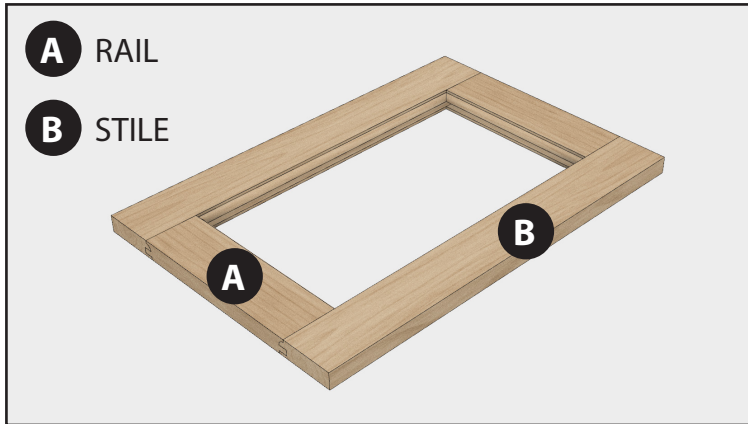


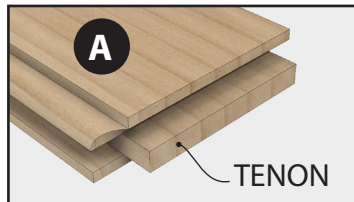
This matched pair of router bits is designed to cut rails and stiles for frame-and-panel doors up to 1" thick. Follow the instructions below for easy setup of both bits.

### Step 1: Determine stile and rail dimensions.



Choose a width for the stiles and rails. Somewhere between 2" and 2-1/2" 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 3/4" and 1" thick. The stiles should 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 when making your cut list. See the worksheet below to calculate the rail length.

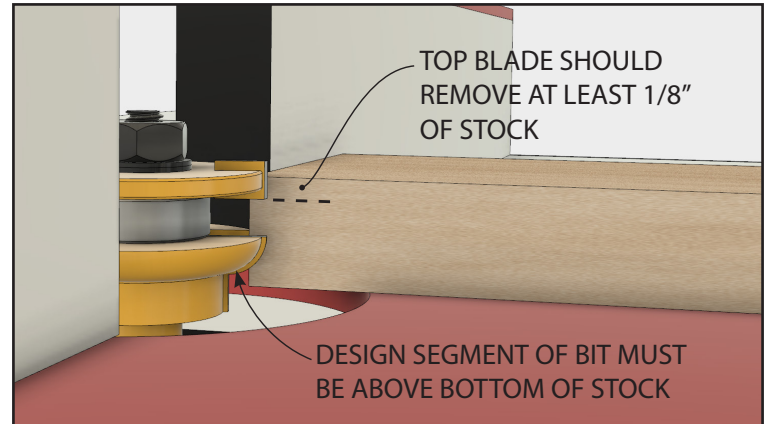


As an example, assume you're going to build a 3/4" x 14" x 20" door with 2" wide stiles and rails. Based on the worksheet, here's what the cut list should look like:

- (2) Stiles... 3/4" x 2" x 20"
- (2) Rails... 3/4" x 2" x 10-3/4"

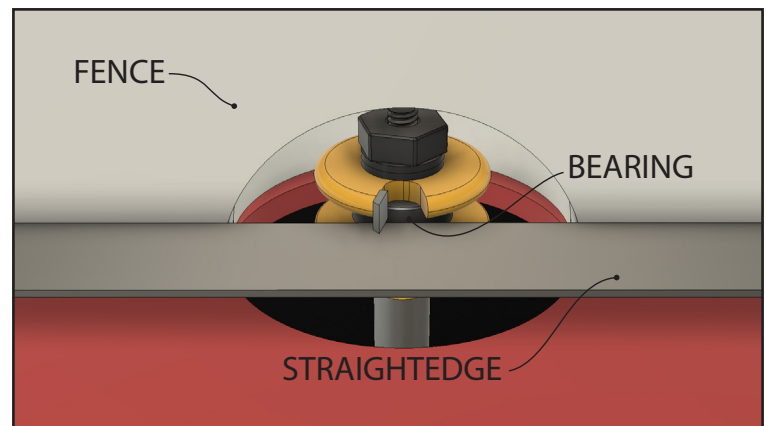
The numbers above represent part thickness, width and height, in that order.

### Step 2: Set up the coping bit height.



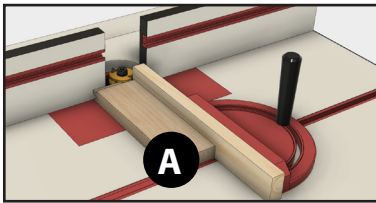
Set the coping bit in the router table. Place a piece of scrap material face down on the table to compare with the bit's height. Adjust the bit up or down until you reach the desired height, as long as the design segment of the bottom blade is above the bottom of the stock. The top blade should remove between 1/8" and 1/4" of material, and should never be below the top face of the stock.

### Step 3: Position the fence.



Set the fence with a straightedge placed against the bit's bearing. Move the fence forward until it touches the straightedge. Lock the fence in place.

## Step 4. Make the cope cut.



Use a piece of scrap material to make a test cut. You'll need a miter gauge or coping sled to cut the ends. Attach a backer

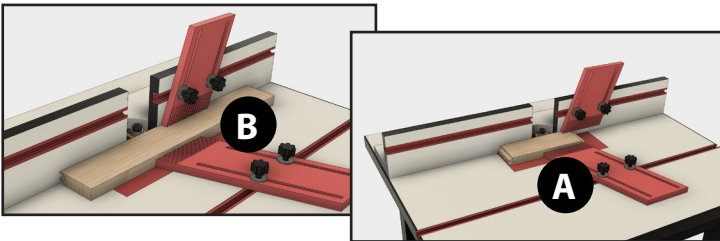
block to the miter gauge to prevent tearout in the back edge of your rails. If the test cut looks good, route each end of the rails with the stock face down.

## Step 5: Set the height of the profile bit.



With the ends of both rails cut, remove the coping bit from the router and insert the profile cutter. You'll need one of the rails to set the bit height. Adjust the bit up or down until the slot cutter is aligned with the tenon in the end of the rail. Set the fence with a straightedge as a guide, just like you did in Step 3.

## Step 6: Make the profile cut.



Install featherboards in the router table and route a piece of scrap material. Test the fit with one of the rails. Adjust the bit height or fence depth if the joint isn't aligned properly. Now route the inside edges of the rails and stiles with the stock face down. Refer to the rail and stile setup guide for instructions on adjusting the joint's fit.

## Step 7: Assemble the door.

Cut a panel to fit in the frame and assemble the door. Apply glue to the surfaces of each cope cut and clamp the door together.

**Tip:** Since the cope is cut cross-grain, tear-out is often inevitable. You'll have less tear-out if you make the cope cut first because the profile cut will remove most of it. A backer board or "chaser" will also help.

## 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	<input type="text" value="20"/>
	<b>MINUS</b>
STOCK WIDTH * 2	<input type="text" value="4"/>
	<b>EQUALS</b>
	<input type="text" value="16"/>
	<b>PLUS</b>
TENON LENGTH * 2	<input type="text" value="3/4"/>
	<b>EQUALS</b>
<b>RAIL LENGTH</b>	<input type="text" value="16-3/4"/>

### YOUR WORKSHEET

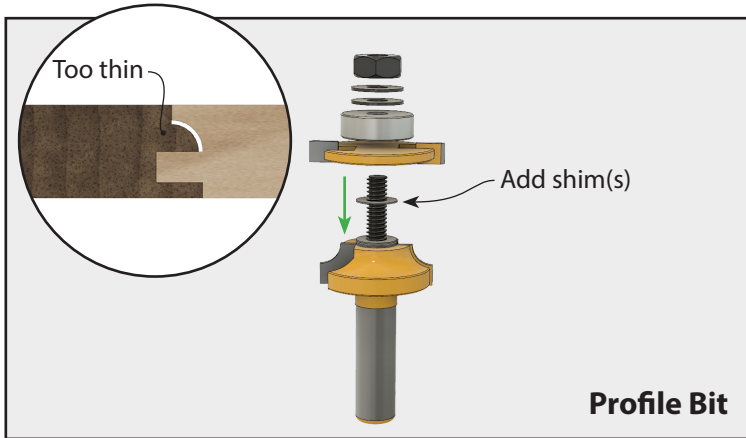
DOOR WIDTH	<input type="text"/>
	<b>MINUS</b>
STOCK WIDTH * 2	<input type="text"/>
	<b>EQUALS</b>
	<input type="text"/>
	<b>PLUS</b>
TENON LENGTH * 2	<input type="text"/>
	<b>EQUALS</b>
<b>RAIL LENGTH</b>	<input type="text"/>



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.

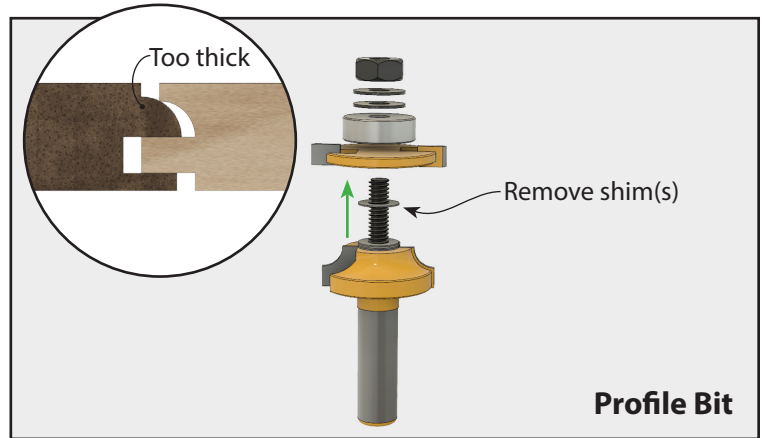
## Four Potential Problems When Routing Rails and Stiles

### 1. Profile bit cuts design tongue too thin



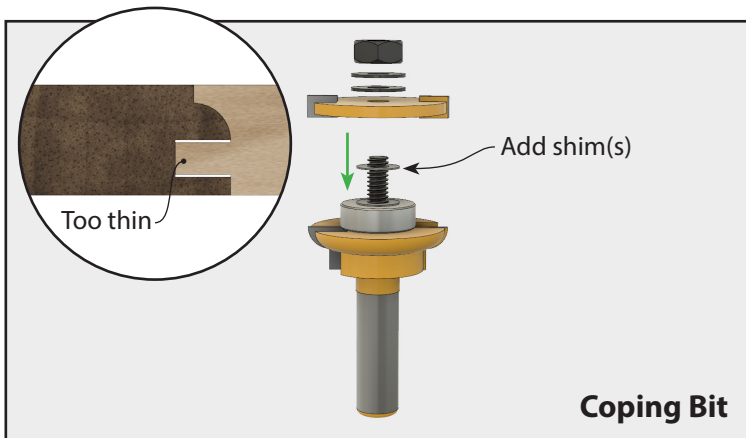
**Solution:** Add shims between the groove cutter and design cutter to increase the height of the design.

### 2. Profile Bit Cuts Design Tongue Too Thick



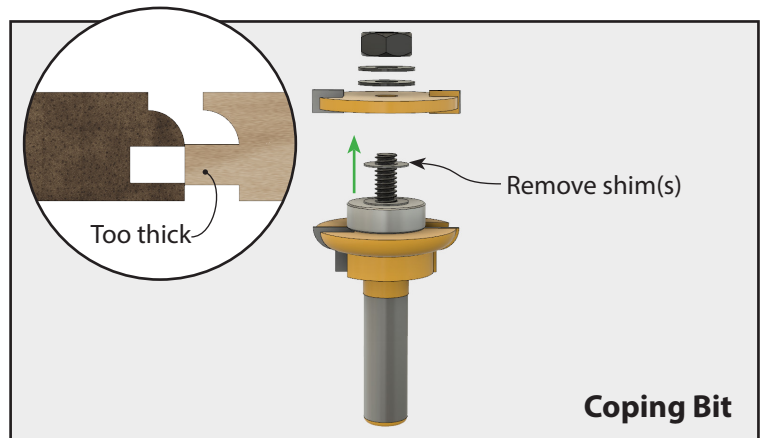
**Solution:** Remove shims between the groove cutter and design cutter to decrease the height of the groove.

### 3. Coping Bit Cuts Tongue for Rails Too Thin



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

### 4. Coping Bit Cuts Tongue for Rails Too Thick



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