

The Essential "All Purpose" Workbench

Challenging Project



Building a workbench seems to be a rite of passage for most serious woodworkers.

It has a maple split top (Roubo) which is what many advanced woodworkers are using. It uses inexpensive vises but is designed to accept the more expensive hardware should you chose to upgrade.

The only "downsides" to this bench would be the difficulty with adding a Benchcrafted tail vise (would need a longer top) and it uses round dogs instead of square dogs. Both of which are options many choose to do differently so, it comes down to a personal choice. You could probably also call out the fact that it's only 6 feet long as well. Frankly, if we would have

made it longer, it would have accepted the Benchcrafted tail vise nicely; but keeping it shorter allowed us to order 12' lumber for the top and not have any scrap.

All details including dimensions, parts list, tool list, and a full cost breakdown are included.



STEP 1: TOOLS

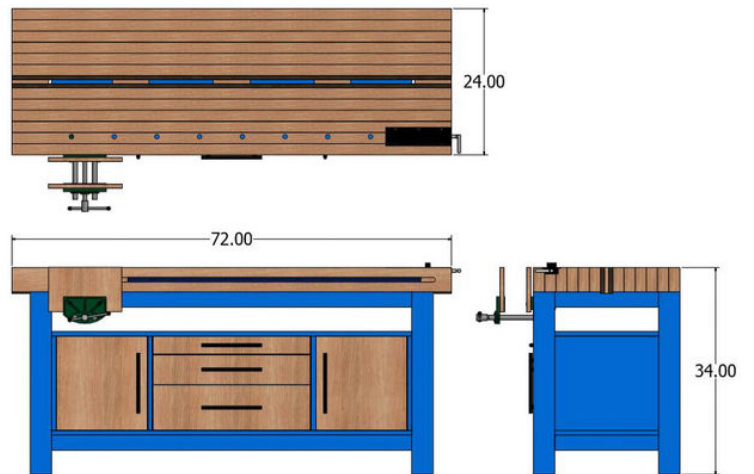
The following tools were used to build the workbench. Optional tools and techniques are discussed at the appropriate step.

- Table Saw
- Dado stack
- Jointer
- Planer
- Band Saw (optional)
- Festool Domino (optional)
- Drill Press
- Miter Saw
- Router
- Squares
- Chisels
- Nail gun/compressor
- Clamps
- Drill/driver
- Sander
- Socket Set or Wrenches



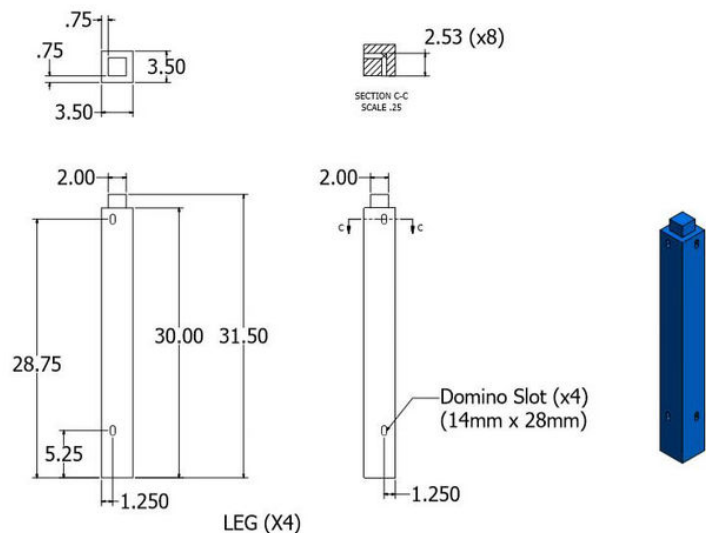
STEP 2: DRAWINGS

Although you will be building to this drawing, it's important that you take actual measurements from your build so that any error created isn't compounded throughout the remainder of the build (Relative Dimensioning). All dimensions are in inches unless noted.



STEP 3: DRAWINGS LEGS

The legs are 3.5" square by 30" long. A tenon is cut in the top side to insert into the corresponding mortise in the workbench top. Mortise and tenon joints could be used for the rail connections as well. However, this workbench uses a Domino Joining System for these joints. The mortise locations are shown to allow the 2.5" square rails to be 6.5" from the floor and flush with the table top.



STEP 4: LEGS 1

The legs are shown as 3.5" square. This step doesn't apply if you have this size available. For this build, two boards were laminated together to meet the size. From there, they were milled down with a planer and joiner to achieve the correct dimensions. Each leg was then cut to 31.5" long.



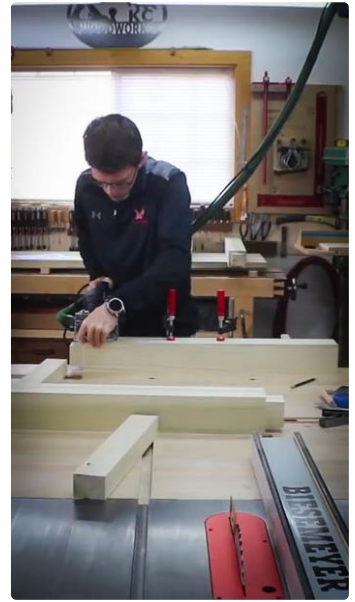
STEP 5 - LEGS 2

The connection between the legs and the bench top is accomplished through a mortise and tenon joint. The tenons on the legs were accomplished on the table saw using a dado stack but could be accomplished in other ways. A single blade and cleaning up with a chisel, router table, or even hand tools could be used to create these tenons. Cut to the dimensions shown in the drawing.



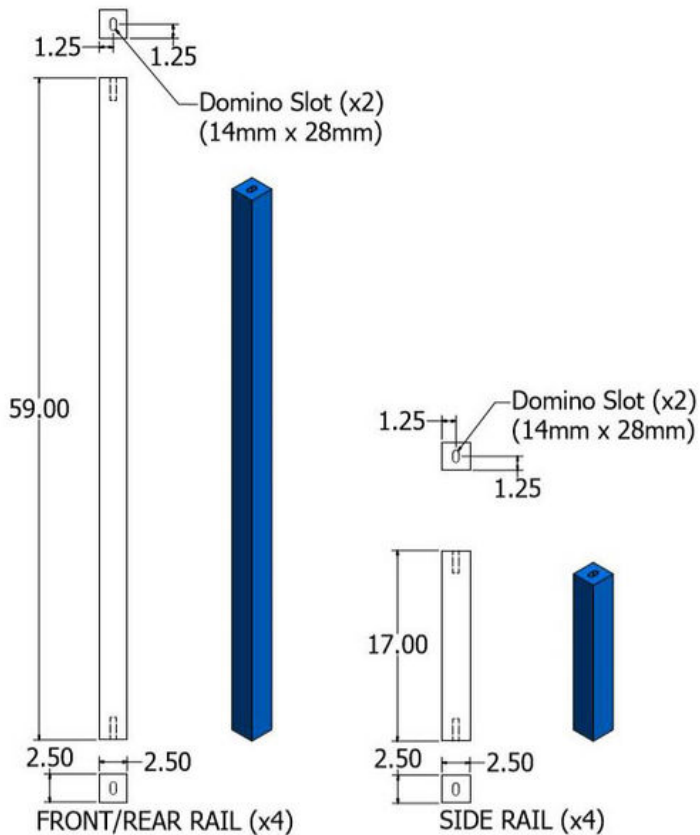
STEP 6 - LEGS 3

Cut the mortise into the legs per the drawing. These were cut with the Festool Domino but, this could easily be accomplished with a router if you don't have the Festool Domino. This could also be accomplished at the drill press and then cleaned up with chisels as well. Just remember to leave your rails extra long to account for making tenons on them if you're not using the Festool Domino.



STEP 7 - DRAWING RAILS

The rails are 2.5" square with a mortise cut into each end. Cut to the lengths shown. As mentioned in the last step, if you're doing a traditional mortise and tenon joint here, you'll need to cut tenons on each end the same way that the tenons on the legs were created. Therefore, length adjustment will be necessary. You will need 4 of each rail.



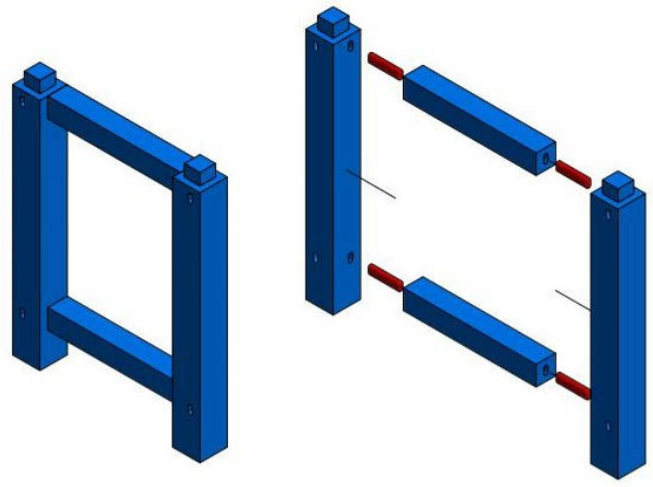
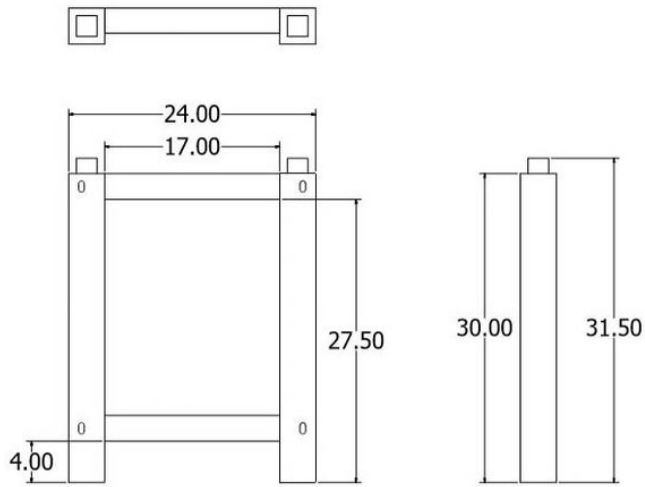
STEP 8 - RAILS

The rails are milled to their final size, 2.5" square. Mortises were then cut into the ends to match the appropriate locations on the legs per the drawing. If you're doing a traditional mortise and tenon joint here, you'll need to cut tenons on each end the same way that the tenons on the legs were created.



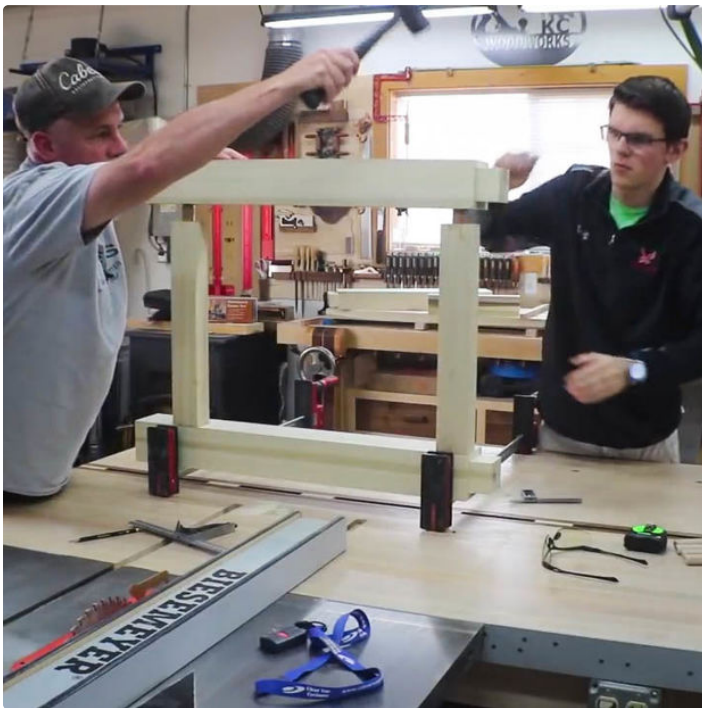
STEP 9: Base - Side Assembly

Attach two 17" rails to the legs with the using the joinery method that you chose. We're using the Festool Dominos. The dimensions should match the drawings when complete. If they do not, it's important to remember this difference and apply it where needed during the remainder of the build. This will alter the dimensions for building the storage case.



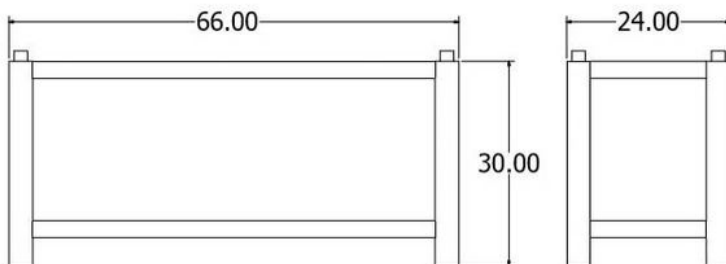
STEP 10: Base - Side Assembly

The dominos used for this build are 14mm x 28mm x 100mm long. Apply glue to both the mortise and the tenon, assemble, and clamp square. Be sure to allow plenty of time for the glue to dry in the clamps.

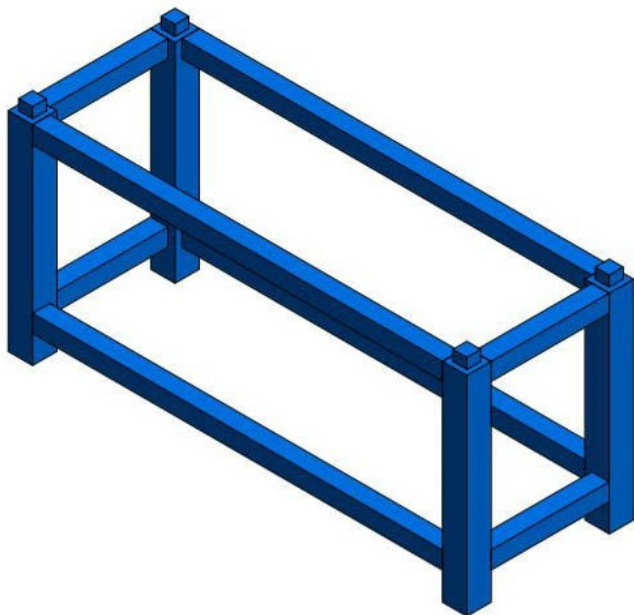
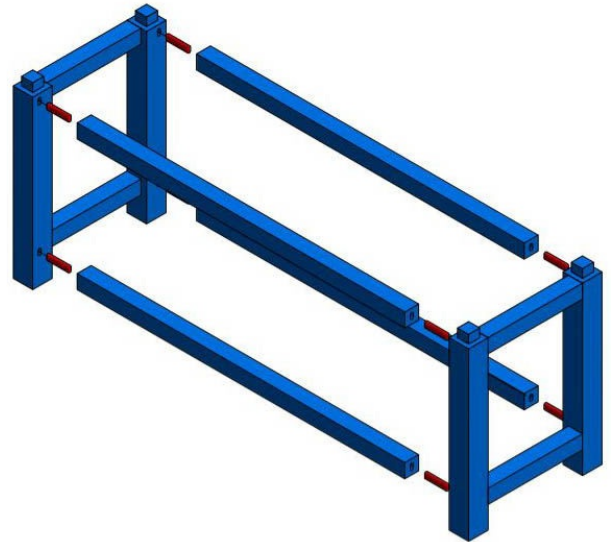


STEP 11: Full Base Assembly

Attach four 59" rails to the Base - Side Assemblies with the joinery of choice. We're are using Festool Dominos. If using traditional mortise and tenon joinery, you will need extra long rails as discussed in the previous steps. Once completed, the dimensions should match the presented drawing.



BASE ASSEMBLY



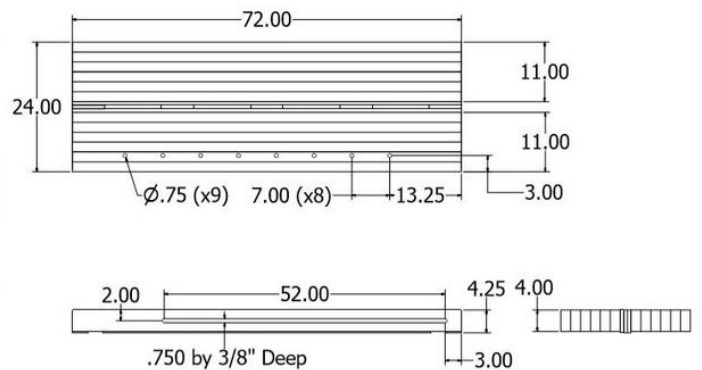
STEP 12: Full Base Assembly

Connect the side legs assemblies together with the 59" rails. This is a good time to paint or stain the completed assembly.



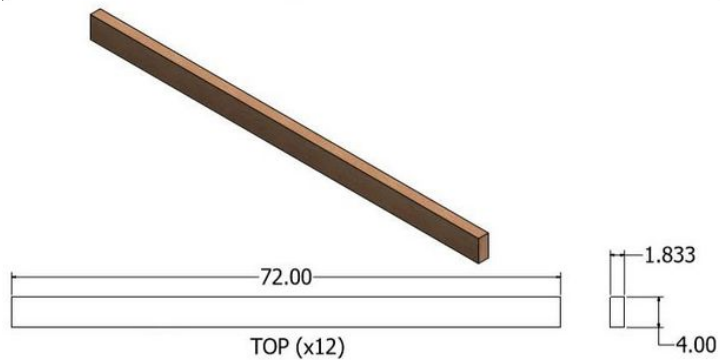
STEP 13: Drawing - Workbench Top

The bench top is the workhorse of the bench. There are many differing opinions on the appropriate material for bench tops. We chose soft maple as it's hard enough to work on but, soft enough to not damage most hardwood parts being built on the bench. All of the accessories designed into the bench top are all there to assist with material holding.



STEP 14: Drawing - Maple Boards

The desired depth for this top is 24". Since this top incorporates the split-top roubo style, each laminated section turned out to be 11" deep. Based on the available wood, this required six boards, each 1.833" thick.



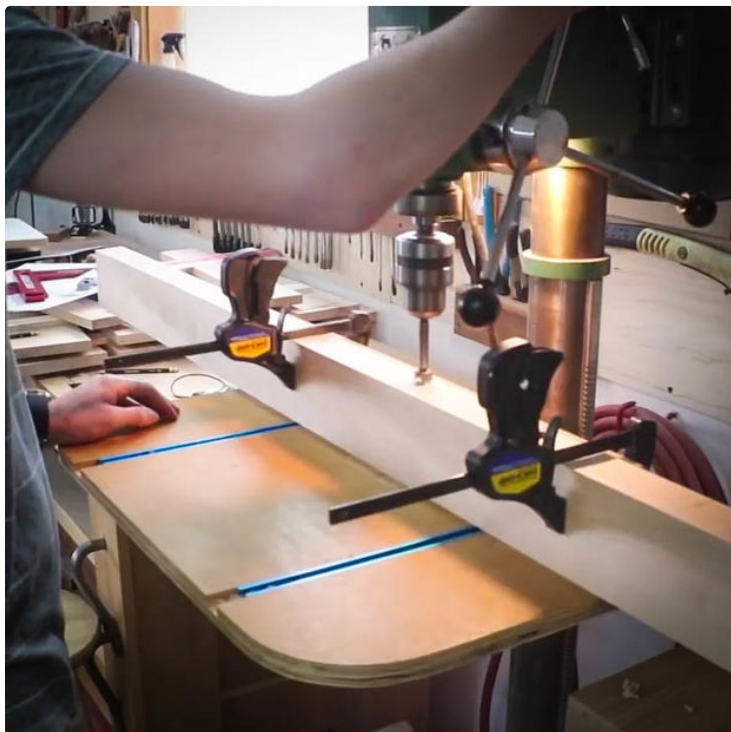
STEP 15: Top - Boards

The maple for the top was milled to final size using the joiner, planer, and table saw. It's important that the material is milled flat and square before the glue up.



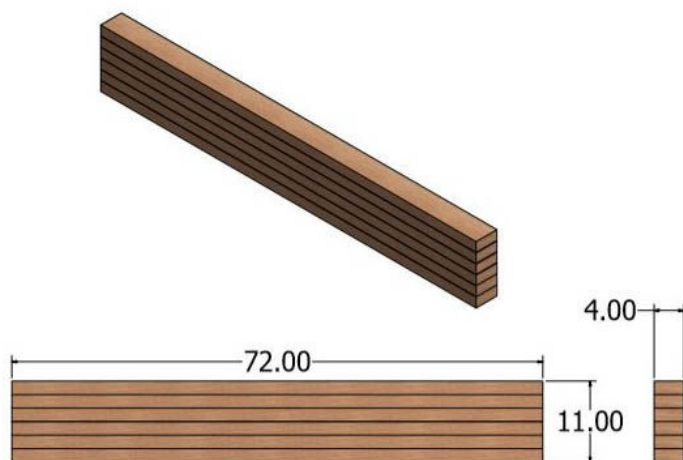
STEP 16: Top - Dog Holes

The dog holes were added to one of the boards on the table top. Refer to the drawing in Step 12 for size and locations.



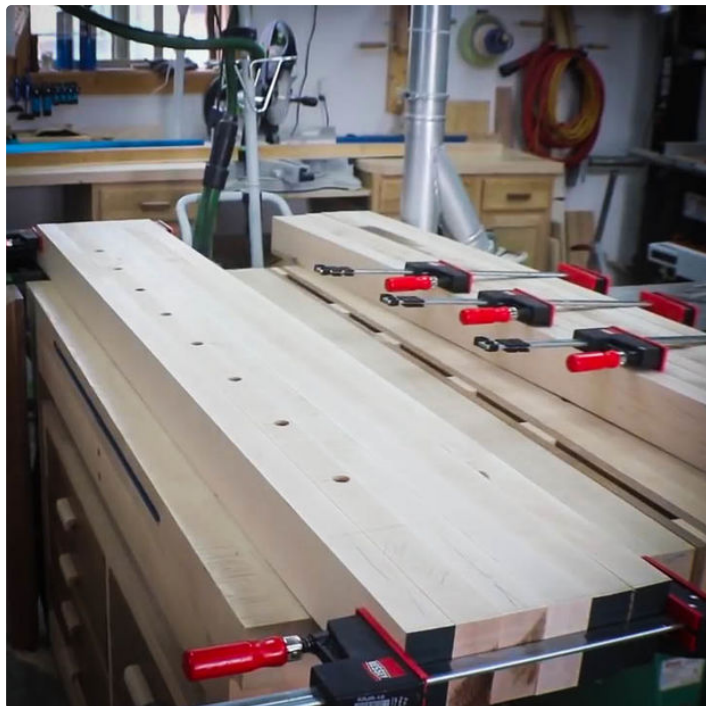
STEP 17: Drawing - Top Section

The two sections should be 72" long x 11" deep x 4" thick.



STEP 18: Top - Laminate

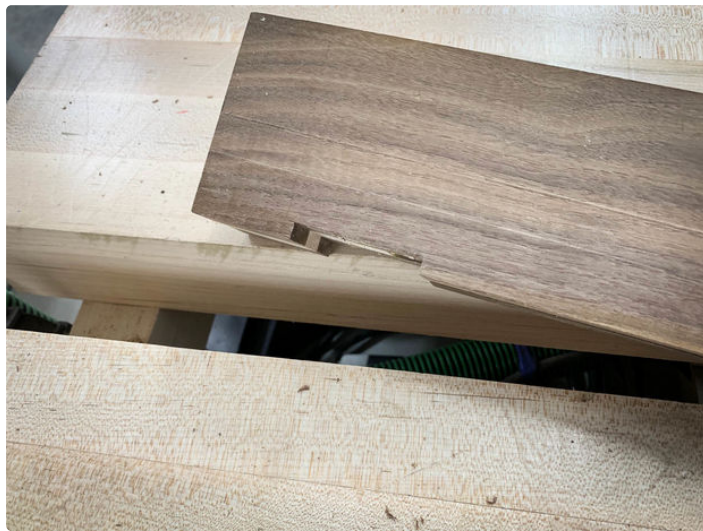
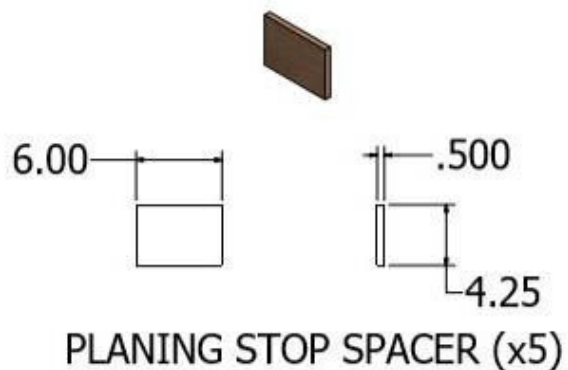
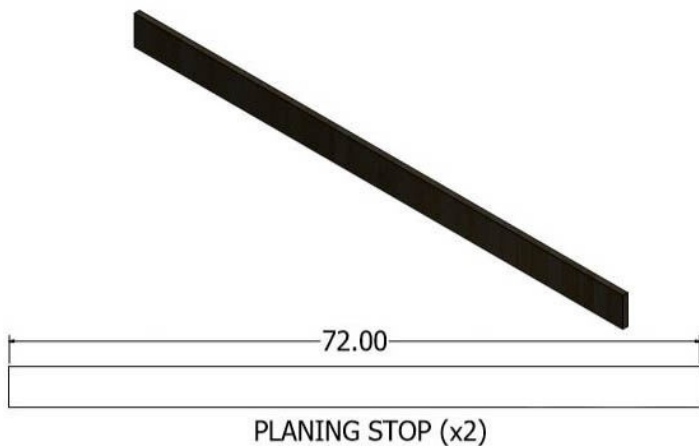
As shown in the previous step, six boards were laminated together for each half of the bench top. Once dried, each section was run through the planer to flatten the surfaces and achieve the final thickness. Don't be concerned if you fall below 4" thick, it's more important that each half is flat and the same thickness.



STEP 19: Drawing/Pictures - Split-Top Section

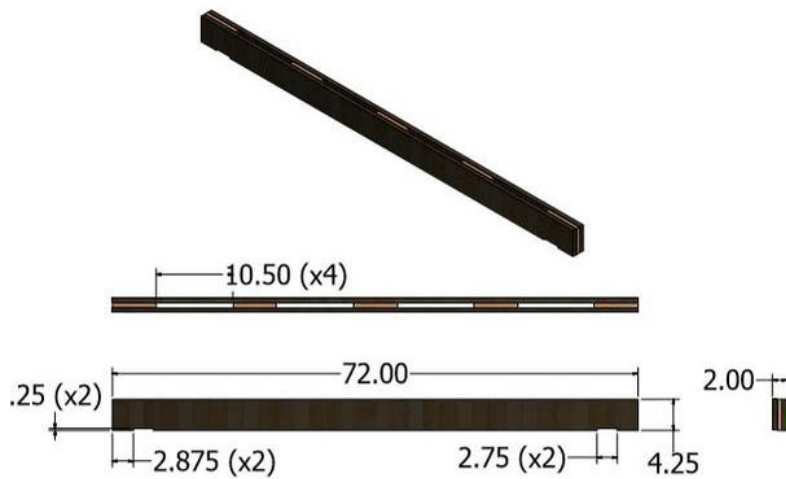
The planing stop is designed to protrude 1/4" above the main bench surface when needed. Note that that the drawing views are shown with it in the down position. We've included actual pictures showing the configurations.

The total thickness of the planer stop is 2". Refer to the drawing for sizes needed to build the stop. You will need two of the long boards and five spacers.



STEP 20: Split-Top Roubo Section

Glue the boards together per the drawing. We used pin nails but you could also just clamp until the glue dries.



STEP 21: Top - Assembly

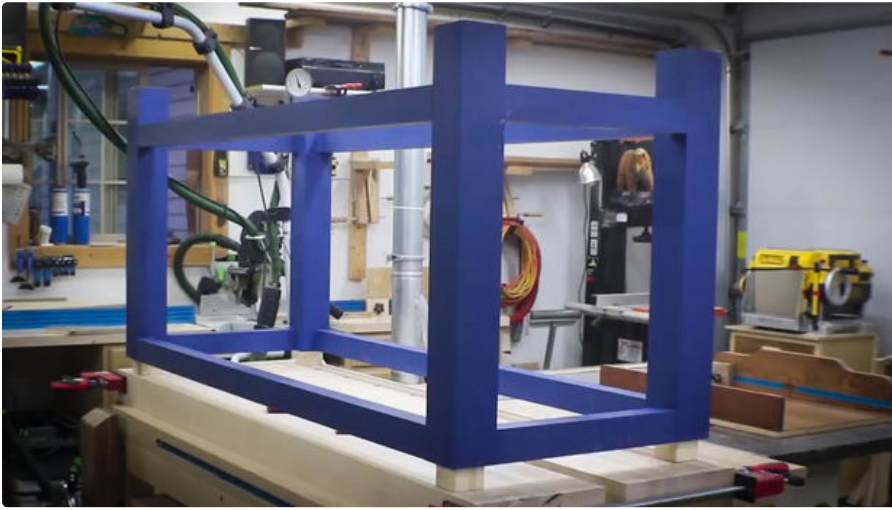
To cut the mortises in the top, turn the benchtop over, put the spacer in the middle, and temporarily clamp the assembly together. Turn the base over and set on the benchtop ensuring that it's centered. Mark the locations of the 4 leg tenons on the top.

A "One Time Use" jig was then created and clamped at each mortise location and a router with a pattern bit

was used in several passes to create the mortise.

At this point, you have mortises with rounded corners and tenons on the legs that are square. You have 2 options. You can either square the mortises using a chisel or, you can round the tenons on the legs to fit the mortises. We rounded the tenons for our build.





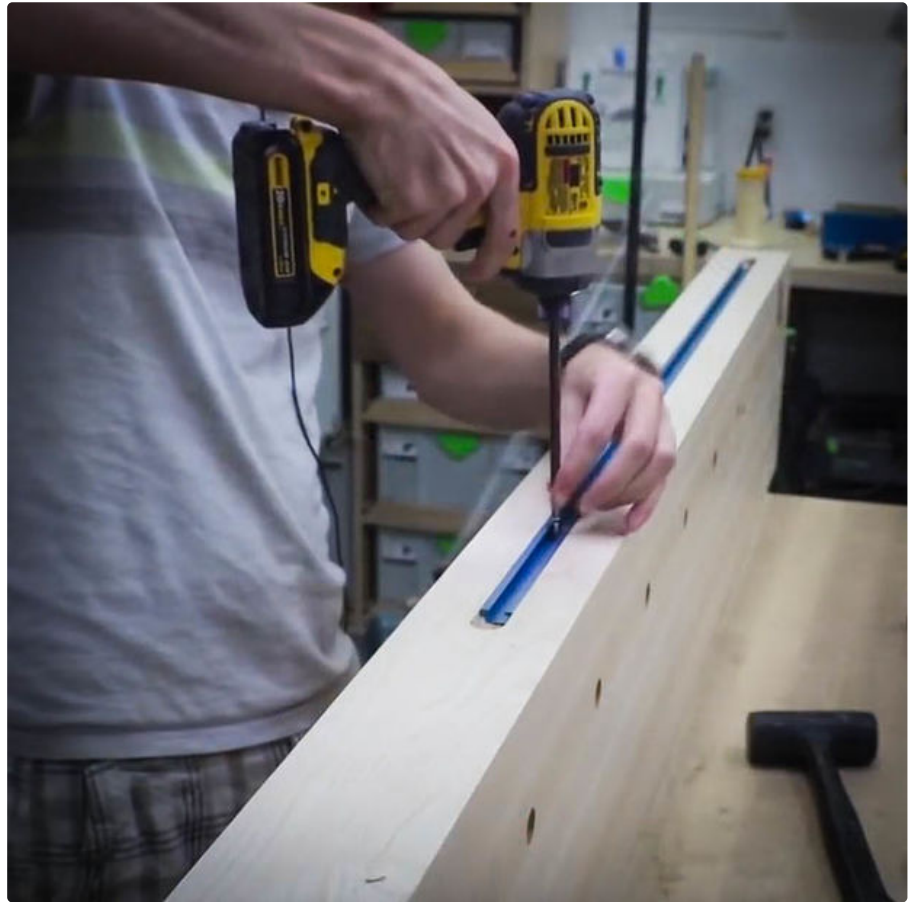
STEP 22: Drawing - Top (Exploded View)

For completeness, this step just the assembled and exploded view of the top.



STEP 23: T Track

Install the [T-Track](#) using a router and $\frac{3}{4}$ " router bit set at the thickness of the T-Track for final depth. Dual edge guides on the router ensure that the groove is cut perfectly straight. However, a single edge guide can be used on this step.



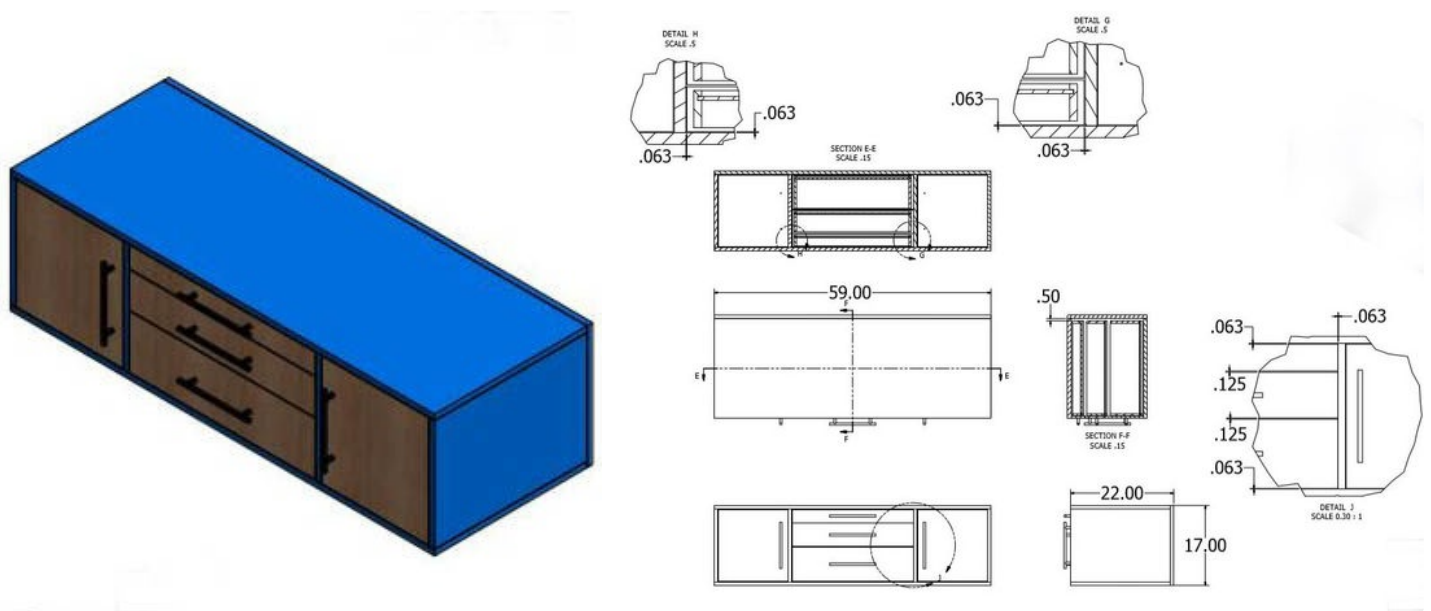
STEP 24: Ready for Storage Cabinet

At this point, everything should fit as expected. Verify the distance between the rails before starting on the storage cabinet. If the dimensions are off, adjust the cabinet dimensions accordingly.



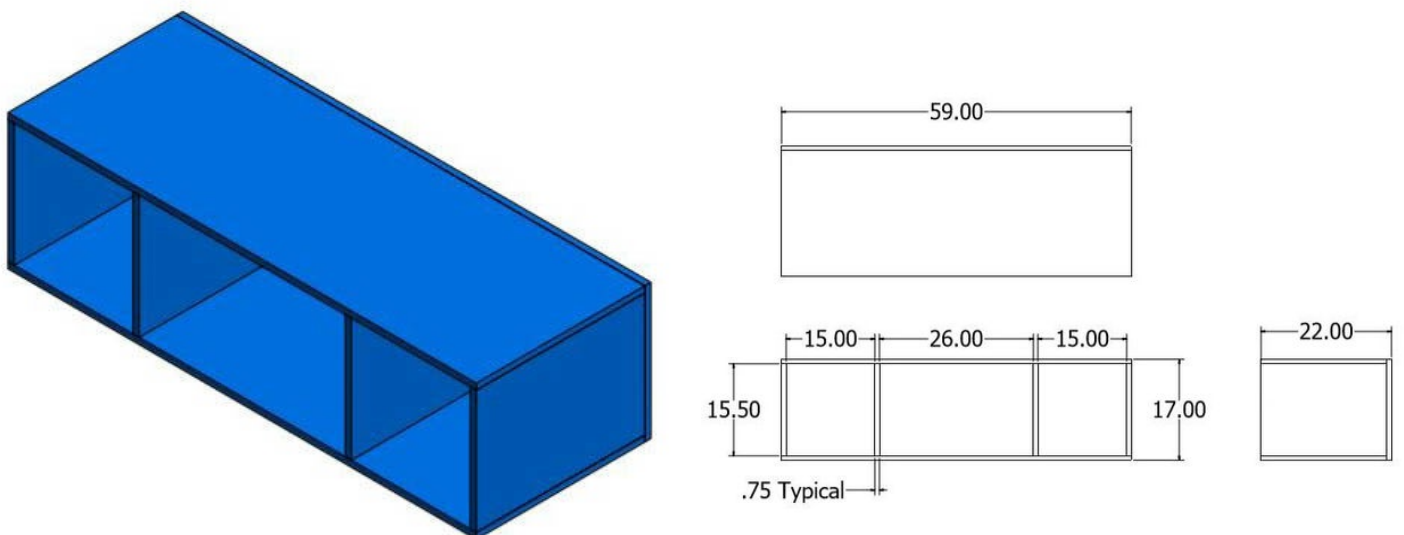
STEP 25: Drawing - Storage Cabinet

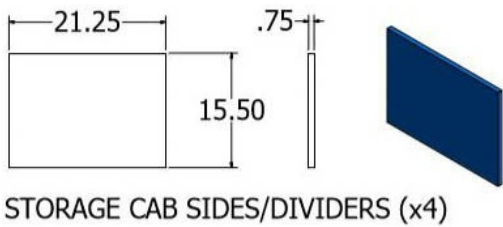
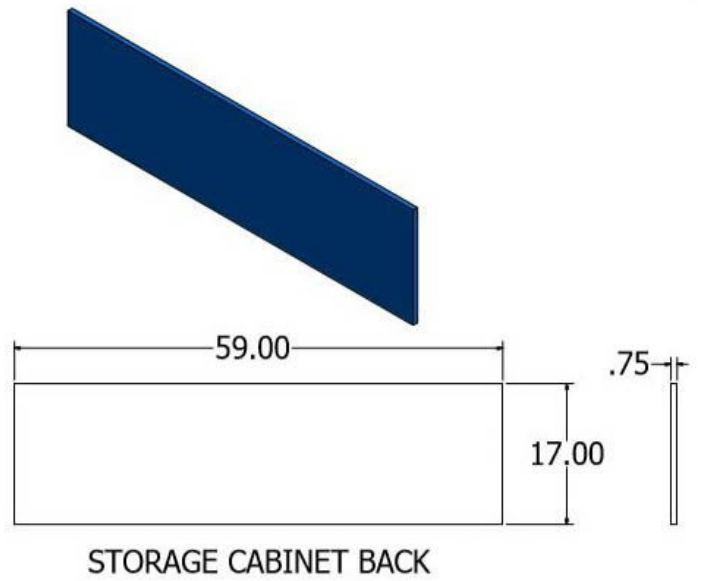
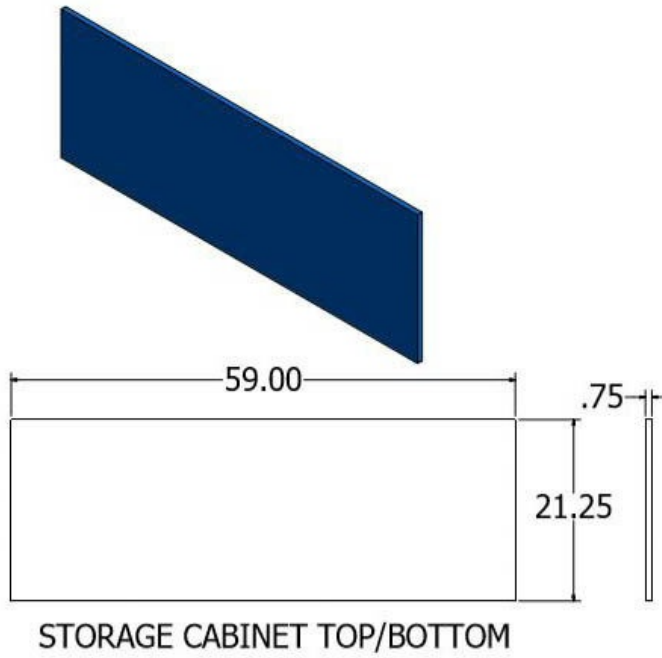
Build to the drawing. Remember to adjust the measurements based off of your bench (Relative Dimensioning).



STEP 26: Drawing - Storage Cabinet

The box is pretty straightforward. The material used is $\frac{3}{4}$ " Baltic Birch plywood.





Step 27: Storage Cabinet - Step 1

Cut the plywood to the sizes shown in the previous step.



Step 28: Storage Cabinet - Step 2

Glue and clamp the pieces together per the drawing. Pin nails can be used in place of clamps. Ensure that the box is square.



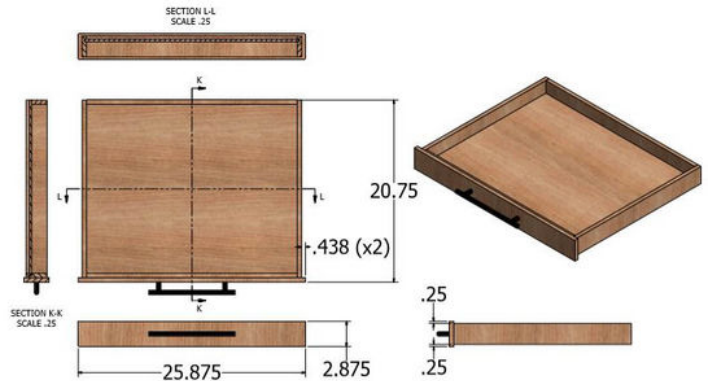
Step 29: Storage Cabinet - Step 3

The back was pin nailed into place.

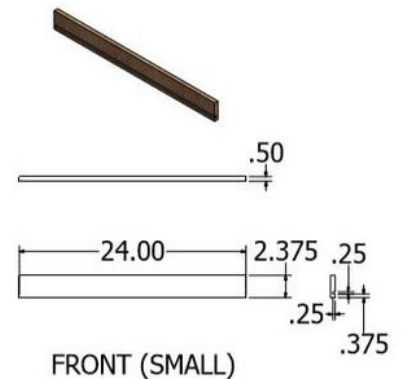
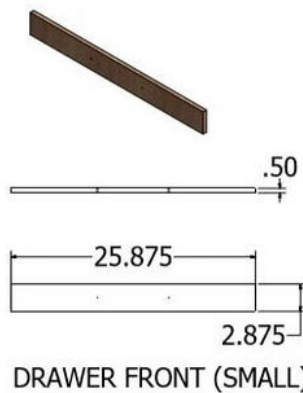
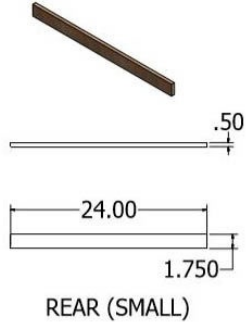
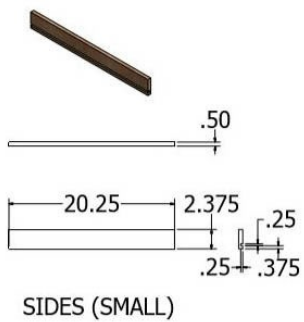


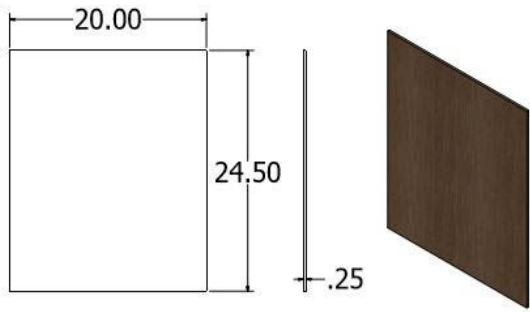
Step 30: Drawings - Drawers

There are three drawers in the storage cabinet labeled small, medium and large. The images shown in this step are for the small drawer. The medium and larger drawers are built in the same manner.



SMALL DRAWER
(SAME CONSTRUCTION FOR MED & LARGE DRAWERS)

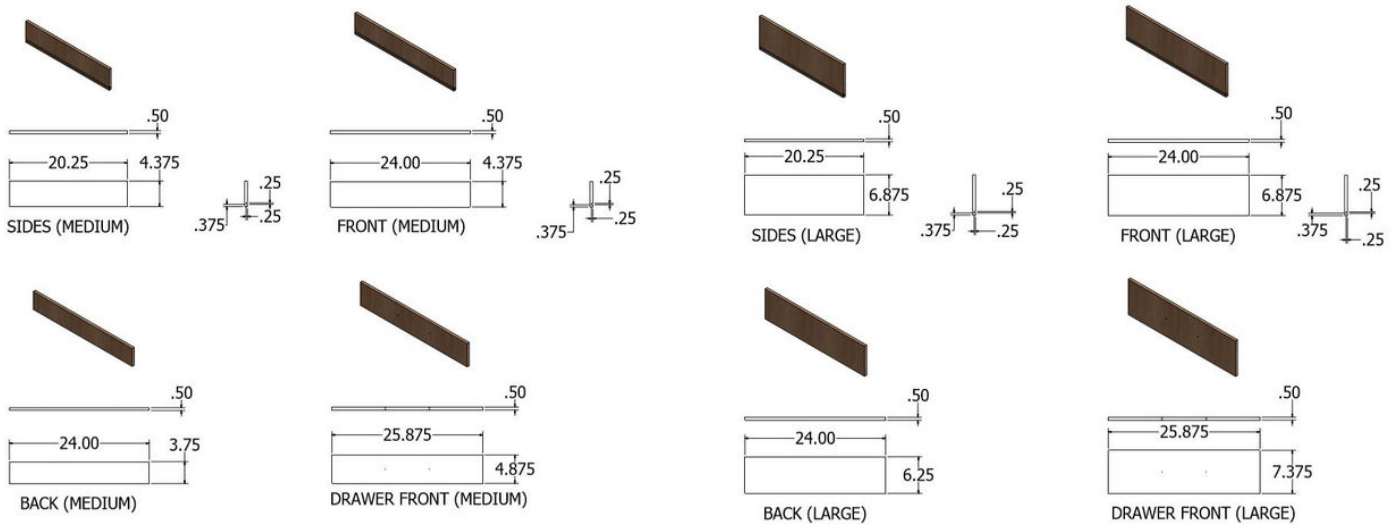




DRAWER BOTTOM
(COMMON FOR ALL DRAWERS)

Step 31: Drawings - Medium and Larger Drawers

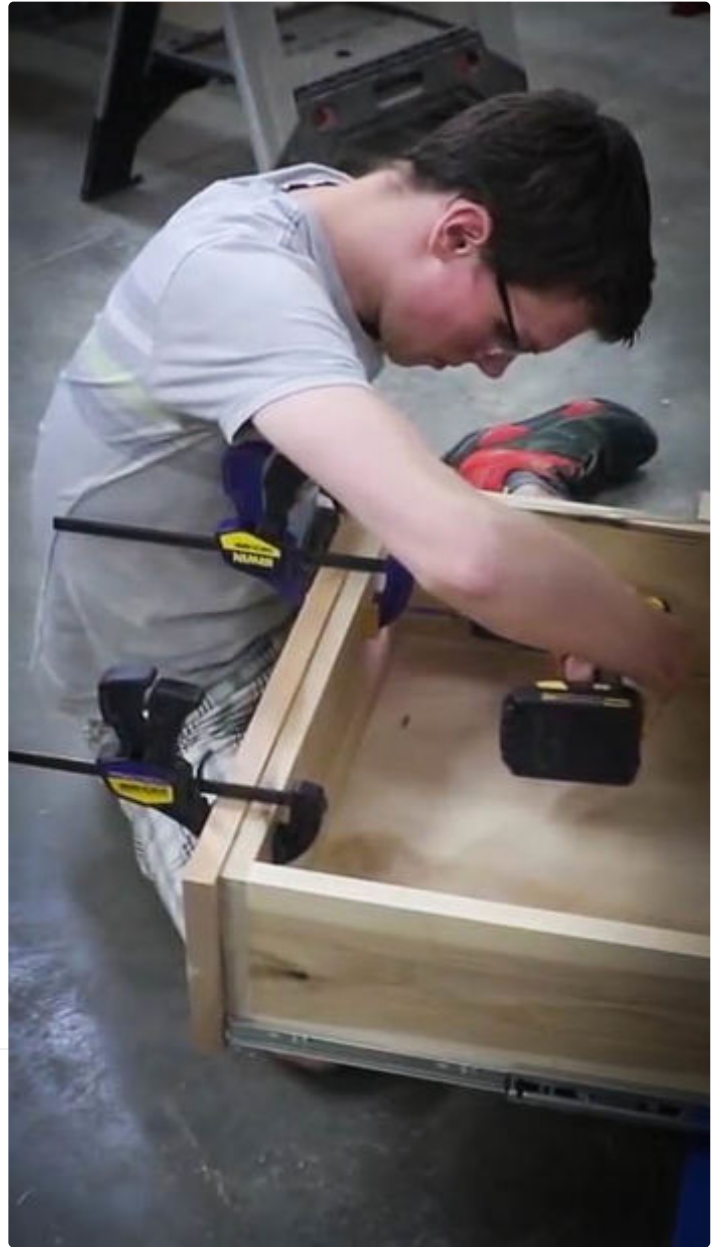
For completeness, the dimensions for the medium and large drawers are shown in this step.



Step 32: Drawer Build

Assemble the drawers per the exploded view. Note that the bottom isn't glued in since it is replaceable. Also, ensure that the width of each drawer box is exactly 1" less than the opening.

Step 33: Drawer Build - Images





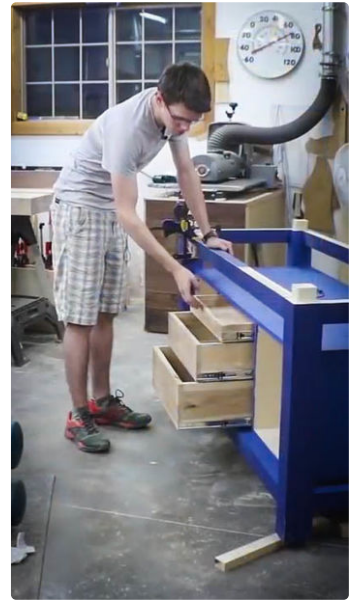
Step 34: Drawer Slides

Full extension 100# glides were used for the drawers. Install per the drawing ensuring that you have even and consistent gaps between each drawer.



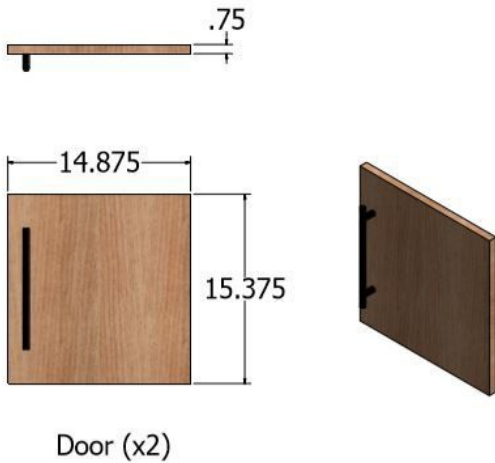
Step 35: Drawer - Final

Install the drawer fronts per the drawing. Using 1/16" thick shims on the bottom and each side of the drawer front, you will ensure that you have an even consistent gap all around the drawer front. Use the pull holes to temporarily attach the drawer front until you can remove the drawer and install screws from the inside of the drawer. Then, remove the screws from the pull holes and install the drawer pull.



Step 36: Drawing - Door

Solid wood boards were laminated together to create a panel large enough to be used for the doors. Using the measurements from your bench, cut the panel 1/8" smaller than the opening to ensure a 1/16" gap all the way around the door. The 1/16" shims used on the drawer fronts work well for locating the doors.



Step 37: Door Build

Butt-style hinges were used to attach the doors to the case. Use a router to cut a mortise in both door locations as well as the case locations to ensure that the hinges sit flush and don't interfere with the functionality of the door.



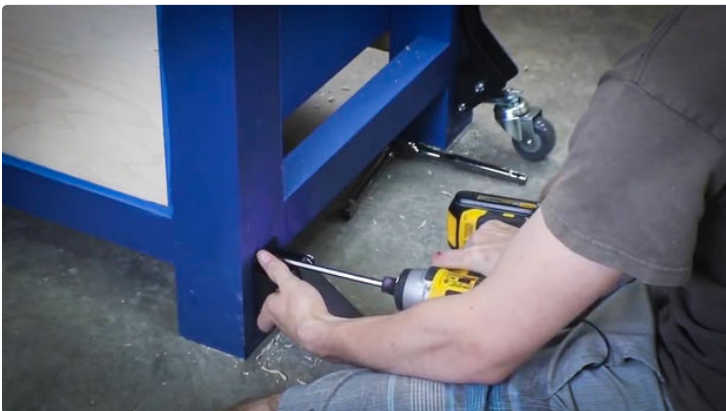
Step 38: Door Magnets

Small blocks at the top of each opening were added to act as stops. Rare earth magnets were installed inside the blocks and doors to help keep the doors shut.



Step 39: Casters

Casters were added to allow the bench to be moved around the shop. These are produced by [Rockler](#). Follow the manufacturer's instructions for installation.



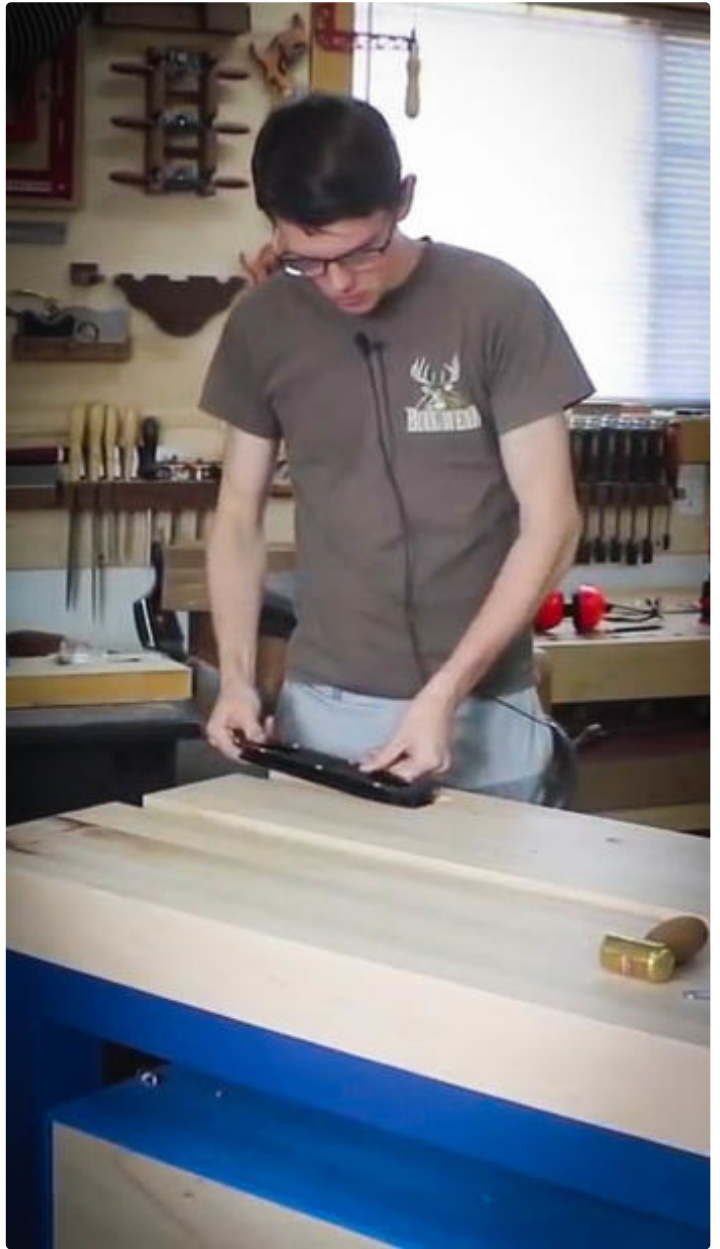
Step 40: Front Vise

The vises used on our bench were both from Lee Valley. The front rail is the inner jaw and an additional outer jaw was added per the manufacturer's instructions. The outer jaw was cut flush with the bench top.



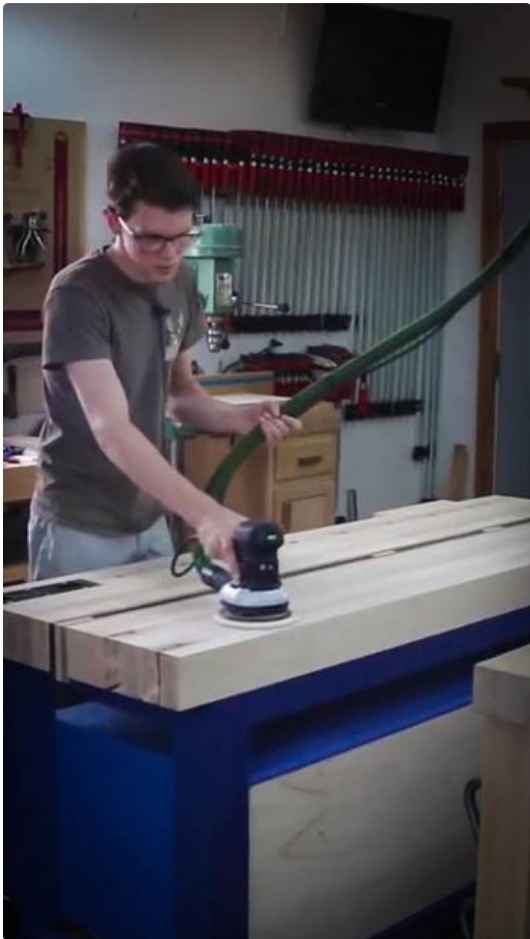
Step 41: Inset Vise

The inset vise allows for an adjustable dog right where it's needed. Follow the manufacturer's instructions for the installation of the vises that you choose to use.



Step 42: Final Touches

The top was sanded progressing through grits 80, 120, and 180. Once the sanding was complete, we applied a coat of water-based polyurethane to the top for protection. Any finish will work and shop furniture is a great place to either use up some leftover finish or try a new finishing technique.



Step 43: Parts List / Cost

The total cost for the bench was \$1438.00. As you can see from the cost breakdown, most of the cost is the lumber. Your bench cost will be altered based on your local lumber prices. You could certainly use less expensive lumber to build your bench. The only downside to that decision is that you may not get the amount of life out of that top that you do by going with the maple.

Lumber				
	Cost	Where	Detail	Notes
Poplar (Base)	\$141.20	Local	\$3.53 per BF (40 BF)	
Maple (Top)	\$520.60	Local	\$6.85 per BF (76 BF)	Bought an extra 10 BF
BB Ply (Case)	\$150.00	Local	\$50.00 Per Sheet (BB)	1/4" for drawer bot and backer on case - 2 ea 3/4" for the case
Birch (Drawer Boxes)	\$50.00	Local	\$2.50 per BF (20 BF)	1/2" BB Ply would work well for this
Cherry (Drawer/Door Fronts)	\$81.61	Local	\$3.89 per BF (21 BF)	Sold as "Rustic Cherry"
Walnut (Tool Tray)	\$27.96	Local	\$6.99 per BF (4 BF)	Sold as "Rustic Walnut"

Hardware/Supplies				
	Cost	Where	Detail	Notes
Drawer Glides	\$33.75	Amazon	3 Sets	
Milk Paint	\$29.07	Amazon	1 Quart	
Veritas Inset Tail Vise	\$98.00	Lee Valley		
Pivoting Jaw	\$12.95	Lee Valley		For the Inset Tail Vise
Low Profile Jaw	\$15.50	Lee Valley		For the Inset Tail Vise
Veritas Regular Front Vise	\$65.00	Lee Valley		
Veritas Vise Handle	\$8.95	Lee Valley		For the Front Vise
Shipping Costs	\$13.95	Lee Valley		Shipping for all the Lee Valley items
Casters	\$79.99	Rockler		
T-Track	\$29.99	Rockler	1 each 4' section	
Mini Hold Down Clamps	\$15.98	Rockler	2 each	For use with the T-Track
Shipping Costs	\$14.99	Rockler		Shipping for all the Rockler items
Door Hinges	\$5.88	Lowes	4 each	3" narrow
Drawer/Door Pulls	\$29.10	Lowes	5 each	
Spax Screws	\$13.52	Lowes	8 each	5/16" X 4" long
Total:	\$1,438			

Step 44: Finished Pictures

The bench is now located in an unheated space in Eastern Washington where there are great seasonal temperature and humidity swings. So far, it's gone through most of one summer and nearly all winter and held up well.





Step 45: Final Thoughts / Improvements

The entire build took us 4 very long days and I would highly suggest spending more time building this bench! We're super happy with how the bench turned out and also super happy to have the ability to put some nice upgrades on this bench as a college student's budget allows.

This bench is designed to grow with a woodworker as their skills and needs change. You could easily add the [Benchcrafted hardware](#), a [Veritas twin screw vise](#),

or even a Nicholson style apron and Crochet on the backside to get even more functionality out of the bench without starting from scratch.

With proper care, this bench should last a woodworker forever and really stand up to just about any task thrown at it! We hope you enjoyed the build.