

Your #1  
Source for  
Competitive  
and Hobby  
Robot Parts



# BUILD YOUR OWN TEST BOX

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SAFETY IS PARAMOUNT IN COMBAT ROBOTICS!  
THIS TEST BOX IS AN ECONOMICAL, SIMPLE, AND EFFECTIVE  
SOLUTION FOR TESTING YOUR ROBOTS SAFELY.

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## IF YOU WANT TO MAKE YOUR SPINNER A WINNER, A TEST BOX IS A MUST-HAVE!

A test box allows you to spin up your weapon safely and even hit objects without needing a full arena. You can make improvements to your designs many times between events, where otherwise you would only find flaws during matches, then have to wait until the next event to see if your new improvements work or not!

## SO WHY NOT?

The most common response is “I don’t know how” followed by “it looks expensive” and “it looks hard”. If that’s you, then you’re in luck! This guide will help you build a strong box that costs less than your robot—and far less than a trip to the hospital for shrapnel in the eye!



**EASY TO BUILD** You don’t need anything more than a hand drill, hand saw, and some glue! (But it’s certainly quicker to use power tools.)

**MAKE IT SAFE** This box is designed with your safety in mind:

- 5/8" thick walls absorb direct hits.
- The polycarbonate is on the top, where it will face the fewest weapon impacts.
- The top slide brackets span the entire perimeter to eliminate gaps. (Avoid drilling/screwing polycarbonate as it can introduce weak points.)
- A continuous hinge seals up the last edge and makes a quick and easy lock.

## BUDGET FRIENDLY

You can get all the parts in one trip to the hardware store. You *can*, but most stores have a limited selection of polycarbonate and you'll have to get creative.

For example, you can't buy a 2'x2' sheet of 1/8in or 1/4in polycarbonate at Home Depot. The closest is a 0.236 thick sheet sized 36x30" for \$88, so there's some waste. Or, you can get a 2ft x 4ft sheet of 1/4in for \$160 and split it in half. Got a friend who also needs a test box?



## BETTER SOURCES

- ◉ McMaster.com: search for part #8574K55
- ◉ Better yet, ask a local plastics shop if they have offcuts and get it even cheaper!

SIZE/QTY	PART	PRICE**
2ft x 4ft	5/8in PLYWOOD SHEET	\$20
2ft x 2ft	1/4in HARDBOARD SHEET	\$20
2ft length	1.5in OR 2in CONTINUOUS HINGE*	\$7
66in length	2.25 x 1.5in EXTRUDED ANGLE	\$16
2ft x 2ft	1/4in OR 1/8in POLYCARBONATE SHEETS*	\$50-80
50 approx	NAILS AND SCREWS	\$5
4 pcs	CASTER WHEELS (optional)	\$10
1 or 2	HANDLES (2nd is optional)	\$7
Like always, all parts can be found cheaper if you shop around!		<b>TOTAL \$95-\$125</b>

\*If you plan only to test 1lb robots, 1/4in polycarbonate with 1.5in hinge will contain everything. For 3lb robots, use 1/8in thick and 2in hinge.

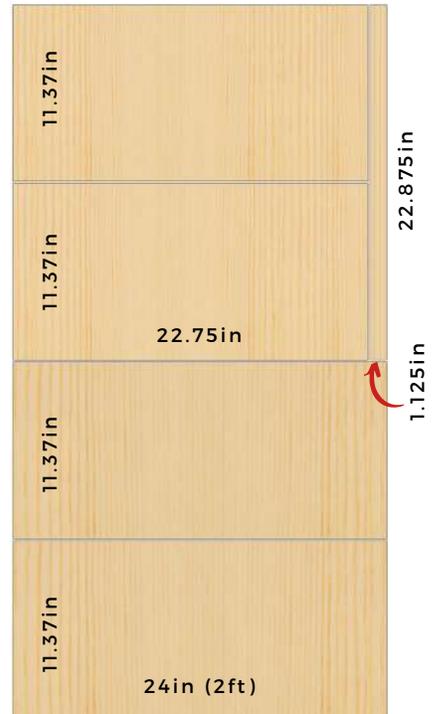
\*\*Local hardware store prices (Home Depot) as of May 2021, wood prices are normally lower!

# LET'S GET STARTED!

1. Cut the 2x4ft plywood sheet in half.
2. Cut a strip off the side of one half, leaving 22.75in width. You will use this strip with the hinge, so don't throw it away!
3. Cut both squares in half again.
4. Glue and nail the sides together and to the hardboard base.



2X4FT 5/8IN PLYWOOD SHEET



5. Cut your polycarbonate to 23.75 x 23.75in.  
If the sheet is 24in wide, you might find it binds on the brackets when sliding. If so, sand the edges until it moves freely, or use washers when mounting the brackets to space them out.



6. Cut your angle bracket into lengths of 21", 21", and 23.75".  
This build used plain extruded aluminum, but slotted angle bracket is cheaper and easier.
  - ⊙ Screw the long bracket to the back of your box with the polycarbonate in place. Add some thin spacers between it and the brackets - bread clips make good spacers!
  - ⊙ Screw the two short brackets to the sides in the same manner.
  - ⊙ Remove the spacers once fastened, and the polycarbonate will slide freely.

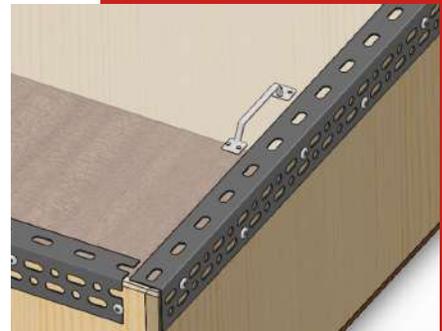
7. Screw the continuous hinge to the front side making sure that when folded, it sits flush or below the edge so the polycarbonate can slide past.





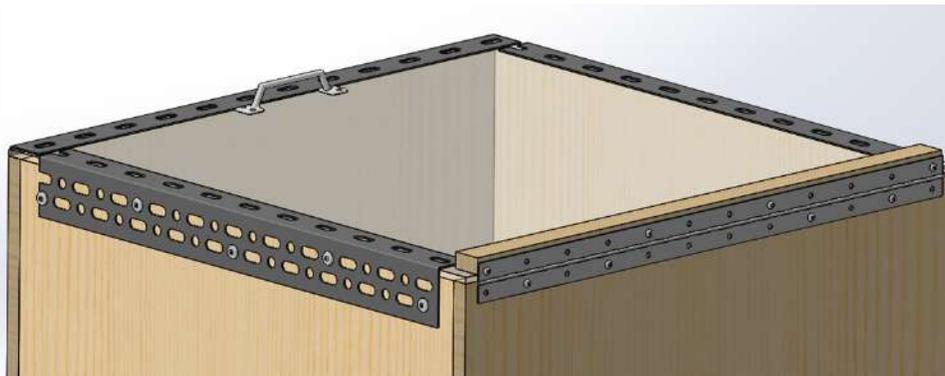
8. Open the hinge and center the thin strip of plywood against it. Mark and pre-drill a few screw holes in the strip. The screws will be near the edge of the wood so pilot holes are important to prevent tear-out. A 1.5in wide hinge works well for  $\frac{1}{8}$ in polycarbonate, but for  $\frac{1}{4}$ in thick polycarbonate a 2in wide hinge will center the holes better.

9. Glue a handle onto the polycarbonate for sliding the sheet. (Screws would introduce weak points into the polycarbonate.) A rubbery adhesive like Shoe Goo works well. Glue the handle to the side opposite the hinge so you can pull the sheet up into place if it sags when closing.  
*(You can also sand an angle onto the top of the back plywood wall if the sheet still hits it.)*



**YOUR TEST BOX IS COMPLETE!**

The closed hinge will keep the polycarbonate from sliding out or popping up when something hits the top.



# UPGRADES!

TECHNICALLY YOU'RE DONE ALREADY, BUT YOU MAY WANT TO ADD SOME HANDY UPGRADES!

## CASTER WHEELS



- ⦿ Caster wheels and a lifting handle will allow you to turn it up on its side and move it out of the way when not in use.
- ⦿ Put the wheels on the side opposite the hinge so the box will stay closed when you tip it up.

## LIFTING HANDLE



## GO AHEAD, TEST OUT YOUR ROBOT!

- ⦿ Prop your phone at an angle on the top or use a tripod to take videos and post them online!
- ⦿ Add something in there to attack, like an old robot chassis or broken toys/electronics. Make it weigh the same as your robot so you get a good feel for what will happen in a real match!

## STAY SAFE AND HAVE FUN!

