

Cabinet-Building Essentials

by
Greg Larson

Classic appearance with 32mm system simplicity.

PHOTO BY MARC GRENIER

ASK TEN WOODWORKERS how to build kitchen cabinets and you'll get eleven answers. So where do you start? At the New England School of Architectural Woodworking (NESAW), we've consolidated industry's "best practices" to create a simple and efficient method of building cabinets that works for professionals as well as home woodworkers. This method combines classic face frame styling with the benefits of frameless construction and the 32mm system. In this story I'll show how to build the single base cabinet shown here. Building this model cabinet demonstrates everything you'll need to know about the process we use, so you'll be able to custom-build your own cabinets.

Efficient construction

The cabinet actually consists of four separate components: a base (called the "toe base"), a box (the "carcass"), a face frame, and a side panel (these last two are the "facing"). This construction method is very efficient. Building the toe base and carcass separately allows getting six carcass sides from a sheet of plywood. Leveling the toe base is easy, because there's no cabinet to get in the way. Once the toe base is leveled, the carcass simply sits on top and is anchored to the wall. For runs of cabinets—the heart of most kitchen cabinetry—you just build plywood carcasses, fasten them together, and apply the facing. Each run of base cabinets

requires only one long toe base.

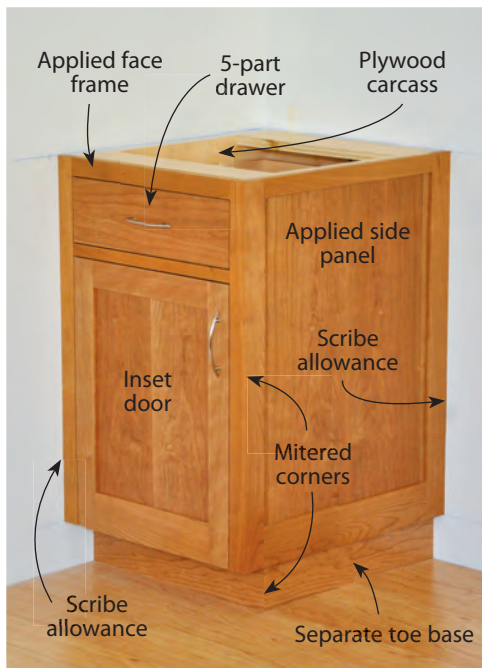
Another key feature is that the carcass sides are flush with the inside edges of the face frame. This allows using Euro hinges and drawer slides without the time-consuming task of building out the cabinet's insides to make them flush with the face frame. Note also that there's no lower face frame rail. This allows using the bottom of the carcass as a doorstop and provides more space inside the cabinet (where every inch counts). The cabinet's 1/2" thick back adds extra strength and rigidity and allows it to be anchored by screwing directly through the back into the wall.

Standard kitchen base cabinets are 24" deep and 36" high to the top of the countertop. Our sample cabinet is 34-3/4" high, which assumes a 1-1/4" thick granite countertop; a standard laminate countertop may require blocking underneath to raise it to the desired height.

Start with the lumber

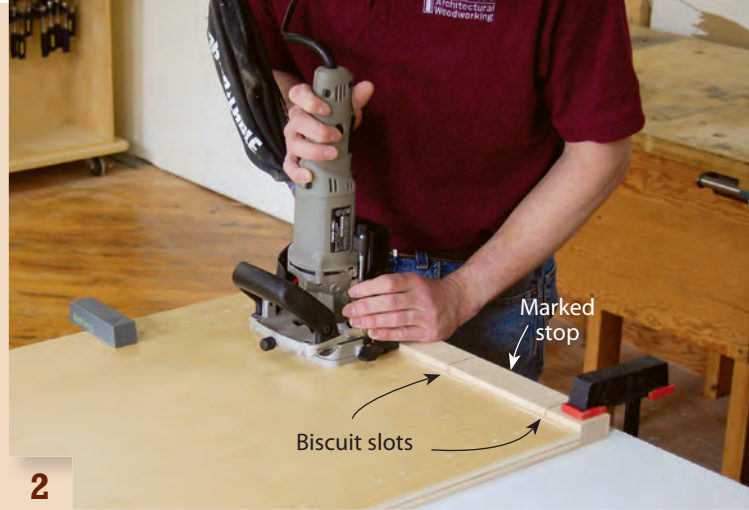
Select boards with the straightest grain for the door stiles and rails (C1–C3, Fig. E, page 36, and Cutting List, page 36). Rough mill this stock and sticker it for as long as possible before milling it to final thickness and width. It's very important that the doors stay flat; using straight grain lumber, milling it in stages, and letting it rest in between stages helps accomplish this goal.

Choose boards with the next-straightest grain to use for





1 Start by boring system holes in the carcass sides. These cabinets are based on the 32mm system. A spacer clamped flush with the bottom indexes the jig.



2 Cut biscuit slots in the carcass sides using a stop marked with the slot locations to register the biscuit joiner. Make sure the carcass side is firmly held against the stop when you cut the slots.



3 Cut matching biscuit slots in both ends of the carcass bottom, using the same marked stop. Make sure the bottom is firmly clamped to the table to avoid alignment issues.



4 Screw together the carcass after applying glue and installing the biscuits. Pre-drill the screw holes to avoid splitting the plywood. Measure diagonally to make sure the carcass is square.

face frames and side panel frames—the appearance of wild-grained parts in the frames may detract from the panels or doors they enclose. This stock should also be milled in stages and allowed to rest.

Mill the face frame and side panel parts (E1–E4; F1–F4, Fig. A) to final thickness and width, but leave them oversize in length. Note that these parts are 13/16" thick and that the stiles for each assembly are different widths. The extra thickness allows placing a 1/16" thick bumper between the 3/4" thick door and the cabinet to ensure the door closes flush with the face frame. The two wider stiles in each assembly include 1/2" scribe allowances that allow cutting them to match the profile of an uneven wall. The ability to incorporate scribe allowances that allow you to seamlessly fit cabinets to the walls is one of the many advantages of building your own cabinets.

Pre-finished plywood

We use pre-finished plywood for the carcasses so we don't have to spend time finishing the insides. This is particularly important if you're spray finishing, because you don't have to drag the assembled boxes back and forth to the spray room. It also eliminates overspray and blowback problems that can crop up when spraying cabinet interiors. If you can't

find pre-finished plywood, or want to use another species for the cabinet interiors, you can still pre-finish it (see "Pre-finishing Plywood," page 68).

Cut all the parts

Start by breaking down the plywood and cutting the carcass sides, bottom and stretchers (B1–B3). At this point, leave the bottom and sides oversize in both width and length, and the stretchers oversized in length. Glue 1/8" thick solid wood edging (B4) in the same species as your plywood to the front edge of the bottom; this edging will be exposed when the door is open and serves as a door stop when it closes. Thin veneered edge banding won't provide sufficient protection.

Trim the edging flush with both faces of the plywood, taking care not to damage the finish. Then rout a 45° bevel on its top edge to avoid damage caused by putting items in and out of the cabinet. Start the bevel exactly at the glue joint between the edging and the plywood. Apply several coats of wipe-on polyurethane to the edging before you assemble the carcass.

Cut the carcass bottom, sides and stretchers to final dimensions along with all of the facing parts. The face frame rails (E3, E4) have to be exactly the same length as the carcass bottom and stretchers (B2, B3), and the face frame and

Fig. A
Base Cabinet Exploded View

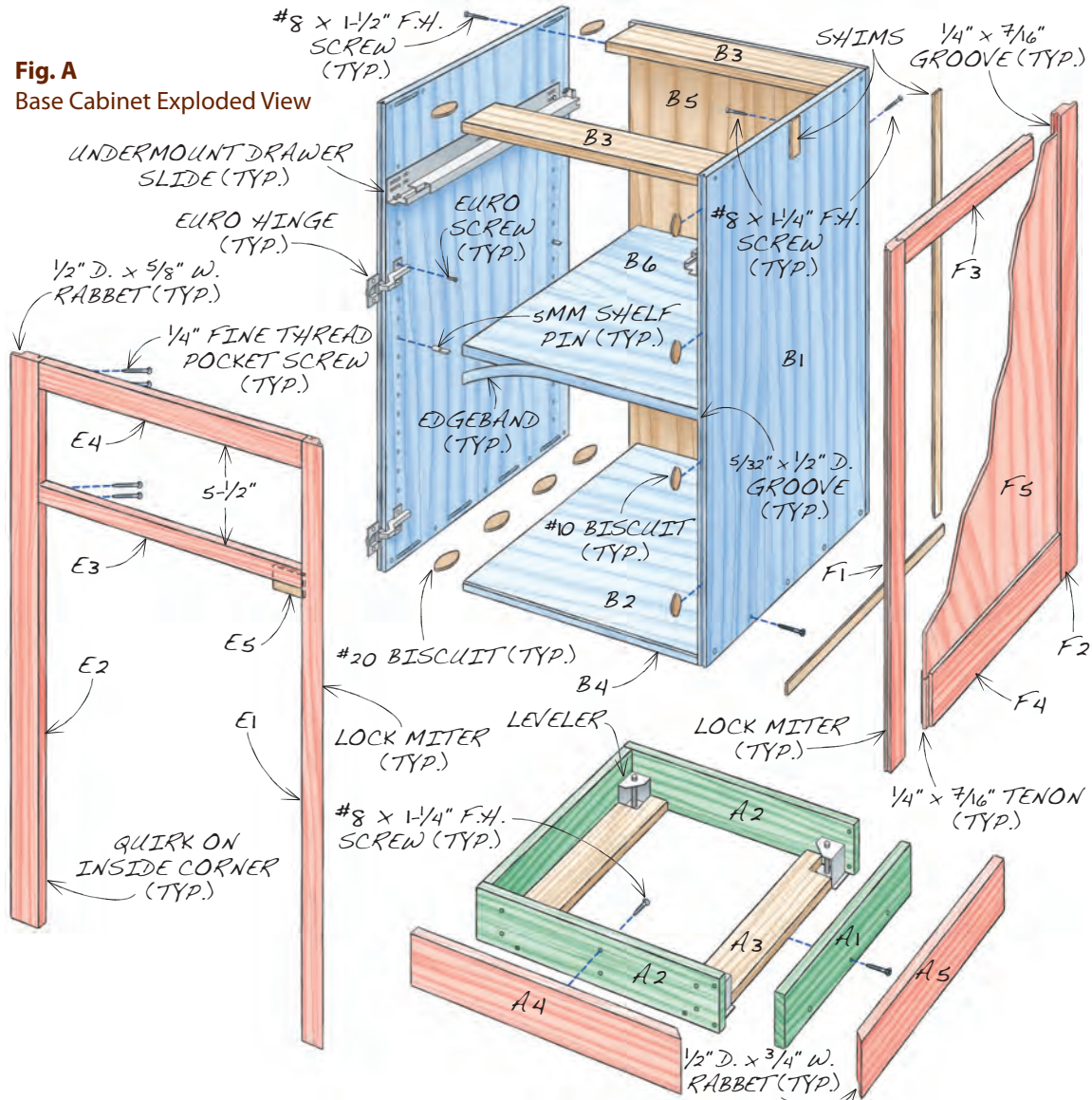


Fig. B
Top View (showing lock miter, quirk and scribe allowance)

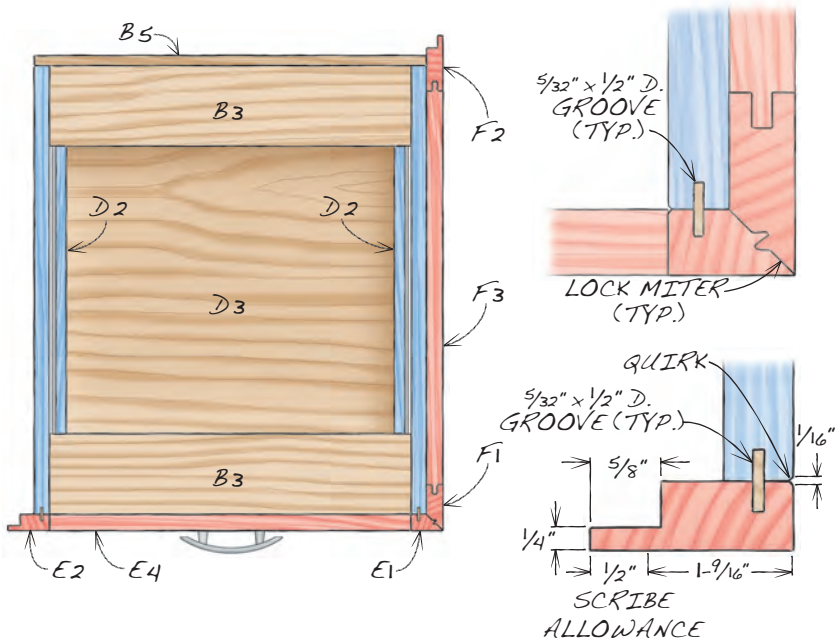
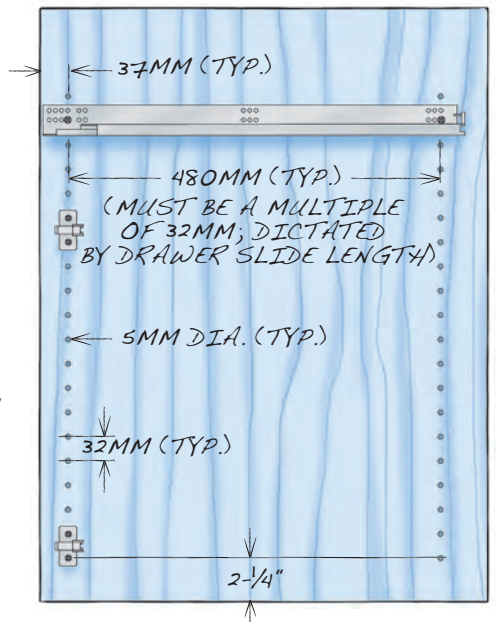
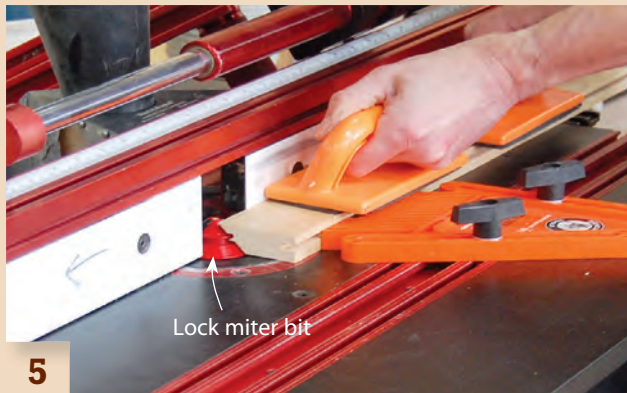


Fig. C
32mm System Hole Layout





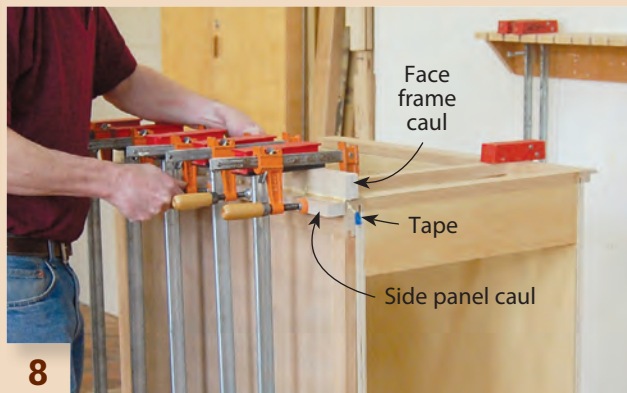
5 Mill lock miter joints in the adjacent face frame and side panel stiles. Using miters to join the cabinet's facing components creates beautiful seamless corners—a hallmark of fine cabinetry.



6 Assemble the face frame with glue and pocket screws. Clamp the frame to a flat surface to ensure good alignment, taking care not to damage the lock miter.



7 Glue together the side panel. Protect its delicate lock-mitered edge by using a spacer and shop-made clamping blocks with the reverse profile.



8 Glue together the face frame and the side panel. Use the carcass as a positioning guide and cauls to ensure a tight-fitting lock miter joint. Tape the carcass so it doesn't stick to the joint.

side panel stiles (E1, E2; F1, F2) are exactly the same length as the carcass sides (B1), so it makes sense to cut them all at the same time, using the same stops.

Cut the side panel rails (F3, F4) to final dimensions now, too. Then use a stile-and-rail set to rout tongue-and-groove joints in the side panel's stiles and rails. Rout the grooves first, then the tongues. The set I use adjusts to fit the thickness of the plywood panel (see Sources, page 39).

Mill quirks, grooves and holes

Clearly mark the carcass sides and stretchers, indicating left and right sides, and the front and top edges. Use a 45° chamfer bit to rout a tiny bevel (about 1/32" wide) on the inside front edge of both carcass sides and the inside edge of both face frame stiles (Fig. B). This detail, called a "quirk," disguises any slight misalignment when the face frame is glued to the carcass.

Next, use a router table equipped with a 5/32" wing cutter to rout full-length grooves in the front edges of the carcass sides and in the backs of the face frame stiles. These grooves will be used to align the face frame with the carcass during glue-up. Reference off of the inside face of both pieces to ensure proper alignment and size the grooves' depth to accommodate #10 biscuits.

The 5mm dia. system holes are used to mount the hinge plates, drawer slides and shelf pins. For the hardware to work properly you need to follow a few basic rules, which include drilling the front row of holes 37mm from the carcass front and the back row of holes a multiple of 32mm from the front row (480mm in this case; Fig C). It's best to keep your layout in metric units. I prefer to use a jig such as the Veritas 32 Cabinetmaking System to drill the holes, especially when I'm building a lot of cabinets (Photo 1 and Sources). Clamp a 2-1/4" spacer flush with the bottom of the carcass side to index the jig, so the holes are always consistently offset from the bottom edge on both sides.

Assemble the carcass

The carcass assembles with butt joints, using biscuits for positioning and screws for strength. Mill #20 biscuit slots in the face of the carcass sides (Photo 2). Mill matching slots in the ends of the stretchers and bottom (Photo 3). Use four biscuits to fasten the bottom and one biscuit centered in both ends of each stretcher. Per Architectural Woodwork Institute (AWI) standards, locate the biscuit slots a maximum of 2" on center from the edge of the side and no more than 6" apart.

Mark the biscuit locations on the outside of both carcass

sides. Then dry-assemble and clamp the carcass while it's laying on its back on a flat surface. Make sure all of the joints come together and are flush. Then pre-drill countersunk holes for #8 x 1-1/2" screws in the sides to connect the bottom and stretchers, making sure to avoid the biscuit locations. Disassemble the carcass and apply glue to the biscuits. Then reassemble, clamp and screw the carcass together (**Photo 4**). Once the screws are in, immediately

remove the clamps and install the back (B5). Check for square by measuring the diagonals of the carcass' front opening—they should be within 1/16" of each other, preferably closer. Fasten the back using #8 x 1-1/4" screws every 4" on center. This is particularly important when building an upper cabinet, as the back is what supports the cabinet when it's fastened to the wall.

Install iron-on maple edgeband on the adjustable shelves (B6) before cutting them to final dimensions.

Cutting List: Base Kitchen Cabinet

Overall Dimensions: 34-3/4" H x 21-1/2" W x 24-1/2" D (a)

Fig. D Drawer

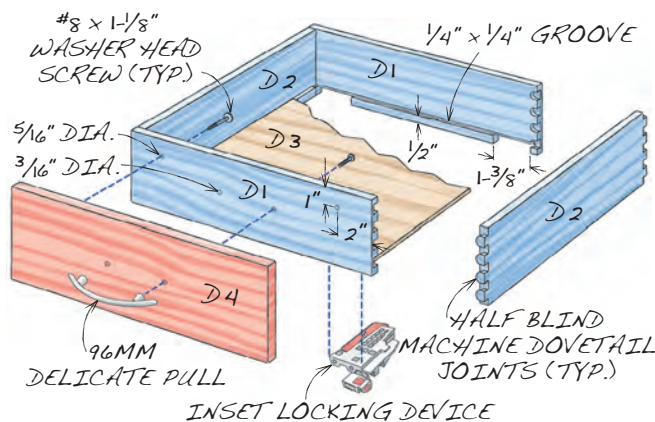
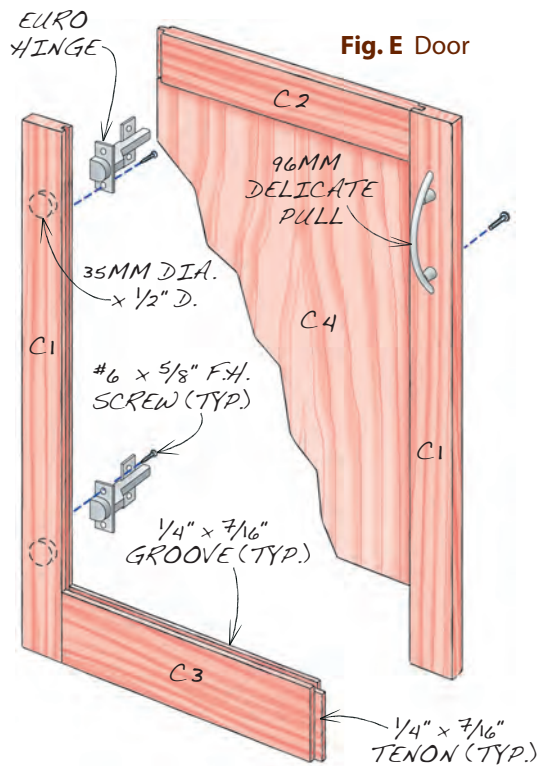


Fig. E Door



Section	Part	Name	Qty.	Material	Th x W x L
Toe Base					4" x 19-3/4" x 21" (d)
	A1	Side	2	Plywood (b)	3/4" x 3-1/2" x 18-3/4" (d)
	A2	Front/back	2	Plywood (b)	3/4" x 3-1/2" x 19" (d)
	A3	Stretcher	2	Plywood (b)	3/4" x 3" x 18-3/4"
	A4	Applied front	1	Cherry	3/4" x 4-1/2" x 21" (d, e)
Carcass	A5	Applied side	1	Cherry	3/4" x 4-1/2" x 22" (d, e)
					30-3/4" x 19-3/8" x 22-11/16"
	B1	Side	2	Maple plywood (c)	3/4" x 22-3/16" x 30-3/4"
	B2	Bottom	1	Maple plywood (c)	3/4" x 22-3/16" x 17-7/8" (f)
	B3	Stretcher	2	Maple plywood (c)	3/4" x 4" x 17-7/8"
	B4	Edging	1	Maple	1/8" x 3/4" x 17-7/8"
Door	B5	Back	1	Maple plywood (c)	1/2" x 19-3/8" x 30-3/4"
	B6	Shelf	1	Maple plywood (c)	3/4" x 21-15/16" x 17-5/8"
					3/4" x 17-7/8" x 22-3/4" (g)
	C1	Stile	2	Cherry	3/4" x 2-5/16" x 22-3/4" (h)
Drawer	C2	Upper rail	1	Cherry	3/4" x 2-5/16" x 14-1/8" (h, j)
	C3	Lower rail	1	Cherry	3/4" x 3-5/16" x 14-1/8" (h, j)
	C4	Panel	1	Cherry plywood	1/2" x 14-1/16" x 17-15/16"
Face Frame					5-5/16" x 17-11/16" x 21-3/4"
	D1	Front/back	2	Maple	1/2" x 4-1/4" x 17-1/4" (k)
	D2	Side	2	Maple	1/2" x 4-1/4" x 20-3/4" (l)
	D3	Bottom	1	Maple plywood	1/4" x 16-3/4" x 20-1/2"
	D4	Applied front	1	Cherry	3/4" x 5-1/2" x 17-7/8" (g)
Side Panel					13/16" x 21-1/2" x 30-3/4"
	E1	Right stile	1	Cherry	13/16" x 1-9/16" x 30-3/4" (m)
	E2	Left stile	1	Cherry	13/16" x 2-1/16" x 30-3/4" (n)
	E3	Mid rail	1	Cherry	13/16" x 1" x 17-7/8"
	E4	Upper rail	1	Cherry	13/16" x 1-1/2" x 17-7/8"
Side Panel	E5	Door stop	1	Cherry	1/4" x 1-3/8" x 1-1/4"
	F1	Front stile	1	Cherry	13/16" x 2-1/4" x 30-3/4" (h, m)
	F2	Rear stile	1	Cherry	13/16" x 2-3/4" x 30-3/4" (h, n)
	F3	Upper rail	1	Cherry	13/16" x 1-1/2" x 20-3/8" (h, j)
	F4	Lower rail	1	Cherry	13/16" x 3-1/4" x 20-3/8" (h, j)
	F5	Panel	1	Cherry plywood	1/4" x 20-5/16" x 26-9/16"

Notes:

- Width and depth dimensions include 1/2" scribe allowances; the allowances that are built-in depend on how much the walls are out of plumb.
- Any type of veneer-core plywood.
- Pre-finished veneer-core plywood.
- Width is nominal; it varies depending on how much the floor slopes.
- Oversize in length to allow mitering and fitting to wall; includes 1/2" in extra width for scribe allowance.
- Width includes 1/8" front hard maple edging (B4).
- Size to exactly fit the opening, then trim to leave 3/32" gaps all around.
- One edge has 1/4" x 7/16" groove.
- Length includes 7/16" long tenons on both ends.
- Undermount slides require that the drawer box front and back are 5/8" shorter than the length of the cabinet's drawer opening.
- Length is dependent on your dovetail jig; overall finished drawer box length must be exactly 21".
- One edge is mitered. Cut E1 and F1 side-by-side from the same piece of wood, so the grain wraps around the mitered corner.
- Includes 1/2" in extra width for scribe allowance; may be more or less, depending on how out of plumb the wall is.

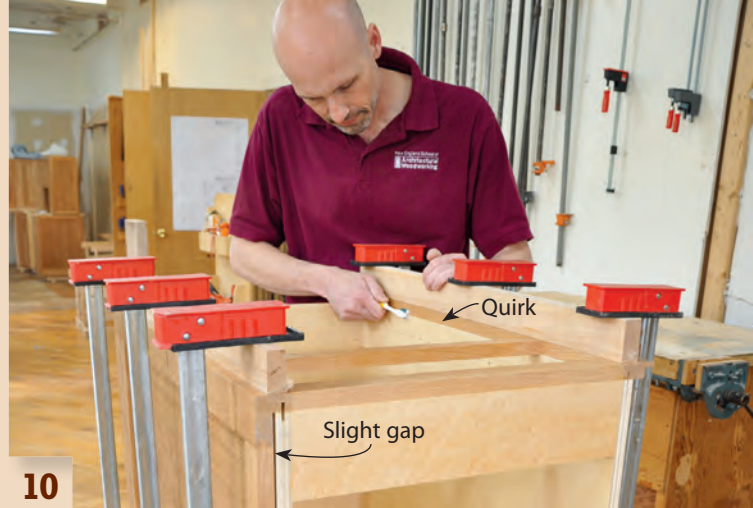


Buy the book
How to Make Kitchen Cabinets
at awbookstore.com



9

Finish the cabinet's facing. End cabinet facings (shown here) consist of mitered face frames and side panels. Facing for interior cabinet runs consist of face frames only.



10

Attach the facing to the carcass by gluing only the face frame. Remove squeeze-out before it hardens. The carcass' undersize plywood leaves a gap that keeps the side panel from binding.



11

Install a full-length shim to maintain an even gap and keep the side panel parallel with the carcass. Then fasten the panel at the back, using pocket screws along its entire length.



12

Use the system holes to mount the drawer and door hardware. Building the inside of the cabinet flush with the face frame significantly simplifies the process.

Allow for scribing

The face frame and side panel each contain one stile that's wider than the other by 1/2"—a typical scribe allowance—so you can cut the stile to perfectly match a wall that isn't straight. To determine just how much width to add for a scribe allowance, it's important to check the wall that the cabinet will attach to. If the wall is out more than 1/2" from top to bottom, you'll have to add that much more width to the stile. Make sure to add at least 1/4" more width than you think you'll need—it's better to have more than enough than not enough.

Rabbeting the scribe allowance eases installation by leaving much less material to remove (Fig. B). Rout the rabbet 1/8" wider than the scribe allowance you've added (5/8" for a 1/2" scribe, for example). When you cut the rabbet, leave the tongue that remains on the face about 1/4" thick.

Rout the rabbet in the back edge of the face frame's extra-wide left stile (E2) now, prior to assembly. However, to make clamping easier during glue-up, wait until after the side panel has been glued together to rout the rabbet in its extra-wide rear stile (F2).

Rout lock miters

Whenever the face frames and side panels meet, I use a miter joint. This gives the cabinets the look of high-quality

furniture. Using a butt joint is much easier, but getting a pleasing match of both color and grain is more difficult. With a mitered joint, I can cut both stiles from the same piece of wood and wrap the grain around the corner.

Cut the long miters on the router table using a lock miter bit (Photo 5 and Sources). With a lock miter bit, you must run one piece horizontally and one vertically. In this case, running the face frame stile (E1) vertically makes the clamping process a bit easier down the road. When a lock miter bit is properly set up, you don't need to change the fence or bit height when you switch pieces.



Learn how to use a lock miter bit at AmericanWoodworker.com/WebExtras

Assemble the facing

Assemble the face frame using 1-1/4" fine-thread pocket screws (Photo 6). To avoid damaging the mitered edge, do not finish-sand this assembly until it has been glued to the side panel.

Glue and clamp the side panel assembly, using shop-made clamping blocks and a spacer to protect the lock-mitered edge (Photo 7). The clamping blocks are the mirror

image of the lock miter. The spacer keeps the clamps away from the miter's knife edge. Remove squeezed-out glue before it hardens. Rabbet the scribe allowance in the rear stile (F2) after removing the clamps. As before, do not finish-sand this assembly until it has been glued to the face frame.

Glue the lock miter joint between the face frame and the side panel, using the carcass as a convenient jig to support both pieces (**Photo 8**). Tape the front corner of the carcass so it doesn't get glued to the mitered facing assembly. Use clamping cauls to ensure a tight joint. When the glue has dried, finish-sand the mitered assembly and tape off the back of the face frame where it will contact the carcass, to ensure good glue adhesion later. Then apply the finish (**Photo 9**). At NESAW, we spray one coat of Zinsser SealCoat dewaxed shellac, followed by two coats of ML Campbell Aqualente water-based lacquer.

Attach the facing

Glue on the pre-finished facing assembly, using biscuits installed in the routed grooves to align the carcass sides with the inside edges of the face frame stiles (**Photo 10**). To avoid damaging the finish, make sure the clamping cauls are smooth and free of debris, and immediately remove squeezed-out glue from the quirks, the tiny bevels in the joints between the face frame and the carcass sides. A toothbrush works great for this.

Because the carcass' veneer-core plywood is undersize in thickness, gluing the facing to the carcass as described above leaves a gap that keeps the side panel from binding. Install shims sized to maintain this gap evenly along the panel's length. Then attach the side panel to the carcass, using 1-1/4" fine-thread pocket screws through the back and along the bottom edge (**Photo 11**). At the top edge, attach the side panel at the midpoint of the carcass. Install a shim and then screw directly through the carcass into the panel's upper rail, using #8 x 1-1/4" screws.

Glue and screw a door stop (E5) to the back of the face frame's mid rail, so it protrudes 3/8" into the upper right corner of the door opening. Stopping the door at both the top and

bottom keeps the door from twisting due to the force of the European hinges. Apply finish to the door stop and any areas on the back of the face frame that weren't finished earlier.

Build the door

Mill the door stiles and rails (C1-C3) to final dimensions. Note that the bottom rail is wider than the top rail. This helps to ground the cabinet, as there is no bottom face frame rail. Size these parts so the glued-up door will be the same size as the opening. Use the same stile-and-rail set you used for the side panel to cut the tongue and groove joints. Cut the panel (C4) and glue up the door (see "Make a Frame and Panel Cabinet Door," page 40).

Trim the door to fit the opening in the cabinet and then install it using Euro-style hinges (see "How to Install a Cabinet Door," page 45 and Sources). Remove the door to sand and finish it. Then install the pull (see Sources).

Build the drawer

The drawer consists of a dovetailed box with an applied front (D1-D4, Fig D). It rides on drawer slides that hide under the box, so they're invisible when the drawer is open (see Sources). I use a dovetailing jig to make the drawer box (see "How to Make a Cabinet Drawer Box," page 49).

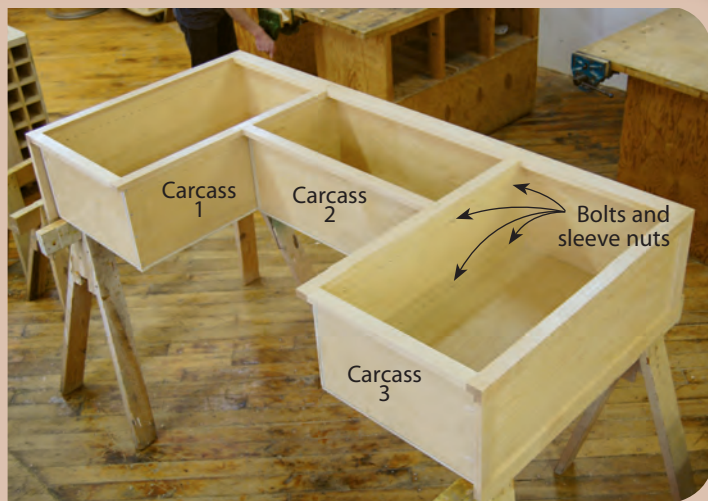
The drawer box must be accurately sized to accommodate the undermount slides. The 21" Blum slides we use require the outside length of the drawer box to be exactly 21". Likewise, our 1/2" thick drawer-box sides require the box to be exactly 5/8" narrower than the cabinet's drawer opening. Also, the drawer bottom must be exactly 1/2" above the bottom of the drawer side.

The undermount slides mount inside the cabinet (**Photo 12**). Then you modify the drawer box and install inset locking devices that attach it to the slide (see "How to Install a Cabinet Drawer," page 59). Once the drawer box is installed, you fit the applied front to the opening and then fasten it to the box using special washer-head screws (see Sources). Sand and finish the drawer box and its applied front after you've fitted them to the cabinet. Mount the pull after the cabinet has been installed.

Complex Cabinets Made Easy

To make a run of cabinets, build separate plywood carcasses and fasten them together using the 32mm system holes. Drill all the way through matching system holes at the top and bottom of adjacent carcasses. Install shims between the carcasses so they'll mount flush with the face frame's 1-1/2" wide internal stiles. Connect the carcasses using sleeve nuts and truss head bolts (see Sources, page 39). Then glue on the face frame.

As shown here, upper cabinet face frames and side panels extend below the carcasses to create valences for under-cabinet lighting. After installation, 1/4" plywood skins are added to cover the exposed carcass bottoms. This cabinet is designed to go over a stove; a microwave oven will hide the rest of its exposed carcasses.



Build the toe base

The toe base's frame will be covered by solid wood facing (A4, A5), so you can build it using nearly any 3/4" thick veneer-core plywood. The long toe bases used under cabinet runs contain multiple stretchers that resemble the rungs of a ladder.

A standard toe base is 4" high, so cut the frame's front, back and sides (A1, A2) narrower, as necessary, to accommodate shimming to an out-of-level floor. In this case, they're sized at 3-1/2" (see "Installing Cabinets," page 62). Screw the frame together after pre-drilling for #8 x 1-1/2" screws; no glue is necessary. Levelers installed in each corner make installation easier and faster (**Photo 13** and Sources). Notch the stretchers (A3) and install them. Cut the facing parts oversize in length for now—they'll be cut to final width and length during installation. Rout a 1/2" x 3/4" rabbet in the bottom edge of each part to make it easier to scribe to the floor. Then sand and finish the facing parts.

Upper cabinet variations

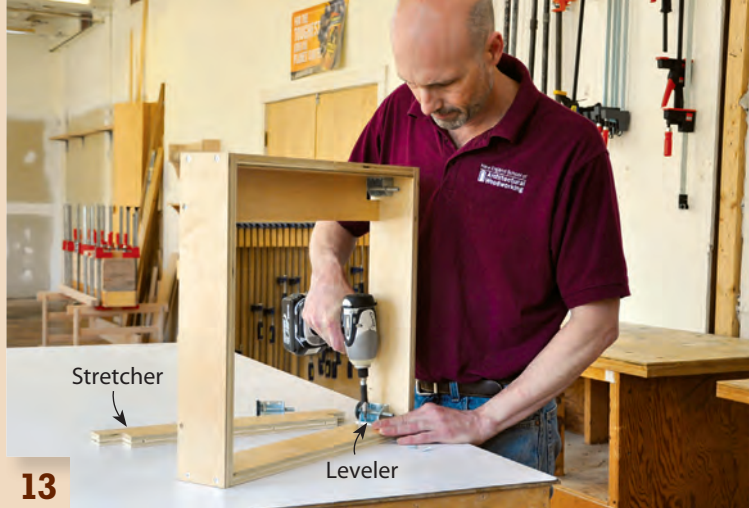
Like the base cabinet, the upper cabinet consists of a plywood carcass with solid wood facing, but it differs from the base cabinet in these important ways: Its face frame has a bottom rail, its door rails are the same width, and its face frame and side panel(s) extend beyond the carcass to create a valance for under-cabinet lighting (see **Photo**, opposite page). Finally, a 1/4" plywood skin of the same species as the facing covers the bottom of the carcass. Finished the same as the rest of the cabinet, this skin is scribed to the wall and attached with construction adhesive and pin nails after the cabinet is installed. 🛠️



See the upper cabinet plans and cutting list at AmericanWoodworker.com/WebExtras

SOURCES

- Lee Valley & Veritas, leevalley.com, Veritas 32 Cabinetmaking Deluxe System, #05J06.02, \$329.
- McFeely's, mcfeelys.com, 800-871-8158, Euro Screws, 5mm x 13mm, #0513-ECS-C, \$5.70 per box of 100 screws; Undercut Flat Head Screws, #6 x 5/8", #0605-FPU-C, \$2.65 per box of 100; Super Round Washer Head Screws, #8 x 1-1/8", 0811-SRZ-C, \$7.35 per box of 100.
- HomeDecorHardware.com, homedecorhardware.com, 877-765-4052, Base Leveler, #Hafele-USA-637.37.904, \$14.74 per set of 4 (two L, two R); Shelf Pin, 5mm, nickel-plated, #Hafele-USA-282.04.711, \$0.20 ea.; Sleeve Nut, M4, 5mm x 35mm, #267.01.717, \$0.72 ea.; Truss Head Screw, M4 x 15mm, #022.34.157, \$5.98 per box 100.
- Woodworker's Hardware, wwhardware.com, 800-383-0130, Blum Tandem 562H Full-Extension Undermount Drawer Slide w/ Blumotion, 21", #B562H 5330B, \$23.12 per pair; Blum Inset Locking Device, #BT51.1700PV, \$8.08 per pair (one L, one R); Blum Tandem Boring Template, #BT65.1000.02, \$53.34; Blum Clip-Top 110° Inset/Self Closing Hinge w/ Blumotion, #B071B3750, \$5.29 each; Blum Hinge Plate, Cam Ht. Adj., 0mm offset, #B173H9100, \$1.10 ea. (one required per Hinge); Blum #2 Pozi Screw Driver, #B POZI, \$8.33; 35mm Economy Carbide Bit, #MD1026, \$16.61.
- Kitchen Cabinet Hardware, kitchen-cabinet-hardware.com, 800-530-8245, Delicate Pull, 96mm, #P84729-SN, \$3.29.



13

Assemble the cabinet's toe base. Building the toe base and carcass separately simplifies construction, eases installation and uses materials efficiently. Screw together the sides and ends, mount the levelers and then install the stretchers.



Greg Larson is the owner/director of the New England School of Architectural Woodworking (NESAW), located in Easthampton, MA. A board member of the Woodwork Career Alliance (WCA) and the New England Architectural Woodworking Institute (NEAWI), Greg has been involved in woodworking for over 25 years.

NESAW offers a nine-month cabinetmaking career-training program, designed to prepare students of all skill levels for immediate employment or self-employment in the cabinetmaking industry. While the program's primary focus is on the development of safe, repeatable cabinetmaking skills, it also teaches students how to efficiently maximize their time, materials and budget. Students also have the option to learn the basics of cabinet design on AutoCAD and SketchUp. More information is available at www.nesaw.com.

Greg and his wife, Margaret, also run The Workbench, a hobbyist school that offers night, weekend and summer workshops in woodworking, home improvement and gardening. A schedule of all workshops can be found at workbenchschoool.com.

New England School of
 **Architectural
Woodworking**

**SAVE \$\$\$
DOING IT YOURSELF**

Cabinets You Can Build

American Woodworker®

THE BEST RESOURCE FOR YOU AND YOUR SHOP

#162, OCT/NOV 2012



\$5.99 US/CAN

Display Until October 29, 2012

A M E R I C A N W O O D W O R K E R . C O M