

Make a quick box using box joints

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Intro: Make a quick box using box joints

I wanted to make a small box for a project and I wanted strong joints. A mitered and glued box wouldn't be strong enough for what I had in mind so I tried box joints.

There are all kinds of commercially available jigs and tools to assist in making box joints (or dovetails) but I made my own jig quickly and easily with the router table at TechShop and some scrap wood.

Tools needed:

Router table and a 1/4" straight bit
Compound miter saw or table saw
Planer/Joiner*
Belt sander*
Straight file
Some clamps
*optional

Materials:

3-4" wide board
Scrap board

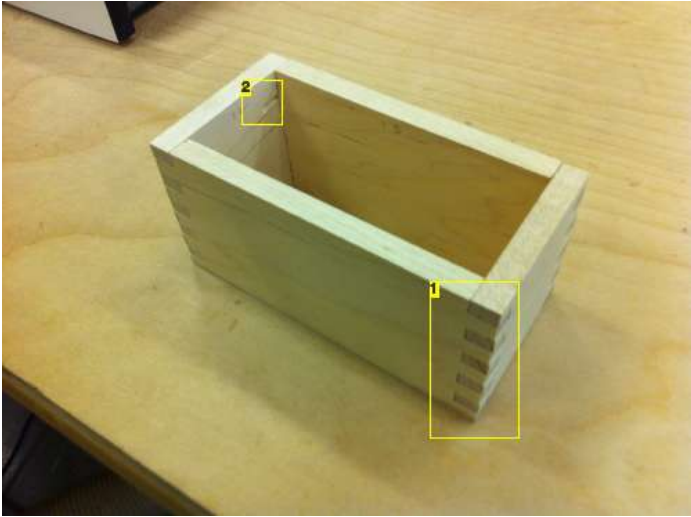


Image Notes

1. Nice fit even without glue. A quick sanding made for a really nice and strong joint.
2. Sometimes the router cuts away a chip as it exits the backside of the wood. Fortunately this was on the inside.

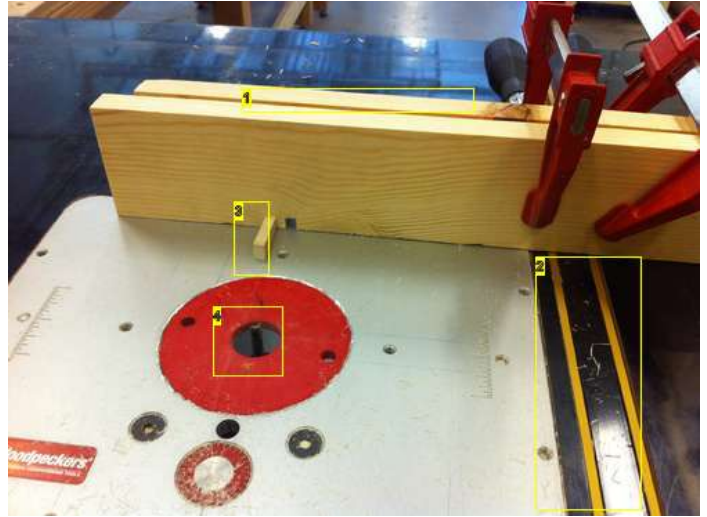


Image Notes

1. The back scrap is for clamping only. It is narrower than the front piece and clears the router bit.
2. Miter gauge slot
3. Jig finger - a tight friction fit
4. Whirling blade of death!

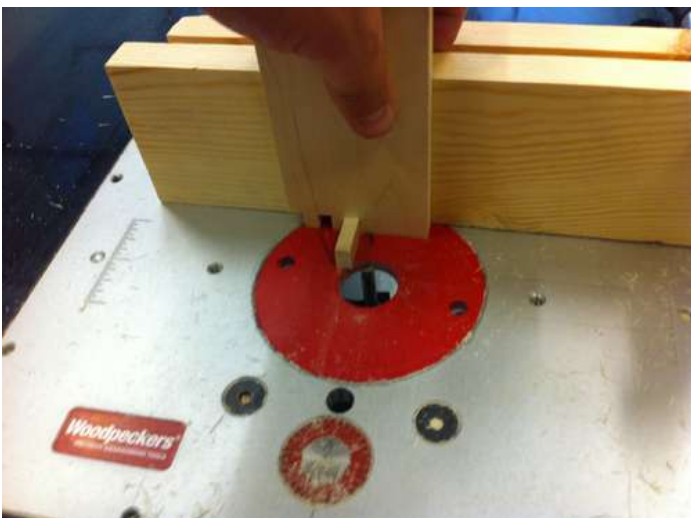


Image Notes

1. My fingers were a REALLY tight fit. A quick and light run through with the file helped it fit on the jig finger. Slightly more filing was needed for the fingers to fit together as a box. Be super careful not to file too much.

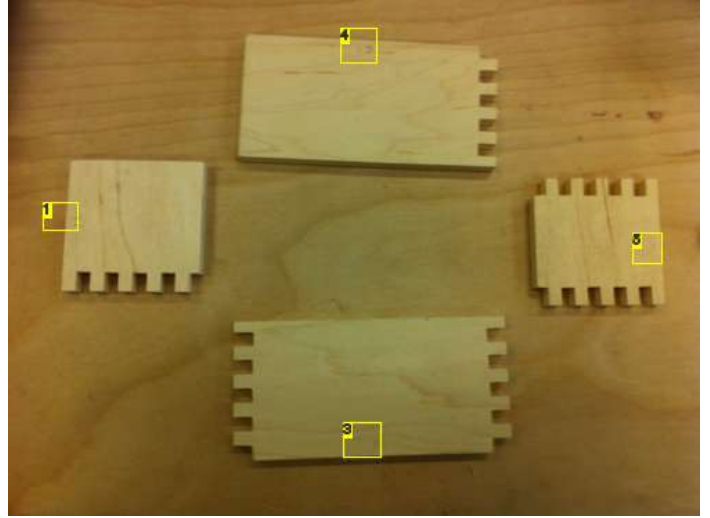
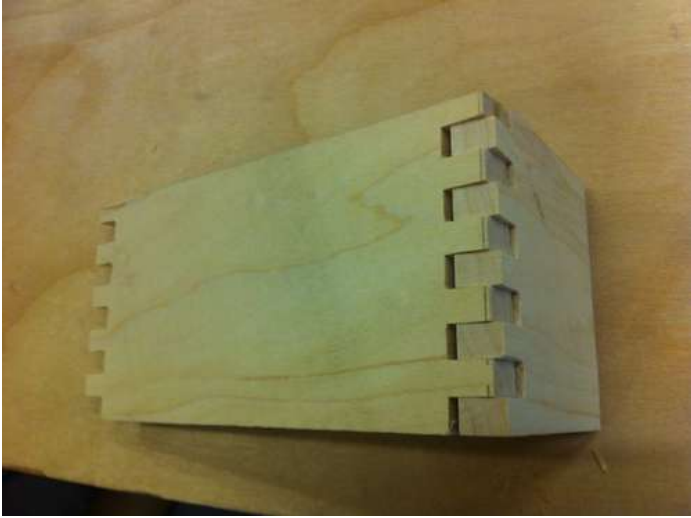


Image Notes

1. light pencil mark: "L"
2. Light pencil label: "F"
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5. Light pencil mark: "R"

Image Notes

1. First cut, align with the side of the jig finger.

Image Notes

1. Second cut - First hole cut fits on the jig finger.

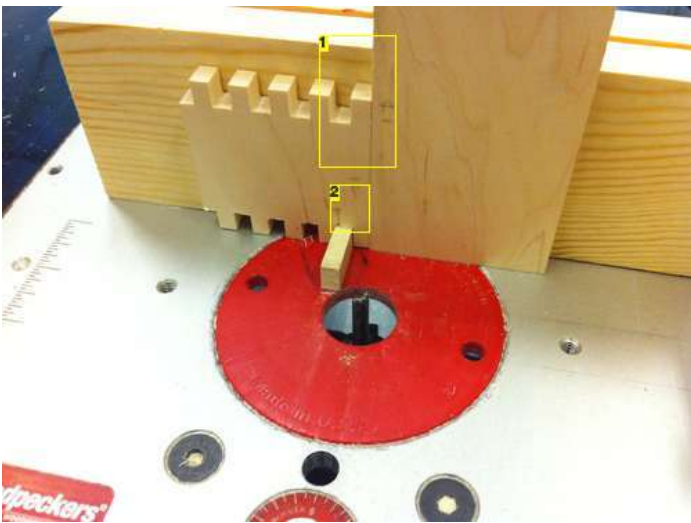


Image Notes

1. Note the marks. The tops of each piece are touching.
2. This finger will eventually fit in to the hole that will be routed next to it.

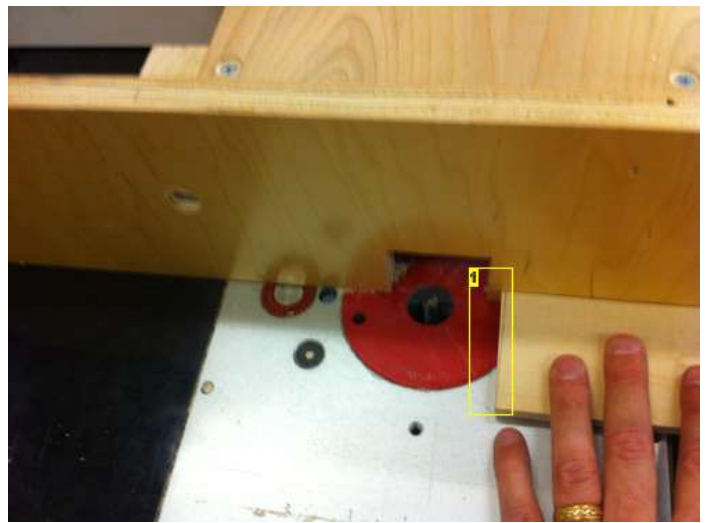


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1. My lid wasn't square. I had to redo it later.



Image Notes

1. There is a tricky part where the edge has to clear the edge of the hole on the fence. I am still working on avoiding a glitch there.

Step 1: Prepare the sides

Plane your board to the desired thickness. I used 2.5" wide maple planed to about 3/8" thickness.

Cut four sides. Label each piece lightly in pencil: front, back, left and right. It helps to put the label at the top of each piece to aid in orientation later.

If it helps, lay them out in the way they will be assembled.

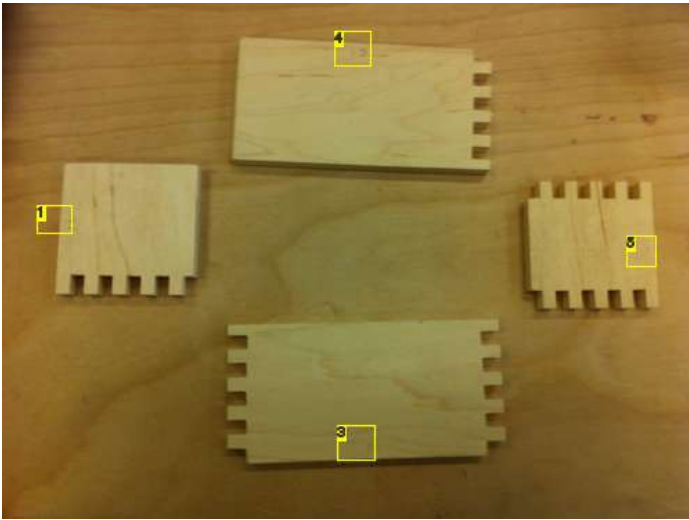


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Step 2: Prepare the jig

For this box, I wanted 1/4" fingers. I inserted a 1/4" straight bit in to the router table and set the height to be the thickness of one of my sides. A quick way to do this is to stack two piece on top of each other with one offset from the other. Raise the router bit until it just touches the offset piece on top. DO NOT CHANGE THE HEIGHT AFTER THIS STEP!

Take a piece of flat scrap wood and clamp it to your miter gauge. In my case, I needed an additional piece of scrap to provide a good clamping surface on the rear of the miter gauge. The front piece is flush with the surface of the router table, the second, clamping piece, clears the router bit.

Turn on the router and rout a rectangular hole in the front piece of scrap. This hole will hold the jig "finger".

Cut a piece of wood, perhaps from your board, just larger than your bit size, in my case 1/4" x 1/4" x ~2"

Fit the piece in to the slot you cut in the jig board. File or sand it down to a tight fit. Also, sand the bottom down so the finger is flush with the bottom of the jig board.

Now, realign the jig board on the router table, against the miter gauge. This time, however, you will clamp the board offset from the bit by EXACTLY the width of the bit (1/4"). I used a 1/4" drill bit as a spacer between the jig finger and the router bit. Clamp the jig board in to position. DO THIS STEP CAREFULLY. Be sure you are measuring against the widest part of the router bit and that the fit is as exact as you can get. This step determines how well the box will fit.

Now, with the jig board clamped in place, route a second hole in the front of the jig board. It should now look like the picture.

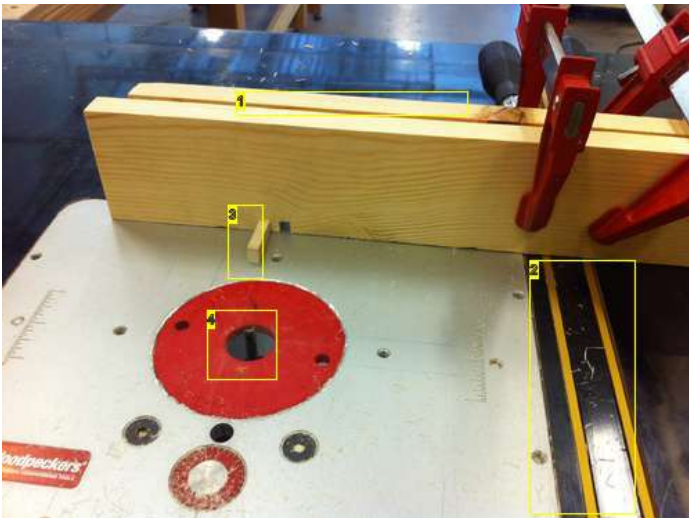


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- 1. The back scrap is for clamping only. It is narrower than the front piece and clears the router bit.
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Step 3: Cut the fingers on the first piece

Now, you can start cutting fingers. It is a good idea to make some test fingers on a few pieces of scrap wood to test the alignment of the jig. If the fingers don't fit together closely, try the alignment again.

For the first cut: Align one side of the side piece with the inside edge of the jig finger. Route a hole. You should now have a piece that has a 1/4" square hole, 1/4" in from the left edge (see picture).

For the second and following cuts: move the piece so that the slot you just cut fits over the jig finger. Route a new hole. Repeat until you run out of board. If the last hole doesn't align perfectly with the edge, don't worry, the corresponding piece will have the same amount of left over hole.

Between routing holes, especially if the jig finger is a tight fit, you may want to run a square file through the newly cut hole to adjust fit. Don't file away too much, just enough for it to fit tightly.

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Step 4: Cut the fingers on the second piece

The second piece is cut the same as the first piece EXCEPT: the first finger is a hole on this piece, so you have to adjust the offset of the first hole. There is an easy way to do this.

Take the corresponding piece you just cut, place the hole closest to what will be the top of the box on the jig finger. Align the back piece with the edge that will be the top of the box touching the top of the side piece (this is where the pencil marks come in handy).

Route a hole. This will make a hole that is at the top of the edge, corresponding to the top finger of the other piece. If everything is well aligned, the router bit should not cut anything from the piece on the jig finger.

Now proceed as before, cutting fingers by aligning the holes on the front piece on the jig finger as before.

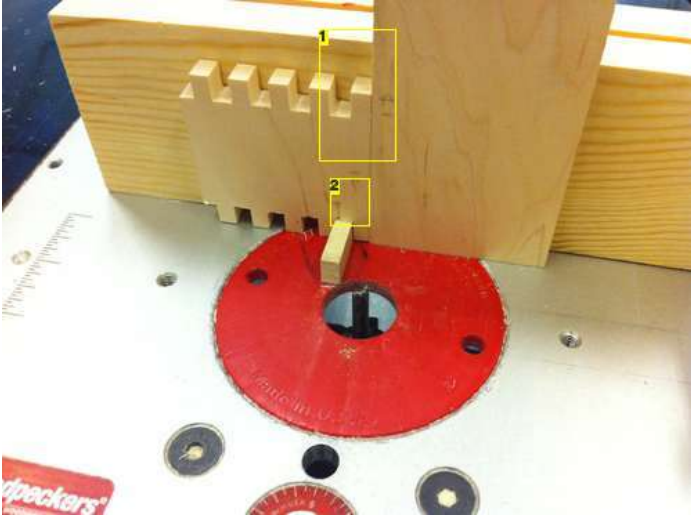


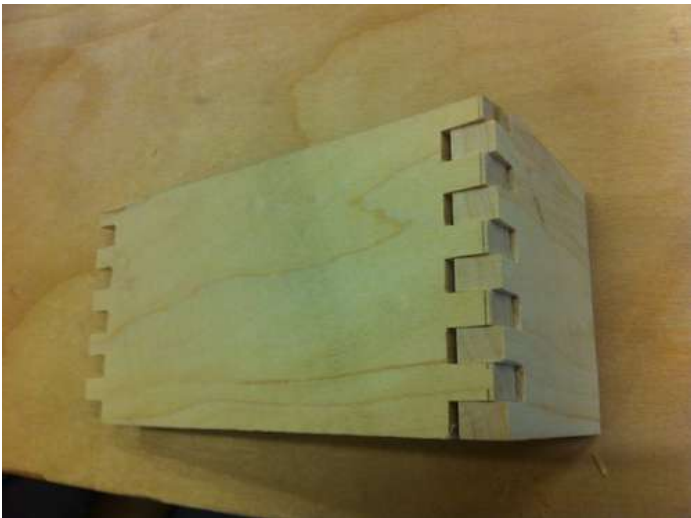
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2. This finger will eventually fit in to the hole that will be routed next to it.

Step 5: Test your fit

Dry fit your pieces. If it is too tight, try some light filing. If it is too loose - oops. try again with better measurement on the jig finger and the router bit alignment.

If the ends of the fingers are too long, that is ok since you can cut/sand them down after the box is complete. If the ends of the fingers are too short, your bit is not high enough. You might be able to file the holes slightly deeper to make a better fit.



Step 6: Make the other two sides

Cut fingers on all eight sides following the same procedure as the first two sides.

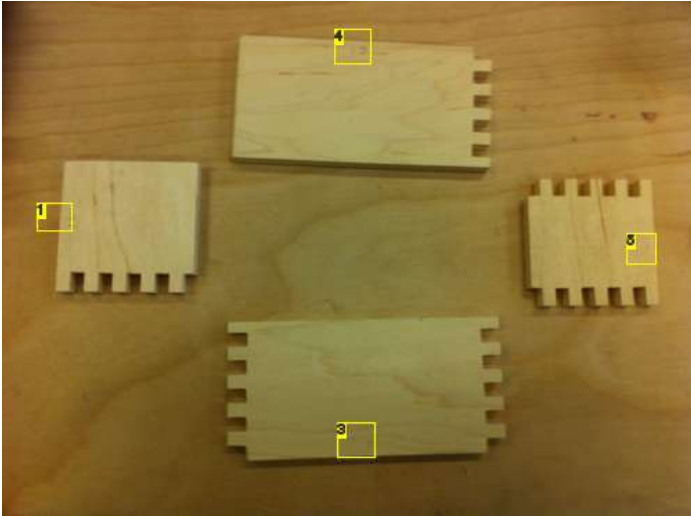


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Step 7: Bottom and Lid

For this box, I wanted a lid that would fit loosely in to the top and a bottom I could glue in place. To do this, I took the top and bottom and routed a 3/8" rabbet around all four sides. Close measurement is helpful here.

To do this, I set up a fence against the router bit, now a 3/8" bit, set to a height of about 1/8". The fence is just about even with the edge of the bit. Again make a test cut or two on scrap to test the fit.

The miter gauge helps to keep the lid square when routing the short side.

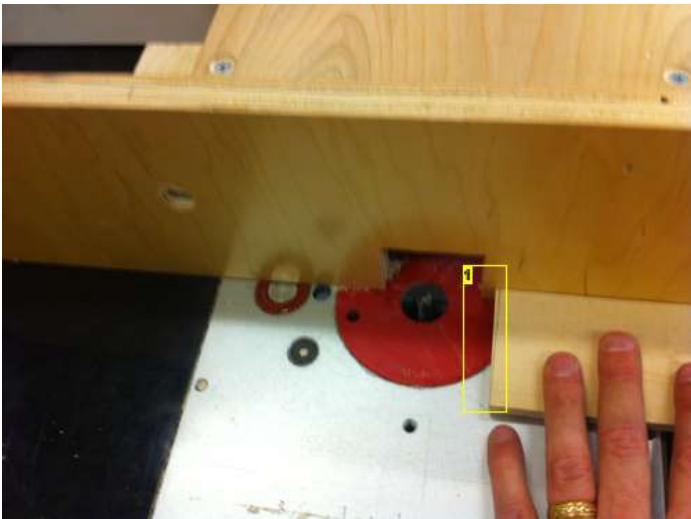


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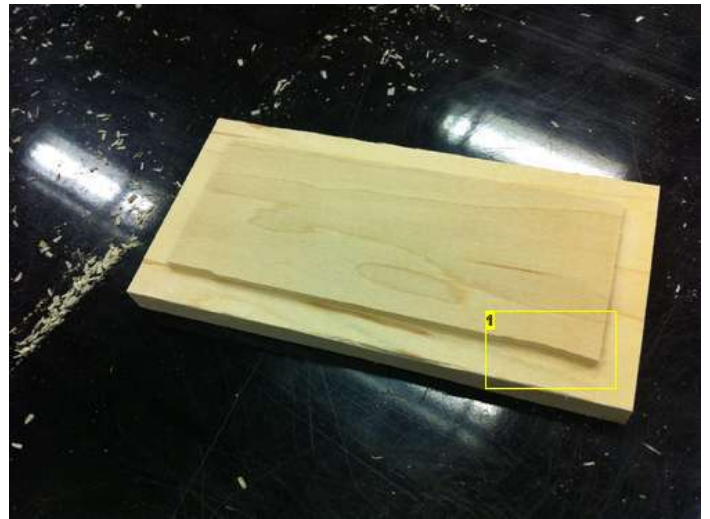


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1. There is a tricky part where the edge has to clear the edge of the hole on the fence. I am still working on avoiding a glitch there.

Step 8: Glue and finish

My box joint fingers were so tight that I had to use a mallet to softly bang them in to place. I probably didn't need glue. The bottom piece glued in to place easily and the lid nestles nicely in the top.

Stain or paint as you like.

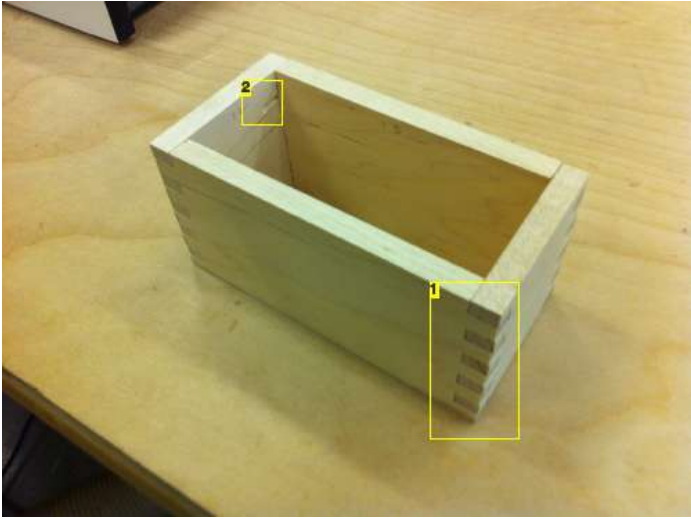


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