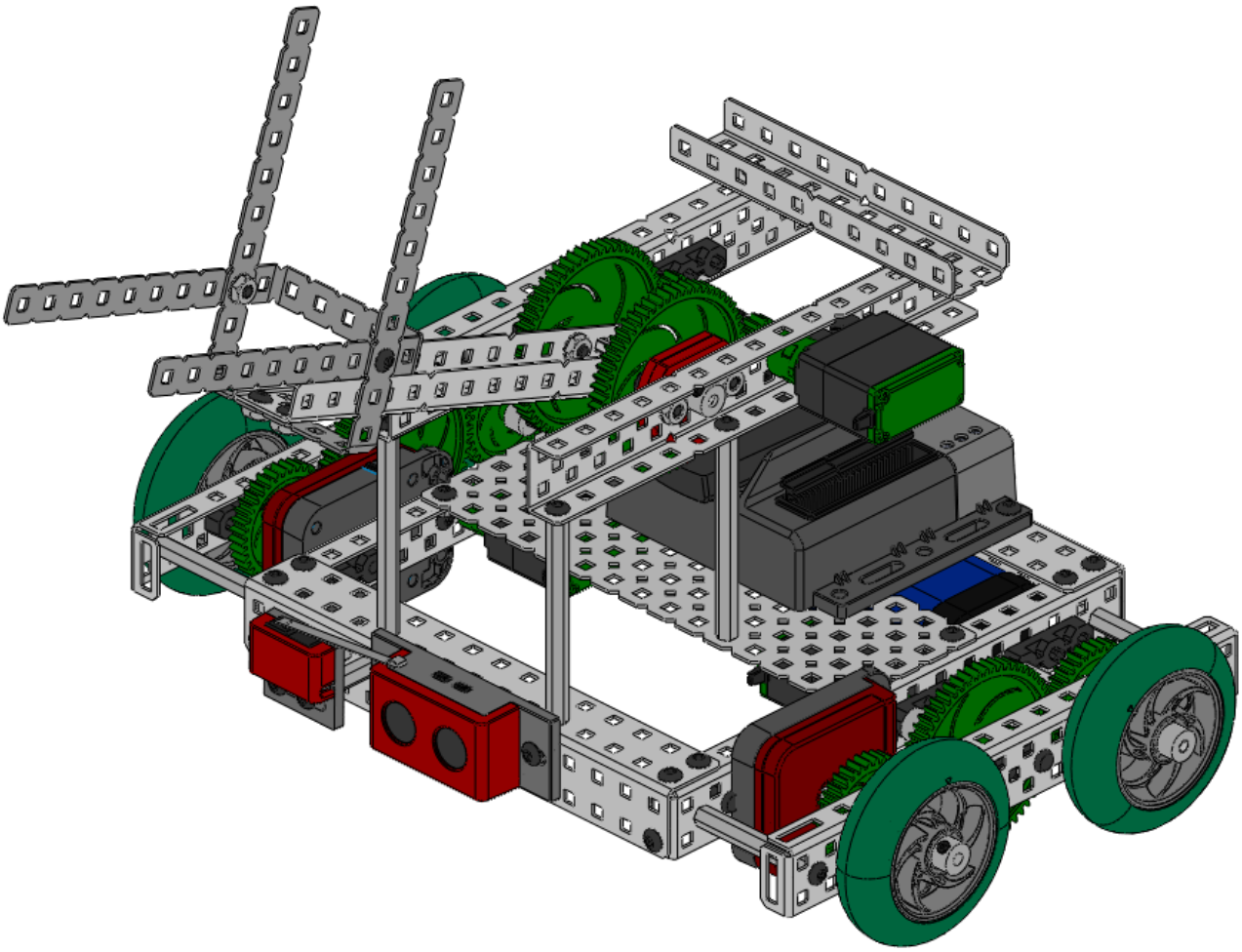
RECBOT BUILDING INSTRUCTIONS



USING THE VEX CORTEX

RECBOT BUILDING INSTRUCTIONS

1 Collect parts and tools from the lists below:

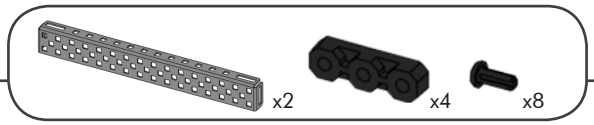
Materials	Quantity
Screw, 8-32 x 1/4" Long	42
Screw, 8-32 x 1/2" Long	6
Screw, 8-32 x 3/8" Long	9
Motor Screw, Long [1/2"]	6
Nut, 8-32 Keps	37
Shaft, 3" long	6
Shaft, 2" long	2
Shaft Collar	17
4.6mm Plastic Spacer	10
Bearing, Flat	15
Bearing Pop Rivets	24
Standoff, 3" Long	4
Standoff, 2" Long	4
Standoff, 1" Long	2
Gear, 12 tooth	2
Gear, 36 tooth	4
Gear, 60 tooth	4
Chassis Rail, 16 hole	4
Chassis Bumper, 15 hole	2
C-Channel, 1x2x1x15 hole	2
C-Channel, 1x2x1x25 hole	1
Plate, 5 x 15 hole	1
Bar, 25 hole	2
Small Low Friction VEX Wheel	4
VEX Cortex Microcontroller*	1
VEX Motor w/ Clutch	3
7.2V Robot Battery*	1
Optical Shaft Encoder*	2
Limit Switch*	1
Ultrasonic Rangefinder*	1
Potentiometer*	1

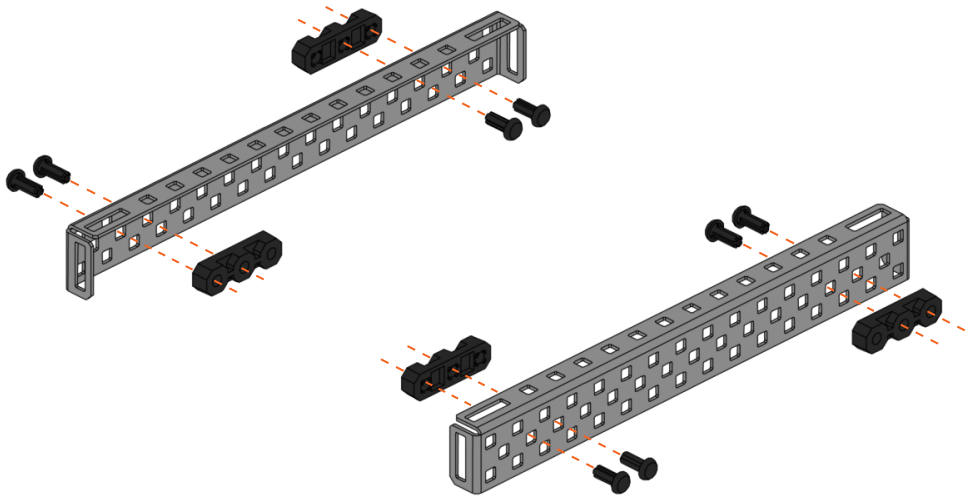
Tools	Quantity
Zip Tie, 4" Long	4
Allen Wrench 3/32"	1
Allen Wrench 5/64"	1
Open End Wrench 1/4"	1
Pliers*	1
Hacksaw*	1

* Not included in Protobot Robot Kit

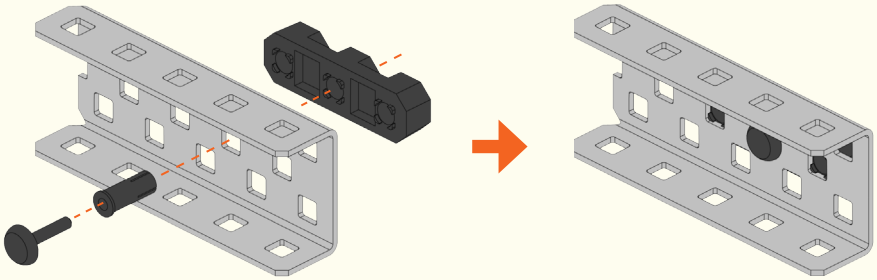
RECBOT BUILDING INSTRUCTIONS

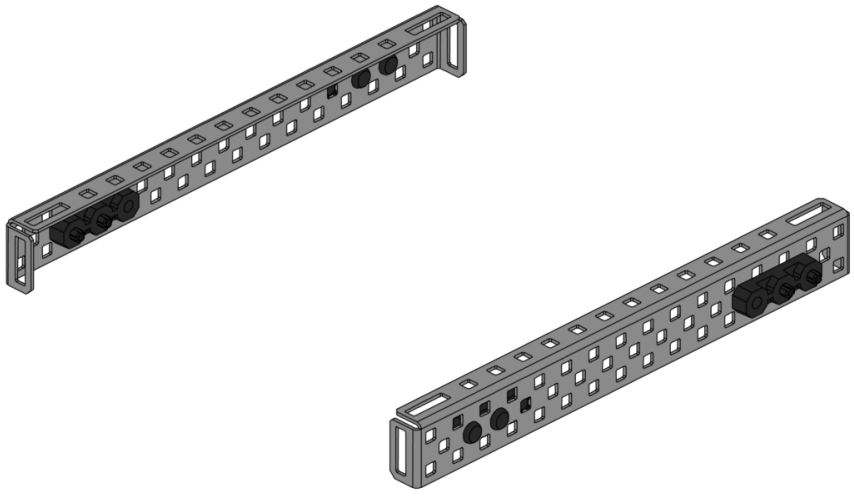
2 Chassis Construction





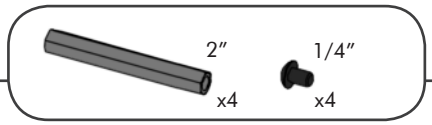
Building Tip - Using Pop Rivets

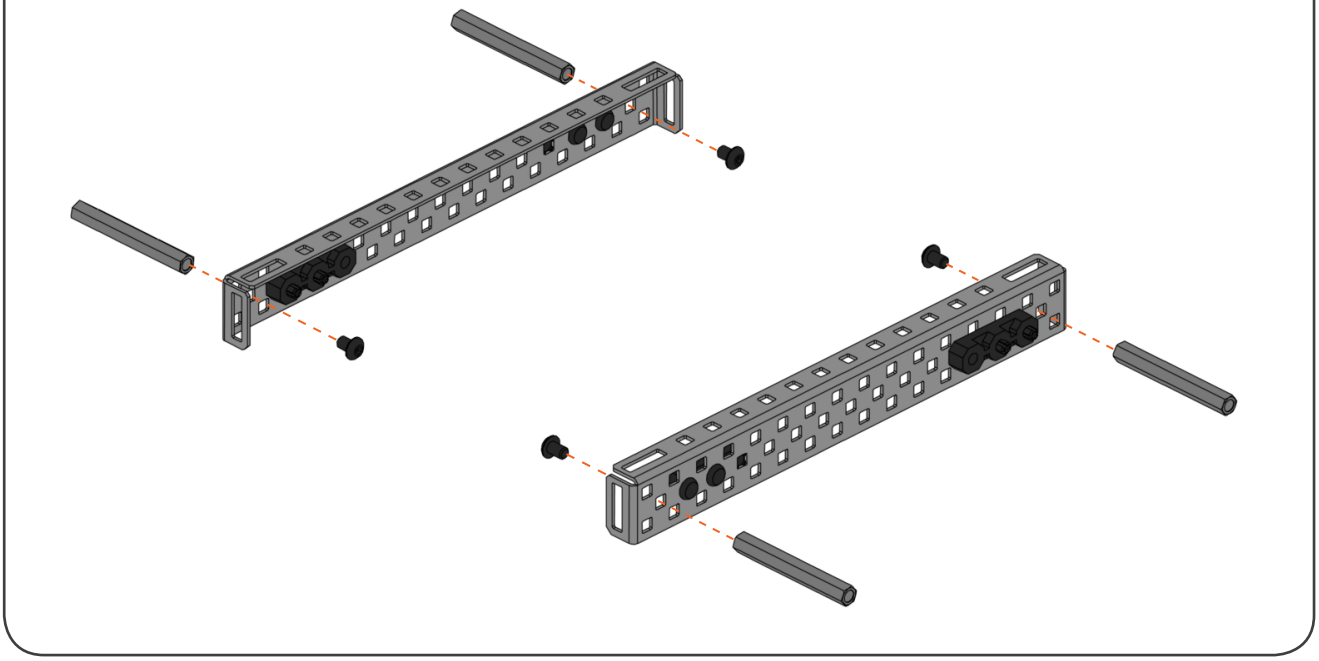


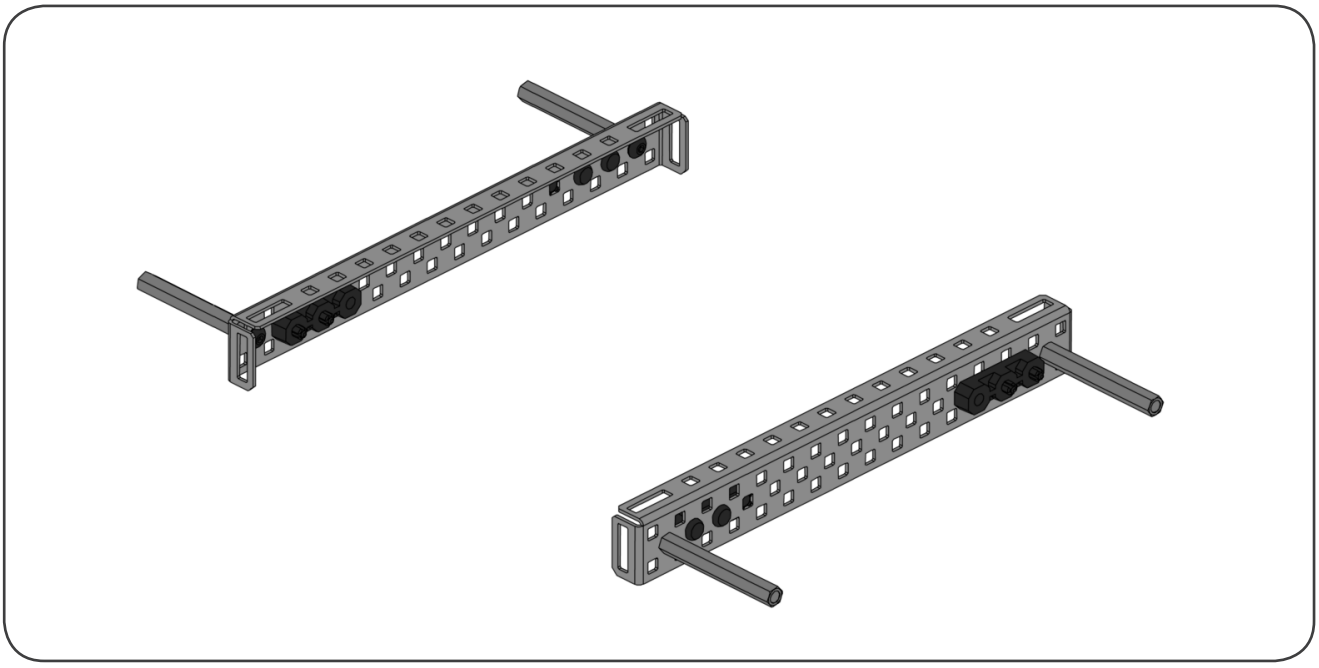


RECBOT BUILDING INSTRUCTIONS

2 Chassis Construction *(continued)*

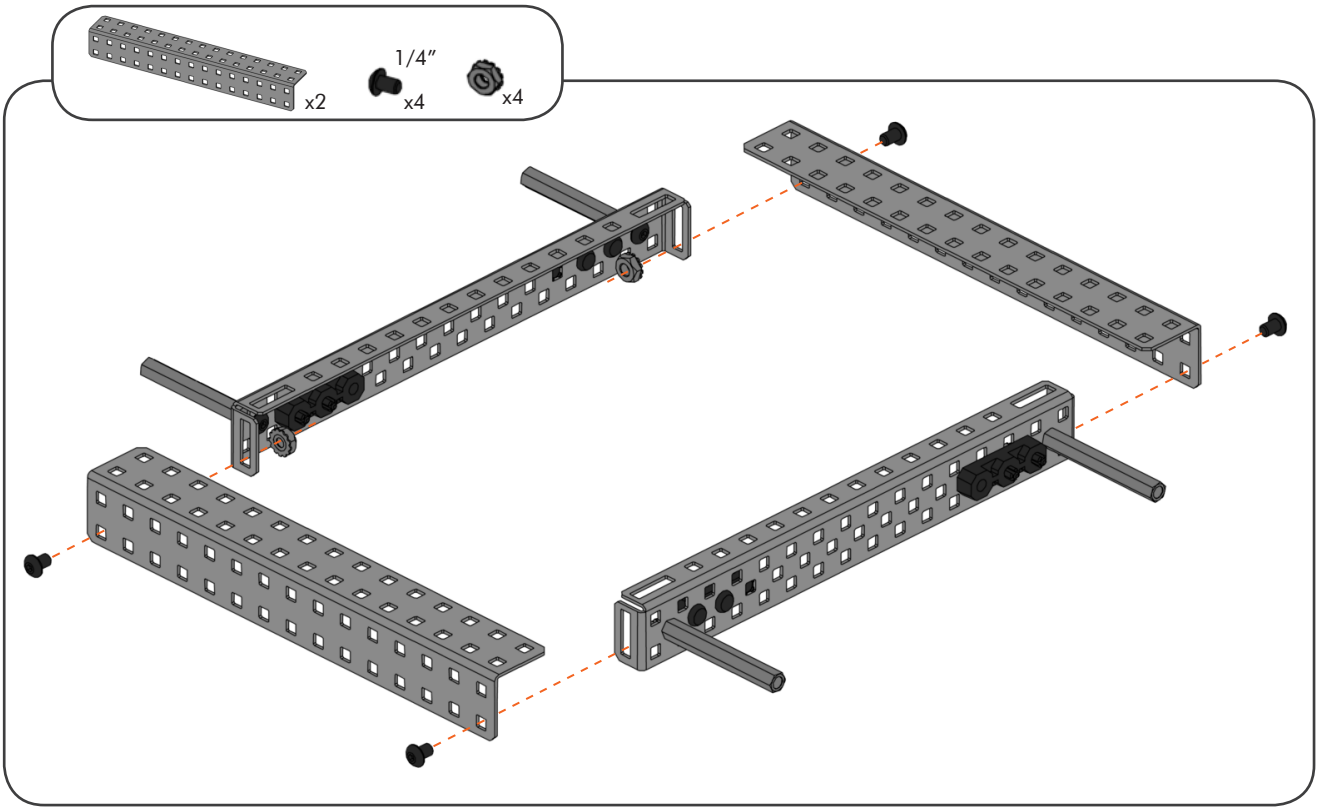


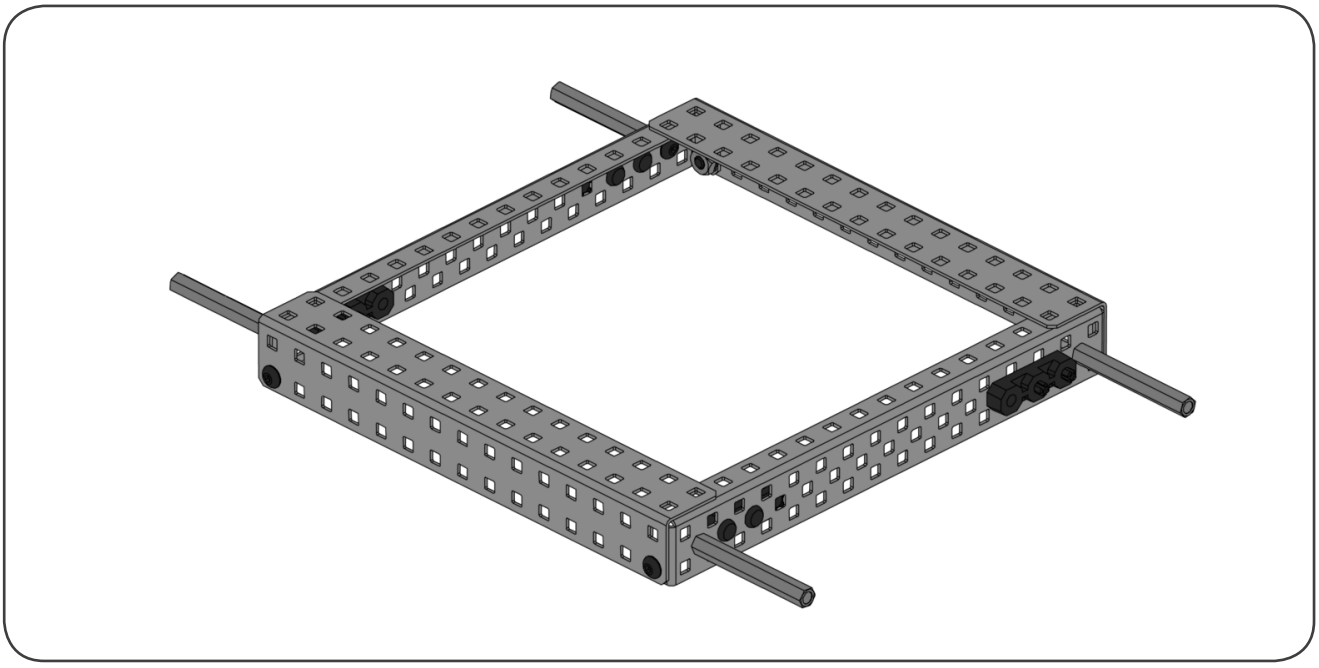




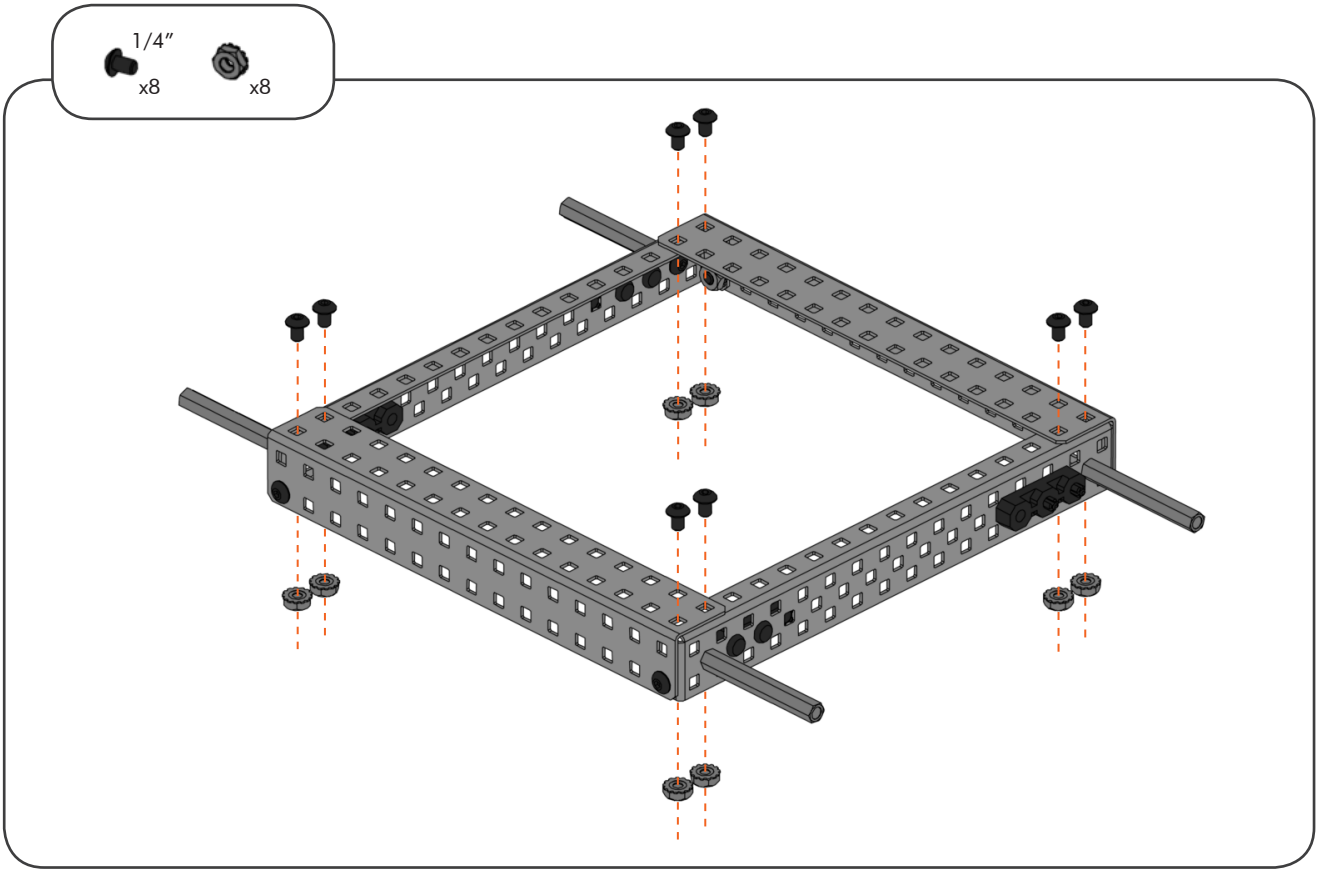
RECBOT BUILDING INSTRUCTIONS

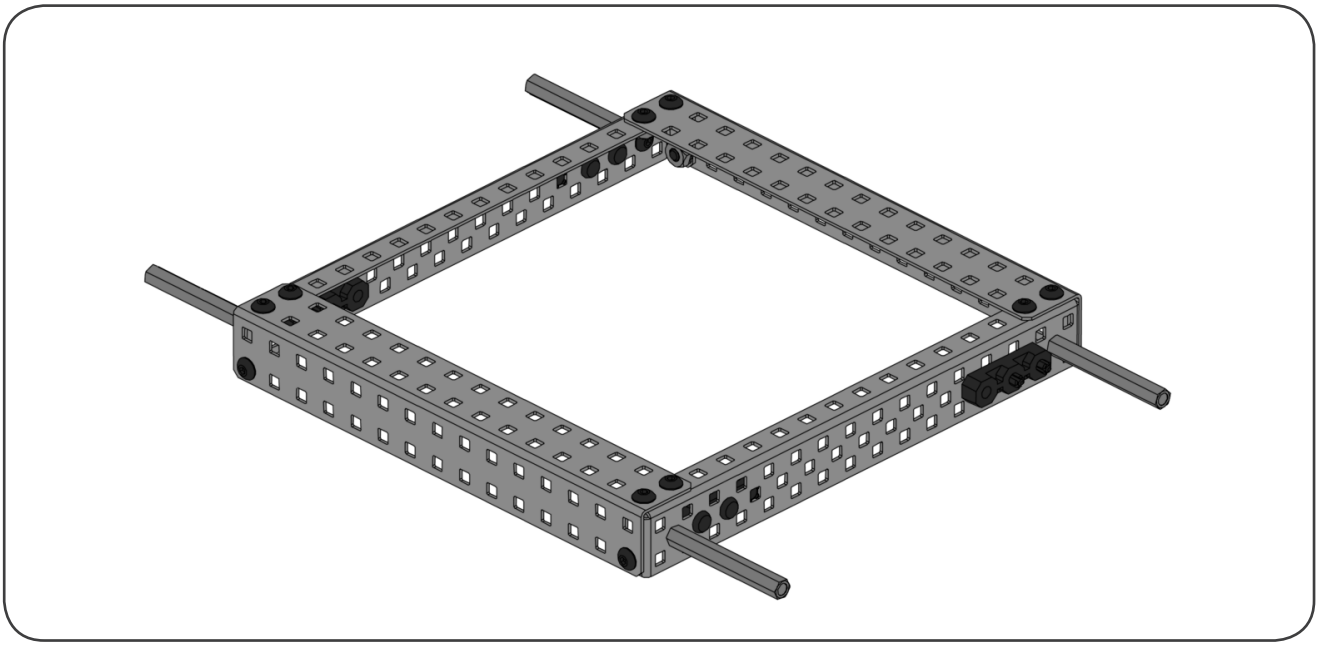
2 Chassis Construction *(continued)*





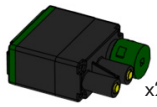
2 Chassis Construction *(continued)*





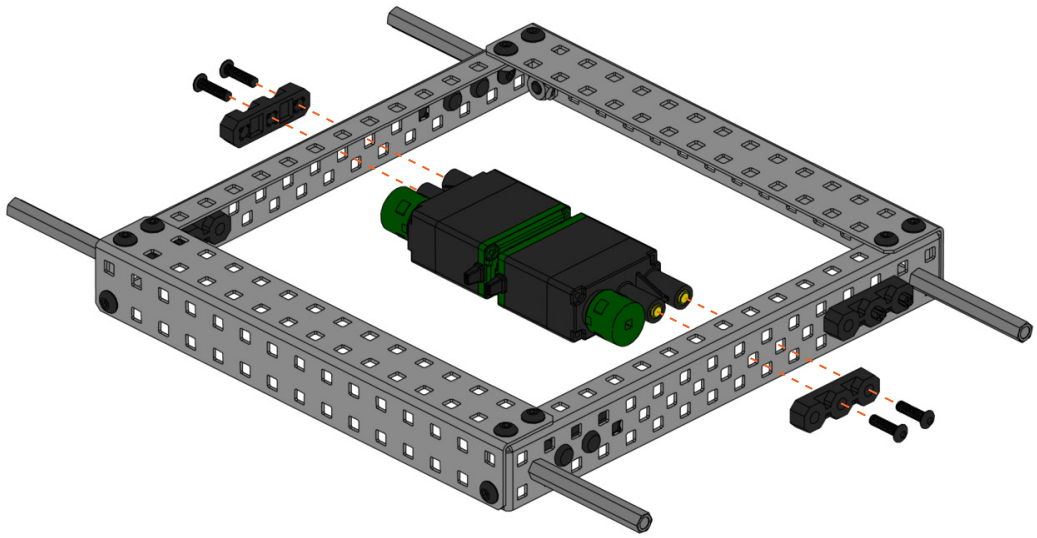
RECBOT BUILDING INSTRUCTIONS

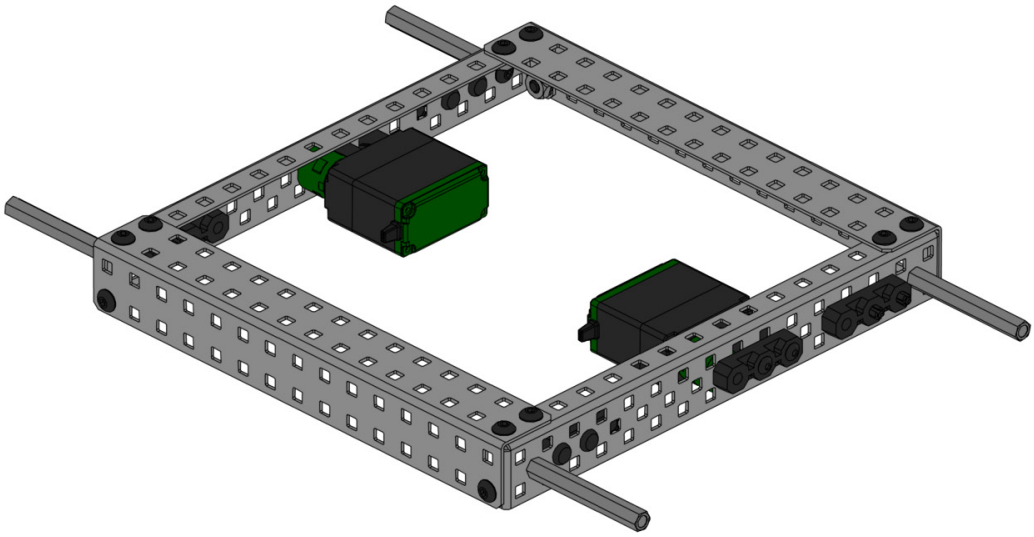
3 Drivetrain Assembly


x2

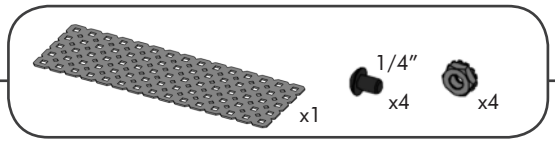

x2

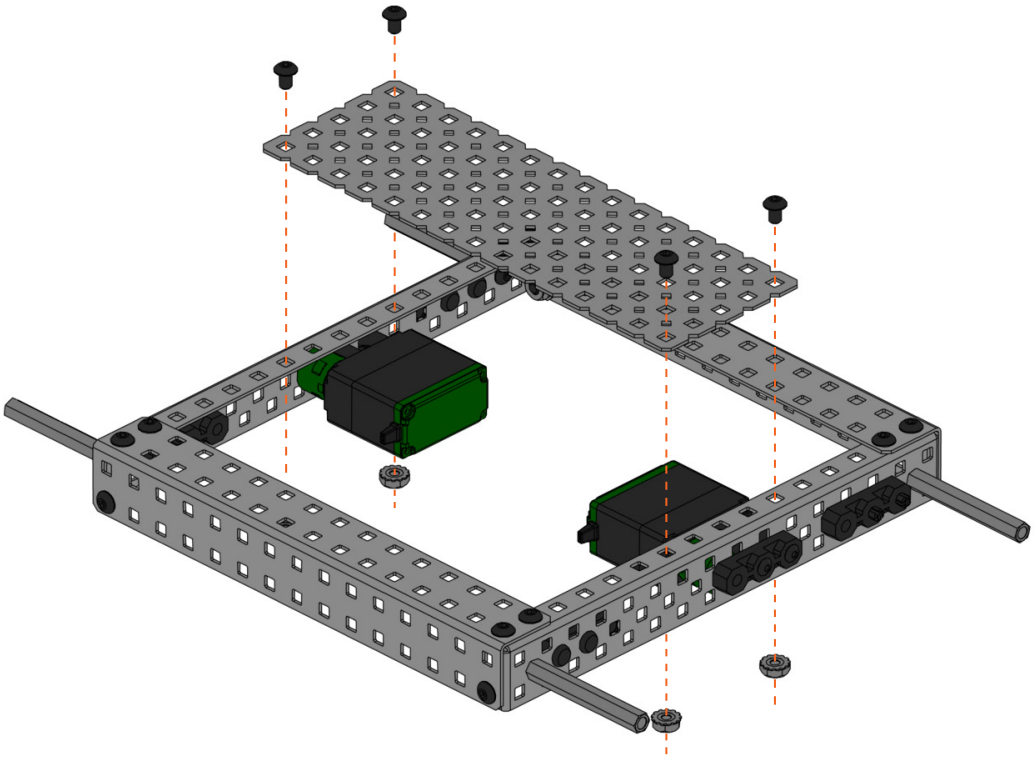

1/2" Motor Screws
x4

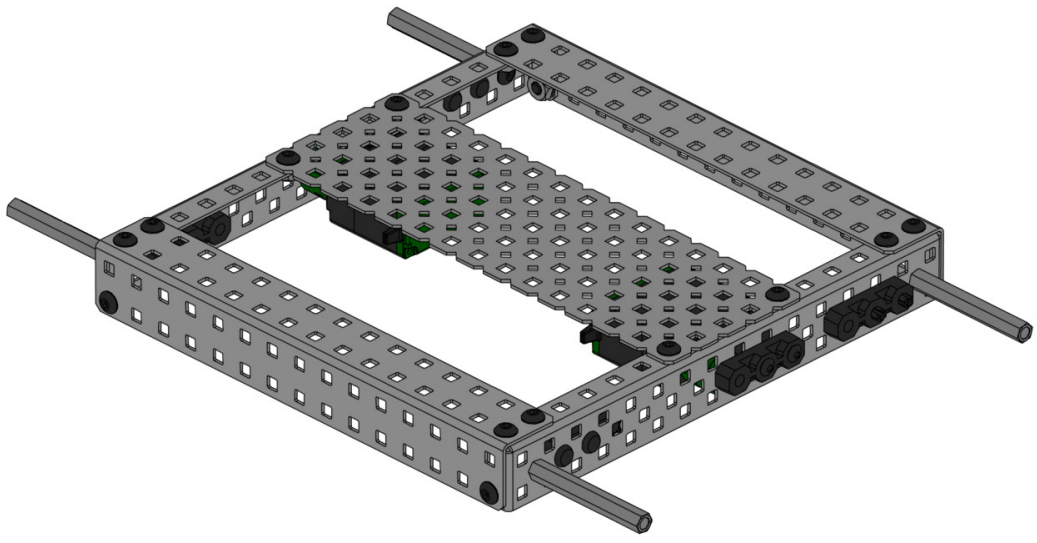




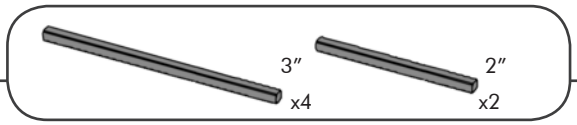
3 Drivetrain Assembly *(continued)*

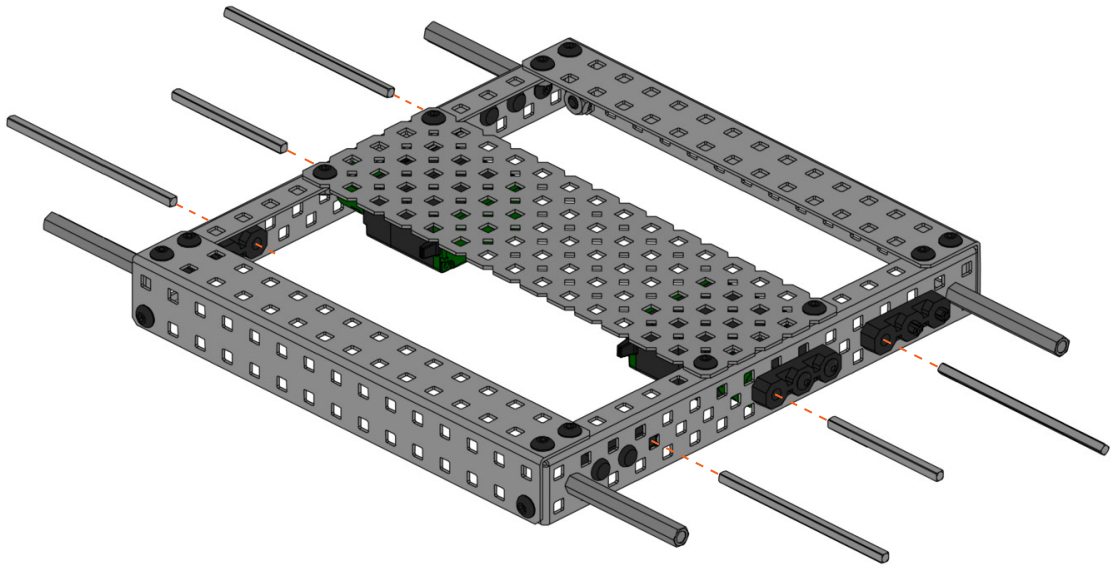






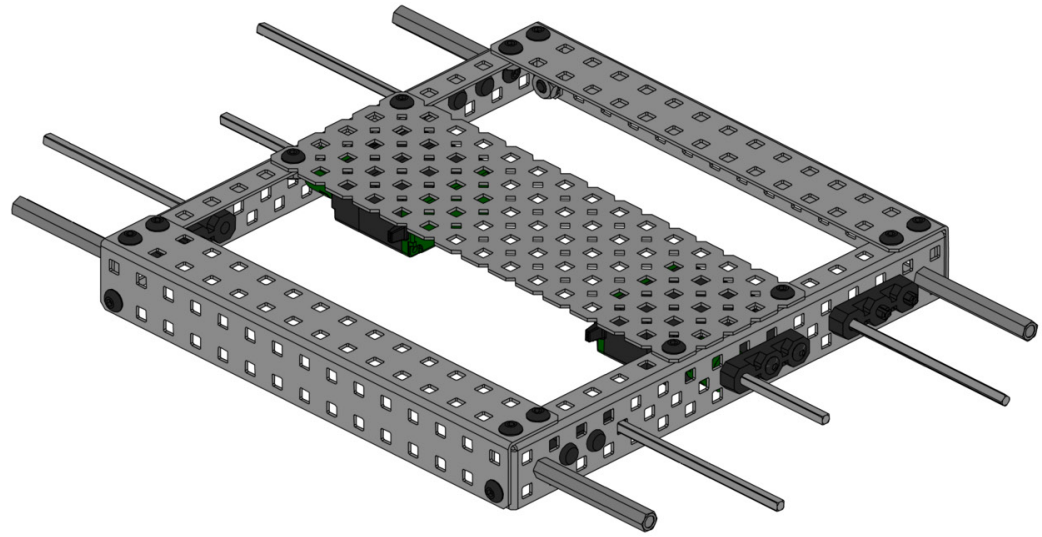
3 Drivetrain Assembly *(continued)*





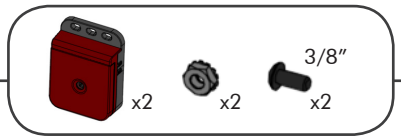
Building Tip - Shaft Length

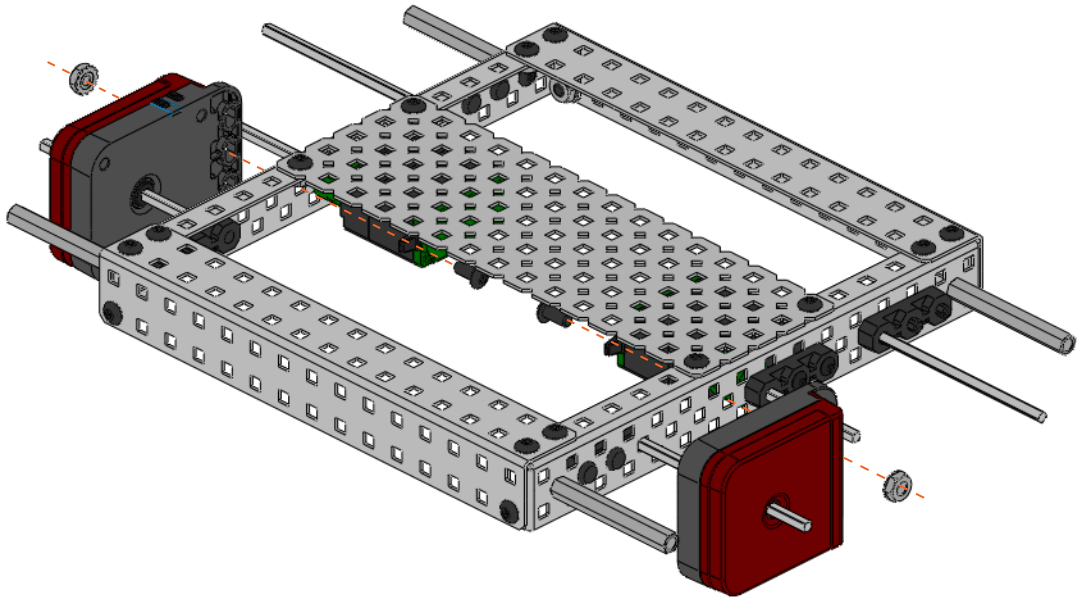
The shafts depicted above are the minimum usable lengths. Longer shafts, if available, can be used to provide some additional support in the drivetrain.

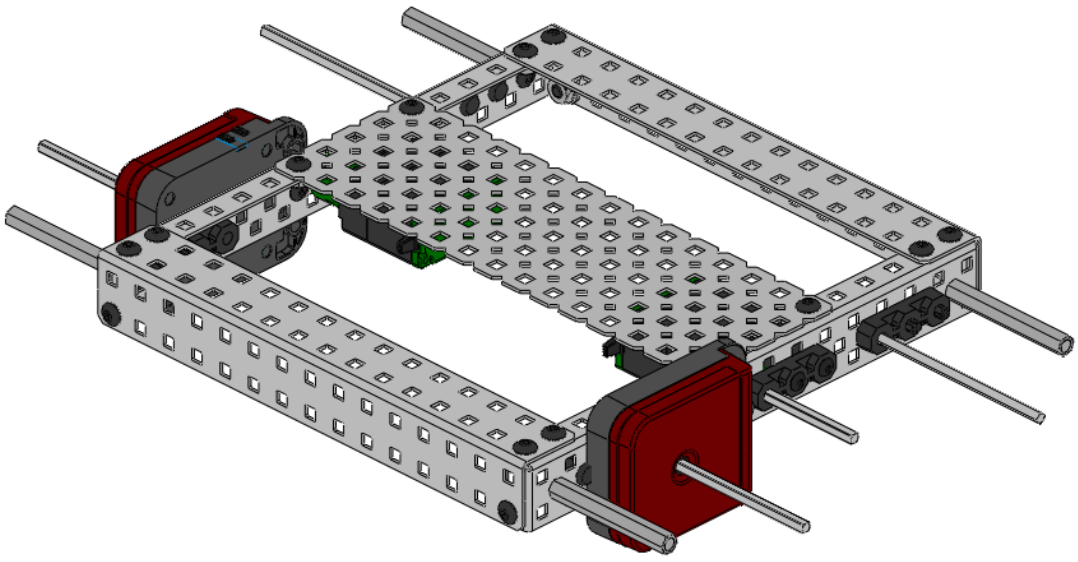


RECBOT BUILDING INSTRUCTIONS

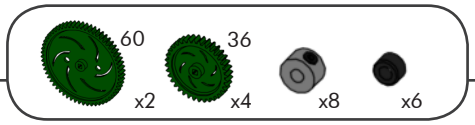
3 Drivetrain Assembly *(continued)*

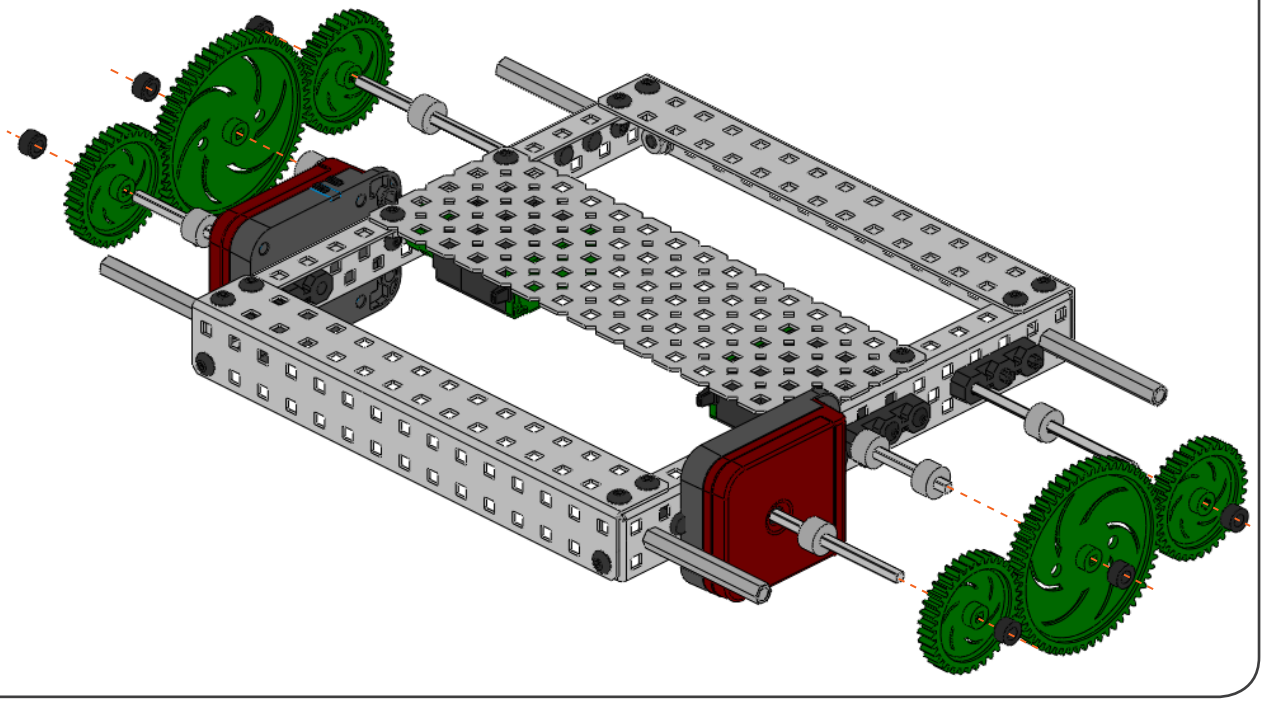




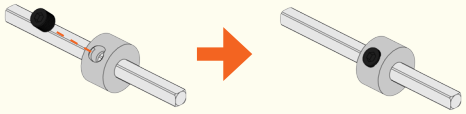


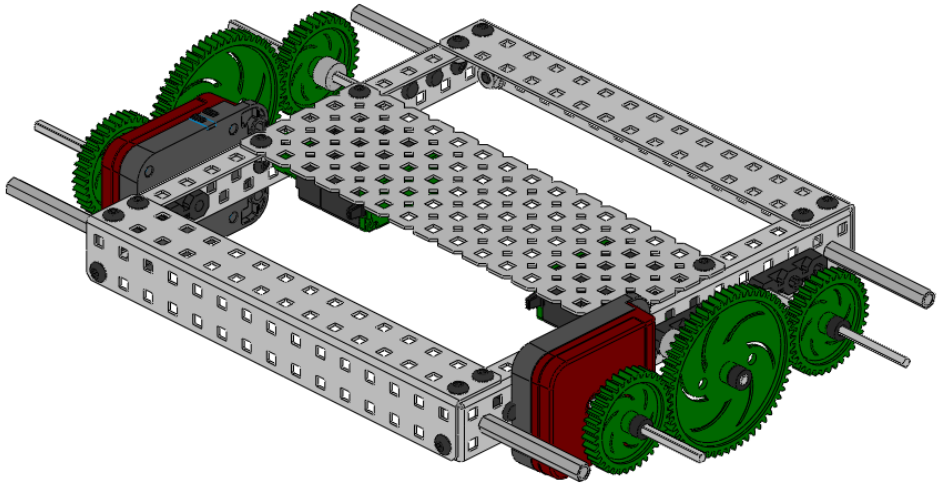
3 Drivetrain Assembly *(continued)*





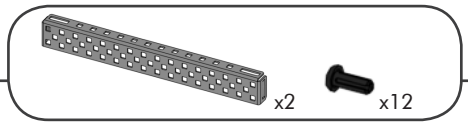
Building Tip - Using Shaft Collars

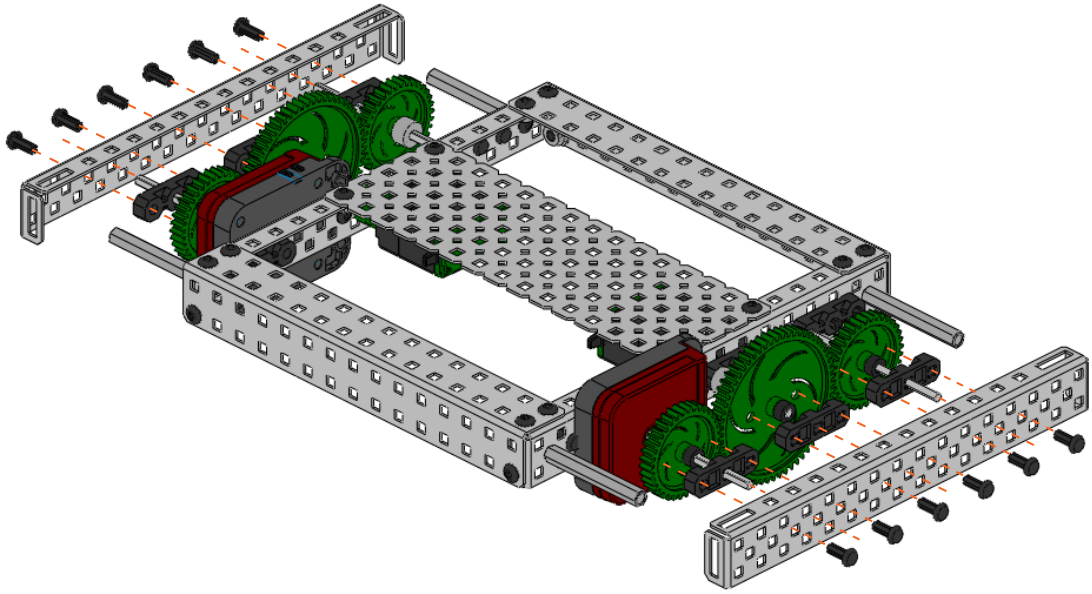


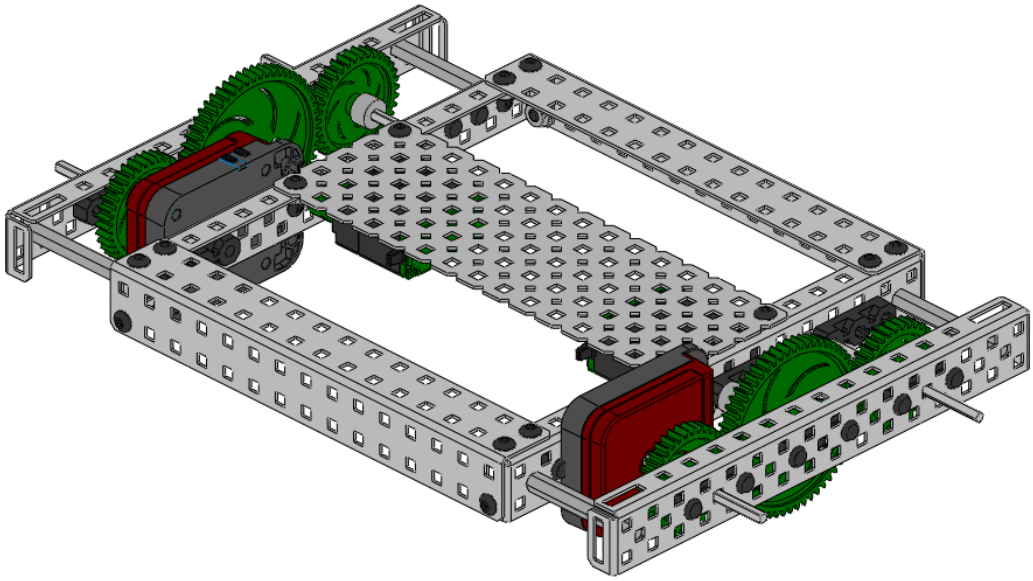


RECBOT BUILDING INSTRUCTIONS

3 Drivetrain Assembly *(continued)*



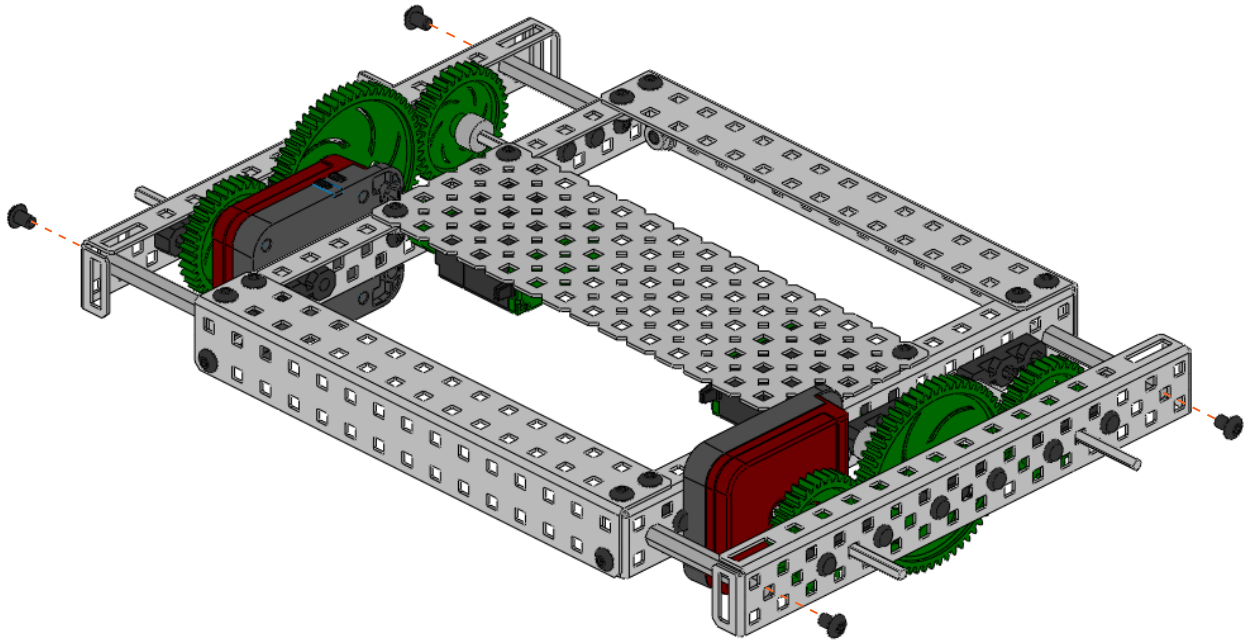


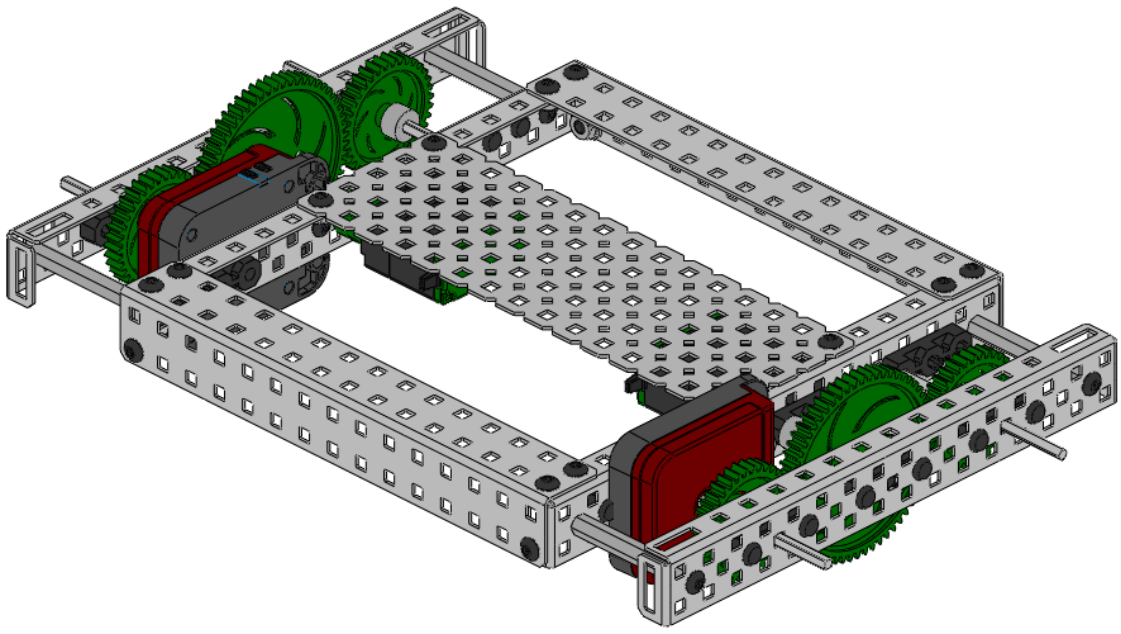


RECBOT BUILDING INSTRUCTIONS

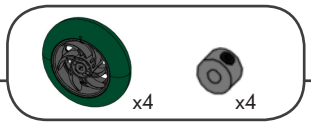
3 Drivetrain Assembly *(continued)*

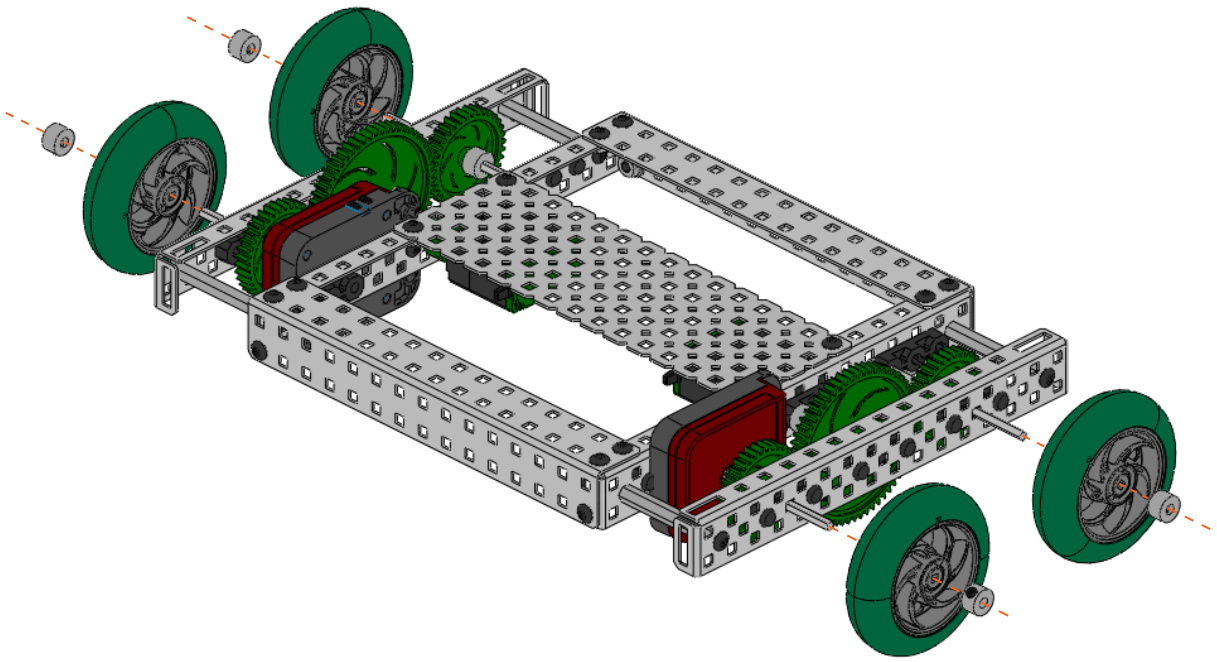
1/4"
x4

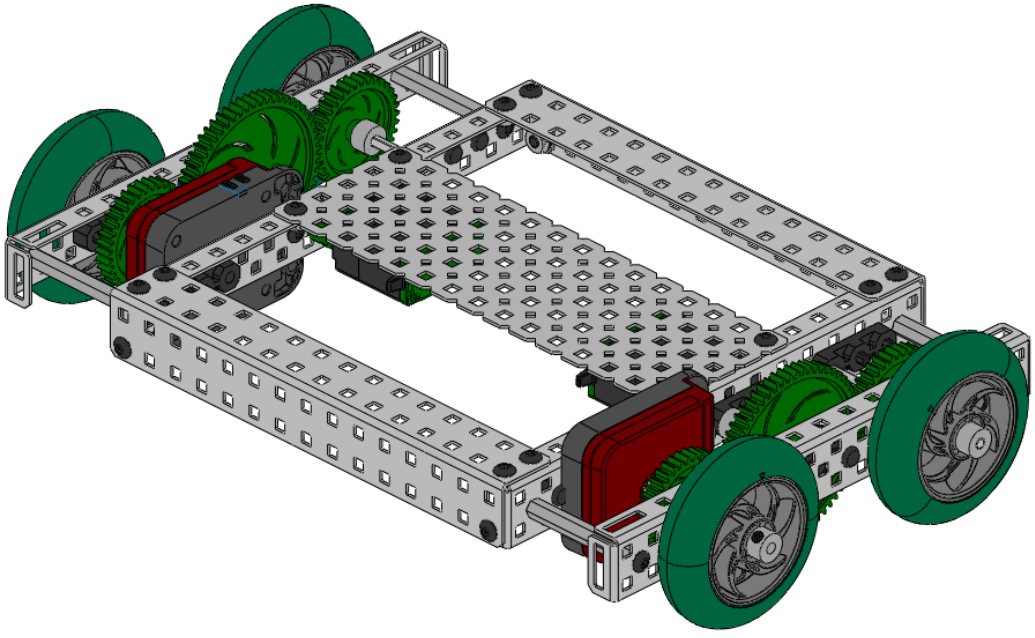




3 Drivetrain Assembly *(continued)*

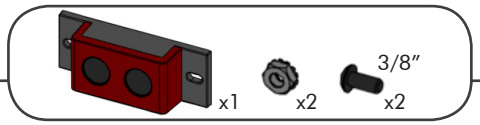


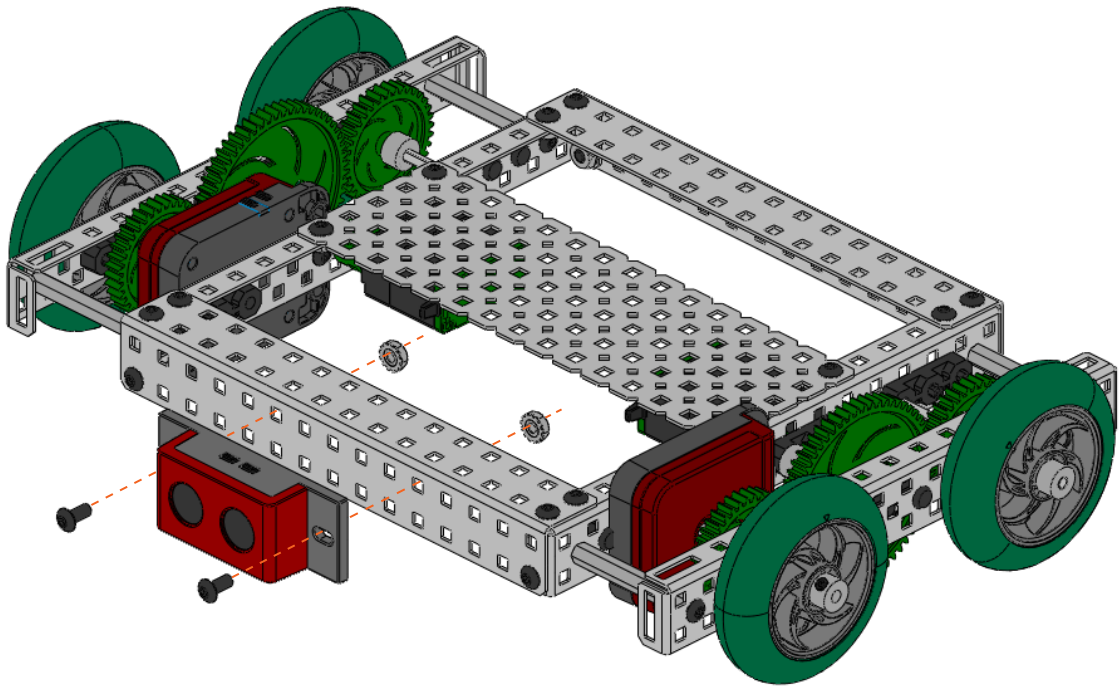


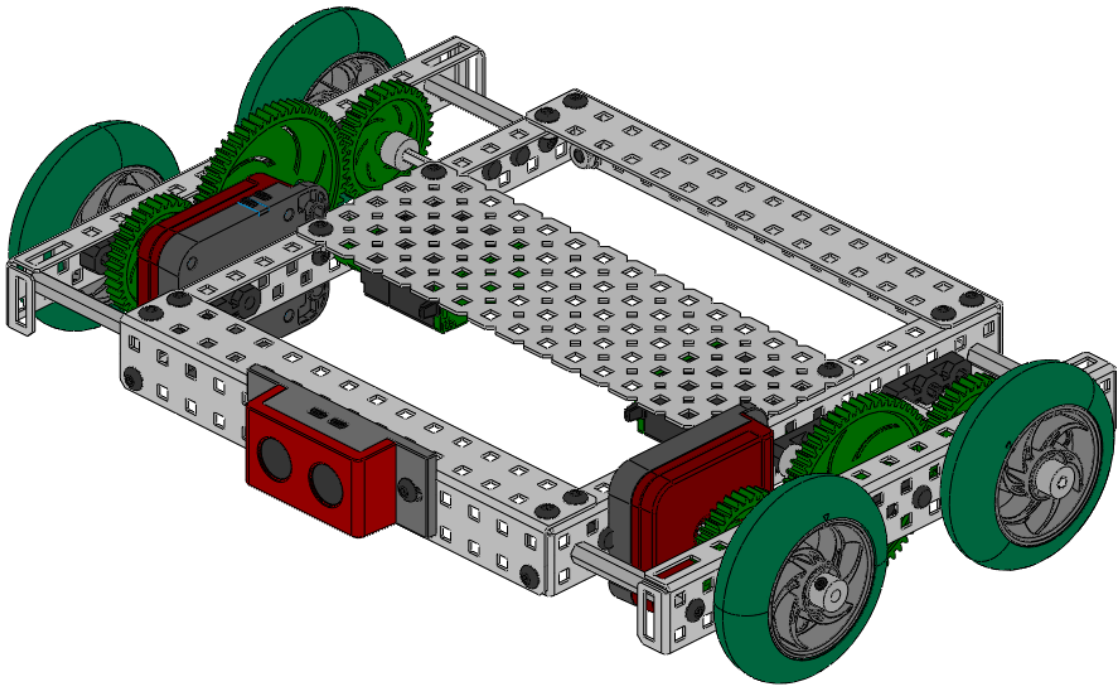


RECBOT BUILDING INSTRUCTIONS

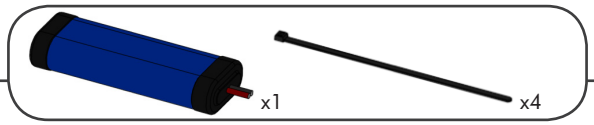
4 Attaching the Ultrasonic Rangefinder

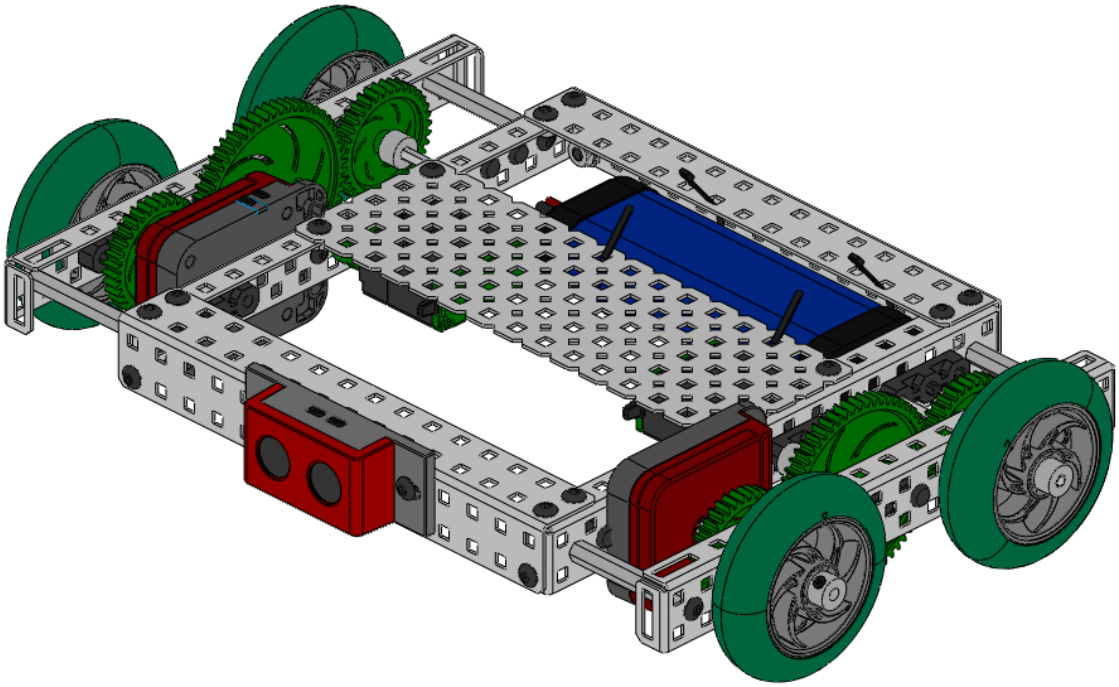


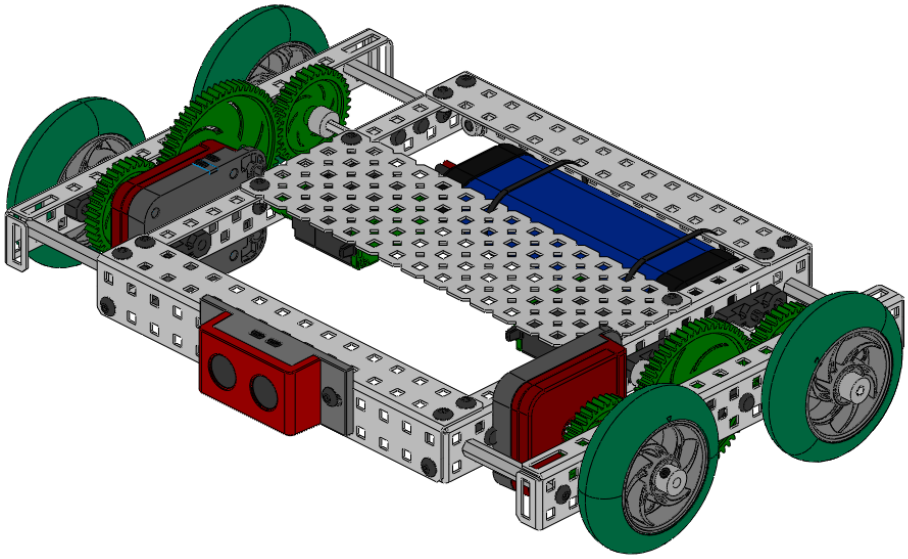




5 Attaching the Battery





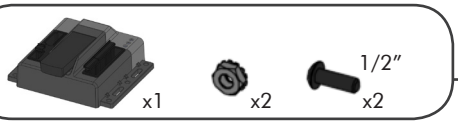


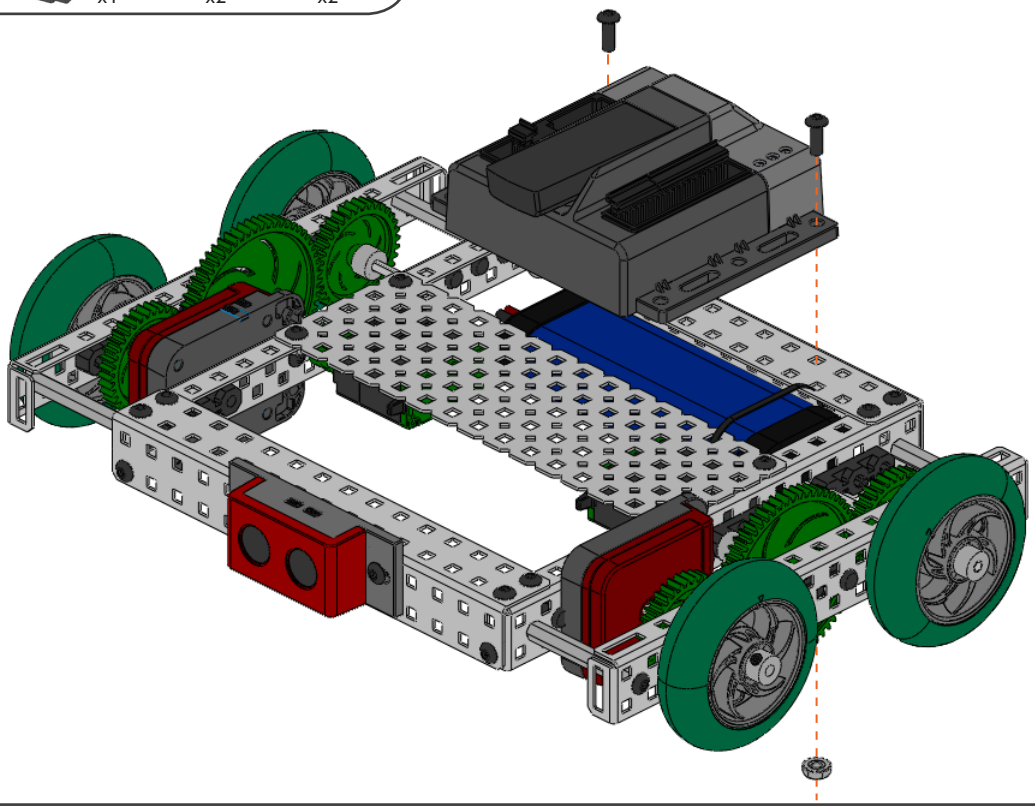
Building Tip - Using Wire Ties

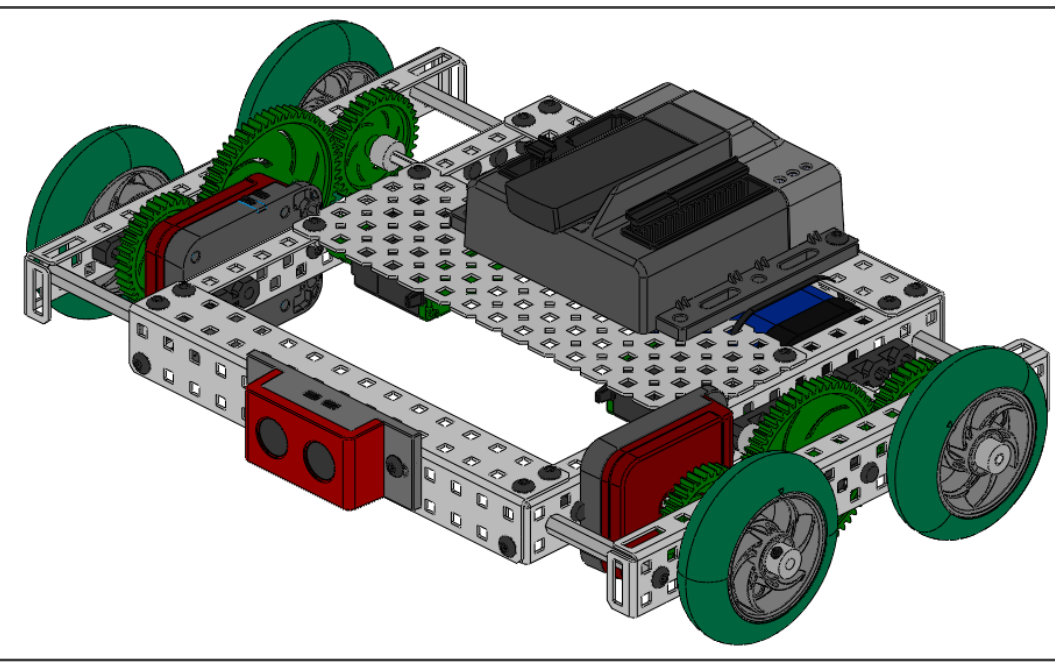
Multiple wire ties can be connected end-to-end to create a longer strand. Also, keeping the wire ties slightly loose around the battery will enable you to remove it for charging, but still hold it in place while the robot is moving.

RECBOT BUILDING INSTRUCTIONS

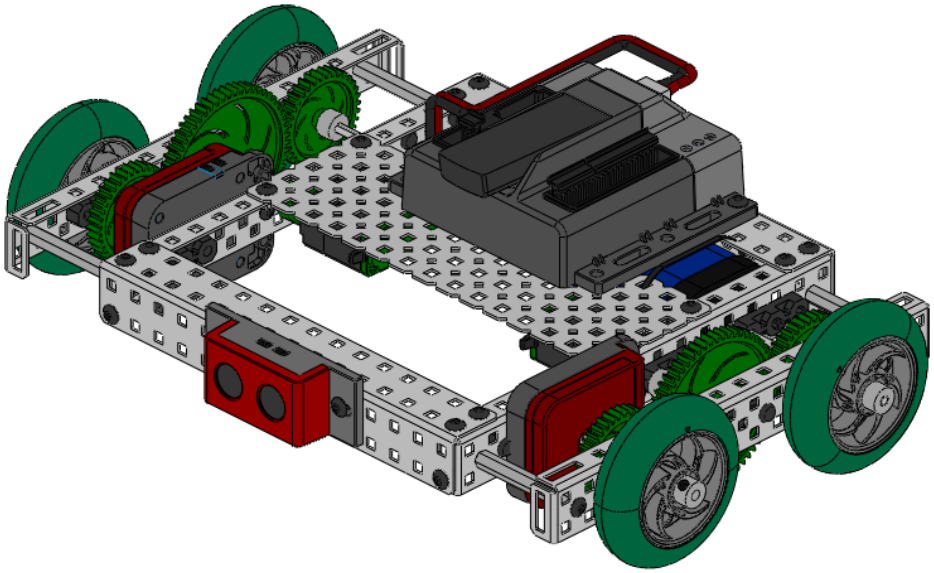
6 Attaching the VEX Microcontroller

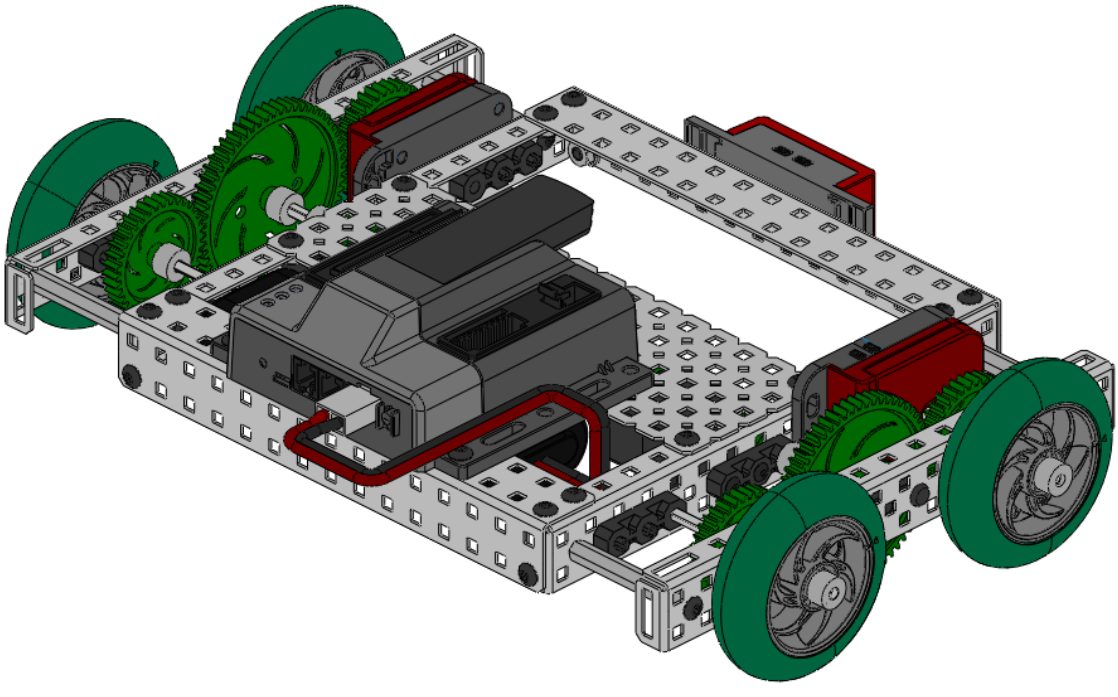




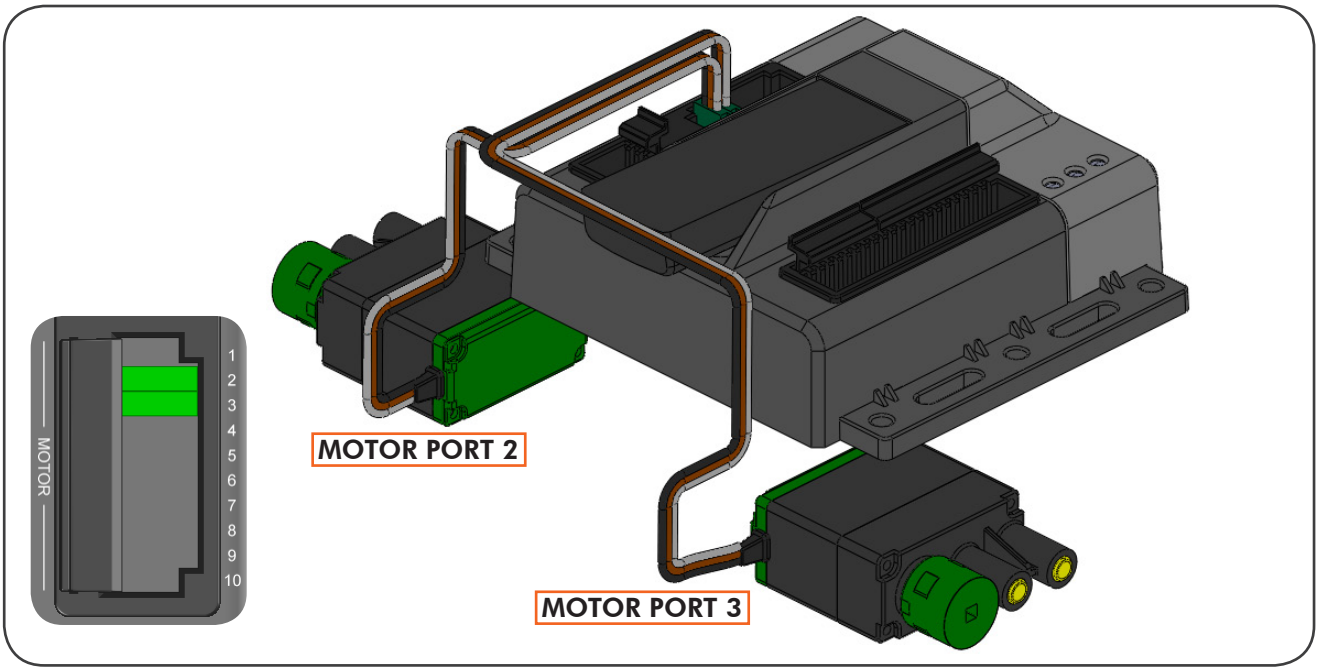


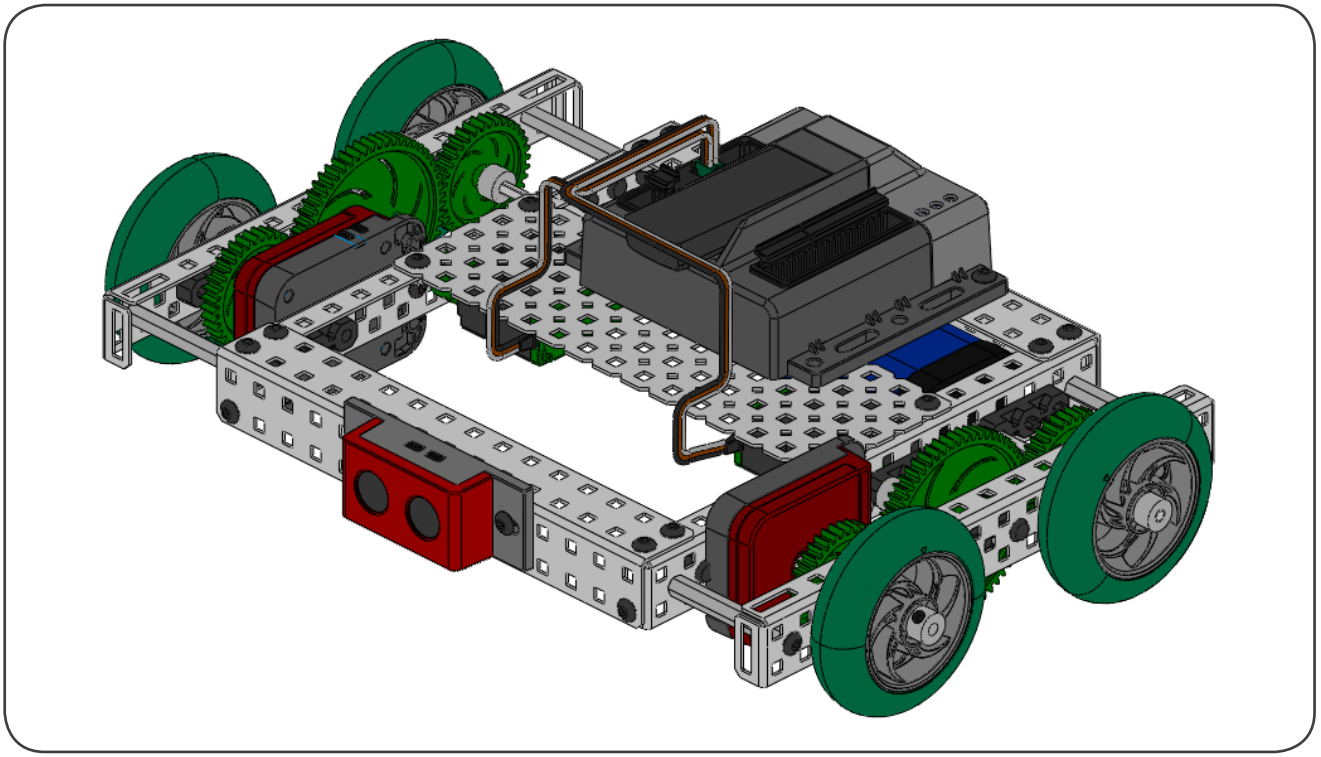
7 Wiring the Battery



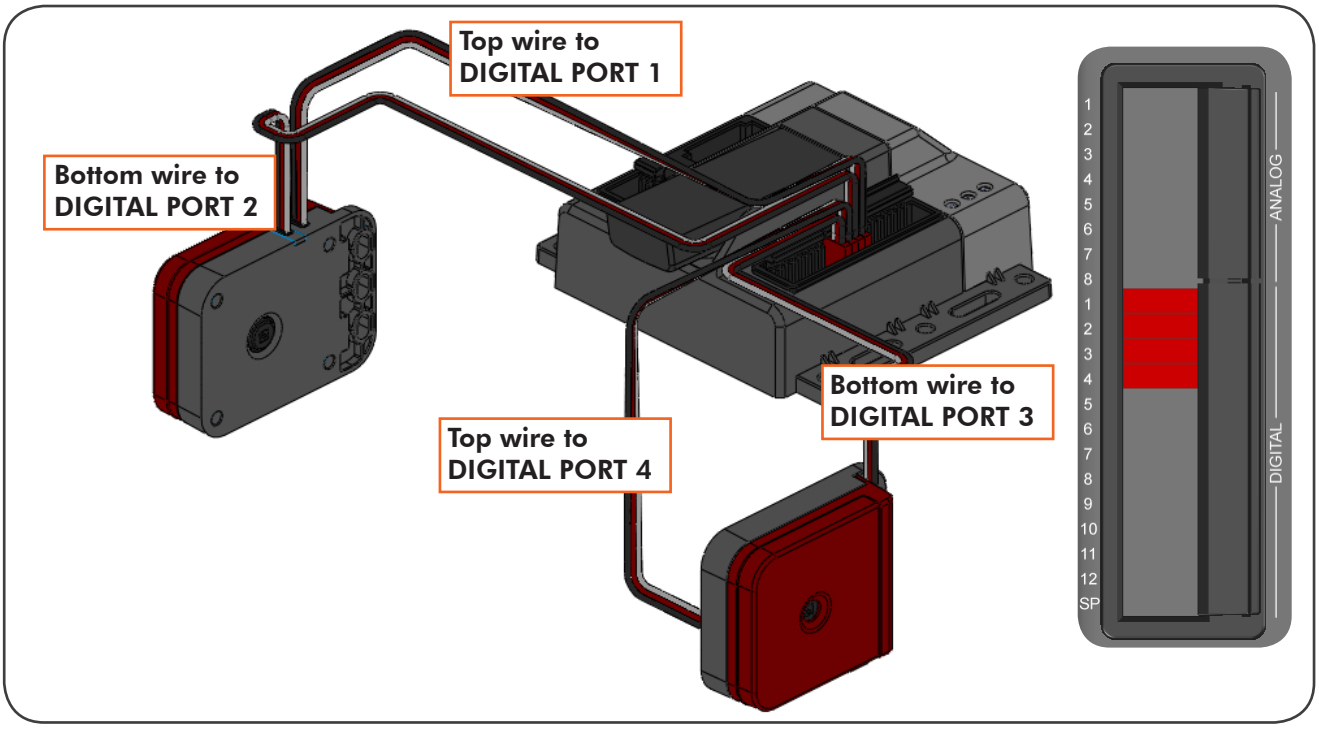


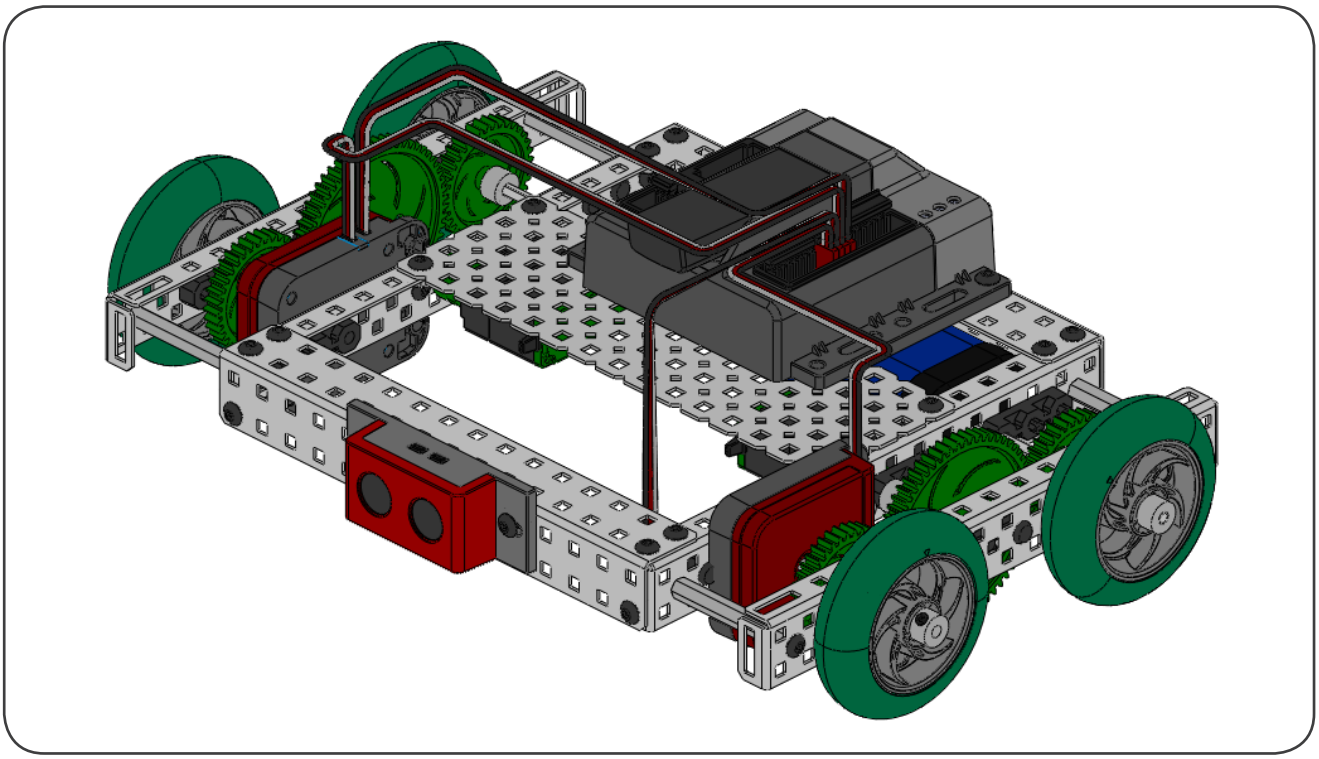
8 Wiring the Motors



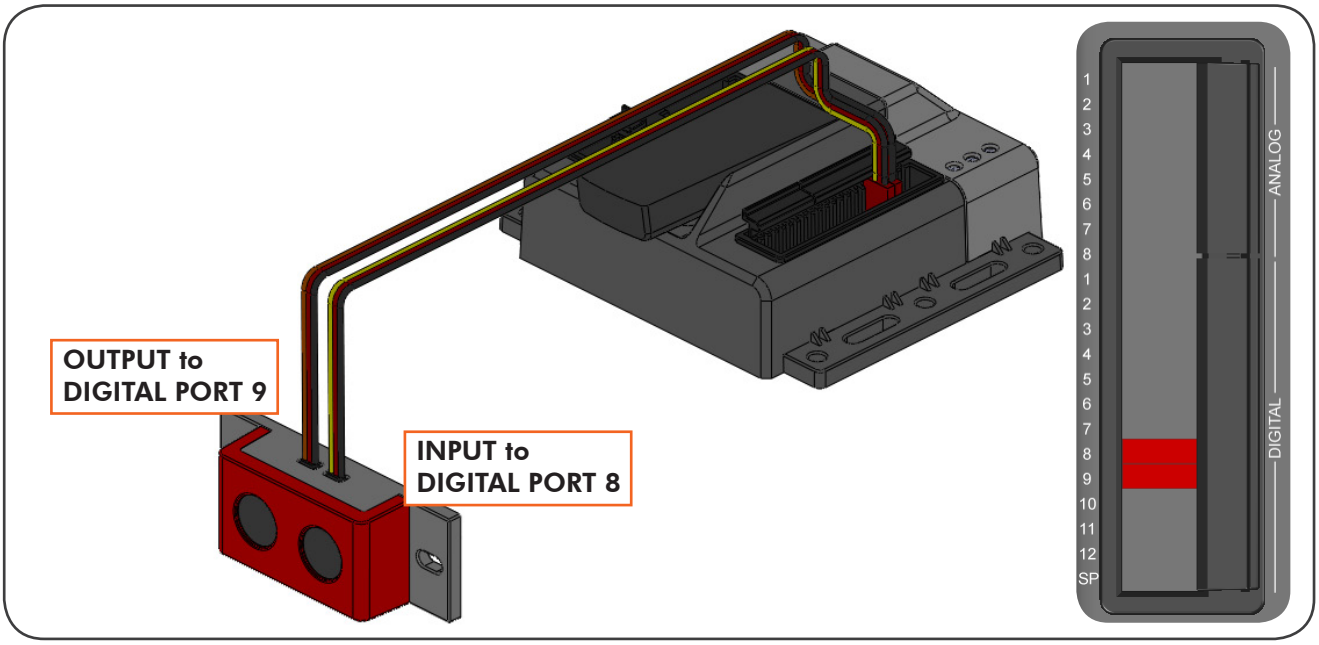


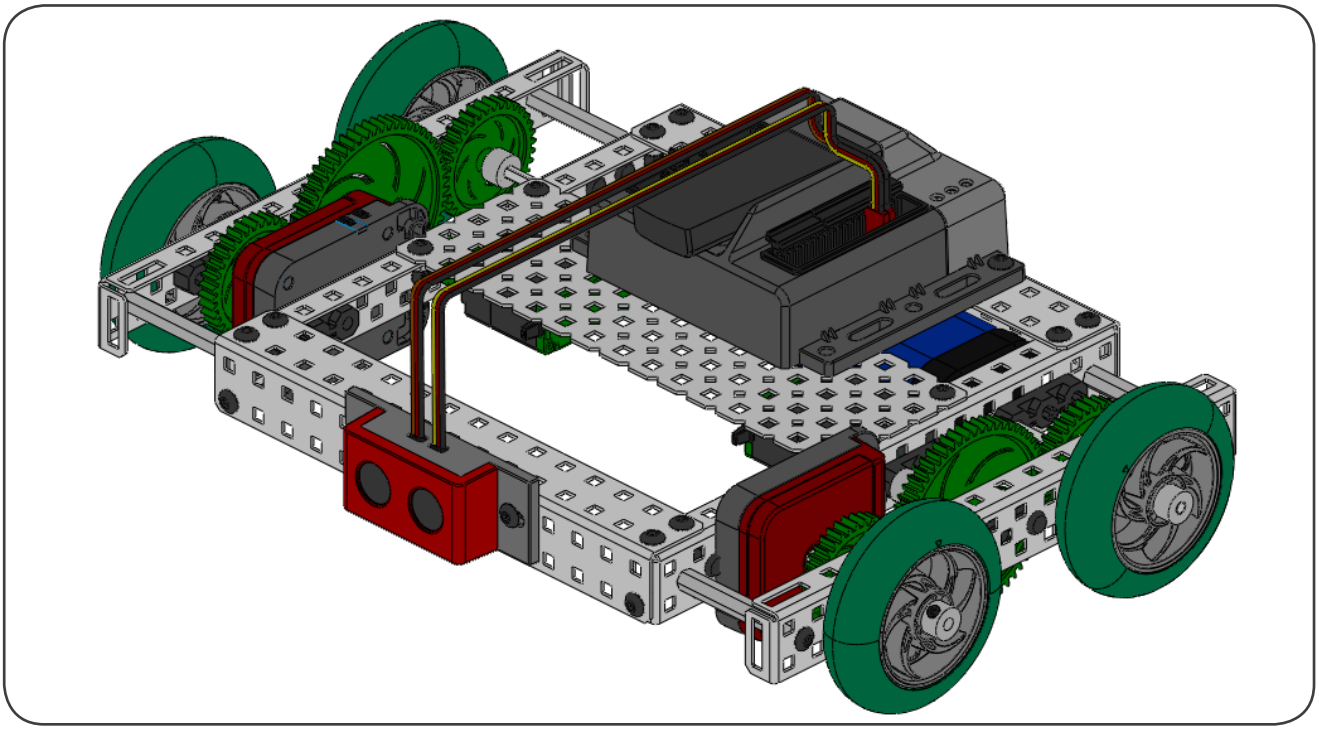
9 Wiring the Encoders





10 Wiring the Ultrasonic Rangefinder



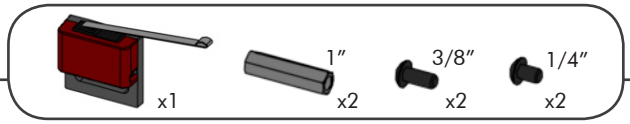


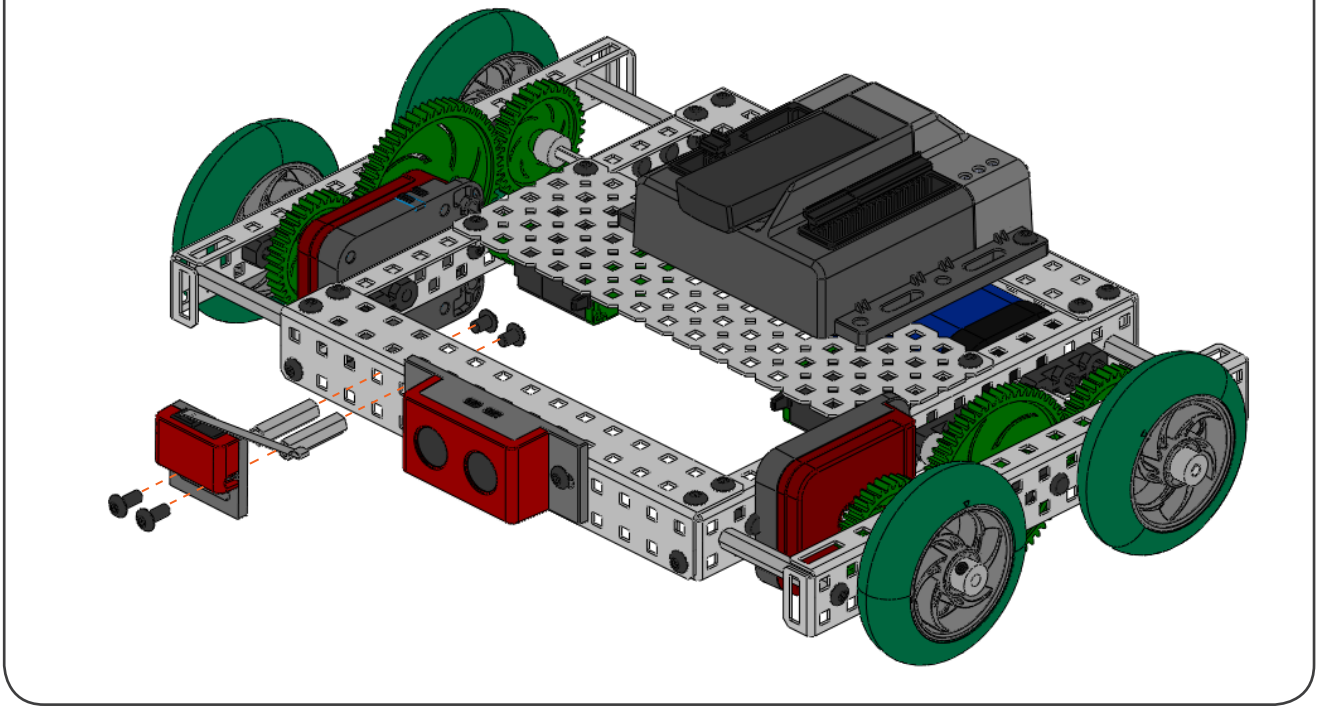
Information - Building Part I Complete

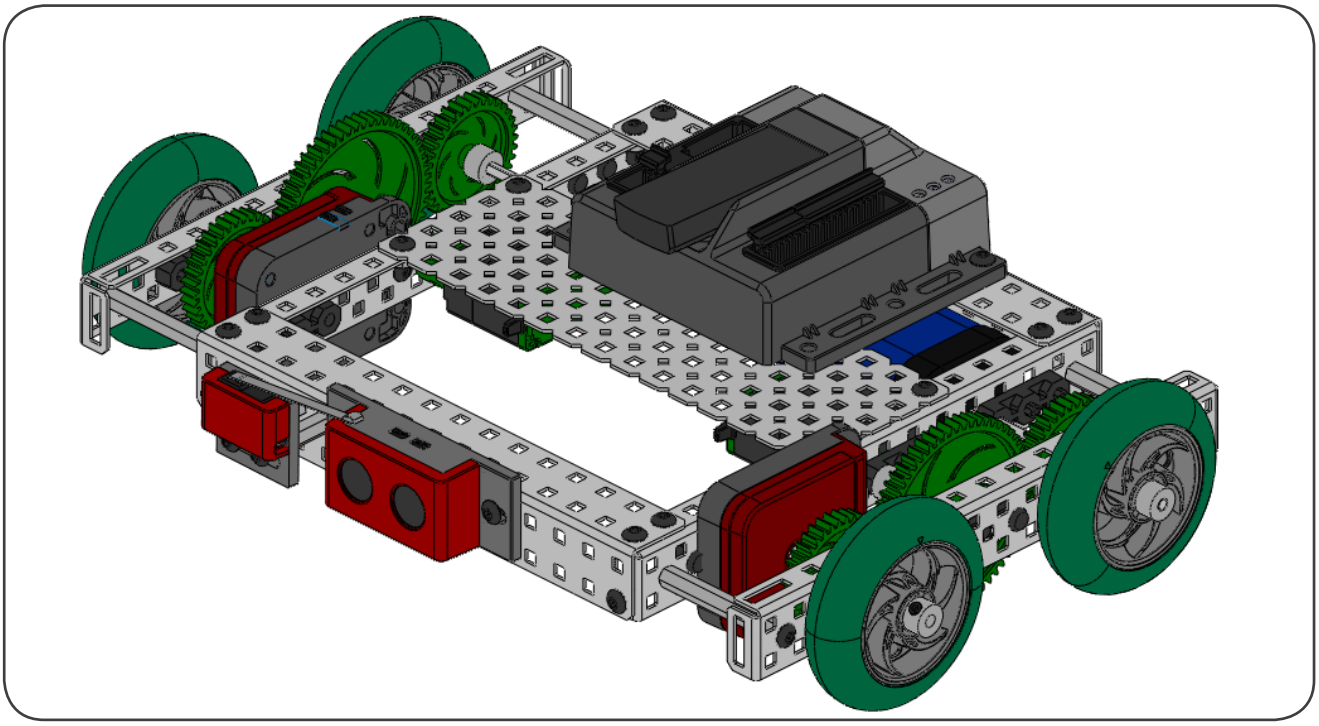
The robot is equipped to perform autonomous tasks based on timing, Encoder rotations, and Ultrasonic Rangefinder feedback. It's recommended that you wire tie any loose wires on your robot, keeping them clear of the drivetrain. Continue on through the remaining instructions to add a Limit Switch, robotic arm, and Potentiometer.

RECBOT BUILDING INSTRUCTIONS

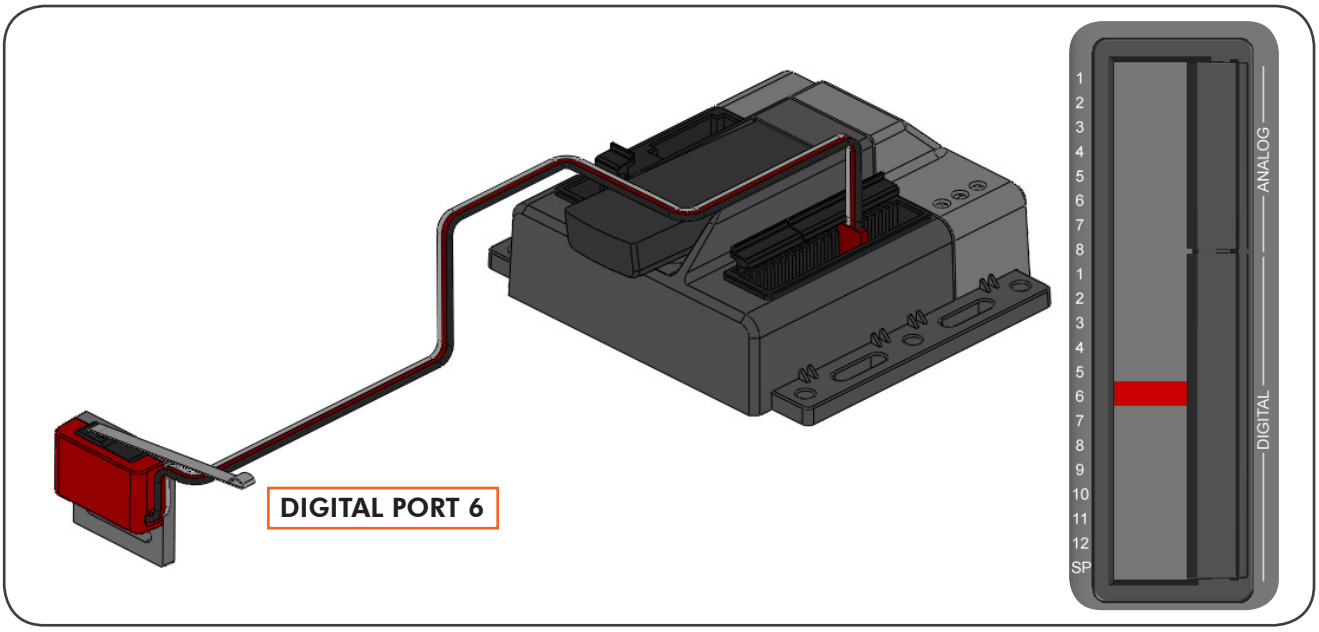
11 Attaching the Limit Switch

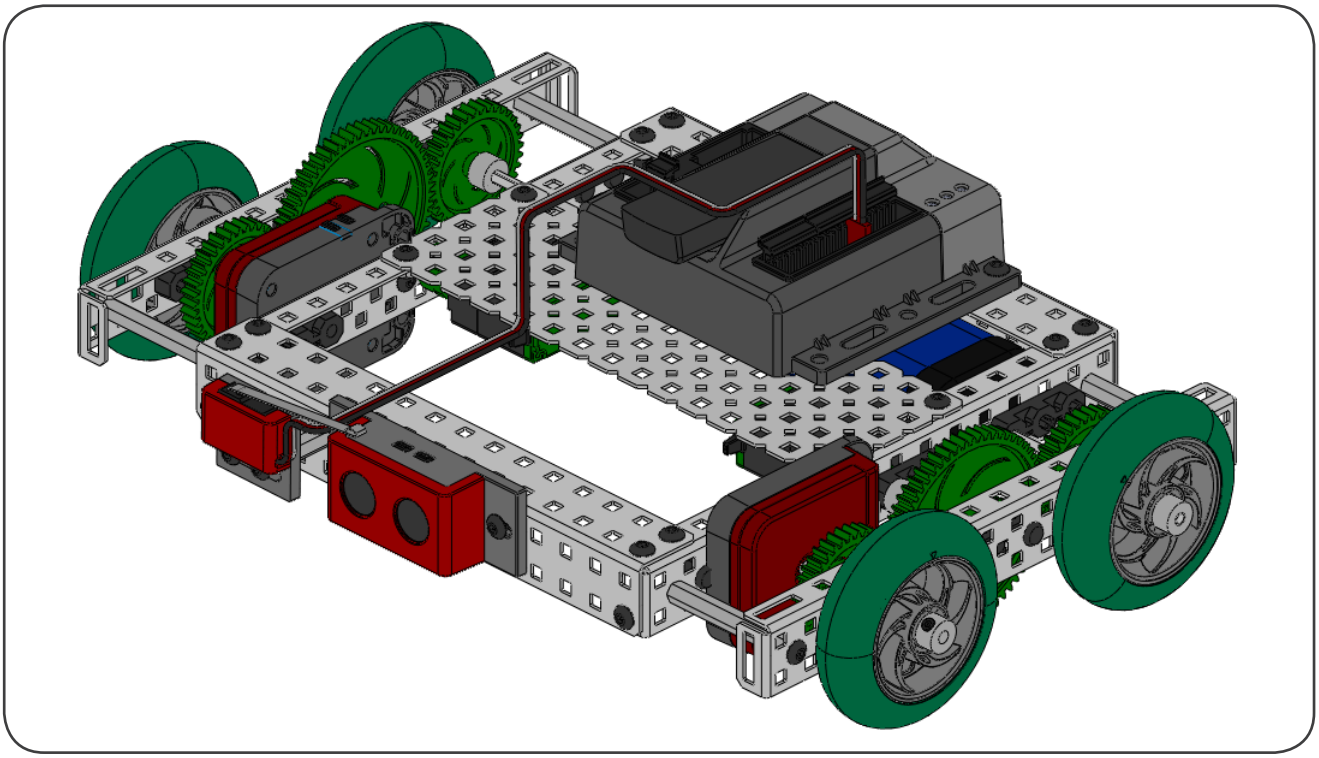






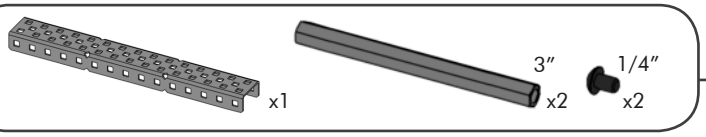
12 Wiring the Limit Switch

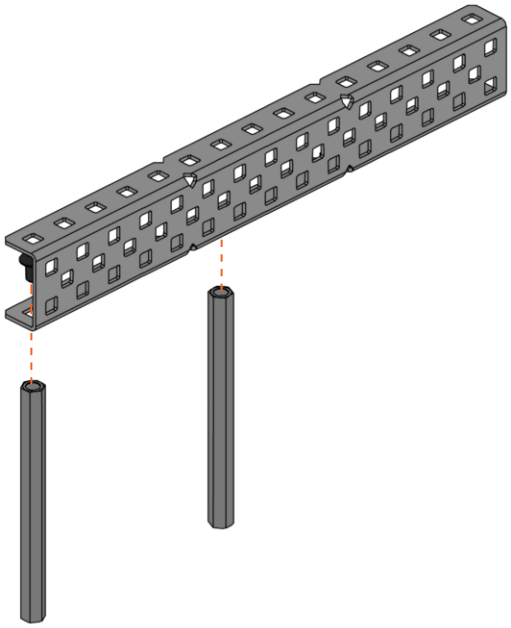




RECBOT BUILDING INSTRUCTIONS

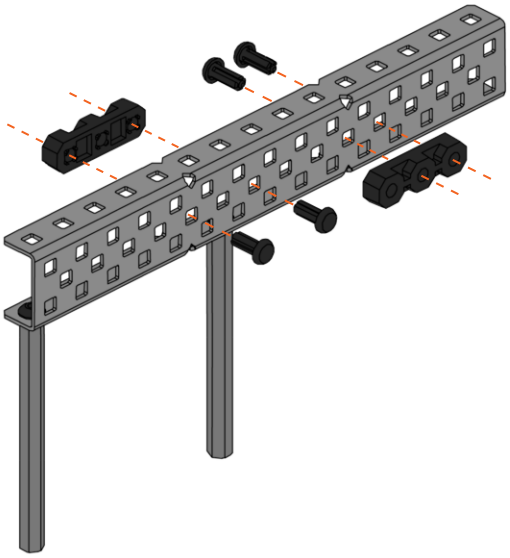
13 Arm Construction





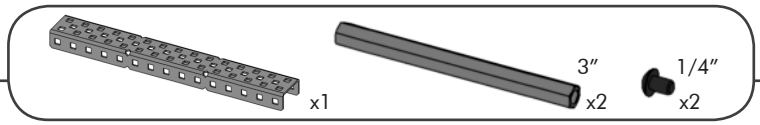
RECBOT BUILDING INSTRUCTIONS

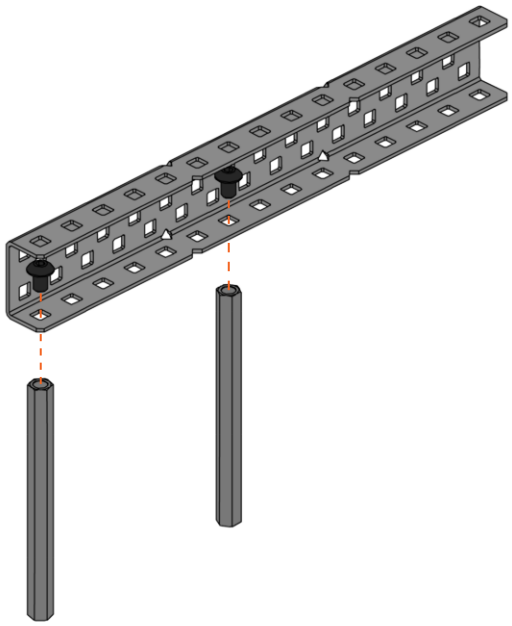
13 Arm Construction *(continued)*



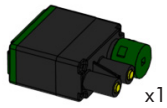
RECBOT BUILDING INSTRUCTIONS

13 Arm Construction *(continued)*



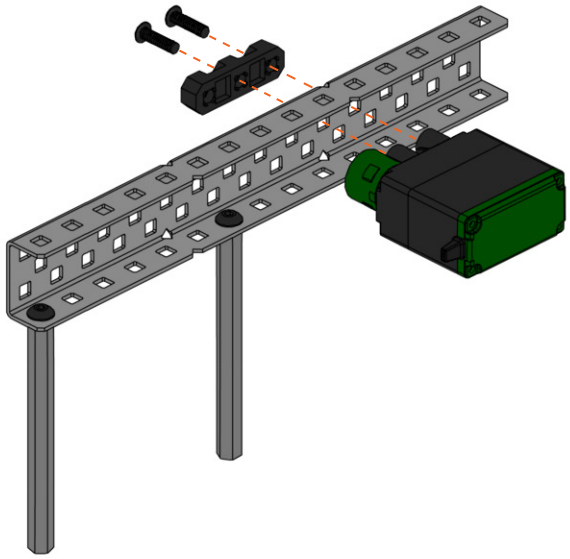


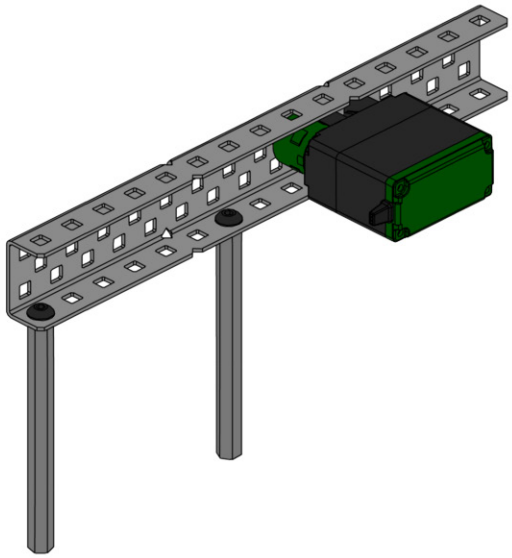
13 Arm Construction *(continued)*


x1

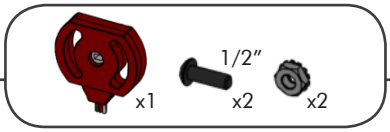

x1

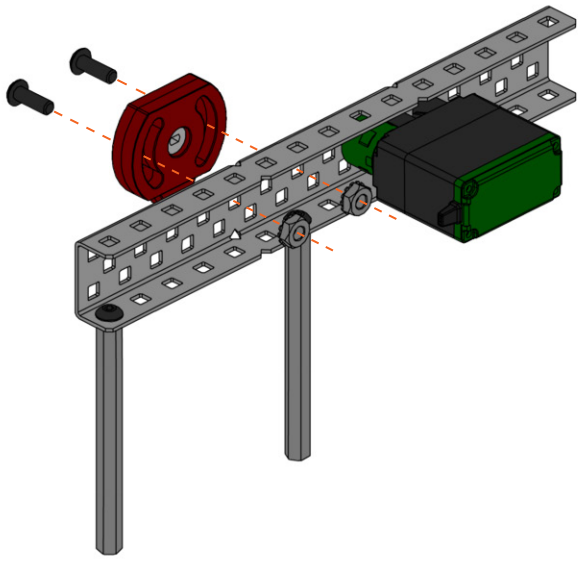

1/2″ Motor Screws
x2

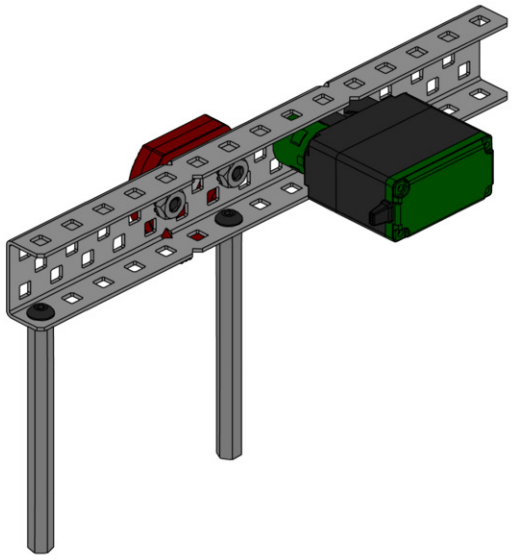




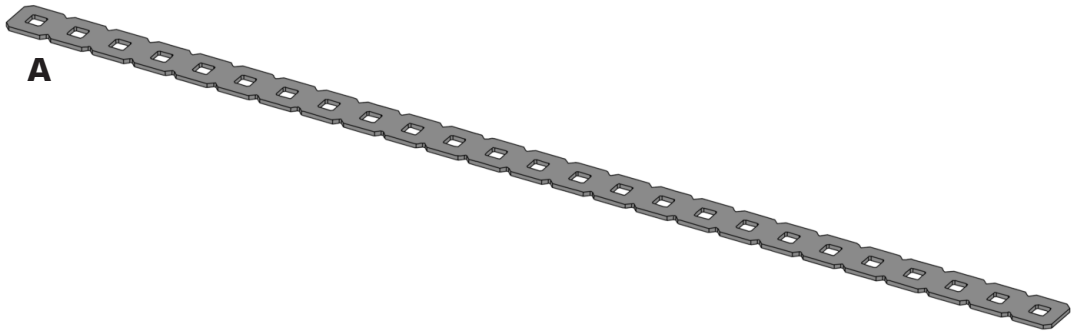
13 Arm Construction *(continued)*

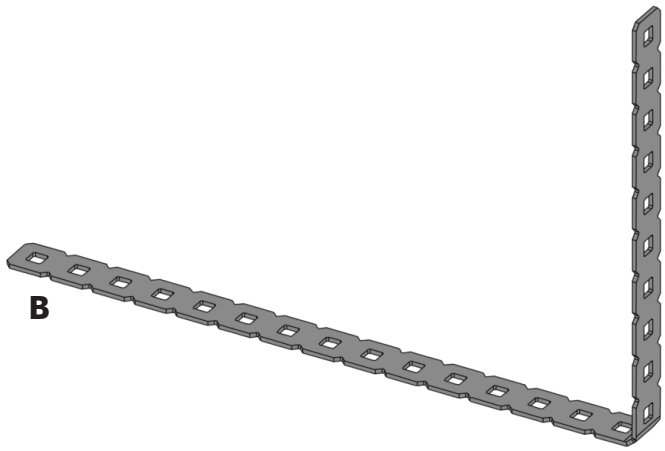


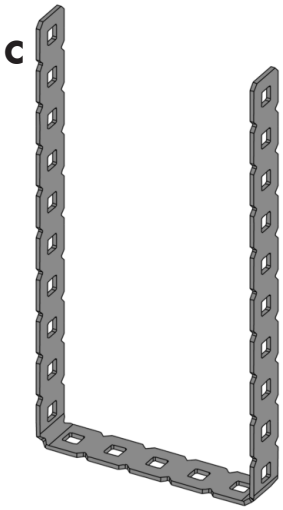




13 Arm Construction *(continued)*





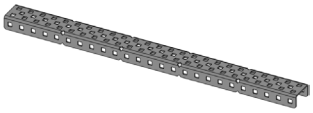


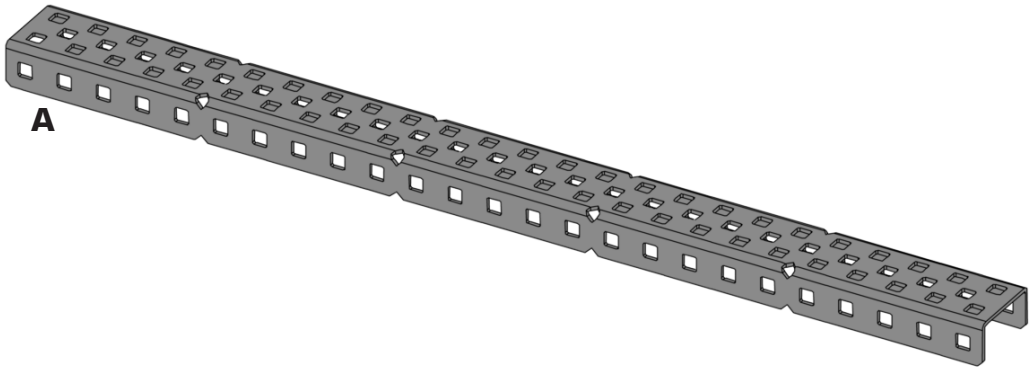
x 2

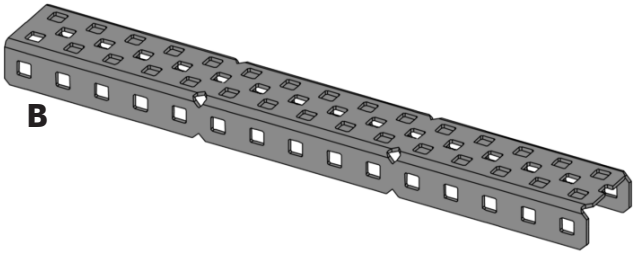
RECBOT BUILDING INSTRUCTIONS

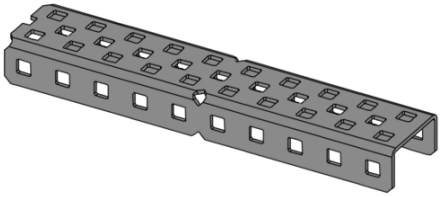
13 Arm Construction *(continued)*

> ***CAUTION - Cutting Tools***
> The following step involves cutting tools and permanent alterations to the materials in the VEX Kit. Make sure you have permission before continuing.
>
> ALL APPLICABLE SAFETY PROCEDURES MUST BE OBSERVED WHILE PERFORMING THIS STEP. IF YOU ARE UNSURE ABOUT HOW TO USE THE TOOLS OR PERFORM THIS PROCEDURE SAFELY, DO NOT ATTEMPT THIS STEP ALONE. SEEK QUALIFIED ASSISTANCE BEFORE PROCEEDING.



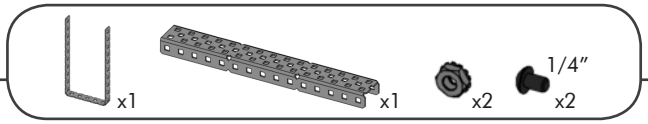


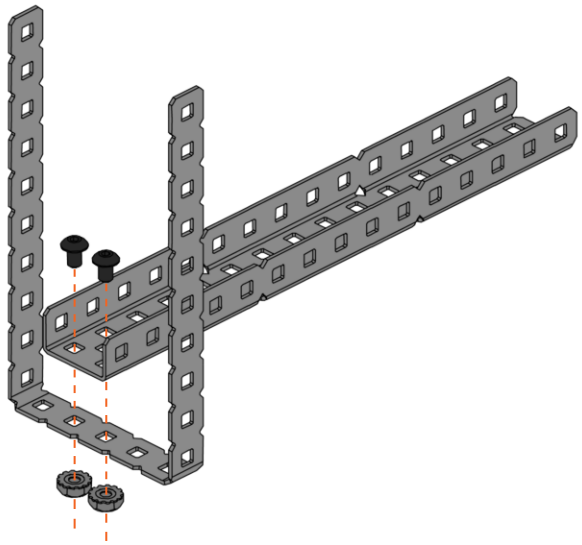


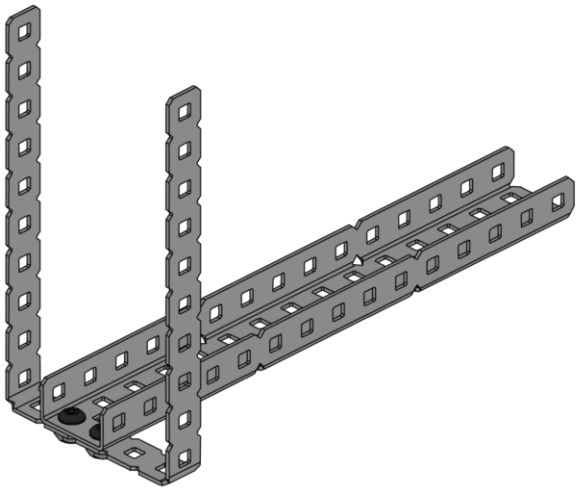


RECBOT BUILDING INSTRUCTIONS

13 Arm Construction *(continued)*

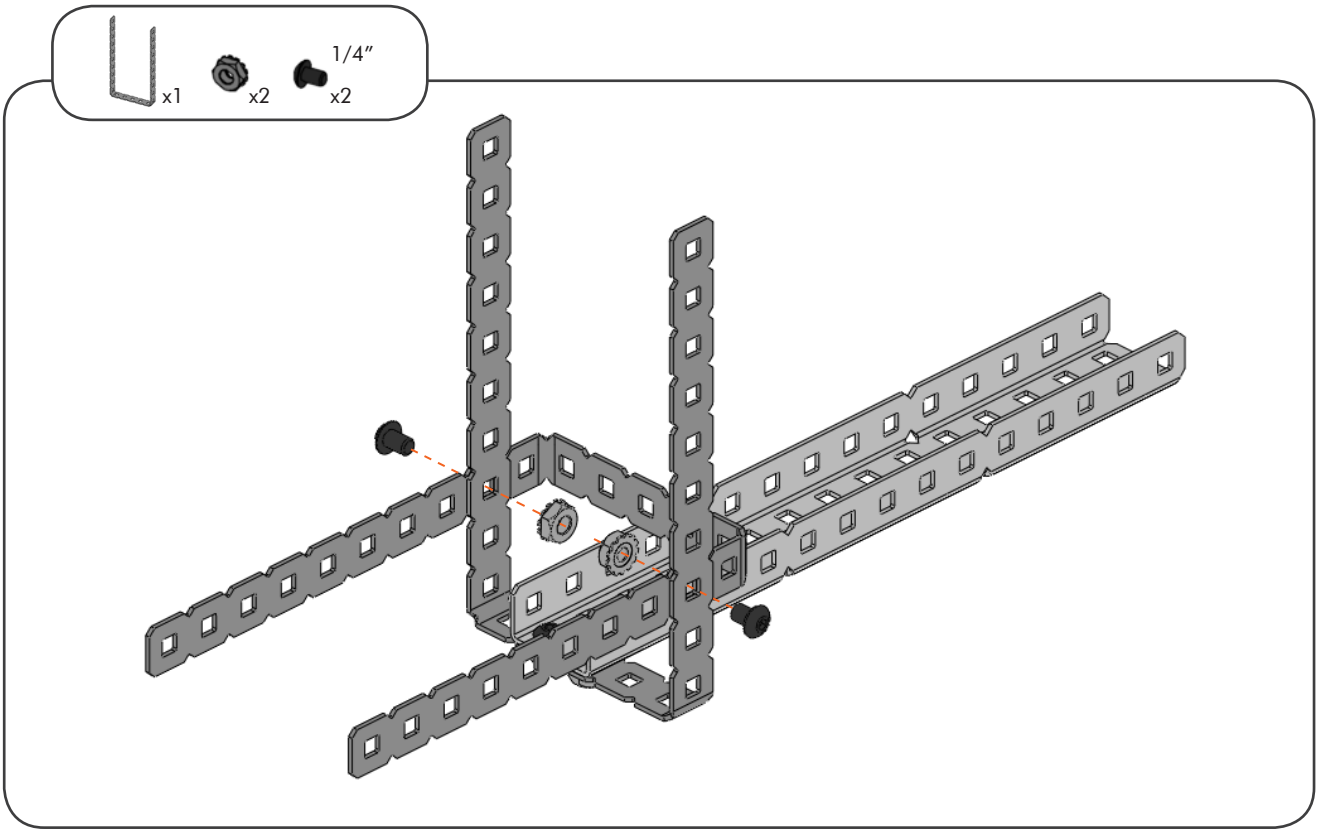


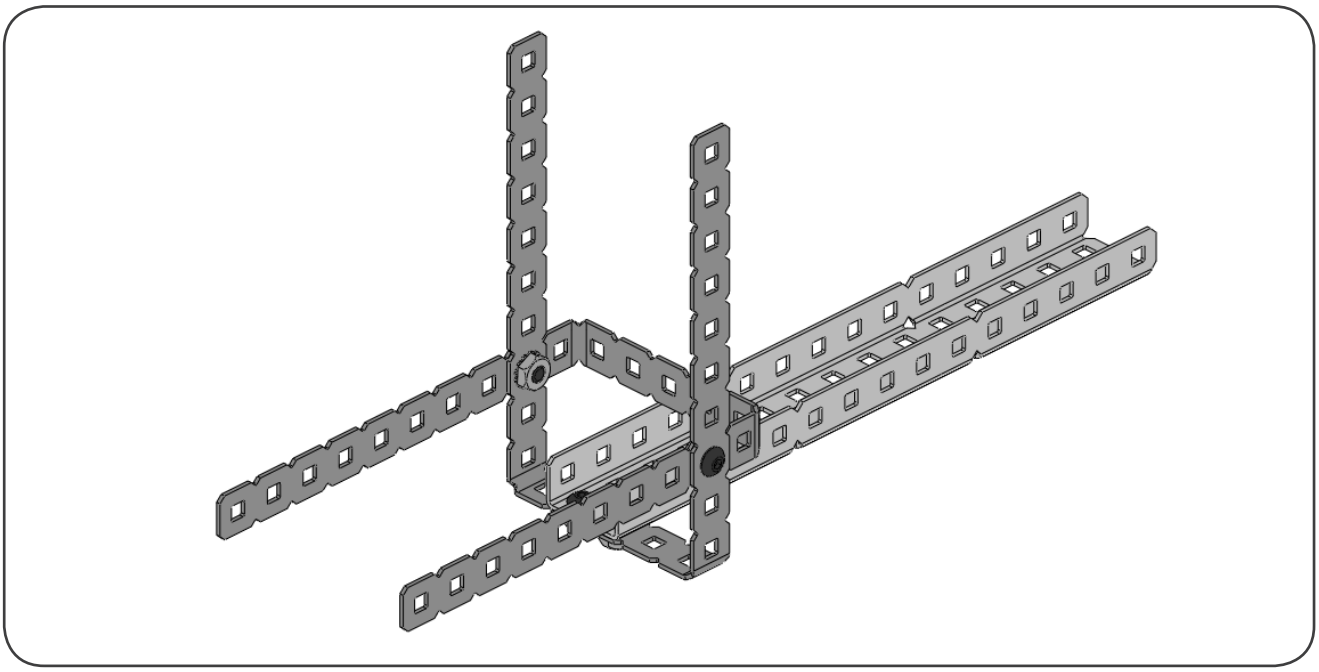




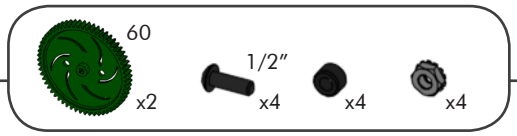
RECBOT BUILDING INSTRUCTIONS

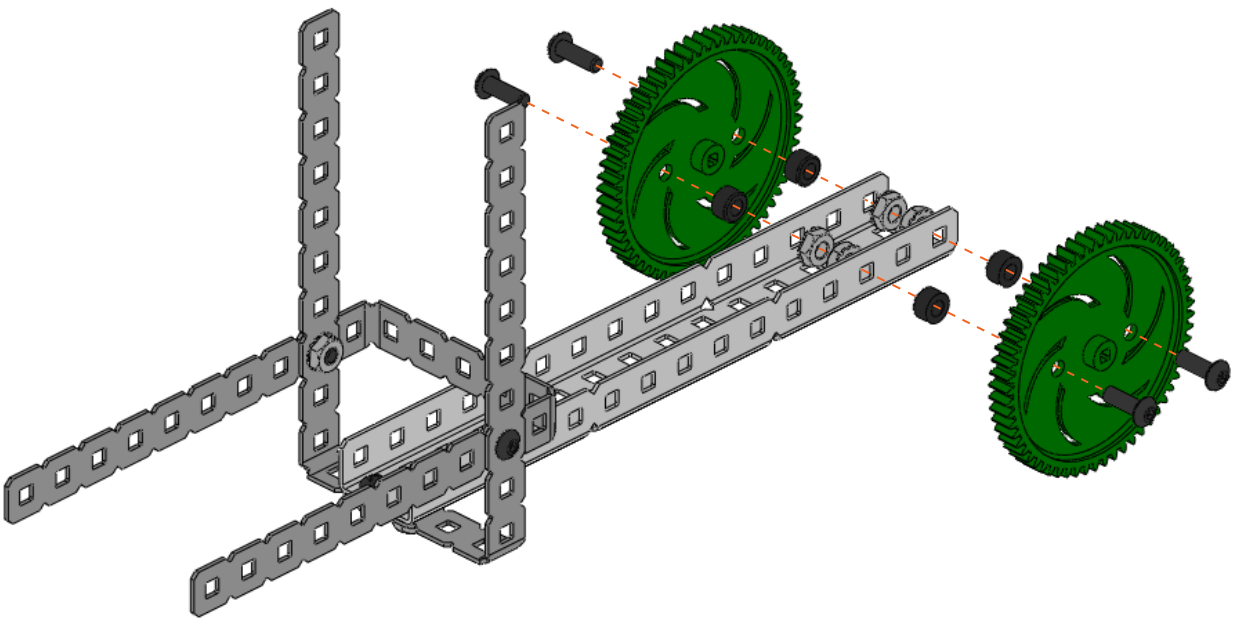
13 Arm Construction *(continued)*

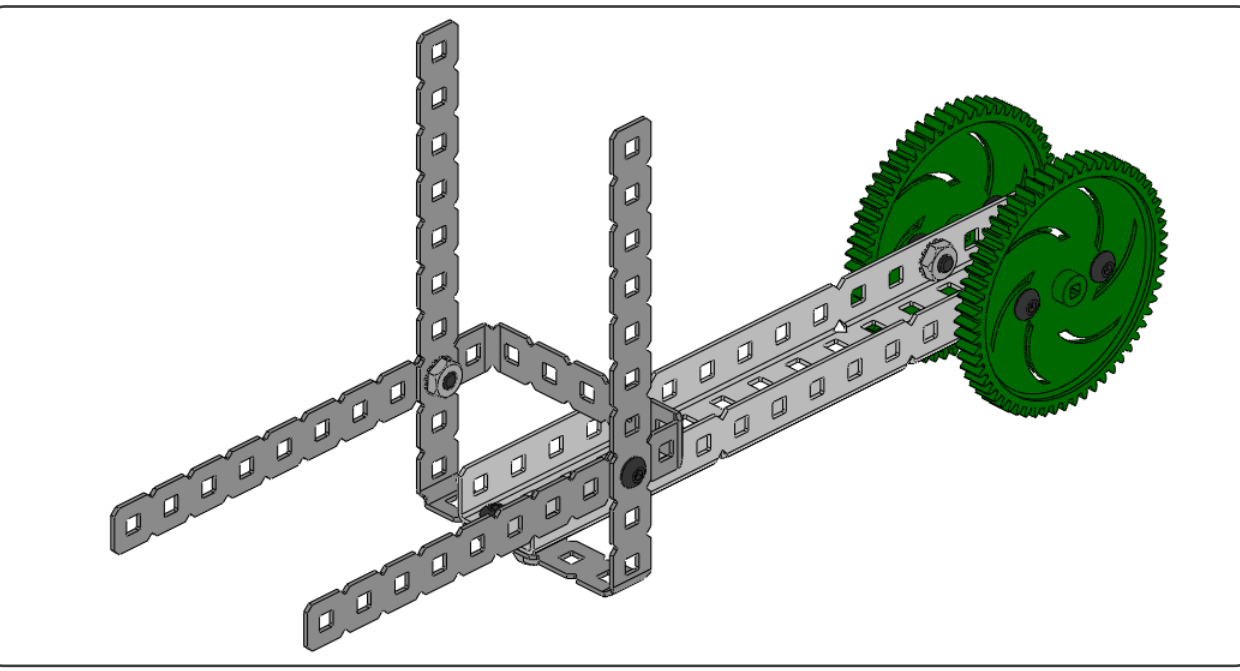




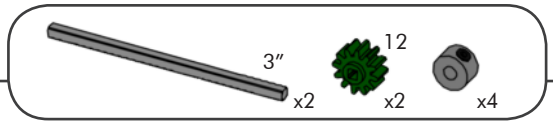
13 Arm Construction *(continued)*

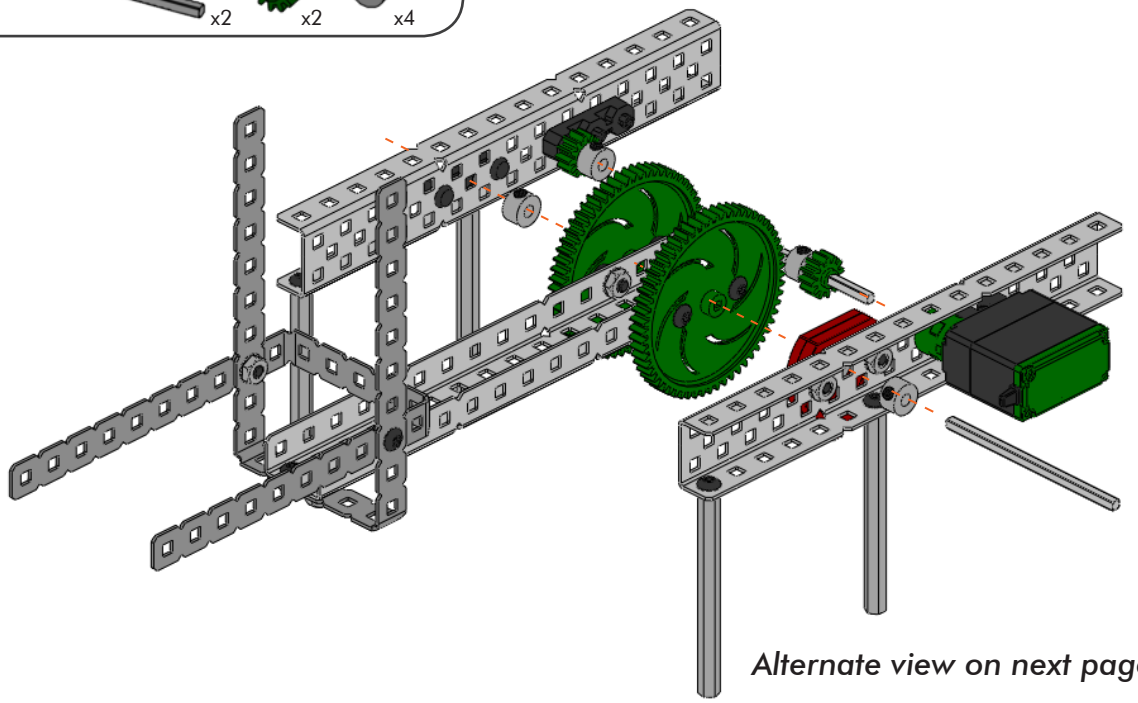






13 Arm Construction *(continued)*

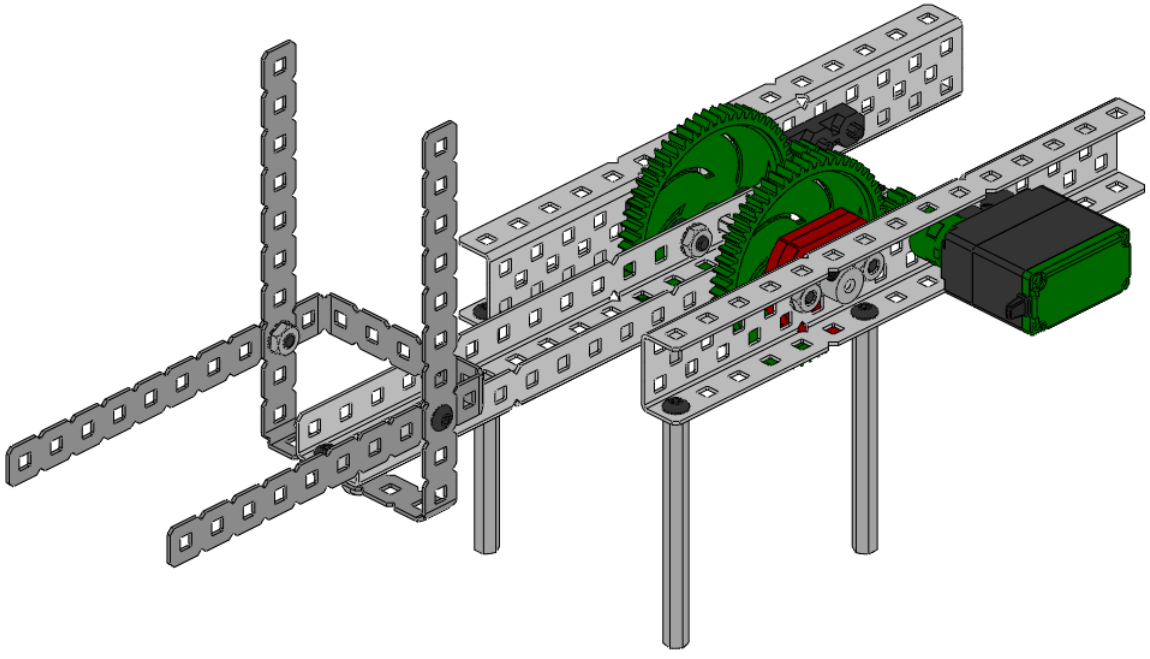




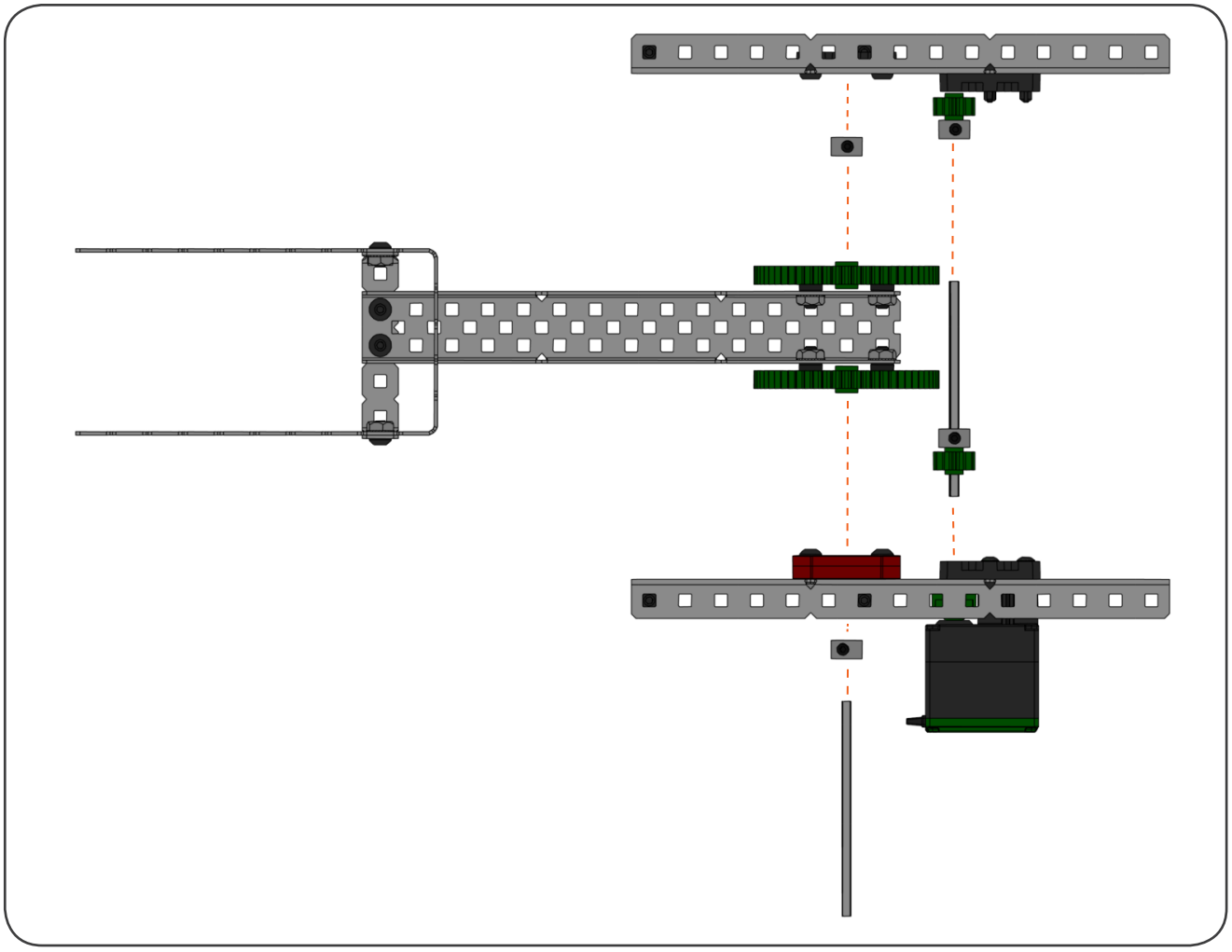
Alternate view on next page

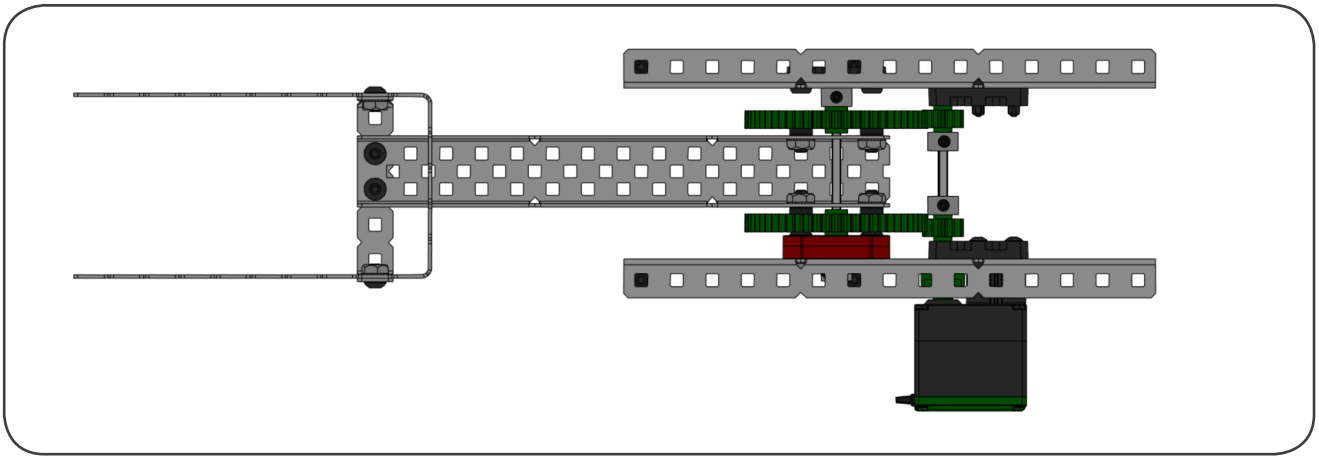
Building Tip - Potentiometer Range of Motion

At this step, make sure the arm rotates within the potentiometer's range of motion. Forcing the potentiomter beyond its mechanical stops will damage the sensor.

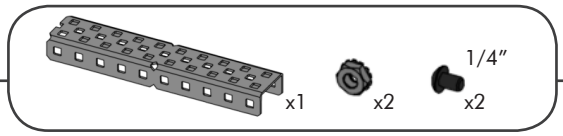


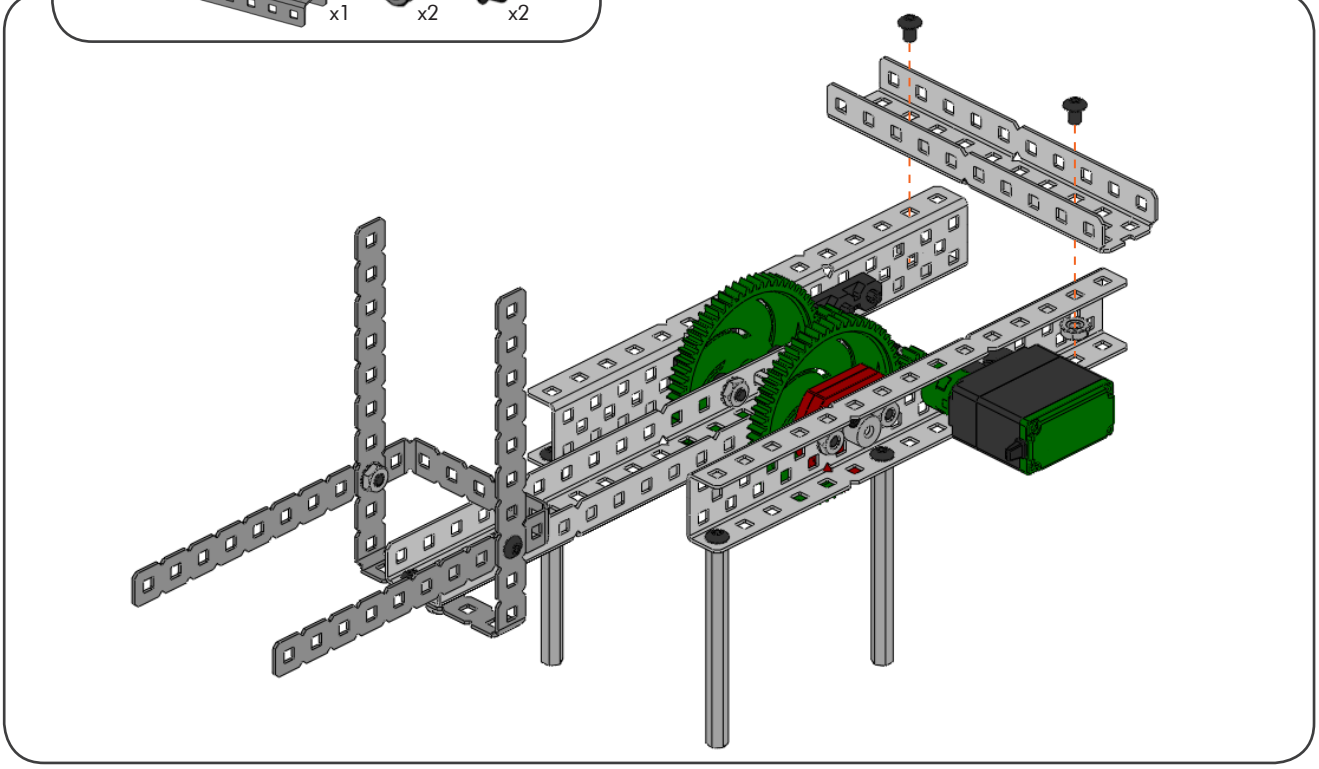
13 Arm Construction *(continued)*

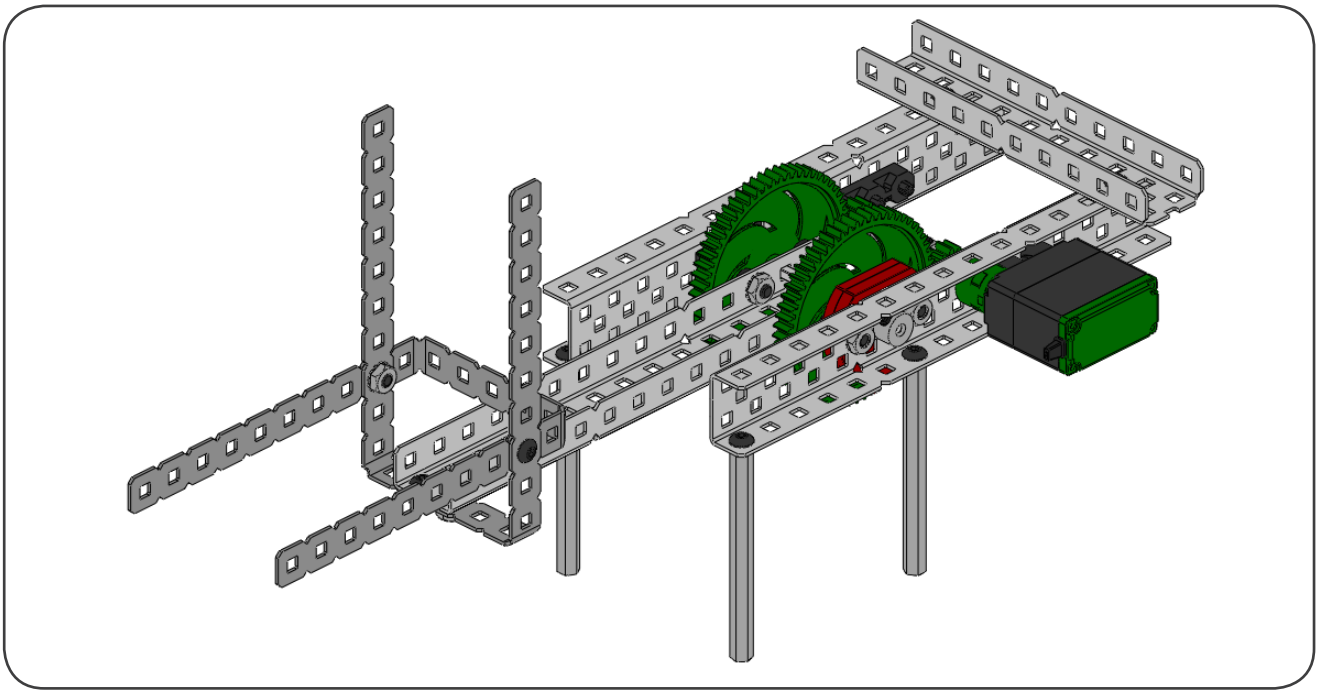




13 Arm Construction *(continued)*



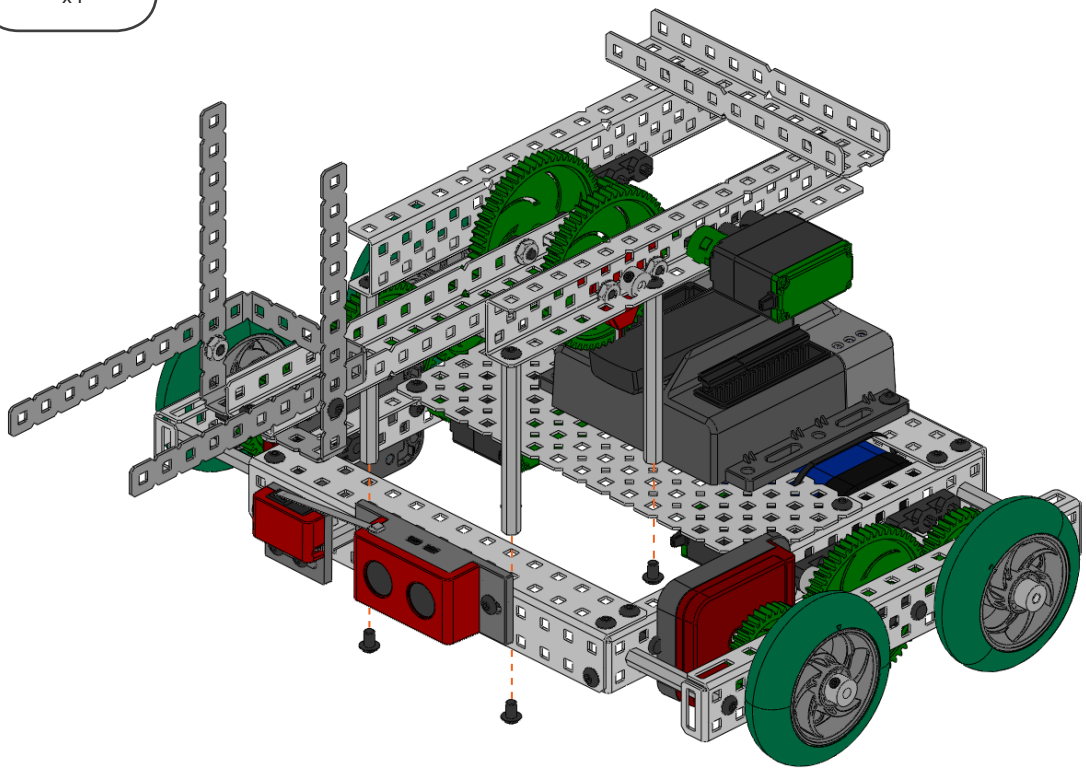


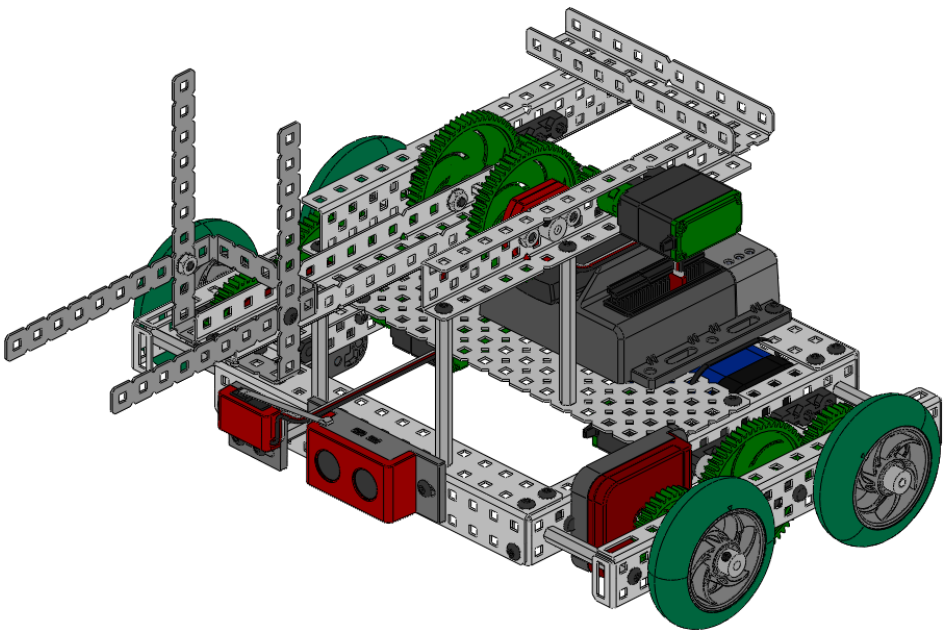


RECBOT BUILDING INSTRUCTIONS

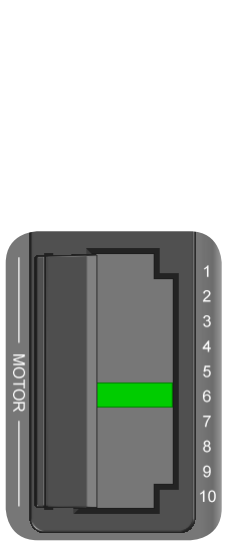
13 Arm Construction *(continued)*

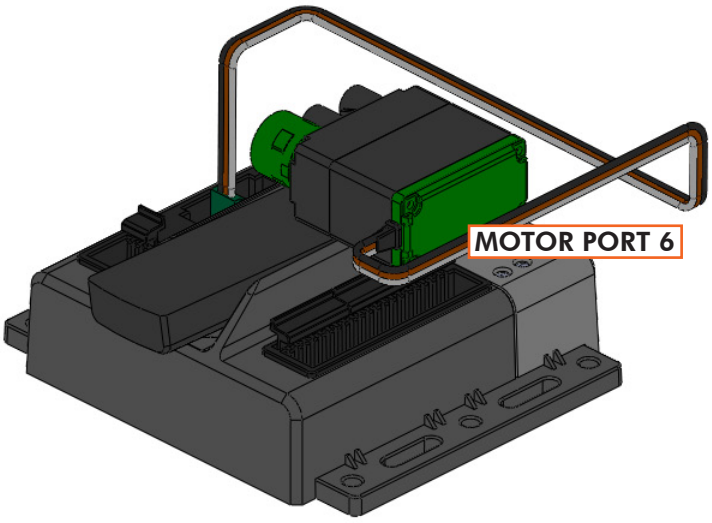
1/4"
x4

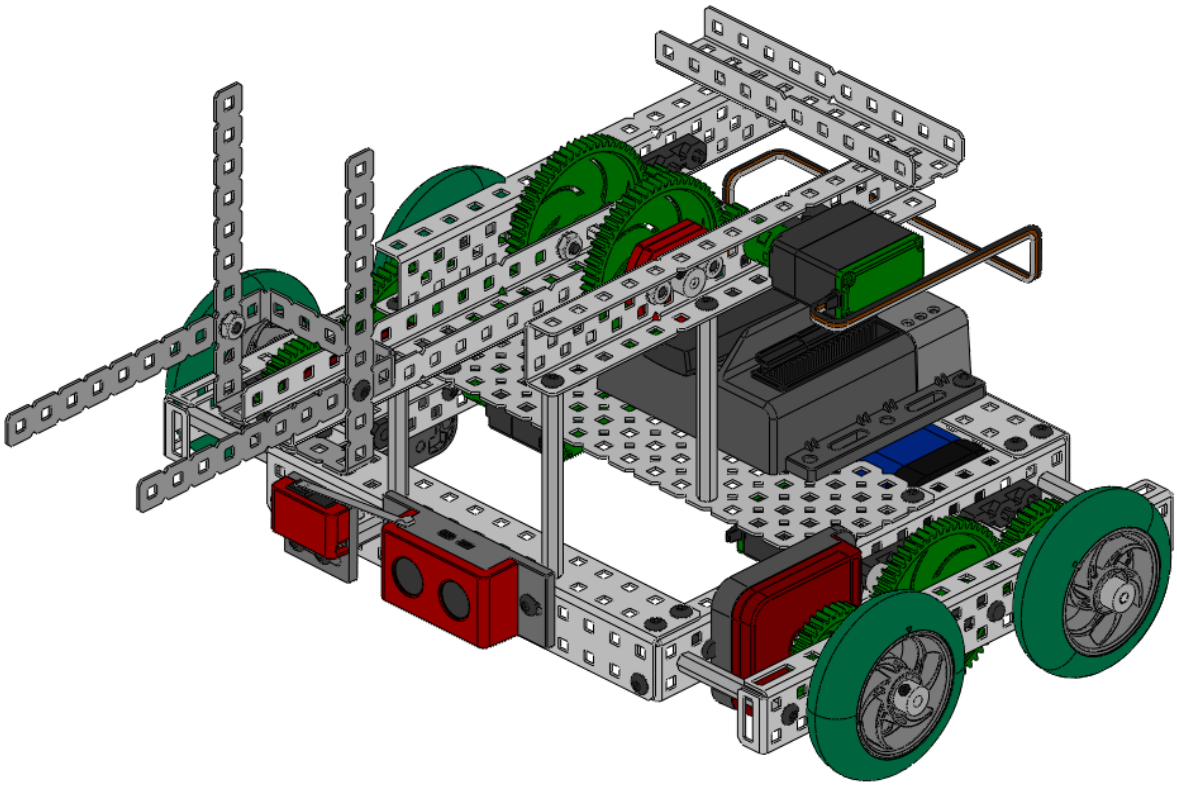




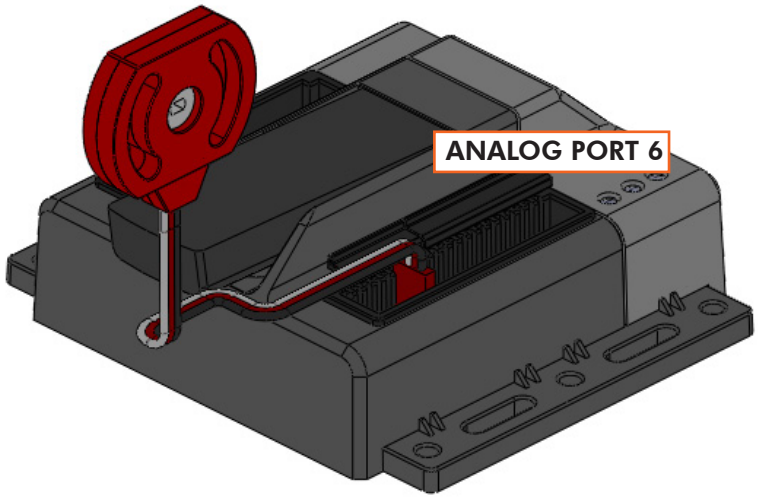
14 Wiring the Arm Motor

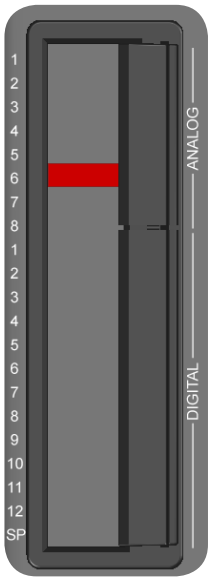


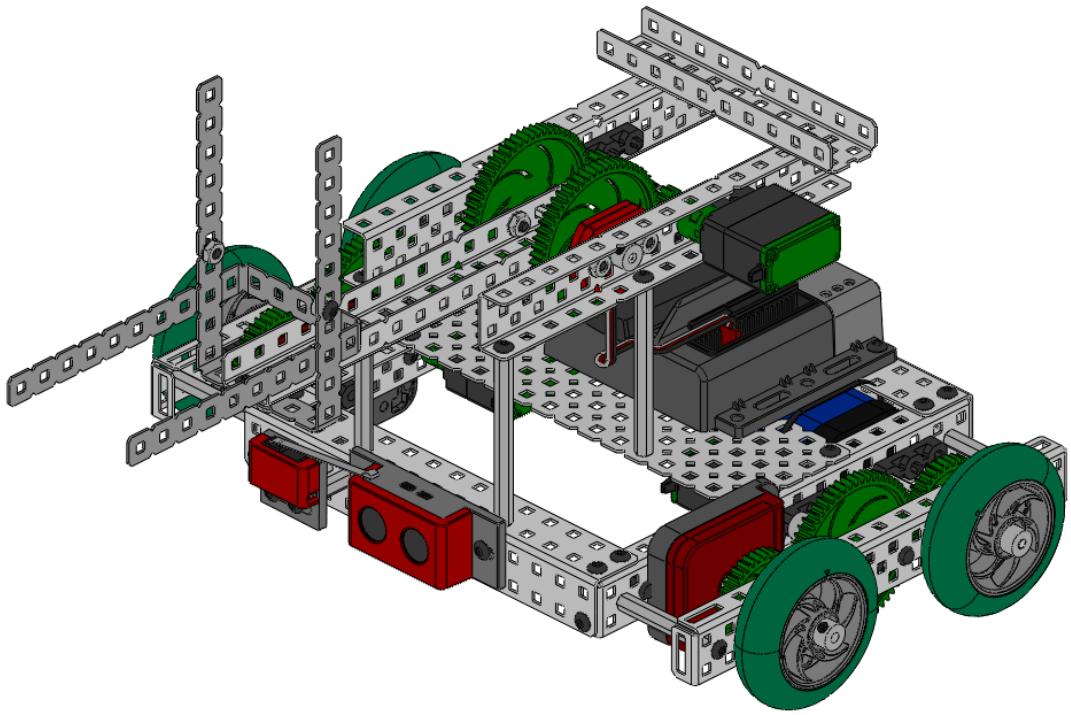




15 Wiring the Potentiometer







Information - Building Complete

The robot is equipped to perform tasks that incorporate the arm and multiple sensors.