Woodsmith PLANS

# SMARTPHONE AMPLIFIER

Weekend Project

# Smartphone Amplifier

This clever project boosts the sound coming from your smartphone. And all it takes is a little creative work at the band saw.

Whether I'm out in the workshop or in the house, more than likely there's music playing from my smartphone. And while the speakers on smartphones have improved over time, the sound coming from them doesn't project very well.

However, with a little shop time, you can create an amplifier like this one. The unique design dramatically increases the volume coming from the speaker located on the bottom of the phone. A tapered opening in the top of the amp accepts most phone models, even with a case.

**BAND SAW SKILLS.** Of course, if you're going to build a project, it's nice to hone some woodworking skills along the way. For this project, you'll spend some quality time working with your band saw. Even though the amp is small, making it involves resawing thick boards into thin parts, making accurate rip cuts, and cutting smooth, flowing curves.

In order to give the amp a unique look, I incorporated "inlay" strips in a contrasting material. But instead of recessing the strips in a shallow groove, the blank is cut apart and the strips are sandwiched in between (drawing on the next page).

## A THICK BLANK

The starting point for the project is making a thick blank. If you have access to lumber this size, a single-piece blank is a great option. But it isn't always easy finding thick material — especially when you only need a small amount. Figure 1 shows the three-layer assembly I used to create the blank. A $\frac{3}{8}$"-thick top and bottom sandwich a thick center piece.

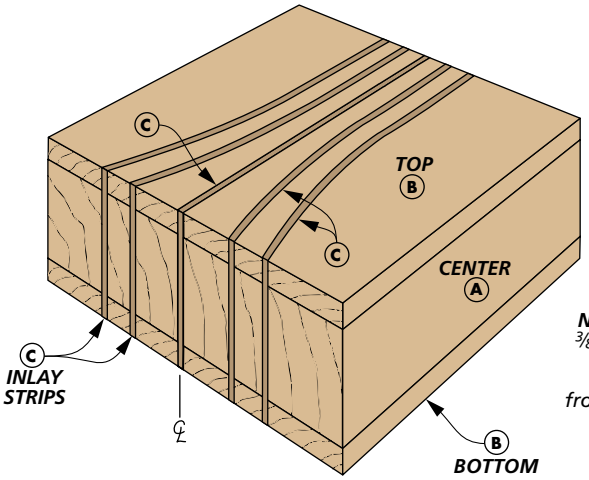
Gluing up the three pieces isn't difficult. It does pay to spend a little time in selecting pieces that have similar color and grain patterns. The glue seams practically disappear with some extra attention spent aligning the grain when you glue the parts together.

**MAKE INLAY STRIPS.** You can make the inlay strips while waiting for the glue to dry on the blank. Begin by ripping material to match the thickness of the blank. Over at the band saw, resaw the

boards into thinner pieces that are long enough to yield five inlay strips, as you can see in Figure 2. Complete the strips by planing them to final thickness (Figure 3) and cutting them to rough length.

**CENTER CUT FIRST.** With the inlay strips in hand, you're ready to start cutting the blank apart. To simplify the layout, I used a paper pattern. I began by making the straight center cut and installing one inlay strip, as in Figure 4. The square, flat surfaces left by this cut allow you to get the hang of the glueup process without having to deal with curves at this point.

Speaking of the surfaces, the key here is making the saw cut in a continuous pass. Combined with a sharp blade, the surface is smooth enough that I found sanding unnecessary. Once the glue and inlay strip are added, the results are tight joint lines, as shown in Figure 5.

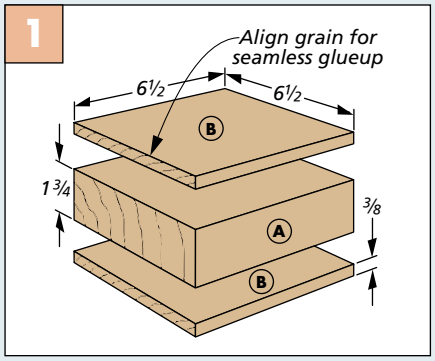



***NOTE:** Top and bottom are 3/8"-thick hardwood. Center is 1 3/4-thick hardwood. Inlay strips are resawn from a contrasting hardwood and planed to 1/8" thick*

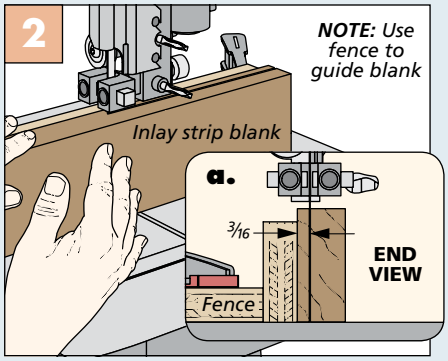
**SLICE & REPEAT.** After removing the clamps from the first glueup, you'll just repeat this process for the other strips. The only difference for the remaining cuts is that you follow along the pattern making a curved cut, as in Figure 6. It's tempting to cut and glue more than one inlay strip at a time. However doing so increases the number of small parts that are difficult to keep aligned.

Work your way out from the center strip. Once the last inlay strip has been glued in place, it's time to transform the blank into the amplifier.

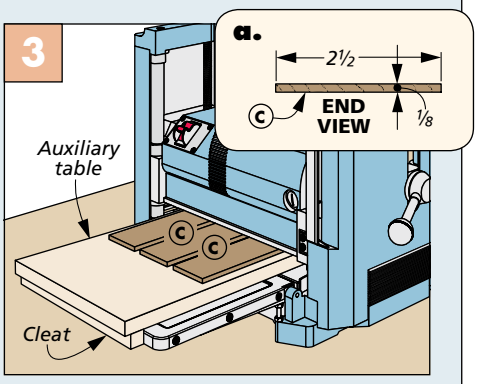
## How-To: CREATE AN INLAID BLANK



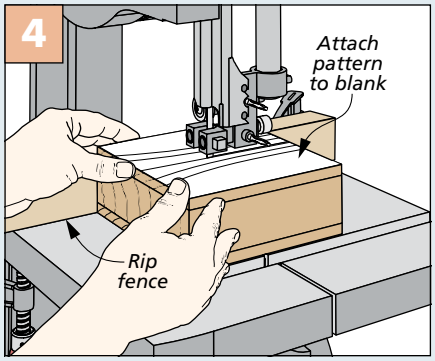

**Three-Part Blank.** A thin top and bottom sandwich a thicker center piece to create the body for the amplifier.



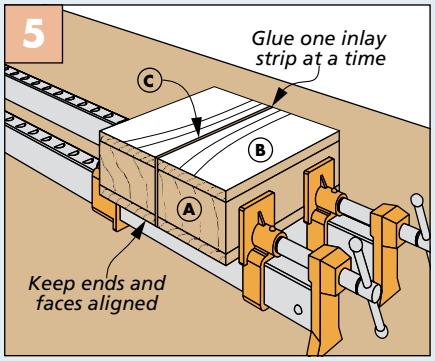

**Thick to Thin.** Resaw a board to create two inlay strips. Cut the strips slightly wider than the final thickness.



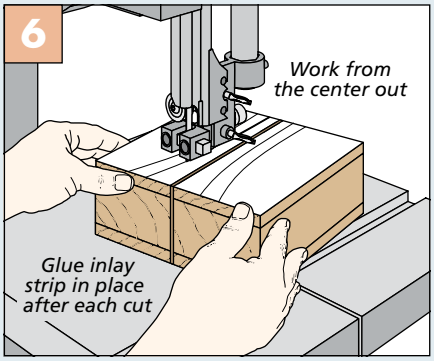

**Final Thickness.** An auxiliary table allows you to plane the strips to final thickness safely and accurately.




**Center Kerf.** Use a paper pattern to set a rip fence and cut the blank in half to accept the first inlay strip.

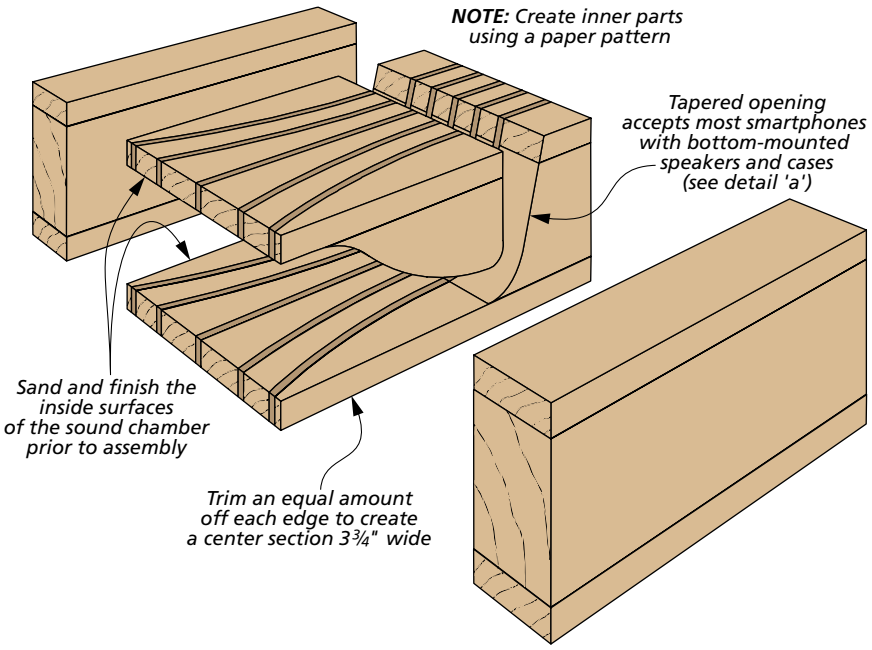



**Glue & Clamp.** Apply glue to the strip and blank. Be sure to keep the parts aligned as you tighten the clamps.




**Curved Strip.** Cut the first curved line in a fluid, even pass for the smoothest result. Sanding isn't necessary.

# Boosting the SOUND



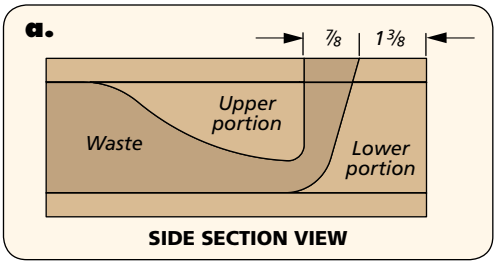

Adding the inlay strips involved quite a bit of cutting, gluing, and clamping. That work continues here, just with a different purpose. Your focus turns now to the functional part of the amplifier — shaping the sound chamber. The drawings at right show you where you're headed while the box below highlights the steps required to get there.

**THE CENTER SECTION.** The opening for the phone and the sound chamber that amplifies the music from the speaker occupies the center of the blank. A few cuts at the band saw allow you to do this. The first step is separating the center section from the sides, as in Figure 1.

A smooth surface transmits sound better. So unlike the earlier cuts, I sanded the inner surfaces of the sides that form part of the sound chamber.

As you can see in detail 'a,' an irregular shape forms the sound chamber. Once again, I used a paper pattern (available on page 5) as a guide. Attach the pattern to one side of the center section and cut just on the waste side of the lines, as shown in Figure 2.

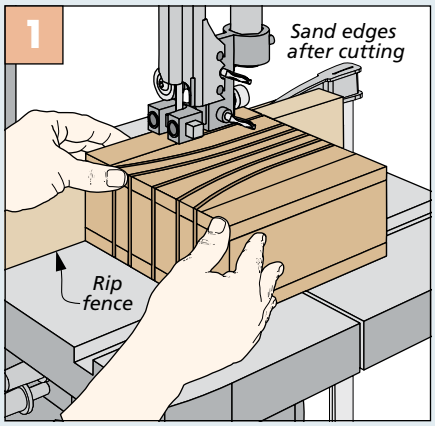
**PREFINISH.** Once you've shaped the upper and lower portions of the sound chamber, it's a good idea to sand and finish the inner surfaces. Like I said, it helps to get the best sound possible from the amplifier. I sprayed several coats of gloss lacquer on these surfaces. Apply masking tape to the edges of the these two pieces to avoid gluing problems later.



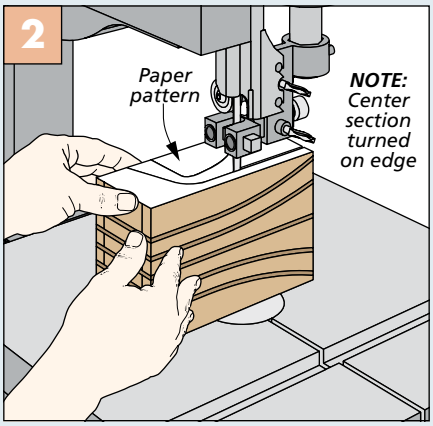

Don't forget to apply finish to the inside of the side pieces. To do this, position the center pieces on each of the sides and trace their profile onto the sides. Then mask off the glue surfaces and erase your lines before spraying on a couple coats of lacquer.

**THE FINAL GLUEUP.** It's time to get out the glue bottle and clamps one last time. There are four parts to manage here.

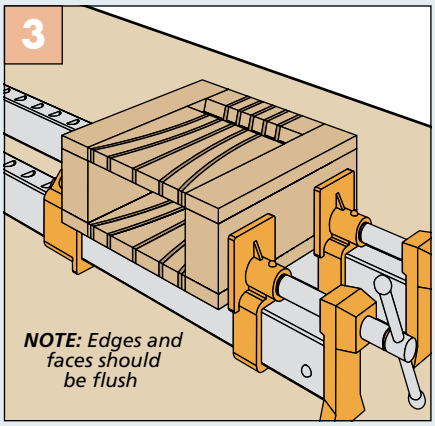
## How-To: SHAPE THE SOUND CHAMBER



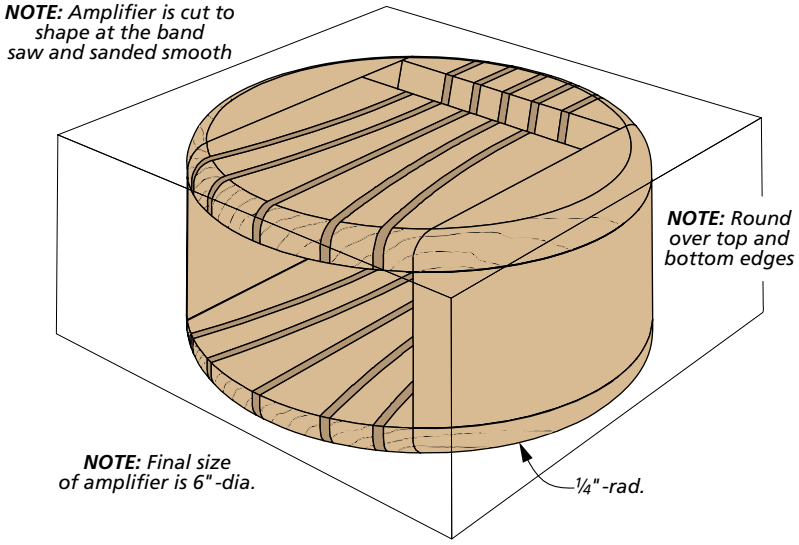

**Straight Rip Cuts.** Trim away each side of the blank, leaving a center section that's 3¾" wide.




**Curved Cuts.** Follow a pattern to create the tapered opening and sound chamber on the center section.



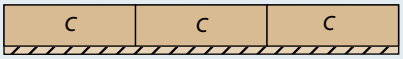

**Glue It Up.** After prefinishing the inner surfaces, glue and clamp the amp blank back together one last time.




## Materials, Supplies & Cutting Diagram

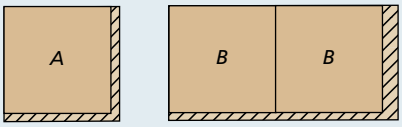
| | | |
|---|---|---|
| **A** | Center (1) | 1¾ x 6½ - 6½ |
| **B** | Top/Bottom (2) | ⅜ x 6½ - 6½ |
| **C** | Inlay Strips (5) | ⅛ x 2½ - 6½ |

¾"x 3" - 24" Mahogany (0.5 Bd. Ft.)




1¾"x 7"- 7" Hard Maple (0.7 Bd. Ft.)

½"x 7"- 14" Hard Maple (0.7 Sq. Ft.)




**NOTE:** Resaw parts 'C' to ⅛" thick. Parts 'B' planed to ⅜" thick

While it may seem that the center pieces would be tricky to keep in the correct orientation, the answer is straightforward. All you need to do is keep the ends and upper surfaces of the parts flush as you apply the clamps, as illustrated in Figure 3 on the previous page.

### FINAL SHAPING

The home stretch on the amp involves creating its final shape. This shape can be whatever you choose to make it. I opted for a simple circle for a compact, pleasing look, as in the drawing above.

After smoothing the upper and lower faces, locate the center of the amplifier and draw a circle using a compass. I made the marks on the bottom face so the dimple left by the point of the compass wouldn't be visible (Figure 1 below).

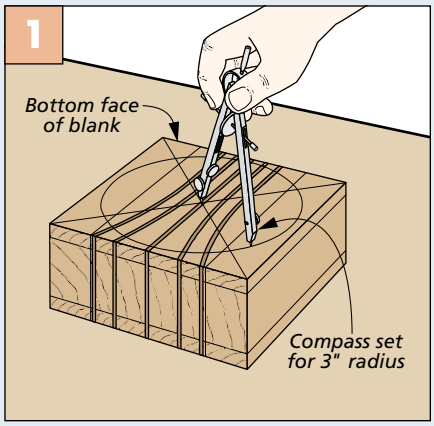
**CUTTING A CIRLE.** After all the band saw work done to this point, you should be pretty comfortable cutting around the circle, as shown in Figure 2. The key is making the cut in a smooth, steady pass. Try to avoid stopping and starting, which leaves lumps and bumps that are more difficult to sand away.

With a steady hand, a disc or belt sander makes quick work of cleaning up the blade marks left by the band saw. Use the layout line as a general guide. I've found that I can track down uneven places by feeling the surface with my fingers. Finish up with some hand sanding to leave a smooth surface.

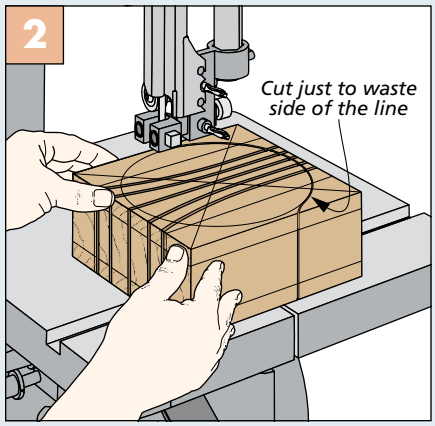
**ROUT A ROUNDOVER.** For the final construction step, head over to the router table and shape a roundover on the upper and lower edges (Figure 3).

A small project like this offers the ideal opportunity to use a spray can finish. In contrast to the sound chamber, I applied a couple coats of satin lacquer to the outside. (Be sure to mask off the inside.) The fast drying time means it won't take long before you'll have this accessory sending out your favorite tunes.

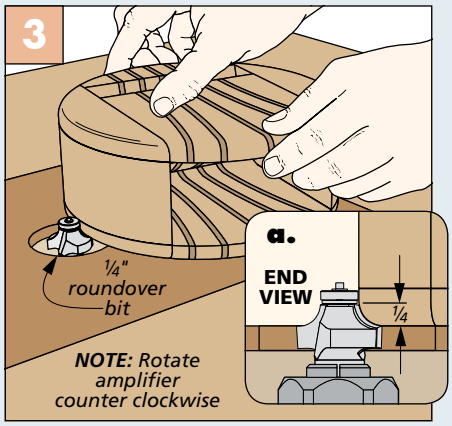
## How-To: MAKE IT ROUND




**Layout Work.** Draw diagonal lines to find the center of the blank and mark the final size with a compass.



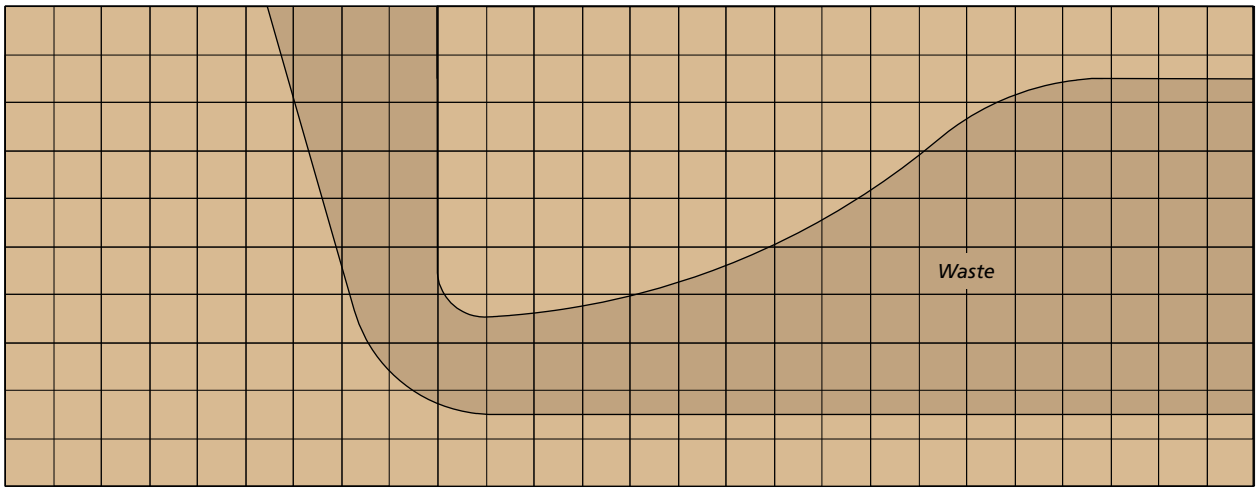

**Rough Cut & Sand.** Cut close to the circle in order to minimize the amount of sanding you need to do.




**Roundover.** A gentle roundover eases the edges. After a final sanding, the amplifier is ready for finish.

# Smartphone Amplifier

## FULL-SIZE SIDE PATTERN




## FULL-SIZE TOP PATTERN