Contemporary Furniture

17 PROJECTS You Can Build

EDITED BY SCOTT FRANCIS

POPULAR WOODWORKING MAGAZINE

AMERICAN WOODWORKER

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Living Room

CHAPTER ONE

Contemporary TV Stand

by David Radtke

Your state-of-the-art TV deserves something better than a flimsy flat-pack shelving unit from the big box store. This handsome display stand features sturdy construction, storage for CDs and plenty of room for cable, gaming and sound-system components. It's even designed to hide the cord clutter that's inevitable when you connect everything together. You can build it in a couple weekends using basic shop tools and a single sheet of plywood. If you use birch plywood from the home center, as we did, you can build this cabinet for less than most flat-packs will cost.

The finishing touch is a wipe-on finish that makes birch plywood – even budget-priced birch plywood – look rich and sumptuous.

Home Center Plywood

Home center birch plywood isn't likely to win any awards, because it's a lower grade product than the birch plywood sold at hardwood lumberyards. The face veneers on home center plywood are usually very thin and they almost always contain both light-colored sapwood and dark-colored heartwood. Grain patterns and figure can vary widely, even on the same sheet. Try to avoid sheets with significant color contrasts, wild grain or pronounced figure.

Some sheets may contain substrate materials that aren't flat. Eyeball each sheet at a low angle and avoid sheets with divots or depressions in the surface or areas where the birch veneer appears to be sanded thin. You only need one sheet of ¾" birch plywood for this project, so if you can't find a sheet you like, try another store or come back another day.

As far as purchasing solid birch for edge banding the plywood, it's a puzzle why home centers that stock birch plywood don't always stock birch boards. I didn't want to use iron-on edge banding, so I had to go to a hardwood lumberyard to buy the birch.

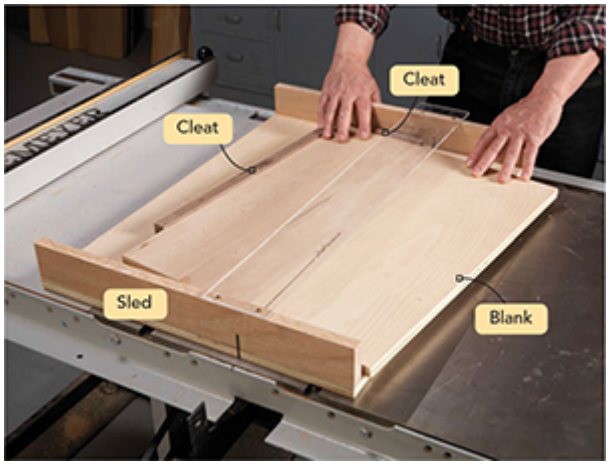
Cut the Tapered Legs

The veneer on home center plywood is prone to chipping, so before you cut the sheet, it's a good idea to install a zero-clearance throat plate in your table saw along with an 80-tooth alternate top bevel (ATB) blade designed for cutting plywood.

Lay out the parts on the plywood according to the cutting list and cutting diagram (**Fig. B**). (Note: Oversize the parts by ½" in both dimensions when you lay them out.)

Break down the plywood sheet into manageable pieces. First, use a jigsaw to rough-cut the back panel (A, **Fig. B** and **Fig. A**). Then either rip the sheet to separate the 18½" wide section that includes the top (B), or crosscut the sheet to separate the two 23" long

leg blanks (C). Note that each blank contains two legs. Once these preliminary cuts are made it's much easier to cut all the pieces to final size.



1 Cut two tapered legs at once using a sled with cleats attached to hold the blank at an angle. Runners attached to the bottom of the sled ride in the saw's miter gauge slots.

2 Plane the edge banding nearly flush with a block plane. Then finish the job by hand sanding with a block. Power sanding is risky because the veneer is so thin.

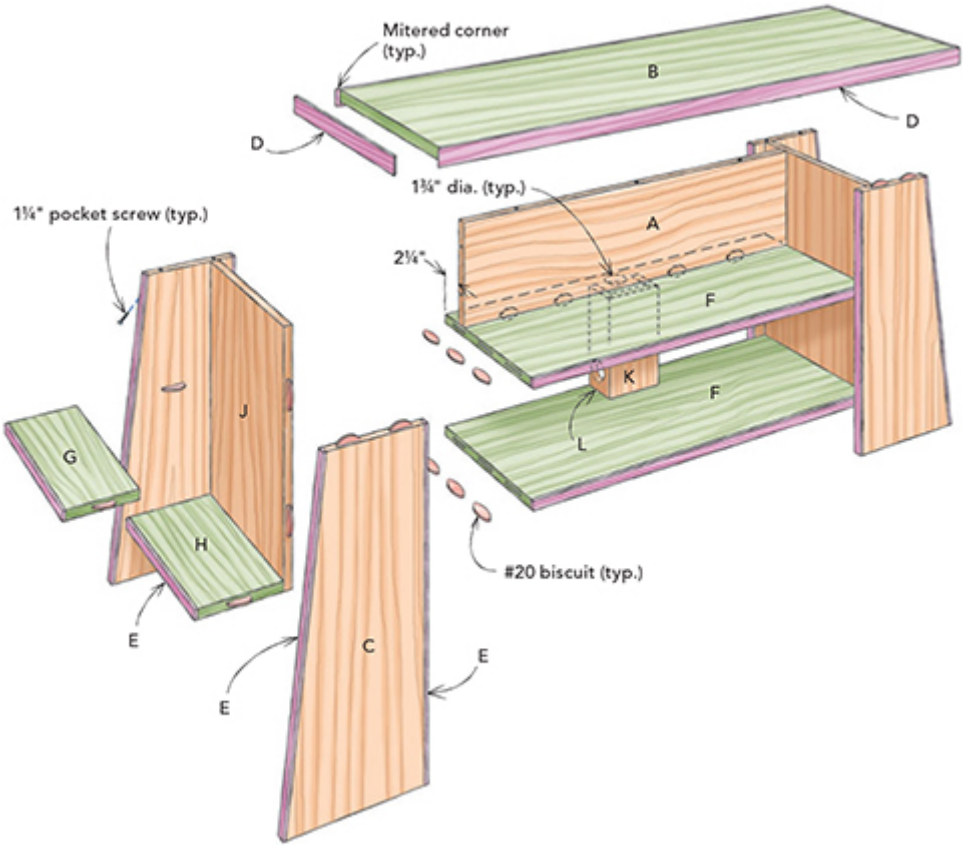


FIG. A EXPLODED VIEW

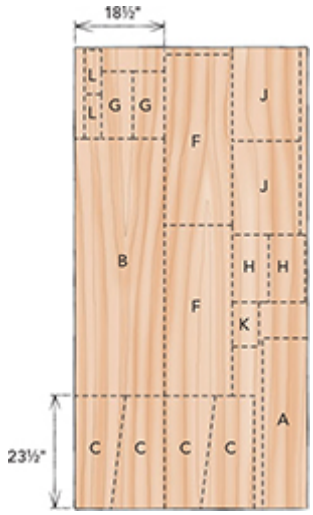


FIG. B PLYWOOD CUTTING DIAGRAM

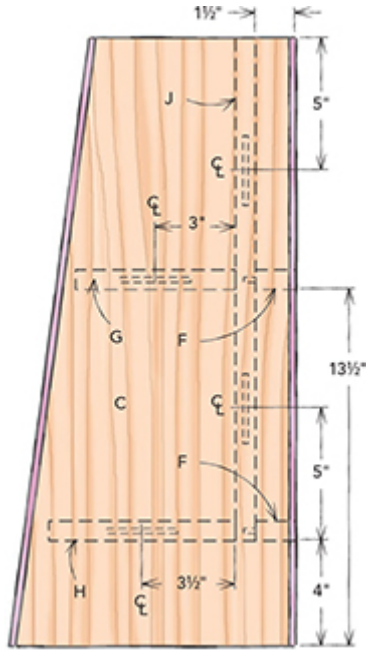


FIG. C LEG DETAILS

Contemporary TV Stand

Overall Dimensions: 23¾" H x 53½" W x 17" D

PART	NO.	ITEM	DIMENSIONS (INCHES)			MATERIAL
			T	W	L	
A	1	Back Panel	¾	8 25/32	35	Birch plywood
B	1	Top	¾	16½	53	Birch plywood
C	4	Leg	¾	10½	23	Birch plywood*
D	2	Wide edge banding	¼	1	84	Birch**
E	4	Narrow edge banding	¼	¾	96	Birch**
F	2	Center shelf	¾	13¼	35	Birch plywood
G	2	Top end shelf	¾	6	13½	Birch plywood
H	2	Bottom end shelf	¾	7	13½	Birch plywood
J	2	End panel	¾	13½	19	Birch plywood
K	1	Chase center	¾	5	8¾	Birch plywood†
L	2	Chase side	¾	3	8¾	Birch plywood‡

*Leg tapers to 7½" at top. Cut two tapered legs from one 18⅛" x 23" blank;
**Cut length to fit; †Both edges mitered; ‡One edge mitered.

Rip the two leg blanks 18⅛" wide. Then use a crosscut sled to cut each blank into two identical tapered legs (**Photo 1**). Fasten a pair of cleats to the sled to hold the blank at the correct angle (**Fig. D**).

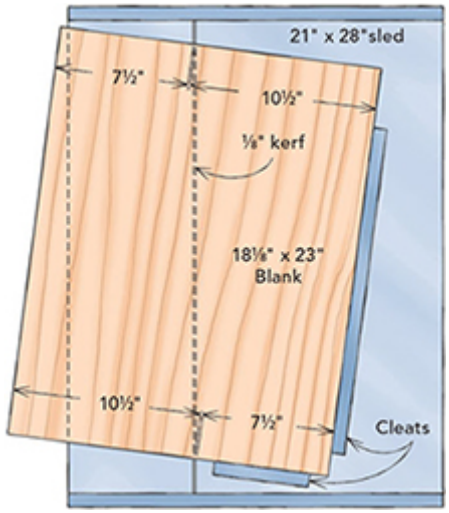


FIG. D LEG TAPERING SET-UP

You don't need to measure any angles – just mark the legs' 7½" top and 10½" bottom measurements onto the ends of the blank. Place the blank on the sled and align the ⅛" spaces between the two lines you've drawn on its ends with the sled's saw kerf. Hold the blank in position and trace its right edge and bottom edge onto the sled. Screw the cleats along these marks, and you're ready to cut the tapered legs. Orient the blanks so that the front faces of the left and right front legs will look good together. Pay attention to the grain: You may decide to cut one of the blanks with its back face up, because that's the best-looking face.

Edge Band the Plywood

Rip lengths of wide edge banding (D) for the top and narrow edge banding (E) for the legs, center shelves (F) and top and bottom end shelves (G, H). Apply a generous bead of glue on each plywood edge and spread it evenly. Center the edge banding on the plywood and stretch tape across the joint to hold the edge banding in position for a couple minutes to allow the glue to tack. Then clamp the joint, using a caul to evenly distribute the pressure.

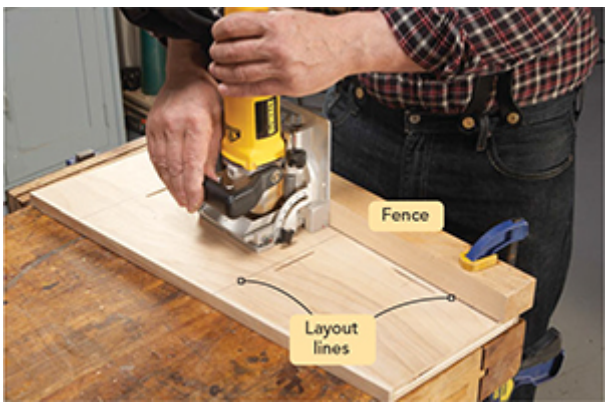
Here's a neat trick: After gluing and taping the edge band to one shelf, use another shelf of the same length as the clamping caul. This trick works for the tapered legs, too.

Be sure to remove all the squeezed-out glue before it dries. For a neat, finished appearance, I glued the top's 1" edge banding all around and mitered the corners.

Trim the edge banding flush with the ends of each piece. Then use a block plane to flush the edge banding with the plywood faces (**Photo 2**). Set the plane to make fine shavings and follow the grain. It's OK to sand the faces of the edge banding with a random orbital sander, but it's best to sand the plywood by hand, using a sanding block.

It's a good idea to plane and sand a test shelf to get a feel for the limits posed by the super-thin birch veneer on this low-cost plywood.

3 Use the bench to register the biscuit joiner when you cut slots for biscuits in the ends of parts such as the shelf shown here. Center each biscuit using the joiner's index line.



4 Use a fence to register the biscuit joiner when you cut slots in the faces of parts such as the leg shown here. Position the fence on a layout line that indicates the bottom of the adjoining piece.

5 Drill pocket holes in the back legs and the back panel. Using both pocket screws and biscuits simplifies assembly.

6 Assemble the bookshelf ends with biscuits and glue. Work on a flat surface and make sure the glued-up assembly is square.

Easy Joinery

Lay out slots for #20 biscuits in the ends of all the shelves, the top ends of both front legs and the bottom edge of the back panel (**Fig. A** and **Fig. C**). Center the slots or space them evenly. Orient the biscuit joiner horizontally to cut these slots (**Photo 3**).

Lay out matching slots in the top face of one center shelf and in the inside faces of each leg and both end panels (J). Note that on the end panels, the center shelves mount directly opposite the end shelves, but only the center shelves are biscuited. Draw lines that indicate the bottom of each adjoining piece. Then clamp a fence on the line and

orient the biscuit joiner vertically to cut these slots (**Photo 4**). The fence registers the biscuit joiner so that these slots will align with the ones already cut in the ends of the other pieces. To cut the slots in the end panel for the bottom center shelf, simply clamp the fence to the end of the end panel.

Lay out and drill pocket holes in the back faces of the back legs and back panel, using a jig (**Photo 5**). Set up the jig to assemble ¾" stock with 1¼" coarse-thread pocket screws.

Assemble in Stages

Start by gluing together the two bookshelf ends (**Photo 6**). Sand all the parts by hand, using a block. Start with #120-grit sandpaper, then switch to #150-grit for final sanding. Be careful not to sand through the veneer. Remove any layout lines that won't be covered by the joints.

Working on a flat surface, dry-assemble the parts to make sure everything fits properly. Then use a flux brush (available at hardware stores) to spread glue into the slots and on the plywood edges. Position the back panel first, flush with the leg at the top and the layout line at the back. Then install the shelves, followed by the remaining leg.

Stand up the assembly to clamp it together. Make sure everything is straight and square and remove any squeezed-out glue before it dries. (Note: You'll be able to clamp the bottom shelf to the back panel, but not the top shelf. Use a couple pin nails to secure it.)

Drill a 1¾" dia. hole in the upper center shelf, 1¼" from the back edge and centered between the ends. Finish-sand this shelf and the back panel and then assemble these parts using biscuits and glue. Make sure the ends remain flush when you clamp the joint. Finish-sand the lower center shelf.

7 Glue and clamp the shelves between the ends. You can use short clamps to complete this job by clamping 2x2s to the lower shelf.

8 Pocket-screw the back panel to the end panels to keep the base from racking. Use a clamp to back up the glued butt joint.

Glue the center shelves between the bookcase ends (**Photo 7**). This large assembly can be hard to manage, so it's a good idea to enlist an assistant to help apply glue, install biscuits, align the parts, position the clamps and remove the squeezed-out glue. Fasten the back panel to the end panels to stabilize the base (**Photo 8**).

Locate and cut the biscuit slots on the underside of the top. You can flip over the base and center it on the top to transfer the slot locations, but there's an easier way: Inside the edge banding, the top overhangs the base by ¾" at the front. That means all you have to do to properly register the biscuit joiner is install a ¾" wide fence against the front

edge banding. Similarly, the top overhangs the base at both ends by 2½". So, just measure the slot center locations in the top of each leg and add the 2½" overhang to transfer them to the top.

9 Install the top. Glue and clamp the biscuit joints at the front and install pocket screws at the back. This method hides the joinery at the front and eases the assembly in back.

10 Fasten the cord chase after centering it on the hole in the upper shelf. The chase and the recess behind the back panel make it easy to hide all the power cords.

Install the top. Apply glue in the slots and to the ends of all the legs and both end panels. Insert the biscuits, position the top and clamp it at the front, using the underside of your bench. Then anchor the back of the top with pocket screws (**Photo 9**).

Assemble and glue the mitered cord chase (K, L) after drilling 1¾" dia. holes in both of the side pieces. Then fasten it between the center shelves (**Photo 10**). Install grommets for a finished appearance.

CHAPTER TWO

Simple Bookcase

By Randy Johnson

The credo of many great 20th-century architects was “Form Follows Function.” That’s certainly true of this bookcase. The strong shelves are supported in a straightforward fashion by equally strong uprights. There’s no decoration, no superfluous details – not even a back to spoil the uniform geometry of this design.

For you, the woodworker, this bookcase has beauty of a different kind. The joinery is amazingly simple: Long threaded rods are concealed inside the pieces and tie the whole

bookcase together. There are no angles to cut, no mortises, no traditional joinery of any kind. And finishing is a breeze because all the parts are finished separately before they're put together. You can buy all of the wood and hardware at a home center.

For tools you'll need a table saw, dado blade, jigsaw, sliding miter saw, planer, jointer, drill press, hand drill, router and router table. If you don't have a sliding miter saw for the wide crosscuts (**Photo 11**) use a table saw sled instead.

Laminate the Plywood

The laminated plywood parts are the bones of this bookcase. They make it strong and stiff – and give it the look of solid wood. The laminations also provide a hiding place for the threaded rods that hold the parts together.

A Strong, Simple Design With Lots of Possibilities

This bookcase is extremely strong and sturdy, thanks to double-layered plywood construction and hidden threaded assembly rods. This knockdown, modular design can easily be modified so you can make a bookcase to fit any room in your house.

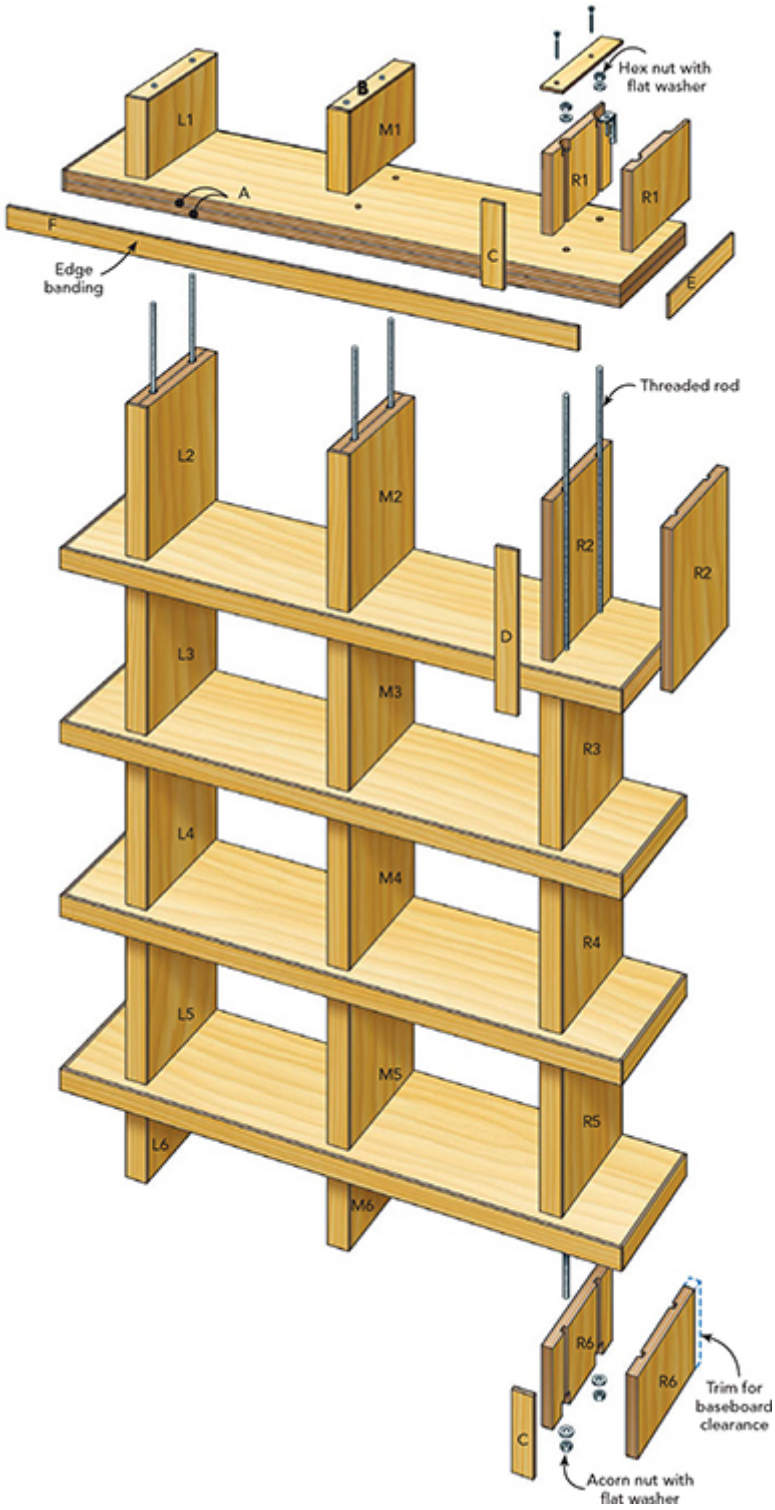


FIG. A EXPLODED VIEW

Label all the parts so you can rematch the wood grain during final assembly.

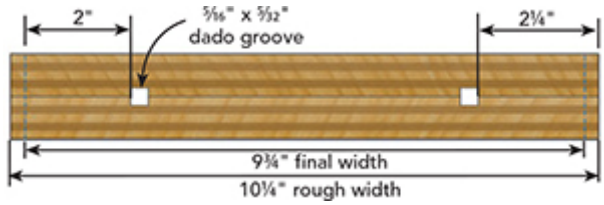


FIG. B END VIEW OF VERTICAL PARTITIONS

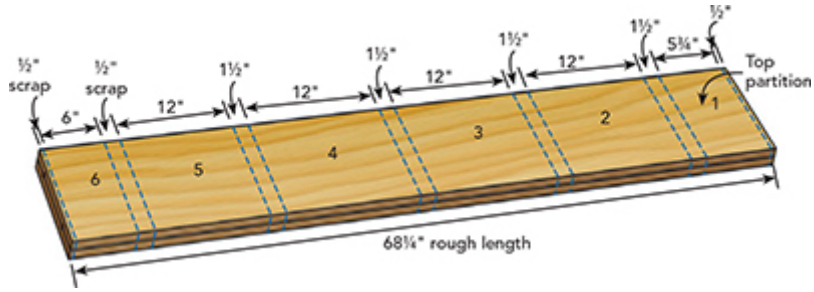


FIG. C LAYOUT FOR VERTICAL PARTITION PANELS

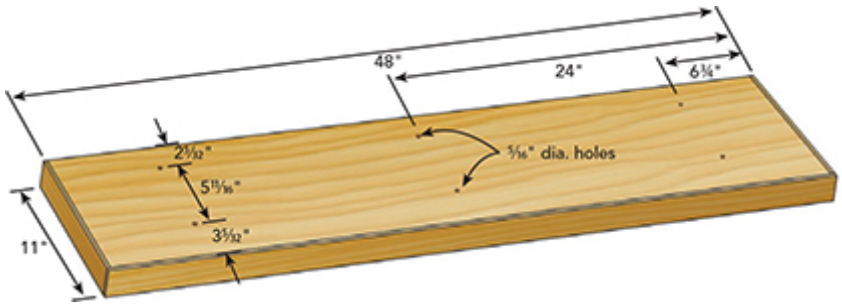


FIG. D DRILLING LAYOUT FOR SHELVES

Contemporary Bookcase

Overall Dimensions: 48" H x 67¼" W x 11" D

PART	NO.	ITEM	DIMENSIONS (INCHES)			MATERIAL
			T	W	L	
A	10	Shelf parts	¾	10¾	47½	Birch plywood
B	3	Top edge banding, top partitions	¼	1½	9¾	Birch
C	6	Front edge banding, top and bottom partitions	¼	½	6	Birch
D	12	Front edge banding, center partitions	¼	1½	2	Birch
E	10	End edge banding, shelves	¼	1½	10¾	Birch
F	5	Front edge banding, shelves	¼	1½	48	Birch
	6	Top partition parts (L1, M1, R1)	¾	9¾	5¾	Birch plywood
	12	Center partition parts (L, M, R, 2-5)	¾	9¾	12	Birch plywood
	6	Bottom partition parts (L6, M6, R6)	¾	9	6	Birch plywood
Hardware						
	6	¼-20 threaded rod	66¼" long			
	6	Hex nuts	¼-20			
	6	Cap nuts	¼-20			
	12	Flat washers	For ¼" rod			
	3	Metal angles	¾" x 3			
	6	Wall anchors				

Mark & Cut the Parts

Carefully mark and label the individual vertical partition parts. We used a special labeling system that makes it easy to rematch the grain during final assembly.

Edge Band the Plywood

Edge banding covers the edges of the plywood and makes the panels look almost like solid-wood planks. Make the ¼"-thick edge banding by resawing ¾" thick by 1¾"-wide lumber in half. Remove the saw marks and reduce the stock to ¼" thickness with a planer.

Rout, Drill & Assemble

Use your router to cut the grooves that house the hidden assembly and mounting hardware. Then counterbore for the nuts and washers, and drill the shelves for threaded rods. Assembly is a breeze – just slip the parts together and tighten the nuts.

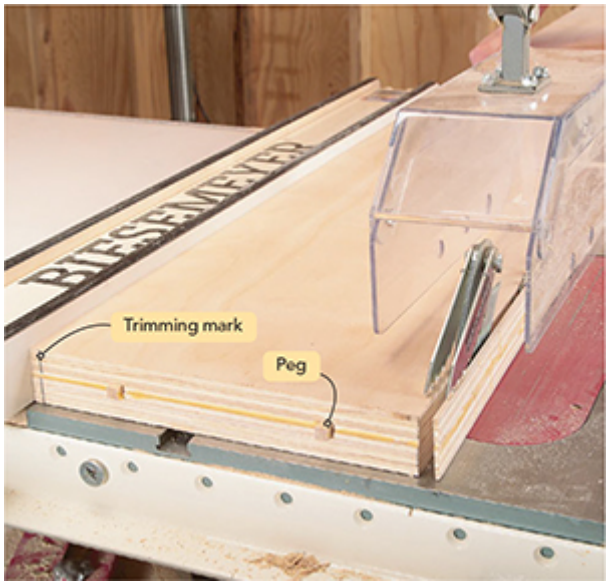
Anchor It to the Wall

It's important to anchor this bookcase to the wall. Bookcases tend to be unstable by themselves; adding the extra weight of books or decorative objects can make the situation even worse. Once an unanchored bookcase starts to fall, there's little stopping it. Always anchor bookcases and other tall furniture to the wall if small children are around.

1 Cut all the plywood parts oversize. Leave the plywood for the vertical partitions (parts L, M and R) as long panels. The individual vertical partitions are cut to final width and length later. Add ½" to the width and length of the shelves (parts A) which are also cut to final size later.

2 Make room for the threaded rods that hold the parts together by dadoing grooves into the backside of the vertical partition panels (parts L, M and R). See **Fig. B** for the placement of these grooves. When the panels are sandwiched together, these grooves create the holes for the threaded rods.

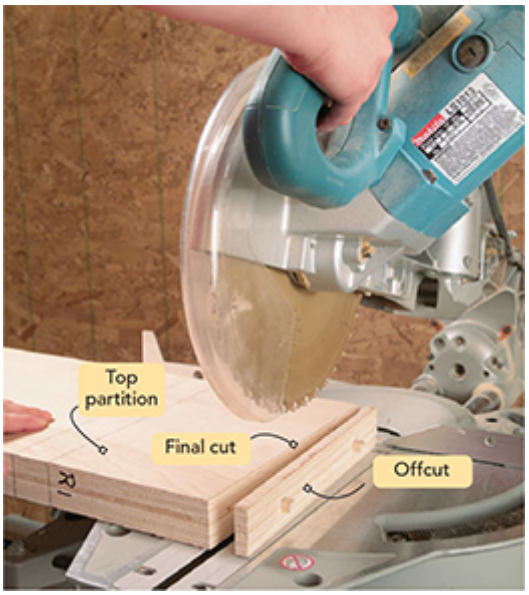
3 Glue together the panel halves for the vertical partitions (parts L, M and R). We glued up all three pairs at once to help keep them flat. This is a big glue up, so use a slow-drying glue. Use $^{5}/_{16}$"-square wood pegs at both ends to keep the panels aligned. The pegs get drilled out later. Use clamping cauls to protect your plywood. If you don't have enough clamps, you can precut your panels in half and glue them up as shorter sections. (Use square alignment pegs in both ends of these shorter panels, too.) This is also the time to glue and clamp the plywood for the shelves (parts A).



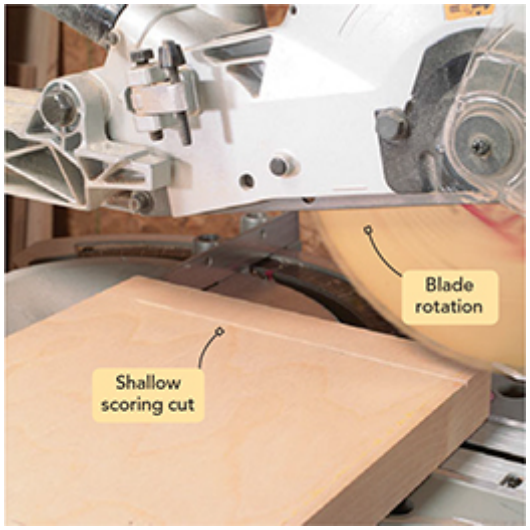
4 Trim the glued-up panels to final width. Measure and cut carefully so the holes are equally spaced from each trimmed edge (**Fig. B**). Scrape off any glue drips from the plywood edges before cutting to prevent the drips from hanging-up on the saw fence. Also, this is the time to trim the plywood shelves to final width.

5 Label the individual vertical partitions (parts L, M and R) on the long panels. The markings help you rematch the grain during final assembly. Use the letters L, M and R for left, middle and right and number from the top down. The double lines represent the location of the shelves and will be cut away when the sections are sawn apart.

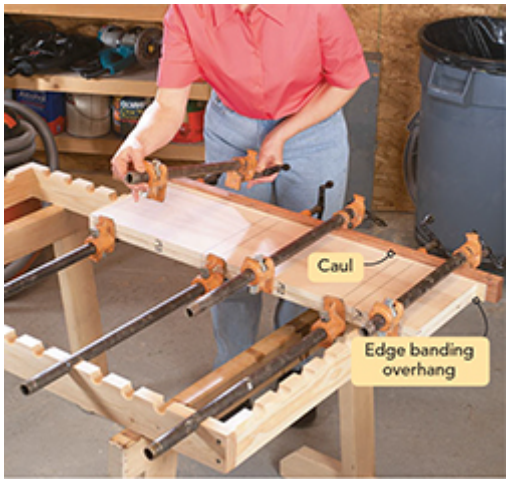
6 Rough cut the long panels into two parts so they’re easier to handle and edge band. Use spacer blocks to provide clearance for your jigsaw blade. Your sliding miter saw would also work for this rough cutting.



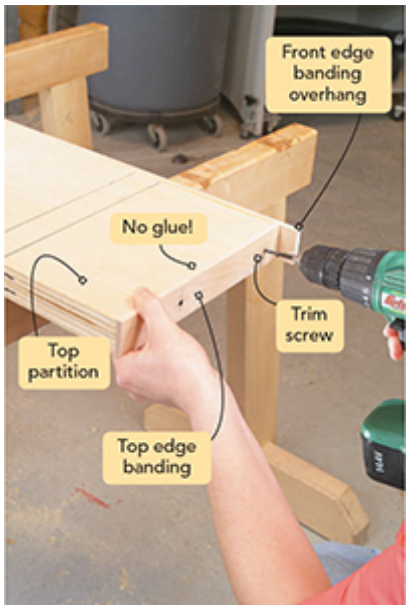
7 Trim the top end of the vertical partitions to final length (parts L1, M1 and R1). Cut the glued-up shelf panels (parts A) to final length at this time also. A sliding miter saw is a great tool for this job because it’s quick and accurate. Prescore the plywood to reduce veneer chipping.



Don’t let chipped plywood veneer ruin a good day in the shop. Take preemptive action by prescoring the top side of your plywood. Make the scoring cut about 1/8" deep on the pull stroke and then, with a return push stroke, complete the crosscut. This reduces or eliminates most veneer chipping.



8 Edge band the fronts of all the partition-panel sections (parts L, M and R). Overhang the edge banding about 1" beyond the top end of parts L1, M1 and R1. This overhang is trimmed after the next step. Use a caul to protect the edge banding and spread out the clamping pressure.



9 Attach the top edge banding (part B, **Fig. E**) with two small trim screws. Do not glue. Then trim the overhanging front edge banding flush, using a handsaw.

10 Flush trim the front and top edge banding on the vertical partitions (parts L, M and R).

11 Crosscut all the vertical partitions (parts L, M and R) to final length.

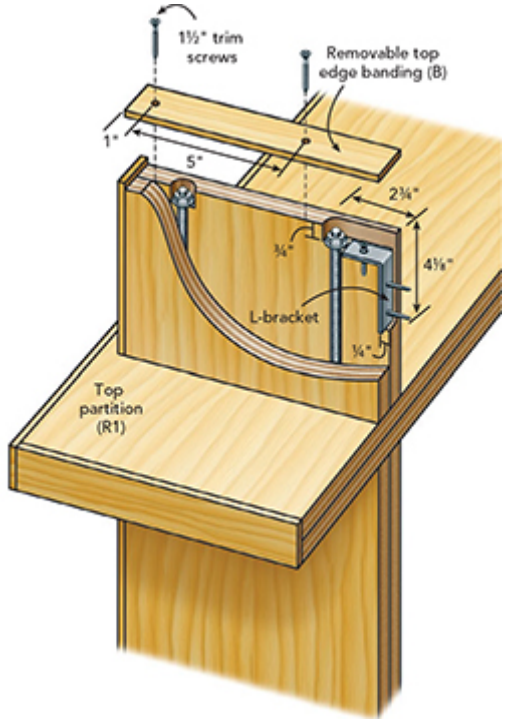


FIG. E CUT-AWAY DETAIL OF TOP PARTITION

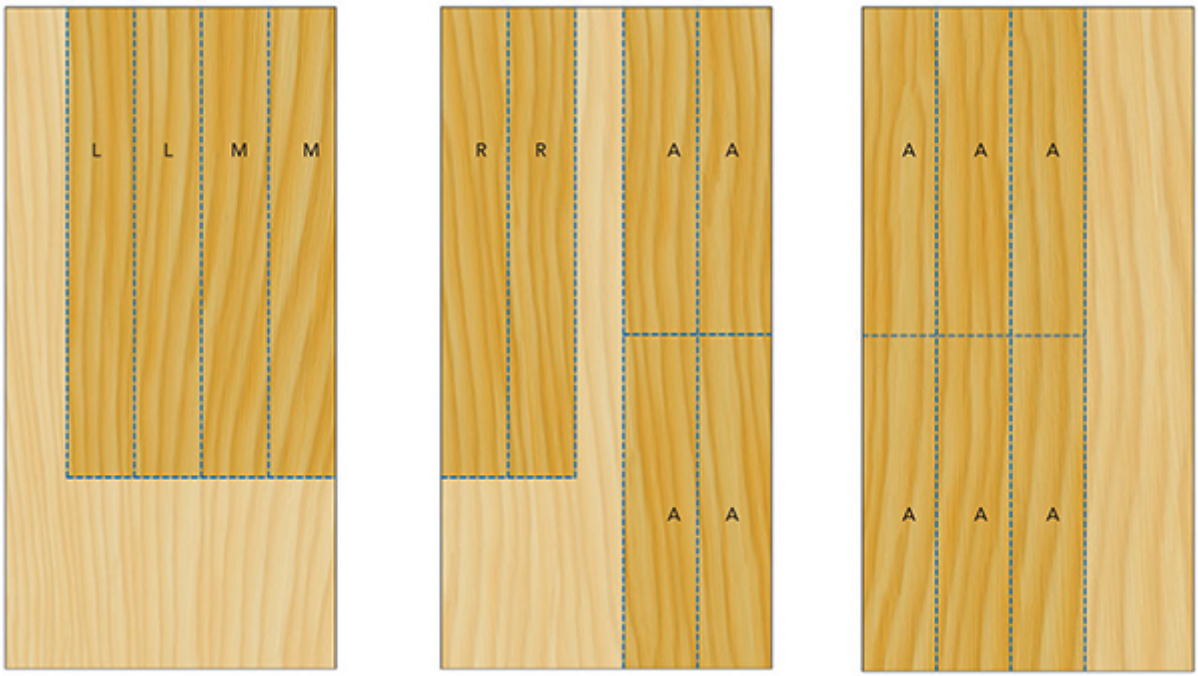


FIG. F PLYWOOD LAYOUT

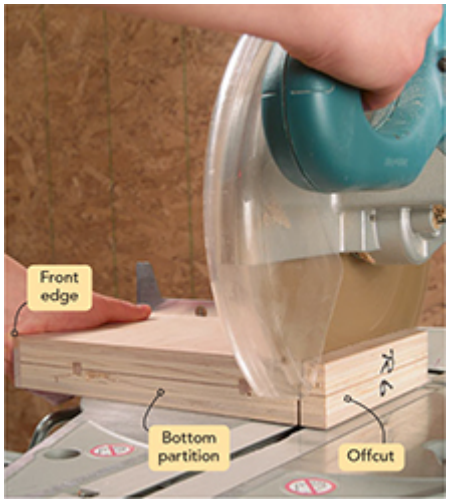
Make It Big or Make It Small

Want to fill your whole wall (even around a window!) with enough storage for a whole library? You can do that!

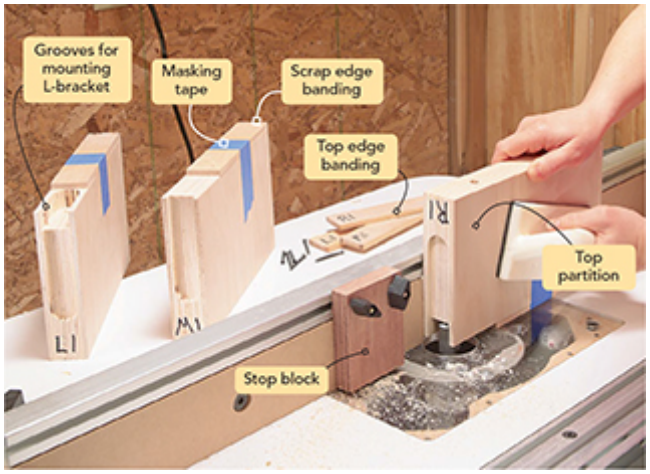
The shelves of our bookcase can easily be made longer than 8' by staggering the plywood pieces when you glue them together. If you measure carefully you'll even be able to hide the joints under the vertical partitions. Use a biscuit joint below the window openings to keep the vertical partitions lined up.

Need a small bookcase? No problem. You can make this bookcase smaller, too. You can even edge band both sides of the shelves and use the unit as a room divider. Just be sure to fasten it to the floor.

You can also make it low, with a piece of glass on the top for a contemporary sofa table. For a low design, skip the trim screws in the top edge banding (parts B) and just glue it on. When it comes time to assemble, epoxy the threaded rods into the square holes in the bottom of the top partitions. Then assemble and fasten the parts together, from the bottom, with regular hex nuts.



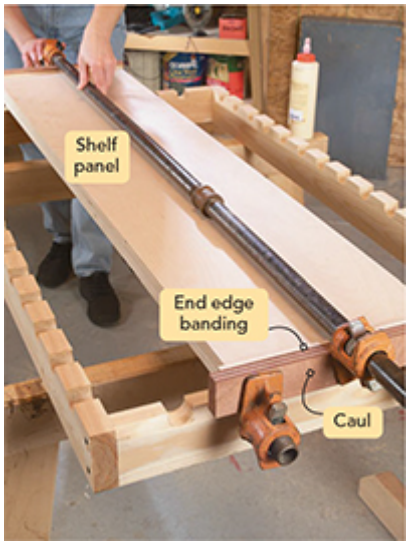
12 Trim off ¾" of the back edge of the bottom partitions (parts L6, M6 and R6). This provides clearance for your wall's baseboard so the bookcase stands flush against the wall. Make sure to re-label the backs of the bottom partitions (L6, M6 and R6) with their location markings.



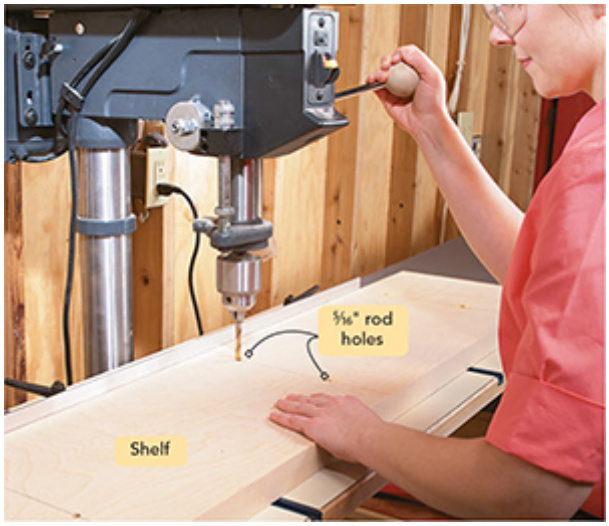
13 Rout the grooves for the wall-mounting brackets into the top partitions (parts L1, M1 and R1, see **Fig. E** for details). First remove the top edge banding strips (parts B) and replace them with short pieces of scrap edge banding. These temporary pieces are needed as spacers because the front edge banding overhangs the top edge. They are left short so they don't interfere when routing the groove. Use a 1"-diameter straight bit for the routing. Cut the deeper top groove in two or three passes.

14 Drill holes for the assembly nuts and washers. Drill into the center of the square wood pegs that are glued into the panels. Only the top and bottom partitions (parts L, M and R) receive these large holes.

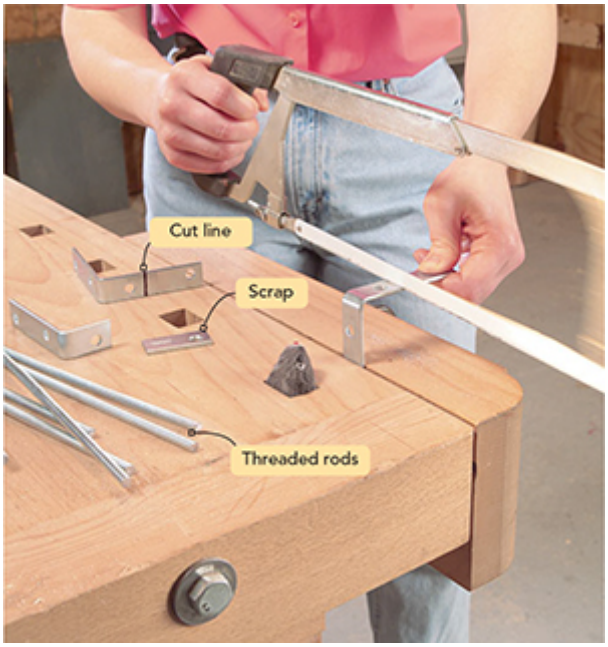
15 Ream out the square holes in all of the vertical partitions (parts L, M and R) with a long drill bit. This removes any dried glue, wood splinters and remaining wood pegs.



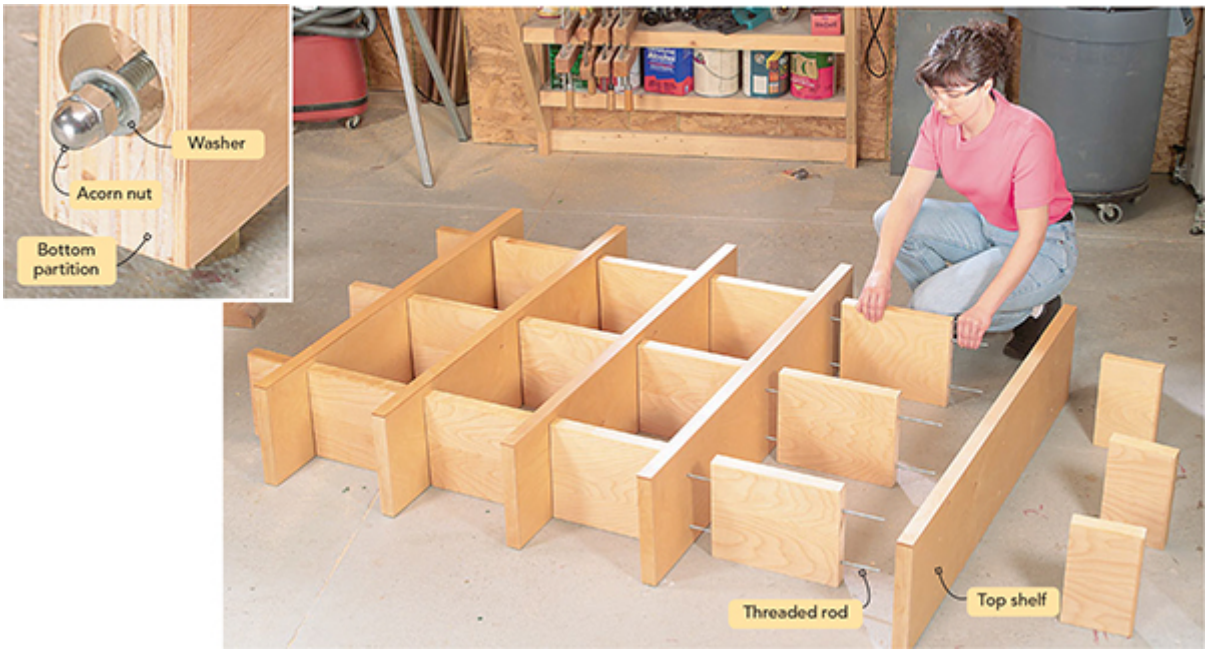
16 Edge band the shelves (parts A). Start with the ends (parts E) and then add the front edge banding (parts F). Trim any overhanging edge banding with a handsaw and flush trim the long edges with a flush-trim bit in your router.



17 Drill holes for the threaded rods in the shelves. Lay out these holes carefully and use a drill press to ensure that the holes go straight through the shelves. See **Fig. D** for the layout dimensions. After all the parts for the bookcase are fabricated, do a final sanding. Then apply a clear finish of your choice. Finishing prior to final assembly is a lot easier than brushing or spraying all those inside corners once the bookcase is put together.



18 Saw the mounting L-bracket and threaded rods to length. The length of the short leg on the mounting angle is not critical, just cut it off about ¼" beyond the first hole.



19 Assemble the prefinished bookcase on the floor. Lay the parts on their backs and slide them onto the threaded rods. Start with the bottom partitions and shelves and work your way to the top. The acorn nut at the bottom acts as a bolt head and makes tightening a lot easier. After sliding all the parts together, put a regular hex nut and washer on the top end. Lightly tighten the parts using a socket wrench at each end. The vertical partitions should self-align, but if you notice one that's slightly out of alignment, give it a little bump until it's lined up. When everything is perfectly aligned, do a final tightening.

20 Mark the inside of the groove on the wall after standing the bookcase against it.

21 Attach the L-brackets to the wall with screws and wall anchors. Align the top of the L-bracket 5⁄8" down from the top of the pencil marks.

22 Screw the L-bracket to the bookcase. If you’re setting your bookcase on carpet you should leave the screw head sticking up about 1⁄4" above the L-bracket. This allows the bookcase to settle into the carpet. Once you’ve secured the L-brackets to the bookcase you can screw the top edge banding strips (parts B) back in place.

CHAPTER THREE

Mid-century Coffee Table

By Mario Rodriguez

Here's a simple table that's perfect for any modern interior setting. It employs loose-tenon joinery and a veneering technique I introduced years ago that uses yellow glue and a common household iron.

The base is made up of square legs that are joined to rails of the same dimension. Then the construction is reinforced by a second set of slightly narrower rails. The rectangle formed by the legs and top rail is visually divided and reinforced by a second, slightly narrower, rail. This simple arrangement of the rectangle creates a nicely divided space that is both strong and pleasing to the eye.

Simple Joints for a Clean Look

The key to this design is a base that doesn't distract the viewer from the intricate top – so I kept the rails and legs at 1½" square. Working with such slender members presented a problem: How could I maintain the dimensions of the parts yet join them soundly?

I decided to use loose mortise-and-tenon construction for the base. Loose tenons provide the necessary strength and allow me to speed up and simplify construction.

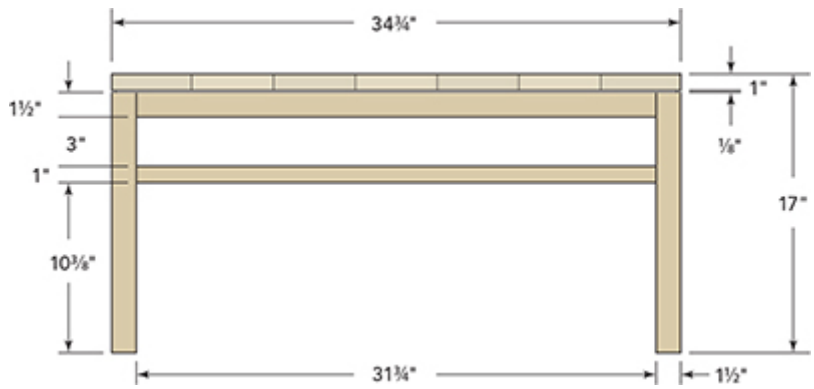
To cut the mortises, use a jig made from scrap plywood that supports and secures the parts, and provides precise registration and uniform results. The key to the jig is a platform that controls the travel of a ¾" outside-diameter router bushing to set the length of the mortise. The mortises are ⅜" wide and cut with an upcut-spiral router bit. The space between the router bit and the router bushing provides adequate clearance for chips and debris generated by the cut.

The distance between the outside of the bushing and the bit is figured into the length of the slot on the router jig. The jig platform is mounted onto a fence that centers the mortise on the wood thickness and a stop is attached to the fence. This setup controls perfectly both the position and dimensions of the mortises for both the legs and the rails.

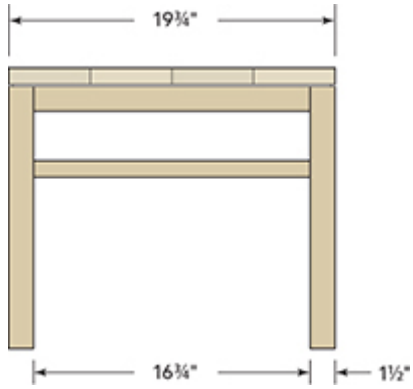
In one configuration, the jig is set to cut the top mortises in the direction of the leg. With the fence reset at 90° to the slot, I cut the mortises for the lower rail, which runs across the leg.

To make the tenons, dimension oak stock to a precise ⅜" thickness and rip it to a fat 1" to match the length of the mortise. Then set the table saw blade at 45° and cut off the corners of the tenon stock to produce tenons that fit neatly into the rounded mortises without any play or slop.

Finally, cut the tenon stock to length on the band saw. Because the legs are only 1½" square, the mortises are a little shallow. But by mitering the protruding ends to 45°, the tenons more fully engage the mortises for increased strength.



FRONT



END

Mid-century Coffee Table

NO.	ITEM	DIMENSIONS (INCHES)			MATERIAL
		T	W	L	
4	Legs	1 1/2	1 1/2	15 7/8	Walnut
2	Long top rails	1 1/2	1 1/2	31 3/4	Walnut
2	Short top rails	1 1/2	1 1/2	16 3/4	Walnut
2	Long mid rails	1	1 1/2	31 3/4	Walnut
2	Short mid rails	1	1 1/2	16 3/4	Walnut
2	Long reveal strips	1/8	1 1/4	34 1/4	Walnut
2	Short reveal strips	1/8	1 1/4	19 1/4	Walnut
1	Top*	1	19 3/4	34 3/4	Plywood

*Top substrate 3/4" plywood with 1/4"-thick strips along bottom edges.

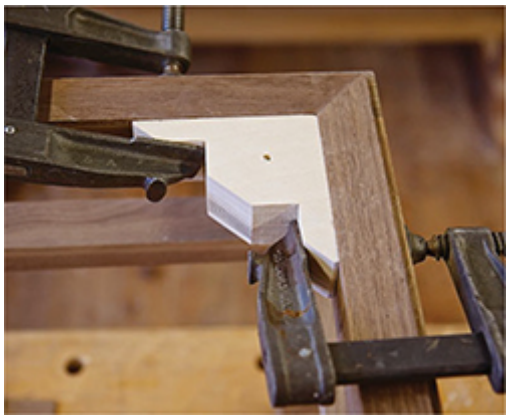
The jig platform is assembled around the bushing to ensure a snug fit. The narrow strips in the middle are equal in width to the diameter of the bushing.

Mortises are cut into both the legs and aprons with the same jig and at the same settings.

With the jig fence reset, mortises for the lower rail (which run across the leg) are also cut.

The ends of the tenons are mitered for a stronger joint.

Thin strips applied flush with the inside edges create a ⅛" reveal between the upper edge of the rails and the tabletop.



Corner blocks are glued and screwed into place. They strengthen the corner and provide a way to attach the top.

Two Steps for the Base

Carefully clean and sand the legs and rails, removing all mill marks before the glue-up. Then join the legs to the longer rails, checking for square and for tight joints. After allowing the longer frames to set up, join the frames to the shorter rails and again check for square.

When the base is completely glued up and set, I glue and nail ⅛"-thick x 1¼"-wide strips flush with the inside top of the table base with mitered corners. These strips create an attractive reveal between the top and base when the table is assembled. Next, I screw and glue reinforcing blocks at each corner to strengthen the base assembly and provide a means of attaching the top to the base later.

Weave the Top

I use ¾"-thick shop-grade plywood for the top, “beefed up” to a 1" thickness with ¼"-thick strips glued and nailed to the underside of the thicker plywood. When the glue is dry, I use a block plane to plane the edges flush.

The veneered top is arranged in a pattern of squares, with each square’s grain running perpendicular to those surrounding it. This easy arrangement achieves an attractive design that resembles a basket-weave pattern that’s made even more striking by the strong linear grain pattern of the teak veneer I used.

The thought of working with veneer usually strikes terror in the hearts of most woodworkers. Veneering can be messy, difficult and unpredictable – but on this project, it’s a piece of cake; many of the problems commonly associated with veneering are easily avoided.

I chose reconstituted teak veneer for its straight grain and strong contrast. Unlike conventional veneer, reconstituted veneer is made up of sliced veneer that is reglued into a distinctive yet uniform color and pattern, then sliced into sheets. This produces an unusually stable and well-behaved material that is well-suited to this veneering technique and perfect for this project.

The veneer is sold in sheets measuring 26" x 135" and is available in several wood species. Because of its unique constitution, the veneer is fairly easy to handle and not prone to cracking or tearing as easily as conventional veneer.

Thin strips added to the perimeter make the plywood top appear thicker. A block plane is used to trim and flush the substrate edges.

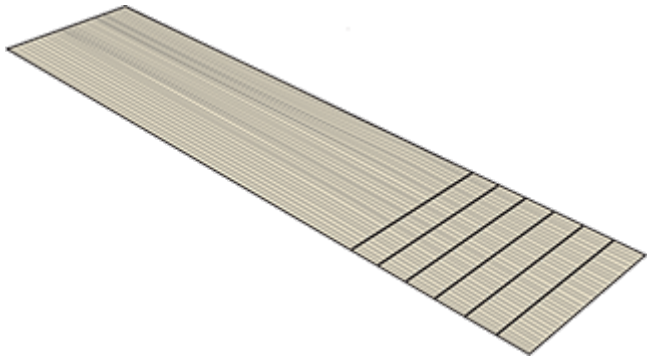
The reconstituted veneer sheet is cut across the grain into 5"-wide strips.

After reducing the large sheet to smaller, easier to handle sections, cut several 5"-wide strips across the grain and a number of 5"-wide strips along the grain. Then tape these strips together, alternating long-grain with cross-grain strips.

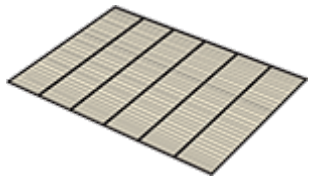
Next, cut this reconfigured sheet into 5"-wide strips, producing strips with alternating grain squares. Finally, flip every other strip end over end to achieve the basket-weave design and tape this arrangement together. (As a precaution, I applied tape along the perimeter to prevent any damage.)

From offcuts and leftovers, form enough edging to cover the tabletop's edges, then generously apply tape to these strips.

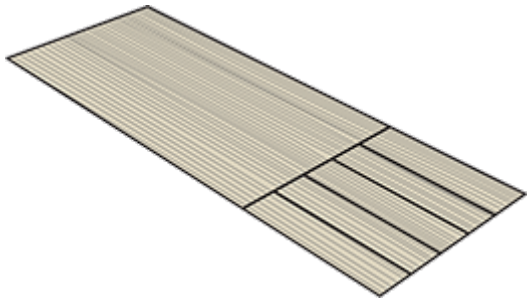
Basket Weave by the Numbers



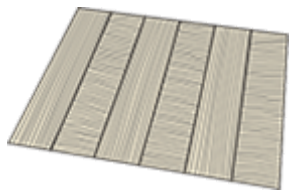
1 Reconstituted veneer is sold in sheets measuring 26" x 135".



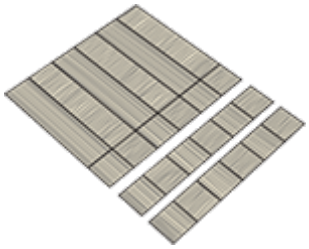
2 Cut 5"-wide cross-grain strips from the sheet.



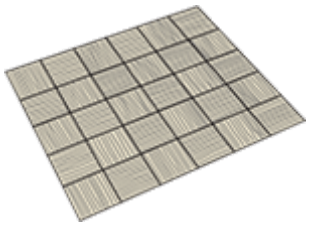
3 Cut 5"-wide strips with the grain from the sheet.



4 Tape alternating strips together. Begin with a long-grain strip and end with a cross-grain strip.



5 Cut 5"-wide strips from the composite sheet.



6 Flip every other strip end over end to achieve a basket-weave pattern and tape the strips together. Edging strips are cut from this basket-weave sheet.

After pinning the strips into place, dampened veneer tape is applied along the entire seam.

Modern Method

To better protect the edges and corners of the table, I decided to glue down the top first then snug the edging up against it. This critical gluing sequence protects the more vulnerable edging from being easily damaged or pulled away later.

Use a 4" foam roller to apply yellow glue to both the plywood substrate and the veneer. The initial application of glue to the veneer causes it to buckle slightly because of the water contained in the glue. That inevitable movement can be minimized by lightly wetting the face (taped) side of the veneer. Be careful though – too much water can loosen the tape. Let the glue dry thoroughly before applying a light second coat.

After about four hours, when everything is dry, carefully place the basket-weave sheet onto the substrate. Align the edges with the substrate but include about ¼" of overhang all around.

With a common household iron set at medium-high, start at the center of the panel and work slowly toward the edges. After covering the entire sheet, let it cool for about an hour.

With the larger basket weave down and secure to the substrate, carefully apply yellow glue to the edging and the substrate edges with a small brush and let this dry thoroughly. Once it's dry, use a warm iron to carefully press the edging into place, making sure it is tight up against the veneer of the top. Then leave everything to set up and cure properly. This curing or drying period will stiffen the veneer, making it easier to clean up and trim later.

A roller secures the veneer tape and ensures a strong bond and a tight seam.

Yellow glue is applied with a foam roller to the back of the veneer and to the substrate.

The iron heats the veneer and the glue, adhering it to the substrate.

Clean-up Time

The tape is applied with water, and I remove it the same way. Once yellow glue is completely dry, it isn't affected by a light application of moisture. So I spray a small amount of water onto the tabletop, wait a few minutes for the tape to soften, then gently scrape and peel off the tape.

With the glue dry and all the tape removed, use various files (I like a 10" second-cut file and a Grobet detail file), a card scraper and a sanding block to trim and flush the edges.

Once you've finished cleaning up the top, apply denatured alcohol to the surface and edges to make sure the veneer is securely applied. The alcohol raises the grain and swells the veneer, which causes it to rise off the substrate surface at any spots where the two didn't fully bond. If you do have any areas that require attention, small bubbles are easily glued down by going over those areas with a warm iron.

After waiting a couple of days for the veneer to dry completely, sand the top and edges to #220-grit, then apply four coats of a wipe-on varnish. (I used a satin finish wipe-on urethane from General Finishes), sanding between the first and second coats. The last two coats are rubbed out with a fine aluminum oxide 3M Rubbing Pad.

The base is stained with a dark walnut dye that is rubbed out and allowed to dry before applying the same wipe-on varnish used for the top.

After wetting down the tabletop, gently remove the tape with a scraper.

After trimming, a detail file cleans up and softens the edges.

CHAPTER FOUR

Bow Front Corner Cabinet

by Chad Stanton

If you're looking for a bit of a challenge and some practice creating furniture with irregular shapes, give this handsome corner cabinet a try. It looks pretty simple, doesn't it? It's just a box with two sides and a few shelves. It's got a curved drawer, too – which isn't so simple – but let's skip that for the moment. As I started building a prototype, I thought, "This is no problem at all. It's just normal cabinetmaking."

Oops. As it turns out, this cabinet isn't normal: Some of its building steps are best done backwards. Normally you'd build a case first, then build a drawer to fit it. Not here – you make the drawer first, then build the case. Normally you'd make a face frame early on and fasten it to the case. Not here – there isn't any face frame. The stiles are added separately, after the shelves and drawer are installed.

After reversing course a few times, I realized that I had learned quite a few new tricks and skills while building the prototype. I gained experience dealing with irregular shapes, figured out how to build up ¾" plywood to make it look thicker and perfected a way to make wide edging that's only 1/16" thick.

About that drawer – although it doesn't hold much, it anchors the whole design by adding visual weight to the bottom of the cabinet. It also anchors the whole building process, in a way. The success of the project depends on making a drawer front with a perfectly smooth, even curve.

Assemble the Sides

Start by laying out all of the cabinet's plywood pieces on one sheet of plywood (**Fig. B**). Draw the two sides (A and B) as one unit. Make this large rectangle 1" wider than the two sides combined and 1" extra-long. Cut out two cardboard patterns for all of the triangular pieces (**Fig. J**). These patterns are slightly oversize, but be sure to create a ¾" gap between the triangles when you lay them out – as shown in **Fig. B** – so you have room to turn a jigsaw.

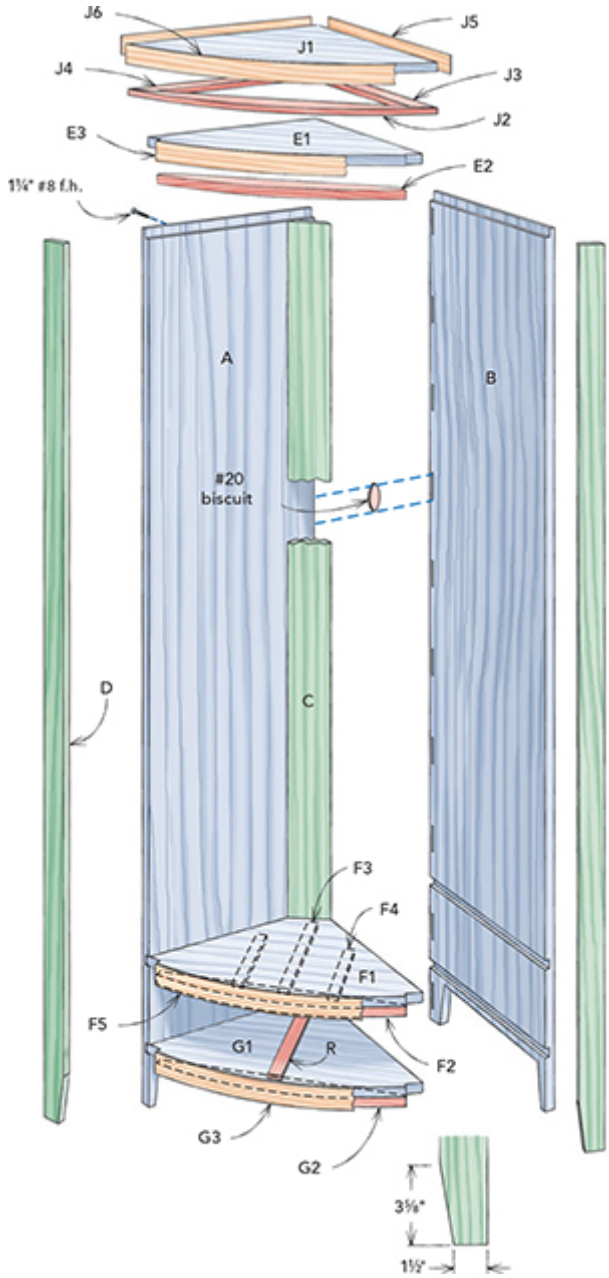


FIG. A EXPLODED VIEW

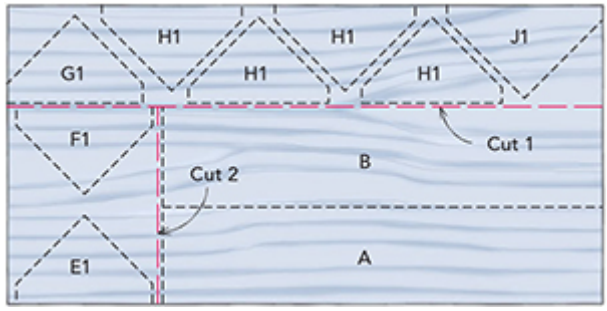


FIG. B PLYWOOD CUTTING DIAGRAM

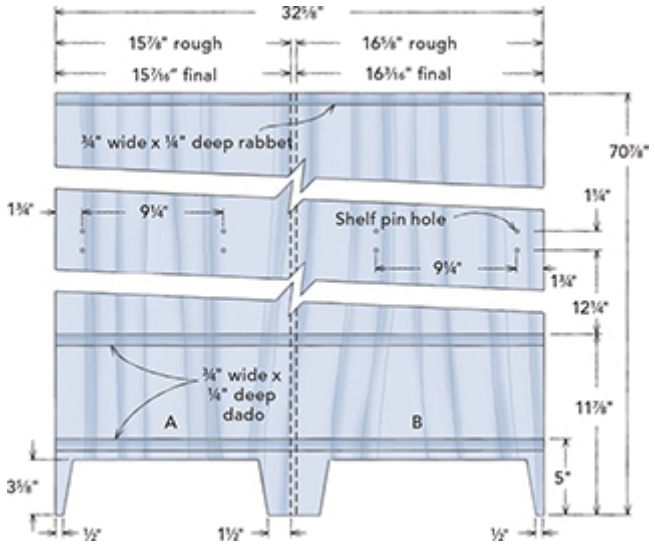


FIG. C SIDE DETAILS

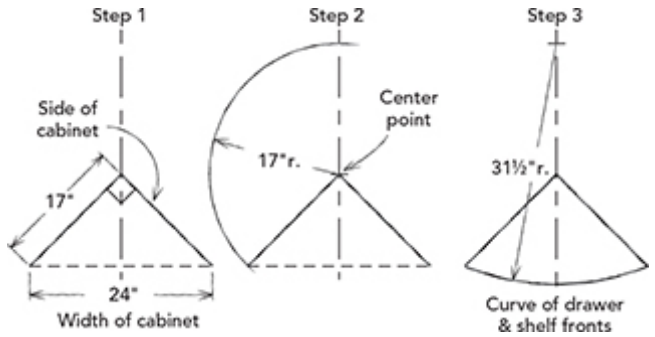


FIG. D CURVE LAYOUT

FIG. E PLAN VIEW OF SHELF TEMPLATE AND CASE

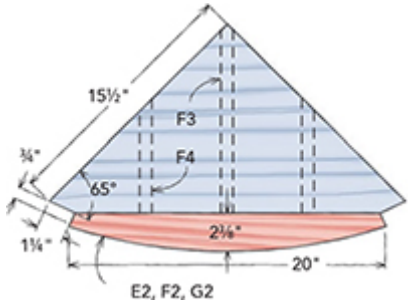


FIG. F SUBTOP AND SHELF DETAILS

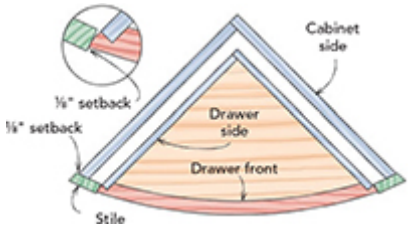


FIG. G PLAN VIEW OF DRAWER INSIDE CASE

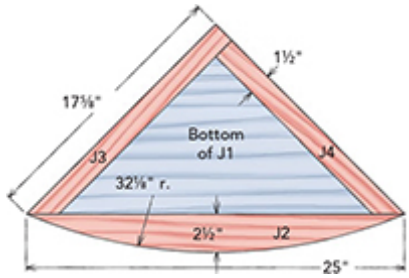


FIG. H TOP DETAILS

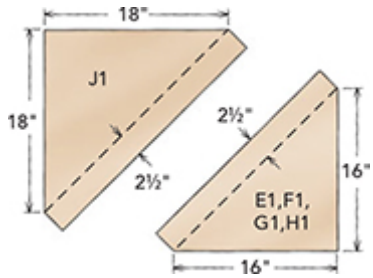


FIG. J PATTERN PIECES FOR ROUGHING OUT TOP AND SHELVES

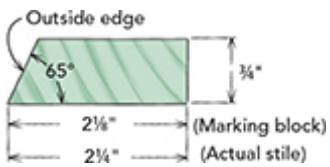


FIG. K STILE MARKING BLOCK

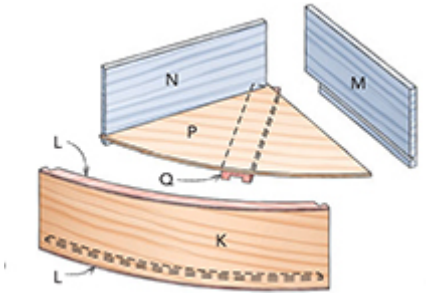


FIG. L EXPLODED VIEW OF DRAWER

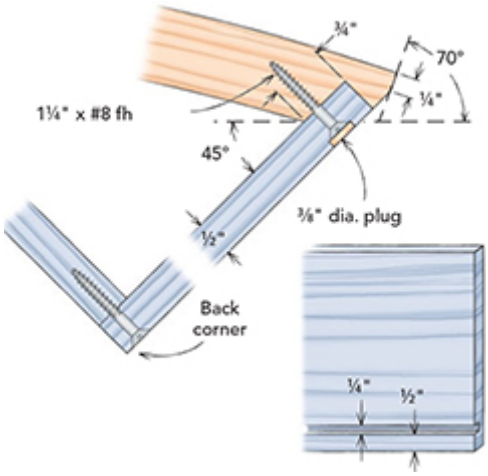


FIG. M DRAWER DETAILS

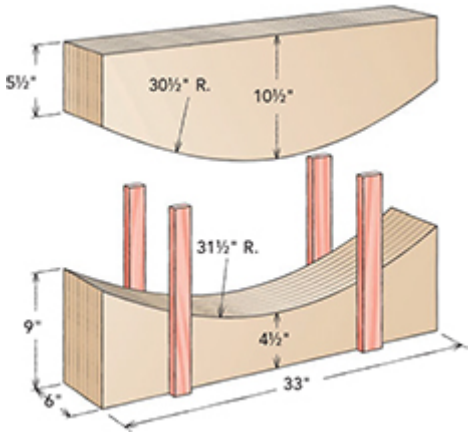


FIG. N DRAWER-FRONT BENDING FORM

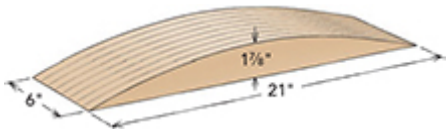


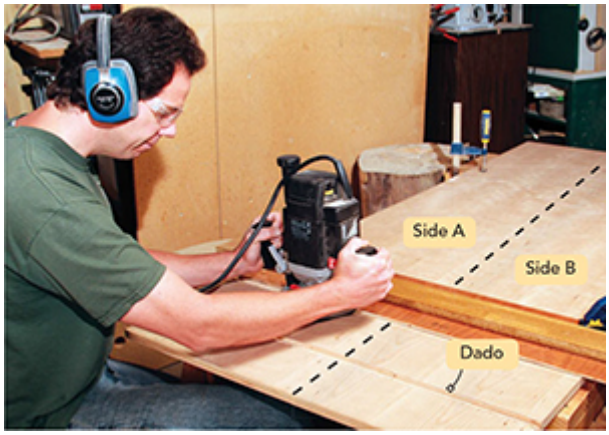
FIG. P DRAWER-FRONT CUTTING JIG

Bow Front Corner Cabinet

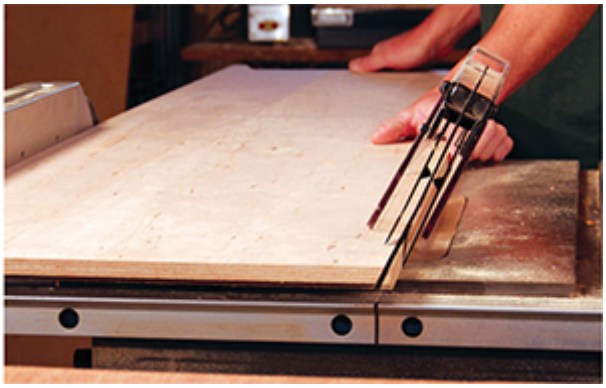
Overall Dimensions: 72" H x 24⅞" W x 15" D

PART	NO.	ITEM	DIMENSIONS (INCHES)			MATERIAL
			T	W	L	
Case						
A	1	Side 1	3/4	15 7/16	70 7/8	Plywood
B	1	Side 2	3/4	16 3/16	70 7/8	Plywood
C	1	Back	3/4	3 1/2	58 1/4	Solid wood
D	2	Stile	3/4	2 1/4	70 7/8	Solid wood
E1	1	Subtop	3/4	13 5/8	21 15/16	Plywood
E2	1	Subtop Buildup	3/4	2 3/8	20	Solid wood
E3	1	Subtop Edging	1/16	1 1/2	20 3/8	Solid wood
F1	1	Shelf 1	3/4	13 5/8	21 15/16	Plywood
F2	1	Shelf 1 Buildup 1	3/8	2 3/8	20	Solid wood
F3	1	Shelf 1 Buildup 2	3/8	3/4	11	Solid wood
F4	2	Shelf 1 Buildup 3	3/8	3/4	6	Solid wood
F5	1	Shelf 1 Edging	1/16	1 1/8	20 3/8	Solid wood
G1	1	Shelf 2	3/4	13 5/8	21 15/16	Plywood
G2	1	Shelf 2 Buildup	5/8	2 3/8	20	Solid wood
G3	1	Shelf 2 Edging	1/16	1 3/8	20 3/8	Solid wood
H1	4	Adjustable shelf	3/4	11 1/2	21 3/8	Plywood
H2	4	Adjustable shelf Edging	1/16	3/4	20 3/8	Solid wood
J1	1	Top	3/4	15	24 15/16	Plywood
J2	1	Top Buildup 1	3/8	2 1/2	25	Solid wood
J3	1	Top Buildup 2	3/8	1 1/2	17 5/8	Solid wood
J4	1	Top Buildup 3	3/8	1 1/2	16 7/8	Solid wood
J5	2	Top Edging, side	1/16	1 1/8	17 5/8	Solid wood
J6	1	Top Edging, front	1/16	1 1/8	25 9/16	Solid wood
Drawer						
K	1	Front	1	5 1/2	20 1/16	Plywood*
L	2	Edging	1/8	1	20 1/16	Solid wood
M	1	Side 1	1/2	5 3/4	13 3/4	Solid wood
N	1	Side 2	1/2	5 3/4	13 1/4	Solid wood
P	1	Bottom	1/4	10 1/2	18	Plywood
Q	1	Guide	1/2	21/2	103/4	Solid wood
R	1	Guide strip	1/4	1	11 3/4	Solid wood

*Make substrate from five pieces of 1/4" plywood 6" wide by 27" long.

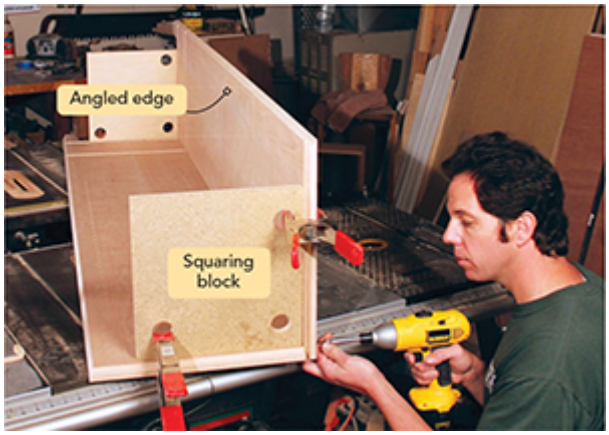


1 Begin by cutting one piece of plywood for both of the cabinet's sides. Rout two dados and a rabbet to receive the cabinet's shelves and subtop, then rip the piece into two sections, one for each side.



2 Cut a 65° angle on the front edges of both sides of the cabinet, then rip the pieces to final width.

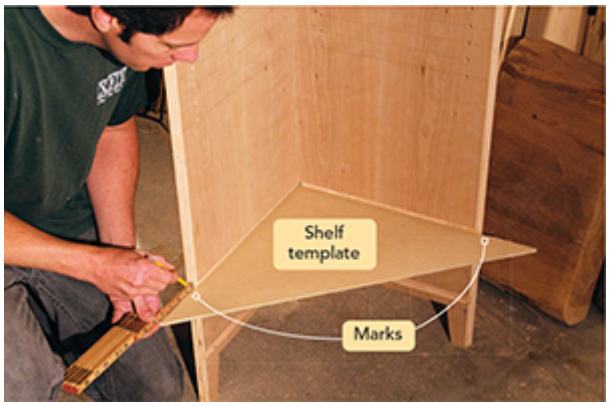
Break down the plywood into three sections. Trim the section that contains the side pieces to final length. Using a straightedge as a guide, rout two dados in the plywood (**Photo 1**; **Fig. C**). These dados receive the cabinet's two fixed shelves (F1 and G1). Rout a rabbet on the top edge of the sides. The rabbet receives the cabinet's subtop (E1). Rip the plywood into two parts, separating the two side pieces. Both of them should be at least ⅜" extra-wide. (Note that side A is ¾" narrower than side B.) Mark what will be the front edge of each side, then rip these edges at 65° (**Photo 2**; **Fig. E**). Make sure these cuts are straight; the stiles will be glued to these edges later on. Rip the other edge of each side, at 90°, to final width. Using a jigsaw, cut out the feet on the bottom end of each side piece. Drill holes for the shelf pins.



3 Assemble the two sides with biscuits and screws, using plywood blocks to hold the cabinet square.

Cut biscuit slots about 10" apart for joining the back corner of the sides. Assemble the pieces – without glue – then drill pilot holes for screws between the slots (**Photo 3**). Glue and screw the two sides together. You could use clamps instead of screws, but clamps might damage the sides' angled edges.

Make the Subtop & Shelves

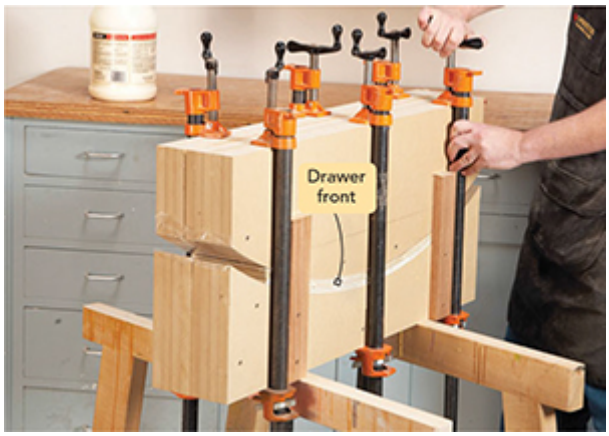


4 Make a template for the shelves and subtop from ¼" MDF. Place the template in the dados and make two marks 11/16" beyond the edges of the cabinet's sides.

This is where things start getting tricky. But don't worry – just follow the procedure below and everything will come out right. Start by making a precise wooden template for the shelves and subtop (**Fig. E**). You'll be cutting and sanding a curve on the front edge of the template later on, so choose a material that shows pencil lines clearly and is easy

to shape, such as ¼" MDF. Place the template in the case, pressed tight to the bottom of both dados, and make two marks 11⁄16" beyond the edges of the case (**Photo 4**; **Fig. E**).

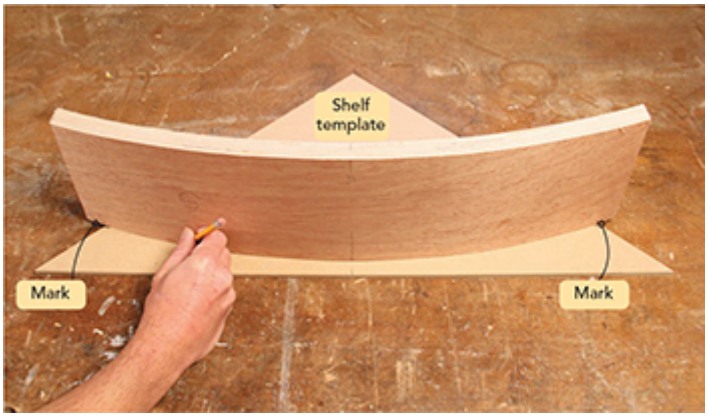
Now it's time to hit the pause button. Before you can go any further, you need to know the exact curvature of the drawer that fits between the shelves. (**Fig. D** shows an elegant geometric method for calculating this curve. It works for a cabinet of any size.) The drawer's front (K) sits flush with the shelves, so once you've nailed down the drawer's curve, you've also got the curve for the shelves.



5 Make the front of the drawer before proceeding any further. You'll need to know its exact curvature before completing the shelf template.

Knowing the drawer front's theoretical radius is a good start, but what you actually need now is the drawer front itself. The front is laminated from ¼" pieces of plywood, not sawn from a giant chunk of wood (**Photo 5**). When you make a bent lamination, the piece usually flattens out a small amount when it comes out of the clamps. Exactly how much "springback" you'll get is impossible to predict. Therefore, you must go through the process of making the drawer front in order to accurately determine its curvature – numbers alone won't work.

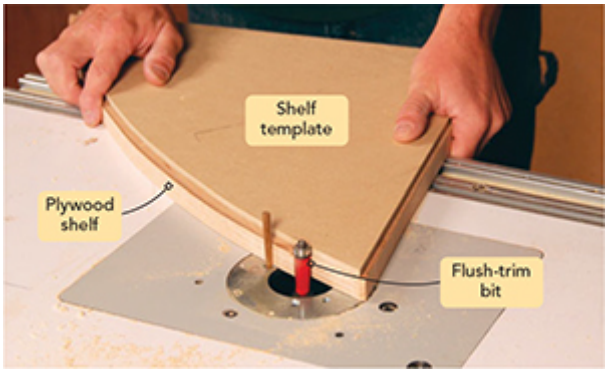
Thinking about this, I hope you'll see that it's risky to make the shelves first and then, later on, try to make a drawer front that matches their curve. Since the drawer front is veneered, there's no margin for error. Once the front is bent, it's impractical to change its shape to match something else. Making the drawer front before making the shelves is the prudent way to go.



6 Place the drawer front on the marks you drew on the template, then trace the outline of the drawer's curve.

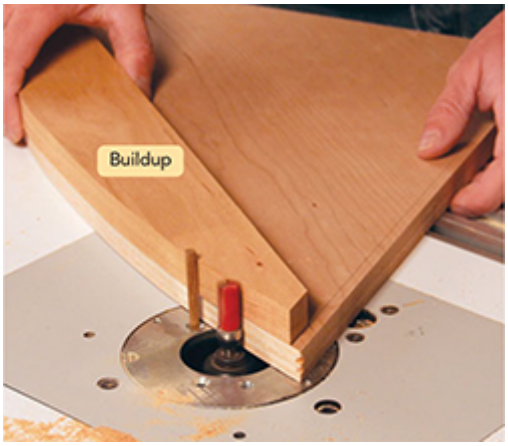
7 Cut the curve on the band saw, then sand down to the line. The shelves and the drawer will be flush with each other, so their curves must match.

Make the front extra-long, using the dimensions given in the cutting list. Place the front on your template and connect the two marks you made (**Photo 6**). Trace the front's curve, then cut the template and sand to the line (**Photo 7**). Compare the template to the drawer front and adjust the template's curve, if necessary, so they match.



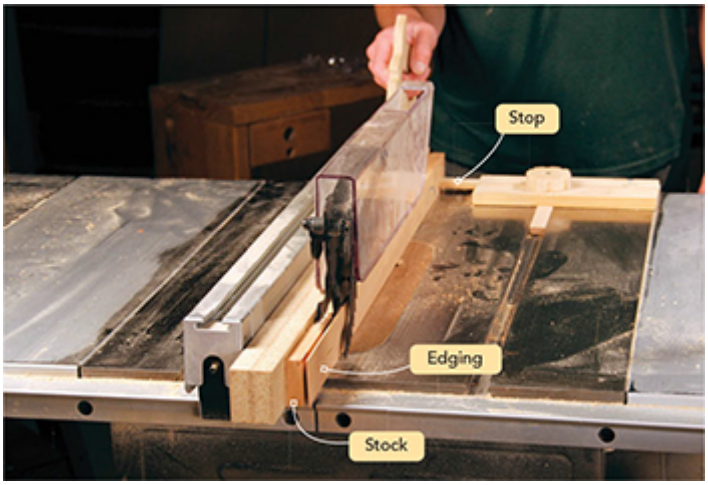
8 Shape an oversize piece of plywood so that it's an exact copy of the template. Make three pieces like this – two for the shelves, one for the subtop.

Rough-cut all the triangles from the sheet of plywood. Set aside the top piece (J1) for now. Place the MDF template on the remaining triangles, allowing a 1/16" margin on the straight sides. Trace the template's curve on each piece. Cut the curve at least 1/16" oversize, then use double-faced tape to fasten the template to each piece. On the router table, shape each piece of plywood all the way around to match the template (**Photo 8**).



9 Add a solid-wood "buildup" piece to each of the three parts, then use a pattern bit to make the buildup flush with the plywood.

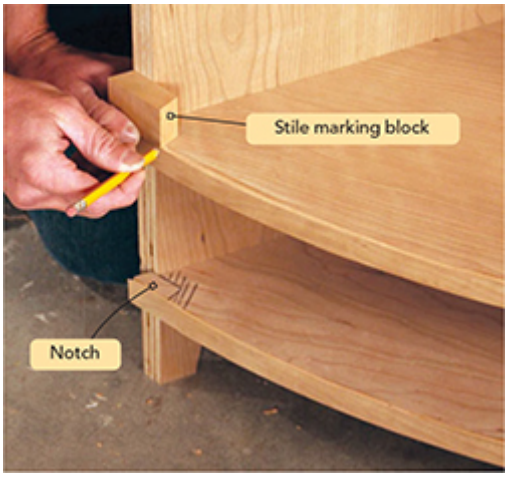
The subtop (E1) and the two fixed shelves (F1 and G1) have front edges that are thicker than 3/4" (**Fig. F**). To achieve this look, glue "buildup" pieces (E2, F2, F3, F4 and G2) to each part. Trim the front buildups flush (**Photo 9**).



10 Saw 1/16" thick pieces of front edging for the shelves and subtop. This method, using a stop locked into a miter slot, allows you to easily cut multiple pieces – all the same thickness – from one piece of stock.

11 Glue the edging to the shelves and subtop, then trim it flush. Tape is adequate to hold the thin edging in place – you don't need clamps.

Resaw 1/16" thick edging for the subtop and fixed shelves (E3, F5 and G3). Also saw edging for the adjustable shelves (H2) and the cabinet's top (J5 and J6). I prefer using the table saw to make edging this thin (**Photo 10**), but you could also use a band saw. I glue the stock to a backer piece so there's plenty of support – and something to push with my push stick. Rip the edging about 1/8" wider than the front edges of the subtop and all of the shelves, then glue the edging to each piece (**Photo 11**). Trim it flush with a small router.



12 Slide the shelves and subtop in place, then trace around a block that has the same dimensions as the cabinet's stiles. Remove the pieces and notch them to receive the stiles.

All of these triangular pieces must have notches cut in them to accommodate the cabinet's stiles (D). The best way to lay out the notches is to use a marking block that's similar in cross section to the stiles (**Fig. K**). Install the shelves and subtop, then mark around the block (**Photo 12**). When you do this, make sure the angled end of the block is flush with the cabinet's side. (The block is ⅛" narrower than the stiles. When you make the stiles and install them tight up against the notches, they'll automatically be proud of the cabinet's sides by ⅛".) Remove the shelves and subtop and carefully cut the notches with a band saw. True the cut surfaces with a file. Use the same block to mark the adjustable shelves. Cut these notches about 1/16" oversize, so the shelves are easier to tip into place.

Build the Drawer

On page 32, you'll find the exact dimensions for the drawer front's two-part bending form (**Fig. N**) and the dimensions for the support piece used to trim the drawer front and cut its joints (**Fig. P**). The dimensions of the joints and other drawer details are shown in **Fig. M**. Determine the exact length of the drawer's front by placing the front on top of one of the fixed shelves. Trace around the notches. When you trim the front, the ends of the drawer should be flush with the notches (**Fig. G**).

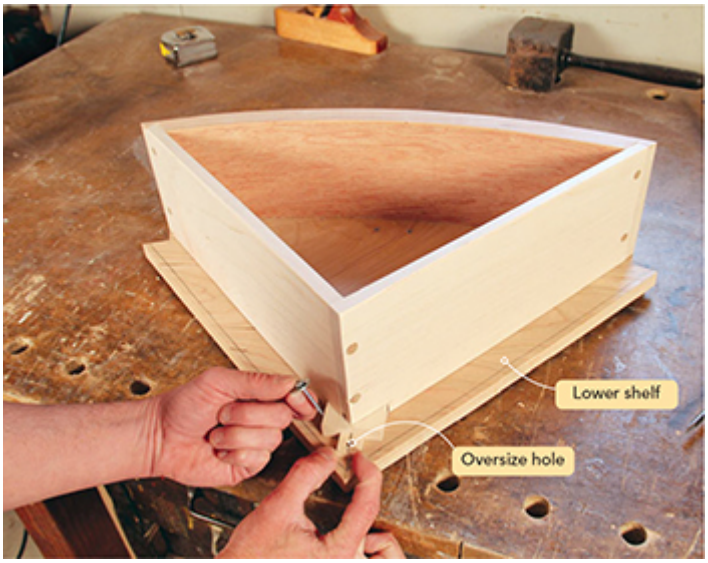
Before assembling the drawer's sides, make the guide (Q) and guide strip (R) – see **Fig. L.** Cut notches in the back corner of the drawer sides to receive the guide, then assemble the drawer. Install the guide with screws – be sure to center it front and back.

Remove the upper fixed shelf (F1) and add some additional buildup pieces (F3 and F4). These serve to prevent the drawer from tipping down when opened, so their precise location isn't important. Replace the shelf.

Next, you'll align the drawer as you install the guide strip on the lower fixed shelf (G1). The location of the strip must be very precise, so the best method is to make the strip adjustable. Here's how to do it: First, remove the lower fixed shelf from the cabinet. Draw a centerline, front to back, on its top face. Across the centerline, draw a perpendicular line 1" in from the shelf's front edge (this represents the inner edge of the drawer front when the drawer is closed). Drill a ¼" hole about 2" back from the shelf's front edge, on the centerline.

Next, turn to the guide strip. Draw a centerline all the way around it, then drill a ¼" hole through the strip about ½" in from one end. Clamp the strip to the shelf and drill pilot holes for the screws you'll use to adjust the strip. Use an extra-long screw in front, but cut it off even with the top of the guide strip before installing it – this gives you the maximum amount of holding power for a thin piece of wood.

13 Fasten a drawer-guide strip to the lower shelf. Run a screw from underneath to secure the strip's front end. The screw passes through an oversize hole, so you can adjust the strip's position.



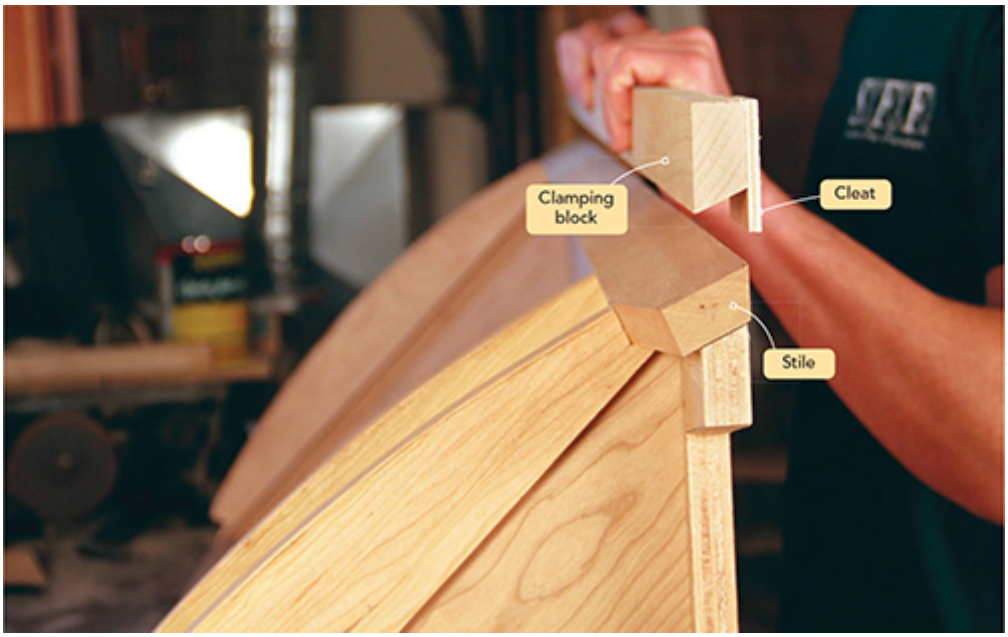
14 Fasten the back end of the strip with another screw running through an oversize hole. Install the drawer and align its front edge with the shelf, then tighten the screws front and back.

15 Install the shelf and check the drawer's operation and alignment. When all is well, glue and screw the shelves in place.

Fasten the front end of the strip (**Photo 13**), but don't tighten the screw all the way. Place the drawer on the strip, then install the rear screw (**Photo 14**). Adjust the drawer until its front is flush with the shelf all the way across, then tighten the screws. Install the shelf in the cabinet and try out the drawer (**Photo 15**). Fortunately, both fixed shelves are still removable if you need to adjust anything, and you can still tweak the

strip. Once everything is right, add some more screws to lock the strip in position, then glue and screw the shelves to the cabinet. In addition, glue and screw the subtop in place.

Add the Stiles & Top



16 Make the stiles and glue them to the cabinet. Use a long clamping block with an angled edge. Add cleats to the block so it doesn't slip.

Mill the stiles, cutting one side at an angle (**Fig. G**). Cut the bottom ends of the stiles to form tapered legs (**Fig. A**). Glue the stiles to the cabinet (**Photo 16**).

17 Fasten the top through the subtop. Both of these pieces are made from ¾" plywood built up to look extra-thick, like the shelves below.

Make the top (**Fig. H**). You can lay out its front curve in a number of ways, but the best way to ensure that the curve will be smooth and true is to make a ¼" MDF template first, as you did for the shelves. The rest of the procedure is similar to building the shelves, but here you'll need three buildup pieces (J2, J3 and J4) and edging on all three sides (J5 and J6). Fasten the top from underneath (**Photo 17**).

Make the back (C) and install it in the cabinet. Nail it from the front or screw it from behind. Finish the adjustable shelves by cutting off their back corners.

CHAPTER FIVE

Two Tub Tables

by Steve Shanesy

I suspect most woodworkers would rather spend an entire day hand sanding than get involved with a project that requires cutting compound miters. And I think they have good reason. Not only are compound miters hard to get right but just about every book

or magazine article has a different way of doing them. To complicate matters further, some sources even give you conflicting settings for the blade tilt and miter gauge.

Over the course of the last three years I have evolved a system that has two basic rules to follow to make cutting these pesky joints nearly foolproof. First, make a mock-up – a miniature one – once you have made your blade and miter gauge settings. Chances are it won't be perfect the first time so you tweak your adjustments until the mock-up is right. Second, don't change the settings in order to cut the other side of the part once the first side is cut. Turn the piece over and move it to the other side of the blade instead. Why? Because it's next to impossible to find the perfect setting on the opposite side of the miter gauge. The same is true for the track arm of a radial arm saw or the miter setting of a compound miter saw.

Armed with these rules, your compound miters have a 90 percent chance of success. The last 10 percent comes from making sure your stock is flat, you hold it firmly when cutting and, of course, you find the "right" angle settings. I say "right" for two reasons. One, you may go to a source that isn't correct. Second, the miter degree markings on most woodworking tools are inaccurate or too crude for the "on the money" setting a tight-fitting compound joint requires.

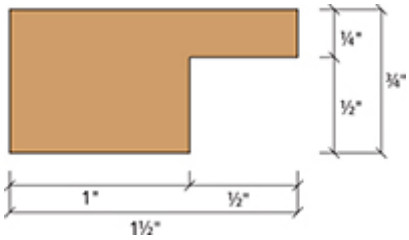
A Tale of Two Tubs

In this chapter I'll show you how to make these two occasional tables. One uses black walnut and has sides that square up at the top in what I call a "crown." The second, which is easier to build, is made from birch plywood and runs the angle all the way until it meets the lid, which on both tables is removable for storing things. Further, the second table is butt-jointed at the sides, not mitered like the walnut version. To keep everything straight, I'll describe the steps in constructing the walnut tub table first.

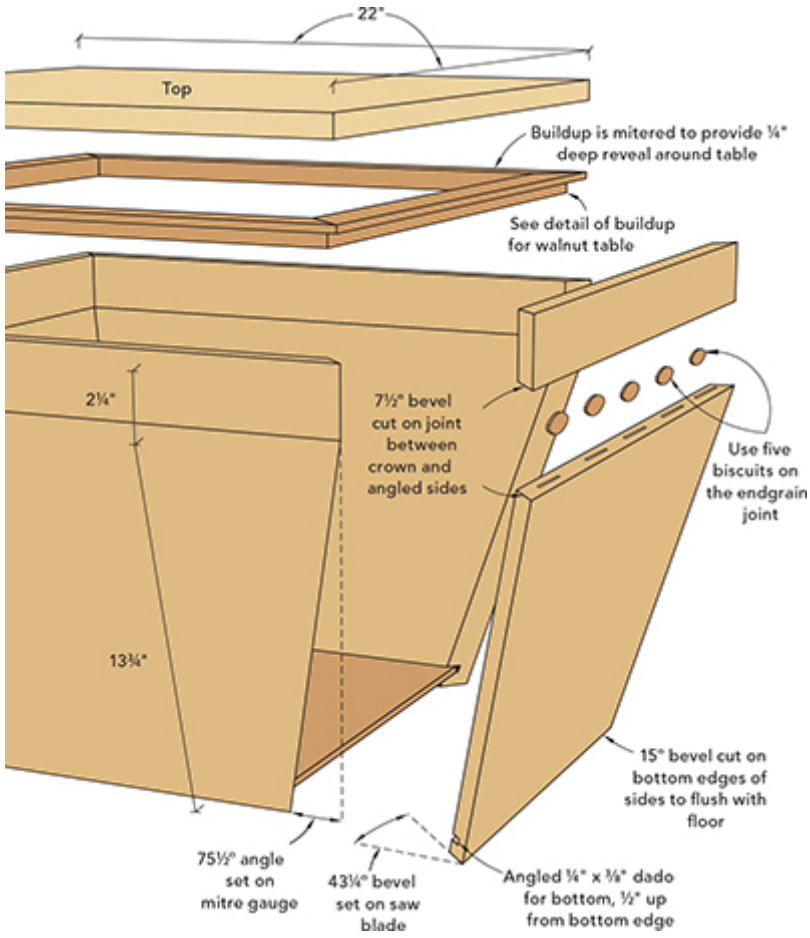
Start by gluing up five panels, four of which are slightly more than 22" wide and 17" long. Make the panel for the top oversized so you can cut it to size after the base is assembled. As you prepare your stock and glue up the panels, make sure your panels stay flat, or the angle you cut later for the miter joint will not be true. You'll note that the grain on the walnut table runs up and down and is continuous from the angled sides to the crown at top. The length of the side panels you glue up will accommodate the crown.

Once glued, sand your panels just shy of your final grit. Next, take the panels to the table saw and cut them square but still oversized. Now crosscut the lower portion of each side from the "crown" piece that will be glued back later. Make this cut oversize at 14¼". This length will allow you to make angle cuts cross grain at the bottom edge and the miter edge where the top piece joins the side and not lose any height.

Next cut the crown pieces to length (and I do mean length because it is the dimension that goes with the grain) to 2¼". Now set the table saw's blade to 15° and cut this angle on the lower edge of the sides' bottom on all four pieces. You should remove only enough material to make the angle and no more. Now change the blade angle to 7½° and cut the complementary angles for the joint where the side and crown join.



DETAIL OF BUILDUP, SOLID WOOD TABLE



SOLID WOOD TUB TABLE EXPLODED VIEW

Solid Wood Tub Table

NO.	ITEM	DIMENSIONS (INCHES)			MATERIAL
		T	W	L	
4	Sides	3/4	22	13 3/4	Walnut
4	Side crowns	3/4	22	2 1/4	Walnut
1	Top	3/4	22	22	Walnut
4	Buildups	3/4	1 1/2	21 5/8	Walnut
1	Bottom	1/4	14 1/4	14 1/4	Plywood

Make the first cut with the outside face down, the bottom edge against the fence and the panel to the left of the blade.

Cut the Compound Miters

Set the crown pieces aside for now. Prepare a piece of stock that's at least 42" long to screw on to your table saw's slot miter gauge. Put at least 30" to the right side. Run your table saw blade over to 43¼°. Set your miter gauge to 75½° on the left scale of miter gauge. Now you are ready to make a small model to check your angle settings. I suggest using a piece of scrap plywood about 6" wide and about 30" long.

Make your first cut by trimming one end of the sample board. Now clamp a stop block about 6" to the right of the saw kerf in the fence. Next take the sample board and turn it over and place the just-trimmed end against the stop block and make a second cut. Again, turn the sample board over, place it against the stop block and make another cut. Repeat two more times and your four sample sides will be cut.

Now place all four sides together and check for gaps in the mitered corners. If there's a gap in the inside of the miter, slightly reduce the angle of blade tilt. If open on the outside, increase the blade tilt angle. For a slight opening, ¼° to ½° should be all the

correction needed. Continue adjusting and checking until there are no openings in the joints or rocking motion when holding them in your hands and applying pressure.

To make the second cut, turn the panel so the outside face is up and the top edge is against the miter gauge fence. Cut the other three panels the same way.

Cut Your Good Panels

Because you have already cut the bevels on the top and bottom edges of the sloping side panels, you have designated which sides face out. In cutting the compound miters, you'll need to keep track of which side faces where.

After the first cut, clamp a stop block to the right end of the miter gauge fence that will give you the 22" finished width at the top after making the second miter cut. I made a 15° bevel cut on the stop block I used, which prevented it from slipping during the cut. Now study the photos to figure out the correct cutting and turning sequence for the sides.

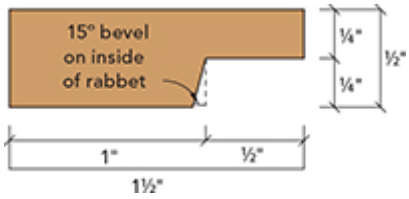
Before moving any saw settings, use masking tape to dry assemble the four sides to make sure everything checks out. Before gluing the sloping sides together, cut biscuit slots in the joint where the sloping side and its mating crown piece go together. I used five biscuits evenly spaced on each joint. Remember, this is virtually an endgrain butt joint so you must rely on the biscuits to make a sound joint. Be sure and angle the fence of your biscuit joiner to 7½° for proper alignment. Cut the dado for the bottom. See the story on the plywood table to see how this is done.

Carefully cut and fit each of the four pieces for the "crown." Dry-assemble them in place before gluing, but wait until the glue on the sloping sides has completely cured.

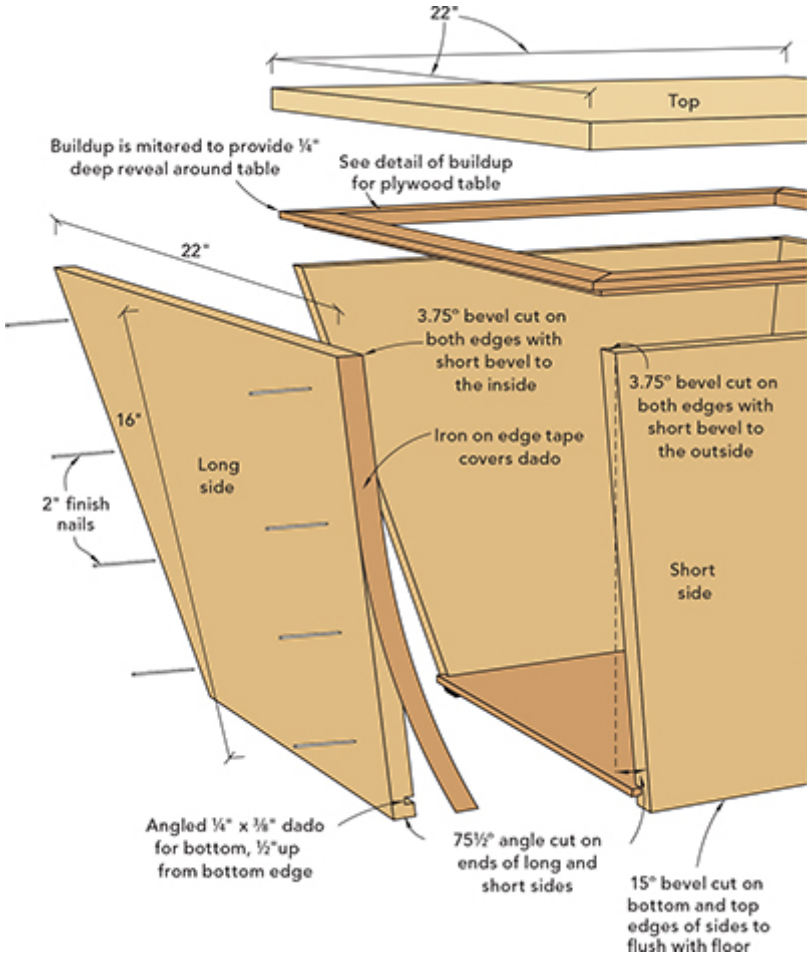
Glue the Compound Miters

The best way to glue up this awkward assembly is to tape the joints with masking tape. First lay out the parts face up and apply two layers of long tape strips along the length of the joint. Make sure the sharp edges are touching and that the top and bottom edges are aligned. With the last joint still open, carefully turn the entire taped-up assembly over and spread wood glue in the joints. Now tip the pieces up and slide the bottom in place before taping the last joint. When it's taped up, check for any open joints that could be caused by being out of square or not taping the joint edges close enough.

While this dries, begin cutting the crown pieces to finished size. Each piece needs a 45° miter joint. Be sure to match the grain with the sloping portion of the side. To glue the crown to the base, cut a piece of plywood that's 22" square, the same size as the top area. This piece gives you the clamping surface you need to draw the crown to the sloping sides. Stack a few pieces of wood under the base so you can get clamp ends under it.



DETAIL OF BUILDUP, PLYWOOD TABLE



PLYWOOD TUB TABLE EXPLODED VIEW

Plywood Tub Table

NO.	ITEM	DIMENSIONS (INCHES)			MATERIAL
		T	W	L	
2	Sides	3/4	22	16	Plywood
2	Sides	3/4	22 1/2	16	Plywood
1	Top	3/4	22	22	Plywood
4	Buildups	1/2	1/2	21 5/8	Poplar
1	Bottom	1/4	13 9/16	13 9/16	Plywood

Note: sizes given include thickness of veneer added after cutting.

Use a small amount of a good polyurethane glue on the joints and tape the corners as shown in the photo before applying glue. After all the surfaces are glued, set this "crown" in place and clamp it down. Check to make sure the corner joints are nicely closed. If they need help, clamp across them as needed.

Miter the ends of the strips and screw them to the top as shown. Use elongated slots for the screw clearance holes where top expansion is expected.

Complete the Top

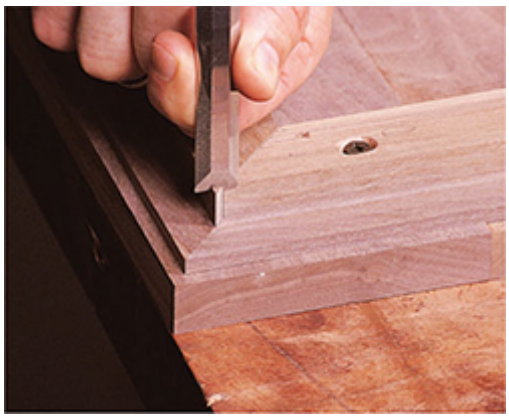
In addition to cutting the top to finished size, you must also add four strips to the underside to create the small "reveal" or "quirk" detail between the top and base. These

strips also serve to keep the top in position because they nest inside the sides.

Study the drawings of these strips on the previous pages. Because the reveal is ¼" square, cut your wood strips so you create a rabbet that leaves ¼" thickness and sets back ½". Make two strips this way. Make the other two strips you need with a ⅝" setback and use these on the sides of the top that run with the grain direction. This additional space will allow the top to expand in humid conditions without pushing out the sides, ruining the miter joints. The top remains loose for easy removal.

To prepare the pieces for finishing, sand up to #150-grit. Be careful sanding at the transition point of the sloping side to the crown. You want to maintain a crisp joint line. The walnut had both great figure and color. So I simply applied two coats of clear finish and let the beauty of the wood shine through.

For me, the two rules of making sound compound miter joints worked perfectly again. Yes, I had to fine tune my setup after I made my mock-up, and I didn't change any settings once I had it right. The results were dead on and my frustration from not "getting it right" was virtually nonexistent. Follow these simple rules and you'll get the same results.



After attaching the lid strips to the lid, trim any overhang on the miters with a chisel.

Cutting the dado for the bottom applies to both tables. Change the angle setting of the saw to 15° in order to cut a dado to hold the ¼"-thick bottom in place. Set the fence so that the bottom will start ½" up from the bottom. The blade height should be ⅜". Make two passes using a regular thickness blade to allow the bottom to slip into place. While you have the blade set, cut your bottom with a 15° bevel on all four edges.

Building the Plywood Tub

The plywood tub table is constructed much like the solid walnut version with a few exceptions. If you plan to build this simpler version, familiarize yourself with construction of the walnut version as well.

The main differences are the absence of the “crown” and the joinery for the the sloping sides. Instead of a compound miter, the sides are butt-jointed together. The two sides that overlay the adjoining sides are simply 1½" wider so the overall width of all the sides remains equal when assembled.

To cut the angles on the sides, prepare the miter gauge fence as described earlier. Only this time, set the gauge degree setting to 75½°, and tilt the blade to 3¾°. Make the cuts exactly as described previously.

There’s one more modification to this unit. In making the pieces that create the reveal and are attached to the underside of the top, Cut the rabbet using a 15° angle as shown in the diagram.

To color the birch plywood, I used a brown walnut stain before clear coating. Make sure you give the stain at least eight hours to dry.

Before gluing and nailing the sides together, use iron-on veneer tape on the edges of the sides that will be exposed. And when assembling, make sure your parts are aligned exactly flush before hammering the nails home. After assembly, use more veneer tape on the top edges of the sides and on the edges of the top itself.

CHAPTER SIX

Summer Table

by Redge Estell

Remember Lincoln Logs? When I was a kid, my friends and I spent hours building cabins and forts with them. Lincoln Logs locked together just like the real deal – one on

top of another – and were my first introduction to wood joinery. While playing with them, I must have learned something that stuck with me years later, when I became a cabinetmaker.

The parts of this table lock together, too – without any glue or fasteners – but in a most unusual way. The table is triangular, and all of the Lincoln Log-style notches are set at a compound angle. The table is composed of three identical frames shaped like an "F." Each frame has only one leg and two arms, so they're very easy to build. All the joints are made on the table saw.

One small warning: Follow the directions closely. All of the pieces look alike, so it's easy to get mixed up and make a mistake. I've figured out a system that should be foolproof (famous last words!), but even so, I recommend that you build a table with some cheap wood first just to get the hang of it.

Three identical frames, shaped like an "F", have arms that lock together like a puzzle.

Summer Table

PART	NO.	NAME	DIMENSIONS (INCHES)		
			T	W	L
A	3	Top arm	3/4	2	24*
B	3	Bottom arm	3/4	2	22*
C	3	Leg	3/4	2	20
D	1	Top	3/8	30" dia.	
E	1	Shelf	3/8	20" dia.	

*Rough length. See Fig. C for final length.

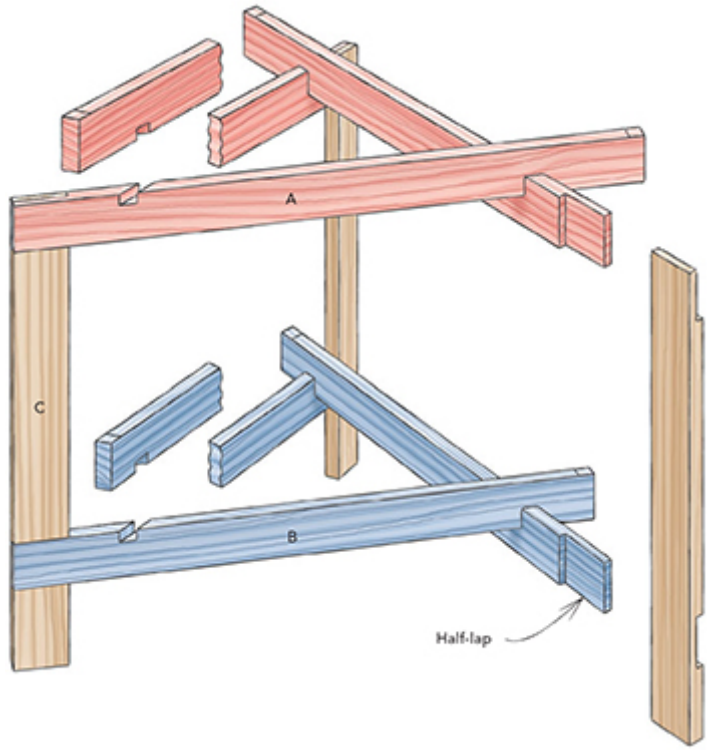


FIG. A EXPLODED VIEW

Taken apart, the table breaks down into three flat pieces.

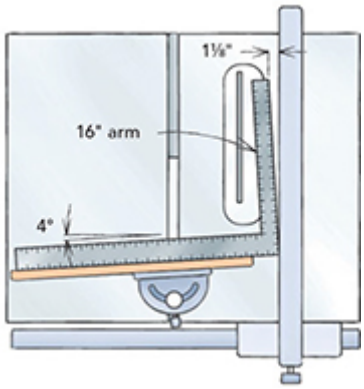


FIG. B TABLE SAW SETUP FOR 4° CUTS

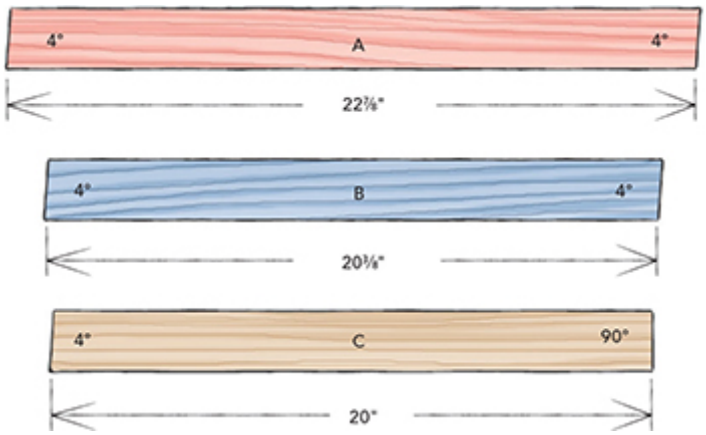
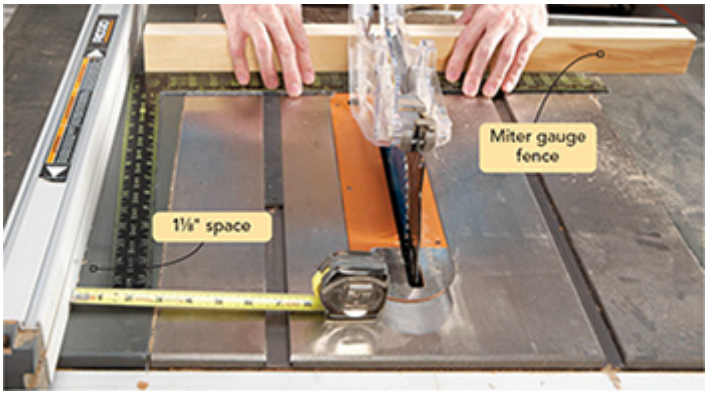


FIG. C END CUTS

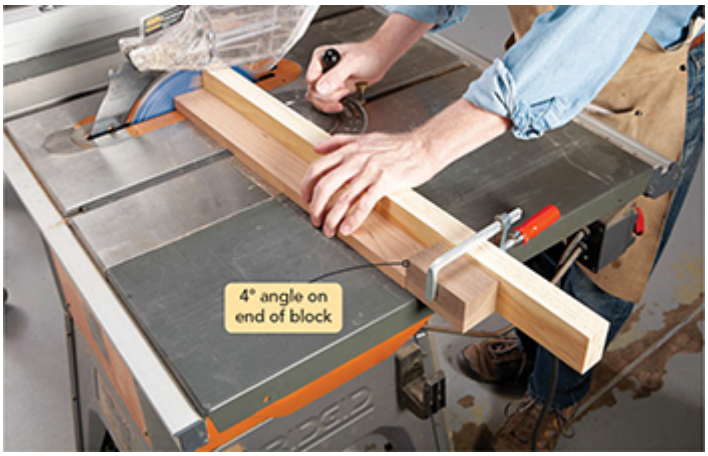
Cut all the Parts

Begin by milling the wood for the top arms (A), bottom arms (B) and legs (C). All of these pieces are ¾" thick, so you could use boards from a lumberyard or home center that have already been planed down to this size. (Face-frame material is ideal.) Cut all of the pieces about 1" extra-long, then joint and rip them to the finished width (see Cutting List).



1 Adjust your miter gauge to 4°. Use a framing square and a ruler to hit this angle right on the money.

All of the arms slope at 4° (**Fig. D**), an angle that will come up a number of times while you're building the table. For the next step, fasten a fence that's about 30" long to your table saw's miter gauge, then use a framing square and a ruler to set the miter gauge at 4° (**Photo 1** and **Fig. B**). You'll need to reset the miter gauge to 30° later on, and then return it to 4°, so the square-and-ruler method has a lot going for it: It's very easy to repeat.

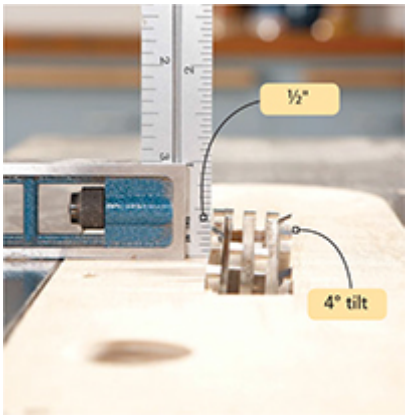


2 Cut the ends of the arms and legs at 4°. When trimming the pieces to final length, use a stop block that is also cut at 4°. This ensures that the pieces are oriented the correct way.

Cut one end of the top arms, bottom arms and legs at 4°. (Use a fine-toothed crosscut blade to minimize sanding later on – these ends will show.) In addition, cut 4° ends on two ¾" x 2" x 4" stop blocks and one 1¾" x 1¾" x 4" stop block. Use the large stop block to trim the top and bottom arms to final length (**Photo 2** and **Fig. C**). Pay close

attention to which way the angles go – the arms should look like a parallelogram when you're done. Reset the miter gauge to 90° and trim the legs to final length.

Cut the Notches



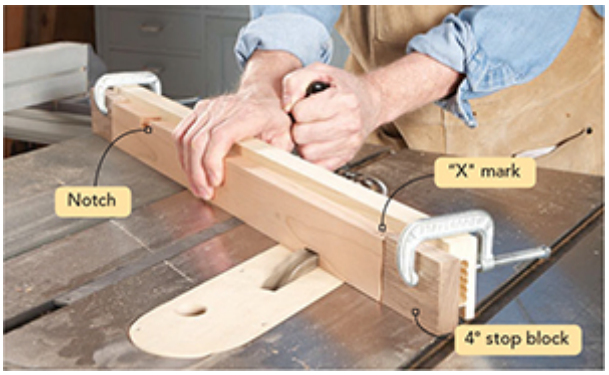
3 Install a dado set in your saw and tilt it to 4°. Raise it to make a cut ½" deep.

4 Adjust the miter gauge to 30°. This angle is easy to establish with a 30-60-90 drafting triangle.

Next, you'll cut the notches that enable the three parts of the table to lock together. For ease of assembly, these notches must be 1/16" wider than the thickness of the arms (¾"). Assemble a 13/16" dado set on your saw's arbor. (If you don't have a 1/16" chipper, add shims that add up to 1/16".) Tilt the dado set to 4° and raise it to cut ½" deep (**Photo 3** and **Fig. E**). Adjust your miter gauge to 30° (**Photo 4**). Note that I'm using a left-tilt saw; if your saw tilts to the right, set your miter gauge in the opposite direction.

5 Mark the forward-leaning ends of all the arms. Keep track of which way these marks go in the steps ahead.

At this point, it's a good idea to mark your pieces so you won't cut a notch in the wrong place (**Photo 5**).



6 Saw two notches in the top arms. Trap the arm between two angled stop blocks. After cutting one notch, flip the arm around to cut the second notch.

Draw a notch on one of the top arms (**Fig. D**). It doesn't matter which end of the arm you mark, because both of the notches on the top arm are the same distance from each end. Position the arm on the miter gauge, then clamp angled stop blocks at both ends of the arm, trapping it. Saw the notch. Flip the arm around so it fits between the stop blocks again and saw a second notch (**Photo 6**). There's only one way the arm will fit between the blocks, so you can't make a mistake.

7 Cut similar notches in the bottom arms. Leave the stop blocks in the same position. Cut the first notch with the arm butted up against the front block; cut the second notch with the arm butted up against the rear block, as shown here.

The procedure for the lower arm is a bit different. Leave the stop blocks where they are. Butt one end of the arm against the forward stop block and make a cut. Flip the piece around, butt the same end against the rear stop block and make the second cut (**Photo 7**). This method ensures that the distance between the notches is the same on both the top and bottom arms, even though the arms are different lengths.

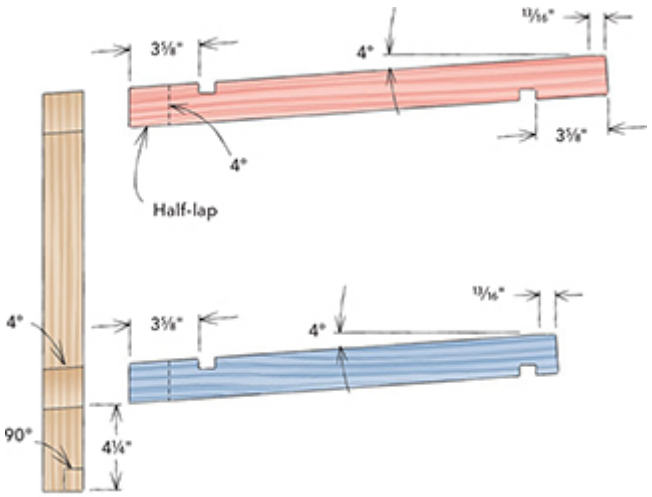


FIG. D FRAME DETAILS

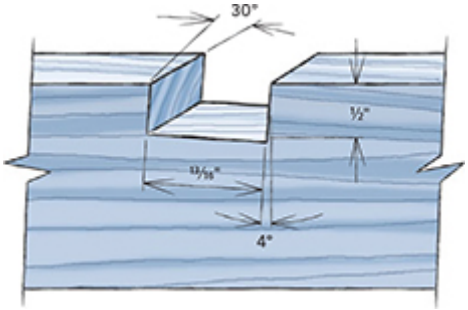
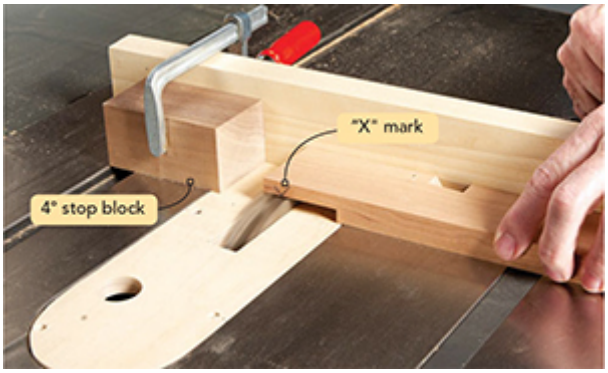


FIG. E NOTCH DETAILS

Make Half-lap Joints



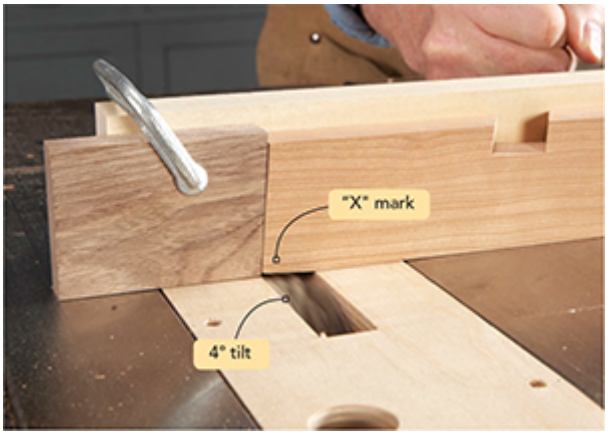
8 Make half-lap joints in the ends of both arms. Here, the dado blades are reset to 90°; the miter gauge is reset to 4°.

Return the dado set to 90°. Lower its height to ⅜". Use the square-and-ruler method to adjust the miter gauge back to 4°. Clamp the large angled stop block to the fence in order to make a dado that's exactly 2" wide – the width of the legs. Cut half-laps in the ends of all the arms (**Photo 8**).

Using a test piece, fine-tune the height of the dado set so that the half-lap joints come out perfectly flush. Without moving the stop block or readjusting the miter gauge, cut half-laps in the top ends of the legs. Once you're done with these cuts, remove the stop block.

9 Cut mating half-lap joints in the legs. Use two stop blocks to determine the width of the lower joint.

Mark the location of the lower half-lap on one of the legs (**Fig. D**). Set up two stop blocks to make this cut. Place the large angled block against the top of the leg and a square block against the bottom of the leg (**Photo 9**). Adjust the blocks to make a cut that's about 1/32" too narrow. Cut a half-lap in one of the legs, then adjust one of the stop blocks to widen the notch until it's just right. Use the same setup to cut the remaining two legs.



10 Saw a 4° bevel on the ends of the arms. This creates flat spots to support the glass top and shelf.

You're just about done on the table saw. There's only one more operation – sawing a 4° taper on the top ends of the arms, where they support the glass. The easiest way to do this is with your dado set (**Photo 10**). Tilt the dado set to 4° and adjust the miter gauge to 90°. Lower the dado set so it will cut a flat spot about 13/16" wide – the exact dimension isn't important. Saw the ends of all the top and bottom arms.

Assembly

11 Glue the arms to the legs. Make sure the pieces are oriented the correct way – the arms of the "F" should incline up, not down.

12 Sand the joints even. Draw pencil lines across the joints and sand until all the marks are gone – this ensures that the arms and legs are flush.

Glue the arms to the legs (**Photo 11**). When the glue dries, draw pencil lines across both sides of the half-lap joints. Sand each assembly until all the pencil lines disappear (**Photo 12**). Plane or file the end grain of the half-lap joints flush with the surrounding wood.

13 Round over all edges with a trim router. That's about it – the table is ready to assemble!

Using a ⅛" roundover bit, soften all the edges of the legs and arms (**Photo 13**). Avoid routing into the notches; soften their edges by hand, using a file and sandpaper.

If your table will have to brave the elements, finish it with an exterior polyurethane. I bought glass tops for my table at a local Pier 1 store; you can order them online from Pier 1 or have a local glass supplier make them up for you.

To assemble the table, first lock two of the frames together. At this point, there will be plenty of play in the joints, so the pieces can swing like a hinge. Insert the third piece, but keep it swung open. Finally, lock the last pairs of notches together, one at a time. Snapping the pieces together will require a small amount of force, but that's good. The tension in the joints turns the assembly into a rigid unit.

Bedroom

CHAPTER SEVEN

Simple Headboard

by Tom Caspar

True story. I first built a headboard like this years ago using only a miter saw, router, sander and a drill. My shop was just a driveway.

The project really is that simple. For materials, all you'll need is a huge board (this one is a piece of African ribbon-stripe mahogany) and some poplar 1x4s from a home center. The joinery consists of just gluing together some of the 1x4s.

Most hardwood lumberyards have a few odd boards that are over 12" wide – ideal candidates for this project. If you find one that's already been planed and is reasonably flat, you're good to go. If the board needs to be flattened, don't walk away. There are a handful of ways you can do this yourself (see "5 Ways to Flatten Wide Boards," page 53).

Simple Headboard

Overall Dimensions: 41" H x 62" W x 4¼" D

PART	NO.	NAME	DIMENSIONS (INCHES)		
A	1	Front	¾	15	62*
B	1	Top	¾	3½	62
C	2	Leg	¾	3½	40¼**
D	2	Leg return	¾	3½	40¼**
E	2	Brace	¾	3½	14†
F	5	Stiffener	¾	3½	8
G	3	Cleat	¾	1	8

This piece can be 12" to 16" wide; *The length of the legs and leg returns will depend on the height of your mattress and the width of the front (A). Length equals height of mattress plus width of A, minus 1¾". In this example, the mattress is 27" high; †The length of this piece should be 1" less than the width of the front board.

Make the Front & Top

The front board (A) can be virtually any width. It will have the most dramatic effect if it's 12" to 16" wide. Cut this board 2" extra-long using a jigsaw or a handsaw. Make the long sides of the board straight and parallel using a router, a top-bearing pattern bit and a long straightedge, such as one of your 1x4s.

1 Trim the end of the big board with a large top-bearing pattern bit. Guide the router with a straightedge. Clamp a scrap piece to the board to prevent blowout at the end of the cut.

Mark the finished length of the front board, then draw lines across both ends of the board using a carpenter's square. Crosscut the board ⅛" longer than these lines. Clamp a 1x4 along each line and trim the board to final length with your router (**Photo 1**). Cut the top board (B) to the same length.

5 Ways to Flatten Wide Boards

If you're good with planes, you can certainly level a wide board by hand. But you can also do the job using small-shop power tools. Here are five methods:

1) Use a handheld power planer. This method will work on a board of any size. The trick is to figure out how much to take off – and where.

2) Jointer and hand plane. If a board is only an inch or two wider than your jointer, you can use the jointer to flatten most of the board, then remove the remaining material by hand.

3) Rip, joint and reglue. If the board is more than 2" wider than your jointer, rip the board into two pieces and flatten each one separately. The critical step is figuring out where to make the rip cut to best conceal the joint.

4) Turn your planer into a jointer. Running a warped board through a planer doesn't necessarily make it flat – just thinner. Build a special sled with some strategically placed shims to keep the board from rocking.

5) Use a router carriage. To level a board of any width, build a gantry for your router with two pieces of aluminum angle.

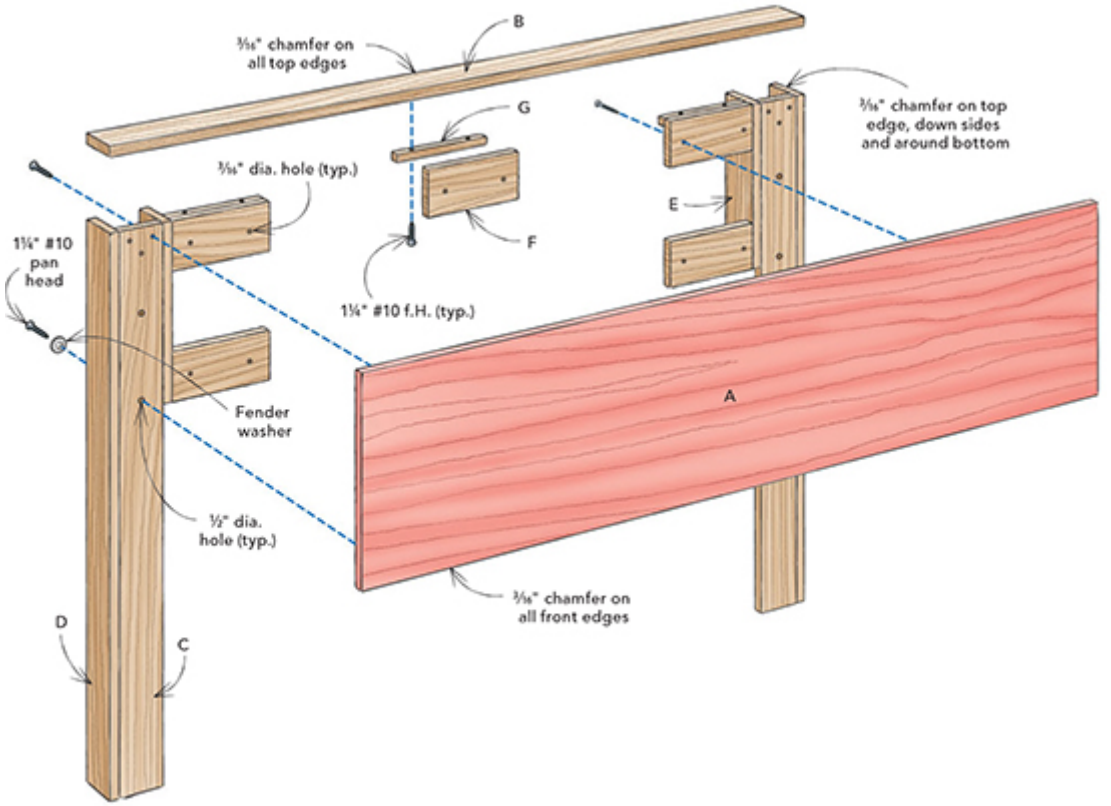


FIG. A EXPLODED VIEW

Make the Legs

First, figure out how long the legs should be. This dimension depends on two things: the height of your mattress as it sits on a box spring and frame, and the width of your front board. To calculate the legs' length, add the mattress height to the width of the board. Then subtract 1¾", and you've got it. Using this formula, the bottom edge of the front board will be 1" below the top of the mattress.

2 Glue the legs together. Place a cutoff under the board you're gluing to ensure that the joint comes out square. Apply two coats of black stain to the legs.

Cut the legs (C) and leg returns (D) to length. Cut the leg braces (E) to length. (These pieces help keep the front board from warping by stiffening the legs.) Glue the legs and leg returns together, making sure that they are flush. Glue the braces to the legs (**Photo 2**). Note that the final assemblies will be mirror images of each other.

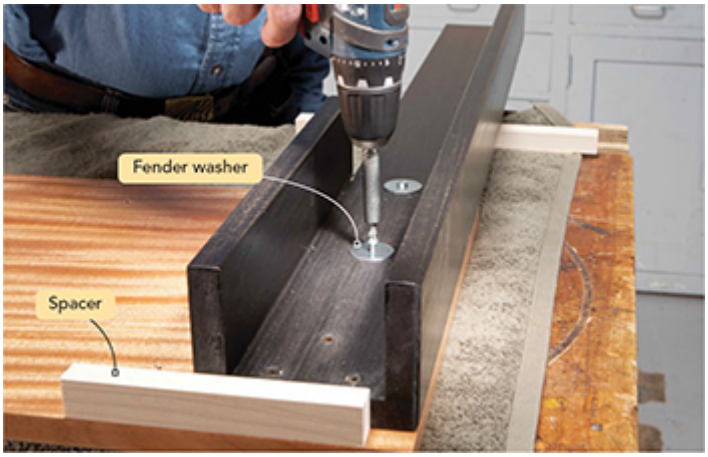
Drill screw holes in the legs (**Fig. A**). Use a spade bit to make the large holes. Plane, rout or sand a chamfer all around the legs, including the ends. Chamfer the front four edges of the front (A) and all four top edges of the top (B). Sand all of these pieces to #120-grit.

Cut all the stiffeners (F) and cleats (G). Drill two screw holes in each piece. Glue the cleats to three of the stiffeners. After the glue is dry, trim 1/16" off both ends of each piece to ensure that the blocks are square and even.

Finishing & Assembly

Finish both sides of the front board with an equal number of coats. This will help prevent it from warping. To bring out the figure in my mahogany board, I first applied two coats of 2-lb. dewaxed blonde shellac (mixed from flakes) to both sides. Then I applied three coats of Minwax Polycrylic water-based finish.

Stain the legs. I used two coats of ebony Minwax Wood Finish (it's actually an oil-based stain), followed by two coats of Polycrylic finish.



3 Fasten the legs to the front board. Use a spacer to position the leg below the board's top edge. The screws with fender washers pass through oversize holes, allowing the front board to expand and contract.

4 Fasten the top board from underneath. Position this piece, and the one below it, snug up against the leg to prevent the headboard from racking side to side.

Start assembling the headboard by fastening each leg to the front board (**Photo 3**). Using a scrap piece of poplar, make sure the legs are ¾" below the top edge of the front board. They should be flush with the end of the front board, too. Then install all the stiffeners. The upper three pieces should also be positioned ¾" below the top edge of the front board. Lastly, install the top board (**Photo 4)**.

CHAPTER EIGHT

Nesting Tables

by David Thiel

If you've been looking for an excuse to buy a really nice table saw blade – or at least get your old one sharpened – this is the project. While these tables are simple to build,

precision and a sharp saw blade will make the difference between a relaxing weekend project or a frustrating exercise in gluing up miters.

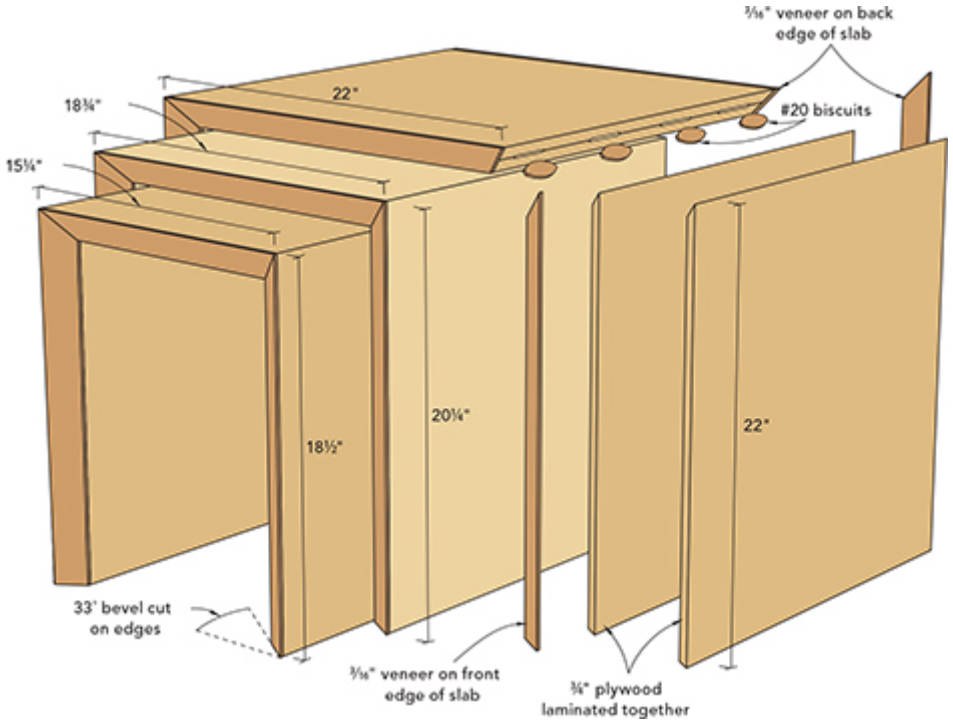
I made these tables using three sheets of plywood. Essentially I ripped each sheet down the middle and glued the two pieces from each sheet together to make a 1½"-thick slab. Then I beveled the front edge and glued thin solid-wood pieces to cover the slab's plywood edges. Finally, I cut the legs and top for each table from the slab and biscuited the pieces together. This method allows the grain on the top to continue uninterrupted down the legs.

Make a Slab

Start the tables by ripping three sheets of plywood in half to just under 24" in width. You won't need all that width, but it will come in handy later. As for the lengths, using the full 96" is a little wasteful, but it makes gluing the two halves together easier.

After ripping the sheets, determine which three faces are most attractive and mark these as the outsides of the tables. Next, glue the pairs together. To keep the sheets from sliding around during glue-up, pound a nail into each slab about 1" from the ends. These ends will be cut off anyway, and it makes glue-up much easier. Stack the three pairs together, then clamp across the stack using stout wood braces to spread the pressure.

After the glue is dry, square off one end of each slab. Then cut the slabs to 68", 62½" and 55" in length. Don't pitch the fall-off pieces, they'll be useful later. Next, rip each slab to 23" wide to give you one flat edge. You could run one edge over a jointer, but the adhesive in plywood is murder on high speed steel knives. When you have one square edge, set the table saw's blade to bevel at 33° and rip the three slabs to 21⅝", 20⅝" and 19⅝" wide respectively. Again, save the fall-off.



EXPLODED VIEW

Nesting Tables

NO.	ITEM	DIMENSIONS (INCHES)			MATERIAL
		T	W	L	
4	Sides*	3/4	22	22	Birch ply
2	Tops*	3/4	22	22	Birch ply
4	Sides*	3/4	21	20 1/4	Birch ply
2	Tops*	3/4	21	18 3/4	Birch ply
4	Sides*	3/4	20	18 1/2	Birch ply
2	Tops*	3/4	20	15 1/4	Birch ply
6	Veneer edges	3/16	2	96	Birch/Maple

*Sizes are of finished components prior to mitering, not cutting sizes.

Homemade Veneer

You're now ready to run some solid lumber to cover the plywood edges. I used soft maple edging on my birch ply tables.

Run out six lengths of 3/16"-thick solid wood for the edges. To plane wood that thin, you probably will have to put an extra board over the bed of your planer – most planers aren't designed for wood that thin.

With the strips ready, it's time to glue them to the slabs. Go find the fall-off from the bevel cuts and grab a couple other sturdy solid strips. Use the fall-off as a caul for clamping. By gluing the edges on the slabs with the bevel facing up, gravity is on your side. I also cheated a little by tacking the edge strips in place with a few small brads at either end. Once again, the extra inch in length will be cut off, so the nail holes won't show.

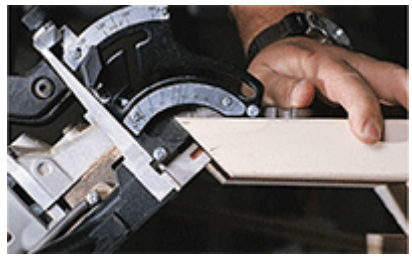
Glue the edging to the three slabs, then trim the edging flush to the plywood. I used a router with a flush-cutting bit for the back edges, and I used a jack plane to get the beveled edges nearly flush. Then I used a random orbit sander to flush the edges perfectly. To soften the edges I used some #120-grit paper and a block of wood to round over the sharp edges.

Glue up the slabs: Spacers underneath the slab allow the solid wood edging to hang over to evenly cover the edges. It doesn’t take a lot of pressure to clamp the edges, and too much pressure will force the front edge caul to slide.

Unless your rip fence is tight to the saw table, the miter will have a tendency to slide under the fence during the second cut (on right tilt saws). Recheck your measurements to accommodate this, or add a tight-fitting auxiliary fence to the standard rip fence.

Getting the Angle on Biscuits

Most of us have used biscuits at some time. If you haven't, they're a great way to align a piece for glue-up, and more importantly provide improved strength to what may be a less-than-perfect glue joint. Many biscuit joints occur with two right-angled pieces mating, but biscuits work just as effectively on mitered joints. In our nesting table case we have multiple 45° joints that need critical alignment and could use extra strength. How to cut the biscuits on the mitered edge is a question best answered by the type of biscuit joiner you own. Below are four options that will take into account even the most basic joiners.



The Porter-Cable model 557 joiner offers a 135° variable fence, allowing you to set the fence for just the right angle and hold the machine firmly against the piece for a very accurate cut.

If your joiner's fence is restricted to 90° of variation, you'll need to make your cut from the inside of the piece and carefully align the face of the leg with the face of the machine.

If your joiner is designed for only 90° biscuiting, don't fret. We've got not one, but two ways to simplify your cuts. The first method is to clamp two beveled pieces together, miters in, to form a 90° pocket, then place the joiner into the groove formed and make your cuts.

... or if you’re feeling inside out, flip the pieces so that the miters face out, clamp the pieces together, and make your cuts from the outside. This is the preferred method of the two.

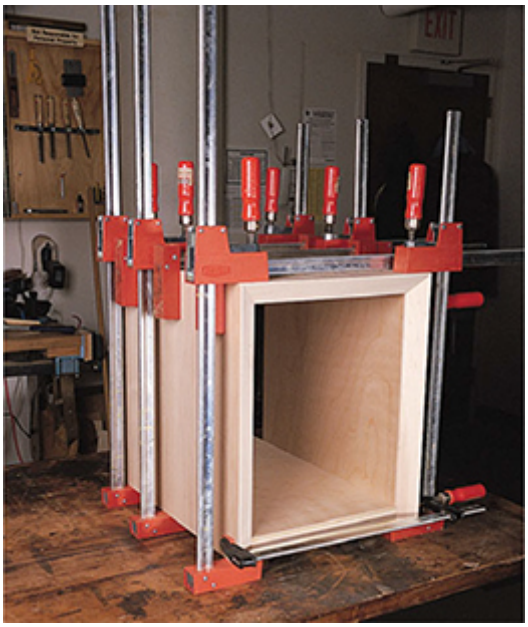
Make Your Miters

The tables slip inside one another with a ¼" gap between each, so accurate cutting and spacing is important. To make the mitered corners and still maintain the grain pattern on the tabletops, first crosscut the three slabs into three parts. Use the table saw with the blade set to 90°. Start by marking the middle of each slab and cut the top section from the middle of each slab, allowing the excess length to remain on the leg sections.

You’re now ready to do the precision cutting, and you’ll see quickly why a sharp blade is important. Start with the largest top (22" x 22") and set the blade bevel to exactly 45° and the rip fence to cut the miter exactly to the width of the top. If you have a left-beveling table saw you’re in luck as the inside of the table is on the tearout side. If you have a right tilt, that sharp blade is important. Make the first bevel cut on one end, then spin the top and make the cut on the opposite end. Again, with a right tilt you have the extra difficulty of the first miter trying to slide under the rip fence. Adjust your cut for any variance and consider adding an auxiliary fence that fits tight to the table surface. Repeat this with all three tops.

You’re now ready to make the miter cuts on the legs. Start with the 22"-high legs and work through the 20¼"- and 18½"-high legs, checking the spacing between the tables by “dry-nesting” as you go.

The first miter cut on the center slab (on a right-tilt saw) will balance the fall-off piece on the blade. Be aware of possible kickback of the scrap piece.



Enough clamps and careful adjustment during glue-up will ensure tight miters and an evenly spaced opening from top to bottom.

Assembly

The hard part is done. The rest is biscuits and clamps. I used four #20 biscuits for each miter joint. With the biscuits cut, the fall-off pieces from cutting the slabs to length come into play. You'll stick them between the legs while gluing up the miters. It makes glue-up much easier. First check the internal dimension between the miters on each tabletop. Try to be as exact as possible, then cut spacers from the fall-off pieces for each table. Finish sand the interior faces of each table and the beveled front edge of each piece before assembly. Put glue on the miters and biscuits and glue the tables. Pay careful attention to the miter joint where the top and legs join. Unlike the hardwood edging, you only have about 1/16" of veneer to sand to match the joint.

With the tables assembled sand the outer faces, paying extra care with the mitered joint. You're now ready to finish. I chose to simply add a few coats of clear finish to the tables, but any number of stains to match an existing decor will work well.

CHAPTER NINE

Illusion Cabinet

by Gary Rogowski

This design is inspired by a taper, but I needed to establish the right proportions to flesh the idea out. In much of my design work, I hover around the safe ground of a 3:5 or a 2:3 proportion in the neighborhood of Golden proportions.

For this cabinet, I thought if I were to make the eye search a bit, then a more distinct ratio was in order. Throughout the design, from the overall dimensions of the case to the size of the parts of the door, everything was held as close as possible to 1:2. This made

for noticeable changes in shapes both in the overall form of the piece and in its members.

Simplified Construction

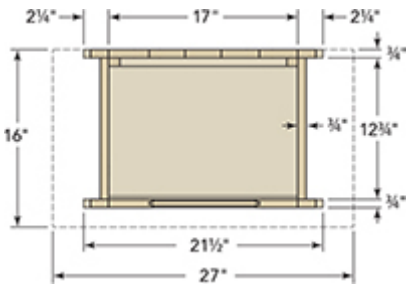
The cabinet appears to be frame-and-panel construction with the legs proud of the side panels. But the sides are solid with the legs simply glued on.

To yield wide enough panels, I assembled the sides from two mahogany boards. I finished planing and sanding both panels then cut them to final length before gluing on the 1/16"-overlong legs, which are also mahogany. It's a bit easier to manage cleanup this way.

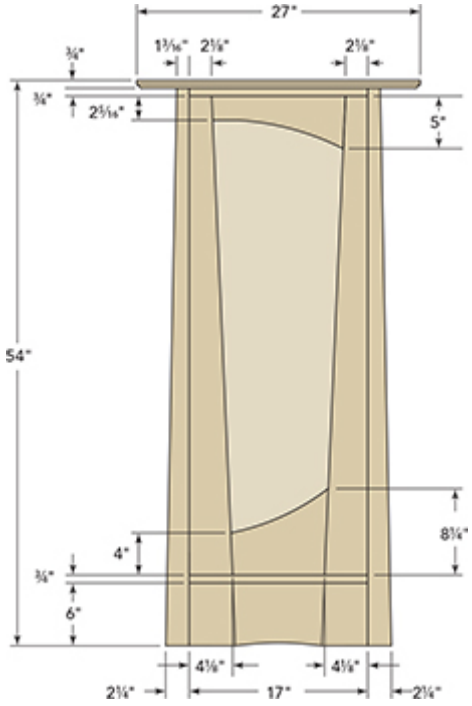
I milled my legs, cut the taper on the band saw and cleaned the faces on the jointer. A pass or two with my jack plane took out any milling marks and I was almost ready for gluing. I used my biscuit joiner to register the panel faces and legs.

Once the legs are glued on, you treat the sides like a flat panel. Plane or sand them dead flat first, then mortise for the bottom panel.

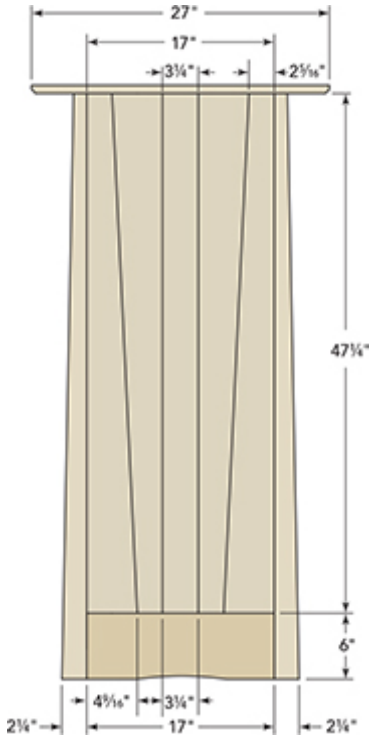
I made a mortising template to cut my mortises. Using a template guide and 1/4" straight bit in my plunge router, I routed the 1/2"-deep x 5/8"-wide mortises and chopped the corners square with my chisel.



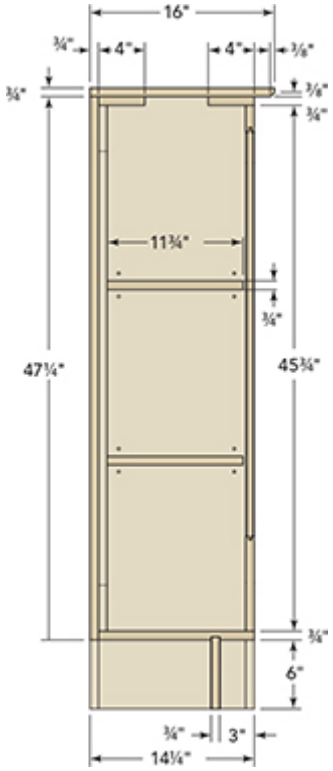
PLAN



FRONT ELEVATION



BACK ELEVATION



PROFILE SECTION

After cutting the tapers on the legs with the band saw, remove any mill marks using a jack plane.

Biscuits aren’t needed to strengthen this joint, but they help keep the two legs and the panel aligned during assembly.

I routed the shoulders of the tenons on the router table, making sure to have a backer piece in place to prevent blow-out on the back edge of the cut. These tenons are about 1/16" shorter in length than the mortise depth to allow for excess glue.

Cut the top rails to the same length as the bottom panel. Cut a 1/16" shoulder on the bottom face of each rail to match the bottom’s tenon length. This guarantees identical shoulder-to-shoulder length for the top and bottom. The shoulder is used to register the parts for marking.

It takes time and attention to detail to make the template, but the results are worth the effort.

A sharp chisel squares the rounded corners left by the router.

Cut the tenon shoulders at the router table, then define each tenon cheek with straight cuts using a handsaw. The waste in between is removed at the band saw.

Start at the front and work toward the back to fit the tenons in the bottom panel.

Illusion Cabinet

NO.	ITEM	DIMENSIONS (INCHES)			MATERIAL	COMMENTS
		T	W	L		
4	Legs	3/4	2 1/4	53 1/4	Mahogany	Tapered
2	Sides	3/4	12 3/4	53 1/4	Mahogany	
1	Bottom panel	3/4	12 3/4	18	Mahogany	Trim tenons to fit
2	Shelves	3/4	11 3/4	16 7/8	Mahogany	
1	Top	3/4	16	27	Mahogany	
2	Top rails	3/4	4	18	Mahogany	Trim tenons to fit
2	Back cleats	3/4	3/4	45 3/4	Mahogany	
1	Straight back plank	3/4	3 1/4	47 1/4	Redwood	*
4	Tapered back planks	3/4	4 9/16	47 1/4	Redwood	*
1	Kick	3/4	6 1/4	17 1/2	Mahogany	
2	Door stiles	3/4	4 1/8	45 3/4	Mahogany	Tapered
1	Top door rail	3/4	5	12 3/4	Mahogany	Curved
1	Bottom door rail	3/4	8 1/8	9 1/4	Mahogany	Curved
1	Door panel	1/2	13 3/8	39 7/16	Fir	Shaped to Opening**

Back planks have shiplapped edges; *Door panel size determined by adding 5/8" to opening in dry-assembled door frame to account for the grooves.

Stand the bottom panel in place on a side and make sure the front edges align. With a pencil, mark the mortise locations onto the bottom. With only a few tenons to cut, it's quicker to cut them by hand than on a machine. (I tried at the table saw – it was too fussy.)

After I marked out the tenon sides, I clamped the bottom panel low in the vise to eliminate vibration, then sawed down to define the tenons. I used my band saw to carefully remove the waste.

Fit the tenons starting at one edge and work your way across. Having a good shoulder plane makes a huge difference in your ability to finesse a fit. Chamfer the tenon ends as well to make sliding them home a bit easier.

The top rails sit flat to the tops of the side panels. I used half-blind dovetails for this joinery because they're invisible and strong.

The top rails were first cut as long as the bottom panel. After I made the shoulders, I cut off ⅛" to keep the tails from being too close to the outer face of the panel. There's no

point in risking a crack with too tight a fit. I used a 1:6 slope to lay out the dovetails and cut them at the bench before marking out the sockets on the panels.

To mark the pinboard, I put the bottom panel into the sides and clamped things tight. Before marking the pin position, I set the top rails in place and clamped those as well – the small shoulders make it easy to clamp across the case. I used a marking knife for this, but somewhere along the way I lost my ability to see tiny knife marks in end grain. To darken them, I used a drafting pencil sharpened to a fine point; it worked great. After sawing inside the lines, I used a chisel to complete the sockets for the tails.

After adjusting the length of the top rails, cut the dovetails. With the rail in place, mark the sockets.

Define the edges of the tail sockets with two saw cuts. Then chisel out the waste.

The cardboard template ensures that the tapers on the door stiles are identical.

The band saw is ideal for cutting the tapers on the door stiles.

Think Ahead About the Door

With the rail dovetails fit into the top of the case sides, it's time to lay out the knife hinges. First, make sure the front edges of the case are all trued up. I clamped the cabinet onto my bench and planed the edges flush.

Make the mortises for these hinges before assembly to keep your life simple. The Brusso knife hinges I used have a brass washer on the pin that separates the two leaves. This sets the reveals or gaps for all the door edges. I made shims out of plastic laminate and a piece of masking tape to match the thickness of the washer.

Put one shim against the case side to set the gap of the hinge stile then mark for the hinge leaf with a marking gauge and knife. I use a router to ensure a consistent depth on the leaf mortises, then chop the corners square. It's easier to drill for the screw holes

now as well. I drilled and ran in steel pilot screws with some wax on the threads to lead the way. I can install my brass screws later on with no worries about breaking a screw.

This cabinet has only two shelves, and I like the ease that adjustable shelves give in building a piece. You just have to remember to get the holes drilled before gluing up. I made a template out of ¼" MDF and marked hole centers for shelf pins exactly where I wanted each shelf to be.

To give me options for shelf placement, I made marks 1" higher and lower than my layout. Using a brad point bit, I drilled the template, then placed it inside the assembled case, marked the holes with the same bit, then deepened those marks with an awl.

These marks are easy to see and align at the drill press. Set up an auxiliary table to support the case side. Shim under the case sides to keep the tapered legs off the table (this also helps to ensure that the holes are drilled straight).

Before glue-up, I cut grooves for the kick piece that goes under the case bottom. I marked the stop point of each groove on the sides, then used my plunge router with a ⅜"-diameter bit and a fence to cut a ¼"-deep groove. I used a chisel to chop the ends of the stopped cuts square.

After the door parts are adjusted to fit, use loose tenons to join the rails and stiles.

Get it Together

As with any cabinet project, assembly is a calming and soothing balm after a long day's work. Right. How I wish that were true. Glue changes everything. Here is what I learned (again) from the experience: You have to plan your glue-up, get your clamps ready and have clamps and corner blocks ready to pull the cabinet square. Assume the worst and be happily disappointed if it doesn't occur. It's much better than assuming that everything will go right, then frantically trying to fix a problem with the glue drying.

I made clamping cauls out of some clear 2x4 scrap laying about. I put a slight convex curve on one edge using a band saw, then smoothed the curve with a handplane. The cauls fit between the legs of the side panels. Two deep extension F-style clamps hold things tight. The cauls pulled the tenons in fine, and the shoulders closed up great.

Center of the Universe

Open cabinets, with no fixed shelves and only a door across the front, can twist on an uneven floor. This is especially true when the cabinet is loaded with books or bottles or both. My strategy is to build them on a flat and true surface that becomes the Center of the Universe.

When the piece goes to its final home and the door doesn't close right or the reveals have changed, I can say: "When I built this piece, it was built at the Center of the Universe and built square – so it's the floor that's the problem." Then I can shim the case under the legs to make the door fit perfectly again.

After the case is glued, I set it on an assembly platform. This platform was double-checked to see that it's not twisted because my shop floor is anything but flat. I placed winding sticks on top and adjusted with shims underneath the platform to pull it in true. Now I had a working area that I could trust.

I checked the bottom rail and the hinge stile of my door against my door opening. If the door is out of square, adjust it to fit. You want to have enough room to place shims under the door and against the hinge side of the case. I used a jack plane to fit the door to its opening.

One at a time. Fitting the pieces to each corner makes it easier to achieve a nice-fitting door. Loose tenon joinery makes this possible.

Use a wire brush to add texture to the front of the panel.

With most of the door edges chamfered, a bit of work on the rail ends continues the detail as it highlights the joint.

Detailed Door

The door frame is made of tapered stiles and shaped rails. The parts all taper from the wide to the narrow ends by a factor of two. This gives the door a distinct look, but makes for challenging construction because none of the frame joints are square.

I made a cardboard template of the taper for the stiles. That allowed me to visualize the slope and mark an identical angle on both pieces. I cut the tapers at the band saw, then removed the saw marks with a plane.

Loose-or slip-tenon joints are the simplest way to build this door. Cut all your parts to size, taper the long door stiles then cut the angles and curves on the rails. (See "Center of the Universe" left.) I made corrections for both length and angle where needed using a low-angle jack plane to fine-tune the fit.

I then mortised all the parts for the loose tenons. It's much easier to make any adjustments when there are no tenons protruding from the rails.

Once I had the door frame put together dry, I planed all my parts flat then set up a router with a slot cutter to make the groove for the panel. I prefer to cut straight into the dry-assembled door rather than separately into its parts. The panel grooves will line up better this way.

The door frame is ¾" thick, so I cut a ¼"-wide x ⅜"-deep groove for the ½"-thick panel. I marked out the shape of the door onto a glued-up fir panel and added 5/16" all around for tongues that fit into the grooves. At the router table, I rabbeted both faces of the panel to make my ¼"-thick tongue.

I cut the rabbet on the outside of the panel then planed, scraped and sanded it. To add texture to the panel's front face, I scrubbed it with a wire brush, then cut the second rabbet and fine-tuned the fit of the panel with my shoulder plane. A coat of shellac was applied to the panel before the door was glued up.

I fit the bottom door rail and hinge stile to the case then mortised in my lower knife hinge. I fit the top rail before putting in the top knife hinge. The handle stile is fitted next with a 5° back-bevel on the edge of the door so it clears the case when opening.

Finishing Touches

The kick is the last piece to get glued in place. I fit it to the grooves in the sides and bottom of the case so it is a slide-in fit. Check for the high spots that show shiny on the tongue and plane those with a shoulder plane until the kick fits home.

The kick has a taper detail carved into it. With the door in place, I marked the taper line of the stiles onto the case then transferred this down to the kick. I pulled out the piece and with a V-chisel carved the lines before gluing the kick into the case, then cut a slight arch between the V-grooves on the bottom edge of the kick for visual interest.

The top is two pieces of mahogany glued up. A 45° bevel is added to the ends and front edge; leave the back edge square. I then planed a gentle bullnose to relieve the sharp edges. The top is screwed to the case through the top rails after finishing.

The back is made of five tapered redwood slats. The central slat is straight, but the outer slats are tapered and have overlapping rabbets. With the top rail and bottom panel set in the thickness of the attached legs, I screwed each of the back slats to them, top and bottom. I added cleats on the inside of the sides just to cover up any movement issues of the back slats.

The door handle is a piece of ebony with three brass escutcheon pins put in to brighten it up a bit. It's attached to the door with a pair of loose tenons. The catch is a brass three-way ball catch.

My cabinets have an inside finish of shellac. On the outside, to darken the wood, I used a coat of linseed oil and let that cure for several days. Six coats of shellac were applied and rubbed out, then I waxed the cabinet.

For the inside of a case, you can also scent the shellac. It's astonishing when you open the door to a pleasant smell if you choose the right scent. Avoid patchouli. Vanilla or lavender would be good. I mix 4 ounces of shellac and 20 drops of scented oil. That yields a delightful surprise when you open up the case. It's good to keep the oil around to brighten up the scent in time.

To continue the overall design, the outer slats of the back are also tapered.

The shape of the handle tapers in the opposite direction of the stile. Brass pins provide an accent to the darker wood.

CHAPTER TEN

Metropolitan Console

by Mario Rodriguez

Back in the ’50s, traditional cabinetmakers in Scandinavian workshops produced sleek, powerful furniture using the latest materials and modest machines. This project pays homage to those exciting days of mid-century modern furniture.

I designed the Metropolitan Console to function as an end table or a nightstand. Its low profile, streamlined design and light color fits well in small rooms and tight spaces.

The cabinet is made from riftsawn red oak plywood. Its orderly, parallel lines are perfect for mid-century modern, which sought a clean break from the busy look of old-fashioned design.

Prepare the Plywood

The case is a simple plywood box with a twist: The wood's grain runs seamlessly around the top and sides, as if it were wrapping paper. It's a neat trick.

The secret to pulling this off is to crosscut the sides (A), top and bottom (B) in consecutive order from one sheet of plywood. You'll miter the ends of each piece, then assemble them like a folded cardboard box (**Fig. A**).

Begin by cutting a long piece of plywood (**Fig. B**). (Cut another piece about 15" square from the same sheet for test cuts.) Draw crosscut lines as shown in the diagram. Write the name of each piece on its front edge, and, for insurance, draw a triangle and a circle across the side and top pieces. These marks will help you reassemble the pieces in the same order later on.

1 Cut the plywood parts for the console from one long sheet. Later on, you'll arrange the pieces in the same order so the grain flows seamlessly around the console.

Here's how to make a minimum number of cuts, so the grain matches as closely as possible from one piece to the next. Begin by cutting off the bottom piece, including the 1" waste shown on the bottom of the diagram. On the piece that remains, cut off the 1" waste shown on the top of the diagram. Cut off both side pieces using a stop block to ensure that they are the same length (**Photo 1**). The top piece will remain; trim the bottom piece to match the length of the top.

Cut a rabbet along the rear edges of all four pieces to receive the back (C).

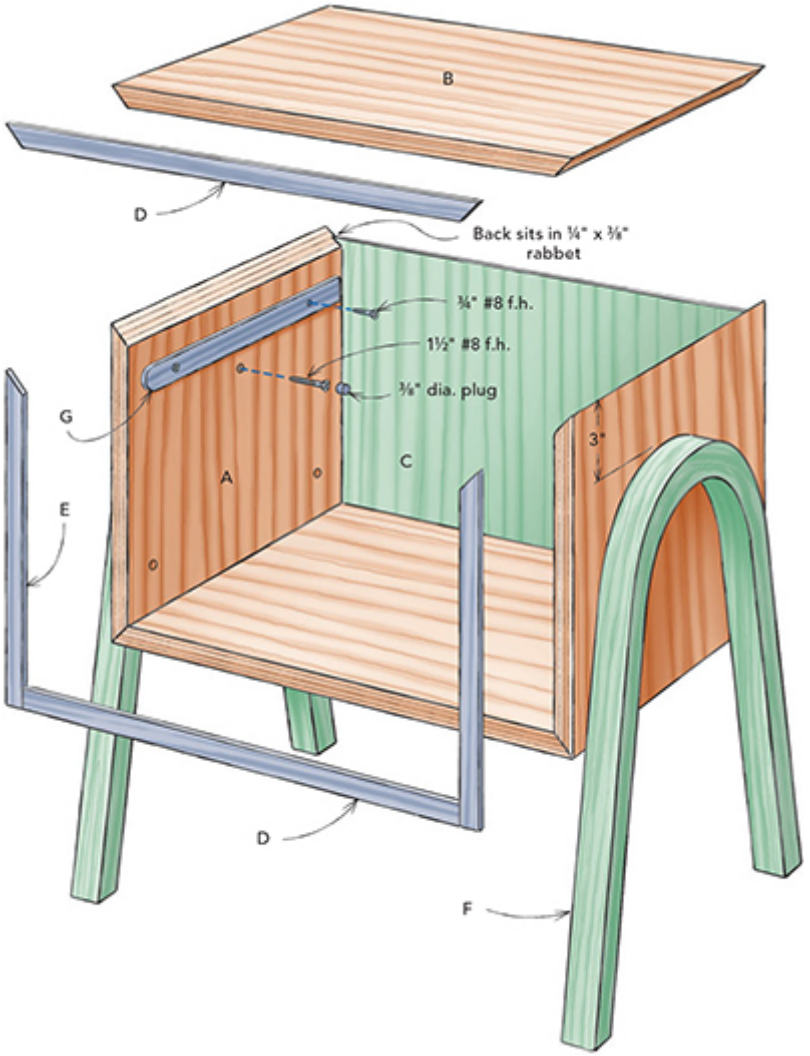


FIG. A EXPLODED VIEW

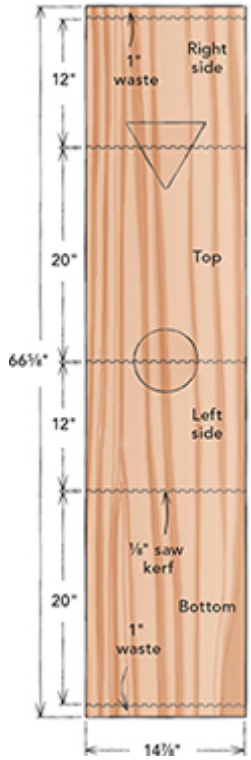


FIG. B PLYWOOD CUTTING DIAGRAM

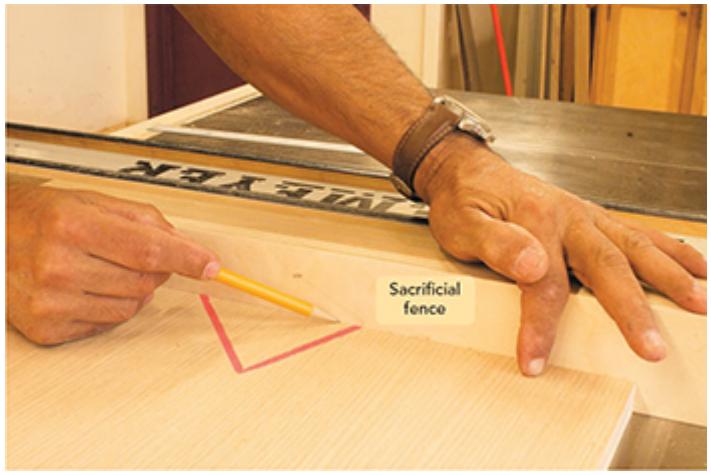
Metropolitan Console

Overall Dimensions: 21½" H x 22½" W x 16" D

PART	NO.	ITEM	DIMENSIONS (INCHES)			MATERIAL
			T	W	L	
A	2	Side	¾	14⅞	12	Oak plywood
B	2	Top and bottom	¾	14⅞	20	Oak plywood
C	1	Back	¼	19¼	11¼	Oak plywood
D	2	Long edging	⅛	13/16	21*	Solid oak
E	2	Short edging	⅛	13/16	13*	Solid oak
F	2	Leg	1⅜	1⅜	18½**	Laminated oak
G	2	Drawer guide	¼	15/16	13	Yellow poplar
H	1	Drawer front	¾	3	18¼†	Solid oak
J	1	Drawer back	7/16	2¼	17⅞	Yellow poplar
K	2	Drawer side	7/16	3	14¼	Yellow poplar
L	1	Drawer bottom	¼	17¾	14	Oak plywood

Notes: *Cut length to fit; trim to final width after gluing to case;* *The legs are made from 22 layers of 1/16" veneer, cut into 1⅜" wide x 50" long strips; †The exact length is ¼" shorter than the cabinet's opening.

Miter the Plywood

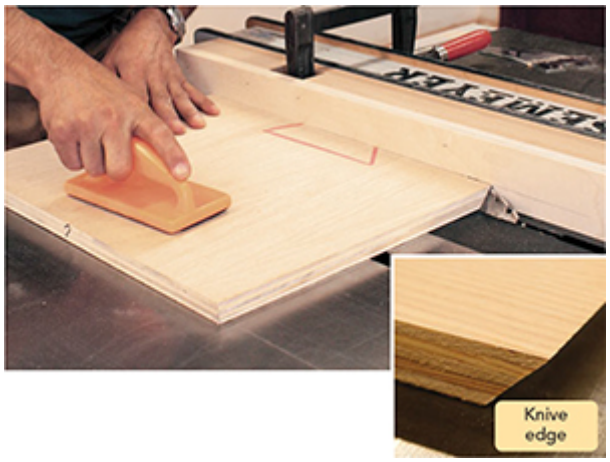


2 Set up the saw to cut miters on the ends of the pieces. First, mark the thickness of the plywood on a sacrificial fence.

Next, you'll cut miters on the end of each piece – without shortening its length. Set up the saw by clamping on a sacrificial fence. Draw a line on the fence indicating the precise thickness of your plywood (**Photo 2**).

If you cut each miter in one shot, the offcut will be trapped between the blade and fence. It might shoot back at you. I use a backer board to prevent this, but you could also batch all of the boards and nibble away at the miters in stages, raising the blade about ⅛" at a time. This method avoids creating offcuts; all the waste is reduced to dust.

3 Tilt the blade 45° and raise it to cut a hair below this line. Adjust the fence so the teeth cut all the way into the fence.



4 Saw the plywood. The miters should have a knife edge that leaves each piece at its original length (see inset).

Setting up the final cut is fussy (**Photo 3**). You'll only want to do this once, so each piece should be ready to go. Your goal is to cut a miter that leaves behind only a whisker of the board's original end (**Photo 4**). You'll probably need to make a number of test

cuts to adjust the height of the blade and position of the fence. When you're set, it's a good idea to cut every end twice to make sure the mitered edges are straight. If your setup is correct, and that whisper of the original edge remains, you can't take off too much – no matter how many times you pass the edge over the blade.

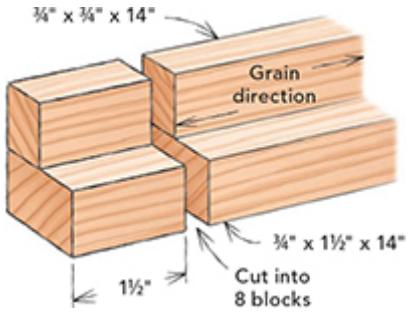


FIG. C CLAMPING BLOCK

Glue the Case

5 Glue the case together. You don't need clamps; I use nylon tent cord, which has some stretch, to apply pressure to the joints.

I don't use splines to reinforce the miters; the joints are strong enough without them. I don't use clamps for the glue-up, either. Instead, I pull the assembly tight with stretchable nylon tent cord (**Photo 5**). Blocks placed at all four corners help square the box and keep the cord from digging into the miters. Glue up and cut a set of these blocks before assembling the case (**Fig. C**).

You'll probably want a helper to hold the case together while you position the blocks, pass the cord around them and knot it tight. If you're working alone, tape the joints together before you apply the glue. To do this, place all the parts face up on a long bench and butt them end-to-end. Stretch a half-dozen pieces of tape across each joint and flip

the entire assembly over. Apply the glue, then fold the pieces together and apply more tape across the last joint.

After tightening the cords, check the case to be sure it's square. You may have to nudge it one way or another to get it right. If any of the miters have small gaps, try closing them up by gently rubbing them with a burnisher or the round shaft of a screwdriver. Wait overnight to let the glue dry hard before continuing to work on the case.

Apply the Edging

6 Glue ⅛" thick edging around the front of the case. Clamps aren't necessary here, either; tape provides adequate pressure.

Saw ⅛" strips (D and E) to use as edging. Note that the edging isn't mitered at all four corners; the bottom corners are butt joints. Start with the long piece for the top. Miter both ends, apply glue and tape the piece to the plywood (**Photo 6**). Make sure the edging overhangs both sides. Miter the short pieces for the case's sides and glue them; finish up with the butted piece, along the case's bottom.

7 Plane the edging until it’s nearly flush with the plywood, then finish up with a scraper, file or sandpaper.

Remove the tape after 30 minutes or so, before the glue fully cures. Scrape off any squeeze-out with a putty knife. The next day, plane the edging close to the plywood (**Photo 7**). Level it flush with a scraper or sandpaper. (You could also use a flush-trim router bit for the whole process.) Use a file to level the inside corners; neither a plane nor a router will work here.

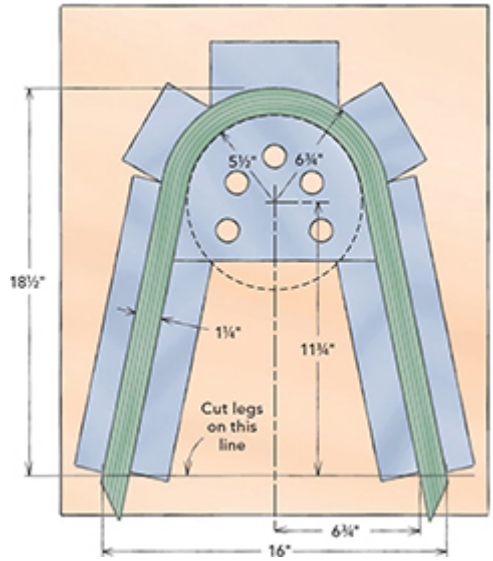


FIG.D BENDING FORM

Laminate the Legs

The legs are composed of 22 layers of 1/16" thick wood glued together. Rather than resaw all these pieces, make them from extra-thick quartersawn red oak veneer (see Sources). To rip the veneer, make a bundle of 10 or so pieces and cut them into 1⅜" wide strips on the band saw.

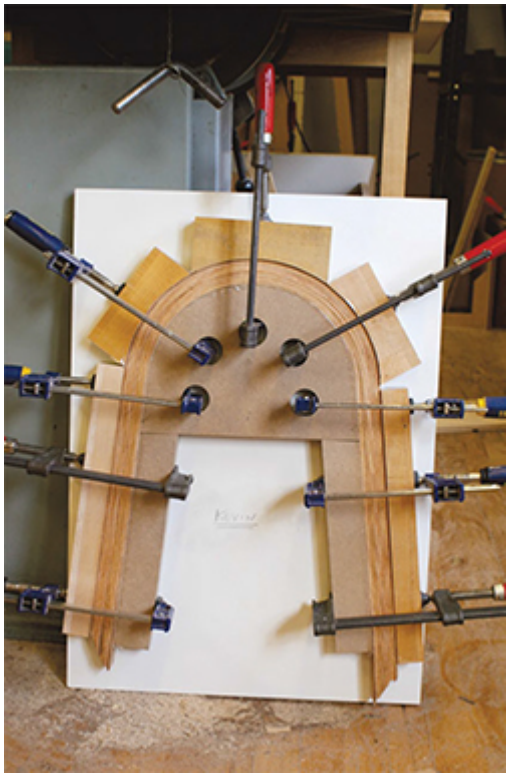
You'll bend and clamp these strips around a form (**Fig. D**). Build the form from two layers of ¾" MDF or plywood and screw the pieces to ¾" melamine or plywood. Run packing tape around the form to keep glue from sticking to it. You'll also need to make three curved blocks to squeeze the laminations to the form. The radius of these blocks should exactly match the outside radius of the leg, as shown in the diagram. Put packing tape on these blocks, too.

It's a good idea to have help during the glue-up. One person can bend the laminations around the form, while the other can put the blocks in place and tighten the clamps.

8 Make the legs by gluing and stacking strips of 1/16" thick veneer. You have to work fast, so apply the glue with a roller.

The whole process starts by rolling a thin layer of yellow glue on one side of all the strips and piling them in a stack (**Photo 8**).

9 Bend the stack of laminations around a form.



10 Clamp blocks around the form to squeeze the laminations together. This process creates a very stiff pair of legs.

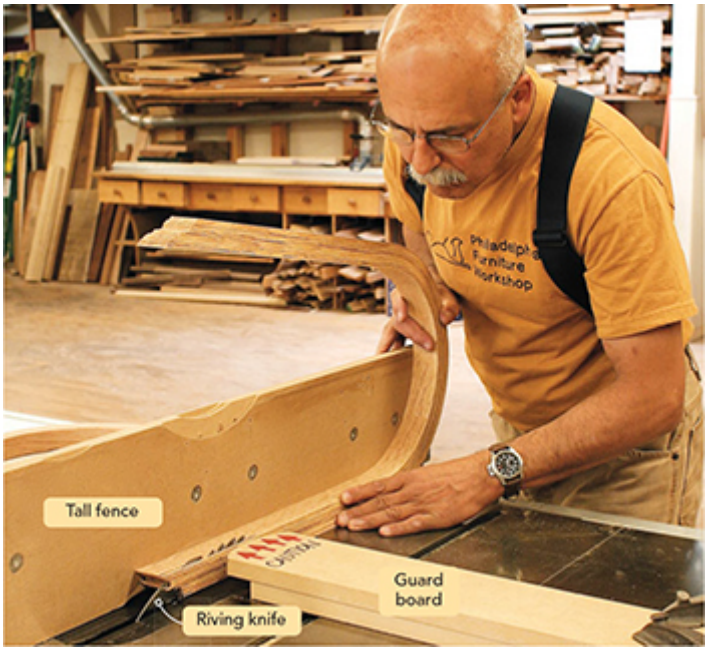
Place the stack on the form, centered on the arch (**Photo 9**). Clamp the middle curved block first, then work your way down both sides (**Photo 10**). Before clamping each section, you'll probably have to smack the laminations a few times with a mallet to force them flush. Leave the laminations clamped in the form overnight.

Mount the Legs

11 Flatten one side of each leg on the jointer. For your safety it is important to use a shop-made guard and a support board.

Your next task is to flatten one side of the legs. I'll show you how I use a jointer to do this (**Photo 11**), but I'd like to caution you that this method requires a steady hand and a special jig. You must always keep your fingers on top of the wood, never on the sides. Alternatively, you could use a plane or perhaps a belt sander to level both sides of the legs.

The jig consists of a support board and a round guard. The support board is clamped to the jointer's rabbeting ledge and widens the jointer's bed. The guard is elevated 1/16" above the support board to clear the knives and is fastened to it. Position the jointer's fence about 2" away from the guard. The guard's round shape allows you to flatten the entire side of a leg in one pass by rotating the leg as you go.



12 Rip the leg on the table saw. Newer saws have riving knives, which help prevent kickback when you can't use a standard guard. For your safety it is important to use a tall fence and clamp a guard board to the saw.

Rip the legs to final width on the table saw (**Photo 12**). This operation also takes a steady hand and an auxiliary guard. Position the end of the guard near the blade and clamp it to the top of your saw. Install a tall auxiliary fence to steady the leg as you cut. Raise the blade about 1½" high, but no more. Push the leg straight through the saw, as shown in the photo, then turn the leg over, end for end, and repeat the operation. Plane the uncut portion, on the curve, by hand.

13 Cut the leg to length. Place the leg back on the gluing form to hold it in the correct position.

14 Mount each leg to the case. Clamp a guide board to the leg to make sure it's even. Fasten the leg with screws.

Use the bending form as a jig to cut the legs to length (**Photo 13**). To align the legs on the case, cut a board 9" wide and clamp it even to the ends of one of the legs (**Photo 14**). Center the leg on the case, then trace around it with a pencil. You'll be fastening the leg to the case with screws, from the inside (Fig. A). Remove the leg and mark where the screws will go on the outside of the case. Drill ⅛" pilot holes through the case, from the

outside. On the inside of the case, counterbore these holes to receive wood plugs. Enlarge the pilot holes so your screws slip through.

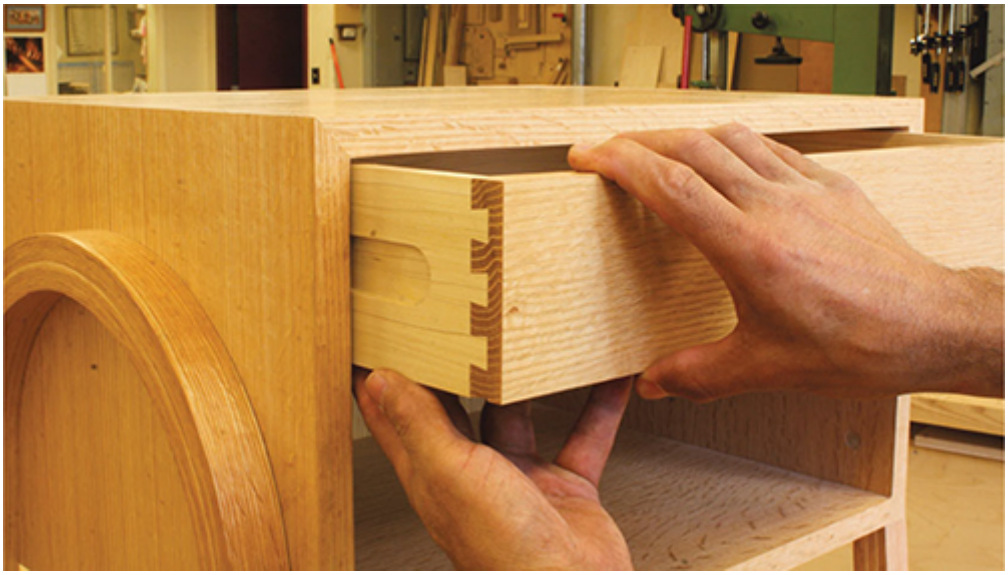
Sand the entire case and both sets of legs. Clamp the legs back to the 9" board and fasten them to the case. Glue plugs on top of the screws and level them.

Add a Drawer

The drawer runs on guides (G) that are screwed to the side of the case (**Fig. F**). On the drawing, note that there's a ⅛" gap between the drawer and the case, all around.

Mill the wood for the drawer front (H), back (J) and sides (K). Rip the front and back to final width. Trim the front exactly ¼" less than the distance between the two sides of your case. Cut the sides to width and length, then rout half-blind dovetails to join the sides to the front (**Fig. E**). (I used a Porter-Cable 4210 jig, which spaces the dovetails 1" apart.) Rout grooves for the drawer bottom (L) in all three pieces. Cut dados across the rear ends of the sides to receive the back, then temporarily assemble the front and sides. Trim the back piece to the correct length and cut the bottom to size. Glue the drawer together. Rout stopped grooves in both sides of the drawer.

15 Fasten the drawer supports inside the case. Use a gauge block to position the supports.



16 Slide in the drawer. The sides of the drawer ride against the drawer support, not the case. If the fit is too tight side to side, remove one support and plane it thinner.

Make the drawer guides. Drill and countersink two holes in each guide for mounting them to the case. You'll need to make a gauge (**Fig. G**) for locating the guides. Fasten the guides to the case (**Photo 15**) and slide in the drawer (**Photo 16**). If the drawer fits too tight between the drawer supports, remove one support and plane it thinner. If the drawer is too loose, remove one support and substitute a thicker one. Add the back to the case and you're ready for finishing.

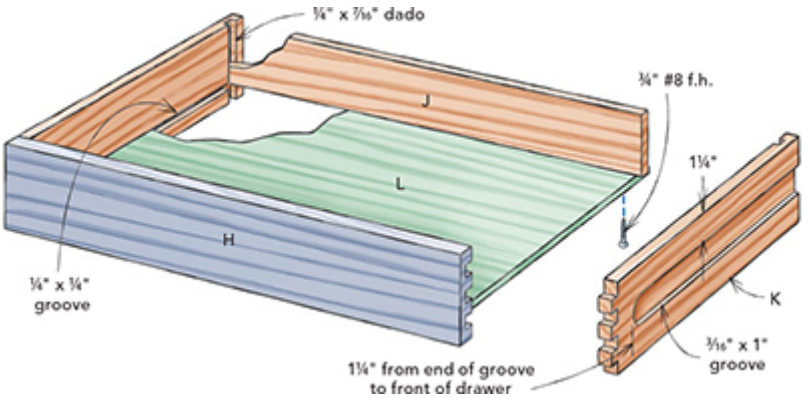


FIG. E DRAWER

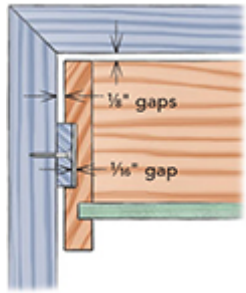


FIG. F DRAWER AND CASE CROSS SECTION

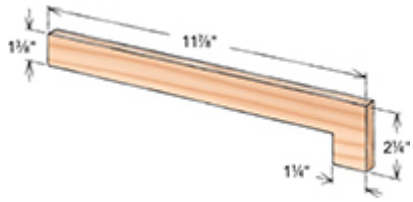


FIG. G DRAWER GUIDE GAUGE

CHAPTER ELEVEN

Splay-leg Table With a Twist

by Tom Calisto

My aim was to make something fairly simple and classic with contemporary flair. The cuffs and cock bead are borrowed from the Federal period, but I added splayed legs and

an angle on the cuffs to introduce more contemporary elements.

At first glance the splayed legs would appear to complicate the construction of the table, but that's not the case. All of the joinery involves 90° corners – the only time compound angles are introduced is when the legs are cut to length.

Inside Leg Tapers

The first step in building the table is milling the material for the legs and aprons. On most tables with tapered legs, the starting point for the taper begins around ¼" below the bottom of the apron. However, because the legs splay outward on this table, I chose to simply taper the entire leg on the two inside faces so that the lines of the table aren't interrupted.

I used ⅝ stock for the legs so I could effectively cut the leg blanks from rift-sawn wood. Depending on how the grain is flowing in your stock, you may have to cut the material on the diagonal or some angle in between to get true rift-sawn blanks. Having the grain flow in a straight line down each leg is important to the design.

After laying out the leg on the ends of the stock, use a band saw to make the rough cuts. Be sure to leave each leg a little oversize. True up two adjacent faces with a jointer and thickness the blanks to 1⅛" square.

The legs start out at 1⅛" and taper on the two inside faces to ¾" square at the foot. The taper can be cut many different ways; I chose to cut them on the table saw using a simple shop-made tapering jig. By using the table saw and a dedicated jig, I can ensure that the legs will be consistent.

Now, with a miter saw set for a compound angle (5° bevel and 5° miter), trim the top of the legs. The legs can be left about ¼" long at this point. They'll be cut to final length after the cuffs are added.

With the legs tapered, cut the mortise for the aprons. I joined the table with loose tenons, but integral tenons can also be used. (If you elect to use integral tenons, be sure to add the tenon lengths to the aprons before cutting them to length.)

With legs that are 1⅛" square, it's best to align the pieces to get a rift-sawn look; you can do that with
⅝ stock.

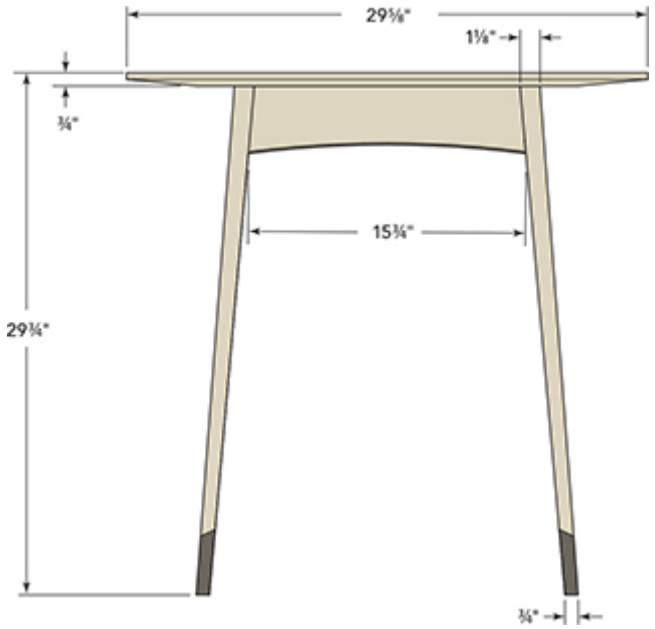
Because of the splay design, you can taper the leg over its entire length – it's also a cleaner look.

With two clamps and a stick, you can lay out a fair curve as your apron pattern.

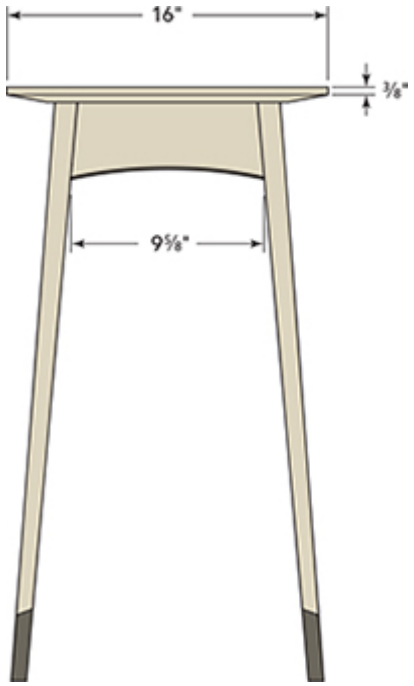
Pay attention to the mortise locations. They are cut on the tapered faces of the legs. It would be easy to cut the mortise on the outside faces at this point. The mortises are ¼" wide by 2½" long and start ½" from the top of the leg. They are offset from the outside face of the leg by ⅜".

I cut the mortises on a shop-made, router-based slot mortiser. (Of all the tools that I've made for my shop, this one has saved me the most time.) The work can also easily be done with a plunge router and an edge guide – just be sure the router is fully

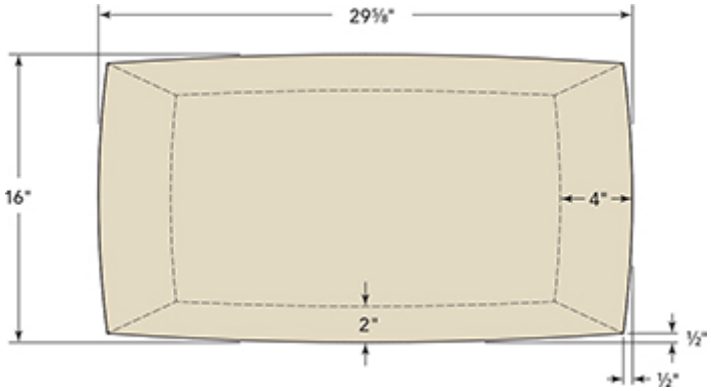
supported to prevent tipping. Take small bites to produce clean and accurately sized mortises.



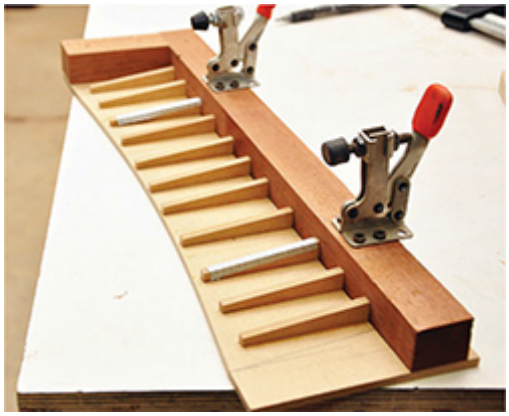
FRONT



SIDE



TOP



The small wedges lift the aprons to position them for the router operation; sandpaper at the clamps increases the hold.

Splay-leg Table

NO.	ITEM	DIMENSIONS (INCHES)			MATERIAL	COMMENTS
		T	W	L		
4	Legs	1 1/8	1 1/8	29 1/4	Sapele	
2	Long aprons*	3/4	3 3/4	15 3/4	Sapele	Loose tenons
2	Short aprons*	3/4	3 3/4	9 5/8	Sapele	Loose tenons
1	Top	3/4	16	29 5/8	Sapele	
16	Ankle cuffs	1/8	1	4	Peruvian walnut	
2	Long cock beads	1/8	1	17	Peruvian walnut	
2	Short cock beads	1/8	1	11	Peruvian walnut	

*Ends are cut at a 5 3/4° angle and top edge is beveled at 5°

Aprons & the Arc

The ¾"-thick aprons are milled to 3¾" x 9⅝" for the sides and 3¾" x 15¾" for the front and back. To create the table splay, the ends of the aprons are cut at a 5¾° angle (the extra ¾° accommodates the leg taper). The tops of the aprons need to be beveled to match the splay (5°) so they will be flush to the underside of the top.

I made a router jig to help cut the arcs for the front and side aprons. It's nothing more than a flush-trim template that holds the work at a 5° angle to produce arcs that match the leg splay. This allows the apron's bottom edge to be parallel with the top when the table is complete.

Waste sawn from the aprons prior to any router work makes the best caul when attaching your bead to the aprons.

The bead is flush with the back face of the apron; on the front, the bead is trimmed to stand ⅛" proud.

The best way to round the bead is using a simple scratch stock – the profile easily follows the arc of the bead.

My shop-made horizontal mortiser makes quick work of the mortises in the legs and aprons. A plunge router can also do the job.

The arcs for the side and front aprons both have the same ½" rise. Because the lengths of the aprons are different, the length and radius of the arcs differ as well.

To create the jig, start with a base of ¼"-thick MDF about 6" wide and 2" to 3" longer than the apron. Lay out the arc so it's centered along the long edge of the base. From the same edge draw a parallel line 3¾" away. This line is used to locate a registration block and to align 5° wedges.

Cut out the arc and clean up the curve so it's smooth and symmetrical. Add a full-length registration block along the 3¾" offset line drawn on the base.

To get the apron to rest on the jig at the correct splay angle, glue identical 5° wedges on the base of the jig along with the full-length registration block. The wedges should be 3" long and the small end should be around 1/16"to ¼" thick – the exact dimensions are not important, but the wedges must be the same. Add a registration block to the right side and toggle clamps to hold the apron in the correct position. The jig is now ready for use.

Place the apron on the jig so the top edge of the apron is flush with the registration blocks. Now trace the arc onto the apron. Rough-cut it at a band saw, leaving 1/16" to an 1/8" for clean-up. Put the apron back in the jig and set the clamps.

To trim the apron, I set up a bottom-mount bearing pattern bit in my router table and flushed the remaining waste to the template. (Be aware that it's easy to tear out wood as you trim the uphill portion of the cut. Plus, the ends are fragile and can be easily snapped off.) Trim all four aprons.

After cutting away the bulk of the ankle waste with a jointer, I use my router to sneak up to the marked lines.

Use a sharp chisel to trim and fine-tune the cuff details.

With the guide block set in position, paring the 25° angle is too easy.

Add the Details

With the joinery and shaping complete, add the details that set this table apart – the cock beading on the aprons and the cuffed feet. I chose Peruvian walnut to accent the sapele of the table because it is easy to work and it's a fairly dark wood when finished.

Both the cock beading and cuffs are made from ⅛"-thick stock. To add the cock beading to the aprons, I cut pieces about 1" longer than the apron along its arc, and a little more than 1" wide.

All of the shaping is done after the bead stock is glued to the bottom edge of the apron. Apply glue to the arc on the apron and install the oversized strips. There is a bit of wiggle room, but try to keep everything flush on the backside of the apron.

After the glue dries, flush the bead to the back side of the apron with a block plane.

To get a consistent ⅛" reveal on the front of the apron, I ran the pieces on edge through the table saw. Another approach is to use a block plane with a scrap piece of the beading material attached with double-sided tape to the sole; the scrap acts as a depth stop.

I rounded the projecting edge with a scratch stock. This was done mostly freehand, holding the scratch stock in my fingers. It may help to rough in the bead with a sanding block, then fine-tune it with the scratch stock. Once the roundover is complete, trim the cock bead flush with the ends of the aprons.

Mill the mortises in the apron so the mortise is offset from the face by ¼". This creates a ⅛" offset between the leg and apron face. The mortise is 2½" long and centered on the end of the apron.

Lay Out & Recess the Cuffs

The cuffs are my favorite part of the project. The cuffs wrap around the legs in a zigzag pattern, going up on two adjacent faces and flowing back down the other two faces. They mimic the arches in the aprons, rising toward the inside of the table – make sure they flow up toward the faces with the mortises.

I chose a 25° angle for the pattern. Because of the geometry, the cuff recess does not terminate at 90° to the face of the leg; it terminates at a 25° bevel to match the 25° angle at which the cuffs terminate in the leg. The recess is easy to pare to the required angles by using a guide block with a matching compound angle.

The first step is to mark the location of the cuff on the legs. Locate the long point of the cuff (the highest point from the foot) at 25½" from the top of the leg. With a sliding bevel gauge set to 25°, begin at the outside corner (the intersection of the two uncut

faces) then transfer the lines around the leg going up one side and down the second. Return to the outside corner and repeat the steps so all the faces are marked.

The next step after layout is to remove the bulk of the material in the cuff recess. A jointer does a great job of hogging it out.

Set the machine for a ⅛"-deep cut and attach a stop block to the fence to limit the length of the cut. Take the cut slowly to keep it safe and produce a smooth surface, then switch to a small trim router and work to within ⅛" of the lines.

The shoulder needs to be pared to finish off the cuff recesses. Because the shoulder tapers down and the line is sloped along the face of the leg, it is easier and more accurate to use a guide block to control the chisel. The guide block should be around 10" long by 1½" square, and have one end cut with a 25° compound miter. Align the cut edge to the layout line as you pare.

Cuff Completion

With the recess complete, the real fun begins – adding the cuffs. The cuffs are made from stock roughly 1" wide, ⅛" thick and slightly longer than the recess. Trim one end to the required compound angle. Glue the first piece in place with both edges projecting equally past the sides of the legs. These will be trimmed later. Make sure the beveled joint remains tight while the joint is clamped up.

After 10 minutes, remove the clamps and any glue squeeze-out. Pay particular attention to the squeeze-out on the “long point” side; the next piece of the cuff butts into this recess so it needs to be clean.

The design of the ankle looks clean and crisp, but the work to get that result is detailed.

There is a specific path to take as you add the cuff pieces to the leg – the secret is to work to the long-point sides.

The small triangular section is exposed as the previous cuff piece is trimmed.

Fit the second piece of cuff stock to the long point side. This time there are two edges to mate: the long side and the compound-cut edge. Adjust the joint as necessary, then glue in the second piece. After 10 minutes, clean any squeeze-out.

The third piece of the cuff fits to the leg in the same manner.

For the fourth piece of the cuffs, pare back the joint along the short side of the bevel and flush it with the recess, paying attention to the grain direction. There should be a small triangular section remaining from the adjacent cuffs after everything is leveled and pared back to the bevel.

Glue in the remaining cuff. After the glue dries, level the cuff with a smoothing plane and trim the legs to their final length of 29¼". The final cut should be parallel to the compound angle at the top of the legs.

Mill & Bevel the Top

Mill the top to ¾" x 16" x 29⅝". To achieve the boat-shaped design, I marked a centerline along both axes, then made a mark ½" in from the four edges. I sprung a batten from corner to corner, crossing at the ½" offset. I then traced the arc created by the batten for each of the four edges.

Band saw the top along the layout lines, then clean up the edges with a block plane. Work downhill from the center of each arc.

The last step is to bevel the underside of the top. The end-grain and the long-grain edges have two different bevels – the end-grain edges get a 4" bevel and the long-grain edges receive a 2" bevel. Both leave a ⅜"thickness to the top. Lay out the lines with a marking gauge, being careful to follow the curves around the edges. Cut the bevels to the lines using handplanes.

Brightly colored masking tape makes it easy to see and cut the layout lines for the boat-shaped top.

Working the taper around the curves in the top requires hand tools. I find that a plane is the fastest and most accurate method.

Stepped cauls allow the best opportunity for accurate clamping.

Finish & Assembly

I typically apply the finish to the components prior to the glue up. It is much easier to sand flat pieces than to worry about sanding in corners. An additional bonus to pre-finishing the parts is that glue squeeze-out is more easily removed after the finish is dry.

On this sapele table, I started with a lemon-yellow dye stain followed by shellac. On the base, brush on the first few coats of shellac (allowing them to dry fully between each, of course), then level the surface using #320-grit sandpaper wrapped around a cork sanding block. The final shellac coat is padded on.

For the top, I built up the shellac thickness enough so that I could rub it out later to achieve a high-gloss finish.

Now on to the glue up. Due to the splay angles, it's difficult to get clamping pressure at 90° to the joint during assembly. Simple notched cauls, or the offcuts from tapering the legs, come in handy for this application.

Because the components are pre-finished, make sure to protect the surface from the clamps and cauls. Glue up the sides of the table base first. After the glue cures, join the two side assemblies with the front and back aprons.

I glue beveled cleats along the top inside edge of the front and back aprons to attach the top to the base using screws. I made ½"-diameter counterbores in the top of the cleats to allow for a small amount of seasonal movement.

This is a fun and enjoyable project that merges classic style with contemporary features. The table can be built in a reasonable amount of time with minimal lumber.

CHAPTER TWELVE

Modern Wardrobe

by David Thiel

Furniture design in the last two centuries has swung back and forth wildly between austere and outrageous. One year everything's Rococo and carved; the next year the far simpler Hepplewhite style is the thing. Then comes the ornate Victorian stuff, which is

followed immediately by the straight-lined Arts & Crafts style. It's no wonder furniture manufacturers stay in business.

Simple is often better. And while some of these clean and contemporary pieces are criticized as merely boring wooden crates with drawers, others show off the elegant proportions of the furniture using only understated accents. I hope you'll agree that the subtle black accents on this wardrobe have achieved that goal.

The wardrobe uses frameless construction, and it is built almost entirely of plywood so it's stable and lightweight. The visible plywood edges are covered with iron-on veneer tape to retain the simple clean lines of the piece. The concealed hinges provide smooth door operation without interrupting the proportions of the door and drawer arrangement of the front. The pulls are unobtrusive and echo the black line of the reveal at the top and the bottom and the black base.

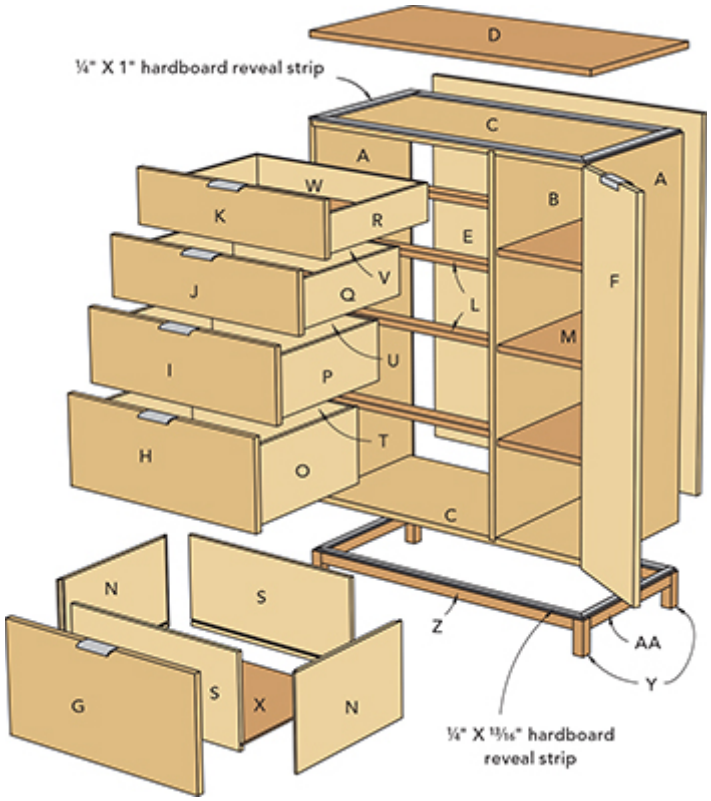
Construction begins by cutting the case pieces to size. Next, cut ⅜" x ¾" rabbets on the back, top and bottom of both side pieces to accept the back, top and bottom. Also rabbet the top and bottom pieces on the back edge to hold the back. Now cut a ⅜"-deep x ¾"-wide dado in the top and bottom pieces to leave an 11" opening between the right side and the vertical partition.

Modern Wardrobe

PART	NO.	ITEM	DIMENSIONS (INCHES)			MATERIAl
			T	W	L	
A	2	Sides	3/4	17 1/4	42 3/4	Maple plywood
B	1	Partition	3/4	16 1/2	42	Maple plywood
C	2	Top & bottom	3/4	17 1/4	35 1/2	Maple plywood
D	1	False Top	3/4	18	36	Maple plywood
E	1	Back	3/4	35 1/4	42	Maple plywood
F	1	Door	3/4	12	42 1/2	Maple plywood
G	1	Drawer face	3/4	12	23 7/8	Maple plywood
H	1	Drawer face	3/4	9 9/16	23 7/8	Maple plywood
I	1	Drawer face	3/4	7 13/16	23 7/8	Maple plywood
J	1	Drawer face	3/4	6 7/16	23 7/8	Maple plywood
K	1	Drawer face	3/4	5 7/8	23 7/8	Maple plywood
L	4	Drawer dividers	3/4	2	22 7/8	Maple plywood
M	3	Shelves	3/4	16	10 15/16	Maple plywood
N	2	Drawer sides	1/2	10 1/16	16	Baltic birch plywood
O	2	Drawer sides	1/2	8 1/16	16	Baltic birch plywood
P	2	Drawer sides	1/2	6 1/4	16	Baltic birch plywood
Q	2	Drawer sides	1/2	5	16	Baltic birch plywood
R	2	Drawer sides	1/2	4	16	Baltic birch plywood
S	2	Drawer front & back*	1/2	10 1/16	21 1/4	Baltic birch plywood
T	2	Drawer front & back*	1/2	8 1/16	21 1/4	Baltic birch plywood
U	2	Drawer front & back*	1/2	6 1/4	21 1/4	Baltic birch plywood
V	2	Drawer front & back*	1/2	5	21 1/4	Baltic birch plywood
W	2	Drawer front & back*	1/2	4	21 1/4	Baltic birch plywood
X	5	Drawer bottoms	1/4	21 1/4	15 3/4	Luan plywood
Y	4	Legs	1 1/4	1 1/4	4	Poplar
Z	2	Base stretchers	3/4	1 1/4	33 7/16	Poplar
AA	2	Base stretchers	3/4	1 1/4	15 9/16	Poplar
		9 Linear feet each of 1/4" x 1" and 1/4" x 13/16" hardboard reveal strip				
		75 Linear feet of 7/8" maple veneer tape				

*If using a “slide in” drawer bottom, subtract 1/2" from the height on the drawer backs.

Before assembly it's best to mark and drill the locations for the shelf pins, and to lay out and mount the base plates for the hinges. As always, a little masking tape on the drill bit makes a handy depth stop.



EXPLODED VIEW

Before rushing to assemble the case, there are a few things to do first. Cut your four drawer dividers to size and apply veneer tape to the front edge of each. Mark the

location of the drawer dividers and decide whether you want to use biscuits or dowels to hold the drawer dividers in place between the left side and the partition. The drawer openings are graduated in size and should be as follows from top to bottom: 5"; 5⅞"; 7¼"; 9" and 11⅛".

Because the door section of the wardrobe is only 11" wide, it's a good idea to pre-drill the right side and partition for shelf pins and also for the European-style hinge plates before assembly. One more pre-assembly task: sand the inside of the shelf section and the part of the back that's visible. You'll be glad you did.

Now assemble the case using glue and by driving nails through the top and bottom pieces into the sides and partition. When in place, the drawer dividers should be proud of the front edge of the case by the thickness of the veneer tape. Lastly, nail the back in place into the rabbets. This will square up the case.

With the case assembled, grab your iron from your laundry room. Apply veneer tape to the front edges of the case, and to the top of the case on the front edge and sides to hide the rabbet joint. The ⅞"-wide tape is plenty because the reveal will only show ¼" of the top of the case.

The hardboard reveal strip is painted black, then mitered to extend beyond the front of the cabinet itself. The reveal strip is recessed ¼" in from the edges of the top.

Learn Something From the Europeans

European hardware is a broad term covering a number of hinges and shelving systems. Best known for its use in commercial furniture, I chose to use it in this piece for a number of reasons. The door hinges allow adjustment of the door in three dimensions after the door is attached, and it is invisible from the exterior of the piece, keeping the lines clean and simple. The hinges do require a 35mm Forstner bit to insert the hinges in the side of the cabinet, and a jig designed just for installing "cup" hinges is available from your favorite woodworking supplier (Rockler (800-279-4441) has one for $7.99; item #53841).

Contemporary decorative hardware can be tricky to find, so I was pleased to find Spokane Hardware Supply (800-708-6649, thehardwarehut.com). Offering a large and varied selection of contemporary, fanciful and traditional hardware for sale on the web, this saves a lot of time running from store to store. The pulls selected for this piece are commercially available to cabinet shops, but it's nice to find them accessible for the home woodworker as well (#DP40-BL, $9.14 each on thehardwarehut.com).

This was the first time I'd used the drawer front adjusters, though they've been available for years. Having fought with adjusting drawer fronts on inset and flush-mount drawers forever, I found these clever plastic devices to be a big help. Allowing 1/8" adjustment in any direction, fine-tuning a drawer front is now a snap rather than a chore. Though the instructions specify a 25mm bit to mount the adjuster in the drawer face, a 1" Forstner works admirably with a little shimming.

The drawer face adjusters are a simple plastic pocket with a metal "nut" captured inside. When attached, the nut will slide freely within the plastic case, allowing the face to be moved 1/8" in any direction.

The false top is simply a piece of plywood edged with veneer tape. Check the size against the finished size of the assembled case to make sure the false top will flush up with the sides, front and back. Remember that the false top extends over the door and drawers and should flush up to them. The ¼" reveal between the top and case is created using strips of ¼" x 1" hardboard, with one edge spray painted black. Fit the strips to the underside of the top, allowing the ¼" setback on the front and sides. Add a fourth strip flush to the rear of the top to level it out. With the strips fit, use black spray enamel paint to coat the visible edge and the underside of the front piece, then attach the reveal strips to the underside of the top.

Now attach the false top to the case. Drill clearance holes through the case and attach the false top using screws up through the inside of the case, again, flushing the back edges of the case and the false top.

The base is a simple frame held together by biscuits, dowels or mortise-and-tenon joinery, with the legs attached between the stretchers at the corners. With the base glued and assembled, add ¼" x 13⁄16" hardboard strips to the top edge as you did to the underside of the top. Next, finish the base and strip with black paint to add visual "weight" at the base of the chest. When dry, attach the base to the cabinet using metal chair braces at the corners.

Now build the drawers using simple ¼" x ½" rabbet joints on the sides, with the fronts and backs captured between the sides. The bottoms slide into ¼" x ¼" grooves in the sides and front that are cut ½" up from the bottoms of the drawer pieces. The back is cut ½" shorter than the front to allow the bottoms to slide into place. Use the bottoms to hold the drawers square while the glue dries, then remove them to make finishing the drawers easier. I set up a ¼" radius router bit in a router table and ran the top edges of the drawer parts (both sides) to make them more finger-friendly. Don't round over the front edge where the drawer face will attach. With the drawers assembled, attach the drawer slides to the cabinet and to the drawer sides and check for smooth operation.

Cover the edges of the drawer faces and the door with veneer tape. Then rout the a shallow mortise centered in the top edge of each for the pulls. Use a router with a straight bit. See the photo at right for the jig I built for this.

I want to mention that the screws provided with the pulls are round-head screws. In an effort to keep things flush and simple I used a countersink on the clearance holes in the pulls and then used flat-head screws to attach the pulls. Now attach the drawer faces to the drawers using the hardware shown in the photo on page 84. This allows for easy adjustment.

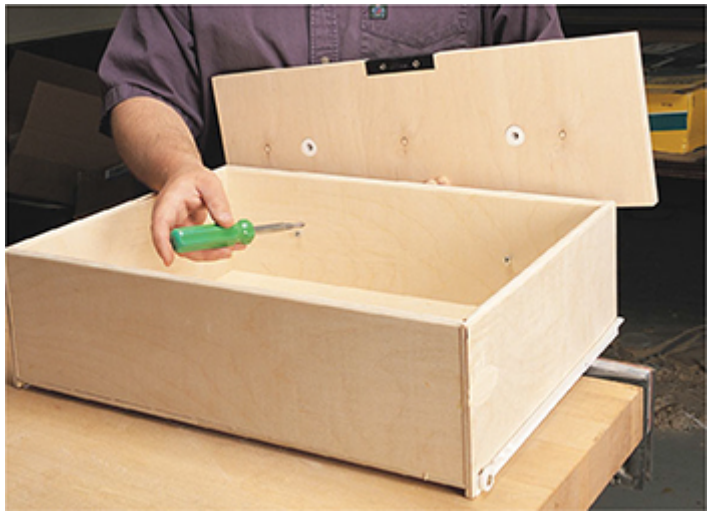
Now drill the door to accept the European hinges and mount them to the cabinet. If you haven't used concealed hinges before, take a few minutes to play with the adjustment to get a feel for the versatility of these hinges.

Lastly, cut a groove the length of both sides of the shelves and then add veneer tape to the front edge. The shelf pins shown slip into the slots in the shelves and provide invisible support. It's your choice whether to make the shelf locations adjustable by adding more shelf pin holes. I preferred to use set locations to keep the interior clean and unmarred.

The case is now ready to finish. Remove the hardware and finish sand. Use a clear finish everywhere, and don't worry about coating the black accent strips. After the finish

has dried, attach the hardware and hang the door. Adjust the drawer fronts and door to make all the spaces equal. Then step back and enjoy the clean simple lines of your work – until the tastes of the furniture world swing back the other way. Then perhaps you'll have to apply some fancy moulding or something.

I cut the top and back recesses for the handles using the same jig. Unfortunately I made my jig a little short and had to move the clamps between cuts. Make your jig the width of the drawer and to fit your own router template guides and you'll be in good shape.



The drawer face adjusters are attached by first drilling two clearance holes in the drawer box front. Then locate the approximate spacing of the drawer face on the drawer front (the closer the better) and make a mark through the clearance hole on the back of the face with a scratch awl. Remove the drawer box and drill the 1" holes for the adjusters. Then just screw the face on and adjust.

Kitchen & Dining Room

CHAPTER THIRTEEN

Contemporary Cabinet

by Megan Fitzpatrick

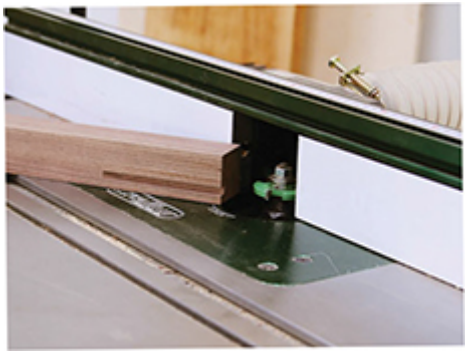
A contemporary look and no dovetails: Those were my self-imposed rules for this cabinet design. I've just completed a remodel on my kitchen, you see, with shop-built Shaker-style cabinets and a passel of hand-dovetailed drawers. I needed a change in design direction.

This walnut and spalted beech hanging cabinet is the result, and while I can certainly see some Shaker (with a touch of Krenov) in its bones, the live-edge top and mix of woods brings it into (or at least closer to) the 21st century.

Rather than relying on the cutting list and illustrations provided, I urge you to let your own eye and the wood you have available guide your build. While I'm pleased with the proportions here, the depth and width were at least in part determined by the width of the walnut and beech I had available, and the place I plan to hang the cabinet.

Mark a line 1" from the end of your stock, then align the 45°-angled blade to exit the cut at that line; this results in a flat-topped pyramid. Make sure the stock is straight and square to ensure the flat is centered.

The point of the cabinetmaker's triangle that meets on the two front posts helps you to always easily see what goes where as your build progresses.



A router with a slot cutter makes quick work of grooves – and it can also make quick mistakes. Test your setup on a piece of scrap sized exactly to your workpiece specs before making your actual cuts.

Start at the Bottom

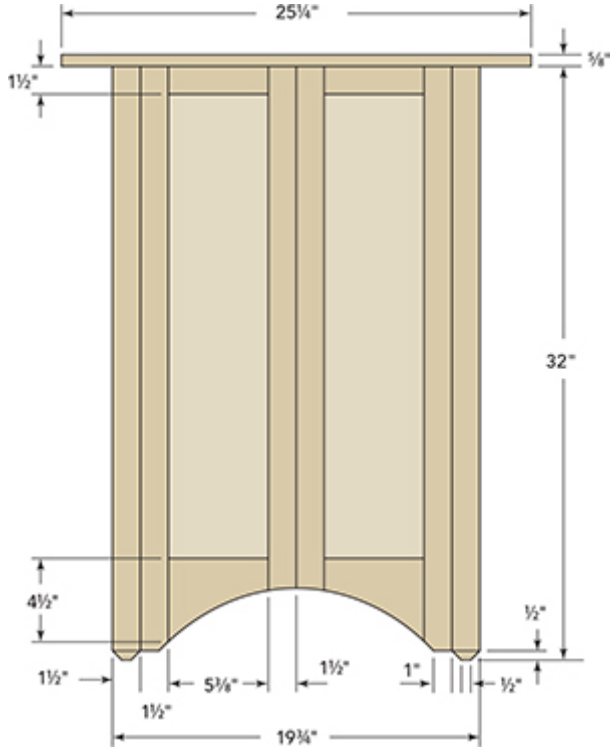
I began by milling the walnut stock for the posts to 1½" square, leaving all the pieces 8" or so over-long. That's because I wasn't sure of the angle I wanted on the pyramid at the bottom of each, and needed some room to try out a few. I used a backsaw to rough out a variety of angles, but in the end, settled on 45°. That's an easy cut at the table saw.

Mark the pyramid base (where it transitions into the flat of the post) 1" up from the bottom on at least one face, then tilt your table saw blade to 45°. Align the saw blade at the top of the cut with your layout line, then cut all four faces. This leaves you with a ½" flat centered on the bottom of each post.

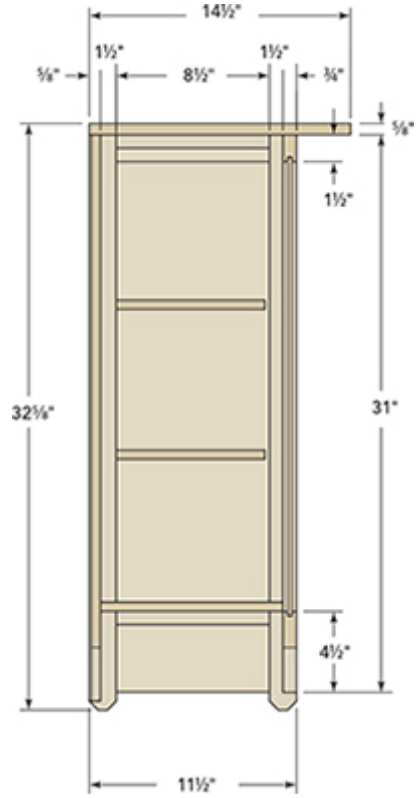
I recommend making these cuts before cutting your stock to final length (off the top, of course); that way, you have some wiggle room if you experience blow-out or decide to change the angle.

After you have a pleasing pyramid, reset your table saw blade to 0° to cut the posts to final length, then decide how you want them to appear in the finished piece. Arrange them in a bundle in the correct order and draw a cabinetmaker's triangle on the top to help keep you oriented throughout the rest of the build.

Now lay out a ¼"-wide x ¼"-deep groove on the front of the back posts and on the back of the front posts, in which ¼"-thick side panels will float. For a pleasing shadow line, I located my panels ¼" back from the edge, then made the cut with a slot cutter at the router table.



FRONT



SECTION

Contemporary Cabinet

	No.	Item	Dimensions (inches)			Material	Comments
			T	W	L		
	4	Posts	1½	1½	32	Walnut	
	2	Top side rails	¾	1½	10½	Walnut	1" TBE*
	2	Bottom side rails	¾	4½	10½	Walnut	1" TBE
	2	Side panels	¼	9	26	Walnut	
	4	Cleats	¾	¾	8½	Walnut	
	1	Bottom	½	9⅜	18¾	Walnut	
	1	Top	⅝	14½	25¼	Walnut	Live edge, use what you have
	2	Shelves	½	8¼	18¾	Walnut	
Doors							
	4	Stiles	¾	1½	31½	Walnut	
	2	Upper rails	¾	1½	7⅜	Material	1" TBE
	2	Lower rails	¾	4½	7⅜	Walnut	1" TBE
	2	Panels	¼	5⅞	26	Spalted beech	

*TBE = tenon both ends

Because it won't show once the top is attached, you can run the groove out the top of the posts. At the bottom, however, set stop blocks or mark the cut termination point on the stock or the router fence and pull the workpiece away from the bit before you cut into your pyramids.

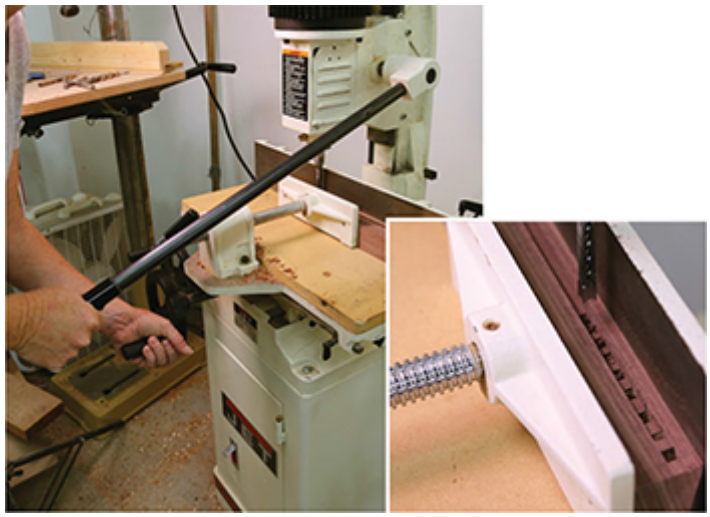
The grooves terminate into ¼"-wide x 1"-deep mortises for the rails, so mark out those mortises and get ready to deepen your grooves.

At the top, the mortises are 1" long and begin ¼" from the top of the post; at the bottom, they are 4" long, and begin ¼" up from the transition line from pyramid to flat.

I set up the hollow-chisel mortiser to cut the mortises – and the grooves make setting the chisel location simple. (Note: You could reverse these operations. Lay out and cut the mortises first – that would make it easier to set up the slot cutter at the router table and it would be easy to tell when you reached the end of the groove cut, because the bit would stop cutting.)

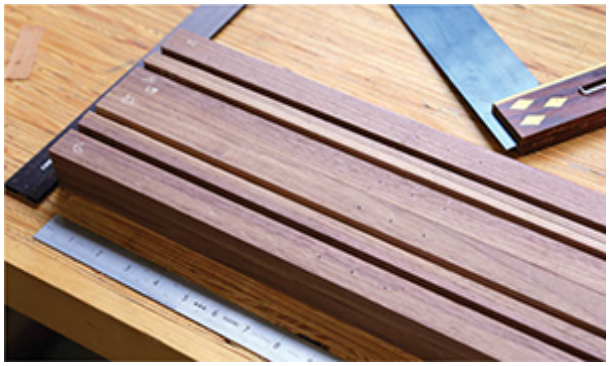
After the mortises for the side rails are cut, bring the work back to your bench, check the depth and clean out the trench as necessary. Leave the router setup alone; you'll need it for the doors.

I used a dado stack at the table saw for the next task: the ⅝"-wide x ½"-deep rabbet on the back edges of the rear posts. Note that the rabbets terminate ½" above the top of the pyramids at the bottom of the posts, so the cut must be finished by hand at the bottom; at the other end, it's a through-cut.



While using the mortiser, I always keep my left hand on the wheel that moves the work right to left – that way, there's no chance I'll grab the front-to-back adjustment by mistake. And notice how I've skipped a chisel's width on my first series of cuts; leaving waste on either side helps to keep the chisel from deflecting. After making these "skip cuts" down the full length of a mortise, I work my way back to remove the remaining waste.

No matter what machine or tool you use to cut your backboard rabbets, it's best to finish the cut at the bottom by hand. You want an easily controllable cut to avoid blowing through the pyramid. I used a chisel to score the extents, then chiseled out the waste coming in alternately from the side and top, to work my way down to full depth.



Butt the mating pieces against one another, and make sure all four posts are aligned at the top. Now mark out the hole locations.

The final work on the posts is to drill shelf-pin holes for two adjustable shelves. I decided on three positions for each shelf, each an inch apart, and located these on the interior post faces. With this layout, the holes and pins won't show at the front when the doors are open (and at the back, they'll be in shadow).

Measuring down from the top of the posts, I marked these at 9", 10" and 11", and 17", 18" and 19", then struck a centerline through the 1"-width of stock behind the groove. I used the drill press to ensure I ended up with perfectly straight ¼" holes.

On the rails, the grooves run all the way through; on the door stiles, stop the cut in the mortise area.

Rails & Stiles

For the rails and stiles, straight grain gives you the most pleasing appearance, particularly if you're using a figured or spalted wood for the door panels – you don't want the panels in a visual fight with their frames. Prep the stock for the stiles and rails for both the sides and the doors at the same time. And prep a few extra lengths for machine setup.

Once you have the stock milled to ¾" thick, reassess your wood and choose the best-looking, straightest-grained pieces for the doors. If possible, cut the center door stiles from one piece of wider stock; the grain will then match perfectly in the middle.

The upper rails on both the sides and the doors are 1½" wide; the lower rails on both are 4½" wide (see the cutting list for the length of each piece on my build). It's best to cut all four narrow pieces with the same saw setting, then all four wide pieces with the same setting; that way, you ensure the widths match perfectly as you move around the cabinet.

Now take one of the test pieces (you did prep extra, right?) to the router table and confirm the setup. Theoretically, the cutter should be automatically centered in the ¾" stock because you raised it to ¼" when cutting the grooves in the posts. Thus, the centered grooves in the rails and stiles align with the grooves in the posts.

Mark the face side of your test piece, then run a groove on the edge and show the test piece to a post. Do they match? Yes? Carry on. No? Try flipping the test piece; they will now.

If you are off by a little, don't raise or lower the cutter – what matters is not that these grooves are perfectly centered, but that they match the grooves in the posts. So take note of which face should be toward the table, mark those on the rails and stiles, then run a through-groove on the inside edge of the eight rails, and a stopped groove on the four

door stiles. (Note that if you're persnickety, you could reset an uncentered cutter for perfection before grooving the door pieces.)

Set the door pieces aside as you complete the sides.

On both ends, the upper and lower side rails get 1"-long tenons with ¼" shoulders. I marked the baselines with my cutting gauge (I find this cuts down on tear-out at the visible shoulder line), then made some of the cheek cuts at the table saw with a dado stack raised to ¼", and some of them with a handsaw… once I realized that my sliding crosscut fence was slightly out of square. So I then cleaned up the table-saw cuts with a shoulder plane, and the side panels got just a hair narrower. (I know better; one should always double-check setups!)

Test-fit the tenons in their mortises, and make any adjustments necessary. Once everything is closing up tightly and you have a good "press fit" (that is, you have to use a decent amount of hand pressure but no mallet to get the joint closed), pull the pieces apart and prep your panels.

I started with ⅝" stock, and after flattening one side of each walnut panel on the jointer and taking it to ⅜" with the powered planer, I switched to bench planes. I have a chipped planer knife that needs rotating and it's a bear to get rid of that track with just a smooth plane. So my No. 7 (jointer) got me within a few No. 4 (smooth) passes to the final thickness of ¼". (Plus, handplanes provide a good workout.)

Test-fit the panels in the grooves. If they slide in fairly easily, you're home free. If they don't, take another pass or three with your smooth plane or random-orbit sander (ROS) and try again.

Once everything fits, cut the pieces to final size (remember to add ½" overall to the length and width of what will show). I did this at the table saw (after resetting my crosscut fence to a perfect 90°).

Give everything a once over with your smooth plane (or ROS). It's easier to do it now than when everything is glued up – though you'll almost certainly have some surface clean-up to perform before finishing.

Now brush glue in the mortises and onto the tenons, slide the panels in place and clamp everything up. (I keep a bucket of water nearby to clean up any glue squeeze-out, and I prefer liquid hide glue.)

While you're waiting for the glue to dry, cut the cleats to which the top and the bottom will be screwed. These fit between the posts and are glued flush with the interior top edges of the four rails on the side panels. This long-grain to long-grain glue joint is plenty strong enough for this application – promise.

Drill three countersunk clearance holes on the underside of each cleat, elongating them a little to allow for seasonal movement, then glue and clamp the cleats in place.

Ensure the bottom is well clamped before driving screws through the cleats to secure it in place.

A scrap cut to the exact length of the opening helps you both to hold things in place and keep things square as you attach the top.

After applying glue, clamp the cleats (or secure them with nails) to hold them in place as the glue dries. Either way, just make sure the countersunk holes are facing in the correct direction – toward the floor. (Here, you can also see the case bottom, with the corners notched to fit around the posts.)

Get Your Case Together

The sides are now complete, and you're ready to make a case out of this thing. For that, you'll need a nicely made bottom (and you should surface the lumber for the shelves at the same time).

The shelves fit between the posts, but the ½"-thick bottom is notched at all four corners to fit around the posts. The front edge acts as a stop for the doors, so it needs to be ¾" back from the post fronts; the back edge is even with the backboard rabbets. I cut the notches with a handsaw.

Here's where the workholding is both critical and a little tricky; it doesn't hurt to have a friend help hold things in place as you align the bottom and screw it to the cleats. A thick backer board will also help.

With everything squared up and the bottom aligned exactly where you want it, drill pilot holes through the cleat clearance holes, then insert screws through the cleats and into the bottom.

After you've driven the screws on both ends of the bottom, check to see if things are still square. If they're a little out, don't fret; both the top and the backboards will help to bring things back to where you want them.

To assist, cut a scrap to the exact length of the opening. Flip the case on its top edges, position it as desired on the underside of your top, then place the scrap between the posts. Now screw through the cleats and into the underside of the top.

Note that on my cabinet top, both the front and back edges are “live,” so I aligned the case to the top by working off the ends.

I chose sugar pine for my backboards; the color will help reflect light inside the cabinet…plus I had a piece of pine wide enough that I needed only two panels for the backboards. I cut them a little over-wide, then joined them with a tongue and groove, which I dressed up with an 3⁄16" bead on the tongue panel. Not only does this create a nice shadow line (to help hide the gap between the two pieces), it mirrors the door opening at the front.

If you don’t have a wide enough piece of wood for just two backboards, that’s OK – you can piece it together from narrower tongue-and-grooved (or ship-lapped) stock.

Now cut the backboard panels to final width and fit them in their opening. This piece was built in the high humidity of an Ohio River Valley summer, so I spaced the center gap with two dimes (in winter, I use nickels).

Now comes the fun part – laying out the “perfect” curve (keep in mind that your perfect may differ from my perfect). I used a symmetric drawing bow (mine is from Lee Valley) because it’s more precise and repeatable than my usual approach of tacking a thin strip of wood in place. The strap on the drawing bow retains the curve. That’s important here; the same arc will be laid out and cut on the bottom of the doors; you need to be able to come back to it.

I marked points 1" in from the corners and tightened the bow until it was tangent to both points. But before settling on that curve, I showed the bow to the lower rails on the side panels. Why? The lower rails on the doors are the same width; I needed to make sure the same curve would leave a pleasing amount of the rail after waste removal.

Mark the curve, cut it at the band saw then fair it with a spindle sander, spokeshaves, rasps and files – whatever works for you.

Once you’re satisfied with the way it looks and feels (touch will give you more feedback than looks, here), secure it in place with screws.

A Nicely Figured Front

Much of the visual impact of this cabinet depends on the doors – specifically, on the door panels. Building the doors is easy – it’s grooves, mortises and tenons, just as on the sides. And you should already have the grooves cut.

So cut the rails to length, cut the tenons and fit them to their respective mortises.

Surface the door panel stock to ¼" thick. If you’ve chosen a spalted wood such as the beech I’ve used, take extra precautions with dust collection. Spalting is a result of fungi, and it can be particularly dangerous to your health.

In just a few passes, a beading plane produces a lovely and crisp detail. Here, I'm using it to dress up the tongue side of my backboards.

A drawing bow allows you to retain a curve for as long as you need it (in this case, for the front and the back). When you're done, simply release the strap, and the bow returns to flat for storing.

Use the dry-fit doors as frames to locate the best-looking areas of your panels, then run a pencil around the inside of each to mark out that good-looking rectangle. Mark a line ¼" out from each edge of the rectangles; that's your cutline.

Cut the first edge of each door panel at the band saw, then use a jointer or jointer plane to true the two edges. The rest of the cuts can then be made at the table saw.

Fit the panels to their doors and glue them up.

Now comes what was for me the most nerve-wracking moment in the entire project: cutting into the completed doors.

Butt the doors together, then trace the curve (I do hope you didn't reset your drawing bow!) on the bottom of the rails, starting 1" in on both edges. Before you make the cuts, check (again) to make sure the curve is below the bottom edge of the case bottom. That is, you need at least ¾" – more, really – remaining at the top center of the bottom rails.

If the bottom shows it will a) look weird and ugly, and b) you won't be able to easily open the doors, because the doors have no handles; you slip your fingers behind the bottom rail to open them. Note that this cut will expose the edge of your tenons at the bottom of the doors; they'll still be plenty strong, and only the cats will notice.

The last task before final surface touch-ups and finishing is to fit the butt hinges. I always fit hinges by hand, using a marking knife to score the extents, then chisels and a small router plane to remove the waste. Typically, I'd say you could use a router and template for this work if you don't like the hand-tool approach – but in this case, you can't. The bottom hinge on each door is even with the bottom of the cabinet; a router simply won't fit.

Remove the hinges before finishing.

The finish is a sprayed coat of garnet shellac to warm up both the walnut and beech, followed by two coats of satin lacquer (with a light sanding between each). After the second coat of lacquer cured, I rubbed out the show surfaces with a brown paper bag, then reattached the hardware.

Because the back edge of the top extends past the backboards, I attached a French cleat that is proud of the back to hang the cabinet, with an offset block of equal thickness at the bottom (both are screwed to the rear posts and to the backboards).

The cabinet appears to float in front of the wall, which creates a nice shadow line at the back. It's also a practical solution to deal with hanging it on my 120-year-old wavy plaster walls – there's no need to scribe the posts to the wall for a flush fit.

Now I just have to design and build a similar table so this contemporary piece has company amidst all the Shaker.

The doors are the most visible part of the cabinet. Cut carefully to ensure the apex of your curve meets at the middle.

CHAPTER FOURTEEN

City Sideboard

by Mario Rodriguez

Apartments in the Philadelphia area where I live are in demand and rents are high. The same is true for urban areas all over the country. So for someone who insists on living in town, one solution is to “go small.” The city sideboard is the perfect piece for tight urban

spaces and it's versatile, too. Measuring around 35" wide and only 16" deep, it can work as a dining room sideboard, an entry table (with storage) or an office credenza.

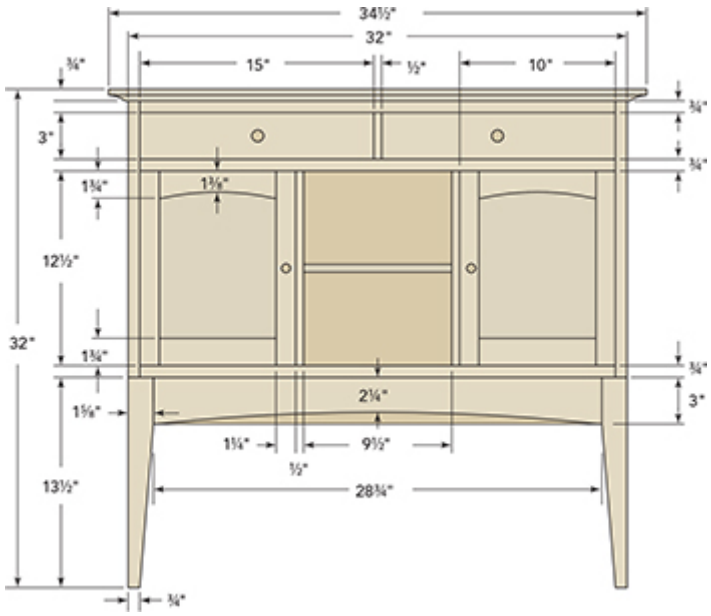
The spare design and clean lines of the sideboard suggest an updated Shaker piece, with a bit of a nod to the work of James Krenov. The wood is soft maple, which is a little "warmer" than hard maple and often features subtle curl. The door panels are bookmatched ambrosia maple, a species with unusual colors and grain patterns similar to those found in spalted maple.

The case, partitions and shelves of this piece are of cabinet-grade ¾"-thick maple veneer plywood. This cuts down significantly on labor and construction time without sacrificing appearance. The top, doors and base are solid maple.

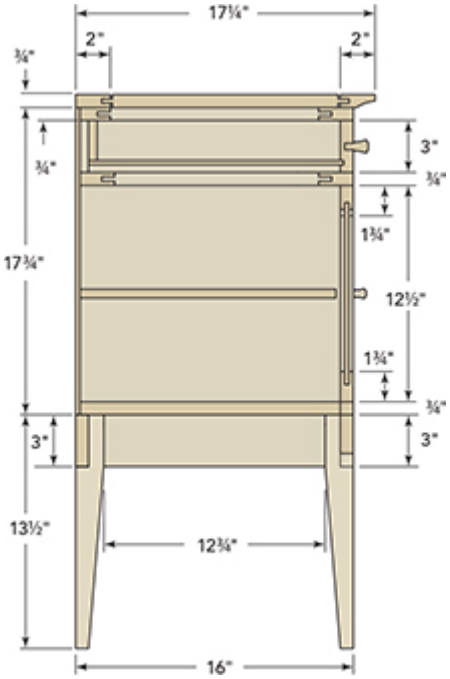
The flat-panel doors are installed with offset knife hinges for a clean, modern appearance and feature custom-turned knobs.

Why Plywood?

Cabinet-grade plywood provides a beautiful, uniform and blemish-free surface in a consistent thickness, and it's available as a 48"-wide panel. You just rip your panel width from the sheet and you're good to go. There is, however one problem: What do you do about the exposed plywood edges? I edged much of the case with ¾"-thick solid soft maple, which provided needed protection and covered the unattractive edges. But what is the best way to apply the solid edge with a strong bond and an inconspicuous seam?



FRONT VIEW



SECTION VIEW

After cutting my various plywood panels, partitions and shelves to length, I rummaged through my rough-sawn solid stock to find straight-grained, clean material of a color similar to the plywood. I chose several boards and milled them ¾" thick, then laid them alongside the plywood to check the color match. By applying denatured alcohol to both, I identified good matches and got a preview of what the color would be on the finished piece.

After selecting my stock, I ripped several strips to 13⁄16" thick, giving me a 1⁄32" overhang on each face of the plywood. When gluing up I centered the edging strip on the plywood thickness. In order to minimize the number of clamps required for a tight, continuous seam I used 16"-long curved plywood cauls made of scrap plywood, cut to a slight ⅛" hollow at their center. The concave edge of the caul is set against the workpiece and requires only a single clamp in the middle to get a tight seam along the length of the caul.

When the glue was dry, I planed the edging nearly flush with a block plane. In order to avoid nicking the thin plywood veneer, I set my plane with its heel on the plywood and its toe slightly elevated on the edging. Because the edging stood proud of the plywood, I could safely plane the solid edging until it was nearly flush with the plywood. Then, I reached for a card scraper. By referencing the majority of the scraper on the panel, I safely scraped the edging flush and then sanded with #220-grit.

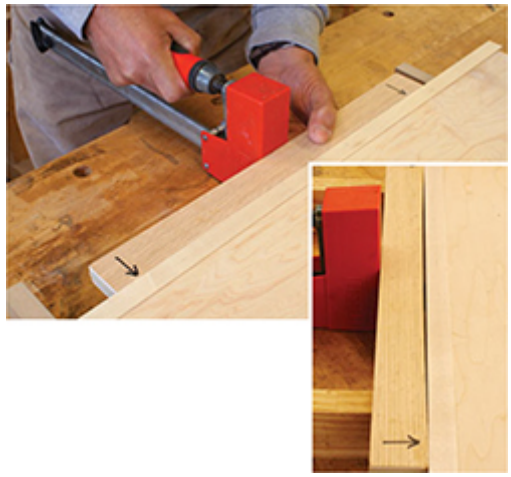
The most critical and visible seams are on the sides of the carcase. I again checked the quality of the seam by applying denatured alcohol. Satisfied with the grain and color match, I cut the bottom and sides to length and width.

City Sideboard

	NO.	ITEM	DIMENSIONS (INCHES)			MATERIAL	COMMENTS
			T	W	L		
Top							
	1	Top panel	3/4	14	31 1/2	Maple	
	2	Side rails	3/4	2	17 1/4	Maple	
	1	Front rail	3/4	2	34 1/2	Maple	
	1	Rear rail	3/4	2	31 1/2	Maple	1/2" TBE*
Base							
	4	Legs	1 5/8	1 5/8	13 1/2	Maple	Tapered on two sides
	1	Front rail	3/4	3	30 1/4	Maple	3/4" TBE, curve on lower edge
	1	Back rail	3/4	3	30 1/4	Maple	3/4" TBE
	2	Side rails	3/4	3	14 1/4	Maple	3/4" TBE
Doors							
	2	Panels	1/4	8 3/4	10 1/2	Maple	Resawn & bookmatched
	4	Stiles	3/4	1 1/4	12 5/8	Maple	Trim to fit opening
	4	Rails	3/4	1 3/4	9	Maple	3/4" TBE
Drawers							
	2	Fronts	3/4	3	15	Maple	
	4	Sides	1/2	3	15 1/4	Poplar	
	2	Backs	3/4	2 3/8	14 3/8	Poplar	Backs dadoed into sides
	2	Bottoms	1/4	14 3/8	14 15/16	Maple Ply	
Carcase							
	2	Sides	3/4	15 1/4	17 3/4	Maple ply	Plus solid-maple edge**
	1	Bottom	3/4	15	30 1/2	Maple ply	Plus solid-maple edge**
	2	Shelves	1/2	14 1/4	10 1/4	Maple ply	Plus solid-maple edge†
	1	Open shelf	1/2	14 1/4	9 3/4	Maple ply	Plus solid-maple edge†
	2	Partitions	1/2	15 1/4	13	Maple ply	Plus solid-maple edge†
	1	Back	1/4	17 3/4	31 1/4	Maple ply	
Drawer Frames							
	2	Front rails	3/4	2	30 1/2	Maple	
	2	Rear rails	3/4	2	30 1/2	Poplar	
	6	Crossmembers	3/4	2	13 1/4	Poplar	3/4" TBE
	1	Partition	1/2	3 1/2	15 1/4	Maple ply	Plus solid-maple edge†

	2	Drawer knobs	3/4	3/4	1 3/8	Maple	May be turned or purchased
	2	Door knobs	3/4	3/4	1 3/8	Maple	May be turned or purchased

TBE = Tenon Both Ends; *3/4" x 13/16" solid-maple edge; †1/2" x 9/16" solid-maple edge



Using a clamping caul with a concave face allows you to glue on the edging with only a single clamp placed at the center.

Use a block plane with the heel flush to the plywood. Stop before cutting the plywood and clean up with a card scraper.

Deep grooves milled on the front and back members house stub tenons on the crossmembers.

Grooves in the frame are later filled to create mortises – a quick solution for a detail that will never be seen.

Infill strips fill the groove in the front of the web frames to create mortises that later house drawer stops.

Clamp a length of plywood in place to guide your router as you mill grooves to house the partitions.

Assembly is simple if the frames are properly grooved for the partitions.

Web Frames Hold the Drawers

The cabinet has two identically sized web frames, one above the other, that sandwich the two drawers. Joining the frames is a center partition that separates the drawers. These frames consist of two latitudinal rails (front and rear) and three longitudinal rails (two side and one center). The frames are joined with ¾"-long stub tenons. These are cut at the table saw and fit in grooves that run along the inside edges of the front and rear frame members.

Near the front edge of the lower front rail, I cut a groove. Later, most of this groove will be filled, leaving four small mortises to house end-grain drawer stops.

Carcase Joinery

Because this is a small case, I thought biscuit joinery would be simple, quick and supply sufficient strength. To align the biscuits, I made a layout gauge from scrap. This simple jig enabled me to easily and exactly place all the biscuits.

To ensure the exact placement of the partition dados, I used a piece of plywood, against which I ran a router. This router spacing guide, registered against the ends of both frames and the bottom panel, produced dados that lined up perfectly for the insertion of the vertical partitions later on.

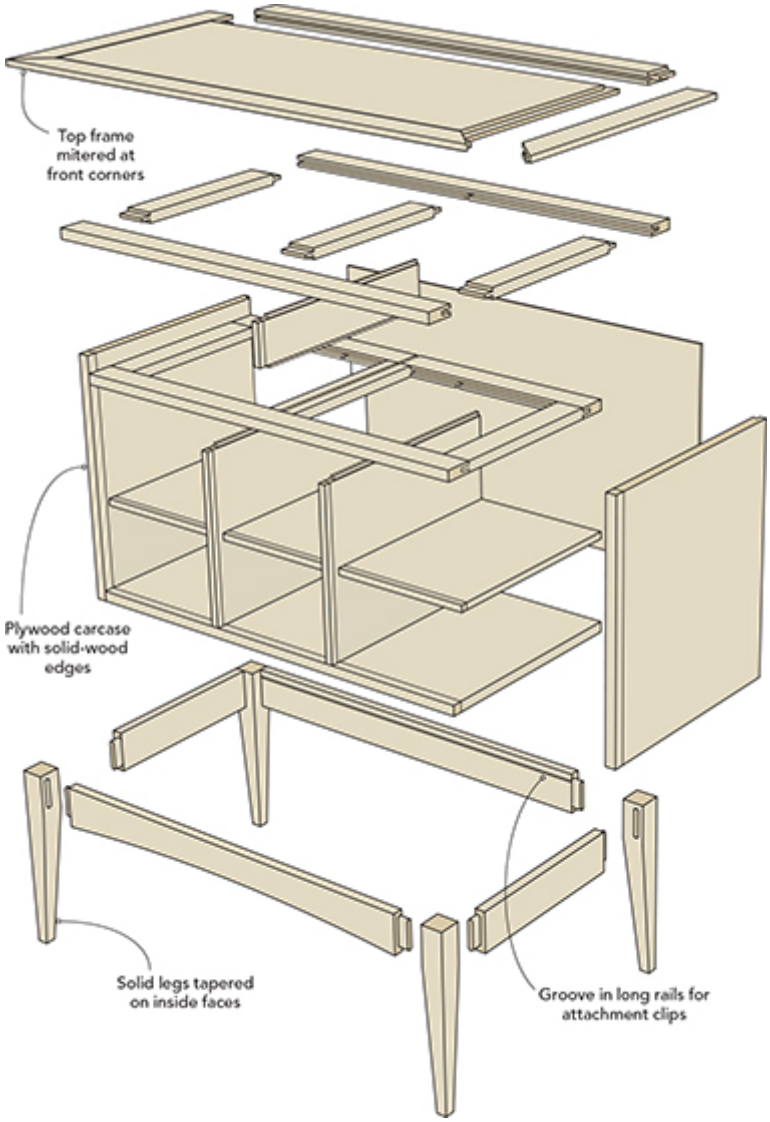
One reason to cut the partition dados before assembly is because the hinge mortises are more easily cut when the web frame and carcase bottom are exposed and accessible. Dados for the partitions are ¼" x ¼", stopped 1" from the front edge and milled to house ½"-thick partitions.

With the exact position of the partitions determined, I laid out the hinge mortises and cut them with a router. I eyeballed the stops, then checked the cut for location and depth with one of the knife hinges. The router left the cuts with rounded ends that I later squared with a chisel.

Glue Up the Case

This is an easy glue-up, but it has to go together dead square. After clamping up the case and inspecting the joints, I made and set up a simple “scissors brace” inside the cabinet. With each end placed in opposite corners of a case, the brace allows me to tweak the case in one direction or the other to get it perfectly square.

With the glue dry, I measured for the vertical partitions – one that separates the drawer web frames and two that divide the lower part of the case. The partitions are made from ½"-thick plywood and edged with solid maple. After cutting them to size, I shouldered the top and bottom edges of the partitions, leaving ¼" x ¼" tongues. Once the vertical partitions were set into place, I reinforced the partition joinery with countersunk screws.



EXPLODED VIEW

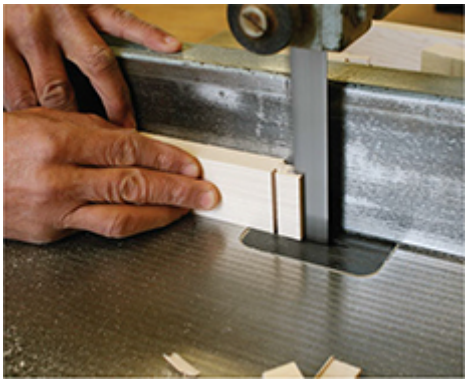
Once the web frames are clamped to the ends, slide the partitions in place from the backside of the sideboard.

Tongues cut on each partition slide into the grooves routed on the web frames.

Partition joinery is reinforced simply – with a single countersunk screw running through the web frame.

Next, I cut the dados for the three fixed shelves, using another router spacing guide to precisely place them. This was easier and safer (in terms of accuracy) than attempting to cut them before the cabinet was assembled. To fit the shelves, I followed the same procedure as for the vertical partitions, stopping them 1" short of the front edge.

Once the panel grooves are cut in the rails and stiles, use both the miter gauge and the fence to cut the tenon shoulders.



Cut perfectly centered tenons at the band saw by running both faces against the fence to cut the cheeks.

Rail grooves are cut before the top rail is shaped, and are deep enough to house the rectangular panel.

Build the Doors

The doors are a traditional frame-and-panel construction with a floating flat panel. I first milled the stock, preparing about 20 percent extra material; this allowed me to discard any that didn't look good in terms of color, grain or because of twist.

After ripping the material to width, I plowed a ¼"-wide x ¾"-deep groove along the inside edge of each door frame member. The shoulder cuts for the tenons on the rails were made on the table saw and the cheeks were cut on the band saw.

This method produces tenons that are clean, tight and flush at the shoulders and fit snugly into the ¾"-deep groove with almost no adjustment required. A test-assembly produced frames that were both square and flat. Next, I cut an arch on the inside edge of the upper rails on the band saw and sanded the cut to a smooth curve.

The panels are made of ambrosia maple, a wood similar in appearance to spalted maple, with color variations ranging from warm pinks to smoky blues, highlighted with strong dark brown figure. Again, as with the door frames, I proceeded slowly to ensure that the resawn panels wouldn't twist or move after the doors were assembled.

I started with a 1⅛"-thick slab of ambrosia maple that was long enough to produce two sets of panels, and cut it down the center on the band saw. This produced two ½"-thick rough-sawn panels. After letting them settle for a day, I jointed the face sides of each panel and thicknessed them to ⅜". I let them rest overnight and finally took them down to ¼" thick. The next day, I sanded them with #220 grit, inserted them into the frames and glued up the doors.

To make the knobs I chucked a 1"-square blank between lathe centers and turned the tenon portions of the knobs (¼" for the door knobs and ⅜" for the drawer knobs), checking the diameter with an open wrench. Once the tenons were sized, I cut the piece in two, and chucked the tenon into a collet chuck to give me easy access to the body of the knob. That way, I could turn the pattern, sand and spray a coat of finish, while the knob turned on the lathe.

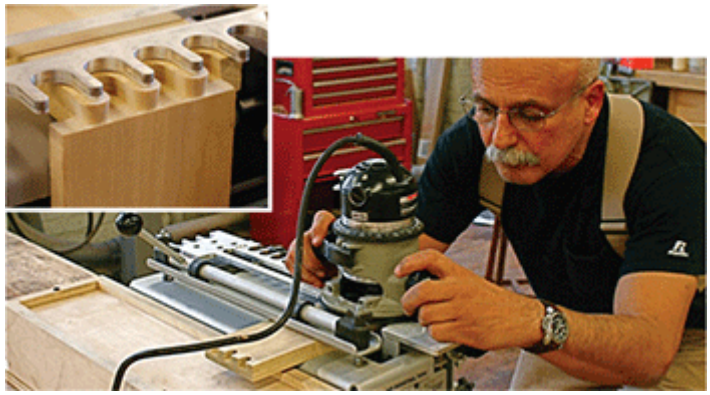
Dovetail Jig Tips

At the Philadelphia Furniture Workshop we often use machine-cut half-blind dovetails. The jig I'm using here is the PorterCable 4212, but there are similar models available from many manufactures. This type of jig cuts a single configuration of dovetails; the angle of the dovetails, their spacing and their height cannot be easily changed when working with this type of jig. Plan the location of the groove for your drawer bottom to land in the middle of a tail.

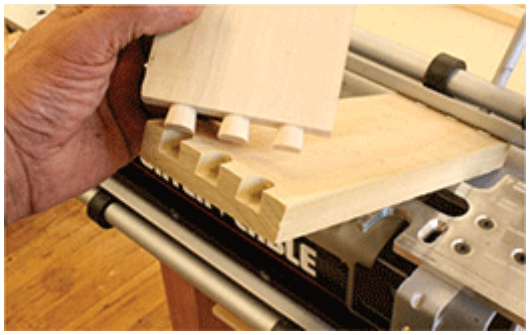
These dovetails can appear a bit monotonous and out of place on a fine piece, but for certain utilitarian pieces such as vanities, kitchen cabinets, casual pieces and office furniture, machine-cut dovetails are perfect. They're strong, clean and bestow a traditional touch to a piece – plus they're fast and easy to produce.

The jig is easy enough to set up and use – if you closely follow the manufacturer's instructions. Below are some critical and additional adjustments to help you achieve impeccable gap-free results:

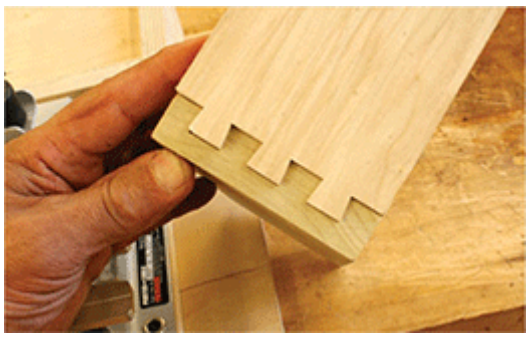
1. Material thickness should be $^{1}/_{2}$" for drawer sides and $^{3}/_{4}$" for the fronts. Parts that are of uneven thickness can shift during the routing operation.
2. Material should be milled square; parallel edges and square ends are critical for accurate drawer boxes.
3. Router bits should be sharp. Dull bits can cause excessive tear-out and burning.
4. Adjust the height of the template to match the thickness of the drawer front. The router rides on this template, so it must sit directly on the drawer front.
5. The ends of the workpieces should butt snugly, without any gaps, when set in the jig prior to routing.
6. Pressure (hold-down) bars should be carefully set for the thickness of the material. If they are unevenly set or exert insufficient pressure, the parts won't register correctly or can shift during routing.
7. Routing should always be done by moving the router from left to right.
8. Carefully follow the contour of the template with the rub collar. A hasty "straight-in, straight-out" cut usually results in too-tight dovetails.
9. When preparing to cut, set the router flat onto the template and engage the left-most finger before starting the router. And let the router stop completely before removing it from the jig.
10. Cut trial pieces – at least one for each side of the drawer, using the same material to be used on the actual drawers. — MR



Easy to use, these jigs cut dovetails of a single size and rout both tails and pins at the same time.



Rounded tails fit snug into the rounded shoulders of the pins.



The assembled joint is mechanically sound and ready to assemble in a fraction of the time it would take to hand cut the joint.

Build the Top

The top is a simple frame-and-panel construction, mitered at the front corners and tenoned at the back. I plowed a ¼"-wide x ½"-deep groove centered on the inside edges of the frame members. I cut a ½"-long tongue on the long edges and a ⅝"-longue tongue on the ends; when I assembled the top, I left a ⅛"-wide reveal around the panel.

The front miters were cut on the miter saw and dressed lightly with a block plane for a perfect fit. To line up the miters, I cut a short, shallow mortise on the miter faces. These mortises were located so as not to interfere with subsequent shaping of the top's edge.

On the lower edge of the top, I wanted a smooth and wide cove that is wider than deep. I didn't have the specific router or shaper cutter for the desired profile. Instead I employed a variation on a technique widely used to cut cove moulding on the table saw.

Loose tenons fit into mortises that are routed in the mitered ends of the frame members at the front corners.

Lighten and refine the top by using a guide fence and slowly raising the table saw blade to cove the top's edges.

I marked out the shape of my cut on a scrap piece of maple and laid a fence across the blade, exposing only a small portion. My technique calls for gradually raising the blade and passing the top's edge along the fence and across the spinning blade. After making several trial pieces, I adjusted the blade height to ⅛" and ran the three edges of the top along the fence and across the blade. After inspecting the initial results, I raised the blade in small increments and repeated the operation. The last pass was a very light cut to clean and smooth any roughness from previous passes.

After the initial shaping on the table saw, I sanded the cove smooth with sandpaper wrapped around a 3"-diameter sanding block.

Build the Drawers

How a drawer is made and how it glides into place reveals a lot about the maker. A drawer should be well made and sturdy, yet lightweight and not bulky. It should operate smoothly year-round and display a neat, even reveal all around the front.

The drawers have ½"-thick poplar sides half-blind dovetailed into ¾"-thick maple fronts. The poplar back is dadoed into the sides to a depth of 3/16", forming the drawer box. A ¼"-thick plywood bottom is slipped underneath the back and into a 3/16"-deep groove that runs along the sides and front. This design provides strength, good looks and ease of construction.

Feel free to build the drawers in whatever manner you prefer – whether it's hand-cut dovetails or with simple rabbets. For this piece I opted for somewhere in between and made machine-cut dovetails using a router and PorterCable jig. For more on the process, see "Dovetail Jig Tips" on page 101.

Traditional mortise-and-tenon joinery is used to join the base. After assembly, a recessed cut along the top on all four sides adds an interesting reveal.

Building the Base

The 13½"-long legs are tapered on only the inside faces. This two-sided technique slims down the leg, but retains a strict vertical orientation when the piece is assembled. Before tapering the legs I routed shallow mortises for the rails. The rail tenons were cut in the same fashion as the door rail tenons (shoulders on the table saw, cheeks on the band saw). I shaped the edges of the tenons with a rasp to fit the rounded ends of the mortises.

The side and back rails are straight; only the front rail is shaped to a gentle curve. To lay out the curve, I used a drawing bow then cut the curve on the band saw and sanded it smooth.

Before assembling the base, I cut a ⅛"-wide x ¼"-deep groove along the top inside edges of both long rails. This groove accepts the table clips later used to attach the base to the carcase.

I glued up the short rails and legs in pairs, positioning the clamps for both a tight joint and a square assembly. When the glue was dry, I glued and clamped them to the long rails, then checked the assembly for square.

When the base assembly was complete, I cut a very small rabbet along the outside top edge of the base on all four sides. This is a small base, so I performed the operation on

the table saw. On a larger piece, this could be done with a router. This rabbet provides a reveal between the base and the carcase and masks any small problems at that joint.

Rout the long straight part of the mortise before assembly. After assembly, use a spacer to locate the hinge and then chisel out the opening for the hinge arm.

Use spacers to establish an even reveal on all four sides of the door. Then mark out the hinge locations.

Rout out the bulk of the waste and fine tune the hinge mortise until the leaf fits flush to the door.

Install the Doors

For a clean, contemporary look I chose offset knife hinges for the doors. Although a tiny bit fussy to install, they're unobtrusive and easy to operate. Before mortising for the hinges, I cut down the slightly oversized doors. First I ripped the doors allowing 1/16" from side-to-side. Next, I cut the doors to length, making the same allowance.

After making my cuts, I set the doors in place using small wedges. This allowed me to tweak the fit and make any allowances as needed in the case. When I was satisfied with the fit and spacing of each door, I milled the necessary grooves in the doors for the knife hinge leaf. After routing the straight grooves for the hinges, I marked out the doors for the protruding offset pivot. I made these cuts with a dovetail saw then pared to my lines. The tight fit of the hinges allowed me to set up everything and make any necessary adjustments before drilling holes for the hardware.

Next I drilled holes for the knobs on the front and a ¼" hole at the upper corner, opposite the hinge, to house a small magnet.

With the mortises already roughed in on the case, I could transfer the exact location of the hinges onto the doors. I accomplished this with a carefully set marking gauge, transferring the settings directly from the cabinet. As with any exacting operation, prepare extra pieces for testing. When satisfied with my tests, I mortised the doors on the router table. The remaining cuts for the hinge offsets were performed at my bench with a sharp chisel. The hard part was laying out and mortising for the hinges. Once this was done, the installation was easy.

Fit the Drawers

I installed four end-grain drawer stops into the mortises at the front edge of the lower web frame. These little L-shaped blocks are milled to fit into a ¼" mortise and leave a small short-grain block that is raised off the surface of the front rail for easy planing. After slipping a drawer in place, I could judge how much to take off the drawer stop with my tiny rabbet plane. It took only a few passes across the stop before my drawers sat flush with the edge of the case.

Make your own magnetic catch. A small mortise cut in the door stop houses a rare-earth magnet.

Simply drill a hole on the inside face of the door and epoxy a small magnet in place.

Make Magnetic Door Stops

After hanging the doors and checking for easy operation and an even gap, I installed a door-stop strip that has an embedded magnet that serves as a hidden door closer. In a ⅝"-square strip of maple, I cut a ⅛"-wide groove down one edge. Fill all but a ½" section of this groove with a maple strip and drop a small magnet into the remaining space. The end of the strip with the magnet should be set opposite the hinges against the underside of the lower drawer web frame, ¾" from the front edge of the cabinet, and screwed into place. This “buried” magnet on the door stop strip will attract a similar magnet set into

the back side of the door. When the closing door is within ½" of the cabinet, the magnetic attraction will close the door. A nice touch.

CHAPTER FIFTEEN

Contemporary Plate Rack

by Megan Fitzpatrick

For years, I had been trying to cajole Kelly Mehler to write a piece for *Popular Woodworking Magazine* on one of his many areas of woodworking expertise: building custom pieces that emphasize the beauty of carefully selected hardwoods.

And I haven't given up on that quest – but one of his forms is just so appealing that I didn't want to wait for Kelly to be convinced in order for everyone to see it. So I built it (with Kelly's permission, of course).

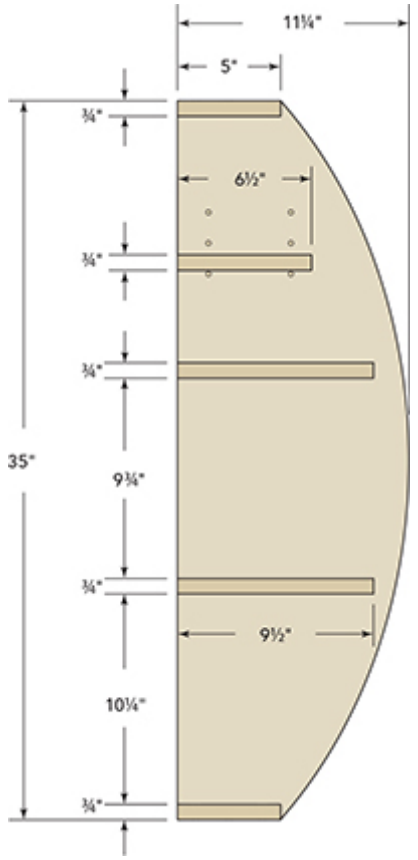
Kelly and his wife, Teri, worked with kitchen designer (and renowned English Arts & Crafts furniture maker) Nancy Hiller to design this plate rack to integrate into their Berea, Ky., log home's kitchen (see "Design Process" on page 109).

Adapt for Your Aesthetics

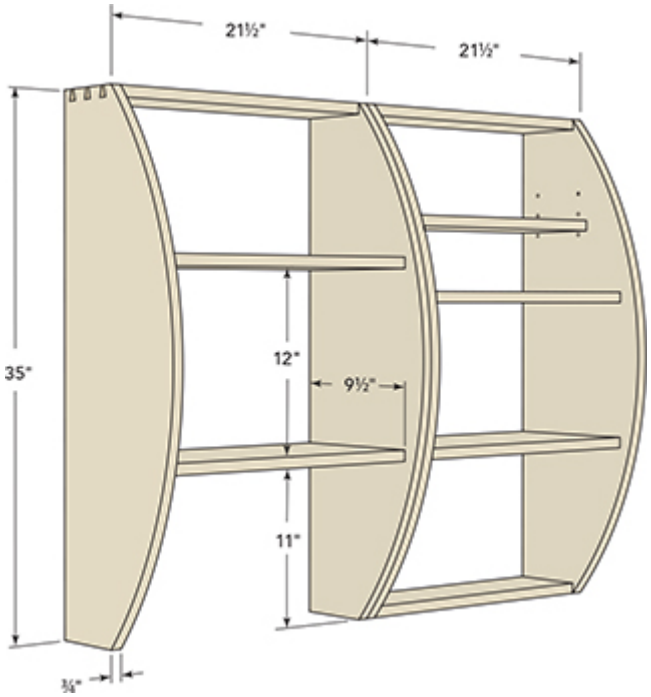
While Kelly built his plate rack in white oak to match the rest of his family's kitchen, I decided on tiger maple – in part because I had a lot of it, but in truth because I'm not

terribly fond of oak.

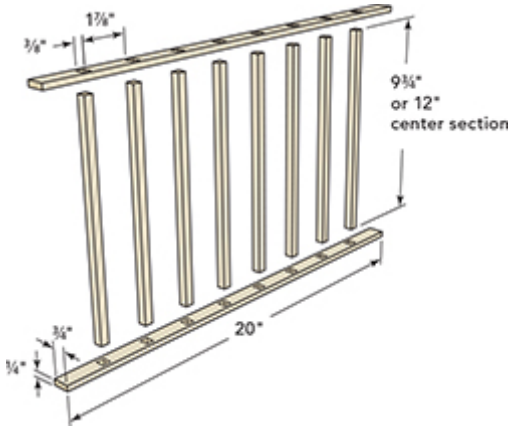
And after studying the pictures of Kelly's, I also made some minor changes to the design of the plate dividers by setting mine back ¼" from the front edge to create an additional shadow line – but more on that to come.



SECTION – END UNIT



3D VIEW – CENTER & END UNIT



DIVIDER SUBASSEMBLY

In addition, before drawing my plan in SketchUp, I measured the three sizes of Louisville Stoneware plates in my collection to make sure I afforded sufficient clearance for them to slide in and out of the rack, then located my fixed shelves accordingly.

It's all in the Pattern

With six sides that must be identical, I decided on pattern routing as the most efficient approach. So the first task was to create a pattern for the router bit to follow. I used ½" plywood because it was handy, but ¼" plywood or MDF would work as well. Or, if you've

no wish to have a pattern on hand for future builds, you could cut and fair the first side from your stock, and use that to guide the pattern bit for the remaining sides.

The sides are 11¼" wide at the apex of the curve and 35" in length. I cut my plywood to that size, then tapped in a nail at either end just slightly more than 5" from the back edge (the sides are 5" at the top and bottom), and one nail just inside the edge at the apex of the curve. I then used those to hold a flexible metal rule in place while I penciled in the curve. (Note that to hit the 5" mark perfectly with my flexible rule, the nail locations were adjusted in increments until I found the sweet spot.)

Plate Rack

	NO.	ITEM	DIMENSIONS (INCHES)			MATERIAL
			T	W	L	
	6	Sides	3/4	11 1/4	35	Maple
	5	Tops/bottoms	3/4	5	21 1/2	Maple
	6	Fixed shelves	3/4	9 1/2	20 1/2	Maple
	2	Adjustable shelves	3/4	6 1/2	19 3/4*	Maple
Divider Subassemlies						
	12	Tops/bottoms	1/4	3/4	20	Maple
	32	Short dividers	3/8	3/8	9 3/4	Maple
	16	Long dividers	3/8	3/8	12	Maple

* Sized for L-shaped supports; if using spoon supports, add 3/16

After cutting close to my line on the band saw, I faired the curve using a spokeshave and sandpaper. Take the time to get your pattern as perfect as possible – how close to finished your sides are right off the router depends upon it.

With the pattern completed, process your lumber, then use the pattern to transfer the shape to the wood, registering it off the jointed edge that will become the back edge of each side. I recommend buying more wood than you need; because there is no decorative element beyond the form itself and the exposed joinery, you'll want sufficient lumber from which to choose the best-looking sides possible.

Again, it's to the band saw to cut close to your lines – about ⅛" away is ideal. Then, if you're using a bottom-mount bearing-guided pattern bit as did I, secure the pattern beneath the workpiece (I do this using a holdfast at either end, with the edge to be worked hanging off the front edge of my bench) then rout off the remaining waste

moving from left to right (into the direction of the bit's rotation). Note that if you begin to experience tear-out, you may need to try climb-cutting. And if your band saw work was less than ideal and you have an excess of waste, remove it in a few passes (this will also reveal where tear-out is likely to occur) rather than hogging it all off at once.

After cutting ½"-thick plywood to the overall length and width of the sides, I used a flexible rule held in place around three nails to draw a fair curve for my pattern.

A sharp spokeshave (followed by sandpaper as needed) made quick work of fairing the pattern's curve.

Rout to shape. Move at a steady pace as you guide the router around the pattern, and be sure to keep the base plate firmly on the workpiece.

Design Process

The design for the dinnerware rack was carefully thought-out for function, appearance and for the particular uses and space considerations of the piece. Based on her work with British kitchen designer Johnny Grey, Nancy Hiller's prodigious kitchen-design skills once again proved enlightening. Nancy suggested that we measure each of our existing pottery pieces, glasses *etc.* with regard to how tall and how wide the dinnerware rack would ultimately need to be in order to accommodate the entire set.

While the sections for the plates are unchangeable, the top shelves are adjustable and thus flexible for changing uses. The dinner plates essentially provided the reference point for the depth of the piece and the apex of the curve on the side pieces so that the plates did not jut out and were firmly supported by the cross members.

Then we had to factor in the height of the primary users of this space – especially my wife, Teri, who is 5'1". Teri wanted to be able to reach the pieces used every day without having to climb up, and we still wanted to have counter space beneath the rack for other uses. We have a deep stainless steel double sink and 9" tall faucets, the space for which needed to be considered functionally and aesthetically in the design. By making the dinnerware rack in three sections, the middle section could be made to specs for the sink faucets.

We chose flexible lighting above the piece that needed to be properly spaced within the context of the height and width of the dinnerware rack, the ceiling height and positioning so as to afford good task lighting. Functionally and ergonomically, the dinnerware rack's location needed to afford convenience to its users. Therefore, proximity to the dishwasher, sink and to eating areas was considered in the placement and capacity of the piece.

Last of all, we realized that the dinnerware rack would be a focal point, so visual appeal and proportion were important. We wanted a fun alternative to the usual rectangular cabinets, but we wanted the piece to blend in with the other cabinetry and not overwhelm the space. Plus, the piece needed be both interesting and not look odd or out of place in our 93-year-old log home.

The clear finish was dictated by wanting to show the grain of the quartersawn white oak on the edges and sides, and we added small splashes of color on the curved edges from local potter and artist Teresa Cole whose graceful and colorful painted, stemmed flowers (inset) provided a unique visual touch in a subtle yet, we think, interesting way.— Kelly Mehler

I recommend making a few passes on a piece of scrap first to determine the speed at which both you and the machine should move; get it right and you'll have an almost finish-ready workpiece (that is, with no burns) right off the bit.

If you do get some burning, you'll need to remove it with a spokeshave (for deep burns) or sandpaper, but try not to change the shape of the edge much. If you do, however, mark that side piece to go on the far right or left of the overall build where minor variations won't be obvious.

On to the Joinery

I considered using the Festool Domino for loose-tenon joinery to attach the sides to the tops and bottoms; that would be plenty strong. But in the end – and for the ends – I decided on dovetails for a touch of added visual interest.

On this build, the side pieces get the tails, with a half-tail on either end so as not to ruin the curve on the front, and to match it at the back.

Because the force – and a lot of it if you have heavy dishes – is vertical, the tails are on the sides. And so that the line at the top and bottom of the curves remained clean, I laid out half-tails at the front and back edges. I don't know about you, but I typically have half-pins at the corners when building casework, so I was sure to clearly mark the waste to avoid cutting away the wrong material.

I cut my dovetails by hand, tails first, and coped out the bulk of the waste before chiseling to my baselines. You should, of course, cut your dovetails with whatever method you prefer.

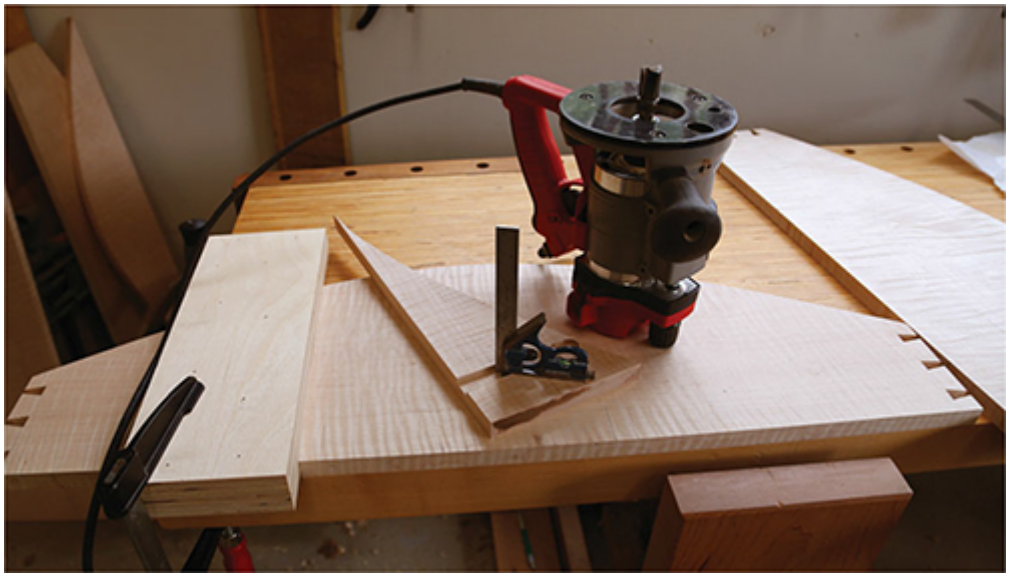
Note that while the two outside units are joined at both the top and bottom with dovetails, the center unit is open at the bottom in this design to accommodate a kitchen faucet.

After you have the dovetails cut and dry-fit, lay out the locations for the fixed shelves. And unless your dinner plates are also 11¼" in diameter and your salad plates are 9" in diameter, you'll need to adjust your dado locations accordingly.

Also consider any changes you may wish to make to the divider subassemblies. With my method and dado spacing, the top and bottom of the divider subassemblies can be no more than ¼" thick and still allow room for my dinner plates to slide in and out. If you decide on thicker material for your subassemblies, you'll need to leave sufficient space both for it and to get your plates in and out.

Measuring from the bottom, the locations for the ¾"-wide stopped dados on mine are at 11" and 21½" on the two outside units, and at 11" and 23¾" on the middle unit. Measuring from the back edge, the dados are stopped at 9½". If your dado locations change, confirm that the curve at that point will accommodate a 9½"-long dado; your dado length may require adjustment. I marked both the right and left edges of my dados

so that I didn't have to think as much when I clamped my simple router jig in position – because the router always runs to the right of the jig, but the jig placement changes depending on if you're working on the left or right side of the case. Marking both sides of the dado makes it a no-brainer.



After marking the dado locations and affixing my jig for the first cut, I ran a dado on a test piece first to confirm the depth of cut – which is ¼".

And if you decide to cut the dados by hand with a saw (before cleaning out the waste with a chisel), you'll need both sides marked to guide the cut.

I stopped the ¾" straight bit just shy of 9½", then used a chisel to square the end and remove the waste.

Now cut the fixed shelves to size and fit them in their dados. I processed my stock to 25/32", and after sanding up to #180 grit, the shelves fit perfectly with just a little pressure.

Mark and drill the hole locations for the moveable shelves before moving on. Commercial shelf-pin jigs are available, or you can make your own jig that registers off the top or back – but with only three locations for each of the two moveable shelves, a jig isn't strictly necessary. The holes are 1½" from center to center, and start 26½" from the bottom edge; they are located 1½" and 5½" from the back edge.

Prep Before Glue

Before glue-up, I recommend getting all the surfaces as close to ready for finish as possible. Yes, you'll no doubt get a mark or two – and some glue squeeze-out – that will need removing after your units come out of clamps, but it's a lot easier to plane or sand with everything flat on your bench.

While I'd typically turn to my No. 4 for this task, the curly maple I chose wasn't having it – so I pulled out the random-orbit sander. (That experience might dictate my wood selection in the future; sanding all the pieces was the only part of building this project that I didn't enjoy.)

With your parts prepped, place one side piece dado-side up on your bench, spread glue on the matching pins and slide them home. Now insert your fixed shelves into their respective dados, put glue on the still-exposed pins of the top and bottom, then slide the other side piece in place. (It helps to have someone on hand to help guide the second end of the shelves into place as you seat the side). Clamp it up and set it aside to dry, then repeat until all three units are assembled.

Register the flat of the chisel off the flat of the end of the router cut, and rock it up to mark the remaining shoulders of the dado; try not to cross the penciled-in line of the dado's end.

With the chisel's flat facing away from the waste, define the end of the mortise then chisel out the remaining waste.

Before the center unit comes out of the clamps, countersink two screws through each side into the bottom fixed shelf, because there's no bottom dovetailed piece holding it together. It's your choice whether or not to plug the holes and cover the screws – if you're hanging all three units as shown, the screws will never be seen.

I think this plate rack would also make a nice set of contemporary hanging bookshelves – and if I went that route, I'd build each unit with a shelf across the bottom, because there would be no need to make room for a faucet.

And if you're pleased with the open shelf concept, after sanding the moveable shelves, you're ready for finish. If not, see "Divider Subassemblies" to make the inserts before applying your finish – you'll need finish on those, too.

Divider Subassemblies

I've not yet determined if I'll be using this piece in my kitchen. At the moment, there's no space for it – but if I decide to tear out and replace my current (and careworn) cabinets, I'll fit this into the plan. And if not, I have ample need for bookshelves. So, instead of fully integrating the dividers into the build as did Kelly Mehler, I decided to make six subassemblies that are slip-fit and pinned in place, but easily removed.

I didn't leave myself much wiggle room; the top and bottom pieces could be no more than 1/4" in thickness and still allow me to slip plates in and out. And with a piece that thin, how could I attach the dividers? I decided to use my favorite machine, the mortiser, to cut square holes in the top and bottom pieces. I walked off the hole locations with dividers, and plunged through wood wide enough to make six pieces (plus a saw kerf for each) at once. Then I simply cut the 3/8"-square dividers to length for a snug top-to-bottom fit, and pushed them into the shallow holes until they bottomed out.

I tapped each subassembly in place, with the front units 1/4" back from the front shelf edge, and the back units adjusted in no less than 1" both to hold the plates and to allow room for a cleat under the back of the top fixed shelves to help secure the carcase to the wall.

I chose a piece of wood wide enough so that I could cut the eight holes for the dividers through at least six top and bottom pieces simultaneously, then rip them off at the table saw.

Cut the dividers to length for a snug fit between the fixed shelves.

Slide the dividers into the holes in the top and bottom pieces, and you get little ladders – six of them in my case.

A Simple Finish

For the finish, I decided on a few coats of sprayed lacquer with a satin sheen, with a light sanding between coats. I sanded with a #600-grit block after the final coat for a silky-smooth feel.

The striped grain in the maple imparts a subtle and pleasing chatoyance – but without overwhelming the eye – as you move around the piece and view it from different angles. That allows the wood to whisper while the form sings.

CHAPTER SIXTEEN

Wall-mounted Server

by Steve Shanesy

As empty nesters, my wife and I recently said goodbye to the family homestead and downsized to a smaller house. Our generously sized dining room was traded for “dining space” at the new place. Our dining room furniture wasn’t going to fit.

My challenge quickly became apparent – design and build a new table and sideboard. But how to optimize the smaller space took a lot more time to figure out. In fact, my early conclusion was there wasn’t space for a sideboard.

Once I settled on a table, I turned my attention to the sideboard. A small cabinet as narrow as 15" deep could work, as long as it hung on the wall. It then struck me that a dining server could double as a counter and be perfect for morning coffee or a light lunch.

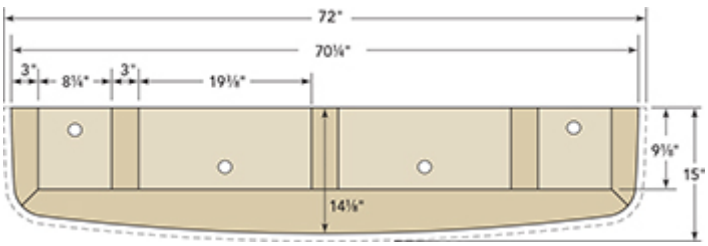
The shape of the server is taken from the dining table and mimics its super-elliptical form. I had a great piece of walnut for the top, and walnut veneer to face the curved, built-up front. But how to wall-mount the server required a bit of engineering.

What's inside the box? The server base has open pockets for steel fingers to slip into and support the server. Each of these steel rods is buried in a wall stud. Collectively, they support an amazing amount of weight.

Fingers of Steel

Years ago while working in a commercial cabinet shop, I learned a neat trick that appears to magically suspend a piece on the wall: Drill into the wall's wooden studs to install a few steel rods, then sleeve the shelf onto the rods via built-in, open pockets.

I had a length of ¾"-diameter steel rod on hand, and matching ¾"-thick material for the build-up is easy to find. The strength of this method is remarkable. I wouldn't hesitate to rest my 175 pounds on the server after it's fixed in place.



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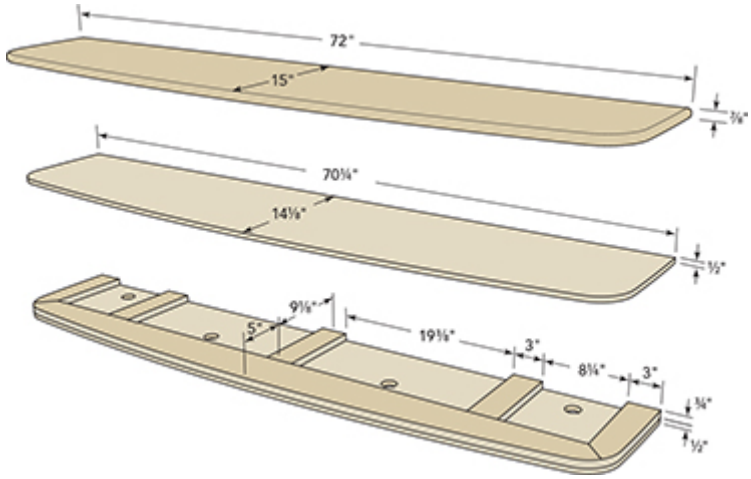


EXPLODED VIEW

Wall-mounted Server

NO.	ITEM	DIMENSIONS (INCHES)			MATERIAL
		T	W	L	
1	Top	7/8	15	72	Walnut
2	Base top/bottom	1/2	14 1/8	70 1/4	Plywood
1	Build-up blank	3/4	3	72*	Pine
1	Build-up front	3/4	5	72**	Pine
1	Veneer	1/16 or 1/32	2 1/4	98	Walnut

Sufficient stock to cut pieces to fit; *Length depends on unit size

Torsion-box Strength

The base that supports the top and houses pockets for the steel fingers is similar to a torsion box, a structurally strong, wooden sandwich of lightweight materials. It is made up of a ¾"-thick build-up that surrounds the perimeter (except for the back), fit between two layers of ½"-thick plywood. Additionally, there are five crosspieces that complete the base.

Before the base can be assembled, the top and bottom plywood pieces are cut to the curved shape. I began with a template for the server top (see "Pattern Routing Curved Shapes" on page 116). For the server base, I made a second template to provide the ⅞" setback, and used a jigsaw to carefully cut on the line before smoothing any irregularities. Before moving on, transfer the centerline locations from the top template to the base template.

Pattern Routing Curved Shapes

Except for the back edge, my dining server design has no straight lines. The front edge is a sweeping curve, the ends are a more subtle curve and the corners have a large bend to join the two. This design mirrors one edge of my dining table, so I simply used that portion of the table pattern to shape the server.

How are these fair curves generated? On a large sheet of craft paper, I found the curve I wanted for the table's long edges by bending a narrow strip of $^{3}/_{8}$"-thick plywood between fixed points. With my bending stick set to a pleasing curve, I transferred the shape to my paper.

To determine the corner radius I used trammel points and, by trial and error, found a radius that looked nice to my eye, then blended the lines into one seamless curve. Then I carefully cut the shape from the craft paper.

To make the top template, I used a piece of $^{1}/_{4}$"-thick MDF. (The template needs only to be slightly more than half the server's length.) I taped the paper to the MDF then traced the outline as shown at left above. I also marked the centers of the front and ends; these centerlines are important for aligning the template when moving it from one section of the top to the other.

Next, I used a jigsaw to cut the MDF at the pencil line. I took my time, knowing that any irregularities required block-sanding the edge to fair the curve. (Imperfections in the template will transfer to your finished work because the router bit bearing rides on the pattern to guide the cut.)

To use the template, align the centerlines of the template with your workpiece then transfer the shape with a heavy pencil line. Using a jigsaw, cut the part staying outside the pencil mark by about $^{1}/_{8}$".

Clamp the template in place using the centerlines for accurate positioning, then use a router and pattern bit to trim to the final edge. I used a bit with a bottom-mount bearing to shape my top. (You could, instead, position your template on top of the workpiece then use a top-mounted bearing bit to trim the base unit.)

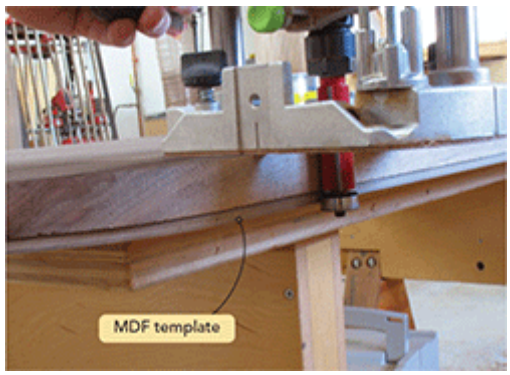
Though you could make the cut in a single pass, it's better to make several light cuts until the bearing meets the template edge.

Once one section of top is completed, use the centerlines to reposition the template for the next section.

Once satisfactory curved shapes are achieved on paper, the shape is traced onto MDF to create the template.

Carefully cut out the template with a jigsaw, staying tight to the line transferred from the paper.

Any irregularities on the template edge are sanded smooth to ensure a fair curve.



Get in shape. Jigsaw the top close to the layout lines, then clamp the template in place. Use a router and pattern router bit to trim the top to its final shape.

With the second template complete, I traced the pattern onto the top of a two-plywood stack. I then used my jigsaw to remove most of the waste, and completed the

work using a router with a pattern bit to trim to the template.

I used the bottom piece of plywood to position my build-up and crosspieces. To establish the cutlines on the build-up pieces, I held each in place then penciled on the curved design. At the band saw, I cut these pieces slightly outside the marked lines so I could trim everything flush with a router after the parts were assembled.

When positioning your crosspieces, make sure you don't put one where a steel finger is planned. That, of course, means you must first determine where on the wall the shelf mounts and where the studs are located. For the pockets, I left plenty of space for the steel fingers.

The build-up and plywood top and bottom are glued and fastened using 1¼"-long narrow crown staples (though brads could be used). Before fastening all the parts, make sure the centerlines on the top and bottom plywood align.

Along the back edge, your crosspieces should set in a smidge – you don't want them holding the base away from the wall.

Once the glue sets, use your router and a bit with a top-mounted bearing to trim the build-up flush to the plywood, which acts as the template. (If your bit isn't long enough to trim to the bottom of the build-up, make one pass, then lower the bit to make a second cut using the trimmed area as your guide.)

Trimming the curved edge this way ensures it is square to the top and bottom. This is important when gluing veneer to a curved edge. If your face isn't square, the veneer heads off in a direction you can't control.

Flush it up and keep it square. The build-up sandwiched between the plywood top and bottom is trimmed using a router with a top-mounted bearing, flush-trim bit.

Walnut veneer, applied using contact cement, covers the face of the base's curved front and side edges.

Veneer the Curve

The veneer needs to cover the entire front without a seam. I had 1/16"-thick veneer on hand, but there's no reason you can't use today's thinner veneer. In fact, it's easier to use thin veneer around the tighter-radius corner curves.

Allow a 1/4" overhang on each edge; then, even if you're off a bit as you attach the veneer, you should have enough width to cover the face.

Contact cement makes a good bond and is easy to use. Apply cement to both the back of your veneer and the face of the base then let it dry before sticking the veneer in place.

To stick the veneer, mark the center of the strip so you can easily align it to the center of the base. Because a long strip of veneer can be unwieldy, set a series of short sticks of wood across the glued face of the base and set the veneer, glue-side down, on them. Starting from the center, remove a few sticks at a time as you work your way along the edge. Hold the veneer strip so your fingers allow you to gauge the amount of overhang, which should be equal on both sides. Get one half applied then work the other half.

Once the veneer is cemented in place, you should increase the bond strength by pressing it with a J-roller, or use a mallet to tap a wood block along the surface.

I trimmed the veneer overhang using my router and a straight bit with a bottom-mount bearing.

The profile of the front edge is created using a ⅜" roundover bit run on both the top and bottom edges.

With the steel rods installed, the base slides in place and is held tight against the wall. Attach the top, drill for a grommet if you like, and you're done.

Make the Top

Mill and size your top to a final thickness. Mine was ⅞". Use your template, router and a pattern bit to shape the top, then round the top and bottom edges using a ⅜"-radius roundover bit.

Finish & Install

I like to add color to walnut, so I stained the server with General Finishes "Candlelight" oil-based stain. After letting it dry overnight, I ragged on three coats of oil-based varnish thinned 50 percent with mineral spirits, lightly sanding between coats using #320-grit aluminum oxide sandpaper.

Hang the finished base on the wall before fastening the top. Cut the five steel rods to a length of 11½". (Deburr the ends of your rods to ease any sharp edges.) Also, drill four

1½"-diameter holes through the base bottom to provide easy access for the screws used to attach the top after it's positioned. (Make sure you avoid any crosspieces.)

Strike a line on the wall to establish the height of the top edge of the base, then measure down half the base's total thickness to find the vertical center of the rod holes. Verify the centers of your studs by driving a finish nail along both sides of each stud, then drill your holes at the stud's center (it's good to have a friend watch to help you keep your drill at 90° to the wall). The hole depth, including drywall, should be 2½". Tap the steel rods into the holes.

Sleeve the base onto your rods. The fit should be snug, with no need for additional fastening. The unit can be removed if needed, but there is little chance it will slide about.

Position your top, then fasten it through the access holes using #10 x 1" screws. And if you like, drill a 1½" hole through the entire server to accommodate a wire management grommet.

We've had the server installed now for a couple of months. It's been great when guests are over for dinner and we've enjoyed a few lunches using it as a counter. It's a terrific solution for our downsized dining space.

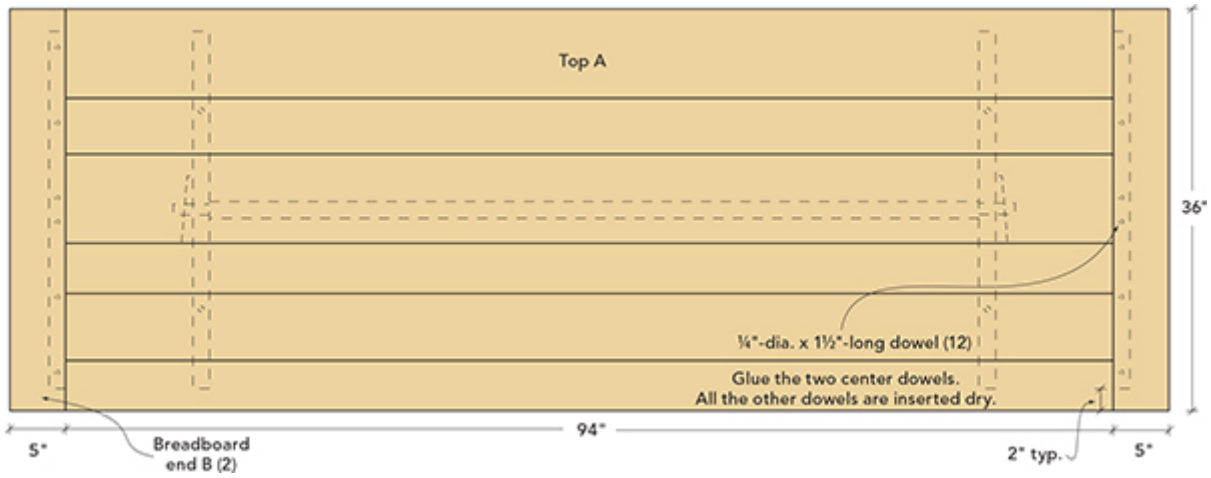
CHAPTER SEVENTEEN

Trestle Table

by Megan Fitzpatrick

This large trestle table is modeled after a piece you might find in the great hall of a medieval castle. It's built of sugar pine, uses no hardware and is entirely knockdown. This very soft wood will pick up dings and dents readily, which helps age the piece a couple of centuries in just a few weeks!

As a dabbler in medieval and renaissance history and literature, I'm fascinated not only with the cultural productions of the time, but the physical ones as well. Thus, I modeled my table after several I've seen in books and in museums, and made my version without any hardware, as most of the furniture of the time was held together by pegs, and iron and leather bands.



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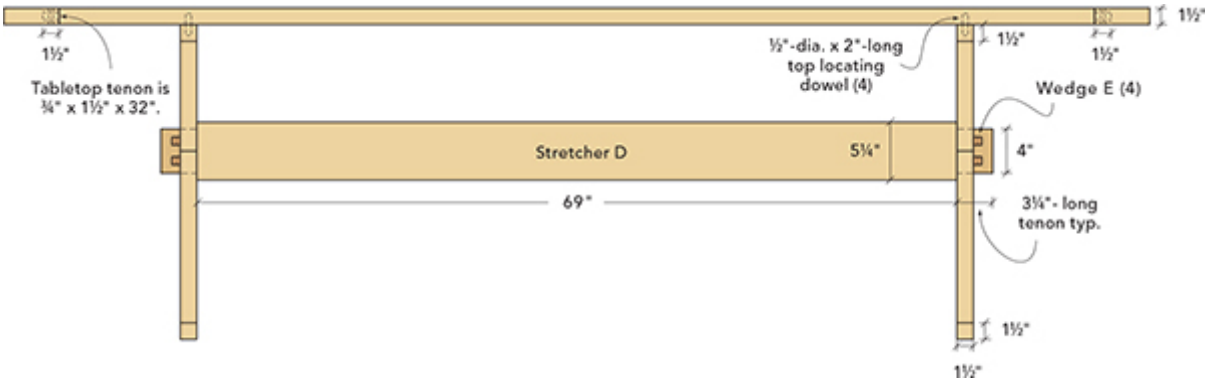
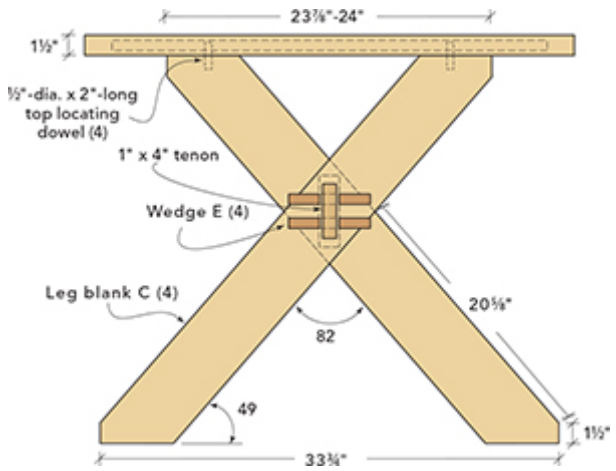
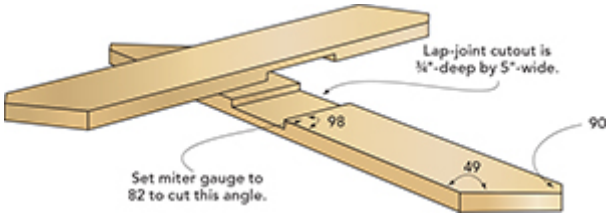


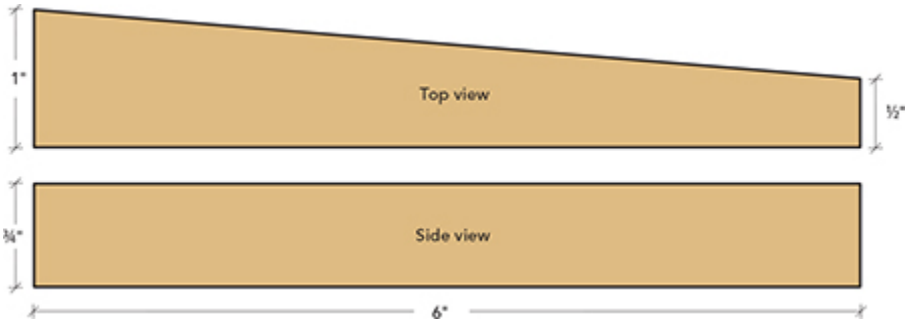
ELEVATION



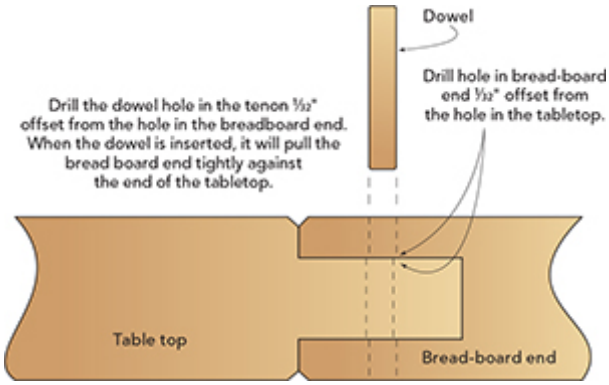
PROFILE



LAP JOINT DETAIL



FULL-SCALE VIEW OF WEDGE



Full-Scale Section Of Tabletop Tenon And Pegs

Trestle Table

PART	NO.	ITEM	DIMENSIONS (INCHES)			MATERIAL	COMMENTS
			T	W	L		
A	1	top	1½	36	96½	Sugar pine	Random width boards to make 36"-wide top
B	2	breadboard ends	1½	5	36	Sugar pine	
C	4	legs	1½	5	40+/-	Sugar pine	
D	1	stretcher	1½	5¼	75½	Sugar pine	
E	4	wedges	¾	1	6	Sugar pine	
Hardware & Supplies							
		12 ¼"-dia. x 1½" dowels					
		4 ½"-dia. x 2" dowels					

1 Cut out all parts for the top. Use random-width boards totaling 36" in width. Before gluing these boards together, cut a bevel on all the long edges using a router with a bevel-cutting bit. Now, cut a ¾"-wide x 1½"-deep x 32½"-long mortise in both breadboard ends using a router fitted with a ½" straight-cutting bit. Mount the router under a router table. Because the mortise is deep, cut the mortise only ½" deep per pass, and then go back for more.

2 This is the router setup used to cut the tenons on the top. Remember to make test cuts on scrap wood until the tenon fits the mortise in the breadboards.

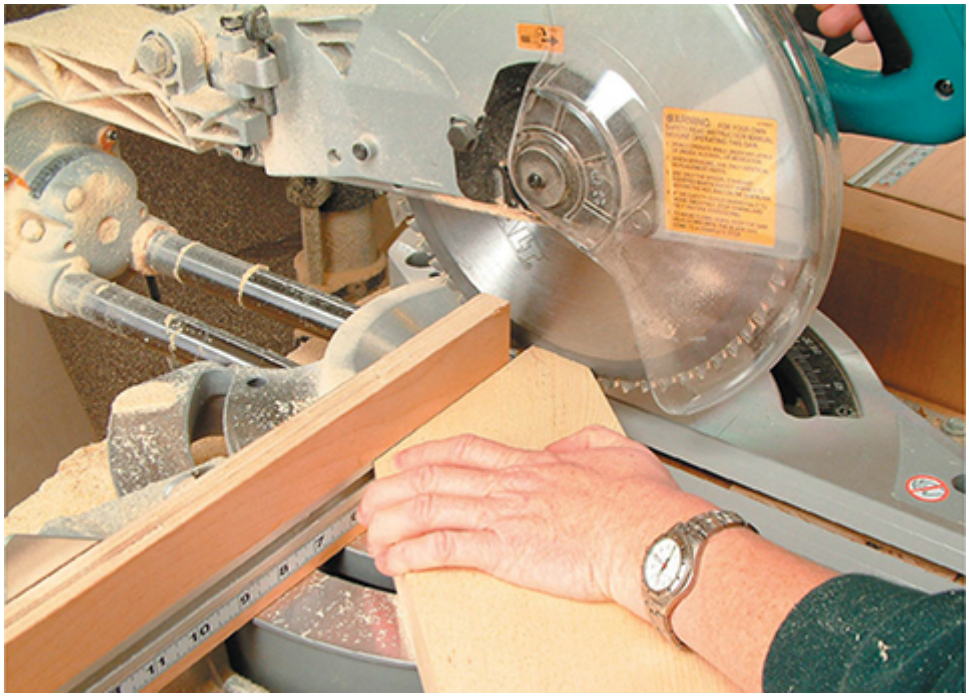
3 When you're satisfied with the fit, cut a ¾"-wide × 1½"-deep x 32"-long tenon along each end of the top.

4 Drill holes in the breadboards for the dowels that will help secure the breadboards to the ends of the top.

5 Moving the center of the holes in the tenons toward the center of the table, drill the holes in the tenons offset 1/32" from those in the breadboards. This will ensure the breadboards are pulled tightly to the top. (See the illustration for details.)

6 Bevel the inside edges of the breadboards. Then slide the breadboards onto the tenons. The fit should be snug. Drive 1/4" x 1 1/2" dowels into the predrilled holes, leaving them proud of the surface to sand off later. Apply glue to the two center dowels only.

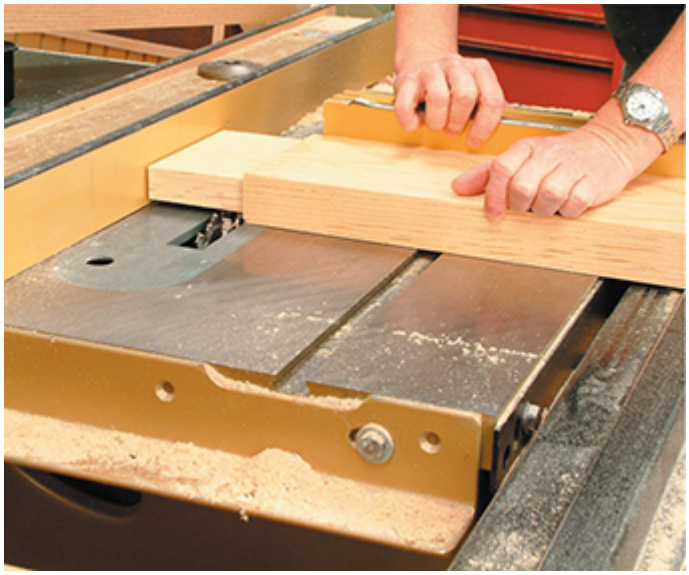
7 Cut the tops and bottoms of all four leg pieces at a 49° angle.



8 For aesthetic purposes, make a 90° cut 1" from both ends of each of the leg pieces.

9 Using your table saw, cut lap joints on the legs. The dado cut should be exactly one-half the thickness of the leg and the same width as the leg. Make test cuts in scrap wood first. Be sure to clearly mark the leg parts so you cut the joints correctly.

10 Glue up the leg assemblies. Then, using a router with a ½" by 1½"-long bit, rout a mortise through the lap joint in both halves of the legs. Square the corners of the mortise using a chisel. This mortise will receive the stretcher tenon that holds the base stable. While some woodworkers choose to cut the tenon first and then cut the mortise to fit, I find it's easier to start with the mortise and fit the tenon to the mortise.



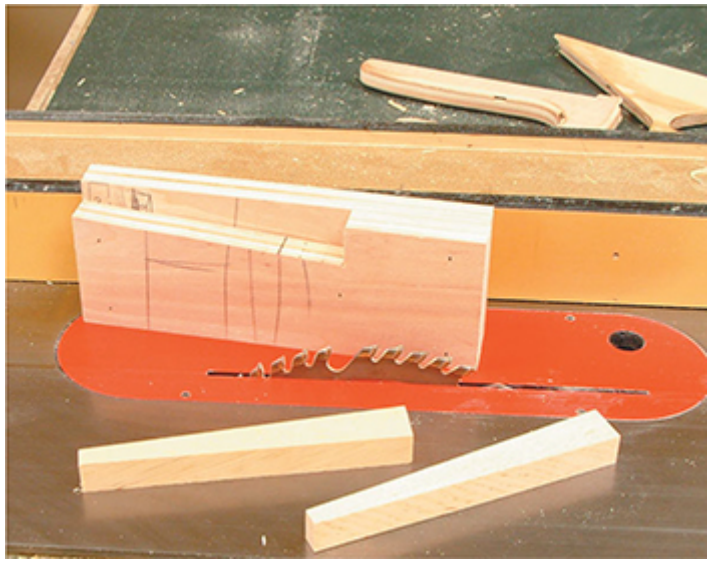
11 Using the table saw, cut the tenons on the ends of the stretcher. Leave the tenons a little thick and plane down the excess until the tenons slide snugly into the mortises in the leg assemblies. Because this is a knockdown project, you want to be able to slide the tenons in and out easily, but still have a tight enough fit to ensure stability.

12 Mark the overhang on the tenons to determine the placement of the holes for the wedges.

13 Drill ¾"-diameter holes to create the mortises. Make sure the edges of the holes are slightly inside the lines you drew. Then, using a chisel, square the holes.

14 Make a simple wedge-cutting fixture by cutting two pieces of ¾"-thick plywood 4" wide by 10" long. Cut the wedge shape out of one of the pieces on the band saw, then join the two with brads. The edges of your wedge-shaped cut need not be perfect, but cut them as close as you can.

15 Insert a piece of wedge stock into the fixture, then cut the wedges on the table saw. Flip the offcut edge for edge and cut another wedge. Flip the stock before each cut. Make a few extra wedges (you never know when a wedge will go missing).



16 This is the underside of the wedge-cutting fixture. Finish-sand all the table parts with #220-grit sandpaper. This table was stained with a heavily pigmented oil-based stain directly on the raw wood. The stain was allowed to dry for 36 hours. Two coats of polyurethane finish were then applied.

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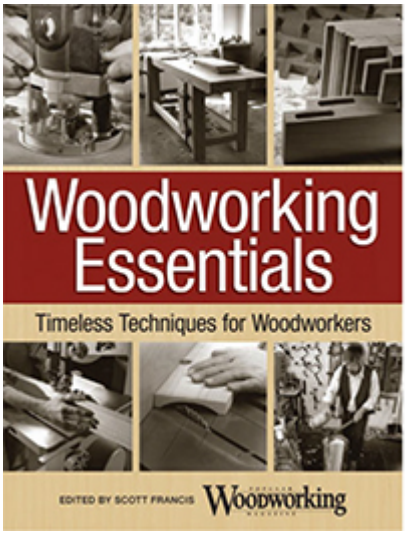

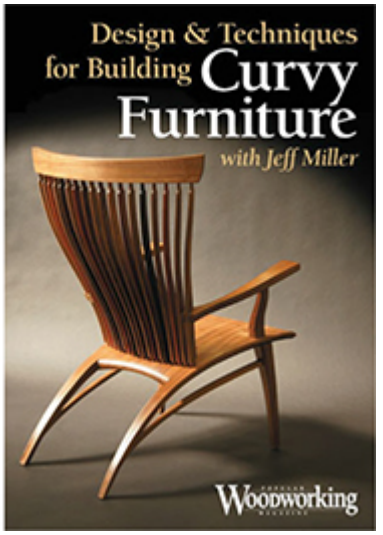

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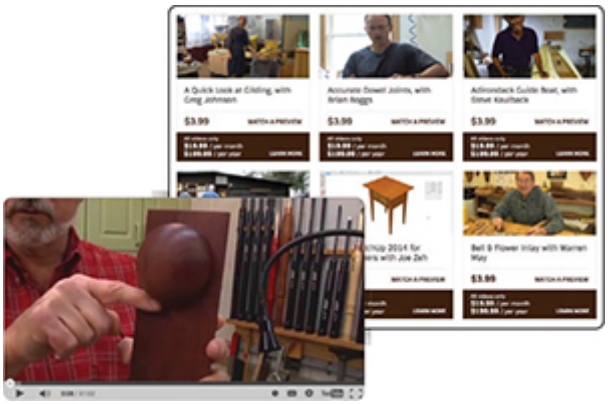

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inches	centimeters	2.54
centimeters	inches	0.4
feet	centimeters	30.5
centimeters	feet	0.03
yards	meters	0.9
meters	yards	1.1