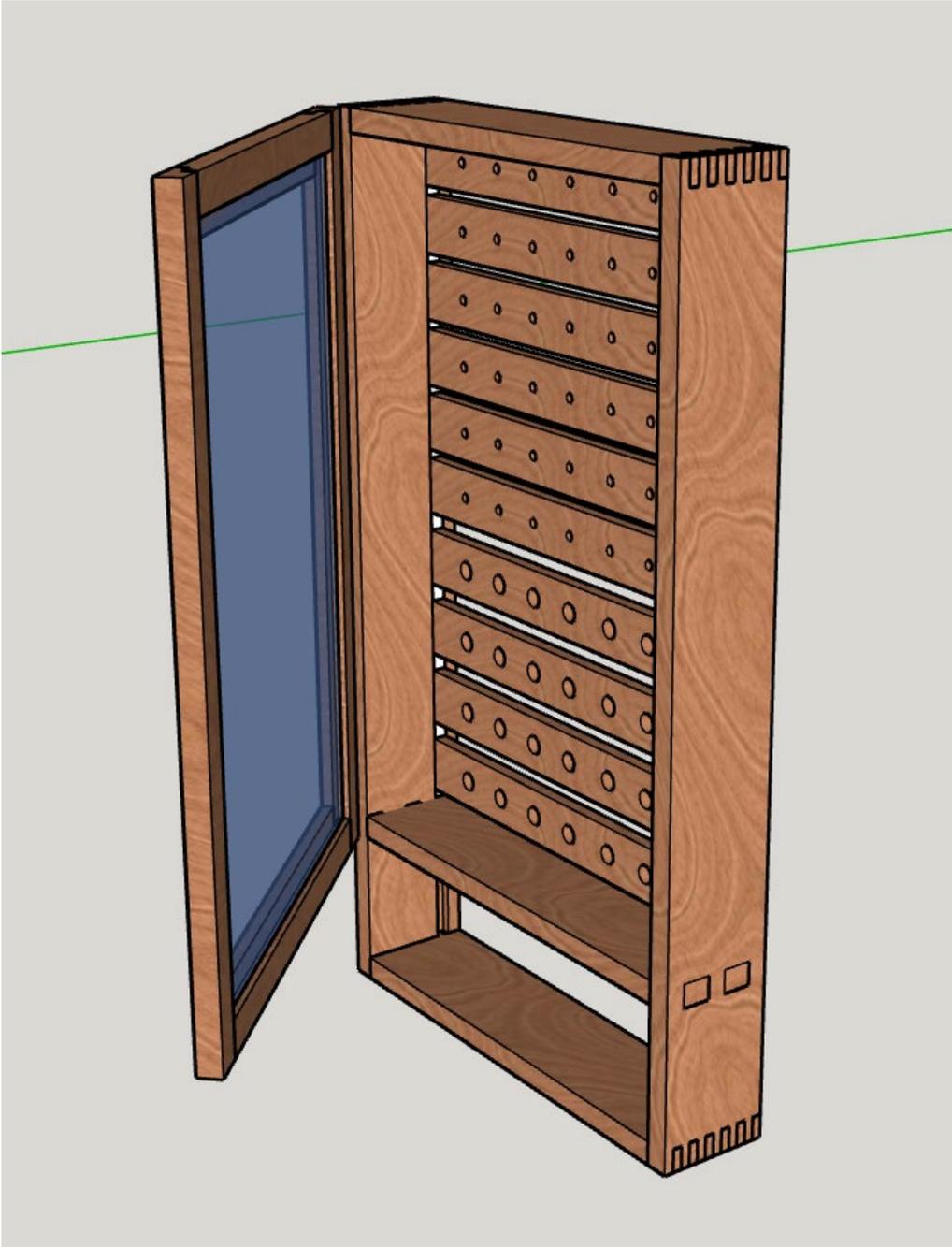


Router Bit Cabinet



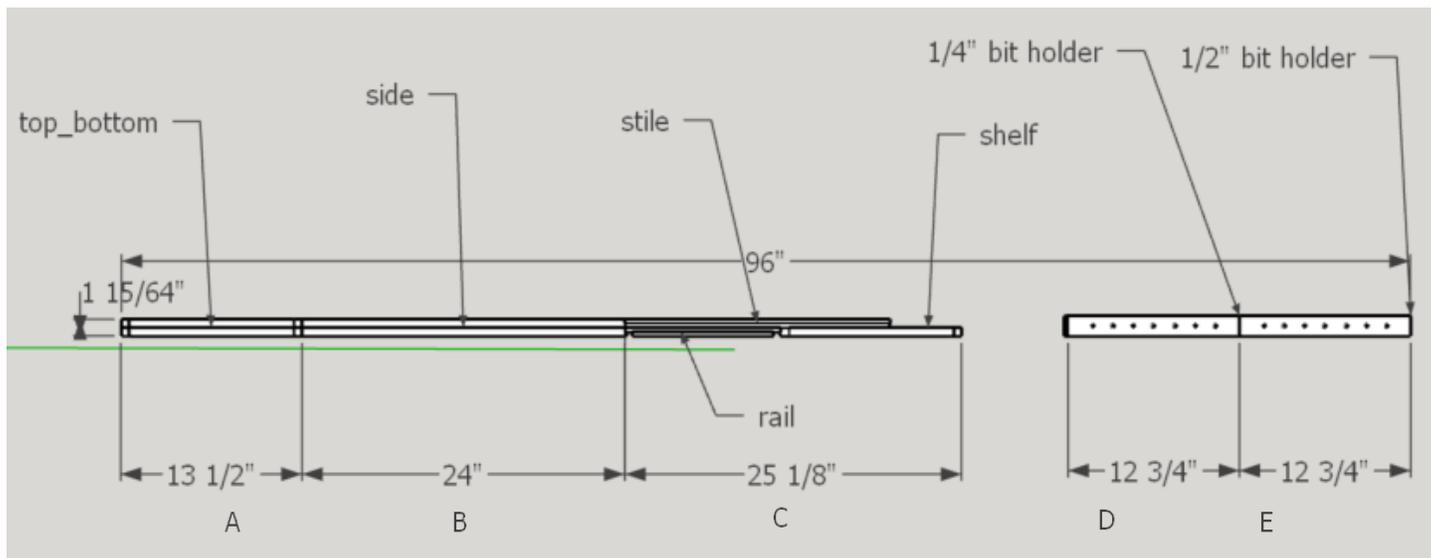
2" x 4" Challenge Plan

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Cutlist

2x4 profile view



Part	No. in Model	L	W	T	Comments	Section/Block
Top/Bottom Carcass*	2	13½"	3"	5/8"	Extra 1/8" will allow for flush trimming a proud box joint	A
Sides Carcass*	2	24"	3"	5/8"	Slightly less after flushing box joint	B
Shelf*	1	13½"	3"	5/8"	Slightly less after flushing box joint	C
Rail	2	11 5/8"	1 ½"	5/8"	9/16" inset for lap with stile	C
Stile	2	19¾"	1 ½"	5/8"	5/16" inset for glass	C
¼" bit holders	6	12 ¾"	1 ½"	3/8"	Seven ¼" holes	D
½" bit holders	4	12 ¾"	1 ½"	3/8"	Seven ½" holes	E
Window (plexiglass)	1	17 7/8"	11 5/8"	1/8"	Inset dimensions for piece I had in shop.	

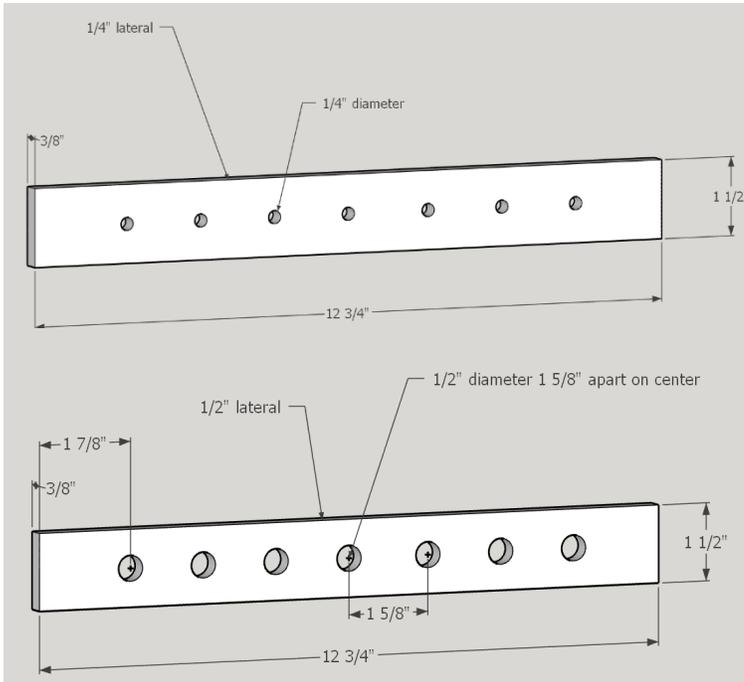
* add 1/8" to carcass/shelf pieces to allow the box joint to be slightly proud of the finished dimensions. Add kerf of saw to shelf – Section C.

The instructions below assume construction from a single 2"x 4" x 8' SPF stud and that the sides will be trimmed to 3" to give square lumber for carcass and door. Faces can be planed, although the laterals (bit holders) need the full thickness dimension if cut as indicated. Resawing with a bandsaw or thin kerf saw blade will render the thicknesses shown. If you use a table saw to re-saw, you will likely get slightly less yield but the basic design should still be achievable.

Spacers used in the back slot (see last page) and rear supports for the plexiglass are not shown in cut list – these can be cut out from scrap pieces (see last page). The plan provides for plenty of scrap for this purpose.

To ensure clean work you should trim the ends and remove/avoid any faults, checks, or large knots in the wood if possible, especially near the ends of any of these cuts. The design allows for some flexibility in this as well as the additional kerf lost from your saw blade. However, section C shown above (that covers the shelf as well as the door frame) needs an additional cut to separate the rails from the shelf. Accordingly, add the kerf of your blade to the length shown here.

Begin by cutting the 2x4 in major sections (A through E) as shown by the bottom set of numbers in the illustration above with extra for carcass and shelf as noted. Set aside the two blocks for bit holders (sections D and E). Trim (or joint and plane) edges of remaining 2x4 to present clean, square edges with a final dimension of about 3". (Note: The depth of your cabinet and therefore width of the carcass and shelf lengths will depend on this dimension. If you can get 3 1/4" out of it, all the better for more depth to accommodate longer router bits.) The carcass, shelf, and door sections are all 5/8" thick. Resaw the lengths by splitting the board evenly then joint and/or plane boards to the final 5/8" thickness.

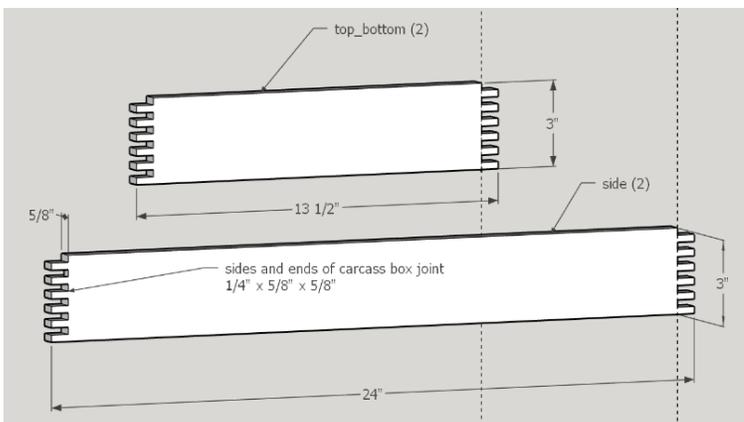


Bit holders (Sections D & E)

Drill 1/4" diameter holes in block D, spaced 1 1/2" or so apart. Cut a 3/8" strip off block E for 1/4" holes (tape this to the first block to assure alignment before you drill).

Drill 1/2" holes along the centreline in the remaining block spaced 1 1/2" or so apart. Then re-saw the block into 3/8" slices to form the lateral strips that will hold the router bits. (Note: if you have odd bit sizes, e.g. 8mm or 3/16, you may wish to generate one or two of that size as well).

If you have not dimensioned the block to cut off the rounded edges, some "slices" will have the milled edges, but these can be placed to face to the back so that only clean edges are shown. If you plan to label the bits, you may wish to drill the holes a little above or below the centreline to make room for those labels.

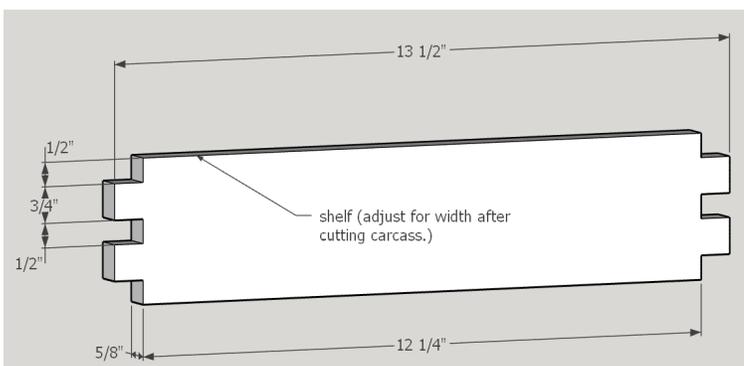


The Carcass

Prepare your carcass joinery in the sides and top/bottom – recommended box joint (shown) or dovetail joinery will provide the strongest joint. Rabbet or miter joinery, if used, should be reinforced with splines.

The design shown here assumes a 3" yield, but as noted above, you may achieve a wider carcass and an additional finger if you can yield more. Recall that you will likely want to cut box joints a little proud (~1/16")

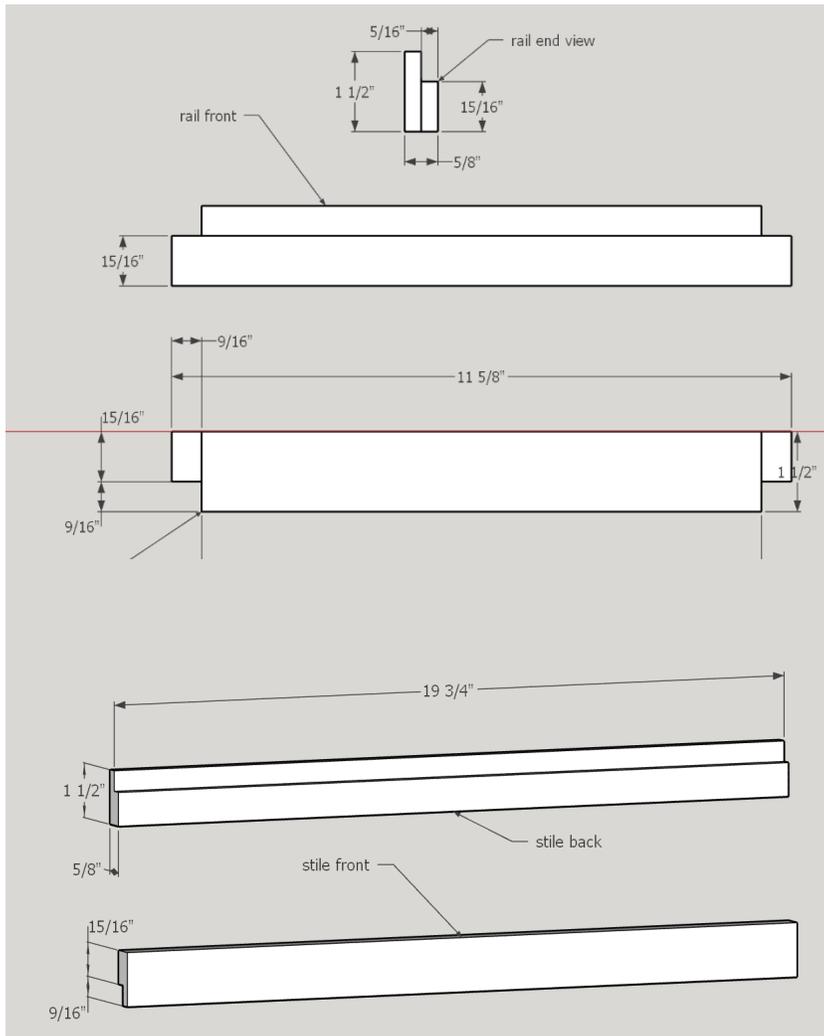
of the thickness of the wood. Therefore when you flush trim the slight overlap, your actual height and width will be slightly smaller than the original cut. Modify additional dimensions as you go based on this trim or – better still – adjust the original cut lengths by an 1/8" or so to accommodate this additional loss.



Separate the rail from the stile in section C. Cut tenons for the shelf as shown based on the final dimensions created by the work above. (Inner shelf is shown as 12 1/4" but this will need to be adjusted slightly once the carcass is flush trimmed. Do not cut the mortises in the sides yet as this will also depend on the final dimensions of the door. Options – dado or hidden or through sliding dovetail.

Door construction

The door is a basic rail and stile system consisting of lap joints and insets for the plexiglass. I am using 1/8" plexiglass and have designed based on a piece I had that was 17 7/8" x 11 5/8" it was a pleasing dimension and I decided not to cut it. However, you can take any piece you have and adjust the dimensions and the inset accordingly.



Begin by cutting the basic lap dado using your saw, dado set or shoulder plane. In my design using that piece of plexi, I calculated that I would need the inset for the glass to be 9/16" wide all round. Since this would also need to create the lap between the two pieces that are 5/8" thick, I split the difference to 5/16" deep.

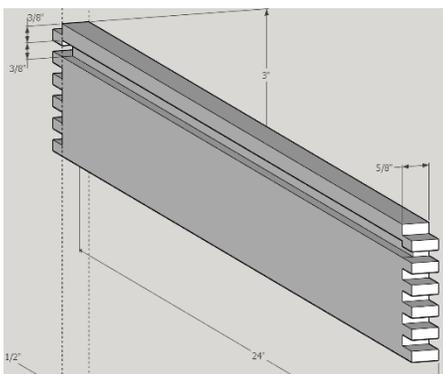
Set your dado stack to 9/16" wide and 5/16" high and cut the lap full-length against the fence (or sacrificial fence) after testing on some scrap. Then use the same setup to cut the "wings" at the end of the rail, which will overlap the stiles.

The stiles are the simpler cut requiring only cutting the groove/rabbit along the full length as shown.

Dry fit the rail and stile and test against the glass to ensure a good fit. The glass will be held into the frame with some wood strips you can fashion from leftover scrap and tack or glue in place once the door is completely assembled, glued and squared up.

Note: The dimensions of the rails are also based on the original width of the top/bottom pieces. You can use a shooting board or fine trim on your saw to match the actual width at this time.

Fit and glue the rails and stiles together ensuring the inset remains on the back all round to fit the glass. You can add additional strength with dowels and/or splines at this point. Given that the plexiglass is not very heavy, a strong glue, well clamped with brad nails, or staples for additional support should provide plenty of strength if you don't want to use dowels or splines.



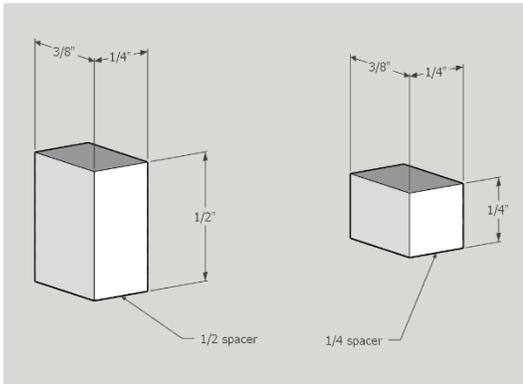
Bit Holder & Shelf

Once the door is complete, you should be able to determine the position of the shelf to align to the bottom of the door. Cut dados in the sides and test and adjust the shelf to fit. Do not glue in the shelf yet.

To hold the bit holders on the back of the case, you will need to rout a 3/8" groove 1/4" deep and starting about 1/4" to 3/8" in from the back of the carcass. Rout this groove on both sides (to the shelf), and top section, with stops to keep the groove from going to the ends and opening a gap in the outside joinery.

Note: you can cut the groove full length of the sides if you intend to put a back in the bottom section (not provided in design but may be an option from scrap) or feed bit holders from top.

Assembly



Using your scrap pieces, you will need to make a few pieces required for assembly. The first will be to cut out a number of spacers that fit in the groove you just cut and go between each level of bit holders. These are all $\frac{1}{4}$ " x $\frac{3}{8}$ " pieces so if you can trim some lengths to that dimension it will help you to cut out the little spacers from there. In my design, I used twelve $\frac{1}{4}$ " spacers and eight $\frac{1}{2}$ " spacers.

In addition, if you have a few longer scraps, you should cut some thin ($\sim\frac{3}{16}$ ") pieces to go on the back of the glass to hold it into the frame. These can be various lengths but you should try to get enough to cover the whole inner dimension of the frame.

That completes all the cutting and joinery but you can add decorative options, such as edge routing, inlays, etc. before assembly.

Option 1: One option for assembly is to cut off a portion of the top/back to allow you to feed the bit holders down into the groove. This is also an interesting option because it could allow you to reorganize your bit holders as more bits of one size or another are added. In this case, you can do a traditional carcass-first approach of gluing in the shelf and then assembling the box by gluing and clamping together the sides and ends. Clamp and square the box and set aside to dry before feeding the holders and associated spacers down from the top. The cut off section from the top could be used as a cleat for mounting or can simply be replaced where you cut it off as a non-fixed piece.

Option 2: If you don't like that approach, then the likely best way to start would be to put the shelf in place without glue – to provide the necessary spacing for the next step. Layer in the holders and spacers as noted below, and then clamp the side with the holders together and glue in the top and bottom. Square up the structure and clamp it until set.

Affix the door with your choice of hinge and use a piece of extra scrap to make a handle or add a brass pull to attach to the outside of the door frame.

Recommended order of bit holder assembly (from bottom/shelf to top - again this is based on the design provided and is a perfect fit for that design, adjust for your own dimensions):

$\frac{1}{4}$ " spacer + $\frac{1}{2}$ " bit holder

$\frac{1}{2}$ " spacer + $\frac{1}{2}$ " bit holder (x 3)

$\frac{1}{2}$ " spacer + $\frac{1}{4}$ " bit holder

$\frac{1}{4}$ " spacer + $\frac{1}{4}$ " bit holder (x 5)

For this design, the result is 10 rows of bit holders; four $\frac{1}{2}$ " and six $\frac{1}{4}$ "

Options & Extras:

Depending on how frugal you have been on cutting and re-sawing, you may have enough wood to do a small drawer, door, or box for the bottom section. Otherwise this space may contain extras like collets, bushings, wrenches and allen keys as well as any router bits that are too high to fit in the cabinet. A couple of small plastic or woven baskets/ bins might also work there.

Magnetic or similar catch for the door.

Additional bit holders for odd-sized bits (8mm, 3/16)

French cleat on back for mounting.

