

Kitchen Cabinets from Components

With careful layout and efficient assembly, you can piece together affordable cabinets from mix-and-match doors, drawers and boxes

by Sven Hanson and Joel Wheeler



Wood adds the custom touch. This bright, Santa Fe-style kitchen is dressed up with cabinet doors and drawer fronts made of pickled maple. The cabinets behind them are affordable modular boxes made of laminated particleboard.

For more than 13 years we've been building premium furniture and custom cabinets in Albuquerque, N.M. In that time, costs have risen, but competition has kept our prices low. About five years ago, we began looking for a partner who could help us stay competitive. That partner turned out to be not just one but a group of companies that make cabinet components.

Component manufacturers make everything from a single, simple square box to elaborate as-

semblies that will cover the wall. The cabinets arrive in tightly packaged bundles of flat panels (called knocked down, or KD). Large retailers such as IKEA sell KD cabinets to brave and thrifty do-it-yourselfers. The retailers include extensive instructions with the components, and market them under the category RTA, which means ready-to-assemble. We often get calls from do-it-yourselfers to help them to complete their jobs, so we don't mind the competition.

Some fabricators deal in machined components made of particleboard veneered with vinyl, polyester or wood. Others carry solid-wood components such as face frames, boxes, doors, drawer fronts, shelves, and drawer sides and bottoms.

Manufacturers show their wares in well-organized catalogs. For some (Components Plus), you specify what you want, and they tell you what you need and give you the prices. Others (Cab-Parts) let you pick from a huge assortment

of shapes and sizes. Then, you add up the costs based on the price list and order the parts by catalog designation.

Typically, we buy KD cabinets and drawers from one manufacturer, doors from another and hardware from our local mail-order distributor (TJ Hardware Inc., P.O. Box 30308, Albuquerque, N.M. 87190; 800-4624266). If we need a hardwood drawer, we go to another fabricator. The result is a set of cabinets that combine the look of custom woodwork with the efficiency of modular construction (photo facing page). As a ballpark price, you can figure the base cabinets will cost about \$70 per running ft. and the upper cabinets \$60 per ft. This price includes the carcasses, drawers, raised-panel doors and necessary hardware. All these parts fit together because the dimensions are standardized and we are meticulous in our specifications.

They call it Eurostyle—Component makers offer the greatest cost savings when supplying frameless cabinets predrilled with two vertical rows of holes spaced on 32-mm centers (photo right). These holes, about 1¼-in. apart, accept shelf pins and hardware-mounting screws.

This style of cabinet construction is called Eurostyle because it was developed in Europe as a response to the devastation of World War II. Europeans needed to get back into the 20th century quickly, and they had to do the job with limited resources. Fractured forests yielded more particleboard than solid lumber, and a decimated work force didn't have time to rebuild an entire continent using their traditional hand craftsmanship. So cabinetmakers and manufacturers of machinery and hardware worked to standardize all aspects of cabinet dimension and construction. That standardization included ditching traditional face-frame cabinets in favor of slab construction.

The hinge hides on the backside of the door, and the flanges that secure the hinge to the cabinet have screw holes on 32-mm centers. The doors hide all but about ⅛ in. of the edge of the carcass. The universal nature of the door-to-hinge-to-cabinet relationship permits a complete remodel of the cabinets for the cost of a new set of doors and the time it takes to install them. For cabinetmakers, that's a good way to sell around the "I'm not sure I'll like it forever" objection.

By ordering premachined parts, we run a safer, cleaner, quieter shop. Each job ties up the shop floor for less than half the time that it takes to build cabinets from scratch. But you've got to knock them together fast. Even more importantly, you must take the basics of a floor plan, turn it into a functioning design and, from it, order the correct parts.

Ordering the cabinets—We begin the cabinet layout with a plan of the room and place center lines on counter-mounted fixtures such as sinks and range tops. Then, we draw in boundaries for areas reserved for stove, refrigerator, compactor, dishwasher and microwave (consult the appliance manuals for clearance requirements). We're also careful to note the positions of walls, doorways and windows on the plan.



Hardware first. Before assembling the boxes, Michael Fratrack screws the hinges and the drawer tracks to the sides of the cabinet. The holes to the left of the slide receive the doweled drawer divider.

From these fixed positions, we determine the unbroken runs of cabinets and figure out how many it will take to fill out the run. Cabinets are sized in 1½-in. or 3-in. increments, depending on which company we're ordering from. Any gaps left over are finished with filler strips.

We prefer to keep cabinet doors in the range of 20-in. wide. Doors that are wider than 22 in. to 24 in. have a tendency to warp, and their manufacturers won't guarantee them for flatness. For a

kitchen to look right, the majority of the doors need to be taller than they are wide.

We can order cabinets that have nonstock dimensions, but there's a hefty penalty to pay. A typical premium is \$5 to \$10 for a change in width or depth, and \$15 for a change in height. And if you've got a base cabinet with nonstandard drawers, you can figure an additional charge of about \$3 per drawer. So when the dimensions get odd, the costs mount quickly.



Building a box. Hardware installed, the box is ready to assemble. Here, the last side is aligned with dowels in the top, the bottom and the drawer divider. The back panel will tuck into the dado in the cabinet side.



Glue secures the back panel. Karen Umland runs a bead of hot glue around the back panel to affix it to the cabinet's sides, back and bottom. The plywood strip on the right is a hanger bar for the cabinet.



Drawers are just small cabinets. Also made of laminate-covered particleboard, the drawer boxes have the same construction details as their cabinets. Here, a drawer slide is being affixed to the bottom of the drawer.

Ideally, the doors of the upper cabinets should line up with doors and drawers of the lower cabinets. In practice, however, this is tough to accomplish. Windows, sinks and other obstacles often derail the strictly aligned approach.

At inside corners it's important to use adequate filler strips (at least 2-in. wide) to allow drawers and doors on both sides of the corner to pass each other. Clients can more easily forgive over-size fillers than cabinet doors that can't be opened. We also want fillers at wall intersections to allow us to scribe to the curvy walls typical of New Mexico's residential architecture. In Euro-style, we don't have an overhanging face frame to provide scribing room.

Basic dimensions figured, we go to the appropriate catalog—or, in the case of Components Plus, we just fax them our list of sizes, and they fax us back our list and the prices. One way or the other, the business of estimating a cabinet installation is greatly simplified by having the first half or our cost computed exactly. The Compo-

nents Plus order can even include the hardware, and that might sway a first-timer or a builder working in a remote location. But you'll save more money by buying in bulk (25 slides or 50 hinges) from a hardware supplier.

Quick assembly is the key—We win or lose the time/money part of this deal at the assembly stage, so we set up the shop to allow our best mechanics to work at full speed. When the parts arrive, we put them into groups: drawer sides; individual cabinet sides and tops; backs; and miscellaneous parts. After this step, we drive the dowels into the horizontal members—cabinet bottoms and drawer dividers. The dowels are held fast by a glue supplied by the manufacturer.

Our cabinet assemblers work on a smooth, 18-in., high bench, assembling the boxes according to a set of instructions provided by the manufacturer. With two cabinet sides laid flat and placed top to top, mechanic Michael Fratrack lightly pencils in positions for hardware. Fratrack uses the

Magic Wand, a layout tool made by Blum. If you don't have one of these tools, you can use a good ruler with enhanced markings to show the 32-mm centers and the positions of the hinges and drawer slides.

On a base cabinet, Michael positions the drawer slides and hinge mounting-plates (photo p. 75). He fastens them into the holes with 5mm stud screws. He then squirts a bit of glue into each of the dowel holes on one cabinet side and wrestles the horizontal parts into proper position. He drives them down by striking the dowels on the other end with a rubber hammer.

The back goes in next, then the otherside goes on (left photo, above) and the rubber hammer slams it home. Instead of clamping, we staple the joint, which provides additional reinforcement.

Michael places the cabinet face down and squares it up by comparing diagonal measurements. Meanwhile, our other mechanic, Karen Umland, glues the hanger bar (a strip of plywood that reinforces the cabinet back where the

mounting screws will attach it to the wall) along the top edge by pressing it into a wavy bead of hot glue. With the same hot glue, she puts a bead, or fillet, around the back-panel perimeter (top right photo, facing page). The result: a square, sturdy cabinet. We have never gotten a customer complaint on carcass quality.

Next, the drawers—The drawers go together in the same manner as the cabinet carcasses. It may seem like a small thing, but the repetitive process means we don't have to change tools or mental gears. No doubt the similarity of material and structure saves time at the factory, too.

After sliding the bottom into place, Michael hammers on the other side. Then, he checks the drawer for square and runs a bead of hot glue around the bottom-to-side connection. He next installs the tracks with $\frac{5}{8}$ -in. #6 nickel-plate deep-thread screws (bottom right photo, facing page).

Ordering and drilling the doors—The doors make up the vast majority of visible surface on a true Eurostyle-cabinet job, so we put a lot of energy into helping the client choose the doors. Ordering doors is simplest when done through your carcass suppliers. They'll automatically make the doors to fit, but you're usually limited to particleboard and laminated work, albeit some fancy styling including rolled edges and running edge pulls. For a more traditional look, we order raised-panel doors from another source.

Various manufacturers offer a wide selection of wooden doors. Most species are familiar North American hardwoods, but some you may never have heard of. Door manufacturers also offer scores of panel profiles, edge profiles and inside edge-bead profiles. Some suppliers will finish doors for you, and they also will drill for hinges and pulls.

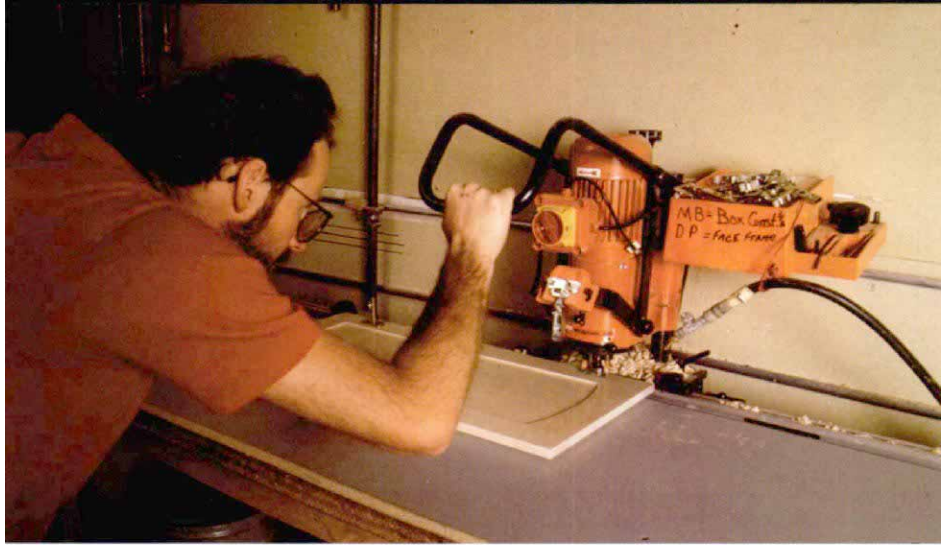
The usual dimensions are the same height as the case, but $\frac{1}{8}$ in. (3 mm) shorter and narrower. That leaves an $\frac{1}{8}$ -in. reveal between doors in a run of cabinets. We leave a minimum $\frac{3}{16}$ -in. gap at a wall to ensure room for the door to open.

Our doors arrive without the holes drilled for mounting the hinges. That way, the door suppliers haven't had to concern themselves with which way the doors open, which cuts down on costly mistakes. Now comes the part where the assembler displays some true craftsmanship, or at least a talent for accurate measurement.

The European-style hinge needs three holes to attach to the door (middle photo, right). In the center is a 35-mm ($1\frac{3}{8}$ in.) by 13-mm deep hole that receives the hinge cup. The edge of this hole is 2 mm to 3 mm from the edge of the door. In addition to the 35-mm hole, the hinge needs two $\frac{7}{8}$ -in. dia. holes for the #6 mounting screws.

We do our drilling with a three-spindle machine costing roughly \$2,600 and made by Blum (top photo, right). Other hinge suppliers offer a similar device.

To mount hinges using an ordinary drill press, you first install the 35-mm bit, rotate one cutter next to the fence and move the fence $\frac{1}{8}$ in. away from the bit (check the specs for your hinge). Clamp the fence in place. We adjust the table to



This machine drills three holes at once. When it's done boring the holes for the hinge, this specialized drill press inserts the hinge into the circular mortise.



Hinges are adjustable. Slots in the hinge-mounting plates allow the hinge to be moved in and out, and up and down, which makes it easy to get the door to lay flat, square and centered on the cabinet.



Installing the doors. Once the boxes are assembled, Fratrack snaps the doors onto their hinges and tinkers with their final positioning with a screwdriver. Sink bases make up the top tier of cabinets. They sit atop a row of base cabinets.



Fitting a drawer front. Drawer fronts in a European-style kitchen must be installed accurately. Two threaded, adjustable inserts are let into 20-mm holes in the back of a drawer front (above), which is then attached to the box with machine screws run into the inserts (below).



Affixing the drawer front. The adjustable inserts allow the drawer front to be moved $\frac{1}{8}$ in. in each direction. When alignment is right, drywall screws make the positioning permanent.

hold the work 1 in. below the bit and set the depth stop to drill to a depth of $\frac{1}{2}$ in. + $\frac{1}{32}$ in. That give us a little allowance if we have thin stock or dust in the hole.

For the majority of the doors, the center of the 35-mm hole is $3\frac{3}{16}$ in. to $3\frac{3}{4}$ in. from the top and bottom of the door. So we set the appropriate stops on the drill-press table to let us quickly register the hinge positions. Special-purpose cabinets sometimes need different hinge positions, and tall doors will need additional hinges. A glance at the positions of the hinge-mounting plates on the cabinets tells us whether we are using the correct set of stops on our hinge machine.

To test the accuracy of our stops, we drill hinge-mounting holes in a 2-in. wide scrap cut to the length of the door. Then, we screw the hinges on the test stick and install the stick on the cabinet. If it sits right and opens cleanly, not hitting cabinet edge or adjacent door, we know the setup is ac-

curate, and we go ahead and drill and attach the doors (bottom photo, p. 77).

Cabinet ends and drawer fronts—Picture the classic window over the sink. Now, glance to the side at the upper cabinets, and you'll likely see a surface that the neophyte designer forgets about. Without some additional treatment, the cabinet sides are probably gleaming white or champagne polyester.

An attractive alternative includes peel-and-stick veneer, prefinished to match the doors and applied to a clean, flat end panel. For a slight additional cost, we apply a raised panel to those ends. To make this look right you've got to make sure the visible edge of the panel is finished, and the door has to be wider by the thickness of the panel's frame. The hinge position has to be adjusted accordingly by using a different base plate.

Drawer fronts are the same widths as the doors. Two typical heights for drawer fronts are 5 in.

and 6 in. Aligning drawer fronts so that the gaps between adjacent drawers are equal is a finicky business. Back in the old days, we used to rely on tricks such as putting small tabs of double-sided mirror tape on the drawer box. Then, we'd slide the drawer into its box, position the drawer front so that it looked right and press the drawer front to the box, hoping it would stick long enough to anchor it with a couple of screws driven from inside the drawer. Now, we use "drawer-front adjusters" to attach fronts to boxes. The adjuster has a threaded-steel insert floating inside a slot in a 20-mm barbed-plastic dowel (top left photo above).

We put one of the adjusters at each end of the drawer front—about 3 in. from the end and roughly centered. The adjusters nest in 20-mm holes that are 10.5-mm deep. We drop 20-mm dowel centers into the holes, press the drawer front to the drawer box and slam it with a fist to mark the drawer box. Through these marks, we

drill 5-mm holes using a brad-point bit and a backer block to reduce tearout in the drawer.

Then, we press the adjusters into the holes in the drawer front and attach it to the drawer box with a couple of machine screws (bottom left photo, facing page). The inserts in the adjusters allow the drawer front to be moved up and down, and side to side about 1/8 in. in all directions. Once we complete final on-site adjustments, we affix the drawer fronts with a couple of 1 1/4-in. drywall screws (right photo, facing page).

Installation notes—In a true Eurostyle job, the upper cabinets hang from a metal Z-bar attached to the wall. Installers hang and adjust the cabinets using special cam-action hangers inside the boxes. The hanger-bar system lets a single worker hang cabinets. I suppose these are clever devices, but we don't mess with them. The hardware costs extra, and the cabinets inevitably have to be notched in places to fit over the bars.

Instead, we install the upper cabinets by screwing through the hanger bars that we've glued to the backs of the cabinets. One installer holds the bottom aligned with a line drawn level from a point 54 in. above the floor, while the other shoots in the screws. That's American style.

Most of the manufacturers sell a combination leg and leveler for their base cabinets. You adjust the levelers with a screwdriver passed through a small access hole inside the cabinet. A press-on cover then hides the hole. After leveling cabinets, you snap the toe kick onto the front leg levelers.

For a couple of reasons, leg levelers have not received wide acceptance in the United States. In Europe, cabinets typically belong to the household, not to the house. Far fewer Europeans own their own homes than Americans, and when Europeans move, they take their cabinets.

The levelers cost only about \$8 per set, but with labor added, that's too much for single use. We construct 4-in. tall bases of 3/4-in. CDX plywood. To level the bases, we crawl the floor with a 4-ft. level until we've determined the highest point in the runs. We start there and level all the bases to that point using shims, construction adhesive and 2x4 blocks glued and nailed to the floor and screwed to the bases. This makes our foundation strong (to learn more about installing cabinets, see *FHB* #85, pp 48-53).

We still build cabinets from scratch when they have to be customized to fit a particular installation. But for the straightforward jobs, using components effectively doubles the size of our shop and lets our skilled cabinetmakers concentrate on the one-of-a-kind projects that they relish.

We can't claim that cabinets from components will turn you into a master cabinetmaker. And we can assure you that making cabinets from components won't work if you like to fake it as you do a job. But if you understand basics of cabinet design and if you can measure accurately and assemble in an orderly fashion, making cabinets from components can really work. □

Joel Wheeler and Sven Hanson are friendly competitors in New Mexico's furniture and cabinet market. Photos by Sven Hanson except where noted.

Cabinet-component suppliers

The manufacturers listed below offer a range of cabinet components, from KD (knocked down) cabinet carcasses to hardwood frame-and-panel doors. In addition to these suppliers, which all ship nationwide, there are countless other regional or local shops too small or too busy to advertise nationally.

Accent Manufacturing;
1585 Mabury Road, Unit B,
San Jose, Calif. 95133; (408)
926-3667, Fax 408-926-0890.
Cabinet-box components,
shelves, drawers, hardware,
drilled doors in laminates
with custom radii, wood-slab
and veneer doors. Sell to
cabinet shops, builders and
related trades.

Cab Parts
716 Arrowst Road, Grand
Junction, Colo. 81505; (303)
241-7682, Fax (303) 241-
7689. Component cabinets
including drawers,
adjustable shelves, roll-out
drawer boxes. Simple line of
cabinets with
comprehensive catalog of
sizes and styles. Sell to
cabinetmakers and
contractors who make their
own cabinets only.

**Components Plus-Vass
Inc.**
3405 Walnut St., Denver,
Colo. 80205; (303) 292-1040,
Fax (303) 292-1041. Line of
melamine cabinet
components featuring 1 1/2-in.
width increments. Dowels
are preinstalled in
horizontal pieces. Doors and
drawers are predrilled for
European hardware. Edge

banding available in pvc,
laminated, wood tape or solid
wood up to 12 mm thick.
Sell to cabinetmakers and
contractors who make their
own cabinets.

**Conestoga Wood
Specialties Inc.**
245 Reading Road, P.O. Box
158, East Earl, Pa. 17519-
0158; (215) 445-6702, Fax
(800) 722-0427.
Comprehensive line of
frameless and face-frame
cabinets, doors, drawers
including dovetailed wood.
Mind-boggling list of
merchandise. Sell to
cabinetmakers and
manufacturers only.

Hutchinson Products Co.
P.O. Box 12066, Oklahoma
City, Okla. 73157; (800) 847-
0091, Fax (405) 946-4446.
Wood or MDF door and
drawer fronts in slab or
frame-and-panel. No
finishing, drilling or
hardware.

Mar-Flo Inc.
8 Fox Court, Dumont, N.J.
07628; (201) 742-4765, Fax
(201) 742-9471. Solid wood
doors in more than 100
styles, finished or
unfinished. Sell to

cabinetmakers, contractors
and savvy owner-builders.

Porta Door
65 Cogwheel Lane, Seymour,
Conn. 06483; (203) 888-619L
Fax (203) 888-5803. Doors,
drawer fronts and drawer
boxes. Finishing available.
Sell to cabinetmakers and
contractors.

Scherr's Cabinets
5315 Burdick Expressway
East, Rt. 5, Box #12, Minot,
N.D. 58701; (701) 839-3384,
Fax, (701) 852-6090. Box
components, drawers
(including dovetailed solid
wood) hardwood doors, raw
or stained and finished.
Drilling and hardware
optional. Sell to cabinet
makers, contractors and
savvy owner builders.

**Top Drawer Components
Inc.**
700 N. Neely St., Suite 4,
Gilbert, Ariz. 85233; (800)
745-9540, Fax (602) 926-9601.
Dovetailed drawers of wood
and melamine in sizes from
2-in. to 14-in. high.
Assembled or RTA, the wood
is finished with two coats of
vinyl sealer and one coat of
precatyzed lacquer. Sell to
anyone.

Cabinet-hardware suppliers

European-style cabinets require hinges, drawer slides, fasteners and assorted jigs and tools that aren't always readily available. Here's a list of manufacturers who can steer you to a local supplier, or to mail-order houses that can fill your order.

Alfit America Inc.
7801 Redpine Road, Suite J,
Richmond, Va. 23237; (800)
451-0444. Drawer slides,
assembly fittings and
adjustable attachment
blocks.

Amerock Corp.
4000 Auburn St., P. O. Box
7018, Rockford, Ill. 61125-
7018; (815) 963-9631. USA-
made European and
traditional hardware.

Julius Blum Inc.
Highway 16, Lowesville,
Stanley, N.C. 28164; (704)
827-1345. European
hardware, jigs and tools.

Grass
1202 Highway 66 South,
Kemersville, N.C. 27284;
(910) 996-4041. Full range of
hinges and hardware.

Mepla Inc.
909 W. Market Center Drive,
High Point, N.C. 27260; (910)
883-7121. Full range of
European hardware, tools
and jigs.

Salice America Inc.
3301 Woodpark Blvd., Suite
P, Charlotte, N.C. 28206;
(704) 598-7258. Full range of
European hinges.