

REC for Cortex

BaseBot Assembly Instructions

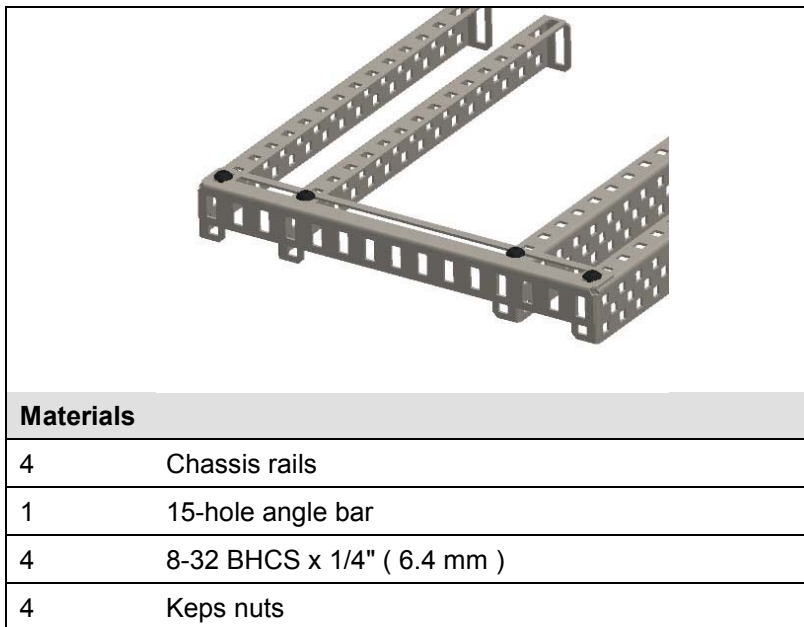
Overview:

This document contains all the instructions for assembling the BaseBot. The diagram numbers correspond to the section of the REC curriculum in which the instructions appear.

Procedures:

Assembling the Chassis

Assembling the BaseBot Chassis - Rear

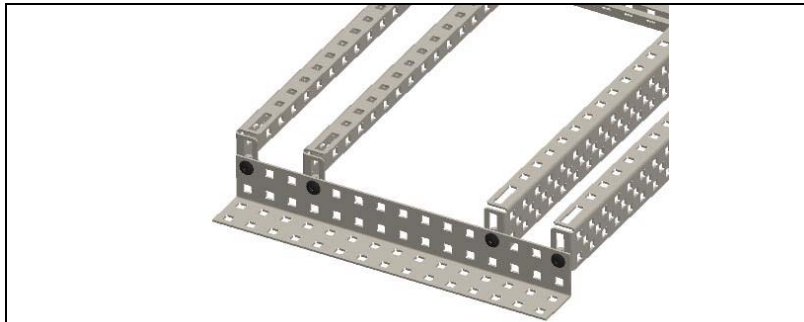


- 1 Assemble the rear of the chassis. Align the holes in the end of the two middle rails to the fourth slotted hole from either end of the angle bar. Do not tighten the screws until instructed to do so.

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Assembling the BaseBot Chassis - Front



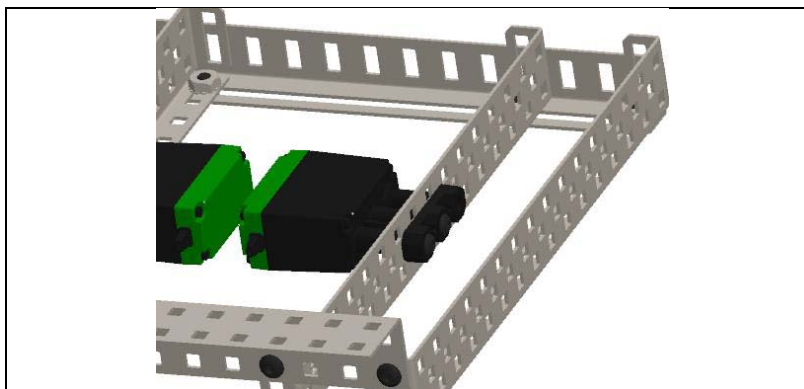
Materials

1	Rear chassis assembly
1	Chassis bumper
4	8-32 BHCS x 1/4" (6.4 mm)
4	Keps nuts

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

Assembling the Drive Train

Mounting the Motors



Materials

2	Motor modules
2	Flat Bearings
4	6-32 BHCS x 1/2" (12.7 mm)

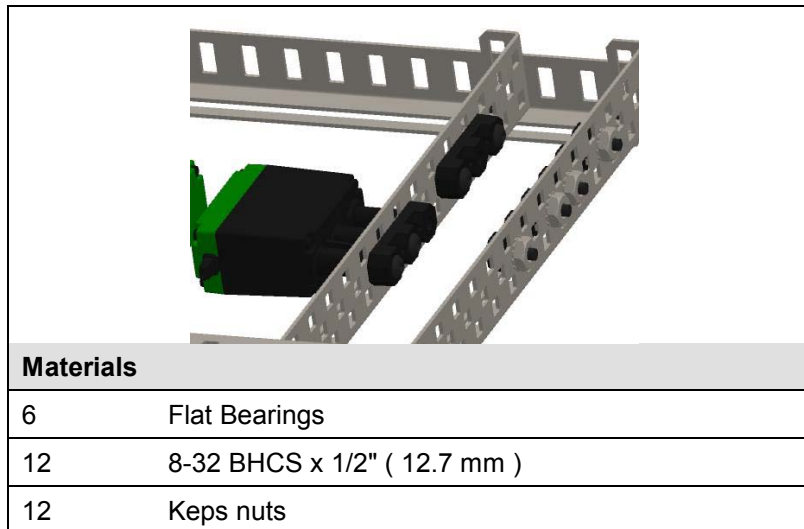
- 1 Mount the motors to the inside chassis rail. Tighten the hardware.

Note: Use the viewer control buttons to play, pause or restart an assembly animation.

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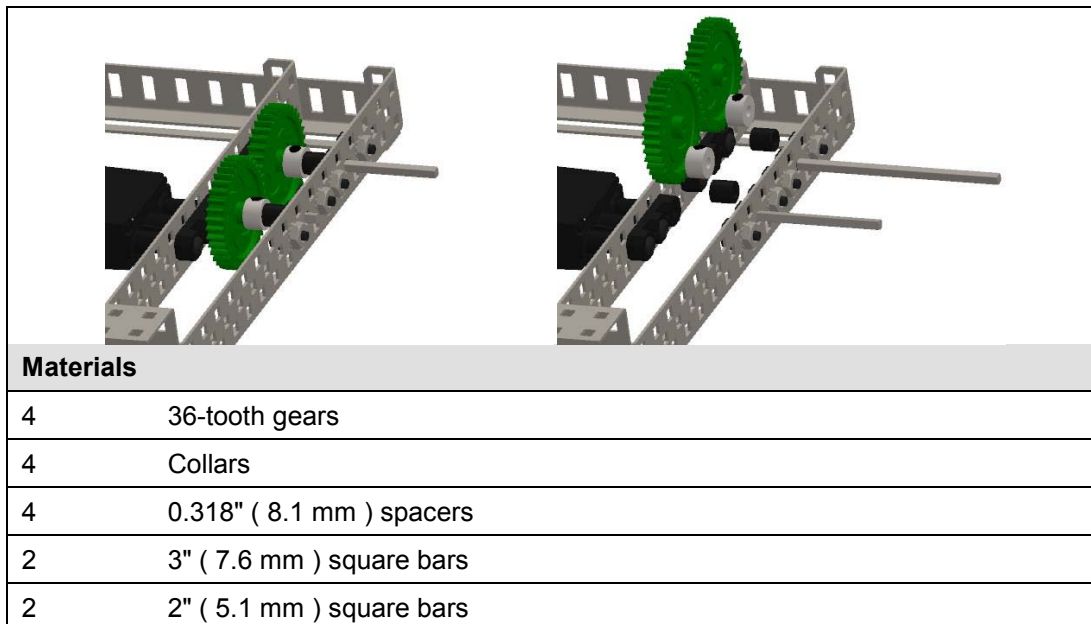
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Mounting the Bearings



- 2 Mount the bearings to the chassis. Tighten the hardware.

Mounting the Gears



Note: 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.

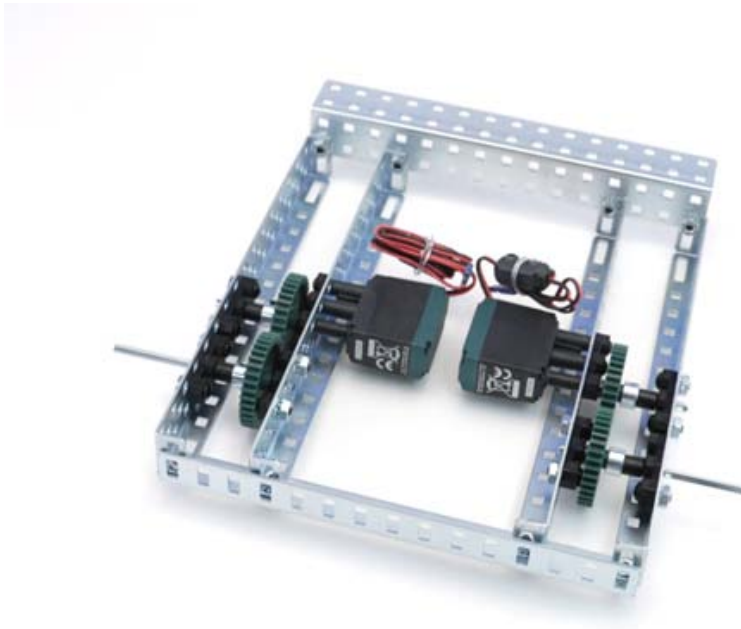
- 3 Mount the shafts and gears.
 - Do not insert the motor shaft all the way into the coupler.
 - Do not tighten the collars until instructed.

Note: If you cannot fit the spacers between the bearings proceed for further instructions.

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Checking Gear Alignment



- 4 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:

- Loosen the rear end of the associated inside chassis rail.
- 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 can move side to side on the shaft:

- Slide the inside chassis rails toward the outer rails just enough to keep the gears from sliding.

- 5 Tighten all the chassis hardware.

Checking Motor Engagement

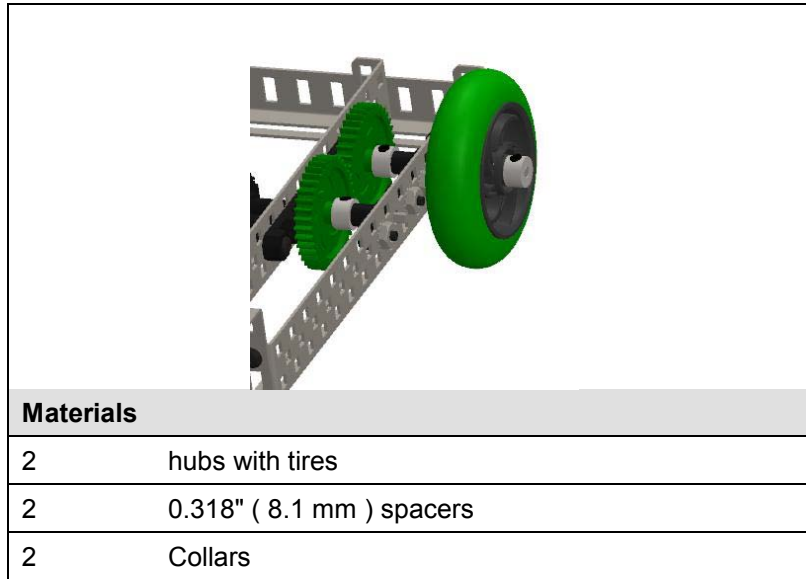
- Push the motor shaft into the motor coupler.
- Test the motor engagement by hand-turning the attached gear. The motor should provide some resistance before turning.
- Tighten the collars on both shafts to secure them into place.

This completes the gear mounting procedure.

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Mounting the Rear Wheels



- 6 Mount the wheels and tighten the collars.

Note: If the portion of the shaft extending from the chassis is too short to mount the collar, loosen the inside collar near the gear and slide the shaft further out.

Checking the Rear Wheel Assembly



Once the collar is tightened, verify that the spacer will rotate on the shaft.

If the spacer is too tight to rotate:

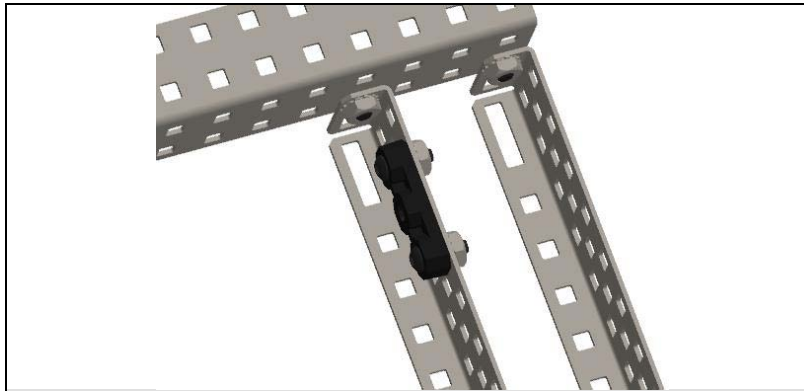
- Loosen the outside collar.
- Adjust the wheel to allow more space between the chassis and wheel assembly.
- Re-tighten the collar.

This completes the rear wheel mounting procedure.

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Mounting the Caster Bearings

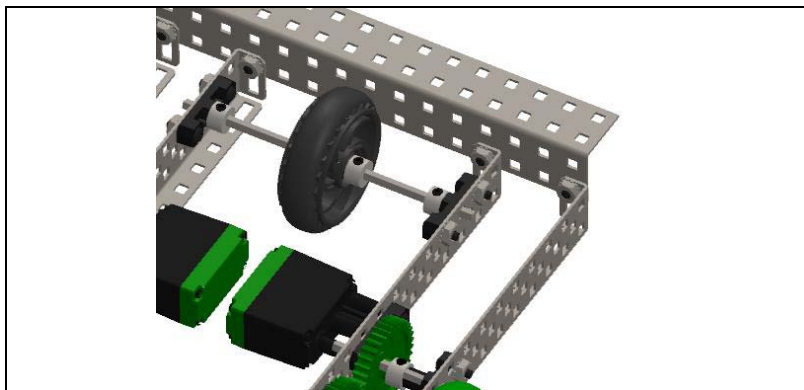


Materials

2	Flat Bearings
4	8-32 BHCS x 1/2" (12.7 mm)
4	Keys nuts

- 7 Mount the caster bearings. Tighten the hardware.

Mounting the Caster



Materials

1	5" (12.7 cm) square bar
1	hub without removable tire
4	Collars

- 8 Mount and align the hub.
 - Tighten the collars to keep the hub centered. The hub should rotate freely without binding.

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Mounting the Controller and Battery Shelf

Mounting the Angle Bar to the Controller

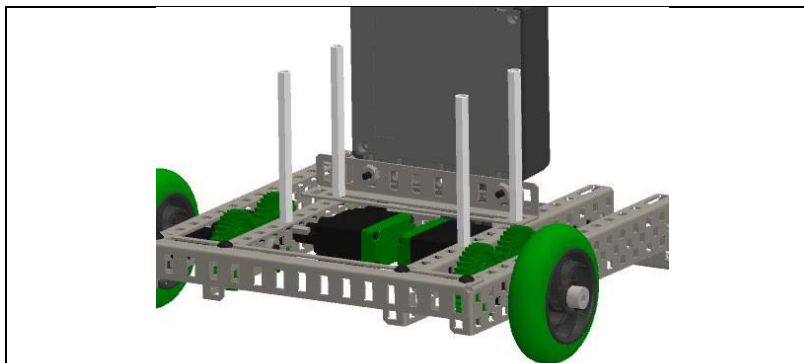


Materials

1	Vex Controller
1	10-hole Angle bar
2	8-32 BHCS x 1/2" (12.7 mm)
2	Keps nuts

- 1 Mount the angle bar to the controller. Do not tighten the hardware until instructed.

Mounting the Threaded Beams and Bracket



Materials

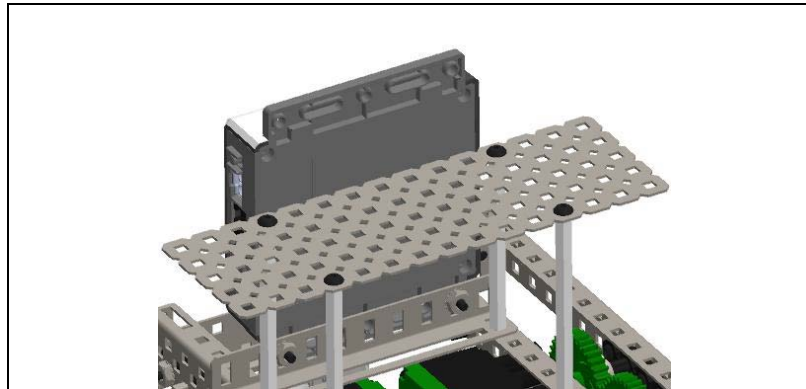
4	3" Threaded Beams (7.3 cm)
4	8-32 BHCS x 3/8" (9.5 cm)

- 2 Mount the threaded beams and the lower controller bracket to the base of the chassis.
 - Tighten the four mounting screws.

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Attaching the Battery Shelf

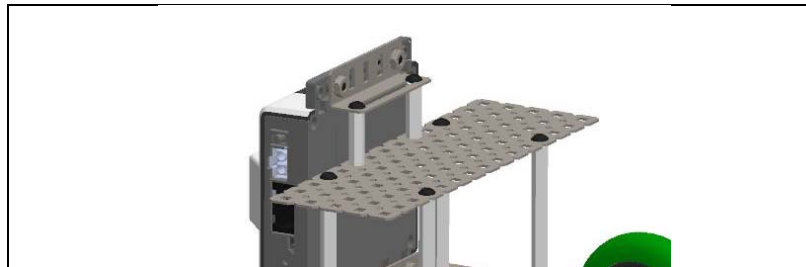


Materials

1	Base Plate
4	8-32 BHCS x 1/4" (6.4 mm)

- 3 Attach the battery shelf to the threaded beams and tighten the four mounting screws.

Attaching the Controller



Materials

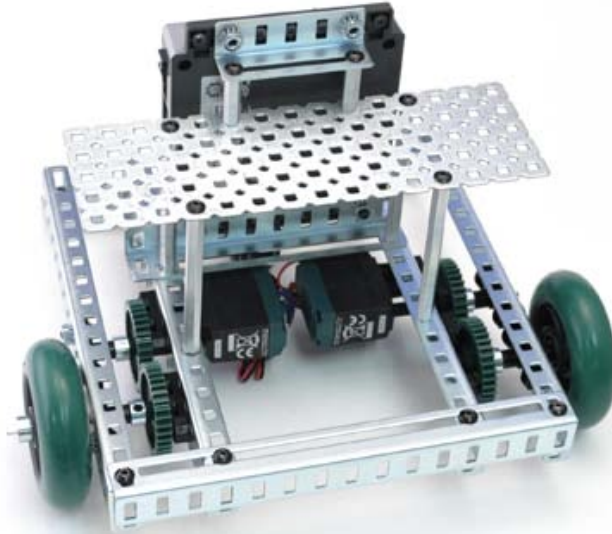
2	1" Threaded beams (2.5 cm)
1	5-hole Angle bar
4	8-32 BHCS x 1/4" (6.4 mm)
2	8-32 BHCS x 3/8" (9.5 mm)
2	Keps nuts

- 4 Attach the controller to the battery shelf. Use the 1/4" screws for the threaded beams and the 3/8" screws for the top of the controller.
 - Tighten all the mounting hardware.

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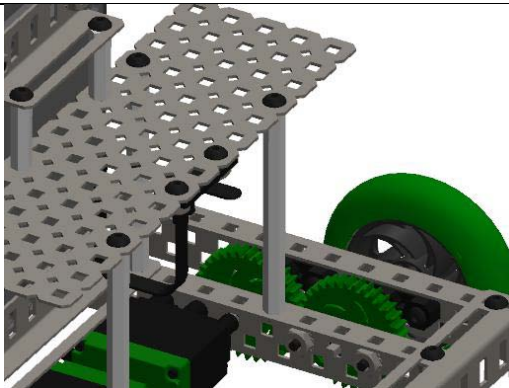
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Your final assembly should look similar to the one below.



Installing the Battery

Installing the Battery Strap



Materials

1	Reusable battery strap
1	7.2V robot battery
4	8-32 BHCS x 3/8" (9.5 mm)
4	Keps nuts

- 1 Slide the end of each battery strap into its locking mechanism.
- 2 Mount the battery straps underneath the battery shelf and tighten the hardware.

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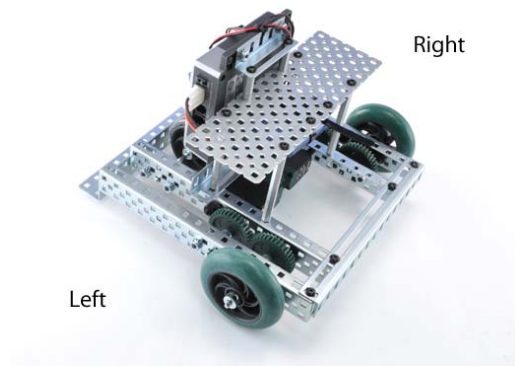
Installing the Battery

- 3 Slide the 7.2V battery through the battery straps underneath the battery shelf. Make sure the battery connector is on the same side as the power switch on the Vex controller.
- 4 Pull the end of each battery strap to tighten the battery into place.
- 5 Plug the battery into the controller.

Note: To remove the battery, push in the locking mechanisms and the end of the battery strap.

Connecting the Motors

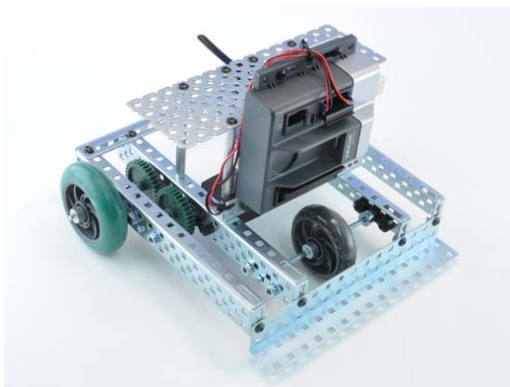
Routing the Motor Wires



- 1 Looking down on the BaseBot, connect the left motor of the BaseBot to motor port 1 and the right motor to motor port 10.

Note: When connecting the motor to the controller, you may need to bend the port guard slightly to reach the port.

- 2 Gather the excess wire and tighten down the motor controller straps. This will keep the motor cables safe from entanglement with other robots and gears.



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Installing the Joystick Batteries

Install the batteries



- Using a screwdriver, remove the cover from the rear of the controller.
- Following the diagrams inside the case, insert 6 fully-charged AAA batteries .
- Replace the battery cover.

Installing the Wireless Keys

Synchronizing the Devices

Before installing the wireless keys, you must first synchronize your devices.

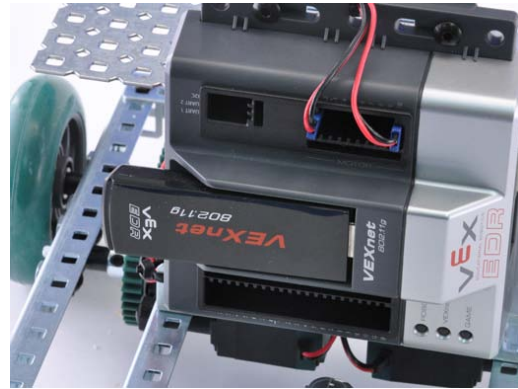


- 1 Plug one end of the USB cable into the controller.
- 2 Plug the other end into the joystick.
- 3 Turn on the joystick.
 - The controller and joystick LEDs will light up. Once the VEXNet light turns solid green, the devices are synchronized.
- 4 When you are finished, turn the joystick off.

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Installing the Keys



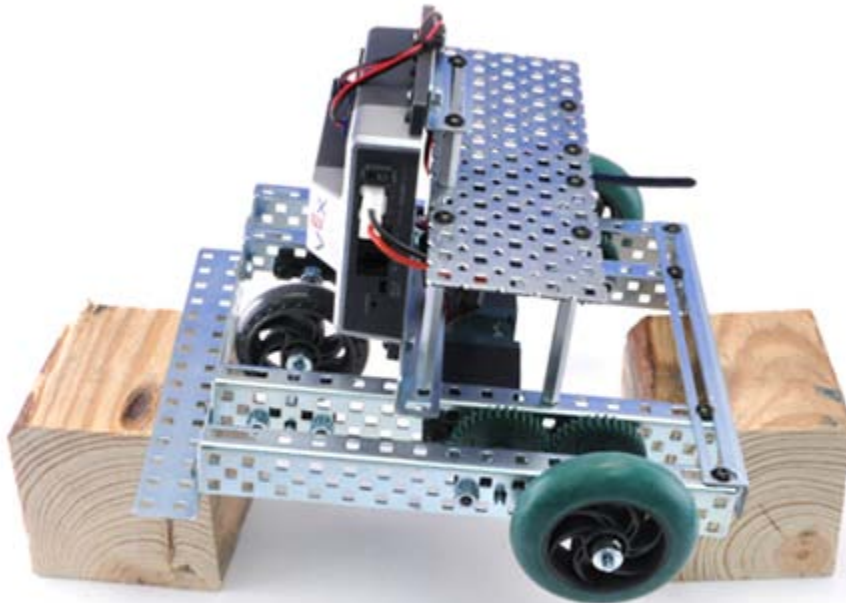
- 5 Insert one wireless key into the joystick.
- 6 Insert the other wireless key into the controller.

The BaseBot is now ready for testing.

BaseBot Testing

Turning On the BaseBot

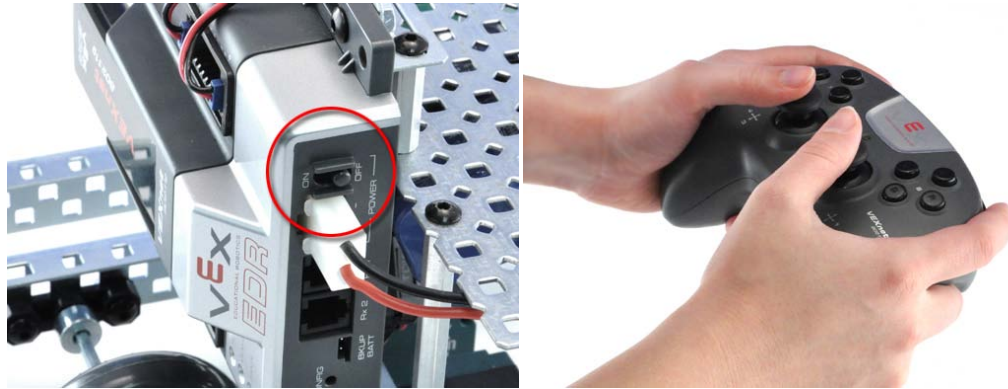
⚠ Caution: Always lift the robot so that the drive wheels are off the ground before turning the power on. This will reduce the risk of an accident from unexpected movement.



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- 1 Slide the power switch on the Vex controller to the ON position.



Note: The battery power light on the front of the controller should be green indicating a properly charged battery. If the light is red, it is time to recharge the battery.

Testing BaseBot Control

- 2 Place the BaseBot on the ground.
- 3 Push the left joystick up (channel 3).
 - Did the left side of the BaseBot move forward?
- 4 Push the right joystick up (channel 2).
 - Did the right side of the BaseBot move?

Troubleshooting

If either side of your robot does not respond to the joystick, review all the wiring connections to make sure everything is correct.

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

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

If the BaseBot still does not respond as expected, see the Updating the IFI Master Code section of the Teacher's Guide,

Congratulations! You have completed the BaseBot!