

The Perfect Gift

# Sweetheart's Music Box



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Project designed and built by  
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Here's a great gift for Valentine's Day, but you'll find it equally appropriate for a birthday, Mother's Day, a wedding anniversary, or simply as a special surprise. Of course, stocking the two compartments with an additional gift of jewelry will win you extra points.

But even after you give away the box, you'll keep the new skills you developed while making it, among them bandsaw-box making, tricks for cutting and inserting a decorative strip, pattern-routing a shape, flocking, and more.



Some people experience allergic reactions to various hardwoods—especially tropical varieties such as the paduak chosen for this project. Dust on your skin could generate a rash, and inhaled dust could lead to coughing and other problems. Wearing long sleeves and a respirator is prudent and inexpensive insurance.

## Begin with the box body

### 1 PREPARE THE BLANK FOR THE BOX BODY (A1, A2, A3).

Unless you're fortunate enough to have some 2"-thick stock on hand, you'll need to laminate several boards—we used three—to obtain this thickness. Begin by jointing and thickness-planing the stock so that it's flat on

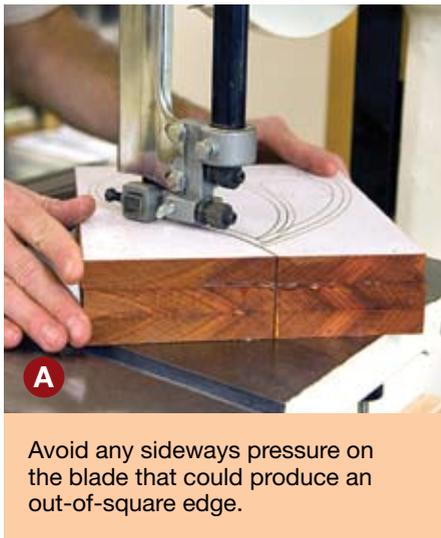
both sides. Spread the glue evenly—we used Titebond III—following the advice in the **Tip Alert**. Stack the pieces, making

**TIP ALERT** Spread glue quickly over a large surface with a disposable applicator such as a business card or playing card. Plastic cards such as digital hotel "keys" or gift cards can endure repeated uses. Simply wipe clean and store near your glue.

sure that the grain direction is parallel in every layer. Clamp securely, and let dry overnight.

**2 SET UP YOUR BANDSAW** with a sharp blade that's thin enough to negotiate the curves in this project. A  $\frac{1}{4}$ " blade with 6 teeth per inch will give you good results. Carefully square your table to the blade, and adjust your blade guides. Hook up your shop vacuum or dust collector to the bandsaw for the reasons explained in the **Tip Alert**.

**3 MAKE PHOTOCOPIES OF THE FULL-SIZED PATTERNS**, (see page 78 and 79). You'll need one copy of the box body pattern and two copies of the lid/base pattern. Adhere the box body pattern to the block with spray adhesive. Note that the grain direction indicated on the pattern runs from top to bottom. Use an awl to mark the centerpoints of the hinge mortises and spring-rod hole.



Avoid any sideways pressure on the blade that could produce an out-of-square edge.

**4 BANDSAW THE BOX BODY**, following the cutting sequence shown on the full-sized pattern and referring to **Photo A**. Note that the first slice is a relief cut that lets the waste fall free at the end of the second cut instead of requiring you to back out the blade. Stop the relief cut about  $\frac{1}{16}$ " from the outline on the pattern. Make cuts 2 and 3 just to the waste side of the line

because you'll sand the edge to the cutline. Especially on the interior cuts (5 and 6), don't back up if your blade strays slightly from the cutline. Instead, gradually steer the blade back to the cutline.

**5 DISCARD THE PLUG FREED BY CUT 4**, or save it for another project. Save the smaller plug resulting from cut 6. This piece, called part A3, will become the cover for concealing the music box movement.

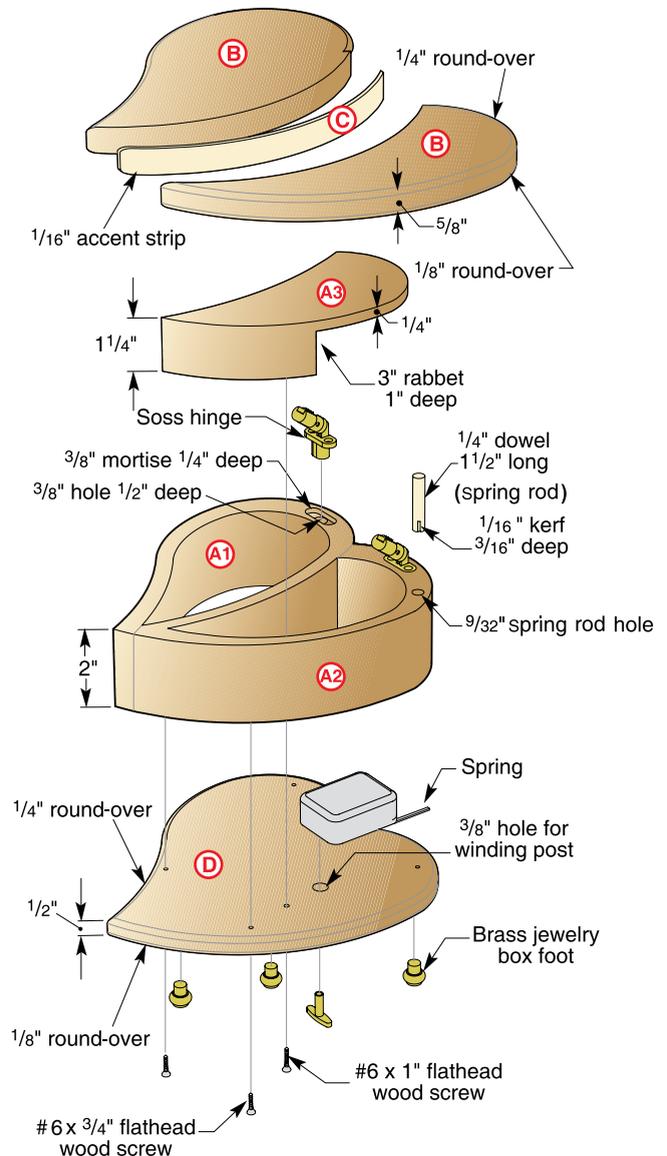


Fig. 1

**6 USE A SPINDLE SANDER TO SMOOTH THE EDGES OF PARTS A1, A2, AND A3.** For smooth-sanded edges with minimal burning, sweep the workpiece along the spindle and use a light sideways pressure. Use 80 grit to remove saw marks, then switch to 120 for smoother results. Finally, hand-sand with 220 grit.

**7 SMOOTH THE INNER LOWER TIP OF PART A1 BY HAND.** This area is too tight for the spindle sander, so you may need a file and sandpaper stuck with spray adhesive to a flat stick (such as a paint stirring paddle).

**8 CHECK THE FIT OF PARTS A1 AND A2** for a snug glue joint, and sand any correction that's necessary.

**9 GLUE-UP A1 AND A2 TO MAKE THE BOX BODY.** Match the registration marks near the top of these two parts. Avoid excessive clamping pressure that could bend or even break the pieces.

Instead of straight clamps, you might want to try a band clamp. See the

#### Tip Alert

for other clamping suggestions. Let the box body dry thoroughly, then unclamp.

#### TIP ALERT

If you don't have a band clamp, consider using  $\frac{1}{4}$  x 4" rubber bands. Glue-up the pieces on a flat surface, such as your saw table or workbench, to ensure proper alignment. But first put down a piece of waxed paper to make sure the assembly doesn't stick to the surface.



Use a fence on your bandsaw to help stabilize the stock when resawing it.

## Continue working on the box body

**1 RESAW PART A3 TO  $\frac{1}{4}$ " THICK,** and bandsaw a rabbet to form a recess for the music box movement. Refer to **Figure 1** and **Photo B**. This surface won't be visible, so there's no need to smooth away the saw marks.

### 2 WRAP THE EDGE

**OF PART A3** with pressure-sensitive white birch veneer edgebanding (see the **Convenience-Plus Buying Guide**). First, run one strip along the inside curve, with the upper edge of the banding a scant  $\frac{1}{16}$ " above the surface of part A3. Press the banding down firmly with a small roller or your fingertips. Cut the ends flush to the wood with a utility knife or veneer saw, then run another strip along the outer curve, and trim its ends flush. Test-fit part A3 into

its recess: You're aiming for a smoothly sliding fit. Sand the edgebanding with 150-grit paper as needed. Wrap the paper around a block and sand off the edgebanding above the top face of A3, making it flush.

### 3 CHUCK A $\frac{9}{32}$ " BIT INTO YOUR DRILL PRESS,

and drill through the box body where shown on the full-sized pattern. You'll also notice dashed lines on the pattern connecting the hole you just drilled with the right-hand cavity in the box body. Chisel out a notch in this channel, as shown in **Photo C**, about 1" deep from the bottom of the box body, for the on/off spring wire of the music-box movement.



Chisel a notch on the bottom edge to house the spring wire that turns the music box movement on and off.

## Construct the lid

**1 THICKNESS-PLANE A  $\frac{5}{8}$ "-THICK BLANK FOR THE LID (B),** and rip and crosscut it approximately  $8\frac{1}{2}$ " square. Spray-adhere one of the lid/base patterns to the bottom of the blank.

**2 BANDSAW THE BLANK INTO TWO PIECES,** steering your blade down the center of the twin dashed lines that show the position of the accent strip (C).

**3 SAND THE SAWN EDGES SMOOTH** using your spindle sander. Check the fit of the edges against each other until they meet without a gap. After you've sanded away the saw marks, clamp one of the pieces to your bench. With spray adhesive, stick a strip of 80-grit sandpaper to the cut edge. Lay the other piece next to it, and rub its edge against the sandpaper to smooth its edge to a mating surface. Keep your strokes fairly short—about an inch or so—and regularly blow away the dust to maintain an aggressive cutting action. Remove the sandpaper to check the fit. If the joint needs further work, adhere the sandpaper to the opposite piece and repeat the process.

**4 THICKNESS-PLANE A BLANK  $\frac{11}{16}$ " THICK** and at least 12" long for accent strip (C). Ensure that the edges of the blank are parallel to each other, and joint both of them straight and smooth. Set up your table saw to rip the thin strip from the blank as shown in **Photo D**.



**D** Using a 4" wide or wider blank for safe ripping, cut a  $\frac{1}{16}$ " strip, letting the piece fall away from the blank at the end of the cut.

**E** With the lid assembly flat, apply the clamping pressure to close the joint and sandwich the accent strip.

**F** With the face of the lid up, and against a stopblock, shave the strip flush with the surface.

**5 DRY-ASSEMBLE (NO GLUE) THE ACCENT STRIP (C)** between the two halves of the lid (B). Mark the strip's length and cut it. Do one more dry assembly, clamping firmly to make sure that the joint closes cleanly.

**6 SPREAD GLUE ON ALL OF THE JOINT SURFACES**, and clamp together the lid (B) and accent strip (C) as shown in **Photo E**, aligning the registration marks on the pattern. In addition to sideways pressure, you may also need to clamp the pieces to your workbench to ensure that they cannot slide against each other. Also, make certain that the accent strip doesn't slide upward. Let the assembly rest until the glue sets.

**7 FLUSH THE ACCENT STRIP (C) TO THE LID (B)**. Remove most of the waste with a razor-sharp block plane as shown in **Photo F**, or card scraper, then sand it flush.

**8 BANDSAW THE LID ASSEMBLY TO SHAPE**, sawing just to the waste side of the line. Don't sand it yet.

Instead, put the lid assembly face down on your workbench (with the pattern facing up). Place the box body face down onto the lid assembly (with the pattern facing down). Check that the lid has

a consistent overhang of approximately  $\frac{3}{16}$ " all around the box body. If necessary, pencil any corrections onto the lid assembly, then spindle-sand the edge of the lid. Strip away the lid pattern, referring to the **Tip Alert** for clean-up advice.

## Make the base

**1 THICKNESS-PLANE A BLANK FOR THE BASE (D) TO  $\frac{1}{2}$ " THICK**, and rip and crosscut it  $8\frac{1}{2}$ " square.

**2 JOIN THE LID (B) AND THE BASE BLANK (D) FACE-TO-FACE** with double-faced carpet tape. Remove most of the waste by bandsawing to within  $\frac{1}{8}$ " of the cutline

**3 CHUCK A FLUSH-TRIM RUNNING BIT INTO YOUR TABLE-MOUNTED ROUTER**, and rotate the lid/base blank assembly counter-clockwise against the bit to trim away the excess material from the base blank. The bit won't be able to reach into the sharp point of the V to complete the cut, so mark this edge with a pencil.

**4 SEPARATE THE LID (B) AND BASE (D)**. Refer to the **Tip Alert** on page 46 for help. Complete the shaping of the base's edge with a utility knife or chisel, followed by sanding.

**5 CUT ALONG THE OUTLINE OF THE REMAINING PATTERN** with scissors, and lightly mist it with spray adhesive to adhere it to the bottom of the base (D). Drill all the holes where indicated. The walls of the box body are a fairly small target for the screws that attach the base. Instead of relying strictly on the pattern for the location of the holes, you'll find that it's safer to lay the base on your workbench, then center the box body on it. Now trace the walls of the box body onto the base to make sure that the screws will hit their target. Drill the holes from the top side of the base, but countersink them on the bottom.



**G** Use a router to round over the top edge of the base. A laminate trimmer would be even easier to handle for this task.

TIP ALERT

If the pattern doesn't strip away cleanly, use a cabinet scraper to remove the paper. You can dissolve excess glue with lacquer thinner on a rag. Repeat the wiping several times to lift adhesive residue from the pores of the wood.

**TIP ALERT**

Pieces joined together with double-faced tape can be tough to pry apart. Try tapping a tapered softwood shim between the parts, or drizzle lacquer thinner into the seam to weaken the tape's bond.

or chuck the bit into your table-mounted router. Remove the pattern from the base.

**7 ROUT THE TOP EDGE OF THE LID (B)** with the  $\frac{1}{4}$ " roundover bit. Switch to a  $\frac{1}{8}$ " roundover bit, and rout both the lid (B) and base (D). Finish-sand all the pieces with 220-grit sandpaper.

## Drill for the hinges

**1 CHUCK A  $\frac{3}{8}$ " DIAMETER FORSTNER BIT INTO YOUR DRILL PRESS**, and set it for a  $\frac{1}{4}$ " deep hole for the hinge mortises into the box body (A). See the **Buying Guide** for more on this bit. All of the hinge mortise centerpoints lie along a single line, so you can set up a fence, as shown in



Set up your drill-press fence to align the hinge mortise centerpoints. This is crucial for smooth hinge operation.

**3 PLACE THE LID (B) FACE DOWN ON YOUR WORKBENCH**, and center the inverted box body on it. Lightly tap the box body so that the dowel centers transfer their marks to the lid. Don't overdo the tapping pressure: You want a distinct but small mark as the target for the tip of your drill bit.

**4 DRAW A THIN PENCIL LINE CONNECTING EACH PAIR OF MARKS.** This will help you accurately position the drill bit for the deeper center holes.

**6 ROUT A  $\frac{1}{4}$ " ROUNDROVER AROUND THE TOP EDGE OF THE BASE.** Use a handheld router as shown in **Photo G**,

**Photo H**, to help ensure consistent results. Drill only the two outer- and inner-most holes for each hinge at this time.

**2 PUT DOWEL CENTERS INTO THE FOUR HOLES.** (See the **Buying Guide** for this inexpensive but handy accessory.) The center may not fully seat up to its rim, but don't worry about that. Use a strip of masking tape for each pair of centers to ensure that they won't fall out when you invert the box body.

**5 REMOVE THE DOWEL CENTERS**, and drill the  $\frac{1}{2}$ " deep center holes into the box body (A). Tap a  $\frac{1}{2}$ " chisel straight downward to complete the edge of the hinge mortises in the box body. Test-fit the hinges, and clean up the mortises as shown in **Photo I**.

**6 DRILL AND CHISEL THE HINGE MORTISES** into the lid (B), using the same procedures you used for the box body. Be very careful with the  $\frac{1}{2}$ " depth setting for the center hole because the lid is only  $\frac{3}{8}$ " thick.

**7 TEMPORARILY INSTALL THE HINGES** into the lid, drilling  $\frac{7}{64}$ " pilot holes for the supplied screws. Check the action of the hinges.

## Begin the assembly

**1 CENTER THE BOX BODY (A) ONTO THE BASE (D)**, and clamp these parts together. Using the countersunk shank holes as guides, drill  $\frac{7}{64}$ " pilot holes  $\frac{3}{8}$ " deep into the box body. Drive the  $\#6 \times \frac{3}{4}$ " screws to secure the base.

**2 TEST-FIT THE MUSIC BOX MOVEMENT** into the box body (A), and trim the spring arm with wire cutters to fit into the channel notch below the spring rod hole. Also ensure that the winding post is centered in the hole in the base (D). Drill  $\frac{7}{64}$ " pilot holes, and screw the movement to the base with two  $\#4 \times \frac{1}{2}$ " screws.

**3 CUT A  $\frac{3}{16}$ "-DEEP KERF INTO THE END OF A  $\frac{1}{4}$ " DOWEL**, where shown in **Figure 1**, using a fine dovetail saw. Fit the dowel into the spring rod hole, engaging the kerf with the spring arm on the music box movement. With the lid open and no downward pressure on the rod, wind the movement and let it play. Slowly press down on the rod until the movement stops completely. Make a pencil mark on the dowel  $\frac{1}{16}$ " above the surface of the box body. Cut the dowel to length, and re-insert it to check its action.

**4 REMOVE THE HINGES AND MOVEMENT**, and inspect the wood pieces, doing any touch-up sanding necessary.



Clean up the hinge mortises with a chisel so that the hinge edge fits closely and the hinge sits flush to the surrounding wood.

## Apply the finish

### 1 APPLY A GENEROUS COAT OF DANISH OIL

to all of the wood parts, including inside the cavities of the box body (A). Don't forget to finish the dowel. Let the oil soak in for about two minutes, then wipe off all you can with dry cloths. Let dry for two hours.

**2 MAKE A ONE-POUND CUT OF SHELLAC** by mixing three fluid ounces of denatured alcohol with two fluid ounces of liquid shellac. (See the **Buying Guide**.) Using a 1" natural-bristle brush, apply three coats of shellac, waiting 30 minutes between coats. Shellac dries fast, so try to flow it onto the surface quickly, with minimum brushing. Let the finish dry overnight.

**3 SMOOTH THE SHELLAC BY LIGHTLY SANDING** with 400-grit and then 600-grit sandpaper. Use a light touch, and inspect your paper frequently.

**4 APPLY A THIN COAT OF WAX**, avoiding the surfaces to be flocked. Buff with a soft cloth.

## Apply the flocking and reassemble

**1 MARK THE LARGE COMPARTMENT ON THE BASE**, and remove the base from the box. Unscrew the movement cover (A3). While the directions for the flocking adhesive state that it should be applied to a finished surface, it will stick provided you scuff the marked area and the top face of part A3—both of which receive flocking—with 120-grit sandpaper.

**2 FILL THE MINI FLOCK APPLICATOR** halfway with black suede flocking. (See the **Buying Guide**)



**K**

Apply the flocking to the special colored adhesive using the Mini Flocker Applicator.

**3 APPLY THE FLOCKING ADHESIVE** with a 1" foam brush on the surfaces to be flocked. Immediately wipe up any that strays onto unwanted areas with a dry paper towel.

**4 GENTLY PUMP THE HANDLE OF THE MINI FLOCK APPLICATOR** as shown in **Photo K** to puff the material onto the adhesive. Let dry overnight.

**5 REMOVE EXCESS FLOCKING** by shaking the parts and lightly wiping with a clean brush.

**6 REPLACE THE MUSIC BOX MOVEMENT** and base. Next, attach part A3 by positioning it, and using the shank hole in the base (D) as a guide to drill a pilot hole. Drive the screw to secure the part. Epoxy the feet into the base, and replace the hinges and dowel. Don't forget to wind the movement before wrapping the box as a gift. 🎁

### About Our Builder/Designer

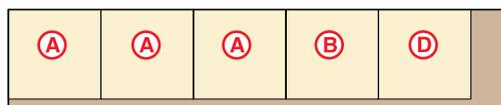
**Stephen Johnson** operates a workshop studio in Athens, Ohio, specializing in fine furniture and custom woodwork designed to achieve a balance between form and function. View more of his work at [SJDfinewoodwork.com](http://SJDfinewoodwork.com).

convenience PLUS

### BUYING GUIDE

		WOODCRAFT #	PRICE
<input type="checkbox"/>	<b>1. Suede Flocking, Black, 3 oz.</b>	16W43	\$10.99
<input type="checkbox"/>	<b>2. Suede-Tex Flocking Adhesive, Black, 8 oz</b>	17H31	\$10.99
<input type="checkbox"/>	<b>3. Mini Flocker Applicator</b>	127115	\$5.50
<input type="checkbox"/>	<b>4. Watco Danish Oil, Natural, 1 pt</b>	123976	\$9.50
<input type="checkbox"/>	<b>5. Bulls Eye Amber Shellac, 1 qt</b>	140701	\$11.99
<input type="checkbox"/>	<b>6. Clear Briwax, 16 oz</b>	85C25	\$13.99
<input type="checkbox"/>	<b>7. Brusso Jewelry Box Feet, Pack of 4</b>	145296	\$11.50
<input type="checkbox"/>	<b>8. SOSS Invisible Hinges, 3/8" x 1", 2</b>	03H33	\$19.99/pair
<input type="checkbox"/>	<b>9. Denatured Alcohol, 1 qt</b>	37D31	\$5.50
<input type="checkbox"/>	<b>10. Dowel Centers, 3/8", Pack of 10</b>	123719	\$6.50
<input type="checkbox"/>	<b>11. 5/64" Vix Bit for #3 &amp; #4 Screws</b>	16I43	\$13.99
<input type="checkbox"/>	<b>12. 7/64" Vix Bit for #5 &amp; #6 Screws</b>	16I41	\$11.99
<input type="checkbox"/>	<b>13. 3/32" Five Star HSS Drill Bit</b>	146673	\$7.99
<input type="checkbox"/>	<b>14. #6 x 1" Brass Flathead Wood Screws, 5</b>	16I22	\$10.99/box of 100
<input type="checkbox"/>	<b>15. #6 x 3/4" Flathead Wood Screws, 2</b>	16I21	\$7.99/box of 100
<input type="checkbox"/>	<b>16. Fastedge Peel &amp; Stick Edge Banding, 15/16" x 8'</b>	146846	\$5.99
Above items available at Woodcraft stores, <a href="http://woodcraft.com">woodcraft.com</a> or by calling (800) 225-1153.			
<input type="checkbox"/>	<b>17. 18-Note Standard Music Movement with Spring (sold separately-call (423) 639-5850 to order)</b>		\$38.95 (includes spring, shipping)
Item above available at: <a href="http://giftsonline.net/catalog_Music_Box_Movements.html">giftsonline.net/catalog_Music_Box_Movements.html</a>			

### Cutting Diagram



1 x 10 x 45" Paduk



1 x 2 x 12" Curly maple