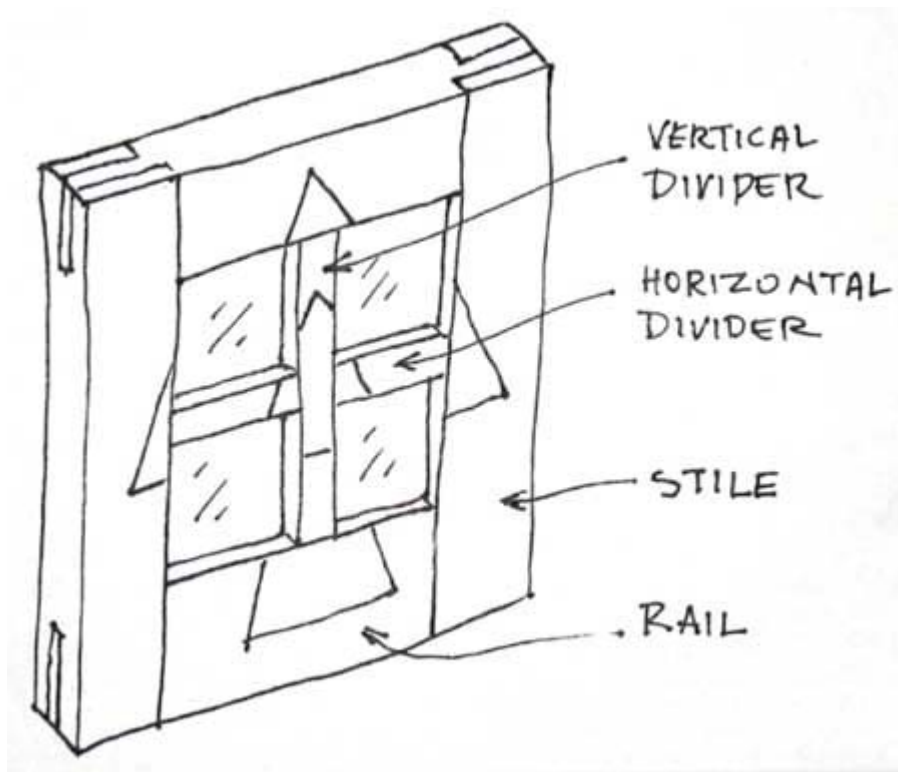


For the Bay Area Woodworkers Association Tech Talk  
April 20<sup>th</sup> 2006

## DIVIDED LIGHTS ON THE TABLE SAW

### Introduction:

A divided light is a door or window with several separate panes of glass. Modern methods fake it, with one large piece of glass, and wood or plastic strips stuck on the glass to simulate the real deal. This presentation will make it clear why they do that, but will also show you that making true divided light doors is not brain surgery! The goal here is to show you how to make these doors with a minimum of effort and fussing. The idea is to trust your tablesaw fence, so this works only if your fence is well calibrated. Also, most blades make a 1/8" kerf, which is important here, so don't use a thin-kerf blade.



Stiles are the vertical structural members of the door, Rails the horizontal pieces that are captured by the stiles top and bottom. The smaller strips that hold the glass have different names depending on who you talk to. Mullions, or some call the horizontal ones mullions and the vertical ones muntins. That is a whole topic in and of itself. Since doors and windows with these elements are called Divided Lights, here we will call those parts...Dividers – and be done with it!

Mill the stock for the stiles, rails and dividers.

In this example the stiles and top rail are 2" wide, the bottom rail is 2-1/2" wide. The stock is ripped on the table saw, using the fence set for those widths. The dividers are 1" wide. Mill at least one extra piece of each size, if possible, for set up. Or a spare in case of a boo-boo. All stock should be 3/4" thick. The stiles and rails should be a convenient width – meaning they should be a multiple of 1/8" in width i.e. 2", 2-1/8", 2-1/4" etc. If you make the bottom rail the same as the top rail it will make things a bit easier, but aesthetics often require the bottom rail to be wider.

I make doors the size of the opening, and trim them square and to final size later. So, cut the stiles the full height of the opening and the rails the full width of the opening (obviously if two doors fill the opening, the rails should be cut to half the opening.) I use the chop saw and a fence for this.

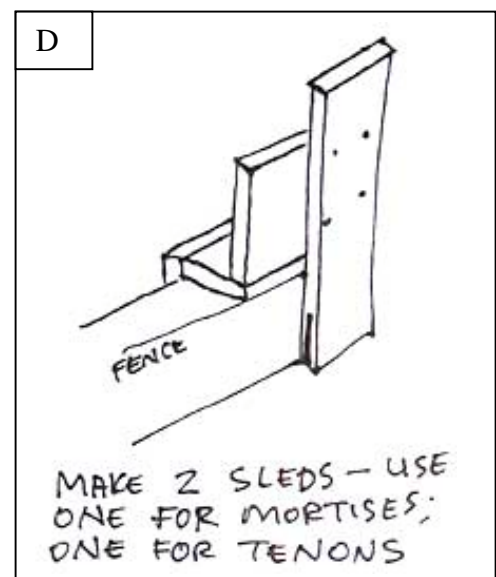
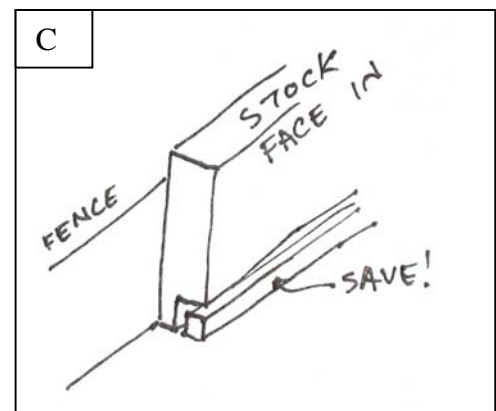
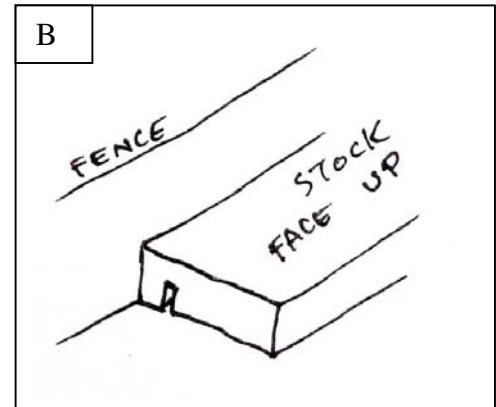
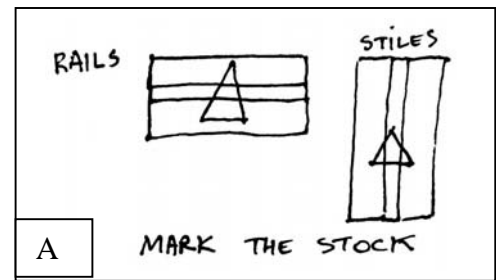
Mark the stock as shown (Fig A).

Set the table saw fence for 1/4" and the blade height for just under 1/2". Run the stock as shown (Fig B).

Set the height at 3/8". Run stock as shown Fig C). This creates a rabbet that is 3/8" x 1/2", and leaves off-cuts that make perfect pieces for attaching the glass later. So save them!!!

The joint for the door frame is a bridle joint. Quick on the table saw, and modern glues hold up well to the cross grain joint. Because of the rabbet the shoulders of the joint are staggered as shown, which looks tricky, but isn't.

Cut the mortises on the stiles first. With the saw fence still set for 1/4", raise the blade to match the dimension shown. It is OK to set the blade a smidgion high. Use the mortising sled shown, which rides over the fence (Fig D). The stock in all operations has what will be the outside face to the fence. In other words the outside face is the reference face. Run the stock as shown. This will give you a 1/8" mortise. Run all stiles this way – and if the bottom rail is wider than the top rail, here is where to deal with that: the blade height must be changed appropriately for the correspondingly deeper mortises. When all the stiles have



this 1/8" kerf/mortise, set the fence to 3/8" (a lateral move of 1/8"). Use the same jig, and make a second pass with the stiles. You will now have a bridle joint mortise 1/4" thick.

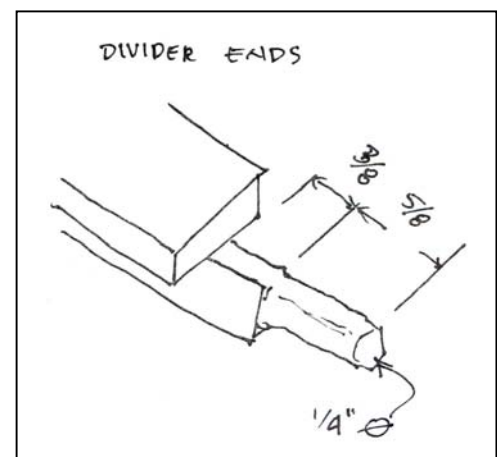
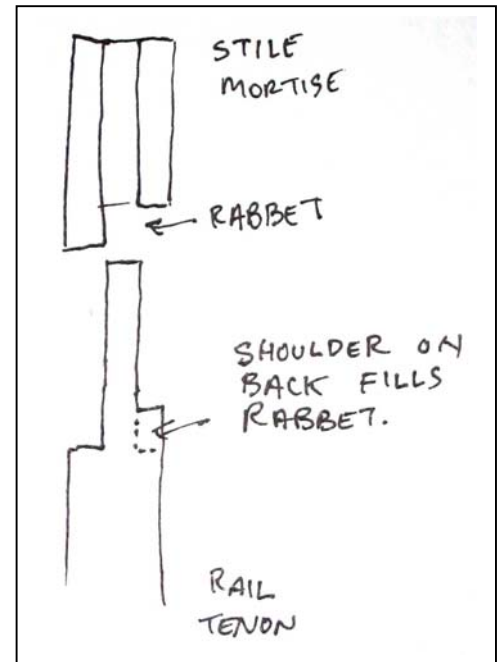
Tenons next. The tenon shoulders on the rear face of the rails will be 3/8" closer to the ends of the stock, to fill the rabbet in the back of the stiles. First you will cut the cheeks of the tenons, setting the blade height to just under the final length of the tenon. Using the tenoning jig, set the fence for 1/8". This will put the FAR SIDE of the blade at 1/4". Run the stock. Adjust blade height to be just under the length of the finished tenon, set the fence out to 1/2", which sets the NEAR SIDE of the blade 1/4" over from where the far side of the blade was on the previous cut. You now have a 1/4" thick tenon, with the shoulder cuts left to do.

Move the fence out of the way, set the blade height to about 3/16" and remove most of the waste from the tenon joints. Do not try to cut the shoulders yet. You will now be able to confirm the fit, which should be a light friction fit. Set the blade height to 1/4" or just the tiniest bit higher. Set the fence to the width of the stile, minus the thickness of the blade. So to cut the face shoulder on a top rail, measure the stile it mates with (which is 2" wide) Set the fence for that, but then move in 1/8". So in this case the fence is at  $2" - 1/8" = 1-7/8"$ . Use the miter gauge to run the stock square to the fence, with the end of the tenon riding along the fence. For the tenons on the rear face, you must move the fence in 3/8", or in this case to  $1-1/2"$ . Cut the shoulders on the rear face. You are done with the main door frame.

#### Dividers.

Cut them to exact length. They need to be 1" longer on each end (2" extra overall) than the distances shown. These distances should still be tidily divisible by 1/8" increments, or 1/16ths at the worst. The divider is T shaped in cross section, and the top of the T is the face side. The other part of the T supports the glass, and is 1/4" x 1/2". The divider contacts the sides of the frame, and runs across the 3/8" wide rabbet. Then a portion of this is shaped into a round tenon 5/8" long.

Anyway, the blade height should be set to exactly 1/4", and set the fence to 1" less the blade i.e. 7/8" and cut the shoulders on the dividers. Nibble the excess stock away with multiple light passes. Set the fence for 5/8 less 1/8",



i.e. 1/2" and cut the shoulders on the little dowel ends. Nibble away the extra stock. Be careful and nibble lightly. The stock at this stage tends to be a little unstable.

For the dividers to cross each other you need to make a lap joint. The horizontal divider must have the top of its T removed to accommodate the face of the vertical divider, and the vertical divider needs a notch on the back to fit the other part of the T.

The blade is still at 1/4" height. OK. Set the fence to (here is a little math) Half the overall length less 1/2" plus half the blade thickness. I like to add back the full blade width, so I can creep up on a tight fit. Using the miter gauge and fence, run the horizontal divider face down, then turn it around, run it again. You should have two cuts, which make a notch a bit narrower than the face of the other divider. Move the fence out a bit and make a second pass. Make a bunch of light nibble cuts to remove the waste between the cuts. The smaller notch in the vertical divider must be 1/4" wide. Set the fence for half the length of the stock. Set the blade height for 1/2". Run the stock face up and turn it around and run it again. This will yield a 1/4" notch.

Make the round tenons on the ends of the dividers by paring off the corners and rounding off the rest with a file. It does not have to be pretty. A few minutes on each is enough.

Drill the mortises in the stiles and rails for the divider tenons. Set the drill press with a 1/4" bit, and a fence so that the 1/4" hole will be dead center in the stock. Measure for location and drill to just over 5/8" deep.

Assemble parts for a dry run test.

At glue-up time make sure you have large clamp blocks to clamp the bridle joints firmly.

That is the door. The sample show with this text was made exactly to its recipe.

A little bit of extra set-up can yield a slightly better fit, but this will get you a solid paint grade door as is.

Contact Mike if you have any comments or questions.

