BaseBot Assembly

Overview:

This document contains all the instructions for assembling the BaseBot.

Procedures:

Assembling the Chassis

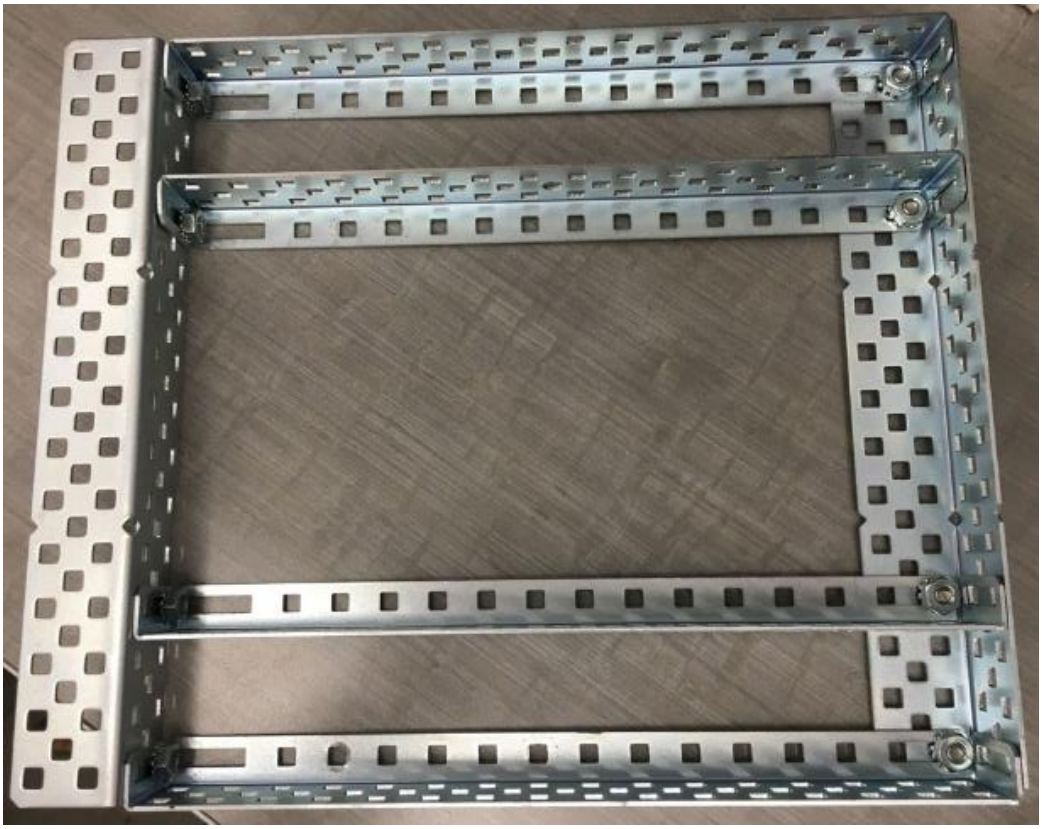
1. Assemble the rear of the chassis as shown in Figure 1. Align the holes in the end of the two middle rails to the fourth slotted hole from either end of the Chassis bumper. Do not tighten the screws until instructed to do so.

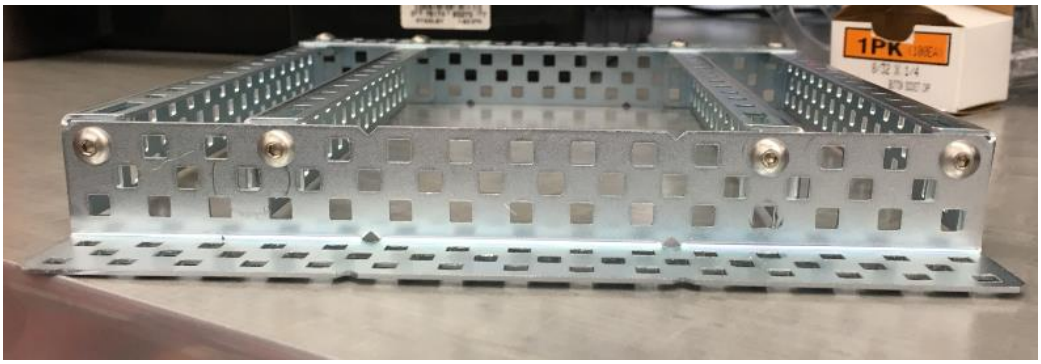
Figure 1

Materials	
4	Chassis rails
1	Chassis bumper
4	8-32 BHCS x 1/4”
4	Keps nuts

2. Assemble the front of the chassis as shown in Figure 2. Note the row and column of screw placement.

Figure 2





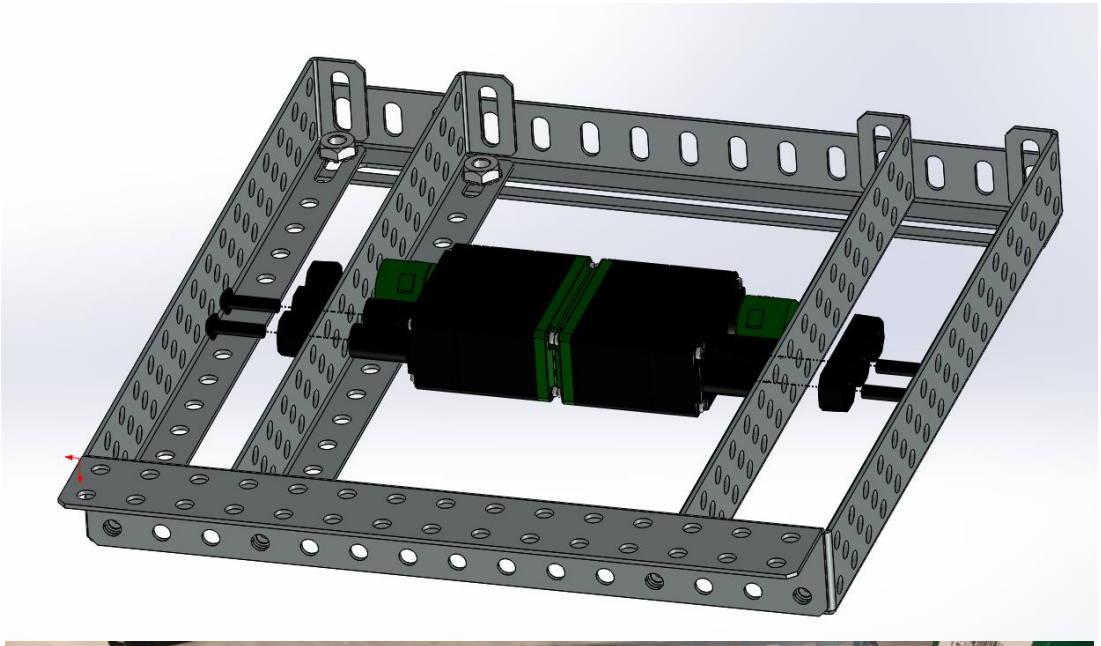
Materials	
1	Rear chassis assembly from step 1
1	Chassis bumper
4	8-32 BHCS x 1/4”
4	Keps nuts

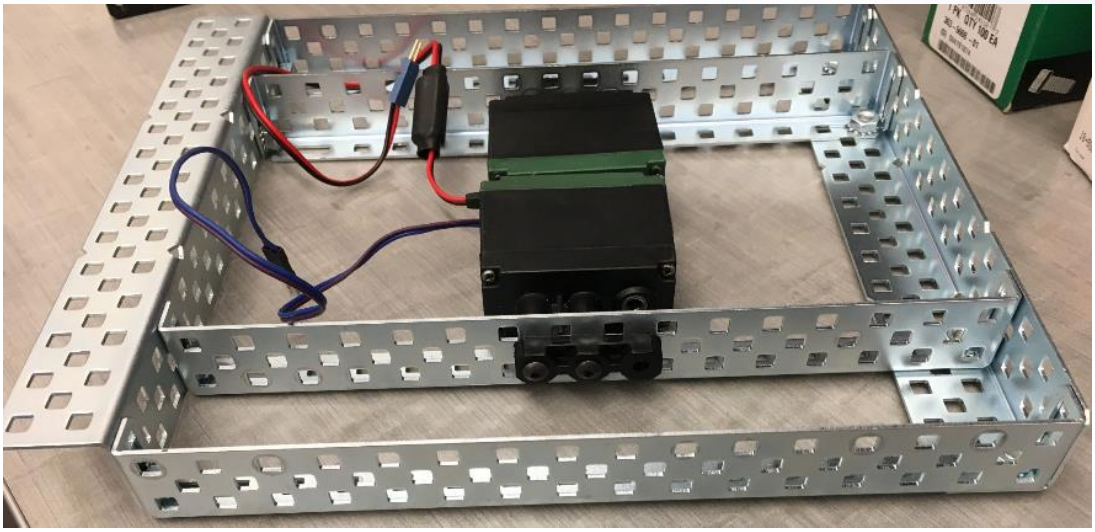
3. Make sure all of the components of the chassis frame are aligned and square, then tighten the hardware.

Assembling the Drive Train

1. Mount the motors to the inside chassis rail as shown in Figure 3. Note screw location in the image. Tighten the hardware.
    - **Note**: Diagrams 3-6, 8 show a slotted angle bar where the rear chassis bumper should be. Your chassis, with the correct rear chassis bumper, should look like the photos.

Figure 3

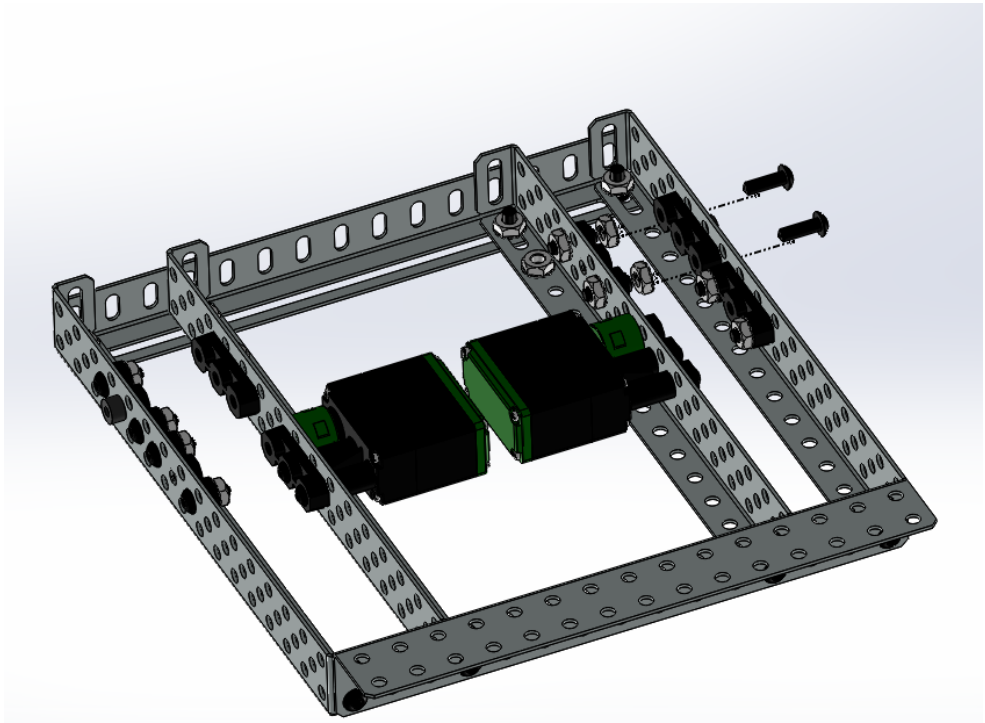


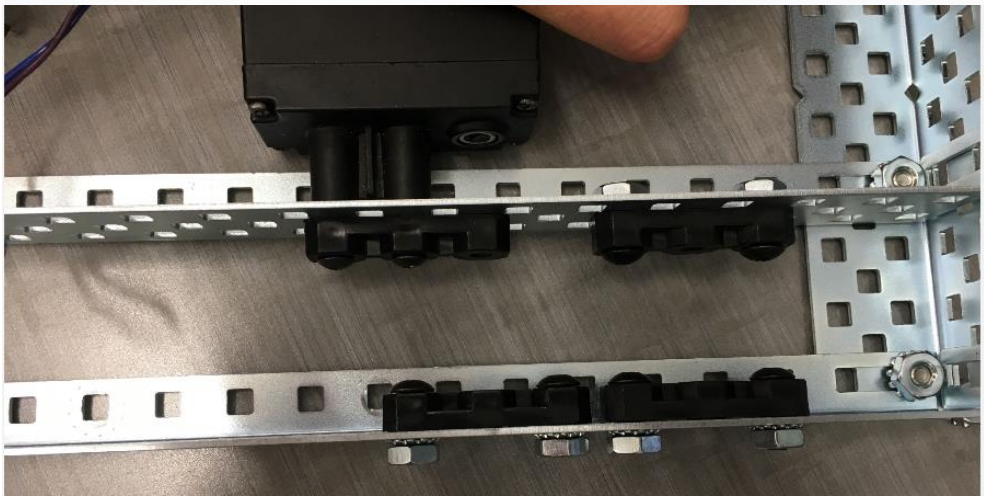


Materials	
2	Motor modules
2	Flat Bearings
4	6-32 BHCS x 1/2”

2. Mount bearings to the chassis as shown in Figure 4. Note bearing location in the image. Tighten the hardware.

Figure 4

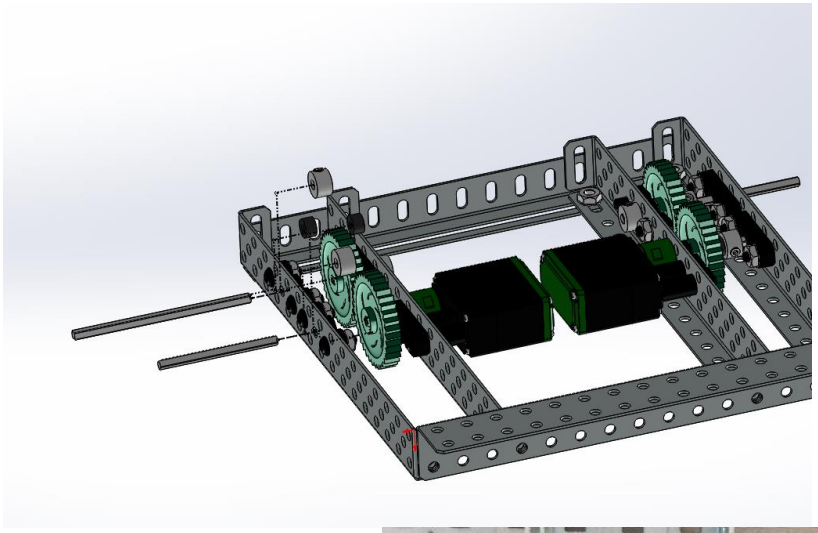


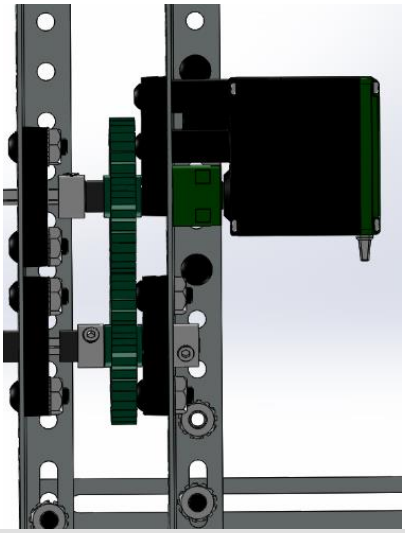


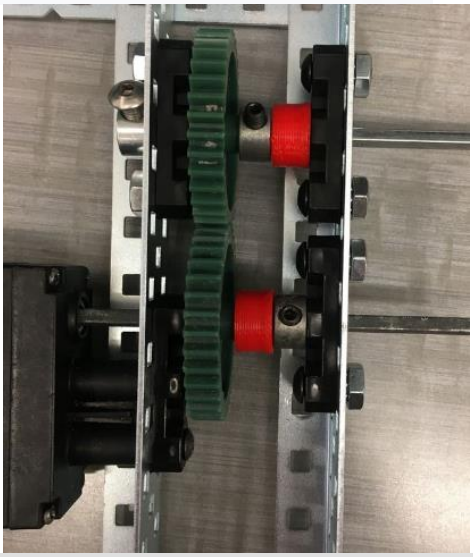
Materials	
6	Flat Bearings
12	8-32 BHCS x 1/2”
12	Keps nuts

3. Mount shafts and gears as shown in Figure 5.
    - Before mounting the gears, be sure the motor mounting screws are tight. Once the gears are installed you will not have access to the top of the motor screws to tighten them.
    - Do not insert the motor shaft all the way into the motor clutch
    - Do not tighten the collars until instructed.

Figure 5







Materials	
4	36 tooth gears
4	Collars
4	0.318” spacers
2	3” square bars
2	2” square bars

4. Check gear alignment
    - Rotate the gears by hand and verify that they mesh correctly and do not bind.
    - If the gears are hard to turn or you cannot fit the spacers in between the bearings:
        i. Loosen the rear end of the associated inside chassis rail.
        ii. Slide the inside chassis rail toward the center just enough to allow the gears to rotate freely and then retighten the chassis rail.
    - If the gears move side to side on the shaft:
        i. Loosen the rear end of the associated inside chassis rail.
        ii. Slide the inside chassis rail toward the outer rails just enough to keep the gears from sliding.
    - Tighten all the chassis hardware
5. Check Motor Engagement
    - Push the motor shaft into the clutch of the motor.
    - Use the Vex open-ended wrench to rotate the longer shaft. Verify the motor clutch spins with the gears as you turn the long shaft.
    - Tighten the collars on both shafts to secure them in to place.

6. Mount the wheels and tighten the collars as shown in Figure 6.
    - **Note:** If the portion of the shaft extending from the chassis is too short to mount the wheel and external collar, loosen the inside collar near the gear and slide the shaft further out.

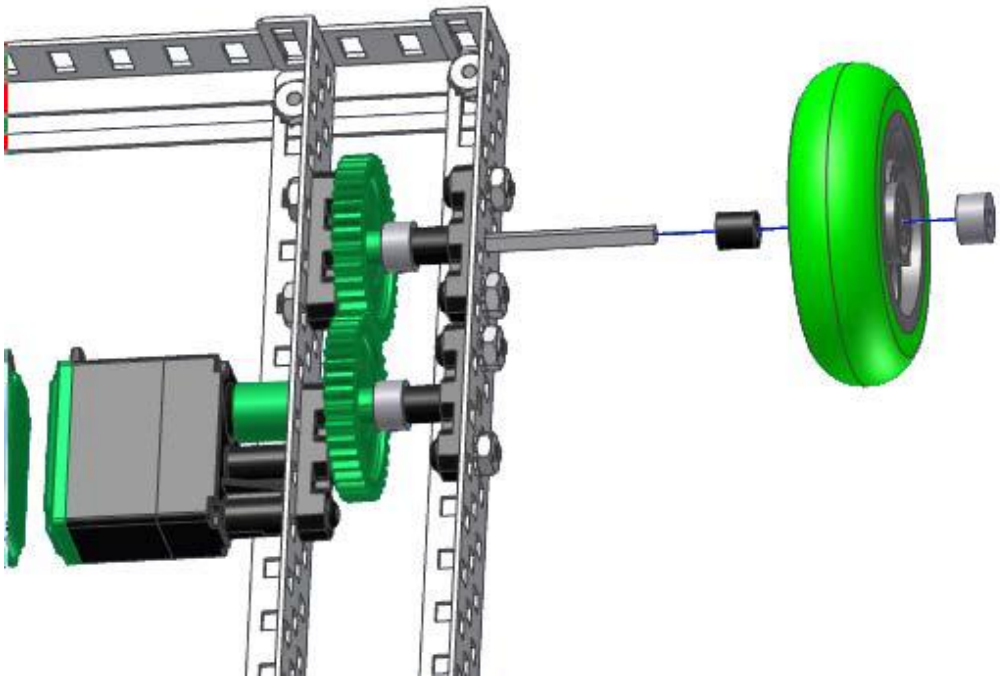
    - Once the collar is tightened, verify that the spacer will rotate on the shaft. If the spacer is too tight to rotate:

        i. Loosen the outside collar.

        ii. Adjust the wheel to allow more space between the chassis and wheel assembly.

        iii. Re-tighten the collar

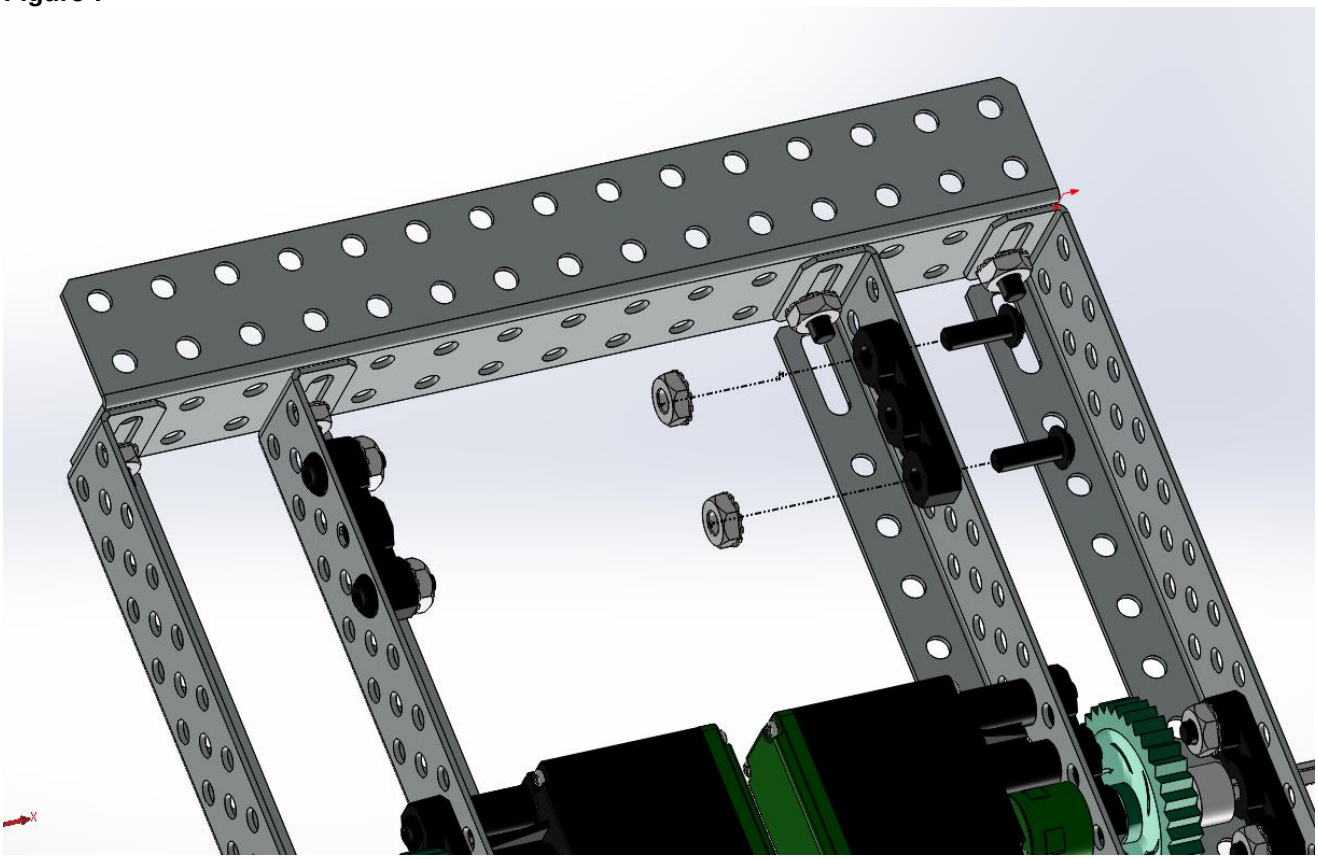
Diagram 6



Materials	
2	1.895” hubs with removable tires
2	0.318” spacers
2	Collars

7. Mount the caster bearings as shown in Figure 7. Tighten the hardware.

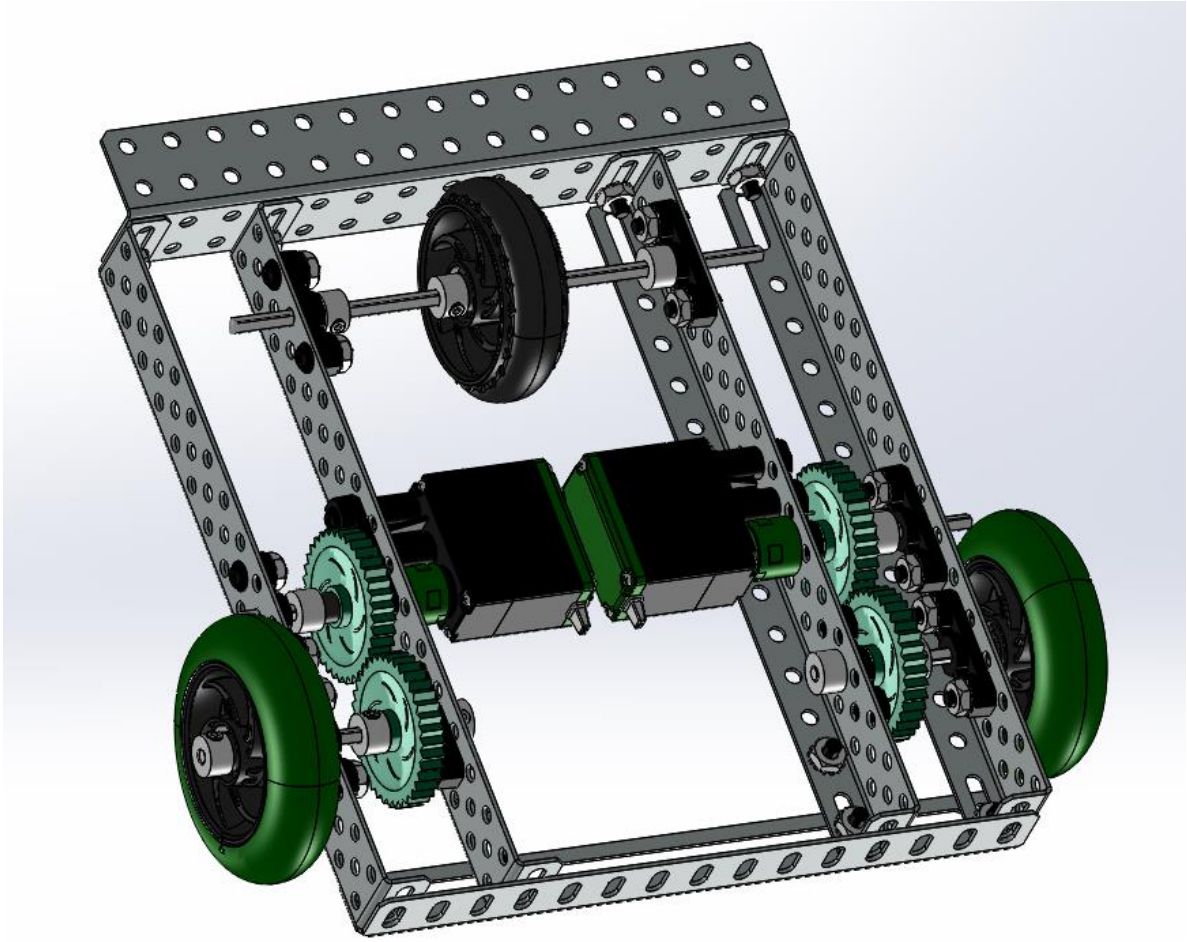
Figure 7



Materials	
2	(2) Flat Bearings
4	(4) 8-32 BHCS x ½”
4	(4) Keps nuts

8. Mount and align the hub as shown in Figure 8. Tighten the collars to keep the hub centered. The hub should rotate freely without binding.

Figure 8

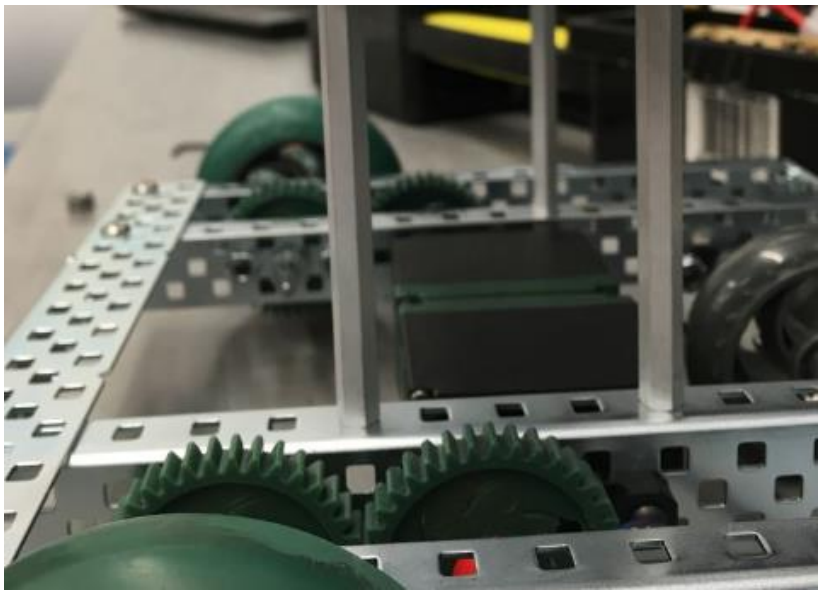


Materials	
1	5” square bar
1	1.895” hub without removable tires
4	Collars

Assembling the Controller and Battery Shelf

1. Mount the threaded beams to the base of the chassis as shown in Figure 9. Note the threaded beam locations relative to the rear bumper.

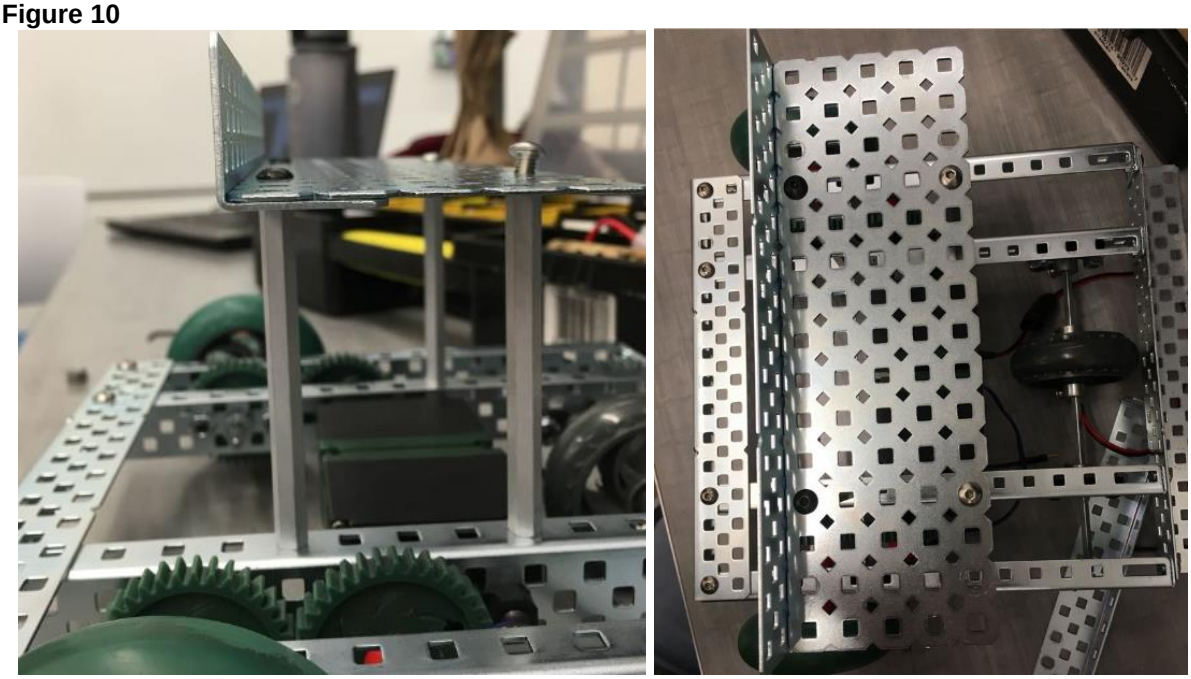
Figure 9



Materials	
4	3” Threaded beams
4	8-32 BHCS x 3/8”

2. Attach the battery shelf and controller mount to the threaded beams as shown in Figure 10. Note that the battery shelf is resting on top of the controller mount. Note screw locations on the battery shelf.

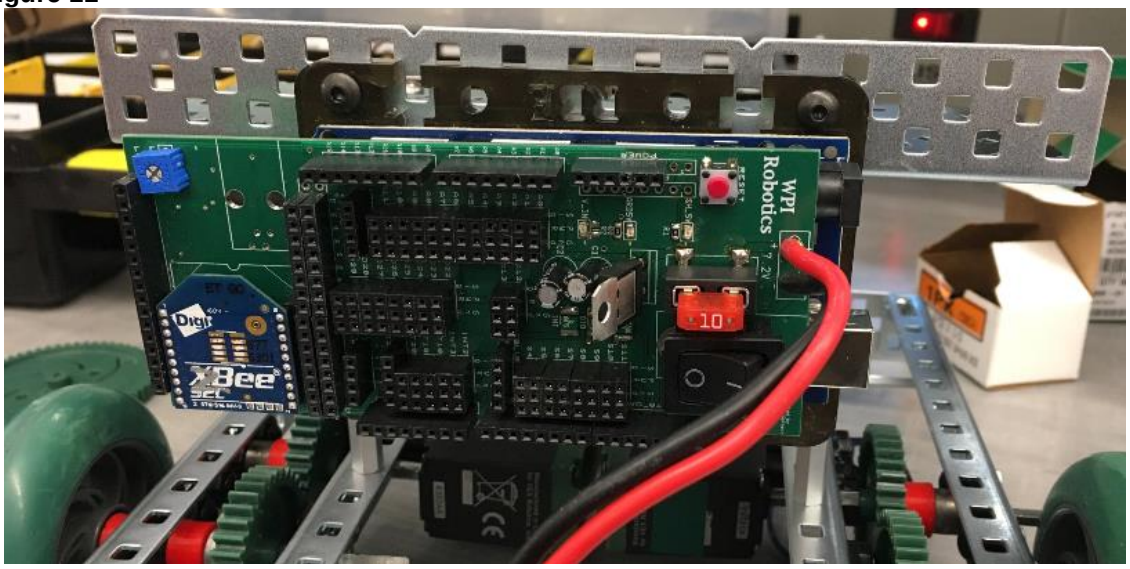
Figure 10



Materials	
1	Battery Shelf
1	Chassis Bumper
4	8-32 BHCS x 3/8”

3. Attach the controller to the battery shelf as shown in Figure 11.

Figure 11



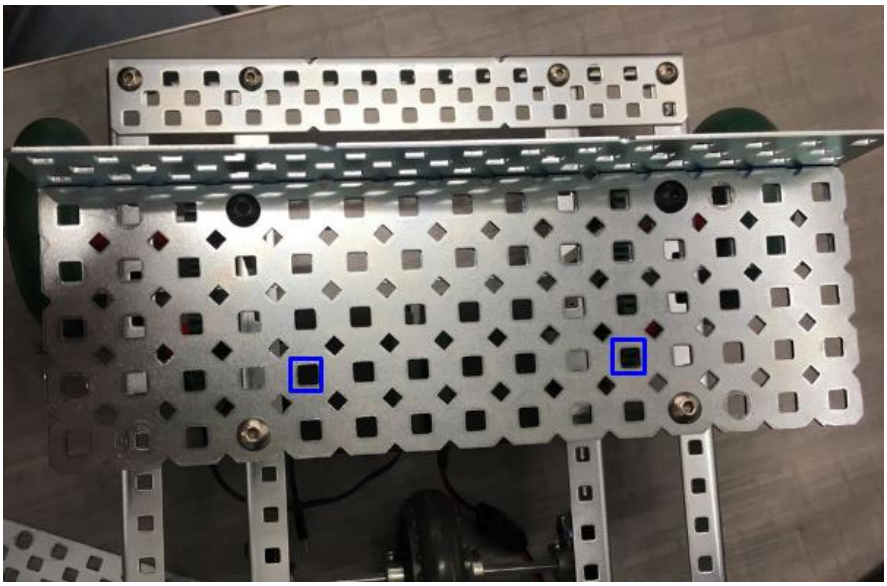
Materials	
1	Controller board
2	8-32 BHCS x 3/8”
2	Keps nuts

4. Tighten all the mounting hardware.

Installing the Battery

1. Loosely secure zip ties through the battery shelf at the locations indicated in Figure 12.

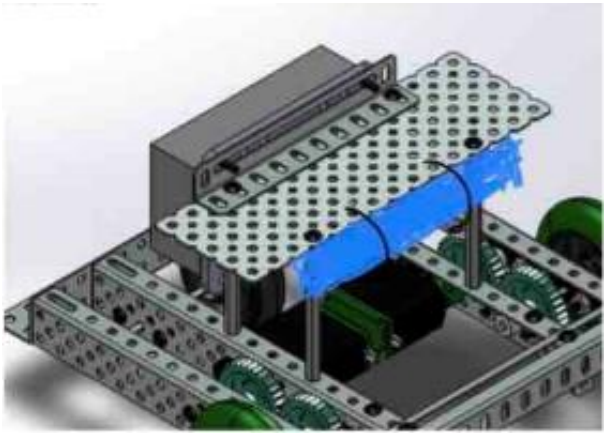
Figure 12



Materials	
2	Zip ties

2. Slide the battery through the zip ties outside the threaded beams, behind and below the battery shelf, as shown in Figure 13.

Figure 13



Materials	
1	Battery

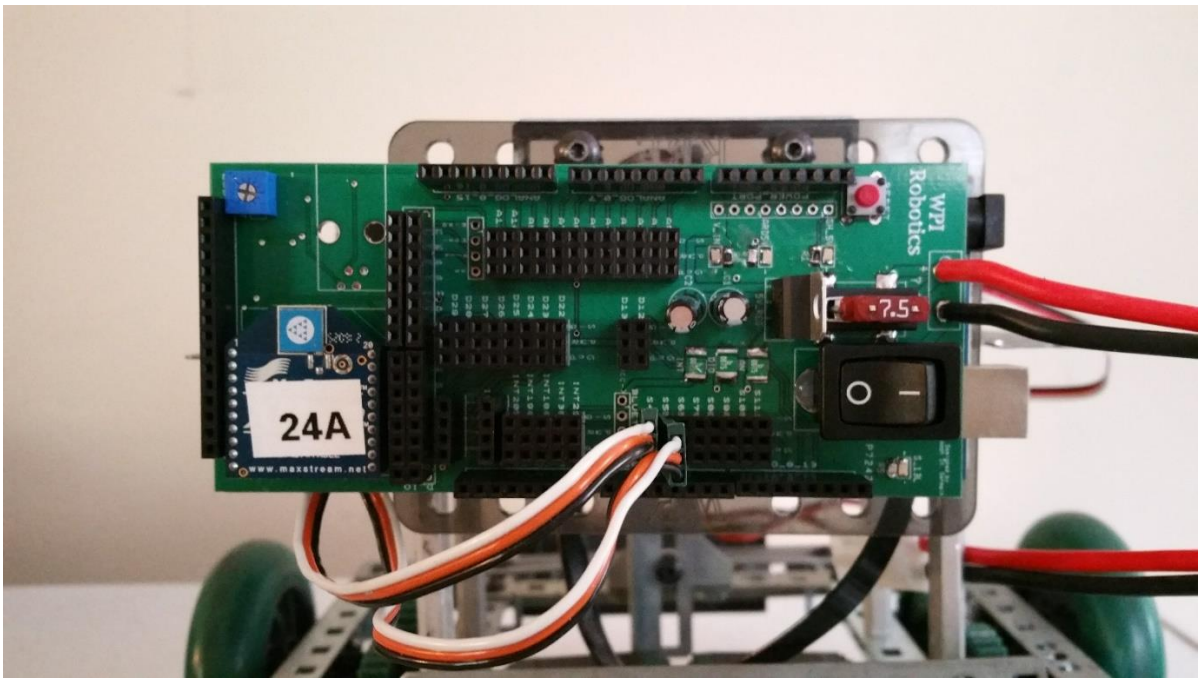
3. Tighten the zip ties to secure the battery in place.

4. Plug the battery into the controller.

Connecting the Motors to the Arduino

1. Route the wires from each of the motors to the top of the controller.
2. Looking down on the BaseBot, connect the left motor of the BaseBot to port S5 and the right motor to port S4 as in Figure 14.
3. Use cable ties to secure the cables to the BaseBot chassis. This will keep the motor cables safe from entanglement with other robots and gears.

Figure 14



Installing the Transmitter Battery

1. Remove the battery cover from the rear of the transmitter.
2. Install the 3-AAA batteries as shown in Figure 15.

Figure 15

3. Slide the power switch on the back of the transmitter into the ON position.

Testing the BaseBot

1. Use the Arduino IDE to load the DFW > Tank Drive example onto the Arduino microcontroller. The robot will not work until this is complete.
    - Refer to the getting started guide for more info.
    - **Caution:** Always lift the robot so that the drive wheels are off the ground before turning the power on. This will reduce the risk of an accident from unexpected movement. The wheels will drive forward if the transmitter is powered off when the robot is powered on
2. Slide the power switch on the Arduino shield to the ON position.
3. Place the BaseBot on the ground.
4. Push the left joystick up. The left side of the BaseBot moves forward.
5. Push the right joystick up. The right side of the BaseBot moves forward.
    - If either of side of your robot does not respond to the transmitter, review all the wiring connections to make sure everything is correct.

Once you verify that both sides are responding to the input of the transmitter:

6. Push both joysticks up and verify that the robot moves forward.
7. Push both joysticks down to move the robot backwards.
8. Push one joystick up and the other down in order to turn the robot.

This completes the BaseBot assembly instructions.