

## REINFORCING THE CORNERS OF FLAT FRAMES

There are a number of different methods that may be used to join flat frame sides together. As most Woodworkers know, "end grain" glue joints are not nearly as strong as glue joints made with the grain. As a result, we need to find ways to make the joints on our frames stronger than they would be if we just glue the sides together.

*For years, I tried everything I could think of to reinforce the corners of frames. This is due to the fact that most wood glues work very well for joining the edges of boards, but not very well joining the ends of boards. Thinner glues will get absorbed into the end grain of the wood, weakening the joint between the ends of the pieces. If you don't have a router bit set to do the following procedure, I would recommend you try Titebond "Molding and Trim" "Glue, discussed later in this section.*

In most applications, I'm not a big fan of "Biscuit Joiners". They are pretty expensive, hard to control, and in the case of using them to make flat picture frames usually take a long time to use. This is because you need to clamp down the piece being jointed to keep it from "kicking" when the blade meets with the wood, or make a special fixture to mount the Biscuit Joiner to. There is also a major problem with this method; the blade on a Biscuit Joiner is so large that in many cases you can't use it when making a frame less than about 2 1/4" wide. This is a problem because the blade will cut through the outside edges of the molding when you make the cut.

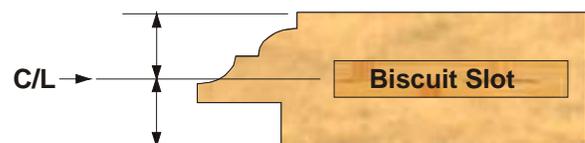
When I use biscuits to join my flat frame sides together, I use one of the router bit biscuit cutters, and do the operation on my router table. By using this method, I can get a frame ready for "glue-up" in 1/4 the time it would take me with a biscuit joiner. It is also a lot safer doing it this way than it is with a "hand held" Biscuit Joiner, as the fence will keep the stock from being "kicked" out of position as it is jointed. Another advantage is the fence keeps the biscuits in the same position side-to-side on the molding. As a result, you don't need to mark both ends of every Frame side and then try to align the marks with the "center of cut" line on the Biscuit Joiner.

Most of the frames I build are less than 2 1/2" wide, and have a maximum rabbet width of 3/8" This gives me an area of about 2 1/8" (maximum width) where I can install the biscuits. I've found that in most cases, it's pretty difficult to install one of the large Beech Biscuits that are used with a conventional Biscuit Joiner, even though there are router bits made for these types of biscuits.

The products that I use on my frames 90% of the time are either the "Biscuits & Bits" or "Itty Bitty Biscuits & Bits". Which one I use is determined by the width of the molding that I have made my frame with. If I have made a frame with a 1 1/4" or wider area to install the biscuit, I use the "Biscuits & Bits", and for narrower widths I use the "Itty Bitty Biscuits & Bits". This is the only kit I have ever seen that can be used on material as narrow as 3/4" when cut at a 45 degree angle, and 1" wide when cut square. The biscuits in this kit are about the size of a nickel.

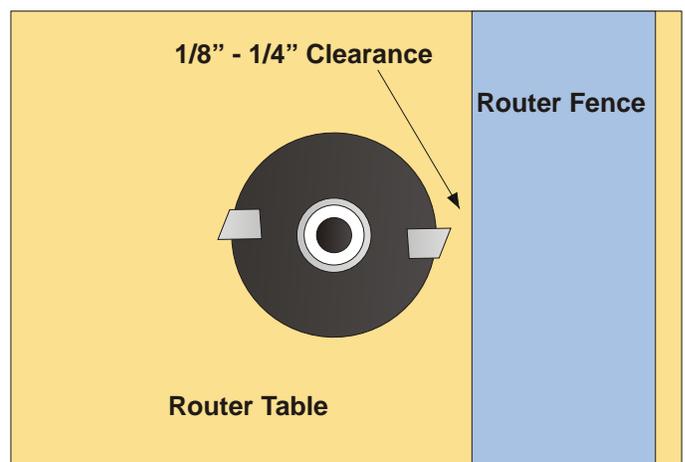
## INSTALLING BISCUITS IN FLAT FRAMES

In most cases, I try to install the biscuits as close to the center-line of the molding (front-to-back) as I can, as shown in the Illustration to the right. As you can see, the biscuit slot is cut toward the outside edge of the molding. Be sure to avoid cutting into the rabbeted area of the molding when cutting the biscuit slots.

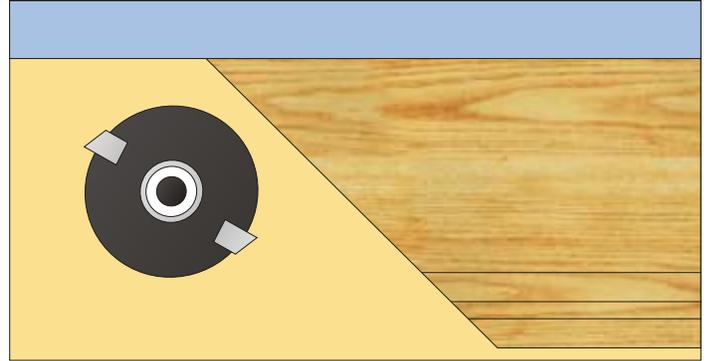
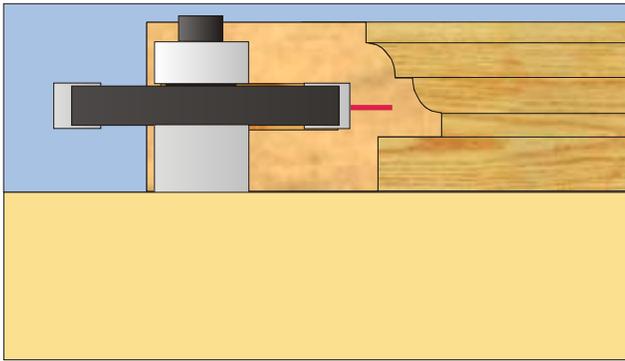


I would recommend that you position the router fence about 1/8" to 1/4" away from the bit when you install biscuits. This will place the biscuits near the outside edge of the molding. I have found that this is the best location to place biscuits to prevent cracks in the outside of the frame corners as the molding expands and contracts due to humidity changes.

***Make sure that when you position the fence***, one of the carbide cutters on the router bit is at the closest position that it will be to the fence as the bit rotates, as shown in the Illustration to the right. This will insure that you will not cut into the router fence when the router is turned on.



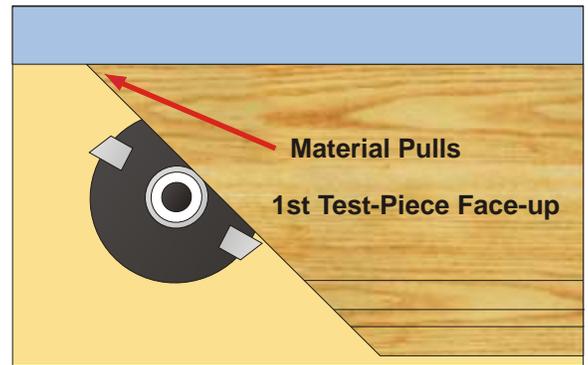
To set the desired height of the router bit, mark the centerline (front-to-back) on a couple of test-pieces of molding that have been cut at a 45 degree angle. Position the 1st test-piece on the router table as shown in the Illustration below (left). Adjust the router height to center the router bit vertically on the centerline. Lock the router height. Place the molding face-up on the router table. Make sure you are clear of the router bit and against the fence, as shown in the Illustration below (right).



**Before you make a test cut**, you should be aware that the direction of rotation of the router bit has a tendency to pull the material very quickly into the bit and fence, as shown in the Illustration below (right). **You should hold the molding very firmly** down on the table, and feed slowly toward the bit as you cut the slots for the biscuits.

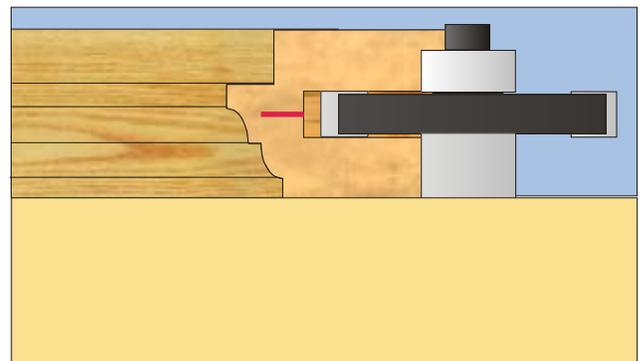
**With the 1st test-piece face-up** on the router table, turn on the router, and slowly push the test-piece toward the router bit, as shown in the Illustration to the right. When the piece makes contact with the bearing on the bit, the slot has been cut to the proper depth.

While keeping pressure toward the fence, pull the piece back away from the bit, and turn off the router.



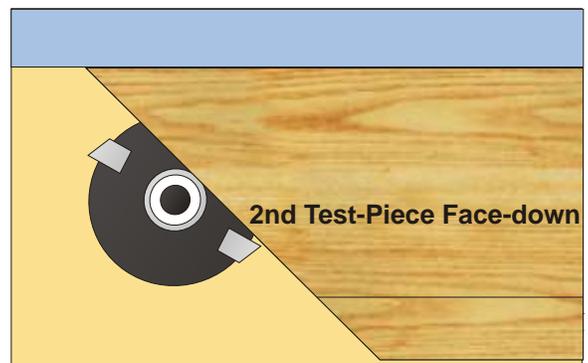
To check whether the slot is centered on the molding, flip the piece that was cut face-down, and place it on the other side of the bit, as shown in the Illustration to the right.

If the slot is perfectly centered, when the piece is moved toward the bit, the carbide cutter on the bit should slip into the slot with little resistance.

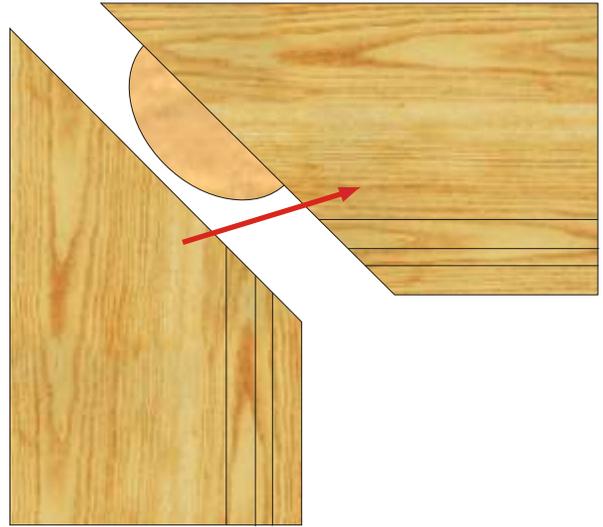


To check if the slot is perfectly centered, we would need to cut a slot in a 2nd test-piece that would meet with the first test-piece we just cut.

**With the 2nd test-piece face-down** on the router table, turn on the router, and cut the slot in the 2nd test-piece. Turn off the router.



To check whether the slots are centered on the molding, place the two test-pieces on a flat surface. Insert a biscuit into the slot on one of the pieces, as shown in the Illustration to the right, and slide the two pieces together.



***If the slots are perfectly centered***, you should feel very little resistance as the pieces are assembled. The front and back faces of the pieces will be perfectly level with one another, as shown in the Illustration to the right.

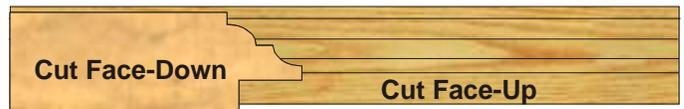


***If the slots are not perfectly centered***, the front and back faces will not be flush with one another. The position of the routed slot will depend on whether the bit was too high or too low, and when the pieces are fit together you can determine in which direction the bit needs to be moved. ***The amount of the offset will be twice the distance the bit was off-center.*** In other words, if the bit was 1/32" off of the centerline of the molding, the faces would be 1/16" offset.

***If the bit was too high when the slots were cut***, the piece that was cut face-down will be higher than the piece that was cut face-up.



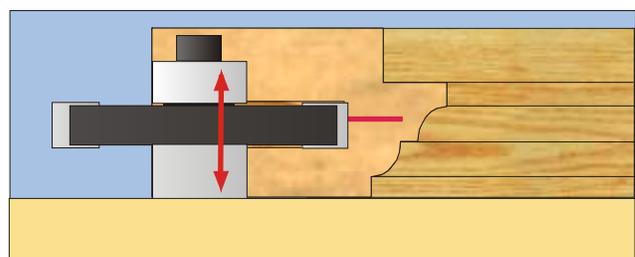
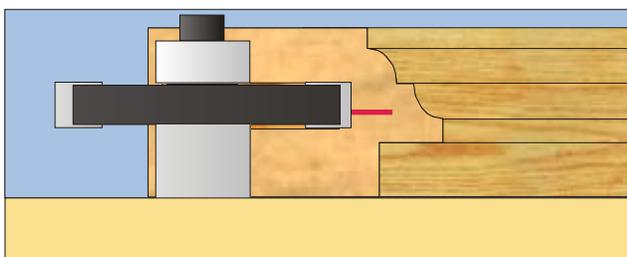
***If the bit was too low when the slots were cut***, the piece that was cut face-down will be lower than the piece that was cut face-up.



***If the faces of the molding are not perfectly flush with one another***, there are two ways that can be used to correct the problem; either the router must be adjusted to center the slot perfectly on the molding, or the slots may be cut in the same end of each of the pieces, and then the router would be adjusted to cut the slots in the other end of each of the pieces.

***If you are building more than a couple of frames***, I would recommend that you take the time to get the bit centered on the molding. If the bit is centered, you can cut the slot in one end of a piece face-up, and then flip it over and cut the slot in the other end face-down. In this method, you actually only need to handle each piece once, and there is almost no chance of making a mistake as you cut the slots. ***If the slots are not centered***, and you place one of the frame sides with the wrong side down on the router table, the slot will be cut in the wrong position, and the faces of the molding will not match.

***If you are building only a couple of frames***, you may decide not to center the bit on the molding. If you decide to use this method, the thing that you need to remember. ***You must cut the slots in the same end of all of the sides*** with the bit in one position, as shown in the Illustration below (left). You will then need to adjust the bit height to cut the slot in the other end of all of the sides, as shown in the Illustration below (right).



## CHOOSING THE BEST GLUE FOR YOUR FRAMES

I've used Titebond™ Wood Glue almost exclusively since I first started Woodworking about 30 years ago. As Titebond™ is considered a "general purpose" glue, it is relatively thin in consistency. This makes it the product I normally use when I glue pieces together using biscuits. Franklin International, the company that introduced Titebond™ in 1952 introduced a new type of glue in 2005 that they call "Molding and Trim™ Glue". I have used it quite a lot, and would recommend you try it. It is the glue I would recommend if you don't have the time (or equipment) to install biscuits. I have used masking tape to hold two pieces together as the glue sets, and couldn't break the pieces apart with as little as 12 minutes of "set time". "Molding and Trim™ Glue" gives you an incredibly strong end grain glue joint with a minimal amount of time and effort. Due to the fast set time and thick consistency, I would not recommend using "Molding and Trim™ Glue" when installing biscuits.

Molding and Trim™ Glue is designed specifically to be used when gluing end grain. It has a thicker consistency than most other glues, and as an end result, doesn't tend to run. Because it is thicker than most other glues, it fills the pores of the wood better, and does not pull into the end of the board like thinner glues. This gives us a stronger joint, without needing to apply a thinner glue 2 or 3 times to get the pores of the "end grain" filled when you assemble a Frame. For information on glues, go to the Franklin International Titebond™ website at [www.titebond.com](http://www.titebond.com).

## PRE-CHECK THE FIT OF THE BISCUITS

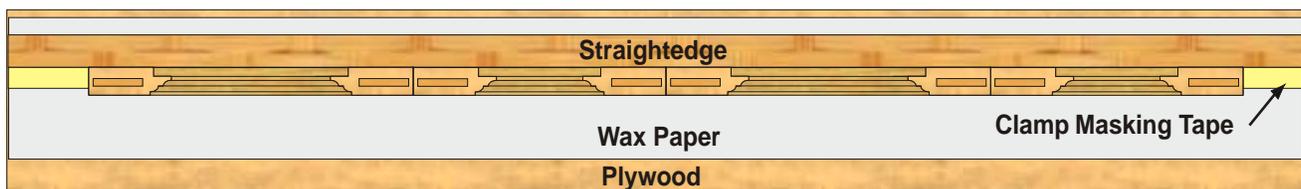
Before you start the assembly of your frame, I suggest that you check the fit of the biscuits that will be used when you glue the frame together. Since the biscuits are wood, they sometimes swell due to humidity before they are used. As a matter of fact, the moisture in the glue will make the biscuits swell, which makes the biscuit tighten in the routed biscuit slots. You want to make sure that the biscuits will slip easily into the slots, without being too loose. If they don't fit properly, you may have a difficult time using the following procedure to assemble your frame.

I normally put a piece of 120 grit "sticky back" sandpaper on a flat surface as I check the biscuit fit. As I check the fit of each biscuit, I will give any biscuit that feels snug a couple of passes across the sandpaper, and re-check the fit.

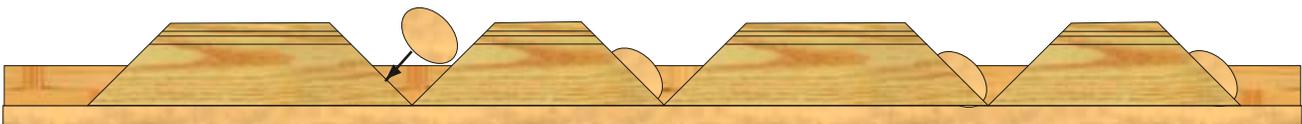
## ASSEMBLING FLAT FRAMES

I like to assemble my frames in one operation, rather than glue the corners one-by-one. To do this, I normally use a piece of flat plywood as my assembly surface, and place a piece of wax paper on it to keep the glue from getting on the plywood. I clamp a straightedge (on top of the wax paper) to the plywood, and lay a piece of masking tape on the wax paper, against the face of the straightedge, as shown in the overhead view in the Illustration below. I normally clamp one end of the masking tape to the plywood so the tape can be held tight as the frame sides are placed on top of it.

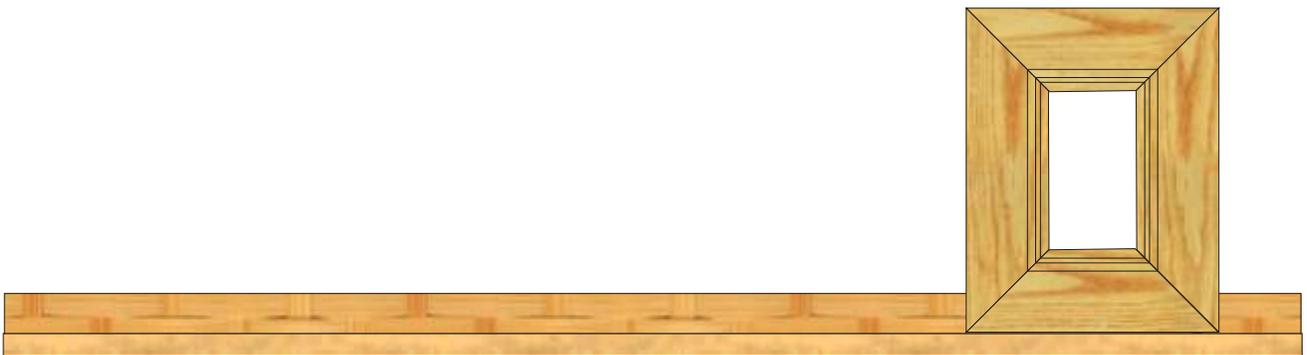
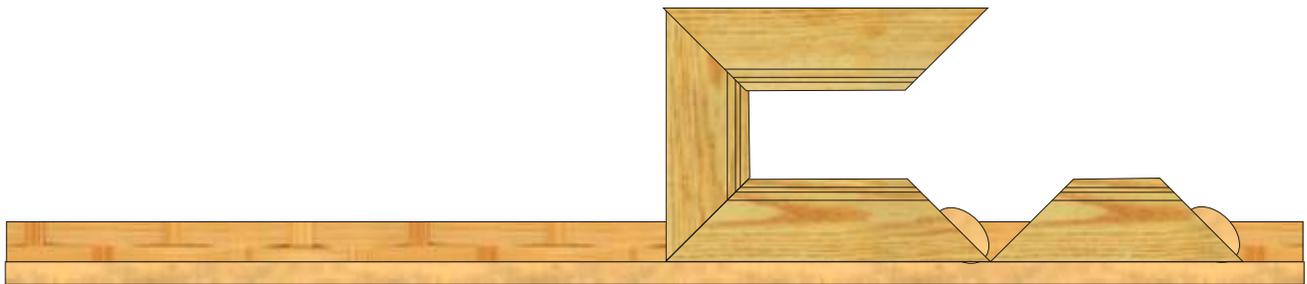
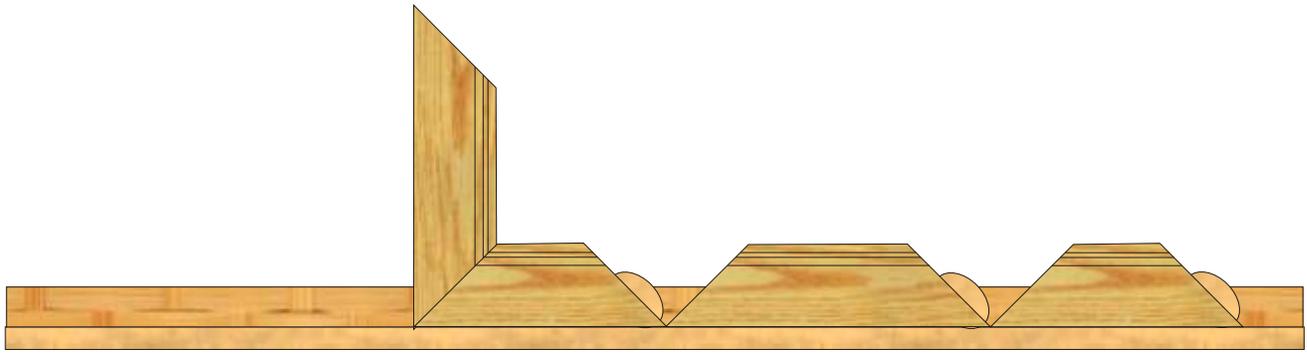
While holding the un-clamped end of the masking tape tight, place the frame sides down on the masking tape. Make sure you keep the points on the ends of the frame sides tight to one another, and that you alternate the long and short sides as you place them downward on the tape, as shown in the Illustration below. While holding down the frame side at the un-clamped end of the masking tape, tear off the excess tape by pulling it sharply upward.



***You must work quickly in the following steps*** to insure the glue doesn't start to set-up before the frame sides are glued together. *Using a Glue Brush*, apply a thin layer of glue to both ends of all 4 frame sides, including the biscuit slots. Also apply a thin layer of glue to both sides of the biscuits, and insert them into the biscuit slots, as shown in the Illustration below.



Roll the 4 frame sides together, as shown in the 3 Illustrations below, and secure the ends with the excess masking tape.



Before the glue has a chance to set, adjust the corners of the frame (if needed) to insure that the outside edges and profiles are properly aligned. Check to make sure the faces of the pieces are all flush with one another, and adjust if needed. If the joints on the 4 corners of the frame are not pulled together perfectly, you should use a band clamp to get a tight fit on all 4 corner joints.

Using a cloth dampened with water, remove any excess glue from the frame and set it aside while the glue dries.

After the glue has dried, remove the band clamp (if used) and masking tape. Sand the frame, being sure to use a sanding block on the front flat surfaces and outside edges to prevent rounding the corners or inside edge where the flat surface meets the routed profile.

Apply the finish of your choice. When the finish has completely dried, install a hanger on the back side of the frame. Cut the back panel for the opening in the frame, and install the object the Frame is built for.

I hope you have found this information on flat picture frames helpful, and by seeing how simple these frames are to build would enjoy the challenge of making compound frames also. On the following pages, we have included the information that will allow you to make the molding for compound frames with just a little more effort than for flat frames.