



CONVEX CURVE CUTTER

An Innovative Bandsaw Accessory

Version 1.0

Safety First



Disconnect saw from power source before fitting or removing insert.



Always wear proper ear protection when working with machinery.



Use caution when handling sharp objects (saw blades, router bits, drill bits and so on). Use protective gloves whenever possible.



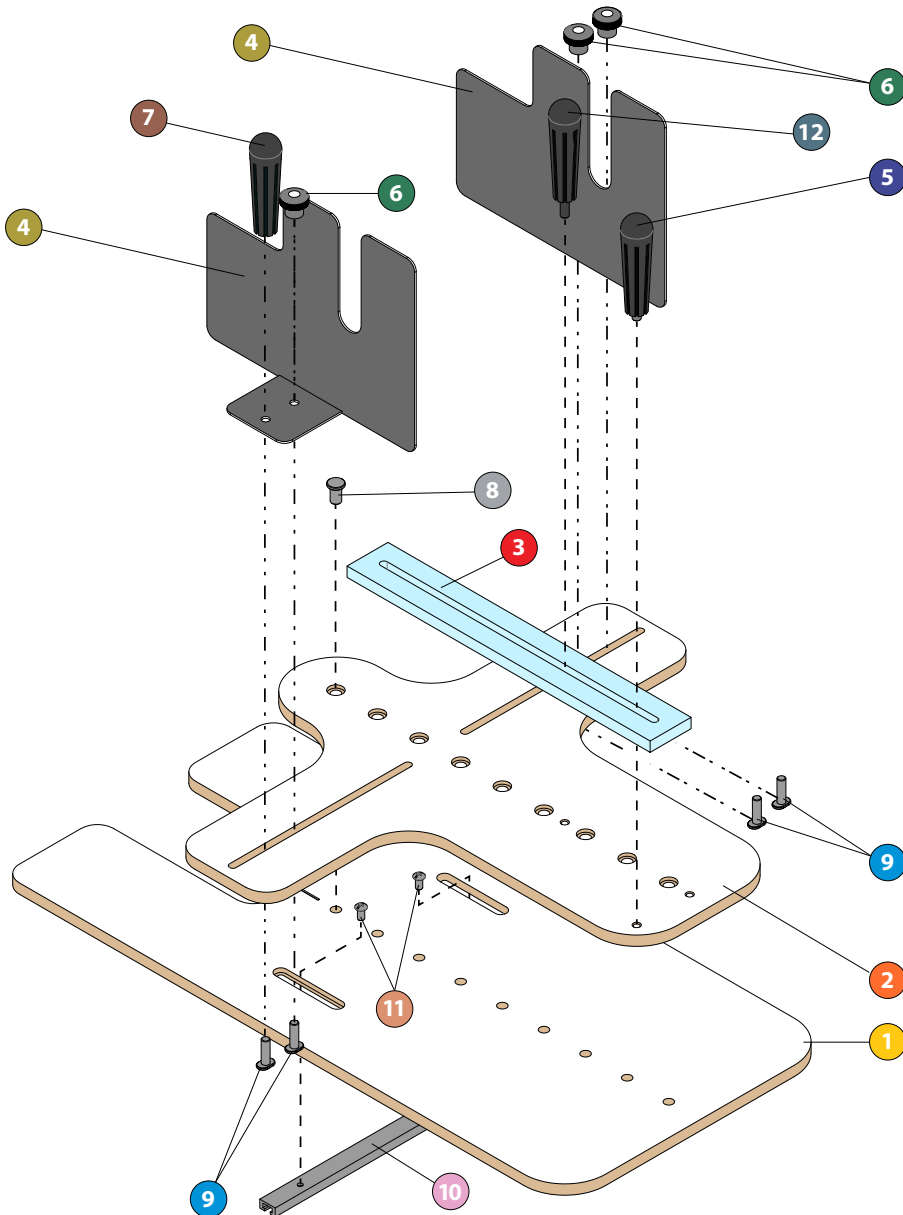
Always wear proper eye protection when working with machinery and tools.



Always wear proper respiratory protection when working near airborne dust particles.

Please read and fully understand any and all safety materials that came with your power tools or machinery before operation. Always follow all safety guidelines set in place by the power tool or machine manufacturer.

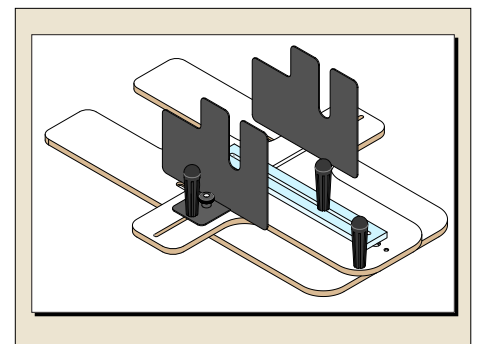
EXPLODED VIEW - Convex Curve Cutter



PARTS LIST - Convex Curve Cutter

No.	Description	Quantity
1	Base Platform	1
2	Turntable	1
3	Clear Acrylic Stop	1
4	Steel Fence	2
5	5/16"-18 Short Studded Post Knob	1
6	5/16"-18 Round Knobs	3
7	5/16"-18 Female Post Knob	1
8	Pivot Pin	1
9	5/16"-18 x 1 T-Bolt	2
10	Aluminum Mini Miter Track	1
11	1/4" x-20 x 1/2" Button Head Screw	2
12	5/16"-18 Long Studded Post Knob	1

ASSEMBLED - Convex Curve Cutter



Band Saw Maintenance

Before setting up the Convex Curve Cutter we recommend that you check to see that your band saw is in good working order. Un-plug your band saw before starting any maintenance on the saw. Check the tires, blade, the blade tension and so on to be sure that everything is working properly before proceeding to achieve the best possible results. Make sure that the band-saw blade is square to the miter slot. Also be sure to follow all general maintenance and safety guidelines that came with your band saw instruction or user manual.



As with all band-saw cuts, the bandsaw and its guides must be tuned according to the band saw manufacturer's recommendations and proper tension applied to the blade. The size of blade recommended with the CCC is 1/2 inch, 3 or 4 tpi. This size blade is the most common size blade for the majority of CCC projects. Depending on the size of the box, radius and finish cut, you may try different "tpi" to produce a different result. Before installing the CCC on to your band saw, install the correct tpi band saw blade on to your saw.

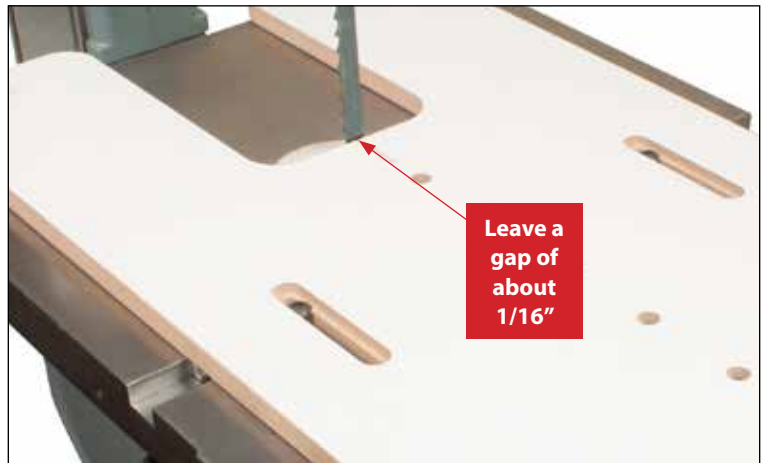
Square The Table to The Blade

Place a machinist or engineers square on the table and slide it snugly up against the blade. Adjust the band saw table top as needed until the table is square to the blade.



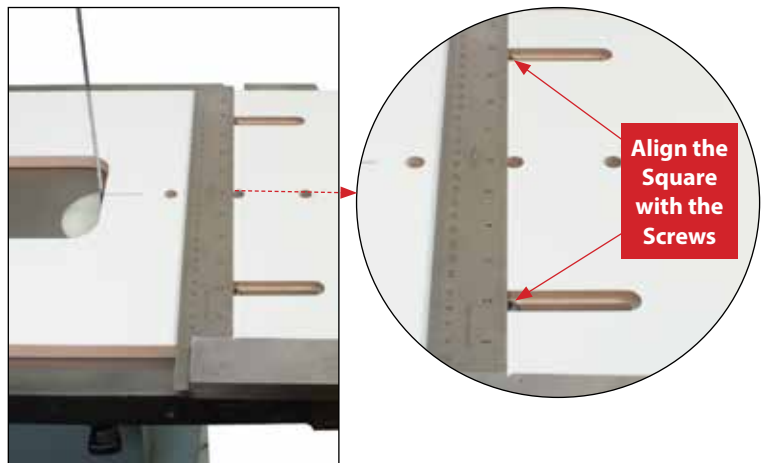
Assemble the Base

Attach the MiniTrack ¹⁰ to the bottom of the Base ¹ using the two 1/4"x20 x 1/2" Button Head Screws ¹¹. Leave both Button head screws loose for calibration purposes. Place the assembled base into the miter slot so that the cut out of the Base ¹ is approximately 1/16" away from the blade.



Square the Base

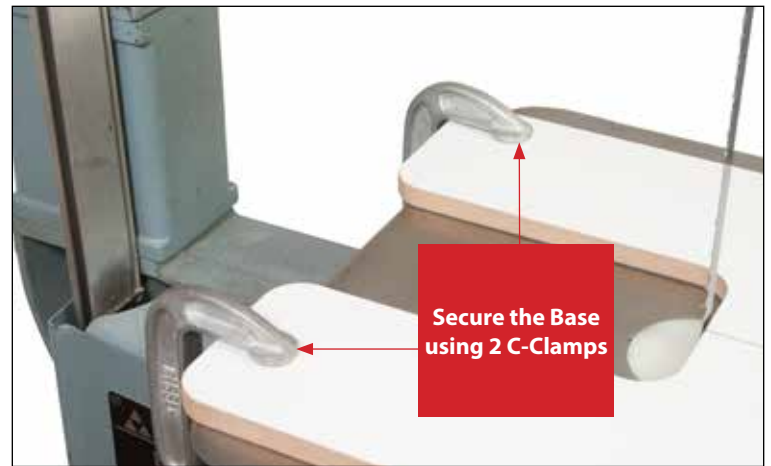
Once the Base ¹ is set and into position, use a large machinist square to square the MiniTrack ¹⁰ to the Base. Place the square on the side of the base and align the center of the two Button Head Screws ¹¹.



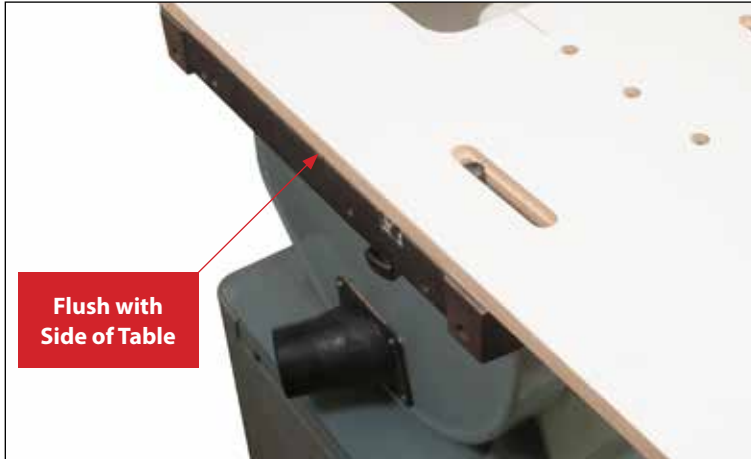
Once aligned and square, secure both Button Head Screws with a hex head wrench. Make sure the Base ① is approximately 1/16" away from the blade once Button Head Screws are secure.



Clamp the base down using two C-clamps or F-Clamps (not included) as shown below.

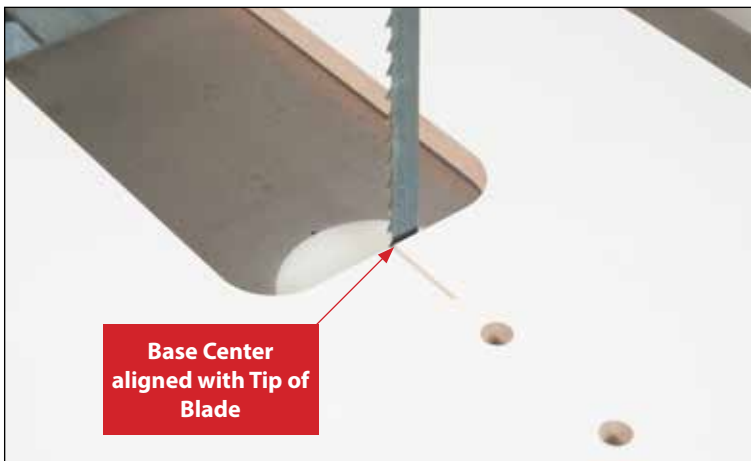


Double check the squareness by sliding the Base ① forward in the miter slot. Check to see the the Base ① aligns with edge of your table as shown below.



Align and Secure the Base

Once the base is square, align the base so that the center line on the base cut out is lined up with the tip of the band saw blade as shown below.

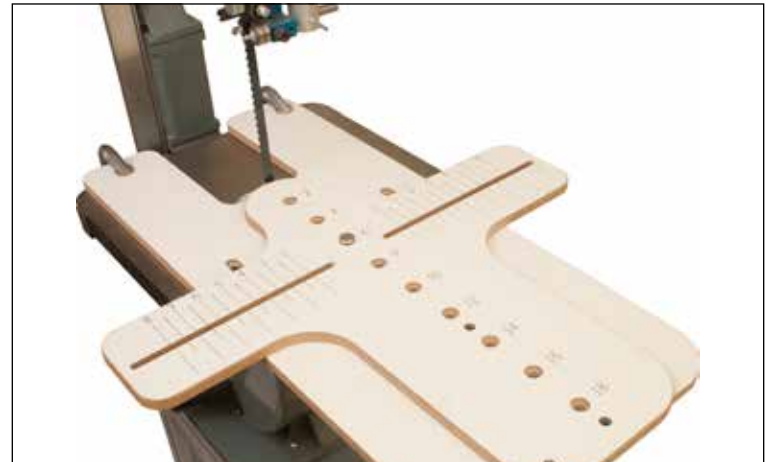


Shop Note:

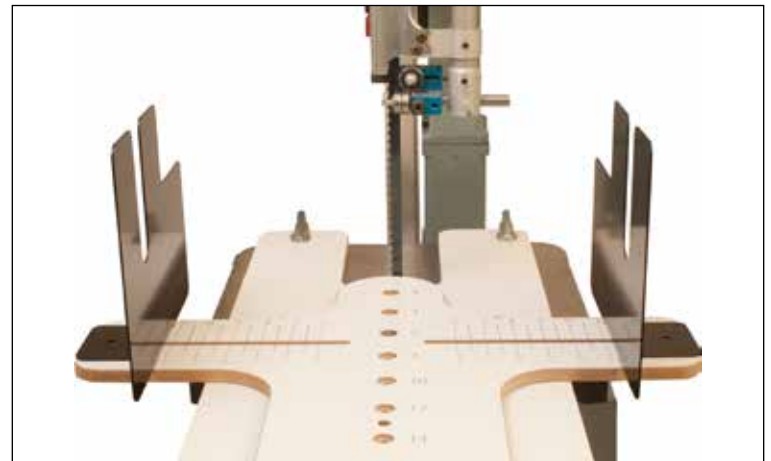
Centering and squaring the CCC Base Platform is critical to the final result of your box and must be done as precisely as possible.

Setting Up the Turntable

Place the Turntable ② on top of the Base ① and align the holes on the Turntable ② with the holes on the Base ①. Insert the Pivot Pin ③ into any of the pivot holes. We will adjust this later once we determine what the arc size is going to be for our project.



Set the Steel Fences ④ onto the Turntable with the shorter end facing the blade. Keep the fences as far to the outside as possible in order to have room to secure them.



Secure the left side Steel Fence ④ using the 5/16"-18 Post Knob ⑦ and a 5/16"-18 T-Bolt ⑨. The Post Knob ⑦ must be placed on the outside hole. Use a 5/16"-18 Round Knob ⑥ and 5/16"-18 T-Bolt ⑨ to secure the inside hole of the Left Side Fence. Use the remaining two 5/16"-18 round knobs ⑥ and 5/16"-18 T-Bolts ⑨ to secure the Right Side Fence. Once secured, slightly loosen all the knobs for adjustments.

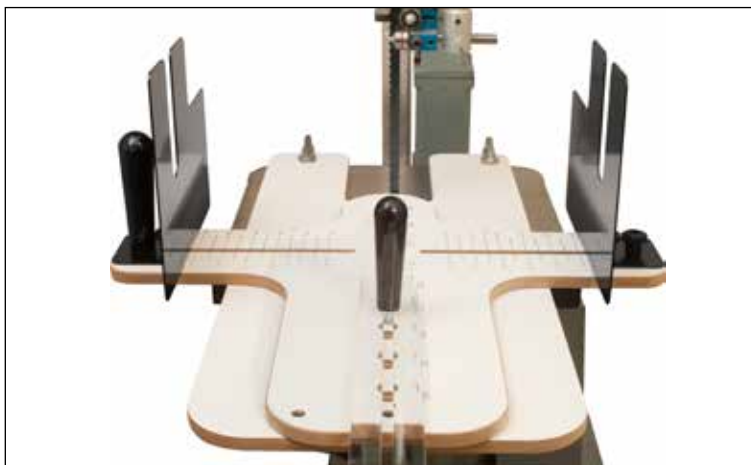
Fasten the 5/16"-18 Short Studded Post Knob ⑫ to the threaded hole in the lower left corner on the Turntable. Secure the knob tightly. This Post Knob is used as a handle to give you better control when pivoting the turntable.



Quick Tip...

The Steel Fences are reversible for larger size projects. Most 14" band saws will use the fences with the Short End Facing the blade as described in the assembly process. IF your band saw is capable of handling larger stock then you may need rotate the steel fence for better control of your stock.

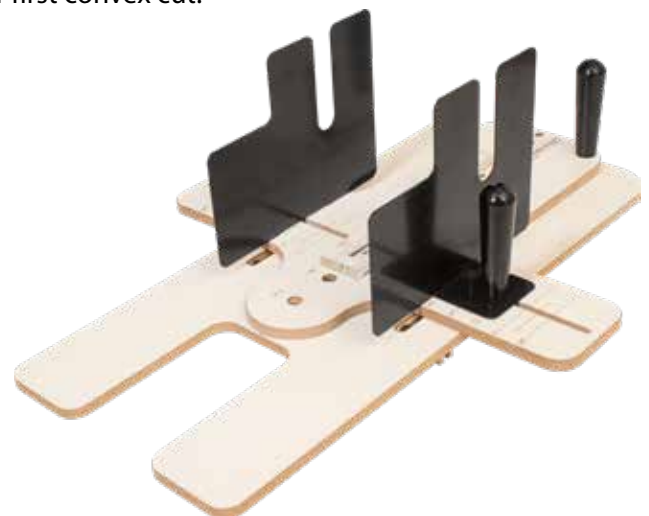
Place the Clear Acrylic Stop ③ on to the Turntable ② so it aligns with the center holes on the Turntable ②. Secure the stop with the 5/16"-18 Long Studded Post Knob ⑤.



Safety Note:

Be sure to check the clearance between your upper guides on your band saw and the top edge of the Steel Fence. There must be enough clearance between the Steel Fence and the Guides before cutting.

Your Convex Curve Cutter should now look just like the image below (installed on your band saw) and is now ready to make your first convex cut!

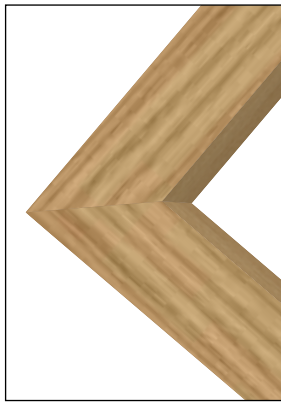


Quick Tip...

There are two threaded holes running down the middle of the Turntable. You have the option of using either hole to secure the acrylic stop depending on the size of your box. You may use the hole furthest away from the pivot point for larger boxes and the hole closest to the pivot point for smaller boxes.

Before Cutting Begins

Before curve cutting on the CCC can begin, you must first construct the jewelry or keepsake box to the dimensions you desire. The box can be square, rectangular, and for the more adventurous, even multi-sided. As long as any side you wish to curve will not exceed the resaw capability of your bandsaw, including the 1" thickness of the CCC base and turntable.



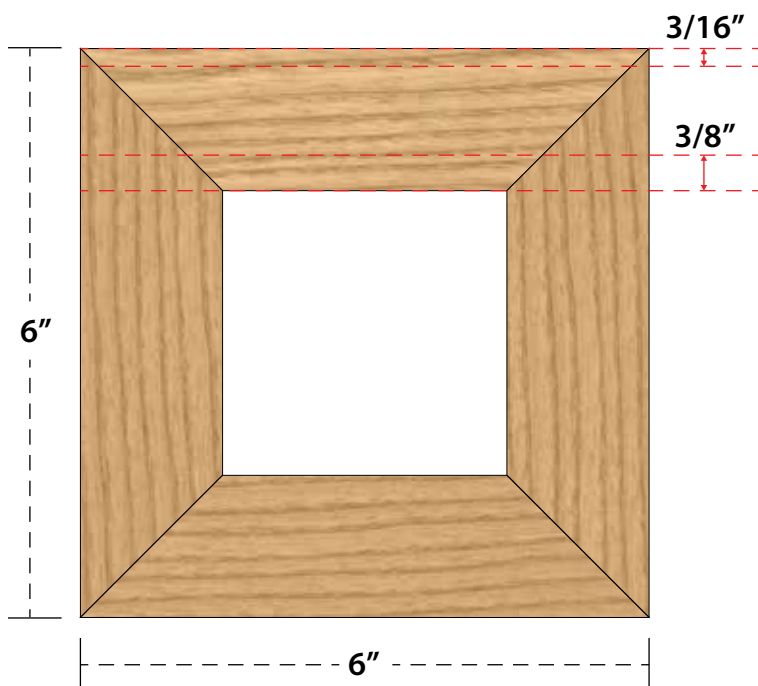
When cutting and assembling projects such as boxes, the corners should fit together square with no gaps showing. This is extremely important for cutting curves on the box sides with the CCC. Most box sides are mitered and it is essential when you cut the parts you get clean, sharp 90 degree corners when assembled. If you don't, you may not get the results you desire.

Box Layout for Symmetrical Arc

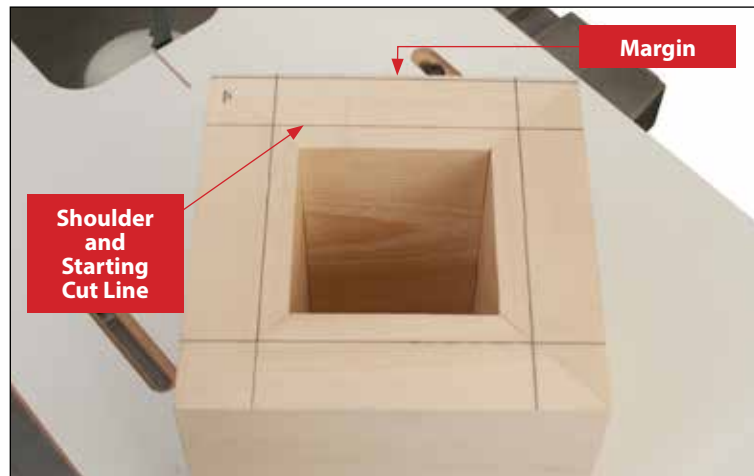
In the drawing below, we are showing the top of the box where the opening is. This is done so we can identify the inner wall thickness of the box as well deciding what size radius can be achieved based on the dimensions of your box. In our example, we are cutting a box that is approx. 6" wide x 6" long x 5" tall and 1½" thick. You should always keep the outer edge of your box at least 3/16" from the edge of the box. The inner wall should be about 3/8" from the center opening of the box as shown below.

Shop Tip:

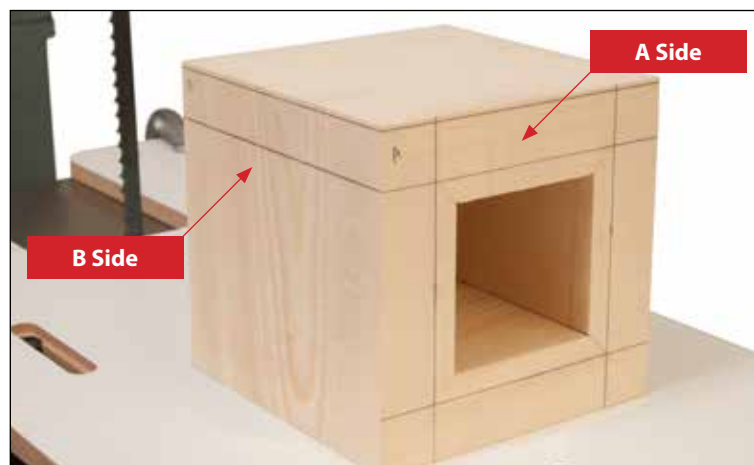
You should always leave approximately 3/16" of space from the outer edge of your box. This will prevent the blade from popping out the side of the box when cutting the arc. Doing this will produce a clean, smooth and continuous arc cut.



Mark the top of the box as shown in the previous drawing. Mark the upper left corner as the "A side" as shown below. Remember to keep a minimum of 3/16" of distance from the outside edge (Margin) of the box and about 3/8" of distance from the inside (Shoulder) of the box. Your layout should resemble the image shown below.



Rotate the box on to its side and carry the margin line and shoulder line to the side of the box as shown below. Mark this side as the "B" side of the box.

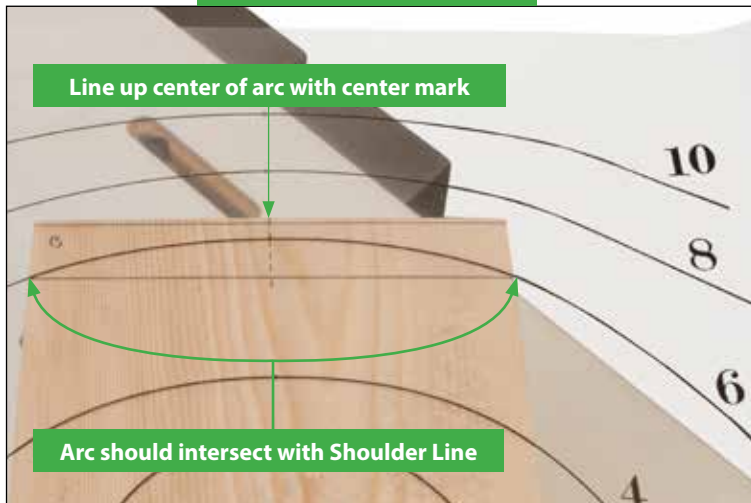


Find the center of the box on the "B side" and mark it with a vertical line as shown below.



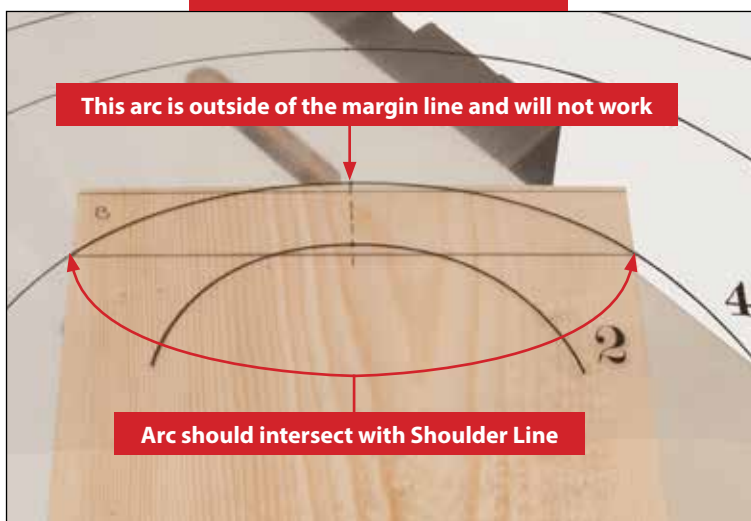
Use the supplied Arc Transparency on "Side B" of the box to decide which radius can be used to shape the sides of your box. Depending upon the size of your project, the size or radius of the arc may vary. The center point on the arc should align precisely with the center line drawn on the box. The contact points should be right on the edge of the shoulder line where it intersects with the edge of the box without the arc protruding past the outside of the 3/16" margin line. In the example below, the 6" radius achieves our tightest radius we can do for this size box. In this example you may cut larger radii such as 8" or 10", however, you can not go under the 6" radius without cutting past the margin line. We have chosen the 6" radius size for this example.

Correct Alignment



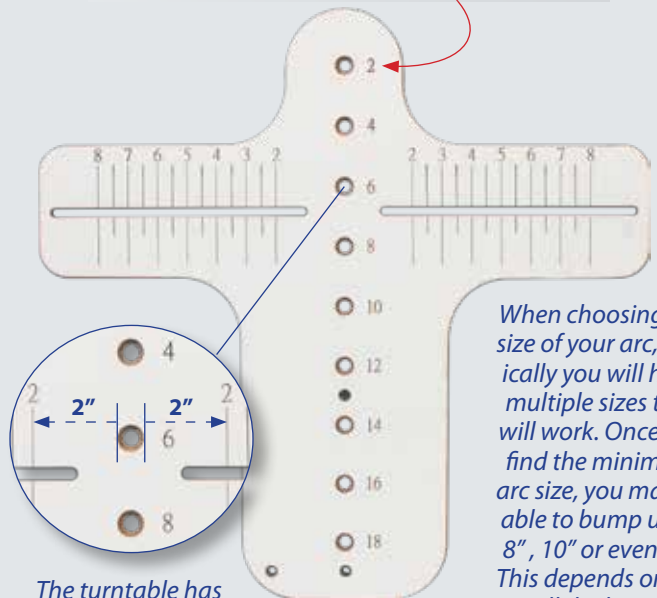
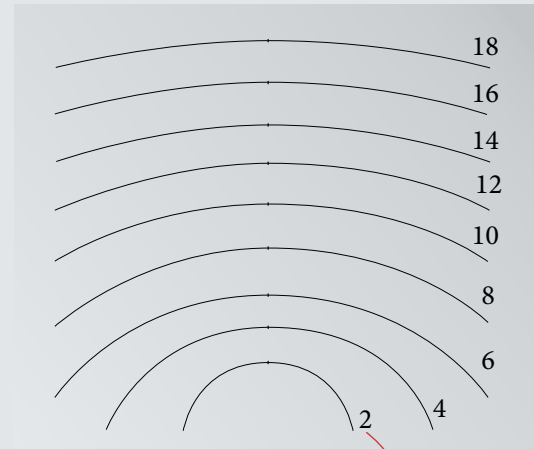
In the example shown below, with the arc lined up with the shoulder line, the center of the arc is too tight and ends up going past the 3/16" margin line. Using the smaller 4" radius in this instance will cause the blade to pop out the side of the box when cutting. This could result in injury and a mis-shaped box.

Incorrect Alignment



Quick Tips...

The numbers running vertically through the center of the turntable directly correspond with the arc transparency numbers. For example; if you are going to create a 2" radius, you will adjust the turntable to the 2" hole and setup up your box at this spot on the turntable.



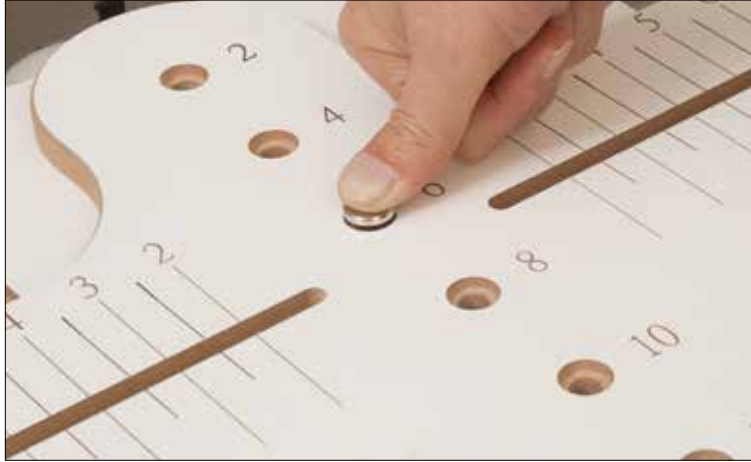
When choosing the size of your arc, typically you will have multiple sizes that will work. Once you find the minimum arc size, you may be able to bump up to 8", 10" or even 12". This depends on the wall thickness of your box.

The turntable has index lines for gauging distance from the pivot point of the turntable and squaring the steel fences

When cutting the convex curves into the box, we are cutting the sides of the box from the top edge of the box to the bottom edge of the box.



Now that we have determined the arc size is going to be a 6" radius for this example, remove the Pivot Pin from the original placement and insert the Pivot Pin ⑥ into the corresponding hole on the Turntable. Push the Pivot Pin ⑧ all the way down. This will be the pivot point for all sides of the box cutting operation.



Shop Note:

The Pivot Pin will be a snug fit. If you are having trouble removing it, you can lift the entire Turntable straight up, which will allow you to push the Pivot Pin out from underneath the Turntable.

Place your box on to the Turntable ② with the "B-Side" of the box facing up and "A-Side" of the box facing the Right Side Fence (Figure 1). Slide the Steel Fences ④ up against the sides of your box (do not secure fences). Center the box using the Steel Fences so that the center mark aligns with the tip of the blade (Figure 2).



Figure 1

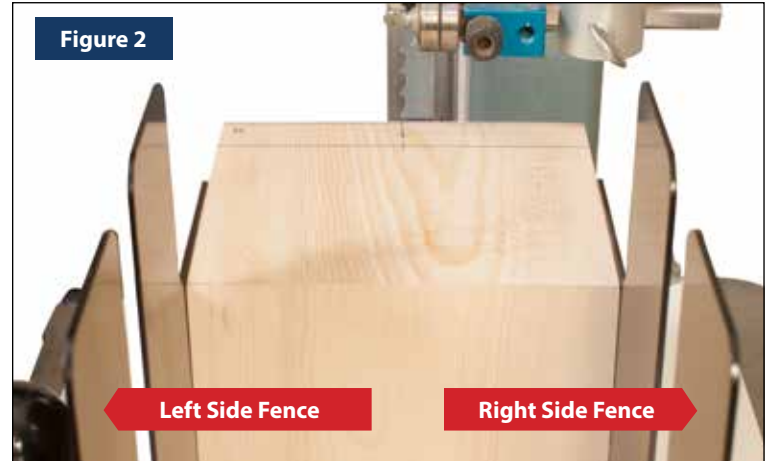
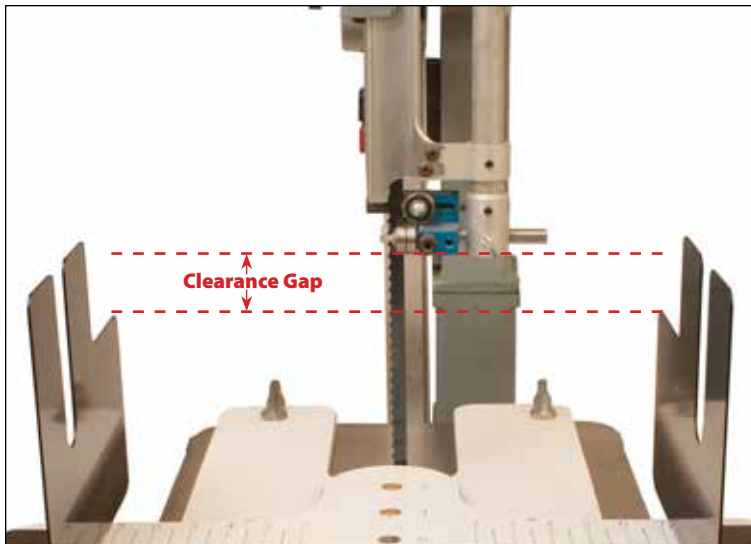


Figure 2

With the Turntable installed with the Pivot Pin placement at the correct arc, adjust the upper guide assembly on the band saw so that there is enough clearance between the box, guide and the steel fence as shown in the image below. (Wooden box not shown in image below for clarity purposes)



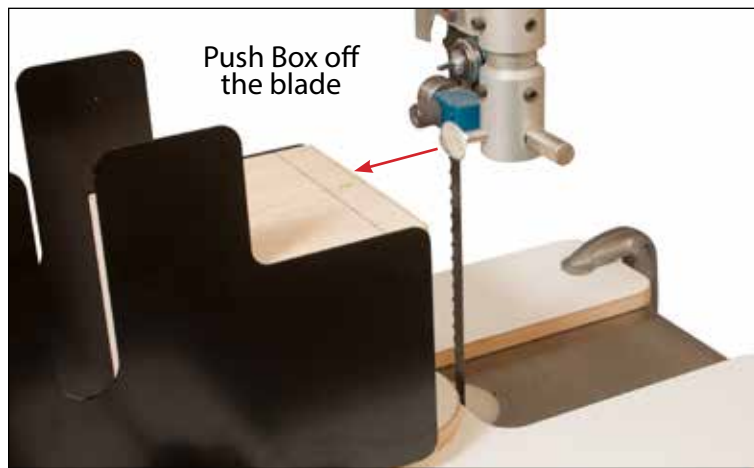
With the box centered, check the index lines on the Turntable in reference to the outside edge of the Steel Fences to square the box before securing the knobs. Once the box is properly centered and squared to the index lines, secure the Steel Fences ④ by tightening all three Round Knobs and the Post Knob.



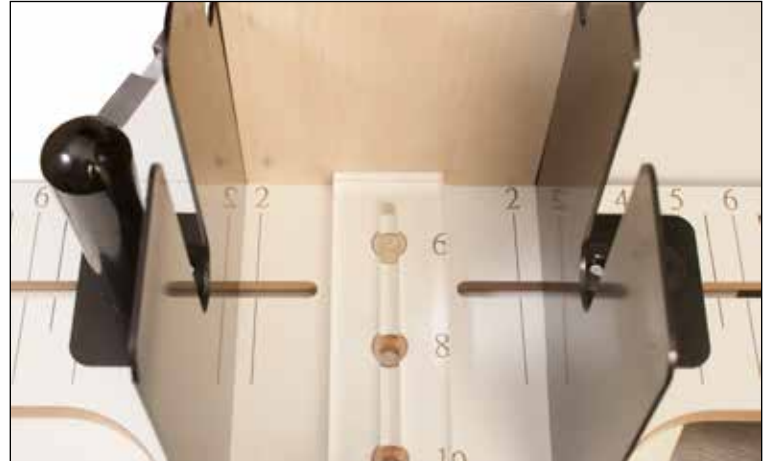
Shop Note:

Centering and squaring the box is critical to the final result of your box and must be done as precisely as possible.

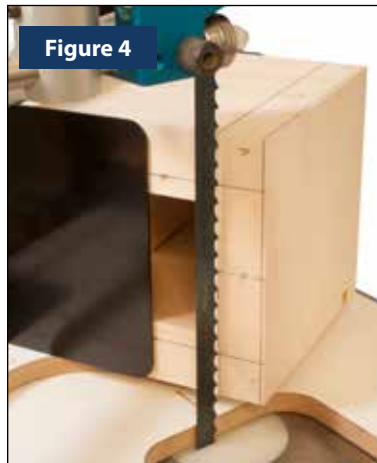
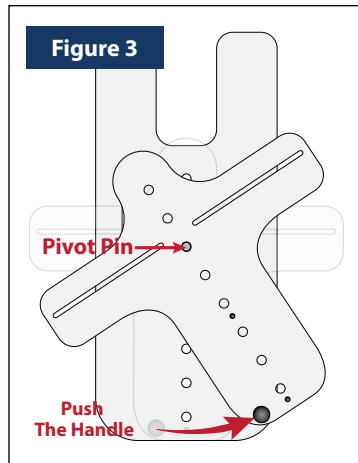
With the Steel Fences secured, push the box away from the blade so that you can rotate the Turntable free of obstruction.



Loosen the Post Knob holding the Clear Acrylic Stop. Slide the Clear Acrylic Stop up against your box. Secure the Post Knob. This keeps your box from moving backwards during the cutting process.



Using the Post Knob on the back corner of the Turntable (Figure 3), Slowly rotate the Turntable counter-clockwise until you have enough room to align the box so that the teeth of the bandsaw blade line up to the Shoulder Line (Figure 4) on the box as shown below. (Some parts have been removed in the drawing for clarity purposes)



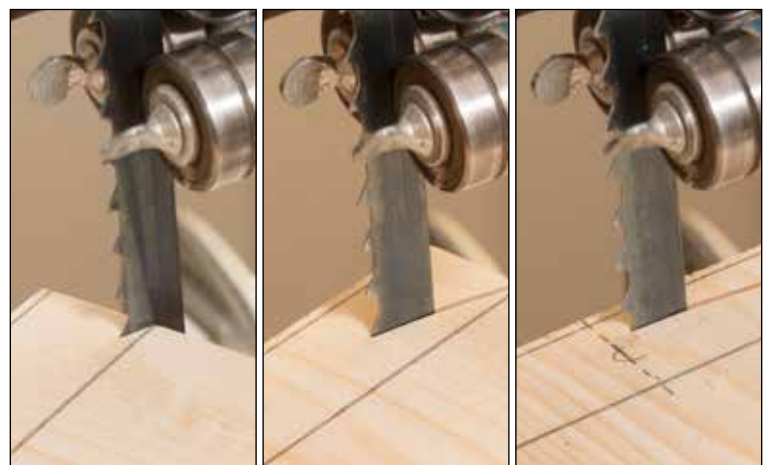
Double check that you are still aligned properly. Make sure the blade is NOT against the wood before starting your cut.



Cutting the Box

Once you are satisfied with your alignment, Plug in your band saw, turn it on and slowly pivot the turntable clockwise making a slight test cut and backing out to make sure you are precisely on the mark. Once you are satisfied that you have hit the mark, slowly continue cutting the box until you cut all the way through to the first side of the box.

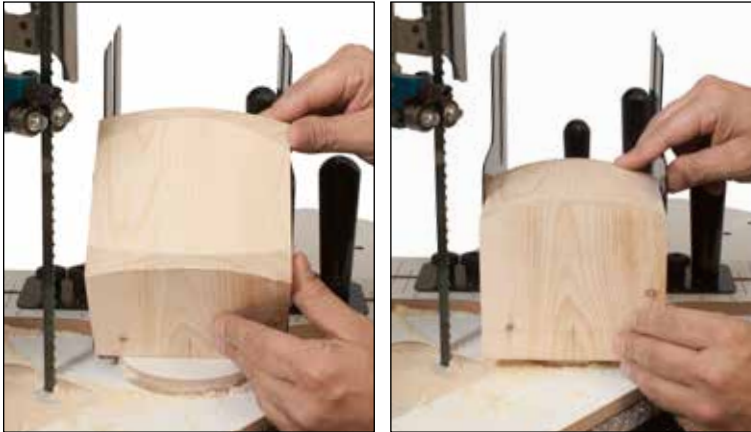
Once the box is properly aligned with the blade, secure the box by clamping the Steel fences together using an F-Clamp (not included).



Once the first side of the box has been cut, turn off the bandsaw and wait until the blade comes to a complete stop. Next, pivot the turntable counter clockwise back to the starting position.



Loosen and remove the F-Clamp then rotate the box by lifting from the bottom of the box and place it on to the next side with the cut that was just made facing upward. This is a quarter turn of the box.



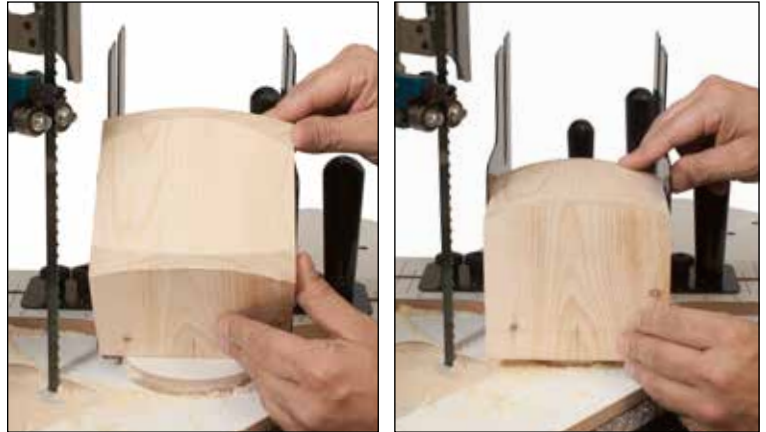
Adjust the box so that it aligns with the end of the previous profile line. To assure that you will make consistent cuts at each corner, make sure that the blade is riding along the edge of the previous profile line as shown below. Once the box is properly aligned with the blade, secure the box by clamping the Steel fences together using an F-Clamp. Check the acrylic stop it is against the box. Turn your band saw on and slowly pivot the turntable clockwise making a slight test cut and backing out to make sure you are precisely on the line. Once you are satisfied that you have hit the line, slowly continue cutting the box until you cut all the way through to the second side of the box.



Now that the second side of the box has been cut, turn off the bandsaw and wait until the blade comes to a complete stop. Next, pivot the turntable counter clockwise back to the starting position.



Loosen and remove the F-Clamp then rotate the box by lifting from the bottom of the box and place it on to the next side with the cut that was just made facing upward. This is a quarter turn of the box.



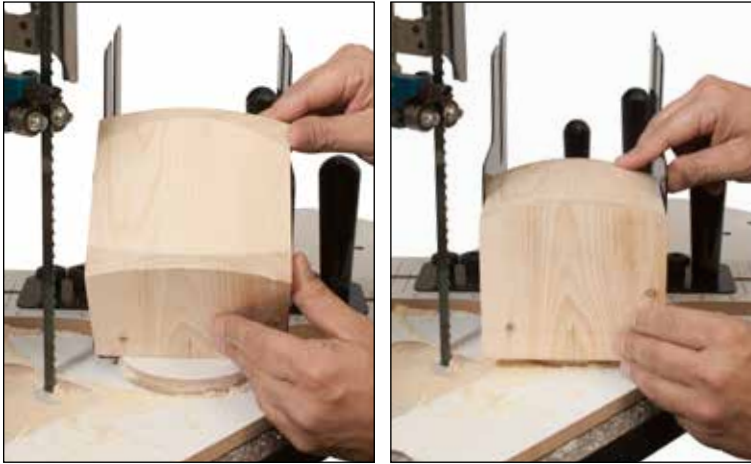
Adjust the box so that it aligns with the end of the previous profile line. To assure that you will make consistent cuts at each corner, make sure that the blade is riding along the edge of the previous profile line as shown below. Once the box is properly aligned with the blade, secure the box by clamping the Steel fences together using an F-Clamp. Check the acrylic stop it is against the box. Turn your band saw on and slowly pivot the turntable clockwise making a slight test cut and backing out to make sure you are precisely on the line. Once you are satisfied that you have hit the line, slowly continue cutting the box until you cut all the way through to the third side of the box.



Once the third side of the box has been cut, turn off the band-saw and wait until the blade comes to a complete stop. Next, pivot the turntable counter clockwise back to the starting position.



Loosen and remove the F-Clamp then rotate the box by lifting from the bottom of the box and place it on to the next side with the cut that was just made facing upward. This is a quarter turn of the box.



Adjust the box so that it aligns with the end of the previous profile line. To assure that you will make consistent cuts at each corner, make sure that the blade is riding along the edge of the previous profile line as shown below. Once the box is properly aligned with the blade, secure the box by clamping the Steel fences together using an F-Clamp.



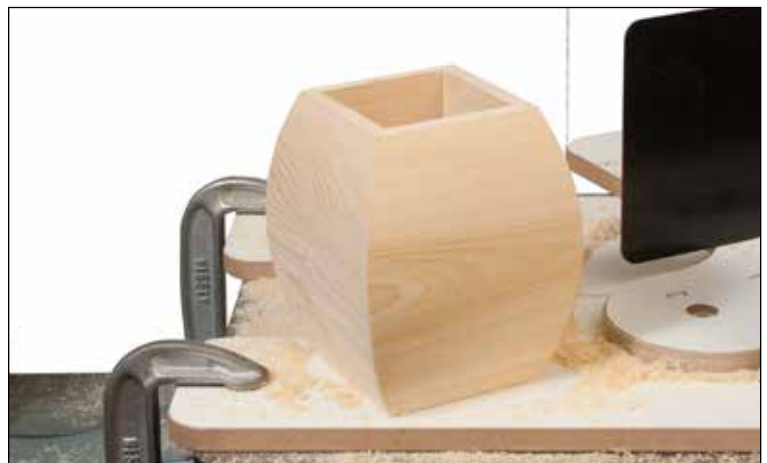
After rotating the box for the final cut, there is a gap between the Acrylic Stop and the Box. We must now re-adjust the Clear Acrylic Stop so that it sits firmly on the box. Loosen the Studed Post Knob and adjust the Acrylic Stop accordingly. Secure the Studed Post Knob.



Turn your band saw on and slowly pivot the turntable clockwise making a slight test cut and backing out to make sure you are precisely on the line. Once you are satisfied that you have hit the line, slowly continue cutting the box until you cut all the way through to the fourth side of the box.



Once the final cut of the box has been cut, turn off the band-saw and wait until the blade comes to a complete stop. Next, pivot the turntable counter clockwise back to the starting position. All of the convex curves are now cut and your box should resemble the box shown below.



Now that your Box is Cut...

Sand and finish the box to your liking and don't be afraid to show it off to friends and family!



Don't Throw Away the Scraps!

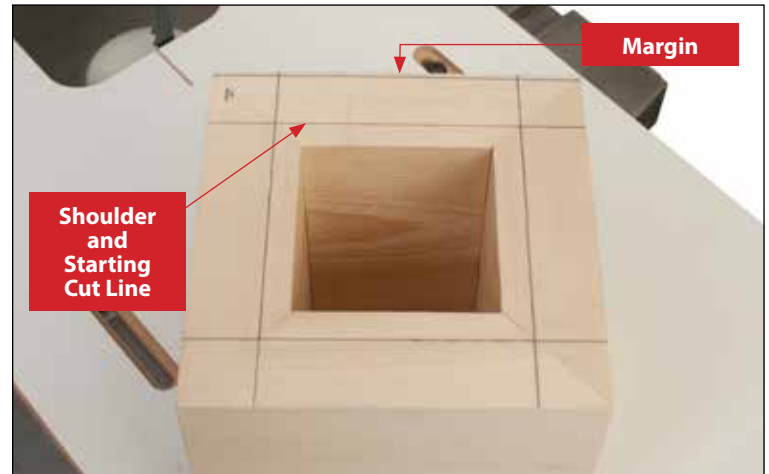
As an added bonus, since the CCC cuts a continuous line, you can use the off cut pieces to create a concave box as well. Simply miter the corners of the cut off pieces to produce wonderful looking boxes as shown below.



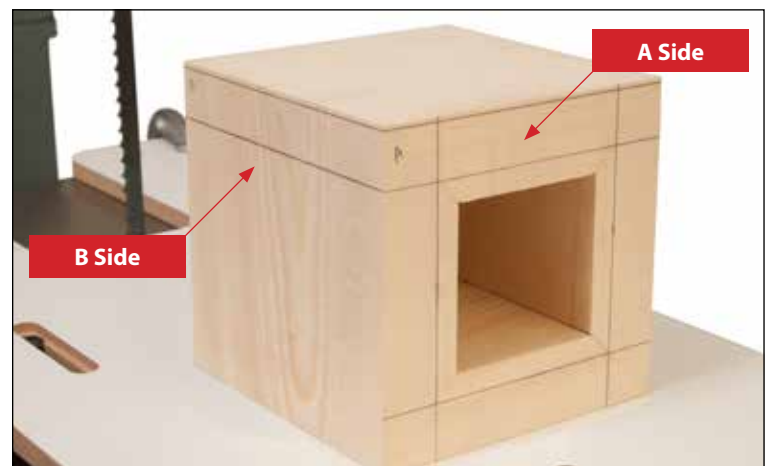
Cut an Asymmetrical Box

Asymmetrical boxes are offset so that one end of the box is thicker than the other. Making an asymmetrical box will create a unique box that is sure to catch the casual eye. In theory there are infinite starting points when cutting this type of box, but typically it only takes a slight shift off center to achieve.

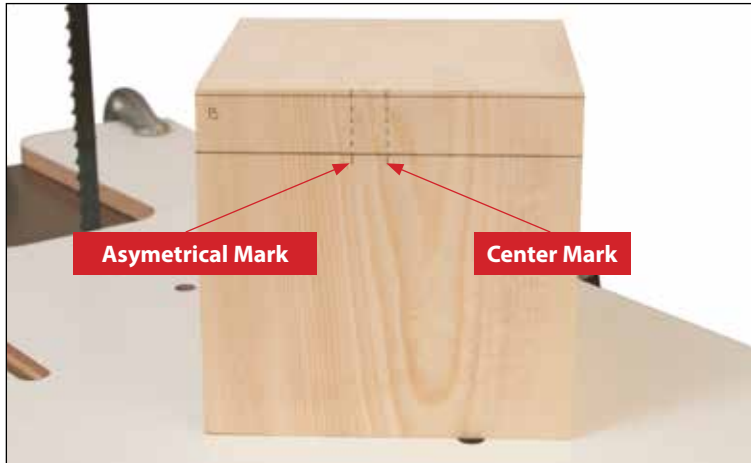
Mark the top of the box as shown in the previous drawing. Mark the upper left corner as the "A side" as shown below. Remember to keep a minimum of $3/16$ " of distance from the outside edge (Margin) of the box and about $3/8$ " of distance from the inside (Shoulder) of the box. Your layout should resemble the image shown below.



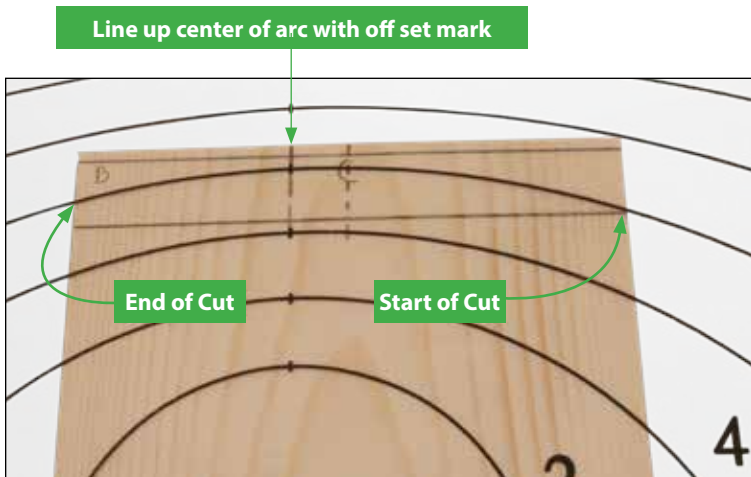
Rotate the box on to its side and carry the margin line and shoulder line to the side of the box as shown below. Mark this side as the "B" side of the box.



Find the center of the box on the "B side" and mark it with a vertical line as shown below. Now decide where your asymmetrical starting will be. It only takes a minor shift off center to create the asymmetrical shape. Once you decide on the location, make a mark as shown below.



Use the supplied Arc Transparency on "Side B" of the box to decide which radius can be used to shape the sides of your box. Depending upon the size of your project, the size or radius of the arc may vary. The center point on the arc should align precisely with the off set mark you made on the box. The contact point on the right edge should line up to the shoulder line where it intersects with the edge of the box without the arc protruding past the outside of the 3/16" margin line. In the example below, the 8" radius achieves our tightest radius we can do for this size box. In this example you may cut larger radii such as 9" or 10", however, you can not go under the 8" radius without cutting past the margin line. We have chosen the 8" radius size for this example. As shown in the image below, you can see how offsetting the center produces a thicker shape to the end cut of the box.



Place your box on to the Turntable ② with the "B-Side" of the box facing up and "A-Side" of the box facing the Right Side Fence (Figure 1). Slide the Steel Fences ④ up against the sides of your box (do not secure fences). Align the asymmetrical mark on the box using the Steel Fences so that the mark aligns with the tip of the blade (Figure 2).



Figure 1

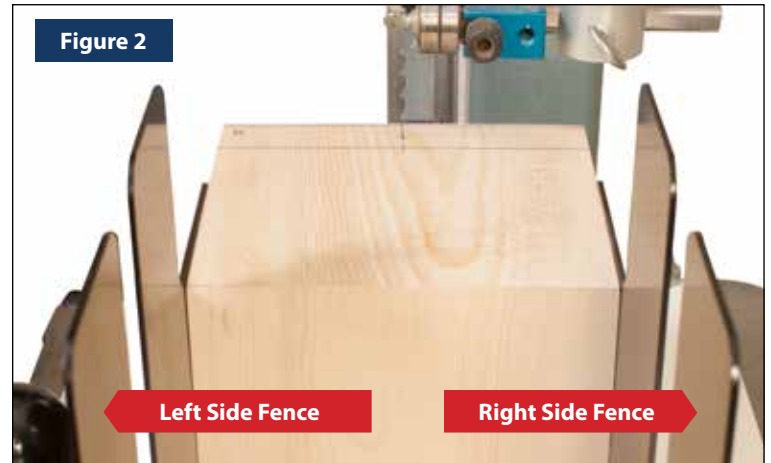


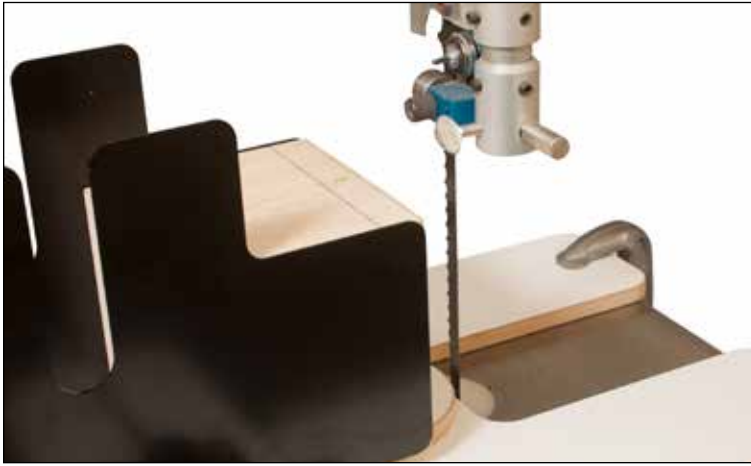
Figure 2

With the box aligned, check the index lines on the Turntable in reference to the outside edge of the Steel Fences to square the box before securing the knobs. Once the box is properly aligned and squared to the index lines, secure the Steel Fences ④ by tightening all three Round Knobs and the Post Knob.

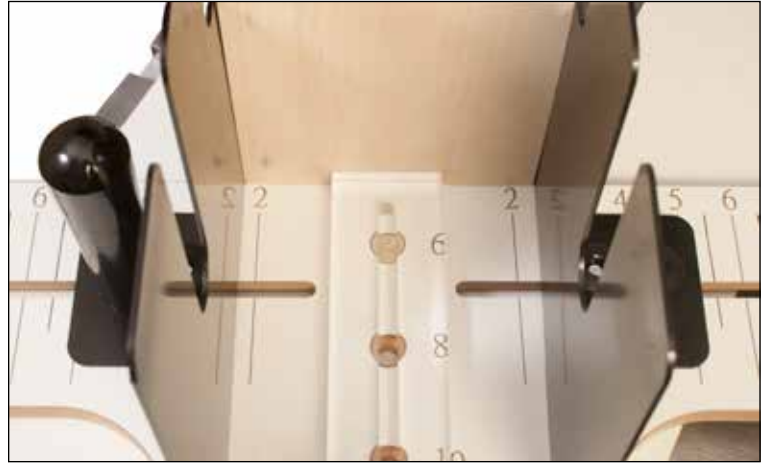


Shop Note:
Aligning and squaring the box is critical to the final result of your box and must be done as precisely as possible.

With the Steel Fences secured, push the box away from the blade so that you can rotate the Turntable free of obstruction.

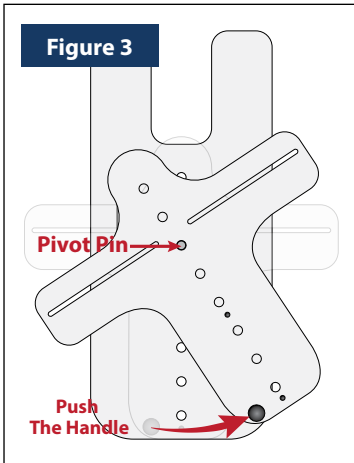


Loosen the Post Knob holding the Clear Acrylic Stop. Slide the Clear Acrylic Stop up against your box. Secure the Post Knob. This keeps your box from moving backwards during the cutting process.



Using the Post Knob on the back corner of the Turntable (Figure 3), Slowly rotate the Turntable counter-clockwise until you have enough room to align the box so that the teeth of the bandsaw blade line up to the Shoulder Line (Figure 4) on the box as shown below. (Some parts have been removed in the drawing for clarity purposes)

Double check that you are still aligned properly. Make sure the blade is NOT against the wood before starting your cut.



Once the box is properly aligned with the blade, secure the box by clamping the Steel fences together using an F-Clamp (not included).

Follow all of the steps outlined in the *“Cutting The Box”* section of these instructions to complete all four sides of your asymmetrical box.



Patent Pending



CONVEX CURVE CUTTER

An Innovative Bandsaw Accessory

MITER BAR MOUNTING INSTRUCTIONS FOR LARGER BANDSAW TABLES

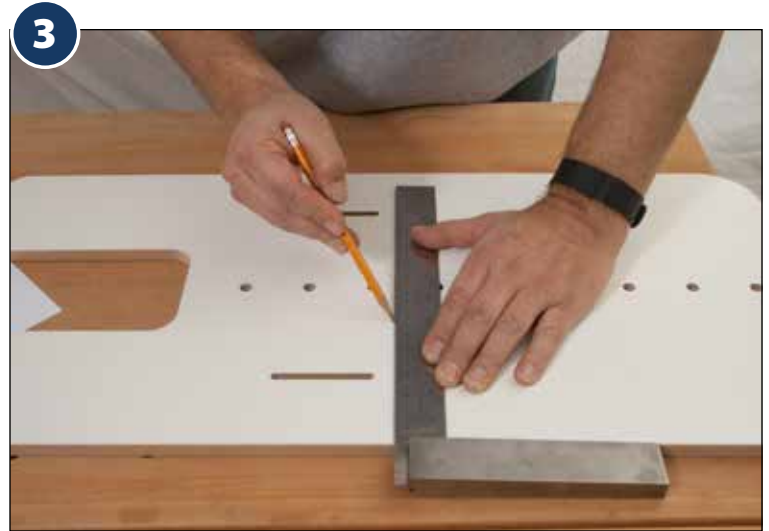
Measure your Miter Slot Distance

Measure the distance from the bandsaw blade to the bandsaw miter slot. In this case it is $6\frac{3}{4}$ " from the blade to the miter slot. Make note of this measurement.



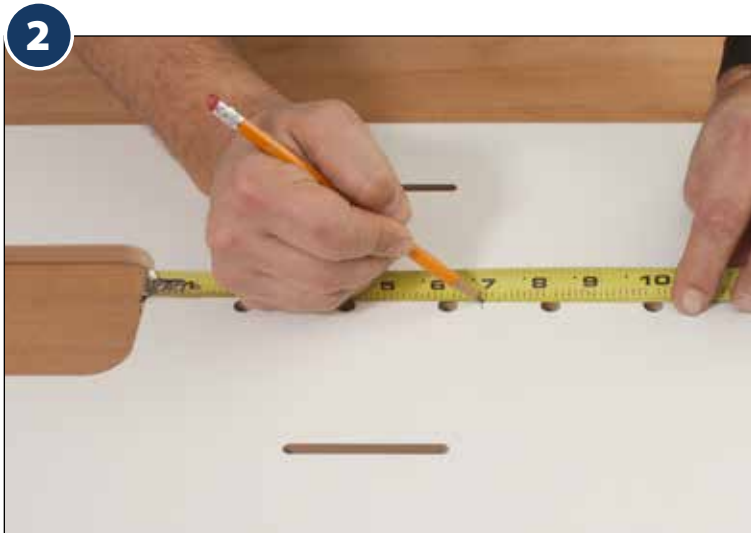
Draw a Line

Using the edge of the base as a reference for your square, align a machinist square with the mark that was just made. Once aligned, draw a line the entire width of the base.



Mark the Base

On the underside of the base, measure $6\frac{3}{4}$ " from the edge of the cutout. Subtract $\frac{1}{16}$ " from the measurement and make a mark as shown below.



Attach the Miter Bar

Align the miter bar with the line that was just made. Attach the miter bar using $\frac{1}{2}$ " long #6 wood screws through the opening of the bar.

