Designing and Building Traditional Cabinets

To control the finished look of custom kitchens, keep cabinet construction in-house

by Bob Cifelli

I'm the shop manager at Kurzhaus Designs, a design-build company with an office in Dennis, Mass., where we also have our cabinet shop. To complement the custom work we do — both new construction and remodeling — we design and build our own kitchen and bathroom cabinets. In our area of New England, there's little demand for clear finishes, so for the most part we build traditional painted face-frame cabinets with frame-and-panel doors. We use soft maple for the frames, and MDF and plywood for panels and carcass parts.

Design and Layout

Occasionally a client will come to us with a kitchen designer in tow. We'll work with outside designers, but to control quality and fit, we still prefer to build the kitchen ourselves. In our experience, most designers work from manufactured cabinet catalogs: They put a kitchen together by joining a bunch of individual cabinets under a common countertop and call it a day. One problem with joining boxes together is that you end up with double

internal partitions that waste perfectly good storage space, not to mention plywood. Plus visually you're stuck with double stiles and seams between every two cabinets.

We prefer to build entire runs of cabinets as a unit, which allows us to get rid of double partitions and to maintain an equal reveal between every door and drawer, top to bottom and side to side (**see Figure 1**). Also, building cabinets to fit a specific space gets rid of scribe strips, bolt-on end panels, and various gap moldings — all of which make the cabinets look blocky and take up space that could have been used for storage.

On a new kitchen, I begin by reviewing design ideas with our clients. We look at their magazine clippings and at photos of our completed work to determine the overall look they're after, including door and drawer styles and paint color. We then talk about function. Where do they want food storage, pots and pans, utensils, containers, appliances, and lighting? Together we outline their dream kitchen. We find that clients tend to be most specific about what they don't want, having lived with it for so long.

I then head back to the shop, armed with the list of dos and don'ts and a few nice-to-haves. At this point, I draw the kitchen in plan view with a few elevations and renderings, using KCDw software (508/760-1140, kcdw.com), which is intended specifically for designing kitchen cabinets and closet storage (**Figure 2**). The version I use costs $4,995. If you've worked with CAD, the program is easy to learn; it takes about two kitchens to get used to its ins and outs and customize the reporting tools. The program yields not only cut lists and assembly drawings for the shop, but also highly realistic 3-D renderings that can help the clients visualize their new kitchen before committing.

Figure 1. Reveals between drawers and doors are uniformly equal, which gives the cabinetry a distinctive look and a pleasing rhythm. To increase storage space and make access easier, the interiors are left free of unneeded partitions.

Figure 2. The author develops both design and production drawings using KCDw software.

Storage Where It Makes Sense

I make sure appliances are paired with the appropriate storage. For example, under a cooktop I'll put two 12-inch-tall pot drawers as wide as the unit (**see sidebar, page 4**). Because we bump the cooktop cabinet depth out as far as 30 inches, these drawers are extra deep.

I also try to bring all dish storage within arm's reach of the dishwasher. Stock upper cabinets are typically 12 inches deep, leaving a scant 11 inches inside for storage. Dinner plates larger than that have to be leaned upright or stored somewhere less convenient. So I make my upper cabinets 14 inches deep and keep them free of inside partitions. If the wall run is 8 feet, I build an 8-foot cabinet with no interior walls and no stiles

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between door pairs (**Figure 3**). The only reason I will interrupt a cabinet run is for an appliance, or because a larger cabinet simply won't fit through the doorway.

Cabinet heights. Stock wall cabinets usually come in heights ranging from 30 to 42 inches and typically get installed 54 inches above the floor (or 18 inches above a standard 36-inch-high counter). While 42-inch cabinets work fine with 8-foot ceilings, with higher ceilings you either have to build a soffit — a space-wasting detail — or leave a gap at the top.

Figure 3. Complete runs of wall and base cabinets are designed and built as single units. The cabinet shown here, seen finished in Figure 1, fills an 8-foot diagonal wall and contains continuous adjustable shelves accessed by a series of doors along its length.

Figure 4. These taller-than-average wall cabinets are sized to leave a balanced reveal on the top rail beneath a crown molding (top left). As long as he's sure he can bring it into the house, the author will build a single cabinet to stand full height under an 11-foot ceiling (top right). Crown molding is normally installed unfinished and painted on site (bottom left).

In my kitchens, I keep the 54-inch baseline but build the upper cabinets to suit the ceiling height, leaving only enough room for crown molding (**Figure 4**). One recent kitchen had 64-inch-tall uppers under a 10-foot-8-inch ceiling.

I also build tall floor cabinets in one piece, fitted to the ceiling and ready for crown molding. We vary the crown height according to the height of the ceiling. For ceilings under 9 feet, we install a stock

Emphasis On Access

I'm a big fan of monster silverware drawers **(1)** located as close as possible to the dishwasher. I put them on soft-closing, full-extension slides (800/438-6788, blum.com).

Below the cooktop, I put two drawers. Big pots and pans go in the larger, bottom drawer; lids and smaller pots go in the upper one. The top drawer also contains an inner drawer **(2)** for cooking utensils. Near the oven, I put a vertical flat-pan rack and a knife drawer customized to suit the clients' collection **(3)**.

I almost never install a false drawer front under the kitchen sink, or one of those drop-down

trays where old sponges go to die. Instead, the doors close on a top rail that's the same width as those adjacent **(4)**. There's no stile between the doors, and the shelf behind them is only 16 inches deep. I leave the space behind the shelf open to the floor for plumbing access. Beneath the shelf I put a full-extension drawer, handy for storing trash bags and other items used in the

sink area. A bottomless base under the drawer makes it easy to service a kickspace heater **(5)**.

There's no perfect answer to the corner base-cabinet problem, but Rev-A-Shelf's (800/857-8721, cabinetparts.com) quarter-turn pull-out hardware **(6)** is one user-friendly option. I also build my own solution: diagonal drawers on full-extension undermount slides as

deep as 30 inches **(7)**, for ample, easily accessible storage.

Many kitchens include breakfast nooks. A 42-inch-tall peninsula cabinet is a good way to separate this area from the kitchen **(8)**. Elsewhere along the countertop, I'll drop a section down to 32 inches for a baking station **(9)**. The marble top shown here provides a nice visual break.

A standard 24-inch-deep cabinet

doesn't make for easy access. So I divide the space in a pantry cabinet, putting a third of it on the door, improving visibility and reach **(10)**. To handle the heavy door, I may install as many as a dozen hinges.

Figure 5. The author provides extra counter space behind sinks and cooktops by bumping these cabinets up to 6 inches forward of the line; bun feet add a furniture look.

Figure 6. Face frames are the first step in the author's construction sequence. A frame for a cooktop cabinet with deep drawers flanked by pull-out pilasters is seen in the foreground.

crown of up to 5 inches tall. Any ceiling over 9 feet deserves a tall, built-up crown, which we mill using a mix of stock and custom profiles.

There are places where the height above the counter must change — such as over the stove — but otherwise, I don't vary the 54-inch elevation. Some designers feel that varying the baseline height adds visual interest, but I think it spoils an eye-soothing horizontal line.

Base cabinets are a different story. I vary the heights and depths of base cabinets to suit the application. I also bump out my stove and sink bases by as much as 6 inches. That way I have plenty of room for mounting fixtures behind the sink, and the homeowner has a place to put cooking condiments behind the stove. Varying countertop depths breaks up the otherwise flat surface of a line of cabinets, and also provides a natural place to divide a long run. I often add bun feet or column legs to these bumped-out cabinets to give them a furniture-like look (**Figure 5**).

Cabinet Construction

I make the face frames first using pocket-screw joinery, which allows us to assemble large, remarkably strong face frames without interlocking profiles or tenons (**Figure 6**). I used to bore the pocket holes with a simple manual Kreg jig

Figure 7. The Kreg DK3100 can drill up to three holes at a time about as fast as the operator can position the workpiece under the air-driven clamp.

(800/447-8638, kregtool.com), but this proved way too time-consuming. I now use Kreg's three-head tub-boring machine, which makes short work of this part of the job (**Figure 7**). A companion tool, the face-frame assembly table, clamps and holds multiple frame parts in alignment for screwing. Together, the two items cost about $6,800.

I also use pocket-screws for gussets, back rails, stretchers, and other internal structural members, including sides and bottoms. For finished partitions and bottoms, we use $3/4$-inch furniture-grade maple plywood; for horizontal and vertical bracing, we use 3-inch-wide $3/4$-inch Arctic birch, glued and pocket-screwed. This plywood is strong and takes cabinet screws well. The bracing squares the cabinet and provides mounting for drawer runners and attachment points for the countertop.

Our cabinets are built to stand on their own and support heavy stone or concrete

Figure 8. An island cabinet with pilasters and a raised snack bar takes shape (top left). The contiguous face frames are directly connected to a structural, raised-panel back. Interior bracing, partitions, and bottom panels will be pocket-screwed from inside. The author and a helper plot the final position for another island cabinet (bottom left), shown finished in Figure 1. The island above is 9 feet long and weighs more than 1,000 pounds empty. It's supported entirely on four bun feet.

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Figure 9. The author cuts and assembles toekick "ladders" on site. He levels and fastens them to the floor first, then screws down the cabinets. The rough toekicks are covered with a prefinished baseboard.
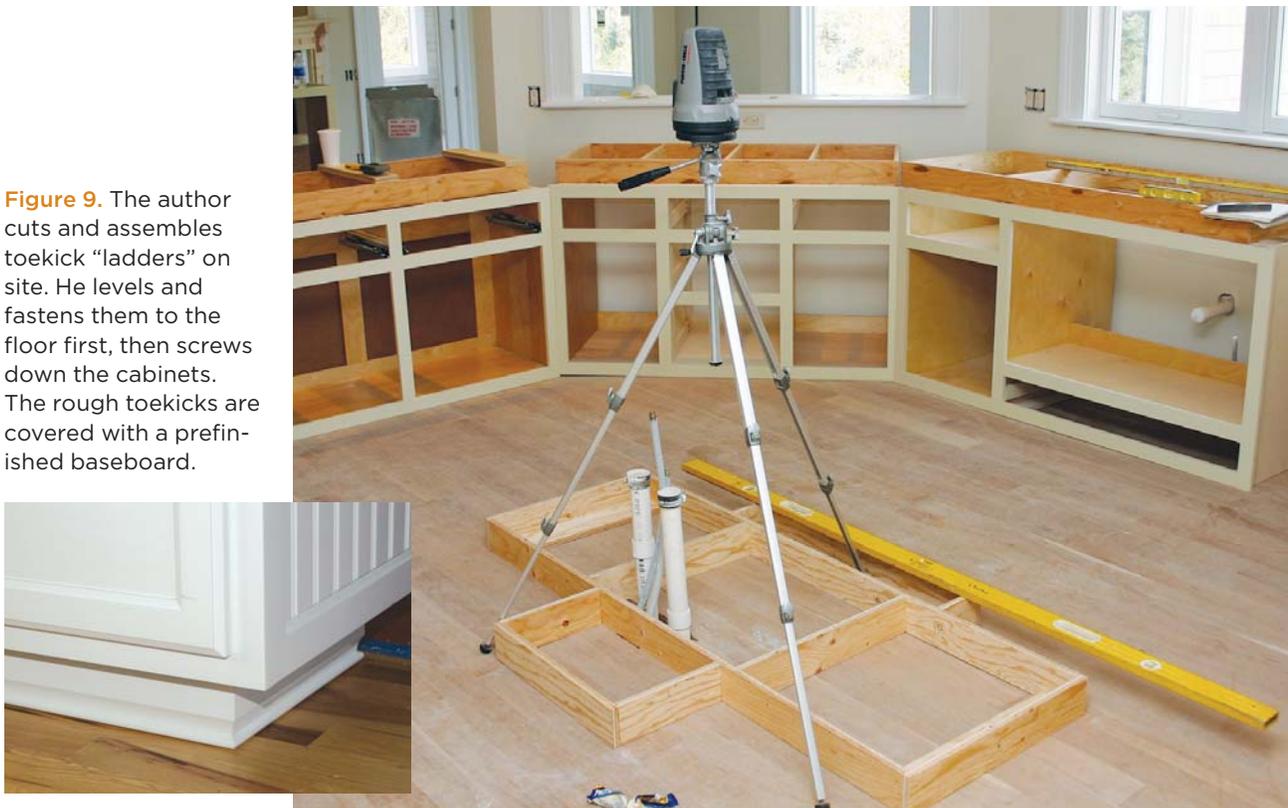
tops and commercial appliances. I don't add backs to base units or uppers that don't have glass doors. I just make sure that the finish wall color is in place before I install, or paint it later. I also don't use solid bottoms in my drawer bases when an open frame serves just as well.

Finished ends. I build finished end panels to match the door style or as a beadboard frame-and-panel. Either way, I attach the panel to the face frame so that the cabinet looks like one seamless, integrated unit. This is particularly important for freestanding island cabinets, which need to look good from every angle (**Figure 8, page 6**).

My base cabinets don't have integrated toekicks. Instead, I rip 3³/₄-inch plywood strips in the shop and build separate "ladders" on site (**Figure 9**). I set these on the floor first, shim or scribe them level, secure them with screws, then attach the

cabinets on top. This simple approach works just as well for island cabinets — and the reduced cabinet height makes it more likely that we'll be able to get the units through the kitchen door.

Finishes

Before we had a spray room, we relied on a triple-stage HVLP turbine gun to spray waterborne finishes. (Because of health and fire hazards, if you don't have a spray booth with a high-volume exhaust system, you pretty much have to use a waterborne finish.) HVLP guns lay on a really smooth coat with little overspray. The turbine air is heated, making the finish flash over a little faster. Dust control is a must because the paint remains tacky for an hour or so after spraying.

Last year, we expanded the shop and invested in a spray room with high-volume exhaust and a fire detection and suppres-

sion system. We also bought a CA Technologies Cougar AAA (Air Assist Airless) system (888/820-4498, spraycat.com). We run air from a large compressor through a five-stage air cleaner and dryer inside the spray room. The compressor supplies air to the AAA pump head at 60 psi, while the system has its own regulator, set at 45 psi. The gun has twin hoses; one supplies paint to the tip at 600 psi and the other provides air to atomize the fan pattern at around 15 psi. Because it lays a lot of paint on at once, the AAA system takes a little getting used to.

We spray finishes made by ML Campbell (800/364-1359, mlcampbell.com). For primer, we use Campbell's Clawlock, a two-part catalyzed undercoat that you mix just before spraying. It has a working time of about eight hours, after which it becomes too thick to spray and must be discarded. Clawlock is made for sealing

MDF, but it works well on maple, too. It can be applied at a thickness of up to 5 mils per coat, and sands nicely.

For the top coat, we use Campbell's MagnaMax precatalyzed lacquer, which produces a hard, high-quality finish. It flashes over completely in five minutes; parts can be stacked within 25 minutes (unlike parts sprayed with waterborne finishes, which can't be stacked for days).

MagnaMax comes pretinted and has a shelf life of about three months.

Cabinet Installation

A typical installation takes us two days. I use a RoboLaser RT-7210-1 (robotoolz.com, 800/984-0404) to mark base cabinet height, upper cabinet height, and all plumb lines on the walls (**Figure 10**). The laser displays a level line of dots across the wall, which I can move horizontally with a remote as I install. I watch for the dots to be split, with the bottom half displayed across the top front edge of the cabinet and the upper half on the wall line. This ensures a level plane for the countertop.

I shim behind the cabinet's back rail to correct for any unevenness in the wall (**Figure 11**), then screw the cabinet to the studs with $4^1/_2$-inch HeadLok screws (800/518-3569, fastenmaster.com). Using these may seem like overkill, but I like them because they self-tap and have large heads that don't sink into the wood. They also provide solid insurance against shear and pullout when we're hanging uppers, which can be quite heavy when they're loaded. We always install solid blocking behind the drywall at the top and bottom lines of the upper cabinets. In cases where a visible fastener is objectionable, I countersink and cover with an inlaid patch of edge banding. If the cabinets have glass doors, I use finish washers behind the screws. I nearly always use obscure glass rather than clear glass in these doors.

When the cabinet installation is complete and the last coat of floor finish is dry, I apply a finished facing to the toekick, usually with a small profile routed into it for a little extra customization. Nail holes in the toekick are hidden with wood filler topped with latex paint.

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Figure 10. Splitting the laser dots between the front edge of the cabinet and the wall line provides a level reference side to side and front to back. This ensures dead-true support for a stone countertop and eliminates unsightly shim gaps.

Figure 11. Here, the author blocks a backless drawer base off the wall to increase countertop depth, using structural star-drive screws to fasten it to the wall framing.