# Bookcase

A good bookcase is more than a set of shelves. It's a home for your most treasured volumes--a place to not only store and protect, but, more importantly, to display. In fact, while it may be designed to hold books, it's also the perfect place to show off photographs and collectibles.

The problem is, a bookcase with such a daunting responsibility won't make the grade if it's built of plywood or pine. What you need is something that lives up to the objects it holds. With this in mind, we've created the third piece in our 100th anniversary furniture series. Like our dining table and chair, our bookcase is constructed of solid mahogany and features details of pomele sapele veneer and wenge.

The case's finished back allows it to be used either against a wall or in the center of a room as a partition.

**Building The Case**

Begin by cutting the case parts to finished dimension. Try to match the color and grain of the pieces for a uniform appearance.

Mark the locations of the front and back rails on each side. Note that the front rails are set back 1/8 in., while the back rails are flush. Use a marking gauge and square to lay out the mortises for each joint.

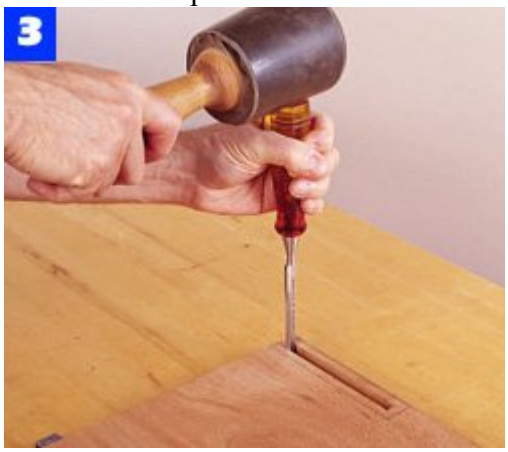
Rout the rail mortises with a spiral up-cutting bit (Photo 1). Make two or three passes to reach the full mortise depth to avoid breaking the bit or overloading the router. Then, rout the back-panel grooves (Photo 2).

Lay out the mortises in the edges of the top and bottom back rails. Maintain the router's previous edge-guide setting and readjust the depth to cut these mortises. Clamp two rails together to provide a wider, more stable base for the router, but be sure to register the edge guide against the outer face of the rail being cut. Readjust the bit depth again to cut the panel grooves in the rails, and then rout the panel grooves in the back stiles. Square the mortises with a sharp chisel (Photo 3).

Use a dado blade in your table saw to cut the tenon cheeks on the rails and stiles (Photo 4). A stopblock clamped to the saw table ensures that all tenons will be the same length. Since most dado blades leave small ridges on the surface of the stock, cut the tenons about 1/32 in. heavy and pare them to size with a sharp chisel. Readjust the blade height to cut the shoulders at the edges of the tenons (Photo 5).


Use a spiral up-cutting bit to rout the mortises in the case sides. Reach full depth in two or three passes.

Rout the grooves for rear panels in the case sides. The grooves extend between the mortises for top and bottom rails.



After routing the mortises in the back rails for the stiles, use a sharp chisel to square the ends of all mortises.

Use a dado blade in the table saw to cut the tenons. A stopblock clamped to the table ensures uniform tenon lengths.

Readjust the dado blade height and hold the rails and stiles on edge to cut the tenon shoulders.

Mark the locations of the joining-plate slots on the inner surfaces of the bottom rails and cut the slots (Photo 6). Adjust the joiner fence so that the slots are set back the proper distance from the rail edge. Note that the front rail has four slots while the back rail has three slots.

Next, lay out the slots on the edges and ends of the bottom shelf and cut them. Use a flat tabletop as a registration surface for locating the slots. Be sure that you hold both the joiner and workpiece tight to the table when cutting. Use the same technique to cut the slots in the top ends of the case sides as well as the top edges of front and back upper rails. Mark the case sides to indicate the positions of the slots for the bottom shelf joint, then cut those slots (Photo 7). Clamp a guide block to the case side to aid in locating the joiner for these cuts.

Make a template out of plywood or hardboard for the shelf-pin hole locations. Note that the edge-to-hole distance is different for the front and back holes. Position the template on each case side and use a depth stop on the drill bit to bore the shelf-pin holes (Photo 8). Install a chamfer bit in the router table and cut the 1/8-in. chamfer on the front edges and outside back edges of the case sides. Then chamfer the front rails and front edges of the adjustable shelves. Install a straight bit in your router and cut the rabbet around the edges of the back panels (Photo 9).

To make the wenge feet, first rip a strip of 1-in.-thick wenge to 2-1/2 in. wide. Adjust the table saw blade to 45° and chamfer the end of the strip (Photo 10). Readjust the blade to 90° to cut a 1/2-in.-high foot off the strip. Repeat the procedure for the remaining feet.

Bore and countersink screwholes in the case feet. Spread a bit of glue on each foot and fasten them to the bottom ends of the sides with 1-1/2-in. No. 8 screws (Photo 11).

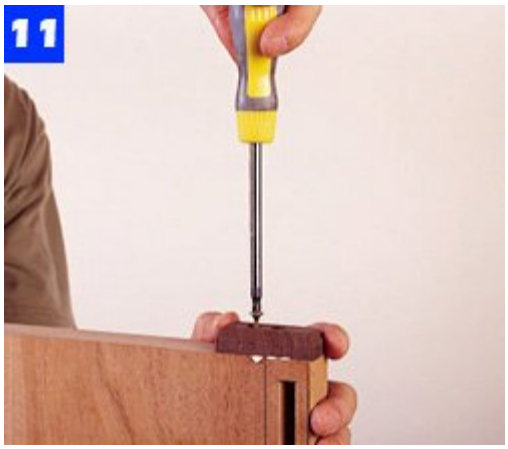
Mark the plate centers on the front and back bottom rails and cut the slots. Use the joiner fence to locate slot heights.

After cutting slots in shelf ends, cut matching slots in case sides. A block clamped to the side locates the joiner.

Make a template of the shelf-pin hole locations. Then, use the template to position the holes in the case sides.

Cut back panels to size from 1/2-in.-thick stock and use a router to shape the rabbet around the panel edges.

Cut a 45° chamfer at the end of a 1 x 2-1/2-in. wenge blank. Set the blade to 90° and saw across the end to make a foot.



Bore and countersink screwholes in each foot. Apply glue and screw the feet to the case sides.

**Decorative Panels**
Cut the wenge panel cores larger than finished dimension--they'll be trimmed to exact size after the veneer is glued in place. After cutting the wenge stock to width, clamp a fence to your band saw and resaw the thin panel cores. Cut the pieces about 1/32 in. thicker than indicated and plane them smooth.

To cut the veneer, first place a scrap plywood or particleboard panel on your worktable and lay a sheet of veneer over it. Lay out the outlines of the veneer pieces to match the wenge cores. Place a straightedge guide over each cut line and hold a veneer saw against the guide while lightly scoring the veneer (Photo 12). It will take several passes with the saw to cut through the veneer.

You can easily press the veneer onto both side panels at the same time. Use a roller to spread glue onto the wenge cores (Photo 13). Place a veneer sheet over each core, then cover each with wax paper.

Stack the two panels with edges and ends aligned and sandwich them between 3/4-in.-thick cauls. It's best to use double cauls on both sides of the stack to evenly distribute the clamping pressure. Apply clamps, beginning at the center and working toward both ends (Photo 14). Space the clamps 3 to 4 in. apart. Allow the panels to sit in the clamps for at least 2 hours. Then, remove the clamps and let the panels dry overnight.

Follow the same procedure for the front-rail panels. Don't be alarmed if the panels show a slight warp. Usually, veneer is applied to both sides of the core to avoid this. When the thin panels are glued and clamped to the bookcase, they'll flatten out.

After the glue has cured, cut the panels to finished size and chamfer the edges. Sand the panel edges and outer surfaces of the front rails and sides to 220 grit. Mark the location of each panel on its case part.

Spread glue on the back of the top-rail panel, place it on the rail and clamp it in position (Photo 15). Use plenty of clamps to ensure a good bond between the panel and rail. Repeat the procedure for bottom rail and side panels.


Hold the veneer saw tight against a straight guide and run it lightly over the veneer several times to make the cut.


Use a foam roller to spread glue on the wenge strips. Then, place a sheet of veneer on each core panel.

Stack the side panels with wax paper between each piece and plywood cauls on top and bottom. Then apply clamps.

Spread glue on the back of a panel and clamp it to a rail. Use plenty of clamps to ensure a good bond.

**Assembly**

Dry fit the front and back bottom rails to the bottom shelf (Photo 16). Then glue and clamp the assembly.

Slide the two back stiles over the edges of the center back panel. Next, apply glue to the mortise-and-tenon joints for the stiles and upper and lower back rails, and assemble the parts (Photo 17). Take care to keep glue off the panel edges. Use long bar clamps to pull the back rail/stile joints tight and let the glue set.

Slide the two remaining back panels into the rail and stile grooves. Then, apply glue to the joints for one of the case sides. Assemble the side to the back subassembly and front rail, and apply clamps (Photo 18). When the glue is dry, add the other side.

Mark the locations of the joining-plate slots in the case top and cut the slots. Clamp a straightedge guide to the top to aid in positioning the joiner.

Set the table saw blade to a 15° angle and bevel the case top edges (Photo 19). Use the miter gauge when trimming the ends, and the fence when cutting the front and back edges. Sand the case and top to 220 grit, spread glue in the slots and on the joining plates, and clamp the top in place.

Mark the locations of the shelf-pin notches in the bottom faces of the adjustable shelves. Use a router with an edge guide and straight bit to cut the notches, and sand the shelves.

**Finishing**

We finished our case with Waterlox Original Sealer/Finish. Apply the finish liberally with a brush or rag and allow it to penetrate for about 30 minutes. Use a lintfree rag to wipe off the excess, leaving only a damp surface. After overnight drying, lightly scuff the surface with 320-grit paper and dust off. Repeat the application using the same method for two or three more coats. When the last coat has cured, rub the surface with 4/0 steel wool followed by a soft cloth.


Spread glue in the joining-plate slots and on mating edges and plates, then assemble the bottom shelf and rails.

Slide the center back panel between the two stiles. Apply glue and join the stiles to the top and bottom back rails.

Join one case side to the bottom/back subassembly, then add the front top rail followed by the second side.

Cut the case top to finished dimension. Reset the blade to 15° and cut the beveled edge around the top.