

Building a Custom Desk

Showing what you can let yourself in for – if you're not careful

Where did the project come from?

Over the past few years, I built a set of dining table and chairs for my older son.

My younger son moved house last year and the place is pretty empty, so I figured it was time to build something for him.

So, I casually asked what he wanted – thinking that a coffee table or something would not be too difficult

Instead, he said “My desk is getting a bit wobbly and I could use a new one”

The existing desk was a metal and glass corner affair that had been assembled and disassembled a few too many times, so the replacement was also going to be a corner unit.

So far, so good -- but then it got interesting

The Starting Point

“I had this idea about the legs, but I don’t know if you could build it”



This is a logo used by the DJ who calls himself Excision

The challenge was how to build this into a piece of furniture

The legs would have to be solid wood, obviously, which meant that the dark ‘lines and arrow’ design would have to be inlaid.

Inlay was something I had never done

But there's more --

“If you could work this into the top somehow, that would be really neat”



This is a logo used on an album by the K-pop group Dream Catcher

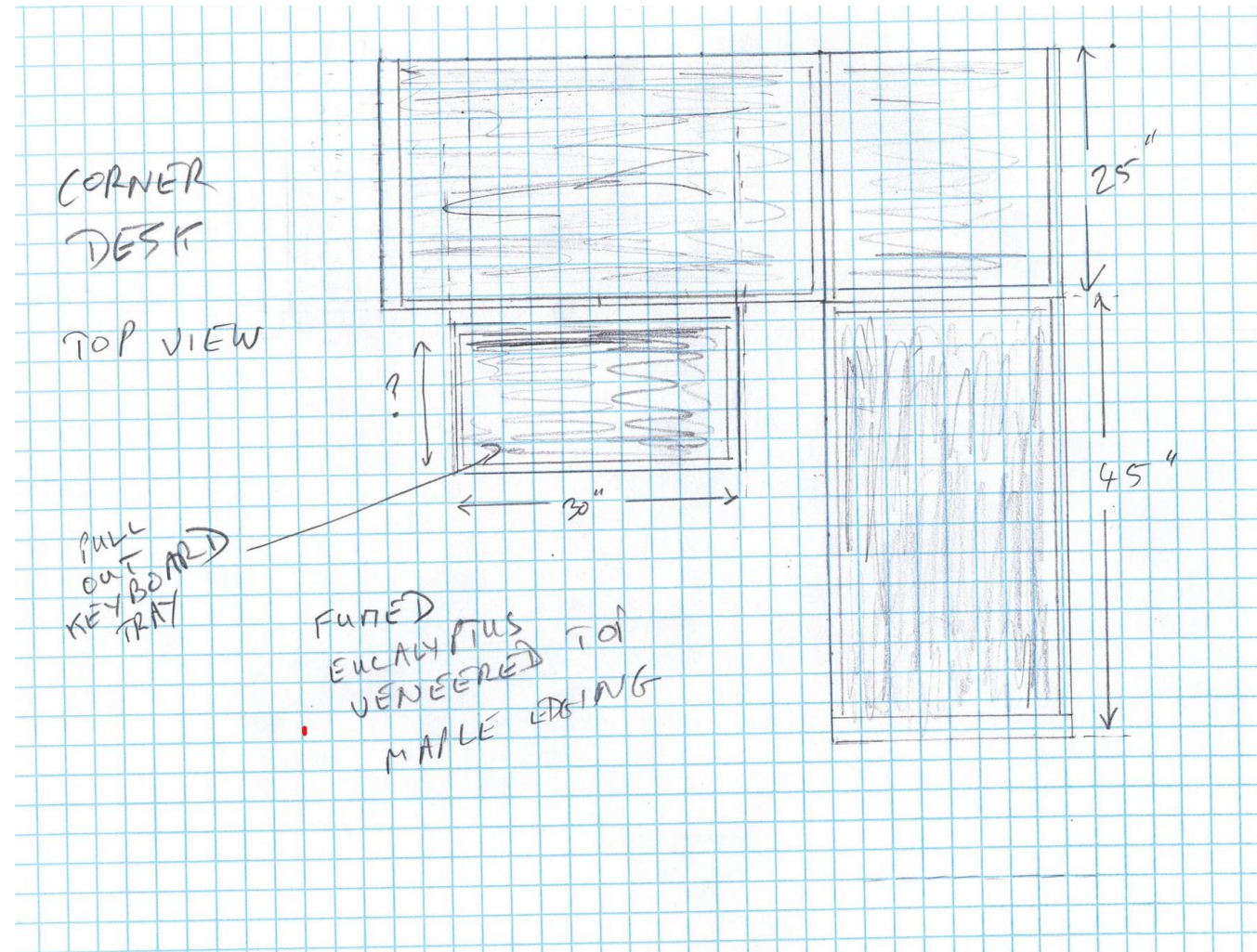
I wasn't too worried about this. It would be marquetry and I have done similar things before.

Choosing the Woods

- The Excision logo is black on white, and the Dream Catcher logo is light on dark, so it was pretty clear from the start that we needed one dark and one light wood
- Maple was an easy choice for the light color
- The dark color was more of a challenge. To work to best advantage, it needed to be as dark as possible. Almost all of the dark wood needed for the project was veneer, so only a little bit of dark solid lumber required.
- VeneerSupplies.com is my go-to source for veneers
- We opted for fumed eucalyptus and chose the darkest lot they had



Basic Sizing – Top View



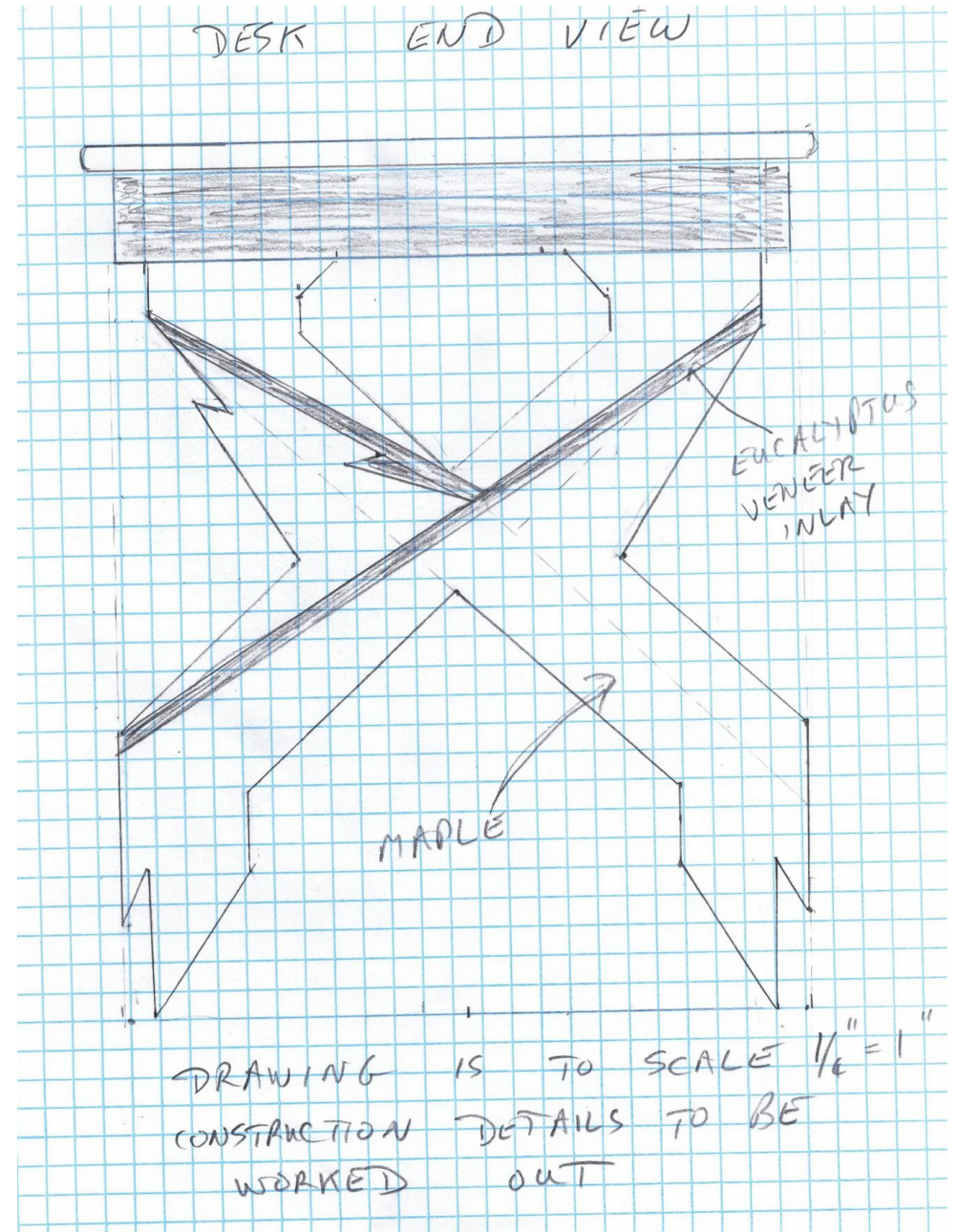
Can the logo work as a leg design?

With the width and height of the finished desk decided, I drew a scale version of the Excision logo and it pretty much fit the necessary height and width for the legs of the desk without any distortion.

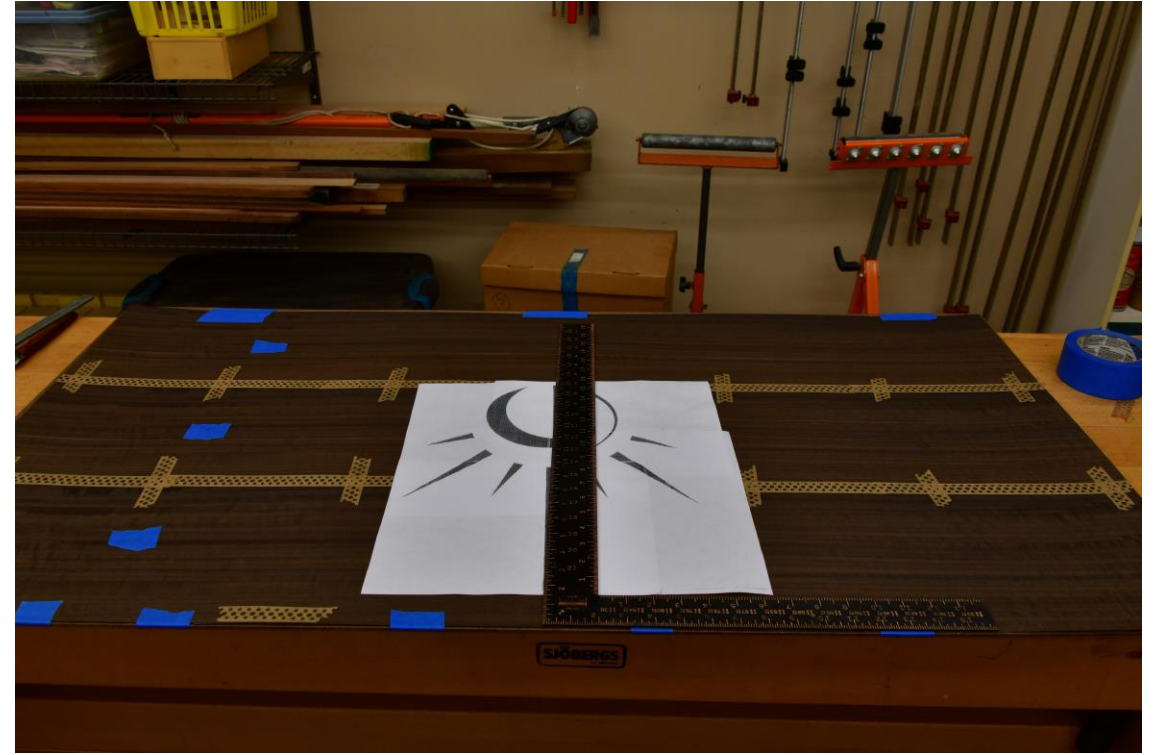
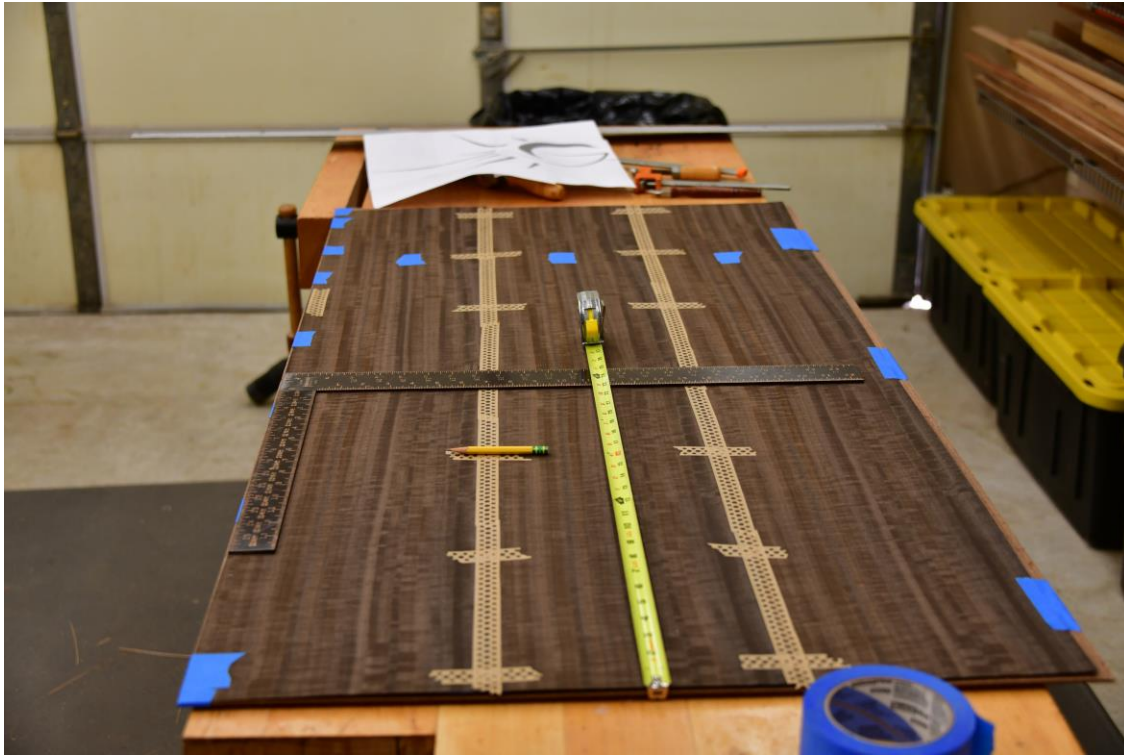
At this stage, I still hadn't figured out how to actually build it, but I had decided the sizing was OK

I also hadn't figured out how to attach the legs to the top

Normally, I try to solve all those issues before starting a build, but the odd shapes made it difficult (at least for me) to figure all that out from drawings, so I decided to build the tops and then deal with the legs later.



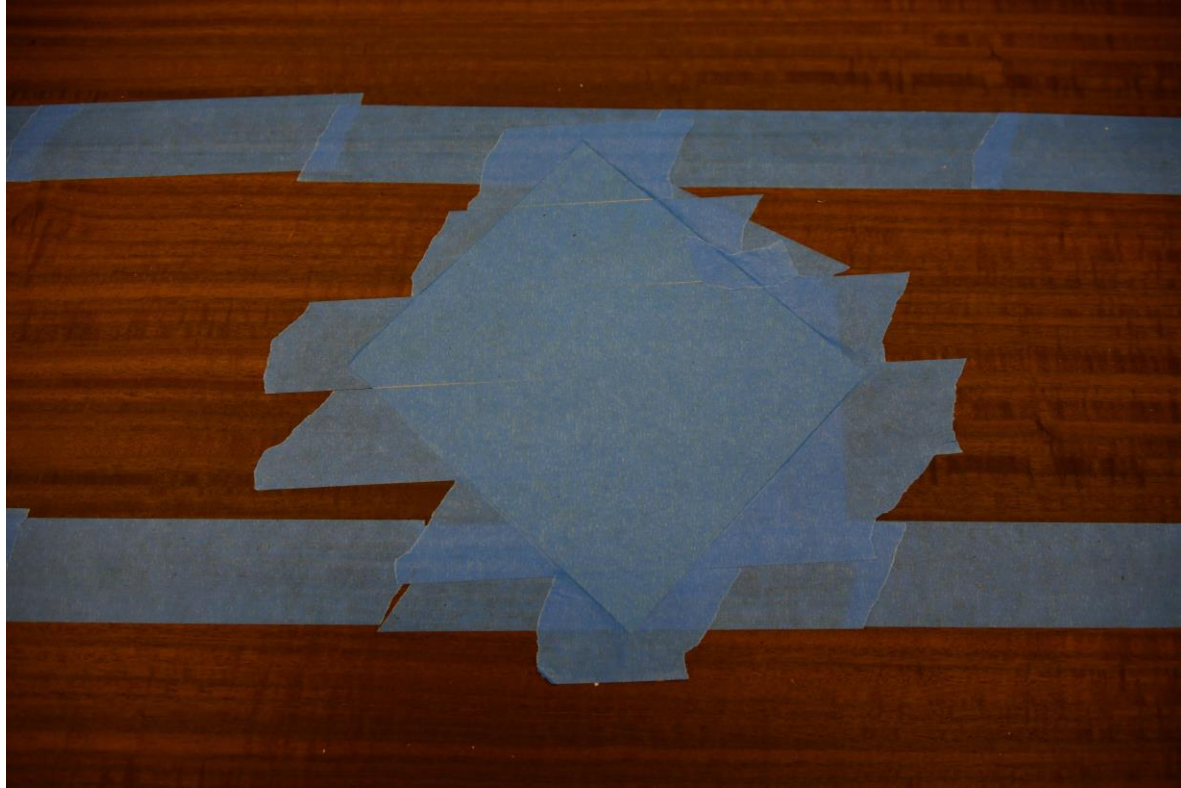
Making the Veneer Panels



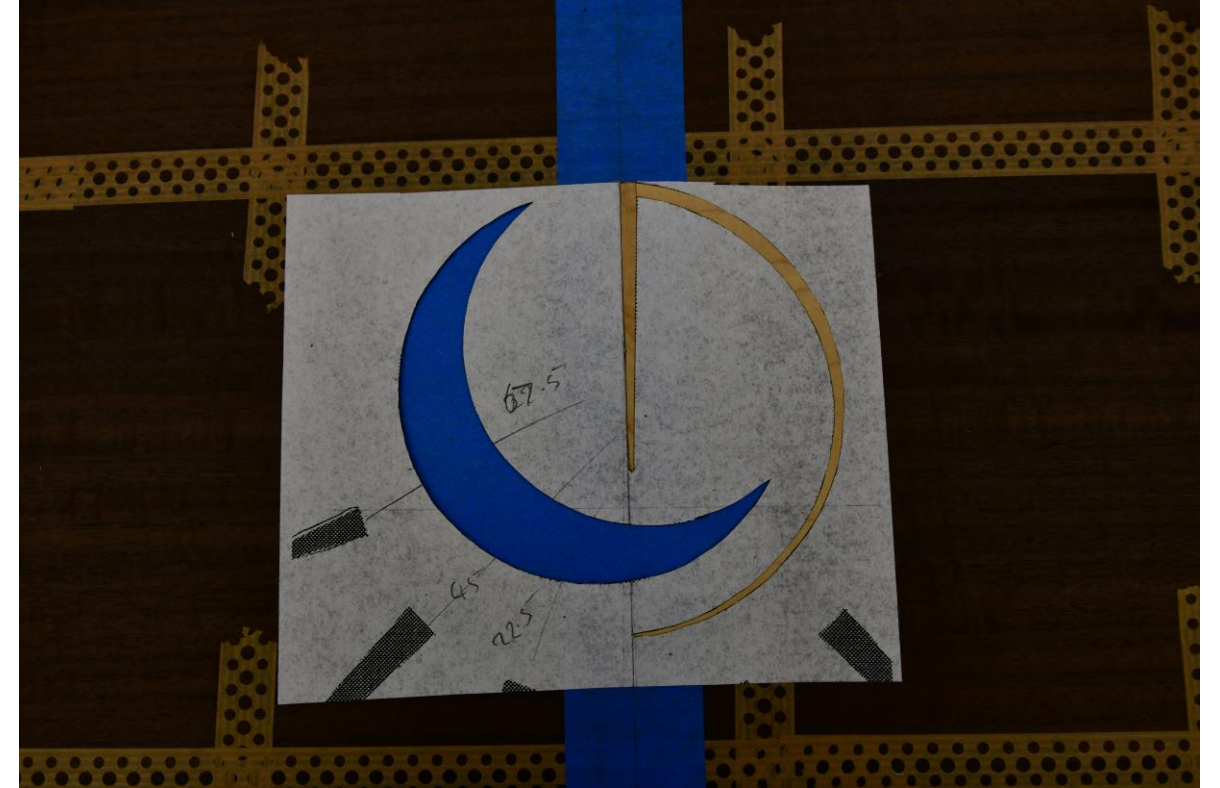
Start by taping three pieces of Eucalyptus veneer together to make the background
Print and enlarge the logo design to the desired size, position on the background and stick down with temporary adhesive.
Note that the panel is slightly wider than the bench, so it is taped to a piece of Masonite to provide stability

Steps for Cutting Design into Background Veneer

- Use blue tape on the back of the panel to minimize tear out
- The paper template glued on the front protects the front face from tear out
- Cut the first element of the design into the background panel
- Rough cut a piece of maple veneer slightly larger than required for the inlay
- Cover both sides of the inlay piece with blue tape
- Turn background panel over
- Position the inlay behind the cutout in the panel and tape in place
- Turn panel face side up and use a marking knife to outline the shape. Continue cutting until the background piece is almost completely cut through
- Remove inlay piece from the back and finish cutting it free
- Push piece into place from the back, trimming to fit as needed
- Turn panel over and see how well you did



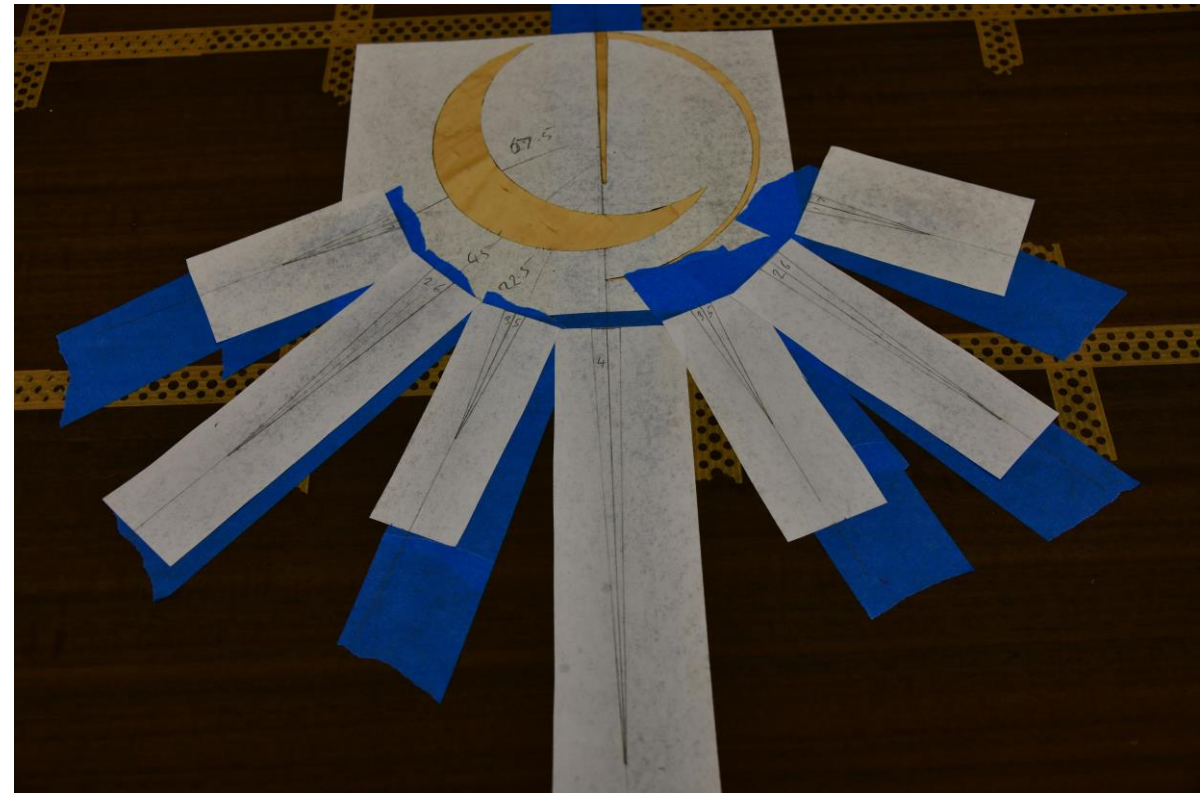
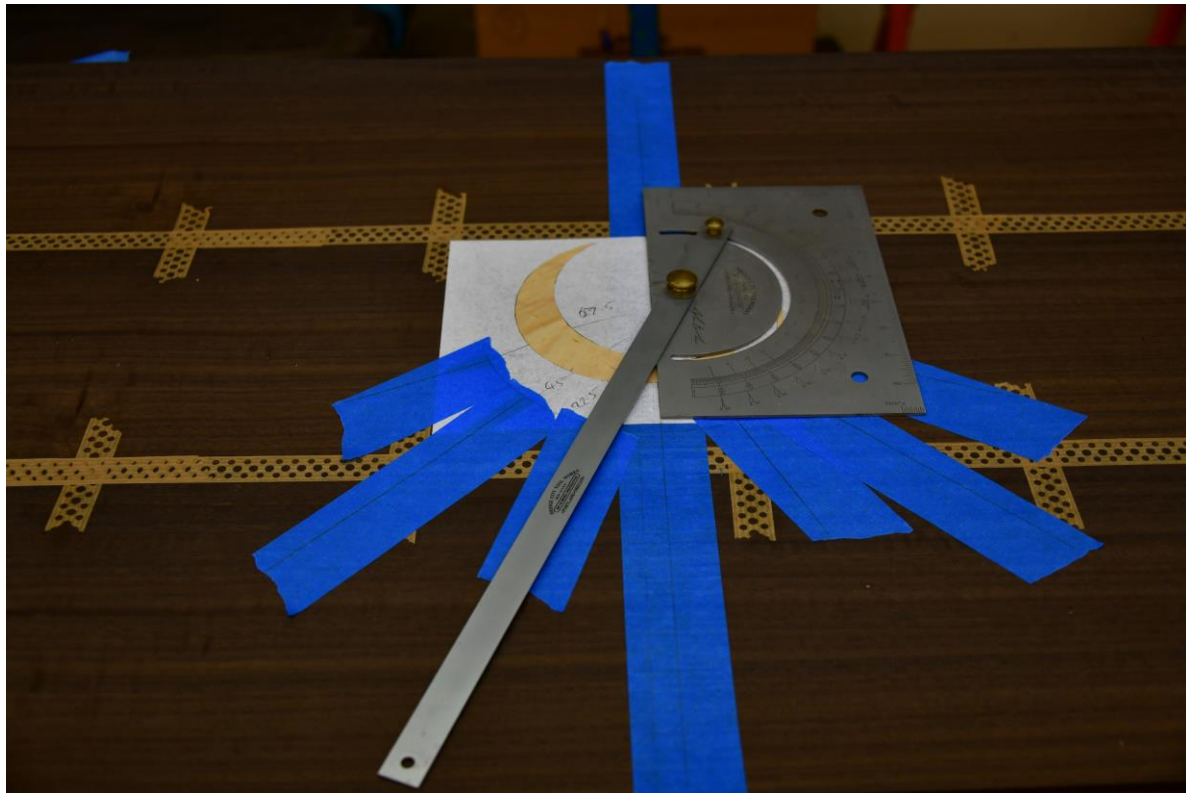
Back of panel. Note blue tape over whole area to protect against tearout. Inlay piece is taped on both sides.



Front of panel before cutting the inlay piece. Note that I made the most difficult inlay piece (the curve of the 'D') first, reasoning that if I got that OK, the rest would be fine.

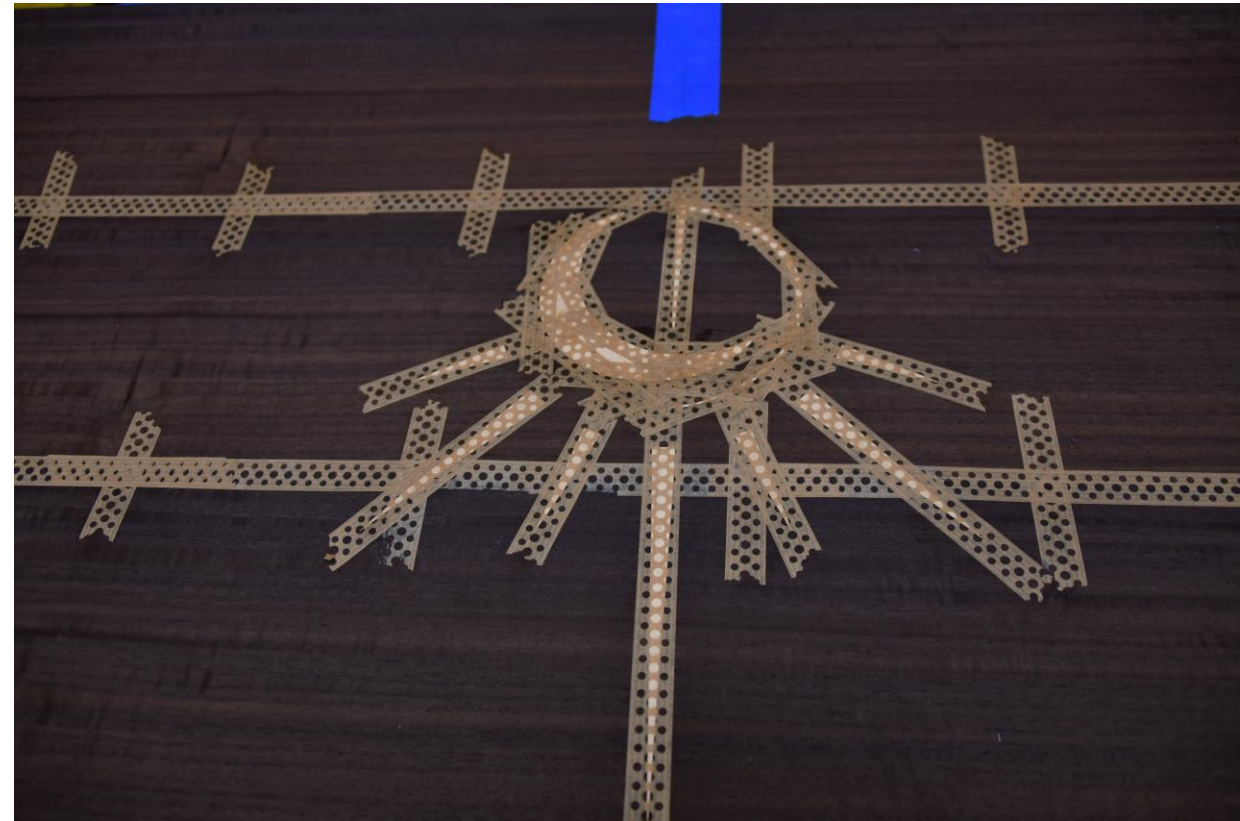
Positioning the Rest of The Design

At this point, I realized that the sizes and position of the 'star points' on the template were not very accurate, so I broke out the protractor and laid them out correctly on the background



The Finished Inlay

All joints are taped so that the panel can be handled as a single piece. Until the panel goes into the vacuum press, the blue tape stays on the back to maximize protection.



The Veneered Panel

Here is the panel after it came out of the vacuum bag and the tape was removed.



Maple Edging

- Next step was to cut the panels to finished size and attach the edging. I used ½" strips of solid maple.
- This is the corner panel. Note the cut-off corner at the back to allow for cable pass through. It's a lot easier to make this look good than if you than make holes in the top.
- You can also see the backing veneer in this picture. I used beech because it was the cheapest.



The Aprons

- Aprons were veneered like the tops but pressed separately from the tops themselves. This allowed for consistency of grain patterns on the aprons.
- Bottom of the aprons was edged with $\frac{1}{4}$ " thick maple strips
- Corners where aprons join are $\frac{3}{4}$ ' square maple



Non Keyboard Side

- For the non keyboard side of the desk, the aprons were glued together first and then attached to the top as a unit. All joints are butt joints.



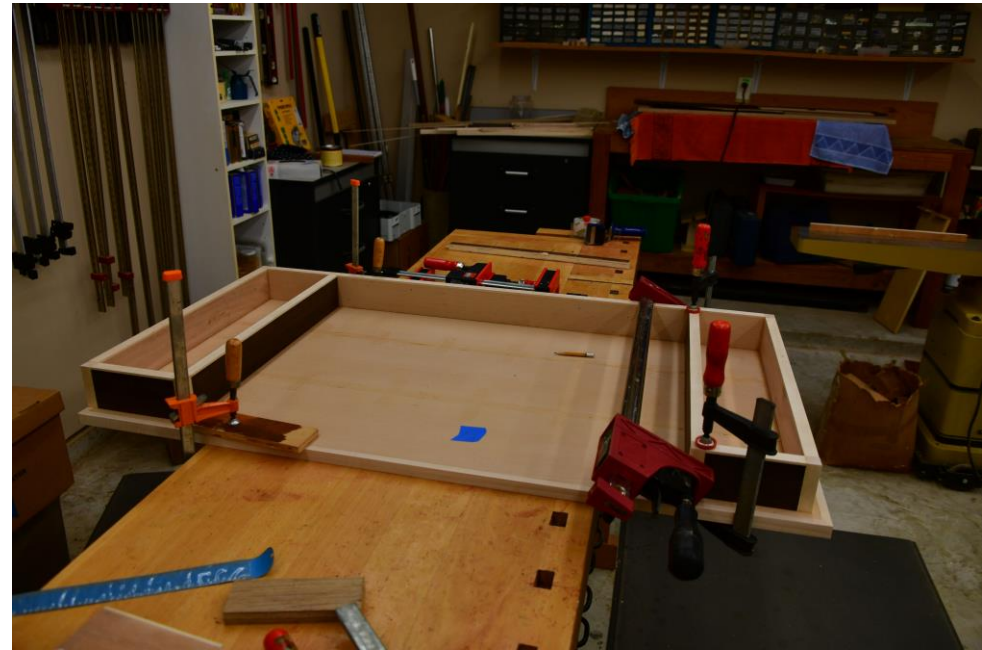
Keyboard Side (1)

- Glue-up for the keyboard side was more complex. Started by gluing the side apron to the top at the end where it joins the corner.
- Chose this because the apron is flush to the end of the top at that point, which makes positioning much easier.
- Subsequent sections of the aprons were added one piece at a time



Keyboard Side (2)

- Final stage of glue up
- At this point, I also test fitted the keyboard slide
- I was not happy screwing directly into the plywood top, so I added a $\frac{1}{4}$ " piece of oak (it was lying around) to allow for a more solid screw hold.



Solving the Problem of How to Build the End Legs

A redrawing of the end legs, but this time marking the actual pieces to be made

The starting point is the two A pieces, which will be joined at 90° using a half lap joint

Add pieces C, using dowels to strengthen the end grain to side grain joint. Dowels are used on all end to side joints

Then add pieces D, taper pieces E and glue right hand piece E. This establishes the base for the inlay.

Inlay the design

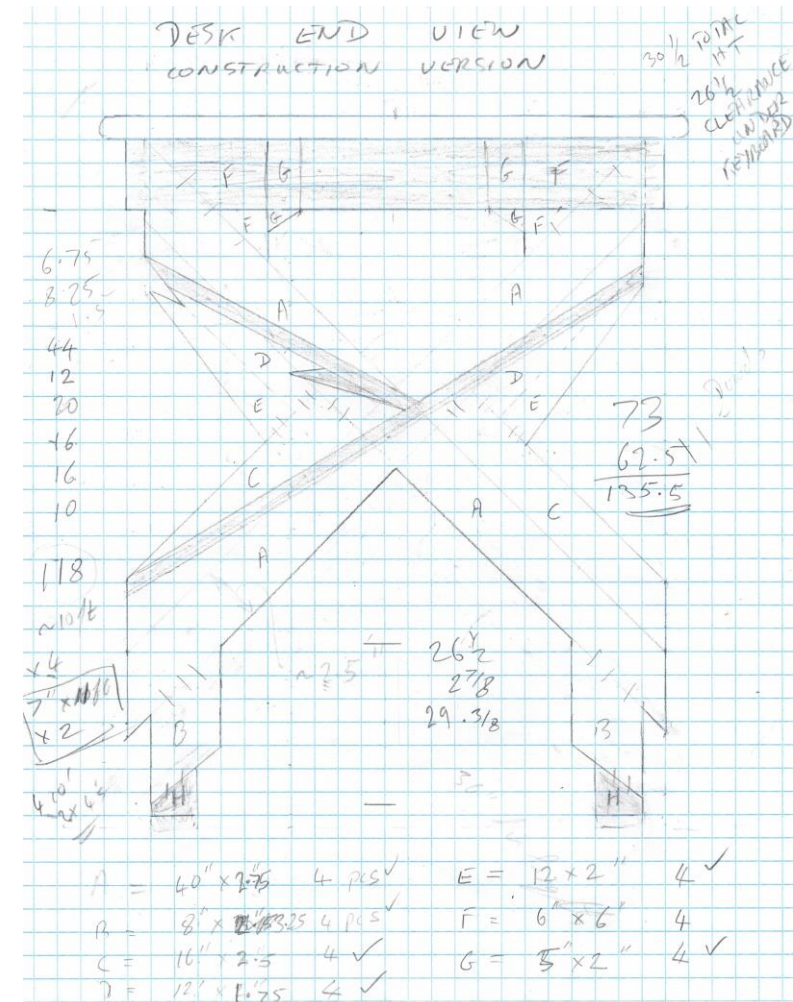
Cut top and bottom to finished width

Cut angles on outside of RH piece D and E and glue RH piece E

Join G and F to each other, then attach to A

Finally, add B and H to make the feet on which the whole thing rests, and glue to A

In addition to the two 'real' leg sections, two practice pieces were made out of scrap lumber, so all setups could be checked at full scale before committing to final cuts



Each End Section is Unique

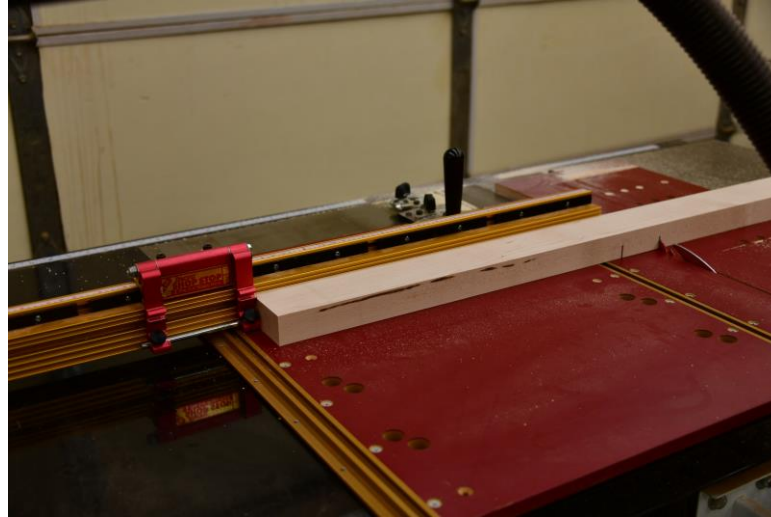
- The ends obviously have a top and a bottom, but, because of the shape of the logo-based design, there is also a left hand and a right hand version
- To keep track of this during construction, each piece of milled lumber was marked to indicate the front/back and top/bottom based on its intended position in the finished leg section
- Wood is 8/4 maple



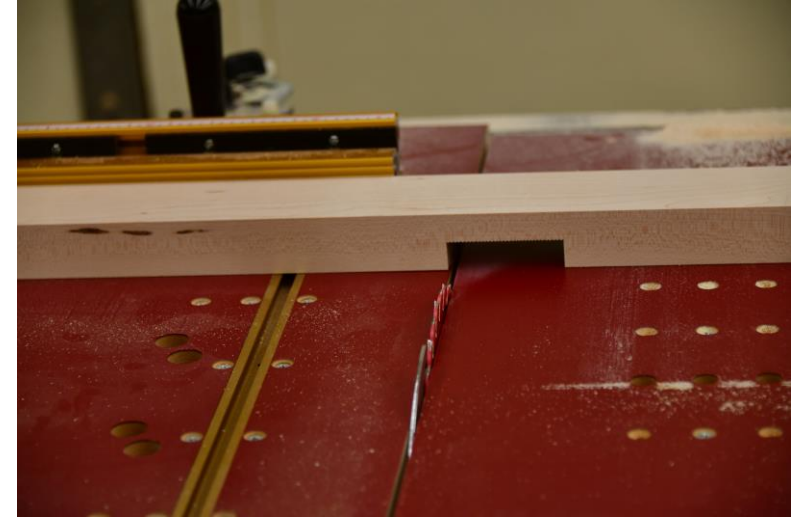
Half Lap Joint Starts Things Off



A stop block clamped to the miter fence positions the stock for the first cut. The distance between this stop block and the adjustable stop on the fence sets the width of the half lap.

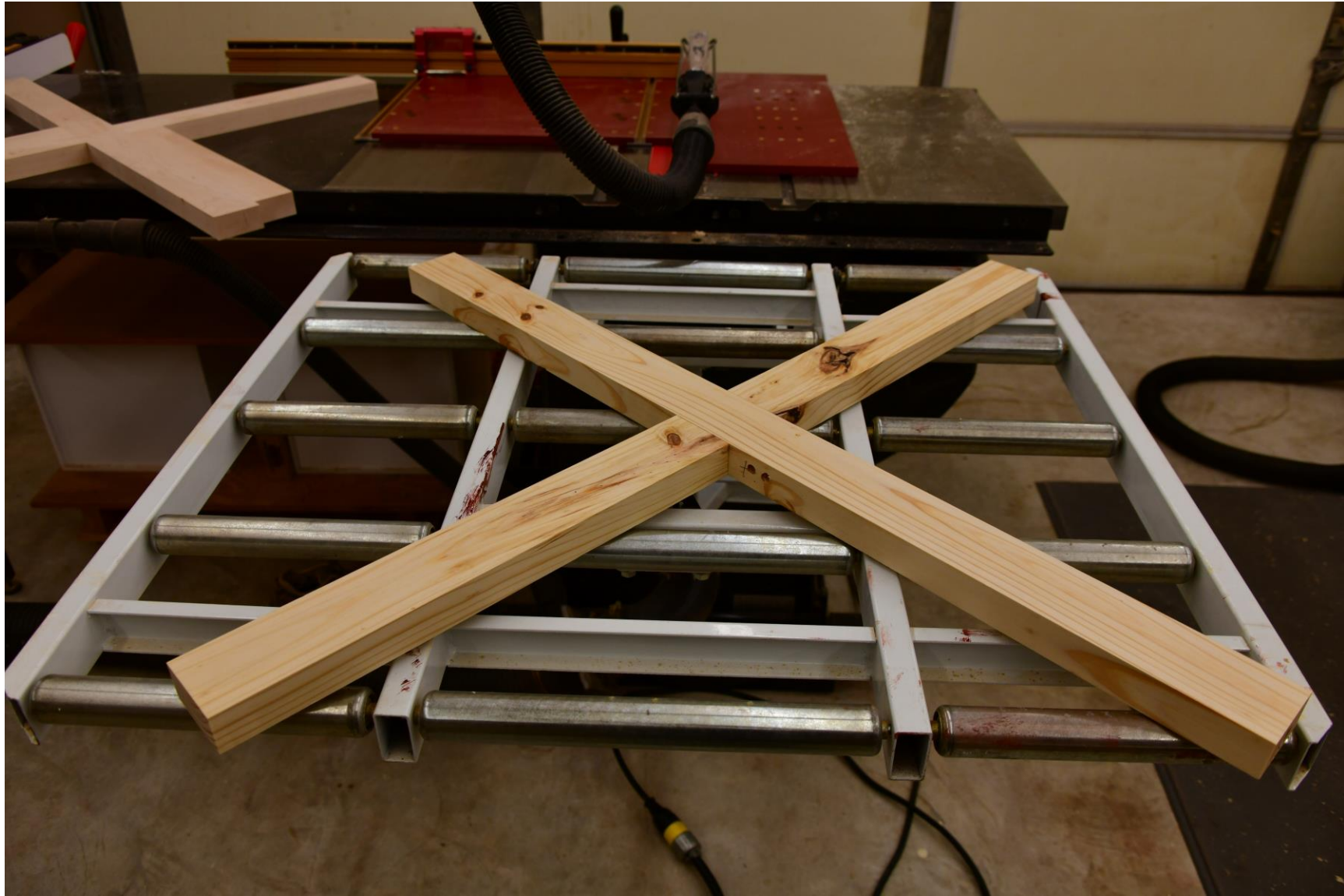


The sliding stop on the miter fence itself is positioned to cut the other shoulder of the joint

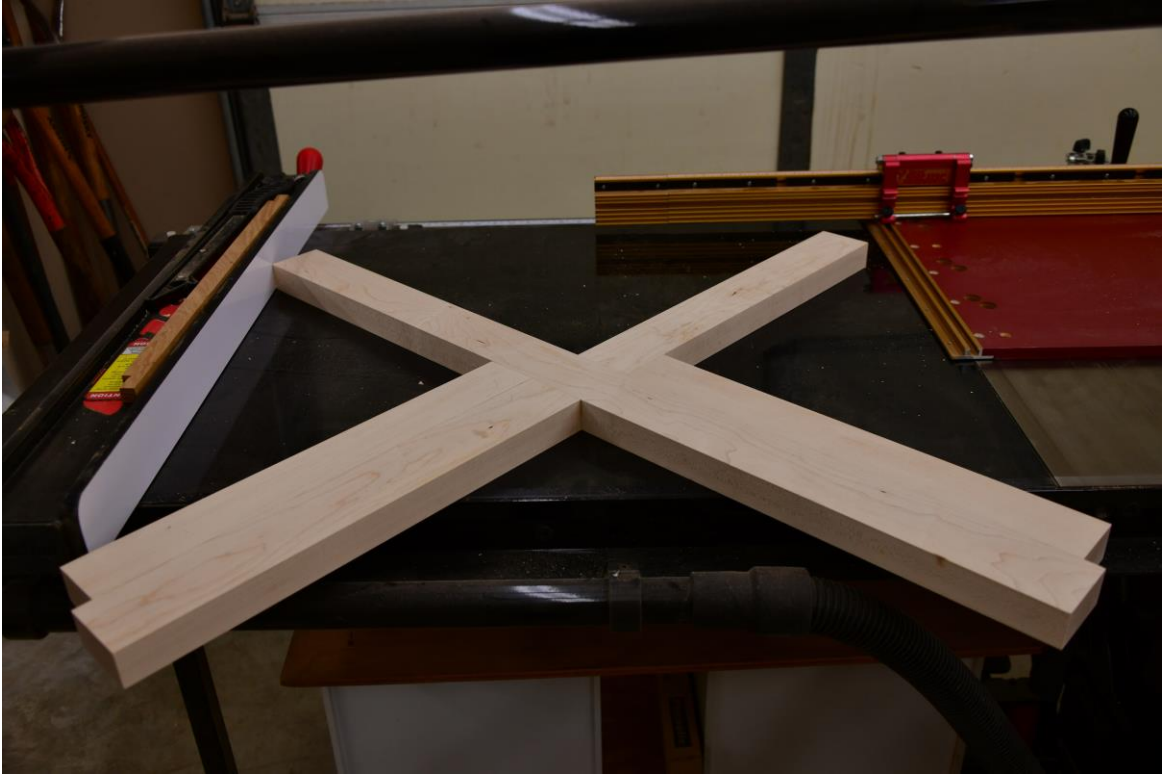


Waste is removed with multiple saw kerfs. Final cleanup with a chisel.

Stage 1 Complete



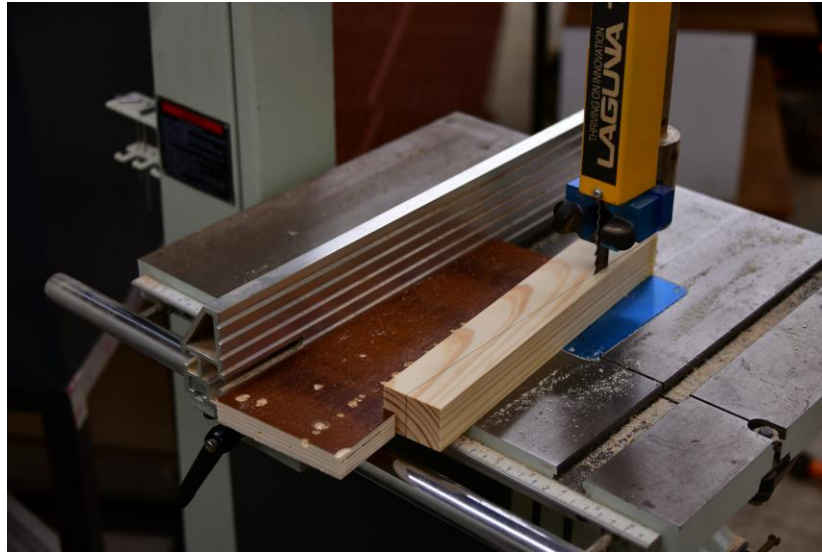
Step 2 – Adding Parts C



Tapering Parts E



A simple taper jig, made from a well-used piece of scrap



Jig in use on the bandsaw



We're now at this point. Ready to lay out the position of the inlays.

Marking the Final Width on the Legs



Mark the center line of the legs. Use a plywood spacer cut to $\frac{1}{2}$ the width between aprons to mark the cut line at the top of the legs



Bottom of legs are wider than top by the width of the apron. Use an offcut section of top to adjust the spacing.

Drawing the Inlay Design on the Legs



Used a meter stick clamped to the legs to locate position of pencil lines



Lines are not easy to see in the photograph, but they are there. Main purpose of outlining the design in this way was to provide a visual guide to minimize possible errors in positioning the router template

Template for Routing Straight Sections of Design



First check offset of router/template bushing from straightedge



Gap in the center of the jig is desired width of inlay (1") plus 2x the offset of the router bit/bushing combination.

Inlaying the Straight Sections



Rout the groove for the long arm of the design first, then the short arm, because this terminates where it meets the first cut. Depth of cut was checked first on some scrap. Here, glue-up is underway for the long section.

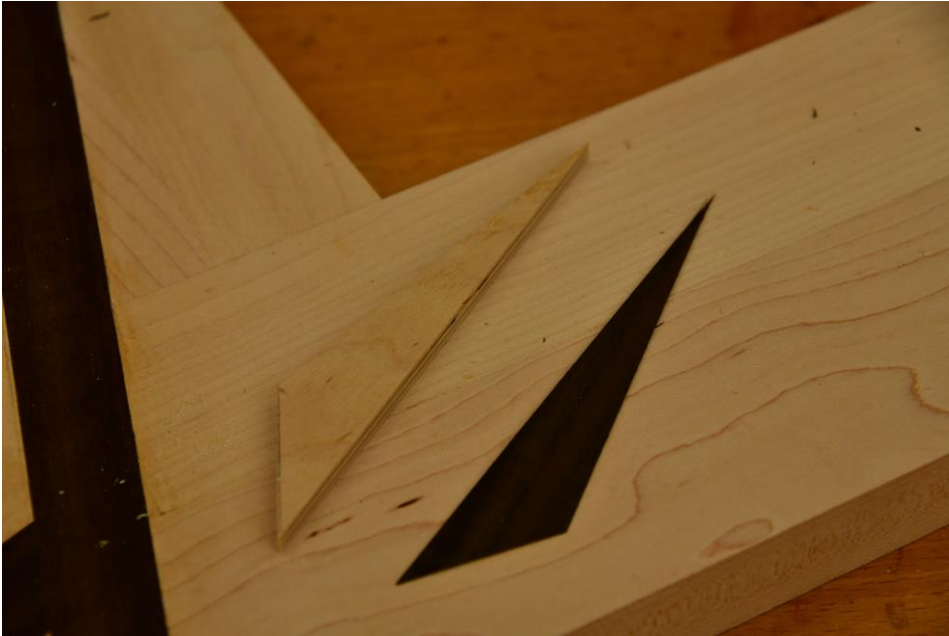


Long section glued. Groove to receive short section is visible at top of picture



Both straight inlay sections glued in

Inlaying the 'Arrow'



Triangle template cut from $\frac{1}{4}$ " Baltic birch. Position marked on leg, edges outlined with marking knife and routed freehand close to line using $\frac{1}{8}$ " bit. Final cleanup with chisels.



Same triangle template used to cut the veneer to size. This is what it looked like with all the inlay cut and glued in place.

Cutting The Tops to Width



Cuts require a 45° miter. Inside bottom corner of cross was used as the index point. Leg was positioned using an auxiliary plywood fence on the miter gauge. Adjust for correct position first, then screw fence in place.



Second cut was made by flipping the leg. Checked for fit before proceeding.

Readjust to Cut Bottom of Legs

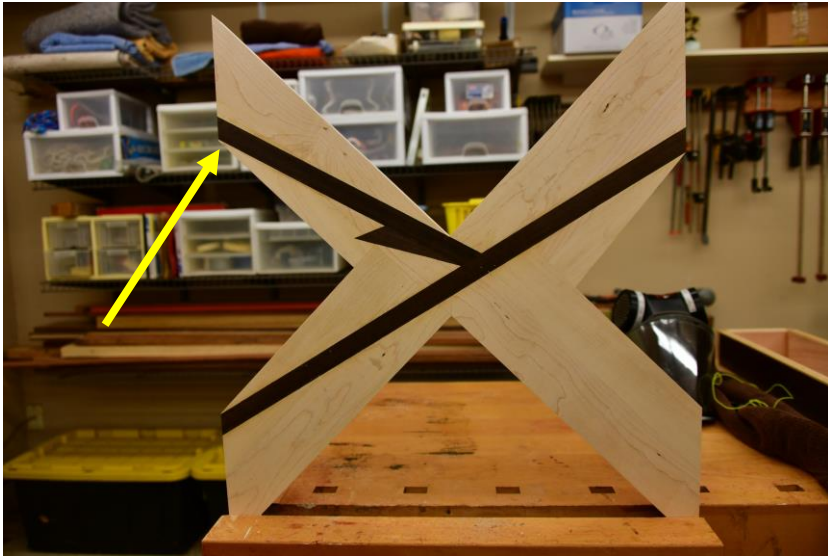
Place an offcut section of apron against the top 45° cut and between it and the saw blade.

Reposition the auxiliary fence and screw it back in place

Cuts were made by raising the blade into the work. As you can tell from the picture, if the cut was made conventionally, the miter gauge would be out of its slot

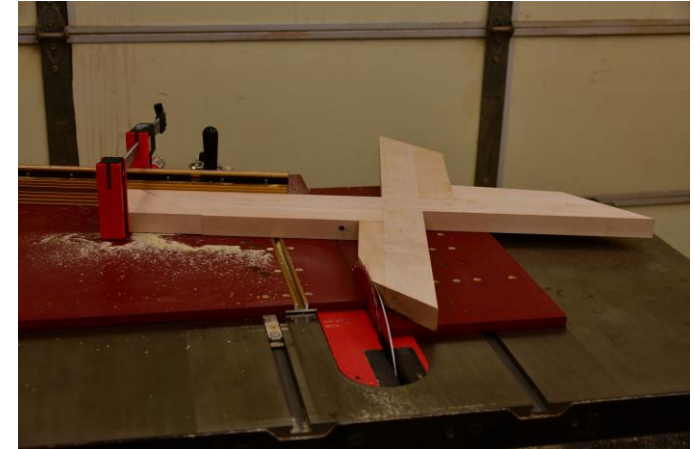


Cutting the 'Notch'



We're now at this point. The next step is to make the v-shaped notch at the point indicated by the arrow

Step 1: Cutting the angle on the assembled leg. Note the 45° stop block clamped to the miter fence



Step 2: Cutting the angle on The left hand piece E. Piece is cut to finished length at the same time. Piece E is then glued to the rest of the leg

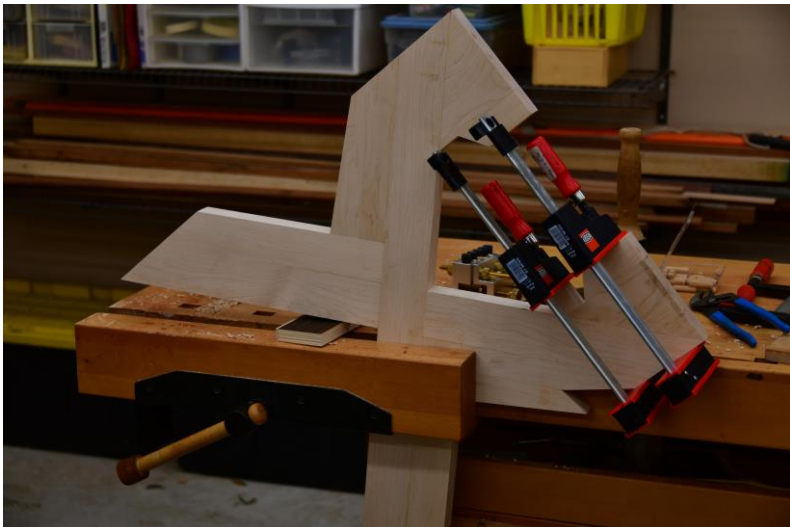


Final Steps – Top of Legs



Make pieces
F and G

Glue F and G
together



Glue the F/G
assembly to
the legs

And we have
this – nearly
there



Joining the Tops to the Legs -1

The tenons at the top of the legs were made using multiple passes with the router.

The rear straightedge in the picture locates the final cut line

Spacers were used to set the cutting line for the various passes

Worked best if the full depth was cut at the end before moving to the second spacer position

Resulting tenon is not perfect, but does not affect strength of final product (I hope)



Joining the Tops to the Legs -2



'Mortice' was formed using offcut sections of the aprons. Checking for fit.



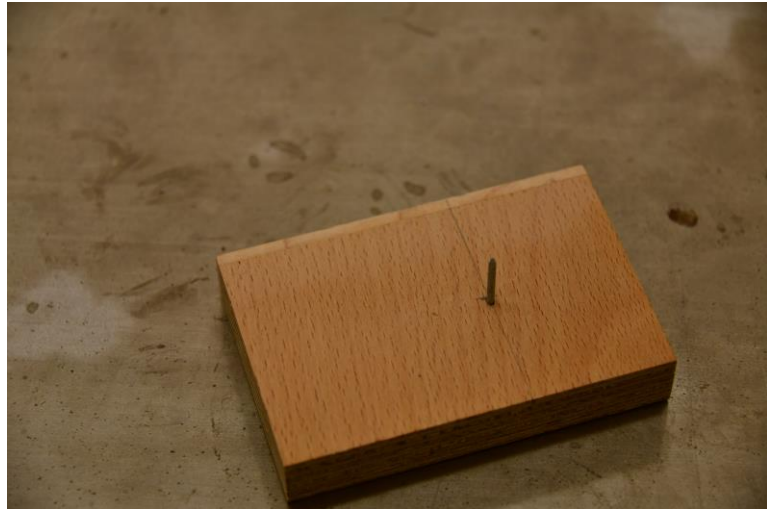
Gluing in progress



Finished result

Joining the Tops to The Legs - 3

At this point I realized I had missed something. The intention was to attach the legs to the top with screws, to allow for knockdown if necessary. BUT, there was no room to get a drill in on the keyboard side to drill the pilot holes



Solution was to drive a 1½" brad at the desired height through another offcut of apron



Use spacer blocks to locate the pilot hole position relative to the apron

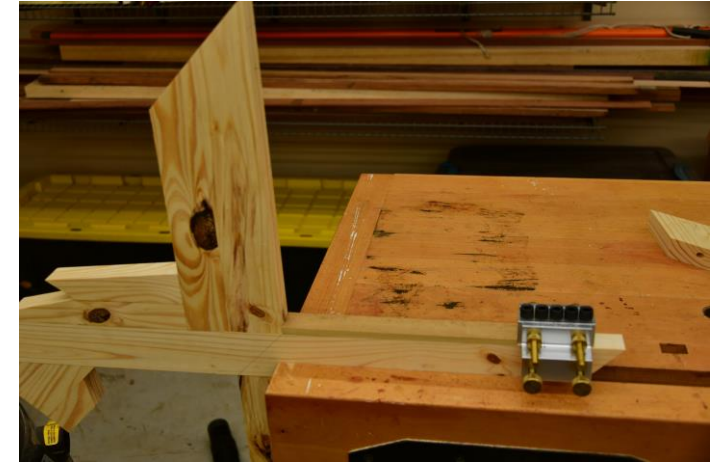


Drive a pilot hole by tightening a clamp. Final step was to drive a screw through the pilot hole using a star drive ratchet.

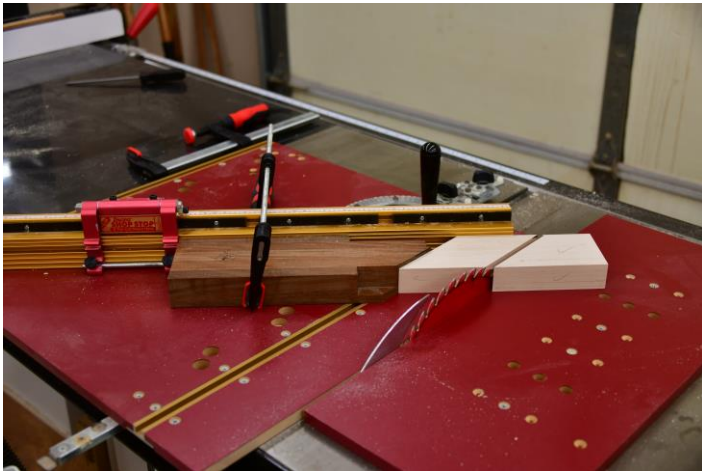
Making the Feet



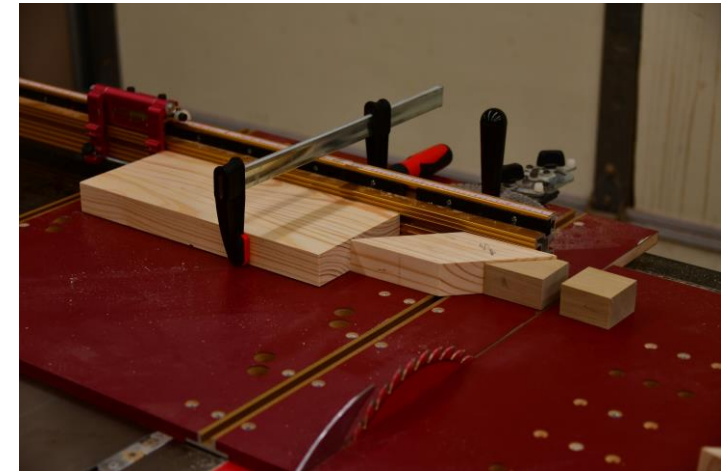
Feet are in two parts, dowel jointed together. Drill dowel holes first, then cut angle.



Dowelmax jig combined with spacer blocks used to locate hole position on legs



Parallel 45° angle cut using combination of 45° stop block and Inkra fence set to 45°



Final cut to length using wide stop block to support point of the 45° cut

Testing Height and Keyboard Fit

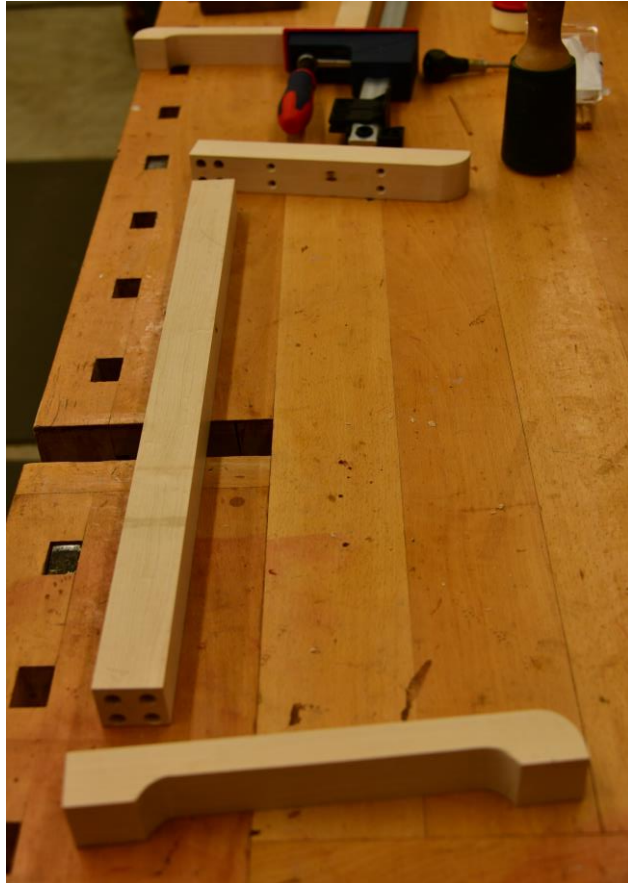


Note that this was done using the practice legs, before cutting the 'real' feet to final size. Also, the keyboard tray here is just a piece of scrap particle board (not even MDF)

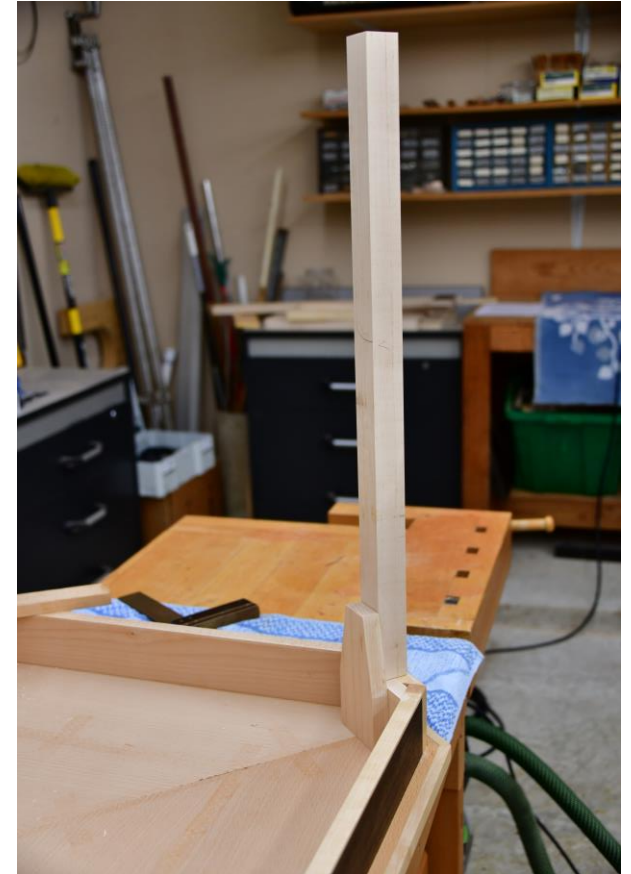
Legs for Corner Section

Two legs support the joints between the straight and corner sections of the desk.

These were made in three sections, dowel jointed together



A third leg supports the back corner



Keyboard Tray



The keyboard slide has a tilt adjustment



With the size of keyboard tray we wanted to use, access to the adjustment wheel required a cutout in the tray



When making the 'real' tray, I opted not to make a cutout in the finished tray. Instead, used a Forstner bit to drill a half hole at the end of two narrow maple strips. Glued in the right position, these make a perfectly parallel sided opening.

Keyboard Tray Final Sizing



First re-check sizing with the practice version



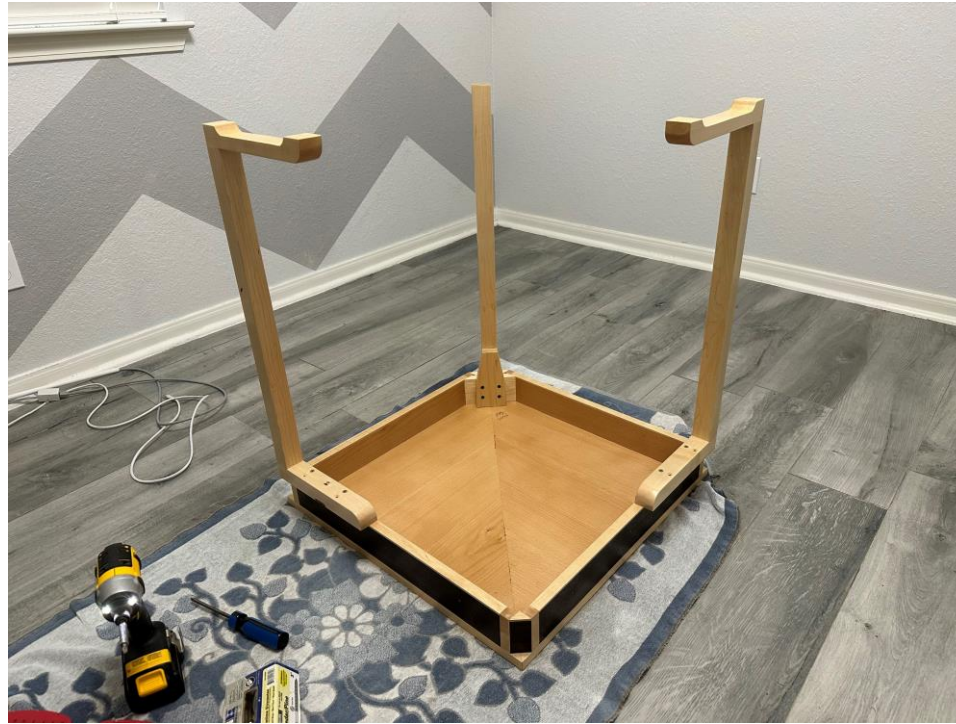
Mount real version in correct location relative to tilt wheel



Trim ends to final size and re-check operation

Delivery and Installation -1

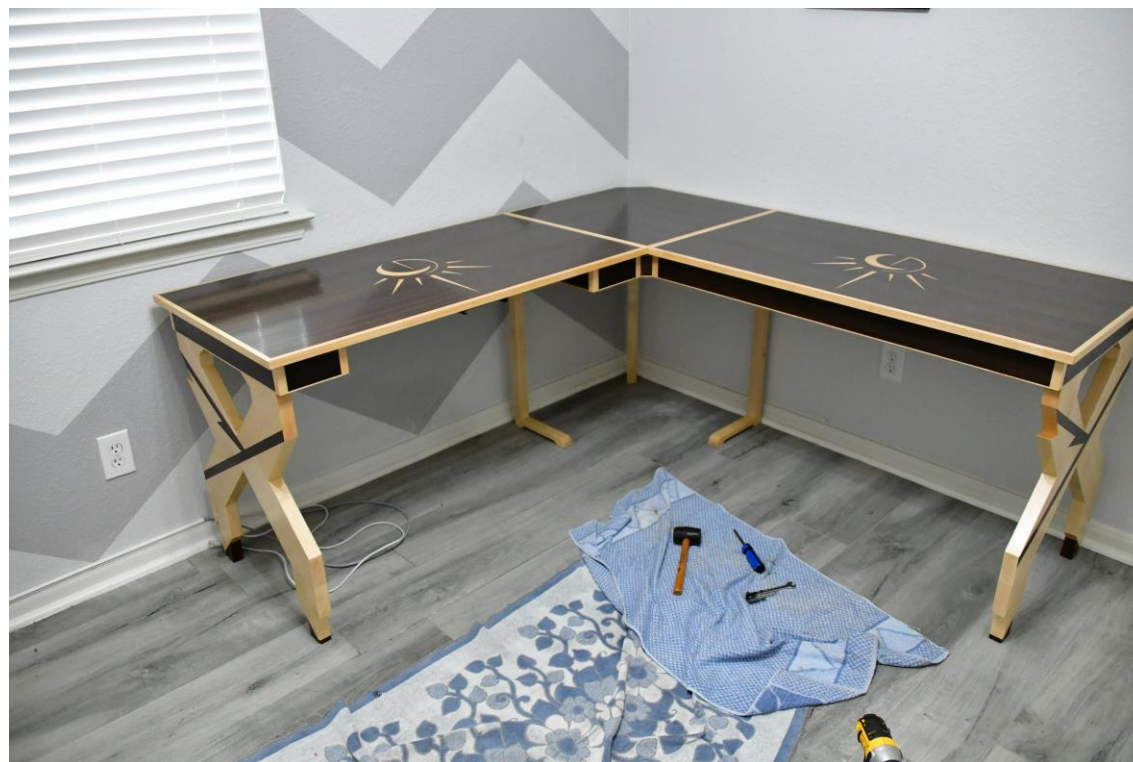
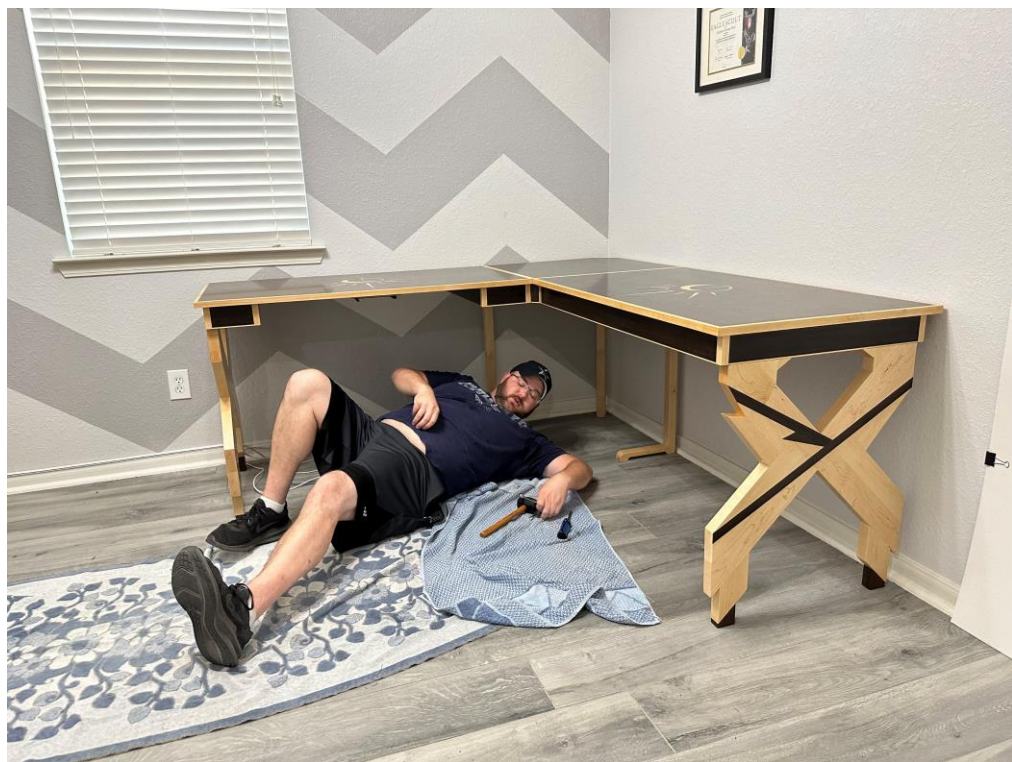
At this point, the fit of the various pieces had been checked in pairs, but the whole desk had never been assembled. The moment of truth had arrived. Delivery day.



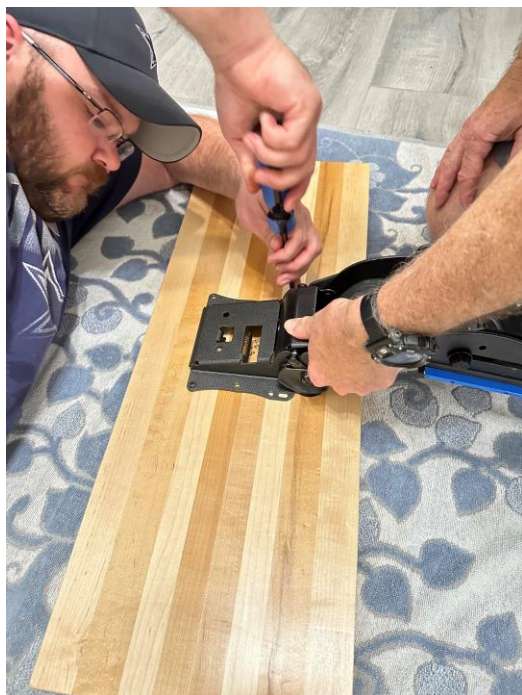
Delivery and Installation - 2



Delivery and Installation - 3



Delivery and Installation - 4



Finished !



