

Jewelry Box Beginner Project Tutorial

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[Jewelry Box Video Showcase](#)

Estimated Working Time: 20-30 hrs

Additional elapsed time: Several days for glue and finish curing

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Tools:

Hand Saw and Vice and/or Miter Saw
 Chisel or NC Mill
 Sand paper and Belt Sander
 Clamps and Band Clamps
 Hand plane or Planar
 Drill Press

Materials:

Wood boards
 MDF, Acrylic or other lasercut material
 Wood Glue
 Tacky Glue
 Felt, velvet, or fabric
 Hinges + screws
 Wood stain, dye, paint, or clear coat as desired

The explanations for the use of specific machinery are broad and given to specify how the machine will be used for this specific project. A more thorough understanding of how the machines/equipment can be obtained by asking the SILab Advisors, who can demonstrate the equipment in person, so let them know if you have any questions!

1. Plan the box and prepare a cut list

Decide the finished outside dimensions before cutting anything. Let:

W = outside width
 D = outside depth
 H = wall height
 t = wall thickness

For a box with four mitered walls:



Diagram source: <https://learn.kregtool.com/learn/joining-wood/>

Front and back: $W \times H \times t$

Left and right sides: $D \times H \times t$

Top and bottom: approximately $W \times D$, with enough thickness to machine a locating lip

Divider: cut only after the internal opening has been measured

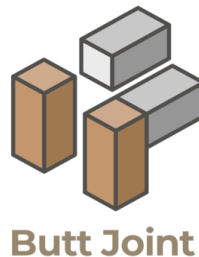


Diagram source: <https://learn.kregtool.com/learn/joining-wood/>

For simple butt joints, account for the overlap. For example, if the front and back cover the ends of the side panels, each side panel will be approximately $D - 2t$.

You can add approximately 1/8 to 1/4 inches of extra length during rough preparation. Final dimensions should be established after the stock is flat and consistently thick.

2. Prepare the wood

Plane the stock if needed before cutting it into short/thin pieces.

You can't use the planer to plane stock shorter than 8 inches or thinner than 0.5 inches. If needed, plane a longer board first, then crosscut it into the individual panels.

A planer makes one face parallel to the face resting on the planer bed. It does not automatically remove a twist, cup, or bow unless one face has first been flattened.

1. Inspect the board for nails, staples, screws, loose knots, severe cracks, or embedded debris.
2. Confirm that one face is reasonably flat. Face the board with the NC Mill if not. (Go to the NC Mill guide further in the tutorial for how to secure boards on the NC Mill)
3. Measure the thickest point with calipers.
4. Set the planer carriage for 1/32 inch pass.
5. Turn on the vacuum for dust collection.
6. Turn on the planer and wait a second for the cutterhead to reach full speed.
7. Feed the board with the grain. Keep it level until the feed rollers take control.
8. Do not push your hands into the infeed opening or reach into the outfeed opening.
9. Inspect the surface, lower the carriage by another 1/32 inches, and repeat.
10. Alternate faces if reducing the total thickness so material is removed more evenly.

Cut six wooden pieces for the box

- Front panel
- Back panel
- Two side panels
- Top panel
- Bottom panel

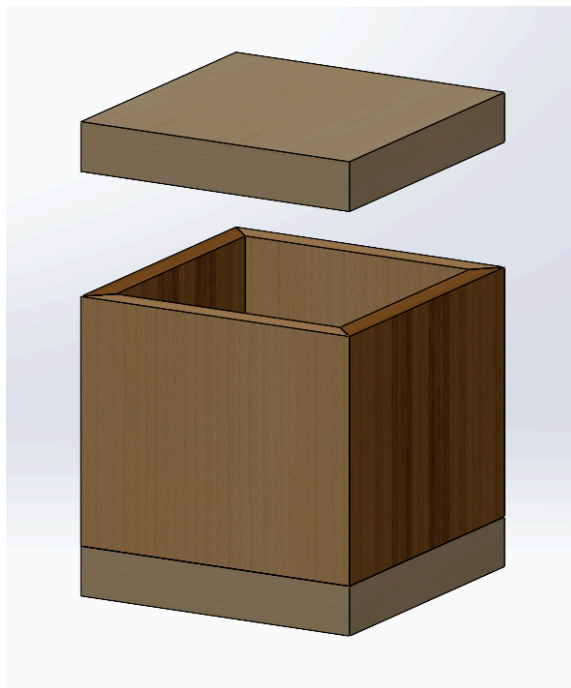
(A divider panel will be cut later)

Using the miter saw

1. Push down on the handle and pull the pin to lift the saw blade.
2. Place the board flat on the table and firmly against the fence.
3. Mark the waste side and align the blade with that side of the line.
4. Clamp the board to the saw base. You can also remove the fence and clamp along that direction as well. (Support long stock at the same height as the saw table.) Don't use your hands to hold the board in place.
5. Keep both hands at least 6 inches from the blade.
6. Start the saw and allow it to reach full speed.
7. Lower the blade through the wood using steady pressure.
8. Release the trigger after the blade passes through the wood.
9. Keep the saw head down until the blade has stopped completely.
10. Raise the head only after the blade stops.

For a wide sliding cut, the head can be pulled forward before it is lowered, followed by a controlled push toward the rear. Do not pull a spinning blade toward yourself through the material. The blade spins toward the back of the table. Have a SILab Advisor demonstrate the sliding-cut procedure before using it.

If your wood is less than 4 inches in height, you can resaw with the bandsaw. If not, hand saw your wood boards to the desired thicknesses. You need to have six sides, the opposite sides of each face should be the same dimensions. (The front panel and back panel, side panels, top and bottom). These dimensions will become the outside dimensions of the box.



Opposite sides (labeled with matching colors) have matching dimensions

For example, I purchased wood that didn't need to be cross cut so I started by resawing (cutting lumber into thinner pieces along the grain) a 2x8x8 in. board into 4 ~0.5x8x8 in. boards for the walls. Then I resawed a 3x8x8 in. board into two ~1.5x8x8 in. boards for the top and bottom. They are slightly thinner than the given dimensions of .5 in. and 1.5 in. because the saw blade has a thickness that turns an equivalent kerf of the board into sawdust. Save some of the sawdust in case you need to fill in gaps when joining the walls later.

To cut with a hand saw:

1. Mark the cut line on all four sides. (If only one side is needed, you can give allowance by shifting the cut line so you plane or sand the board afterwards, also make sure the kerf is on the sacrificial side)
2. Place the boards in a vice with sacrificial, soft scrap wood on both sides of the board. The soft, sacrificial wood prevents the metal part of the vice from digging into the wood and making an imprint. Put a trashcan to catch unwanted sawdust.
3. Clamp the board close enough to the cut to prevent vibration, but leave space for the saw.
4. Begin with several short, light strokes to establish a kerf.
5. Use longer strokes once the blade tracks correctly.
6. Watch the line on both the face and edge to keep the cut square.

7. Rotate the board 90 degrees and cut from another corner
8. Repeat until the board is cut.



3. Smooth the boards

I passed the thicker boards through the planer to ensure the cut side was smooth. I could pass down to the 1 inch boards but keep in mind that thinner boards, like the further cut 0.5 in. boards can't be passed through the planer because they are too thin. Hand plane and sand for smoothness instead. The top and bottom boards should have a good thickness relative to the wall thickness for a solid feeling.

Using a hand plane:

(Use a hand plane for short panels, boards near the planer's dimensional limit, or small corrections.)

1. Identify and mark regions to be removed.
2. Clamp the board securely to a table.
3. Check the grain direction on the board's edge. Plane with the grain whenever possible.
4. Set the blade for a very shallow cut.
5. Begin with pressure near the front of the plane.
6. As the plane crosses the board, shift pressure toward the rear.
7. Stop when the face is flat; do not continue removing material merely to eliminate every minor visual mark.

It would be easier if the stock you buy/find is already in its final thickness because resawing by hand is a lot of work. You can miter saw if you need to make cross cuts. But there is a visual benefit to resawing your own boards: you can match the grain on the walls. Perform most sanding while the panels are still separate. This makes it easier to sand uniformly and prevents accidental rounding of assembled corners.

A suitable progression is:

- 40-60 grit for saw marks
- 100 grit (Belt/Disc Sander) for general sanding
- 150 or 220 grit before staining

Keep in mind 40 and 60 remove material aggressively and can leave deep scratches that must be removed before staining.

Always sand through the previous grit's scratches before advancing. You can mark the surface lightly with pencil between grits; when the pencil marks disappear evenly, the previous scratch pattern has generally been removed.

4. Prepare the joints

Butt joints are easier to cut and assemble. Test the four walls around the bottom panel and confirm that the outside dimensions are correct.

A miter joint hides the wall-panel end grain but demands greater accuracy.

1. Mark the inside (and outside, if not only cutting the corner).
2. Cut the joining edges at 45°. Follow the hand saw instructions above for how to set up the piece in the clamp.
3. Keep opposite panels exactly equal in length.
4. Arrange all four panels in order on a flat bench.
5. Bring the corners together without glue.
6. Check whether the final corner closes without a gap.
7. Check the assembly for squareness by measuring both diagonals.
8. Make very small corrections with a small hand plane, the belt sander and sandpaper.

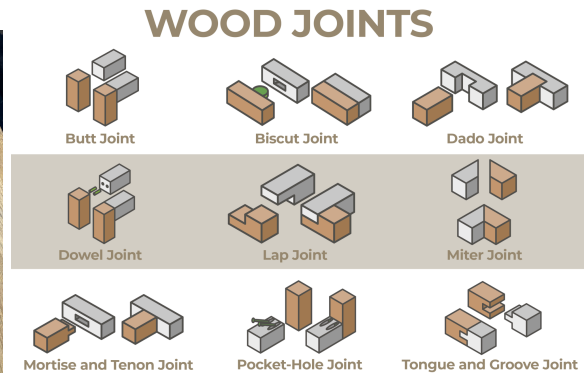


Diagram source: <https://learn.kregtool.com/learn/joining-wood/>

5. Glue the walls together

Complete a full dry assembly before applying glue.

For miter joints, the painter's-tape method helps keep the faces aligned:

1. Lay the panels outside-face-up in their correct order.
2. Bring the edges tightly together.
3. Apply painter's tape across each joint.
4. Turn the connected panels over.
5. Apply a thin, continuous coat of wood glue to the mitered surfaces.
6. Fold the four panels into the box shape.
7. Close the final corner with tape.
8. Add one or more band clamps.

For butt joints:

1. Check that the box sits flat.
2. Measure both diagonals; equal diagonals indicate a square assembly.
3. Because end grain absorbs glue quickly, apply a very thin preliminary coat to the end grain, allow it to absorb briefly, and then apply the normal glue coat before assembly.
4. Adjust before the glue begins to set.
5. Do not overtighten the clamps. Excessive pressure can distort the walls or force most of the adhesive from the joint.
6. Remove accessible squeeze-out with a wet paper towel before it hardens.
7. Allow the wood glue to cure for a day.

For butt joints, you can use regular clamps (on the back wall) and also use band clamps as necessary.



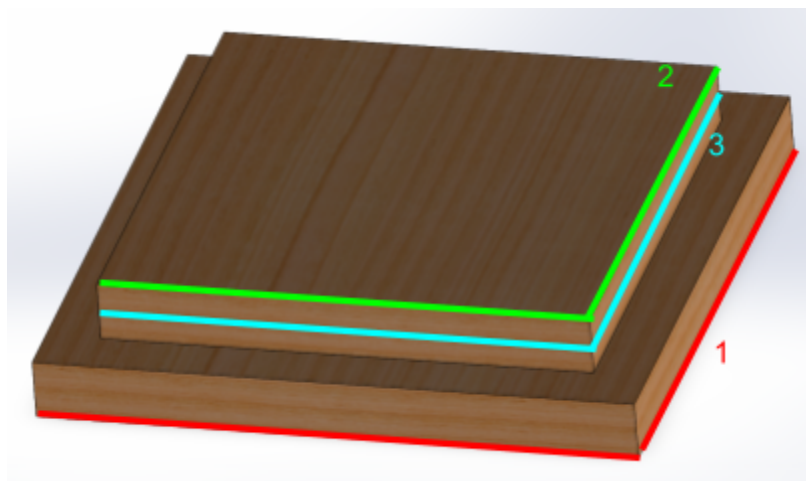
6. Create the bottom insert

Once the walls are glued

1. Place the wall assembly on the bottom panel.
2. Align it carefully with the panel edges.
3. Trace the actual inside opening.
4. Measure the traced rectangle.
5. Reduce the lip dimensions slightly so it will fit without being forced.
6. Mark the depth of material to be removed around the lip.

The board will be machined to have:

1. A full-size outer surface matching the outside dimensions of the box
2. A smaller raised tongue or lip that fits into the inside opening
3. A shoulder around the tongue that rests against the wall edges



Use either a chisel or the NC mill to remove the outside material.

Using chisels

1. Clamp the panel securely to the bench. Or if small enough: in a vice.
2. Score the shoulder line with a marking knife.
3. Keep the non-cutting hand behind the cutting edge.
4. Begin in the waste area rather than directly on the finished line.
5. Remove thin layers instead of trying to remove the full depth at once.
6. Work from multiple directions to avoid splitting the edge.
7. Use the chisel bevel deliberately:
 - a. Bevel toward the waste when paring to a shoulder
 - b. Flat back against the finished surface when leveling
8. Use a rubber mallet, it's not necessary to use excessive striking force.
9. Test the fit repeatedly.

Using the SILab manual/NC mill

1. Determine:
 - a. Panel size
 - b. Lip size
 - c. Shoulder width
 - d. Cut depth
 - e. X/Y datum location
2. Choose an end mill, it's better to go as large as possible for efficiency, I used the largest bit size: 3/4 inches.
3. Place a sacrificial board beneath the workpiece if there is any possibility of cutting through.
4. Clamp the panel onto the metal table attachment.
5. Verify that clamps, the vise, and fasteners are outside the programmed cutter path.
 - a. You might need to unclamp, rotate the board and reclamp.
6. Follow NC Mill procedure from a lab advisor on installing the bit.
7. Establish X and Y zero at the selected datum.
8. Establish Z zero at the top surface.
9. Enter/program rectangular geometry. Or do it by hand on a marked board.
10. Start the spindle and make shallow passes.
11. Remove chips with the air compressor.
12. Keep the board on the NC mill if using the NC mill for the next step.



7. Create the Bottom Divider

1. Measure the actual inside dimension of the box.
2. Decide whether the divider will fit between the side walls or front and back walls.
3. Cut the divider slightly oversize.
4. Plane or sand it gradually until it fits without bowing the box walls.
5. Trace the insert sides on the bottom board.
6. Trace both divider faces to establish the dado (the groove cut in the face of a board, into which the edge of the board is fixed.) width.
7. Machine or chisel a shallow dado.
8. Keep the bottom of the dado flat.
9. Test that the divider sits vertically and does not rock, if not, use the NC mill or chisels to remove more material.



8. Line with fabric/felt + Attach (glue) the bottom panel

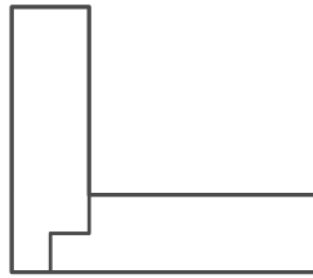
Cut Felt to the dimensions of the box using the rotary cutter. Glue it onto the box with tacky glue. Apply as thin of a coat as possible to ensure the fabric retains softness. You want the glue to secure the fabric to the wall while not soaking through and hardening the exposed side of the fabric. This thin coat is especially crucial with felt/velvet; it easily absorbs glue.

Glue the internal dividing board with wood glue once the felt it will touch on its edges is glued on. Glue the walls with wood glue onto the groove of the bottom board.

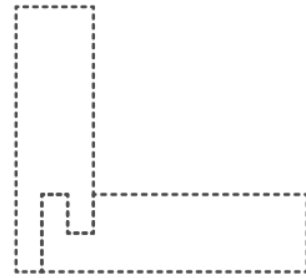
Wipe any squeeze-out with a wet paper towel. The joining of the bottom board and wall opening are similar but not exactly rabbited joints. This ensures a more secure and durable construction.



**Wood Joint
Half-Lap, Corner**

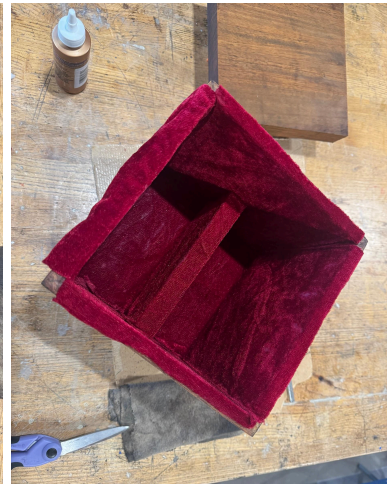


**Wood Joint
Rabbet**



**Wood Joint
Rabbet, Tongue**

Diagram Source: <https://www.dimensions.com/element/wood-joint-rabbet>



9. Lasercut Internal Compartment boxes.

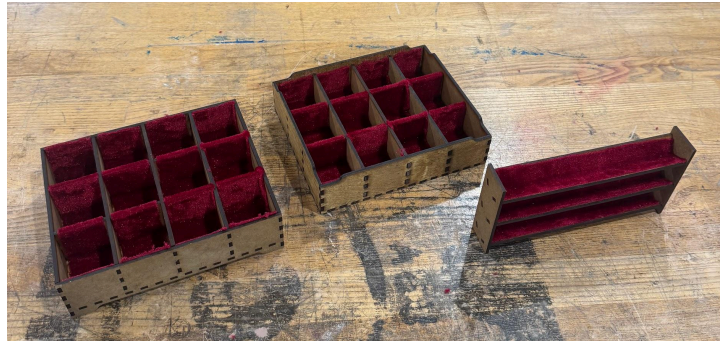
Measure the internal dimensions of your box, accounting for the thickness of the felt. Use a laser cutting box maker using these dimensions to specify the outside dimensions. I used [Boxes.py](#). Make customized internal boxes to organize the inside.

1. Enter the intended outside dimensions.
2. Enter the actual sheet thickness, measured with calipers.
3. Use the appropriate finger-joint or kerf setting.
4. Export a .DXF file.
5. Cut a small joint test or one bottom-and-wall pair before cutting every component.
6. Adjust the fit if the test joint is excessively loose or tight.
7. Nest the remaining components efficiently.
8. Run the full job while observing the laser continuously.

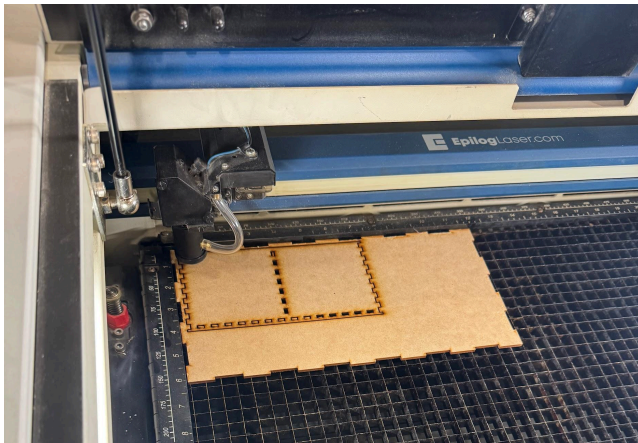
I used two bottom boxes for bracelets/necklaces, two 3x4 compartment trays for rings/earrings, and a shelf for smaller rings/earrings. Apply felt in the same way as the big box, with a thin layer of tacky glue. Remember that the laser cutter is the one machine which you must always tell a lab advisor before starting a cut.



Bottom Box



Trays and Shelf



10. Make the lid

Put the top board on the NC mill or use chisels to shape as desired. I did a border cut with the NC mill just like the bottom board and sloped two edges with the belt sander. I also made a cavity with the NC mill on the inside side of the lid. You can laser engrave your initials on the inside of the lid as well.

11. Sand, Stain and Clear Coat



Final sanding

1. Inspect the assembled box under angled light.
2. Sand glue residue completely; stain will reveal any remaining glue.
3. Sand in the grain direction.
4. Use 150 and 220 grit as appropriate.
5. Avoid rounding over the lid-to-box mating edges.
6. Ease sharp exposed edges very lightly.
7. Vacuum thoroughly between grits.
8. Wipe the surface with a lightly damped paper towel.

Staining

1. Test the stain on scrap from the same board.
2. Go outside.
3. Apply a thin, even coat.
4. Wipe excess.
5. Allow it to dry fully before deciding whether another coat is needed.
6. Read the can for information about duration and number of coats

12. Add hardware

Lay out the hinges

1. Place the lid on the box and center it.
2. Mark both hinge locations symmetrically.
3. Position each hinge and mark its screw-hole centers.
4. Verify that the screws will not break through the wall or lid.

Choose a drill bit approximately equal to the screw's solid root diameter, excluding the thread. A pilot hole that is too large will not grip; one that is too small the screw may split the wood or strip the screw.

1. Install the drill bit.
2. Tighten the chuck.
3. Remove the chuck key.
4. Set the drill-press table and depth stop.
5. Clamp the workpiece to the table. Never hold a small lid or box wall by hand.
6. Lower the stationary bit to verify alignment.
7. Turn on the drill press.
8. Feed the bit slowly into the wood.
9. Stop at the depth setting.
10. Raise the bit completely and turn off the machine.
11. Wait for the spindle to stop before unclamping the workpiece.

Attach the hinges

1. Place the hinges over the pilot holes.
2. Turn every screw by hand. Use a properly sized manual screwdriver.
3. Alternate between screws so the hinge remains aligned.
4. Stop when the hinge is seated; do not overtighten and strip the hole.
5. Test the lid after each hinge is loosely installed.
6. Make final adjustments before tightening all screws.
7. Apply WD-40 if the hinges are squeaky (Place a paper towel to catch excess)



Congratulations! Your Jewelry Box is Complete!

