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WOOD®

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THE SHOP ISSUE

Custom Workshop Cabinets p.36
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Low-Cost Lighting Upgrades p.60

CRAFT A SHOP (OR A KITCHEN) FULL OF OUR BEST-BUILT CABINETS EVER! p.36

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Sand boards up to 22" wide

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- 0–15 FPM variable-speed feed
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SHOPAHOLIC

DO YOU WORRY THAT YOU SPEND MORE TIME WORKING *ON* YOUR SHOP THAN *IN* YOUR SHOP? NEVER FEAR. WE'RE HERE TO HELP. HELP ENABLE YOUR SHOP ADDICTION, THAT IS.

When you buy a tool, do you dream of all the jigs, bases, storage, and accessories you get to build for it rather than the furniture you can build with it? Is your latest workbench in better shape than your decades-old dining table? Do you excuse yourself from family gatherings to go sharpen and shine your chisels?

If you answered yes to these, pull up a padded shop stool and let me welcome you to The Shop Issue—our tribute to your temple: the woodshop. Whether your shop is a means to an end or the end in itself, this issue is for you. On *page 50*, we show you how to tune up a workhorse of your workshop: the planer. And on *page 22*, we reveal the year's most innovative tools; start making room in your shop now. We discuss today's options in workshop lighting on *page 60* which make it easier than ever to make your shop even safer and more inviting. That's in addition to our reader-favorite *Shop Tips* and *Your Shop* columns.

But the centerpiece of this year's Shop Issue is an in-depth masterclass on building shop cabinets on *page 36*.

One of the dubious and exaggerated résumé entries that helped me land a job at *WOOD*® magazine nearly two decades ago was a teenage summer job working at a small remodeling and cabinet shop—meticulously stick-building face frames in hopes they landed flush with the plywood, crawling into dark carcases to inhale polyurethane fumes as I chased drips and runs with a badger-hair brush, wrestling heavy base cabinets to level them for installation. And while that left me with passable cabinetmaking capability, it didn't exactly fuel my enthusiasm for that particular branch of our hobby.

Kevin, our Senior Design Editor, on the other hand, has refined his cabinet-making techniques to an effortless art form through years of custom kitchen and shop-cabinet installations. This article is the culmination of those years of experience, and you'll want to mine it for its wisdom even if cabinets aren't in your immediate future.

In it, you'll see that pre-finished plywood greatly speeds the interior finish. A foolproof dadoed carcase and face frame snap together like Lego with applied end panels that blend away seams. A separate ladder base eases installation and leveling. Undermount slides maximize drawer space while hiding from view. And hyper-adjustable concealed hinges practically install themselves while eliminating the fear of misaligned doors. He's even provided two configurations of the same base cabinet to let you mix, match, and alter for your shop's needs.

If you've been putting off outfitting your shop with needed storage, use this article as your procrastination buster, putting your dream shop within reach. You'll want to move in permanently. Or better yet, you'll want to apply these same techniques to outfit your kitchen or bath in stunning style.

And don't worry: If you're one of those weirdos that *does* like to build the occasional non-shop project, we've got you fully covered with projects for the living room, kitchen, and patio.

So get out to the shop and build something—even if that something *is* your shop. We'll help.

Lucas

LUCAS PETERS
lucas.peters@woodmagazine.com
@peters.lucas

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Vol. 43, No. 1

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WOOD®
Issue No. 308 | March 2026

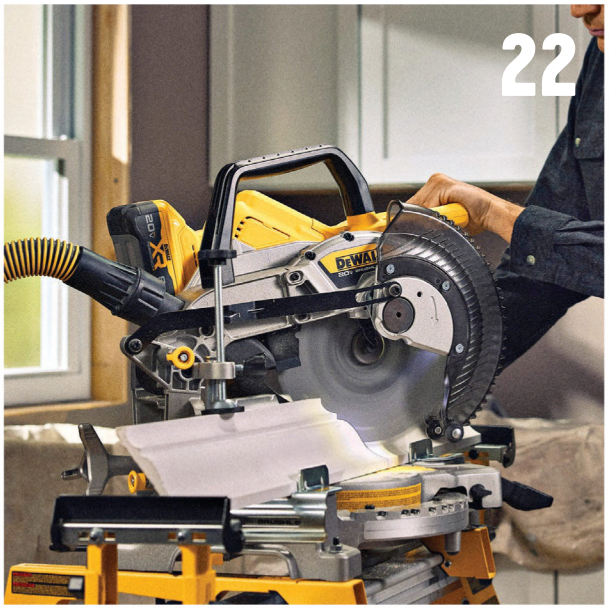
PLANS

ON THE COVER

36

Introducing *The Shop Issue*. We've packed these pages with the projects (like these cabinets) and the advice you'll need to give your shop the top-to-bottom makeover you've been dreaming of.

TOOLS & TECHNIQUES



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TOP-DRAWER TECHNIQUES

When you build drawers for your projects, are you a "butt joint and nails" kind of person or do you go all out with handcut dovetails? Your choice of joinery and hardware can range from practical to pretty. Let us help you get the most out your drawers.

DRAWERS 101

Learn the basics of good drawer design for your project.

- **Perfect Piston-Fit Drawers**
  woodmagazine.com/pistonfit
- **Insight on Inset Drawers**
  woodmagazine.com/insetdrawers
- **Build Super-Simple Drawers**
  woodmagazine.com/easydrawers
- **Purchase our handy Drawer-Box Helper plan:**
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SLIDE INTO SUCCESS

Select the right drawer slides and install them correctly.

- **Roll On With Ball-Bearing Slides**
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LOCKED JOINT

Create a strong, interlocking drawer joint on your tablesaw with a few simple steps.

- **Use the drawer-lock joint on the Rolling Kitchen Island. Find FREE plans at**
  woodmagazine.com/kitchenisland

Tears From a Volcano

Uniquely American stone ignites romance

On May 18, 1980, the once-slumbering Mount St. Helens erupted in the Pacific Northwest. It was the most impressive display of nature's power in North America's recorded history. But even more impressive is what emerged from the chaos... a spectacular new creation born of ancient minerals named Helenite. Its lush, vivid color and amazing story instantly captured the attention of jewelry connoisseurs worldwide. You can now have four carats of the world's newest stone for an absolutely unbelievable price.

Known as America's emerald, Helenite makes it possible to give her a stone that's brighter and has more fire than any emerald without paying the exorbitant price. In fact, this many carats of an emerald that looks this perfect and glows this green would cost you upwards of $80,000. Your more beautiful and much more affordable option features a perfect teardrop of Helenite set in gold-covered sterling silver suspended from a chain accented with even more verdant Helenite.

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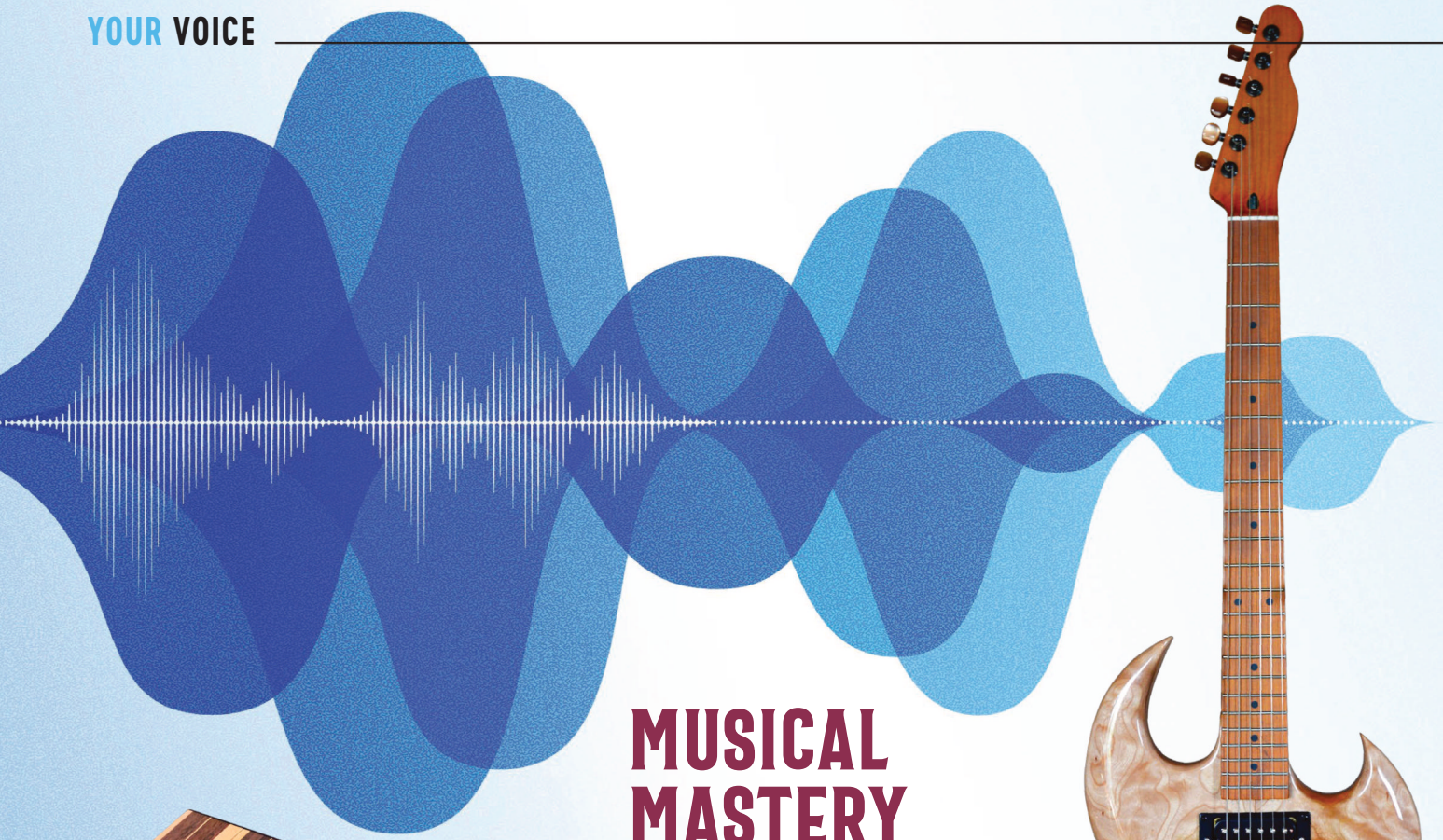


MUSICAL MASTERY

About three years ago, I purchased a guitar kit online but was very disappointed with the quality of the wood. Instead, I designed and built my own guitar from scratch using curly cherry. I have 17 more guitars in various states of completion. And I don't play guitar. But then, neither did Leo Fender. So I think I'm in good company.

George Vogel
Perry, Ohio

KEYS TO SUCCESS

When I first saw the "Well-Composed Cutting Board" in issue 244 (December 2016/January 2017), I was in awe of it. I knew it could be a challenge but I recently worked up the courage to make one. I have received numerous comments about the awesome 3D effect.

Richard Weik
Middletown, Pennsylvania

Purchase plans for the Keyboard Cutting Board.
woodstore.net/piano

BUSTIN' BASS

My son-in-law, Bryan Minerly, and I repurposed a neglected baby grand piano to hold an electronic keyboard for a local church. Not wanting to leave any pieces unused, we incorporated the pile of keys into an electric bass made for my son, Sam.

Graham Chase
West Hartford, Connecticut

CONGRATS TO ZACH!

Zach Brown, one of our contributing editors, won "Best of Show" at the Iowa State Fair woodworking exhibit for a pair of custom nightstands he made entirely from a single piece of Iowa walnut.

Here's what Zach says about his design and build process: "The legs pass through holes in the lower shelf, and the shelf gets pinned to the legs. The horizontal rungs act as drawer slides and bookends. They are halfway set into the legs (in a semicircle made with a Forstner bit) and also pinned in place. I rounded over the ends of the rungs and the mushroom-shaped drawer pulls with a knife.

"I turned the 1" legs and made the ⅝" rungs with a dowel-maker. I used Osmo hard wax oil with a matte sheen for the finish."

We think Zach's craftsmanship certainly deserves a blue ribbon.

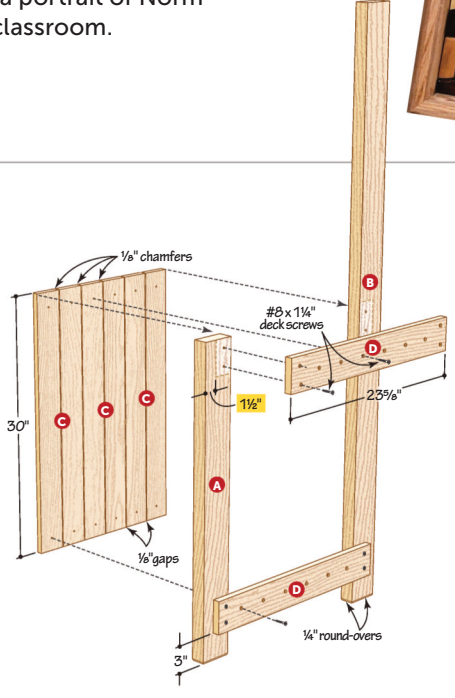
LEARNING BY DOING

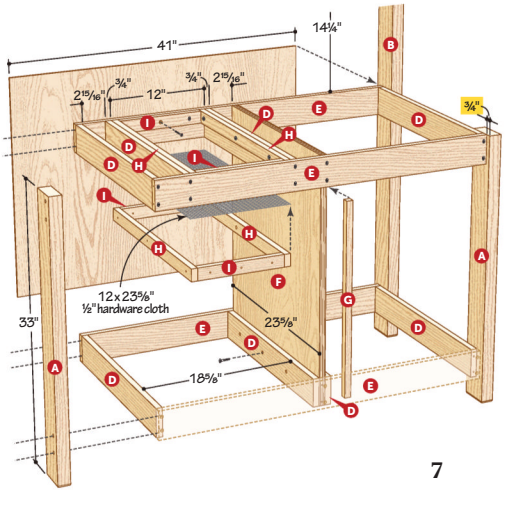
I'm the woodworking instructor at Abington Heights High School in Pennsylvania. I was hired three years ago to reestablish a dwindling program in our technical education department. I run an introductory course along with Wood I, Wood II, and Wood III. I have the opportunity to work with approximately 100 students each year. After I introduced them to intarsia, my Wood III students and I decided to take on a portrait of Norm Abram to hang proudly at the front of our classroom.

Justin Bechaver
Clarks Summit, Pennsylvania

CORRECTION

An observant reader pointed out problems with a couple of measurements on the "Simply Perfect Potting Bench" in issue 302 (May 2025). Drawing 1 on page 54 locates the bench rail (D) 1⅜" from the edge of the front leg (A). That setback should be 1½". This change means that in Drawing 2, the distance from the edge of the front leg to the face of the bench stretcher (E) will be ¾", rather than the ⅝" shown.





JIM KUEHN of Stillwater, Minnesota, thought it would be a fun challenge to design and build this rustic ski lodge table from odds and ends he has accumulated over the years. A pair of vintage skis serve as the runners. An antique sled serves as the tabletop and fits on a frame Jim built. He added a shelf underneath made from old boards.

Using his own design, **TIM LITTLE** of Lacey, Washington, built this pine ferry boat set for his nephew. He hand-lettered them: "Yuri" for the ferry; "Kwan Lamah" for the car, named after a resort owned by his grandparents 100 years ago in the San Juan Islands; and "Friday Harbor" for the firetruck, named for the town near the resort.

MATTHEW ROHR of Arlington, Virginia, made this wedding card receiving box for his son and daughter-in-law's reception. It's made of purpleheart and hard maple, and the sides accommodate 8×10" photos accessible through a removable and locking bottom panel. Along with an envelope slot, the top panel displays a photo or message.

DAVE SOCOTCH of Diamond Bar, California, salvaged an antique walnut headboard and footboard to make this porch swing. The headboard, with its ornate crest and carved designs, serves at the back of the swing. Dave cut the footboard in two to create the arms.

MIKE STEGMAN of Carthage, Missouri, built these nesting tables from Osage orange wood collected from his yard. He finished the trio with wipe-on polyurethane.

SEND US A PHOTO OF YOUR WORK

Want to see your work showcased in *WOOD*® magazine? Send a high-resolution digital photo of your completed project to ***woodmail@woodmagazine.com.***

continued on page 10

Blade Stunner

Beautifully made, magnificent to look at, this knife is a work of art at ***only $99***

Stauer Impossible Price ONLY $99 +FREE Sunglasses

It's not often you happen upon a blade smith who has gem cutting skills. But finding needles in haystacks is what we do best, so when we saw this master craftsman's handiwork, we made certain to procure some of these Southwestern masterpieces to complete our collection.

EXCLUSIVE FREE
Stauer 30x60 HD Pocket Binoculars
a $99 value
with your purchase of the Sedona Knife

The stainless steel blade, bolster and pommel are exquisitely etched and would have looked great with a less ambitious handle. But the results of overachieving are stunning here. The turquoise-blue colored handle is ablaze with assorted stones like jasper, marble, sunstone, and coral that have been hand cut and inlaid in a Southwestern motif.

But we don't stop there. While supplies last, we'll include a pair of $99, **30x60 power HD Pocket Binoculars** and a genuine leather sheath FREE when you purchase the Sedona Knife.

"I AM A KNIFE COLLECTOR AND THE SEDONA LOOKS GREAT IN MY COLLECTION."
— WILLIAM B.

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Knife Specifications

5" etched stainless steel blade; 9-1/2" overall length
• Turquoise-colored handle with accent stones including coral, marble, sandstone, tiger's eye, jasper and sunstone

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YOUR PROJECTS

After his grandson became an avid chess player, **BRIAN MOLLA** of Worden, Illinois, built this skeleton-character-themed chess set patterned after one he saw at an auction. The playing surface consists of maple and wenge squares pinned together with dowels. The sapele case features drawers and dividers made from cherry. Skull drawer pulls match the theme of the chess pieces.

Using white oak from a 100-year-old milk barn belonging to his wife's family, **DENNIS GAGNON** of Villa Park, Illinois, built this bathroom vanity for his daughter. It features two- and three-stack drawers at each end, storage space behind the doors, and a towel shelf underneath.

WADE NITZ of Hastings, Michigan, built this Monterey cabinet from cherry. This type of Prohibition-era furniture was made to resemble a chest of drawers but opens up to reveal a bar. Wade used his CNC router to engrave his adult son's initials on the drawer front.

WEE WORKSHOP WONDER

Squeezing a workshop into half of a two-car garage doesn't have to limit its woodworking potential. The key is careful tool placement and efficient workflow.

WRITER: RANDY MAXEY

Chuck aligned his tools and workbench, matching their table heights where possible, to support large workpieces. The layout aids project workflow through the shop.

Chuck retired after working 45 years for an industrial manufacturing company. During that time, he also served six years in the Pennsylvania Army National Guard.

SHOW US YOUR SHOP

Send high-resolution digital photos of your shop to ***woodmail@woodmagazine.com*** and we may showcase it in the magazine!

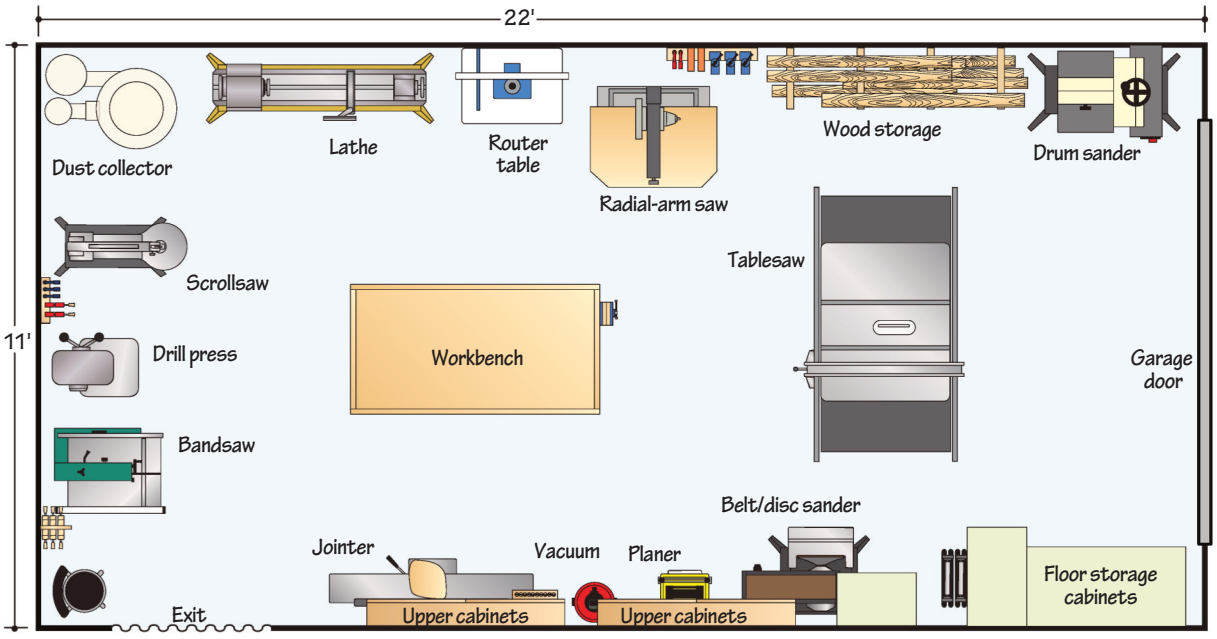
Moving from Pennsylvania to Indiana forced Chuck Trupe to downsize his shop. With only one space as an option, he told his wife, "You can do anything you want with the house, I just want half of the garage." Thankfully, she agreed that was a fair trade.

Chuck started by constructing a wall down the center of the garage. This serves two purposes. Most importantly, it keeps sawdust off his wife's car. And it provides ample wall space for locating shop equipment and mounting storage cabinets.

Next, Chuck began arranging his lifetime accumulation of tools, which presented some challenges in his one-stall space. He started by creating a scaled drawing of his shop area, using small paper cutouts of each of the stationary tools to experiment with layout options. He says, "I had to be very conscious of how I was going to move wood within the shop."

Chuck also didn't want to get rid of any tools, some of which have been with him for a long time. He still uses the radial-arm saw, belt/disc sander, and drill press he bought in 1974 after graduating high school. His wife gifted him the tablesaw in 1980, along with other tools over the years. Of course, he's made some upgrades as well, such as replacing his 4" jointer with a 6" model–which he bought for $6 at an auction. While he's clearly loyal to his tools,

PHOTOGRAPHER: CHARLES TRUPE II; **ILLUSTRATOR:** ROXANNE LEMOINE



Chuck does believe in making upgrades. See *Chuck's Woodworking Wisdom* on *page 14* for his advice about that and woodworking in general.

His drill press, located beside the bandsaw, serves as outfeed support when he rips long pieces on the bandsaw. He positioned the radial-arm saw so that long boards would be in front of his lathe and wood storage racks when he cuts them to length. His main workbench at the center of the shop serves as outfeed support for the tablesaw. A mobile base under the tablesaw allows him to move it around to accommodate larger boards or sheet goods. One benefit of the tight quarters is that everything is so close, requiring only a few steps to move from station to station.

While Chuck's shop looks cramped, he was careful to allow plenty of walking space to maneuver. Any tool or accessory he needs is only a few steps away.

CHARITY CHRISTMAS TOYS

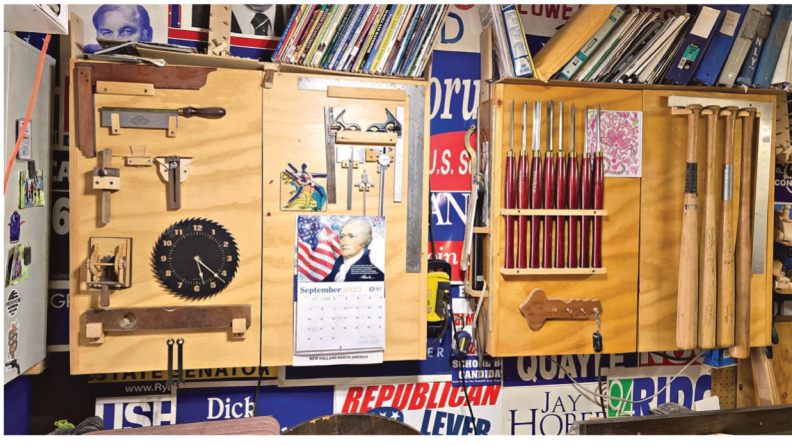
Chuck is a member of the Central Indiana Woodworkers club (ciww.org). The club's goal each year, in partnership with over 40 social service agencies, is to make 10,000 toys that are given out to children at Christmastime. Chuck's personal goal is to make 500 toys this year. Most of the toys are made out of 2×4s, but the club supplies the woodworkers with specialty items, like wheels and axles.

An interior hinged partition vastly increases the amount of square footage available for hanging tools. Magnetic catches hold the partition and doors closed.

A simple plywood wall cabinet houses Chuck's small tools and supplies, along with his treasured baseball collection. Sturdy continuous hinges support the doors.

In his previous shop, which was about twice the size of this one, Chuck built a lot of furniture. Since downsizing, he focuses mostly on making smaller items for his grandchildren and toys for charity (see *Charity Christmas Toys* on *page 13*).

Chuck reminds us that there are lots of projects of all skill levels you can make in a small shop. "Do you enjoy working with your hands and creating a family heirloom your great-grandchildren will enjoy long after you are gone? You don't need an air-conditioned 40×40' shop complete with a bathroom and shower to do that." Chuck says he still has the skills to make larger furniture pieces but gets great satisfaction making small toys for children. "I am a happier person after I get my shop time. Just ask my wife."

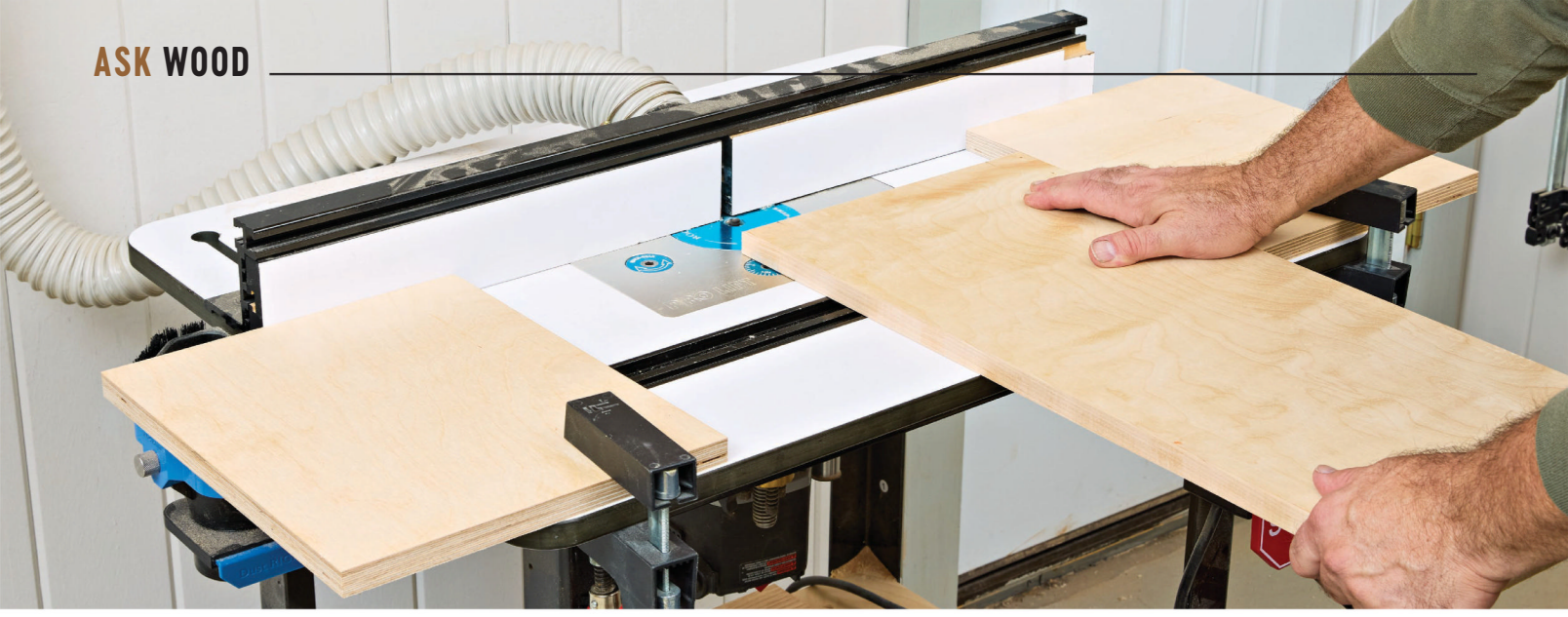


Leaving no space wasted, Chuck made custom racks for the cabinet doors to store a variety of hand tools and lathe accessories. The cabinet tops serve as shelves for storing books and plans.

CHUCK'S WOODWORKING WISDOM

Here's Chuck's advice for anyone interested in woodworking:

- Find a woodworking mentor. The best way to do that is to join a local woodworking club. Most have special interest groups covering about any aspect of woodworking you want to learn.
- When buying equipment, start with what you can afford and upgrade as finances become available.
- Subscribe to a woodworking magazine that matches your interests.
- It's okay to make mistakes—learn from them and move forward.
- Don't let a large or complex project overwhelm you. Just break it down into simpler components and take it one step at a time.



Q: STOP SHELVES FROM SLIP SLIDIN' AWAY

I recently built a cabinet with adjustable shelves. The front of the cabinet has no face frame, so the shelves tend to slide forward on the shelf supports when I pull items from them. How can I prevent this?

Clark Millinger
Erie, Pennsylvania

A: Shelf pins, or shelf supports, offer a great way to add adjustability to shelving. Some L-shaped shelf supports have a hole in the bottom face, allowing you to drive a small screw through the support and into the bottom of the shelf. While this secures the shelf, it also requires you to remove the screw if you ever want to change the shelf position. A better method, and the one we prefer, is to notch the underside of the shelves to fit over the shelf pins. This locks the shelves in place and hides the shelf pins.

How you create the notches depends on the type of shelf pins you're using. For spoon-style shelf pins, you can cut the notches by hand with a chisel, but a router table makes for a neater job and a more consistent depth, which is important to prevent shelf wobble. With the shelf pins installed in the cabinet, set a shelf on the pins and mark their location on the underside of the shelf. Select a straight bit that is the same width as (or slightly wider than) the shelf pins. Install the bit in your router table and raise the height to match the thickness of the shelf pin.

Position the router-table fence so the distance from the fence to the outer edge of the bit is equal to the exposed length of the shelf pin. Clamp a pair of scrap boards to the table to line up the marks on your shelf with the bit, then push the end of the shelf into the rotating bit, *top*. Test the fit of the shelf pin in the notch, *inset*.

For rod-style shelf pins, the procedure is identical. But instead of a straight bit, use a roundnose (core-box) bit that is the same diameter as your pin. The bit creates a half-round slot that fits over the pin, locking the shelf in place.

Note: **Do you have your own method for securing shelf pins? If so, share it with us at woodmail@woodmagazine.com.**

Have a question? Drop us an e-mail.
askwood@woodmagazine.com

★★★★★

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— Gene H.

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TOP SHOP TIP

RACK & ROLLER

My roller outfeed stand spent a lot of time just hanging on the wall, so I gave it a second life as a handy shop rack.

First, I crosscut a 1×6 just longer than the roller as a top. Then I added sides: a 1×4 on one edge and a wider board that rests on the stand's angled leg to hold the assembly level, which is important for holding my morning cup of coffee. A pair of cup hooks near the lower edge of the wide side lets me wrap a beefy rubber band around the leg to prevent tipping, and a cleat under the top fits tight against the roller. Finally, I added a French cleat to each side to hold any of several boxes I've built. The stand takes up little floor space in use while offering lots of storage. And when I want to use the stand as an outfeed roller, the assembly lifts off easily.

Sam Jenkins
Bastrop, Texas

For his Top Tip, Sam wins a Makita 18-volt Detail Belt Sander with battery and charger starter kit worth $530.

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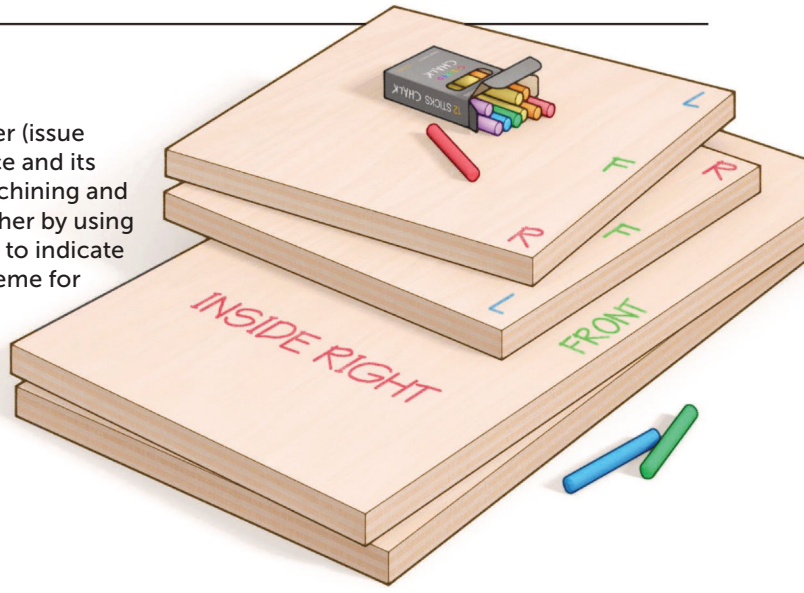
Because we try to publish original tips, please send yours only to *WOOD*® magazine.

ILLUSTRATOR: CHRISTOPHER MILLS

A MARK OF MANY COLORS

Here's a favorite tip I used while building the Tailored Tool Tower (issue 273, March 2021). Chalk works great for labeling each workpiece and its orientation. Chalk is durable enough to stay in place during machining and joinery but wipes away easily after assembly. I take it a step further by using colored chalk: red for the right side, blue for the left, and green to indicate edges or ends that face front or back. Sticking to this color scheme for every project makes it easy to orient each part and helps ensure that all the parts go together correctly.

Kelly Churchill
Cheyenne, Wyoming

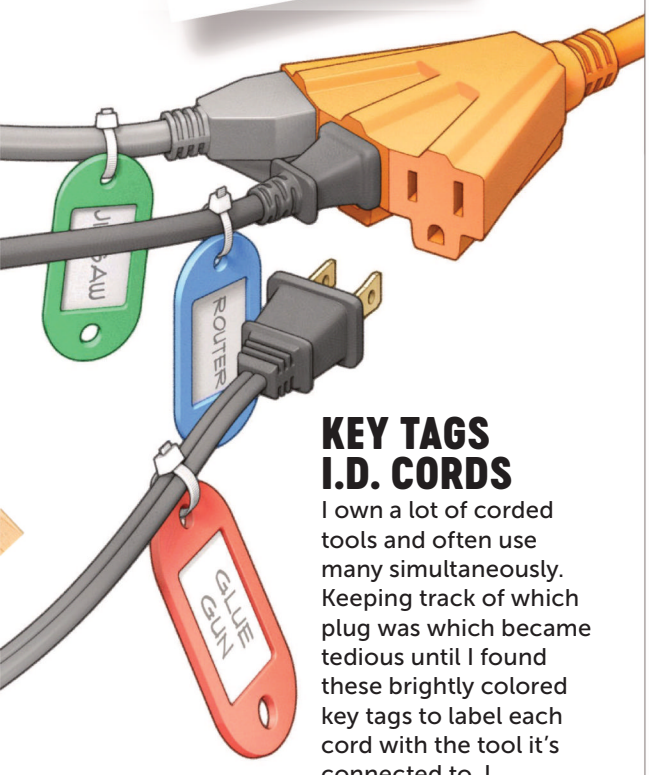


Download plans for the Tailored Tool Tower.
woodstore.net/tooltower

KEY TAGS I.D. CORDS

I own a lot of corded tools and often use many simultaneously. Keeping track of which plug was which became tedious until I found these brightly colored key tags to label each cord with the tool it's connected to. I fastened the tags to the cords near the plug end with a zip tie to make it easy to select the correct cord.

John Weber
Katy, Texas



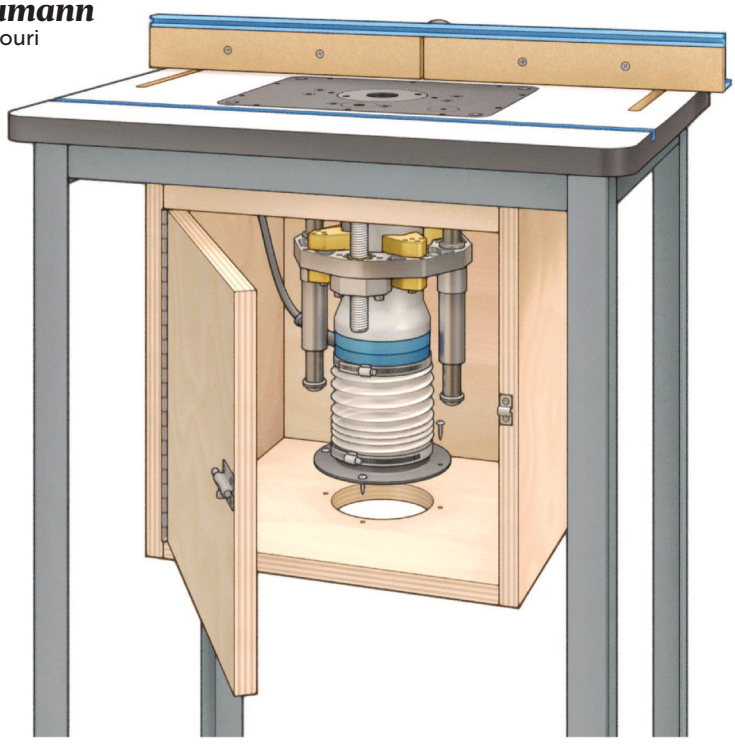
A HOSED ROUTER

The shop vacuum that I use with my router table fence still allowed a little dust to escape below the table until I built a router box to capture the rest. It works great, but I worried about the router overheating due to reduced airflow or sucking in dusty air.

To eliminate my worries, I cut a hole in the bottom of my router box and mounted a hose flange over the hole on the inside. Then I used hose clamps to attach a section of dust-collection hose between the flange and router motor housing.

Now when I use my router, the motor pulls in dust-free air through the bottom hole in the box. Excess dust is sucked in through the fence's dust port. The flexible hose maintains a tight seal when I raise and lower the router.

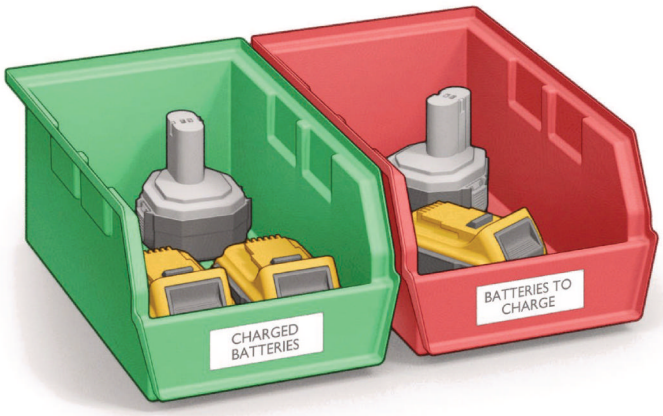
Chris Baumann
St. Louis, Missouri



DEAD OR ALIVE

In a shop with multiple tools that each have a couple of batteries, it was easy to lose track of which ones are charged or need to be charged. To keep them separate, I put them in large storage trays—green for charged, red for needing to be charged.

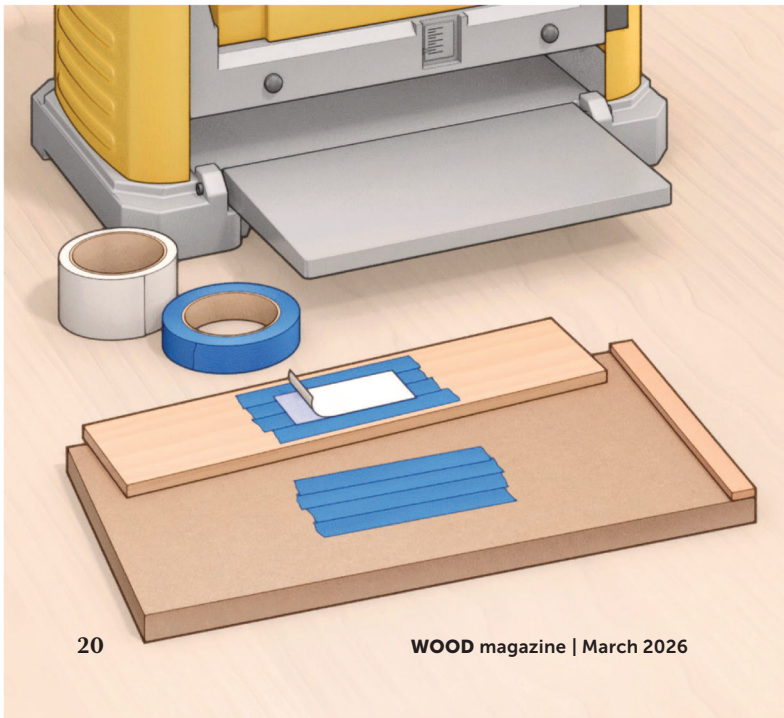
Kelly Churchill
Cheyenne, Wyoming

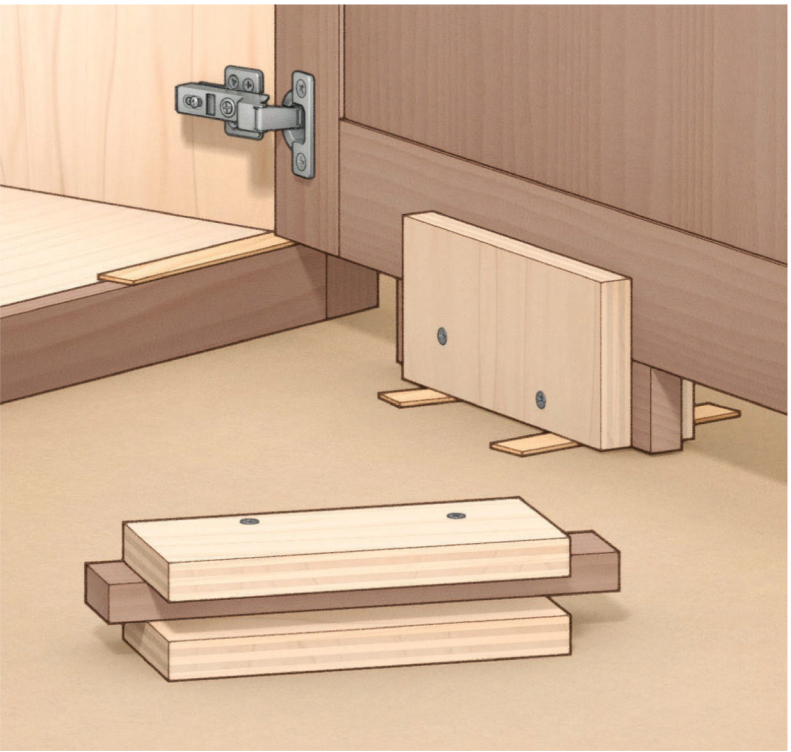


TWO TAPES IN ONE

I routinely use many of the double-faced tape tips presented in issue 301 (March 2025). It holds many things securely but can be a real bear to remove. To make it easier, I first apply painter's tape to each piece, right where I want the tape to go. The painter's tape does not significantly reduce the strength of the assembly but peels away much easier without damaging the surface.

David Leard
Mobile, Alabama





A-DOOR-ABLE AIDS

While building a batch of bathroom cabinets, I wanted an easy way to mount multiple inset doors with consistent gaps. Because I have only two hands, I made a pair of custom door supporting saddles that maintain consistent bottom gaps and make installation of concealed hinges easier.

Start by setting the cabinet on a flat surface. Then rip shims to the thickness of the door reveal. Mount the hinges to the door and clip the mounting plate to the hinge.

To make the support saddles, from scrap stock the thickness of the door's rail cut an 8"-long piece to the same width as the cabinet face frame bottom rail. Sandwich this piece between two wider pieces of plywood, making sure they are all flush along one edge. This creates a space on the opposite edge that cradles the door frame.

Place a shim under the hinge side of the door on top of the face frame and slide the saddles beneath the door. Position a pair of shims under each saddle to align and stabilize the door as you fasten the hinges to the cabinet.

Tom Carrell Jr.
Brookport, Illinois

WOOD® INNOVATION AWARDS 2026

Despite a challenging year, manufacturers continue to create new products that help woodworkers take our craft to new levels.

WRITER: DAVE STONE

COUNTERSINKS STAY SHARP WITH CARBIDE CUTTERS

Countersink drill bits aren't glamorous, but are indispensable workhorses for building projects with screws. Like all bits, they eventually get dull, resulting in ragged countersinks and tear-out.

Make It Snappy Tools' iCARB countersinks are designed to remain sharp twice as long thanks to reversible, replaceable carbide inserts that handle the conical cutting. Titanium-nitride coated twist drills help ensure clean shank holes. Four sizes are available for use with #7 through #12 screws.

ICARB INDEXABLE CARBIDE COUNTERSINKS
Make It Snappy Tools, *snappytools.com*
No. 43607-43610, $40 each; no. 43622 replacement cutters (pair), $20

PHOTOGRAPHERS: JACOB FOX, MANUFACTURER-SUPPLIED IMAGES

CONVERTIBLE PLANE TACKLES MANY TASKS

Multifunction planes aren't new. But we award the Bridge City HP-10 Foxtail Plane for adeptly accomplishing multiple functions thanks to its well-designed interchangeable bases and irons. The plane comes equipped for shoulder planing and easily converts to rabbeting. Cove bases and irons, as well as crown bases and irons, are each available in four diameters.

Setting up the HP-10 for all of its configurations will set you back serious money. The investment will reward you, though, with serious capabilities.

FOXTAIL CONVERTIBLE PLANE
Bridge City Toolworks, *bridgecitytools.com*
No. HP-10, $799

MITERSAW BLADE BRAKE BOOSTS BATTERY CHARGING

DeWalt's press release for its new 10" and 12" dual-bevel cordless mitersaws detailed a host of great features we expect to see, along with one mentioned so briefly that it was easily overlooked: "These saws feature 'Cut. Capture. Charge,' a regenerative braking technology optimizing runtime and efficiency." Wait. Does that mean the saws recharge the battery as the blade slows, just like electric cars?

Sort of. Blade brakes on most cordless saws work by creating a closed circuit when the trigger is released that quickly stops the blade, but also consumes energy. The company's regenerative braking technology, according to DeWalt, "utilizes a high-frequency switch between closed and open circuits, incorporating the battery into the circuit. This allows energy generated during braking to be redirected and stored in the battery, effectively recharging it instead of losing the energy as heat."

While the amount of energy regained is small, it helps squeeze a few more cuts out of the battery per charge. And more cutting time with less charging is innovation we can get behind.

DEWALT 20V MAX XR MITERSAWS
DeWalt, *dewalt.com*
12" sliding double-bevel no. DCS785B, $699 (bare tool);
10" double-bevel no. DCS714B, $429 (bare tool)

INNOVATION LIES BEYOND THIS SAW'S TOUCHSCREEN

Harvey Industries' new Alpha A-15 bandsaw features a touchscreen that displays blade tension, table tilt angle, and blade speed. The screen is novel, and we're anxious to see what the tech will deliver but, to us, it's not the list-topper of this saw's innovations.

That distinction goes to the Big Eye fence system, which is similar to the tablesaw version that won a *WOOD® Innovation Award* in 2024. The fence is smooth, accurate, and versatile due to the multiple adjustable bearings it rides on and its built-in microadjuster. It's also available separately for those who want to upgrade an existing bandsaw

The Stain-Less nickel coating that prevents rust on the table and internal cast-iron components comes in a close second. Throw in tool-free microadjust blade guides, and this saw proves innovative even without the screen.

A-15 INTELLIGENT BANDSAW AND BIG EYE BANDSAW FENCE
Harvey Industries, *harveywoodworking.com*
Bandsaw no. Alpha A-15, $5,790; Big-Eye Fence no. B-70, $899

COMPACT, FINE-FILTERING DUST CYCLONE

Grizzly's new wall-mount cyclone packs a lot of features into a small space. It pulls dust through a 6"-diameter inlet at a rate of 770 cubic feet per minute into a cyclone that captures large debris in a 20-gallon rolling drum. Air then gets pushed into a HEPA filter that captures particles as small as 0.3 micron.

A 110-volt, 1½-hp motor supplies power, and a remote provides easy control, while a 73-decibel noise rating keeps things quiet while you work.

WALL-MOUNT HEPA CYCLONE DUST COLLECTOR
Grizzly, *grizzly.com*
No. G0990, $1,075

RETRACTABLE CASTERS LIFT AND LOCK WITH EASE

Making workbenches and heavy tool stands mobile proves challenging. Sitting on wheels, they often lose stability. Retracting the wheels often proves clunky. Smart Casters solve both problems. Simply lift up each end of your bench 1" and the casters drop down and lock in place, holding the leg off the floor. Lift again, and the casters retract into their housings as you set the leg back down. It's as simple as that.

Smart Casters are available in side- and top-mount configurations, as well as a new configuration that arranges two wheels on a single top-mount carriage for low-profile applications. Capacity ranges from 600 to 800 lbs. per set of four.

SMART CASTERS
Bennington Manufacturing, *retractablecaster.com*
Various item nos., $60-$110 per set.

MOVING TABLE ADD-ON EXPANDS CNC CAPACITY

Owners of a Onefinity 4x4' CNC can increase capacity to handle full 8' sheets by bolting on the new Full-Eight table. The table integrates with the system to automatically move long materials by 4' after the first 4' section is machined, meaning you don't have to manually reset the workpiece to make tiled cuts. Ball screws drive the table with very low backlash to ensure smooth operation and accuracy where the tiled cutting paths meet.

FULL-EIGHT AUTO-TILING TABLE
Onefinity CNC, *onefinitycnc.com*
No. Full-Eight, $1,975 (estimated)

POWERED-UP POCKET HOLES

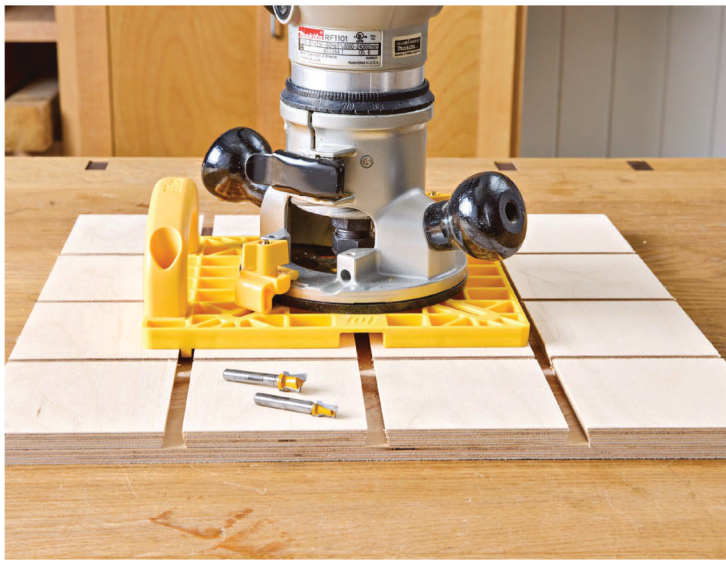
Kreg's new Rebel Pocket-Hole Joiner combines the convenience of a portable jig with the power of a built-in motor. The Rebel uses a 20-volt brushless motor to power a built-in bit. Place the jig on your workpiece, pull the bail handle, and it positions and drills a pocket hole in stock from ½" to 1½" thick—no drill required. Integrated guides and fences make setup easy, while a grippy base surface helps hold the jig in place. The motor offers plenty of power, and a dust port ejects chips and allows connection to a 1¼" vacuum hose.

Kreg understands that the Rebel alone might not justify adding another cordless platform to your shop, so the company developed a lineup of woodworking-centric tools that all employ the same 20-volt battery. See *page 68* to learn more.

REBEL POCKET-HOLE JOINER
Kreg Tool Company, *kregtool.com*
No. KPTBRB100A, $350 with battery and charger

> **"IN A YEAR OF TARIFFS AND ECONOMIC UNCERTAINTY, COMPANIES STILL CREATED INNOVATIVE WAYS TO TACKLE WOODWORKING TASKS OF MANY KINDS."**
>
> ***-DAVE STONE, MANAGING EDITOR***

ROUTER JIG CREATES CONSISTENT DOVETAIL SLOTS



MicroJig's MatchFit system uses clamps that slide in dovetail slots cut into a worksurface. The company's router guide kit makes routing a grid of those slots easy. The jig's platform holds routers with bases up to 7" in diameter, and it comes with a ¼" straight bit and ½"x14° dovetail bit (in your choice of ¼" or ½" shank).

The platform centers and secures the router using a pair of onboard clamps. With the jig's guide key riding along the edge of the worksurface, make an initial pass with the straight bit. Make a second, parallel slot 4" away by running the guide key in the initial slot. Then repeat. After completing your desired grid, swap to the dovetail bit and rout again, working your way back across the surface to ensure the key fits tightly into each slot.

MATCHFIT GRID ROUTER GUIDE KIT
MicroJig, *microjig.com*
No. MFRG-400-025, $99

PORTABLE CYCLONE EXTRACTS FINE DUST

The Oneida XT14 Dust Extractor combines a cyclone dust collector with a high-efficiency particulate air (HEPA) filter to create a portable solution for efficiently collecting fine dust. At 22" wide and 38" tall, it's not much larger than a shop vacuum, but is designed to work more efficiently. According to Oneida, the cyclone captures up to 99.9% of dust and debris from the airstream, dropping it into the 14-gallon steel collection bin. That leaves only relatively clean air to pass through the HEPA filter. As a result, the filter requires cleaning 100 times less often than a shop vacuum.

The XT14 is designed to work with tools equipped with 2½" dust ports, and it rolls from tool to tool on five locking swivel casters.

XT14 CYCLONIC HEPA DUST EXTRACTOR
Oneida Air Systems, *oneida-air.com*
No. XT14, $950-$999 (estimated)

SMART DRILL PRESS TACKLES BORING TASKS

Jet's newest drill press shows that touchscreen control can be smart and useful, and not just a novelty. The screen lets you control speed and a lot more, including 22 tool profiles and seven material types. Just pull up the ones you need, and the drill press figures out the rest. User-programmed presets allow you to save 15 more customized setups. In any of the modes, you can fine-tune spindle speed using a large dial. You can even control depth stops via the screen as well as manually, and display measurements in fractions, decimals, and metric units.

Jet backs up the technology with features you'd expect in a drill press of this size: a 20" swing, 6" of quill travel, a 14x20" table, and a 1.5-hp brushless motor. The screen's brain monitors the motor to warn of impending overload.

JET 20 SMART DRILL PRESS
Jet Tools, *jettools.com*
No. JDP-20S, $2,400

GANTRY ADDS STAND-ALONE CUTTING TO HANDHELD CNC

The Shaper Origin transformed CNC routing by putting numerically controlled cutting into a handheld router form factor. Now the Shaper BenchPilot is transforming that tool for double duty as a stand-alone CNC.

This motorized gantry system accepts a first- or second-generation Shaper Origin router on a simple clip-in base. The router's built-in tracking still works, compensating for small variations to keep the bit on track as the gantry moves it on the X and Y axes. Capacity is roughly 11×18", and the system allows traditional horizontal workpiece placement, as well as vertical clamping to cut joinery. The system can be used alone with the Origin or combined with Shaper's Work Station and optional shelf kit. Best of all, the BenchPilot doesn't hinder using the Origin on its own. Simply unclip it to quickly switch back to handheld CNC routing.

BENCHPILOT
Shaper Tools, *shapertools.com*
Various item nos., $1,499-$1,998

ARTICULATING DUST BOOM GETS A BIGGER BROTHER

Mullet Tools' articulating dust boom received a *WOOD® Innovation Award* in 2024. Now the boom is back with a larger version designed for use with 4" dust-collection hose.

Like its smaller sibling, this one features thinwall PVC sections connected with 360° swiveling pivots that lock solidly and seal well with beefy gaskets. An included mount attaches to a wall, workbench, or ceiling, providing solid mounting, while the arms reach up to 45" to the included dust hood.

As with its smaller sibling, we're impressed that the sturdy components prove easy to adjust and hold their positions well to bring dust collection to a variety of workshop tasks, this time without the noise of a shop vacuum running nearby.

4" BOOM ARM FOR DUST COLLECTORS
Mullet Tools, *mullettools.com*
No. 4-inch boom arm, $350

MAGAZINE SLING TABLE

Combining mahogany and leather, this Danish Modern-inspired cube offers a design and mitered tenon construction that will both stand the test of time.

WRITER: KERRY GIBSON
BUILDER: KEVIN BOYLE
BASED ON A KAI KRISTIANSEN DESIGN

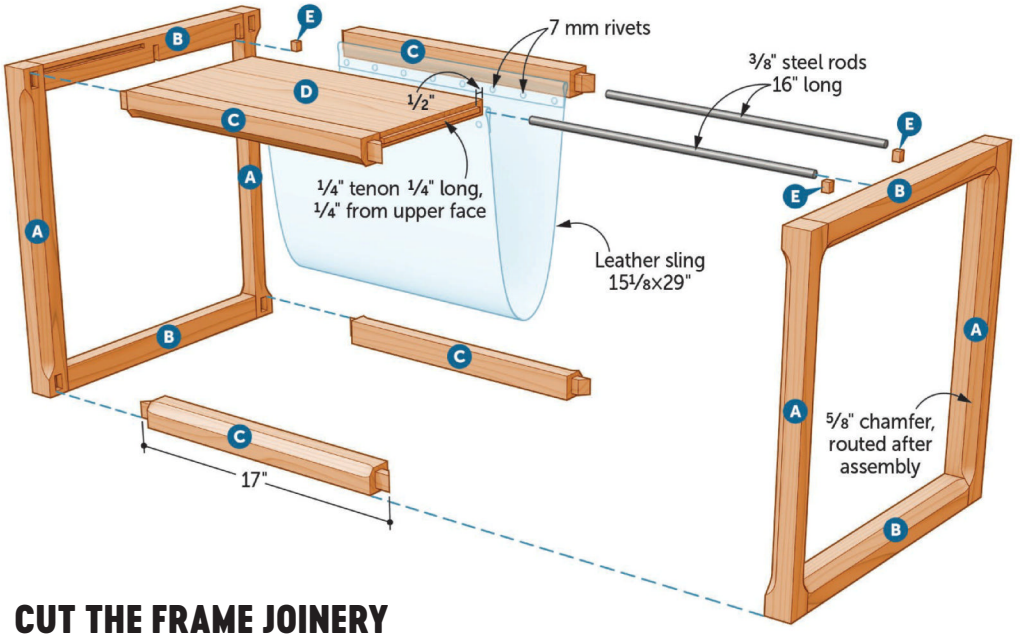
OVERALL DIMENSIONS
18"W × 18"D × 18"H

Up for a challenge? This project provides a chance to try a new joinery technique and to work with materials other than wood, all without investing a lot of time or money.

The frame for the Danish Modern cube calls for cutting intersecting mortises in the legs. To do this, we used a hollow-chisel mortiser, but you can easily create them using a drill press and a hand chisel. Then you'll cut tenons on the ends of the stretchers and miter them to fit inside the intersecting mortises.

To make the sling, you'll cut, punch, and rivet a piece of leather that's supported by two steel rods. Never worked with leather? We'll show you how.

EXPLODED VIEW



CUT THE FRAME JOINERY

TIP!

Chalk makes highly visible marks on darker woods, then wipes away easily before you finish.

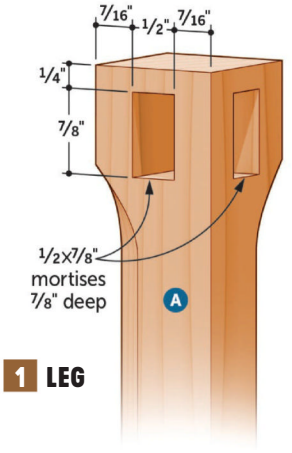
When cutting the mortises in the legs, you'll need to create two pairs of legs that mirror each other. So, be sure to mark your pieces as you work.

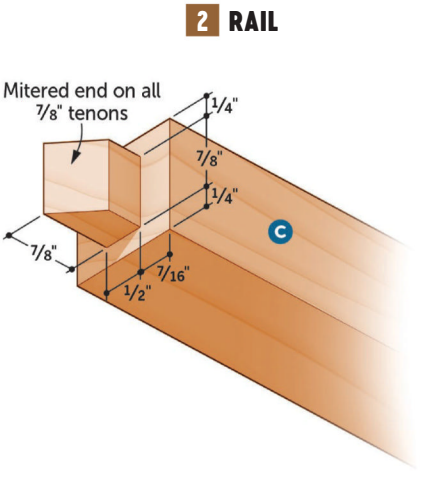
1 From 1 3/8" stock, cut the legs (A), stretchers (B), and rails (C) to size **[Exploded View, Materials List]**. Cut an extra length of 1 3/8" scrap stock for setting up the tenons. Set the stretchers and rails aside for now.

2 With a marking gauge, lay out the mortise locations on the legs (A) **[Drawing 1]**. Using a hollow-chisel mortiser with a 1/2" bit, form the intersecting mortises near both ends of each leg.

3 To form the tenons on the stretchers (B) and rails (C), first install a dado stack in your tablesaw at a height of 7/16" and set your fence as a stop for the 7/8"-long tenons. Using your miter gauge, make multiple passes to form the tenon face cheeks, first on your scrap setup piece, then on the stretchers and rails **[Drawing 2]**. Lower the blade to 1/4" and repeat for the tenon edge cheeks.

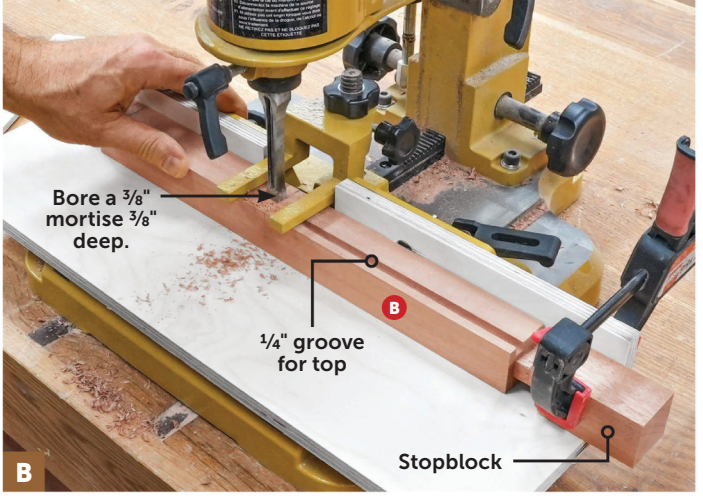
4 Miter the ends of all the tenons, taking care to keep the proper orientation of the rails and stretchers.



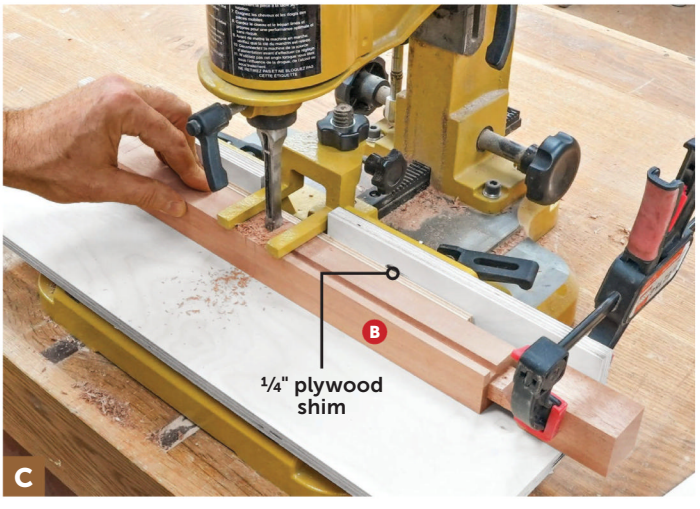


PHOTOGRAPHER: JASON DONNELLY; **ILLUSTRATORS:** ROXANNE LEMOINE, CHRISTOPHER MILLS

Rout a ¼" stopped groove ¼" deep in the upper stretchers (B). A piece of tape on the router fence shows you where to stop the groove cut. Reset the fence to make the cut on the mirror-image piece.



Set the mortiser fence to make an initial cut ½" from the top edge of the stretcher (B) to form the stopped dado for the leather sling support rod. Use a stopblock to maintain consistent position.

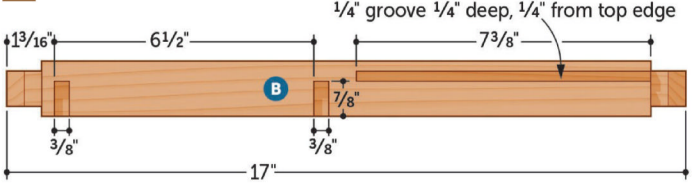


Slip a ¼" shim behind the stretcher (B) and make a second cut for the dado. Add a second ¼" shim to complete cutting the stopped dado in the upper stretchers. Repeat the process for each stopped dado.

5 Install a ¼" spiral upcut bit in your table-mounted router and rout a stopped groove for the top (D) in the upper stretchers (B) **[Drawing 3, Photo A]**. The stretchers should mirror each other. Square the ends of each groove with a chisel.

6 Mark the location of the stopped dadoes in the upper stretchers for the hanger rods **[Drawing 3]**. Cut the dadoes using a ⅜" bit in your hollow chisel mortiser with a stopblock attached to an auxiliary fence. Make the first cut for the inner dado, then shim the stock to complete the dado **[Photos B, C]**. Reset the stopblock and repeat the cutting and shimming steps for the outer pocket. Then repeat these steps to cut the pockets in the mirror-image upper stretcher.

3 STRETCHER



MATERIALS LIST

PART		FINISHED SIZE T	W	L	Matl.	Qty.
A	LEGS	1⅜"	1⅜"	18"	M	4
B	STRETCHERS	1⅜"	1⅜"	17"	M	4
C	RAILS	1⅜"	1⅜"	17"	M	4
D	TOP	¾"	7⅞"	15¾"	M	1
E	ROD FILLER BLOCKS	⅜"	⅜"	½"	M	4

MATERIALS KEY: M–mahogany.
SUPPLIES: ⅜×36" steel rod.
BLADES AND BITS: ½" and ⅜" hollow chisels or ½" and ⅜" brad-point drill bits, ¼" router bit, 45° chamfer router bit.
SOURCES: 3mm hole punch, no. 97K0950, $5; rivet anvil, no. 97K0965, $18; 7mm Small Brass Rivets, no. 91Z5123 (pkg. of 25), $5; 9mm rivet setter, no. 97K0961, $9; leevalley.com; Russet milled leather, 3×2' piece, $40, montanaleather.com.
PROJECT COST: It cost us about $115 to build this project. Your cost will vary by region and source.

CUTTING DIAGRAM

This project requires 6 board feet of 8/4 mahogany and 2 board foot of 4/4 mahogany based on example boards shown.

1⅜×3½×60" Mahogany (2 needed)

¾×3½×24" Mahogany

†Plane or resaw to the thickness listed in the Parts List.

¾×5½×24" Mahogany

ASSEMBLE THE CUBE

1 Finish-sand the interior faces of the legs, stretchers, and rails. Glue and clamp two rails between each pair of legs, checking for square. When the glue dries, rout the chamfer on the side assemblies (A/C) **[Photo D, Exploded View]**.

2 Glue up a panel from 3/4" stock and cut the top (D) to size **[Materials List]**. Form a 1/4" centered tenon on each end of the top, then cut a 1/2" shoulder on the corners nearest the sling **[Exploded View]**.

3 Install the top, with no glue, in the grooves of the upper stretchers (B), then glue and clamp the four stretchers between the side assemblies (A/C).

4 Rout chamfers in the end frames (A/B) using the same technique used to chamfer the leg/rail assemblies previously. Finish-sand the cube and apply finish, taking care to keep finish out of the hanger rod pockets. Cut the rod filler blocks (E) from a longer piece of 3/8×3/8" stock and set them aside.

ADD THE SLING

1 Cut the sling to 15 1/8×29" from a larger piece of leather using a straightedge and a utility knife.

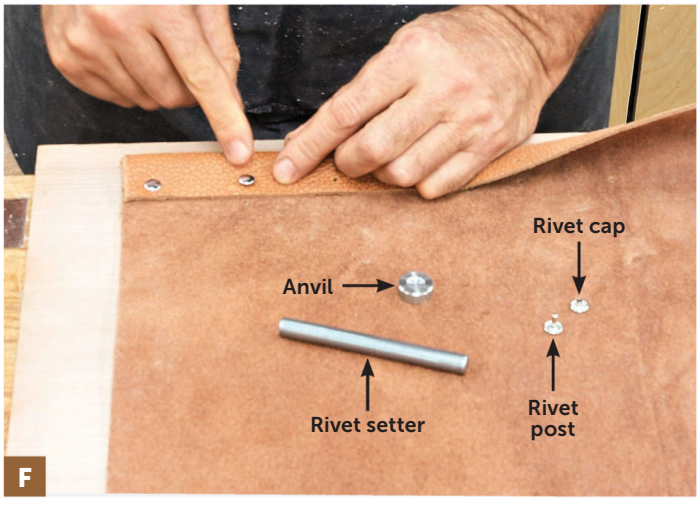
2 Place a piece of tape on the ends of the sling and mark the rivet locations 5/8" from the outside edge and 2" on center. Fold over 1 3/8" of the end and clamp it to a piece of scrapwood, then punch rivet holes where marked on the tape **[Photo E]**.

3 Insert the post side of the rivet from the bottom, place a cap over the post, and drive the rivet in place **[Photo F]**. Drive rivets at all the hole locations.

4 Use a hacksaw and a vise to cut two 16" lengths of 3/8" steel rod. Insert the rods through the sling openings you just created and, with the cube turned upside down, slip the ends of the rods into the pocket openings in the upper stretchers (B). Apply glue to the rod filler blocks (E) and clamp them in place above the rods. When the glue dries, touch up the blocks with finish. Then position the table next to your easy chair, load the sling with your favorite magazine (hint: it's *WOOD*®) and relax.

Form a chamfer on the side assemblies (A/C) by routing in several passes with a 45° chamfer bit, raising the bit slightly between passes to prevent tear-out and burning.

Fold over 1 3/8" of the end of the leather, suede side to suede side, and clamp it to a piece of scrapwood. Then use a 3mm hole punch and a hammer to cut holes, where marked, through both layers of leather.



Insert the post side of the rivet through the hole, then place a rivet cap atop the post. Position the anvil under the post side of the rivet, then use the rivet setter and a hammer to cinch the rivet into place.

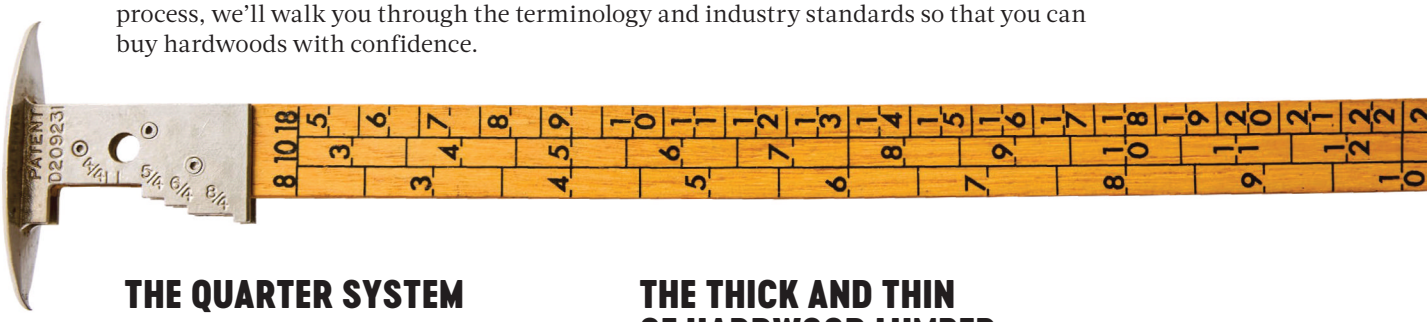
UNDERSTANDING LUMBER BUYING

Armed with the right knowledge, you can walk into any lumberyard and order hardwood lumber like a boss.

WRITER: VINCE ANCONA

PHOTOGRAPHER: JASON DONNELLY; **ILLUSTRATOR:** CHRISTOPHER MILLS

Jewelers often speak of the four Cs of diamonds: cut, color, clarity, and carat. You can make similar comparisons when it comes to evaluating hardwood lumber: how the board is sawn and milled (cut), the species (color), the grade (clarity), and the board footage (carat). Most of the time, you already know the species you want before setting foot in the lumberyard. But navigating the other aspects of buying hardwood lumber can be intimidating, especially for the uninitiated. The terms, measurements, and pricing methods used with hardwood lumber may seem arcane and unfamiliar. To demystify the process, we'll walk you through the terminology and industry standards so that you can buy hardwoods with confidence.



THE QUARTER SYSTEM

Hardwood lumber is sold in several thicknesses. But rather than expressing the thickness in fractions of an inch, the industry uses a system of "quarters," with each quarter being equivalent to 1/4" in thickness. Under this system, a 1"-thick board is referred to as 4/4 (pronounced "four-quarter"), a 1 1/4"-thick board is 5/4 (five-quarter) and so on. The most common standard thicknesses are 4/4, 6/4, and 8/4, but you may run across, 10/4, and even 12/4 and 16/4.

Here's where things get tricky, though. The quarter system refers to the thickness of the roughsawn wood *before* it's planed. A 4/4 board that starts off 1" thick will typically end up 3/4" to 13/16" thick after planing. But it's still priced as if it were a full 1" thick. In essence, you're paying for the wood that is planed off during the milling process. So if your project calls for parts that are a true 1" thick, you'll need to buy 5/4 or thicker stock. For a guide, see *The Thick and Thin of Hardwood Lumber, right.*

It's also worth noting that the quarter system goes down to only 4/4. Sawmills tend to not cut lumber thinner than 1" because thin boards twist and cup more than thicker boards during the drying process. However, lumber dealers offer "thin stock" that has usually been planed down from thicker material. Commonly available thicknesses for thin stock are 1/2", 3/8", and 1/4". Thin stock costs more per square foot than thicker stock because you're paying for the convenience of having the lumber planed to thickness.

TIP!

You can often save money on thin stock by buying 4/4 stock and planing or resawing it to your desired thickness.

THE THICK AND THIN OF HARDWOOD LUMBER

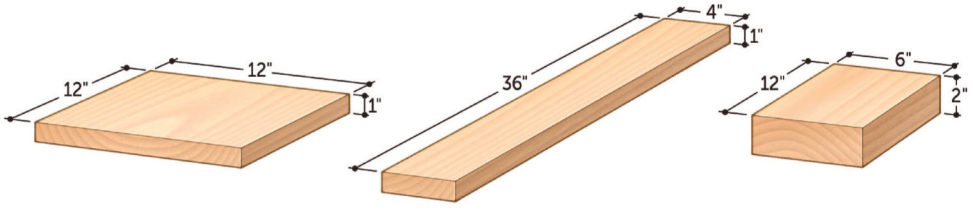
QUARTERS	NOMINAL THICKNESS	FINISHED THICKNESS
4/4	1"	13/16"
5/4	1 1/4"	1 1/16"
6/4	1 1/2"	1 5/16"
8/4	2"	1 3/4"
10/4	2 1/2"	2 1/4"
12/4	3"	2 3/4"
16/4	4"	3 3/4"

BOARD FOOTAGE

One of the most confusing aspects of buying hardwood lumber is the way it's sold. Framing lumber, or dimensional lumber, is milled to standard dimensions (2×4, 1×6, etc.) and then sold either by the piece or by the lineal foot. By contrast, hardwood lumber is sawn into random-width boards to maximize the yield from each log. Instead of being sold by the piece or lineal foot, it's sold by volume (with some exceptions, as you'll see later). The volumetric unit of measure for hardwood lumber is the board foot, which is equivalent to 144 cubic inches, or the amount of wood contained in a board that is 12" wide, 12" long, and 1" thick, *below.*

TIP!

Calculate board footage using the formula (T×W×L)/144, where T is thickness, W is width, and L is length, all expressed in inches.



◀ Despite their varying dimensions, all three of these boards contain one board foot, or 144 cubic inches, of wood.

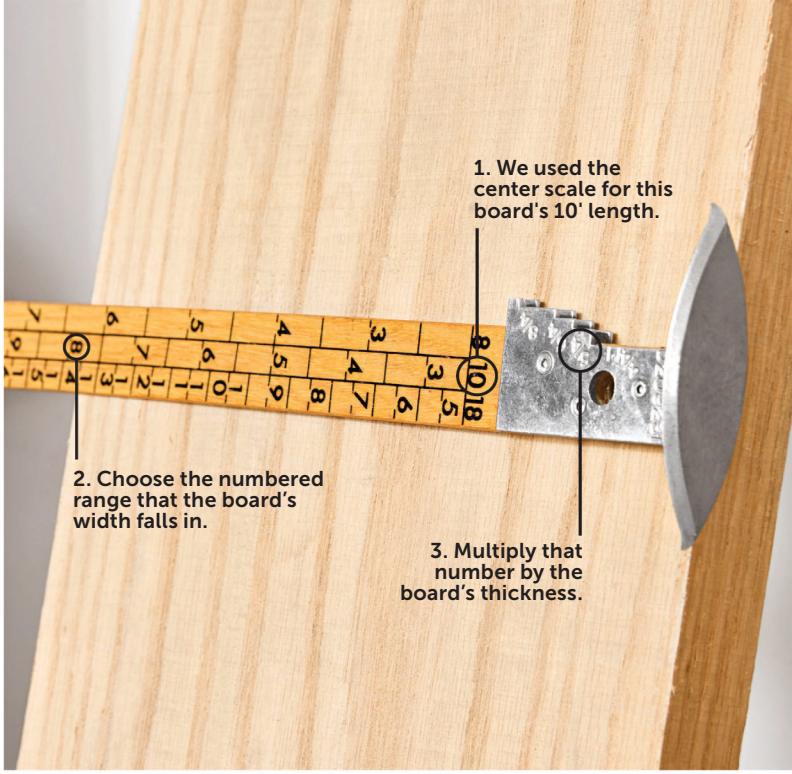
TIP!

Calculate board footage with your phone. We like Board Feet Easy in the Apple App Store and Board Foot Calculator on Google Play.

Sawmills and lumberyards often use a lumber rule to quickly measure board footage, *right*. When you place the rule across the width of a board, rows of index marks quickly indicate the board footage. But you can also determine the board footage by measuring the width and length of the board and using a board footage table, doing simple calculations, or using an app on your smartphone.

Before you go to the lumberyard, make sure you have at least a rough idea of the board footage requirements for your project. If your project plan doesn't indicate the total board footage, you can calculate it by determining the board footage of each part and adding them up. Then add 15% to 20% for waste.

Although board footage is the standard used for most hardwood lumber, there are some exceptions. Thin stock (5/8" or less) is usually sold by the square foot rather than the board foot. Some expensive exotic species, such as ebony, may be sold by the pound. And turning blanks are often sold by the piece.



To read a lumber rule, lay it across the width of the board and, looking under the appropriate length column, take a reading where the rule crosses the edge of the board. Multiply by the board's thickness for board feet.

GRADING

All commercially produced hardwood goes through a grading process. In the U.S., grading standards are set by the National Hardwood Lumber Association. Boards are graded based on the percentage of usable wood after accounting for defects such as knots or cracks.

The highest grade of lumber is known as FAS, which stands for firsts and seconds. To be graded FAS, boards may contain only a minimum amount of defects on both faces and must be at least 6" wide and 8' feet long. Just below FAS boards are Selects. Select boards may be narrower (as narrow as 4") and shorter, and one of the faces can have more defects than is allowed in the FAS grade. FAS and Select boards command the highest price and are the two grades you're most likely encounter at a hardwood lumberyard, often mixed together. These grades are most suitable for furniture.

Lower grades also exist. These allow even more defects and can be as narrow as 3". No. 1 Common is often used in cabinetry for rails and stiles, where the pieces don't require wide boards. The No. 2 grades are suitable for rustic furniture, or interior parts that won't be seen. Not all hardwood dealers carry all grades in every species, so you may have to place a special order for lower grades. Even though a board with a lower grade will have more defects, the clear areas will be just as good as those in higher grade boards.

TIP!

You can sometimes save money by buying lower grade lumber and working around the defects.

You also need to know what is and isn't considered a defect for the purposes of grading. Common defects include knots, cracks, checks, wormholes, and bark inclusions, *below*. These areas are defects because the wood is essentially missing, and can't be used.

Sapwood, burly grain, and mineral stains are not considered defects because these areas of the board are still usable. Marks or stains left behind by stickers (the small pieces of wood used to separate boards during drying) are not considered defects if they sand out easily. But sticker stains that deeply penetrate the wood are.

SAWING AND MILLING

Aside from species, size, and grade, two more factors figure into the cost of lumber: the sawing and the milling. In short, more effort and more waste produces more expensive lumber. The least costly way to process a log at the sawmill is to saw it lengthwise into slices, either into sequentially stacked slabs, *top left*, or with strategic turns that maximize yield from the more stable outer portion of the log, *top center*. These methods, known as flatsawing and plainsawing, produce wider boards with characteristic wavy or "cathedral" grain patterns.

There are several "radial" sawing methods that yield wood grain that intersects the face of the board, *top right*, resulting in more dimensionally stable lumber. Wood cut from the log where the growth rings are perpendicular to the face is known as quartersawn and in some species can exhibit attractive medullary rays (most common in oak). Riftsawn grain comes from wood where the grain intersects the face at about a 30-60° angle. The tradeoff is that these methods are more labor-intensive and produce more waste. The resulting cost gets passed along to you.

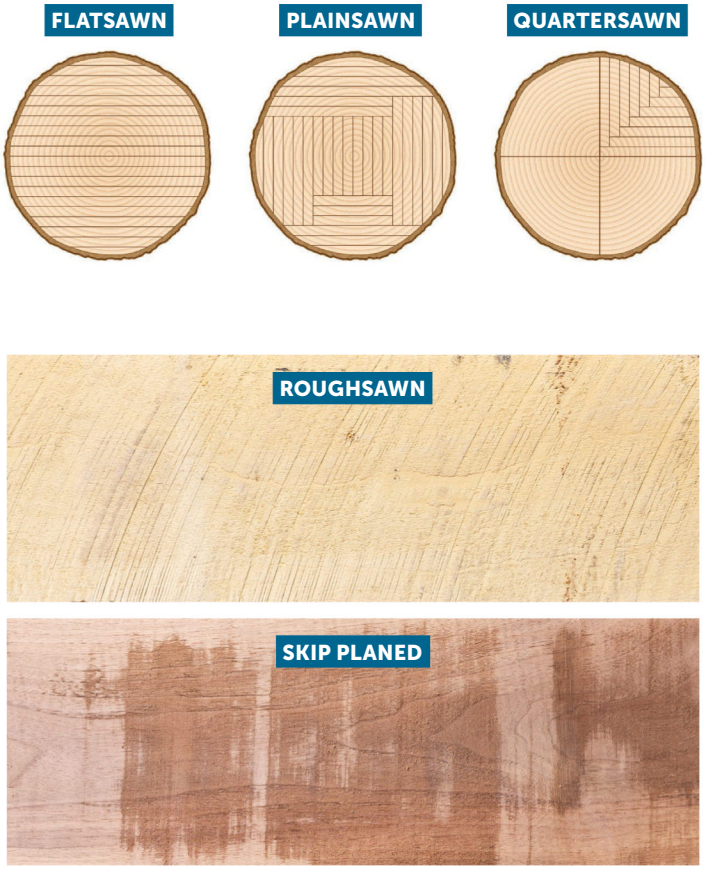
TIP!

If you own a planer, jointer, and tablesaw, buy roughsawn boards to minimize cost and maximize yield.

After the logs are sawn into boards and dried, they may be sold as roughsawn lumber or they may be milled further, with each additional operation adding more cost but leaving less you'll need to do. Roughsawn lumber is less expensive than planed lumber, but it's also difficult to tell what the grain pattern of the wood looks like. Skip-planed lumber (sometimes called "hit or miss planed") is roughsawn lumber that has been passed through a planer to knock down the high spots, leaving some of the saw marks behind, *lower right*. This allows you to get a better idea of what the surface of the wood looks like, but still leaves the board with enough excess thickness so that you can plane it down to your desired specifications.

Most hardwood dealers that sell planed lumber will offer S2S (surfaced two sides) or S3S (surfaced on two sides with one edge straight-line ripped). Boards that have been straight-line ripped give you one good edge to run against a fence when ripping the lumber down in your shop.

S4S lumber has been surfaced on both faces and both edges, and is usually cut into dimensional sizes such as 1×4, 1×6, 1×8, etc. These are nominal sizes, with the actual widths being ½" to ¾" narrower. The most expensive due to the amount of milling involved, this type of hardwood lumber is often found in home centers.



BUYING ETIQUETTE

If you don't have a retail woodworking store or hardwood lumber dealer in your area, you may need to purchase from a sawmill or supplier that usually caters to commercial or professional customers. If so, it's a good idea to call ahead and ask if they sell to the general public and if there are any minimum order requirements. Most dealers will expect you to know how many board feet you want, so don't show up with a cutting diagram and ask the salesperson to figure out how much wood you need.

Some dealers don't allow you to pick out your own lumber, but most are usually willing to accommodate requests if you need boards of a certain width or length. If the dealer does allow you to pick out your boards, be neat about it and don't leave the rejected boards in a pile for the employees to restack. If a board has a bad knot or crack, move on to the next one instead of trying to haggle with the salesperson over it. These defects have already been taken into account in the grading of the lumber. Don't be afraid to ask questions, but be respectful of the salesperson's time as well, especially if the store is busy.

CUSTOMIZABLE SHOP CABINETS

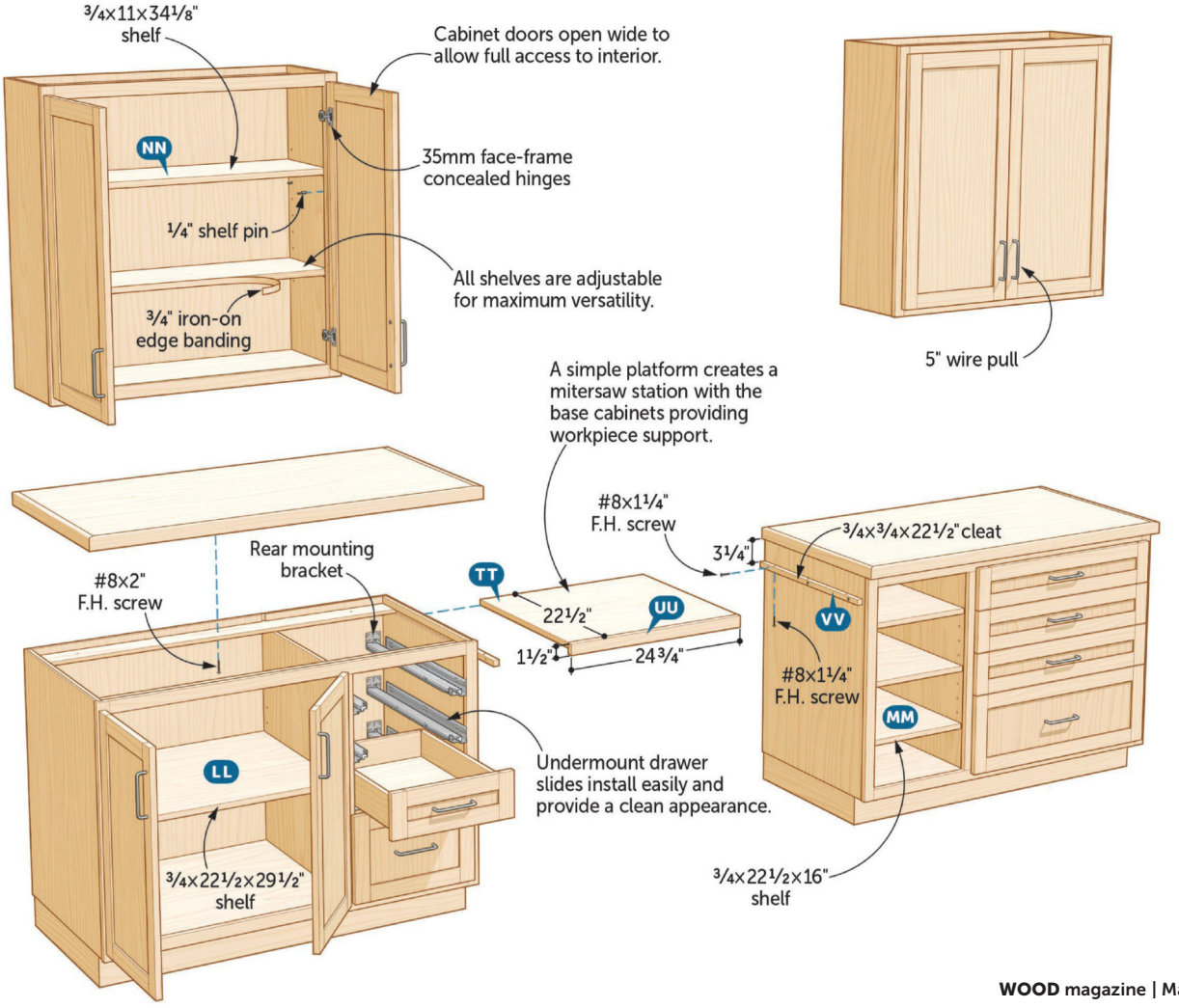
Build wall and base cabinets to supply your shop with serious storage. Simple tablesaw techniques make the process straightforward.

WRITER: CRAIG RUEGSEGGER
DESIGNER/BUILDER: KEVIN BOYLE

After years of building and installing kitchen and shop cabinets, Senior Design Editor Kevin Boyle has a foolproof and efficient cabinetmaking technique. Using his methods, you'll have a set of shop cabinets ready to use in almost no time. Tablesawn dadoes and rabbets create the cabinet carcases quickly, make a perfect-fit face frame, and form the joinery for the drawers and doors. Prefinished plywood greatly reduces finishing chores, speeding construction even more.

The identically sized base cabinets have two configurations. One features doors and narrow drawers; the other has wider drawers and open shelves. Mix and match versions to suit your needs. Add a simple platform between two cabinets to create a mitersaw station.

EXPLODED VIEW



PHOTOGRAPHER: JASON DONNELLY; **ILLUSTRATOR:** CHRISTOPHER MILLS

OVERALL DIMENSIONS
Wall cabinet: 36"W x 14 9/16"D x 36"H
Base cabinet: 48"W x 25 13/16"D x 36"H
Two base cabinets with mitersaw platform: 121 1/2"W x 25 13/16"D x 36"H

CRAFT CARCASES EN MASSE

If you're making more than one of these cabinets, increase your efficiency by cutting parts and joinery for all cabinet carcases at the same time to reduce tool setup changes.

1 From 1/2" prefinished maple plywood, cut the carcase sides, tops, bottoms, backs, dividers, and stretchers (A–H) to size **[Parts List, Drawings 1, 2]**. Mark each part with its letter or name to ensure you machine the joinery correctly going forward.

TIP!

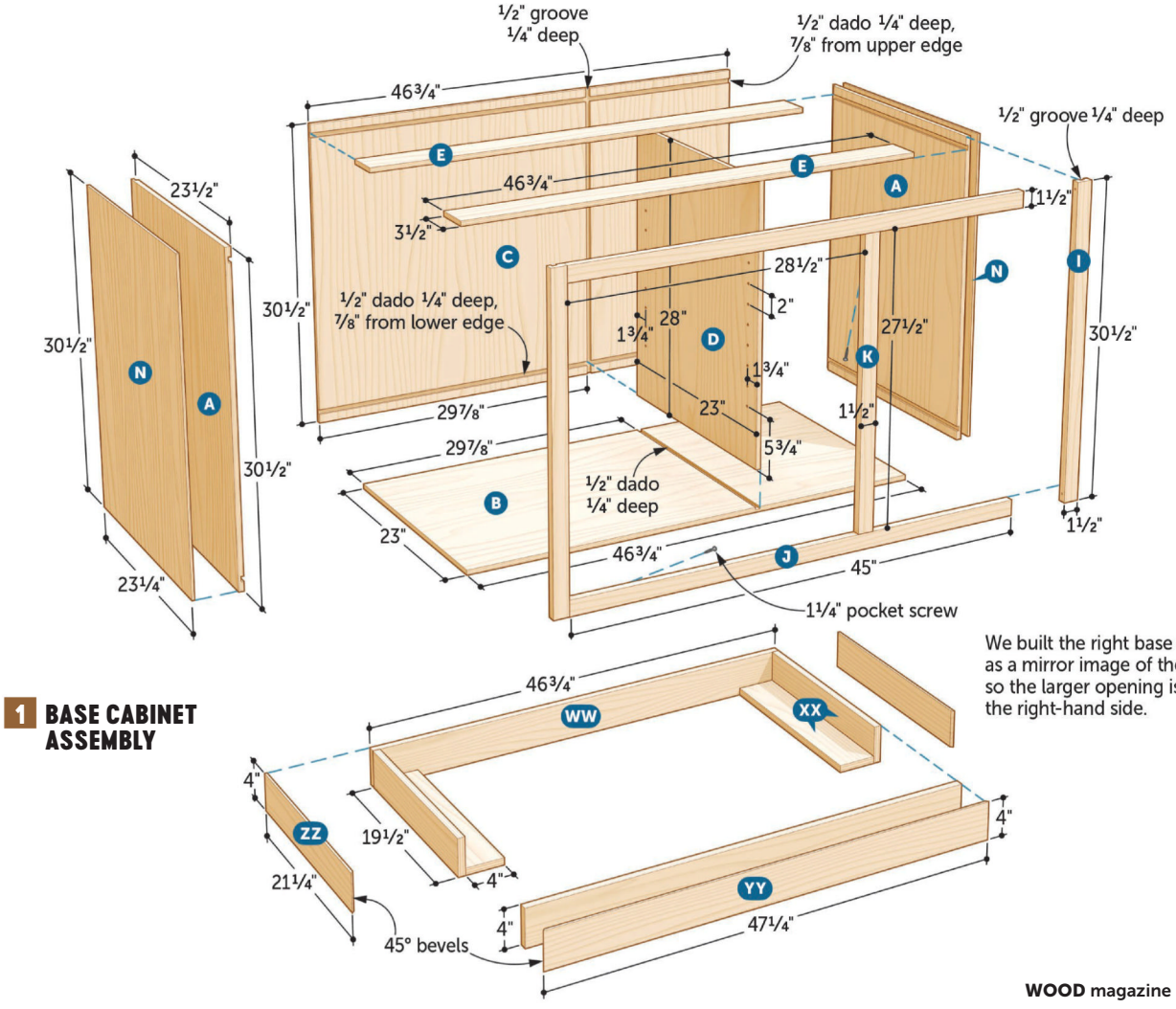
Keep track of the combination of shims and chippers to recreate this setup later.

2 Install a dado stack in your tablesaw to match the thickness of your 1/2" plywood. Raise the blade 1/4" above the saw table and set the rip fence 7/8" from the innermost tooth of the stack. Cut the dadoes on the prefinished faces near the ends of the base sides, wall sides, and backs (A, C, F, H) **[Photo A]**.

3 Attach an auxiliary face to your tablesaw rip fence and position it to just touch the dado stack. Rabbet the rear edge of each base and wall side (A, F) **[Drawings 1a, 2]**.

Dado the prefinished faces of the sides and backs (A, C, F, H). This places the best-looking faces to the interior of the cabinet where they will be visible. The exterior will be skinned with finish panels.

4 Remove the auxiliary face and reposition the rip fence to cut the dado or groove for the divider in each base bottom (B) and back (C) **[Drawing 1]**.

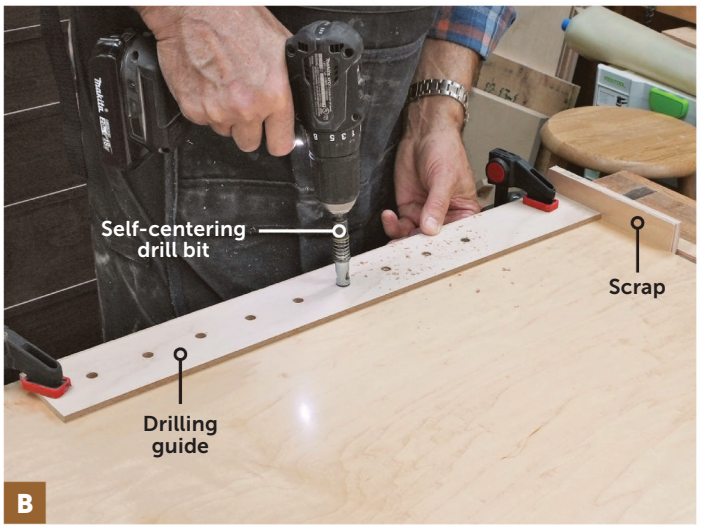


1 BASE CABINET ASSEMBLY

We built the right base cabinet as a mirror image of the left, so the larger opening is on the right-hand side.

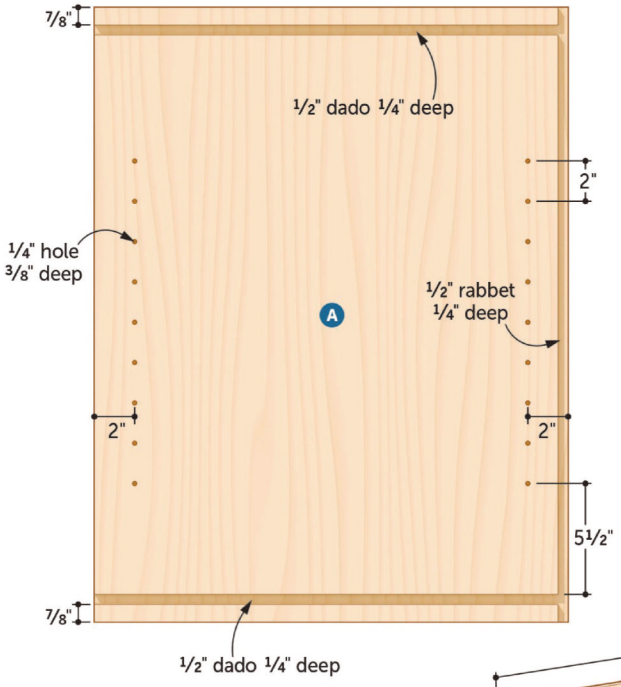
Note: **We drilled shelf-pin holes using a self-centering bit with a 3/8" collar. Drill the holes in the guide to match the bit you use.**

5 From scraps of 1/4" plywood, make drilling guides for the shelf-pin holes with nine holes spaced 2" apart on center. Refer to **Photo B** and **Drawings 1a** and **2**. Use the guides to help drill 1/4"-diameter shelf-pin holes in only one base side (A) **[Photo B]** and all wall sides (F). Also drill pin holes in the prefinished face of the base divider (D), clamping the guide 1/4" above the divider's bottom end.

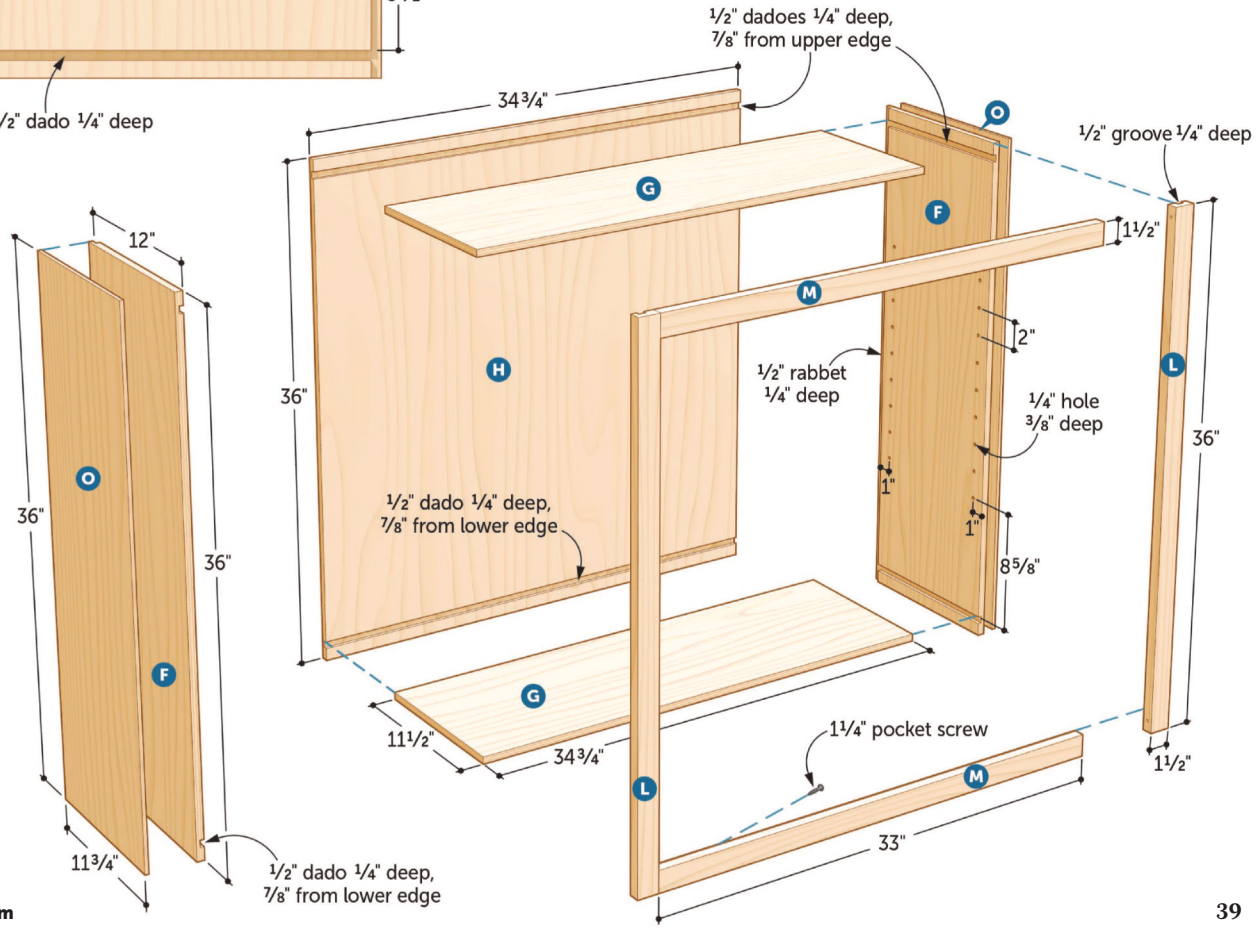


Place a scrap of 1/2" plywood in the dado in a side, butt the drilling guide against it, and clamp the guide in place. Use a self-centering bit to drill the 1/4" holes 3/8" deep.

1a BASE SIDE (Left side shown)



2 WALL CABINET ASSEMBLY



CARCASE ASSEMBLY

1 Transfer the centerlines of the dadoes in the sides (A, F), bottoms (B), and backs (C, H) to the rear faces of these panels **[Photo C]**.

Note: **Make sure you position the back properly for the desired drawer layout. We mirrored ours, with the dadoes closest to the left side in one base, and to the right side on the other.**

2 Begin assembling a base bottom (B) and back (C) by applying glue to a dado in the back and inserting the bottom. Clamp the parts together and staple along the layout line drawn earlier **[Photo D]**.

3 Apply glue to the middle dado in the bottom (B) and groove in the back (C) and install the base divider (D). Secure the divider with staples.

4 Next, glue a base stretcher (E) into the top dado **[Photo E]**.

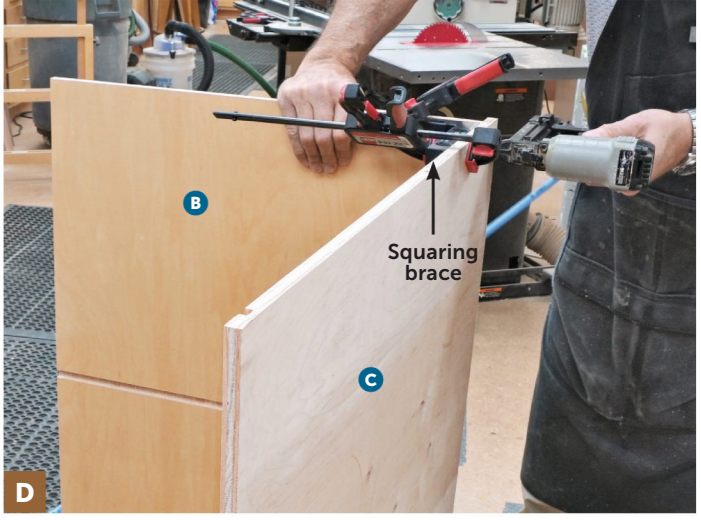
To help place staples properly during assembly, transfer the centerlines of the dadoes to the rear faces of the sides (A, F), bottoms (B, G), and backs (C, H).

> **IF YOUR SUPPLIER DOESN'T STOCK PREFINISHED PLYWOOD, THEY CAN ALMOST CERTAINLY ORDER IT. THE GIANT TIME SAVINGS ARE WORTH ANY SLIGHT ADDITIONAL COST.**
>
> ***-KEVIN BOYLE, SENIOR DESIGN EDITOR***

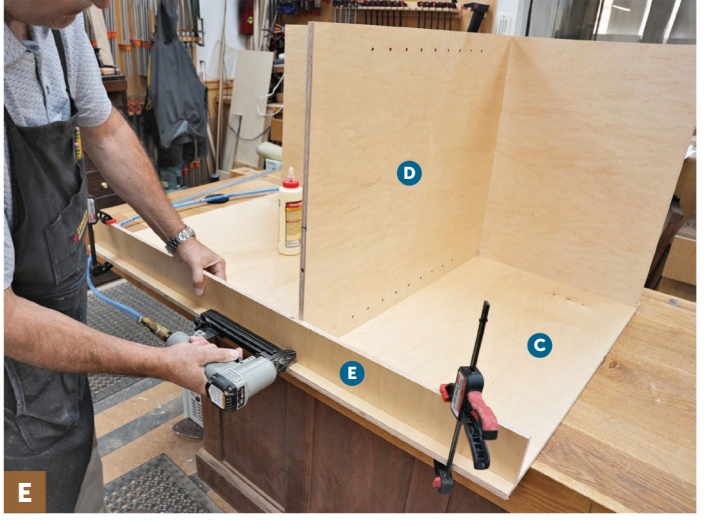
5 Stand this assembly on end and add a base side (A) **[Photo F]**. Note that the side stands 1/4" proud of the bottom (B) front edge. This lip fits into a groove in the face frame later. Flip the carcase over and add the second side.

6 Add glue to the ends of the front base stretcher (E) and install it in the top dadoes of the base sides (A) **[Photo G]**. Repeat this assembly process for the other base cabinet.

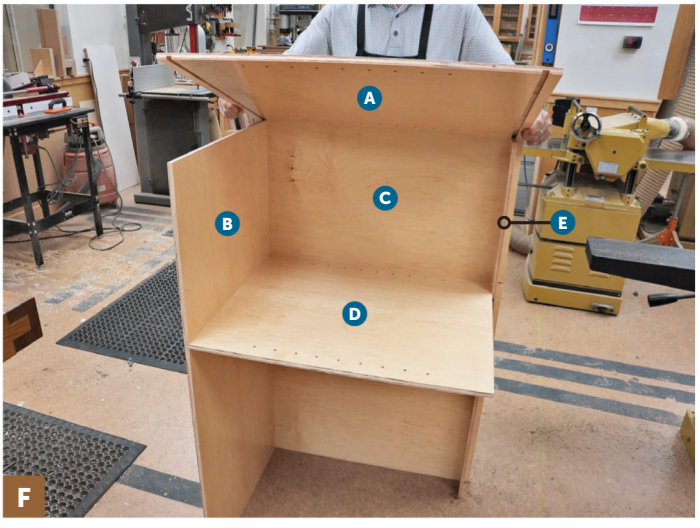
7 For the wall carcases, apply glue to the dadoes in the wall back (H) and staple the wall top and bottom (G) in place **[Drawing 2]**. Then add the wall sides (F). As with the base carcases, the sides (F) stand 1/4" proud of the top and bottom (G) front edges.



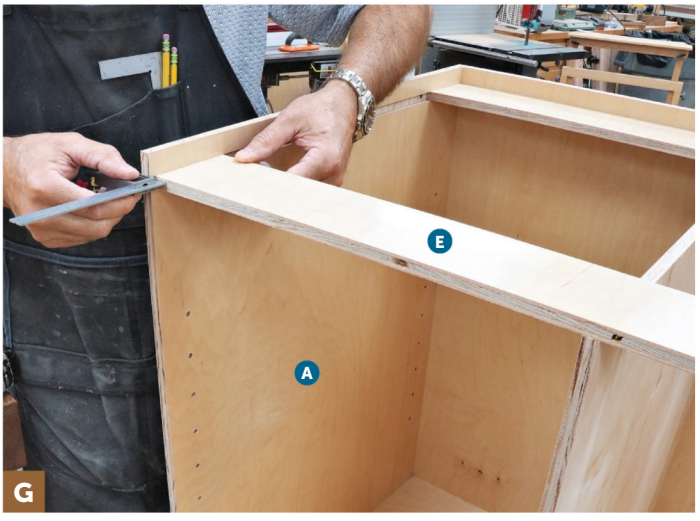
Draw the bottom (B) and back (C) together with clamps and a squaring brace. Then drive ¾" narrow-crown staples along the layout line drawn earlier to help secure the bottom.



Glue the stretcher (E) flush with the ends of the back (C). Clamp it in place and staple into the divider (D). Then drive staples through the back and into the stretcher.



Apply glue to the dadoes and rabbet in a base side (A), then staple the side to the base bottom (B) and back (C). Note that the top dado needs glue only where it contacts the base stretcher (E).



Use a combination square to position the front base stretcher (E) ¼" from the front edge of the base sides (A). Clamp across the carcase just behind the stretcher, and drive two staples into each end.

FASHION THE FACE FRAMES

Hardwood face frames strengthen each carcase, provide a finished appearance, and hide the edges of the plywood.

1 From ¾" maple, cut the face frame rails and stiles (I–M) to size **[Parts List]**. Drill two pocket holes near each end of the rails (J, M) and center stiles (K) **[Drawings 1, 2]**.

2 Assemble the face frames with glue and fine-thread pocket screws. For the base cabinets, center the center stiles (K) on the base dividers (D).

3 Clamp the face frames to their cabinets with the stiles (I or L) overhanging the sides (A or F) equally. Mark the side locations on the stiles. Install a dado stack in your tablesaw to match the thickness of your ½" plywood. Cut ¼"-deep grooves at the marked locations on the rear of the stiles **[Drawings 1, 2]**. Finish-sand the face frames and set them aside.

4 Cut the finish panels (N, O) to size and finish-sand them.

5 Apply a clear finish to the front faces and edges of the face frames as well as the best faces of the finish panels. We sprayed on two coats of satin lacquer.

6 After the finish dries, glue and clamp the face frames to the carcases. When the glue dries, glue the finish panels to each side (A, F) of the carcases, butted against the rear of the face frames.

Note: **These grooves will not cut into the pocket screws in the face frame.**

DOORS AND FALSE FRONTS

The cabinets have frame-and-panel doors in two sizes and drawers in four sizes. The rails and stiles for the drawer false fronts and the doors are identical in thickness and width. They also use the same joinery, so cut all these parts to size, then cut the joints to reduce tool setups.

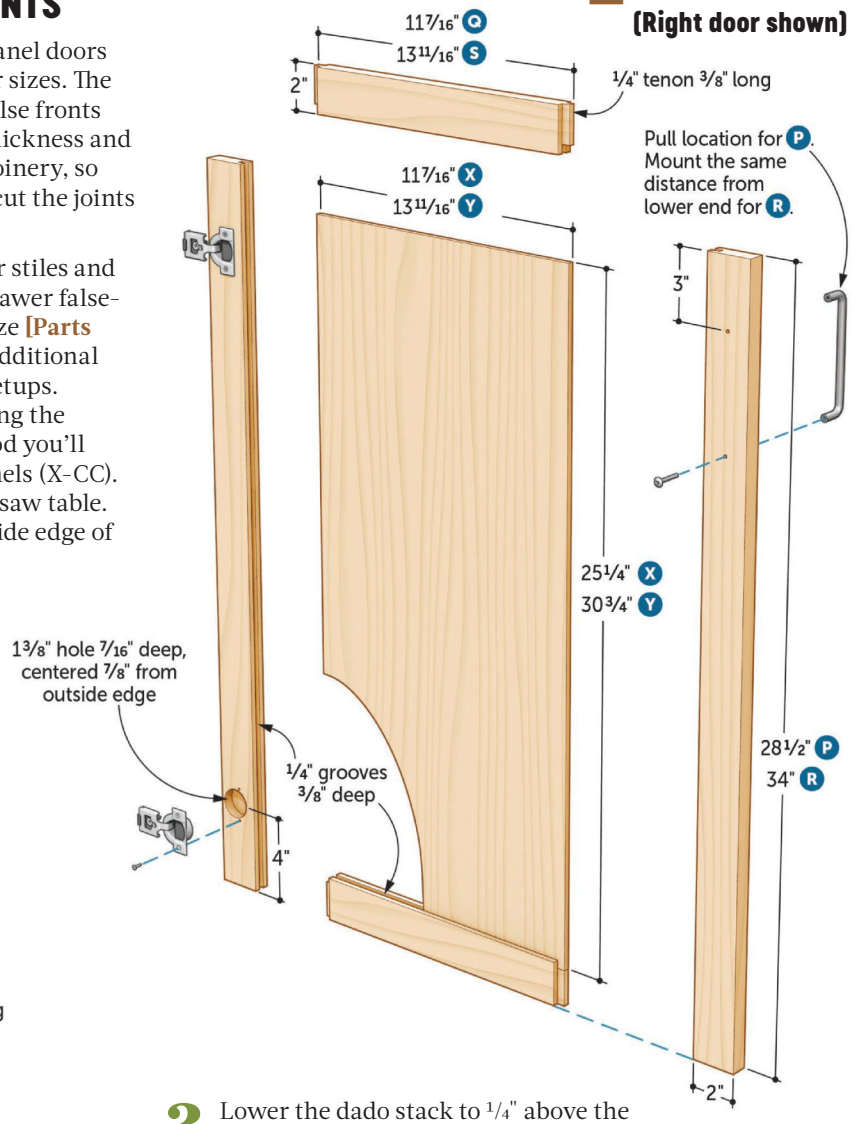
1 From ¾" maple, cut the door stiles and rails (P–S) along with the drawer false-front rails and stiles (T–W) to size **[Parts List, Drawings 3, 4]**. Cut a few additional lengths to help with tablesaw setups.

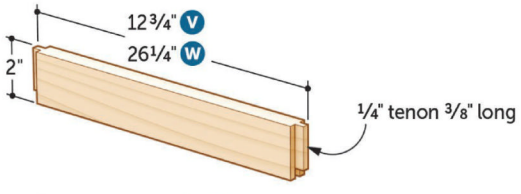
TIP!

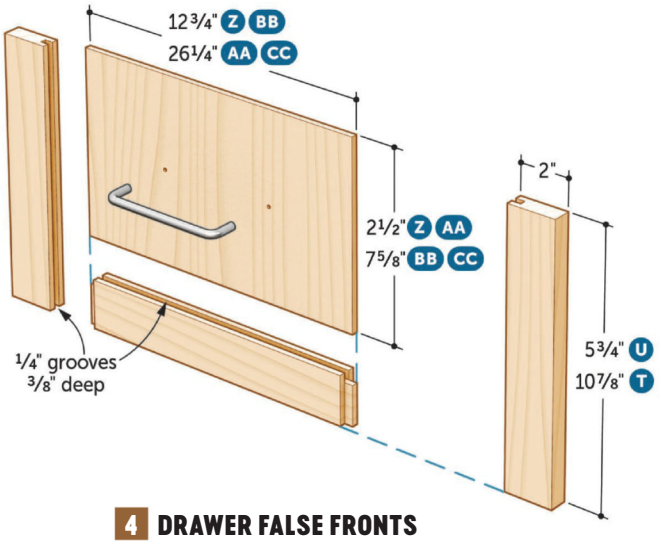
If your plywood is less than ¼" thick, use a rip blade. Make a pass with each face of the rails and stiles against the rip fence.

2 Set up a dado stack matching the thickness of the ¼" plywood you'll use for the door and drawer panels (X–CC). Raise the blade to ⅜" above the saw table. Cut centered grooves on the inside edge of each rail and stile (P–W).

3 DOORS (Right door shown)







4 DRAWER FALSE FRONTS

3 Lower the dado stack to ¼" above the saw table. Making cuts on both faces of a test piece, form a tenon that fits snug in the grooves of the stiles. Then set the rip fence ⅜" from the outside edge of the dado stack and cut tenons on the ends of the rails (Q, S, V, W) **[Drawings 3, 4]**.

4 Dry-fit the doors and false fronts and cut the panels (X–CC) to size from ¼" maple plywood. Finish-sand the panels.

5 Assemble the doors and false fronts one at a time by applying glue to the tenons and to the back edge of the grooves in the rails and stiles. Position a rail in one stile, add the panel, then add the remaining rail and stile. Clamp across the rails, and check for square.

6 After the glue dries, drill the 1⅜" stopped holes in the back face of the door stiles to accept the hinge cups **[Drawing 3]**.

7 Finish-sand the assembled doors and false fronts, then set them aside.

NOW THE DRAWER BOXES

1 From 5/8"-thick maple, cut the drawer-box parts (DD–II) to size, along with a couple of extra pieces for testing setups **[Parts List, Drawing 5]**.

2 Install a 1/4" dado stack in your tablesaw and raise it to cut 1/4" deep. Position the rip fence 3/8" from the blade and dado the ends of the drawer sides (DD, EE).

3 Move the rip fence 1/2" from the blade and cut a groove near the bottom edge of each drawer part to accept the bottom panel later.

4 Attach an auxiliary face to the rip fence and adjust the fence so the face just brushes the dado stack. Raise the blade to cut 3/8" deep and cut test rabbets on scrap until you have a tongue that fits snug in the dadoes in the sides (DD, EE). Rabbet both ends of each front and back (FF–II).

5 Cut the drawer bottoms (JJ, KK) to size from 1/4" plywood **[Drawing 5]**. Finish-sand the bottoms and the inside faces of the drawer fronts, backs, and sides (DD–II).

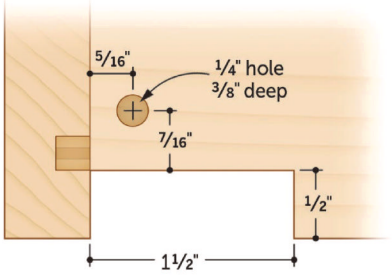
6 Apply glue to the dadoes and groove in a drawer side. Glue the appropriate front and back to the side. Add glue to the grooves in the front and back, slide the bottom in place, and glue the remaining side to the assembly. Clamp and check that the drawer is square and rests flat, then set it aside to dry. Repeat to glue up the remaining drawers.

7 We used bottom-mount drawer slides **[Sources]** that require you to notch the drawer backs (FF–II) then drill a hole to accommodate the slide hardware **[Drawing 5a]**. Start it by making vertical notch cuts with a handsaw. Then use a chisel to remove the waste. Drill the holes, then finish-sand the drawers.

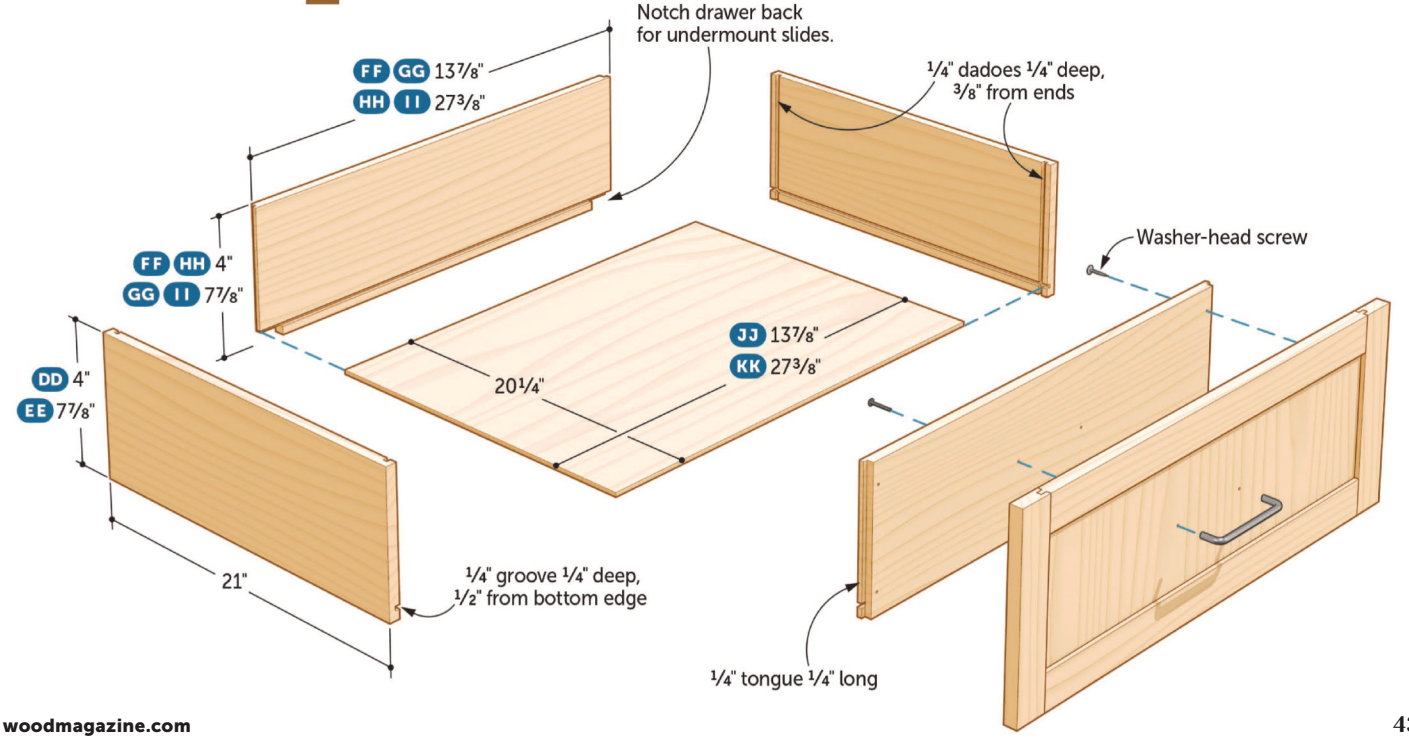
8 Cut the shelves (LL–NN) to size from 3/4" prefinished plywood **[Exploded View]**. Apply iron-on edge banding to the front edges and trim and sand it flush. Apply finish to the drawer boxes, false fronts, doors, and shelf edging, and to the shelves, if needed.

Watch a video on applying iron-on edge banding.
woodmagazine.com/ironon

5a DRAWER-BACK NOTCH



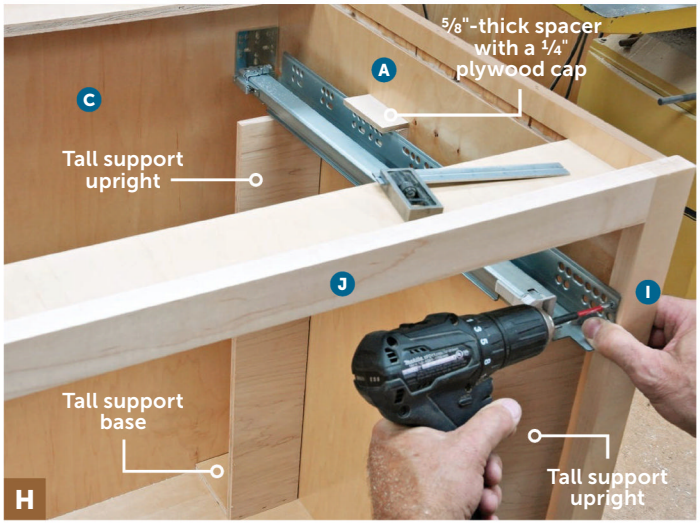
5 DRAWER BOXES



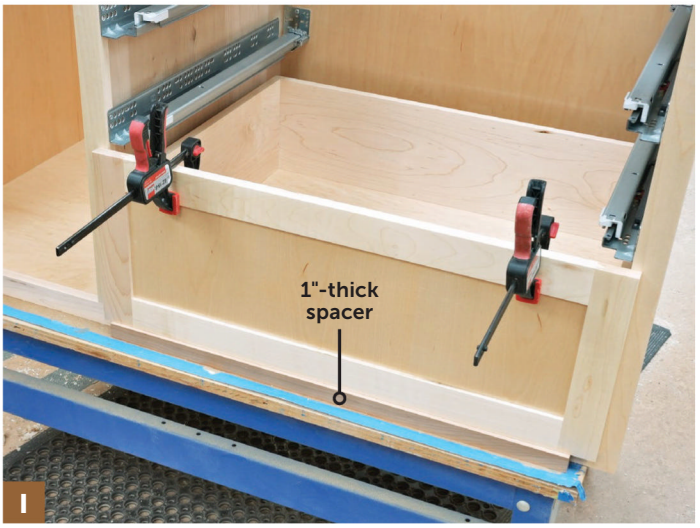
INSTALL THE SLIDES

1 To support the drawer slides, build six L-shaped supports from scrap by attaching 3"-wide uprights to 3×3" bases. Refer to **Photo H**. Make two supports 22½" tall, two 16⅝" tall, and the others 10¾".

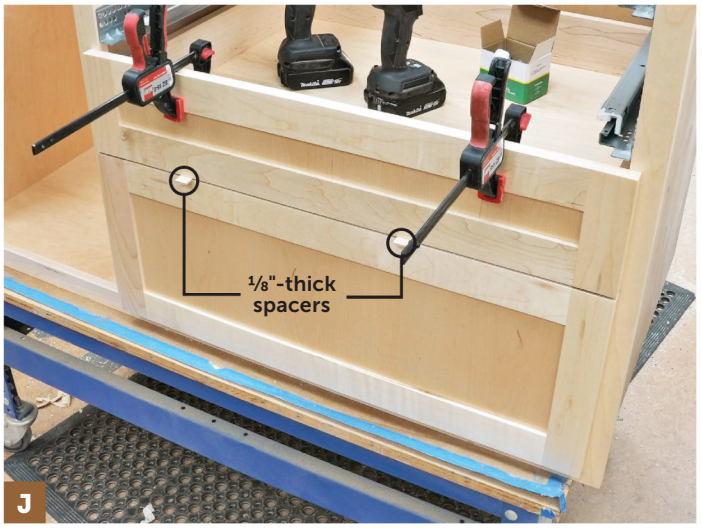
2 Slide a rear bracket onto one of the drawer slides, then support the slide on the tall supports. Position the front of the slide ⅛" inset from the front of the face frame, slip a ⅝"-thick spacer between the slide and cabinet side, and screw the slide to the face frame **[Photo H]**. Drive a screw to secure the rear bracket. Repeat for the other side, then continue down, installing the next two sets of slides using the shorter uprights. For the bottom slides, rest them on ¼"-thick spacers.



L-shaped uprights support the slide while a capped ⅝"-thick spacer keeps the slide parallel to the carcase side. For now, attach each slide with one screw at the front and one at the back.



A 1"-thick spacer positions the bottom false front. Make sure the front is centered between the stiles, clamp it in place, and drive screws through the drawer front and into the rails of the false front.



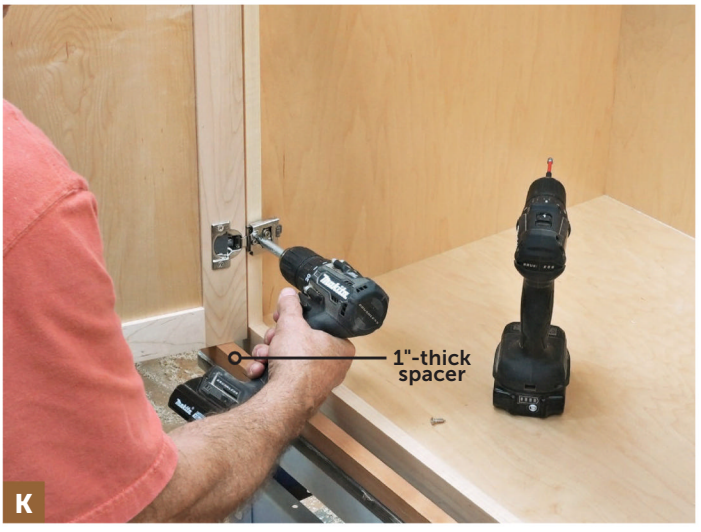
Rest the next false front on ⅛"-thick spacers, and align the ends with the false front below it. Clamp the false front in place and drive screws to secure it to the drawer front.

Note: **Drive three screws into each false-front rail on the wide drawers. Drive two screws into each rail on the narrow drawers.**

3 Following the manufacturer's instructions, attach the front mounting clips to the underside of the drawers. Install the bottom drawer in a carcase and rest its false front on a 1" spacer, centering the front between the center and side stiles **[Photo I]**. Clamp the false front in place and drive #8×1" washer-head screws from inside the drawer to secure the false front.

4 Install the next drawer up, rest its false front on ⅛"-thick spacers, and screw the false front into place **[Photo J]**. Repeat for the remaining drawers and false fronts. Test the operation of the drawers and if all is good, drive additional screws to secure the drawer-slide brackets to the carcases.

5 Install the concealed hinges in the doors **[Drawing 3]**. Rest a door on a 1" spacer and secure the plates to the face frame **[Photo K]**. Repeat for the remaining doors.



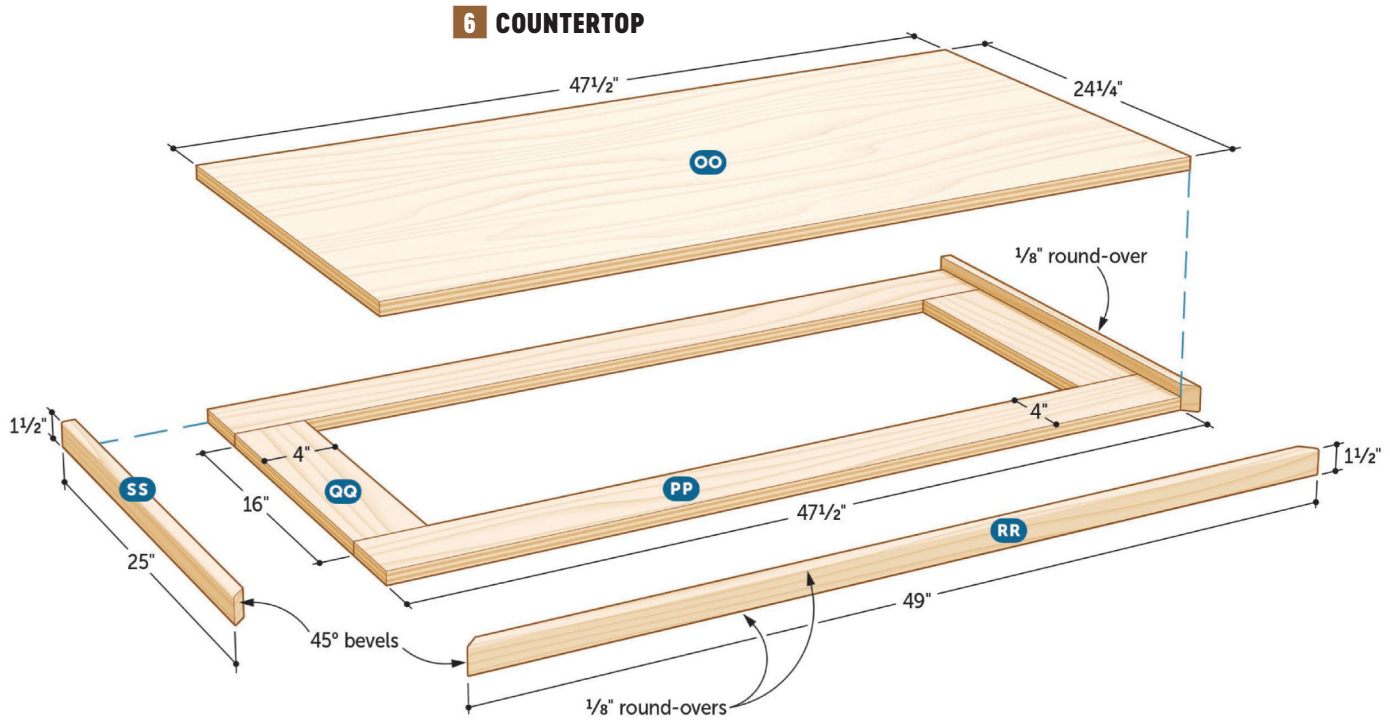
Open the hinges so the plates extend. Rest the door on a 1"-thick spacer so it aligns with the lowest drawer false front. Butt the tabs of the clip against the face frame and drive a screw to secure the hinge.

FROM TOP TO BOTTOM

Shop-made countertops of plywood edged with hardwood provide sturdy worksurfaces. A top that mounts between two base cabinets creates a mitersaw workstation.

1 From ¾" plywood, cut the countertops (OO) along with the front/back fillers (PP) and end fillers (QQ) to size **[Drawing 6]**.

2 Glue a front filler (PP) flush with one edge of a countertop (OO), then add the end fillers (QQ) against the front filler, flush to the ends of the countertop. Glue the remaining back filler (PP) tight to the end fillers. This back filler will be slightly inset from the rear edge of the countertop so you can scribe-cut the countertop, if necessary, to fit tight against your shop wall.



3 Cut the front and side edging (RR, SS) 1" overlong and bevel-cut one end of each. Clamp the beveled ends of the front edging (RR) and one side edging (SS) together along the countertop and mark the opposite end of the front edging. Bevel-cut the front edging to length, then use the two side edging pieces to help position it as you glue and clamp it into place. Mark the finished length of each side edging, then remove them to avoid gluing them into place prematurely.

4 Crosscut the side edgings (SS) where marked, and glue them into place. After the glue dries, rout ⅛" round-overs on the top and bottom of the edging **[Drawing 6]**.

5 Cut the mitersaw top (TT), mitersaw top edging (UU), and mitersaw cleats (VV) to size **[Exploded View]**. Glue the edging (UU) to the top (TT). Rout ⅛" round-overs on the edging, then finish-sand the mitersaw top and cleats, and the countertops (OO–SS).

6 Cut the riser fronts/backs (WW) and ends/stretchers (XX) to size **[Parts List, Drawing 1]**. Assemble these parts with glue and 2" finish nails.

7 Cut the riser trim pieces (YY, ZZ) 1" overlong, and bevel-cut one end of each at 45°. Finish-sand the riser trim pieces, then apply a finish to the riser trim pieces, countertops (OO–SS), mitersaw top (TT/UU), and cleats (VV).

Note: **We sized our mitersaw platform at 24¾" long. Measure your mitersaw's base and lengthen parts TT and UU if necessary. Be sure to take into account the ⅝" overhang of the surrounding countertops.**

INSTALL YOUR CABINETS

1 Place the risers (WW/XX) where the base cabinets will rest with a spacer between them **[Photo L]**. If needed, mark and cut away any baseboard so the risers rest against the wall.

2 Shim the risers until they rest level in both directions and in the same plane as each other. Then screw the risers to studs or the wall sill plate with #9×3" washer-head screws.

3 Remove the spacer, trim away any exterior-facing exposed shim in the way, then bevel-cut the riser front trim (YY) to length, working as you did with the edging for the countertops (OO). Glue and clamp the riser front and end trim (YY, ZZ) to the risers.

4 Remove the doors and drawers from the carcases. Place a base carcase onto a riser, against the wall and centered from side to side. Shim behind the carcase as needed and screw the carcase to wall studs **[Photo M]**.

5 As you place the second base carcase, check the fit of the mitersaw top (TT/UU) between the carcases. Screw the second base to the wall when the fit is satisfactory. Screw the mitersaw cleats (VV) to the carcases so the wings of your mitersaw will sit flush with the countertops (OO) **[Exploded View]**. Then screw the mitersaw top into place.

TIP!

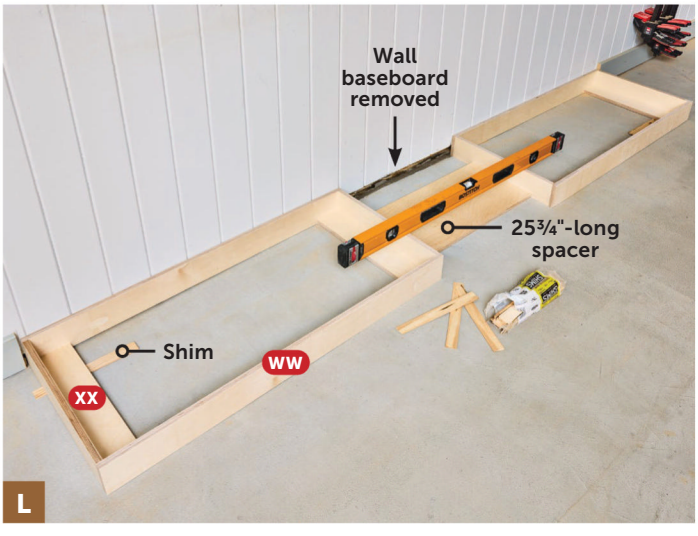
Extend your level to span both bases by resting it on the edge of a 2"-wide piece of plywood.

TIP!

If you need to feed the mitersaw power cord or a dust hose through the mitersaw top, drill those holes now.

6 Center the countertops (OO-SS) side to side on the base carcases and against the wall. Scribe the rear edges if needed to get a tight fit to the wall, then cut and sand to the scribe lines. Secure the countertops by screwing up through the base stretchers (E).

7 To install the wall carcases, build an 18"-tall stand from scrapwood. Refer to **Photo N**. Mark the wall studs above the top of the wall carcase position, then rest a wall carcase on the stand. Screw the carcase to the studs. Install the shelf pins where desired in all carcases, and place the shelves (LL–NN) on the pins.



Use a scrap plywood spacer 1" longer than the mitersaw top (TT) to keep the risers positioned as you level them with shims from front to back and side to side. Make sure the tops of the risers are coplanar.

> **THE SAME TECHNIQUES USED TO BUILD THESE SHOP CABINETS CAN CREATE A KITCHEN'S WORTH OF CABINETS, TOO.**
>
> ***-KEVIN BOYLE, SENIOR DESIGN EDITOR***

Locate the studs in the wall. Fill gaps between the carcase and wall with shims, then drive #9×3" washer-head screws through the base back and into the studs. Score the shims, then break off the excess.

Position the wall carcase where desired. (We mounted ours flush with the outer ends of the countertops.) Secure near the top with two screws, then remove the stand and drive more screws at the bottom.

8 Make a drilling template to install the wire pulls on the doors and drawers [Photo O, Drawing 3]. Drill the holes [Exploded View], install the pulls, then reinstall the doors and drawers in the carcases.

9 Mount your mitersaw, then start organizing all those items needing a home in your shop.

Make a 2"-wide template from plywood. Drill the first hole 1" from the end and the second to match the hole spacing in the pulls. Clamp the template flush with the inner edge of a rail and drill.

PARTS LIST

PART		FINISHED SIZE T	W	L	Matl.	Qty.
CARCASES						
A	BASE SIDES	½"	23½"	30½"	PFP	4
B	BASE BOTTOMS	½"	23"	46¾"	PFP	2
C	BASE BACKS	½"	46¾"	30½"	PFP	2
D	BASE DIVIDERS	½"	23"	28"	PFP	2
E	BASE STRETCHERS	½"	3½"	46¾"	PFP	4
F	WALL SIDES	½"	12"	36"	PFP	4
G	WALL TOPS/BOTTOMS	½"	11½"	34¾"	PFP	4
H	WALL BACKS	½"	34¾"	36"	PFP	2
FACE FRAMES & FINISH PANELS						
I	BASE STILES	¾"	1½"	30½"	M	4
J	BASE RAILS	¾"	1½"	45"	M	4
K	BASE CENTER STILES	¾"	1½"	27½"	M	2
L	WALL STILES	¾"	1½"	36"	M	4
M	WALL RAILS	¾"	1½"	33"	M	4
N	BASE FINISH PANELS	¼"	23¼"	30½"	MP	4
O	WALL FINISH PANELS	¼"	11¾"	36"	MP	4
DOORS & DRAWER FALSE FRONTS						
P	BASE DOOR STILES	¾"	2"	28½"	M	4
Q	BASE DOOR RAILS	¾"	2"	11⁷⁄₁₆"	M	4
R	WALL DOOR STILES	¾"	2"	34"	M	8
S	WALL DOOR RAILS	¾"	2"	13¹¹⁄₁₆"	M	8
T	TALL DRAWER STILES	¾"	2"	10⅞"	M	4
U	SHORT DRAWER STILES	¾"	2"	5¾"	M	12
V	NARROW DRAWER RAILS	¾"	2"	12¾"	M	8
W	WIDE DRAWER RAILS	¾"	2"	26¼"	M	8
X	BASE DOOR PANELS	¼"	11⁷⁄₁₆"	25¼"	MP	2
Y	WALL DOOR PANELS	¼"	13¹¹⁄₁₆"	30¾"	MP	4
Z	SHORT NARROW PANELS	¼"	12¾"	2½"	MP	3
AA	SHORT WIDE PANELS	¼"	26¼"	2½"	MP	3
BB	TALL NARROW PANEL	¼"	12¾"	7⅝"	MP	1
CC	TALL WIDE PANEL	¼"	26¼"	7⅝"	MP	1

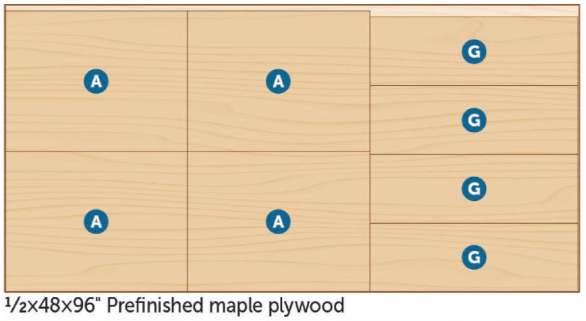
PART		FINISHED SIZE T	W	L	Matl.	Qty.
DRAWER BOXES & SHELVES						
DD	SHORT SIDES	⅝"	4"	21"	M	12
EE	TALL SIDES	⅝"	7⅞"	21"	M	4
FF	SHORT NARROW FT/BKS	⅝"	4"	13⅞"	M	6
GG	TALL NARROW FT/BKS	⅝"	7⅞"	13⅞"	M	2
HH	SHORT WIDE FT/BKS	⅝"	4"	27⅜"	M	6
II	TALL WIDE FT/BKS	⅝"	7⅞"	27⅜"	M	2
JJ	NARROW BOTTOMS	¼"	13⅞"	20¼"	MP	4
KK	WIDE BOTTOMS	¼"	27⅜"	20¼"	MP	4
LL	WIDE SHELF	¾"	22½"	29½"	PFP	1
MM	NARROW SHELVES	¾"	22½"	16"	PFP	3
NN	WALL SHELVES	¾"	11"	34⅛"	PFP	4
COUNTERTOPS & RISERS						
OO	COUNTERTOPS	¾"	24¼"	47½"	MP	2
PP	FRONT/BACK FILLERS	¾"	4"	47½"	MP	4
QQ	END FILLERS	¾"	4"	16"	MP	4
RR*	FRONT EDGING	¾"	1½"	49"	M	2
SS*	SIDE EDGING	¾"	1½"	25"	M	4
TT	MITERSAW TOP	¾"	22½"	24¾"	MP	1
UU	MITERSAW TOP EDGING	¾"	1½"	24¾"	M	1
VV	MITERSAW CLEATS	¾"	¾"	22½"	M	2
WW	RISER FRONTS/BACKS	¾"	4"	46¾"	MP	4
XX	RISER ENDS/STRETCHERS	¾"	4"	19½"	MP	8
YY*	RISER FRONT TRIM	¼"	4"	47¼"	MP	2
ZZ*	RISER END TRIM	¼"	4"	21¼"	MP	4

*Parts initially cut oversize. See the instructions.

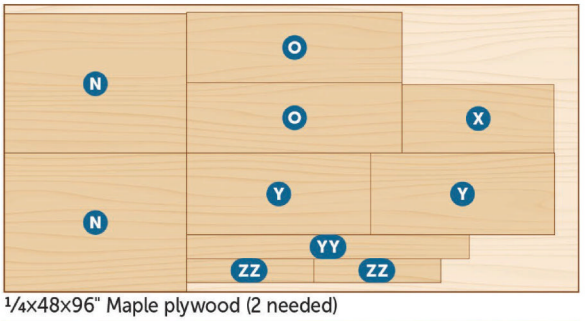
MATERIALS KEY: PFP–prefinished maple plywood, M–maple, MP–maple plywood.
SUPPLIES: ¾" narrow-crown staples; 1¼" fine-thread pocket screws, #8×1¼", #8×1½", and #8×2" flathead screws; #8×1" and #9×3" washer-head screws; 2" finish nails; ¼" shelf pins; iron-on maple edge banding.
BLADE AND BITS: Dado set, 1⅜" Forstner bit, ¼" self-centering drill bit, ⅛" round-over router bit.
SOURCE: 21" soft-close, full-extension undermount slides no. VLS2-U21-SC (8 pairs), $20/pair; undermount-slide locking devices no. VLS2-U-FBKT (8 pairs), $3/pair; undermount-slide rear brackets no. VLS2-U-RBKT (16), $1 each; Blumotion 105°, ½"-overlay, soft-close hinge no. BHB38N358BE08 (12), $4 each; 5" wire pulls no. HAF-116.07.443 (14), $2.50 each, cabinetparts.com.
PROJECT COST: It cost us about $1,750 to build this project. Your cost will vary by region and source.

CUTTING DIAGRAM

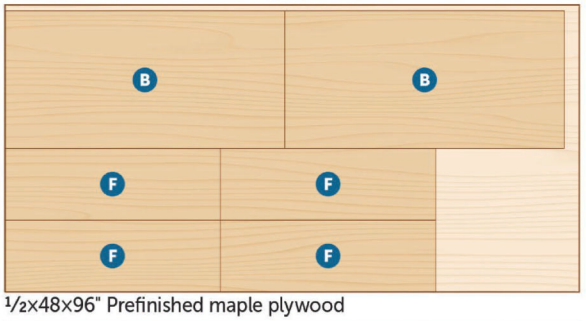
We purchased 75 board feet of 4/4 maple. Before cutting parts to size, we planed them to the thicknesses shown in these example boards.



1/2x48x96" Prefinished maple plywood



1/4x48x96" Maple plywood (2 needed)



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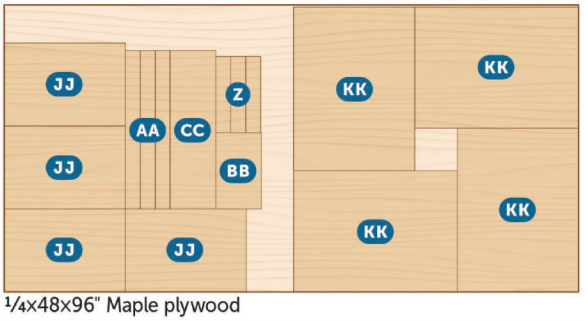
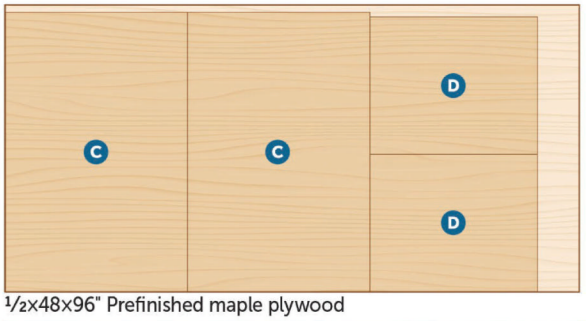
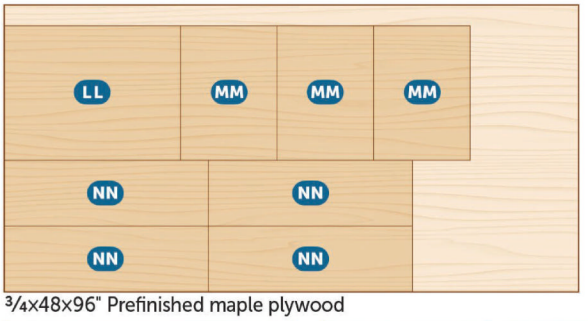


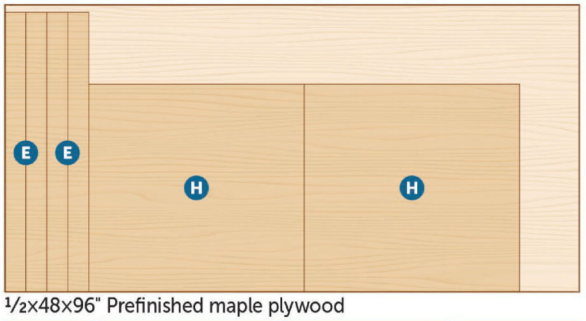
1/4x48x96" Maple plywood



1/2x48x96" Prefinished maple plywood

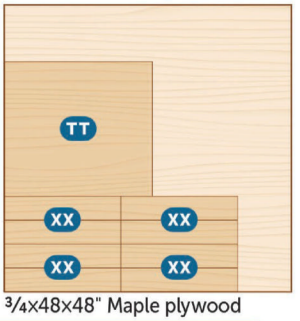


3/4x48x96" Prefinished maple plywood



1/2x48x96" Prefinished maple plywood

3/4x48x48" Maple ply (2 needed)



3/4x48x48" Maple plywood

3/4x3 1/2x96" Maple

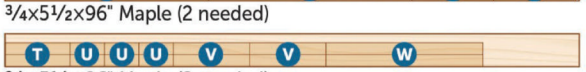
3/4x3 1/2x96" Maple

3/4x3 1/2x96" Maple

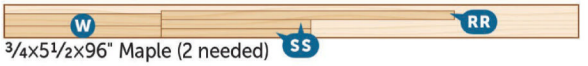
3/4x3 1/2x96" Maple

3/4x5 1/2x96" Maple

3/4x5 1/2x96" Maple (2 needed)



3/4x5 1/2x96" Maple (2 needed)



3/4x5 1/2x96" Maple (2 needed)

5/8x9 1/4x96" Maple (2 needed)

5/8x9 1/4x96" Maple

5/8x9 1/4x96" Maple

5/8x9 1/4x96" Maple

THICKNESS PLANER TUNE-UP

These easy maintenance steps keep your portable thickness planer performing at its peak to produce the best boards.

WRITER: KEN BURTON

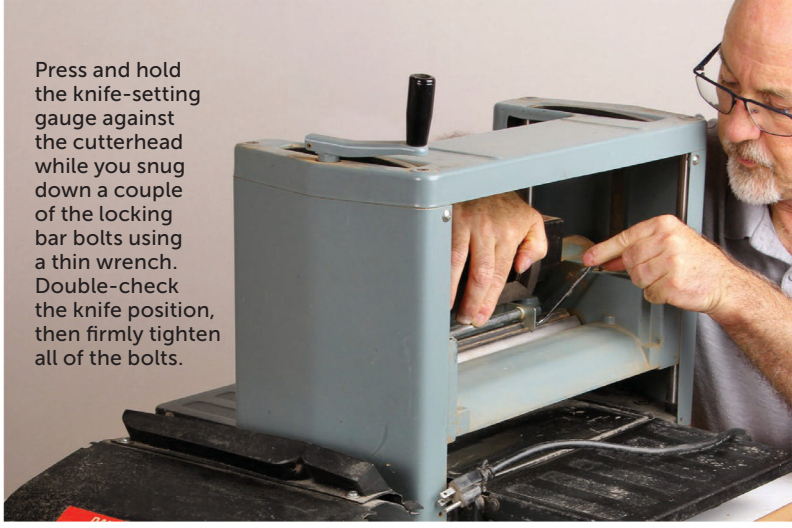
PHOTOGRAPHERS: KEN BURTON, KELSEY HANSEN

Thickness planers are some of the simplest, hardest-working machines in a shop. Just adjust the height, feed your stock through, and repeat. They'll do this all day long with nary a complaint. But even the hardiest of these workhorses needs a little TLC now and then.

Keep your planer shaving smoothly with these maintenance tips. Most of these will apply to any "lunchbox"-style portable planer, whether new or, like our example, much older. All of these basics also apply to stationary planers, though those larger models may require additional maintenance that portable models don't.

TIP!

We shouldn't have to say this, but: Make sure your planer is unplugged to prevent unintended start-ups.



Press and hold the knife-setting gauge against the cutterhead while you snug down a couple of the locking bar bolts using a thin wrench. Double-check the knife position, then firmly tighten all of the bolts.

KEEP A KEEN EDGE

Worn knives are the most common reason to crack open your planer for maintenance.

Dull knives will reveal themselves in several ways, including tear-out where the wood fibers are being pulled out rather than sheared, powdery or granular dust rather than longer shavings, a slower feed rate requiring increased effort to push the board through the planer, and audible motor strain. Neglected, they can cause the motor to work harder, create excess heat, and increase pitch and resin buildup.

But even new or freshly sharpened knives can develop nicks from overlooked grit or embedded metal in the wood. These nicks show up as long ridges in a freshly planed board.

If you notice any of these signs, it's time to change your blades, a process that intimidates many woodworkers. But changing knives is easier than you think.

To change knives with alignment tabs, simply unbolt the cap, remove and rotate each knife to expose the second cutting edge, and push the knife back onto the tabs. Then reattach the retaining cap.

The knives in older machines, including this classic Delta 22-540, are the hardest to deal with because they lack the built-in alignment aids that are common on many newer machines. On this planer, each knife sits in a groove that runs the length of the cutterhead. The knife drops in then gets sandwiched in place by a bar that locks in as you tighten multiple short bolts. You have to manually position the knife side to side and adjust how far the knife edge projects beyond the cutterhead.

Thankfully, two things make these tasks relatively easy. First, the knives in this and many similar planers sit on springs in the bottom of the groove. The springs push the knife outward from the cutterhead, preventing it from falling in too deep as you make adjustments. Second, many of these older-style planers were shipped with a knife-setting gauge that allows you to push against that spring pressure, seating the knife back into the cutterhead consistently from end to end while you tighten the locking bar bolts, *above*.

While more cumbersome to set up, knives of this type offer a couple of advantages. Most can be sharpened rather than disposed of. This style also allows you to offset each knife slightly from side to side, which can keep a sharp but nicked set of knives working longer.

Even if your planer is older and is no longer manufactured, you can usually find new knives. Search online by brand and model to find aftermarket versions.

Many newer planers simplify knife changes by using double-edged, disposable knives with alignment holes that fit onto tabs on the cutterhead. A cap locks the knife in place, allowing it to fit into only one position, *left*.

TIP!

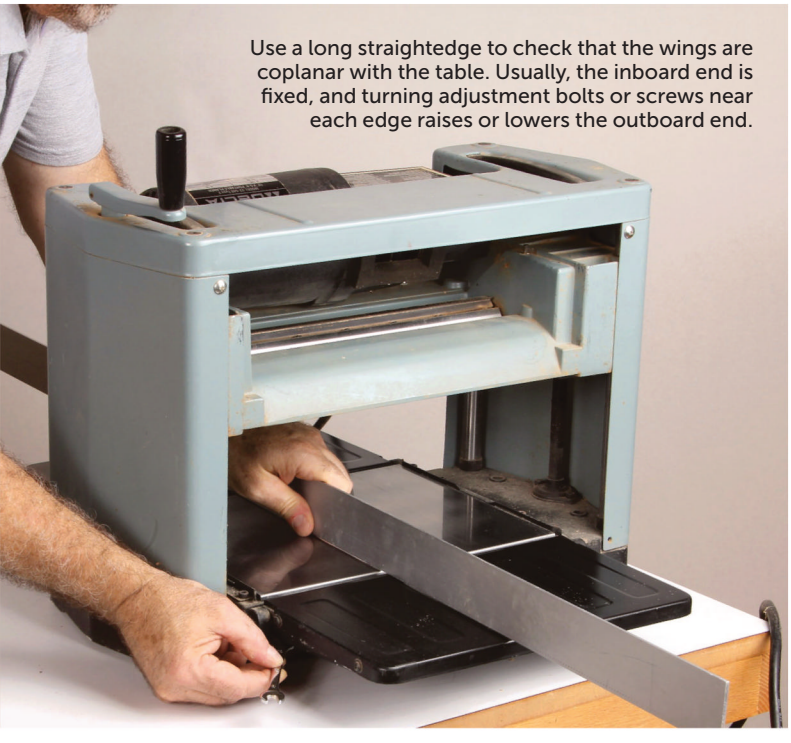
If the knife-setting gauge for your planer is missing, find a replacement or a universal gauge online. Some feature magnets that hold the blade and the gauge in place.

TIP!

Always rotate your cutters in the same direction (we choose clockwise) for consistency. Marking the used edge with a Sharpie helps keep track of how many fresh edges remain.

In the past few years, planer cutterheads have increasingly been equipped with rows of small carbide inserts instead of long knives. They're hands down the easiest to change, *right*. As with disposable straight knives, the cutterhead ensures their alignment. But the four-sided inserts give you twice as many refreshes before disposal, as well as the option to deal with only a single insert, rather than all, in the case of a nick.

To change an insert-style cutter, loosen a screw that holds it in place, then rotate the cutter 90° and tighten the screw. This allows you to refresh any or all of the cutting edges as needed.



Use a long straightedge to check that the wings are coplanar with the table. Usually, the inboard end is fixed, and turning adjustment bolts or screws near each edge raises or lowers the outboard end.

FINE-TUNE THE TABLE

Portable planers rely on overhead feed rollers to push the material through. For them to work their best, the table needs to be clean and slick. Raise the head to full height and scrub the bed with fine (000) steel wool dipped in paste wax, *page 50*. This removes pitch buildup and lubricates the surface. Wait a few minutes, then buff the table thoroughly with a clean rag.

Clean the infeed and outfeed wings, as well. Then check their alignment with the planer table, *left*. Use a long straightedge to check in the middle and near both edges.

Scrub each feed roller using a medium-grit scrubbing pad to refresh the surface and dislodge debris. Dampen the pad with all-purpose cleaner, such as Simple Green, to remove stubborn pitch buildup.

REFURBISH THE ROLLERS

TIP!

To access all portions of the feed rollers, plug in your planer and run it for a few seconds to rotate the rollers. Unplug it and continue.

If boards are pausing or feeding poorly even with sharp blades, the feed rollers may need attention. While you have the head fully up, check their condition. The rollers are coated in thick neoprene or rubber. Push your thumbnail into the surface to make sure it hasn't hardened and remains slightly resilient. Also check to ensure no cracks or major damage exist. If the rollers are excessively worn, consult your owner's manual. You should be able to get replacements for a newer planer. For an older model, check out sources such as **acrotechinc.com** to see whether recoating the rollers is an option. Replacing rollers requires extensive disassembly of the planer.

If the rollers aren't worn, clean them to ensure they'll maintain a grip on boards to keep them moving, *left*.

An old toothbrush (not your spouse's) scrubs buildup from the chains and gears. After you knock it loose, use compressed air to blow the gunk out of the assemblies and housing.

TIP!

Lay the planer on its side or back, as needed, to provide easier access and to keep oil where it belongs as it gets absorbed.

LUBRICATE THE INTERNALS

The gears and chains that drive the feed rollers, along with the threaded rods and mechanisms that raise and lower the head, require occasional attention. After removing necessary access panels, start by cleaning out accumulated sawdust and gunk, *above*.

After cleaning the gears and chain, apply a drop or two of machine oil to each chain link and to the feed roller bearings. Then clean and lubricate the threaded rod that raises and lowers the planer head, *right*.

Lubricate the height-adjustment screw using paraffin wax. Oil attracts too much dust. Crank the head through its full range of motion a time or two to work the wax in and knock off excess.

Access the brushes by unscrewing a plug on each side of the motor. Replace the brushes when the carbon measures less than 3/16" long or if any part of the assembly looks worn or burned.

BRUSH UP THE MOTOR

Finally, check the electrical components. First, check the cord and plug, replacing them if they're damaged. Then check the motor brushes, *left*. Check the manufacturer's recommendations for how often they should be inspected. Delta, for example, recommends checking after 50 hours of use, and then every 10 or so subsequent. There are usually two, accessible by unscrewing a plug on each side of the motor. Replace both brushes when the carbon portion on any of them is less than 3/16" long or if any part of the assembly looks worn or burned.

After performing your maintenance steps, reinstall the access panels, check that fasteners are tight, and then run the planer for a minute or two without planing stock while listening for unusual sounds. Then plane test stock to see how much better your planer runs and admire the smooth boards as they emerge.

A CABINET WITH PIZZA-ZZ

Pair this stainless steel-topped cabinet with a portable pizza oven, a pellet smoker, or a grill and you have an outdoor kitchen on wheels.

WRITER: KERRY GIBSON
DESIGNER/BUILDER: KEVIN BOYLE

OVERALL DIMENSIONS
30"W × 26"D × 36¾"H

PHOTOGRAPHER: JACOB FOX; **ILLUSTRATOR:** CHRISTOPHER MILLS

FRAME FOR STRENGTH

Inner frames give the cabinet its strength and shape and also support the drawer [Exploded View].

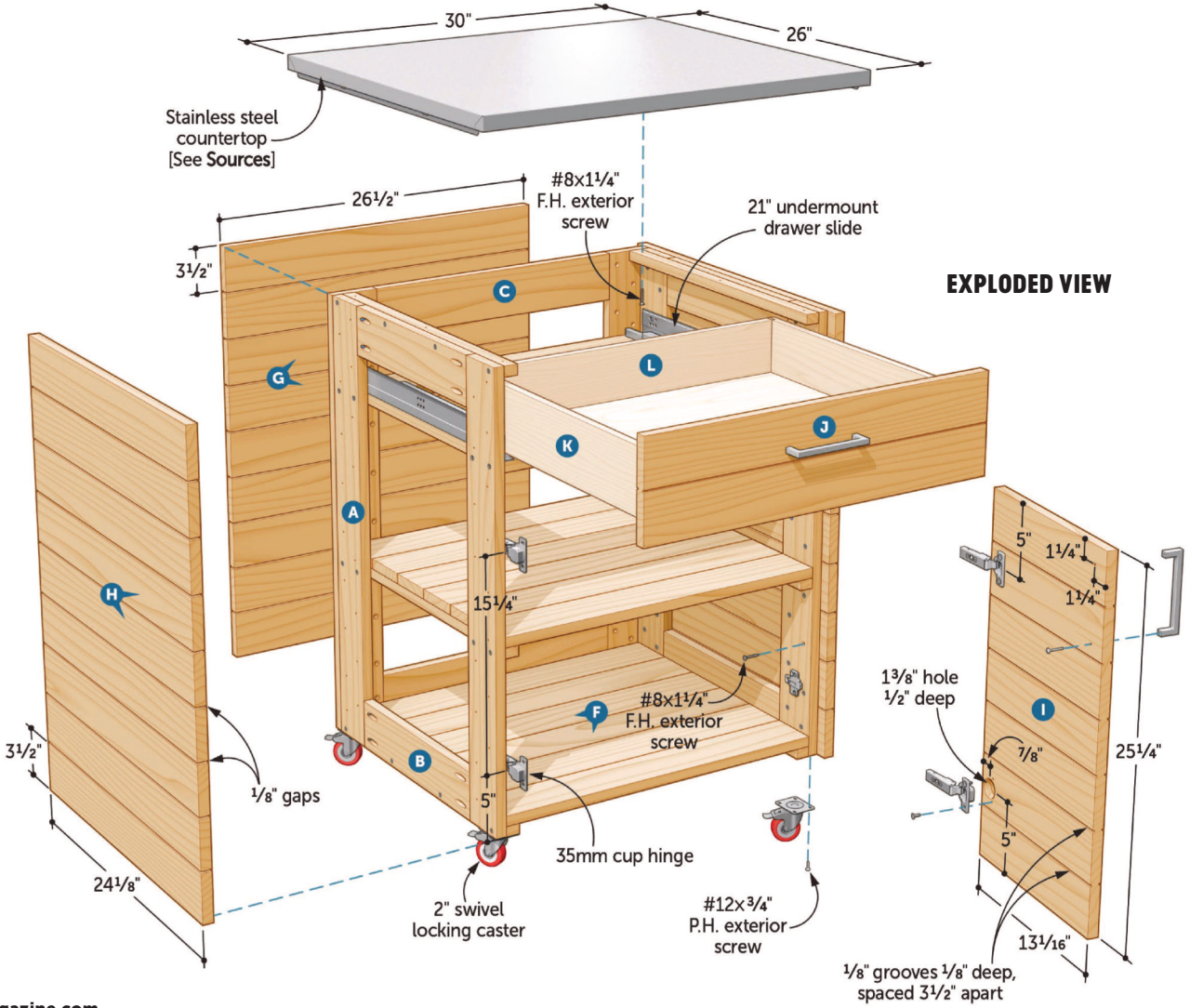
Note: **We built our cabinet from weather-resistant cypress. Cedar and redwood offer great options, but we'd stay away from treated pine due to potential food contact.**

1 Cut the frame stiles (A), side rails (B), and back rails (C) to size [Drawing 1, Parts List]. Use a jig to drill pocket holes in the ends of the side rails and back rails. Assemble the side frames (A/B) and back frame (A/C) with water-resistant glue (such as Titebond III) and exterior-rated pocket screws. Finish-sand the frames.

2 Cut the divider rails (D) to size, retrieve the two remaining side rails (B), and assemble the divider frame with glue and pocket screws. Finish-sand the assembly.

3 Spread glue on the rear edge of one side frame (A/B) and clamp the back frame (A/C) against it with the pocket holes on both frames facing outward and the edges flush. Then reinforce the joint with screws [Photo A].

With the back frame (A/C) glued and clamped to one side frame (A/B), drill countersunk pilot holes through the rear frame stile into the edge of the side frame and drive exterior-grade screws.



4 Clamp a pair of 6³/₈"-wide scrapwood spacers flush with the top of the side/back assembly (A–C) to position the divider frame (B/D). Assemble using glue and screws **[Drawing 1, Photo B]**.

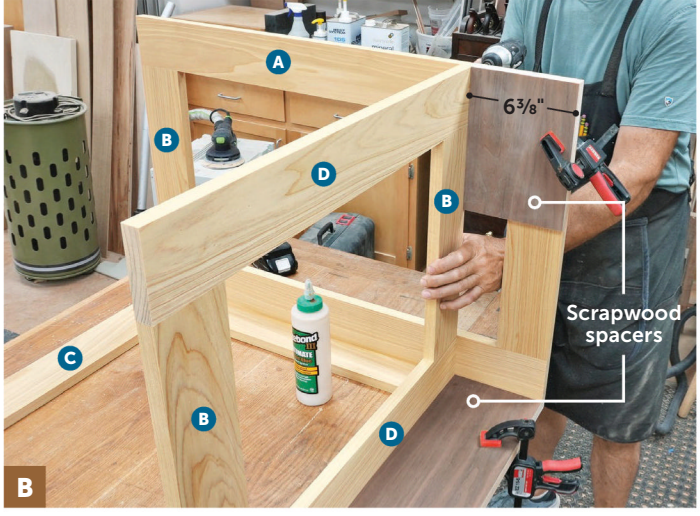
5 Glue and screw the final side frame (A/B) to the frame assembly (A-D).

ADD THE SLATTED SHELVES

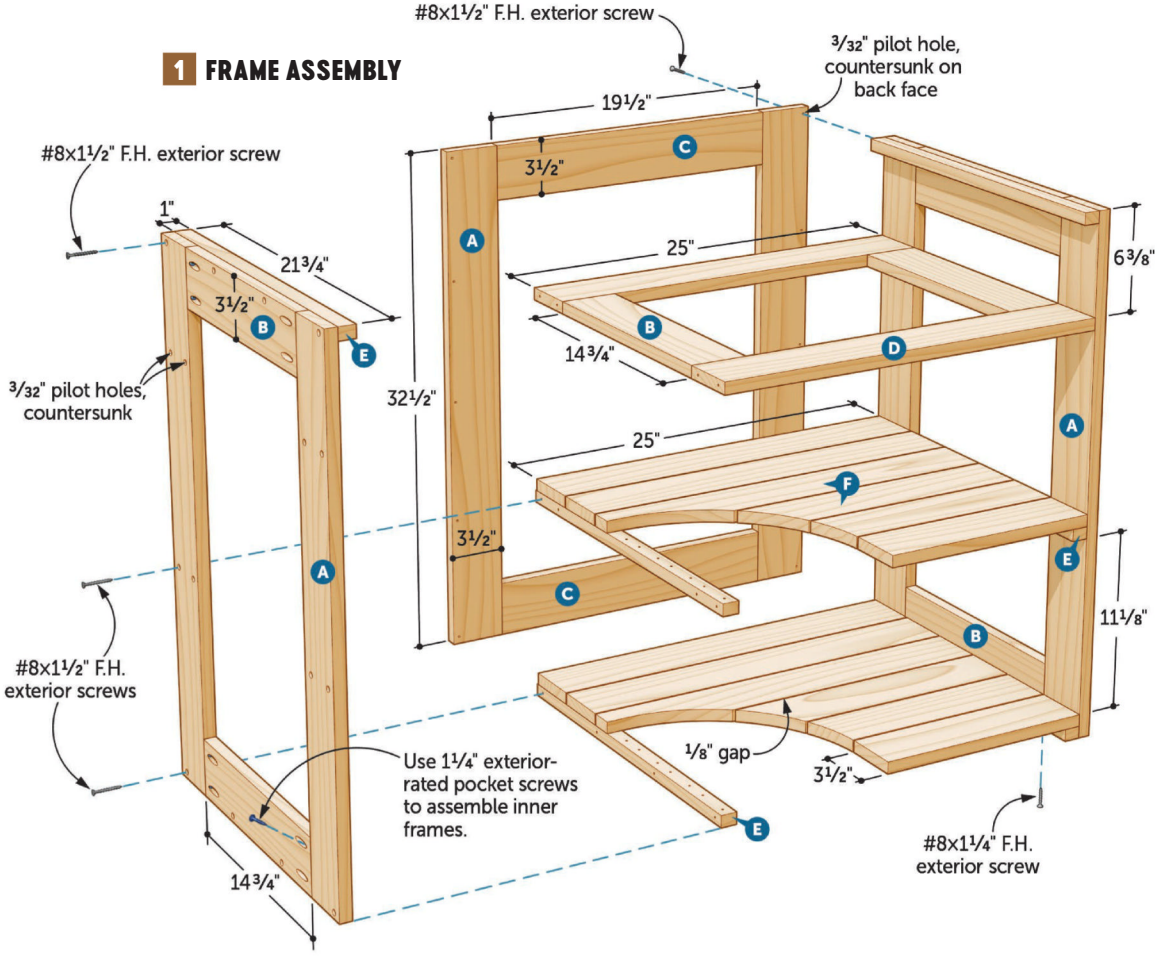
1 Cut the shelf cleats (E) and shelf slats (F) to size **[Parts List]**. Finish-sand the slats and cleats. Set a shelf slat facedown on your workbench. Position the shelf cleats on the slat flush with each end, drill pilot holes, then glue and screw the cleats to the slat, checking the assembly for square **[Photo C]**. Use spacers to position the remaining slats as you attach them. Repeat for the second shelf.

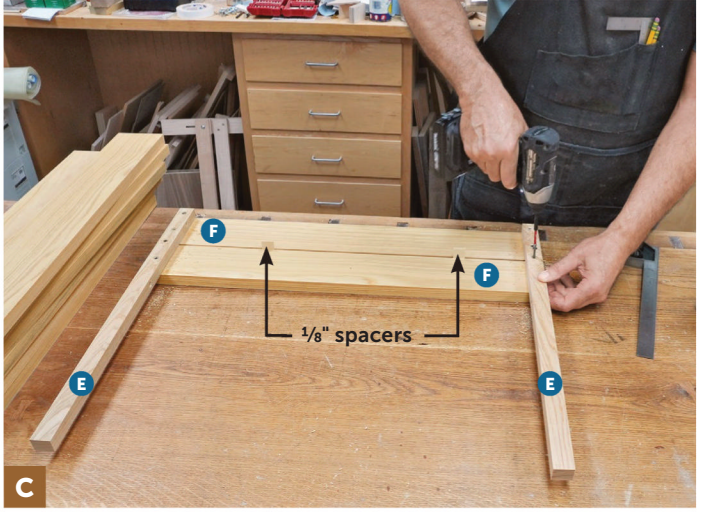
2 Glue the bottom shelf assembly (E/F) to the cabinet frame flush with the bottom edge. Drill countersunk holes through the side frame into the shelf cleats (E) and drive screws **[Drawing 1]**. Cut four spacers and use them to position and attach the second shelf **[Photo D]**.

3 Glue and screw the two remaining shelf cleats (E) to the interior sides of the frame assembly (A–F), flush with the top **[Drawing 1]**.

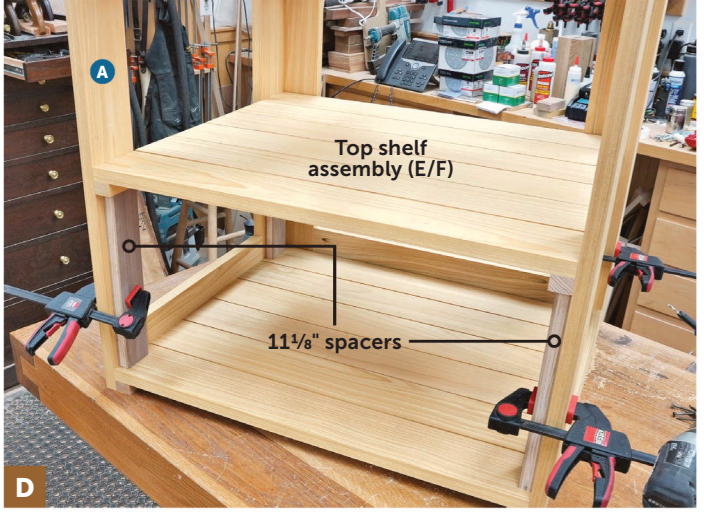


Apply glue to a side and back edge of the divider frame (B/D) and position it against the spacers. Drill countersunk pilot holes and drive screws to secure the shelf frame to the side/back assembly (A–C).





Attach the shelf cleats (E) square and flush to the first shelf slat (F). Then use 1/8" spacers to position the remaining slats. If necessary, rip the final slat to width so the edge is flush with the end of the cleats.



Cut four scrapwood spacers and clamp them to the cabinet frame assembly. Set the top shelf on the spacers, drill pilot holes through the frame stiles (A), and glue and screw the top shelf into place.

Learn all about concealed hinges.
woodmagazine.com/euro-hinges

CLAD THE CABINET FRAMES

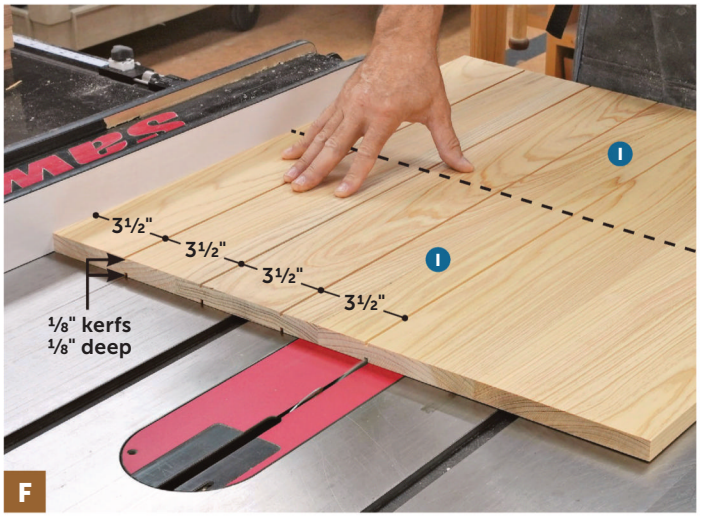
1 Measure the width of the frame assembly's back and cut the back cladding (G) to matching length. Cut the side cladding (H) to length **[Exploded View, Parts List]** and finish-sand all the cladding pieces.

2 Glue and clamp the first back cladding board flush with the bottom of the frame and drive a pair of 1 1/4" screws near each end from the inside of the cabinet. **[Exploded View]**. Use 1/8" spacers to position the remaining back cladding boards, and attach them. Attach the side cladding boards the same way **[Photo E]**. Locate the screws to leave room for the hinge plates.

3 From 3/4" stock, glue up an oversized blank for the doors (I) and trim it to 25 1/4×26 1/4". To imitate the cabinet cladding, cut 1/8" kerfs across the width of the blank, making the same cut in both faces before adjusting the rip fence for the next cut **[Photo F]**.

4 Crosscut the doors (I) to finished size. Lay out and drill 1 3/8" holes 1/2" deep for the cup hinges **[Exploded View]**. Insert and square the hinges in the holes to mark the location of the mounting screws. Remove the hinges, drill holes for the screws, and finish-sand the doors.

Glue and screw the first side cladding board (H) into place. Then use 1/8" spacers to position the remaining side cladding boards, keeping them flush with the back cladding (G).



Cut 1/8" kerfs 1/8" deep in the door blank, flipping it to make each cut in both faces. Start with the rip fence 3 1/2" from the blade, then adjust the fence for each set of cuts to leave 3 1/2" between the kerfs.

Note: When making your jig, verify the hinge-plate mounting hole locations and adjust the hole positions if necessary.

5 To attach the hinge plates to the case, we made a jig by cutting a kerf in a piece of 3/4" stock, gluing in a piece of hardboard, then drilling holes that correspond with the hinge-plate mounting holes, along with a larger hole along the centerline **[Drawing 2]**. Mark the hinge centerline on the case **[Exploded View]**, align the jig, and drill the holes **[Photo G]**.

6 Attach the hinges to the doors and the plates to the case. Install the doors and adjust the hinges so the doors fit with even, uniform reveals. Then install the door pulls.

Mark the centerline of the hinge on the cabinet case. Align the jig using the witness marks centered on the larger hole then drill pilot holes. A self-centering bit helps drill the holes accurately.

ADD THE DRAWER AND TOP

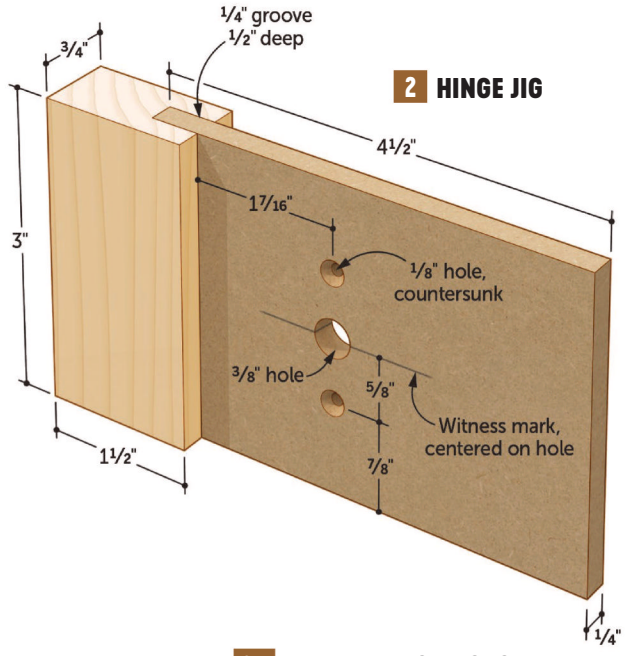
1 Glue up a panel for the drawer false front (J) and trim it to size **[Parts List]**. Cut a kerf centered on the width on both faces, similar to the kerfs in the doors. Finish-sand the false front.

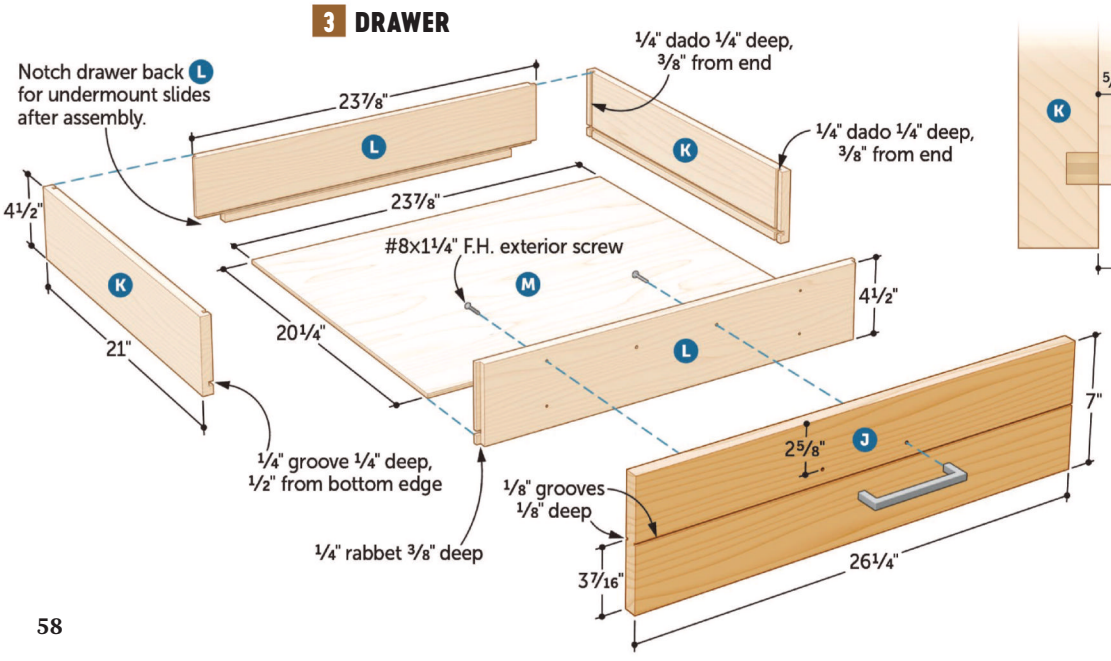
2 From 5/8" stock, cut the drawer sides (K) and front/back (L) to size **[Drawing 3]**. Install a 1/4" dado stack in the tablesaw, raised to 1/4". Set the rip fence 3/8" from the dado stack and cut a dado in each end of the drawer sides.

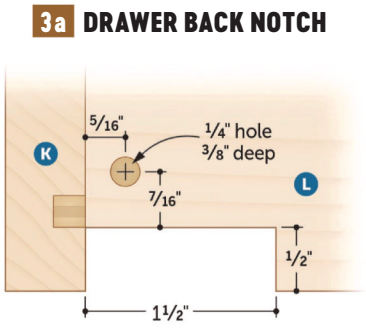
3 Reset the fence to 1/2" from the dado stack and cut a groove for the drawer bottom (M) in the drawer sides, front, and back.

4 Add an auxiliary face to the rip fence and position the fence so the face just brushes against the dado stack. Adjust the blade height to 3/8", make a test cut in 5/8" scrap, and test the fit in the groove in a drawer side (K). Then cut a rabbet in each end of each drawer front/back (L).

5 Dry-fit the drawer box and measure for the drawer bottom (M). Cut it to size from 1/4" plywood. Finish-sand the





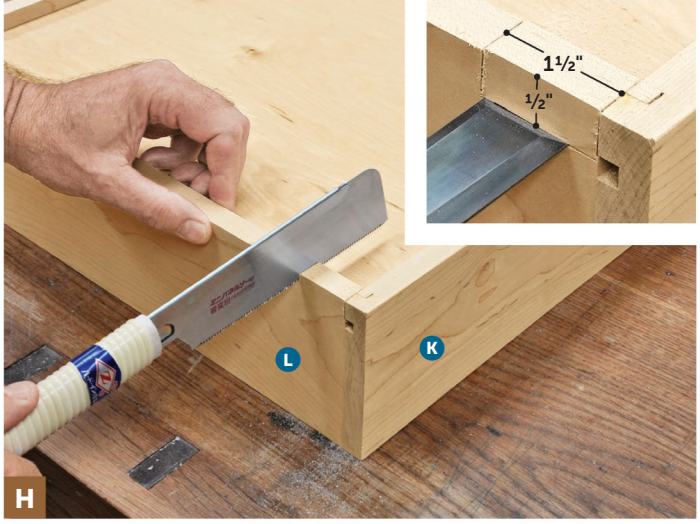


parts, then glue and clamp the drawer box together, checking for square.

6 We used bottom-mount drawer slides [Sources] that require you to notch the drawer back (L) [Photo H] then drill a hole to accommodate the slide hardware [Drawing 3a]. Install the slides in the case and the clips on the underside of the drawer box according to the manufacturer instructions. Slide the drawer into place.

7 Place 1/8" spacers on top of the doors for positioning the false front (J). Apply double-faced tape to the drawer front (L), and center the false front side-to-side, aligning its kerf with the gaps in the cladding. Gently pull the drawer open, clamp the false front to the drawer front, and attach the false front to the drawer box with screws [Drawing 3]. Lay out the position for the drawer pull, centered on the length of the false front, and drill holes for the mounting screws.

8 Remove cabinet hardware, complete any necessary touch-up sanding, then apply an exterior finish. We used Varathane satin spar urethane. Reinstall the hardware and mount the casters [Sources]. Drop the stainless steel top onto the cabinet and secure it by driving screws through its flanges into the cabinet's sides. Roll the cabinet into place and fire up the grill.



The notch in the drawer back (L) accepts the undermount drawer slides. Start it by making vertical cuts with a handsaw. Then use a chisel (inset) to remove the waste.

PARTS LIST

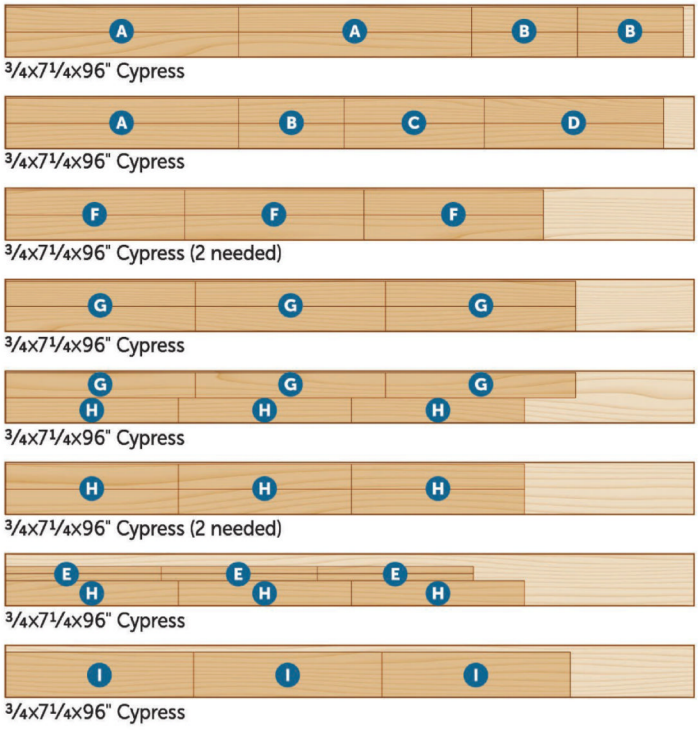
PART		FINISHED SIZE			Matl.	Qty.
		T	W	L		
A	FRAME STILES	¾"	3½"	32½"	C	6
B	SIDE FRAME RAILS	¾"	3½"	14¾"	C	6
C	BACK FRAME RAILS	¾"	3½"	19½"	C	2
D	DIVIDER FRAME RAILS	¾"	3½"	25"	C	2
E	SHELF CLEATS	¾"	1"	21¾"	C	6
F	SHELF SLATS	¾"	3½"	25"	C	12
G	BACK CLADDING	¾"	3½"	26½"	C	9
H	SIDE CLADDING	¾"	3½"	24⅛"	C	18
I*	DOORS	¾"	13 1/16"	25¼"	C	2
J	DRAWER FALSE FRONT	¾"	7"	26¼"	C	1
K	DRAWER SIDES	⅝"	4½"	21"	M	2
L	DRAWER FRONT/BACK	⅝"	4½"	23⅞"	M	2
M	DRAWER BOTTOM	¼"	20¼"	23⅞"	Ply	1

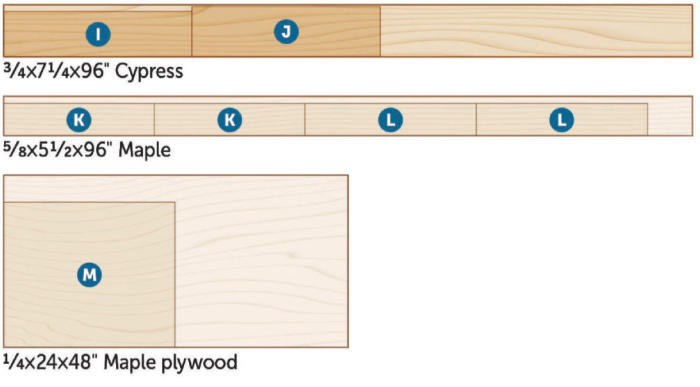
*Parts initially cut oversize. See the instructions.

MATERIALS KEY: C–cypress, M–maple, Ply–maple plywood.
BLADE AND BITS: Dado set, 1/8" self-centering drill bit.
SUPPLIES: 1¼" exterior pocket screws, #8x1¼" and #8x1½" exterior flathead screws, #12x¾" panhead screws.
SOURCES: 2" swivel casters (4) no. 1620601, $10 each, lowes.com. 21" undermount drawer slides (1 pair) no. VLS2-U21-SC, $20; drawer clips (1 pair) no. VLS2-U-FBKT, $3; cup hinges (4) no. BH71T5550, $3 each; hinge plates (4) no. BH175H7100, $2 each; pulls (3) no. TK-M1160, $12 each, cabinetparts.com. Stainless steel top no. OKCSST26, $140, homedepot.com.
PROJECT COST: It cost us about $500 to build this project. Your cost will vary by region and source.

CUTTING DIAGRAM

We purchased 54 board feet of 4/4 cypress and 4 board feet of 4/4 maple. Before cutting parts to size, we planed them to the thicknesses shown in these example boards.





SHOP GLOW-UP

Step out of the dark ages and transform your shop with modern, better lighting. It's easier than you think.

WRITER: VINCE ANCONA

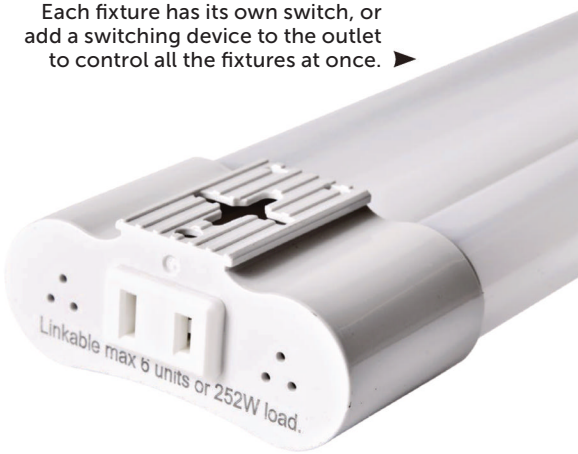
PHOTOGRAPHERS: JASON DONNELLY, JACOB FOX

For finishing tasks, a low-angle raking light highlights imperfections or brushstrokes that need attention.

Even though we tend not to give it much thought, it's hard to imagine anything more important to a shop than lighting. Not only is a dark, poorly lit shop an unpleasant place to work, it's also dangerous if you can't see what you're doing. The good news is that many inexpensive plug-and-play solutions exist today, making it easy to upgrade your shop lighting without having to pawn your favorite tools. The biggest challenge is selecting the right lighting for your needs. To help you out, we'll break the subject into four distinct types you'll need and present options for each.

Plug-and-play LED fixtures are inexpensive and easy to install. The tubes in this fixture are advertised to last up to 50,000 hours, which is the equivalent of 17 years if used 8 hours per day.

A receptacle on the end of the fixture allows you to link up to six fixtures. Each fixture has its own switch, or add a switching device to the outlet to control all the fixtures at once.



AMBIENT LIGHTING

Ambient lighting is the workhorse of any shop. For decades, 4' fluorescent fixtures were the mainstay in most shops and garages. And while you'll still find fluorescent tubes buzzing and flickering away in some shops, they're being rapidly phased out in favor of LEDs as more and more states ban the sale of fluorescent tubes and bulbs. Although they cost more initially, LED tubes offer several benefits over fluorescents, including lower energy cost and longer life.

If you're looking to transition from fluorescent lights to LEDs, you have a couple of choices: Install new LED fixtures, or upgrade your existing fluorescent fixtures with LED bulbs.

> **"A WELL-LIT SHOP IS NOT ONLY MORE PLEASANT TO WORK IN, IT'S SAFER TOO."**
>
> ***-VINCE ANCONA, CONTRIBUTING EDITOR***

Modern LED fixtures offer a lot of advantages. First, they're inexpensive, at as little as $10 for a self-contained 4' dual-bulb fixture. They plug directly into an outlet, eliminating the need for hardwiring, *above, top*. Most have a receptacle on one end that lets you daisy-chain several fixtures and power them from a single outlet, *above, bottom*. They typically include a toggle switch or pull chain to turn each fixture on and off individually. Most are supplied with chains for suspending from the ceiling as well as screws for surface mounting. One thing to note is the bulbs in these fixtures are not serviceable, requiring you to replace the entire fixture when they eventually burn out.

If your existing fluorescent fixtures are in good condition, consider upgrading just the bulbs. Some LED tubes are plug-and-play, allowing you to simply replace the fluorescent tubes directly, *left*. Not all fluorescent fixtures are compatible with plug-and-play LEDs, so check before you buy. If your fixtures aren't compatible, use a ballast-bypass style of LED instead. These LEDs require basic rewiring of the fixture to bypass the ballast. But you don't have to worry about the ballast going bad down the road.

LED replacement tubes have pins on the ends to fit in standard fluorescent fixtures. Some require bypassing the ballast in the fixture; others can be installed with no modifications.

SOURCES:

Amazon.com
- Linkable 4' LED Shop Lights 4-pack B06XGBKDKZ, $40
- T8 LED Fluorescent Tube Replacement Bulbs 4-pack B074M8KCJ1, $39
- LED Garage Lights 2-pack B0BGBH5Y7L, $32
- Porcelain Lampholder With Outlet B00002N5FR, $7
- Socket Adapters 2-pack B07V8RLCNH, $8
- LED Shop Lights Color Temperature Selectable 2-pack B0DTPP6VG7, $50
- Magnetic LED Machine Light B0B38CB577, $70
- 12x Magnifying Glass With Light B0DDXMMJ91, $32
- LED Magnetic Work Light 500 Lumens B098N83H86, $15
- LED Headlamp B0CLDK89HV, $16
- Cordless Worklight With Hooks B09Z6B19YN, $41

Moffatt Products
moffattproducts.com
- LED Task Light Magnetic Base 95302, $110

Dutton Tools
duttontools.com
- Sander Light, $50

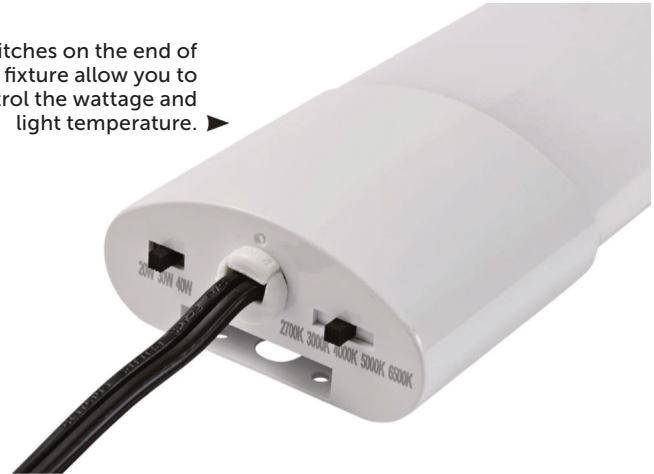
If your shop is in a garage or basement with nothing but a couple of bare, exposed lightbulbs, you still have options. One is a deformable LED light with panels that you can rotate or angle up or down to direct light where you need it, *right*. Another option is to install a lampholder with an integrated outlet or use a screw-in adapter, *below*, to plug in one or more of the LED fixtures mentioned above.

Regardless of which type of LED fixtures or tubes you decide to use, there are two specs to keep in mind when shopping: lumens and Kelvin (K) ratings.

A replacement porcelain light fixture with built-in outlet, *left*, allows you to add additional lights with minimal electrical work. A pull-chain adapter, *right*, is another option.

The lumen rating indicates how much light the fixture puts out. For a shop, you'll want between 60 and 100 lumens per square foot of shop space. So install enough fixtures for a combined lumen rating that falls within this range. (Our need for light increases as our eyes age, so aim on the higher side if you're older.)

The Kelvin rating describes the temperature of the light, not in terms of heat, but color. For a more detailed explanation, see *True Colors: The Kelvin Scale, right*.



Switches on the end of this fixture allow you to control the wattage and light temperature.

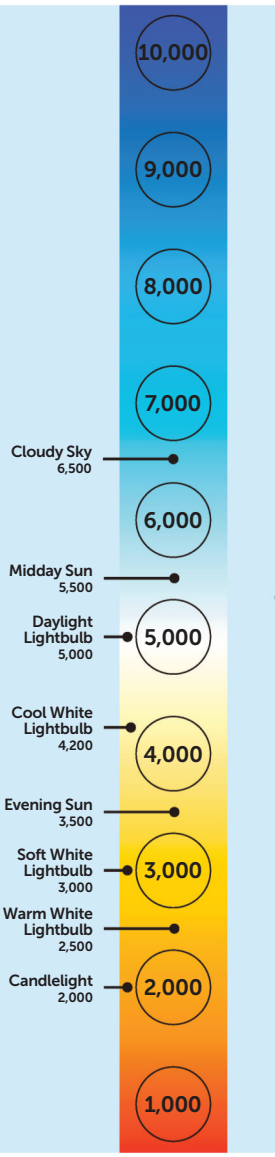
Deformable fixtures screw directly into a light socket. The arms pivot and swivel to direct the light where it's needed. Check the color temperature before you buy, as many are 6,000K or higher.

TRUE COLORS: THE KELVIN SCALE

An important characteristic of light is its temperature, or how "warm" the light appears. Lights with a lower color temperature appear warm and yellow, while at the opposite end of the spectrum, higher-temperature lights will appear cold and blue.

You're probably familiar with terms like "soft white" and "cool white." These are marketing labels for the color temperature of a lightbulb or tube. A more objective way to compare lighting temperature is with the Kelvin (K) scale. Most LED lights fall between 1,000K and 10,000K. The higher the number, the colder and bluer the light appears, *right*.

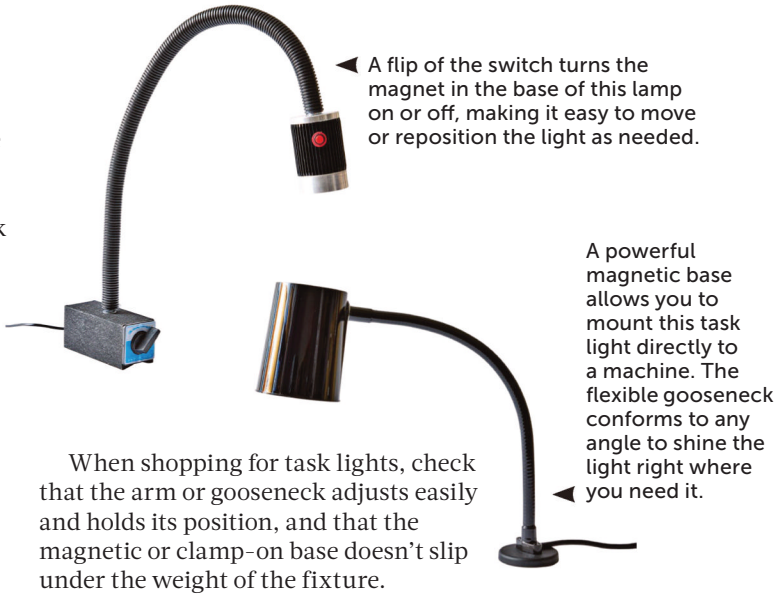
For a shop setting, LEDs with around a 5,000K rating are a good choice, providing a slightly cool, white light that is similar to daylight in color. Or even better, choose fixtures that have multiple brightness and color temperature settings. Switches on some fixtures allow you to change the light intensity and color temperature as needed.



TASK LIGHTING

Ambient lighting provides the all-around illumination in a shop, but it may not provide enough to clearly see layout lines or the position of bits or blades when drilling or cutting. In these instances, use dedicated task lighting to augment your overhead lighting.

Task lighting is simply additional lighting concentrated on a specific area. This can be as simple as an under-cabinet light fixture mounted above your workbench. But often, task lighting is mounted at specific tools or workstations. Light fixtures with flexible goosenecks or swing arms allow you to direct the light exactly where you need it, *right*. You'll often find such lights with magnetic or clamp-on bases, allowing you to move them from tool to tool if needed.



A flip of the switch turns the magnet in the base of this lamp on or off, making it easy to move or reposition the light as needed.

A powerful magnetic base allows you to mount this task light directly to a machine. The flexible gooseneck conforms to any angle to shine the light right where you need it.

When shopping for task lights, check that the arm or gooseneck adjusts easily and holds its position, and that the magnetic or clamp-on base doesn't slip under the weight of the fixture.

An articulated arm allows you to adjust this lighted magnifier to any position, leaving your hands free for delicate tasks.

Like its bigger brother, this small detail light is adjustable and has a magnetic base.

FINE DETAIL LIGHTING

Think of detail lighting as scaled-down task lights. Detail lighting focuses an intense amount of light on a small area. These small fixtures usually mount to a workstation or tool and are adjustable, allowing you to change the height and angle of the light on the fly. Some incorporate magnifiers to allow you to zoom in on important details, *above, left*.

Most detail light fixtures are small to avoid getting in your way during use, *above, right*. But for situations where this isn't possible, a headband light allows you to aim the light right where you need it with just a tilt of your head, *below*. Rechargeable models weigh so little that you'll barely notice that you're wearing one. Most offer different levels of brightness.

A flexible LED strip in this headband can be set to one of three brightness levels to light up a wide field. For a more focused light, switch on the high-intensity spotlight on the side.

This LED light ring fits around the base of the sander, providing a raking light right above the surface.

RAKING LIGHT

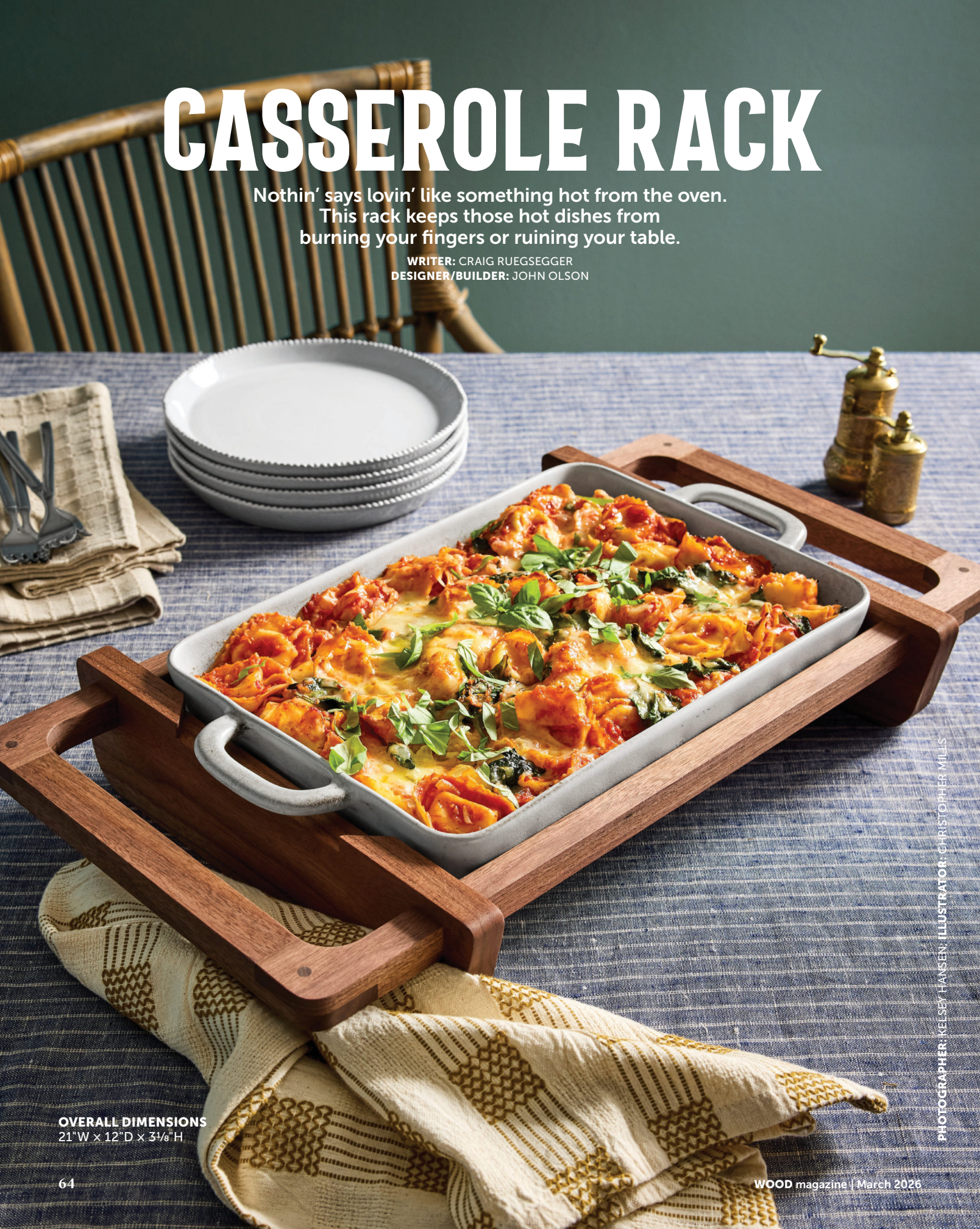
Just as important as the amount of light is the direction of the light. Overhead lighting isn't always the best for sanding or finishing. For operations like this, you need a narrow beam of light that comes from the side. A slim bar lamp provides raking light that accentuates surface imperfections, such as sanding scratches or areas that are missing finish, *page 60*. This light is rechargeable and has swiveling feet so you can adjust the position. It also has hooks that allow you to hang it from the ceiling or on the wall.

For sanding tasks, check out the LED lights available from Dutton Tools. These custom-made LEDs attach to the base of a random-orbit sander and cast a raking light on the wood as you work, *above*. They're available in several different models to fit a variety of sanders.

CASSEROLE RACK

Nothin' says lovin' like something hot from the oven. This rack keeps those hot dishes from burning your fingers or ruining your table.

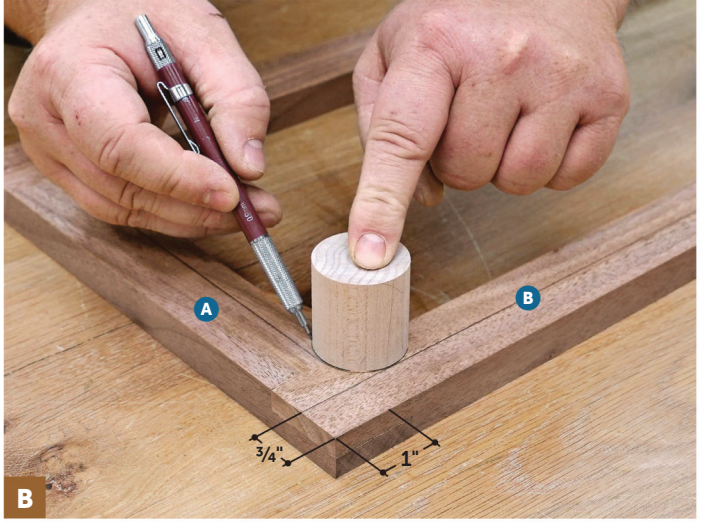
WRITER: CRAIG RUEGSEGGER
DESIGNER/BUILDER: JOHN OLSON



OVERALL DIMENSIONS
21"W × 12"D × 3⅛"H

PHOTOGRAPHER: KELSEY HANSEN; ILLUSTRATOR: CHRISTOPHER MILLS

Set the dado stack height just under ⅜" above the saw table. Cut a rabbet on one end of each of your test scraps. Test the fit, adjust if needed, then rabbet the handles (A) and rails (B).



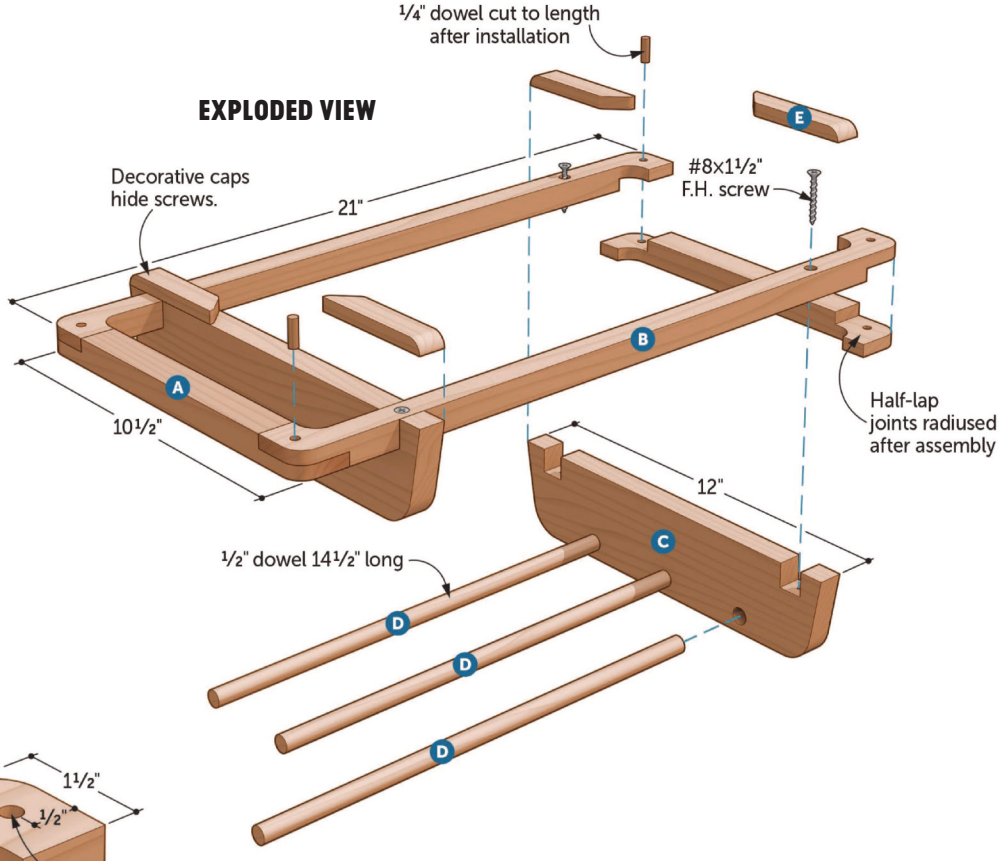
Scribe the interior widths of the handles (A) and rails (B). Trace a radius matching your flush-trim bit to connect the layout lines at each inside corner. Mark both faces of the workpieces.

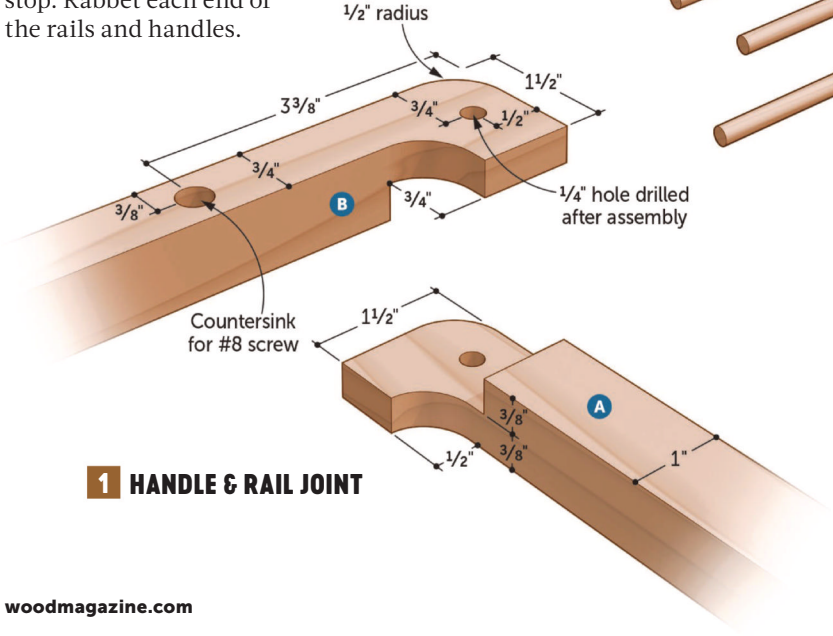
This project, like a casserole, presents a great way to combine leftovers into something tasty, so we raided the scrap bin to build ours. We sized the 9"-wide interior to fit our 9×13" dish. Measure yours and add any necessary width to the length of the handles (A) and feet (C).

LAP UP THE FRAMEWORK

1 From ¾× 1½" walnut, cut the handles (A) and rails (B) to finished length **[Parts List, Exploded View]**. Cut two pieces of ¾×1½" scrap at least 6" long to help with tablesaw setup in the next step.

2 Install a ¾" dado stack in your tablesaw to cut half-lap joints in the handles and rails. Dial in the blade height using your test pieces **[Photo A]**. Then set the rip fence 1½" from the outermost point of the dado blade as a stop. Rabbet each end of the rails and handles.





1 HANDLE & RAIL JOINT

3 Dry-fit the handles (A) and rails (B). Use a combination square to help mark the interior widths of the pieces–1" for the handles and ¾" for the rails–on both faces **[Drawing 1]**. Then lay out the radius at each inside corner **[Photo B]**. Bandsaw the handles and rails to rough shape, staying 1/16" to the waste side of the layout lines.

4 Glue and clamp the handles and rails together, clamping from edge to edge in both directions to draw the half-lap shoulders together before clamping down on the face of each joint. Let the glue dry.

5 Make a handle-shaping jig [Drawing 2] to flush-trim the handle/rail assembly to finished shape. The jig's lower frame supports the handle/rail assembly and provides a bearing surface for the flush-trim router bit. Attach the top frame pieces to the bottom frame so the handle/rail assembly fits inside without play and so you have equal exposure of the lower frame on opposite sides.

6 Place the handle/rail assembly in the jig. Install a flush-trim router bit in your router and adjust the cutting depth so the bearing rides on the jig, but clears the benchtop. Clamp the jig in place and rout the handles and rails to shape [Photo C].

Note: **We used a 1⅛"-diameter flush-trim bit, but any diameter will work. You'll simply have different radii in the corners.**

Secure the jig with bench dogs or clamps. If you use clamps, you'll need to stop and reposition them as you work around the assembly.

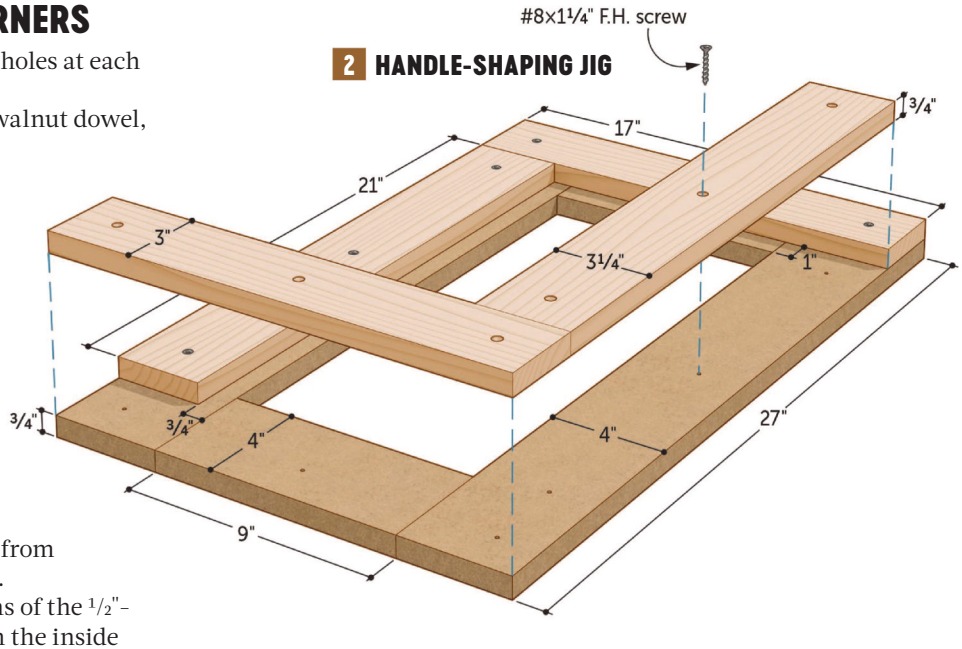
DRESS UP THE CORNERS

1 Mark and drill the ¼" holes at each corner [Drawing 1].

2 Cut 1" lengths of ¼" walnut dowel, apply glue in the holes, and tap the dowels into place. After the glue dries, cut and sand the dowels flush.

3 Lay out the radius on each outside corner [Drawing 1]. Bandsaw near the lines, then sand to the lines.

2 HANDLE-SHAPING JIG



FOOT NOTES

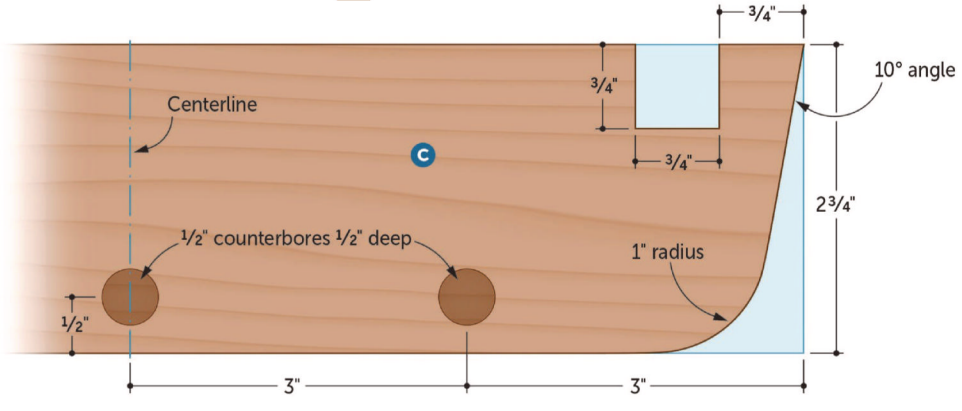
1 Cut the feet (C) to size from ¾" walnut [Parts List].

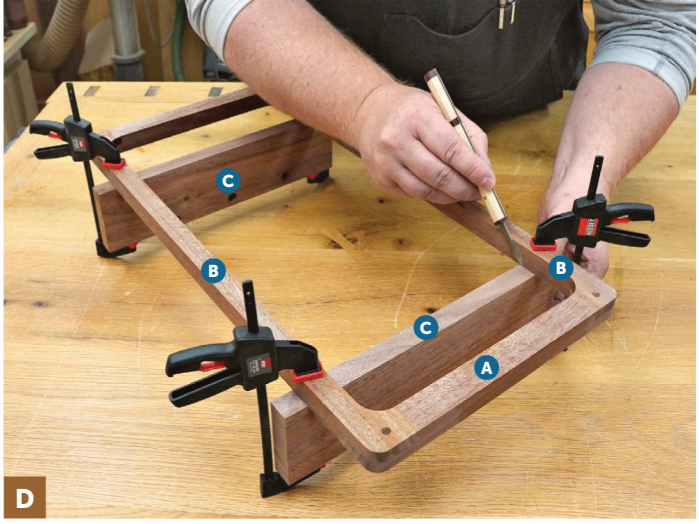
2 Mark out the locations of the ½"-deep counterbores on the inside faces near one edge [Drawing 3]. Drill the counterbores at the drill press.

3 To lay out the notches in the feet, center the handle/rail assembly on the top edges of the feet (C) and scribe along the rails [Photo D].

4 Install a dado stack in your tablesaw matching the width of the notches you marked in the previous step. Set the blade to ¾" above the saw table. Cut the notches [Photo E]. Check the fit of the handle/rail assembly in the notches.

3 FOOT DETAIL





D

Center the rail/handle assembly (A/B) on the length of the feet (C). Clamp the pieces together, then scribe along both edges of both rails (B) to mark the location of the notches.

E

Align the dado blade with the scribe marks on a foot (C) and clamp the foot to the miter-gauge extension. Cut the notch, then repeat for the notch near the other end.

5 Mark and cut the 10° miter and 1" radius on the ends of both feet [Drawing 3]. Finish-sand the feet.

6 Cut three supports (D) from a 1/2" walnut dowel and check their fit in the counterbores in the feet. Sand them to fit if needed. Glue and clamp the dowels into the counterbores. Then glue the handle/rail assembly into the notches, centered end to end. Check that the assembly rests flat on a tabletop and let the glue dry.

7 Drill countersunk pilot holes through the rails (B) into the feet (C) [Drawing 1]. Drive #8×1 1/2" screws through the countersunk holes into the feet.

TIP!

Measure the top of your casserole dish from end to end (not including the handles), and add 1 1/8" to determine the length of the supports.

PARTS LIST

PART		FINISHED SIZE T	W	L	Matl.	Qty.
A	HANDLES	3/4"	1 1/2"	10 1/2"	W	2
B	RAILS	3/4"	1 1/2"	21"	W	2
C	FEET	3/4"	2 3/4"	12"	W	2
D	SUPPORTS	1/2" diam.		14 1/2"	W	3
E	CAPS	3/8"	3/4"	3 1/2"	W	4

MATERIALS KEY: W–walnut.
SUPPLIES: #8×1 1/4" and #8×1 1/2" flathead screws, 1/4" and 1/2" walnut dowels.
BLADE AND BIT: Dado set, flush-trim router bit.
PROJECT COST: Because we built this project from scrap, it cost us about $14 to build. Your cost will vary by region and source.

CAPS CAPTURE CASSEROLES

TIP!

Handles vary between dish manufacturers. Have your dish on hand to check the fit of the caps as you shape them.

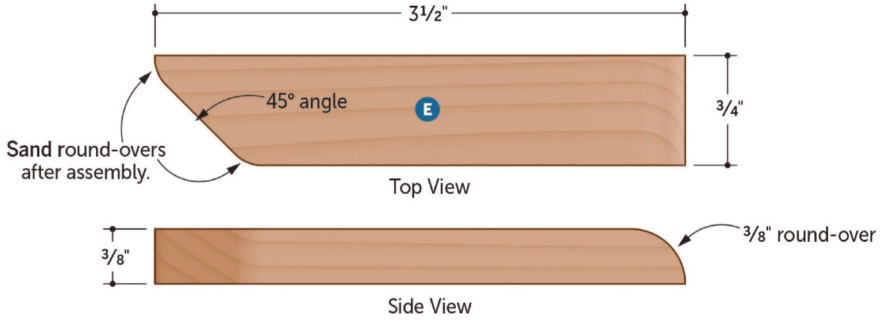
1 From 3/8"-thick walnut, cut the caps (E) to size, miter-cutting one end of each at 45° [Drawing 4]. Dry-fit the caps on the feet (C) with your casserole dish in place. Make any needed alterations to the caps, then glue them into place, flush with the ends of the feet.

2 After the glue dries, round over the ends of the caps (E) with a file and sandpaper [Drawing 4].

3 Finish-sand the rack, then apply a finish. We applied butcher block oil, letting each application soak in until the wood no longer absorbed more. Wipe off excess oil, then let the rack dry until it feels dry to the touch. (That may take several days.) Round up your favorite casserole ingredients, and treat the family to a meal where no one burns their fingers (or the table) on a hot dish.

Find a selection of Tater Tot casserole recipes at woodmagazine.com/tots

4 CAPS (Scribe to fit your dish)



ENTER A NEW CORDLESS CONTENDER

Product designers at Kreg knew cordless power was a must for the company's new Rebel Pocket-Hole Joiner, but they understood that woodworkers might balk at adopting another battery platform for just one tool. Rather than back away, they went all in and developed the company's new Ionic Drive 20-volt tools. Will their gamble pay off?

PHOTOGRAPHERS: JACOB FOX, JIM HEAVEY, MANUFACTURER-SUPPLIED IMAGES

Kreg moved beyond pocket holes to power tools with its new line of Ionic Drive cordless tools. The current lineup consists of the eight tools, *above*, along with a cordless version of the company's tracksaw, and the Rebel pocket-hole tool (*page 25*). All of the tools share the same 2- and 4-amp hour batteries, and are offered as bare tools, as well as in a variety of combo kits.

In our limited testing, the tools feel like they're built for serious woodworking tasks. All are equipped with brushless motors that provide adequate power. Even the 4½" circular saw sliced through 6/4 oak without complaint. Thoughtful features abound. For example, the jigsaw moves the blade slowly for increased control as you start a cut, and then speeds up automatically to the selected setting. Dual LEDs on the trim router illuminate the bit well. And the impact driver features a reverse-assist mode that first pulses to break fasteners free and then backs them out at half speed to avoid stripping.

Kreg Tool Company, *kregtool.com*
Various item nos., $120-$350

SHOP-TESTED

MULTI-FIT IN A VALUE HOSE KIT

Tester: Vince Ancona

Powertec joins the chorus of manufacturers offering multi-fit vacuum hoses with its kit that includes four quick-connect fittings and a PVC hose that expands as you pull on it from 3' to 10' long.

The flexible rubber ends of the fittings slip over or into a tool's dust port, holding securely enough to stay on the tool. A quick-connect adapter on the end of the hose slides on and locks in place. Press a pair of tabs on the connector and you can easily switch just the hose to a different tool, leaving the fitting in place. Powertec sells fittings on their site á la carte should you need more.

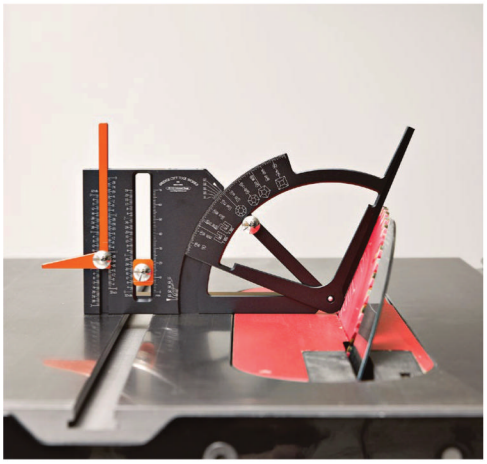
I tested the kit with a couple of sanders, a tracksaw, and a router. I was able to find an appropriate size fitting for every tool. Out of the box, one of the fittings in the kit I tested was a tight fit in the quick-connect adapter, but light sanding solved the issue. The hose is a bit heavy and cumbersome to use, but overall the kit works as it should. While this setup may not fit every tool you own, it covers enough at a reasonable price to make it a worthwhile addition to the shop.

Powertec, *powertecproducts.com*
Power Tool Vacuum Hose Kit with 10' Hose no. 70376, $50

SHOP-TESTED

MULTIFUNCTION LAYOUT GAUGE PROVIDES PRECISION

Tester: Kerry Gibson



Bridge City has a reputation for designing high-quality, beautifully finished tools, and the UG-1v2 Universal Gauge is no exception.

The protractor feature lets me accurately set the bevel angle of my tablesaw blade and the tilt of my bandsaw table using a highly legible white-on-black scale with 1/32" imperial and 1mm metric graduations. Bridge City claims accuracy of 0.002" over the length of the 3 7/16" adjustable leg. A magnetic base holds the gauge securely in position on cast and metal surfaces. The same protractor lets me set and mark angles from 45° to 135° and the gauge has icons that indicate the correct angle settings for four-, five-, six-, and eight-sided polygons. Additional icons show proper setup for 6:1 and 8:1 dovetails. The protractor arm has a small right-angle flange that cradles a drill-press-mounted bit to accurately set the table for angled holes.

A leg acts as a height gauge for blades and bits, and reverses for use as a depth gauge. An adjustable marking gauge allows laying out lines parallel to edges. So far, I'm impressed with the quality and accuracy of this multitalented layout tool.

Bridge City Tool Works, *bridgecitytools.com*
Universal Gauge no. UG-1v2, $189

SHOP-TESTED

VACUUM HOSE KIT PROMISES A FIT

Tester: Craig Ruegsegger

Mullet Tools' FitsAll hose kit provides a real-world solution to my shop full of tools sporting different-size vacuum ports. A 10'-long, 1¼" I.D. hose fits onto any of the eight rubber adapters sized to fit tool ports up to 2½" O.D. The adapters are intended to stay on the tool, allowing you to quickly move the hose from one tool to another. Ribs inside the adapters ensure a snug fit, and I was able to fit them onto almost every portable tool in my shop.

The end of each adapter extends at a 10° angle to the hose connection, helping provide tool-handle clearance and elevating the hose off the bench when using my random-orbit sander. If you have several tools with the same-size ports, you can buy additional adapters. The other end of the hose attached securely to my 10-gallon vacuum.

I was unable to fit an adapter to my Porter-Cable 890 router or to the inlet on my DeWalt dust extractor. But Mullet guarantees that if no included adapter fits one of your tools, the company will 3D-print an adapter for you free of charge. I let the company know, and they quickly provided custom adapters that fit well and stayed in place.

Mullet Tools, *mullettools.com*
FitsAll Hose Kit with Bushings, $100

NEW & UNTESTED

SLIDING TABLE EXPANDS CROSSCUT CAPACITY

A new sliding table attachment from Grizzly allows you to support big boards and full 4×8' sheets for crosscutting on a cabinet-style tablesaw. The attachment is designed to fit Grizzly, Shop Fox, and SawStop 10" tablesaws. Grizzly states the table can be adapted to fit most saws with 27"-deep tables, though they may require drilling and tapping holes in the table edges to receive mounting hardware.

Made from anodized aluminum, the table features legs that attach in T-tracks to support full sheets, and can be removed for working with smaller stock. A cast-aluminum fence has flip stops that slide along its 42⅞" length, plus a telescoping extension that provides 60" maximum crosscut length using those stops. Maximum rip capacity is 48". The miter head swings 60° left and right, and has a positive lock with detents at commonly-used angles.

Grizzly Industrial, *grizzly.com*
Sliding Table Attachment for Table Saws no. T32737 $780

SHOP TESTED

HIGH-IMPACT DRIVER

Tester: Jim Heavey

The Bosch 18-volt brushless impact driver allows you to select from three speeds (800/2,300/3,400 rpm) to match requirements of the fasteners you are driving. Selectable auto stop and auto slow-down modes prevent overdriving, the first when a bolt is fully seated, the second when increased resistance is detected while driving screws.

Two LED lights illuminate the work surface, and the driver's compact design makes working in tight spaces easy. I found it well balanced with plenty of power to drive long screws and lag bolts.

Bosch, *boschtools.com*
Brushless Impact Driver no. GDR18V-1950C, $189

NEW & UNTESTED

BIG JOINTER GETS A POWER UPGRADE

A 72"-long table and 8"-wide cutterhead give Oliver Machinery's new jointer the capacity to joint big boards. That cutterhead is equipped with 36 four-sided carbide inserts arranged in a helical pattern to provide smooth results and easy cutter replacement. Oliver recently upgraded the jointer's 230-volt motor from 2 hp to 3 hp to better handle cuts, up to ⅛" deep, in dense hardwoods. The big paddle-style power switch has also been relocated from the machine's base to a stalk that sits behind and above the infeed table to provide easier access. Like other jointers in this size class, this one is heavy (352 lbs) making it challenging to move. Oliver solves that by equipping the jointer with an integrated locking mobile base.

Oliver Machinery Company, *olivermachinery.net*
8" Parallelogram Jointer with Helical Cutterhead no. 4235.230, $3,190

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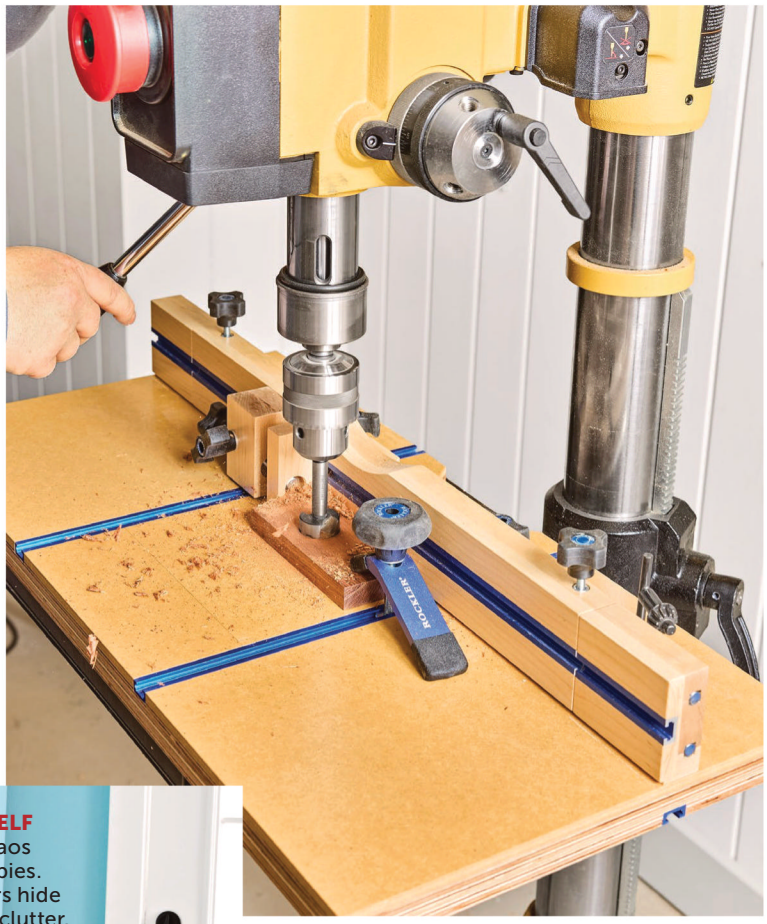
A GLIMPSE INSIDE THE MAY ISSUE (ON SALE MARCH 20)

TABLESAW JOINERY 101

Beyond simply breaking down boards, a tablesaw adds massive capability to your workshop. Round out your skillset with these fundamental tablesaw joints.



SHOE-STOWING SHELF

De-feet entryway chaos with convenient cubbies. Easy-to-build drawers hide away keys and other clutter.

ULTIMATE DRILL PRESS TABLE

Graduate from that old metalworking table to one designed for woodworking accuracy, with an extendable fence, hold-downs, and micro-adjustable stops.

TANKS FOR THE CHOO CHOO

You're welcome. Now get out there and build this tanker car to deliver that sweet crude to the living-room-floor refinery.

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- Tight tolerance laser-engraved scale.
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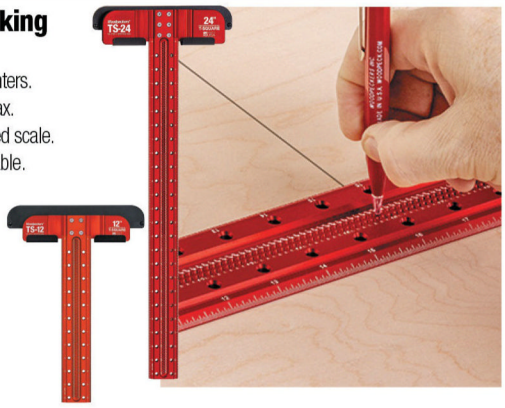


Precision T-Square
Includes a wall-mountable Rack-It®
TS-12 12"....$139.99
TS-24 24"....$159.99
TS-32 32"....$189.99

in-DEXABLE® Combination & Double Squares

- Push-button index locks head at any full-inch.
- Laser-cut scribing guides for precision parallel lines.
- Retractable support keeps head aligned to your stock.
- Available in inch or metric.

in-DEXABLE Squares
Includes a wall-mountable Rack-It®
Double 6"....$139.99
Center Finder 6"....$149.99
Combination 12"....$179.99
Protractor 18"....$249.99
Other Sizes Available on ***Woodpeck.com***

Joinery Sled

NEW TOOL

- Half-Laps, Bridle Joints, Sliding Dovetails, Tenons & More!
- Works with table saws & router tables.
- Patented leaf spring miter bar fits all 3/8" x 3/4" miter slots.
- Table adjusts from 44° to 91°.
- Micro-adjuster postitions vertical table precisely.

Joinery Sled....$339.99
Includes a wall-mountable Rack-It®

Router not included.

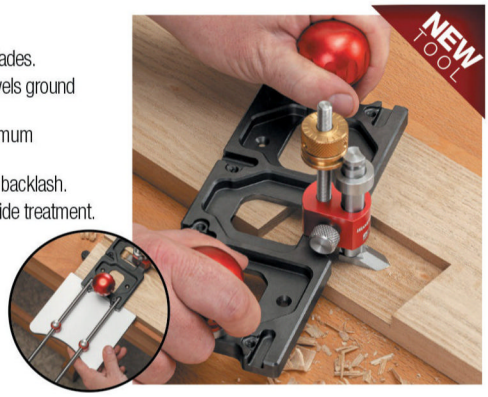
Rout-N-Plane® Benchtop Board Mill

- Perfect for end grain cutting boards.
- Adjusts to work with almost any size or style router.
- Two sizes: 15" and 24" wide. Both work from 3/4" to 3" thick.
- When it won't fit your planer, plane it with Rout-N-Plane!

Rout-N-Plane Benchtop Board Mill
15"....$179.99
24" XL....$239.99

Router Plane

- Includes square & spearpoint blades.
- Blades lapped perfectly flat. Bevels ground and ready for final honing.
- 12 blade positions ensure maximum access & support.
- Fine-thread adjustment with no backlash.
- Ductile iron base with black-nitride treatment.
- Optional fence keeps plane parallel to an edge.



Router Plane
...$279.99
Fence Add-On Kit....$69.99

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*US 48 States only. Ultra-Shear brand only. Cannot be combined with other products.

Finger Grip Groove Bits

These bits create a subtle concave recess in the edge of your cutting and serving boards. Bearing controls depth of cut.

Carbide-Tipped, Finger Grip Groove Bits, Round, 2-Flute
1/2" Shank *for 1-1/4" boards*....~~$54.17~~ $46.99
1/4" Shank *for 3/4" boards*....~~$48.05~~ $39.99
1/4" Shank *for 1" boards*....~~$51.93~~ $43.99
More Router Bits are available on ***Woodpeck.com***

Flat Top Grooving Saw Blades

ULTRA·SHEAR® by Woodpeckers

When you need flawless, flat-bottomed cuts, our 40-Tooth Flat Top Grooving Blade delivers. The chisel tooth design yields a perfectly square groove.

10" x 40 Flat Top Grooving Blade, 5/8" Arbor
1/8" Kerf....~~$166.78~~ $129.99
3/16" Kerf....~~$186.83~~ $149.99
1/4" Kerf....~~$196.86~~ $179.99
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