Drop-leaf tables are great multitaskers; lift the leaves to fit a few more chairs or drop them to make space. This action hinges, literally and figuratively, on the rule joint. The joint—consisting of a fillet and a radius on the top, and a mating cove on the leaf—gets its name because it resembles the knuckle joint on the end of old-fashioned folding rulers.

The fact that this joint has been used for centuries testifies to its functionality and durability. Unlike square edges, it looks good whether the leaf is up or down. The mating edges also support the leaf along its entire length, eliminating stress on the hinges when the leaf is up. In the down position, the coved end hides the hinges and helps deflect debris that would interfere with the joint.

Rule joints aren’t difficult to make, but there are some pitfalls that can keep a joint from operating like it should. Here’s a simple step-by-step approach to ensure success, plus some tips to tune a joint to perfection.

Lay out the joint
Before starting your router it’s necessary to understand the mechanics of this folding joint. As shown in Figure 1, a rule joint consists of a beaded board (the top), a coved board (the leaf), and a drop-leaf hinge. The joint revolves around the barrel of the hinge.

In a perfect world, the hinge pin’s center point would align perfectly with the center point of the round-over and cove. In reality, such precise positioning does not allow for wood movement, finish thickness, or crumbs that find their way into the joint. It’s best to nudge the centerline of the pin about 1/32” towards the edge of the table. This causes the leaf to move away from the top as it travels to the down position. The extra clearance also helps prevent binding when raising and lowering the leaf.

Figure 1: Rule Joint Anatomy

Tip Alert
Milling extra stock and making a test joint save time. These steps will help you work out the joint’s geometry. The test pieces also serve as gauge blocks to quickly duplicate bit and fence settings.

Note, too, that hinge leaves aren’t always flush with the underside of the top and leaves; they’re more often mortised deeper, as shown above. This is because the mortise depth is determined by the joint’s horizontal centerline. The
centerline is based on the fillet thickness and joint radius, not the hardware thickness (see “Matching The Joint To Your Top,” right). Should you wind up where the hinge sits proud of the tabletop, decrease the fillet dimension or use a smaller radius to “sink” the hinge.

Prepare the panels and rout the profiles
Exact top thickness isn't critical, but you do want to make the top and leaf flat, straight, and the same exact thickness.

After preparing your stock, make a set of gauge blocks to match your sketch. Next, use a handheld router and round-over bit to rout the top (Photo A). To rout the cove on the leaf (Photo B), set your router’s depth stop close to what you need and take incremental cuts until the stop bottoms out. To find the exact depth, set your gauge block against your leaf and use a feeler gauge as shown in Photo C and Inset.

Finally, mark the horizontal centerline on the edge of the top.

Match the Joint to Your Top
There are no hard-and-fast sizing rules for rule joints. Fillet sizing involves a balancing act between available bits, the center point of the hinge pin, and aesthetics. I think a ⅛” fillet looks good on a ¾”-thick top, but it’s common to find antiques with ¼” fillets. A beefier ¼” fillet works with a 1”-thick top, but you can reduce the depth to ⅛”.

Here’s some fillet and bit information to get you started. To compare the different looks, draw the joint full-scale before you buy your bits. A sketch can also prevent layout and routing mistakes. Finally, make a sample joint to check the look and fit.

<table>
<thead>
<tr>
<th>Top Thickness</th>
<th>Fillet Size</th>
<th>Radius</th>
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<tbody>
<tr>
<td>⅛” thick top</td>
<td>¼” fillet</td>
<td>⅜” radius</td>
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<tr>
<td>⅛” thick top</td>
<td>¼” fillet</td>
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<tr>
<td>1” thick top</td>
<td>⅛” fillet</td>
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</tr>
<tr>
<td>⅛” fillet</td>
<td>¼” radius</td>
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and remove the small amount of material that was left uncut by the round-over bit as shown in Photo D. (If this material isn’t removed, the leaf will bind as it’s raised or lowered.)

**Locate and mount the hinges**

Drop-leaf hinges differ from butt hinges in that the metal leaves have different lengths. The short leaf and hinge barrel are mortised into the top (see Figure 1). The longer leaf, mortised into the table leaf, spans the coved edge and enables the table leaf to swing down under the edge of the top.

Installation starts with positioning. For good support and stability, locate the hinges 3” to 4” in from the ends, about every 10” along the run of the leaf. Lay out the hinges to set the spacing and mark the locations with a pencil. Next, set a marking gauge to the centerline of the hinge pin/radius minus ½” and scribe a line as shown in Photo E at each hinge location.

Using a trim router outfitted with a ¼” diameter straight bit, adjust the fence so the bit is centered on the scribed line. Set the bit depth to accommodate the hinge barrel. (Don’t forget to include the mortise depth of the hinge). Now tilt or plunge the bit into the underside of the top at the left edge of the hinge location and rout the recess for the hinge barrel from left to right as shown in Photo F.

After you’ve routed all of the barrel mortises, butt the leaf against the top and clamp the two parts together. Lay the hinges in place and scribe around them with a utility knife. Unclamp the parts and rout to depth, determined when making the test joint for the hinge leaves as shown in Photo G. Clean up to the edges and square the corners with a chisel.

**Screw the joint parts together**

Place the top and leaf face down on the bench, lightly clamp the parts together, and lay the numbered hinges in their respective mortises. Using a Vix bit, drill one pilot hole in each hinge leaf and then install the screws as shown in Photo H.

Flip the assembly over and test the action of the leaf. To find and fix spots where the top and
Drop-leaf hinges run from $5 per pair for rolled steel hinges to $30 apiece for precision brass. It’s OK to go cheap, but less-expensive hardware requires some minor modifications.

First, steel hinges are rarely flat—the bottom of the barrel protrudes past the bottom of the hinge leaf. This problem can be easily remedied by clamping the hinge in a vise and giving it a few raps with a piece of wood and a hammer. Do this on both leaves until the leaves and barrel are in the same plane. It doesn’t take much to flatten; check your progress with a straightedge so you don’t go past your mark.

Another hurdle with cheap hardware: the heads of the supplied screws don’t fit the countersunk holes. To fix this, chuck a countersink in your drill press and make the recesses deeper so that the screw heads sit flush.

Remove as little material as possible—reattaching the leaf and checking the fit several times is better than creating a larger gap.

Finally, use a straightedge to check that the leaf and top are in the same plane. Chances are good that there may be some areas where there’s a bit of misalignment, but in most cases it’s easily leveled with a cabinet scraper. When everything looks right, install the remaining hinge screws, and (if necessary) trim the top assembly to final length. Now finish-sand the leaf/top assembly.

Help with Hinges

Use a hinge-mortising bit to rout out the bulk of the hinge-leaf recesses. Pare up to the lines with a chisel.

Not quite flat

Install one screw in each leaf to check the fit. Label the hinges so that they’re reinstalled in the same mortises.

Flat
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