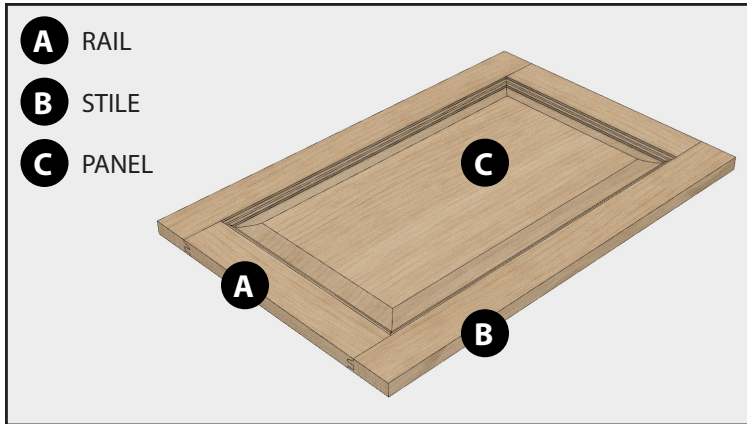This matched pair of router bits is designed to cut rails and stiles for frame-and-panel doors up to 15/16" thick. Follow the instructions below for easy setup of both bits.

Step 1: Determine stile and rail dimensions.

A RAIL

B STILE

C PANEL

Choose a width for the stiles and rails. Somewhere between 2" and 2-½" is common for cabinet doors, but you can use any width you like. Just be sure there's enough material for the profile cutting-depth plus 1" for structural strength.

Use stock between ¾" and ¹⁵⁄₁₆" thick. The stiles must be the same length as the door. The rails will have tenons on each end that fit into the stiles. Be sure to account for the extra length created by the tenons when making your cut list. See the worksheet below to calculate the rail length.
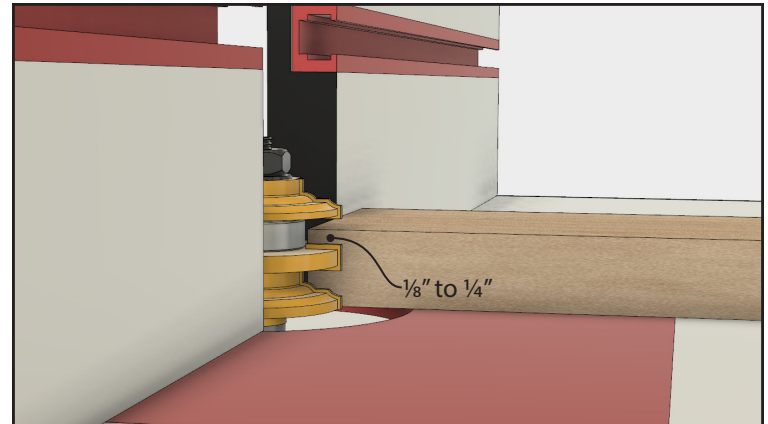
TENON
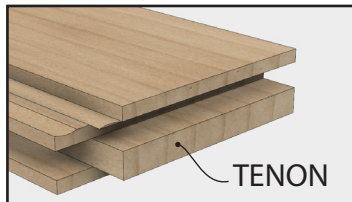
As an example, assume you're going to build a ¹⁵⁄₁₆"x 14" x 20" door with 2" wide stiles and rails. Based on the worksheet, here's what the cut list should look like:

(2) Stiles... ¹⁵⁄₁₆" x 2" x 20"
(2) Rails... ¹⁵⁄₁₆" x 2" x 10-¾"

The numbers above represent part thickness, width and height, in that order.

## Step 2: Set up the bit for routing the profile.

⅛" to ¼"

Install the bit in the router table. Place a piece of scrap material on the table to compare with the bit's height. Adjust the bit until the slot cutter is at least ⅛" below the top face of the stock.

## Step 3: Position the fence.

FENCE

STRAIGHTEDGE
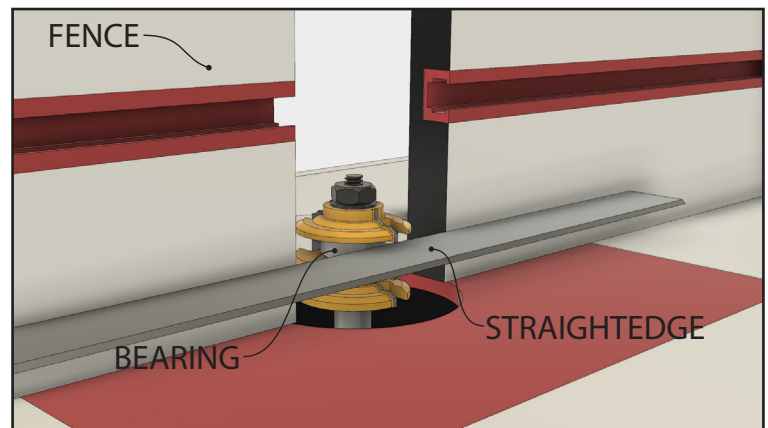
BEARING

Place a straightedge against the bit's bearing. Pull the fence forward until it's flush. Lock the fence in place. After making a test cut, you may wish to adjust the fence position slightly. You do not need to change the fence position when moving from the coping cut to the profile.

Step 4. Make the profile cut.
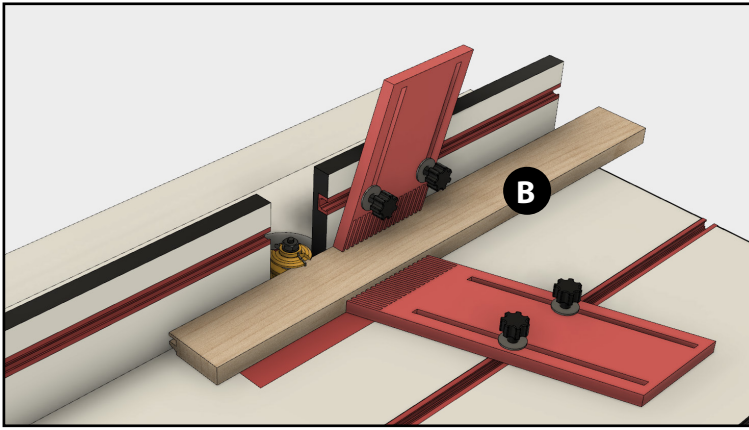
Make a test cut on a piece of scrap material and adjust the fence depth if necessary. Install featherboards in your router table to help you guide the stock through the bit safely, and then route the profile in the stiles and rails.

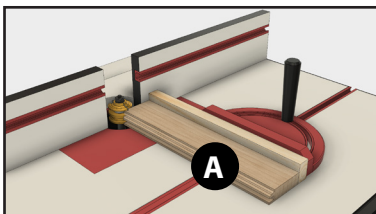## Step 5: Adjust the bit height for the cope cut.
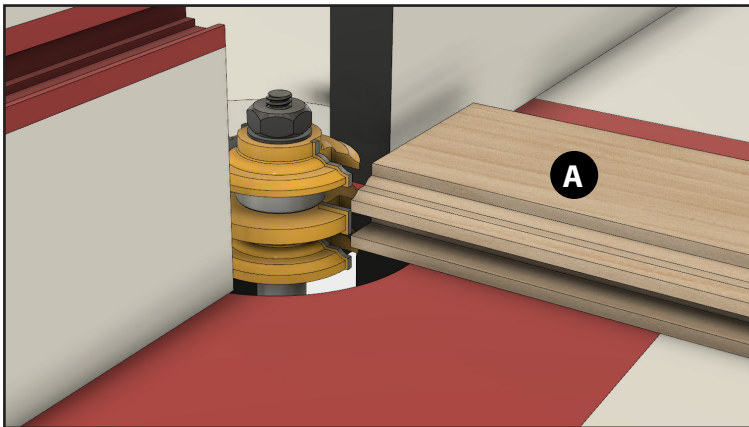
Place one of the rails you just routed on the table with the profiled face up as shown. Adjust the router bit until the slot cutter aligns with the groove in the rail.
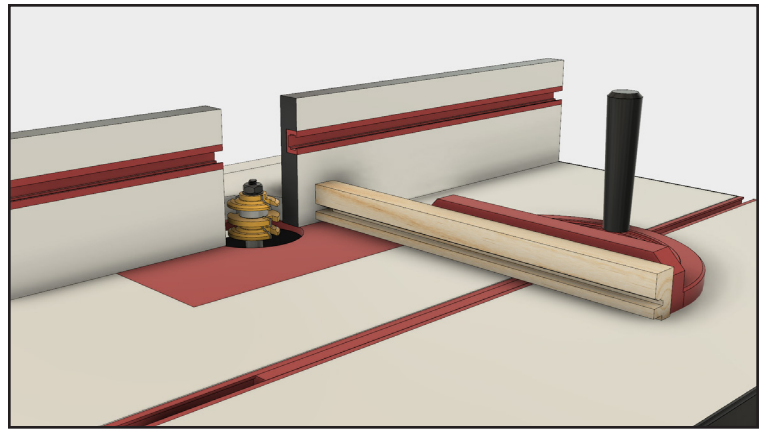
Step 6: Route the rails.
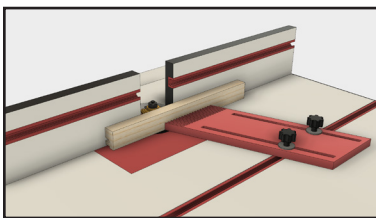
Cut a backer board to place behind your rail stock for the cope cuts. Route one long edge of the board.
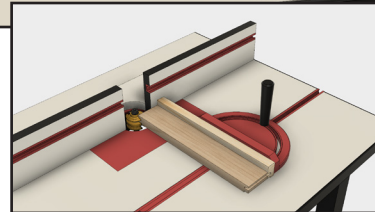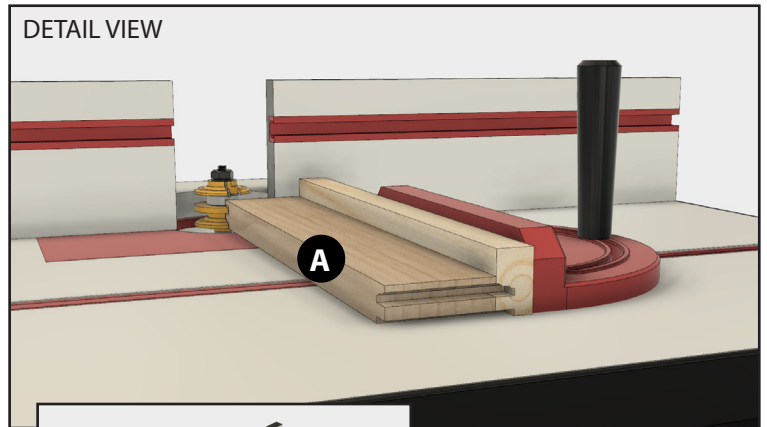

Cope one end of each rail with the groove in the backer board facing backward. This will prevent tearout in the back of the rails.
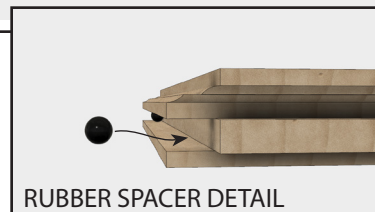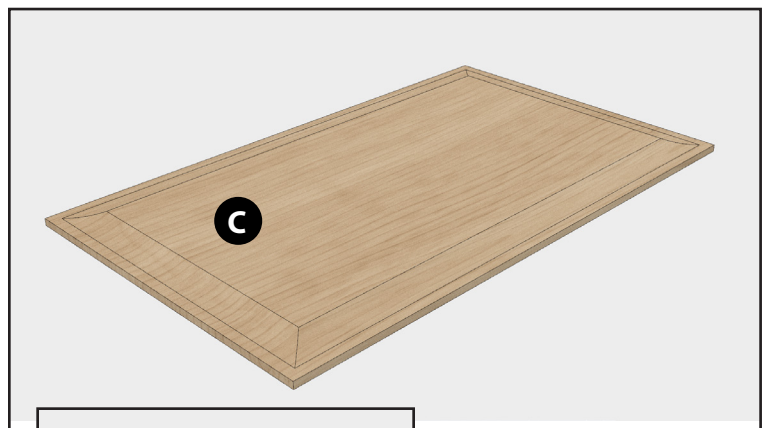

Flip the backer board 180 degrees so the groove faces forward.
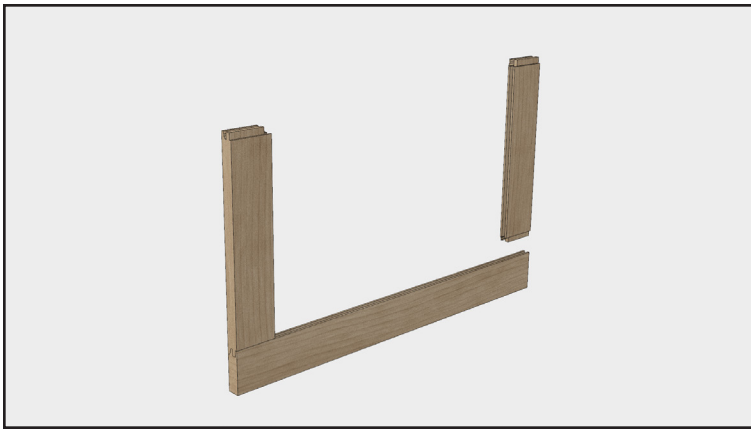
DETAIL VIEW

Fit the profile of each rail into the backer board and make the second cope cut.

Step 7: Assemble the door.

RUBBER SPACER DETAIL

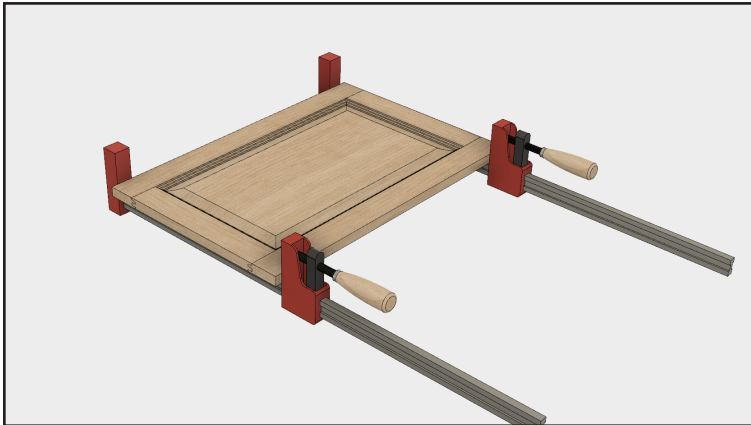Cut and route a panel to fit in the frame. If using a solid wood panel, make it slightly undersized to allow room for the wood to expand. Use spacers inside the stile and rail grooves to keep the panel centered.

Apply glue to the coped ends of each rail. Insert the rails into one of the stiles.

Slide the panel in place.

Add the second stile and clamp the door until the glue is dry. Allow at least 30 minutes in warm, dry conditions.

Rail Length Worksheet

Fill in the boxes below with the door width, stock width multiplied by two and tenon length multiplied by two. Then complete the equation to find the correct rail length.

EXAMPLE WORKSHEET

DOOR WIDTH	20"
MINUS	
STOCK WIDTH * 2	4"
EQUALS	
	16"
PLUS	
TENON LENGTH * 2	3/4"
EQUALS	
RAIL LENGTH	16-3/4"

YOUR WORKSHEET

DOOR WIDTH	
MINUS	
STOCK WIDTH * 2	
EQUALS	
PLUS	
TENON LENGTH * 2	
EQUALS	
RAIL LENGTH	

Although Yonico rail and stile bits are pre-shimmed, some fine-tuning may be necessary. Test your router bit setup on scrap material. If required, use shims according to the instructions below to achieve a perfect fit.
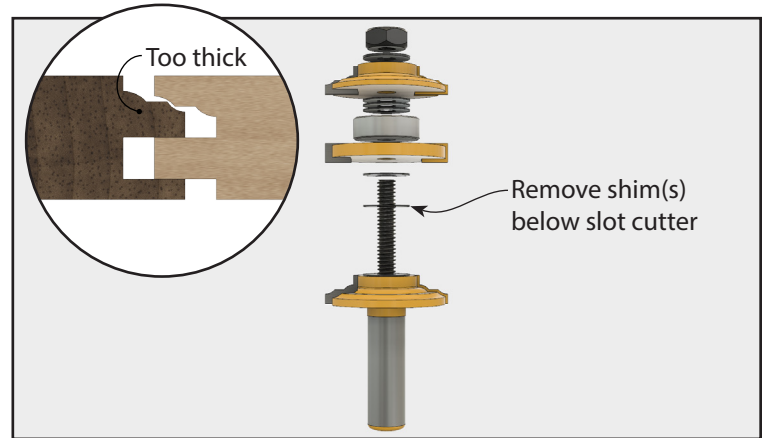
Four Potential Problems When Routing Rails and Stiles

1. Profile bit cuts design tongue too thin
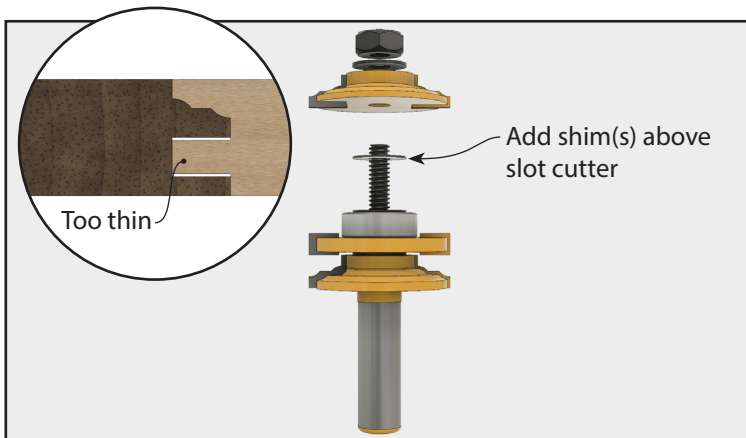
Too thin

Add shim(s) below slot cutter
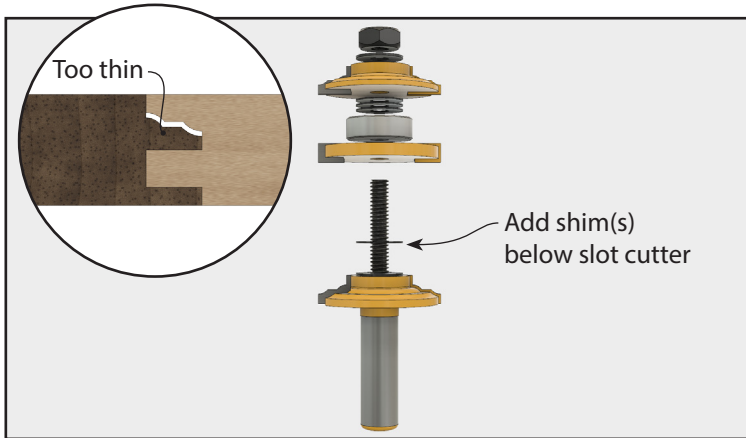
Solution: Add shims between the groove cutter and design cutter to increase the height of the design.

2. Profile Bit Cuts Design Tongue Too Thick

Too thick

Remove shim(s) below slot cutter

Solution: Remove shims between the groove cutter and design cutter to decrease the height of the groove.

3. Coping Bit Cuts Tongue for Rails Too Thin

Add shim(s) above slot cutter

Too thin

Solution: Add shims within the tongue space to add height to the tongue.

4. Coping Bit Cuts Tongue for Rails Too Thick

Remove shim(s) below slot cutter

Too thick
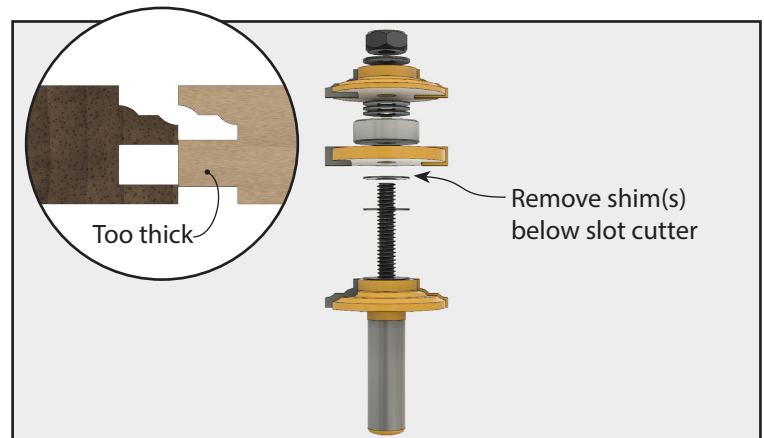
Solution: Remove shims from within the tongue space to decrease the thickness of the tongue.