HAVEN TABLE

ROXIAS DESIGN

design concept notebook

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INDES352 Design & Fabrication – Fall 2019

Introduction

My initial concept for this project was a to create a multi-functional table. Understanding that my client's space was a small living room inside a condominium, I knew this could not be a massive piece and needed to have a feeling of lightness, so I adjusted the scale to fit those requirements. I drew inspiration from my clients' mid-century modern aesthetic and other historical references such as the Eames's take on bent plywood and Scandinavian designers Muuto, who do contemporary pieces that lean towards mid-century style.

Other constraints to the project were the limited availability of a workshop and sophisticated tools, and a delivery date six weeks from start. In addition, the multipurpose nature of the piece included a space for a small vinyl record collection and a resting nook for their cats.

With all this in mind, I used Sketchup to define a cubic boundary volume and designed the piece to fit into it. The space requirements were met by adding a vertical partition and a horizontal shelf, and I rounded the bottom corners to alleviate the perceived mass. To allow cats to easily enter their resting nook, I did away with the concept of legs, and added a simple low platform base, slightly recessed to further increase the lightness of the design.

I chose Apple-Ply for its traditional use as a material in Mid-century Modern furniture and its focus as a design detail. Its ply layers will be a highlight to the overall look of the piece along with hidden biscuit joinery and kerf cuts to for the curved bottom surface.

After several iterations, the final design was approved by my clients. I then created CAD plans, elevation, sections, and cut-lists along with a hand rendering of the final design.

Design references

Muuto basket

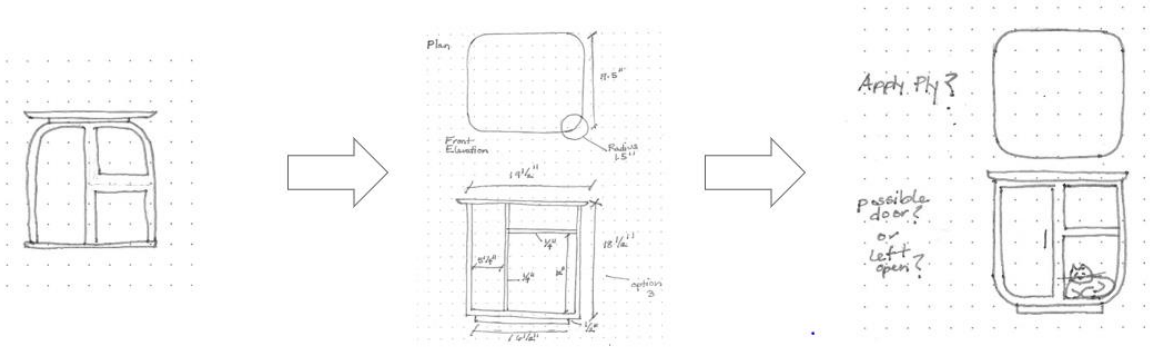
Eames table

Eames lounge chair

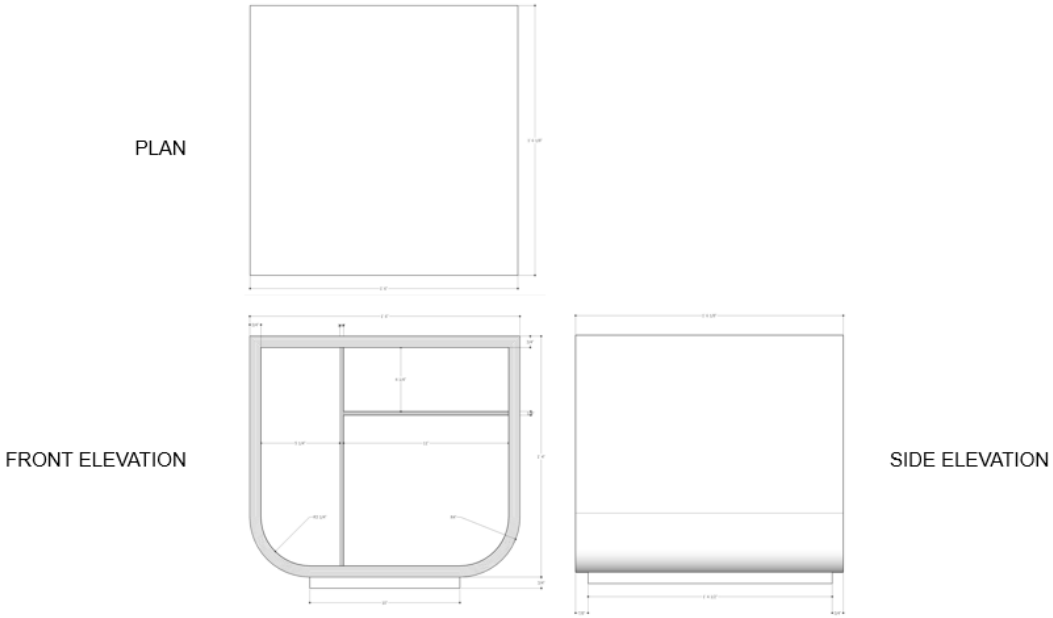
Materials

Apple-Ply (¾” and ½”)

Design documents



Design iterations



Final plans

Cut List

Part	Thickness	Width	Finish Length
Top	¾”	18 1/8”	18 1/8”
Curved carcass	¾”	18 1/8”	56”
Base	¾”	16 ½”	10”
Interior shelf	¼”	17 9/8”	11”
Interior vertical divider	¼”	17 9/8”	14 ½”
Back	¾”	14 ½”	16 ½”
Door	¼”	5 ¼”	14 ½”

Final rendering

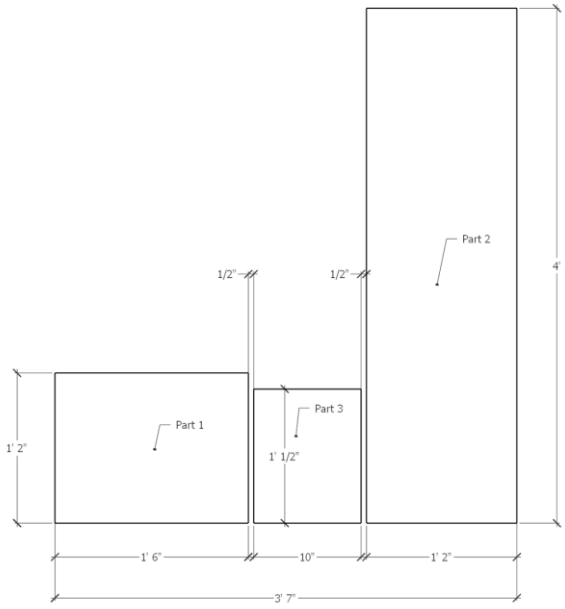
Build process

Go to Crosscuts, using cut-list select sheets of Apple-ply

- This was a bit intimidating at first, but once the procedure of how the place worked was clear, it was fine. I was able to quickly find my sheets of Apple-ply, pay, and move on to the next part.

Rough cut sheets into smaller pieces, 1st rip cuts, then cross cuts. Make sure each board is numbered according the cut-list

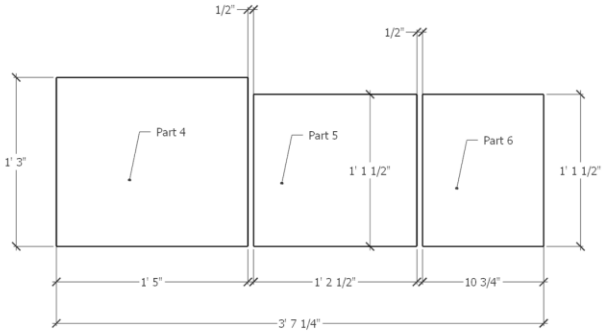
¾” ApplePly/Russian Birch Plywood



Cut list

Part	Thickness	Width	Finish Length
Part 1 – Top	¾”	18”	14”
Part 2 - Carcass	¾”	14”	48”
Part 3 - Base	¾”	10”	12 ½”

1/2” ApplePly/Russian Birch Plywood



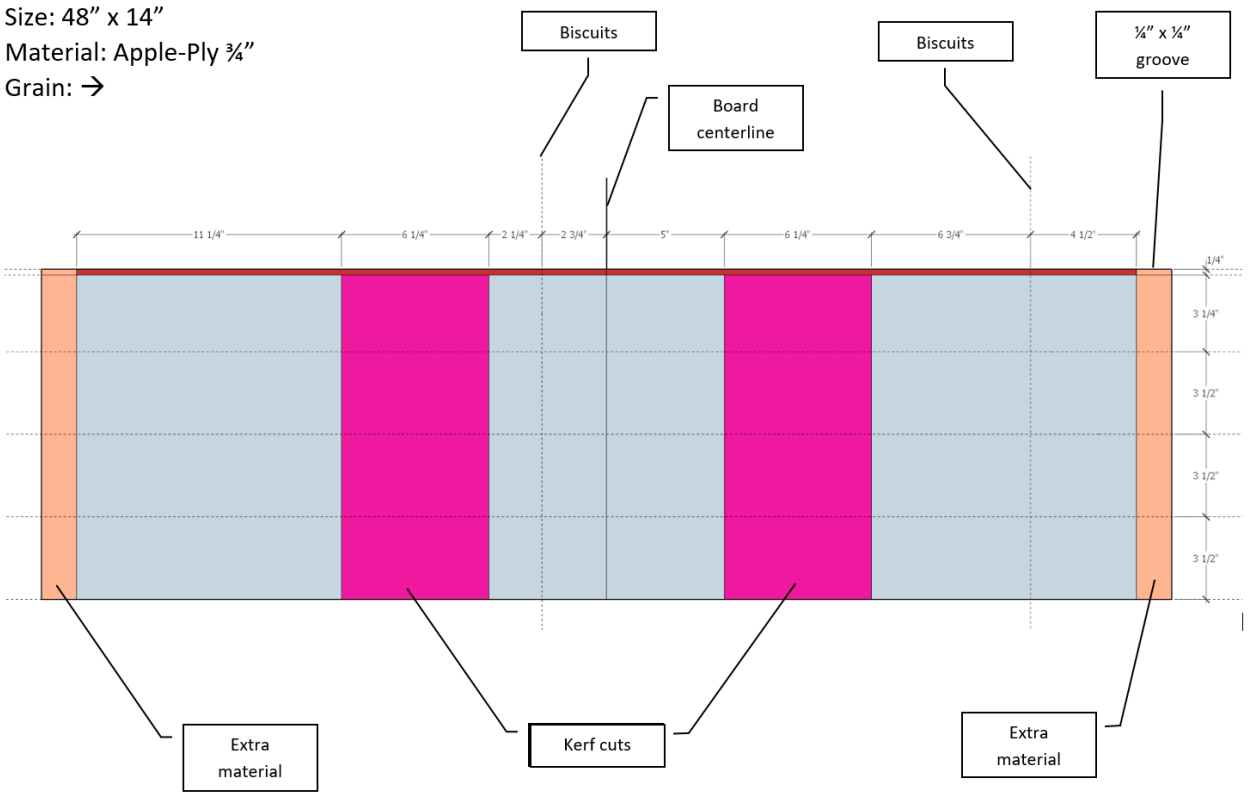
Cut list

Part	Thickness	Width	Finish Length
Part 4 – Back	½”	17”	15”
Part 5 – Vertical divider	½”	14 ½”	13 ½”
Part 6 – Shelf	½”	10 ¾”	13 ½”

- This went swimmingly, but now I needed to work on the main event “The board” aka everything that would either make or break my design.

Measure and mark on board (carcass) where kerf cuts start and end, where biscuits are, and where rabbet joint will be.

- In order to stay organized, I created a cut plan just for the board. Once I had this, marking up was super easy!



For the Kerf cuts, I will need to figure out (depth, spacing, and how many are needed) to create 4-degree curve.

- **This was not so easy!** I initially used a website called *blocklayer.com* for my formula and it is correct (if you have precise tools and skill to begin with). So, I quickly scratched that and moved on to good old math and trial and error. It was easy enough to figure out the overall space I needed (approximately 7inches worth of kerf on both sides) to get the carcass to bend at 90 degrees with a 4-degree curve, but the spacing and the depth were another story. Spacing: a spacing jig was created to keep uniform spacing between kerfs. I used the leftover Apple-ply for my testing and after at-least 100 kerf cuts at various techniques (due to machinery I needed to go over kerfs twice), spacing, and depths, I came to the correct formula (1/8” depth with 3/16” spacing). This was key to allowing the board to bend without breaking. I soon went to work on my 18 kerfs per side and managed to only go off line on two!


Roxy

- With this figured out, this meant I was able to finally get started on my actual design, but other questions soon followed.
- Before being able to glue the curves in place I would need to have all necessary cuts done on the carcass.
- How do I keep the carcass at 90-degrees with curves in place?
  A homemade jig was necessary for this. A simple structure that was 18” wide (interior) to fit my board’s width, two 90-degree vertical panels screwed into the board, and 1 horizontal brace at the top of the vertical panels screwed into place to keep structure in locked in place.

- Which glue is appropriate to keep curves in place? Wood glue or Gorilla foaming glue?
  For this I tested 2 different types of glue (Gorilla foaming & wood glue) on leftover kerf test boards. It was decided that while Gorilla foaming glue is messier, it performed better than regular wood glue because the foam filled the kerfs. Wood glue only worked if the kerfs had contact with each other and since my kerf cuts are not perfect, this was not an option. I also discovered it would take 2 passes of Gorilla foaming glue to sufficiently fill the kerf cuts.

Cut ½” Rabbet joints on both carcass and top

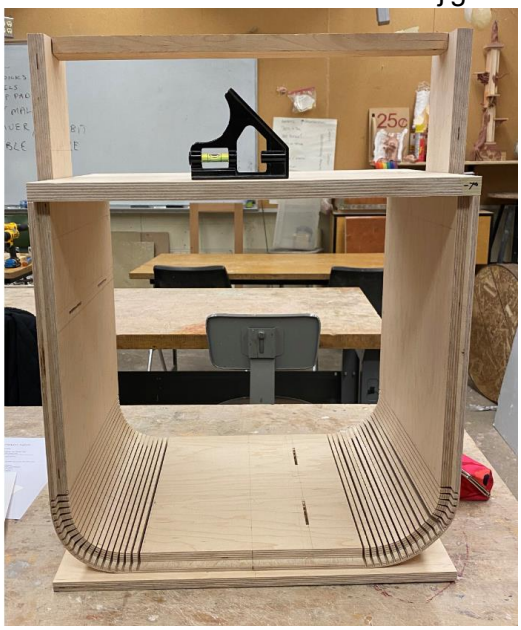
- Not too bad. I used a sample piece of ¾” Apple-ply and quickly I learned that I needed to do 3 passes to get the depth of cut I needed (it breaks if you don’t).

Cut biscuits on carcass, vertical divider, and shelf

- As usual, nothing could be easy with this design. For the biscuiting, I was dealing two different ply thicknesses (1/2” and ¾”) that needed to match up. A shim of 1/8” was necessary to make up for the difference in depths.
- After figuring out the correct set-up for the biscuits, it went well.
- I saved the final biscuits for after the top is, and height of the carcass have been settled.

Find correct height for form

- I placed the carcass for the very first time into the jig. I then marked a center mark of 9 inches on the base of the jig to find the center of my carcass. Then, I measured from the bottom of the jig's base and marked 17" on the sides of the jig.



Cut 45 degrees angles on the carcass and top

- I fretted over this part and with a lot of help from master woodworker Tahle, I was able to get these just right. Phew!

Currently, this is as far into the process as I was able to get to this point. Throughout this project I have learned so much and look forward to finishing up this project and showing off the fruits of my labor to my clients.

What's left for me to do….

1. Put carcass and top in the jig and adjust for level top
2. Measure actual height of the partition and cut
3. Measure height of biscuit cuts for the shelves on the carcass
4. Port the same measured height to the partition
5. Remove the partition
6. Cut the partition to size
7. Measure and mark the position of the biscuits on the top
8. Remove everything from the jig
9. Insert the shelf biscuits on the side of the partition
10. Insert the top biscuits on the top of the partition
11. Assemble and glue shelf and partition with wood glue
12. Get someone to help putting the glue in the kerf cuts
13. Put carcass back in jig, making sure the height is correct
14. Put partition and shelf in the carcass, gluing the biscuits
15. Insert the biscuits at the top of the partition
16. Put and glue top to partition and sides of the carcass
17. Make sure everything is level, clamp and let it stay overnight
18. Unclamp, verify everything is secure
19. Place carcass on its side
20. Place back panel on top of the carcass (rabbet jointed side)
21. With a pencil, trace the shape of the carcass onto the back panel
22. Take back panel and use band saw to cut away excess (leaving a bit extra on each side)
23. Fit until back panel fits securely into rabbet joint on the back of carcass
24. Glue back panel to carcass, and leave overnight to dry
25. Take base piece, measure & mark with pencil 4 equidistant spaces ¾" from each side
26. Take carcass, measure and align base piece, clamp down, screw base onto carcass
27. Plug holes created by screws with felt liners
28. Sand and buff
29. Voila, I am done!