3 techniques for fast and accurate tapers

With these three jigs, you can rip tapers on anything from a footstool leg to a tall bedpost.

When it's time to taper furniture legs, an adjustable jig, such as the one shown right, will handle 90 percent of those jobs. But for very short or long legs, you need a more suitable-size jig. The jig on the next page handles long parts; for short parts, build the jig on page 13.

1. Adjustable tapering jig handles most furniture jobs

This adjustable tapering jig [Drawing 1] holds table or cabinet legs shorter than 34" and up to about 2½" thick. Build the base by cutting grooves in ¼" birch plywood and gluing ¼" hardwood to the top to form slots. Make the two movable hold-downs and the pivot block from hardwood and plywood. (To find the jig hardware, see Sources, on page 13.)

To cut accurate tapers, first make sure your table saw fence parallels the blade and the blade aligns 90° to the saw table. A 24-tooth rip blade helps prevent burn marks. Also, joint and plane all four faces of your workpieces square so they'll index accurately on the jigs. Ready? Let's tackle that 90 percent first.

To taper two adjoining faces of a leg blank, first mark the tapers on the sides of the leg [Photos A and B, next page]. Capture the base between the blade and rip fence, and adjust the fence out just a hair to prevent the jig from touching the saw blade. Then set the blade higher than the combined thickness of the jig base and the leg blank.

1 ADJUSTABLE TAPERING JIG

1a PIVOT BLOCK DETAIL
Lay the blank on the jig, aligning the taper marks with the edge of the jig closest to the blade [Photos A and B]. Make the nontapered end of the workpiece flush with the trailing end of the jig [Photo C]. Slide the hold-down blocks against the workpiece as stops, and tighten the nylon nuts. Then secure the blank to the jig with the clamps.

Start the saw, and slide the jig tightly against the fence as you cut the first taper [Photo D]. Then rotate the workpiece 90° and make the second cut.

To taper all four sides of a leg, you must reference from the center of the workpiece because after two cuts, you no longer have square faces to work from. Start by laying out the tapers on the four leg faces. Then draw diagonal lines between the corners on the bottom of the leg to mark the center. At the center, drill a \( \frac{1}{4} \)" hole \( \frac{1}{2} " \) deep. Place the pivot block into a slot at one end of the jig [Photo E], and position the pivot-block screw to align with the centered hole.

Align the taper line with the edge of the jig, and secure the workpiece with the hold-down blocks and clamps. After cutting the first taper, rotate the workpiece 90°, and reinsert the pivot-block screw. Make the second cut, and repeat for the remaining two tapers.

2. Make a big jig to taper long posts

You could lengthen the adjustable jig to hold almost any size workpiece—even 6'- or 7'-long posts for a canopy bed. But you’d seldom need that capacity. Besides, the jig would be cumbersome to use for smaller parts, and difficult to store. You’re better off tailoring a jig specifically to taper large blanks.

For these special cases, build the jig, following the instructions and Drawing 2 on the next page. Tailor the length of the fence guide to meet your needs.
Building the jig
Start by jointing and planing a 2×6 that’s about 16" longer than your workpiece to 1¾"×5". (We’ve sized the jig shown for 80"-long bedposts.) From hardwood or ¾" plywood, make and attach a saddle that captures your tablesaw fence [Drawing 2].

Some posts have two tapers—short ones at their feet and long ones at their tops. If your posts follow this form, you must make separate brackets for the short and long tapers. You’ll need a third, front-pivot bracket, too.

From ¾" plywood, cut, glue, and screw together the three brackets, as shown below. Mark the pivot-dowel or screw height on each bracket at a distance above the saw table that’s half the thickness of the workpiece (1¾" for a 2½" square post).

The front-pivot dowel should position the workpiece to provide 1" of clearance from the fence guide. Mount the front-pivot bracket flush with the bottom edge of the fence guide, and place the jig on your tablesaw. Provide infeed and outfeed support as necessary for the long, heavy jig to ensure accuracy and safety.

Make brackets to fit tapers
To tailor short- or long-taper brackets for the workpiece tapers you want, first mark taper lines on your workpiece. Mark the pivot-dowel or screw height on each bracket at a distance above the saw table that’s half the thickness of the workpiece (1¾" for a 2½" square post).

For the final taper, you no longer have a saddle that captures your tablesaw fence [Photo I, next page].

Move the fence to align the cutting line with the blade, and add infeed and outfeed support. Cut the first taper [Photo J], and rotate the workpiece 90°, keeping an untapered edge against the saw table for the next cut. Repeat for one more cut.

For the final taper, you no longer have a flat post face to ride on the saw table. The post shown was mortised and drilled as necessary before tapering, while the faces are still square.

Cutting short tapers
Attach the short-taper bracket to the fence guide, and then screw the post to the bracket [Photo G]. To help control the jig, position infeed and outfeed supports in front and back of your tablesaw.

Cut the first taper [Photo H]. Then remove the screw, rotate the workpiece 90°, and reinsert the pivot screw. Make the second taper, followed by two more.

Cutting long tapers
To cut long tapers, install the long-taper bracket. Screw the foot end of the post to the bracket [Photo I, next page].

To save time, use a dowel instead of a screw to pivot the front of the workpiece. Both the short and long brackets on the opposite end keep the post from pulling free.

To adjust short tapers, the square portion of the post rests flat on the saw table. The post shown was mortised and drilled as necessary before tapering, while the faces are still square.

Move the fence to align the cutting line with the blade, and add infeed and outfeed support. Cut the first taper [Photo J], and rotate the workpiece 90°, keeping an untapered edge against the saw table for the next cut. Repeat for one more cut.

For the final taper, you no longer have a flat post face to ride on the saw table. The post shown was mortised and drilled as necessary before tapering, while the faces are still square.

To cut long tapers, install the long-taper bracket. Screw the foot end of the post to the bracket [Photo I, next page].
3. Taper small parts easily on a sled

Build this simple sled for a fast, accurate, and safe way to achieve perfect tapers, even when cutting small or thin parts for your project.

First, cut a hardwood fence the same thickness and length as your workpiece, and two ½"-thick cleats for the front and back to contain the workpiece. Next, cut the sled’s base. It must be large enough so at least 2" of the base remains uncovered on either side of the workpiece. Set your tablesaw fence to leave enough of the base on both sides of the saw kerf to support your workpiece. Cut through the base, leaving a minimum of 2" uncut at the rear. Leave your fence in place for the next cut.

Lay out the taper on your workpiece, then place it where the kerf aligns with the waste side of your taper line. Trace around your workpiece on the base to mark locations for the fence and cleats. Glue the fence and both cleats in place along the outline, where shown.

To cut a taper, nestle the workpiece against the jig’s fence and between the two cleats on either end, and secure it there with hold-downs using #8×1¾" wood screws. Then make your tapered cut as shown above.

Sources
Hold-down. Kreg Trak Clamp with bolt and knob, #145831, $6, Woodcraft, 800-225-1153 or woodcraft.com.
Four-arm knob. With through hole and ¼"-20 insert, #12230, $2.50, Woodcraft.

Produced by Bob Wilson with Chuck Hedlund
Illustrations: Roxanne LeMoine; Lorna Johnson
A tapering jig works great when you have a few parts to make. But when a project calls for a number of matching parts with tapered edges (or when you may want to make more matching parts later), cut them quickly and accurately with this simple tablesaw jig.

Begin by making a plywood pattern to match each piece that requires tapered cuts. Then, fasten the pattern to the stock with double-faced tape or screws. With a little planning, you may be able to position the pattern screws exactly where you'll later make screw holes in the finished piece, meaning you won't have to fix any extra holes required by the pattern.

Now, make a pattern-cutting jig by screwing together two pieces of plywood, as shown in the Drawing. Clamp the jig to your tablesaw’s rip fence, and position the jig edge just a scant \( \frac{1}{32} \)" beyond the edge of the blade to allow for sanding the cut edge.

With everything secured, just slide each pattern/stock assembly along the fence to duplicate the parts, reusing the pattern as needed to complete the project.
Tablesaw thin-strip ripping jig

Here’s a safety-minded jig that will make you feel more comfortable ripping tiny pieces.

Sometimes you need to rip several thin strips of wood to equal thickness to serve as edging, veneer, or bending stock. Slicing off thin stock on the fence side of the blade, however, could prove unsafe. That’s because it becomes awkward to use your blade guard and pushstick when you cut close to the fence. The solution: Run the wide portion of your workpiece between the fence and blade, cutting the strips on the side of the blade opposite the fence. You could accomplish this by measuring for each cut, but that’s tedious and imprecise. This thin-strip ripping jig does the job safely, accurately, and quickly.

First, build the jig

1. Cut ¾” plywood to the size shown for the base in the Drawing on the next page. Cut a dado on the bottom side of the base for the guide bar, where shown. Now, cut the ¾” dado on the top side of the base for the sliding bar.

2. Cut two pieces of maple to size for the miter-slot guide bar (adjust the size to fit your tablesaw’s slots, if necessary) and the sliding bar. Center the miter-slot guide bar in the bottom dado, and glue it in place. Drill a pair of ½” holes in the sliding bar, where shown, scrollsaw the material between them, and smooth the inside of the slot with a file.

3. Set the jig in your tablesaw’s left miter-gauge slot. Place the sliding bar in the dado with its left end flush with the base. Slide the jig forward, and mark the point where a left-set blade tooth touches the bar. Make a second mark ½” closer to the base. Remove the bar, and crosscut it at the second mark.

4. Drill a ⅛” pilot hole in the sliding bar, centered on the end you just cut. Drive a brass screw halfway into the wood. (We used brass to avoid any chance of damaging a tablesaw blade.) You’ll turn this screw in or out to fine-tune your jig’s basic “zero” setting, or to adjust it for a blade of different thickness or with a different tooth set.

5. From the bottom side of the assembly, drill and countersink a ⅛” hole through the miter-slot guide bar and base for the machine screw that holds the plastic knob. Sand all of the wood parts to 180 grit, and apply three coats of clear finish.

6. Make a mark 1” from the left end of the sliding bar. Cut the first 1½” from an inexpensive steel rule, align its left end with the mark, and attach it with epoxy. Place the bar in the base.

7. Cut a piece of ¼” clear acrylic to the dimensions shown for the indicator. Drill and countersink the two mounting holes, and scribe and mark a cursor line, as shown in Photo A. Attach the indicator to the base, and screw the knob onto the machine screw.

To make a cursor, scribe a line across the acrylic indicator with a sharp knife and a square. Color the scribed line with a permanent marker. Wipe off the excess ink with a cloth, leaving a fine line.
Now, cut some strips

To cut a thin strip with the jig, place its guide bar in the left-hand miter-gauge slot on your tablesaw. Loosen the knob, set the cursor to zero (the bottom end of the rule), and retighten the knob. Slide the jig so that the brass screw head is beside the saw blade. Turn the screw in or out with a screwdriver until the head lightly contacts a left-leaning tooth. Pull the jig toward you, loosen the knob, set the cursor for the desired strip thickness, and retighten the knob.

Position your workpiece against the rip fence, and move the fence over to bring the left edge of the workpiece against the screw head, as shown in Photo B. Lock the fence, set the jig out of the way, and you’re ready to cut a strip, as shown in Photo C.

After completing the cut, clean up the workpiece edge on the jointer. Replace the jig in the slot. Then unlock the rip fence, move it to bring the jointed edge against the screw head, lock the rip fence, remove the jig, and saw another strip. Repeat the process as many times as necessary to produce all of the strips that you need for your project.

Size your thin-strip ripping jig to suit your tablesaw, so that a 1" screw in the guide bar can contact the blade. Install a zero-clearance throat plate to prevent the sawn strip from falling into the saw.

Remove the jig before making the cut so the workpiece doesn’t bind between the rip fence and the screw head. Replace the jig in the slot without making any adjustments to set up the next cut.
Dead-on 90°

Crosscut sled

When you use this sled, your accuracy and efficiency at the tablesaw will soar.

A reliable tablesaw miter gauge handles a lot of crosscutting tasks, but not all. It rides in only one slot, and supports the workpiece on just one side of the blade, allowing for inaccuracy. This problem goes away, however, with an accurate crosscut sled. Our design is both inexpensive and simple to build. Plus, it includes a reliable, adjustable stop for repeatable cuts. From the moment you put this sled to use at your tablesaw, you’ll discover that making right-angle cuts is easier and safer.

**Build a real workhorse**

1. Select a flat piece of ¾" plywood, and cut the platform to the dimensions shown on Drawing 1 on the next page.
2. Cut two ½×3×30" maple pieces for the fence, and cut a ⅜" groove ⅛" deep in the face of one piece, where shown on Drawing 1a. Glue the two blanks together, keeping the edges flush and the groove facing the inside of the lamination. After the glue dries, cut a ¼" groove centered on the ⅞" groove. Then, cut a rabbet along the front of the bottom edge and a ½" groove centered along the top edge.

**SHOP TIP**

Enhance sled’s versatility with a flip stop

You can adapt the mitersaw/radial-arm saw flip stop shown on pages 8–9 to this crosscut sled for even greater versatility. With this modification, you can set the stop to cut multiple same-length parts, but then flip it out of the way to make cuts to other lengths without having to remove and reset the stopblock.
1 EXPLODED VIEW

- #8 x 1/2" F.H. screw
- TOP BLADE GUARD
- 1/8" shank hole, countersunk
- 1/4" groove 1/8" deep (to fit measuring rule)
- 1/8" rabbet 1/8" deep
- 1/4" groove 3/8" deep

- 30'
- 1 1/8" flat washer
- 1/4" long hex head bolt 1 1/2" long
- 3/4" dado 1/4" deep
- 1/8" from top edge

- 6 9/16" 1/4" pilot hole
- 3/4" x 18 x 30" plywood
- 3/4" x 1 1/4" x 2 7/16" stop block
- 3/8" x 1/4" guide bar

- 1 x 3 x 30" supports
- 1/8" groove 1/8" deep
- 1/4" x 3 1/4" x 3 3/4" stop block
- 1/8" x 1/4" x 18" supports
- 1/8" x 1/4" x 16 1/4" clear acrylic

1a FENCE SECTION VIEW

- 1/2" groove 1/8" deep (to fit measuring rule)
- 1/4" groove 3/8" deep

1b INDICATOR DETAIL

- Score a line on the acrylic with a knife, and color it with a permanent marker.

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3 From 3⁄4" maple, cut the blade-guard sides and end [Drawing 1]. Glue and screw the end to the sides. Now, screw the blade guard to the fence, where shown.

4 Cut the front rail to size from 3⁄4" maple. Use a jigsaw or bandsaw to cut a notch, where shown, for the blade to pass through. Attach the front rail and the fence to the platform with screws.

5 Cut, sand, and finish two top blade-guard supports. Using a fine-toothed tablesaw blade, cut a piece of 1⁄4" clear acrylic to size for the blade-guard cover. Attach the cover to the supports and the front rail.

6 From 3⁄4" maple stock, cut two strips to serve as miter-slot guide bars. Set your tablesaw rip fence 8 1⁄8" to the right of the blade, and lower the blade below the table's surface. (Note: Make sure your fence is parallel to the miter-gauge slot before proceeding.) Apply double-faced tape to the top of each guide bar, and attach the bars to the platform, as shown in Photos A and B. Remove the assembly from the saw, and permanently attach the bars with screws.

7 Cut a piece for the stopblock, and cut a dado in the back, where shown [Drawing 1]. Cut a guide bar, and glue it into the dado. Drill a shank hole through the block and bar, where shown. Now, cut a piece of 3⁄4" acrylic plastic to size for the stopblock indicator [Drawing 1b]. Drill and saw the slot where shown and file it smooth. Make a cursor line, as shown in Photo A on page 15.

8 Remove the top blade guard, sand the jig, and apply three coats of finish. Reattach the blade guard, assemble and install the stopblock, place the crosscut sled on your tablesaw, and make a cut from the front edge through the fence, stopping short of the blade guard. Use a rule to set the stopblock 4" from the kerf. Mark the center of the stopblock on its top end, align the 4" line on the self-adhesive measuring tape with that mark, and attach the tape in the fence groove. Use tin snips to cut off the portion of the tape extending beyond the left end of the fence. Place the indicator on the stopblock, align the cursor with the tape’s 4" line, and attach the indicator to the block with a screw.

Now, let’s go sledding

If a workpiece fits between the fence and the front rail, you can cut it on your crosscut sled, as shown in Photo C. Use the stopblock to cut multiple pieces to the same length, provided that length falls within the stopblock’s range. Remove the stopblock when cutting pieces that extend beyond that range. When you install a blade of a different thickness or with a different tooth set than the one used to calibrate your stopblock, check the setting with a rule, and adjust the cursor.

Sources

1 1¼" four-arm plastic knob, no. 142230, $2.50.
Self-adhesive rule, no. 145832, $9.50.
You'll turn to this miter sled like a trusted friend whenever you need gap-free corners. To make mitering a cinch, even on long pieces, T-tracks hold a stopblock anywhere along the 25"-long fences. A hardwood block behind the fences shrouds the blade while channeling sawdust downward into the saw.

Before you build this sled, consult the owner’s manual to tune up your saw. (See page 24 for more articles and a video on saw setup.)

**Build your super sled**

Begin by cutting the sled base to size from ¾" Baltic birch plywood [Exploded View, right]. Cut two 18"-long hardwood runners to fit your tablesaw miter slots and two 1x3x25" hardwood miter fences. Using a dado blade that matches the width of your T-track (see Sources), center a groove in each miter fence deep enough to recess the T-tracks flush with the fence faces. Cut T-tracks about 1" shorter than the fences and screw them in place with one end flush with the outside end of each fence.

**A sled helps you cut tighter miters**

A dedicated tablesaw miter sled gives you two big advantages over miter gauges and mitersaws. First is price. You can build this sled from a quarter-sheet of Baltic birch plywood, scrap hardwood and MDF, and $35 in hardware—far less than a mitersaw or an aftermarket miter gauge. Second, after the initial alignment, you’ll get consistent results with a miter sled without spending additional time on setups and test cuts.

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** prófibra para멸성당 JIGS**

**PRECISION miters every time**

Build this sled in one evening and rely on it for perfect mitered corners for years to come.

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**EXPLODED VIEW**

- ¼" hexhead bolt 1½" long
- 25°
- 24" T-track
- 45° mitered end
- ⅛" flat washer
- 1 x 3 x 4½" STOPBLOCK
- ¼" hole, countersunk on bottom face
- #8 x 1½" F.H. screw
- ⅛" four-arm knob 24"
- ALIGNMENT TRIANGLE
- ⅞" grooves ⅛" deep, centered
- ¼" carriage bolt ⅛" long
- ⅛" hole with a ⅛" counterbore ⅛" deep on bottom face
- Miter-slot runner (size and position to fit tablesaw)

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**STOPBLOCK**

- ¼" hole, 4⅛" long 45° mitered end
- ⅛" rabbets ⅛" deep
- MITER FENCE ⅛" grooves ⅛" deep, centered
- ¼" hole with a ¼" counterbore ¼" deep on bottom face
- SLED BASE
- 45° mitered ends 24"
- 24" T-track 1½ x 3 x 6"
- BLADE-GUARD BLOCK
- 18"
- 24"
- 3"
Install a saw blade, lower it completely, and adjust the rip fence to center the sled base above the blade.

**Quick Tip:** Make your “runner” buddies proud. Drop two pennies in each miter slot and lay the miter-slot runners on top of them so the runners stand just proud of the saw table.

Next, attach the sled base to the runners [Photo A] by pressing the base against the tape. Slide the base off the saw, and flip it over to countersink, drill, and screw the runners to the sled base.

Now, drill two ¼” holes 2” from the back edge of the sled base, without drilling the miter-slot runners. Counterbore the holes on the underside of the base to accept a ¼"×1½” carriage-bolt head.

From ¾” MDF or an MDF-core sheet, cut a 17” square and use a reliable square to check for a precise 90° corner. Using a bandsaw or jigsaw, cut the square in half diagonally. Center and clamp one triangle onto the sled base while keeping the long edge flush with the back edge of the sled base. Turn the base and triangle upside down and transfer the ¼” hole locations to the triangle. Remove the triangle and lay out two ¾”-long slots perpendicular to the long edge and centered on the hole locations. Drill pairs of ¼” holes to define the slot ends and cut away the waste between the holes.

Now loosely bolt the alignment triangle onto the sled base with its point centered. Using the 45° angle on a combination square, align the triangle on the sled base [Photo B].

Next, use the triangle and sled to miter one end of a test scrap until it fits the 45° angle on your square with no gaps. Then, make test cuts in four pieces of scrap and check that they go together without gaps, as shown in How to tell if you’ve cornered the market on accuracy on page 24.

After your sled cuts airtight miters using the alignment triangle, you’re ready to attach the two miter fences. Use the sled to miter the fence ends where the T-track stops short. Apply double-faced tape to the bottom edges [Photo C]. Press one fence against the edge of the alignment triangle with the mitered tip just over the kerf in the sled base, and press the fence in place. Repeat for the other miter fence. The first cut you make with the jig will trim the fence miters to create a zero-clearance backer.

To test the accuracy of the miter fences, again miter the four test scraps and assemble them into a frame. Once you achieve gap-free miters, drill and screw the miter fences to the sled base.

To make the blade-guard block, laminate two pieces of ¾×3×6” hardwood and allow to dry. Use your tablesaw with the blade tilted 45° to bevel both faces at one end, forming a point at the center. Then, glue and clamp this blade-guard block to the sled base behind the fences [Exploded View]. Finally, cut a stopblock to size as shown on the previous page and drill it for a ¼” hexhead bolt.
**How to tell if you’ve cornered the market on accuracy**

To test the position of the alignment triangle, cut a test frame with four equal sides of $\frac{3}{4} \times 3 \times 12$" MDF. Those eight miter cuts multiply the slightest misalignments enough to find and fix them.

Here’s how to go about it: Although you’ll normally cut from both sides of your miter sled when it’s finished, make these test cuts only from the left side. First, miter one end of each piece. Use double-faced tape to adhere a stopblock to the sled base against the alignment triangle and a hair less than 9" from the center kerf. Flip each test piece end for end and cut the second miters.

Tape three mitered corners tightly together and examine the fourth joint. If it looks like the one far left, rotate the alignment triangle counterclockwise a little bit. If the fourth joint resembles the corner middle left, gently rotate the alignment triangle clockwise.

If you end up with an even gap on all four corners, like the one near left, blame the saw-blade tilt. Check the blade with a reliable square or drafting triangle to make sure it stands 90° to the saw table.

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**Cut corners for a frame**

To make a frame, first cut blanks for both pairs of frame sides. Using the right fence of your jig, miter one end of each frame part, as shown on page 22.

For four sides of equal length, set your stopblock on the left miter fence and cut the opposite end of all four parts. To make sides of unequal length, cut the longest sides first so you’ll still have a usable blank for the short sides in case you make a mistake. Then, reset your stopblock and cut the short sides.

To miter extra-long parts, first glue a beveled block to a strip of plywood or MDF cut to the length you need to accommodate your frame parts. Then, clamp the extension to a sled fence [Photo D] and miter the opposite ends of your frame parts.

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**TABLESAW TUNEUP**

**VIDEO**

- “Tune Up Your Tablesaw”, 6½ minutes, free at woodmagazine.com/tstuneup

**ARTICLES**

- “Tune Up Your Tablesaw” issue 152 (November 2003)
- “Miter Gauges & Sleds” issue 179 (October 2007)

($)=$Download from woodmagazine.com for a small fee. Type “tune up” or “miter gauge” in the Search box.

**Sources**

- **T-track**: 4’ aluminum track no. 20054, $26, Rockler, 800-279-4441, rockler.com.
- **Knobs**: Four-arm knob with a ¼”-20-thread insert (2) no. 142230, $2.50, Woodcraft, 800-225-1153, woodcraft.com.

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For workpieces longer than your miter fences, cut them to identical lengths using a stopblock extension. Make the stopblock 2" thick so that the mitered end of your workpiece can touch the mitered end of the stopblock.
Four simple jigs increase speed and accuracy

- **Make cleaner crosscuts.** A zero-clearance crosscut sled, when paired with a quality blade, virtually eliminates tear-out in veneered plywood, guarantees a square cut, and costs just pennies to make. We spiffed up the sled shown at right with an adjustable stop, but that’s just the icing on the cake. This fence-forward design allows you to cut wider workpieces than one with the fence closer to the operator. During assembly, locate the miter bar so that about 1⁄4" of the fence will overhang the blade. Before you use the base and sled, run it through the blade to remove this excess and create a zero-clearance edge.

**PANEL-CUTTING SLED**

- 1⁄4 x 2 1⁄2" R.H. machine screw with head cut off
- 1⁄4 x 1 1⁄2 x 3" stop
- 1⁄4 x 2" F.H. machine screw
- 1⁄4" threaded insert
- 1⁄4" rod 24" long
- 1⁄4" flat washer
- 1⁄4" lock nut

**STOP DETAIL**

- 1⁄4 x 2" F.H. machine screw
- 1⁄4" hole (Drill before cutting slot.)
- 1⁄4" slot 1 1⁄4" long
- 1⁄4" round-overs
- 1⁄4" flat washer
- 1⁄4" lock nut

- **Miter better with a dedicated sled.** For perfect miter joints, it’s more important that both miter cuts add up to precisely 90° than each miter is exactly 45°. This blade-straddling miter-cutting sled ensures that those complementary cuts always equal a right angle. To install the miter-slot guides on the bottom of the sled, place the guides in your saw’s slots, set the sled on top of them, and then drive screws into the guides through the top of the sled. Now cut a blade kerf about halfway across the sled. Using a combination square, mark the location of the right-hand fence 45° to that kerf, and install the fence on that line. Place a reliable framing square against that fence to locate the left fence, rest the left fence against the square, and then screw it into place. Make test cuts, and if needed, remove the fence screw farthest from the kerf, adjust the fence’s angle, and drive a new screw to secure it.

- **Taper with confidence.** You can buy or build more elaborate tapering jigs, but this simple helper below will handle most of your tapering chores. It runs in the saw’s miter-gauge slot. To use the jig, measure the width of the sled and set your fence that distance from the blade. Remove the top screw, loosen the pivot screw, rotate the fence to match your desired taper, and then tighten both screws. Butt your workpiece against the dowel with one edge against the jig’s fence, and then cut your taper.

continued on page 90
Adjustable Miter-gauge Extension

If you’re like the craftsmen in the WOOD® magazine shop, you usually have a wood extension attached to your tablesaw miter gauge. An extension adds control when crosscutting and also backs up cuts to prevent grain tear-out. Sometimes you’ll clamp a stopblock to it for accurate repeat cuts or to control the length of a tenon or lap joint. While most scrap extensions are screwed to the miter gauge in only one position, here’s how to make an infinitely adjustable one with router-cut T-slots and a pair of 1⁄4” toilet-flange bolts. (Find these bolts in the plumbing department of hardware stores or home centers.) The extension is so easy to make, we suggest you build several at a time so you won’t hesitate to throw one away when it’s used up.

The position of the attachment holes in your miter gauge determines the width of the extension. For a miter gauge with holes close to the bottom, a 3”-wide extension will accommodate two T-slots. (The model shown in the photos has holes 7⁄8” from the bottom.) For a miter gauge with holes higher up, measure from the bottom of the gauge to the center of the holes, and double this dimension to determine the width of an extension with a single, centered T-slot. An extension of 18–24” is a good length for most tasks.

With your extension stock cut to size, use your tablesaw to cut grooves, where shown in Step 1. Switch to your table-mounted router, and use a keyhole bit to rout the T-slots, where shown in Step 2.

Enlarge the holes in your miter gauge to 17⁄64”, and fasten the extension to the miter gauge, as shown below. When one end of the extension gets chewed up by repeated cuts, loosen the bolts, and slide it off. Flip the extension end-for-end, slide it back over the bolts, and tighten the nuts. Then bring the uncut end of the extension into play, as shown below. ♠
Rout parallel slots to perfection

I volunteered to make a tally board for my bridge club, and my plan to use sliding dovetails for each player’s name block seemed so simple. To lessen the strain on my router and prevent the dovetail slot from packing with dust, I decided to precut the slots with a straight bit, then rerout them with a dovetail bit. But how could I ensure dead-on repeatable spacing for 20 slots?

To solve the dilemma, I fashioned a subbase for my router from 1⁄2” birch plywood, with a 3⁄8×5⁄16” hardwood guide dadoed in place on the bottom, as shown in the drawing below. The distance between the guide and a 5⁄16” straight bit mounted in the router equals the intended spacing between the slots.

I routed the first slot with a 5⁄16” straight bit in my table-mounted router, then used the same bit in my handheld router, with the subbase guide in the first slot, to rout the second slot. The second slot guided the router for the third slot, and so on, until I had cut all the slots that would be needed.

Next, I switched to my dovetail bit, and set the cutting depth so as to not widen the original 5⁄16” slot. I used the second slot to dovetail the first slot, then rerouted the remaining slots into dovetails, using the adjacent slot as a guide.

The jig worked like a champ, saved me a lot of time over alternative methods, and the results were flawless. Before you try this, you’ll need to make some test cuts to figure the precise relationship between cutting depth, dovetail-bit angle, and straight-bit diameter to make sure the slots will work for your project.

—Charles Hoffman, Ellicott City, Md.

How to safely rout along a narrow edge

Here’s a simple way to support your router when machining the edge of a part in an assembly. Clamp a 1½”-wide scrap (a 2x2 works great) of the needed length to the part, flush with the edge, as shown. The scrap provides additional support for the router base to ride on, allowing you to keep the router stable and make a straight cut.

—From the WOOD® magazine shop

Jig makes it safe to rout small pieces

My table-mounted router seemed ideal for shaping 3⁄8” stock into knobs for a box I was building, but the small blanks—only 1 1/4” square—would make the job hazardous to my hands. So I built the jig, shown at right, to secure the blanks.

I cut scraps of Baltic birch plywood to the dimensions shown for the jig’s base and sliding L-shape guide. To make the jig adjustable, I cut two slots in the guide and attached it to the base with knobs screwed into threaded inserts in the base. A toggle clamp holds the workpiece firmly against the base and the guide. I routed the front edge of the base, as shown, to clear the bit; I then set up the appropriate bit and a zero-clearance fence on the router table to machine the knobs.

—Bob Lasley, Broken Arrow, Okla.
The trick to cutting mortises in table legs is to precisely position the mortise on each leg and to make each mortise exactly the same length. Build the mortising jig as shown at right, and you'll be able to cut identical 3/8”-wide mortises time after time.

To set up a cut, mark the length and centerline of the mortise on your workpiece. Clamp the workpiece to the base of the jig so the mortise is centered in the slot on the sliding top plate. Lock the plate into place with the wing nuts. The threaded rod acts as a stop, and allows you to adjust the length of the mortise from 3/8” to 2 1/4”. Once you've locked in these settings, you can quickly transfer the jig from one workpiece to the next.

Now, fit your router with a 3/4” guide bushing and a 1/2” straight or spiral-flute bit. (For the cleanest cuts, use an up-cut spiral for solid wood; a down-cut spiral with plywood and veneers.) Insert the guide bushing at one end of the jig slot, turn on the power, plunge, lock, and guide the router to the other end. Deep mortises will require two or more passes—no sweat, thanks to your plunge router turret stops. Just take time between passes to clear chips from the previous pass. ¶
How to build your own

1. Cut a piece of 1/2" Baltic birch plywood to 6x9" for the extended base (A). Cut a centered 1/4" groove 1/4" deep along one end, where shown on Drawing 1 and the full-size base pattern on the WOOD Patterns® insert. Use a table-mounted router with a slot cutter or a tablesaw with a zero-clearance insert to cut the groove.

2. Spray-adhere the full-size base pattern onto the blank, aligning the 1/4" groove with the groove location marked on the pattern. Bandsaw and sand the extended base (A) to shape.

3. Remove the baseplate from your router and position the plate on the paper pattern adhered to the extended base. Align the baseplate holes with the centering lines on the pattern. Mark the screw-hole centerpoints, as shown in Photo A. Trace the router-bit clearance hole onto the extended base.

4. Drill and countersink the marked holes for attaching the extended base to the router. Then drill or scrollsaw the router-bit clearance hole.

5. Rout a 1/4" round-over along the bottom edge of the extended base where shown.

Note: Do not round over the end of the base with the groove.

Form the trammel arm

1. From 1/2" Baltic birch plywood, cut a piece to 3x20" for the trammel arm (B). Cut a centered 1/4" groove 1/4" deep along one end of the arm, where shown on Drawing 2.

2. On the top face of the arm, mark the centerpoints, and drill a pair of 3/16" holes through the arm, where dimensioned on Drawing 2. Connect the hole perimeters for the slot (to be cut later) with a straightedge and pencil.

3. On the bottom face of the trammel arm (B), use a Forstner bit to drill a 1/2" hole 3/16" deep, where shown on Drawing 2.

4. To form the trammel-arm recess, install a 1/2" straight bit into your table-mounted router. Raise the bit 3/16" above the surface of the table. Position the fence so the bit centers over the 1/2" hole drilled in the previous step. Mark start and stop reference lines 1/2" from the center of the straight bit on the router fence.

5. Bring the trammel arm (B) up to the left start mark on the router fence, and slowly lower it onto the bit, as shown in Photo B.
Putting the trammel to work
Using trammel points or a large compass, mark the centerpoint and required radius on your workpiece. Cut the workpiece about ⅛" oversize with a handheld jigsaw. This leaves less material to rout and improves the quality of the cut. At the previously marked centerpoint drill a ¼" hole ⅛" deep. Position the centerpoint adjustment plate with attached pivot pin until the distance from the inside cutting edge of the straight bit to the center of the pivot pin equals the desired radius of the circle. Drop the pivot pin into the centered hole and begin routing in a counterclockwise direction, as shown at the top of the previous page.

Join the extended base to the trammel arm
1 From ¼" hardboard, cut the spline (C) to size. Glue the spline into the grooved end of the trammel arm.
2 Cut the connector plate (D) to size from ⅛" hardboard. Drill the two countersunk mounting holes and glue and screw the connector plate to the trammel arm (B), where shown on Drawing 3. Slide the extended base (A) over the spline (C) in the trammel arm. Drill and countersink the ¼" hole through the base and connector plate for the knob machine screw, where indicated on the extended base pattern. This ensures hole alignment and a tight fit between the two pieces.

Add the centerpoint adjustment plate
1 Cut the adjustment plate pieces E and F to size. Drill the holes shown on Drawing 3. Screw the three pieces together.
2 Grind opposite edges off a 2" long ⅛" flat washer so it fits into the ½"-wide trammel-arm recess. Hacksaw the head off a ¼" hexhead bolt, where shown on Drawing 3a. Thread a ¼" hexnut onto the bolt. Assemble the adjustment plate to the trammel arm (B) in the configuration shown on Drawing 3b.

Materials List

<table>
<thead>
<tr>
<th>Part</th>
<th>FINISHED SIZE</th>
<th>Matl. Qty</th>
</tr>
</thead>
<tbody>
<tr>
<td>A extended base</td>
<td>⅛&quot; 6&quot; 9½&quot;</td>
<td>Ply 1</td>
</tr>
<tr>
<td>B trammel arm</td>
<td>⅛&quot; 3&quot; 20&quot;</td>
<td>Ply 1</td>
</tr>
<tr>
<td>C spline</td>
<td>⅛&quot; ⅛&quot; 3&quot;</td>
<td>HB 1</td>
</tr>
<tr>
<td>D connector plate</td>
<td>⅛&quot; 3&quot; 3&quot;</td>
<td>HB 1</td>
</tr>
<tr>
<td>E guide bars</td>
<td>⅛&quot; ⅛&quot; 2&quot;</td>
<td>Ply 2</td>
</tr>
<tr>
<td>F centerpoint</td>
<td>⅛&quot; 2&quot; 4&quot;</td>
<td>HB 1</td>
</tr>
</tbody>
</table>

Materials key: Ply-plywood, HB-hardboard.

Supplies: Spray adhesive, #8×⅛" flathead wood screws (2), #8×⅛" flathead wood screws (4), ⅛"-20×1⅛" flathead machine screw, ¼" flat washer, ⅛"-20 tapered knob, ⅛" hexhead bolt 2" long with nut, ¼" flat washers (2), ⅛-18 three-arm knob.

Bits: ⅛" round-over, ⅛" straight router bits; ⅛" Forstner bit.
Great Ideas for Your Shop

Cope-Cutting Sled

Rout rail ends safely and precisely.

A rock-solid support system helps you rout rail ends that tightly fit mating stiles. The large base, dado, and hold-downs designed into this sled accomplish just that, while the handle and dowel keep your hands safely away from the spinning bit.

Build the sled by cutting the parts to the sizes noted on the drawing. Make several extra sacrificial backer strips. The backers create zero-clearance supports for cleaner cuts, and can be easily replaced after becoming too chewed up.

Glue two pieces of 1/2"x7 1/2"x17" plywood together face-to-face for the base. Cut a 3/4"-deep dado 4" wide in the 1"-thick base. Use the full-size pattern on the WOOD Patterns® insert to create the handle, and rout 1/4" round-overs along the handle edges except for the bottom. Screw the handle, dowel, and toggle clamps to the base, making sure the screwheads are countersunk so they won’t rub against the router top.

To cope the end of a rail using the sled, raise the bit 1/4" higher than if you were cutting the rail directly on the router tabletop. Clamp a scrap piece of stock the same thickness as your rails firmly against the router-table fence and backer strip with the toggle clamps. Turn on the router, and ease the sled and workpiece into the bit. Slide the sled and test piece backward just after completing the cut in the rail end, where shown in the photo. Doing this prevents destruction of the sled’s trailing inside edge. Check the fit of the joint against your previously routed stiles, and adjust the height of the bit as necessary before cutting your rails.

Project design: Rod Cox, Mt. Pleasant, Iowa

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