Prefabricating a Frame-and-Panel Ceiling

BY GARY STRIEGLER

Early in my career, I chose to focus on custom homes and remodeling. Although this kind of work can sometimes be challenging, I like interacting with clients and adding custom details that make their house personal to them. Sometimes, those details come toward the end of the job.

For example, recently a client wanted to add a design element to a hallway ceiling that functioned as a transition between a two-story entry and a two-story living room. These rooms were trimmed with casing, baseboard, and ceiling details that I would describe as "transitional" Craftsman-style. She was hoping that the hallway ceiling would reflect some of these details without being too fussy.

By this point in the project, I had a good working relationship with my client, so we were able to come up with a plan for a flat panel ceiling detail with a center panel turned 45 degrees to the perimeter frame. As a final tweak to the design, we added a diagonal rail in each corner to mimic the look of the cabinet doors in the adjoining powder bathroom.

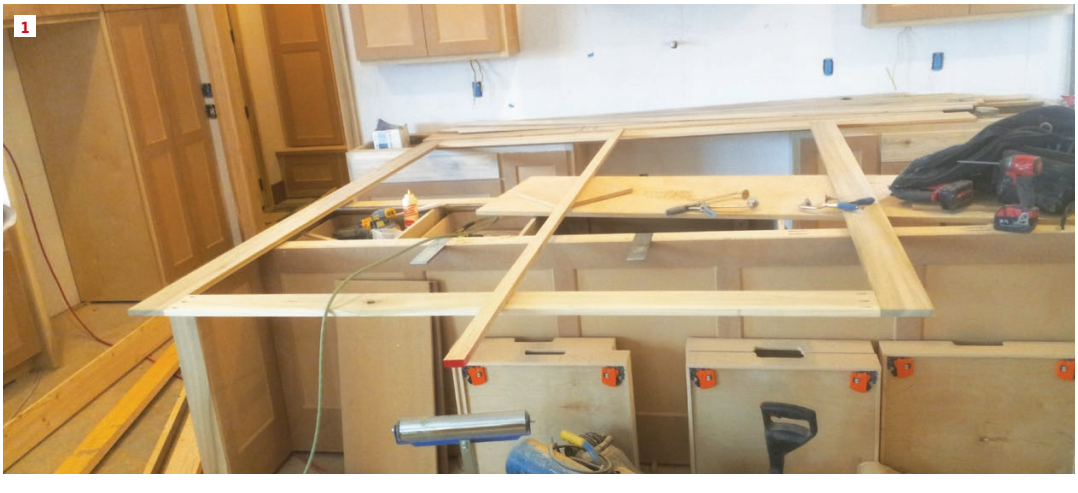
Layout. The roughly 8-by-8-foot ceiling was not quite square, measuring a few inches wider than it was deep. This was a factor that we had to take into account when planning the layout and making the miter cuts—which were not quite true 45-degree cuts—at the corners for the ceiling panel. Because the hallway was relatively small, we decided that the best approach would be to preassemble the frame-and-panel ceiling and lift it into place.

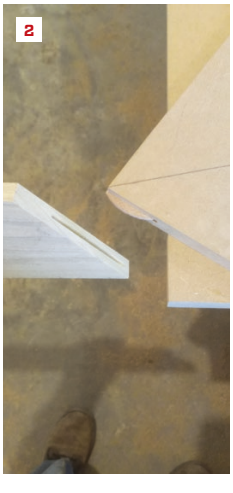
I started by laying out the perimeter frame, sizing it about an inch smaller in each dimension than the ceiling; the gaps between the frame and the walls would be covered by a large cove molding after the paneled ceiling was installed. I made the stiles and rails 3 1/2 inches wide out of 1x4 poplar and planned on overlapping one inch of the frame with the cove molding **(1)**.

Frame assembly. I joined the outer frame together with pocket screws, then cut the center panel from 3/4-inch-thick MDF to size to accommodate the base of a ceiling light fixture, which would be installed later.

The design includes a pair of intermediate, 2 1/2-inch-wide poplar rails that run from the center point of each outer frame piece and intersect on the diagonal with the corners of the center panel. Since the project was paint-grade and out of square by a small amount, I made the not-quite-45-degree miter cuts to fit the center panel, then added small filler pieces to each miter cut to complete the V-cut look.

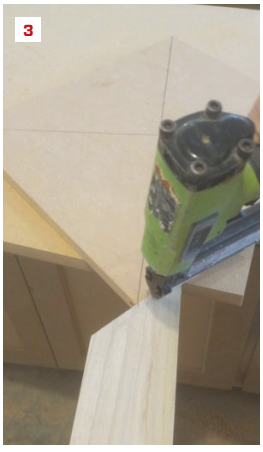
For the joints between the intermediate rails and the center-panel corners, I used small, carefully placed, #0 biscuits because a pocket

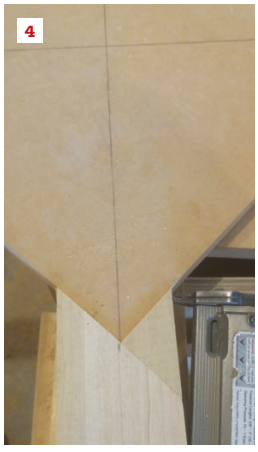


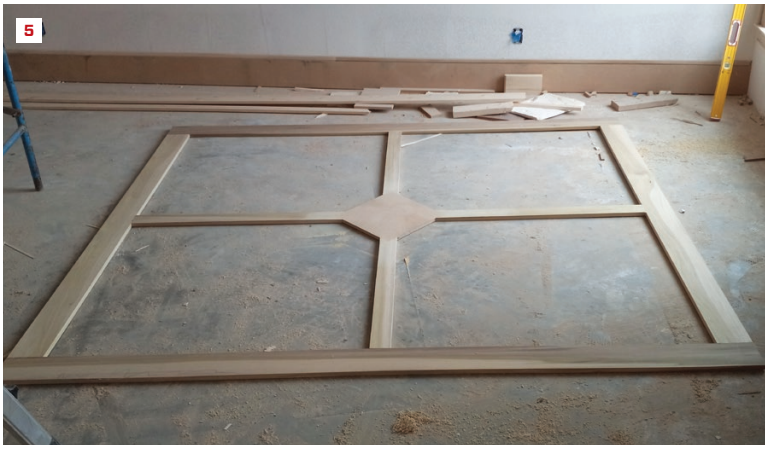


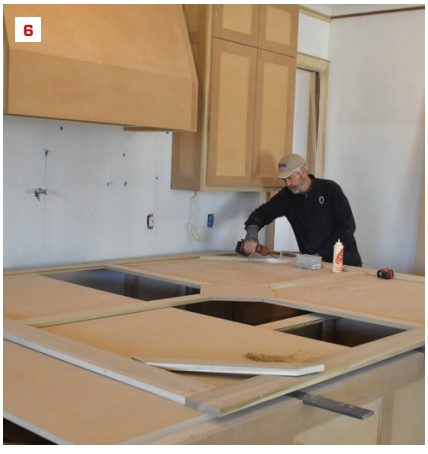
Photos by Gary Striegler

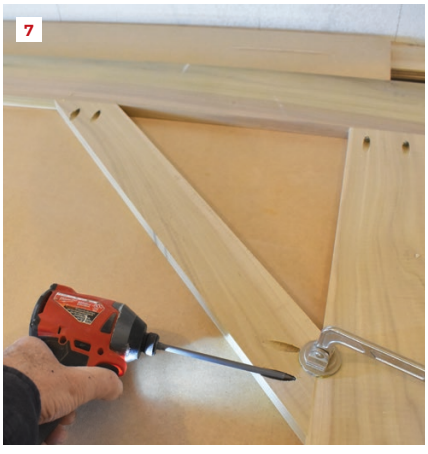
The author assembled the approximately 8-by-8-foot frame from 1x4 poplar, using pocket screws to join the stiles and rails together **(1)**. The frame was sized to leave a gap, which would later be covered by cove molding, between the frame and the walls. Small biscuits joined the 2 1/2-inch-wide intermediate rails to the corners of the center MDF panel **(2)**.











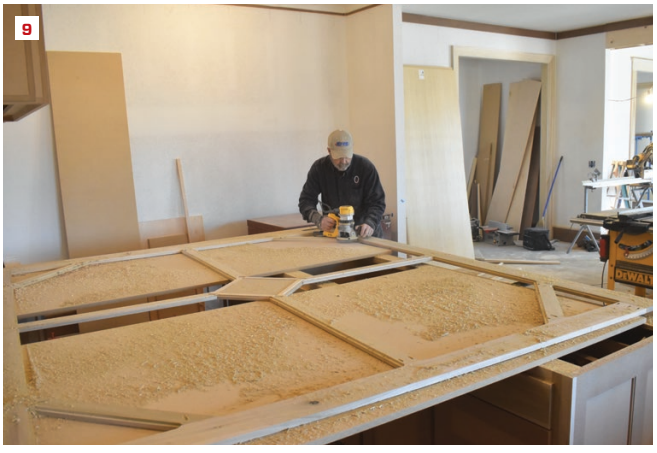
A short, headless pin driven into the glued and mitered biscuit joint helps to clamp the pieces together **(3)**. A smaller filler piece completes the V-joint **(4)**. After joining the intermediate rails to the center panel, the author fastened the assembly to the frame with pocket screws **(5)**. He cut short diagonals and attached them at the corners with pocket screws **(6, 7)**. Because he planned to rabbet the back of the frame for panels, he carefully located the pocket-screw holes so that the screws wouldn't land in the path of the rabbeting router bit **(8)**.

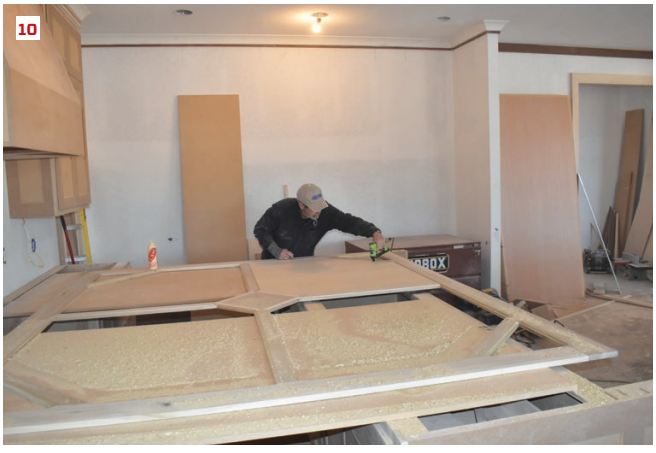
screw probably would have blown out the corner of the panel **(2)**. To clamp the joint, I then drove a 5/8-inch headless pin into it **(3)**. Finally, I added a filler piece with glue to finish the V-joint **(4)**.

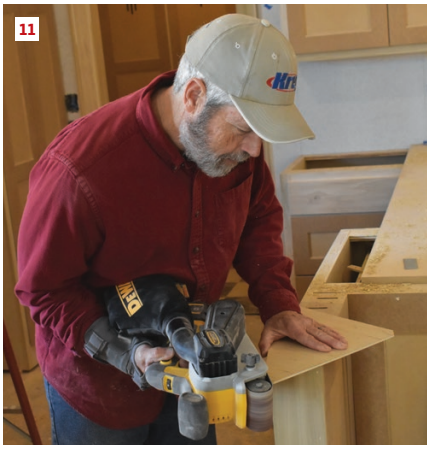
Keeping the panel centered was critical to maintain symmetry and align with the placement of the light fixture, so I double-checked the layout several times while I was adding the intermediate rails. I did this by fastening all four intermediate rails—which I had cut long—to the panel corners first, then adjusted the placement of the assembly on the frame until I was satisfied that the panel was centered. Next, I marked and cut the intermediate rails to final length and fastened them to the frame with pocket screws **(5)**. When drilling the pocket holes, I was careful to stay more than 1/2 inch in from the edge of each joint in the frame piece so that the screws wouldn't be hit by my router bit as I cut the rabbets for the panels later.

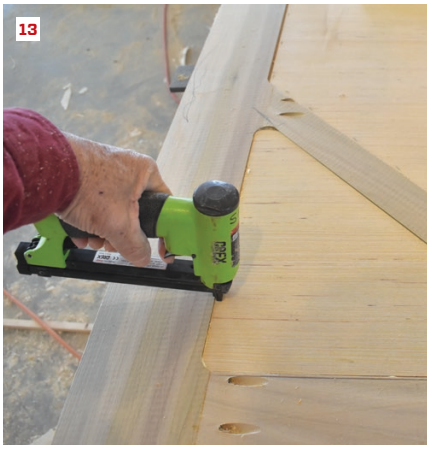
Adding the short diagonal rails at the corners was the last step to finish the frame. I laid them out for equal distance from the corners. Since the frame was not a perfect square, I scribe-fit the cuts. Even at off angles, pocket screws make great, snug joints **(6, 7, 8)**.

Panels. I could have simply stapled plywood to the back of the









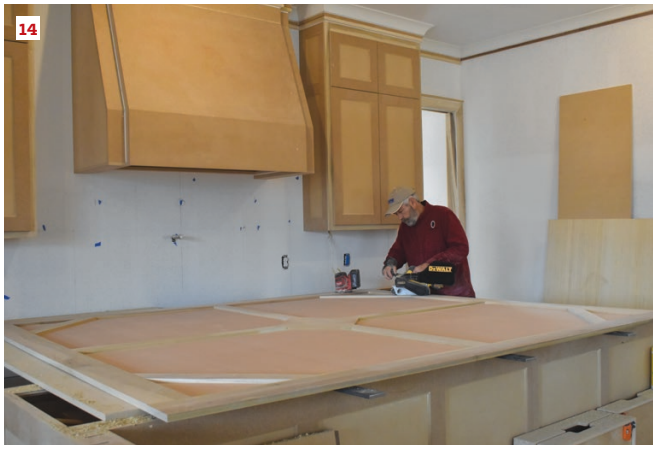
The author used a router to cut 1/4-inch-deep-by-1/2-inch-wide rabbets in the back of the frame to accommodate the 1/4-inch plywood panels **(9)**. When the corners were 90 degrees or greater, he simply clipped the panel corners to fit them into the rabbets **(10)**. To fit the acute angles on the small, triangular corner panels, he used a belt sander to round over the corners **(11, 12)**. The panels are held in place with glue and short wide-crown staples **(13)**.

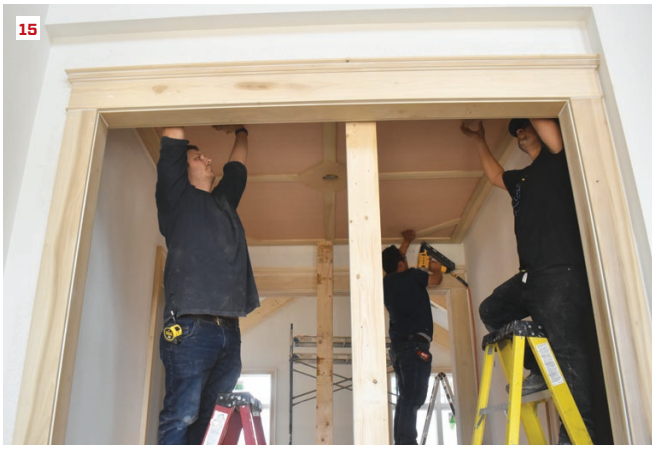
frame, which would have left a 3/4-inch step from the face of the frame to the plywood. But I knew from other projects that it looks a lot better to rabbet the plywood up into the back of the frame, leaving a 3/8-inch or 1/2-inch step. So I chose to cut a 1/4-inch-deep-by-1/2-inch-wide rabbet in the back of the frame with a Whiteside multi-rabbeting bit, using the smallest bearing in the set.

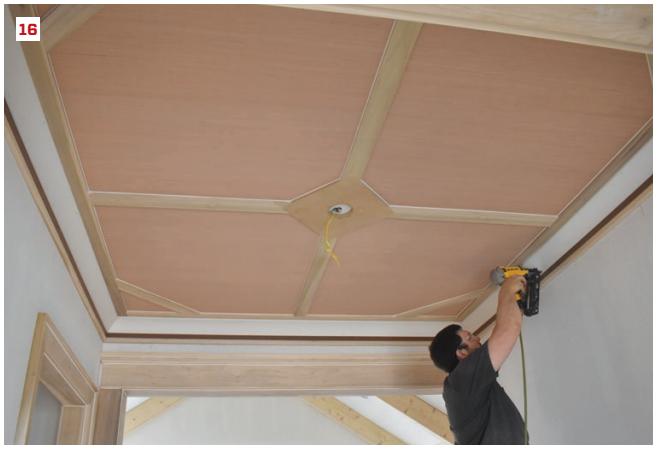
Getting a clean cut when making rabbets is important. If the wood tears out, it looks sloppy. I am comfortable with first making a light, counterclockwise "climb" cut, then removing the rest of the material with a normal clockwise cut **(9)**. Another way to get a square corner is to set the router shallow for a first pass, then adjust the depth of cut. A third option is to set up two routers, make a shallow pass with the first one, and cut at full depth with the second.

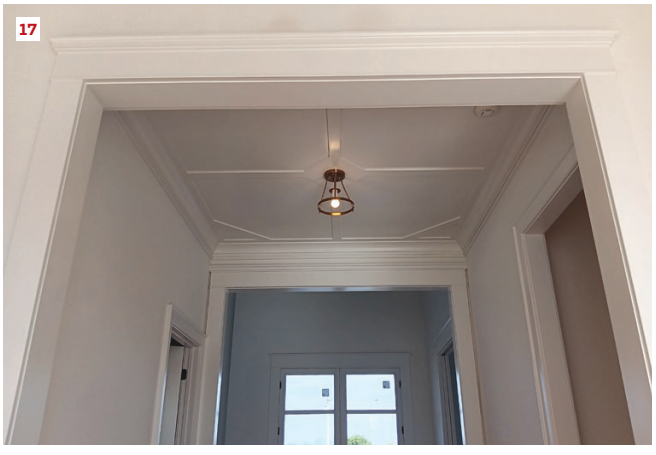
I cut the panels from a couple of sheets of 1/4-inch sanded birch plywood **(10)**. The 1/2-inch width of the rabbet cuts allowed for a fair amount of forgiveness to cut the panels, but I did need to clip their corners to accommodate radius corners of the rabbet. That works well for 90-degree angles but not for the two acute angles at the corners of each triangular-shaped panel. I could have chiseled out a pocket for the plywood, but I tried using a belt sander to round the corners to fit. After a little practice, I decided this approach was much faster than the chisel option **(11, 12)**.

After test-fitting all of the panels, I fastened them to the frame with glue and short, 1/2-inch-long staples. For this task, I like to use wider, 7/16-inch or 1/2-inch crown staples (the kind that you might use to put up plastic or a vapor barrier) rather than narrower, 3/8-inch crown staples, which tend to bury themselves halfway through the thin plywood panels. In addition, the wider crown staples have more holding power **(13)**.









After installing the panels, the author flipped the assembly over and smoothed over the joints with a belt sander **(14)**. A couple of 2x4 deadman supports propped up the ceiling while the crew first nailed and then screwed it through the drywall and into the framing **(15)**. Cove molding covers the joint between the frame-and-panel ceiling and the walls **(16)**. The painted ceiling in the transitional hallway complements the trim in the adjacent entryway and living room **(17)**.

When all the panels were in place, I asked a couple of other carpenters on the job to carefully help me flip the assembly so I could sand the face **(14)** and carefully cut out the hole for the light box.

Installation. We had to move the ceiling assembly only a short distance to install it, positioning one man on each side to support it during the move. First, though, we carefully marked the locations of our ceiling joists to nail and screw into and made layout marks for the edges with a 2-inch gap all around to properly orient the assembly so that it didn't get misaligned.

Since I wanted to take pictures of the installation process, I cut a couple of temporary 2x4 support legs to length to act as a fourth pair of hands and help the other three guys until they could shoot enough nails to attach the assembly to the ceiling **(15)**. It took a few minutes to double-check the layout and make sure we centered up perfectly on the electrical box for the light fixture, so the 2x4 legs really came in handy. Afterward, we added trim-head screws at each fastener location for extra strength.

To finish up, we added the same cove-molding detail that we had used in the rest of the house **(16)**. Our client was very happy with the result, especially after the paint crew had primed and painted the ceiling along with the trim work, and the electrician had wired up the ceiling fixture **(17)**. The frame-and-panel detail creates a strong visual impression without being overly traditional in the most public area of the home.

Gary Striegler, a JLC contributing editor, owns Craftsman Builders, in Fayetteville, Ark. (craftsmanbuildersnwa.com), and teaches workshops at the Marc Adams School of Woodworking. Follow him on Instagram at @craftsmanbuilders. He will be presenting trim-carpentry building clinics on the show floor at JLC Live in Providence, R.I., March 2024.