



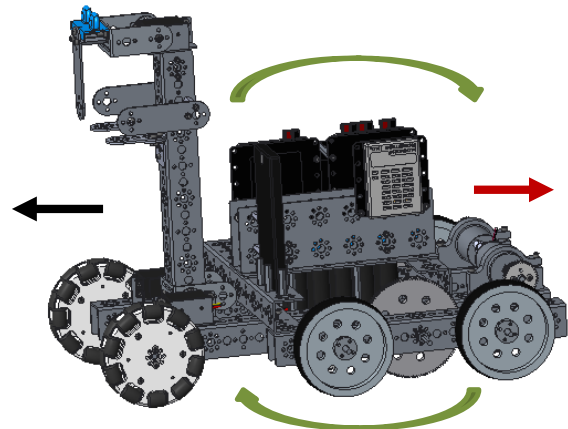
Field Support and Product Retirement

Your robot design becomes more effective by including an informed plan for usage and maintenance. A field support plan contains instructions for operating the robot, required tools for maintenance and repair, spare parts, and a copy of the programming. Every team member should have access to your field support plan.

You can think of the field support plan as an operator's manual. Instructions for operating the robot should include how the robot responds to the controller. A simple explanation is included below as an example. If your robot is more complex, your field support plan may require a more instructions. In some cases, a robot mechanism may need a coordination of controls to aim or score effectively. Anything like that should be explained in the field support plan.

Robot Controls

Drive motors controlled by joysticks Left joystick controls the left drive motor Right joystick controls the right motor	
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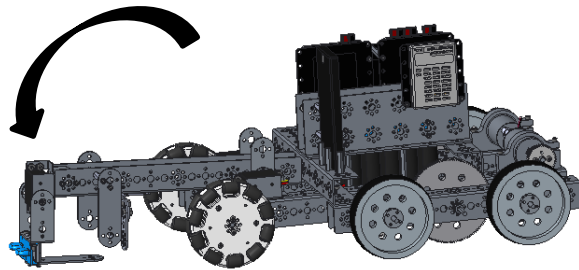


Both joysticks forward drives the robot forward

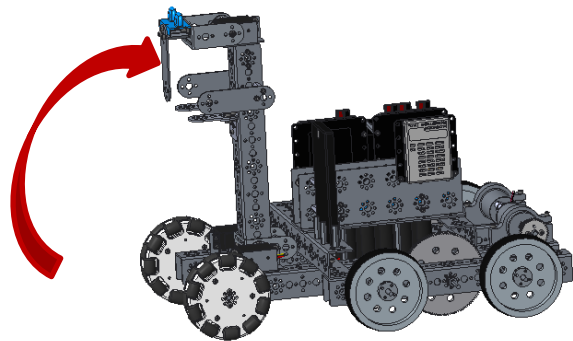
Both joysticks back drives the robot in reverse

Joysticks in opposite directions turns the robot within its own radius

Arm mechanism controlled by the A and B buttons

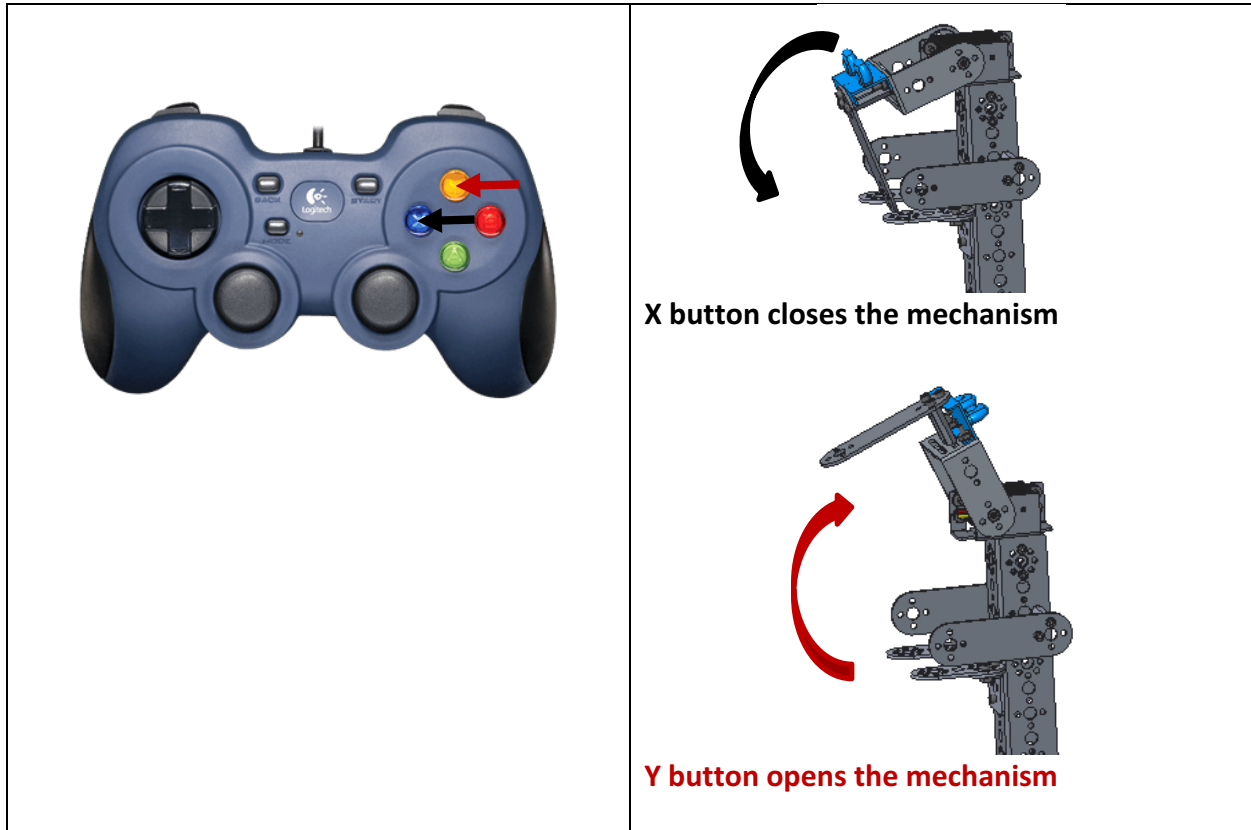


A button moves the mechanism down



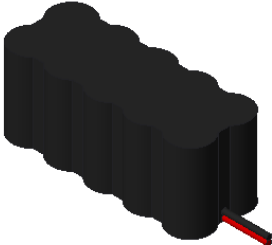
B button moves the mechanism up

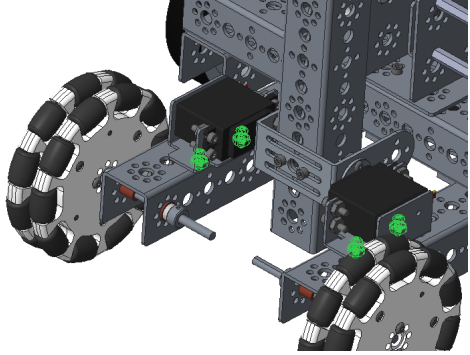

Claw mechanism controlled by X and Y buttons



Maintenance

Based on your FMEA, you know the likely ways your robot may fail and how its performance will be affected. Include a summary of the potential problems and solutions for dealing with them in your field support plan. A simple example is provided:

Potential problems and effects	Solutions
<p>Low battery will reduce the load the arm mechanism can lift. The battery will begin to fail with 8 – 10 min of operation.</p> <p>Almost certain</p> <p>Serious performance degradation</p>	<p>Include a spare battery in your competition kit of parts.</p> <p>Recharge your battery after 8 minutes of use.</p> <p>Required: battery charger</p> 
<p>The screw that secure the arm mechanism's servo brackets to the chassis loosen during the operation of the robot.</p>	<p>Tighten the screws securing the mechanism servo brackets after each competition match or practice run.</p>

<p>The mechanism continues to work correctly, but may become misaligned.</p> <p>60% chance</p> <p>Slight performance degradation</p>	 <p>Required: 7/64" hex key</p>
<p>The claw mechanism servo motor is vulnerable to stripping, especially if it is operated in contact with the floor.</p> <p>If the servo motor becomes stripped the mechanism will no longer function.</p> <p>Possible, but not likely</p> <p>System failure</p>	<p>Avoid operating the claw mechanism until you are sure its has a clear path to open and close.</p> <p>Include a spare servo motor in your competition kit of parts.</p> <p>Required: 7/64" hex key, pen screw driver</p> 

Product Retirement

Most companies are now required to provide plans for appropriate product retirement including retrieval of the products and disassembly and recycling of parts and materials. Similarly, your team should collectively decide what will happen to your robot after it's competitive season has concluded.

Many teams will disassemble and reuse the parts in future seasons. If you team decides to do that, determine when that will happen. Often times teams will keep their robot intact in order to do off-season practices, outreach activities, or experiment with different programs or mechanisms.

A plan for a responsible resolution of your robot system after its useful life is over is part of the design process.

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Questions or ideas? Drop us a note at FIRST@ptc.com.

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