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Dave Campbell
Editorial Content Chief, *WOOD* magazine



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Make and master the no-cost Box-Joint Jig

Waiting until the price is right to acquire a box-joint jig? By using shop scraps, we got the cost down to zero, and came up with a method that makes adjacent box sides interchangeable for foolproof assembly.

While making the box-jointed trio on *page 78*, *WOOD*® magazine Master Craftsman Chuck Hedlund came up with an innovative way to make box joints using a simple box-joint jig. He also incorpo-

QUICK TABLESAW TUNE-UP

The box joint relies on simple geometry: All of the cuts are square to each other and to the face of the lumber. So before you make the jig, take a few minutes to verify your tablesaw's settings and to make any adjustments.

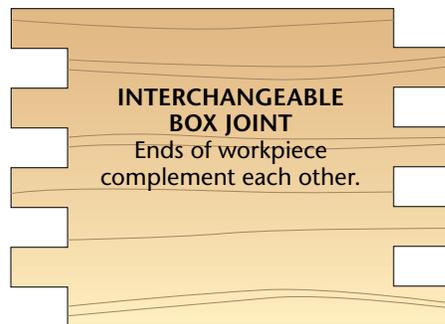
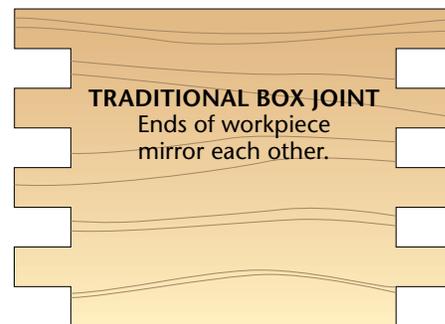
First, ensure that the blade is absolutely parallel to the miter-gauge slot. Next, set the blade perfectly perpendicular to the tabletop. Finally, lock your miter gauge at a right angle to the blade.

rated a subtle change in the arrangement of the fingers. The traditional method: Make two sides that start with a finger at the top and two ends that start with sockets at the top, as shown at *right top*. Instead, Chuck made four interchangeable sides, each with a finger at the top of one end, and a socket at the top of the other, as shown at *right bottom*. This technique makes it nearly impossible to assemble a box incorrectly. Here's how to make the jig and cut the joints.

Every good box joint needs an accurate jig

To ensure success in making box joints, first check the alignment of your tablesaw. For tune-up tips, see the sidebar at *left*. With your tablesaw ready, begin making the jig by cutting a 4x18" extension for your miter gauge from $\frac{3}{4}$ " medium-density fiberboard (MDF). MDF is typically flat, but check your piece after cutting by laying each side flat on your saw table. Don't attach the extension to your miter gauge yet.

Install a $\frac{1}{4}$ " dado blade and a zero-clearance insert in your tablesaw. Raise the dado blade to make a cut just a hair more than $\frac{1}{4}$ " deep. Verify the depth with a test cut in scrap.

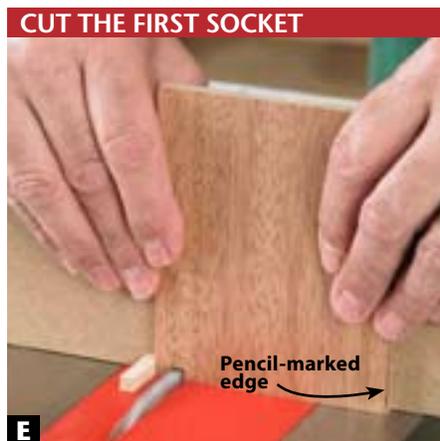


Notch the extension and install an index pin

Set your rip fence to cut a notch 7" from the end of the MDF miter gauge extension [Photo A]. Holding the extension against your miter gauge, cut the notch.



Watch two FREE videos related to this article. Learn how to make and use this jig at woodmagazine.com/videos. And tune-up your tablesaw with tips at woodmagazine.com/tstuneup.



(Don't pull the extension backward through the blade and don't move the rip fence after the cut.)

To make the indexing pin, start by planing a 12" length of hardwood scrap (we used maple) until you have a perfectly square section that fits snugly into the notch in the extension [Photo B]. As you approach the $\frac{1}{4}$ " thickness on the pin, lower the cutterhead in tiny increments to sneak up on a snug fit and rotate the stock 90° for a second pass at each height setting to keep it square.

When you're satisfied with the fit, crosscut the strip in half. Place the two strips side by side against the fence [Photo C]. Holding the extension against the strips, cut a second notch. Again, cut only on the forward stroke.

Turn the extension upside down and insert one of the hardwood strips into the second notch, leaving about 1" projecting from the front, [Photo D]. Drive a nail to hold this indexing pin in place. (To avoid splitting, drill a pilot hole first.) Set the second hardwood strip aside: You'll need it later.

Finally, apply double-faced tape to the back of the extension. With the end of the extension against the rip fence, slide

the miter gauge squarely into position against the back of the extension, adhering it with the tape. Use screws to secure the extension to the miter gauge. After double-checking the set-up, you can remove the rip fence.

Building a better box starts with stock prep

When building boxes, spending a few extra minutes properly preparing stock will pay big dividends when the joints slide together sweetly. Here's the sequence that produces that big payoff.

Step 1 Use your jointer to flatten one face of each board, and then plane the opposite face smooth, parallel, and to the desired thickness.

Step 2 With one face held flat against the jointer fence, machine one edge of each board straight, smooth, and square. Rip the opposite edge $\frac{1}{8}$ " wider than your box's finished height, and mark the ripped edge with a continuous pencil line. Why the extra width? Because a tiny error in the width of each cut multiplies with each subsequent cut across the width of the workpiece. Cutting the pieces oversize accommodates that accumulation. If your joint cuts wind up

dead-on, you simply trim away the excess after cutting the joint. If they don't, each joint still sports a full set of identical pins and sockets.

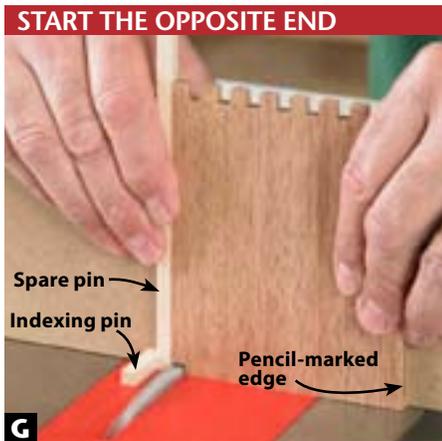
Step 3 With the jointed edge against the miter gauge, cut the box pieces to length. An extension with a stopblock ensures identical lengths.

While you're preparing your project stock, it's a good idea to give identical treatment to some extra scraps that you can use for test cuts.

Test cuts prove the accuracy of your setup

Making test cuts in scrap will familiarize you with the cutting technique and confirm the jig setup.

With the pencil-marked edge away from the blade, [Photo E], hold a box side flat against the miter gauge extension, butted against the indexing pin. Cut the first socket, and after the jig clears the dado head, lift the box side clear instead of pulling it backward through the blade. (At this time, pulling the jig itself backward over the blade is fine.) Now fit the first socket over the indexing pin [Photo F], and make the second cut. Continue placing the just-



cut socket onto the indexing pin until the joint is complete.

Consistency counts when you make the multiple passes required to make a box joint. For the best results, try to keep your body mechanics identical on each stroke. For example, your miter-gauge bar has a small amount of clearance to permit it to slide. To prevent that slight allowance from introducing a problem, exert the same amount of sideways pressure on the gauge as you make each cut.

Cut the opposite end of the workpiece

Begin the opposite-end cuts by placing the hardwood strip between the indexing pin and the box side [Photo G]. Keep the end of the box side flat against the table, and the pencil-marked edge away from the indexing pin. Make the cut, and set aside the strip. Register the end socket against the indexing pin and make the second cut [Photo H]. Continue this sequence to complete the joint.

After cutting two sides, dry-assemble them to check the joint fit. The ideal box joint fits together with only slight resistance.

If the joint is too tight, the space between the dado blade and the pin is too wide. To fix this, make pencil registration marks on both the extension and the miter gauge indicating their current position. Remove the jig from the miter gauge, strip away the carpet tape, and move the extension slightly to the left. Carefully snug down the screws to hold it in this new position. If the joint has visible gaps, the space between the dado blade and pin is too small. Follow the procedure outlined above, but this time shift the extension slightly to the right. Prove the setup with a new series of test cuts.

SHOP TIP

How a mirror saves your neck

Craning your neck to look over the box-joint jig to align the socket on the indexing pin can quickly become uncomfortable. Eliminate this problem by propping and clamping a mirror at the end of your saw table, as shown at right. A 12" mirror tile is an inexpensive solution you can find at nearly any home center. Apply tape to its edges to prevent cuts.



Trim the sides to width

After you've cut joints in all of the sides, it's time to rip them to final width. Set your tablesaw rip fence to precisely align the blade with the bottom of the last

socket (the one at the pencil-marked edge) [Photo I], and rip all the sides. 🌲

Written by **Robert Settich** with **Chuck Hedlund**



Practice using the jig and refine your box-joint making technique by building this handsome trio of boxes from the step-by-step plans starting on page 78.

Tempting Trio Box Ensemble

These catchall containers, with beautiful finger joints, are deceptively simple to make.



PROJECT HIGHLIGHTS

- Overall dimensions: 7¼" wide × 19⅝" long × 5⅝" high.
- The staggered arrangement of the boxes shows off the corner joinery.
- Make it with odds and ends you already have in your shop.

Skill Builders

- A clever variation in technique makes box joints easier to cut.
- Discover how a special router bit takes the hassle out of installing the bottoms in box-jointed boxes.
- Learn how to make perfect radius corners on your router table.

Build the boxes

1 From ¾" stock, cut the box sides (A) to length and ⅝" wider than listed [Materials List, page 80]. Now, to form the finger joints, see page 74.

2 With the finger joints complete, dry-assemble the boxes, and rout a groove into each one for the bottom (B) [Drawing 1, Photo A]. (See Source for the router bit.) Then make a snug-fitting box-squaring jig [Drawing 2]. (We used ¼" hardboard.)

3 Cut the bottom (B) to size, and radius the corners [Drawing 1]. For a quick way to form perfect radii, see the Shop Tip on the next page.

4 Dry-fit the bottoms (B) into the boxes. Then separate the sides (A) and bottoms, and finish-sand the inside faces of the parts. Mask the fingers [Photo B], and apply a clear finish to the inside faces of the sides and the bottoms. (We applied three coats of aerosol satin

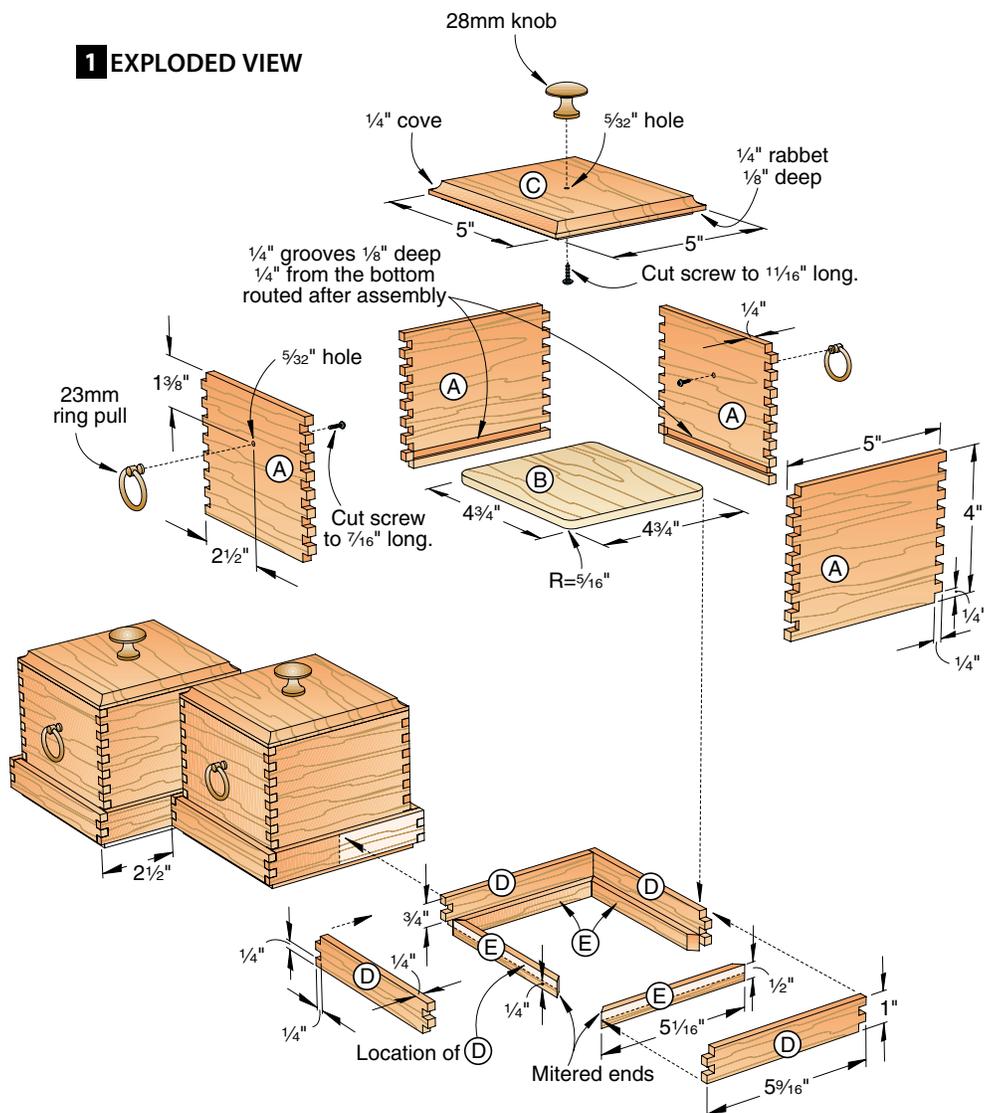
ROUT THE BOTTOM SLOTS



A Clamp each box together without glue, and use a ¼" box-slot bit to rout a slot around the inside for the bottom (B).



1 EXPLODED VIEW

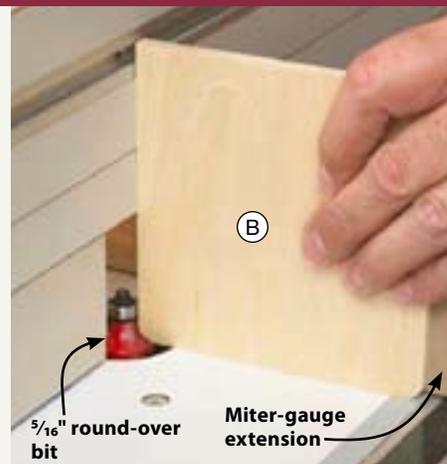


SHOP TIP

How to form perfect corner radii

Using a box-slot bit to form grooves in the box sides for the bottom saves you the trouble of filling in gaps at the corners, made by cutting the grooves on the tablesaw or router table with a straight bit. The trade-off is that you must round the corners of the bottom to match the radius of the slot bit. Here's a simple way to quickly form perfect corner radii:

Chuck a round-over bit that matches the radius of the slot cutter into your table-mounted router ($5/16$ " for this bit). Position the fence flush with the bit pilot bearing and parallel to the miter-gauge slot. Then attach an extension to the miter gauge with the end just grazing the face of the fence. Now,

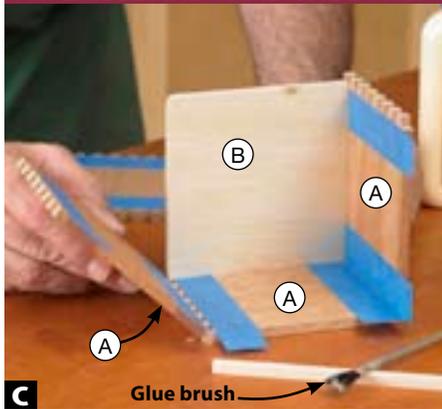


with the bottom (B) against the fence and backed by the extension, rout the corners, as shown above.

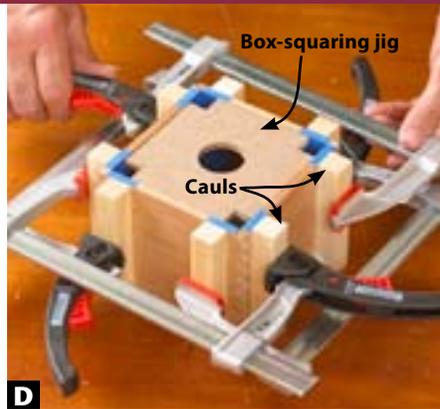
MASK THE GLUE SURFACES



B To protect the glue surfaces of the box sides (A) when finishing the inside surfaces, cover the fingers with masking tape.



C Protect the inside faces of the sides (A) with masking tape. Then brush glue onto the fingers, and assemble the box.



D Insert the squaring jig into the box. Then apply clamps, using scrapwood cauls to distribute the pressure.



E To prevent rounding of the corners and edges, adhere sandpaper to a flat surface, and finish-sand the outsides of the boxes.

lacquer, sanding with 320-grit sandpaper between coats.) Remove the tape.

5 Assemble the boxes [Photos C and D]. Then sand the outside surfaces flush [Photo E]. Use the same method to sand flat the top and bottom edges of each box. Now remove the squaring jig and masking tape, and drill holes for the ring pulls [Drawing 1].

6 Cut the lids (C) to size. Then chuck a $\frac{1}{4}$ " cove bit into your table-mounted router, and rout the top edges. [Drawing 1]. Switch to a rabbet bit, and rout the bottom edges. Now drill a hole into each lid for the knob. Finish-sand the lids.

Note: When routing the coves and rabbets, rout the end grain first, and use a follower block to prevent chip-out. Any chipping that does occur will be removed when routing the long-grain edges.

Make the bases

1 Cut the base sides (D) to length and $\frac{1}{8}$ " wider than listed. Then form the finger joints in the same manner as for the box sides (A).

2 Dry-assemble one base, and make a base-squaring jig [Drawing 2]. Then,

as with the boxes, apply masking tape to protect the inside surfaces of the base sides from glue, and glue and clamp the bases, inserting the squaring jig.

3 With the squaring jig in place, finish-sand the base sides. Then sand flat the top and bottom edges. Remove the jig and tape.

4 Miter the cleats (E) to fit inside the bases. Then glue and clamp them in place, allowing the cleats to protrude $\frac{1}{4}$ " beyond the bottom edges of the base sides (D) [Drawing 1]. Now glue and clamp the bases in the staggered arrangement shown. Place them on a flat surface to dry.

Finish and assemble

1 Inspect all the parts, and finish-sand where needed. Apply the finish.

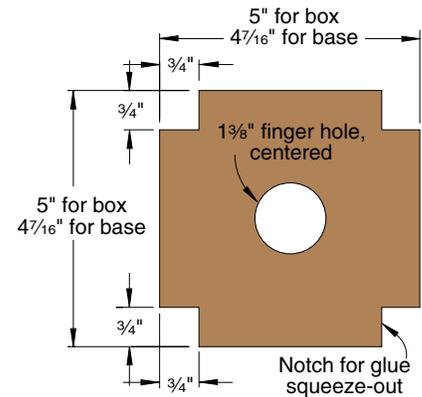
2 Cut the ring pull and knob screws to length [Drawing 1], and install the hardware. Place the boxes into the base frames, resting them on the cleats (E). 🌲

Written by **Jan Svec** with **Chuck Hedlund**

Project design: **Kevin Boyle**

Illustrations: **Roxanne LeMoine; Lorna Johnson**

2 SQUARING JIGS



Materials List

Part	FINISHED SIZE			Matl.	Qty.
	T	W	L		
A* box sides	$\frac{1}{4}$ "	4"	5"	M	12
B bottoms	$\frac{1}{4}$ "	$4\frac{3}{4}$ "	$4\frac{3}{4}$ "	BP	3
C lids	$\frac{1}{2}$ "	5"	5"	M	3
D* base sides	$\frac{1}{4}$ "	1"	$5\frac{9}{16}$ "	M	12
E cleats	$\frac{1}{4}$ "	$\frac{1}{2}$ "	$5\frac{1}{16}$ "	M	12

*Parts initially cut oversize. See the instructions.

Materials key: M—mahogany, BP—birch plywood.

Supplies: Masking tape, spray adhesive.

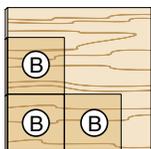
Blade and bit: Stack dado set; $\frac{1}{4}$ " box-slot, $\frac{5}{16}$ " round-over, $\frac{1}{4}$ " cove, and rabbet router bits.

Source

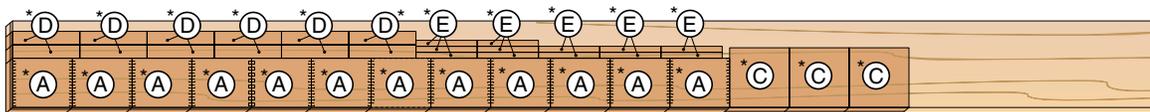
Router bit: $\frac{1}{4}$ " box-slotting bit no. 16J83.04, Lee Valley, 800-871-8158, leevalley.com.

Hardware: 23mm ring pulls no. 01A23.21, (6); 28mm knobs no. 01A03.28, (3). Lee Valley, above.

Cutting Diagram



$\frac{1}{4}$ x 12 x 12" Birch plywood



$\frac{3}{4}$ x $7\frac{1}{4}$ x 96" Mahogany (5.3 bd. ft.) *Plane or resaw to the thicknesses listed in the Materials List.

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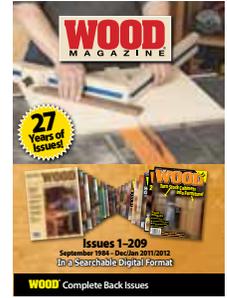
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