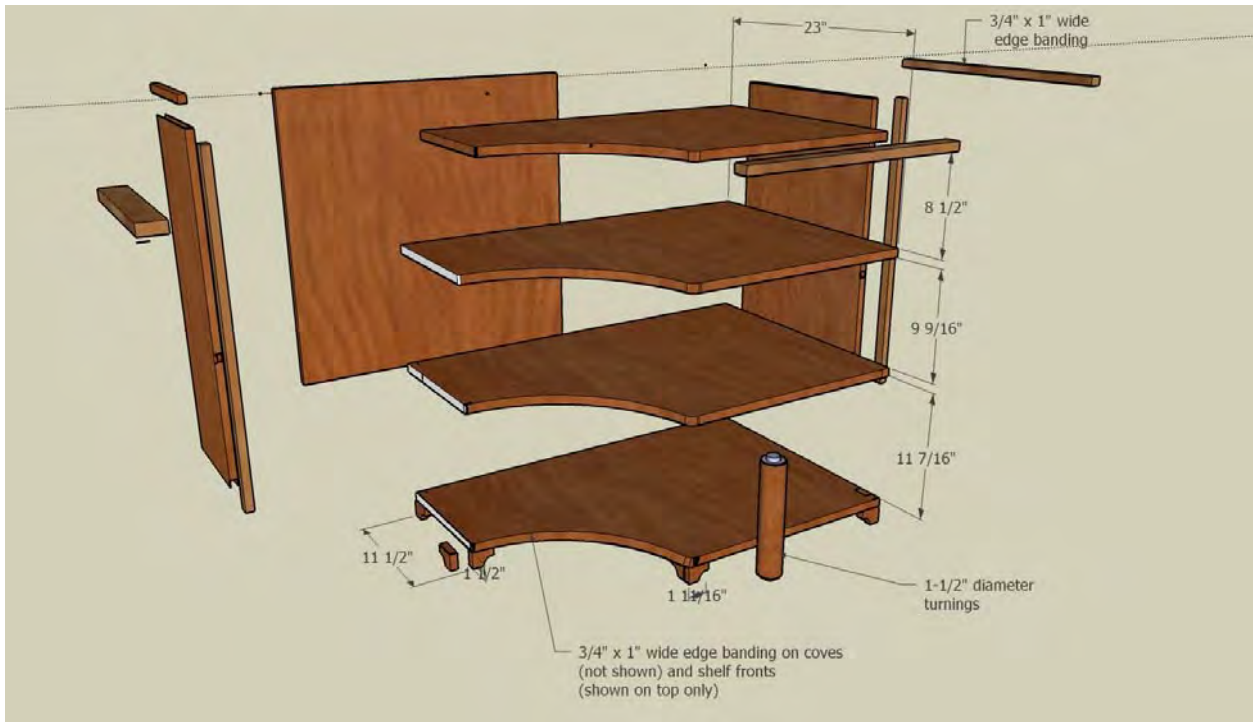


## Display Case (for J&S)



This is constructed of maple plywood with solid maple (soft maple) edge banding. It was made to fit between a door and a kitchen cabinet, and has an elegant circular taper between the wide and narrow sides. The center shelf supports are maple turnings, in keeping with the radii of the shelves and the escutcheon. The simple feet are mitered at the corners and have a radius cut in the ends.



<b>Cut List</b> (The dimensions of this case were changed repeatedly. The piece should be re-designed and the cut list should be revised to agree with the drawings.)					
Plywood -- Maple Veneer Ply $\frac{3}{4}$ G2S					
	Name	Dimensions	Milling		
1	Top	20- $\frac{1}{2}$ x 31 $\frac{3}{4}$ x $\frac{3}{4}$	Groove edges $\frac{1}{2}$ " D x $\frac{1}{4}$ " W,  Cut cove, Rabbet front $\frac{5}{16}$ " w x $\frac{3}{8}$ " D for trim Rabbet bottom of rear $\frac{3}{8}$ "W x $\frac{1}{2}$ " D for back		1
2	Bottom	20- $\frac{1}{2}$ x 32- $\frac{1}{2}$ x $\frac{3}{4}$	Cut cove. Rabbet front for trim		1
3-4	Shelves	20- $\frac{1}{4}$ x 32- $\frac{1}{2}$ x $\frac{3}{4}$	Cut cove. Rabbet front for trim		2
5	R Side	20- $\frac{1}{2}$ x 31- $\frac{3}{4}$ x $\frac{3}{4}$	Dado for shelves & back		1
6	L Side	10- $\frac{1}{2}$ x 31- $\frac{3}{4}$ x $\frac{3}{4}$	Dado for shelves & back		1
7	Back	32- $\frac{1}{2}$ x 31- $\frac{3}{4}$ x $\frac{1}{2}$	$\frac{1}{2}$ " Baltic Birch		
Solid Maple $\frac{3}{4}$ " finished thickness					
1.	R. Top T&G Trim	1- $\frac{3}{8}$ " x 1- $\frac{3}{8}$ " x 20- $\frac{1}{2}$	Glue up from oversized stock. See notes. Miter front end		2
2	L. Top T&G Trim	1- $\frac{3}{8}$ " x 1- $\frac{3}{8}$ " x 11 $\frac{1}{2}$	Glue up from oversized stock. See notes. Square front end		2
3	R. Front top trim	16- $\frac{9}{16}$ x 1- $\frac{5}{16}$ x $\frac{3}{4}$	Miter right end. Rabbet to fit shelf		
4-6	R. Front shelf trim	15 $\frac{7}{8}$ x 15 $\frac{1}{16}$ " x $\frac{3}{4}$	Rabbet to fit shelf Fits square into side trim		4
7-10.	L Front Trim	Curved, 1- $\frac{5}{16}$ " W x 20- $\frac{3}{8}$ x $\frac{3}{4}$ cut from 20- $\frac{3}{4}$ x 4- $\frac{5}{16}$ wide	Cut with bandsaw Trim with router Rabbet to fit shelf.	Nominal. Calculated is 20-13 $\frac{1}{16}$ " Measure	4

11, 12	Side front trim	31 $\frac{3}{4}$ x 1 x $\frac{3}{4}$	Butt joint to edge of plywood		2
13	Escutcheon	3 $\frac{1}{4}$ x 31 $\frac{3}{4}$ x $\frac{3}{4}$	Solid Maple $\frac{3}{4}$ " finished 33 $\frac{1}{4}$ would reach from edge to edge		1
14	Center support	1 $\frac{1}{2}$ round x 8 $\frac{1}{2}$	Face glued & turned Solid Maple $\frac{3}{4}$ " finished	2 x $\frac{3}{4}$ " Add $\frac{3}{4}$ to length of each for dowel pins	
15	Center support	1 $\frac{1}{2}$ round x 9 $\frac{1}{2}$	Face glued & turned Solid Maple $\frac{3}{4}$ " finished		
16	Center support	1 $\frac{1}{2}$ round x 11 $\frac{1}{2}$	Face glued & turned		
17- 28	Feet (Legs)	1 $\frac{1}{2}$ x 1 $\frac{1}{2}$ x $\frac{3}{4}$	Shaped on bandsaw Mitered corner		12
		1 $\frac{1}{2}$ x $\frac{3}{4}$ x $\frac{3}{4}$	glue/alignment block	2° wood	6
29	Left Shelf/top supports	10 $\frac{1}{2}$ x $\frac{3}{4}$ x $\frac{3}{4}$	quarter-round Trim length of bottom support to fit between legs	Optional, depending on strength of joints at top and bottom.	4
30	Right shelf/top supports	22 x $\frac{3}{4}$ x $\frac{3}{4}$	quarter-round Trim length of bottom support to fit between legs		4
31	Dowels for #14	$\frac{1}{2}$ " dia x $\frac{3}{4}$ " dowels	hardwood dowels		6

1. Cut out pieces. Trim pieces (1-12) should be cut long & trimmed to fit at assembly time.

2. Construct blanks for left and right top T&G trim from two pieces of 1 $\frac{1}{2}$  x  $\frac{3}{4}$ " stock. Face joint and glue them, then trim the resulting pieces to 1- $\frac{3}{8}$  square. Lay out the  $\frac{1}{2}$ " d x  $\frac{1}{4}$ " w tongues (tenons) exactly, as if you will cut them by hand. Since the corner T&G trim pieces are  $\frac{1}{8}$ " over-size, use the *tenon* sides as the reference edges. Cut the tenons (tongues) on a router with a T&G bit or on a table saw with a dado stack. Set saw fence to layout line. Irregular profile may be difficult to control on saw. Use a strip of wood to support cut edge.

3. Cut  $\frac{1}{2}$ " deep x  $\frac{1}{4}$ " wide grooves across the tops of the sides, and the sides of the top, to accept the left and right top T&G trim pieces. The grooves can be centered, because the trim

pieces will be over sized in cross section.

4. Cut  $\frac{3}{4}$ " wide by  $\frac{3}{8}$ " deep dados in sides.
5. Cut  $\frac{3}{4}$ " wide by  $\frac{1}{4}$ " deep dados in back.
6. Cut  $\frac{3}{8}$ " wide x  $\frac{1}{4}$ " deep rabbets in back edge of top, bottom and sides.
7. Cut  $\frac{3}{8}$ " wide x  $\frac{1}{4}$ " deep rabbets around edge of back

8. Make two curved templates, one for the inside radius and one for the outside. (You need two because they have to be attached to the work, not the cutoff.) The trim will be rabbeted to the shelf. The largest bearing I have for my rabbet bit yields a  $\frac{5}{16}$ " rabbet. The rabbeted edge of the plywood must match the *cut* edge of the trim.

The included angle should be  $90^\circ$  or less to look right. The radius of the cove therefore must be  $> 17-18$ " for these shelf dimensions. I used  $r=20-\frac{1}{4}$  for the cut edge of the plywood. If the cut edge of the plywood has  $r=20-\frac{1}{4}$ ", its rabbeted edge will have  $r=20-\frac{9}{16}$ ". So, the template for the plywood edge should have  $r=20-\frac{1}{4}$ ". It must be convex. The template for the trim should have  $r=20-\frac{9}{16}$ ". (Then the rabbeted edge of the trim would be  $20-\frac{1}{4}$ ".) It must be convex.

The template for the curved trim will be "banana" shaped, two concentric arcs. The concave surface of the  $1-\frac{5}{16}$ " wide trim should have  $r=19-\frac{1}{4}$ ". The concave surface of the trim will show, but it does not have to fit against anything, so its regularity is not crucial.

Make a beam compass out of a piece of thin plywood to lay out the radii. Cut them on the bandsaw and smooth them with a small drum sander to the pencil mark. Cut a  $\frac{5}{16}$ " rabbet along the concave surface of the shelf template.

Sand the trim template until it fits the rabbeted shelf template perfectly. Mark the templates "top" and "bottom", "left" and "right".

Lay out the shelf and trim cuts using the templates. Cut them "fat" on the bandsaw. Attach the top of each template to the *bottom* of each piece with carpet tape and small nails. Trim the cut to the template using a trim bit in a router table. Hold the trim pieces in a small parts sled with two jig clamps. (Not your fingers, shudder.) Strongly advise a test cut for both shelf and trim.

9. Joint bottom of escutcheon piece. Cut escutcheon on bandsaw. Sand smooth to layout line. Cut decorative holes with Forstner bit ( $\frac{7}{8}$ "

10. Assemble & install feet

A. Cut profile on feet by cutting a hole with a hole saw at the center of a set of

four feet pieces.

B. Miter outside vertical edge of feet.

C. Separate feet & glue together around a large glue block that extends slightly ( $1/32$  -  $1/16$ " ) beyond the bottom of the foot. See Hylton, p. 116

D. Attach feet to case bottom

11. Assemble top & trim. Right trim is mitered to front trim. Curved front trim butts left side trim and back of right front trim. (See diagram) Plane trim level with top. (See note below)  
Attach escutcheon to top.

12. Fit trim to bottom and shelves. Trim should be proud of top surface of shelf. Use a  $3/8$ " dado as a jig to line up trim precisely to sides. When glue is dry, level the trim to match plywood.(See Note, Planing Edge Banding Flush)

13. Round over edges of trim on top, bottom, shelves and escutcheon. Round over shelf supports (if any)

14. Round over side trim(?)

15. For center supports: drill  $3/8$ " deep hole in bottom of top. Drill appropriate diameter hole  $3/8$  into each shelf surface. Drill hole in center of each center support, top & bottom, as needed.

[?16. Stain & apply 2 coats of finish to *bottom* of top, shelves and center supports.  
*Protect glue surfaces!*]

17. Glue up case.

Prepare at least three special cauls that are as long as the wide side and are very strong. Before you apply glue, judge tightness of fit. If the shelves fit too tightly into the dados they will be hell to position correctly.

A. Turn case to rest on the right side.

B. Clamp back firmly to right side. Align right side and back. Back is reference guide, will not be glued in this step.

C. Install middle shelf support to underside of top shelf and then install top shelf in right side. Align back of shelf in dado on back.

D. Install lower shelf support to underside of lower shelf and then install lower shelf to right side. Align back of shelf in dado on back.

E. Install assembled bottom

F. Attach left side, aligned to back

G. Attach top shelf support to top shelf

H. Attach top

Apply back with screws. Do not glue.

18. Cut ½" deep x ¼" wide mortise in back top of side trim. Attach trim to front sides  
(Finishing nail or plugged screw counterbore at bottom)

20 Pre-wash, stain, & finish

21. Apply back

### *Critique*

The top corner joinery (long T&G) was successful and seems strong. This is a joint to use again for joining plywood at 90°. See Tage Frid's Vol I for details about how to make it.

The design of this case could be improved significantly. Consider using the corner T&G joints for attaching the bottom. Alternatively, consider extending the sides to the floor and cutting out the shape of the feet from the plywood. Then the actual hardwood feet could be glued to both the sides and bottom. This would strengthen the bottom shelf, which could be dadoed into the sides.

The curved trim on the left front of top, bottom and shelves looks quite elegant but is difficult to cut and fit well. Consider other designs, e.g., cutting the radius in solid wood .

It might be better to fit the edge banding to the top and shelves before assembly, so that they are each a unit. They could then be trimmed to the same length as the shelves, etc.

Fit the shelves and bottom behind the vertical side edge bands, i.e., use the side edge bands to register the shelves to the front of the case.

The center supports can have straight sides or curved turnings.

Glueup was extraordinarily difficult and nearly ruined the piece. The wide shelves just would not slide into the ¾" deep dados, and when I was able to force them in, they were randomly misaligned with the front and back. The fact that the two sides are not the same width meant that there was no place to put a clamp to force the sides together at the front.

A. Prepare special cauls for the narrow side that are as wide as the wide side.

B. Use a glue with a long open time. Titebond sets much too quickly. This would have been a good application for hide glue.

C. Chamfer edges of plywood slightly to make it easier for shelves to slide into dados. Consider alternatives to dado joints for such a wide shelf, e.g., two or three short tenons into mortises (stopped dados). These might slide together more easily and would align the shelves front to back.