

FREE ROUTING GUIDE | **10 PLUNGE ROUTERS**
PULLOUT POSTER INSIDE! POWER-PACKED TOOLS THAT DO IT ALL

WORKBENCH

WOODWORKING TO IMPROVE YOUR HOME

ROUTER SPECIAL

- ▶ **ROUTER TABLE BASICS**
OUR BEST TIPS & TRICKS
- ▶ **5 ALL-NEW BITS TO**
REV UP YOUR ROUTER
- ▶ **GET ORGANIZED!**
ROUTER JOB
BOX MAKES
IT EASY

AUGUST 2006

3 EASY HOME PROJECTS

- WINDOWS THAT WOW!
- DRAMATIC DECK REDO
- NO-FUSS FLOOR
REFINISH

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EDITORIAL

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It seems like everything has to be "extreme" these days. Just turn on the television, and you'll see extreme sports, extreme adventures, and extreme home makeovers, to name a few.

But let's face it, I'm never actually going to ride a 100-foot wave, or get buried up to my neck in sand while reptiles lick my face. And there just aren't enough rocket-fueled, extreme energy shots on the planet to power me through a seven-day building blitz that doubles the size of my house.

That's not to say these extremes aren't entertaining. But a steady diet of them tends to give a distorted idea of how things actually work.

Take a look at home improvement, for example. Extravagant projects that require massive tear-downs and unlimited budgets look great on TV, but they're certainly not the norm.

A much more manageable approach to home improvement is to undertake a series of smaller, less invasive, more affordable projects. Projects that are "anti-extreme," if you will, like the ones we feature in *Workbench*.

In this issue, for instance, we'll show you how to transform the

windows in your home by adding a few inexpensive moldings (page 36). Some are purchased right off the rack at the home center. Others are made by routing simple profiles using a router table. Either way, just cut the moldings to length, glue them together, and nail them in place.

Or, if you have a solid-wood floor hiding under an old carpet, be sure to check out the article on page 58. There, you'll see how to sand and refinish your wood floor without filling your house with dust or toxic fumes, and without spending a bundle of cash.

Finally, the second part of our deck makeover begins on page 64. As you may recall, it's five separate projects, all built on top of the original deck framing to save time, money, and materials. In this final installment, we walk you through the basics of stair-building, so you can construct a set of stylish stairs without having to call on the pros.

Of course, this "anti-extreme" idea may never play on prime time. But there's one thing for certain. Projects like this really do make an *extreme* improvement in your home.



Tim

SPECIAL ROUTER ISSUE!

Over 20 pages devoted to the most versatile tool in the shop. Whether you want to build this sturdy router "job box" (right), get better results on your router table (pg. 74), or check out the hottest new plunge routers (pg. 44) and cutting-edge bits (pg. 84), this issue has it all.



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This shop-made drill press table features a large surface with folding leaves, an adjustable fence, and a replaceable insert. In short, it's everything a drill press table should be.



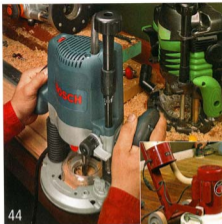
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WORKBENCH ONLINE

Check out WorkbenchMagazine.com for cutting diagrams, plans, and bonus content. From this issue, you'll find:

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74 Top Router Table Tips & Tricks
A router is more precise, accurate, and easier to use when mounted upside down in a router table. See our best router table tips and tricks to get the most from this hardworking tool.



NEW COALITION HELPS HOMEOWNERS

Master Mold

Don't believe the myths, and don't buy into the hype. Mold is a problem, but there are practical solutions for homeowners, builders, and remodelers.

Having survived the scourges of lead paint, formaldehyde, asbestos, and radon, it seems our houses are once again out to kill us. This time, though, the affliction du jour is mold.

Yep, the same stuff that signals the end for a loaf of bread or that the cheese requires judicious trimming is taking root in the dark, damp recesses of our houses and is being blamed for all variety of physical malady. You may have seen it growing in the corner of your basement or the underside of your roof. But don't burn the place down just yet.

It seems that mold hysteria might be a bit overblown and that there are some common-sense solutions to stem the tide of these ubiquitous fungi.

Getting out the facts about mold is the stated mission of a newly formed organization, appropriately named the Responsible Solutions to Mold Coalition. The group's website (ResponsibleMoldSolutions.org) sheds light on the true nature of mold, who might actually be at risk from exposure to it, how to prevent it, and how to



The RSMC website offers real solutions to prevent and eliminate mold.

combat it if it's too late for prevention. "Four Myths About Mold," below, is just a small sample of the information available on the website.

Visit the Responsible Solutions to Mold Coalition website or call 773-755-1700 for more information on the causes, cures, and preventions of mold.

FOUR MYTHS ABOUT MOLD

- Myth #1** **Mold grows only on paper, wood, and other organic material.** Reality — Mold will grow on any surface, including glass, fiberglass and even steel.
- Myth #2** **Mold can be eliminated.** Reality — Only "clean room" technologies, which are too expensive for the home, can eliminate mold spores.
- Myth #3** **Only experts can clean mold.** Reality — Homeowners can clean small patches of mold using household detergents and warm water.
- Myth #4** **Once mold starts, it will always be present.** Reality — Mold can be stopped in its tracks, but only if moisture is minimized or eliminated. Therefore, leaks should be corrected as soon as they become apparent.



R. Lee Ermye

YOU'RE IN THE "ERMEY" NOW

Golf With Famous Drill Sgt.

Even if you don't know the name R. Lee Ermye, you may recognize him from his role as the quintessential drill sergeant in the movie *Full Metal Jacket*. Or you may know him from his current role as host of the History Channel's *Mail Call*.

But even if you have no idea who Ermye is, you can bet that a couple days of golfing, dining, and schmoozing with this former Marine Corps Staff Sergeant turned character actor will be an unforgettable experience. And Vermont American is offering

that opportunity as the grand prize in their national sweepstakes.

The grand prize winner will spend two days this September with Ermye. Other prizes, including appliances, tools, and accessories from Bosch, Skil, and Vermont American, will be awarded through December 2006.

Entry forms and full contest rules are available at retail locations that sell Vermont American products or online at VermontAmericanSweepstakes.com. You can also call 800-837-5236 for additional information.

OWNER'S MANUAL

For Your Home

Your car came with one. So did your DVD player and every power tool you own. It's an owner's manual. And without one, every digital clock in the country would be flashing 12:00. So why didn't your house come with one?

Probably because trying to condense all the information about a house into a single volume seemed insurmountable to even the most intrepid authors.

Dan Ramsey, however, was up to the task and recently released *The Home Owner's Manual: Operating Instructions, Troubleshooting, and Advice on System Maintenance*. Ramsey is a licensed building and home improvement contractor who has written more than 20 DIY books.

This surprisingly compact book is filled with useful information for any homeowner, but I consider it an especially good gift idea for the young, first-time home buyer. Through eight chapters, you'll become more familiar with the systems that comprise every home and learn how to maintain and upgrade them as necessary (*Chapter Highlights, below*).

Of particular interest is chapter six. It deals with many common

household emergencies, such as clogged drains, broken pipes, and gas leaks.

A full index, glossary, and a list of additional sources of information round out the book and make it easy to locate precisely the information you need for any situation.

The *Home Owner's Manual* can be purchased directly from Quirk Books for \$15.95 at QuirkBooks.com or by calling 215-627-3581.



HOME OWNER'S MANUAL CHAPTER HIGHLIGHTS

Chapter 4: Specific instructions for 25 interior-maintenance projects.

Chapter 6: A quick reference for handling 16 common home emergencies.

Chapter 7: Suggests popular improvements to make a home more livable and gives specific instructions on how to complete them.

Glue On A Roll

I apply glue in two measures: too much, or too little. I need something that pre-meters the glue and puts it only where I want it.

Which is why I was excited to hear about a product being developed by the makers of Bolder Bond polyurethane glue called Bolder Bond Glue Tape.



Wet the joint, apply glue; clamp the joint. The only difference is in the application, which is done by placing a strip of the glue-impregnated cloth between the pieces.

(That's just the working name. It'll be catchier when it goes to market.)

The tape is actually a heavy-duty fabric that's impregnated with polyurethane glue. So rather than squeezing the glue into a joint, you simply apply a strip of the tape. After the glue cures, cut off any tape that's protruding from the joint (*Photo, below*).

As I said, the product is still in development, but Bolder Bond hopes to have it available for retail later this year. Visit BolderBond.com or call 866-876-0659 for more information on all Bolder Bond products.

GORILLA GLUE:
DOGS LOVE IT!

I like Gorilla Glue because it works. Dogs like it because it smells like peanuts. Or maple syrup. Or peanuts covered in maple syrup. Whatever. They like the smell of it, and they eat it. And then it expands into something the size of a Nerf football that has to be surgically removed.

There are at least two confirmed cases of this happening, and both dogs survived. Gorilla Glue is aware of the problem and has changed the labeling to warn specifically against animal contact. Our advice is to continue using Gorilla Glue, but take care to store it as cautiously as other household chemicals.



WORKBENCH STAFF

Out of the Office



Skil's Tool School offered Bill Link and other DIY editors a chance to use the company's latest tools.

Workbench senior editor Bill Link recently attended Skil Power Tools "Tool School Extreme," in Orlando, Florida, along with editors from several other DIY publications. Skil used the event to unveil a long list of new products aimed at consumers and cost-conscious professionals.

After a couple of hours of Power-Point presentations and upbeat projections of the growing DIY market from Skil representatives, they turned the editors loose to build a CD cabinet using Skil tools. Results varied.

Nonetheless, it was a great opportunity to see Skil's new lineup and have a chance to evaluate the tools by building a real project. Look for our take on the new Skil circular saw in *Tools & Products* on page 33.

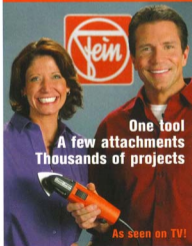
SOY GLUE (RE)DEVELOPED

Soy-based glue isn't exactly a new idea. In fact, up until the 1950s, when petroleum-based products became prevalent, soy protein was a primary binder used in plywood.

Now, with the price of petroleum skyrocketing and concerns about the environmental impact of formaldehyde on the rise, soy-based glues are poised to make a comeback.

Leading the resurgence is Deland Myers, PhD, a food science professor at Iowa State University. In fact, Myers and his team already have a working formulation; they simply need a way to bring it to market. They are currently in talks with "two of the largest adhesive manufacturers" to make that happen. Stay tuned.

The MULTIMASTER RS Remodeling/Renovation System



**One tool
A few attachments
Thousands of projects**

As seen on TV!



Everything you need to make your house like new in one great kit. The MULTIMASTER does things other power tools can't. Sand into corners and along edges. Undercut a door jamb. Plunge into baseboard...right through the nails. Remove grout. Scrape paint and linoleum.

The RS Kit contains a MULTIMASTER 636-2 variable speed tool plus:

- Sanding Pad • Universal E-Cut blade
- HSS Segment Saw blade
- Carbide Grout blade • Scraper blade
- Carbide Rasp • Plastic carrying case
- Tool wrench, screws and washers
- 5 each assorted sandpaper, grits 60, 80, 120, 180

For more information, a free brochure and to see the complete line of MULTIMASTERS and accessories at a dealer near you call 1-800-441-9878 or visit us on the web at www.fein.com.

Powered by innovation



Visit us at IWF Booth 6413

HONE YOUR OWN

Router Bits

Keep a keen edge on your bits with a few passes over a diamond sharpening stone.

Q: A couple of my router bits are getting pretty dull. Do I need to have them sharpened professionally, or can I do it myself? If I can sharpen them, what's the best way to do it?

Joe Sanders
Cincinnati, OH

A: If a router bit is extremely dull, it can be tough to bring it back to "factory" sharpness yourself. In that case, you're better off to take the bit to a professional sharpening service.

Go Pro — To find a sharpening service, check your yellow pages, or do an online search using "router bit sharpening." You'll find a number of services that

sharpen bits for between \$3 and \$5 per bit, plus shipping. That's economical, but it does mean you'll have the hassle of packing and shipping bits, plus being without them for a week or more.

Hone Your Own — You can avoid this hassle, or at least minimize how often you have to deal with it, by keeping the edge from getting too dull in the first place. This is done by honing router bits to maintain sharp edges (Photo, above right).

Carbide cutters on router bits are very hard, so you'll need a diamond sharpening stone. A "super-fine," or 1200-grit bench stone (about \$20) is aggressive enough for honing but leaves a smooth



A few passes over a diamond sharpening stone will maintain a sharp cutting edge on most types of router bits. Hold the bit flat against the stone for a consistent edge.

edge (Photo, right). "Pocket" stones are also available (less than \$10) that work well for bits with small cutters. The stones shown here are made by Eze-Lap (Eze-Lap.com).

Clean First — Before you begin honing, remove the guide bearing if the bit has one, and then clean the bit with pitch remover. Scrape gently with a knife to remove stubborn buildup.

Keep It Flat — Now you can begin honing by placing one cutter on the diamond stone.hone only the faces, not the edges.

Grip the bit firmly to keep the cutter flat against the stone, and stroke it back and forth. Count your strokes as you go — 12 to 20 should be enough. Then flip the bit over, and hone the other cutter. Use the same number of strokes to ensure that the bit will stay balanced.

DIAMOND BENCH STONES are available in "super-fine" (1200 grit for a smooth finish



DIAMOND POCKET STONES get into tight spaces where large stones can't reach



Pitch buildup and dull edges kept this core box bit from cutting smoothly (left). After cleaning and a dozen passes over a 1200-grit diamond stone, the bit was ready for action (right).

GOT QUESTIONS? WE HAVE ANSWERS!

Include full name, address, and daytime phone number. You'll receive one of our handsome **Workbench** caps if we publish your question.

HOW TO SEND YOUR QUESTIONS:

Email: Q&A@workbenchmag.com

Forums: forums.woodnet.net

Mail: Workbench Q&A, 2200 Grand Ave., Des Moines, IA 50312



WHAT'S THE STORY WITH Undersize 2x4s?

Q: *Maybe this is a simple question, but it has me stumped: Why doesn't a 2x4 actually measure 2" thick by 4" wide?*

Brian Jones
Austin, TX

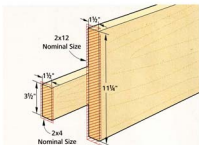
A: What you've discovered is the difference between the nominal dimensions (2x4) and actual dimensions (1½" x 3½") that describe 2x4s.

In fact, all dimensional lumber used in framing and construction measures just slightly smaller than its stated (nominal) size (see the Chart, right). There are a couple of reasons why.

First, the stated size of framing lumber used to be the actual size. Tear into a house built before about 1940, and you'll find studs that actually are 2" x 4".

But testing later proved that these framing members could be made slightly smaller without losing significant strength. The sizes shrunk to save wood, but the standard names stuck.

Second, these boards are milled from the log at the nominal dimensions. The boards shrink during drying, and then get further reduced in size as they are planed to final size (illustration).



Nominal	Actual	Nominal	Actual
1 x 2	¾" x 1½"	2 x 2	1½" x 1½"
1 x 3	¾" x 2½"	2 x 4	1½" x 3½"
1 x 4	¾" x 3½"	2 x 6	1½" x 5½"
1 x 6	¾" x 5½"	2 x 8	1½" x 7¼"
1 x 8	¾" x 7¼"	2 x 10	1½" x 9¼"
1 x 10	¾" x 9¼"	2 x 12	1½" x 11¼"
1 x 12	¾" x 11¼"	4 x 4	3½" x 3½"

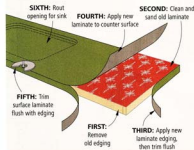
HASSLE-FREE

Countertop Facelift

Q: *I'm planning to reface my kitchen cabinets, and that got me wondering whether I could do the same with the countertops. They're in good shape, but they look dated. Can I simply apply new laminate over the old?*

Mark Hendricks
Tulsa, OK

A: The answer depends, first of all, on the type of counters you have. If they're "post-formed," with a drip edge molded in at the front and an integral backsplash, you won't be able to "reface" them. That's because getting the laminate to wrap around those curves takes heat and a lot of pressure. For these types of counters, replacement is the best bet.



But if the countertops are flat, and the old laminate is still well-adhered, you can apply new laminate over the old (illustration, above).

First, you'll need to remove the sink. Then clean

the old laminate thoroughly to get rid of grease. Next, rough up the surface with 220-grit sandpaper. Then lay the new laminate using contact cement, trim it to fit, and cut the sink opening.

CAN YOU PAINT ALUMINUM SIDING?

There's a common misconception that paint won't adhere to aluminum siding. But it will as long as you prepare the surface properly and apply the right paint.

The most critical step is removing any "chalk," a powdery residue that often forms on the siding and will keep paint from getting a good "bite." Use water and a brush, a pressure washer, or a combination of the two.

Next, sand any peeling or damaged areas, feathering the edges of the paint so it blends in. Then clean the siding thoroughly, starting at the top and working down.

That done, apply a good oil-based (alkyd) primer. Now you can finish up with an oil or latex topcoat for a paint job that will last for years.

A BIGGER PORT IMPROVES BAND SAW

Dust Collection

Q: I have my hand saw connected to my dust collector through the small port under the saw table, but a lot of the dust still ends up in the saw cabinet or in my shop. Is there anything I can do to collect more dust?

Erno Hauer
Marietta, GA

A: You already touched on the problem: The tiny dust-collection port on most band saws means you have to start with small-diameter hose, and then use an adapter to step up to 4" hose. This drastically reduces how much air the collector can pull.

At the very least, make the small-diameter hose as short as possible. You also can drill holes in the throat plate around the blade to allow more airflow.

These steps may help, but what your saw really needs is a bigger port, such as the 4" version shown in the *Photo*, below left. Installing a port requires cutting an opening in the door, but it's a relatively simple job. Locate the opening near the bottom of the door where dust accumulates inside the cabinet (*Photo*, above).

The port is made from a "universal" 4" dust-collection hood. To position it as low as possible, you'll have to trim one



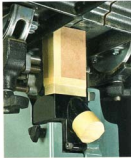
A band saw blade pulls a lot of dust into the lower saw cabinet.

edge of the hood to match the radius of the door. Hold the hood in place, then reach through with a pencil and outline the opening. Block the door open before cutting the opening with a jig saw.

Now caulk or weather-strip around the opening, and then mount the hood with sheet-metal screws. Attach an adjustable elbow and 4" hose. Finally, cover the saw's old port (*Photo*, below). Again, you may want to drill holes in the throat plate to increase airflow. **■**



A 4" port on the lower door catches dust that gets pulled into the cabinet.



Cover the standard port, and make a cardboard shield around the blade.

Hitachi's Latest Innovation

12" Sliding Compound Miter Saw
C12LSH

Revolutionary Slide System

Lets the saw head move along fixed rails, allowing the saw to be used on a bench top or other areas where space is limited.

Top Mounted LCD Display

Flexible, Liquid Crystal Display mounted above the motor eliminates guesswork and provides clear and accurate miter and bevel readings.

Fully Adjustable Laser Marker

Accurately indicates the cut line and can be dialed-in to the right or the left of the cut depending on user preference.

Micro Miter & Bevel Adjustment

Fine tune cutting angles with micro miter and bevel adjustment knobs to ensure exact cuts, saving time and eliminating costly mistakes.



HITACHI

www.hitachipowertools.com

PROTECT EXPOSED WOOD WITH Epoxy Sealer

Q: *Moisture has penetrated the finish on my wood windows, causing them to discolor. How can I preserve the wood, and what finish can I use for better protection?*

*Tim Browning
Pella, IA*

A: There's a product called Clear Penetrating Epoxy Sealer that will help (Photo, below). When brushed onto bare wood, this product actually penetrates into the wood fibers to protect them from moisture damage.

Like standard epoxy, this epoxy sealer is a two-part product that gets mixed together before use. But what's different about this sealer is

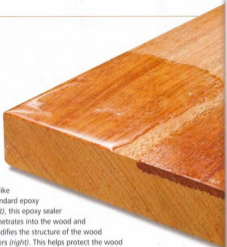
that it's a blend of epoxy and a solvent, so it's as thin as water (Photos, below right). This thin consistency is what allows it to soak into the wood (Photo, right). The sealer also creates a compatible surface for paint or varnish to form a strong bond with.

You can use epoxy sealer on bare wood. But if the wood has mold or mildew damage, you'll need to do some prep work first. Start by stripping the old finish and sanding the surface smooth. Neutralize any damage with bleach (Fig. 1). Then, brush on the epoxy sealer (Fig. 2). Once the sealer dries, sand the wood lightly, and apply a protective varnish (Fig. 3).



EPOXY SEALER

Smith & Company's Clear Penetrating Epoxy Sealer (CPES) is available in a two-pint kit for \$37 from Jamestown Distributors (JamestownDistributors.com; 800-497-0010).



Unlike standard epoxy (left), this epoxy sealer penetrates into the wood and solidifies the structure of the wood fibers (right). This helps protect the wood from moisture damage.



This epoxy sealer penetrates well because the product is actually epoxy thinned with a solvent. This makes it runny (left) when compared with a standard epoxy (right).

APPLYING THE SEALER



1] To fix damaged wood, strip the existing finish. Then scrub any dark areas with a 50/50 solution of bleach and water.



2] After mixing the two-part epoxy sealer, brush it liberally onto the wood. Keep brushing until the wood is saturated.



3] Let the sealer dry overnight, sand lightly with 220-grit sandpaper, and then apply three coats of varnish or paint.



"Chestnut"

"Sierra"

"Redwood"

"Western Red Cedar"

"Cedar"

Semi-transparent stains are available in a wide variety of colors to suit your tastes.

CHOOSING THE BEST

Cedar Deck Stain

Q: *I enjoyed the deck redo in the June 2006 issue of *Workbench*. I am wondering what stain you would recommend to preserve the cedar deck boards?*

*Jon Sibrell
West Des Moines, IA*

A: You have two choices for staining cedar decking: clear stain or semi-transparent stain. To protect cedar, the stain should be oil-based, contain mildewcides and fungicides, penetrate wood, and prevent UV damage. You'll find these properties in both clear and semi-transparent stains.

In fact, the only major difference is that clear stains filter UV rays, while semi-transparent stains block them (Photo, below). This difference means that semi-transparent stains will last longer: three to four years between applications. Clear stains need

to be applied every one to two years but are easier to apply (more information on page 23).

Whichever you choose, steer clear of solid-color stains or paints. These will peel and flake off if exposed to sun and moisture.



Clear stains (left) have trans-oxides that filter the sun's UV rays. Semi-transparent stains (right) use pigments to block the rays.

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TIPS & TRICKS FOR

Applying Stain

Applying stain to a surface as large as a deck can be challenging. Here are some tips that will ensure success.

Roll It On—Use a paint roller, so you can apply stain quickly. Attach the roller to a long-handled extension rod to give your back a break.

Don't Get Lapped—If you want to add a bit of color, a semi-transparent stain works great. But if you let stain dry in one area and roll over it, you'll end up with lap marks.

To prevent this, a good approach is to break the

deck into sections. Stain just three boards at a time, working from end to end (Photo, right). Once you have completed those three boards, brush stain onto the edges with a foam brush (Inset Photo), and then move on to the next three deck boards.

A Clear Option—A clear stain won't leave lap marks, so you can just work your way from one side of the deck to the other. Just be sure to stop occasionally and brush between the boards as you work across the deck.



When using semi-transparent stain, roll it on three boards at a time. Then brush in the cracks (right).

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Product Information Number 275

LOW-COST, EASY-TO-BUILD

Mobile Base

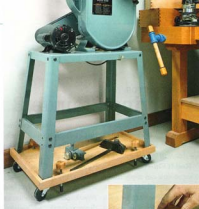
Save money by making your own mobile tool bases. Adjustable "feet" on the base raise it off its casters to stabilize the tool.

It's a given—mobile tools make your shop efficient. The problem is buying a mobile base for every tool costs a bundle.

To save money, I build my own mobile bases using material from the scrap bin and a few common items of hardware. They even have adjustable "feet" that raise the base off its casters to create a stable work platform.

Each tool is mounted to a $\frac{3}{4}$ " plywood base (*Construction View*). Cut the base to fit your tool stand. Then drill a hole (counterbored from underneath) at each corner for bolts that connect the stand to the base (*Section View*).

To make the feet adjustable, each one is made up of a threaded rod, two nuts, and a wood knob. Use epoxy to "fix" the nuts into counterbores in the base and knob. A vinyl grip on the rod prevents



it from slipping on the floor when you engage the feet.

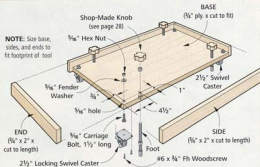
To add rigidity to the base, I glued pieces of $\frac{3}{4}$ "-thick hardwood around the edges. Installing the feet and casters and then bolting the tool stand in place completes the base.

David Plush
Glenwood Springs, CO

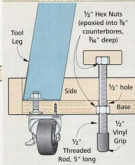


Adjustable "feet" raise the base off the casters to stabilize the tool.

CONSTRUCTION VIEW



SECTION VIEW



BEST TIP WINNER!

David Plush wins a Kreg "Super Kit" that includes a K3 pocket-hole jig, right-angle clamp, bench clamp, extra bit, DVD, and booklet — a \$241 value!

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PIPE-CLAMP CRADLES CREATE

Perfect Glue-Ups

I use pipe clamps in my shop, and I have no complaints — except when edge-gluing boards together to make a solid-wood panel. Then, the pressure from the clamps tends to bow the panel.

These clamp cradles solve that problem. They have rails made from aluminum bar stock that fit into saw kerfs in the cradles (Photo, right). The rails elevate the panel above the clamps. This way, the pressure exerted by the clamp screw is centered on the thickness of the panel (Cradle Section View). The result is a flat panel.

The cradles can be used when gluing up either $\frac{1}{2}$ "- or $\frac{3}{4}$ "-thick stock (see Details

in *Cradle Section View*). That's accomplished by two different-depth kerfs, one in each face of the cradle (*Construction View*).

To make the clamp cradles, start with an extra-long blank. Cut the kerfs in the top and bottom faces of the blank, and then crosscut the cradles to length.

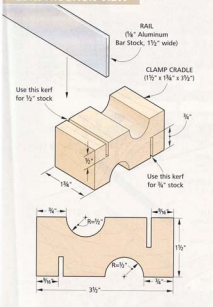
You'll also need to cut a curved notch in each cradle to hold the pipe clamps. Just clamp the cradles together (kerfs aligned), and drill a 1" hole at the joint line. Then flip the blocks around and repeat the process.

Dale Larson
Coal City, IL

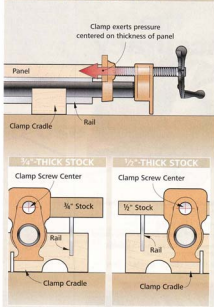


These cradles hold aluminum rails that raise the glued-up panel off the clamps. This centers the clamping pressure on the thickness of the stock, so you end up with a flat panel.

CONSTRUCTION VIEW

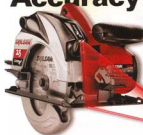


CRADLE SECTION VIEW



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TIPS & TECHNIQUES

ADJUSTABLE BENCHTOP

Hold-Down System

My workbench doesn't have bench dogs, so I added my own clamping system to secure pieces against the benchtop.

The main components of this system are an adjustable hold-down bar and two T-tracks (*Construction View*). The bar is ideal for securing large workpieces (*Photo, right*). Just slide the piece under the bar, and tighten a pair of lock knobs to clamp it in place.

You can also use the bar as a fence to guide a tool. Here, you simply butt the workpiece against the bar and then secure it with metal hold-downs that slide in the T-tracks (*Inset*).

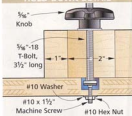
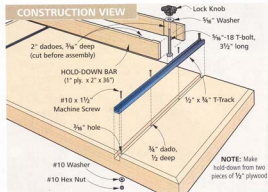
To equip your bench with this clamping system, rout dados for the T-tracks. Then install the tracks with machine screws and nuts (*Hold-Down Detail*).

To add rigidity, I made the hold-down bar from two pieces of 1/2" plywood. Cut dados in each piece to form the adjustment slots, and laminate the bar together. When the glue dries, insert T-bolts in the slots, slide the heads of the bolts into the T-tracks, and thread on the lock knobs.

Tom James
Yucca Valley, CA



A hold-down bar and two T-tracks provide a number of clamping options for your bench.

HOLD-DOWN DETAIL**CONSTRUCTION VIEW**

NOTE: Make hold-downs from two pieces of 1/2" plywood

Simple Shop-Made Knobs

The shop-made mobile base (page 24) requires "super-size" knobs. They're impossible to find in stores, but easy to build in the shop.

Just drill four holes and a centered counterbore in a

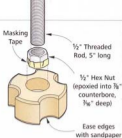
$\frac{3}{4}$ "-thick scrap block. Then cut between the holes to form the knob, and epoxy a nut into the counterbore. Masking off the nut keeps epoxy from seeping up onto the threads.

SECOND: Drill $\frac{3}{8}$ " counterbore, $\frac{7}{16}$ " deep



FIRST: Drill $\frac{1}{4}$ " holes

THIRD: Cut knob to shape



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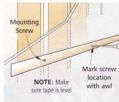


KEY TO KEYHOLE SLOTS?

Tape Template

Keyhole slots are a great way to hang wall-mounted projects like the picture rail in the June 2006 issue of *HomeAdvisor*. But for the rail to hang straight, you have to locate the mounting screws right both horizontally and vertically.

To locate the screws easily, I use a strip of tape as a template. Run the tape along the back of the rail, flush with the top edge. Then punch through the tape at the top of each keyhole slot (Photo). Now transfer the tape to the wall, and mark the hole locations with an awl (illustration).



NOTE: Make sure tape is level

Mark screw location with awl

A DIY-FRIENDLY

Stair Rail

A new angle on building balustrades makes it simple for any DIYer to create a grand staircase.

Even if you don't know a baluster from a banister, you can still build a grand stairway using the Fusion Balustrading System.

The Fusion system is a large collection of stair parts and adjustable connectors that make it incredibly simple to install a beautiful, contemporary balustrade on just about any interior stairway.

At present, you can mix and match chrome and brass connectors and balusters with oak and hemlock banisters to build the rail

that best complements your home's decor.

All of the wood is pre-finished, and the pivoting connectors eliminate the need to make intricate angle cuts. This effectively reduces stair rail construction to something akin to playing with a really nice-looking erector set.

Fusion promises that additional wood species are forthcoming, and we're told they are currently experimenting with an exterior version of the system.

Surprisingly, the cost of the system isn't as outlandish as you might think. The parts



Simple but attractive adjustable connectors take the mystery out of all the angles involved in installing a typical balustrade.

for a complete Fusion balustrade may cost you as much as 25% more than conventional, solid-oak parts. But not having to hire a carpenter will more than make up the difference.

The Fusion Balustrading System is currently available in

the U.S. exclusively through American Wood Moulding.

For more specific pricing information, a downloadable catalog of the full line, and product availability, call 800-638-4200 or visit AmericanWoodMoulding.com

BOSCH THINKS BIG WITH

Compact Drill

Despite its compact size, the Bosch 10.8-volt Pocket Driver (PS20) is a serious drill/driver. We got our first look at this tool at the International Builder's Show back in January. And while we're going to hang on to our high-voltage cordless drills for the big jobs, this is our new go-to drill/driver for small to mid-size jobs.

Bosch took advantage of lithium-ion technology, which uses smaller and lighter

battery cells than NiCad or NiMH, to pack 10.8 volts into this small package.

The drill delivers an ample 80 inch-lbs. of torque at speeds from 0 to 400 rpm and features an 11-position clutch to tailor the power to the work.

A handy soft-sided carrying case, one-hour charger, two batteries, and two bits are included for about \$130. Visit BoschTools.com or call 877-267-2499 to learn more.



Smaller, lighter, lithium-ion batteries allow Bosch to pack its compact Pocket Driver with ample power for many jobs.



The light weight of the Pocket Driver means more work with less fatigue.

BLADE GAUGE III

Aligns Jointer Knives

Pacific Rack & Machine has added yet another use for its Blade Gauge. The original Blade Gauges (versions I and II) are handy for setting bit and blade heights in $\frac{1}{32}$ " increments on router tables and table saws. The latest version, dubbed Blade Gauge III (\$60), extends that functionality to jointers.

A magnetic base holds the gauge securely on the outfeed table of the jointer while the end of the gauge

extends over the cutterhead. Simply adjust the knives (or the table height) until the light comes on, which indicates the knife edge and table top are perfectly flush.

Of course, the Blade Gauge III has all the same uses as I and II, so with this single tool you can make perfect adjustments to your router table and table saw, as well.

Visit BigLeg.com or call 877-220-2699 for more information.



A powerful magnet holds the Blade Gauge III on the jointer outfeed table. As soon as the knives contact the metal gauge, it completes a circuit and illuminates a small light.



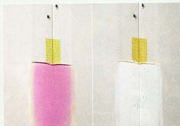
NOT JUST FOR CRAFTERS

Dremel Glue Gun

While hot glue can be useful for repairs or temporary assemblies, the typical glue gun leaves a lot to be desired.

Dremel's new glue gun, however, is anything but typical. A wide flip-down base keeps it from constantly tipping over, dual heat settings offer greater control over glue flow, and two LED lights clearly indicate when the gun is heated up and ready to dispense glue (Photo, right).

The Dremel model 1200 is available at hardware stores and home centers for about \$25. Visit Dremel.com or call 800-437-3635 to learn more.



DryDex goes on pink, so it's easy to distinguish new coats from old ones.

When the compound turns white, it's time to recoat.

Color-Coded Compound

DAP has taken the mystery out of working with joint compound with their DryDex formula that goes on pink and changes to white as it cures. An all-white joint means it's time to apply another coat, or to sand and paint the joint.

This same DryDex technology has been available for some time in a DAP spackle, and with the addition of the joint compound, DIYers can approach drywall installation with the same confidence the spackle gave them for repairs.

DAP DryDex joint compound is available in home centers and hardware stores for about \$20 for a two-gallon bucket. Visit DAP.com or call 800-543-3840 for more information on DryDex joint compound and spackle.

DUAL-LASER SKIL CIRC SAW

Accurate, Affordable

Two lasers really are better than one. I saw this firsthand when I tried the new Skil LaserX2 circular saw (model 5755) during a recent press event hosted by Skil.

During the event, I had a chance to make a variety of cuts with the saw in both plywood and solid wood. I found it to be much quicker to align the saw for a cut than trying to position a single laser just the perfect distance from the actual cut line.

The advantage of two lasers over one is that the dual lasers show you precisely where the material is going to be removed. So by

placing the laser lines on the waste side of your cut line, you can be certain that the finished dimension is exactly what you want.

Along with this enhanced accuracy, I was equally impressed with the saw's power. The 13-amp, 2½-hp motor is more than adequate for light- to medium-duty work, and it keeps the saw affordable (about \$80).

Blade changes are simplified with a spindle lock, and the blade wrench stores onboard the saw, so you can keep track of it. An 18-tooth carbide blade comes standard with the saw.



Two laser lines projected from the blade guard on the Skil model 5755 circular saw show the exact location of the kerf that will be cut by the blade.

Another nice feature through materials up to 2⅝" thick.

The Skil model 5755 is available at hardware stores and home centers. For more information, visit Skil.com or call 877-754-5999.

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from drab to fab

3 Windows THAT WOW!

Here are three inexpensive and easy ways to transform the windows in your home. Using off-the-rack moldings from the home center and simple shop-made trim pieces, you can go from ho-hum to high-style windows in a weekend.

BEFORE The dark ranch-style trim surrounding this window is remarkable only in how very unremarkable it is. But you'll be surprised at how three simple, yet inspired, window treatments can improve the view.



Windows should be something more than just an interruption in the wall. They should be part of the wall: an architectural component and an integral part of a room's decor.

Today's high-end home builders understand this, which is why elaborate window trim is becoming standard fare in their new homes.

To see what a difference incorporating fancy trim into your own home can make, just compare the *Before Photo* on the facing page to the three stylized windows below. It's the same window with the same view in all four photos.

But by simply changing the casing from a plain brown wrapper to something with a bit of depth and detail, the entire setting is transformed. Each of these three styles of window trim makes a statement that has a dramatic impact on the character of a room.



To add the distinctive look of muntin bars to your window, see page 41 or go to WorkbenchMagazine.com.

Regardless of which of these three styles you choose — contemporary, traditional, or Craftsman — the techniques used to create the treatment are essentially the same: moldings are cut to length, glued together into sub-assemblies, and nailed in place. Some of the moldings, like the fluted side pieces and rosettes in the traditional window

trim, are right off the rack at the home center. Others are made by simply routing a profile on the edge of a board. (We've included a separate article on router-table basics on page 74 which will help with this part of the project.)

It's really as simple as that. Upgrading your window trim using this method doesn't involve a big mess, large expense, or huge amounts of time. In fact, you should have little trouble trimming several windows in a single weekend. And chances are good that you already have the tools you need in your shop.

And don't be afraid to add your own personal touches to the windows, like the easy-to-apply muntin bars shown in the *Photo* above. Or even extend the trim style to the rest of the room with matching baseboards. You can find more information on these additional projects online at WorkbenchMagazine.com.



CONTEMPORARY Add a simple frame and a coat of paint to your existing trim for a clean, contemporary look (page 38).



TRADITIONAL A mix of off-the-shelf and shop-made moldings bring out a more traditional sophisticated style (page 40).



CRAFTSMAN Red oak trim pieces, decorative curved brackets, and faux pegs create a Craftsman look (page 42).

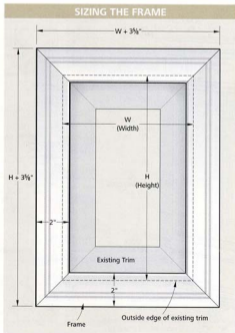
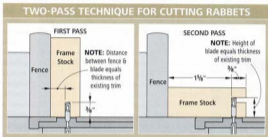
the rabbet depth. (Remember, the depth matches the trim thickness.) Now set the workpiece against the fence, and make the cut.

For the second pass, the workpiece is flat on the table saw. Raise the blade to cut into the kerf made by the first pass. Then reset the fence as shown, and make another pass to complete the rabbet.

Once that's done, there are a couple of decorative details to take care of — two grooves in the outside face and a chamfer on the inside edge (*Section View Detail*). To make these, cut two saw kerfs in the face of each frame piece. Then tilt the blade to 45°, and bevel-cut the inside (rabbeted) edge.

Miter to Length — Now it's just a matter of mitering the frame pieces to length. You can use the table saw or miter saw to do this. Just make sure the tip-to-tip length matches the lengths of the frame pieces that you calculated earlier.

Assemble the Frame — The only shop work that's left is to glue the frame together. You'll find that the miter joints will tend to slip out of alignment when you clamp them. One way to prevent that, though, is to use the clamping tip on page 92. When the glue dries, pin the corners of the frame with finish nails. Then just paint and install the frame, as shown in *Figs. 1 and 2* below.



1] To install the frame, set it over the existing window trim, so the reveal is even all around. Check for gaps (*Fig. 2*) before nailing the frame in place.



2] For uneven walls, shim the frame. Score and break the shims, then caulk gaps.

SET A SOPHISTICATED TONE WITH TRADITIONAL TRIM

The traditional-style trim around this window is much more elaborate than the trim on the contemporary version. Nevertheless, it's surprisingly easy to make and install.

As you can see in the *Construction View*, the key elements of this window treatment are two fluted moldings (A) and a pair of decorative rosettes (B). You can get both items off the rack at most home centers.

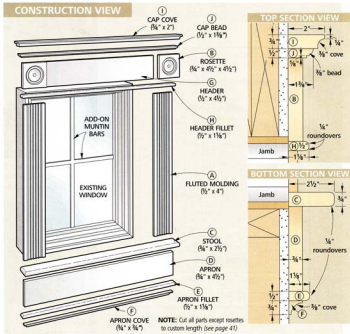
In addition, you'll need to make a few moldings. A horizontal stool (C) and a wide apron (D) define the bottom of the window. And a small fillet (E) and cove molding (F) create a transition from apron to wall. At the top of the window, a header (G) connects the two rosettes. Another fillet (H) underneath this assembly and a two-piece cap (I, J) on top completes the trim.

For this makeover, you'll need to remove the existing window trim with a pry bar. Slipping a putty knife between the trim and the wall prevents the pry bar from damaging the wall.

Size Up the Situation — The next step is to establish the size of the new trim pieces. The thickness and width of these pieces are detailed in the *Construction View*. As for lengths, those are determined by the height or width of the window opening (*Sizing the Trim Pieces*).

One thing to note here is that the "window opening" we're referring to is the inside opening, or distance between the window jambs. These jambs are represented by the dashed lines in the *Illustration* on page 41.

Using the height and width of the opening as starting points, you can figure out the lengths of all the trim pieces. Notice that we've also taken into account a $1/4$ " reveal around the inside edges of the opening. The reveal, which is the distance the trim is set back from the exposed edge of the window jamb, adds visual interest. Plus it makes for an easier installation because you don't have to get the trim perfectly aligned with the edge of the jamb.



Make the Moldings — Now it's just a matter of making the moldings. Here again, we used poplar for these. Its workability makes it an especially good choice when it comes to routing the end and edge profiles on the moldings. You can find both the $\frac{3}{4}$ "- and $\frac{1}{2}$ "-thick poplar boards you'll need at most home centers.

With boards in hand, rip the moldings to width and crosscut them to length. Then, using a table-mounted router, rout the decorative profiles on the ends and edges of the moldings (Section Views, page 40). Our in-depth article on router table basics (page 74) and the shop tip on page 89 will ensure good results when routing the moldings.

Assembly & Installation — With the moldings complete, glue and nail the upper and lower sub-assemblies together. (The side pieces — which are simply cut to length — go on separately.) Then paint the trim and install it from bottom to top, as shown in the Photos below.

No-Pain Window "Panels"

An easy way to create the look of individual glass "panes" is to add muntins to the inside and the outside of a window. These are $\frac{1}{2}$ "-thick wood strips with the ends beveled to fit against the window sash.

We attached the muntins with a special automotive tape. This tape is super-sticky, so be sure the muntins are positioned correctly as you press them into place. We laid out the muntin locations with the blue masking tape shown here. (For more info, go to WorkbenchMagazine.com)

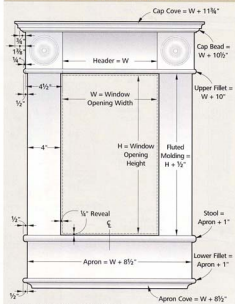


AUTOMOTIVE TRIM TAPE

Used for adhering trim to cars, this weather-proof tape is available at auto parts stores.



SIZING THE TRIM PIECES



NOTE: Dashed lines indicate window jamb



1] Center the lower sub-assembly on the width of the window, and nail it in place. Note the small reveal between the window jamb and stool.



2] After installing the fluted side moldings, set the upper sub-assembly in place. Center the rosettes over the sides, and then nail the assembly in place.

CREATE A CUSTOM CRAFTSMAN WINDOW

If your taste runs toward Craftsman style, this window makeover will certainly appeal to you.

Made from straight-grained red oak, this version features an apron (A) and stool (B) that define the bottom of the window (Construction View). Curved wood brackets (C) add visual interest and help support the stool. Resting on top of the stool is an upside-down U-shaped frame with a hardwood cap (D). Faux "pegs" (E) and thin strips of wood (F) decorate the frame. And as before, applied muntins divide the window glass.

Here again, you'll need to remove the existing window trim for this makeover. Take care to avoid damaging the wall or window jamb.

Sizing Considerations — Once that's done, the next step is to determine the size of the various trim pieces. The Construction View below details the thickness and width of the pieces. Note that the header is thinner than the sides of the frame to create some architectural "depth" at the top of the window.

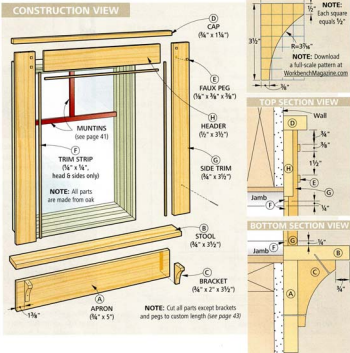
As for the length of the trim pieces, that depends on the height and width of the window opening. After measuring the size of the opening, calculating the lengths is a snap (see Illustration on page 43).

Material Matters — Once you've figured out the sizes of all the trim pieces, make a parts list, and then head to the home center for the material. You should be able to get what you need in the board aisle at most home centers. We found some nice-looking S4S oak boards (surfaced on all four sides) in both $\frac{1}{2}$ " and $\frac{3}{4}$ " thickness.

Simple Construction — After rounding up the stock, construction is pretty straightforward. It's similar to the traditional version in that you'll be cutting pieces to length on a miter saw, gluing them together into sub-assemblies, and then mounting the assemblies to the wall.

It's best to start with the lower sub-assembly and then build from there. Simply crosscut the apron and stool to length.

Then lay out and



cut the curved brackets to shape using a jigsaw or band saw (*Bracket Part View*).

Next, glue the apron and stool together. Then attach the brackets with glue and nails to complete the lower sub-assembly.

As for the upper sub-assembly, glue the sides (G) and header (H) together first, making sure they're flush with each other in back. These are end-grain glue joints, so they have little strength. But gluing and nailing on the cap will add plenty of rigidity until you get it mounted to the wall. To complete this part of the project, glue the decorative trim strips around the inside edges of the frame, and then add the faux pegs (*Sidebar, right*).

Two-Step Installation — After applying a finish to the trim (and painting the jamb, in our case), installation is an easy two-step process as shown in Figs. 1 and 2.

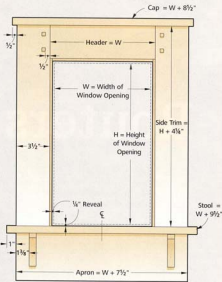
— *Written by Kate Bosenbarick, project designed by James R. Downing, illustrated by Matt Scott*

Perfect Peg Placement

The "pegs" on this window trim are thin slices of wood that get glued in place. To make sure the pegs align with each other (and to avoid making a glue mess), lay out their locations on a strip of tape. Then cut openings in the tape, and glue on the pegs.



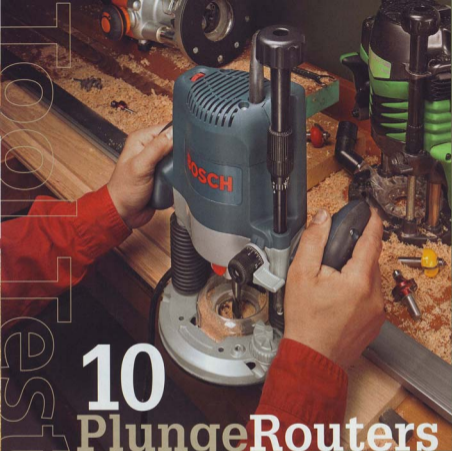
SIZING THE TRIM PIECES



1] To install the Craftsman window trim, center the lower sub-assembly on the width of the window. Then fasten it in place.



2] Now set the U-shaped upper sub-assembly onto the stool. Be sure to check that there's an even reveal on both sides, and then nail it to the wall.



10 Plunge Routers

Can routers this big and powerful be nimble enough for handheld work but still versatile enough to mount in a router table? If you choose carefully, yes.

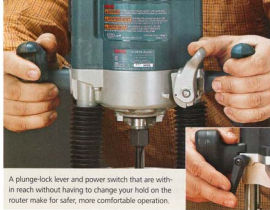
When your woodworking projects include challenging elements like large, deep mortises, specialized joinery such as cope-and-stick joints, or even heavy shaping cuts like raised panels, you better have a router that can deliver the power and precision these techniques demand.

Today's crop of big plunge routers is a good place to start looking for just such a router. Each of these ten models cranks out three or more horsepower,

has plenty of plunge depth for deep cuts, and features variable speed, so you can adjust the rpm to match a full range of bit sizes.

The very best of these routers offer precise depth adjustments, fluid, smooth plunging action, effective dust control, and are as at home in a router table as they are for handheld operations.

The choices are many, but when you compare these routers on the finer points, the field narrows dramatically. So let's take a closer look.



A plunge-lock lever and power switch that are within reach without having to change your hold on the router make for safer, more comfortable operation.

CONTROL LOCATION

The first measure of any handheld tool is how well it fits your hands. This is a test you can do for yourself wherever you shop for tools. In fact, I'd encourage you to do just that and compare your findings with ours. Because while we certainly have our own opinions on this, it is largely a matter of personal preference.

What you're looking for are comfortable handles that allow for a firm grip to control the power of a tool this size. And you should be able to reach both the plunge-lock lever and power switch without having to shift your grip very much.

Based on that, the Bosch router was the one that all of our testers agreed was the best fit (Photo, above). The Worx router was another strong contender, though some testers did report that the plunge lock was slightly further away than they'd like it to be.

Makita, Poeter-Cable, Hitachi, and DeWalt also received passing grades, though there was nothing remarkable about the controls. They were simply spaced within reach of most hand sizes and didn't have any complicating factors.

One router that caused some head-scratching was the Triton. The plunge-lock lever and the power switch seemed fine to most testers, but the unique rack-and-pinion plunge operation proved more troublesome. Ultimately, everyone agreed that for handheld work, it's best to disengage

this feature and allow the router to plunge just like any other router. (And, by the way, thumbs up to Triton for including an override to this feature.)

Festool drew the most complaints for a plunge-lock lever that was just beyond the comfortable reach of most hands (Inset Photo, above).

COLLETS

Our expectations for collets are somewhat contradictory. On one hand, we expect them to hold the bit firmly while the router is running. On the other hand, we want them to release the bit with minimal effort when it's time for a change.



Collets with reducers rarely hold the bit as securely as collets with numerous slits that allow consistent pressure to be applied.



BOSCH 1619EV5

Virtues	Excellent controls; Good dust collection; Great table router; Superior depth setting system; Largest base opening.
Vices	Slightly top-heavy.
Verdict	If you're only going to have one router in your shop, this is the one.

www.BoschTools.com
877-267-2499



DEWALT DW625

Virtues	Comfortable controls; Great depth-stop system; Nicely balanced.
Vices	Troublesome dust control; Small bit opening.
Verdict	A serious contender for best in class. Outshone only by the Bosch.

www.DeWalt.com
800-433-9258



FEIN RT1800

Virtues Good depth-stop system; Very smooth running; Smooth plunge action.

Vices Expensive; Awkward controls; Inconvenient to mount the dust shroud.

Verdict This is a well-built, albeit expensive, router, with few bells and whistles.

www.FeinUSA.com
800-441-9878



FESTOOL OF 2000 E

Virtues Good dust collection; Well balanced; Smooth running.

Vices Very expensive; Awkward controls; Poor depth-stop system.

Verdict A mixed bag of good and bad features, which just won't do at this price.

www.FestoolUSA.com
888-337-8600



Five fixed positions on the Bosch turret (above) make it easier to rout a series of progressively deeper passes than turrets with just three adjustable positions (inset).

You can spot the routers with collets that meet both of these seemingly contrary criteria fairly easily. First, the router will have two collets, rather than one $\frac{1}{2}$ " collet with a reducer sleeve for $\frac{3}{4}$ " bits (see *Photo on page 45*). The problem with these reducer sleeves is that they don't grip the bit shank as securely as conventional collets, so the bit has a greater likelihood of slipping during heavy cuts. Additionally, these sleeves can be very difficult to remove from the collet once sawdust gets packed in around them.

Second, the collets will have several slots in them that allow for more uniform compression of the collet and, as a result, more surface contact with the bit.

We were completely satisfied with the collets that come with the Bosch, Porter-Cable, DeWalt, Fein, and Hitachi routers. The Freud and Makita routers

each include very good $\frac{1}{2}$ " collets, but both use a reducer sleeve to accommodate $\frac{3}{4}$ " bits. The Festool router has a good $\frac{1}{2}$ " collet, but no collet for $\frac{3}{4}$ " bits. (**Note:** This router does include a smaller collet for 8 mm bits.)

We were most disappointed in the Triton's collets. Both the $\frac{1}{2}$ " collet and the $\frac{3}{4}$ " reducer allowed a bit to slip once during our testing.

PLUNGE PRECISION

While power is the forte of these big routers, the need for precision can't be overstated. And a plunge router's precision is dictated almost entirely by its depth-stop system.

The Bosch has the best example of a depth-stop system that is easy to use and allows for precise setups (*Photo, above*). The turret in this system has five fixed positions rather than three adjustable



Triton's dust-collection port (left) is built into the base of the router, and two see-through shields allow little space for dust to exit anywhere else. The DeWalt dust port (right) has to be mounted from underneath the router base.



Bosch's large base opening (left) easily accommodates a 3½" panel-raising bit. The much smaller opening on the Freud (right) makes using bits this large difficult.

stops, which is standard for the other models. This makes it much simpler to make deep cuts in smaller increments. Additionally, the stop rod makes quick gross adjustments and then transitions easily to micro-fine adjustments.

The Fein and DeWalt depth-stop systems were close runners-up, but their turrets were not quite as user-friendly.

Once again, it was the Triton that we liked the least. The depth-of-cut scale is built into the turret on this one, and setting the depth is done by adjusting the stops rather than the stop rod. With a bit of care, we were able to make accurate cuts with this router, but it does involve some extra steps when compared to more conventional systems.

DUST COLLECTION

The amount of dust a router can produce is a serious health concern. And it can also make it difficult to see the path of the bit during handheld operations. Both of these problems can at least be lessened with effective dust control.

And this is one point on which Triton scored very well. The nearly enclosed base of this router and a built-in dust port leave very little space for dust to escape, except into the vacuum hose (Photo, facing page).

Bosch and Festool also have decent dust shrouds that are simple to attach or detach. Hitachi has a similar shroud, but you'll have to keep a screwdriver handy to take this one on and off. DeWalt, Worx, and Freud also do a good job of collecting dust, but only

after you go to the trouble of attaching a shroud from underneath the base (Photo, facing page). But inconvenient dust control is still better than no dust control, which is what you'll get with Porter-Cable and Makita.

BIT OPENING

Turning large-diameter bits, such as those for routing raised panels, is precisely why you'd need a router like this. Strangely, not all of these routers have enough clearance in the base to work well with bigger bits.

The Bosch is certainly roomy enough (Photo, above left). The 4"-diameter base opening in this router will accommodate just about any bit you care to mount in the router. Hitachi is a close second with a 3⅞" opening.

Slightly less roomy are the Triton, Porter-Cable, Festool, and Fein routers. Each of these routers has at least a 3"-diameter opening. With the Makita, DeWalt, and Freud, however, you'll have trouble with bits much larger than 2½" in diameter (Photo, above right).

Understand, these smaller base openings don't necessarily mean you can't use large-diameter bits. It just makes it more difficult to mount them in the router, and it also limits the range of depth adjustment you can make.

Keep in mind that the size of this opening only impacts a router's usefulness when mounted in a table. Bits this large shouldn't be used at all for handheld routing.



FREUD FT2000E

Virtues	Attractively priced; Good table manners.
Vices	Stiff plunge operation; Small base opening; Some wiggle in the plunge stroke.
Verdict	This is a value-priced router, but you'll sacrifice some capability for the savings.

www.FreudTools.com
800-334-4107



HITACHI M12V2

Virtues	Good control placement; Decent depth-stop system; Large base opening.
Vices	Dust shroud is tricky to get on and off.
Verdict	This redesigned router is a big leap forward over Hitachi's previous model.

www.HitachiPowerTools.com
800-706-7337



MAKITA 3612C

Virtues Well-balanced router; Very smooth running; Comfortable controls.

Vices No dust collection; Uses reducer to accept 1/4" bits; Depth-stop system is crude.

Verdict Lots of power and comfort; little in the way of refinement.

www.Makita.com
800-462-5482



PORTER-CABLE 7539

Virtues Comfortable controls; Simple operation.

Vices No dust control; Not well-suited for table-mounting.

Verdict A fundamentally strong "old-school" router that could stand some updating.

www.Porter-Cable.com
800-487-8665

Stop rod locks into the turret Spring Override



By disengaging the spring and locking the stop rod into the turret, Bosch's depth-stop system is transformed into a convenient lift system.



TABLE MANNERS

The size of bit these routers can easily accommodate is only one small measure of their "table manners." Just as important is how easily you can make height adjustments, both gross and fine. And historically, the fundamental nature of plunge routers has made them a poor choice for table-mounting.

That's because the same qualities that make them function as *plunge* routers actually work against them when they're mounted in a table. Specifically, the return springs that help lift the router in handheld operations become a force you have to overcome to make height adjustments on a router table. And the plunge-lock lever that lets you control the movement of the router is just one more control to manipulate when making adjustments on a router table. Finally, consider the matter of fine adjustments, which are often made with small knobs that are difficult to operate when these routers are mounted upside down.

Two of the routers in this test, however, are especially well-suited to table-mounting because each one of these challenges has been removed.

Both the Bosch and the Triton make the return spring a non-issue. On the Bosch, the spring can be disengaged by plunging the router completely and pushing a small button next to the turret (*Inset Photo, above*). The spring on the Triton can be removed simply.

Both routers also allow you to lock the plunge lever

in the "off" position, so the routers move freely.

A large extension knob on the Bosch makes fine adjustments easy, even below a table (*Photo, above*). And the rack-and-pinion height adjustment on the Triton (that we judged to be a nuisance for handheld work) is a great way to adjust this router when it's table-mounted.

None of the other routers in this group really distinguished themselves as strong candidates for table work. The Hitachi, Freud, and Makita at least have extension knobs that make fine-tuning a little easier, but you'll still have the spring pressure and plunge-lock levers working against you.

BIT CHANGING

Changing bits has largely become a one-wrench operation these days. Among these routers, only the Porter-Cable still requires two wrenches for loosening or



The base of the Triton router depresses the spindle lock automatically, leaving both of your hands free for bit changes.

tightening the collet. All of the others offer their own version of a spindle lock, each of which performed well for us.

Triton offers the most hassle-free bit-changing system of all. This router lets you extend the collet beyond the base for unobstructed access (*Photo, bottom of page 48*). And the lock engages automatically, so you have both hands free to steady the router and turn the collet nut.

FINAL RECOMMENDATIONS

A big plunge router is a big investment. Fortunately, it's possible to get one that's as easy to use as it is powerful and that can adapt to a wide range of routing operations.

Editor's Choice — Based on that, we selected the Bosch 1619EV5 as the "Editor's Choice." We found virtually no shortcomings in this router. It offers a comfortable grip with easy-to-reach controls, will turn the largest bits with ease, has above-average dust collection, a great depth-control system, and may be the best big table router on the market right now.

We also want to offer a nod to Hitachi for their newly redesigned M12V2

router. This model is light-years ahead of its predecessor thanks to better ergonomics, a stronger return spring, easier bit-changing, and an improved depth-stop system.

Another router that's worth noting is the DeWalt DW625. Not much has changed with this router since its inception, but it continues to be one of the standard-bearers for this category because of its comfortable control locations, above-average depth-stop system, and track record of durability and accuracy.

Top Value — Our "Top Value" award goes to a newcomer — the Worx WT600K. For right at \$200, you get a very capable router in a surprisingly compact package. And even at this bargain price, the router comes with dust collection, an edge guide, one guide bushing, a spiral bit, and a carrying case.

The other routers in this test, while certainly powerful enough, lack many of the refinements and versatility that we've come to expect in routers that cost this much. **■**

— Written by Bill Link

PLUNGE ROUTER SPECIFICATIONS

Brand	Model	Price	Motor	Speed (rpm)	Collets	Plunge Stroke	Base Opening	Turn Positions
Bosch	1619EV5	\$309	15-amp	8,000 - 21,000	1/4", 1/2"	2 3/4"	4"	5
DeWalt	DW625	\$264	15-amp	8,000 - 22,000	1/4", 1/2"	2 1/4"	2 1/2"	3
Fein	RT1800	\$342	15-amp	8,000 - 22,000	1/4"	3"	3"	3
Festool	OF 2000 E	\$475	16.7-amp	12,000 - 21,000	8 mm, 1/2"	2 9/16"	3"	3
Freud	FT2000E	\$190	15-amp	8,000 - 21,000	1/4", 1/2"	2 1/2"	2 3/4"	3
Hitachi	M12V2	\$229	15-amp	8,000 - 22,000	1/4", 1/2"	2 9/16"	3 3/8"	3
Makita	3612C	\$244	15-amp	9,000 - 23,000	1/4", 1/2"	2 3/8"	2 1/2"	3
Porter-Cable	7539	\$337	15-amp	10,000 - 21,000	1/2"	3"	3 1/2"	3
Triton	TRC0001	\$330	15-amp	8,000 - 21,000	1/4", 1/2"	2 1/2"	3 1/8"	3
Worx	WT600K	\$199	15-amp	11,000 - 28,000	1/4", 1/2"	2 1/4"	3 1/4"	3



TRITON TRC0001

- Virtues** Superior dust collection; Excellent bit-changing.
- Vices** Steep learning curve to work all the controls; Had some bit slippage.
- Verdict** A unique router that will serve you well once you learn your way around it.

www.TritonWoodworking.com
888-874-8661



WORX WT600K

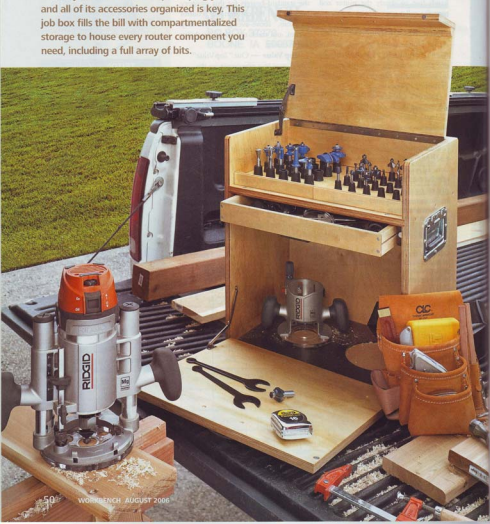
- Virtues** Affordably priced; Compact design; Uncomplicated operation.
- Vices** Some slop in the plunge action; Small base opening.
- Verdict** An impressive newcomer that should serve nicely for most handheld routing.

www.WorxPowerTools.com
888-599-3711

PORTABLE/HANGING

Router Job Box

On the jobsite or in the shop, keeping your router and all of its accessories organized is key. This job box fills the bill with compartmentalized storage to house every router component you need, including a full array of bits.



Although routers aren't particularly large tools, they demand an awful lot of space relative to their size. That's because along with the motor and perhaps a couple of bases, you'll also need to find room to store and organize the wrenches, collets, dust hood, and of course, all those router bits.

And as for portability? Forget about it. Sure, you can carry your router wherever you need to, but how are you going to get all those supporting pieces to come along? The plastic cases that routers often come in are mostly useless, and the canvas bags are scarcely better if you want any semblance of order to the whole collection.

This router job box solves all those problems, and more. It has space for a router motor and a plunge- and fixed-base (making it perfect for the popular router combination kits), plus a drawer for wrenches, sub-bases, bushings, and other accessories. And there are two removable trays that can hold 40 or more router bits thanks to some nifty plastic bit holders. The drop-front door also makes a perfect staging area for bit changes or other adjustments.

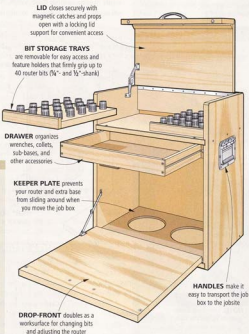
Additionally, simple mounting cleats (*Detail, below*) and a pair of sturdy handles means you can mount the job box on a shop wall and then easily lift it off when you need to take your router to the jobsite (*Photo, left*).

Building the router job box is pretty straightforward, and there are a handful of details that make the process and the finished product more interesting (*Illustration, right*). We'll be sure to point out those details as we go along and offer a few helpful tips along the way.

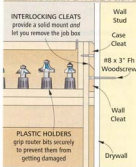


By mounting it on a wall, this job box becomes a nice shop cabinet, complete with a drop-down work surface.

CONSTRUCTION VIEW



MOUNTING CLEAT DETAIL



CONSTRUCTING THE CASE

One nice thing about this job box is that it's built entirely with sheet goods, mostly $\frac{3}{4}$ "- and $\frac{1}{2}$ "-thick plywood, plus a bit of $\frac{1}{8}$ "-thick hardboard.

You'll want to get started by cutting the sides (A, B), bottom (C), and divider (E) from $\frac{3}{4}$ " plywood (Case Construction, below). Then cut the back (D) and hinge plate (F) from $\frac{1}{2}$ " plywood. Set the $\frac{1}{2}$ "-thick parts aside for the moment, so you can focus on the joinery in the thicker pieces.

Each side needs a dado for the divider to nest in, a rabbet to accept the bottom, and a groove to mount the back in. All three can be cut easily with a dado blade mounted in your table saw. But remember, the back is only $\frac{1}{2}$ " thick, so you'll need to change your dado-blade setup at least once while you're cutting these joints. Another important point to remember

is that the sides are mirror images of each other. I can tell you from experience that it's easy to get in a rush and wind up making two identical sides. So double-check to be certain all the joints are laid out where they need to be.

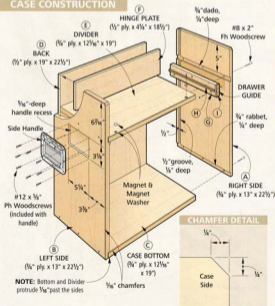
After cutting the joinery, you're ready to work on one of those interesting details I mentioned earlier. Look at the *Chamfer Detail* below, and you'll see that we trimmed off the upper corners of the case sides. Later, the lid will be chamfered to match, but for now we'll only worry about the sides.

The simplest way to do this is to lay out the chamfer according to the dimensions in the *Chamfer Detail*, below. Then cut and sand to the line as shown in the *Photos* on the next page.

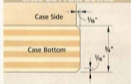
Next come the recesses for the side handles. This requires a bit of template routing. You can learn how

After dry-fitting the plywood panels that form the "shell" of this job box, glue and screw the case together.

CASE CONSTRUCTION



CASE BOTTOM DETAIL



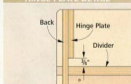
CATCH DETAIL



CHAMFER DETAIL



HINGE PLATE DETAIL



to do this in *Tips from the Workbench Shop* on page 90.

Now you can shift your focus to the bottom and divider. These need a bit of detailing before you assemble the case. The *Case Bottom Detail* on page 52 shows how these panels stand just proud of the case sides and have small chamfers all the way around their exposed edges. Again, this is a decorative touch to give the case some additional dimension. These are easy to rout with a chamfer bit mounted in your router table. And while you're set up for it, rout chamfers on the outside edges of the case sides, as well.

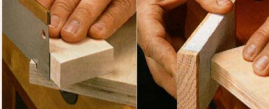
One final item before assembling the case is to prepare it for the magnetic catches that keep the lid closed. Each consists of a magnet and a magnet washer (*Catch Detail*). You'll need to drill counterbores in the divider to accept the washers, but don't install the washers just yet. You'll want to leave these out for now, so you can use a tip I'll share with you later to align the magnets.

Case Assembly — Now you can assemble the case. Start with a dry assembly to check the fit of all the parts and to drill pilot holes and countersinks for the screws that hold it together.

One important note about the order of assembly is that the back has to go in *before* the bottom and divider. These parts will butt against the back, so having the back in place will make aligning everything much simpler.

With that in mind, glue and clamp the case parts together, and drive screws into the pilot holes.

The last piece of this sub-assembly is the hinge plate. As the name implies, this is where you'll mount a continuous hinge for the lid. But this rail will also help hold the bit trays in place when the chest is complete. If you take a look at the *Hinge Plate Detail*, you'll see that there's a space between the bottom of the plate and the divider. The back edge of the bit storage trays will slide into this space to hold them securely when the cabinet is on the move. That said, attaching the hinge plate couldn't be much simpler. Just glue and clamp it flush with the top of the case.



To chamfer the corners, hold a guide block directly on the cut line. Use a hand saw to make the cut, and then true up the corner with a bit of sanding.

THE DRAWER GUIDES

The first step in fitting this case with a storage drawer is to build a set of drawer guides. I opted for shop-made guides to keep the cost and complexity of this job box to a minimum. And these guides are about as simple as they get. A pair of plywood rails (G) each accept a hardboard runner (H) that fits in a groove cut in the rail (*Drawer Guide*).

This groove is centered in the width of the guide rail. Be sure to cut or rout this groove to provide a snug fit for the runner. Then cut the runners to size, and glue one into each rail.

To complete the guides, you need to add a magnet plate (I) to the front end of each rail. Each plate is just a small piece of hardboard with a $\frac{1}{2}$ " hole drilled in it to hold the magnet. Make the plates and glue them to the guide rails, but here again, leave the magnets out for the time being.

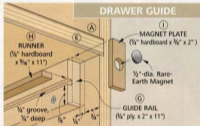
After allowing the glue to dry, you can mount the guides inside the case. Once again, I'd suggest a dry run here. Positioning these just right is important because these pieces will eventually determine how well the drop-front fits.

The goal is to position the guides so that when the drop-front is closed, the outer face of the drop-front will be flush with the front edges of the case sides.

You could try to accomplish this by cutting the guides to exactly the right length, so they could just butt against the case back and leave the perfect

spacing at the front. But an easier way is to make them a little short (the dimensions listed for the guides already account for this) and then register them from the front of the case.

To register the guides, clamp a scrap of plywood that's the same thickness as the drop-front to the case side (*Photo*, below). Now simply butt the front end of each guide against the scrap and attach it with glue and screws. Note: Position the screws near the ends of the guides, so they are well away from the handle recesses.



Use a piece of scrap to set the guides back the perfect distance from the front of the case.

STORAGE COMPARTMENTS

With the basic case constructed, you can begin defining the compartments that make this router job box so versatile. We'll get started in the lower compartment with the drawer that hangs directly below the divider (*Exploded View*). Then we'll add the drop-front that encloses the router storage compartment.

BUILD THE DRAWER

The accessory drawer is another simple sub-assembly. The ends of the drawer front and back (J) are rabbeted to accept the drawer sides (K), as shown in the *Drawer Assembly* on page 55. And all four of these drawer pieces are rabbeted to accept the hardboard bottom (L).

One thing to take note of on this drawer is the groove that's cut into each drawer side. These grooves slide onto the hardboard runners of the drawer guides. At first glance, this looks just like the groove in the guide rail. But if you look closer, you'll see that this time, the groove is *not* centered in the

workpiece. Instead, it's offset toward the top slightly. This offset ($1/16$ ") provides clearance between the top of the drawer and the divider panel (*Drawer Guide Detail*, below).

To get started on the drawers, cut the front, back, and sides to size from $1/2$ " plywood. Rabbet the front and back to accept the sides, and then rabbet all four pieces for the drawer bottom.

Now outfit your table saw with a $1/4$ " dado blade to cut the grooves in the drawer sides. Test your setup on a scrap piece before cutting the actual drawer pieces. You may need to shim the dado blade to cut the grooves wide enough.

When you're satisfied with the width and placement of the groove in the scrap, cut the grooves in the drawer sides. Then join the sides to the front and back using glue and screws.

Next, measure between the rabbets in the bottom of the drawer assembly, and cut the hardboard bottoms to fit.

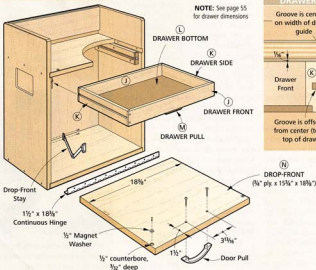


Extend the groove through the drawer back by cutting and chiseling a small notch in the back.

Glue and clamp the drawer bottom in place, and allow the glue to dry.

Once that's done, you'll need to extend the grooves in the drawer sides through the back of the drawer, so the drawer can slide onto the hardboard runners (Photo, above). A handsaw and a chisel are the fastest, easiest tools to use for making these small cuts. And since these are hidden, neatness isn't critical.

EXPLODED VIEW



The final touch on the drawer is a small hardboard pull (M). Cut this piece to size, and knock all the sharp corners off one face with sandpaper (*Drawer Pull Detail, below*). Then glue and clamp the pull (with the eased edges exposed) to the bottom of the drawer.

DROP-FRONT DETAILS

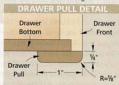
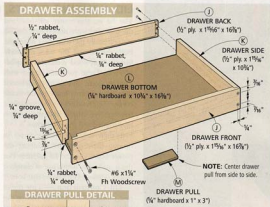
The drop-front (N) that encloses the cabinet is the simplest piece of this job box. But mounting it just right does present one challenge because the case bottom extends beyond the case sides just slightly. So if you were to mount the continuous hinge as normal, the drop-front would be flush with the case bottom. But you want the drop-front to be flush with the case sides, so you need to set the hinge back just a little bit to make up the difference. This adds a couple of extra steps, but the finished job box will look better for the effort.

The first step is to position the hinge on the case bottom as shown in the *Drop-Front Hinge Detail*. But you're not going to actually install the hinge this way. For now, you just need to measure so it fits inside the case. You'll use this piece as a template for mounting the hinge now, and then make it into a keeper plate for your router bases later.

Next, cut the hardboard to length so it fits inside the case. You'll use this piece as a template for mounting the hinge now, and then make it into a keeper plate for your router bases later.

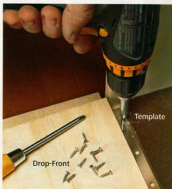
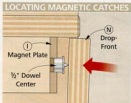
Now you can install the hinge. Go ahead and attach it to the drop-front to get started. Then, with the hardboard template placed inside the job box, butt the hinge against the template, and attach it to the case bottom (*Photo, right*). The attached drop-front should close and seat flush with the case sides.

That leaves the magnetic catch and the drop-front stay. You drilled holes for the magnets in the magnet plates earlier. Now you need to drill matching counterbored holes in the drop front for the magnet washers. The easiest way to make sure these align is to use

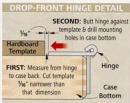


dowel centers to mark the hole locations in the drop-front. Place a dowel center in each magnet plate (*Locating Magnetic Catches, below*). Then close the drop-front, and press firmly so the points of the centers make small dimples in the inside face. Drill counterbores on the marks, and attach the washers. This is also a good time to install the magnets in the guides. I used epoxy to hold these in place.

To install the drop-front stay, first open the drop-front, and shim it level. Then position the stay, and drill pilot holes with a self-centering bit. Finally, drive the mounting screws by hand to secure the stay.



Use a hardboard template to position the continuous hinge at the proper setback so the drop-front will close flush with the case sides.



Mount the Lid — Now it's time to mount the lid on the job box. Just like the drop-front, the lid is mounted with a continuous hinge, but this time there's less fussing involved. This hinge can be installed in the typical manner since none of the adjoining edges extends beyond the others.

Now you can add the magnets that hold the lid closed. Again, place dowel centers in the counterbores in the divider to mark the drilling locations in the lid. Drill the counterbores, and epoxy the magnets in place. To complete the lid, attach the lid stay.

Bevel the Lid — Now that the lid is attached, it's in the perfect position to rout a bevel on the front edge to match the hand-cut chamfers on the corners of the case sides. You can use one of these cut corners to set up your router (*Photo and Illustration, right*). Then simply rout the lid to match the sides.

Interlocking Cleats — When your job box isn't on the jobsite, you'll want a convenient way to store and use it. A set of interlocking cleats handles that nicely. Each cleat has one edge that's beveled at 45°. With one cleat attached to the wall (T) and the other mounted on the back of the case (U), the bevels interlock to hold the job box securely in place.

To make these pieces, simply cut them to size, and then bevel-rip the edges on the table saw. The cleat that gets mounted to the case receives a decorative chamfer. But you won't be able to rout it after the cleat is installed because the lid hinge gets in the way. So rout or cut this chamfer, and then install this cleat on the back of the job box, flush at the top. Mount the other cleat on the wall at a height that will make it easy to lift on and off, and make sure to hit wall studs with the mounting screws.

Keeper Plate — Now it's time to make the keeper plate (V) for your router bases using the hardboard template that positioned the drop-front hinge earlier. The first step is to trim about 1/4" off the front edge, so it won't interfere with the drop-front. Then make the cutouts for the router bases to nest in. Use the bases themselves as patterns to position and lay out the openings. Cut the holes with a jig saw, and then fine-tune them with a file and sandpaper to get a snug fit. Double-sided tape holds it in place.

Finishing Touches — This is a good time to protect the job box with a couple coats of polyurethane finish.



Adjust the depth of cut on your router, so the bit aligns with the chamfer in the case side.

Then add the side handles, pulls, and bit holders. I spaced the rows of bit holders 1/2" apart, which accommodates all my standard bits. Large-diameter bits may require a little more space. **■**

— *Written by Bill Link, project designed by Kent Welch, illustrated by Matt Scott*

MATERIAL LIST

Part	Qty	Size	Material
CASE			
A RIGHT SIDE	1	3/4" x 13" x 22 1/2"	Plywood
B LEFT SIDE	1	3/4" x 13" x 22 1/2"	Plywood
C CASE BOTTOM	1	3/4" x 12 1/2" x 19"	Plywood
D CASE BACK	1	3/4" x 19" x 22 1/2"	Plywood
E CASE DIVIDER	1	3/4" x 12 1/2" x 19"	Plywood
F HINGE PLATE	1	1/2" x 4 1/2" x 18 1/2"	Plywood
G GUIDE RAIL	2	3/4" x 2" x 11"	Plywood
H RUNNER	2	3/4" x 3/8" x 11"	Hardboard
I MAGNET PLATE	2	3/4" x 3/4" x 2"	Hardboard
J DRAWER FR./BK.	2	1/2" x 1 1/4" x 16 1/2"	Plywood
K DRAWER SIDES	2	1/2" x 1 1/4" x 10 1/4"	Plywood
L DRAWER BOTTOM	1	3/4" x 10 1/4" x 16 1/2"	Hardboard
M DRAWER PULL	1	3/4" x 1" x 3"	Hardboard
N DROP-FRONT	1	3/4" x 15 1/4" x 18 1/2"	Plywood
O LID TOP	1	3/4" x 11 1/2" x 18 1/2"	Plywood
P LID FRONT	1	3/4" x 4 1/2" x 18 1/2"	Plywood
Q CORNER BRACE	1	3/4" x 3/4" x 18 1/2"	Plywood

Part	Qty	Size	Material
R BIT TRAY	2	3/4" x 9 1/2" x 10 1/2"	Plywood
S TRAY PULL	2	1/2" x 1 1/4" x 9 1/2"	Plywood
T WALL CLEAT	1	1/2" x 2 1/2" x 18 1/2"	Plywood
U CASE CLEAT	1	1/2" x 2 1/2" x 18 1/2"	Plywood
V KEEPER PLATE	1	3/4" x 11 1/2" x 18 1/2"	Hardboard

HARDWARE:

- (12) #8 x 2" Fh Woodscrews
- (15) #8 x 1 1/2" Fh Woodscrews
- (8) #6 x 1 1/4" Fh Woodscrews
- (16) #12 x 3/8" Fh Woodscrews
- (1) 1 1/2" x 48" Continuous Hinge (cut into two hinges)
- (1) Friction Lid Stay (00T07.50)**
- (1) Drop-front Stay (#00T07.12)**
- (2) Recessed Chest Handles (#NSH-10)*
- (2) Arc Door Pulls (#00W32.20)**
- (4) 3/8" x 1/2"-dia. Rare-Earth Magnets (#99K31.03)**
- (4) 1/2"-dia Magnet Washers (#99K32.62)**
- (4) Six-Packs of 1/2" Bit Holders (#16J03.61)**
- (4) Six-Packs of 1/2" Bit Holders (#16J03.62)**

*Item available from Reid Tool Co. (800-253-0421; ReidTool.com)
 **Items available from Lee Valley (800-871-8158; LeeValley.com)

NO-FUSS, NO DUST

Floor Refinish

Revive a dingy old hardwood floor by sanding and refinishing it yourself. It's easier than you might think.

In the past, refinishing a hardwood floor was a job typically reserved for professionals. And when you consider that the task required heavy-duty sanders that could gouge a floor in a heartbeat and created huge dust clouds and overpowering finish fumes, you could hardly blame a homeowner for hiring a pro.

Fortunately, those obstacles have all been eliminated. In fact, with the user-friendly sanders and finishing products that are available today,

floor refinishing is a job that any DIYer can handle, all for about \$1 a square foot. Surprisingly, it can also be done quickly. The 300-square-foot floor shown here took the homeowners four days to sand and finish.

The primary tool you'll need, the e2V floor sander, can be rented in most areas. It removes the old finish in no time. And with water-based finishing products, the refinishing process goes quickly, too. We'll explain the best ways to sand and finish a floor over the next few pages.



LIGHTER & BRIGHTER

After spending years covered with carpet, this floor's finish was dull, cloudy, and faded. We sanded off the old finish and brightened up the oak flooring with a water-based floor finish.



BEFORE YOU BEGIN ASSESS THE CONDITION OF THE FLOOR

No two floors are alike. So before you do any sanding, take a look at your floor to determine what it needs.

Renewal—The best-case scenario is that your floor only has surface scratches and a slightly faded finish. In this case, you can probably get by with a “renewal” rather than a complete refinishing. This requires scuffing the top-coat of finish with 120-grit sandpaper on a random-orbit sander, cleaning up the dust, and then applying one fresh coat of finish (see page 62 for details).

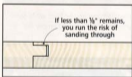
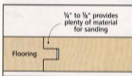
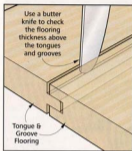
Refinish—If your floor has major scratches, stains, or just an overall dull-looking finish, then a full refinishing is the way to go. This process starts with sanding off the existing finish with a large sander (Sidebar, right) and then applying several coats of a new finish.

Check Thickness—Before doing any sanding, though, check the thickness of the floorboards. This is important: If your floorboards don't have enough material left above the tongues and grooves that join them, they can't be refinished at all. Let me explain.

Each time a floor is sanded, the top surface gets worn away, leaving less material above the tongue and grooves. If you sand through and expose the joints, it eliminates the mechanical connection between the floorboards, which causes the boards to loosen up.

How do you know if there's enough material left? You may be able to remove a furnace register and ex-

amine the ends of the floorboards. If that's not possible, slip a butter knife between the boards as a depth gauge to check the thickness (Illustration, below). In either case, look for at least $\frac{1}{8}$ " of material.



A TALE OF TWO SANDERS

To refinish your own hardwood floor, you'll need two sanders. One you may already have: a handheld random-orbit sander. The other, the ezV floor sander from Varathane, is essentially a large random-orbit sander. It's available for rent for around \$40 a day at many hardware stores and home centers (most notably Lowe's).

The ezV sander has three 6" sanding heads that orbit independently, and around each other. With this dual-orbiting action, it sands effectively without being overly aggressive, and it also allows you to sand in any direction across the floor without gouging the wood.

Another bonus of the ezV sander is it has a built-in vacuum canister that collects dust as you sand. It's not completely dust-free, but it's about as close as you can get from a floor sander.

A random-orbit sander comes in handy for touching up edges and low spots that the ezV can't reach (page 60).



The ezV sander from Varathane features three orbiting heads and a built-in vacuum for effective, dust-free sanding.



ROOM PREP CHECKLIST

- △ Clear the room of all furniture and anything else you want to keep free from sanding dust.
- △ Remove any quarter-round molding (but not the baseboard) around the perimeter of the room.
- △ Pull up any raised nails, or else sink the nail heads fully and fill the holes with wood filler.
- △ Reattach loose boards, and patch any broken ones (learn how to patch flooring at WorkbenchMagazine.com).
- △ Seal all the doorways, furnace vents, and heat registers in the room with plastic or painter's masking tape.
- △ Open several windows for ventilation, and place a fan in one of the windows blowing out.



If you notice dust beginning to gather and swirl around on the floor while sanding with the ezV, that means the built-in vacuum is full. Stop and empty the vacuum bag before you resume sanding.

START BY SANDING IT DOWN

Before a new coat of finish can go on the floor, the old one has to come off. That requires sanding the floor down to bare wood.

I know, that sounds like a tough, dirty job. Fortunately, the ezV sander makes it easier than you might expect, with a lot less mess thanks to its built-in vacuum (*Sidebar, page 59*).

To prepare a floor for a new finish with this sander, you have to make three sanding passes using 36-, 50-, and 80-grit sanding discs. All told, this required about five hours of sanding for this 300-square-foot floor.

Get Ready—The first sanding pass removes the existing finish to expose the bare wood. This requires the ultra-coarse 36-grit sanding discs. To install them, tip the sander back on its handle, so the underside is exposed. Then apply a disc to each of the three sanding pads using the hook-and-loop fasteners.

Start Sanding—Now tip the sander up, turn on the vacuum first, then the sander, and begin sanding slowly across the floor. Thanks to the orbiting heads, you can sand in any direction you want. Just sand back and forth over one area until the finish is stripped off, and then move on to the next (*Fig. 1*).

As you sand, you may notice spots where finish won't come off. These are low spots that would require a lot of extra sanding if you were to use the



SAND THE "FIELD" After installing 36-grit discs on the sander, sand slowly back and forth to remove the finish.



SWITCH DISCS OFTEN To speed up the sanding process, change discs as soon as they clog with the old finish.



SAND THE EDGES Once the "field" is sanded, use a random-orbit sander to sand the edges of the floor.

RAZOR-SHARP SCRAPERS

A steel blade on a paint scraper will dull quickly when removing finish. But a few quick passes with a mill file will have it ready for action again.

To sharpen the blade, hold the scraper on its side, and tilt the file to match the bevel on the cutting edge. Now take four or five strokes, pressing down firmly as you file. Repeat the process until you've worked your way across the edge. When it's sharp, a small burr will form along the edge.



ezV. (You'd have to sand the entire area perfectly flat.) But that's not necessary. Instead, just hit these low spots with a handheld random-orbit sander before moving on.

You'll also notice during this first finish-removal pass that you need to change sanding discs frequently (Fig. 2). This is because the discs clog with finish quickly. Change discs as soon as you notice that they're not removing material as fast. (We changed them every 20 minutes.)

Another thing to pay attention to as you sand is the dust collection. The built-in vacuum makes sanding remarkably dust-free, but the vacuum bag fills quickly, so stop and empty it frequently. It's easy to tell when the bag is full, as dust will begin to swirl around on the floor (Photo, left). Emptying the bag only takes a minute, and then you can resume sanding.

Edges & Corners—The big sander will take care of the main "field" of the floor. But to sand the edges, you'll need to use a random-orbit sander.

Just as with the ezV sander, start with very coarse (40-grit) sanding discs. Work your way along the walls with the sander, applying firm downward pressure. Sometimes, it helps to tip the sander slightly to concentrate pressure near one edge of the pad.

If you plan to install quarter-round molding, you don't need to sand all the way up to the baseboard, but get within

at least $\frac{1}{2}$ " of it (Fig. 3). Here again, plan on going through a number of discs for this first finish-removal pass.

It might be difficult to get into the corners of the room (or into a small space), so this is where a scraper comes in handy. With it, you can remove the finish and scrape the wood smooth (Fig. 4). I use an old-fashioned paint scraper. It removes finish very quickly if properly sharpened (Sidebar, right).

Vac Time—Once you've completed the first pass with the sander and scraper, you need to clean all the dust off the floorboards. Doing so prevents the next round of sanding discs from grinding the abrasive particles from the previous grit into the wood. Just make a pass with a shop vacuum using the wide nozzle attachment to remove any dust (Fig. 5).

Switch Sanding Grits—Next, begin smoothing the floor by using progressively finer grits of discs on both sanders (50-grit, then 80-grit). With each pass, follow the same sequence shown in Figs. 1-5 below. Now that the finish is removed, these two sanding passes shouldn't use up as many discs as the first pass.

Look for Stains—If you had any water stains on the floor before you began sanding, don't be surprised if they're still hanging around afterward (Fig. 6). We'll show you a simple three-step technique for removing them on page 63.



4 SCRAPE THE CORNERS Use a paint scraper to remove finish in the corners and other areas the sander can't reach.



5 VACUUM DUST Once the entire floor is sanded, vacuum the dust using a



6 REMOVE STUBBORN STAINS If any stains remain after sanding, use wood bleach to remove them (see page 63).



TIME FOR THE BIG FINISH

With the sanding complete, you're just about ready to apply a new finish. But first, you have an important choice to make: oil-based or water-based finish?

Oil vs. Water—If you'd like a more traditional look, then oil-based is the way to go. It imparts a warm amber color to the wood. On the other hand, it takes longer to dry, and the strong odor requires leaving the house after each coat.

Water-based floor finish offers a more transparent appearance (*Photos, below left*). It dries quicker than oil-based, and the odor isn't as strong.

A Quick Dust-Up—At this point, your floor should be sanded smooth and vacuumed. But once the finish goes down, any dust still on the floor will be visible in the finish. So it's worth taking an extra step to remove any last bit of dust: cleaning the floor with dry disposable cloths. Swiffer pads work especially well (*Fig. 1*).

Exit Strategy—Before finishing, you'll also need to plan an "exit strategy." Simply put, you want to apply the finish in such a way that you can leave the room when you're done—without getting painted into the proverbial corner.

Apply Finish—To apply the finish, you'll need a paint tray, an applicator pad (a synthetic pad for water-based, and a lamb's wool pad for oil-based), and a long extension handle. Also, keep a foam brush handy for any areas that

Whether you choose a clear water-based finish or an amber oil-based finish (*right*), the tools you'll need for your floor are a paint tray, an applicator pad, and an extension handle (*above*).



WIPE IT DOWN Making a pass with disposable cloths over the entire floor will catch any dust the vacuum missed.



GO WITH THE FLOW To get good coverage, saturate the applicator with finish, and pull it smoothly across the floor.



GET THE EDGES Where the floorboards meet the wall, turn the pad 90° to get finish closer to the baseboard.

the applicator can't reach. Pour the finish into the paint tray, and then dip the pad into the finish.

Now place the pad on one edge of the floor and slide it back and forth in line with the floorboards as if you're mopping the floor. It's easiest to put the finish down with a "push" stroke, and then smooth it out with a "pull" stroke (Fig. 2). Work your way across the floor like this, slightly overlapping each pass to keep a "wet" edge.

Where the floorboards run perpendicular to the edge of the room, turn the pad 90° (Fig. 3). Then smooth out that finish by making strokes with the grain.

Sand It Smooth—After applying a coat, let the finish dry until hard to the touch. (We finished this floor on humid days, so we let each coat dry overnight.) Then sand lightly before applying the next coat to remove dust and even out the finish. To do this, put 240-grit paper on the sander, and move it lightly and quickly across the floor (Fig. 4). Then vacuum and wipe dust before applying the next coat.

You'll want to apply four coats, repeating the steps below for each. As each coat goes on, the floor will gradually develop a more consistent sheen and a smoother appearance. **▶**

—Written by Wyatt Myers, illustrated by Kurt Schultz



SAND LIGHT & QUICK Sanding between coats removes any dust. Use 240-grit discs on a random-orbit sander.

REMOVING STAINS

A water stain is one of the most common problems you'll come across when refinishing a hardwood floor. Quite often, it won't sand out.

In many cases, however, you can bleach the stain out. Common household bleach isn't strong enough, so you'll need a wood bleach like oxalic acid powder.

Oxalic acid powder is available at most hardware and paint stores. Mix about 16 oz. of the powder with 1 gallon of hot water. Then pour a small amount of the solution directly onto the stain, and work it in with a scrub brush (Fig. 1). Leave the solution on overnight, and check the stain again the next morning. You may need to treat it several times to bleach the stain completely.

Once the stain is removed, the next step is to neutralize the oxalic acid. This is important because any residual acid can react with the finish and change its color.

To clean off the oxalic acid, mix 4 oz. of borax (available at hardware stores) with 1 gallon of hot water, and use a sponge to rinse the area where you applied the bleach (Fig. 2).

Once the wood dries, check that the area is clean and completely free of oxalic acid residue. To do that, brush a small amount of finish onto



After scrubbing this water stain with a wood bleach solution and letting it dry overnight, it cleaned right up.

the wood with a foam brush (Fig. 3). If it goes on clear and smooth, you know you're ready to apply finish without having to worry about an adverse reaction from the oxalic acid. If it changes color (typically purple), sand the area down to bare wood, and then test the area again.



1] Mix the wood bleach (oxalic acid powder) with hot water, and scrub it onto the stain.



2] Once the stain is removed, scrub the area with a borax and hot water solution to neutralize the acid.



3] To make sure acid residue won't react with the finish, brush on a thin test coat of finish.



High-Style Deck Stairs

Get more from your outdoor living space with a stairway that unites your deck and yard. We'll show you how ... step-by-step.

Decks and backyards are both great places for outdoor living. Too often, though, they're almost completely disconnected from each other both physically and visually. But with a few tools and basic framing skills, you can build a great-looking stairway to integrate the deck and yard.

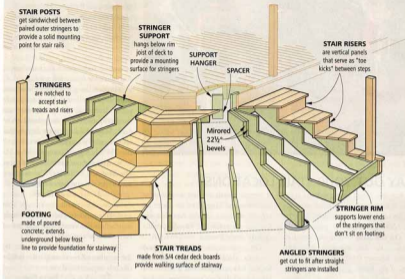
We'll show you how it's done, starting with an understanding of how the components of a stairway go together (*Construction Focus*). Then we'll walk you through custom-sizing the stairs to fit your deck. Whether you opt for a simple straight staircase or the wraparound version shown here, building them isn't as tough as you might think.

When the stairs are done, we'll put the finishing touch on this deck redo with a lattice screen system that hides the underside of the deck.

The stairs and under-deck screen wrap up the dramatic deck makeover that started in the June 2006 issue (*Photo, left*). You can download those project plans FREE for a limited time at WorkbenchMagazine.com.



CONSTRUCTION VIEW



STRINGER SUPPORTS ANCHOR THE STAIRS

Before you can build the stairs, you need a way to attach them to the deck. This is done with 2x8 stringer supports that hang directly under the rim joist (*Stringer Support Installation, right*). Like the stairs, the supports wrap around the angled corner of the deck, a feature we added in Part One of our deck makeover.

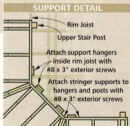
The center stringer support is held in place by a pair of support hangers. Spacers get added to these hangers to bring the center support flush with the doubled-up rim joist. The outer stringer supports also mount to hangers, and to the extra-long stair posts that were built with the railing in Part One.

After installing the hangers, cut the center stringer support to the same length as the angled section of rim joist, beveling each end at 22½°. Then screw it to the spacers on the hangers.



NOTE: Attach all support hangers and stringer supports with four 8 x 3" deck screws at each location

Next, add the outer stringer supports. Bevel one end to match the center support, and then hold each outer support in place and mark its other end. Those ends are cut square, 1½" beyond the upper stair posts. The overhang provides a mounting point for the outermost stair stringers.





After staking out the footing locations, you can bore the post holes. We did this with a walk-behind skid steer and auger attachment from a local tool-rental center.

LAY OUT YOUR STAIR LOCATIONS

Before you begin laying out the stairs, take a minute to get familiar with the terms used for sizing stairs in *Stairs By the Names & Numbers* on page 67.

On the Rise — The first step is to measure the *Total Rise* of the stairs. This is the distance from the ground to the top of the decking in the area where the stairs will be located. Measure

at several points to find a consistent measurement. Then subtract about an inch to account for the fact that the footings the stairs rest on will project slightly above ground.

Once you know the total rise, you can start calculating all the dimensions for the stair stringers. You'll get into a bit of math, but it's pretty simple. Just

be sure to write down the numbers as you work for future reference.

The first thing to determine is how many steps you'll need. More accurately, you'll determine how many *risers* are needed to reach from the ground to the deck. Most building codes dictate that risers should be somewhere between 6" and 7 3/4" tall. A good compromise is 7".

So, to figure out the number of risers, first divide the total rise (37" in our case) by 7 to get the number of risers:

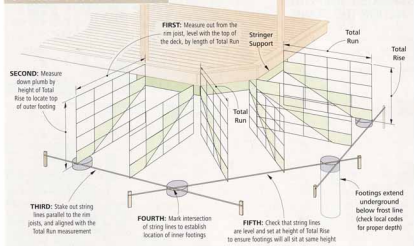
$$37 \div 7 = 5.28 \text{ Risers}$$

Since the result isn't a whole number, round to the nearest whole number to determine the number of risers: Five in our case.

Now just divide the total rise by the number of risers to get the height of each step, or tread rise:

$$37 \div 5 = 7 \frac{1}{2} \text{ Tread Rise}$$

STRINGER & FOOTING LAYOUT



Like most deck stairs, ours are made so the upper step sits below the top of the deck. That means the rim joint serves as the final riser. That gives us a "freebie," so the stringers get one less riser (four, altogether).

With that, we know the first three important facts about our stringers: Each will have four risers that are $7\frac{1}{4}$ " tall. And because the number of treads always equals the number of risers, we have four treads, as well.

An In-Depth Look — Next, it's time to figure out the depth of each stair tread. We made the tread surface from standard $5/4 \times 6$ " cedar deck boards, so it just made sense to base the tread depth on the width of these boards ($5\frac{1}{2}$ " actual width). For our deck, we wanted deep steps, so we used three deck boards for each tread. Leaving $\frac{1}{8}$ " spaces between the planks, we ended up with a total tread depth of $16\frac{1}{4}$ ":

$$5\frac{1}{2}" \times 3 = 16\frac{1}{2}" + \frac{1}{8}" + \frac{1}{8}" = 16\frac{1}{4}" \text{ Tread Depth}$$

Run the Treads — Knowing tread depth, we can easily determine the last two stringer dimensions. Those are the

depth of the notch in the stringer, or *tread run*, and the total depth of the stairs, or *total run*.

To get tread run, just subtract 1" from the tread depth:

$$16\frac{1}{4}" - 1" = 15\frac{1}{4}" \text{ Tread Run}$$

This way, when the treads are installed, they overhang the next riser by 1" (see the *Rise, Run, & Tread Detail*). This overhang, called *nosing*, prevents your heel from catching on the riser as you walk down the stairs.

You'll notice, too, that each tread sits against a $\frac{3}{4}$ "-thick riser at the back. But the tread also overhangs the riser below it, so these measurements cancel out and don't affect the tread run.

The last measurement needed for the stringers is the total run. And calculating it is easy. Just multiply the tread run by the number of treads:

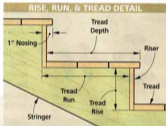
$$15\frac{1}{4}" \times 4 = 63" \text{ Total Run}$$

A Firm Footing — With this final number, you have all the dimensions for building the stringer. But don't start cutting yet. First, you should

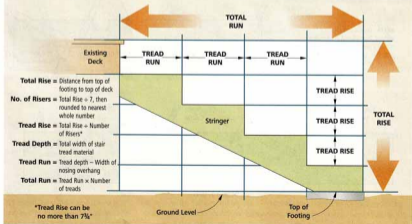
lay out the location of the footings that the two outer stringers, as well as the two near the center, will rest on.

Look at the *Stringer and Footing Layout* on page 66, and you can see that the footings are located out by measuring from the deck by the total run. Also measure down from the top of the decking by the total rise to determine the height of the top of each footing. Then you'll set string lines to mark these locations.

The footings are made by boring holes in the ground (Photo, page 66), inserting cardboard forms, and then filling the forms with concrete. The diameter and depth of the footings are dictated by your local building code and will be specified in the building permit you'll acquire before building the deck stairs.



STAIRS BY THE NAMES & NUMBERS





Lay out notches in the stair stringers quickly and accurately using a framing square outfitted with a pair of clamp-on stair gauges (below).



BUILD THE STAIR STRINGERS

Now you can get started on the stair stringers. They're made from pressure-treated 2x12s and notched to house the treads and risers (*Stringer Layout*, below).

Creating these wraparound stairs requires two kinds of stringers. Most are straight, but the stringers at the corners have to be made differently to accommodate the angles. Making the straight stringers, though, is the place to start.

To lay them out, you just need the measurements you took earlier, a framing square, and a pair of "stair gauges" (*Photo*, left). You'll start with a "test" stringer. It can be made from a 2x12, a 1x12, or even 1/4" handboard. After test-fitting, it becomes your template.

Gauge Your Success — Stringer layout is easy using the stair gauges. Just attach one to the short leg of the square, aligned with the *tread rise* ($7\frac{3}{8}$ "). The other gauge goes on the long leg of the square at the *tread run* ($15\frac{3}{4}$ ").

Now lay the square on a 2x12, and butt the stair gauges against one edge. Mark along the outside edges of the square, and then continue the tread-rise line all the way across the board to lay out the upper end of the stringer (*Upper Tread Layout*). Then slide the square along

the 2x12, and trace each notch until you've laid out four treads and risers.

The last (lowest) needs two modifications. First, this lowest tread run needs to be shortened by $1\frac{1}{2}$ " to accommodate a stringer rim that gets added after the stringers are installed. Second, you need to create the surface the bottom of the stringer will sit on, called the heel (*Lower Tread & Heel*).

The heel runs parallel to the lowest tread, so you can lay it out with the framing square. But before you do, you need to make the lowest rise 1" shorter than the others (so $6\frac{3}{8}$ ", in our case). That way, when you add the treads, this first step up from the ground will be the same height as all the others.

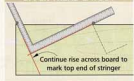
A Two-Step Cutout — Now you can cut the test stringer with a circular saw. For the notches, cut in just until the saw blade reaches the intersection of the layout lines. Then, complete the notches with a hand saw or jig saw.

After cutting this first "test" stringer, clamp it in position on the deck to make sure it fits properly. Once it checks out, simply use the test stringer as a template to lay out all the stringers. Then cut them using the same techniques.

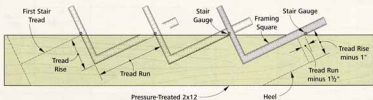
STRINGER LAYOUT

NOTE: Lay out and cut out a "test" stringer. Then place it in position on the deck to make sure it fits properly. After that, lay out all of the remaining straight stringers by simply tracing around the "test" stringer.

UPPER TREAD LAYOUT



LOWER TREAD & HEEL

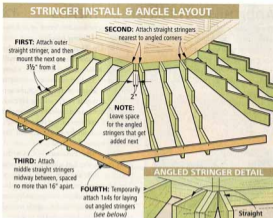


Install Straight Stringers — Now you can install the straight stringers (*Stringer Install & Angle Layout*). Set the outer ones that rest on the footings first, and screw them to the stringer supports. Screw the other stringers in place, and then temporarily shim their bottom ends level with the outer stringers.

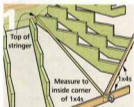
Add a New Angle — Next comes the angled stringers. They attach at the corners of the deck and rest on the two inner footings. Because of their location, these stringers are unique.

First, they're paired face-to-face to create a double-thickness stringer (*Angled Stringer Detail*). That provides adequate surface for attaching the treads. Second, the ends of these stringers, as well as the rise cuts in the notches, must be beveled at $22\frac{1}{2}^\circ$. When paired up, those bevels mirror one another to create a 45° beveled face for attaching the stair risers.

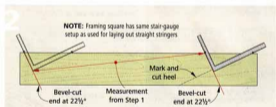
Building these angled stringers might seem complicated, but the sequence in Figs. 1 through 4 below makes it easy. Note that when cutting the notches, you



can use a circular saw to cut the tread runs. But to cut the beveled tread rise, use a jig saw. Cut two stringers with the blade beveled $22\frac{1}{2}^\circ$ in one direction. Then reset the saw to the opposite bevel, and cut the last two stringers.



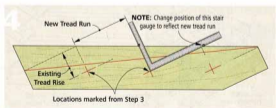
1] Tack 1x4s to the straight stringers, then measure from the stringer attachment point to where the 1x4s intersect.



2] Lay out the upper end of the stringer using your square and stair-gauge setup. Transfer the measurement from Step 1 to this board. Where it intersects the edge, mark the lowest rise. Then cut the stringer to length, beveling the ends at $22\frac{1}{2}^\circ$.



3] Position the stringer, and then use a long level or straightedge to transfer rise and run marks from the straight stringers.



4] Remove the stringer, and lay out the notches using the marks you just made. The tread runs are longer than those on the straight stringers, so you'll need to adjust the position of that stair gauge. Now bevel-cut each rise at $22\frac{1}{2}^\circ$, and cut each run at 90° .

ADD THE POSTS, RISERS, & TREADS

You're almost ready to lay down the cedar risers and treads that complete the stair structure, but two more parts need to be installed beforehand. First is the stringer rim that gets ripped to width and then screwed on to support

the stringers that don't rest on a footing (*Post & Decking Install*).

Post-Up Time — Next come the support posts for the railing. If you built the deck railing in Part One, you know the routine. They're just cedar 4x4s cut to match the length of the posts at the top of the stairway. If you're adding lighting, you will need to machine the groove and filler strip that the wiring runs through. That done, bolt the posts between the outer stringers (*Post Detail*).

About the Fascias — Once the posts are in, you can add a pair of fascia boards to hide the two outer stringers. The fascias are made from 1x12 cedar. Use your original test stringer to lay out the notches in the fascias, cut them, and screw the fascia boards to the stringers.

Risers Come Next — Now you can begin forming the steps by installing the cedar risers. They're ripped to width to match the tread rise.

Make keys for the center section of the stairway first. To do that, measure from point to point at each riser notch. Then cut these risers to length, beveling each end at 22½°.

Now fit the outer risers. First bevel one end at 22½°. Then butt it against the center riser section, and mark the other end flush with the face of the stringer fascia. Cut the riser to length, and screw it in place.

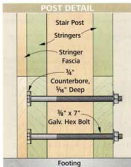
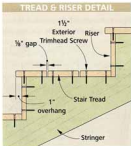
Lay Down the Treads — Next come the stair treads made from 5/4 cedar deck boards. Start once again with the center treads. Measure from end to end along the riser, then cut a piece of decking about 3" extra long.

Lay this piece in place so it overhangs a riser by 1", mark its length, and miter each end at 22½°. Measure and cut the remaining pieces for that tread the same way, and then attach them with 1½" trimhead screws (*Photo, left*).

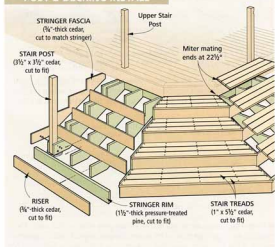
With the center treads in, you can make the outer treads. Miter the inside end of each to fit, and extend the outside end 1" beyond the stringer fascia.



The treads are mitered at 22½° to wrap around the corner and secured with almost-invisible trimhead screws.



POST & DECKING INSTALL



STAIR RAILS COME NEXT

If you built the deck rail system in Part One of our deck makeover, then the stair rails will be familiar (*Stair Rail Construction View*). The rails are cedar 2x4s that span between the posts. Metal balusters fit into keeper strips mounted to the rails. But the stair rails are a little different.

For example, these rails just butt against the posts, rather than fitting into dados, so the ends of the stair rails have to be beveled to fit flush against the posts. Luckily, this bevel angle is the same as the angle of the stringers, so just set up your framing square with the stair gauges at your original tread rise and run points.

Next, lay the square across the edge of the rail, and then mark and cut the upper end. Now hold this rail in place against the upper post, and mark the other end. Then bevel that end of the rail to length. Use this rail to test the fit at the other locations, and then cut the remaining

rails. Finally, screw them to the posts (*Railing & Post Detail*).

Add Keeper Strips — The keeper strips, too, are made just like their counterparts in the deck rail: 1x cedar stock ripped to width, and then routed with a “classical” profile. They get bevel-cut to length, as well.

To make it easier to drill the angled holes in the keeper strips for the balusters, I came up with a simple drill press jig (*Photo, right*). It features a pin in the table that indexes each hole and prevents the keeper strips from slipping while you drill the holes. You can learn how to make the jig on page 88.

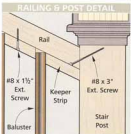
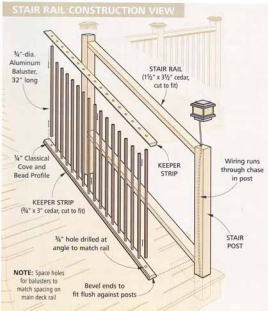
After cutting the keeper strips, slip the balusters in between, and mount the assemblies to the stair rails.



When mounting the stair rails, align the upper ends with the rails on the deck. Then drive screws into the posts to secure the rails.



To drill evenly spaced, angled holes in the keeper strips for the balusters, I used this drill press jig (see page 88).



PUT UP A SCREEN

To finish off the deck, we hid the deck framing underneath with screens (Photo, right). They're made from heavy-duty cedar lattice surrounded by a 2x2 frame (Screen Exploded View). The screens are sized to match the openings in the deck rail, and sit between dividers that line up vertically with the deck rail posts.

Level the Field — Because our yard sloped, we wanted to create a level base for the screens to sit on. We did this with a "ledge wall" made from pressure-treated 2x8s. They're attached to vertical spacers on the deck-support posts, and laid with the lowest ones partially buried into the ground (Installation Detail).

The Frame-Up — With the ledge wall in place, you can cut and install the dividers. They get screwed into the face of the deck support beam, and toe-nailed into the top edge of the ledge wall.

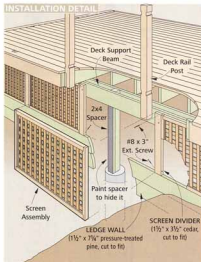
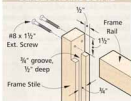
Now you can measure and cut the screen frames. Choose long, straight 2x2 stock, or rip your own from wider material. Then use a table-mounted router or a table saw to cut a centered groove that the lattice panel will fit into (Screen Frame Detail).



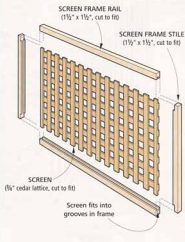
Next, cut the frame rails and stiles to length, and then rabbet the ends of each rail to mate with the stiles. Cut a panel to fit from heavy-duty lattice, and then assemble each frame. Slip them in place under the deck, and secure them to the deck support beam and to the ledge wall.

—Written by David Stone, project design by Kent Welsh, illustrations by Erich Loge

SCREEN FRAME DETAIL



SCREEN EXPLODED VIEW



ESSENTIAL GUIDE TO THE ROUTER TABLE

Open up a new world of woodworking possibilities by learning how to set up and use a table-mounted router.

The router undeniably ranks as one of the most versatile woodworking tools. But a router becomes even more capable when it's turned upside down and mounted in a router table.

Table-mounting gives you a level of control over the router you just can't get when using it handheld. Think of it like ripping a board with

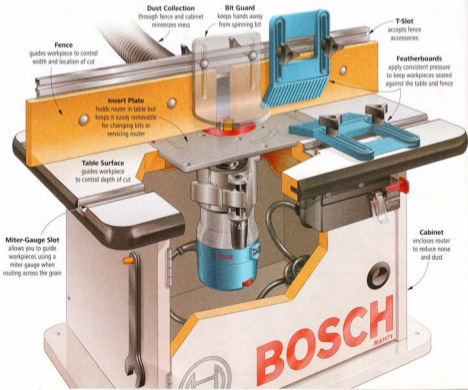
a handheld circular saw versus ripping it on a table saw. Rather than having to secure the workpiece somehow and then move the cutter over it, you secure the tool and then move the workpiece over the cutter. This lets you guide the workpiece with confidence and means you don't have to fight the weight, torque, and vibration of the tool.

A router table also offers large surfaces, namely the table and fence, that support and guide your workpiece. Plus, the table and fence accept accessories like a miter gauge, guards, featherboards, and others that make routing safer and easier.

TABLE ANATOMY

To use a router table successfully, you need to get familiar with its components and their functions. The illustration below provides an overview:

Table — The table is, of course, the key component in a router table. It provides a flat, smooth surface for your workpiece to ride on. Obviously, the large surface simplifies routing large pieces, but it offers better control when working with small stock, too.



Tables are made from many materials, but one of the most common is melamine-coated MDF. It's dense, stable, and stays flat.

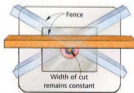
Insert Plate — On most router tables, the router mounts to a removable plate that fits into an opening in the table. This setup lets you easily remove the router for changing bits, servicing the router, or even using it handheld.

Miter-Gauge Slot — Most tables also have a slot that accepts a miter gauge. That means you can support workpieces when routing across the grain. On some tables, the miter slot is paired with a T-slot for mounting accessories.

Fence — The next critical component is the fence. Its mission is simple: to hold your workpiece in a constant position relative to the bit as you rout. That makes the router-table fence a lot like a table saw rip fence, but the router-table fence is more complex.

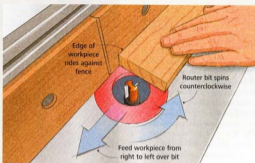
When routing along the edge of a workpiece, you only expose a portion of the bit. The rest tucks into an opening in the fence face. On most fences, the faces slide, so you can make the opening around the bit as small as possible to help prevent tearout.

To adjust the position of a router-table fence, you slide it backward or forward and then lock it down. And because the router bit is essentially a single point, it doesn't matter during most routing operations whether the fence is parallel to the edge of the table or whether it sits at an angle (*Illustration, below*).



ALL THE ANGLES. The fence can sit at any angle on the table without affecting how far the bit protrudes from the face.

FIVE RULES FOR TABLE ROUTING



FEED STOCK FROM RIGHT TO LEFT. Looking down on the router bit, it spins counterclockwise, so pushing the workpiece from right to left moves it against the rotation of the bit and forces the workpiece against the fence.

1] Always feed from right to left.

A workpiece should always be moved against the rotation of the bit. When routing handheld, that means you move the router from left to right. Flip the router upside down in a router table, though, and you need to reverse the feed direction: Feed from right to left (*illustration, above*). This prevents the bit from grabbing and throwing the workpiece.

2] Use a guide. When routing, you always have to use something to guide the workpiece. On a router table, use the fence or a pilot bearing on the bit to guide the workpiece.

3] Don't stress the router or bit. On a router table, it's easy to force the router to bite off more than it can chew by feeding too fast, taking an oversize cut, or pushing too hard. This puts a tremendous side load on the bit that can tear up a workpiece, stress the router bearings, or even break a bit. So make sure to take light cuts.

4] Get a grip on small pieces. When working with pieces that are narrow or less than about 6" long, the torque



SECURE SMALL PIECES. When routing a small piece, use a strong clamp to hold the workpiece securely.

of the spinning bit can yank the workpiece out of your hands and throw it, or draw your hands into the bit. So always use a small-piece handler, a clamp, a push block, or a miter gauge to hold the piece (*Photo, above*).

5] Use featherboards when routing with the fence. Featherboards apply steady pressure to keep a workpiece tight against the table or fence. This helps ensure accuracy by maintaining a consistent depth and width of cut, and it prevents you from having to get your hands close to the spinning bit.

FENCE-GUIDED ROUTING

You can perform a lot of different operations on a router table, but they all boil down to the same simple goal: Making a cut of a specified depth and width in a workpiece. To do that, you need to guide the workpiece against the router table's control surfaces. The first of those is the table itself. This is "ground zero," so the height of the bit above the table determines the depth of cut.

The second control surface determines the width of cut. In most cases, this is the fence. Use it any time a workpiece has a straight edge that can ride along the fence face. Sometimes, however, like when you're routing irregular-shaped pieces, a guide bearing on the bit plays a role in width of cut (see the Box, below). This is true whether you are routing the edge, end, or face of a workpiece.

ROUTING EDGES

One of the most common uses of a router table is shaping the edge of a workpiece. This may be to add a decorative profile,



ON THE EDGE. By changing the position of the router-table fence, you control how much of the bit is exposed and, in turn, how wide of a cut the bit makes.

such as an ogee or chamfer, or it may be for creating rabbets, tongues, or other kinds of joinery.

To machine an edge, you position the fence so that only a portion of the bit is exposed in front of the fence face (Photo, above). As you rout, your hand pressure keeps the workpiece against the table, while the bit's rotation pulls the workpiece tightly against the fence. To get the most consistent cutting results possible, position featherboards on the infeed (right) side of the bit. These help maintain steady pressure on the workpiece.

When routing edges, you should only rout the edge that rides against the fence. In other words, don't move the fence back and trap the workpiece between the fence and bit. Routing that way is almost guaranteed to result in a "kickback," where the bit grabs and throws the workpiece.

The fence, by the way, can still be useful when using bearing-guided bits, particularly when routing

long pieces (Photo, below). In these cases, you position the fence so the guide bearing is flush with the fence face or sits just slightly proud of the face (Illustration, below). The bearing controls the width of cut, while the fence provides support as you feed the workpiece.



Piloted Bits. The fence can enhance control with piloted bits. Set the fence so the bearing just clears the face (below).



TWO TYPES OF BITS

Some bits have an auto-pilot. Some router bits have "pilot" bearings (left) that limit their width of cut. Bits without bearings (right) require a control surface (usually the fence) to limit cutting width.

PILOTED BIT
Bearing limits width of cut



NON-PILOTED BIT
Requires fence to limit width of cut





NARROW PIECES NEED SUPPORT.

To rout the end of a narrow workpiece, you can use a miter gauge that rides in a slot in the table (above) or a push block that rides against the fence (inset).

ROUTING ENDS

Using the fence also allows you to rout the ends of a workpiece. This is especially useful for joinery, such as cutting tenons on the ends of door rails.

Routing the end of a wide workpiece is no different than routing the edge: pass it over the bit with the end riding against the fence. But if a piece is narrower than about 3", it doesn't have a large enough bearing surface against the fence to resist the force of the spinning bit. So narrow pieces have to be handled differently to prevent the bit from grabbing the workpiece and pulling it out of your hand.

The solution for successfully routing the end of a narrow piece is to place support behind the long edge. That's done with a miter gauge or push block.

Miter Gauge — Many tables come equipped with slots that will accept a miter gauge. With this setup, you can support the edge of the workpiece as you rout it with the end butted against the fence (Photo, above).

One thing to be aware of when routing with a miter gauge, though, is that the end of the workpiece will

always move in a straight line parallel to the miter-gauge slot as you push it. So if the fence isn't perfectly parallel to the miter-gauge slot, you'll get an inconsistent width of cut.

On the positive side, a miter gauge can be rotated, which allows you to rout the ends of mitered workpieces.

Push Block — If you want to avoid the hassle of setting the fence parallel with the miter-gauge slot, you can use a push block when routing narrow pieces (Inset Photo, above) instead of a



ROUTING THE FACE. By positioning the fence away from the bit, you can rout the face of a workpiece (Photo, left). If you need to widen the cut, move the fence farther away from the bit before making a second pass (Illustration, right).

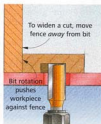
miter gauge. It's just a square block that serves the same role as the miter gauge: supporting the edge of the workpiece while you rout the end. The difference is that the block rides against the fence, instead of following the miter-gauge slot. That means you'll always get a consistent width of cut without having to set the fence parallel to anything. The push block offers one more advantage, too. It backs up the workpiece to prevent tearout as you rout.

ROUTING THE FACE

When routing the face of a workpiece, the role of the router-table fence changes slightly. That's because when routing on a face, the diameter of the bit itself establishes width of cut. The fence itself establishes the location of the cut (Photo, below).

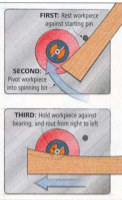
Another important thing to know is that you'll have to feed the piece over the bit more slowly than you would when routing an edge. This is necessary because the bit is taking a larger bite, and there's very little room for chips to escape as you cut.

If you want to widen a cut you've routed in the face of a workpiece, it might seem logical to move the fence closer to the bit for the next pass. But that traps the workpiece between the bit and fence. The proper method is to move the fence farther away from the bit (Illustration, below).





GOING FENCE-FREE. With bearing-guided bits, the bearing controls width of cut, not the fence. That lets you rout curved and odd-shaped pieces that can't ride against the flat face of a fence. A starting pin in the table helps you start cuts safely.



BEARING-GUIDED ROUTING

Though the router-table fence is incredibly useful, there are times when it can get in the way. For instance, if the edge of a piece is curved or has an irregular shape, it can't ride against the flat face of the fence. That means you can't use the fence to limit the width of cut.

You can rout these pieces on a table, though, using bearing-guided bits. As discussed on page 76, the bearing on this type of bit acts like a "fence" to limit how wide of a cut the bit can make. So all you have to do is run the workpiece along the guide bearing.

The bearing can either ride on the edge of the workpiece, or on a pattern attached to the workpiece. We'll talk more about that in a moment, but a safety note is important first.

Get Off to a Good Start — When routing with the fence, you have a solid surface to hold the workpiece against as you start the cut. Without a fence, though, all you have is the bearing on the bit. And if you just push the workpiece against the bearing, the spinning bit can grab it with enough force to cause the workpiece to kick back.

To make routing without the fence safe, most tables have a starting pin that you can insert into the router plate

(*Photo and Illustrations, above*). To use the pin, just set the edge of the workpiece against the pin, and then pivot the leading end into the spinning bit. Then rout as normal, guiding the workpiece against the bearing on the bit.

TEMPLATE ROUTING

One very useful variation on bearing-guided routing is shaping a piece to match the contour of a template (*Photo, below left*). With this technique, you can rout almost any shape easily.



USING A TEMPLATE. The bearing on a flush-trim bit rides against a template to rout a workpiece to the exact same shape.

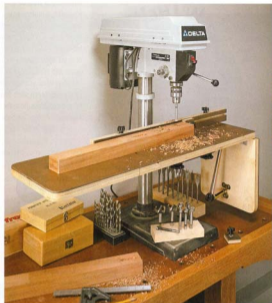
The process is simple. First, you cut a template from 1/4" hardboard to match the final shape you want for the workpiece. Then, trace the outline of the template onto a workpiece. Next, cut the piece to rough shape with a jig saw or band saw, staying about 1/8" outside the layout line.

Now adhere the template to the rough-cut piece with double-sided tape. That done, mount a flush-trim bit in your router table, and adjust the bit height so the bearing rides on the template. Now all you have to do is rout the waste to trim the piece to final shape (*Photo, below*). **■**

—Written by David Stone, illustrated by John Hartman



TOP VIEW. The workpiece is cut to rough shape before routing, so the bit only has to trim off a small amount of waste.



Even with the leaves folded down, this drill-press table offers two square feet of worksurface.

SPACE-SAVING DROP-LEAF

Drill Press Table

Add a large table, an adjustable fence, and a pair of stop blocks to your drill press without sacrificing shop space.

Nothing improves a drill press as much as a good table and fence. And few are much better than this setup inspired by Art Outlaw of Evansville, Indiana. It has a large main table and a sturdy fence with adjustable stops that make accurate setups a snap. Plus, it offers support for long workpieces with a pair of extensions that flip up like table leaves.

The table consists of three main parts: a center table that mounts to the metal table on the drill press, and the

two leaves (*Construction View*). T-slots in the center table let you quickly adjust the fence and lock it in place. There's even a replaceable insert under the bit.

When sizing the main table, you need to make it at least 10" wider than the metal table on your drill press. This allows room for mounting the spring-loaded drop-leaf supports, as well as the hinges, that control the leaves. As for depth, the main table overhangs the metal drill-press table about 1" in front, and a couple inches at the back.

The Layered Look — To create a sturdy worksurface, the main table and the leaves are built up from three layers of

material: two layers of 1/2" plywood and a third of 3/4" hardboard. This construction also makes it easy to form the T-slots in the table, as you'll see in a minute.

But first, you need to cut the pieces that make up these layers. To ensure that all the layers will be the exact same size, it's best to start by cutting just the *bottom layer* of the main table and each leaf to exact size and shape.

After shaping those, cut another main table and two leaves, but make each about 1/4" oversize. Glue and clamp these to the bottom layers, so there's an overhang all the way around. That done, use a router equipped with a flush-trim bit to trim the overhanging layer flush.

T-Slots: Part 1 — Now you can form the first part of the T-slots in the main table. To do this, cut a pair of shallow dadoes in the table surface (*Fig. 1*). You'll complete the slots after gluing on the hardboard top layer. But before you can do that, you'll need a way to mount the main table to your drill press.

Mounting Hardware — The main table simply bolts to the metal drill press table and gets secured with large knobs. But the mounting bolts need to be installed now, before the hardboard top layer goes on (*Mounting Detail*). That way, there are no holes in the worksurface of the table, and the mounting bolts are captured.

Top It Off — After slipping the mounting bolts into their holes in the plywood, you can add the $\frac{1}{4}$ " hardboard table surface. There are three parts: the removable insert and two table tops that flank it. They're also made oversize, like the second plywood layer.

Start by cutting the insert 4" wide and 12 $\frac{1}{2}$ " long, with both edges beveled at 45°. Clamp it so it sits centered on the width of the plywood substrate, with the extra length overhanging the front and back edges.

Next, cut two 11" x 13" table tops, and bevel one of the long edges of each. Butt these pieces against the insert, and glue them to the plywood substrate. Once they're clamped, slide out the replaceable insert and make sure there's no glue squeeze-out in its path. After the glue dries, trim the hardboard flush with the substrate. While you're at it, glue trim the hardboard tops to the leaves.

T-Slots: Part 2 — Now you can complete the T-slots for the fence-mounting bolts. Set up a dado blade end again, and set the depth of cut at $\frac{3}{8}$ ". Place the main table top down

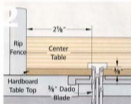
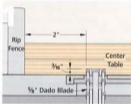
on the saw, and position the rip fence to align the blade with the dado cut earlier in the substrate (Fig. 2). Cut this slot, and then flip the table end-for-end to complete the other T-slot.

Next, test-fit the table on the drill press. Then lay out and cut a clearance notch for the crank that adjusts the height of the metal drill press table.

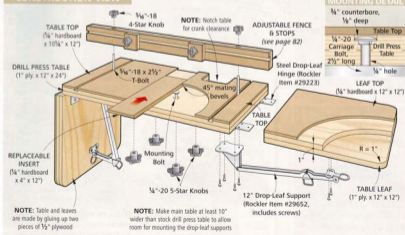
Make It Folding — Now mount the wings by installing the drop-leaf hinges. Note that you need to leave a $\frac{1}{32}$ " gap between the main table and each leaf. Then mount the drop-leaf supports. The manufacturer's instructions specify how to position and adjust them so the leaves will sit flat with the main table.



Mating bevels keep this replaceable insert securely on the drill press table.



CONSTRUCTION VIEW





Adding a fence and stop blocks enhances the precision and accuracy of the drill press table.

ADD AN ADJUSTABLE

Fence & Stops

Like the drill press table, this fence is a three-layer lamination of plywood and hardboard. The fence also has a T-slot that's formed just like those on the table. This slot runs lengthwise to hold a pair of adjustable stops. Mounting bolts pass through vertical slots in the fence to attach it to the table.

Begin with a Blank — To make the fence, start by cutting a piece of $\frac{1}{2}$ " plywood to 5" x 28". Begin forming the vertical channels for the fence-mounting bolts by cutting a dado across the blank as shown in Figure 1. Then flip the piece end-for-end, and cut another dado to match.

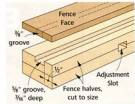
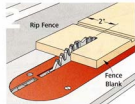
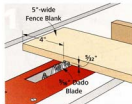
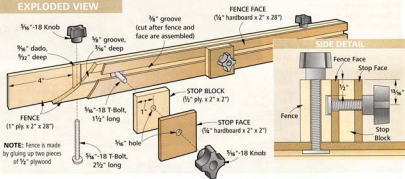
Next, install a standard blade and rip this blank into 2"-wide strips (Fig. 2).

That done, glue the two fence layers together to form the slot (Fig. 3).

Get on Track — After the glue dries, you can form the T-slot in the fence, and install the hardboard. This is done using the exact same techniques used for making the slots in the table: Cut a long, shallow groove with a dado blade, glue on the hardboard face, and then cut through to complete the slot.

Add a Pair of Stops — All that remains now are the fence stops. They're made from a single layer of $\frac{1}{2}$ " plywood with a hardboard face. A single hole drilled through each one accepts a T-bolt. This bolt is used along with a knob to secure the stop to the fence.

EXPLODED VIEW



GET MORE FROM YOUR ROUTER

5 All-New Router Bits

Whether you want to rout perfect dados, flawless profiles, crisp, smooth edges, or even make slot-wall storage panels for your shop or garage, these new bits will make your router more versatile than ever.

Dado Cleanout Bits

A dado blade mounted in a table saw makes quick work of cutting dados. But sometimes it leaves a jagged surface on the bottom of the dado (*Inset Photo*).

This makes for a poor-fitting joint. But a quick pass with this dado cleanout bit creates a smooth, flat-bottom dado (*Main Photo*).

The dado cleanout bit has cutting edges on both the sides and bottom, plus a bearing on the shank that rides along the shoulder of the dado, so it smooths a dado

without changing its dimension. I like to use a slightly undersize bit, and clean up the dado by making one pass against each shoulder.

DADO CLEANOUT BIT

Virtues Creates smooth, flat-bottom dados for cleaner-fitting joints.

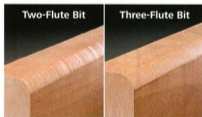
Vices Adds a step to making a dado.

Verdict The results are worth the extra step required.

www.Woodline.com
800-472-6950



A dado blade can leave dados with a jagged, uneven bottom (*right*). But a quick pass with this dado cleanout bit will make it smooth and flat.



While two-flute bits can leave cutter marks and "waves" on edge profiles (*left*), these three-flute bits produce consistently smooth cuts (*right*).



TripleWing Bits

In the last few years, you've probably noticed how razors have gone from three blades, to four, and now to five. Well, now it seems that router bits

are following suit: These new TripleWing bits from MLCS have three cutting edges and a claim of "smoother cuts and longer life."

When I compared these bits head-to-head with two-flute bits, the improvement was noticeable. For example, a two-flute roundover bit produced an uneven profile, while the three-flute bit left a smooth surface (*left*). And since the bits have three cutters, rather than two, sharing the wear, their claim of longer cutting life seems valid.

TRIPLEWING BITS

Virtues Three cutting flutes create smooth cuts and longer life.

Vices Caused some minor burning on end grain in cherry.

Verdict Priced the same as two-flute bits, they're worth a try.

www.MLCSWoodworking.com
800-533-9298

Slot-Wall Bit

One hot trend in shop storage is "slot-wall" paneling. Common in commercial garage storage systems, these are just panels with large T-slots running the length of them. But the panels often cost \$60 or more for a 4-ft. square section.

Now there's a bit that lets you cut the T-slots using a router and a straightedge (Photo, right). The hooks and shelves from the other systems fit into the T-slots, letting you create your own shop storage system.

The slot-wall bit takes a big "bite," so rout slowly and move the router backward a few inches from time to time to clear waste.

SLOT-WALL BIT

Virtues Lets you create your own inexpensive shop storage.

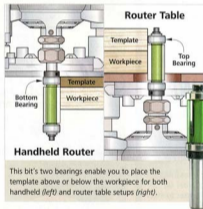
Vices Large bit requires slow passes to cut clean slots.

Verdict A nifty way to make versatile shop storage.

www.LeeValley.com
800-871-8158



To make your own slot-wall panels for garage storage, equip your router with this slot-wall bit, and use a straightedge to guide the router.



Flush-Trim/Template Bit

By adding an extra bearing to a standard flush-trim bit, Lee Valley's new flush-trim/template bit creates several new routing possibilities.

TEMPLATE BIT

Virtues Allows versatility for flush-trimming and template routing.

Vices Lacks the plunge ability of some flush-trim bits.

Verdict A must for anyone who does a lot of template work.

www.LeeValley.com
800-871-8158

Most flush-trim bits have one bearing above the cutting flutes, but this bit has a second bearing on the shank. This allows you to rout with a template attached to either the top or bottom of the workpiece. And this applies whether you're using a handheld router or a table-mounted router (see Illustrations, left). Either way, simply adjust the cutting height of the bit so one of the bearings rides against the template, and you're ready to go.

Piloted Bits

Bits with metal pilots were around long before bearing-guided bits, but you don't see many anymore. That's because the spinning pilot would burn the wood. MLCS revamped the idea with a brass pilot that runs cooler. This small pilot lets you rout into tight spaces and inside corners (Photo).

BRASS-PILOT BITS

Virtues Small pilot lets you rout into tight spaces; inexpensive.

Vices Pilot tends to burn wood if left in one place too long.

Verdict A specialty bit, but priced around \$20, they're worth a look.

www.MLCSWoodworking.com
800-533-9298



The small pilot on this roundover bit sneaks right into the corner of a frame to create a smoother transition. The brass used on the pilot runs cooler to prevent the wood from burning.

DRILL PRESS JIG ENSURES

Aligned Holes

This indexable drill press jig lets you drill angled holes accurately without the workpiece slipping.

To make the keeper strips for the deck stair rails (page 64), you'll need to drill a series of angled holes to hold balusters. This poses a few challenges. First, the holes must align precisely between the top and bottom strips. Second, they have to be spaced evenly. Finally, you'll need a way to prevent the strips from sliding while drilling.

To make sure the holes align, I taped the strips together face to face. Then, to solve the other issues, I built this jig that clamps to the drill press table.

The jig is just a plywood base and a fence that are screwed together. A dowel in the base serves as an index

pin that spaces the holes the correct distance apart. Plus, it holds the workpiece steady as you drill.

To set up the jig, first set the angle of the drill press table. Use a setup block that's mitered at the same angle as the stair rails (Fig. 1).

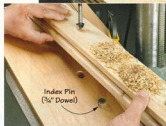
Now you can focus on the index pin. The pin fits into a hole in the base and

sticks up a bit above it. As you drill each hole in the strips, you fit that just-drilled hole over the pin. This automatically positions the strip to drill the next hole.

To make this work, start by laying out the first hole location in the strips. Clamp both the jig and the strips to the drill press table, and drill through the keeper strips and into the base (Fig. 2).

Next, remove the strips, and insert the index pin into the hole you just drilled in the base. Place the hole in the keeper strips over it, and reposition the jig to drill the second hole (Fig. 3).

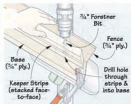
At that point, you're set up to drill the rest of your holes. Simply place each just-drilled hole over the pin, and drill the next hole in the line (Photo, above).



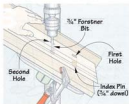
This drilling jig ensures accurate, evenly spaced holes thanks to its built-in index pin. The pin also prevents the angled strips from sliding as you drill.



1] Hold an angled setup block against a long twist bit to set the angle of the drill press table.



2] With the jig and strips clamped in place, drill through the strips and into the jig. This creates the hole for the index pin.



3] Insert the index pin in the jig, slip the hole in the strips over it, and reposition the jig to drill the second hole.

UPGRADE YOUR FRAMING SQUARE WITH

Stair Gauges

Stair gauges (the little brass clips attached to the framing square in the *Photo* at right) are essential for laying out stair stringers. But the usefulness of these gauges extends beyond that, however.

Try Square—The stair gauges have a lip that hangs under the edge of the square. So they can butt against the

edge of a piece to be used like a try square (*right*).

Marking Gauge—With a third stair gauge in this setup, you have a place to rest a pencil for marking a line (*below left*).

Angle Transfer—Finally, adjust the gauges on the two legs to mark an angled line across a piece (*below right*).



Mount both stair gauges to one leg of a framing square to create a super-size try square for marking wide panels.



Add a third stair gauge to the framing square, and you have a handy marking gauge for scribing a straight line on the face of a wide workpiece. Just hold the pencil, and slide the square.



By attaching the gauges to both legs of the square and then placing the square so the legs extend out over a workpiece, you can mark an angled line across the piece.

FANCY MOLDING FROM

Built-up Stock

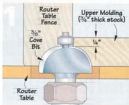
The upper trim for the “traditional” window treatment (*page 40*) looks complicated, but it’s easy to make by routing a profile on two pieces and then stacking the pieces together. By making the lower piece narrower and shorter than

the upper piece, you can create the attractive “reveal” between the pieces that’s seen in the *Photo* at right.

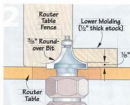
To make the molding, just cut the two pieces to size, and rout the ends and edges as shown in the *Illustrations* below.



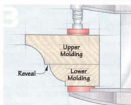
This seemingly elaborate molding is just two pieces, each with a routed profile, stacked one on top of the other.



1] Rout the ends and edges of the upper molding with a $\frac{3}{8}$ " cove bit on the router table.



2] Switch to a $\frac{3}{8}$ " roundover bit, and then rout the ends and edges of the lower molding.



3] After routing both pieces, glue and clamp them face-to-face to create the finished molding.

QUICK & EASY

Template Routing

The chest handles on our router job box (page 50) fit into large, shallow recesses in the case sides. An easy way to make these recesses is to use a plunge router with a special dado cleanout bit and a plywood template.

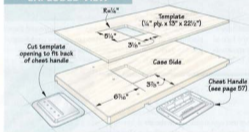
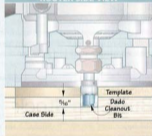
The template is a piece of $\frac{1}{4}$ " plywood with an opening the same size as the desired recess. The bit has cutters on the end to create a smooth, flat bottom and a bearing that rides against the edges of the opening to cut the recess to that exact size.

To make the template, cut it to match the case side. Then measure the recessed portion of the handle, and lay it out, centered on the width of the template. Drill the corners of the opening with a $\frac{1}{4}$ " drill bit, use a jig saw to cut between the corners, and sand the edges smooth.

Finally, to cut the recess, clamp the template in place, equip the router with the bit, and plunge it into the opening. Rout the perimeter clockwise, and then waste out the rest of the material.



This template, along with a dado cleanout bit, makes it easy to rout a large, shallow recess that's the perfect size for the chest handles.

EXPLODED VIEW

ROUTER SIDE VIEW


Handsaw Crosscut Guide

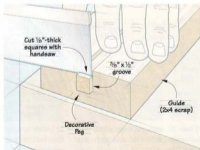
On the Craftsman-style window trim (page 42), we applied small decorative pegs near the top corners.

I cut each peg from a long wood strip. But doing this on a table saw or miter saw would be overkill, so I used a small guide and a handsaw to make the cut.

The guide is just a 2x4 block with a groove that holds the workpiece in place

while you make the cut. To use it, slide the workpiece, so it extends past the end of the guide the desired amount ($\frac{1}{4}$ ", in this case).

To get a square cut, hold the saw so the side of the blade is against the end of the guide. Drag the saw teeth across the workpiece to define the cutline. Now complete the cut, keeping the blade against the guide.



THREE EASY STEPS TO CLAMPING

Mitered Frames

The contemporary window trim option in this issue (page 38) features a frame joined with mitered corners that get glued together.

Now, gluing up the mitered corners of a frame can be tricky, especially if you're working alone. It's difficult to keep the miter joints aligned while trying to tighten the clamps.

To make it easier, I use two pairs of pipe clamps and a three-step process.

Start with Two — Begin by clamping two opposite sides of the frame (see Fig. 1 below). Light pressure is all that's needed here. You don't want to damage the fragile tips of the miters. In fact, it's a good idea to attach rubber pads to the jaws of the clamps to prevent any damage.

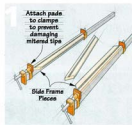
To get ready for the next step, set the clamps so they're the same distance apart as the length of the two unclamped pieces. Use one

of those two pieces to check the spacing. Don't worry here about being too exact, though. You can reposition the assembly later if you need to.

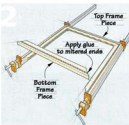
Add the Rest — The second step of the process is to apply glue to the mitered ends of the remaining two pieces and slip them into place to complete the frame. They

should fit right into position between the two pieces that are already clamped (Fig. 2).

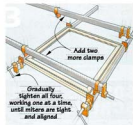
Add Clamps — To finish up, position two more clamps across the frame (Fig. 3). Tighten the clamps, gradually adjusting one at a time, until all four miter joints are perfectly aligned and drawn tightly together.



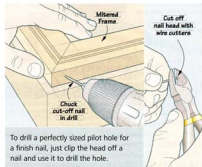
1] Place the two side frame pieces into bar clamps, and apply light clamping pressure to the tips of the miters.



2] Apply glue to the ends of the top and bottom frame pieces, and slip them in place, making sure the faces are flush.



3] Position two more clamps over the frame, and slowly tighten all four clamps to draw the miters into alignment.



To drill a perfectly sized pilot hole for a finish nail, just clip the head off a nail and use it to drill the hole.

Drill a Perfect Pilot Hole

The mitered joints on the contemporary-style window frame shown above may look great, but they don't offer a lot of holding power. To add some strength, it's a good idea to drive a nail into each joint.

The trick is driving the nails into the edges of these frames without splitting the wood. Ordinarily, I would search through my drill bits to find one that's just the

right size. But then I realized I had the perfect "bit" right in my hand: the nail itself.

To use a nail to drill a pilot hole, first clip off the head with a pair of wire cutters (*best*), and chuck it into a drill with the tip facing out. Then drill each pilot hole in the frame, using the nail just as you would a standard drill bit (see *Illustration, left*).



A telescoping fence, adjustable scale, and a flip-stop allow for accurate, repeatable cuts on workpieces up to 36" long.

JESSEM MITE-R-EXCEL PROVIDES

Indexed Accuracy

A unique dual-pin system makes setting up at any angle highly accurate and infinitely repeatable. And 36" of crosscutting capacity accommodates long workpieces easily.

Because so much is made of having a high-quality rip fence on your table saw, it's easy to overlook the need for an equally accurate and versatile miter gauge. Fortunately, there's no shortage of aftermarket gauges that have the accuracy, repeatability, and ease of setup you need to get the absolute most from your saw.

One such gauge is the latest offering from JessEm. The Mite-R-Excel boasts the same heavy-gauge aluminum and brass components, manufactured to exacting tolerances, that have earned JessEm a reputation for accessories that perform and look as good as anything on the market.

It took just a few minutes to assemble our evaluation unit and fit it to the miter slots in our table by tuning the adjustable miter bar. We checked the miter gauge to see if it was square to the blade and to the table, and it was dead-on. (Though it's worth noting that this

gauge is easily adjustable should your experience be different than ours.)

After a few more minutes with our nose in the user's manual, we got the hang of what JessEm calls their Dual Indexing Angle Location System. The system consists of a primary pin that lets you adjust the miter gauge in 5° increments and a secondary pin for making half-degree adjustments between the 5° detents (*Photos, below*). Once you familiarize yourself with the pin position combinations, it's a

remarkably fast and accurate way to set the gauge at any angle. Best of all, this system allows you to repeat the setup precisely without having to squint at the lines on the angle scale.

Additionally, the miter gauge features a telescoping fence with a flip-stop and a sliding scale that you can zero out quickly and accurately as your setup changes (*Photo, above*).

The Mite-R-Excel sells for about \$230. For more information, visit JessEm.com or call 866-272-7492.



1] A large primary pin locks the miter gauge at 5° increments between 0° and 45° in both directions.



2] Use the smaller secondary pin to make half-degree adjustments between the 5° detents.

CABINETMAKING

1870s Style

Learn how one craftsman keeps the tools, techniques, and traditions of a bygone era alive through his furniture.

Robby Pedersen's business is definitely not your ordinary cabinet shop. The first clue lies in the shop's name: RVP-1875. The rest is revealed as soon as you step through the front door of this quiet building on the town square in Story City, Iowa.

Once inside, your gaze turns to the dozens of tables, desks, beds, and chests on display. They look antique, but are newly built examples of Robby's signature 1870s-style furniture.


At the back of the showroom sits the shop. Instead of power tools, it's equipped with a few sturdy workbenches along with more than 100 planes and old hand tools.

You see, RVP-1875 is an authentic 1870s cabinet shop transplanted into the modern world. And Robby (below left) is both a craftsman and a historian, dedicated to preserving the skills of the craftsmen of the era, as well as the utilitarian furnishings they built for Midwestern settlers.



To do that, Robby cuts, mills, and dries his own lumber. Then he hand-planes those boards to thickness and crosscuts and rips them to size using handaws (above right). Wide panels are assembled with tongue and groove joints. And dovetails, rather than glue or nails, lock carcass sides together.

Even Robby's stains are homemade. They start as a concentrated dye made by boiling walnuts. Mixing the dye with water determines the final shade of the stain. Adding berries gives the stain red tones, while onion peels make yellows. Topcoats are made from linseed oil and beeswax custom-blended to suit the piece.

Thankfully, Robby does have one modern tool: a computer to manage RVP1875.com, where you can learn more about his furniture and the woodworking classes he offers. 



A low bench positions boards at the right height for ripping. Thick stock and dovetail joints make the bench sturdy, while wide feet and a shelf loaded with bricks keep it stable.

Fashioned after a bin used to store flour or other dry goods, this piece shows the dovetail joints, natural stain, and authentic hardware that are hallmarks of Robby's work.



Photos courtesy of RVP-1875

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Edge-Routing Guide

3 Common Bits, 17 Custom Moldings

Bit Basics

1/4" Roundover
(43402PC, 2880120)

1/2" Roundover
(43459PC, 2885121)

1/2" Core Box
(43149PC, 2907513)

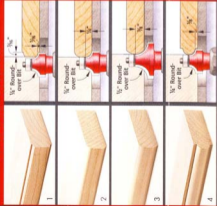
These three router bits make it easy to create 17 custom moldings. Just rout a profile on the edge of a 3/4"-thick workpiece by making one, two, or three passes on the router table.

Note: Router-Cable part numbers for bits shown at left.

Two-Pass Method

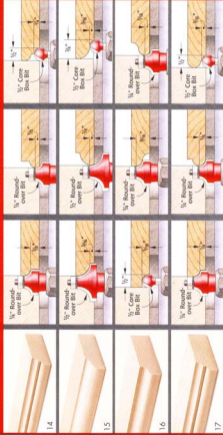


One-Pass Method





Three-Pass Method



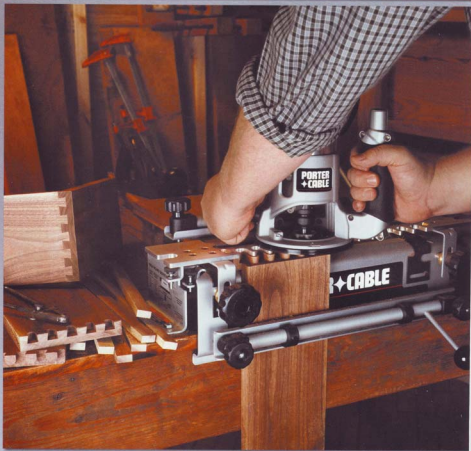
Routing Tips

- When using a bit with a bearing, be sure the router table fence is flush with the bearing.
- For best results, use two or three (or more) light cuts rather than one deep cut.
- Fine sanding will "blend" multiple cuts into one smooth, seamless profile.

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