

# CIRCLE-CUTTING JIG



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jigs & fixtures

band saw

# Circle-Cutting Jig

In just an afternoon, you can build a simple accessory that makes creating perfect circles a snap.

The band saw is without a doubt one of the most versatile tools in the shop, especially when it comes to cutting curved or round parts. And with the jig you see above, you can even cut perfectly shaped circles quickly and reliably.

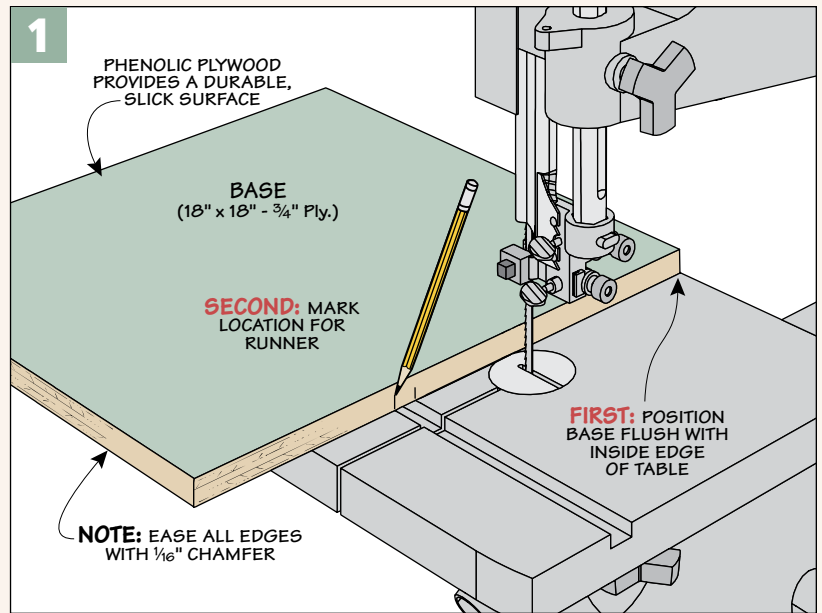
The jig's base is made from phenolic plywood. This type of plywood has a durable, slick surface that makes it perfect for supporting a workpiece as

you rotate it through the cut. An adjustable pivot pin that's mounted in this base, as well as a heavy-duty aluminum bar, work together to allow you to cut circles up to 38" in diameter.

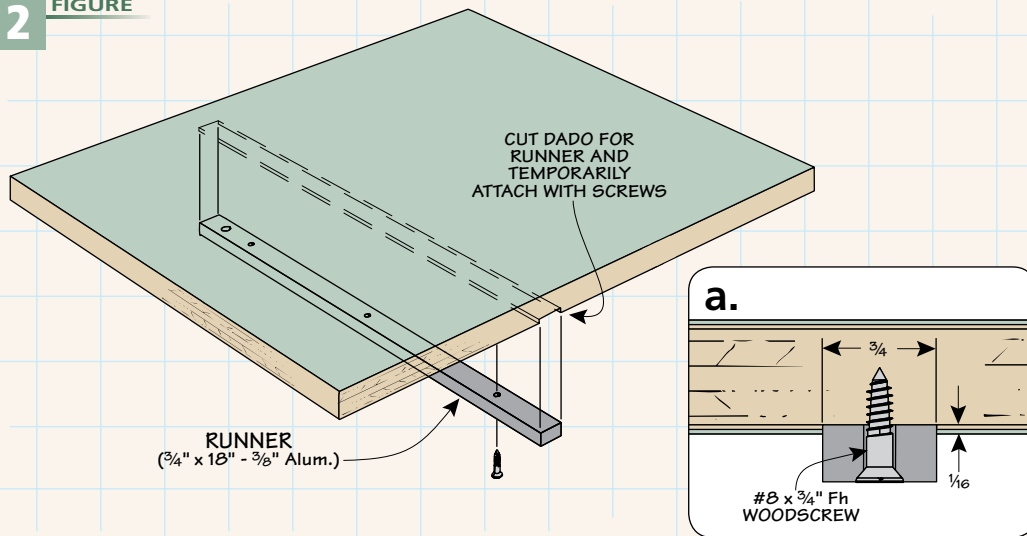
Finally, a unique stop system lets you align the pivot pin with the front edge of the blade. This way, the jig automatically stops at the correct point for you to begin rotating the workpiece for the cut.

**Sizing the Base.** To get started, you'll want to measure the width and depth of your band saw table. I sized the jig base 4" larger in both directions to provide solid support for the workpiece (Figure 1).

**Locate the Runner.** An aluminum runner rides in the miter slot to align the jig for the initial cut into the workpiece. (I'll talk more about that later.) To locate the runner, place the base on the saw table with the left side of the base flush with the edge of the saw table. After marking the location of the miter slot, cut a shallow dado sized to fit the runner (Figure 2). You can temporarily install the runner to complete the next step.

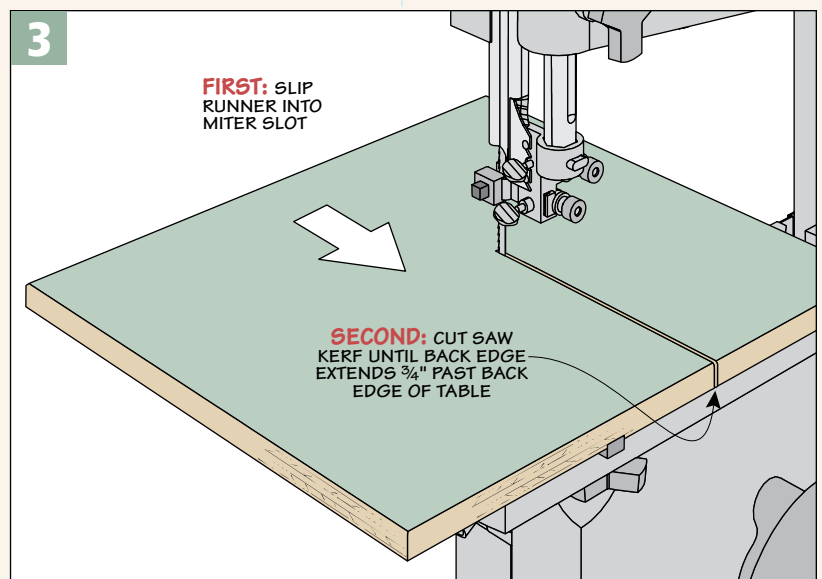


**2** FIGURE



**Making a Saw Kerf.** The next task is to create a kerf in the base. This kerf locates the end of the stopped groove that will be used to house the adjustment bar.

Cutting this kerf is a simple matter. Just turn on the saw, set the runner in the miter slot, and push the base forward into the band saw blade. Proceed slowly, so you don't cut too far into the piece. Once the back edge of the base extends 3/4" past the back edge of the table, you can stop the cut, as shown in Figure 3 at right. At this point, you can turn your attention to making the adjustment bar, which we'll show you how to do on the next page.



# attaching the Bar & Stop

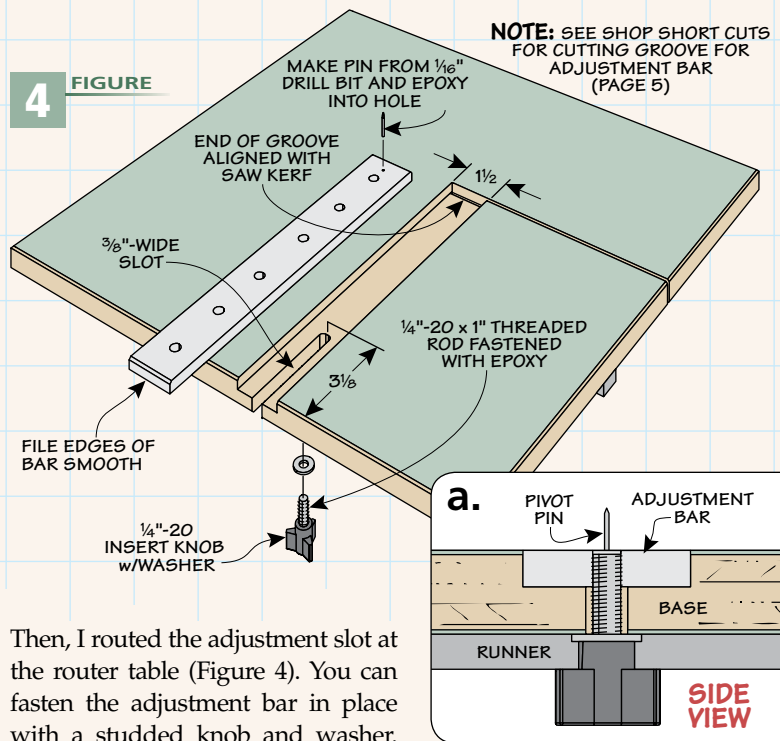
With the base complete, you're ready to add an adjustment bar that locks in the cutting radius. Lastly, you'll add an adjustable stop. This stop correctly positions the pivot pin relative to the blade. It also prevents the jig and workpiece from lifting off the table once you start the cut.

**Adjustment Bar.** The first thing to do is cut the  $\frac{5}{16}$ "-thick aluminum bar to length. I took the time to file off the sharp edges before drilling and tapping all the holes (margin drawing). The tapped holes allow for a wide range of adjustment for the cutting radius.

Figure 4 and the margin drawing show all of the hole locations in the adjustment bar. The pivot pin is made from a  $\frac{1}{16}$ "-dia. drill bit ground to a point. It's glued with epoxy into the aluminum bar. The remaining holes are drilled and tapped for a  $\frac{1}{4}$ "-20 thread.

**Groove & Slot.** You can set the bar aside for now and get to work on the stopped groove for the bar. And there's a slot located at the end of the groove for the adjustment knob that sets the radius. I removed the runner to make these two tasks easier.

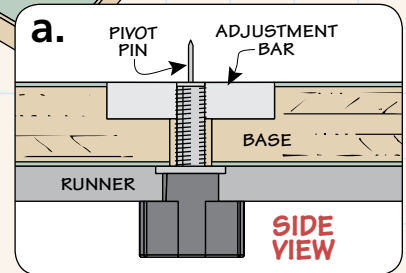
Routing the stopped groove is easy (see Shop Short Cuts on page 5).



Then, I routed the adjustment slot at the router table (Figure 4). You can fasten the adjustment bar in place with a studed knob and washer. Now would also be a good time to reinstall the runner on the bottom.

**Stop Assembly.** When using the jig, it's important that the pin is directly aligned with the front edge of the blade's teeth (see page 4). This prevents the blade from binding and results in a smoother cut. To accomplish this goal, I made the stop assembly shown in Figure 5.

The assembly starts with the mounting block. Its thickness matches the thickness of the band saw table (Figure 5a). Drill the through hole for the threaded rod and the two screw holes used when attaching it to the base. You can

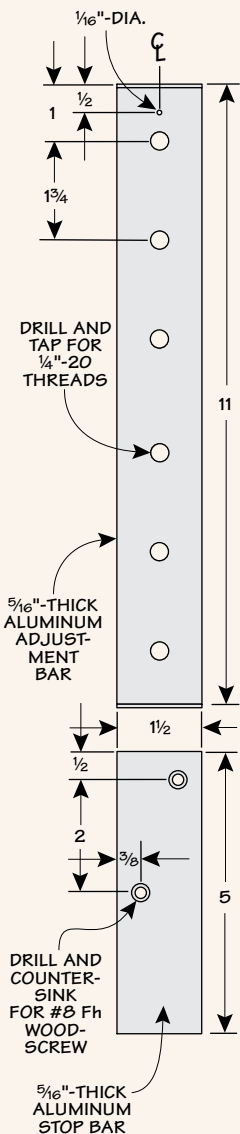
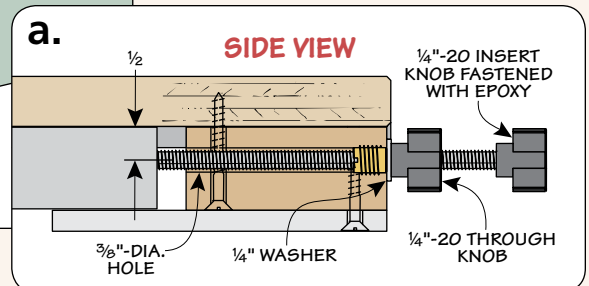
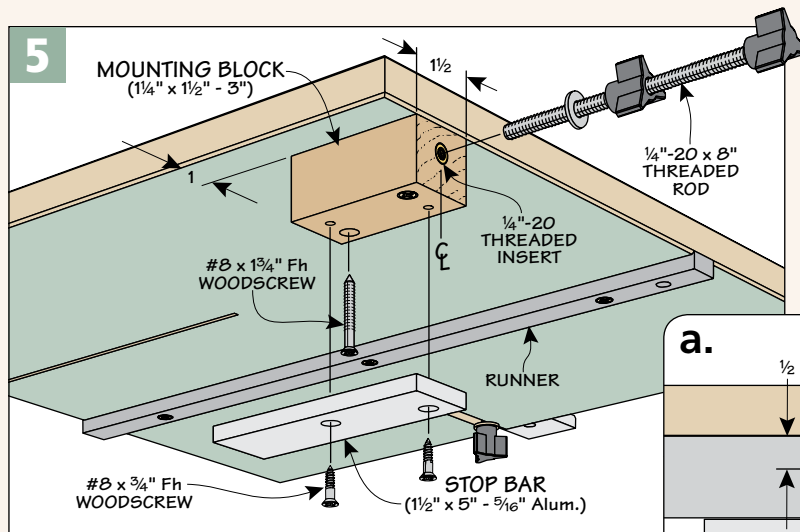


go ahead and install the threaded insert while you're at it.

After fastening the block to the underside of the base, all you need to do is install the hardware. This starts with a short length of aluminum bar. It's longer than the mounting block and creates a "hook" to keep the jig in place. You can see how it's installed in Figures 5 and 5a.

Next comes the knob assembly. Begin by cutting the threaded rod to length and using epoxy to fasten a knob at one end. After the epoxy sets up, you can spin on a locking knob before threading the rod into the insert in the mounting block.

**Final Adjustment.** The last thing to do is install the jig on your saw and make some adjustments following the process detailed on the next page. Once everything is set up, you'll soon discover how easy it is to cut perfect arcs and circles in no time at all.



# Using the Circle-Cutting Jig

Setting up the jig and using it is pretty simple. The photos guide you through the process.

**Initial Setup.** The most important part of using the jig is making sure the pivot pin is aligned with the front edge of the blade. This is a matter of adjusting the stop to contact the edge of the table and locking it using the locking knob.

**Set the Radius.** The next step is to set the radius for the desired cut. Here, you're measuring from the

center of the pin to the outside edge of the blade's teeth.

**Cutting.** You're almost ready to start cutting, but first you need to drill a centered pivot hole in the workpiece. This involves drilling a stopped hole on the bottom face.

With the saw off, slip the workpiece over the pivot pin. Now you can turn on the saw and get ready to make the cut.

While holding the workpiece steady, slide the jig forward,

making a straight cut until the jig stops against the table. Then, you can begin rotating the workpiece into the blade to cut a perfect circle.

**Perfect Circles.** After cutting the workpiece to shape, a little sanding is all it takes to remove the saw marks.



▲ **Aligning the Center Pin.** Use a framing square to align the pivot pin with the front edge of the blade. After adjusting the stop underneath so that the threaded rod contacts the table, lock it in place (inset photo).



▲ **Setting the Radius.** To set the radius, loosen or remove the adjustment knob and slide the bar so the pivot pin is located at the desired radius and tighten the knob.

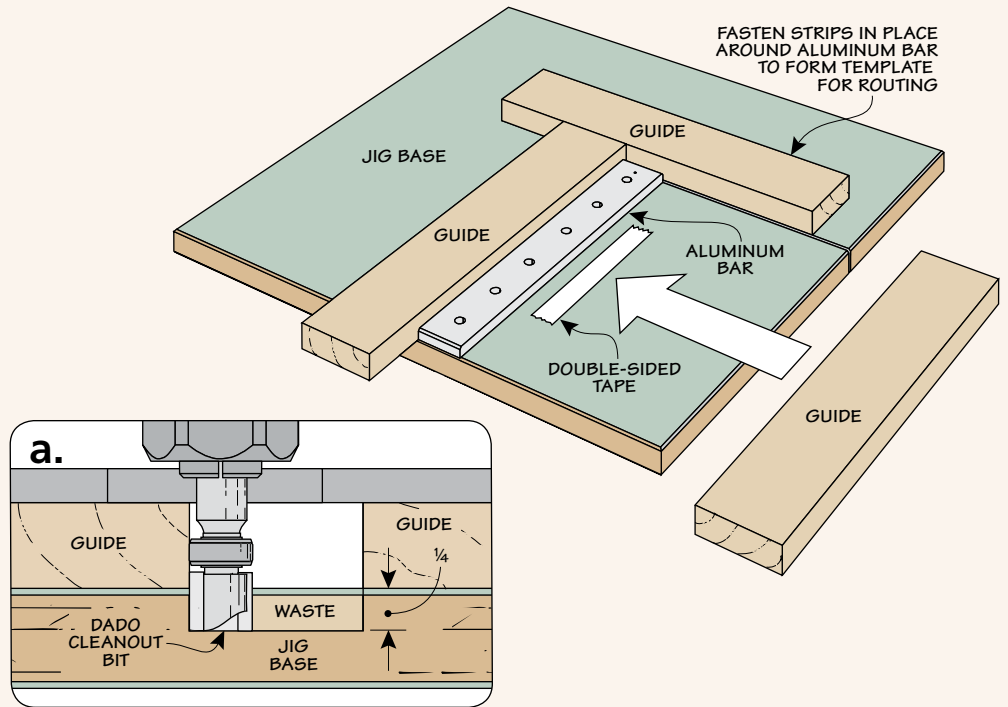


▲ **Straight Cut First.** After drilling a pivot hole (inset), place the workpiece on the jig. As you make the cut, hold the workpiece straight until the jig stops.



▲ **Perfect Circles.** Once the stop contacts the band saw table, you can start rotating the workpiece into the blade in a clockwise direction. The key to a smooth edge is to maintain a consistent feed rate throughout the cut.

# Shop Short Cuts



## Fitted Groove

The adjustment bar on the band saw circle jig rides in a stopped groove. To cut the groove, I used my router and simple guides. As you can see in the drawings above, I assembled the guides around the aluminum bar, guaranteeing a perfect fit. All you need to do is set the

bar in position on the base, then fasten hardwood guides around it using double-sided tape.

I used a dado cleanout bit to rout out the groove. The bearing on the bit follows the guides. All that's left to do now is square up the corners with a chisel.

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ORDER  
SOURCES**

Woodsmith Store  
800-444-7527

McMaster-Carr  
630-600-3600  
mcmaster.com

Reid Supply  
800-253-0421  
reidsupply.com

Woodcraft  
800-225-1153  
woodcraft.com

Kreg Tool  
800-447-8638  
kregtool.com

## Project Sources

The circle-cutting jig doesn't take long to build, especially if you have all of your supplies ready to go. You can find the  $\frac{5}{16}$ " x  $1\frac{1}{2}$ " aluminum bar (8975K18) at *McMaster-Carr*. You'll also need  $\frac{1}{4}$ "-20 insert knobs (DK-1204) and  $\frac{1}{4}$ "-20 through knobs (DK-1210), both of which I found at *Reid Supply*. The *Kreg* jig/bar fixture (KMS7303) can be purchased from Kreg Tool. And I got the phenolic plywood (131170) from *Woodcraft*.