



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 AM14U6 frame. These brackets can be placed in a variety of different places along the frame rail to allow for full bumper coverage.

Bumper Hardware Included Parts (am-3966a)			
Component	Part Number	QTY	Part Photo
Front/Back Bumper Bracket	am-5748	8	
Side Mount Bumper Bracket	am-3962	8	
AM14U – Bumper Hardware Kit – am-3966ah			
Ring Pin, 3/16" x 3-1/8"	am-1760	8	
10-32 RHS x 3.75"	am-1502	4	
10-32 Wing Nut	am-1483	8	
#8 Phillips Flat Head Wood Screw	am-1387	60	
10-32 Nylock Nut	am-1042	4	
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/Back Bracket is designed to sit on top of the AM14U6 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.

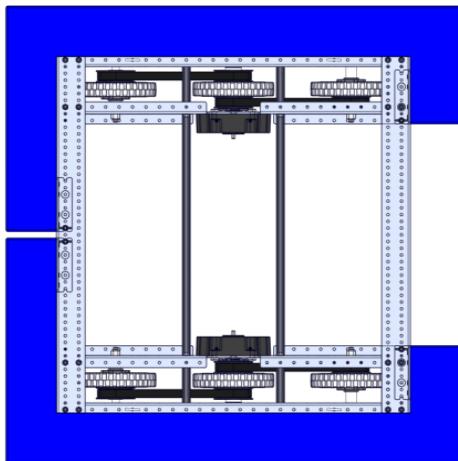
The Side Mount Bracket is designed to sit between the top and bottom flange of the AM14U6 outer plate. Side cutouts on the bracket allow for it to fit over hardware. These brackets should be spaced evenly along the sides of the robot and at the end of any bumper segments.

Ring Pins and Wing Nuts are also included. These allow for quick bumper segment removal without the use of hand tools. This hardware can be swapped out for your own hardware such as screws and nuts.

AM14U6 Bumper Attachment Suggested Method

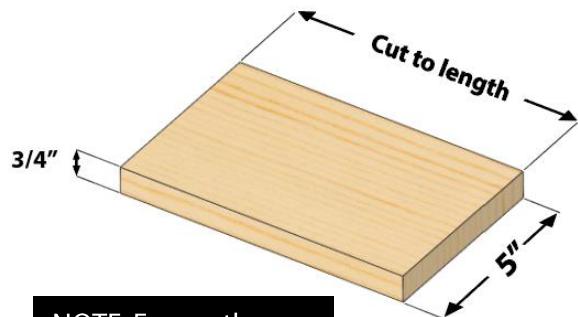
NOTE: Additional tools and materials are needed to complete a bumper set

Step 1: Below is an image of the shape your final set of bumpers should take: two C-shaped assemblies, one per side of the robot. Ensure your design **complies with all bumper rules** found in this year's game manual.



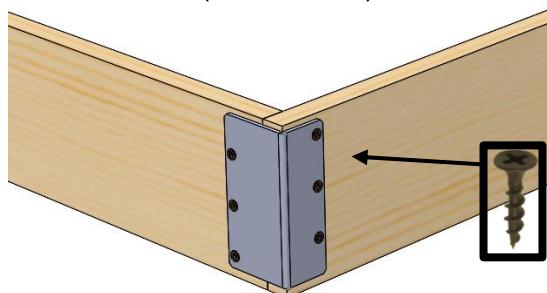
Full wrap with opening – Two C-Segments

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.

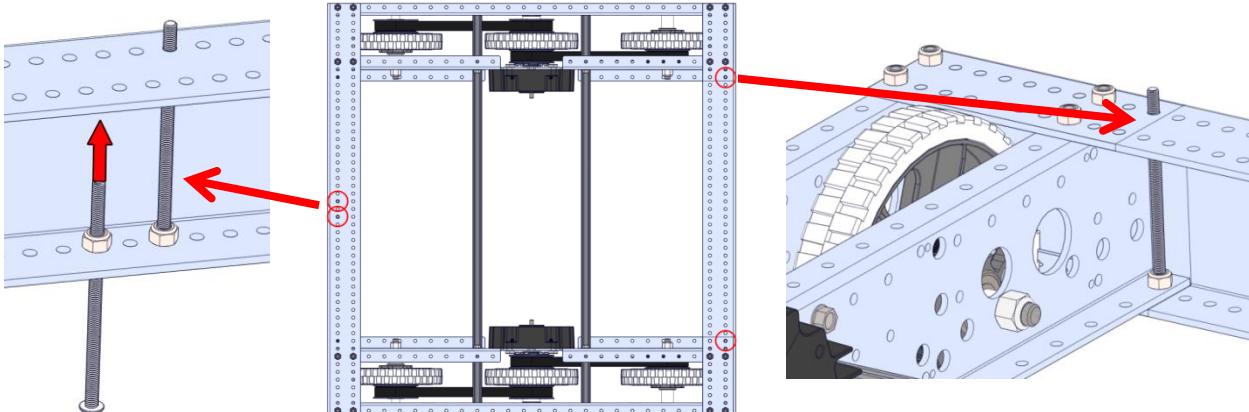


NOTE: Ensure the length of each plank meets the minimum length allowed according to the current rule manual.

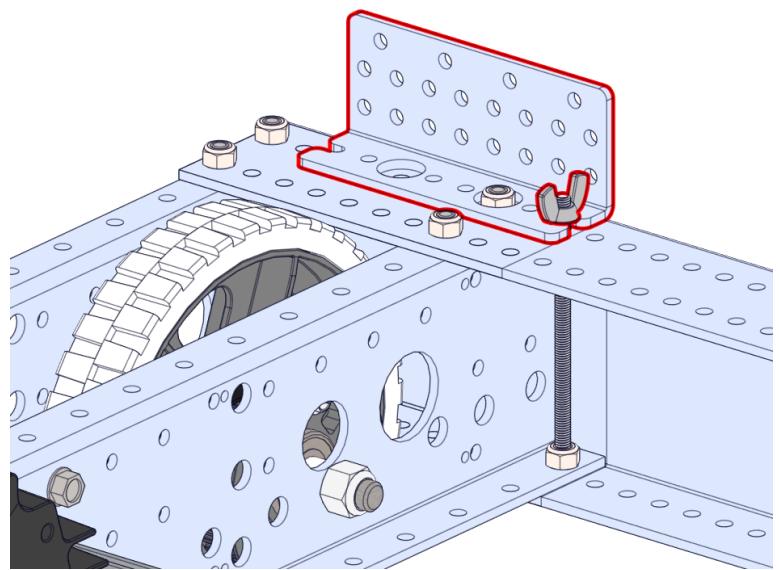
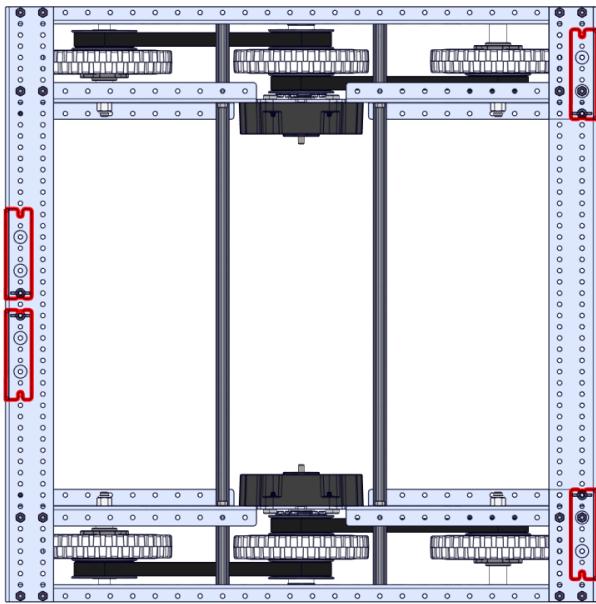
Step 3: Bumpers can either be made in straight sections or in sections that wrap around corners. To ensure that bumpers designed to wrap around corners are rigid, it is recommended that the corner edge be strengthened with angled corner connectors such as am-3233b (not included) or similar bracket.



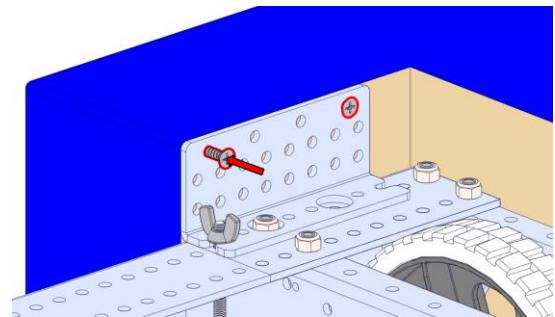
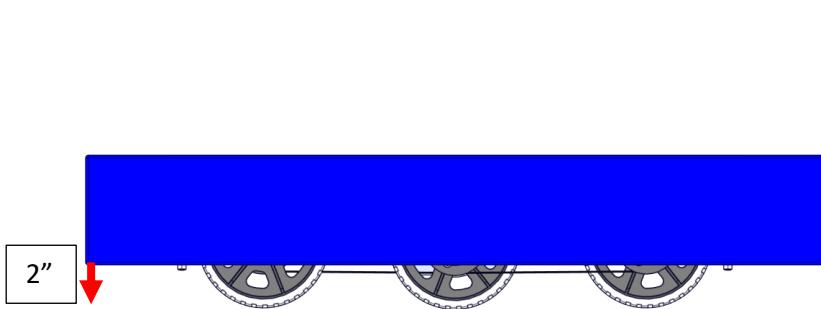
Step 4: Through the chassis, insert [4] 3.75" 10-32 Phillips Head Screws (am-1502) in the locations shown. Secure them in place using [4] 10-32 nuts (am-1042) screwed all the way on as shown, one per screw. Some locations may already have chassis screws installed where these screws will go, remove those screws first.



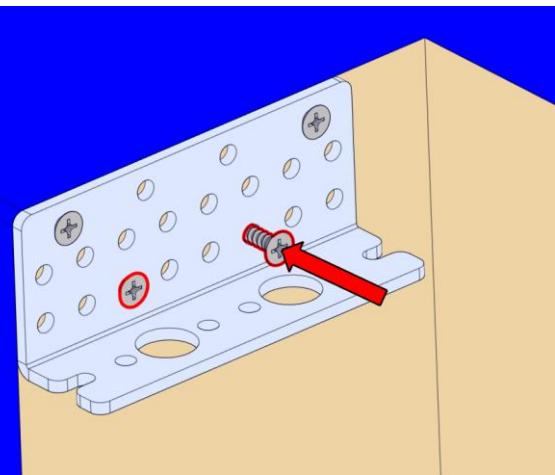
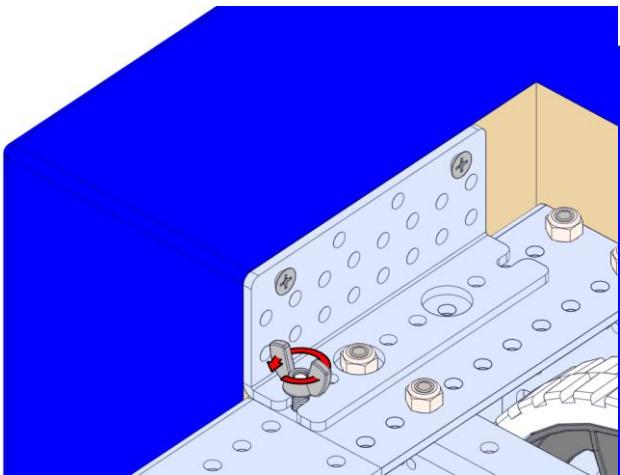
Step 5: Using [4] wing nuts (am-1483), install [4] front/back bumper brackets (am-5748) on the studs attached in Step 4. Make sure the brackets are parallel with the exterior faces of the chassis.



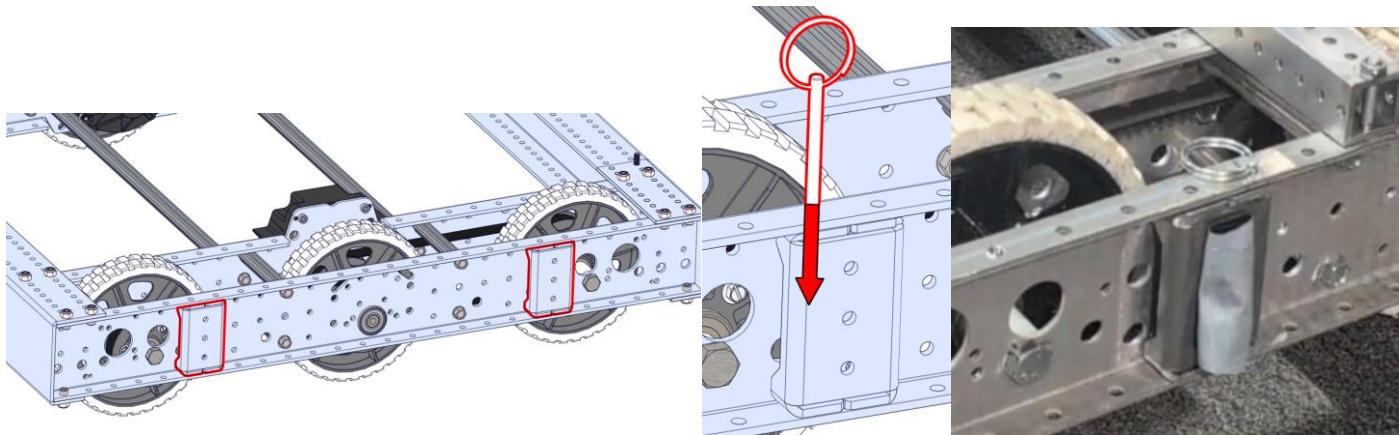
Step 6: Use any object to hold your bumpers 2" up from the floor and then push them against the chassis. Using a drill, secure the bumpers to each bracket with 1-2 wood screws (am-1387).



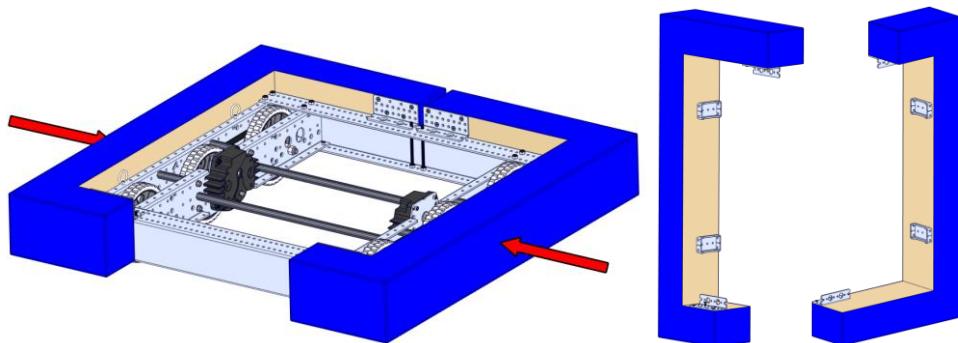
Step 7: Unscrew the wing nuts from the studs and remove the bumpers. Then, finish installing the brackets by installing [4] total wood screws (am-1387) in each.



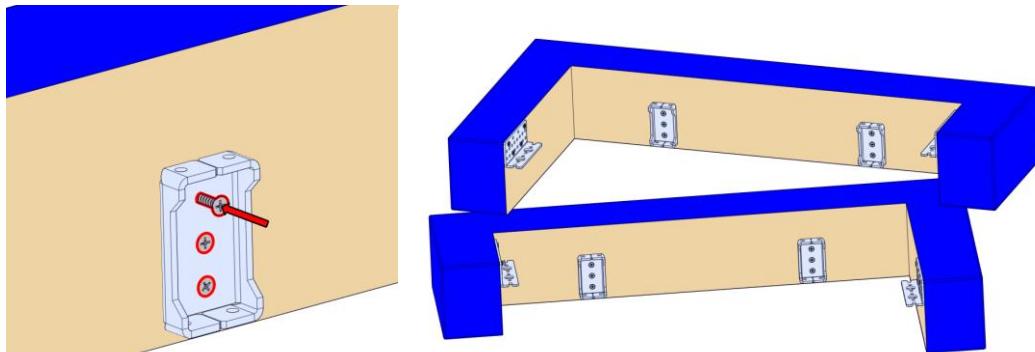
Step 8: On the chassis, insert [4] Side Bumper Brackets (am-3962). Pin them in place with [1] Ring Pin (am-1760) each, [4] total. On the outside of each bracket, place a loop of tape, sticky side out.



Step 9: Place the bumpers back on the chassis, making sure to press the bumper wood firmly against the tape to ensure a quality hold. Then, taking care to make sure the side brackets stay with the bumpers, remove the ring pins and lift the bumpers clear of the chassis.



Step 10: Without removing the tape, secure the side brackets to the bumpers using [3] Wood Screws (am-1387) per bracket, [12] screws total.



Step 11: Attach the bumpers to the chassis again using the ring pins and wing nuts. The bumpers are now complete.

