



A better way

California custom cabinetmaker develops bit and software program for mortise and tenon box construction solution on a CNC router

By Jeff Crissey

There are those who are content doing things the way they've always been done, and there are those who innovate and create better methods. David Hilker, president of Hilker's Custom Cabinets, is the latter. Unhappy with the poor performance prospects of butt joint construction and the time-consuming dowel and dado construction methods, Hilker set out to find a way to machine cabinet boxes and drawer parts with the idea that he could load a sheet of material onto a CNC router and unload parts that required no further material handling or machining steps.

"Our typical project is for houses in the 14,000-sq.-ft. range, and we are generally doing \$200,000 to \$300,000 worth of cabinets in a home," says Hilker of his San Jacinto, Calif.-based business. "These are houses on a grand scale, mainly on the coast in the Rancho Santa Fe, La Jolla and Newport Beach area."

Driven by a clientele that wants only the best, Hilker's Custom Cabinets strives to create cabinetry that provides the highest quality construction methods to match the high-end designs that include 12" moldings and ornate door styles.

"Although there are a lot of people who would contest this, I think doweling is the slowest method on earth for assembling cabinets," says Hilker. "Dado joints should be quicker, but to get them to fit correctly can be time-con-

suming, and butt joints aren't really joints at all. When you're manufacturing box parts, people don't realize the time is spent in handling material. When you are making custom cabinets and you have 5,000 different parts, it's not readily apparent what each part is, so the worker has to pick it up, identify it and then figure out what further machining steps are required, orientate it and load it on the next machine. The actual machining only takes seconds, but the part identification and material handling take forever, and that's what I wanted to eliminate."

Hilker's solution, five years in the making, is a mortise-and-tenon joinery system nested on a CNC router using specialized tooling, completely eliminating the need for secondary machining operations (except for flipping some partitions). Named TenonCam, Hilker's patented specialized tooling bit indexes from the spoil board to mechanically locate the tenon, but it is processed by the computer, while automatically accounting for material thickness variations. Hilker developed software in conjunction with CabinetVision to make TenonCam a turnkey plug-in and a local tooling company to develop trial bits.

"Cabinetmakers often think the way they do things is so special and custom that there is no software program that could ever get the job done," says Hilker. "They will create drawings and a manual cutting bill, then make a mistake and compensate for it on the fly. They've been doing it for



so many years that the concept of sitting down and defining the way they build cabinets is three strikes against any automated software program right off the bat. In reality, software companies have created programs capable of incredible things. One of the best things that CabinetVision did was to allow people with knowledge of scripting to modify the core program via user-created standards. Once you have it set up – and it took me five years to get it the way I wanted it – it becomes the quickest thing on earth.

“I made my initial bit drawing and took it to a local tool company, who first made a carbide-tipped wing cutter. That didn’t work, so we manipulated the degree of compression shear angle. Ultimately, I went to a solid carbide compression spiral bit to form the tenon. We wanted to be able to cut melamine, veneer core, MDF and all other materials with no tear-out.”

To handle the machining of his mortise-and-tenon joinery, Hilker purchased a 5000 Series CNC router from MultiCam last year, replacing the company’s manual methods of panel processing. The 4’ x 10’ router, which the company also uses for construction boring, is equipped with a 12-spindle carriage and nine-position drill head.

“I started researching machinery options about five years ago,” says Hilker. “I always thought CNC routers were capable of doing this type work, but I thought the software was just really coming-of-age at that point. Nested-based manufacturing appealed to me because it is designed to put sheets on and take finished parts off, and this process allows just that. We use it to create a traditional mortise-and-tenon joint with the face that we want to control down to the router table as you would



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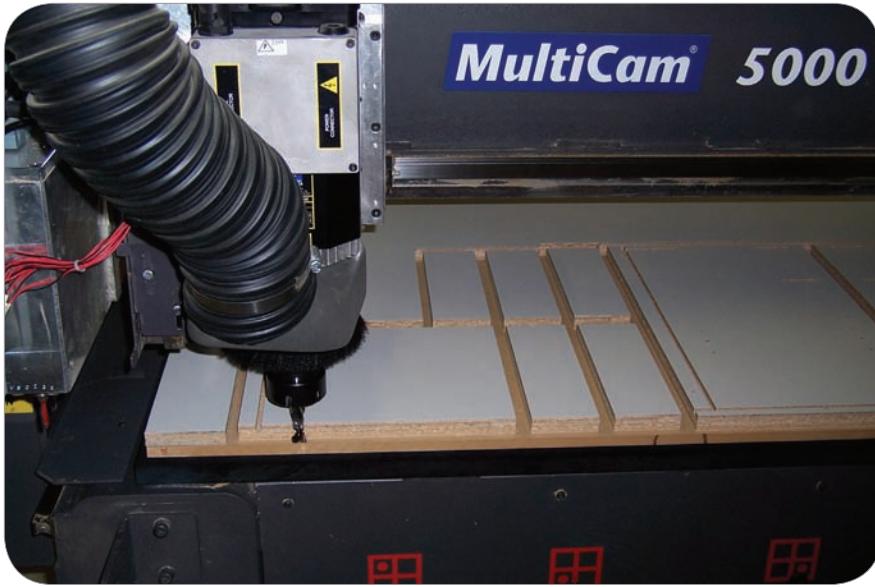
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its door construction. The rails and stiles are machined on an Accu-Systems MMTJ, a single-sided machine for doing miter, mortise and tenon work.

“We have some proprietary door styles we’ve developed over the years, as well as styles that interior designers and architects have designed,” says Hilker. “We are always being asked to do more heavily molded and ornate door and panel styles than what is commonly available, so we will run our own moldings, including crown and base. On the caliber of houses we’re doing, our customers don’t want to go next door and see the same type door. They are not paying that kind of money to have stock cabinet doors and trim.”

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on a shaper or double-end tenoner. Any material thickness variation goes to the inside of the cabinet and becomes insignificant.”

Hilker’s Custom Cabinets also manufactures its own cabinet doors, employing mortise-and-tenon joinery for

For more information, circle: #418 for TenonCam; #419 for Planit; #420 for MultiCam; and #421 for Accu-Systems on the Reader Service Card.



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