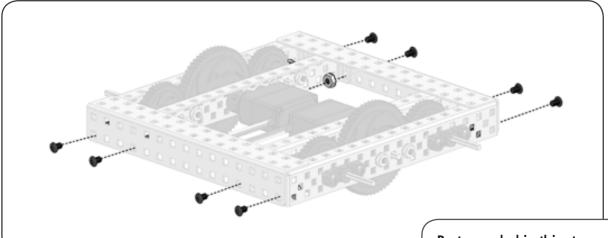
Place chassis bumpers on the front and rear of the chassis rails, as shown.

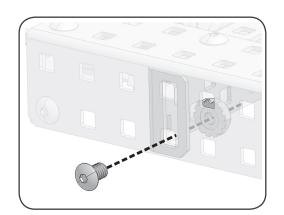


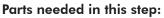


4 Chassis Subassembly, continued

Secure the vertical faces of the chassis bumpers to the end of the chassis rails using four $\frac{1}{4}$ 8-32 screws and keps nuts in the front, and four in the back.





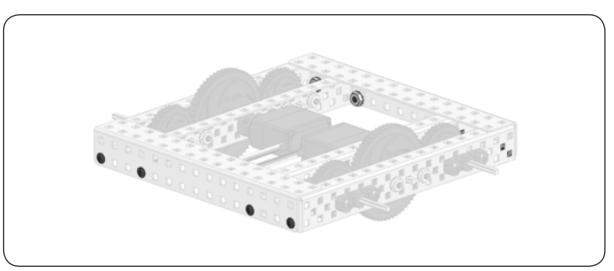




1/4" x 8



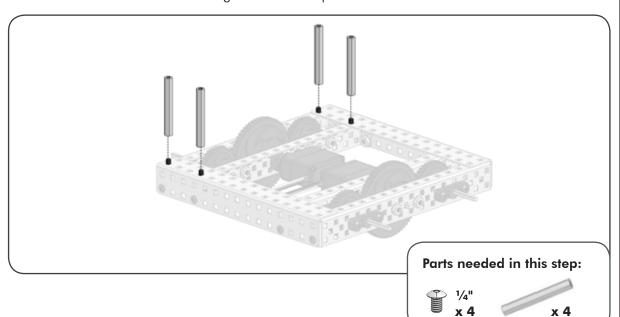
x 8

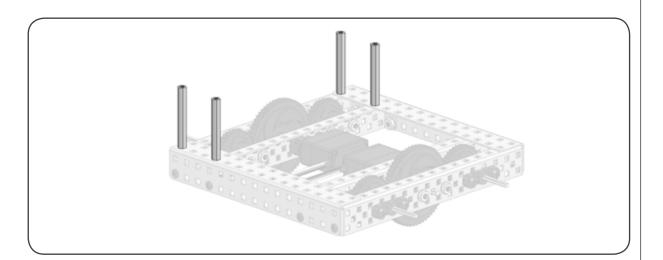


4 Chassis Subassembly, continued

Skip Here

Connect four 2" standoffs using four 1/4" 8-32 screws. Place them as shown and be sure to note that two of them are on the edge and two are one space away from the edge. Connect the parts using the thicker allen wrench while holding the standoff in place.

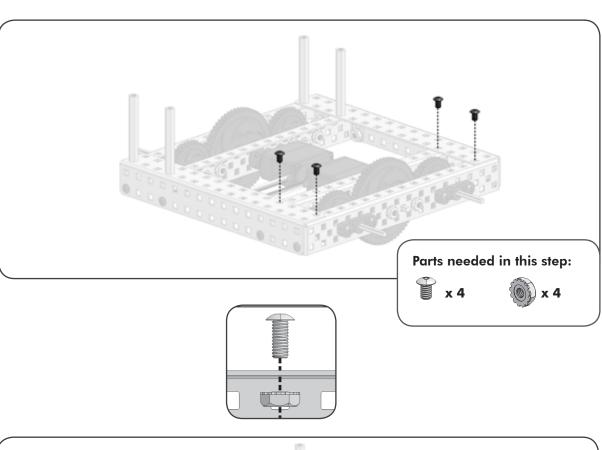


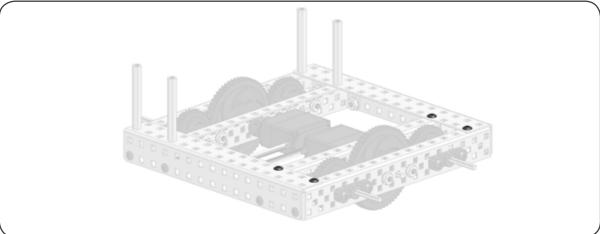


4 Chassis Subassembly, continued

Skip Here

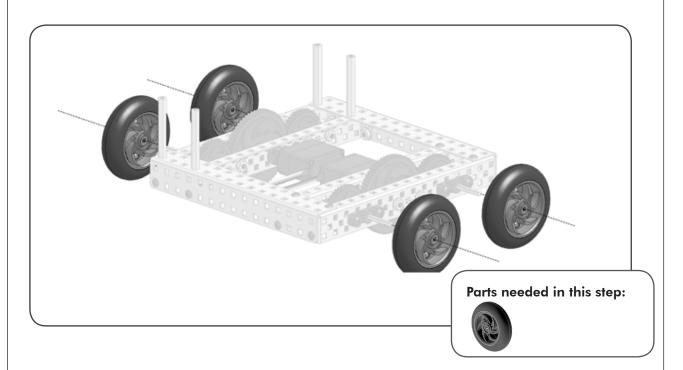
Secure the horizontal faces of the chassis bumpers to the top of the chassis rails using 1/4" 8-32 screws and keps nuts, six in the front and four in the back.

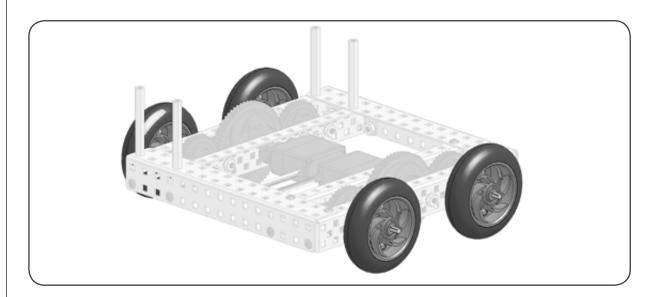




with the bearing flats.

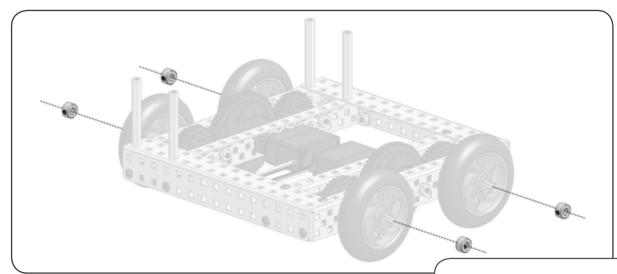
Chassis Subassembly, continued
Install the small green tires (2.75" Removable Tire and 1.895" Hub) wheels instead on the 3" square beams, as shown. Slide them down so they are flush





4 Chassis Subassembly, continued

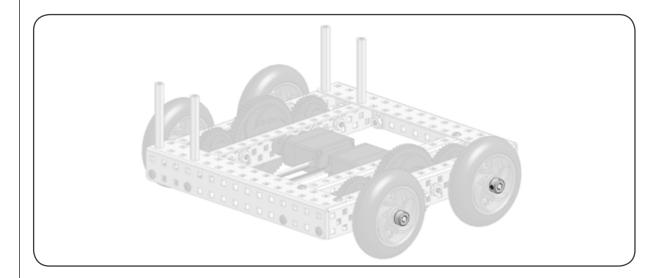
Slide the collars onto the shafts such that they are flush against the wheels. Tighten the collars in place with the smaller allen wrench.



Parts needed in this step:

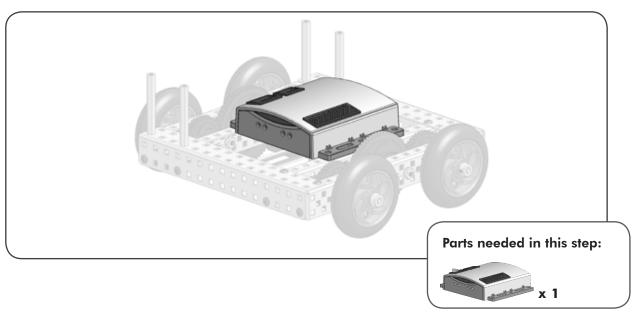


x 4

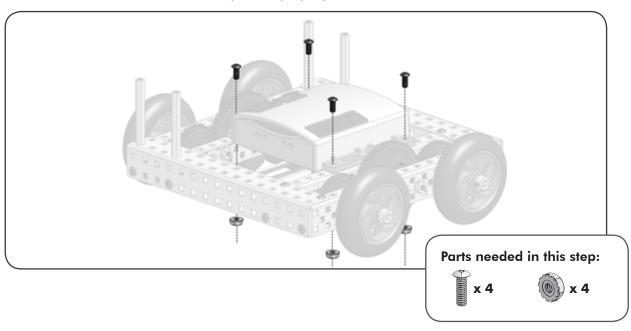


4 Chassis Subassembly, continued

Position the micro controller on your robot as shown. The exact position of your micro controller is not important, but positioning it as close to the center, as shown, is ideal.



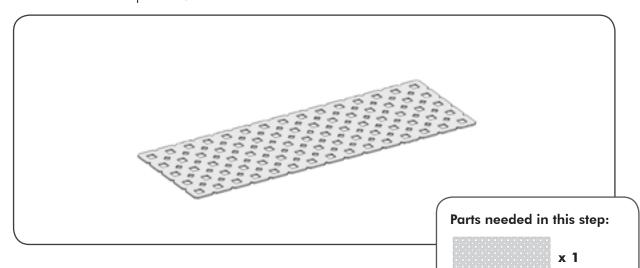
Attach the micro controller to the chassis using four 3/8" 8-32 screws and keps nuts, as shown. Insert the screws into the small holes in the micro controller to hold it in position properly.



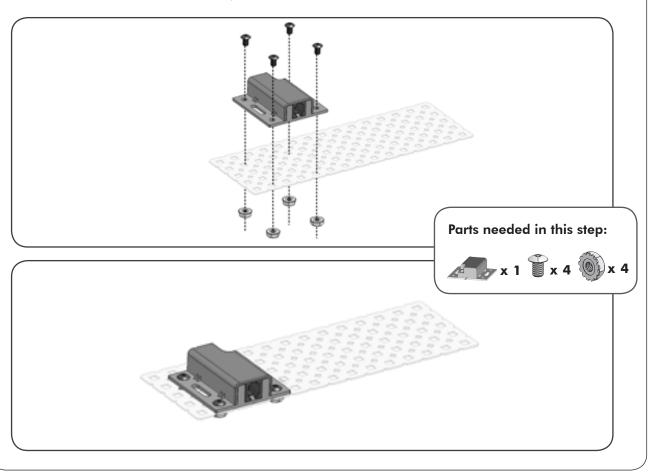
4 Canopy Assembly

Stop Here

You will need a punched panel to begin constructing the canopy. You are constructing a seperate part in this segment, which will later be attached to squarebot.

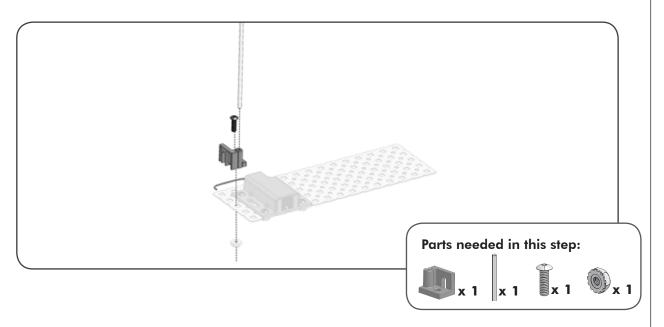


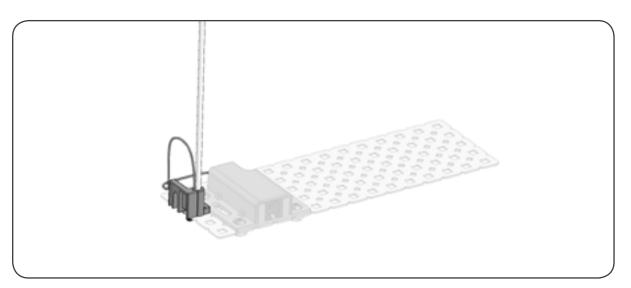
Attach the yellow receiver to the pnched panel using four 3/8" 8-32 screws and four kep nuts as shown. Be sure to leave one empty row of holes on the left of the receiver.



4 Canopy Assembly, continued

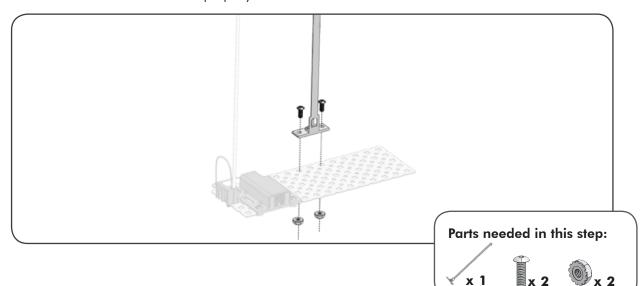
Attach the antenna holder using a 3/8" 3-32 screw and keps nut, securing the screw through the middle hole on the left edge of the canopy. Then, slide the yellow antenna wire from the receiver inside the antenna sleeve and place the antenna sleeve with the wire into the antenna holder.

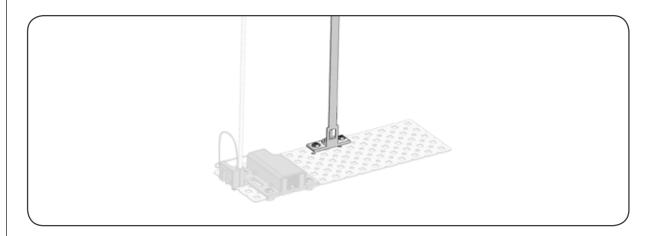




4 Canopy Assembly, continued

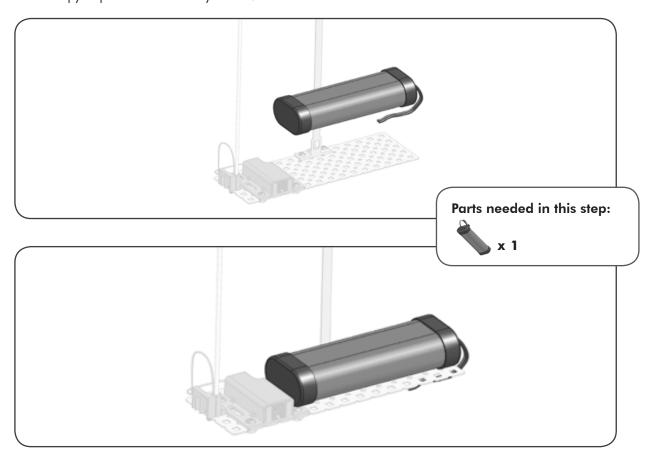
If you are using the Vex rechargable battery, attach the battery strap along the back row of the punched pannel using two 3/8" 8-32 screws. Be sure it is oriented properly.



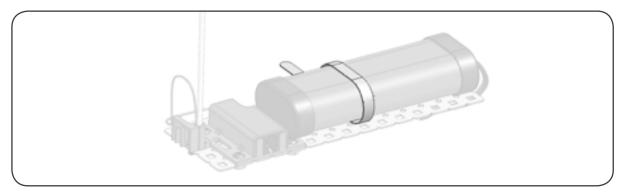


3 Canopy Assembly, continued

Take the blue rechargable Vex battery and orient it as shown. If you are using the blue Vex AA battery holder, simply attach it to the canopy in place of the battery holder.



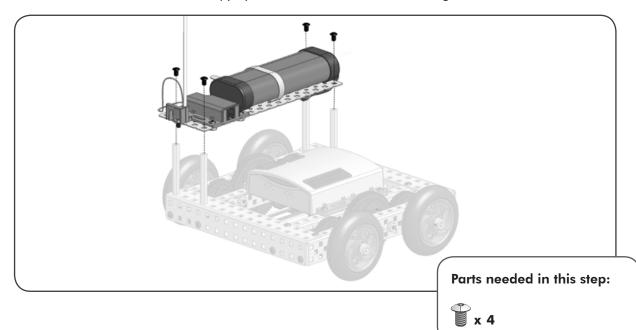
Lock the battery into place using the battery strip.

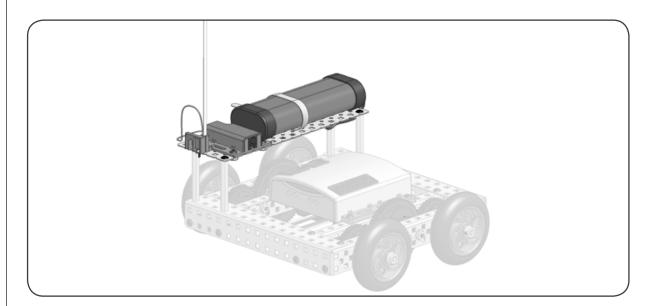


4 Canopy Assembly, continued

Attach the canopy to the robot. To do this, secure the canopy onto the four offsets you attached earlier using four 3/8" 8-32 screws.

You will have to offset the canopy by one hole eiter to the left or the right.



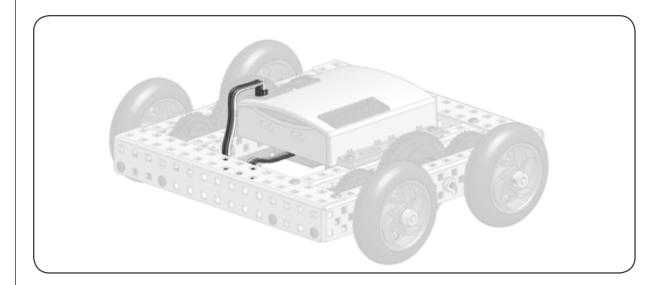


4 Wire Assembly

First, plug the wire coming from the right motor into "Motors" port 2. Right refers to the robot's right. We use the side of the controller witht the LEDs as the front.

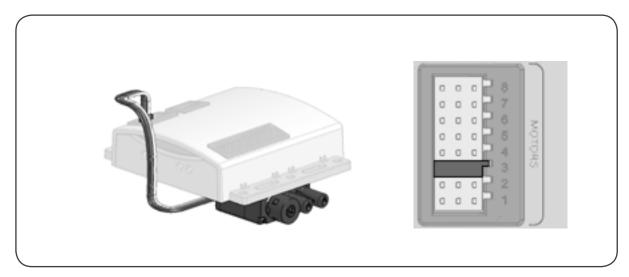
Be sure to plug in the wire correctly and gently. The wires should slide in easily when properly oriented.

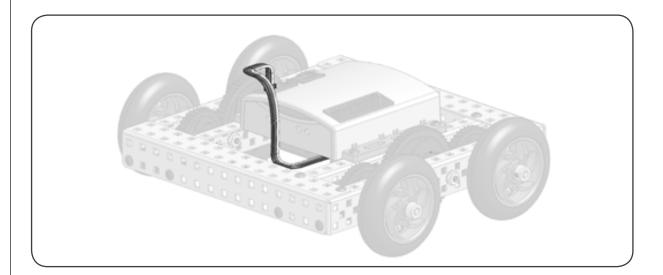




4 Wire Assembly, continued

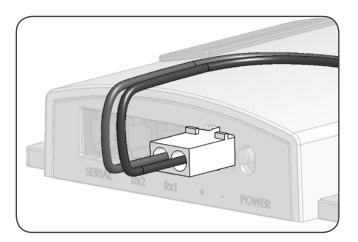
Next, plug the wire that is attached to the left motor into Motor port 3 on the micro controller.

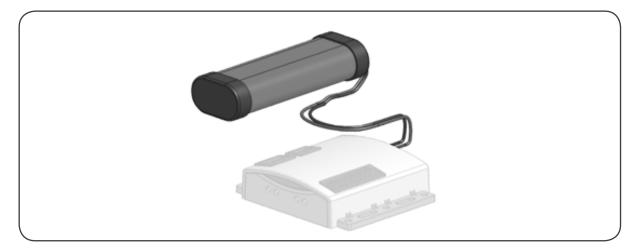


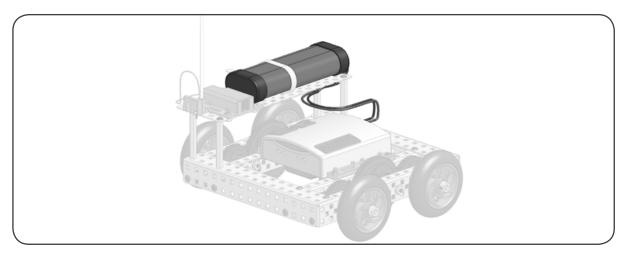


3 Wire Assembly, continued

Plug the battery into the back of the micro controller. Take the wire coming out of the battery and plug it into the matching white port on the back of the micro controller.







3 Wire Assembly, continued

Take the 9" RJ-10 wire (the yellow wire that looks like a phone cable) and plug one end into the back of the yellow receiver module. Plug the other end into the port marked "Rx1" on the rear of the micro controller.

