

# **Traditional** **Bookcase**

**Create your own classic bookcase with simple tools in five easy-to-follow steps.**

by **David Radtke**





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Create your own classic bookcase with simple tools in five easy-to-follow steps.

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Don't make the same mistake I made when I moved into my new house. I left my books stacked in boxes for two years before I finally got around to building bookcases. I can't tell you how many times I rummaged through those boxes looking for reference books or that mystery novel I wanted to revisit.

When you're ready to display *your* literary favorites, don't go to a furniture store and settle for a poorly constructed bookcase with zipo for detail. For about the cost of a cheap bookcase (\$300), you can build this handsome and solid heirloom-quality piece.

This project is too challenging for a beginner. Don't tackle it unless you've used a router and a doweling jig and feel confident with your circular saw. We've broken the project into five easy-to-follow steps and given you the option of selecting your own trim and finish.

The bookcase construction is straightforward and basic, so it's easy to cut and fit the pieces. The fixed shelves add stability and are designed to hold a variety of average-sized books, but you can customize the shelf heights to suit your collection.

Our bookcase is made primarily from maple plywood and detailed with solid maple boards and regular lumberyard maple colonial stop molding (**Fig. A**). If maple isn't your favorite wood, you could opt for birch and oak plywood and moldings. They too are commonly stocked in full-service lumberyards and good home centers.

The grooved vertical front pieces on each side (fluted casing) may look challenging, but with a shop-made jig and a router, you'll get perfect results. For details, see "Make Your Own Fluted Casing—The Easy Way," p. 8. Figure on about a day and a half for cutting and assembling, plus a couple of evenings for sanding and finishing.

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### ALL YOU NEED ARE SIMPLE HAND AND POWER TOOLS

The only power tools you'll need are a 7/8-hp router, a circular saw (**Photo 1**) with a fine-toothed plywood blade, a drill, a power miter saw and an orbital sander. (And you could substitute a hand miter saw for the power one.) You'll also need other wood-working tools like C-clamps, bar clamps, spring clamps, a screwdriver, drill bits and a doweling jig (**Photo 5**) with a 3/8-in. brad point bit. Although you could get by without it, a 24-in. Clamp & Tool guide (**Photo 2**) is great for routing perfectly straight grooves (dados) to support the shelves (see the Buyer's Guide, p. 11). This tool clamps firmly to the edges of the plywood and leaves an unobstructed path to push your router from one side to the next. It's not a tool you'll get and use only once. The Clamp & Tool guide has dozens of uses, such as helping you make super-straight crosscuts (perpendicular cuts to the wood grain) on lumber and plywood.



# Bookcase Step 1

## Building the basic box: Sides, shelves and back



1

**RIP** 3/4-in. hardwood plywood into 11-1/4 in. wide pieces for the sides and the shelves. Cut these pieces to length to make the two sides and the six shelves. Also cut the 1/4-in. plywood back to width and length while you have the edge guide set up.

### GET STRAIGHT RIP CUTS WITH A HOMEMADE JIG

If you've got a fancy setup for achieving perfectly straight cuts (rips) from a sheet of plywood on a table saw or something else, all the better. If you don't, this simple jig (**Photo 1**) is what you need.

Construct the jig by screwing together two scraps of either 1/2- or 3/4-in. plywood. The top narrow piece (2-1/2 in. wide) must have one factory straightedge. Leave the bottom piece a few inches wider than your saw base (in most cases, that will make the bottom piece about 10 in.). Screw the top piece to the bottom with drywall screws every 5 in. Now you need to trim the lower piece perfectly straight.

Now, clamp the jig to the entire piece of 3/4-in. maple plywood, setting it to the correct width. Rip-cut (lengthwise) the two bookcase sides (A), then cut them to length (cross-cut). Rip two additional lengths and crosscut them (outer sides "A" facing up) into 31-7/8 in. lengths for the shelves. Cut the 1/4-in. plywood back (C) to the dimensions in the Cutting List, p. 7.



2

**MARK AND CUT** the 1/4-in. dados in the sides. Use a special 23/32-in. wide straight-cut router bit for a tight fit for the thinner-than-3/4-in. plywood.



3

**GLUE AND SCREW** the plywood shelves to the sides with 1-5/8 in. wood screws. Drill pilot and countersink holes no more than 3/4 in. from the front and back to accept the screws. The screws will be covered by molding later. Next, align the 1/4-in. plywood back (C) and square the assembly by nailing into the back of the sides and shelves.

# Bookcase

## ROUT THE 1/4-IN. DEEP SHELF SLOTS INTO THE SIDES

The shelves (B) lock into 1/4-in. deep slots (dadoes) in the upright sides (A). To make the dadoes, install a 23/32-in. straight-cut router bit (see Buyer's Guide, p. 11) in your router and set the depth of cut to 1/4 in. The special 23/32-in. router bit is the same width as 3/4-in. plywood, so the slots it cuts will make a nice snug fit for the shelves. Don't substitute a 3/4-in. bit; you'll be unhappy with the sloppy fit.

Clamp your edge guide (**Photo 2**) to a scrap piece of plywood and rout a test dado. Then measure the distance from the edge guide to the near edge of the dado. This will give you the distance you'll need for setting up each dado groove. Mark and cut (see **Fig. A**) all the 1/4-in. deep dadoes on the inside face of each part A. **TIP:** When you cut dadoes with a router and straightedge, clamp the edge guide to the left of your intended groove, then push the router base away from you as you rout the groove. This keeps the router tight against the edge guide as the bit rotates through the cut. Finish-sand all the plywood pieces now with 150-grit sandpaper; otherwise, you'll struggle with sanding in tight spaces after assembly.

## GLUE AND SCREW THE SHELF ENDS INTO THE SLOTTED SIDES

It's essential to have a flat surface for assembly so you can align the shelves squarely to the sides. The shelves (B) should fit tightly into the grooves. Test the fit. If the shelf won't slip into the dado, wrap some fine sandpaper (150-grit) around a 1/2-in. square block about 3 in. long and sand the sides of the grooves until you get a snug fit.

Once you're sure everything fits, you'll have to work fast to complete the assembly. You'll need to get the shelves glued into the dadoes and the 1/4-in. plywood back nailed

**APPLY** the divider and stop molding to the sides of the bookcase. Glue, then nail the divider molding to the sides with 6d finish nails (two per piece). Glue the stop molding to the sides as shown in **Fig. A**. Further secure the molding with 7/8-in. brads spaced every 12 in. Set the brads with a nail set. You'll fill the holes later with wood putty.



into place before the glue sets (about 15 minutes). This means you need to get your drill, countersink bit and a power screwdriver and screws ready to go.

Spread a light coat of glue on one shelf side and into the dado, then fit each shelf into its dado. Have a moist cotton rag handy to wipe away any oozing glue. Next, screw the shelf to the side as shown in **Fig. A**, p. 84. The screw holes for each shelf side must be predrilled within 3/4 in. of the front and the back. The screwheads will be covered later by the molding. Follow this procedure for each shelf.

Now, before the glue sets, grab the 1/4-in. plywood back (C) to square the assembly. There's no need to glue the plywood back to the shelves or sides. First nail the back along one entire side using a 1-in. panel nail every 5 in. Then align the top of the other side flush with the top edge of the plywood; this will square the assembly. Nail along this side, then nail the rest of the back into the backside of the shelves. Let the glue dry for at least two hours before continuing.

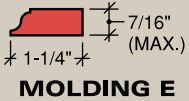
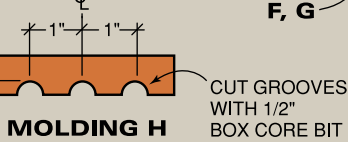
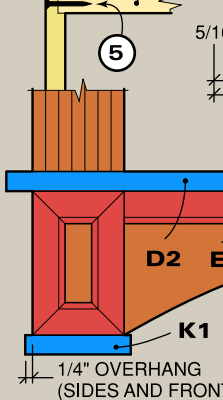
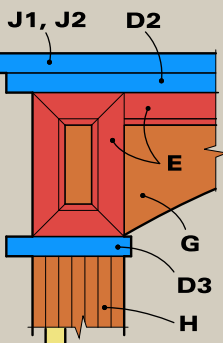
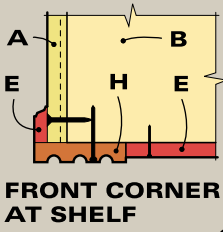
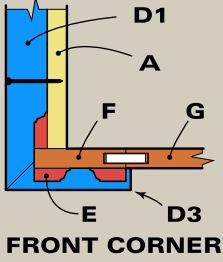
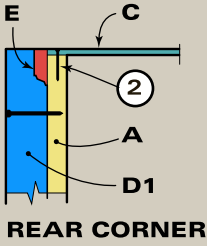
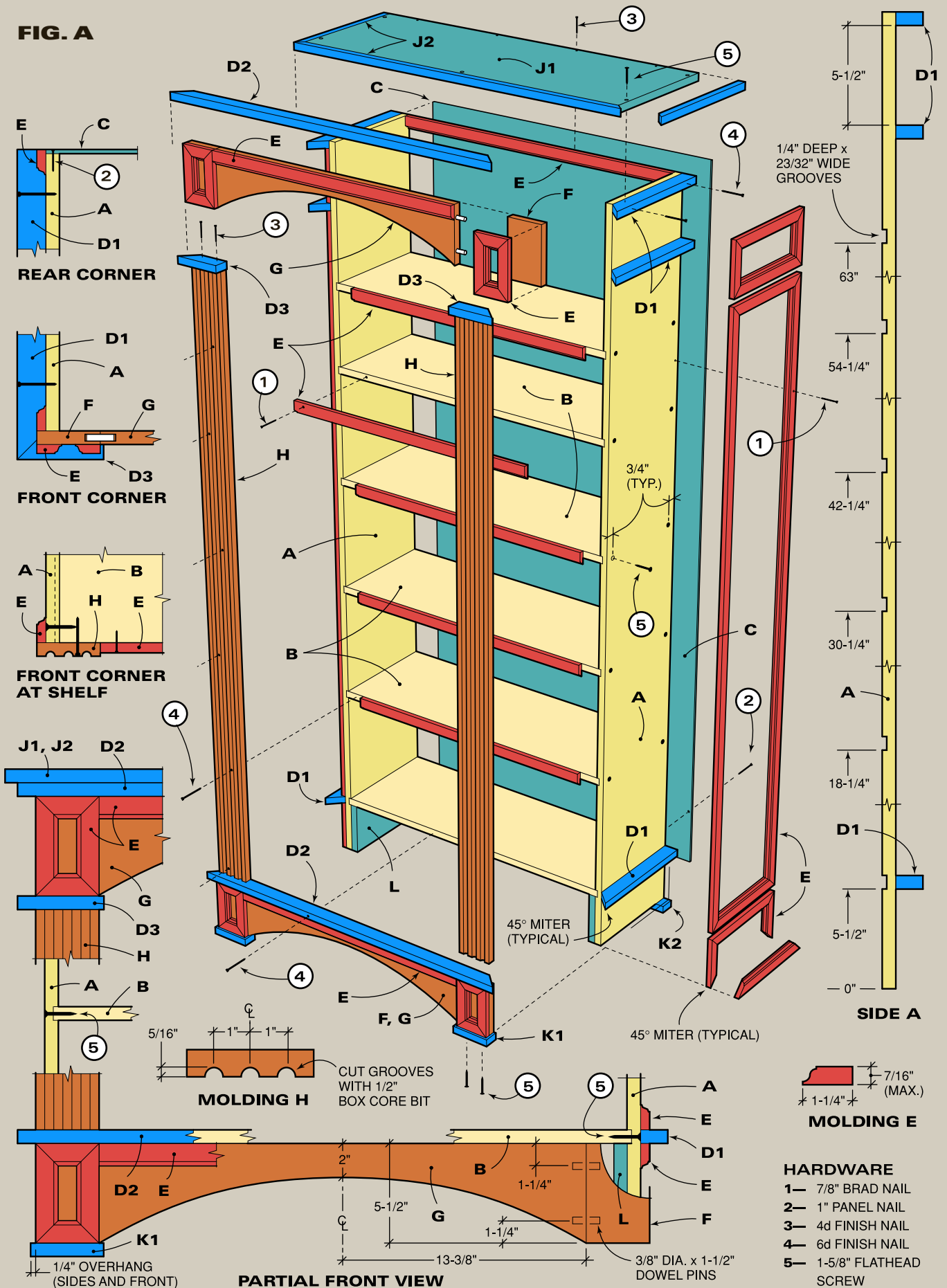
## DETAIL THE SIDES OF THE BOX WITH MOLDING

Now it's time to detail the sides with the divider moldings (D1 and the lower D2; **Fig. A**) and the colonial top moldings. The divider molding, with the stop molding (**Photo 4**), breaks the strong vertical line to give the bookcase a distinct architectural look. It has a base section, a main vertical section and a top section similar to the cornice of a building.

To begin detailing the sides, first cut the divider molding, then glue and nail it (use 6d finish nails) to the sides (**Photo 4**). Drill pilot holes through the molding to prevent splitting. The colonial stop molding (E) and the backside of the divider molding must be applied so they align flush with the 1/4-in. plywood back. Glue and clamp this molding to the side. Drive 7/8-in. wire brads through the stop molding into the sides every 12 in., then set them.



**FIG. A**



- HARDWARE**
- 1— 7/8" BRAD NAIL
  - 2— 1" PANEL NAIL
  - 3— 4d FINISH NAIL
  - 4— 6d FINISH NAIL
  - 5— 1-5/8" FLATHEAD SCREW

# Step 2

## Making the decorative front pieces: Corner blocks, curved aprons

### CUT THE CORNER BLOCKS AND THE CURVED APRON AND GLUE THEM TOGETHER

The decorative upper and lower corner blocks (**Photo 6**) are simple to make from 3/4-in. wide x 5-1/2 in. long pieces of solid maple. The detail on the front of the corner blocks is made by gluing mitered colonial stop molding to each block face. First cut the four corner blocks (F) and the two curved aprons (G). Use a 27-1/2 in. radius to mark the curve onto the aprons. A nail, a wire and a pencil will work fine. Drill

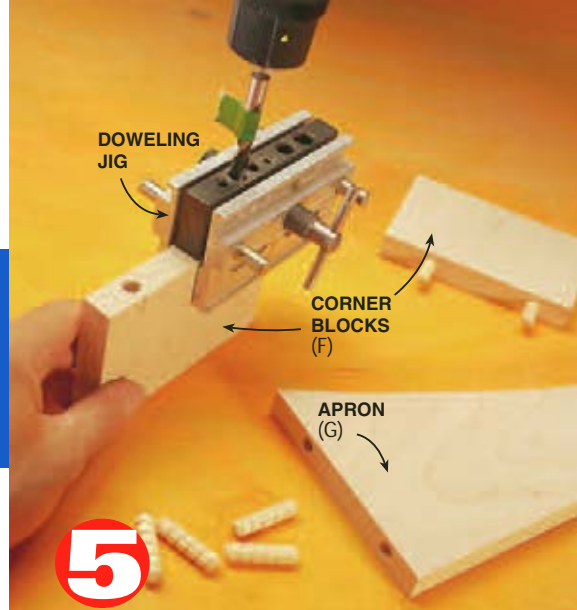
the dowel holes into the inside edge of the blocks and corresponding holes into the end of each apron. Don't glue these parts together yet. Mark the backside of each block and apron so you know which piece goes where.

Now to detail the corner blocks, miter the stop molding to fit the perimeter of each block. I used a wooden handsaw miter box for control. Avoid cutting small pieces with the power miter saw. Once you've cut all the pieces, glue them to the blocks and clamp them with spring clamps (**Photo 6**). When the glue is dry, sand the edges of each block clean and glue the doweled joints for each upper and lower apron assembly. Clamp each assembly for at least two hours.

### Cutting List

KEY	PCS.	SIZE & DESCRIPTION
A	2	3/4" x 11-1/4" x 78" maple plywood sides
B	6	3/4" x 11-1/4" x 31-7/8" maple plywood shelves
C	1	1/4" x 32-3/4" x 76" maple plywood back
D1	6	3/4" x 1-1/2" x 13" maple divider molding*
D2	2	3/4" x 1-1/2" x 35-7/8" maple divider molding*
D3	2	3/4" x 1-1/2" x 4-5/8" maple divider caps*
E	80	7/16" x 1-1/4" colonial stop molding (allows for waste)
F	4	3/4" x 3-1/2" x 5-1/2" maple corner blocks
G	2	3/4" x 5-1/2" x 26-3/4" maple curved aprons
H	2	3/4" x 3-1/2" x 64-3/4" maple fluted casing
J1	1	3/4" x 12-15/16" x 35-3/4" maple plywood top
J2	5-1/2	3/4" x 3/4" maple edge banding*
K1	2	3/4" x 1-1/2" x 4" maple front feet*
K2	2	3/4" x 1-1/2" x 2" maple back feet*
L	2	3/4" x 5-1/2" x 11-1/4" support strips

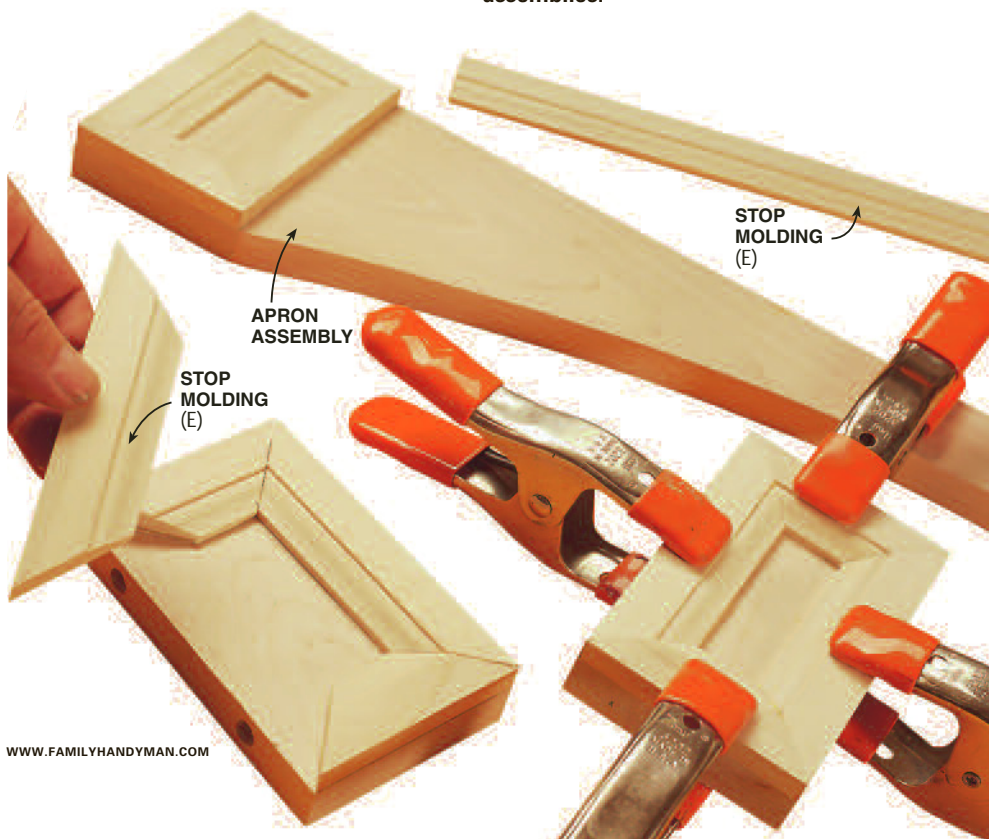
\*Have the lumberyard cut these pieces to width from a 1x6.



**5** DRILL 3/8-in. dowel holes in the corner blocks and corresponding holes in the aprons. Glue and clamp this assembly after you glue the stop moldings to the front of the blocks.

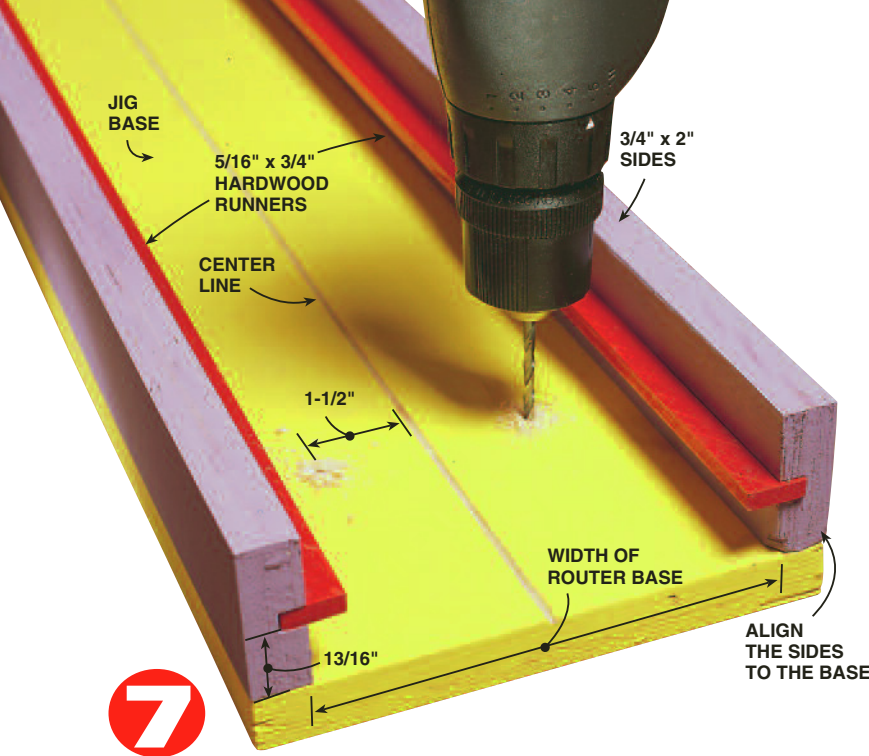
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**GLUE** the stop molding to the front of the corner blocks. Be very precise about the miter cuts. A simple wooden handsaw miter box works great for these small, hard-to-hold pieces. After the glue is set, sand the edges of the block with 100-grit, then 150-grit, sandpaper. Glue the dowel joints and clamp the corner blocks to the apron to complete the apron assemblies.



# Step 3

## Make your own fluted casing—the easy way



7

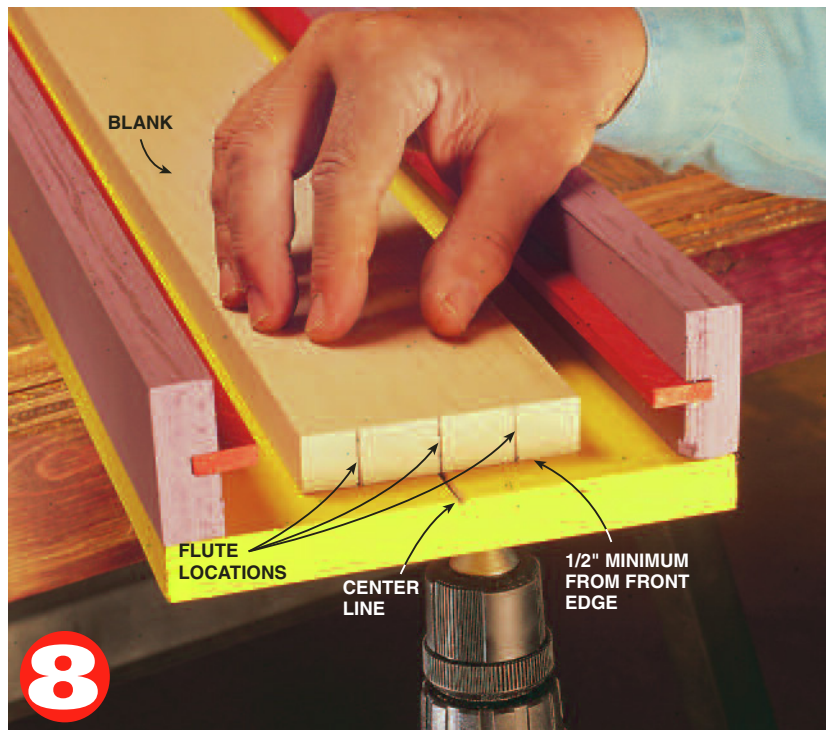
**DRILL** holes 1-1/2 in. on both sides of the center line of your jig. Keep the holes about 4 in. back from each end and spaced about 2 ft. apart toward the middle. The holes are spaced 1-1/2 in. from the center to avoid having screw holes show through your flutes. If you rout a different width or number of flutes, you may need to change the hold-down screw locations. After drilling the holes, flip the jig over and countersink them to accept screws for holding the workpiece.

Making decorative flutes for cabinet trim was a task I dreaded for years. My first attempts involved an edge guide attached to a router base. Invariably I'd slip up, the router would wander (usually on the last flute), and I'd have to start all over. Later I tried a router table. But as I repositioned my hands while feeding the board over the bit, burn marks would appear, and they'd take hours to sand out. But now that I've built this jig for my hand-held router, I've overcome those problems. Now I enjoy churning out perfectly fluted pieces.

### BUILD THE FLUTING JIG FROM 3/4-IN. PLYWOOD AND TWO HARDWOOD STRIPS

Use one-third of a sheet (lengthwise) of 3/4-in. cabinet-grade plywood for the base and sides of the jig and two strips of hardwood for the runners (Photo 1). Here's how to measure, cut and assemble the jig:

- Measure the base of your router plus two thicknesses of your plywood sides (usually 23/32 in. each, or 1-7/16 in. total) to get the right width for the jig base.
- Rip the measured jig base width lengthwise (8 ft.) from your plywood sheet. Accuracy is critical; use your cutting guide for your circular saw or a table saw.
- Rip the two plywood sides 2 in. wide.
- Rip two runners 5/16 in. wide from a 3/4-in. thick hardwood board.
- Cut the 5/16-in. wide dados into the two sides using either a dado blade or multiple passes with a standard table saw blade. The dados must be 3/8 in. deep.



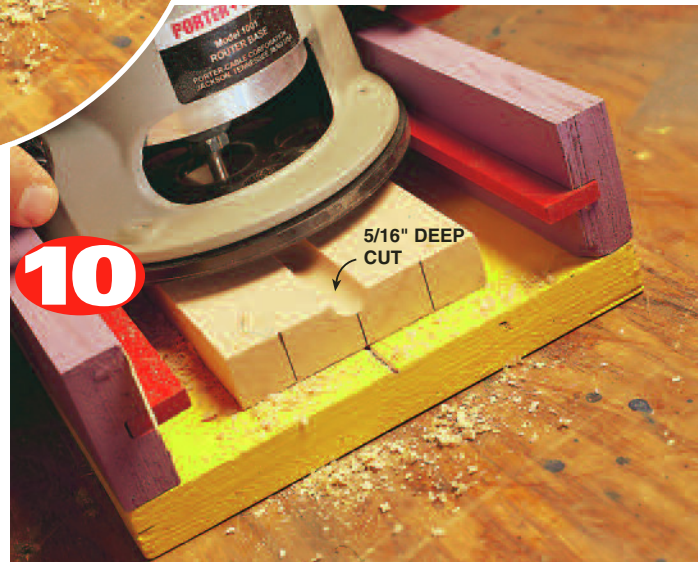
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**MARK** your flute locations 1 in. apart on each end of your 1x4 blank. Align the center mark of the workpiece with the center line of the jig and screw the blank to the jig from underneath. Do the same on the opposite end and be sure to install the hold-down screws toward the middle as well. If your blank has a slight bow or crook, the hold-down screws will hold it straight and flat as you rout.





**ROUT** the first pass of the first flute 5/32 in. deep. Don't try to take the whole depth at once, because you may get some tear-out and chatter. For a smooth cut, keep the router moving all the way to the other end in one continuous pass.



**ROUT** a second pass with the router bit set at 5/16-in. depth. Be sure to check your router depth gauge so you can repeat the exact depth for the final pass on the next flutes.

## Bookcase

- Glue (carpenter's glue works best) and screw the jig sides to the jig base (Photo 7). The sides must be flush with the base on each side. Drill pilot and countersink holes for the screws. Use a 1-1/4 in. screw every 8 in. along each side.

- Secure the hardwood runners into the dadoes using carpenter's glue and spring clamps. Set the jig aside to dry.

Once the jig is assembled, test the fit of your router base. Move it along the chute from end to end. It must glide freely along the runners without binding on the sides. You may have to sand the sides a bit if the router is too tight in the chute. Conversely, if there's play between the router and the sides, install a strip of veneer on one side. (See the Buyer's Guide, p. 11.)

Now that you've made the jig, follow the instructions in Photos 7 - 11 and practice on some scrap pieces. To ensure consistent depth (you'll make two progressively deeper passes for each flute), familiarize yourself with the depth gauge on your router. It's usually a dial or ring on the housing.



**ROUT** each side flute using the same two-pass method as with the center flute. When the blank is positioned to the side of the jig, only one row of hold-down screws is necessary.

# Step 4

## Applying the front trim, top and feet



**ALIGN** the bottoms of the fluted side casing with the corner blocks. Glue, clamp and nail the casing to the bookcase sides. Use six 6d finish nails per side. Set the nails and fill the nail holes.

### CUT THE PLYWOOD TOP AND GLUE SOLID MAPLE STRIPS TO THE EDGE

Now cut and glue the stop molding (E) to the top of the plywood back. Use spring clamps to hold it in place. While the glue is drying, cut the plywood top (J1) and the 3/4 x 3/4-in. edge banding (J2) to length. Glue the molding around the front and sides of the plywood top. Use masking tape to hold the edging in place until the glue dries. Once the glue has dried, sand the edging flush to the plywood on the top and bottom. Screw the top assembly to the sides (A). Use 4d finish nails to secure the top to the stop molding in the back. Now cut the stop molding strips to cover the cut-edge shelf fronts. Secure the molding with glue and 7/8-in. brads. Set the brads and fill the holes with wood putty.

### SCREW THE FEET TO THE BOTTOM FRONT AND BACK

To complete the assembly, cut the front and back feet and secure each with two 1-5/8 in. wood screws. Be sure the support strips (L) are glued to the underside (Fig. A, p. 6) first to help support the feet. Cut the front and back feet and screw them to the bottom with 1-5/8 in. wood screws.

### GLUE AND NAIL YOUR DETAIL MOLDINGS TO THE BOOKCASE FRONT

Turn the bookcase on its back to glue the front trim pieces in place. Start by aligning the bottom edge of the lower apron assembly even with the bottom edge of the sides (A). Let the apron overhang the sides an equal amount. Mark this location. Next, glue and clamp the assembly (Photo 12) in place. Next, glue and clamp the fluted casing pieces in place. Be sure they overhang the same distance as the lower apron assembly. For added insurance, nail the casing to the plywood sides with six 6d finish nails (Fig. A, p. 6) spaced evenly along the length.

Now glue and nail (Photo 13) the divider caps (D3) to the top of the fluted casing and to the side pieces of divider molding (D1) with 4d finish nails. The caps are a continuation of the divider molding and establish an end point for the fluted columns. After the upper apron assembly is glued in place, glue the upper full-length divider molding (Fig. A) to the top of the apron assembly and then nail the miter joints together with 4d nails.



**GLUE** the upper apron assembly to the sides after nailing the divider cap molding to the top of the casing. Once the apron assembly is glued, the next step is to glue, nail and clamp the top center section of the divider molding in place.

# Step 5

## Wipe on a beautiful Danish oil finish

Bookcase projects like this are really tough to finish with a brush-on varnish after assembly, so I used a wipe-on oil/varnish commonly called Danish oil. You can select colored oil/varnish or clear. The combination oil/varnish is as easy to apply as an oil and buffs to a nice luster like a brushed-on varnish. Apply the finish according to the manufacturer's instructions, using a cotton rag and keeping a brush on hand to get into the corners. Fill all the nail holes after the first coat of finish is dry. Use colored putty sticks to match the surrounding wood tone. Two coats of finish will be adequate but a third will give you a bit more luster and depth. **NOTE:** Hang the oil-soaked rags outside to dry to prevent combustion. 🏠

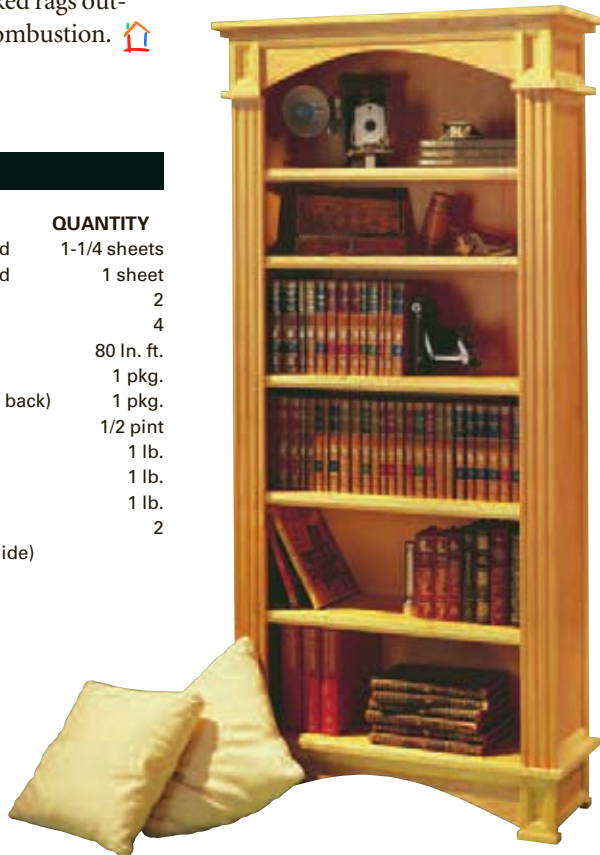
### Shopping List

ITEM	QUANTITY
3/4" x 4' x 8' maple plywood	1-1/4 sheets
1/4" x 4' x 8' maple plywood	1 sheet
1x4 x 7' maple	2
1x6 x 5' maple	4
Colonial stop molding	80 in. ft.
7/8" brad nails	1 pkg.
1" panel nails (for plywood back)	1 pkg.
Carpenter's glue	1/2 pint
1-5/8" wood screws	1 lb.
6d finish nails	1 lb.
4d finish nails	1 lb.
Colored wood putty sticks	2
Router bits (see Buyer's Guide)	

### Buyer's Guide

**BOOKCASE**  
 ■ Clamp & Tool guide is available from Tools on Sale (800-328-0457). Catalog No. CT24C, \$24.95.  
 ■ The 23/32-in. router bit is available from Trend-lines (800-877-7899). The 1/4-in. shank is Catalog No. CT1097K, \$10.95; 1/2-in. shank is Catalog No. CT1098K, \$10.95.

**FLUTE JIG**  
 ■ Pressure-sensitive veneer strips: Catalog No. 77925, \$3.99.  
 ■ Polycarbonate base blanks: Catalog No. 24935, \$14.99.  
 ■ 1/2-in. core-box bit: Catalog No. 90924, \$12.69.  
 All available from Rockler Woodworking and Hardware, (800) 279-4441.



## Anchor your bookcase with a safety wire

Although stable on hard flooring, tall narrow cabinets like this bookcase can be unsteady when set on wall-to-wall carpeting. The 1/4-in. thick tackless wood strip below the carpeting and near the wall can slightly elevate the back of the cabinet and make the bookcase tippy. You can remedy this problem by reducing the thickness of the back feet by 1/4 in. and attaching an 18-gauge steel safety wire, as shown below, near the center back of the cabinet. Fasten the other end of the wire to a stud.

Mark your bookcase height on the wall. Screw in a 2-1/2 in. dry-wall screw with a finish washer halfway into the wall stud, wrap the wire around the screw, then tighten the screw to the drywall. Drive a 1-in. screw and finish washer near the back of the bookcase into the plywood top. Position the bookcase and wind the wire tight around the screw. Tighten the screw and finish wire down and cut the excess wire. Now you can pile on the books.

