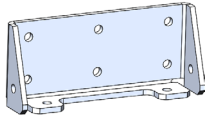
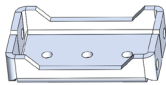



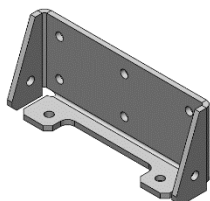




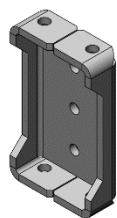
Bumper Hardware Assembly Guide

Included in this year's Drive Chassis Base Kit are brackets and hardware to build a red and blue set of bumpers and securely attach them to the AM14U5 frame. These brackets can be placed in a variety of different places along the frame rail to allow for partial or full bumper coverage.

Bumper Hardware Included Parts			
Component	Part Number	QTY	Part Photo
Front/Corner Bumper Bracket	am-3961	8	
Side Mount Bumper Bracket	am-3962	8	
AM14U – Bumper Hardware Kit – AM-3966h			
10-32 RHS x 3.750"	am-1502	12	
10-32 Wing Nut	am-1483	25	
#8 Phillips Flat Head Wood Screw	am-1387	50	
Note: Additional items are needed for bumper assembly including wood, pool noodles, robust red and blue fabric, and industrial staples. For supplies, visit AndyMark.com .			



The Front/Corner Bracket is designed to sit on top of the AM14U5 end plate and provide additional backing for front and back impacts. These brackets permanently attach to the bumper with included wood screws. AndyMark recommends that these brackets be attached at the end of any bumper segments and behind any long lengths for optimal strength.



The Side Mount Bracket is designed to sit between the top and bottom flange of the AM14U5 outer plate. Side cutouts on the bracket allow for it to fit over hardware. These brackets should be spaced evenly along the sides of the robot and at the end of any bumper segments.

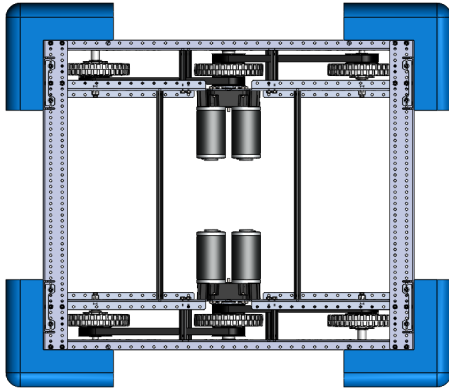


Long screws and wingnuts are also included. This hardware allows for the quick bumper segment removal without the use of hand tools. This hardware can be swapped out for your own hardware such as hex head screws and nuts, or quick release pins.

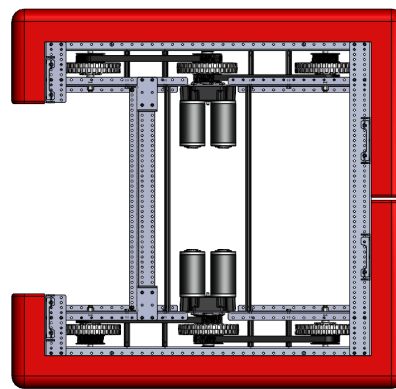
AM14U5 Bumper Attachment Suggested Method

NOTE: Additional tools and materials are needed to complete a bumper set

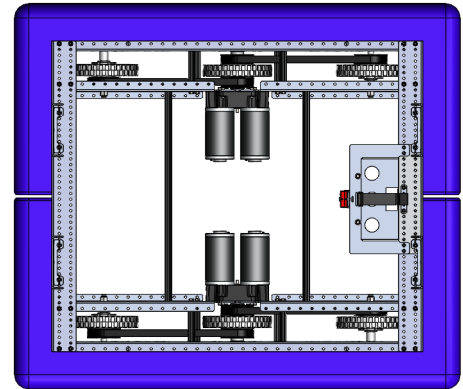
Step 1: Plan out which edges of the drive base frame perimeter will be covered with bumpers. You may choose to accommodate for a mechanism or opening in your frame. Ensure this design **complies with all bumper rules** found in this year's game manual.



Corner Bumpers



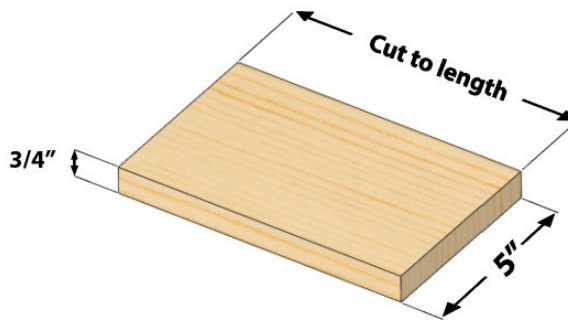
Frame Opening



Full wrap – Two C-Segments

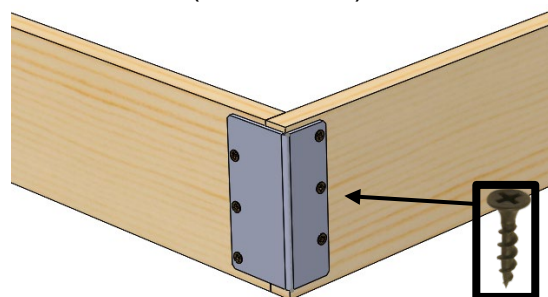
Brackets should be attached to the frame in the corners, at the ends of bumper segments, and behind any long bumper lengths.

Step 2: Cut $\frac{3}{4}$ " wood into bumper planks that are 5" tall and to desired lengths. Make sure to plan out the lengths of all your pieces before cutting taking into consideration wood overlap in the corners.



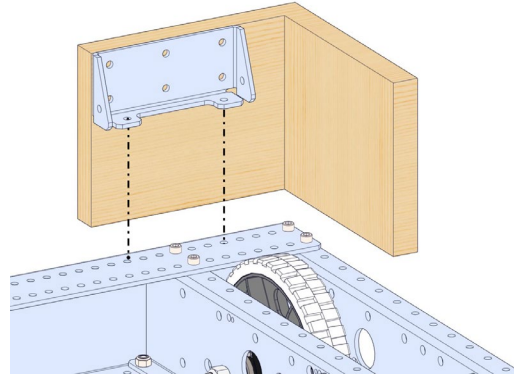
NOTE: Ensure the length of each plank meets the minimum length allowed according to the current rule manual.

Step 3: Bumpers can either be made in straight sections or in sections that wrap around corners. To ensure that bumpers designed to wrap around corners are rigid, it is recommended that the corner edge be strengthened with angled corner connectors such as am-3233a (not included) or similar bracket.



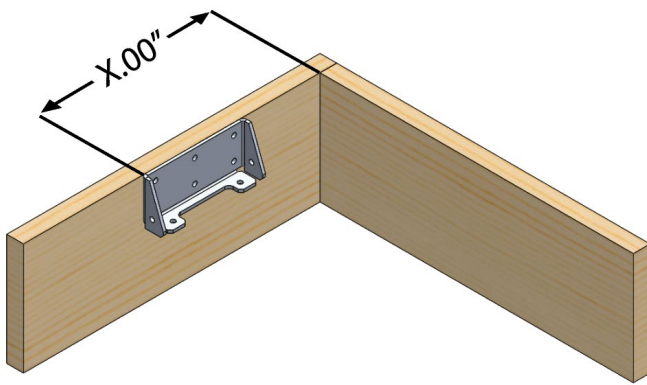
Step 4: The Front/Corner Bracket (am-3961) is designed to be a robust attachment for the bumper onto the AM14U End Plate. The holes on the bottom bracket will align with holes on the End Plate and can be placed anywhere along the frame to avoid hardware or mechanisms.

If building corner bumpers, the brackets should be placed at edges of the front wood sections for support.

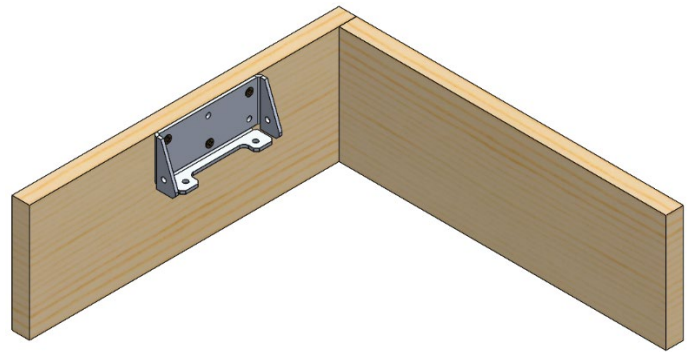


Step 5: Line up the top edge of the Front/Corner Bracket with the top edge of the plank assembly.

In order to align with the holes on the drive bases, the edge of the bracket should be an integer number of inches away from the inside corner.

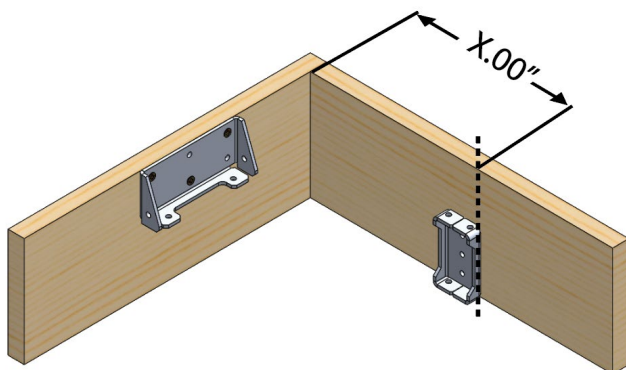


Step 6: Install three #8 wood screws (am-1387) into each Front Bracket as shown to secure the bracket to the wood.

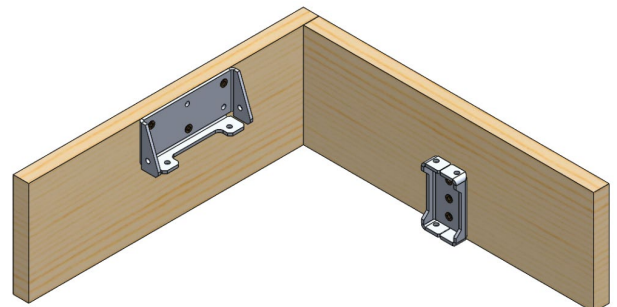


Step 7: The Side Bracket (am-3962) will need to fit between the flanges on the Outer Plate of the AM14U5. To align with the holes, the edge of the bracket should be an integer number of inches away from the inside corner.

For corner bumpers, line up the Side Bracket (am-3962) close to the edge of the plank for support.



Step 8: Once the bracket is in place, install three #8 wood screws (am-1387) into each Side Bracket as shown below.



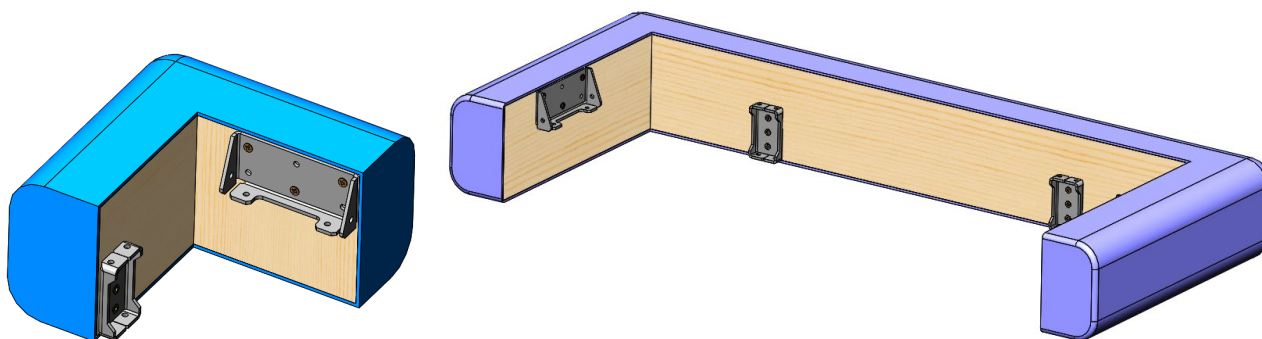
Step 9: Cut noodles to a length that matches the wood planks. Cut fabric large enough to wrap around noodles and wood with enough extra for stapling. If adding **team numbers onto fabric it may be useful to do this before adding to bumper segments.**



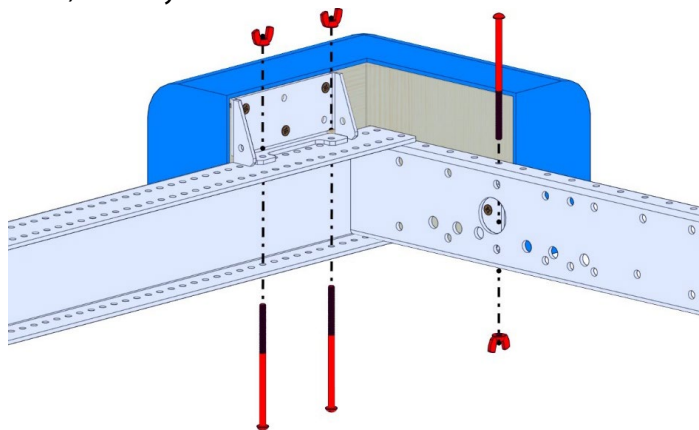
Step 10: Wrap fabric tightly around noodles. No noodles should be showing after wrapping. Staple fabric evenly along edge of bumper and trim any extra fabric. The holes and hardware to attach bumpers will need to be accessed frequently.



The finished segments should look similar to the pictures below:



Step 11: Attach bumpers as shown with 10-32 x 3.75" round head screws (am-1502) and 10-32 wing nuts (am-1387) for easy installation and removal.



Note: On Side Brackets, the wing nuts must be installed on the bottom of the chassis in order to clear the bumper wood. Alternatively, #10-32 nuts can be used.