Combo Squares: The Basics and Beyond

Tips and tricks for getting better joinery from these must-have layout tools

BY TIMOTHY ROUSSEAU

Every fall, a new group of students begins the 12-week furniture-making program at the Center for Furniture Craftsmanship in Maine, where I teach. They spend the first few weeks learning to tune and use essential hand tools like chisels, planes, and saws. They also learn about layout tools, and it doesn't take them long to understand why one layout tool, the combination square, is perhaps the most useful of all. I know I couldn't work without at least one close to hand.

Checking for square

Because 90° cuts are so common and critical in furniture making, you'll use the combination square most often to verify the accuracy of corners and joinery.

Across the end grain. *The 12-in. square works best here. Hold the square's body in your dominant hand and press the head against the board's edge. Slide the blade down until it touches the end grain. If you see light coming through, the cut is not square.*

On the edge. *The technique used for end grain works here, too, but a 4-in. square is better because it's easier to balance on the narrow edge.*

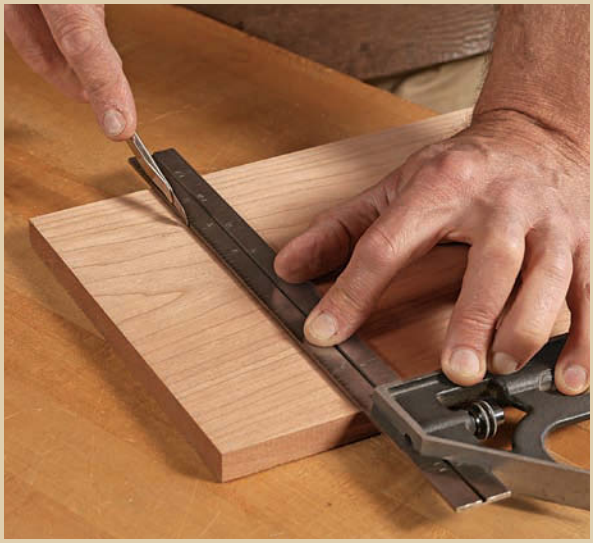
Photos: Matt Kenney

Joints need checking, too. *For inside corners, you'll need to push the blade into the body and lock it in place. This setup can be used to check dry-assembled cases and miter joints to determine if they're square.*

Make jigs accurate. *To square up a shooting board's fence, register the head against the runway and the blade against the jig's fence.*

Precise layout

Joints that come together without gaps start with accurate layout. The combination square can be used for laying out square shoulders, as well as case and frame miters.



How to hold the square. *When marking across a narrow edge, pinch the square's head against the board, using three fingers on the head and your thumb on the board. Use your index finger to hold down the blade (left). The grasp is nearly the same when marking across the face of a board. However, as your thumb can't reach the far edge, use it to help hold down the blade (right).*

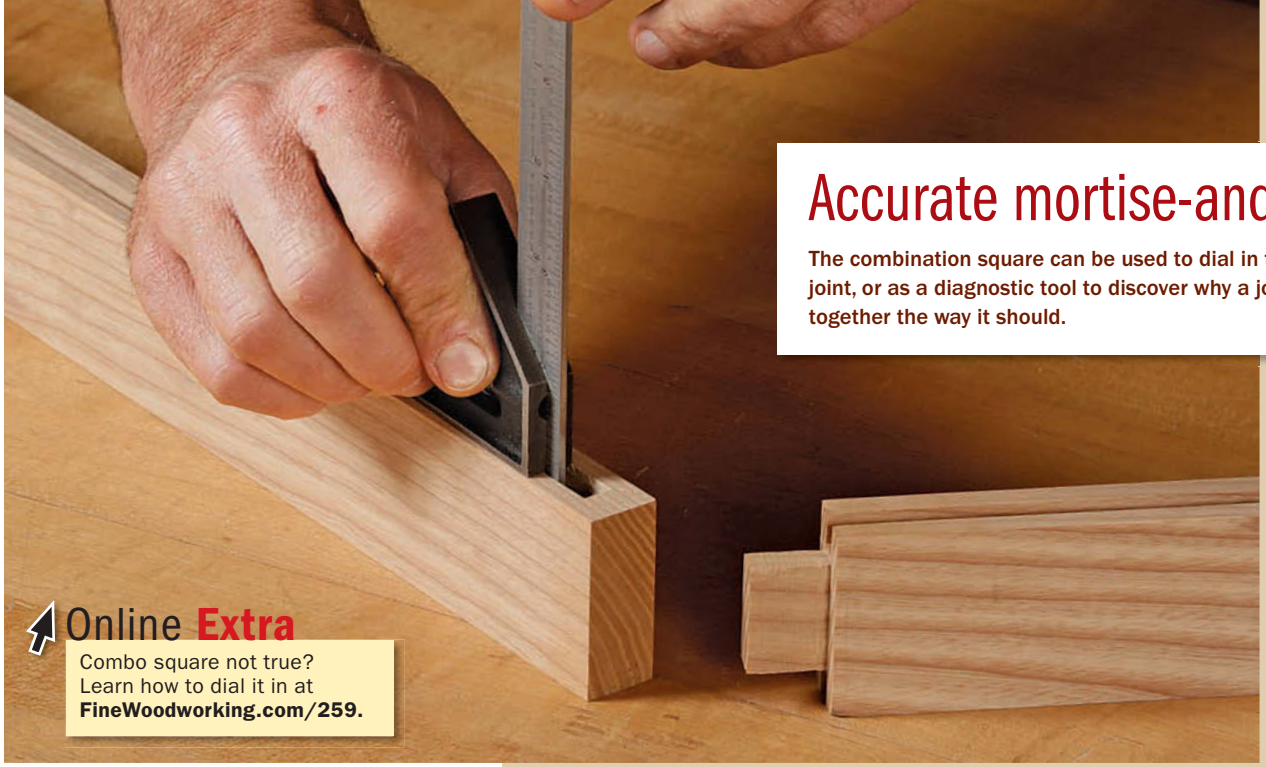
Two heads are better. *Rousseau puts two heads on a 24-in. blade to lay out joinery on wide panels. With this setup, it's a snap to lay out identical joinery at different locations, such as dadoes for shelves in case sides.*

Working with one head. *This is more accurate than using a ruler to locate a joint, because the head gives you positive registration off the end grain and is repeatable from one board to the next.*

MITER JOINTS

On edge. *The angled fence on a small 4-in. or 6-in. combination square is easier to manage when laying out a miter on the edge of a board, say, for a mitered dovetail. The grip is the same as it is for square layout.*

On the face. *Use the angled fence of a larger 12-in. square to mark wide miters like those for a picture frame. Use your thumb and index finger to offset the head's weight.*



Accurate mortise-and-tenons

The combination square can be used to dial in the fit of a test joint, or as a diagnostic tool to discover why a joint doesn't go together the way it should.

Measure the mortise depth. *Loosen the blade, place the head on the stile, and slide the blade down until it bottoms out in the mortise. Lock the blade.*

Online Extra

Combo square not true? Learn how to dial it in at **FineWoodworking.com/259.**

Compare it to tenon's cheeks. *If the head sits on the end grain while the blade hits the shoulder, the tenon is just right.*

Keep it centered. *Set the blade against one cheek (below), then check from the other side.*

Many woodworkers understand the fundamental uses for combination squares, such as laying out joinery or checking to see if the corner of a case is square. But they're good for so much more. I find them invaluable for diagnosing why a joint won't come together or close up without gaps, and for checking the joint's accuracy after it is assembled. Here, I'll help you master this fundamental tool. Once you do, the combination square will help you do better work.

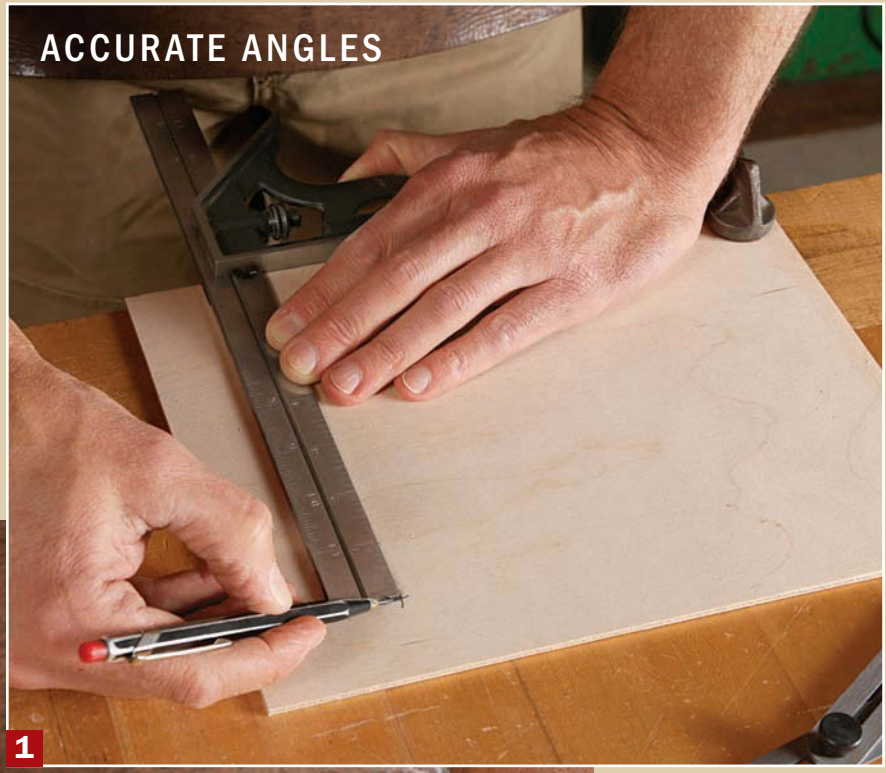
Start with a 6-in. square

Combination squares come in a variety of sizes, but the most useful sizes for furniture making are the 4-, 6-, and 12-in. models. Of the three, I use my 6-in. square the most. It's small enough to fit into joints like mortises and between dovetails, but it's big enough for machinery setup. It's also easy to control when laying out joints. However, I do use the 12-in. square often, and I keep a 4-in. square in my apron pocket to help fit dovetails and to quickly check edges for square. If you're just starting out, get the 6-in. combination square first, and then the 12-in. model. The 4-in. square can wait.

The rule etched into the blade of a combination square is available in a dizzying array of scales, but almost all of them are meant for machinists and other metalworkers. As a woodworker, you should get the "4R Grad" rule, which has 1/8-in. and 1/16-in.

Dialing in dovetails

The combination square is a handy aid from beginning to end. You can use it to help with layout, to check for high spots on shoulders, and for cheeks that bulge.



Slick trick for dovetails. *The 1-in.-wide blade of a 12-in. combo square can be used to set a bevel gauge to common dovetail angles such as 1:6 and 1:8. Extend the blade so that its length matches the slope number (6 in. for 1:6). Then mark on both sides of the ruler at the board's edge, along the sides, and the top edge (1). Use the square's blade to draw a line from the bottom corner on one side to the top corner on the other side (2). Place the bevel gauge's body against the board's edge and angle the blade to match the sloping line (3). Now you're ready to lay out some dovetails.*

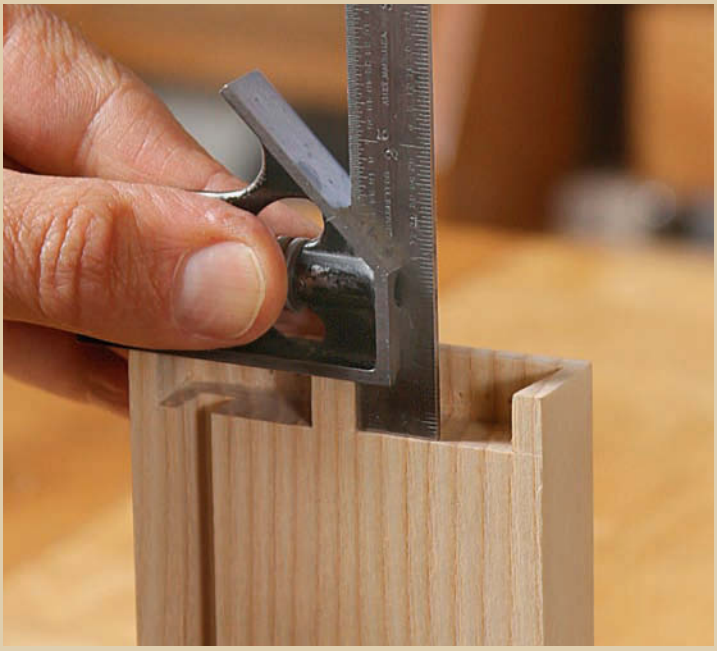
increments on one side and 1/32-in. and 1/64-in. increments on the other.

If you're in the mood to lavish yourself with a specialized tool, get a combination square with a 24-in. blade. With a second head attached, it becomes a great layout tool for case joinery.

As for what brand to buy, I've had good luck with Starrett combination squares, and I recommend them to my students.

Keep the shoulders square. *Press the head against the tail board's surface and lower the blade. Run it back and forth to find high spots.*

How flat is the webbing? *Extend the blade to match the length of the tails. With the head on the pin board, slide it through the socket to determine where to pare.*



Check the cheeks, too. *With the head on the end grain, you can check them for plumb. You also can check the shoulder this way.*

A good grip improves accuracy

The head of a combination square is much heavier than the blade. Because the head hangs off the side of the board during layout, it can be tricky to keep the square steady, especially since you hold it with your non-dominant hand. Not steadying the head can lead to bad layout.

The solution is to use your pinky and the two fingers next to it to press the head against the edge of the board. If the board is narrow enough, reach across it with your thumb and pinch the board between your thumb and the square's head. Press down on the blade with your index finger. This grip keeps the square tight against the board with the blade flat on the workpiece, which allows you to use your other hand to get a precise mark with a pencil or knife. If the board is too wide to pinch, then use your thumb and index finger to press down on the blade.

You're now ready to put the combination square to use for laying out joints and checking their accuracy. □

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