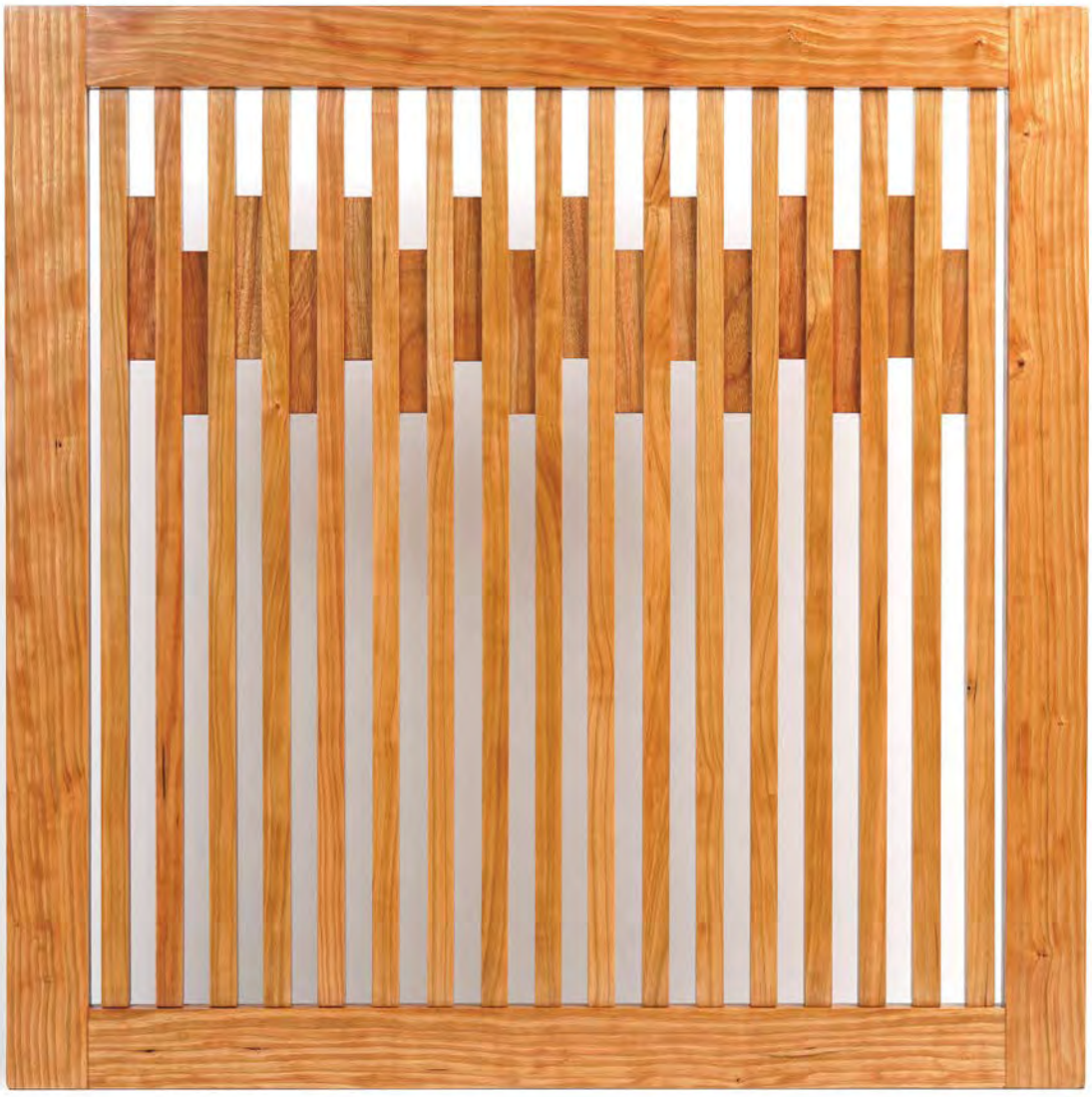
Modern Take on a Craftsman Door



Spindles add style and ventilation

BY ROBERT WEBB

I recently built a Craftsman-style console to house stereo and TV components, and I wanted the cabinet to be both beautiful and functional. To allow sound and heat to escape—and remote-control signals to enter—I traded solid door panels for vertical spindles common to the Craftsman style. To add visual interest, I inserted filler blocks between the spindles in a wavelike pattern.

This door design is especially helpful wherever ventilation makes sense—for a stereo cabinet like mine, or for kitchen cabinets, a bathroom vanity, a mudroom cabinet, a wine rack, or a closet. But it has a modern, minimalist style that will work in lots of places.

You can vary the size and spacing of the spindles, and there are a number of design possibilities for the filler blocks. While Craftsman-style furniture is traditionally made with quartersawn white oak, this contemporary take looks good in lots of woods. I went with cherry.

These doors are also fun to build, and they offer a number of valuable woodworking lessons.

Brief tour of the construction

The door frames are reinforced with deep mortise-and-tenon joinery, ensuring they will stay square and swing freely for decades to come.

You can cut the joints however you like. I cut the mortises using the simple router box described in Bob Van Dyke's article in *FWW* #303 ("Quick and Accurate Mortises"), with the help of

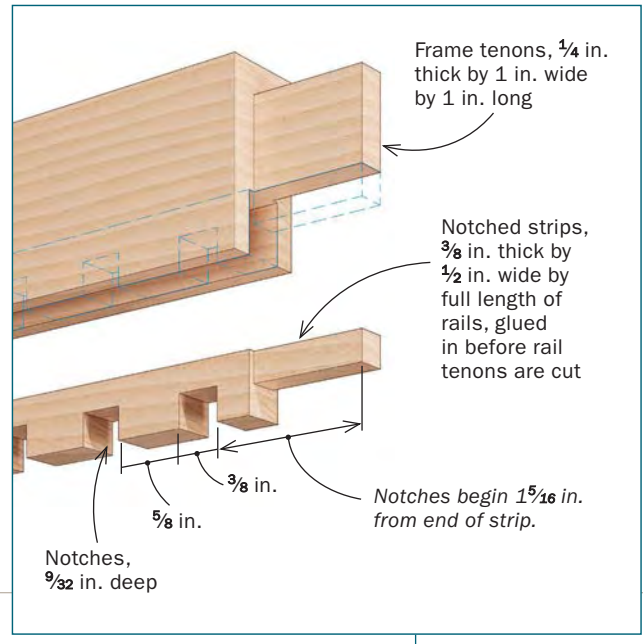
Photos: Asa Christiana. Drawings: Dan Thornton.

a plunge router and a spiral upcutting bit. I formed the tenons on the table saw using a stacked dado set.

The spindles are where things get interesting. I've learned in the past that you don't want to mortise their full thickness into the rails. If you do, you'll inevitably have small gaps, either right away or in the future, and viewers will be able to see down into those. The gaps will also trap dust. Instead, you want to cut short tenons slightly smaller than the spindles. The small tenon shoulders will hide the joints.

Chopping dozens of equally spaced mortises in the rails would be tedious to say the least. My approach does away with mortising altogether. Instead, I cut grooves in the rails and insert notched strips into them—forming mortises without actually mortising. This approach is not only straightforward but also versatile, and it can be used for vertical or horizontal spindles of any size.

As for the decorative filler blocks, those are glued into place after the door frames and spindles are assembled.

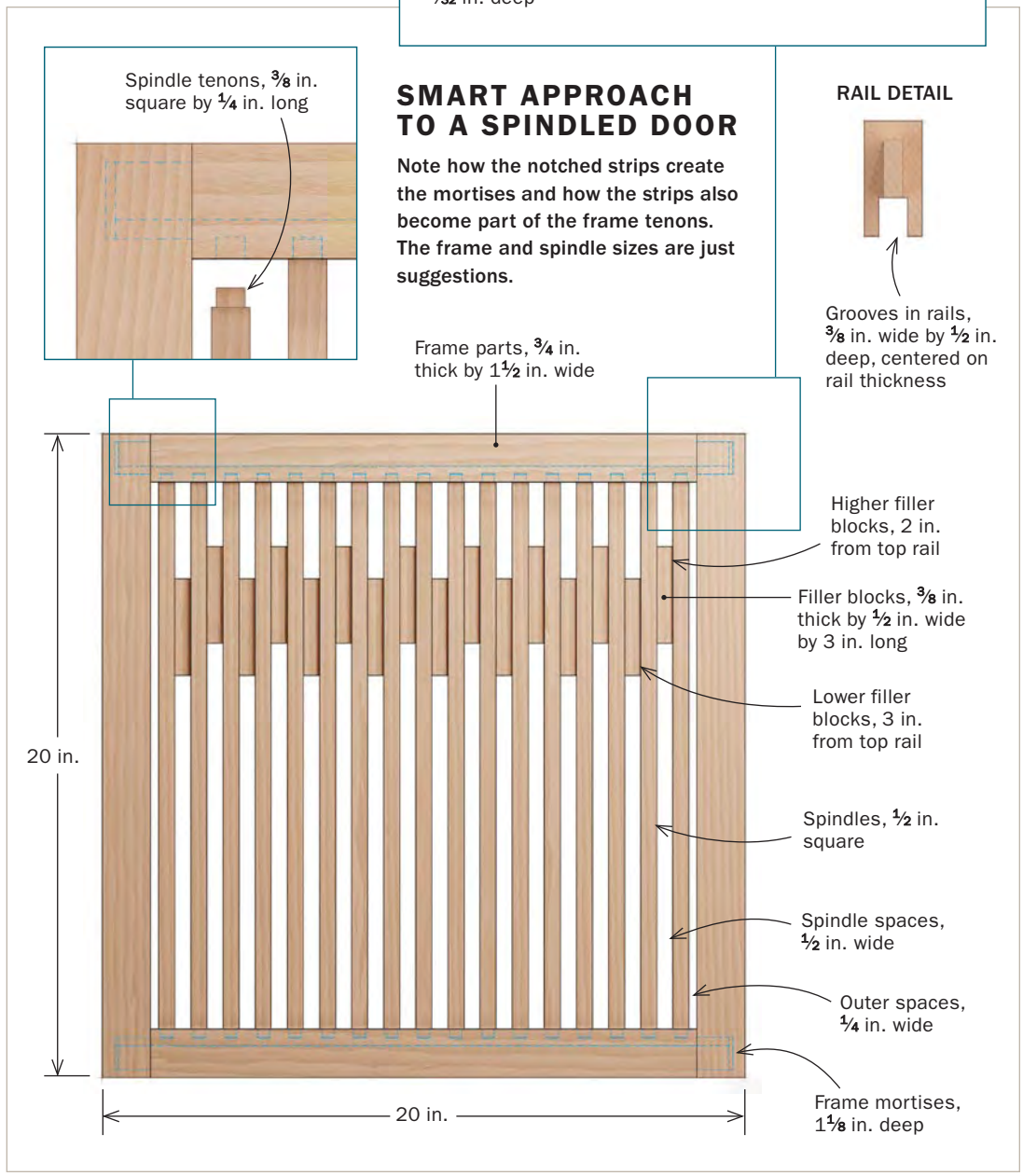


Start with the notched strips

Your first task is to figure out how thick you want your spindles to be and how to space them evenly in your door frames. You may have to adjust the widths of the frame parts to make the spacing work out. To my eye, it looks better if the outermost spaces are a bit smaller than the others and there are no filler blocks in them.

Even though the spindle tenons will be just ¼ in. long, I add 1/32 in. to the notch depth to be sure that the tenons will insert fully and their shoulders will close. I make the strips ½ in. thick in order to support the notches. But I want the tenons at the ends of the rails to be as wide as possible for optimal strength, so I glue the notched strips into their grooves before tenoning the rails. This way, the ends of the strips become part of the tenons.

Start by cutting grooves along the inside edges of the rails, centered on their thickness, using a dado stack. Cut these first on a scrap piece to be sure they are exactly ½ in. deep, and



Mortises without mortising

The spindles require a long row of perfectly spaced mortises. Rather than cut the mortises individually, Webb finds it faster and more accurate to groove the rails and glue notched strips into them.

Slot the rails. *Webb used a ¼-in.-wide dado set here, running the workpieces in both directions to create ⅜-in.-wide grooves centered on the rails.*

Plane the strip board. *The strips are cut from a wider board. Plane that board until its edge fits snugly in the rail grooves.*

then run the stock in both directions to be sure it ends up ⅜ in. wide and centered on the stock.

Indexing jig spaces the notches—The notched strips are ripped from a wider piece of stock. Start by planing that board exactly ½ in. thick, and then cut it to the same length as your rails. Before moving on, mark where the tenon shoulders will begin so that you don't notch those areas.

Cut it to length. *Cut the strip board to the same length as the rails. Then add a plywood auxiliary fence to your miter gauge (see photo at right).*

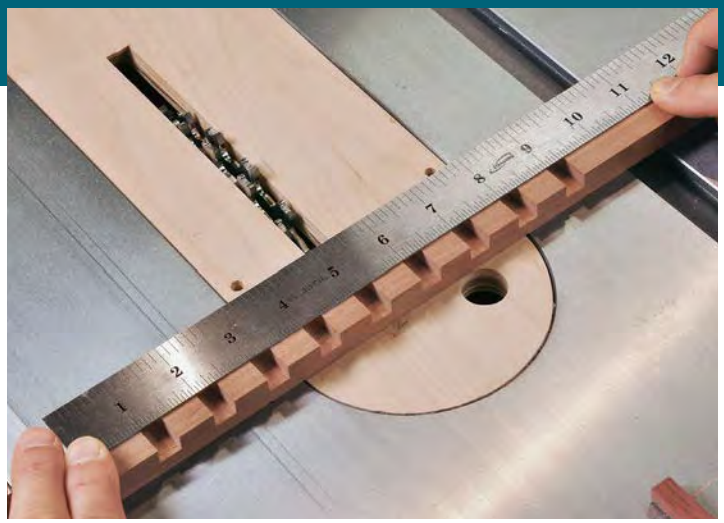
Center the first dado. *Mark the center of the strip, set up a dado set to cut a dado that's ⅜ in. wide and 9⁄32 in. tall, and center it on the mark.*

Add a key to the auxiliary fence. *Cut a ¼-in.-thick by ⅜-in.-wide slot in the fence, and screw a ⅜-in.-wide hardwood key into it as shown.*

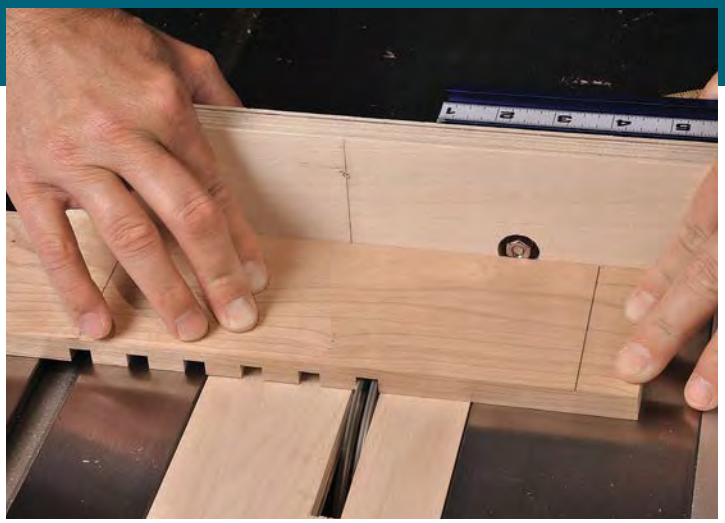
Set the spacing. *Slide the fence along your miter gauge until the key is exactly ⅝ in. away from the outer blade. Reattach the fence in that position.*

To cut evenly spaced notches in this wide board, build a simple indexing jig as follows: Start by attaching a plywood fence to your miter gauge and installing a ⅜-in.-wide dado set in your table saw. Make cuts in scrap to dial in the dado width precisely. Raise the dado cutter to 9⁄32 in. high, and make a cut through the plywood fence.

To make sure the notches end up centered on the length of the rails, mark the center of your stock. Placing a notch at the center of the board will give you an odd number of spindles. (For an even number of spindles, the space between



Cut a test strip. *Use the indexing jig to cut a row of notches in a test strip. Spacing errors are cumulative with this jig, so you'll see them at the end of the row. Adjust the fence position and do another test if necessary.*



Cut half of the notches. *Use the jig to cut a row of notches in your real strip stock, starting at the center and moving toward one end, stopping short of the tenon area (marked).*

Cut the other half. *Flip the stock around to cut notches in the opposite half, starting at the center again.*

Rip the strips. *Cut the notched board into strips that fit snugly into the rail grooves.*

Where to apply glue. *Place glue on the strips only, applying it along the bottom and sparingly on the sides near the notches, where squeeze-out will be difficult to remove.*

the middle two notches should be centered.)

Start by cutting a notch at the center mark of your workpiece. In my case, the notches are ⅜ in. wide, which requires three blades in my dado stack.

Next, make a key that fits into the ⅜-in.-wide slot in the auxiliary fence and then glue or screw it into place. Now loosen the fence and reattach it to the miter gauge with the indexing key ⅝ in. away from the dado stack. (That will create the desired 1-in.-on-center spindle spacing.)

The accuracy of the ⅝-in. gap between the key and the next notch is critical—as any

Glue in the strips. *Webb uses a narrow notched strip to apply pressure to the strip being glued in. After glue up, run the rail through the planer or table saw if the notched strip is not perfectly flush with the edge of the rail.*

Mortises and tenons

The frame parts get standard mortises and tenons. The spindles get little stub tenons. Webb used a box jig (see *FWW* #303) to rout the mortises, and a dado-stack setup for the tenons.

Box setup for routing mortises. *Use spacer boards and wedges to lock the frame stiles into a U-shaped box for routing their mortises. The router gets a ¼-in.-dia. spiral upcutting bit.*

Dial in the edge guide. *Lay out a mortise on a test piece, and adjust the router's edge guide to align the bit with the layout.*

Make a few test plunges before mortising the stiles. *Measure with dial calipers to make sure the mortises will be centered (right). Mark the beginning and end of each mortise, and cut each mortise in a series of passes, using the depth stops on your plunge router (far right).*

error will accumulate along the row of notches—so check it by cutting a series of notches in a scrap board. If there is an error, adjust the location of the indexing jig slightly and cut more test notches. When you are happy with the spacing, place that first dado you cut onto the indexing key and cut the next notch and then the next, continuing until you reach the end of the row, which should stop right before the mark for your tenon shoulder.

When you've cut the last dado in the row, mark that end of the board with a light registration mark so that after the board is cut into strips you can keep track of their original orientation. You'll orient them the same way in the doors in case the notches aren't perfectly centered. This ensures that the spindles end up plumb.

Now flip the stock, place the centered dado on the indexing key again, and cut the dadoes on the other half (stopping at the shoulder mark once again).

Rip off strips and insert them in the rails—To turn the notched board into notched strips, rip off ⅜-in.-wide pieces on the table saw. Dial in the rips on scrap first to be sure the strips end up snug in their slots.

When gluing in the strips, pay attention to the orientation marks you made earlier and to the orientation of the rails. Use a

sparing amount of glue along most of the length to minimize squeeze-out in the notches, which are tough to access. Use more at the ends.

If the strips aren't perfectly flush with the inside edge of the rails after glue-up, feel free to skim that edge with a light rip cut on the table saw, or a light cut in the planer.

Cut the mortises and tenons

As usual, I cut the mortises first and then fit the tenons to them. For my mortise-and-tenon method, it is critical here for the mortises to end up perfectly centered on the thickness of the stiles, because my tenon-cutting method centers the tenons also. So I was very careful when adjusting the edge guide that rides the side of the mortising box.

After the mortises were cut, I squared them up using a mortising attachment at the drill press without the center drill bit inserted. This works well, since there is very little wood to remove. Alternatively, you can use a chisel to square the mortises or a utility knife to round the tenons.

I cut matching tenons at the table saw, using a ¾-in.-wide stack of dado blades. I support the stock with the miter gauge and use the rip fence as a stop.

Use an extra piece of frame stock to dial in the tenon cuts before cutting your real workpieces. Aim for a friction fit that will slide together with glue on it.

Spindles get tenons too

I ripped the spindles a little bit oversize in thickness and then removed the saw marks in the planer, bringing the spindles down to ½ in. square.

You'll need to cut the spindles to finished length before tenoning them. To do this, dry-fit the door frame and measure the distance between the rails. Then add the tenon lengths, remembering to leave the tenons a tiny bit shorter than the depth of the mortises to make sure the shoulders seat fully.

Once again, make a couple of extra workpieces so that you can dial in the shoulder-to-shoulder distance of the spindles, as well as the fit of their tenons, before cutting into the real spindle stock.

Clean results. *Trust your eyes to stop the mortises at the pencil marks. The mortise length is not critical as long as it reaches the marks.*

Square the mortises. *You can do this with a small chisel, or use a mortising bit in your drill press, as shown, with the drill bit removed.*

Tenon the rails. *Load a wide dado set in your table saw, support the workpiece with the miter gauge, and use the rip fence as a stop.*

Tenon the spindles. *First, dry-fit the frames to determine the spindle length and the distance between their tenon shoulders. Then cut them to length. When tenoning them, set a stop at the far end of your miter gauge.*

Assembly is straightforward

The frames and spindles are assembled first, and the filler blocks go in afterward.

Prefinish the frame parts. *Wipe on a coat of finish to make it easier to remove glue squeeze-out after assembly. Keep glue off the joint areas, and don't prefinish the spindles at all.*

Assemble the door

I sand all of the parts before assembly. If you sand away any of your registration marks, be sure to replace them in unseen areas.

To make it easier to remove glue squeeze-out, I prefinished the rails and stiles with one coat of Tried & True Varnish Oil, avoiding the glue surfaces in the joinery. Because the filler blocks are glued in after the door is assembled, I didn't prefinish the spindles.

The spindles make this glue-up somewhat more tricky and time-consuming, so it's important to dry-fit everything to make sure it will all come together perfectly. That said, the spindle tenons don't need glue, which makes things a bit easier.

How to manage the spindles. *The spindle tenons are inserted dry. Clamp one rail to the bench and fit its spindles. Note the spacer strip that keeps the spindles level, making assembly easier. Then, starting at one end of the opposite rail, insert the rest of the tenons.*

Add the stiles. *Hold the rails and spindles together with a strap clamp, apply glue to the mortises and tenons in the frame, and clamp the stiles in place. Make sure the assembly is square.*

Before the glue sets, I check for squareness by measuring the diagonals. If the door is out of whack, try adjusting your clamps to shift it back to square. If that doesn't work, throw a clamp across the diagonal that's measuring longer, and squeeze it gently until the two diagonals are equal.

Add the filler blocks

While the glue is drying, mill the filler blocks. You want them to slide in snugly without pushing the spindles one way or the other.

For a variety of subtle reasons, not every space between the spindles will be exactly the same. So it works best to create three piles of filler blocks: one group exactly ½ in. thick and

Plane the filler-block sticks. *The short blocks start as long sticks. To deal with inaccuracies in the spindle spacing, make one group of sticks 0.500 in. wide, one group roughly 0.490 in., and a third group 0.510 in.*

Gluing tips. *To install a filler block, apply glue lightly to its sides, but not to the spindles. Keep the glue near the back edge of the block and away from its ends, where excess will be hard to remove.*

two groups that are thicker and thinner by just a hair. The difference was much less than 1/64 in. on my calipers—likely closer to 0.005 in. or 0.010 in.

To make sure the blocks end up in the right positions, mark where their tops should be on the back of the spindles. You'll be installing the blocks from the back, where they end up flush with the spindles, so you'll be able to feel if they're inserted to the right depth.

When the doors were dry, I chose blocks that fit nicely into each space and glued them in one by one in my wave pattern, aligning them with the pencil marks and making sure they were flush with the spindles.

To prevent squeeze-out on the front side of the door, apply a thin layer of glue to the blocks only, not the spindles. Also, try not to apply glue near the ends of the blocks, to prevent squeeze-out on the end grain, where it can soak in and show up under the oil finish that follows.

Blocks go in from the back. *Push them in until they are flush with the back of the spindles and aligned with the pencil marks on the spindles that denote their locations. Note how squeeze-out is pushed to the back of the assembly, where it is easy to remove.*

Once the squeeze-out has been removed and the blocks have been set, give the back of the spindles a few passes with your random-orbit sander to bring everything flush and to remove the pencil marks and glue remnants.

On my cabinet, I applied a coat of Tried & True to the whole door, let it cure for a week or so, and then added two coats of oil-based Minwax polyurethane (satin).

Whether you place electronics behind them or not, these doors are attractive, functional, and fun to build. I hope you give them a try. □

Clamp as necessary. *Select from the three groups of blocks, each sized a bit differently. If possible, choose a block that fits each space without flexing the spindles.*

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