The Family Handyman®
PROJECT PLAN

Cherry bookcase

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Cherry Bookcase

This bookcase features simple pocket screw joints and a modular design you can adapt to any room

by David Radtke

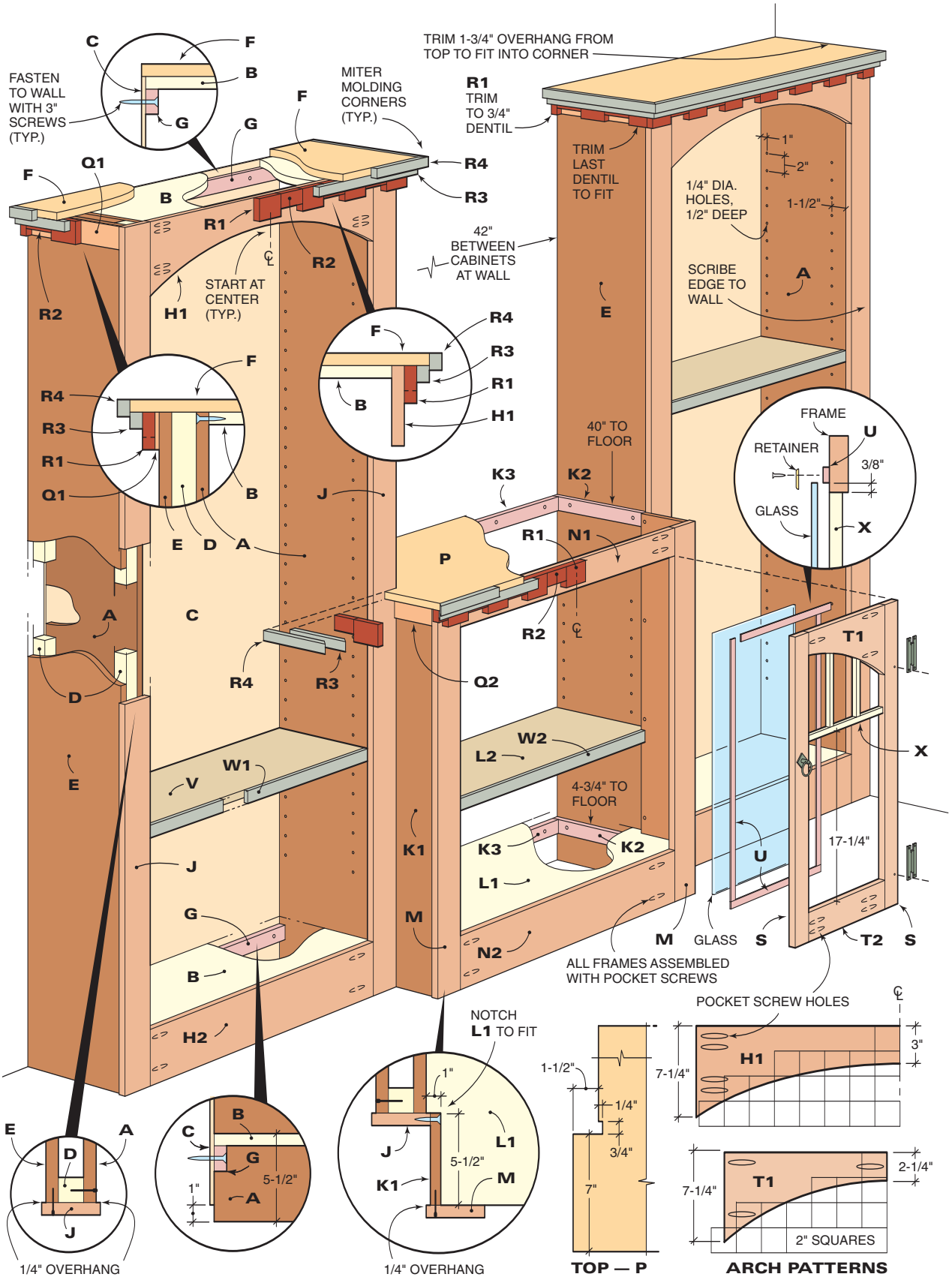
Some bookcases have plenty of charm but are shy on actual shelf space. Others will house stacks of books but are short on looks. This elegant design does it all, featuring more than 43 ft. of shelf space.

Our multi-component system has two 7-ft. tall end bookcases plus a shorter center cabinet with glass doors to create dust-free storage for electronics or your favorite collectibles. The total width is just over 10 ft., but you can build narrower or wider individual components to custom-size it to fit nearly any room. You can build it into a corner as we did, center it along a wall, or if you like, build it wall to wall. The total cost was $1,500.

Don't confuse this project's elegance with complexity. The step-by-step building process is well within an intermediate skill level. As far as special tools go, a portable table saw is a must. The flat homemade moldings and dentils are simply cut from 3/4-in. thick boards. The face frame and door joints are made with an inexpensive pocket hole jig and can be assembled in minutes. Even if you've never used a jig like this, it only takes about 15 minutes to get up to speed on it. A power miter saw also is a real timesaver, and I'd suggest either buying or renting an air-powered finish nailer to save even more time and get better results.

Cherry isn't available at home centers. You'll need to find a specialty hardwood lumber supplier that stocks cherry boards and plywood. If cherry isn't available in your area, consider another hardwood like oak, maple or birch.

Figure A Bookcase details



Sizing up your room

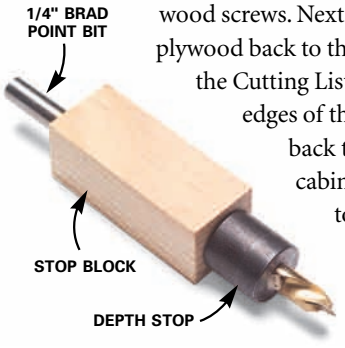
Trying to decide where to install your shelves? First make sure your ceiling height is adequate and there's enough wall space. You can change the dimensions of the project a bit to accommodate your space. Second, check the locations of your electrical receptacles. Make sure they don't fall directly behind one of the cabinet sides. If they do, adjust the placement of the cabinets or move the receptacle. If the receptacle is directly behind one of the tall cabinets, you'll need to cut an opening in the back of the cabinet to expose the receptacle and install a box extender. If you need further help with these tasks, see "Electrical Safety for Wood Paneling," May '98, p. 64, and "Rough-in Wiring," March '01, p. 55. To order a copy, see p. 7.

Start with simple boxes

Cut the plywood for the sides, top and bottom to width on your table saw. You'll notice in the Cutting List that the outer plywood sides (E) are 1/4 in. wider than the inner plywood sides (A). This additional width covers the 1/4-in. plywood back nailed to the back of the inner sides so that you'll get a nice, right-to-the-wall look viewed from the side.

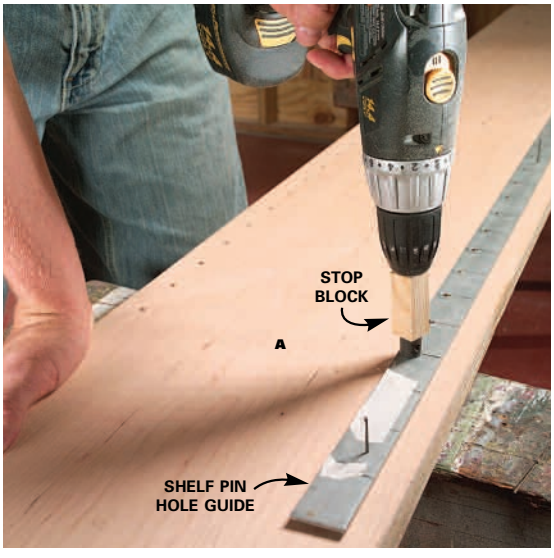
Drill the shelf support holes into the inner sides using a homemade jig like the one shown in **Photo 2**. It takes a bit of work to make this simple jig, but you'll find tons of uses for it in the shop. The jig will ensure that each row of the shelf bracket holes will be level with each other. Don't bother drilling holes within the top and bottom foot of the sides, since they'll never be used that high or low; see **Figure A** for hole placement.

Screw the sides to the top and bottom panels (**Photo 3**) with 1-3/4 in. wood screws. Next cut your 1/4-in. plywood back to the dimensions in the Cutting List. Use the factory edges of the plywood back to square up the cabinet as you nail it to the backsides of parts A and B.

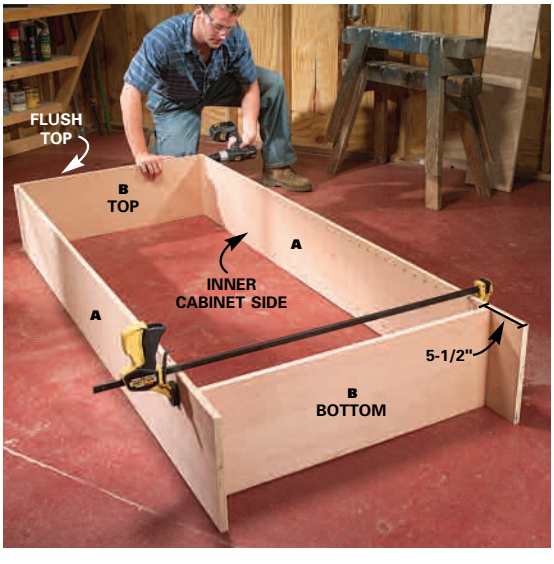


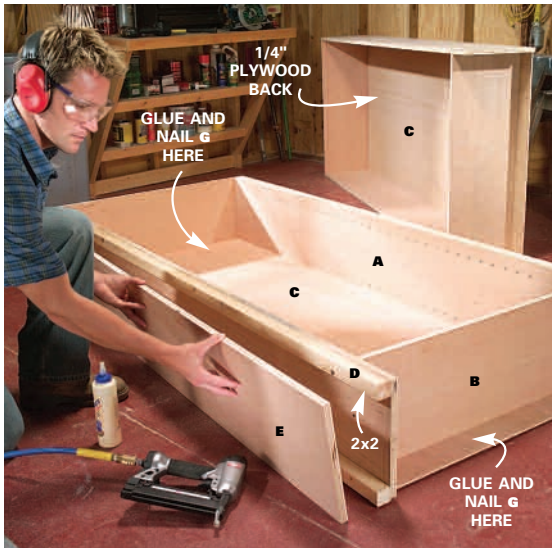
1 Cut 3/4-in. plywood sides and tops using your circular saw and a cutting guide. Support your workpiece with 2x4s beneath to keep the cut from buckling and pinching the blade.

2 Make a drilling guide jig for the shelf supports from 1/8-in. thick steel from a hardware store. Drill holes every 2 in. and carefully place the jig on each panel (A) for uniformly spaced holes 1/2 in. deep. Use a stop block to control the depth positioning (photo below). See Figure A for positioning details.



3 Predrill and screw the inner side panels (A) to the top and bottom (B) with 1-3/4 in. wood screws. Nail the 1/4-in. plywood back to the inner side panels and the top and bottom to square up the box.





4 **Glue and nail the 2x2 spacers to the sides from inside the box with your nail gun. Complete the cabinet box by gluing and nailing the outer plywood panels to the 2x2. Glue and nail fastening strips (G) in place at this time.**

5 **Screw the finished top (F) to the top of the cabinet with 1-1/4 in. wood screws. Make the back flush with the back of E and space the sides evenly. If the cabinet goes against the wall, cut off the wall side of the top flush with E.**

6 **Cut the arched curves with a jigsaw, smooth them with a belt sander, then drill the backside of the arched front using a pocket hole jig.**

Thicken the box sides for function as well as looks

The bookcases don't need to have double-thick side walls, but thick walls look more substantial and keep books from being hidden behind the wide face frame front.

With the simple box completed, add straight 2x2s to the sides as shown in **Photo 4**. Apply yellow wood glue to the edge and hold it firmly against the side of the box as you nail it with your nail gun from inside the box. Use 1-1/2 in. nails. Be sure the front 2x2 is flush with the inner side (A) and the outer side (E). The back 2x2 is best placed slightly in from the back edge of the outer side so it won't keep the cabinet away from the wall as you screw it in place later.

Once you glue and nail the outer plywood sides to the 2x2s (**Photo 4**), cut the cabinet top to the dimensions in the Cutting List. If you're customizing the cabinets to a different size, cut this top piece 2-1/4 in. deeper and 3-1/2 in. wider than the outer dimensions of the top of each cabinet assembly. Now get somebody to help you carry these two cabinet boxes into your room and get ready to tip them up into place. Be sure you've removed the baseboard around the bookcase location, and save the pieces so you can recut them to fit against the bookcase sides once you've finished the job.

Use a pocket hole jig to help join the face frames and the door frames

If you've ever butt-joined two pieces of wood with dowels or biscuits, you'll be sure to appreciate the speed and strength of pocket hole joinery. Unlike dowel and biscuit assembly, there's no messy glue or clamps. Just set the jig on the backside of the rail

(top or bottom horizontal piece), squeeze the locking plate pliers, drill the holes, remove the jig and then drive the screws through the angle pilot holes into the face frame sides. You'll be amazed at the strength of the joints and how flush the surfaces align. For the best results, be sure you hold the two pieces you are joining down firmly on a clean, flat surface so the screw drives precisely for perfect alignment. Check out our article "Simple Cabinetry with Pocket Screws," Oct. '99, p.74, for more information on how to use this tool. To order a copy, see p. 7.

Cut the curves for the top rails of the face frames and the door frames using your jigsaw and the pattern shown in **Figure A**. Clamp the cut piece to the side of your workbench or sawhorse and then use your belt sander to carefully smooth the irregularities of your cut. Then just cut the lower rails to length with your miter saw and pocket-screw them together as shown in **Photos 6 and 7**.

Plumb, shim and screw the side bookcases to the wall

Chances are your walls and floor have some irregularity like a corner that's not exactly square or a wall slightly out of whack. Start with the corner cabinet and get it reasonably plumb and level with shims. Close is good enough because the project design is somewhat forgiving. Leave about a 1/8-in. gap between the side wall and the cabinet to make room for your face frame to overhang a bit. Screw the corner cabinet to the wall (**Photo 9**).

Once the first cabinet is set, draw a plumb line 42 in. away from this cabinet. Slide the next wall cabinet over to this line and shim it to be perfectly level with the first cabinet. Screw the cabinet to the wall through the fastening strips at the top and bottom into the wall studs.

With the tall side cabinets securely fastened, bring the face frames into the room and check their fit against the faces of wall cabinets. If you're installing one of the cabinets against the side wall as we did, you may need to scribe and trim the face frame

7 **Hold the sides of the frame so the edges are flush and drive the screws into the mating piece with special pocket hole screws. This makes for a super-strong, fast, glue-free joint.**

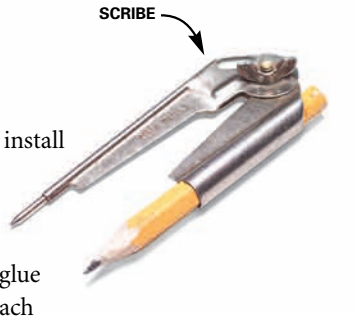
8 **Set the cabinet boxes in the room. Space them 42 in. apart. Shim as necessary to get them both plumb and level. Cover spaces or gaps at the bottom with base shoe molding later.**

9 **Locate the studs and screw the cabinet through the horizontal fastening strip into the wall.**

10 **Scribe the preassembled face frame to the side wall if your wall is uneven. Make sure the face frame overlaps the inner panel by 1/4 in. on each side.**

11 **Center the second face frame assembly on the box, mark it, then glue and nail it to the front of the cabinet.**

12 **Screw the side wings (K1) of the center cabinet to the edges of the face frames of the side cabinets. Drill pilot holes and use 1-1/4 in. wood screws. Be sure they're perfectly plumb and level with each other.**



a bit before you install it (**Photo 10**). Trim or sand if necessary and then apply glue to the front of each cabinet and nail each face frame assembly in place with your finish nailer (**Photo 11**).

Build the center cabinet in place

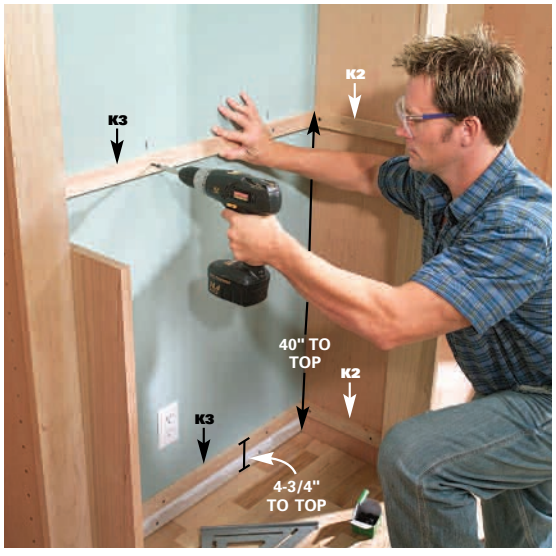
Unlike the flanking side cabinets that you build in your shop area, the center cabinet relies on the outer cabinets for part of its structure, so it needs to be built right in the room. Cut the flanking side wing pieces (K1), align them with the edges of the face frames, drill a pilot hole and screw them in place as shown in **Photo 12**. Next cut the support strips (K2 and K3) and screw them to the cabinet sides and back wall as supports for the center cabinet floor and the top (**Photo 13**). Cut and notch the floor piece (L1) and nail it to the cleats. Next, position the center face frame over the side wings, leaving a 1/4-in. overhang on each side. Then glue and nail it (1-1/2 in. nails) to the wings (K1) and to the front edge of the plywood floor (**Photo 14**).

Be sure to cut the top (P) so it projects 1-3/4 in. past each side wing (K1) and 1-1/2 in. out from the face frame in the front. If the top projects a bit farther than this, all the better, since you can sand it flush with the upper molding strip (R3) later. This way you'll be sure that the top strip (R4) will fit against the plywood top.

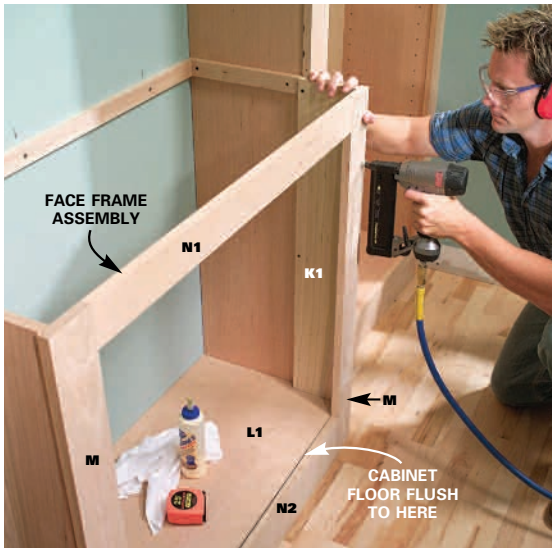
Mass-produce the dentils and spacers ahead of time

Just rip a 1x4 board to 3-1/16 in. on your table saw and another to 1-1/2 in. wide. Mark a line on your miter saw to cut the wider board into 2-1/4 in. lengths to make the dentils. Change the mark to cut the narrower board into 3-1/16 in. lengths to make the spacers. Next rip a couple of 1x4 boards to 1-in. widths to make the upper moldings R3 and R4.

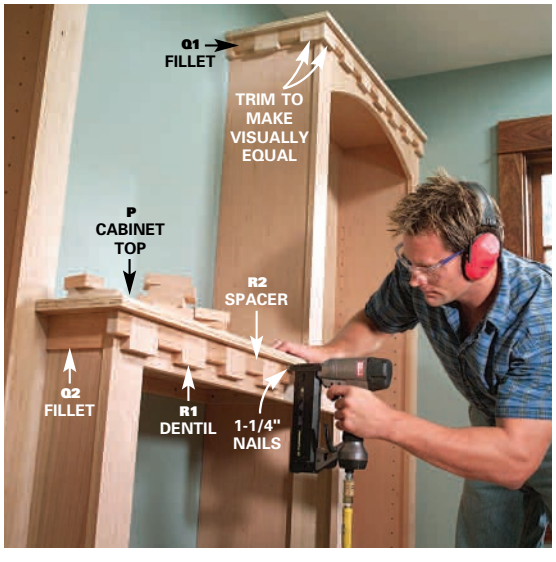
Mark the top center of each cabinet, then grab three dentils and mark the center bottom of each. Align the marks and nail the dentils smack in the middle of the cabinets up against



13 **Level and screw the cleats (K2 and K3) to the cabinet sides and wall studs with wood screws (1-1/4 in. screws on the sides and 2-1/2 in. screws into the wall studs).**



14 **Cut and nail the center cabinet floor (L1) to the lower cleats, then glue and nail the center face frame assembly to the side wings (K1) and floor (L1). Then cut and nail on the top (P).**



15 **Mark the center of each cabinet. Center the first dentil (R1) over the mark and then nail the dentil spacers (R2) between each pair of dentils. Use 1-1/4 in. brads in your nail gun. Trim the dentils at the corners to ensure even wraps around each side of the corner.**

the projecting plywood tops. Next, nail a spacer on each side and work your way to the side of each side cabinet. Nail a 1/4-in. x 2-1/4 in. fillet on the side of each cabinet to fur out the dentil moldings to keep them aligned. Measure and cut this piece carefully so it ends up flush with the overhanging face frame. **Note:** Make the dentils visually equal at the corners (**Photo 15**). To achieve this, trim the side corner 3/4 in. less than the front corner dentil.

To finish the top cornice of each bookcase, cut the molding strips to length on your miter saw and nail them with 1-1/2 in. nails. After the first strip is in place, check the overhang of each top. The top edge should be flush with the face of R3. If the pieces aren't flush, sand them flush with a belt sander.

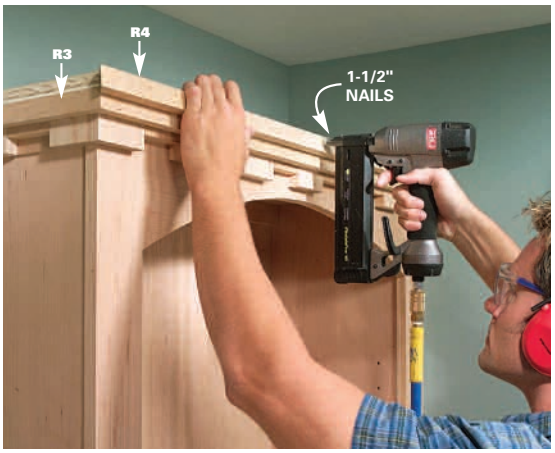
Get the spacing right on your inset doors

Inset doors are often considered difficult to install because they have to fit precisely inside the face frame. First, cut the pieces, then assemble each door using your pocket hole jig. Next, clamp the doors together at their center stiles with spacers between them and set the assembly up to your opening (**Photo 17**). You may need to trim an edge or two with your table saw, and for fine adjustments, use your belt sander.

To hang the door, use simple face-mount hinges (see Buyer's Guide, p. 46). Just shim the doors as shown and then drill pilot holes holding the hinge in place. Work in one screw at a time to get perfect hinge placement. Once the doors are mounted, remove the hinges until after finishing.

Shaping a recess for glass along the inside of the door can be a hassle, so to keep things simple, we devised a much easier method than routing it out. All you need to do is cut strips and glue and nail them to the backside of the door. Leave a 3/8-in. lip for the glass to sit on and then buy simple glass retainers at a hardware store. Then order the glass. Get tempered glass from a glass supplier because regular double-strength glass is prone to breaking.

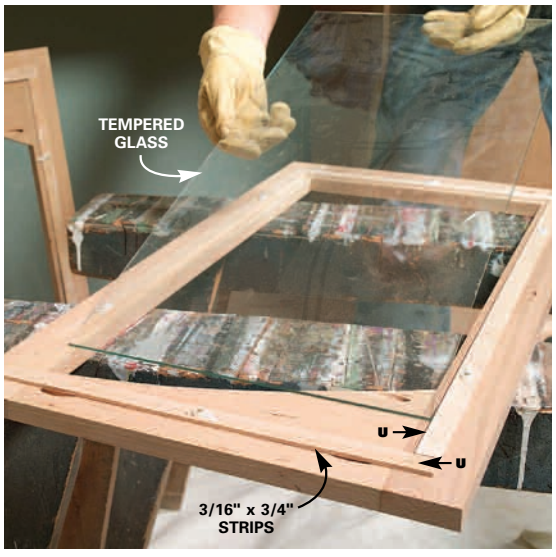
The final step to great-looking doors is to make the muntins that overlay the glass (**Photo 20**). Measure up 17-1/4 in. from the



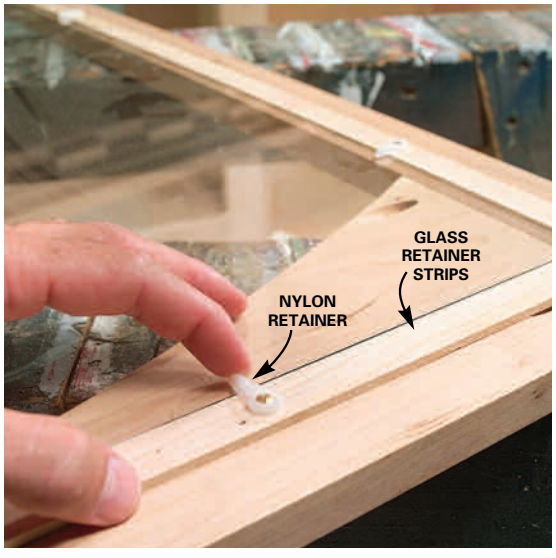
16 **Miter the ends of the upper trim strips R3 and R4 and nail the first strip to the dentils and the upper strip to the cabinet top.**

bottom of the door glass opening and then measure, cut and place the first horizontal piece so the bottom edge of it aligns with the mark. Mark these strips so you'll get three equal glass sections. Cut angles on the tops to follow your curve. Once you're happy with how they fit, mark the muntin placement onto the door, mix up some clear epoxy (**Photo 20**) and glue the assembly to itself and the door edge. **Note:** Place wax paper under joints to keep the epoxy off the glass. Once the glue is set, clean up any excess at the joints with a file or sandpaper.

17 **Cut the door stiles (S) and the door rails (T1 and T2) and assemble them with pocket holes and screws as shown in Figure A. Trim the doors and set the top and side clearance. Use tablet backer board from a legal pad for spacers. Use double spacers at the top, bottom and center and use single spacers at the sides against the face frame. Install the face-mount hinges and magnetic catches at this time.**



18 Cut 3/16-in. strips from 3/4-in. thick material, then glue and tack it (5/8-in. brads) to the inside of the door. Leave a 3/8-in. lip for the tempered glass panels.



19 Buy nylon storm window glass retainers from a hardware store along with No. 4 brass screws to secure the glass.

20 Cut muntin strips on your table saw and glue them to the ends of the rails and stiles with epoxy. Be careful not to slop glue on the wood faces or it will block your finish stain.

Cut the shelves from 3/4-in. plywood

Rip the plywood and then cut it to length (3/16 in. less than the inside measure) for the shelf blanks. To give the shelves a solid wood look, rip strips 1-1/4 in. wide and then 1/2 in. thick, cut them the same length as the shelf blanks and glue and nail them to cover the plywood edge.

The center shelf is made the same way. Just rip the plywood to 11-7/8 in. wide and cut the solid edge strip and nail it in place so the strip falls between the inside faces of the side wings (K1). You'll also need to drill holes into the center cabinet sides for the shelf supports.

Cherry can be fussy to finish

To help get the Watco Cherry Finish as even as possible, we used Minwax Pre-finish Wood Conditioner first and then applied the color. This cut down on the blotchiness, and sanding lightly over trouble spots gave us a good look. After three days, we applied satin polyurethane for a nice, even, durable sheen. If you hate fussy finishing, apply a clear oil or varnish and the cherry will darken naturally with age.

Shopping List

DESCRIPTION	QTY.
3/4" cherry plywood	5
1/4" cherry plywood	2
1x4 x 7' cherry	12
1x6 x 8' cherry	5
1x8 x 8' cherry	1
Door hinges (see Buyer's Guide)	2 pr.
3/16" tempered door glass (measure to fit)	2
Magnetic door catches	2
Yellow wood glue	1 pt.
Door glass retainers	12
No. 4 brass screws	12
1/4" shelf supports	44
Pneumatic gun nails (3/4", 1-1/4", 1-1/2")	
1-1/4" wood screws, box of 100	1
1-3/4" wood screws, box of 100	1
Epoxy glue	1
Watco Cherry Finish	2 qts.

Buyer's Guide

You can buy the hinges (No. 76067; $7.29 per pair), door pulls (No. 73472; $11.99 each), shelf supports (No. 33902; $3.69 per package), magnetic catches (No. 26559; $1.49 each) and Kreg jig (No. 22446; $59.99) from Rockler Hardware (800-279-4441 or www.rockler.com).

Cutting List

KEY	PCS.	SIZE & DESCRIPTION
A	4	3/4" x 11-5/8" x 84" inner plywood cabinet sides
B	4	3/4" x 11-5/8" x 33" plywood cabinet top, bottom
C	2	1/4" x 34-1/2" x 83" plywood cabinet backs
D	8	1-1/2" x 1-1/2" x 84" pine
E	4	3/4" x 11-7/8" x 84" outer plywood cabinet sides
F	2	3/4" x 14-1/8" x 42-1/2" plywood cabinet tops
G	4	3/4" x 1-1/2" x 33" upper and lower fastening strips
H1	2	3/4" x 7-1/4" x 32-1/2" face frame arch
H2	2	3/4" x 5-1/2" x 32-1/2" face frame base
J	4	3/4" x 3-1/2" x 84" face frame sides
K1	2	3/4" x 5-1/2" x 40" center cabinet side wings
K2	4	3/4" x 1-1/2" x 11-7/8" cabinet cleats
K3	2	3/4" x 1-1/2" x 40-1/2" wall cleats
L1	1	3/4" x 17-3/8" x 42" plywood center cabinet floor*
L2	1	3/4" x 11-7/8" x 42" plywood center cabinet shelf*
M	2	3/4" x 3-1/2" x 40" center face frame sides
N1	1	3/4" x 3" x 35" center face frame top
N2	1	3/4" x 5-1/2" x 35" center face frame base
P	1	3/4" x 19-5/8" x 45" plywood center cabinet top*
Q1	4	1/4" x 2-1/4" x 11-7/8" cabinet side fillets
Q2	2	1/4" x 2-1/4" x 4-3/4" cabinet side fillets
R1	32	3/4" x 3-1/6" x 2-1/4" dentils
R2	28	3/4" x 1-1/2" x 3-1/16" dentil spacers
R3	16'	3/4" x 1" upper molding
R4	16'	3/4" x 1" top molding
S	4	3/4" x 2-1/4" x 31-1/2" door stiles
T1	2	3/4" x 7-1/4" x 12-15/16" arched door rails
T2	2	3/4" x 3" x 12-15/16" bottom door rails
U	17'	3/16" x 3/4" glass edging*
V	10	3/4" x 11" x 32-13/16" plywood shelves
W1	10	1/2" x 1-1/4" x 32-13/16" shelf nosing
W2	1	1/2" x 1-1/4" x 40" shelf nosing
X	5'	5/8" x 5/8" door muntins*

* Cut to fit

Art Direction • BECKY PFLUGER
Photography • BILL ZUEHLKE
Technical Art • GENE THOMPSON
Project Design • DAVID RADTKE