



clean-cut Box Joints

Box joints have a prominent place in wood-working. And there's a good reason for that. The interlocking pins and slots provide ample glue surface that virtually guarantees a rock-solid, long-lasting joint. To top it off, box joints showcase the contrasting end and face grain of the wood.

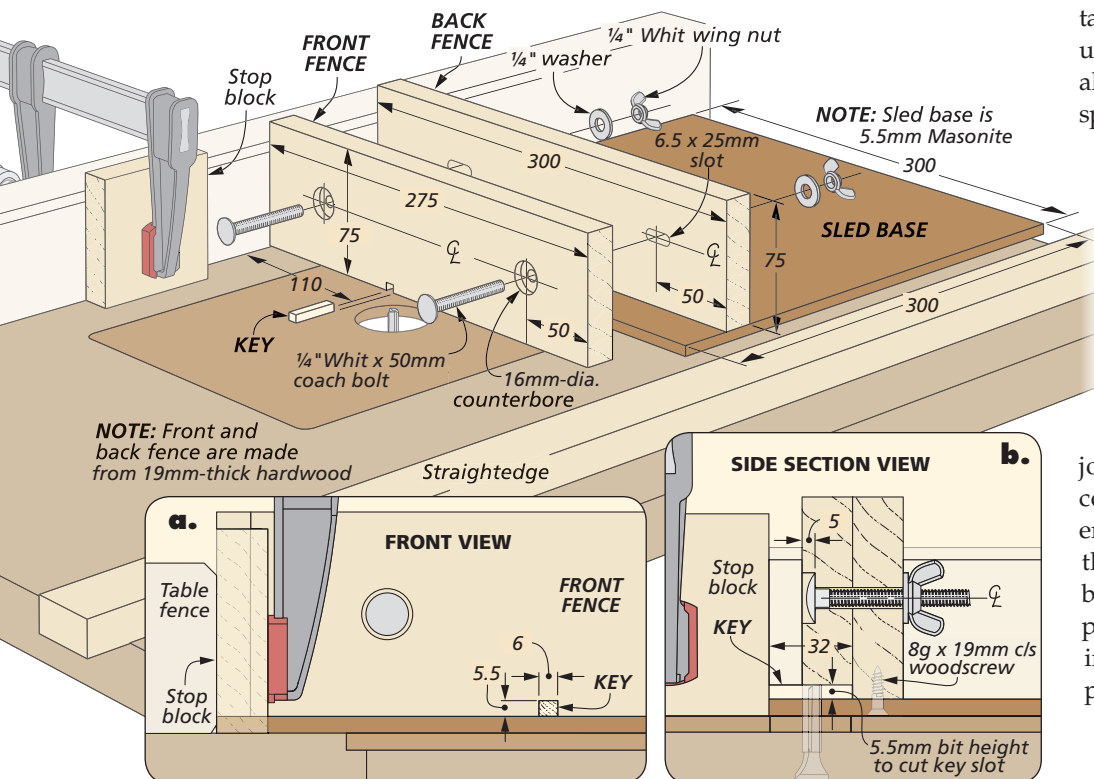
METHOD OF CHOICE. Box joints can be made by any number of different techniques. The table saw with a dado blade is certainly one option for cutting the slots in workpieces over 12mm-thick. However, when working with small, thin workpieces, my preferred method is to make box joints at the router

table using a straight bit and the simple jig shown above and in the drawings below. The straight bit creates nice, crisp corners in the workpieces.

IT'S ALL IN THE JIG. The key to achieving precise, snug-fitting joints lies in the careful construction and set-up of the jig. As shown below, the jig consists of a fixed rear fence attached to a Masonite sled. The sled is sized to slide between the router table fence and a straightedge clamped to the table surface. The rear fence features slots used to attach the front fence. These slots allow easy side-to-side "tweaking" of the spaces in between the cuts.

The front fence is the critical part of the jig. It holds a hardwood key used to index the workpiece after each pass. The key is offset from the router bit by exactly the width of the cut. The fence not only controls the spacing of the pins in the joint, but also backs up the workpiece to prevent tearout during the cuts.

I sized my jig to make 6mm box joints in 6mm-thick material, but it could easily be modified to make different width box joints simply by replacing the front fence and key. The details for building the jig are covered on the next page. Then it's just a matter of following a few simple guidelines to turn out perfect box joints.



THE SETUP

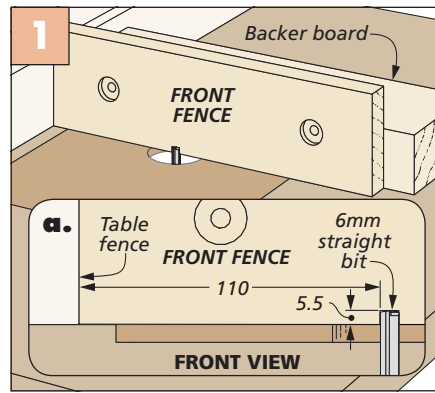
Start by routing the slots in the back fence and attaching it to the sled base with screws. The drawings at right show the remaining steps to build and set up the jig on the router table. With the counterbored holes in the front fence located and drilled, I installed a 6mm straight bit in the router table to cut the notch that holds the hardwood key. Figure 1 shows how I used a thick backer board to hold the front fence upright and keep it square to the router fence and set up the jig on the router table. With the counterbored holes in the front fence located and drilled, I installed a 6mm straight bit in the router table to cut the notch that holds the hardwood key. Figure 1 shows how I used a thick backer board to hold the front fence upright and keep it square to the router fence and set up the jig on the router table.

The router bit height should now be set slightly above 6mm, measured from the top of the sled base. This allows the pins to run a little long. It's easy to sand them flush after assembly. The next step is to set the distance between the bit and the key (Figure 2). This establishes the width of the pins. Since it's such a critical measurement for the success of the joint, I used a brass set-up block to set the initial position of the router fence.

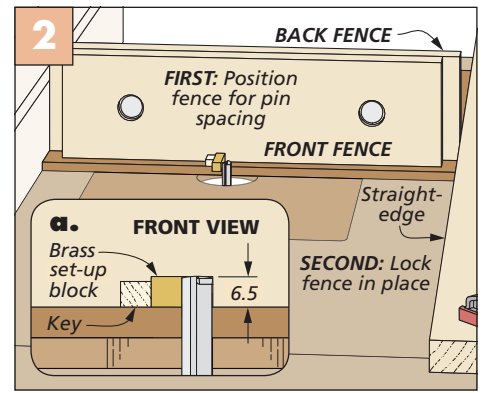
Instead of just sliding the jig along the fence, a straightedge clamped to the table effectively "traps" the jig and keeps it from shifting as the cut is made. Just be sure the jig slides freely along the length of the router table.

TEST RUN. To finetune the jig, you'll want to have test pieces on hand that are the same thickness as your final workpieces. A stop block clamped to the router table fence is also a good idea to keep from cutting through the rear fence (main photo, opposite page).

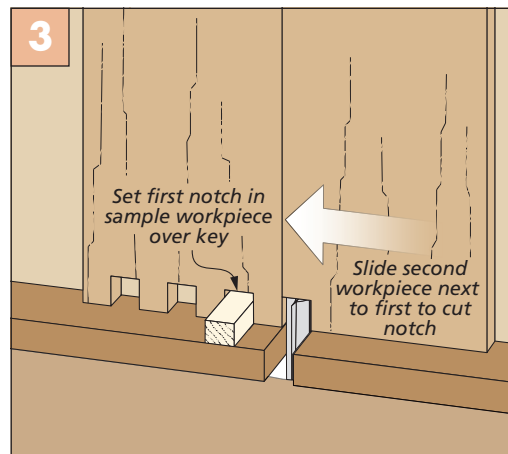
To make a test joint, butt one piece up against the key and cut the first slot. Reposition the piece so the newly cut slot straddles



Cutting Key Slot. A thick backer board keeps the workpiece upright and square to the router table fence.



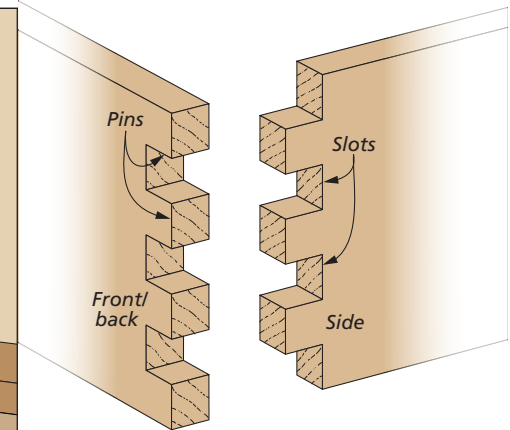
Position Fence. Use a set-up block to aid in positioning the router fence. Then clamp the straightedge to the table.



Trial Run. After cutting the slots in one sample piece, use that piece to help locate the starting position for the mating corner workpiece.

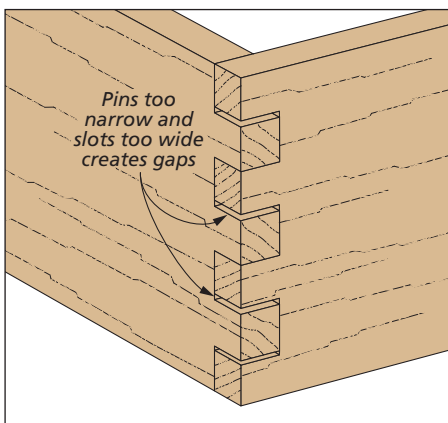
the key and make another pass. Figure 3 shows how to position the first test piece to help start the same process on the mating corner piece.

MAKE ADJUSTMENTS. The drawings below show the most common reasons a box joint doesn't fit together snugly. If the joint

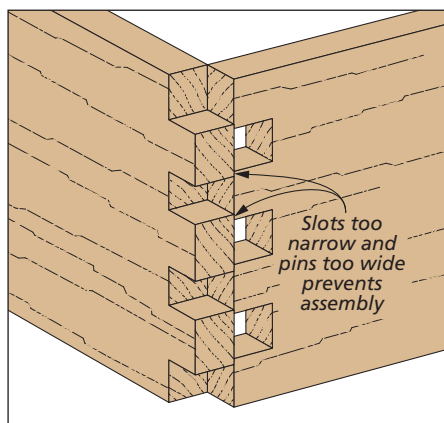


▲ **Box Joint Anatomy.** Slots and pins interlock to form the box joint.

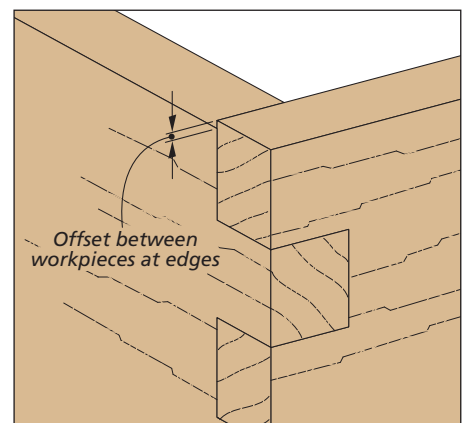
is too loose, move the key away from the bit. Likewise, if it's too tight, move the key closer to the bit. This can be done by loosening the wing nuts and sliding the front fence in the desired direction. Just don't go overboard with these adjustments. A tiny tweak is generally all that is needed.



Too Loose. A gap between each pin and slot is caused by a key that's too close to the router bit.



Too Tight. If the pins won't fit in the slots at all, the key is set too far away from the router bit.



Offset. An offset can be caused by not having one (or both) workpieces fully seated against the key.

BOX JOINT METHOD

With the router table jig tuned up and cutting snug-fitting joints, you're just about ready to start working on your project. But before the sawdust starts flying, there are just a few points to keep in mind while working.

STAY ORGANISED. Unintentionally cutting parts in the wrong sequence makes a project go downhill quickly. The best way to avoid this is to label every piece. I also letter the matching corners of the project as shown at right.

BE CONSISTENT. It's also important to stay consistent with each pass of the jig over the bit. Even slight changes in the pressure applied can affect the fit of the box joint. Hold the jig with both hands and perform each pass exactly the same.

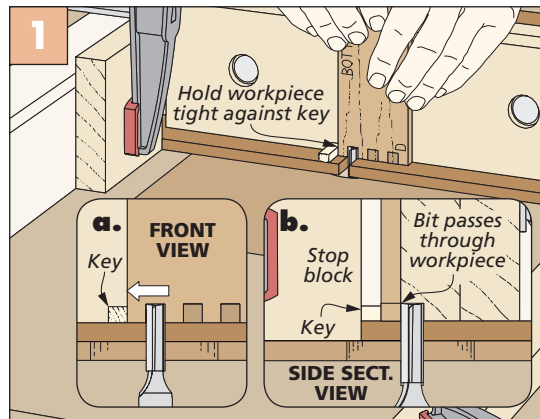
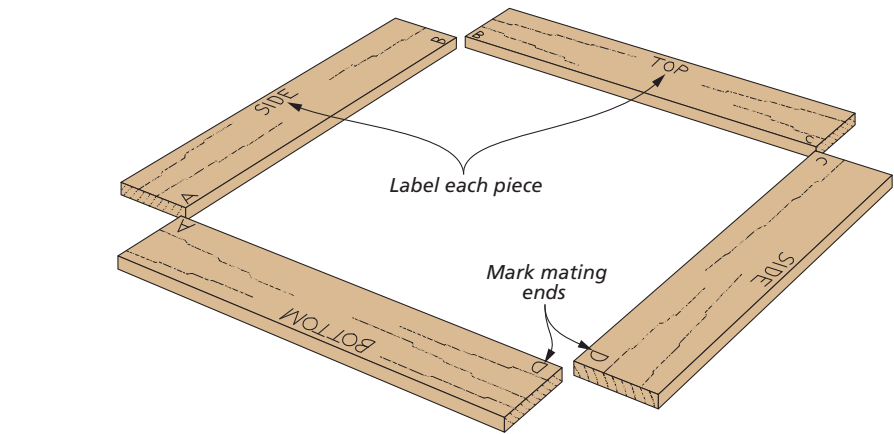
FULL PINS & SLOTS. Because the eye is naturally drawn to the alternating grain of a box joint, visual accuracy is more important than dimensional accuracy. This simply means that there should be a full pin or full slot at the top and bottom of the workpiece.

This is fairly easy to achieve when working with narrow parts, like the pieces of the Christmas Boxes in issue 153. As parts become wider than 100mm, however, it's a good idea to start with extra-wide workpieces and trim them to size after the box joints are cut. With these precautions in mind, it's time to build a box.

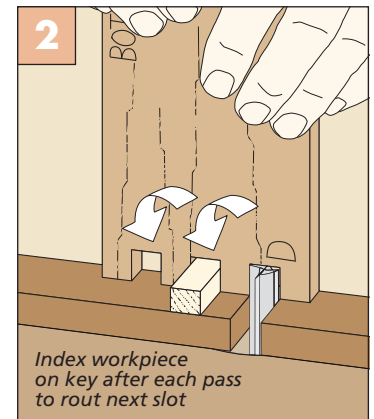
TOP & BOTTOM FIRST. Figure 1 shows how the first piece is positioned against the key and fence to make the first pass on the top and bottom workpieces. After the first cut is made, simply position it over the key (Figure 2) and continue down the workpiece. To cut the slots on the other end, flip the workpiece end-for-end (Figure 3), making sure you start with the same edge against the key as before.

SIDES UP NEXT. The technique for cutting the side pieces starts out slightly different. Since the top and bottom began with a full pin on each edge, the sides will start with a slot. To make this cut, you'll use one of the top or bottom pieces as an index.

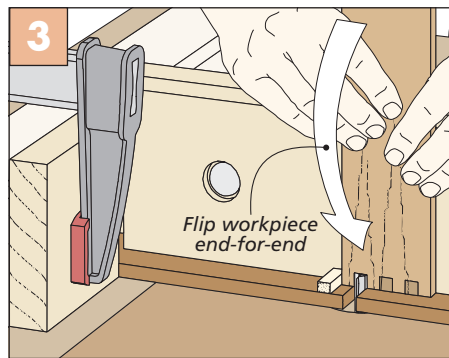
Figure 4 shows exactly what this set-up looks like. Position a top or bottom workpiece over the key and butt a side piece up against it. Hold the pieces tight to the fence



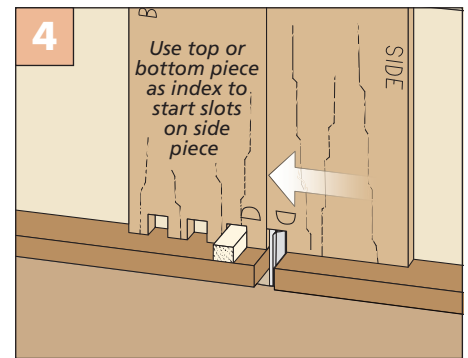
Front & Back. For the first slot in the top (or bottom), hold the workpiece tight against the key and firmly against the fence.



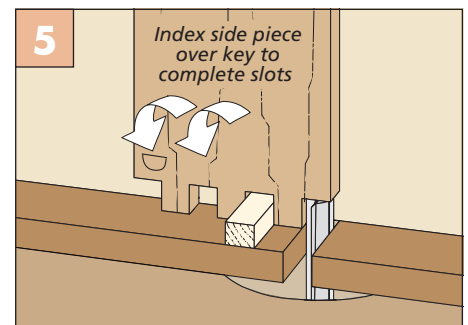
Index. For the next slot, lift the workpiece, slip it over the key and make another pass.



Flip It. The matching slots on the opposite end are cut by flipping the workpiece end-for-end and repeating.



First Cut in the Side Piece. Locate the first slot in the side piece by using the top or bottom as an index.



Complete the Sides. The process continues as before: slip the notch over the key for each subsequent cut.

and make the cut. The rest of the cuts on the side pieces are made the same as on the top and bottom. Simply hop the workpiece over the key (Figure 5) and continue down the edge until all of the slots are done.

When you flip the side piece to complete the cuts on the other end, be sure to index the workpiece against the same top or bottom piece you used previously to keep the cuts consistent.

BUILD A PROJECT. With this handy jig at your disposal, you're ready to tackle a project that requires box pin joints.