



Biscuit Basics



This versatile and speedy system handles all the joints in plywood casework

BY TONY O'MALLEY

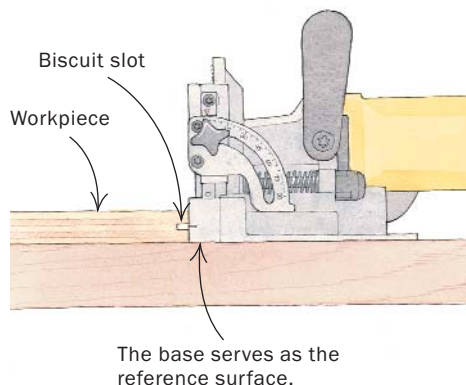
When I started my first job in woodworking in 1984, the biscuit joiner, also called a plate joiner, was just arriving on the shop scene. The company where I learned the trade still was using rabbet and dado joints to assemble plywood case goods. It's a tried-and-true system but one we abandoned forever after discovering the manifold benefits of biscuit joinery.

First, by using biscuit joints instead of rabbets and dados, every joint is a butt joint, which makes calculating dimensions from a measured drawing much less painful and error-prone—no more adding and subtracting to account for dados and rabbets. Second, biscuit joinery allows you to move a stack of freshly cut parts directly from the tablesaw to the workbench, where all of the joinery work can be done (maybe not a big deal in a one-person shop, but a definite advantage in a shop where coworkers are waiting to use the saw). Third, there's no need for dado blades and the finicky process of getting the fit just right. Fourth, biscuit joinery eliminates the frustrating task of sliding large workpieces across the saw to cut joinery. Sure, you can avoid

ALIGNING BISCUIT SLOTS

THE BASE IS A CONSTANT REFERENCE

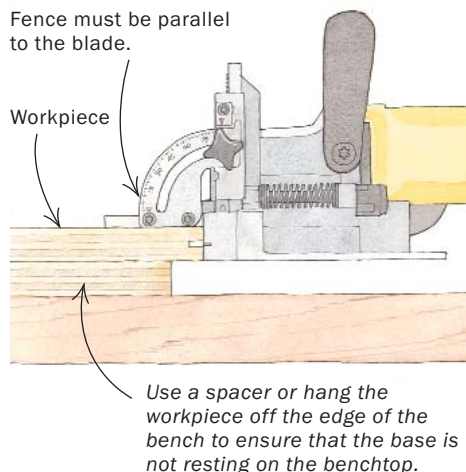
Try to rely on the base of the machine as the reference surface. This generally is a better approach because the distance between the blade and the base does not change, whereas the fence is movable.



The standard position is shown at left. To cut the mating slots, the workpieces or the tool (above, with the help of a jig) must be positioned vertically.

THE FENCE OFFERS FLEXIBILITY

Make sure your fence is reliable, and be sure the base isn't getting hung up on the benchtop or another workpiece below.



Fence adds convenience. If the fence is used for both cuts (left and above), the workpieces can remain flat without the need for jigs.

these last two problems by cutting rabbets and dados with a router and T-square guide, but biscuiting is much faster. Fifth, assembling a case with rabbets and dados, no matter how finely fit, always requires some extra effort to get the case clamped up squarely—the joints just seem to lean a little bit on their own. A biscuit-joined case, in contrast, almost always clamps up squarely right from the get-go (assuming your crosscuts are square, of course).

But the biscuit joiner's usefulness goes far beyond joining carcasses. From strength-

ening miters to joining panels, from assembling face frames to attaching them to cabinets, this versatile tool can be a major player in your shop's lineup. As a colleague recently observed, the biscuit joiner may be the most significant tool development for the small-shop woodworker since the invention of the router.

I should point out that dovetails and mortise-and-tenon joinery remain the best

approaches for solid-wood furniture construction. But the biscuit joiner can handle all of the joints in a basic plywood cabinet—from the case to the shelves or dividers to the face frame, the base molding, and even a drawer—with the exception of the door, which requires traditional joinery for additional strength.

What to look for in a biscuit joiner

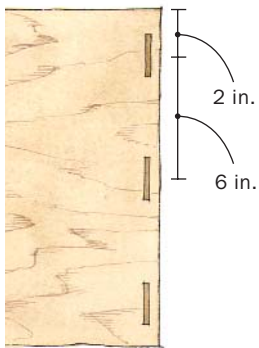
Most of the time, the base of the machine can be used as the reference surface for making a cut. In most machines this positions the slot in the center of 3/4-in.-thick

Watch it on the Web

For video tips on using a biscuit joiner, go to www.finewoodworking.com.

LAYING OUT BISCUIT SLOTS

HOW MANY BISCUITS?

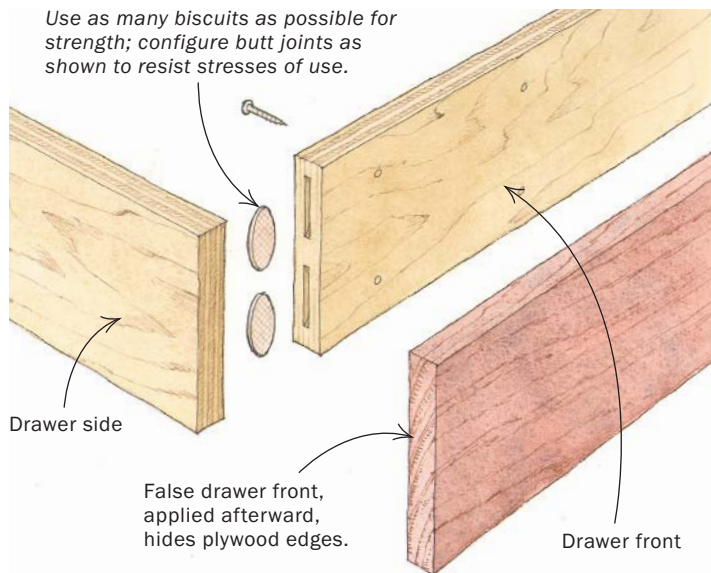


A good rule of thumb for carcass construction is to use at least one biscuit for every 6 in. of width. Locate them close to the front and back edges to keep the corners aligned, unless screws are used for assembly.

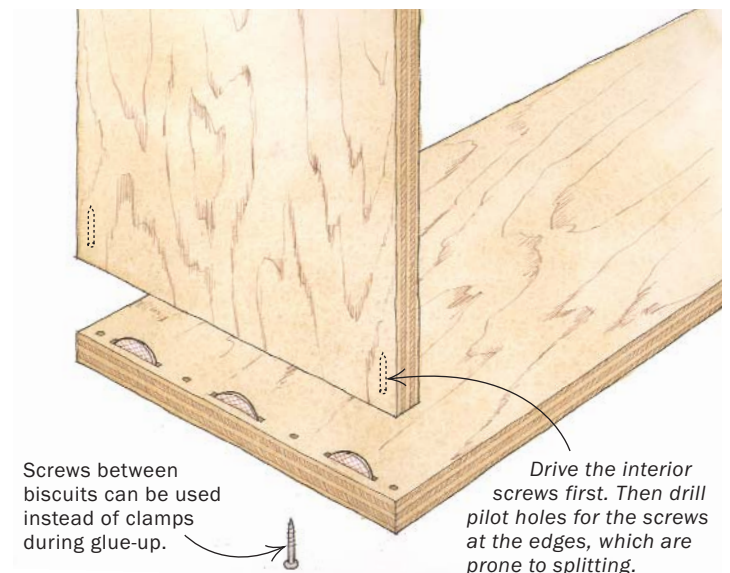


Layout tricks. For this carcass, only the center of three biscuits must be marked. To locate the outside biscuits, line up the edge of the tool with the edge of the stock. Mark the pieces as a group, first on their ends (left), carrying the marks onto the faces where necessary (right).

DRAWER-BOX CONSTRUCTION



CARCASS CONSTRUCTION



Two ways to locate dividers and shelves

Cut slots for a single shelf or divider all at once. After laying out all of the pieces and cutting slots in the divider or shelf, clamp the case parts together and use a long straightedge as a fence for the tool.



A jig to locate multiple fixed shelves. For a symmetrical series of shelves, use a piece of sheet stock that reaches to the center shelf. A small cleat at the end locates the jig accurately each time (right).

stock. However, a fence mounted onto the face of the tool provides more versatility in positioning the slot. So it is very important that the machine cut a slot parallel to both its base and its fence; otherwise, joints won't line up properly. (For a review of biscuit joiners, see *FWW* #151, pp. 58-63.)

Not all machines are created equal, and it's worth the time and effort to check that a new machine is accurate, and return it if it's not.

Joining cases and boxes

When joining parts to form a case or drawer box, the first step is to mark the slot locations on all of the parts. Often, this can be done simply by aligning the two pieces as desired and then drawing a small tick mark across the mating edges. However, for casework, where there are several of the same type of piece—sides and shelves, for example—it helps to develop a system (see the drawings and photos on the facing page).

How many biscuits and where?—Biscuit joints in case goods supplant conventional joints like the dado, the rabbet, and the splined miter. These are long joints, and it seems logical to cram in as many biscuits as possible, but it's not necessary. Biscuits are manufactured by compressing the wood slightly so that upon gluing there will be a predictable amount of swelling. This swelling makes the joint at every biscuit stronger than a conventional wood-to-wood bond. My loose rule of thumb for case material is to use one biscuit for every 6 in. of width.

This is fully adequate, especially when using screws instead of clamps to pull together the cabinet during glue-up. When I can't use screws to clamp and reinforce the joint—when the sides will be exposed—I don't use more biscuits; instead, I position the end biscuits as close to the edge as I can.

Whenever possible, use the base of the tool as a reference—To cut biscuit slots along the edge of a workpiece, you have two choices: You can use the machine's fence or the machine's base to position the slots. Whichever you choose for any given joint, you need to use the same reference for both sides of the joint. Remember, too, that the reference surfaces

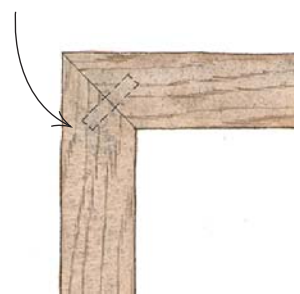
JOINING MITERS



STANDING MITERS

To use the trusty base as a reference, clamp two pieces with their inside faces together, aligning them carefully. Then the biscuit joiner can rest in the 90° notch to cut slots in both miters.

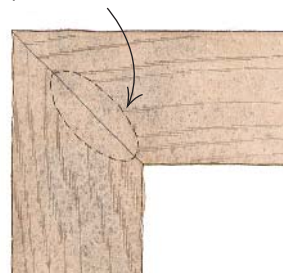
Biscuits are sized and located to avoid breaking through the outside faces.



FLAT MITERS

Clamp down workpieces for safe and accurate results. Be sure to keep the tool pressed firmly in place throughout the stroke.

Locating biscuits closer to the inside of the miter allows the outside edges to be profiled or molded.



GLUING MITER JOINTS

End grain can drink up glue, starving the joint. Prevent this by brushing a thinned wash of glue on the joint and letting it glaze over before applying glue at regular thickness. Don't forget to put glue on the biscuits as well.

JOINING AND ATTACHING FACE FRAMES

BISCUITS KEEP PIECES FLUSH



Narrow frame pieces require smaller, non-standard biscuits. The Porter-Cable 55K Plate Joiner includes a smaller blade for joining pieces as narrow as 1½ in.

Determine where the biscuit will begin and end. Allow extra room at edges that might be molded later, which could expose the biscuit. Mark the center of the slot, and then transfer the mark to the mating piece.



on the workpieces should be the outside face and edge because they must end up perfectly aligned.

For most biscuiting tasks, you can rely almost solely on the base of the machine as the reference surface. Even on inexpensive biscuit joiners, the base usually is parallel to the blade. However, some fences are less reliable than others in terms of being perfectly aligned with the blade and staying locked in position. It's also easy to rock most biscuit joiners out of alignment when using the fence on the edge of a ¾-in.-thick panel; cutting those same slots with the base of the machine flat on a bench is a more stable and reliable approach.

When using the base as a reference, a biscuit joiner automatically places the center of the slot ⅜ in. from the bottom edge of the stock. To change that dimension, use thin stock such as hardboard to shim the machine or the workpiece to the proper position.

When joining box sides, cutting slots in the ends of panels is simple using the base, but cutting the opposite side of the joint—into the face of the panel—requires either holding the part on end or laying the part flat and orienting the machine vertically. For tall pieces the latter option is easier; so make a simple L-shaped guide to keep the

machine perpendicular to the workpiece (see the top right photo on p. 67).

Building and attaching a face frame

Biscuits can be used both for joining face frames and for locating a face frame on a cabinet. When assembling a face frame, use the largest biscuit that the stock will accommodate. In most situations, you don't want part of a cutoff biscuit showing at the corner of the frame. So narrow face-frame stock may require using the small biscuits designed for face frames (they require a smaller cutter). On wider stock, one of the standard three sizes should work fine.

Just a few biscuits to locate a face frame—When attaching face frames to cases, I generally rely on the long glue joint for strength, using a few biscuits to keep the frame from sliding around during the glue-up. A complete row of biscuits up and down every side would be overkill and would make it harder to fit the face frame to the case.

First, cut the slots in the case sides. This can be done before or after the case is assembled. Then glue up the face frame and lay it on the case to check the fit around the edges. Sometimes I build the frame to create a ⅛-in. to ¼-in. overlap on the outside of the case, which is fairly typical of

kitchen-cabinet construction. Other designs require that the face frame be flush on the outside. Still other times I allow a very large overlap for scribing a built-in cabinet to a wall. If there is overlap, use plywood or medium-density fiberboard (MDF) shims to raise the base of the biscuit joiner the appropriate amount when cutting the slots in the face frame.

Mitered joints

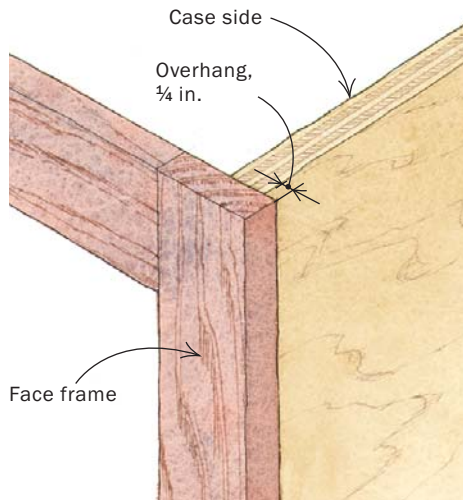
Miters provide clean-looking joinery in numerous situations. However, having an equal combination of end grain and long grain, miters need more than glue to hold them together for the long run. Biscuits are the perfect way to reinforce them.

There are two different types of biscuit miters, and plywood cabinets use both of them. Face frames often feature flat miters for a picture-frame effect. And base moldings usually have standing miters at their corners. Of course, both types of miters are used elsewhere in woodworking—in boxes, frames, and other moldings—and biscuits can be used for these, too.

Biscuiting flat miters—Once the stock has been mitered, determine which size biscuit will fit best. Be sure to factor in any shaping that may be in store for the assembled frame (rounding over or rabbeting,

BISCUITS ALIGN THE FRAME AND CASE

For an overlapping face frame, offset the biscuits. The stiles on this shop cabinet will overhang the sides by $\frac{1}{4}$ in., which must be factored in when locating the biscuit slots.



for instance). Usually, it's necessary that the biscuit be concealed in the stock. Remember that even a #0 biscuit is better than no reinforcement at all.

Biscuiting standing miters—The outside corner on a base-molding assembly is a typical situation for a standing miter reinforced with biscuits. I also use biscuits to reinforce mitered case corners, instead of the more conventional continuous spline. With base moldings, the bottom edge of the stock won't show, so you can use a larger biscuit and let it extend out the bottom. A bigger biscuit gives you a deeper and stronger joint, and the excess is easily trimmed with a flush-cutting saw or utility knife.

The main layout principle is to position the biscuit slots off center, closer to the inside of the miter; otherwise, you risk cutting through the face of the stock.

The best technique for biscuiting standing miters depends on the size of the stock and the configuration of the fence on your machine. Some fences offer a fixed 45° position, while others are adjustable. Some fences have a solid face, while others are an open frame. And the thicker and wider the stock, the more bearing surface you have for the fence to register on. □

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Use the tool's base as the reference. Cut the slots in the case as usual, but place a $\frac{1}{4}$ -in.-thick shim under the tool when slotting the face-frame stiles.



Only a few biscuits are necessary. These serve primarily to keep the frame and case aligned during glue-up. Use plenty of clamps to distribute pressure. The glue-up will go more easily if the piece is on its back with room all around for clamps.