

Divided Light Door Set



User Instructions

Congratulations on your purchase of the Divided Light Door Set. This set will help you create beautiful cabinet doors with true divided light panels.

Following are complete step-by-step instructions for using the Divided Light Set.

Be certain to unplug the router whenever you are making adjustments or doing bit changes.

All of these cutters are to be used in a router table only, never in a hand-held router.

When milling your door stock make extra pieces that can be used for test cuts.

Read through the instructions completely so you know and understand the entire process before setting up your first cuts.

CMT recommends that you make and master a set of practice joints before attempting your first door.

Parts of a door

It's important to understand the terminology involved in a divided light door. Note that the mullion is continuous from the top rail to the bottom rail. The muntins butt into the mullion.



Material

This set is designed to be used on material that is 7/8-in. thick. The more accurately you mill your stock to that thickness, the easier the set up will be.

The muntins and mullions are 7/8-in. wide when finished, but it's easier to work with wide stock until the tenons are cut, then rip the parts to width.

Understanding The Joints

Before setting up the router bits, be sure you understand the joinery involved in the divided light door.



The rails are joined to the stiles with a haunched mortise and tenon joint. You can cut the mortises in the stiles using a mortiser or router. The tenons on the rails are made using the rabbet bit included in the set.



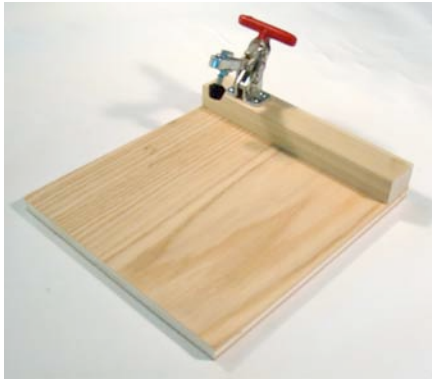
The vertical mullion is joined to the rails with a simple mortise and tenon. The horizontal muntins are joined to the stiles with the same joint.



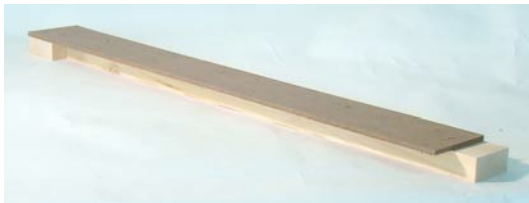
The muntins are joined to the mullion with a stub tenon. The mortise goes completely through the mullion.

What you need

In addition to the Divided Light Set you'll need a 1/4-in. straight bit such as the CMT #811.564.11. You'll also need a 5/32-in. thick spacer. A twist bit works well as a spacer. Finally, you'll need two shop-made jigs.



This sled is used to cope the ends of the rails, muntins, and mullions. The plywood base should be 1/2-in. thick. The backer board should be 7/8-in. thick. The toggle clamp used to secure the material is available at woodworking specialty stores.



This L-shaped narrow parts sled is used to safely profile and rabbet the muntins and mullions. The bottom board should be 27/32-in. thick, covered with a 1/4-in. thick cap. The hook at the trailing end should be 27/32-in. wide.

Prepping the pieces

Mill your door stock from straight-grained material so it's less prone to twisting or warping. Mill the stock to a thickness of 7/8-in. Start with the mullion the same width as the rails and stiles and rip it to 7/8-in. later.

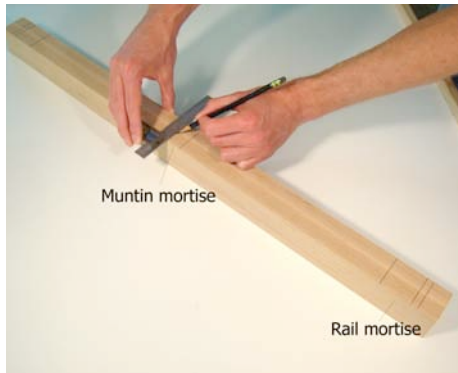
Calculate the outside dimensions of your door. The finished length of the stiles will match the height of the door. For now, make them 2-in. longer than that dimension. This makes mortising easier.

Calculate the length of the rails by subtracting the width of two stiles from the overall width of the door, and adding 2-in. (1-in. per side) to allow for the coping and tenons.

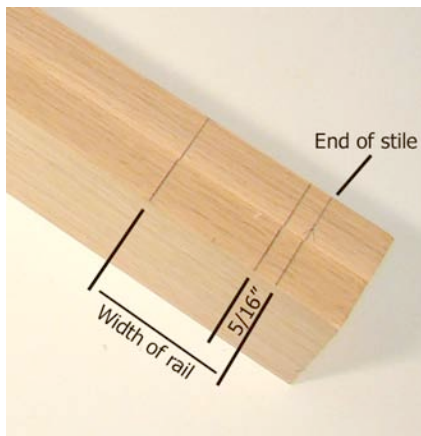
Calculate the length of the vertical mullion by subtracting the width of two rails from the height of the door and adding 2-in. (1-in. per side) to allow for the coping and tenons.

The piece from which you'll cut the muntins should be wide enough so you can rip two 7/8-in. wide pieces from it, and slightly longer than half the length of the rail. You'll cut it to finished length later.

Lay out the mortises



Lay out the mortise locations on the stiles. The mortises that will receive the muntins should be as long as the muntins are wide, 7/8-in.



Lay out the mortises for the rails. Remember that the stile is 1-in. longer than its finished length. The distance from the end of the stile to the end of the mortise is equal to the width of the rail. The haunch is 5/16-in. long. Cut the mortise at the full depth of 1-in. from the 5/16-in. lay out line to the end of the mortise.



Transfer the location of the muntin mortises from the stiles to the mullion.

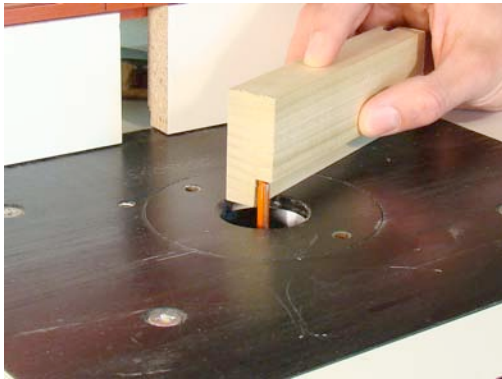


Lay out the location of the mullion mortises on the rails. The mortises should be as long as the mullions are wide, 7/8-in.

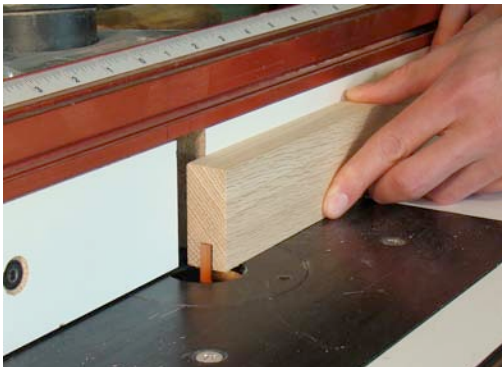
Mortising



Cut 1/4-in. mortises 1-1/16-in. deep. The mortises are located 5/16-in. from the face of the board. If you've correctly machined your stock to 7/8-in. thick, this centers the mortise. If you cut the mortises using a router you'll need to square the ends of each mortise. Cut the stiles to finished length. The board with no mortises is for the two muntins.



Set the height of a 1/4-in. straight bit to 1/2-in. Using the router bit from the set cut a rabbet in a piece of scrap. Use the rabbet to set the height of the bit.

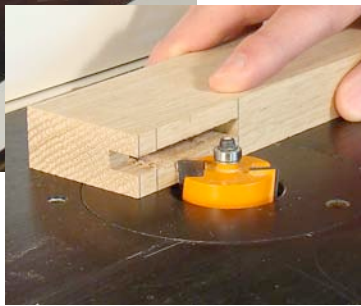
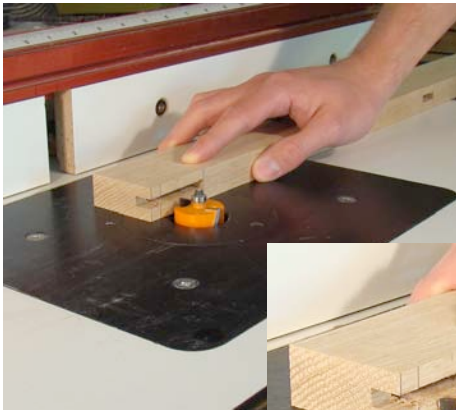


Using the router table fence, center the bit on your stock. Finish the mortises on the stiles.

Cut the tenons



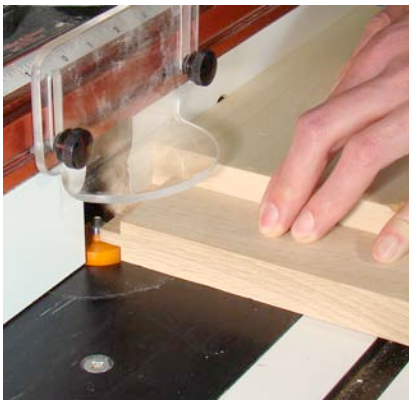
Install the rabbet bit in the router table.



Set the height of the rabbet bit by aligning the cutter with the edge of the mortise.



Position the fence by aligning the face of the fence with the ball bearing on the bit.



Using a test piece that is the same thickness as your door stock, cut a test tenon. Check the fit of the tenon into the mortise. Adjust the height of the rabbet bit as needed to tighten or loosen the fit.

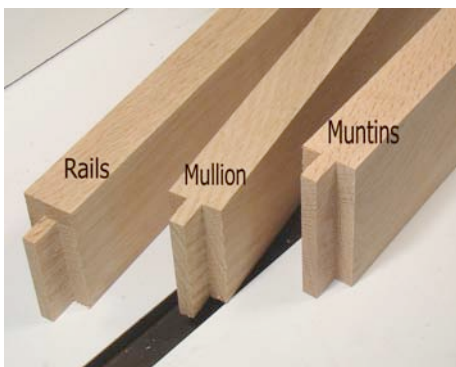
When the height of the bit is correct cut the tenons.



Cut haunches on the rails only. With the rails' outside edge down on the table, cut the haunches first. Use a backer board to reduce tear out. Make the opening in the fence as narrow as possible.



Complete the tenons on both ends of the rails and mullions and on one end of the muntins. Do not tenon the second end of the muntins at this time.



When complete, your tenons should look like this.

Cutting rabbets



Without changing the height of the bit or the fence position, cut rabbets on the inside back edge of the rails and stiles.



Reset the fence position to cut a 1/8-in. rabbet. Do not change the height of the bit.

Cut the muntin blank to length. Calculate the length by measuring from the end of the rail to the mullion mortise and adding 7/16-in.



After cutting the piece to length cut a small rabbet on the bottom only of the piece.



Reset the fence position for a 5/16-in. rabbet. Do not change the height of the bit.

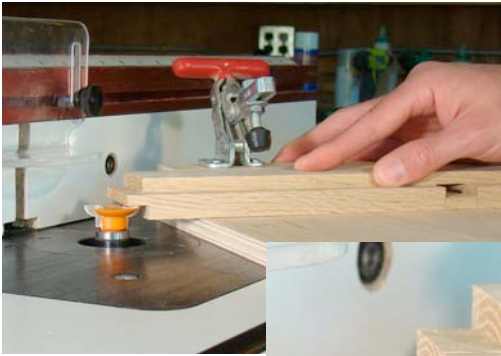


Machine the muntins and mullion to final width. Using the narrow parts sled cut rabbets in both bottom edges of each piece.

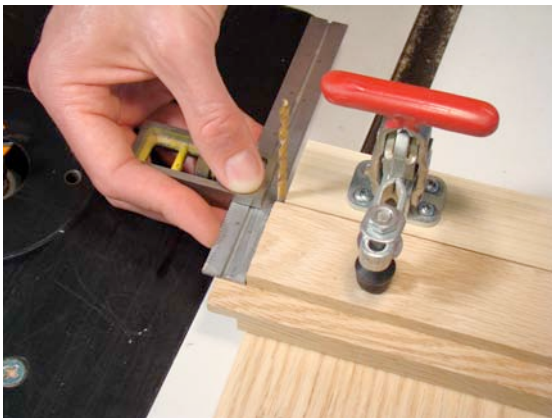
Coping the end grain



Install the cope cutter in the router table.



Set the height of the cutter so it just skims the bottom of the tenon.



Position the rails, front face down in the sled, so the tenon shoulder projects $\frac{5}{32}$ -in. past the edge of the sled. It's important that this is set very accurately. A twist bit is a good way to gauge this.



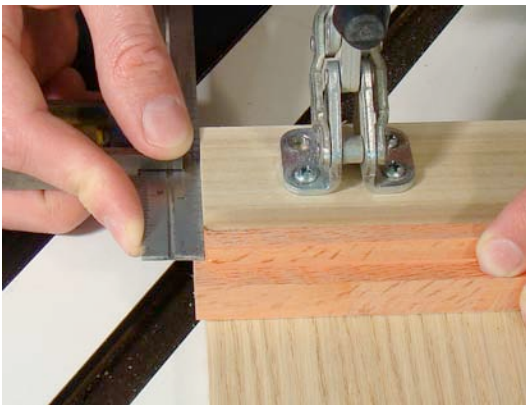
Allowing the bearing on the cope cutter to ride on the base of the sled, under cut the tenon and cope both ends of the rails.



Position the mullions in the sled the same way you positioned the rails and cope both ends.



Position the muntins in the sled and cope the tenon end only using the same positioning as the mullion and rails.



On the opposite end of the muntins make the end of the 1/8-in. rabbet even with the backer board. Cope this end.

Shaping the edges



Install the shaping cutter in the router table.



Set the height of the bit so the top corner of the bit is even with the bottom face of the tenon.



Make the face of the fence even with the ball bearing on the bit.



Shape the inside corners of the rails and stiles.



Use the narrow parts sled to shape both edges of each muntin and mullion.



Assemble your door. Because of the number of pieces involved you may find it easiest to assemble sub-sections first. For example, glue and clamp the rails and mullion, allow to dry, then assemble the rest of the door.