# A Lesson in Basic Joinery

Practice cutting dadoes and rabbets while building a handy organizer

> BY MARIO RODRIGUEZ

y students always find it more satisfying to perfect their joinery by creating a piece of furniture rather than by adding to the kindling in the scrap bin. The dado and the rabbet are fundamental woodworking joints found in all kinds of furniture, from bookcases to highboys. Building this organizer, which either can be hung on a wall or stood on a table, allows you to practice these joints while creating a useful piece of furniture.



This piece features dadoes that run the width of the sides to support the shelves, and stopped dadoes in the upper shelf and the underside of the top to receive the partitions. Rabbets in the cabinet include those at the top of each side piece and partition as well as in the drawer construction. Both joints provide accurate alignment of the parts, load-bearing capability, and increased glue surface. They can be cut accurately on the tablesaw, with or without a dado set, and with a router using various fences and jigs.

#### Materials are cheap and easy to find

I chose red oak as the primary wood for this project and pine for the drawer boxes and the back slats. If you can find 11-in.wide oak boards, you will be spared the step of gluing up panels, but glue-up is not a big procedure for a project this size. The oak for the partitions needs to be

## SIMPLE BUT USEFUL JOINTS

#### DADOES

The dado, a square, flatbottomed recess cut across the grain of one board to receive the end of another, can run the full width of the board or stop short of one or both edges.



Full-width dado



Stopped dado

The rabbet is an open-sided recess cut along the edge or end of a board to receive the edge of another.

RABBETS



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# CUT FULL-LENGTH DADOES AND RABBETS ON THE TABLESAW

#### TWO TYPES OF DADO BLADES ARE AVAILABLE



The outside cutters of a stackable set of blades (above) are placed on the arbor first and last, with chipper blades between them. The width of the cut is finetuned by placing metal or paper shims between the blades. Adjustable blades (right), also called wobble blades, can be adjusted to width by rotating a dial on the side of the blade.



thicknessed to ½ in., and most of the pine needs to be 3% in. thick; this is best done with a planer rather trying to resaw thicker stock. You will need about 18 ft. of 8-in.-wide oak boards, and 7 ft. of pine, which includes an extra 20% to be on the safe side.

### Dadoes and rabbets can be cut on the tablesaw

Most of the dadoes and rabbets for this project can be cut on the tablesaw using a set of dado blades. There are two types of dado blades (see the photos above): stackable blades, which consist of two outside blades to cut the sides of the joint and multiple chipper blades to remove the waste in the middle, and adjustable blades, also known as wobble blades. I prefer the stackable dado set because it makes a cleaner cut. Install a throat insert made for a dado set. Mount the two outside blades and sufficient chippers to make a cut just under <sup>3</sup>/<sub>4</sub> in. wide. Using a piece of surplus oak as a gauge to make test cuts, fine-tune the width by adding or removing shims between the blades until you achieve a snug fit.

Each side piece gets a pair of dadoes for the shelves, and the top and bottom shelves each receives one narrow dado for the drawer divider. Dadoes shallower than ¼ in. deep can be cut in one pass, but feed the workpiece slowly to achieve a clean cut and avoid straining the motor. Use the rip fence to guide the location of each dado, making the same cut on both side pieces before adjusting the fence for the next dado. Apply firm downward pressure on the workpiece to ensure that the depth of each dado is consistent throughout its length.





# A QUICK DRAWER JOINT MADE WITH DADOES AND RABBETS

The front, back, and sides of the drawer boxes are connected by dado and rabbet joints cut on the tablesaw. The false fronts are mounted with screws after the drawers have been assembled.



Even though the cut for the rabbets on the top of each side piece is  $\frac{1}{2}$  in. square, there is no need to reset the width of the dado set. Instead, clamp a piece of  $\frac{3}{4}$ -in.-thick plywood or medium-density fiberboard (MDF) to the rip fence, locate the fence for the cut, and gradually raise the blade so that it eats into this sacrificial fence.

The final cuts with the dado blade are ½-in.-deep by ¾-in.-wide rabbets on both sides of each end of the three partitions, and ¾-in.deep by ¼-in.-wide rabbets on overlapping sides of the pine back slats. Known as a shiplap joint, this allows the boards to move seasonally without creating a gap between them.

## Stopped dadoes are best cut with a router

On this project the partitions are secured in stopped dadoes in the upper shelf and the top.

The stopped dadoes must be cut in identical positions on the top shelf and the underside of the top piece. To achieve this I use a rub collar (also called a template guide) in conjunction with a template. The collar has a tubelike piece of metal that surrounds the router bit and guides it by means of a template placed on the workpiece. When laying out the job and making the router template, the difference between the outer diameter of the rub collar (in this case % in.) and the router bit (¼ in.) must be taken into account. Blocks of wood glued to the underside of the template



**Cut dadoes in the drawer sides.** The positions of the dadoes on the drawer sides are determined by the thickness of the front and rear drawer pieces.





Rabbet the front and rear

**pieces in two steps.** Move the front and rear drawer pieces vertically across the blade (above) to make the first part of the rabbet. Use a zero-clearance insert plate around the blade to support the workpiece. With the piece flat on the table (left), make the second cut, leaving a tongue that will connect with the side pieces.

# **ROUTING DADOES**

#### **USE A TEMPLATE FOR MATCHING DADOES**

The partitions are secured in stopped dadoes in the upper shelf and the underside of the top. Because the cuts must be in matching positions, use a rub collar (also called a template guide) in conjunction with a template. Make the template out of a piece of plywood and cut guide slots and access holes for the router bit and rub collar. Rub collar, or template guide 1½-in. access hole Router bit Plywood, 3% in. thick to start routing by 191/2 in. wide by Stop blocks 20 in. long mounted on bottom 91/8 in 4¼ in. 8¼ in. Guide slots, Add <sup>7</sup>/<sub>8</sub>-in.-wide spacer ½ in. wide by blocks when routing 10<sup>3</sup>/<sub>8</sub> in. long the shelf dadoes



**Cut the template guide.** With a T-square guide clamped to the edge of the plywood template, rout a slot for the template guide to ride in.



**Router template spaces partitions evenly.** Because the stopped dadoes for the partitions must be cut precisely and in identical positions on both the upper shelf and the top, it is best to use a plywood template to guide the router.

act as stops to ensure accurate placement on both of the pieces to be cut.

I also use the router to cut <sup>3</sup>/<sub>4</sub>-in.-square stopped dadoes on the sides for the back slats and on the underside of the top for the sides. Because these cuts are near the edges of the workpiece, a fence attached to the router and guided by these edges works well. You will need to stop the router just before the end of each cut and square up the end with a chisel.

While you have the router out, now's a good time to profile the edge of the top. Although the piece shown here has a cove on the underside of the front and sides of the top piece, you may prefer the look of a chamfer. Regardless, use a bearing-guided bit running along the edge of the workpiece. For a clean cut with minimal tearout or burning, make the cut in two stages with the second cut at the final depth removing only a small amount of wood.

### Cut the drawer parts using the tablesaw

Because the drawers have false fronts and are fitted with guides, it is safe to make up the drawer boxes before the carcase is assembled.



AN EDGE GUIDE IS ANOTHER OPTION



After cutting the stopped dadoes for the partitions, add an adjustable fence to the router and cut the stopped dadoes at both ends of the top to receive the sides.



**The template guides the router.** A rub collar (or template guide) screwed to the router base runs against the template, guiding the router bit.

The front, back, and sides of the boxes are connected by dado and rabbet joints cut on the tablesaw: First cut two dadoes on each side piece; the distance from the end is determined by the thickness of the front and back pieces.

Because the next cut is made with only a thin section of wood in contact with the tablesaw, install a zero-clearance insert around the sawblade to prevent the workpiece from getting wedged between the table and the blade. In two cuts you can make rabbets on the ends of the drawer back and sides to create a tongue that connects with the dadoes on the drawer sides. Before assembling the boxes, cut grooves on the inside of the front and sides, and cut away the back of the drawers so that the bottom can be slid in. The drawer partition simply is a <sup>3</sup>/<sub>4</sub>-in.-thick piece of pine that is joined to the two shelves with <sup>1</sup>/<sub>4</sub>-in. dadoes. These can be cut on the tablesaw with two passes over a conventional blade. To avoid having end grain exposed on the front of the cabinet, use a tongue-and-groove joint to attach a thin facing piece of oak.

## Assemble the carcase and fit the drawers

You will find that the assembly of this project will be much easier to do on a pair of sawhorses, because the gap between the horses allows more room for clamping. Glue the shelves to the cabinet sides and slide in the drawer divider from the front. When these joints are dry, slide in the back slats, glue in the three partitions,



and then glue on the top. Screw the center of each back slat to the sides.

Before fitting the drawers, mill some rabbeted drawer guides from pine and set them in place with glue. The rabbet along the bottom and the fact that they are 1½ in. short allow them to be trimmed in place with a block plane.

Once you have achieved a snug fit for each drawer box, mark its location on the back of each false drawer front. Transfer the loca-

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tion of the holes on the drawer box and drill pilot holes in the false front to avoid splitting the wood with the screws.

The last pieces to add

## CONSTRUCT THE CASE AND FIT THE DRAWERS

**Assemble the piece.** Begin by gluing the sides to the two shelves. Apply some glue to the grooves and slide in the drawer divider from the front. Then slide in the back slats and glue in the partitions. The last piece of the case to be attached is the top. Working on a pair of sawhorses gives you more options for clamping positions.



**Drawer guides have a rabbet and stop 1½ in. from the back slats.** This allows the thickness to be trimmed with a block plane after they have been installed.



**Fit the drawer fronts.** After cutting the false fronts to size, mark the location of the drawer box on the back of each, including the holes. To attach the drawer front, drill the holes in the drawer box slightly oversize to allow for fine-tuning to the opening.

are a valance that is set just in from the sides and glued to the lower shelf, and a two-part French cleat if you are going to hang the organizer on a wall. Before assembly you should sand the interior sections with 100-, 150-, and 220-grit paper. With the piece assembled, plane all of the joints flush and repeat the sanding sequence on the outside. Wiping the wood with denatured alcohol will reveal any glue that has squeezed out. Sand these areas again with 220-grit paper.

Finish the wood with three coats of an oil-varnish mixture, such as Waterlox, sanding between the first two coats with 220-grit paper. When the finish has cured, rub the cabinet with 0000 steel wool, and wax and buff the wood for a smooth, satin finish.

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