

Working from the designer's plans, the author marks the kitchen layout on the floor to make sure that the cabinets will fit and rough-ins are correctly located (1, 2). Prior to base cabinet installation, he projects a level line on the walls with a laser to find the high and low points in the floor (3).

## Foolproof Kitchen Cabinet Installation

BY CHRIS KLEE

**Prep work** for a successful kitchen cabinet installation begins well before the cabinets arrive on site; before rough-in, even. It all starts with a solid design by a good designer who is familiar with the usual issues—and who knows how to avoid them. For example, it's the designer's job to know how the vent for a kitchen sink will be run when the sink is located underneath an 8-foot-wide window. A good designer will make sure that the installer has enough filler to prevent cabinet drawers from being blocked by 1-inch-thick back-banded door casings and that there is a spot on a kitchen island for the electrical outlets required by code. Having a good working relationship with an experienced kitchen designer is crucial and is why most builders tend to work with only one or two cabinet shops.

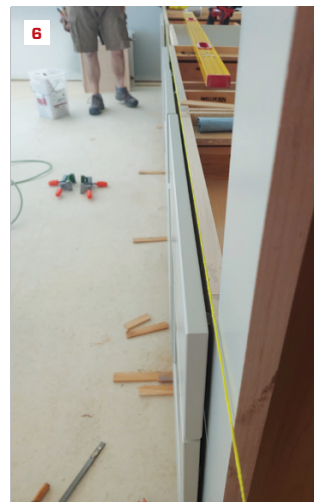
**Layout.** On any kitchen—whether in a new house or as part of a remodeling project—I start by laying out the cabinets in full scale on the floor with a marker prior to rough-in based on the designer's plan (1, 2). This way, I can make sure that the cabinets will fit within the given space. Drawing the cabinet layout on the floor also gives the clients a chance to visualize how their kitchen will look in real space, and it's a great way to show the mechanical trades where things should go.

During my walk-throughs with the subcontractors, we mark the floor and walls with the locations of everything (it's helpful to work with the same company rep each time). Doing this also gives everyone a chance to double-check that things will meet code when done.

For example, we install toe-kick ducts in almost all the houses we build, and it's always a problem when the duct comes up at the seam of two cabinets. Drawing the cabinet layout on the floor and walking through the details with the HVAC installer helps avoid this situation. The process also gives other trades a chance to ask questions and find out things they need to know, like what kind of finished floor there will be and how thick of a substrate is required. I find it to be a worthy investment of time.

**Adjustability.** The layout is never perfect. That's why it's so important to build in adjustability for island pendant lights, sconces, and things like that. Sometimes, it's cut and dried where lights have to go, and we set the electrical boxes for lighting fixtures based on the plan. In other cases,

Photo 1 by Geoff Eldred; remaining photos by Chris Klee



Where base cabinets terminate at a wall or tall cabinet, the author shims them as needed up to the level line (4). Preassembling runs of cabinets where possible and using plenty of clamps during installation helps keep the cabinets square to one another (5), while a string line stretched across the faces of the cabinets helps keep them aligned as they are shimmed to the wall (6).

though, we have the electrician run the wiring to the general fixture location and leave loose cable buried behind the drywall. That way, after the cabinets are installed, the cable can be fished out of the wall and the fixtures placed exactly where they need to go.

When anything like electrical cable or a pipe is buried behind drywall, it is important to note the locations on the cabinet drawings, because oftentimes the cabinet installers will not see the rough-in. I also like to document the rough-in photographically and make sure that the pictures are available for the installers. Emailing them a picture can save a lot of headaches when they are figuring out where the pipes are in a wall.

**Rough-in.** Once the project manager has worked out the details with the designer and subs, rough-in can begin. At this point, the most important tool that the project manager should have on site is a complete set of marked-up kitchen plans, along with the appliance cut sheets for the subs to reference. Having this and the full-scale layout the PM and subs did earlier should make getting everything in the right place pretty easy.

Except when it's not. Plumbing, for example, is usually straightforward, but on each job, certain details will need to be accounted for, such as the supply line for the ice maker in the refrigerator. Will it be a regular water line, or does the supply have to be conditioned by some sort of filter first? Does the refrigerator selected by the clients require a specific location for the water line (common with some higher-end appliances)?

The electrical rough-in can also throw you a few curves: Will the

plugs work with the spec'd appliances? How will the island outlets be routed? Are any in-cabinet outlets needed? Is there undercabinet lighting? If so, our electricians typically will stub out the wiring a little higher than where the upper cabinets will meet the wall, so that we can just notch the drywall a little and pull the Romex or low-voltage wiring to the correct elevation. This goes back to building in adjustability.

**Installation.** When the cabinets are ready to go in, the prep work should make the installer's job go more smoothly. I always start with the base cabinets, because their location often drives where my uppers are located. First, I figure out if the cabinets need to be scribed to the floor, or if they'll need to be shimmed up. The easiest way to do this is by using a laser to identify the high and low spots in the floor (3).

Next, I like to fine-tune the cabinet layout on the wall. If certain things need to be in certain spots—for example, a sink is centered on a window—now is the time to find the center of the window and work out from there. I also make sure to carefully read up on the appliance specs, making note of anything that is special about their clearances or opening requirements.

If the end run of a cabinet will show, I make the floor elevation there my benchmark. I want the ends of the runs to sit on the floor—not shimmed—which in some cases requires scribing some of the cabinet boxes to the floor. If, however, there are multiple cabinets in a run where the sides are all covered, then instead of scribing, I simply cut a little extra off the bottoms of the cabinets as needed with a track saw and shim them back up to my level line (4).



Spacer sticks cut to the exact clearance dimensions of undercounter appliances and fastened to the cabinets with pocket screws ensure that the appliances will fit (7). Wiring inside of a cabinet needs to be run through conduit, except where it is protected by a false back, as shown here (8). Neatly filling nail holes after installing crown and other trim is a key part of the process (9).

If the cabinet run is between two walls, I use the high point in the run as the benchmark and shim the cabinets up to it. The toe kick will cover up the shims. To keep runs of smaller cabinets square, I preassemble them prior to installation and use a string line to align the faces while I shim and fasten the cabinets to the wall (5, 6).

Because I've already installed the base cabinets and know they are perfectly level, I like to make a box to support the upper cabinets while installing them. It's usually just some scrap plywood or whatever is handy built to 19<sup>7</sup>/<sub>16</sub> inches tall. This way, I can shim the cabinets up perfectly to the line.

I use Torx-head structural-grade cabinet screws to secure the cabinets to the wall framing. Gold-colored screws blend well with the prefinished plywood finish on the inside of most cabinets. To secure cabinets to each other, I prefer to use trim-drive screws through the face frames, which require smaller, less-noticeable holes. To position the face frames where I want them, I use Jorgenson cabinet clamps, which hold tight and are fast to use. For frameless cabinets, I use Kreg vise grip-style clamps. I prefer the manual style, as I think they hold better than the automatic ones.

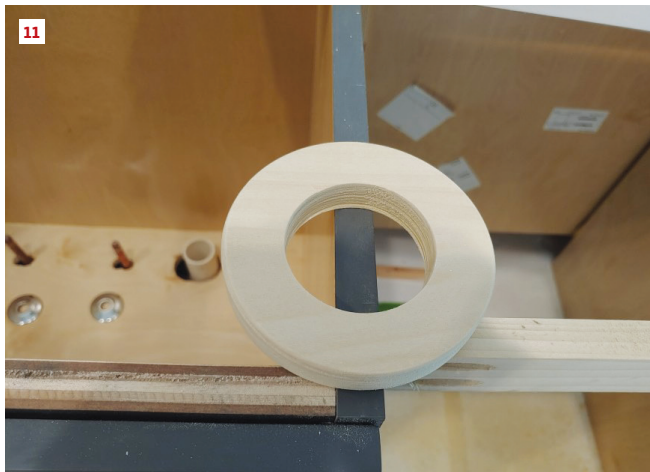
Putting a little painter's tape over the ends helps protect the finish.

One helpful trick is to make spacer sticks for ranges, dishwashers, undercounter fridges, and the like. I size the spacers to match the appliance dimensions, and I drill pocket holes in each end so that I can use screws to hold them in place. The spacers ensure that the appliances will fit, and the appliance installer can easily remove them when that time comes. The spacers also help prevent the cabinets from being bumped during countertop installation (7).

When installing a kitchen island, remember that code requires conduit for any wiring exposed within the cabinet. Often, there are false backs or space between the cabinets that can accommodate Romex, which is a much cleaner installation; otherwise, we have to run the cable through flexible conduit (8).

**Trim tricks.** Trim like crown and light rail always finishes off cabinets nicely. For multipiece trim assemblies, I assemble as much as I can on a worktable to keep miters tight and aligned, especially when a ceiling isn't perfectly flat. To keep the nail holes small, I fasten the corners together using a 23-gauge pin nailer. If you don't want any nail holes, you can use FastCap 2p10 glue, which





A jig speeds installation of cabinet hardware (10). When a cabinet that has already been drilled for plumbing lines has to be shifted slightly, a wood trim ring can be fabricated to cover the enlarged hole around a drain line (11, 12).

is a fast-setting, two-part super glue that cures in just seconds, though it can be tricky to use because of the quick set-up time.

Filling nail holes isn't my favorite job, but I've found that warming up the wax stick makes it easier to place. You can hit it with a heat gun for a few seconds or put it in a microwave or even under an incandescent light bulb (if you can find one). Cutting down a Bondo spreader card makes a great putty knife for working the wax into a nail hole and removing the excess. Keeping the tool clean will be the difference between a nice, neat job and a mess on the crown, so have some rags on hand. When you finish a section, a little cleaner or paint thinner on a clean rag will remove residue and smudges (9).

**Hardware.** Measuring out every knob and handle and doing all that math isn't fun, and there's a lot on the line if you get it wrong. To take some of the stress out of this process and to speed it up, I recently added a True Position Tools TP-1935 jig to my installer's kit. The set-up process is easy to learn, and with the jig I can set up and drill whole kitchens in an hour or two, instead of most of the day (10).

**Fast fixes.** During any cabinet installation, mistakes occasionally happen. Sometimes it's a math error, a measurement error, or just a bad drawing (or a good drawing with an old note that wasn't erased). Sometimes things get moved at the last minute, such as a sink base that gets pulled forward to accommodate a larger sink.

When new holes for supply lines or the drain need to be drilled in the back or side of a cabinet, the best way I've found to cover up the old holes is to make a new bottom or back out of a 1/4-inch prefinished maple plywood panel, with the holes drilled in the correct locations. The same technique can be used when an electrical outlet has been cut incorrectly or has been moved.

This technique works well with face-frame cabinets, but with a frameless cabinet, the edge of the plywood panel will be exposed. In that case, I sand the front edge of the bottom panel and round it over, then put some poly on it to seal it. Another option is to edge-band the panel.

Sometimes, the hole locations are off by less than an inch or so, such as when I had to move an island to account for end panels that were 1 inch thick instead of 1/4 inch thick (it always pays to read plans carefully). I couldn't find a metal trim ring for the 2-inch sink drain that would cover the gap, so I made a wood trim ring instead. I used a 4 1/2-inch hole saw to cut the outside (OD) out of a piece of 1-by, then a 3-inch hole saw for the inside (ID) of the ring (ID). Next, I ran the ring through a planer to knock it down to 3/8 inch thick and hit it with some clear coat to seal it up (11, 12).

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