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heirloom

Music Box

▼ One chamber inside the box is reserved for the musical works.

It's not often that you can build an heirloom project in such a short time. Especially one that sounds as good as it looks.



I've met a lot of craftsmen who have a music box on their woodworking bucket list. The pleasant sounds of a music box can calm crying babies and relieve stress in people of any age. Of course, the music is all in the works, so you can choose a melody that takes you to a happy place and time.

But the box has to be something special to house your favorite tune. This box has everything needed — a beautiful shape, an elegant marquetry panel, and a banded top.

Like all small box projects, the key to a successful build is close attention to detail. I've broken the process down into three

stages, the body, top, and bottom, so it's easy to take things step by step and get a great result. It also helps to choose a beautiful wood, like the walnut I used.

IT'S ALL IN THE ANGLES. The front, back, and sides of the box are pretty straightforward. The key is making sure the $22\frac{1}{2}^\circ$ miters are correct to get everything to come together. A few test pieces can help you double check your saw setups. It's also worth noting that the grain on the corners runs perpendicular to that of the other pieces. By joining them with splines, they're sure to hold up for a lifetime.

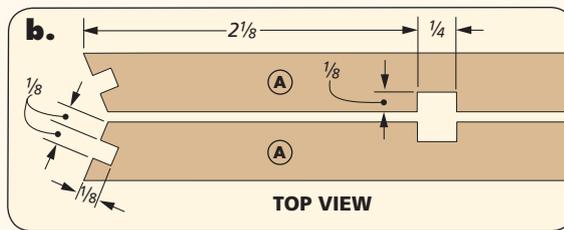
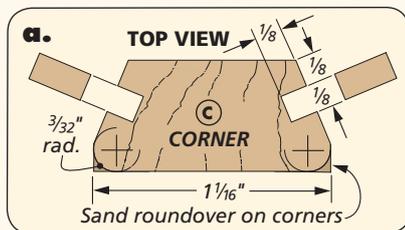
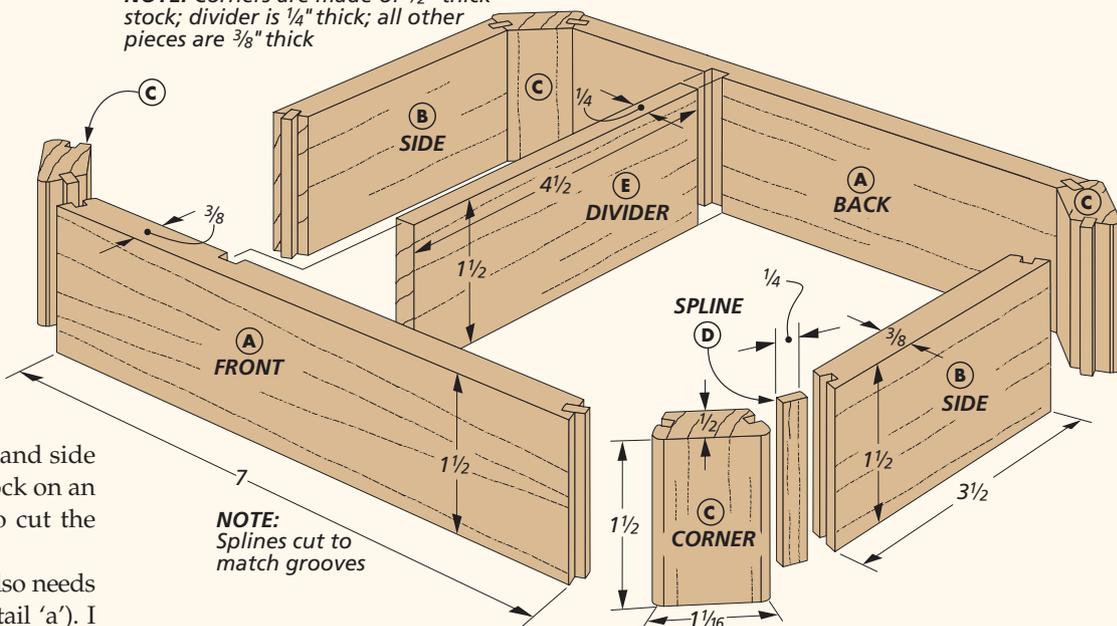
NOTE: Corners are made of 1/2"-thick stock; divider is 1/4" thick; all other pieces are 3/8" thick

FRONT, BACK, & SIDES. As you can see in the lead photo and the main drawing at right, the front, back, and sides all attach to the corners. I began by planing my stock to the correct thicknesses. Then, I tilted my table saw blade to 22½° and cut one end of each of the front, back, and side pieces. I used a stop block on an auxiliary miter fence to cut the pieces to final length.

Each of these pieces also needs a slot for the spline (detail 'a'). I cut the slot by leaving the blade at 22½° and standing the piece on end with the bevel facing the rip fence. A backer board helps keep the pieces stable while you make the cut (left drawing in box below). I installed a dado blade to cut the dados in the front and back for the divider.

CORNERS. Next up are the corners. Start with an extra-long blank and tilt the saw blade to 22½°. The middle and right drawings below show the rest of the process. To complete the pieces, relieve the edges by sanding a slight roundover. Now, cut the corners to final length.

SPLINES. Now, prepare some stock for use as splines. I resawed a piece of stock on the table saw.

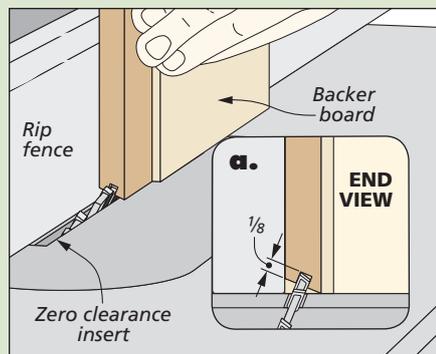


To plane the stock, I taped it to a carrier board and planed it to the final thickness (1/8"). Planing also cleans up the saw marks. You can crosscut the splines to 1½" using a crosscut sled on the table saw or a hand saw and miter box.

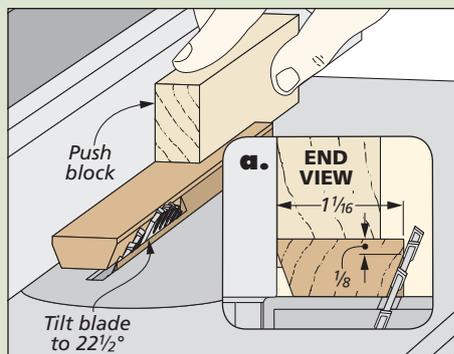
DIVIDER. The last part you need for the body of the box is the divider. Cut it to length, testing the fit between the dados on the front and back.

ASSEMBLY. At this point, you're ready to assemble the body of the box. All you need to do is brush glue in the grooves and on the splines and assemble the pieces. Then insert the divider into the dados and clamp it up. I used a band clamp to apply pressure to the joints, but conventional clamps will work, as well. Before setting the assembly aside to dry, check it to make sure it's square.

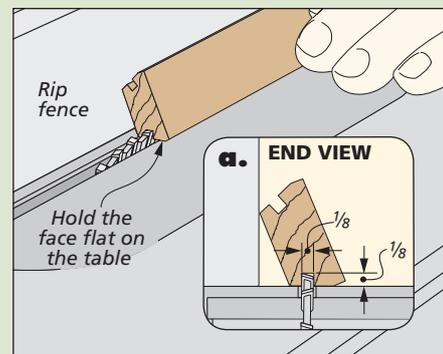
How-To: Make the Frame Pieces



Spline Grooves. Cutting the groove on the ends isn't difficult if you use a backer board to stabilize the workpiece.



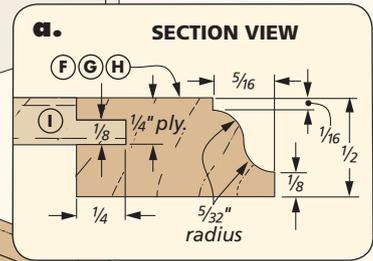
Bevel. With the blade set at 22½°, cut a bevel on one edge of a long blank. Then set the fence and cut the blank to final width.



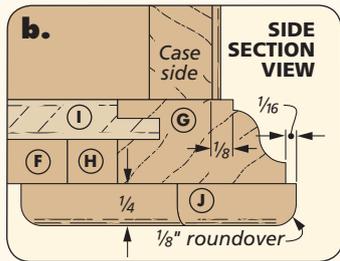
Groove. Now set the blade to 90° and hold the bevel face-down to cut the groove on each edge.

NOTE: Base frame pieces are made from 1/2"-thick stock; feet are made from 1/4" stock; panel is 1/4" plywood

NOTE: After dry fitting frame to verify gap-free joints, trim the panel to fit with a shoulder plane



NOTE: Frame parts have 22 1/2° mitered ends



making the **BASE**

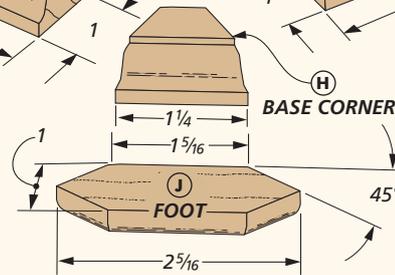
With the body of the box complete, the next step is to make the base. As you can see in the main drawing, the base consists of a hardwood frame surrounding a plywood panel. Grooves in the frame house a tongue on the edges of the plywood. After routing a decorative profile on the assembled base, you'll add four feet to raise it slightly off the surface. It all starts with the frame.

FRAME. For the frame, you'll need to rip some 1/2"-thick stock to 1" wide. I left the blank for the pieces extra-long to make cutting the groove for the panel easier.

Positioning the groove properly is important to ensure the finished panel is flush with the top edge of the frame. An easy technique for setting the rip fence is to hold the plywood base blank up next to the table saw blade. By moving

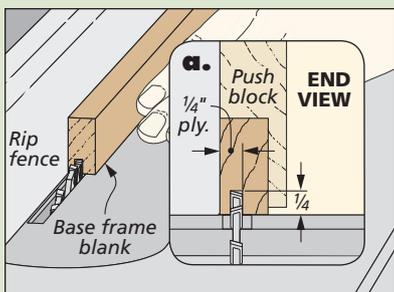
the fence so that the outside face of the plywood is flush with the outside edge of the blade, you're guaranteed that the groove in the frame will be positioned correctly and the panel will be flush when installed (left drawing below).

The next step is to miter the pieces to length. For this, I turned to an auxiliary miter fence and a stop block. This time, however, you have to set the miter gauge

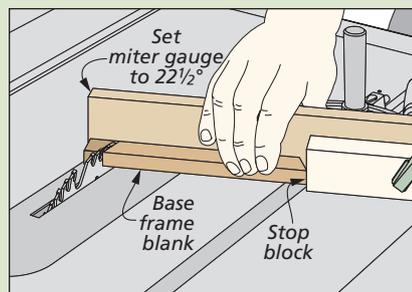


NOTE: Profile on frame is routed after assembling the base

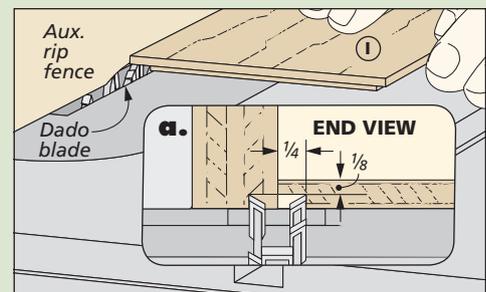
How-To: Make the Base Frame & Panel



Groove. The groove for the panel is offset so the completed panel sits flush with the frame.



Cutting Miters. Use an auxiliary fence on the miter gauge to cut the 22 1/2° miters on the ends of the frame pieces.



Rabbet. After cutting the panel to size, bury the dado blade in an auxiliary rip fence and cut a rabbet around all four edges.

How-To: Complete the Base & Body

angle to $22\frac{1}{2}^\circ$ and make sure the blade is at a perfect 90° . I cut the pieces to rough length, then mitered one end of each piece (center box at the bottom of the opposite page). As before, I used a stop on the auxiliary miter fence to control the length of each piece.

BOTTOM. Now you can turn your attention to the plywood bottom panel. After cutting the panel to size, you'll need to cut the rabbet on all four edges. The right drawing at the bottom of the opposite page shows how I buried part of the blade in an auxiliary rip fence to cut the rabbets. I just used a hand saw to nip off the corners (Figure 1 at right). You can create the rabbet on the upper part of the panel with a chisel as shown in Figure 1a.

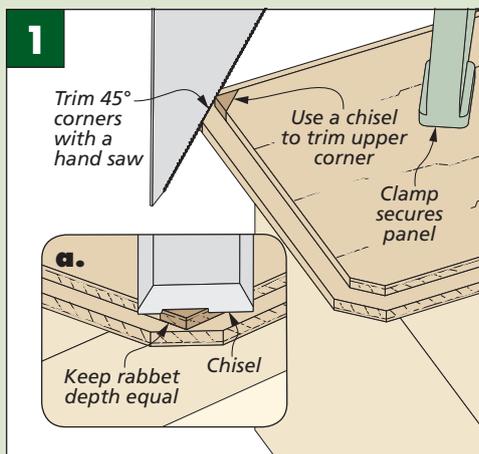
In Figure 2, you can see how I used a band clamp again to glue up the base and panel. Then it's time to head to the router table and rout the decorative profile on the base frame (Figure 3).

FEET. The hardwood feet are the next parts you need to make. In addition to complementing the design of the base, the feet elevate the box to provide clearance for the music works winding key.

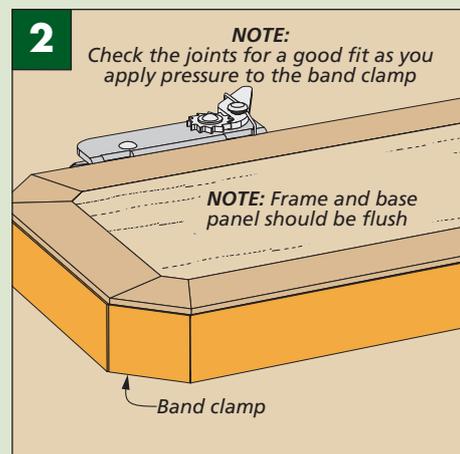
After milling some stock to $\frac{1}{4}$ " thick and cutting the pieces to rough length, cut the miters on each end (Figure 4). Once again, a stop block ensures the feet are all exactly the same length. To complete the feet, round over the bottom edges with sandpaper.

All it takes is a dab of glue on the feet to attach them to the frame. But as you attach the feet, you need to pay attention to the reveal to make sure it's uniform on all the edges (Figure 5a). I used tape to prevent the feet from sliding out of position while the glue dried.

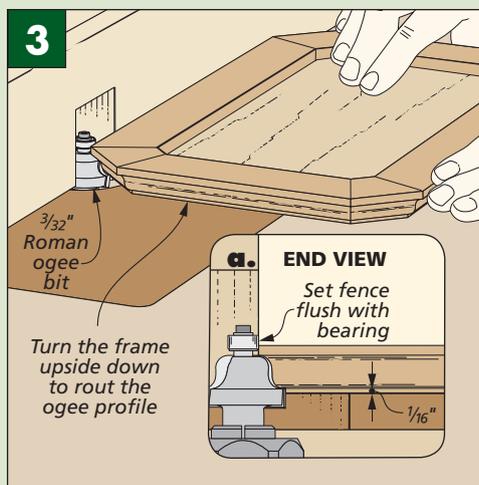
ASSEMBLY. Now you can glue the box body to the base. Figure 6 shows how I used a piece of plywood as a caul on the body. As with the feet, the thing to look for is a consistent reveal on the base. At this point, you're ready to move on to the top.



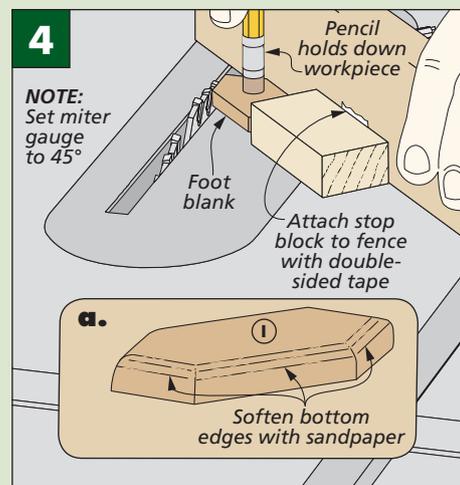
Base Panel. A hand saw is the perfect tool for mitering the corners of the panel. These edges will be hidden in the grooves in the frame.



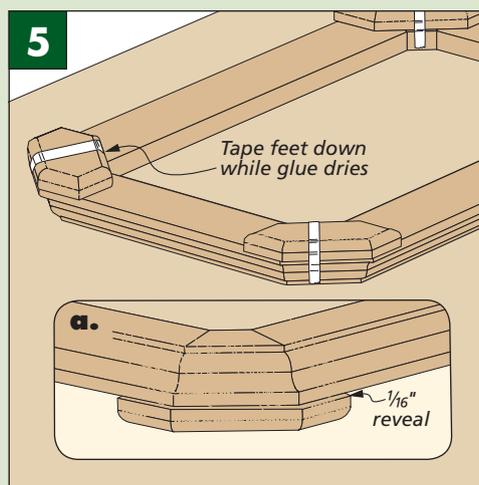
Base Assembly. After the final trimming of the base, just add glue to the joints and use a band clamp to hold it all together.



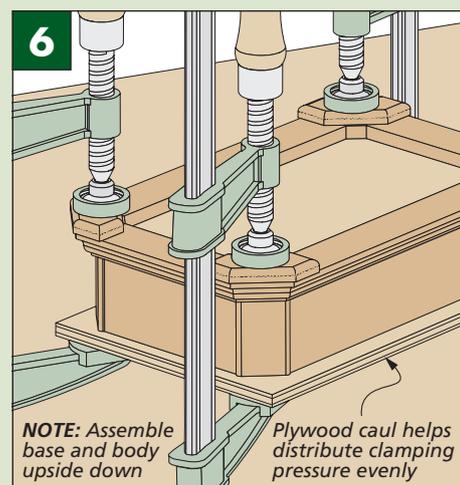
Routing a Profile. After cleaning up the glue squeezeout from the base, rout the decorative profile on the frame.



Feet. Set the miter gauge to 45° to miter the feet. Install a stop block to keep the cuts uniform and the feet sized correctly.



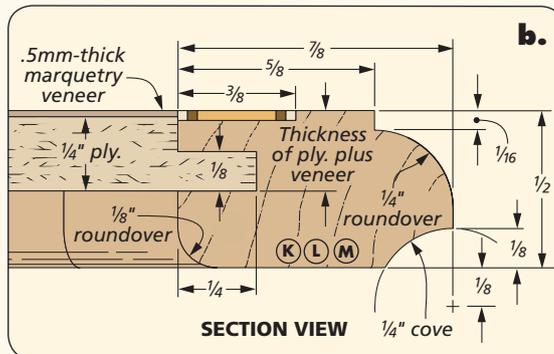
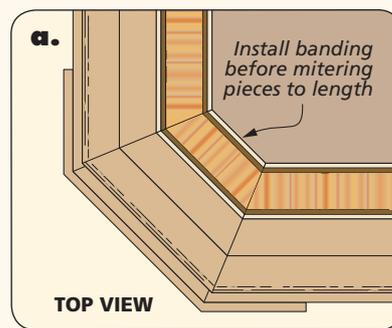
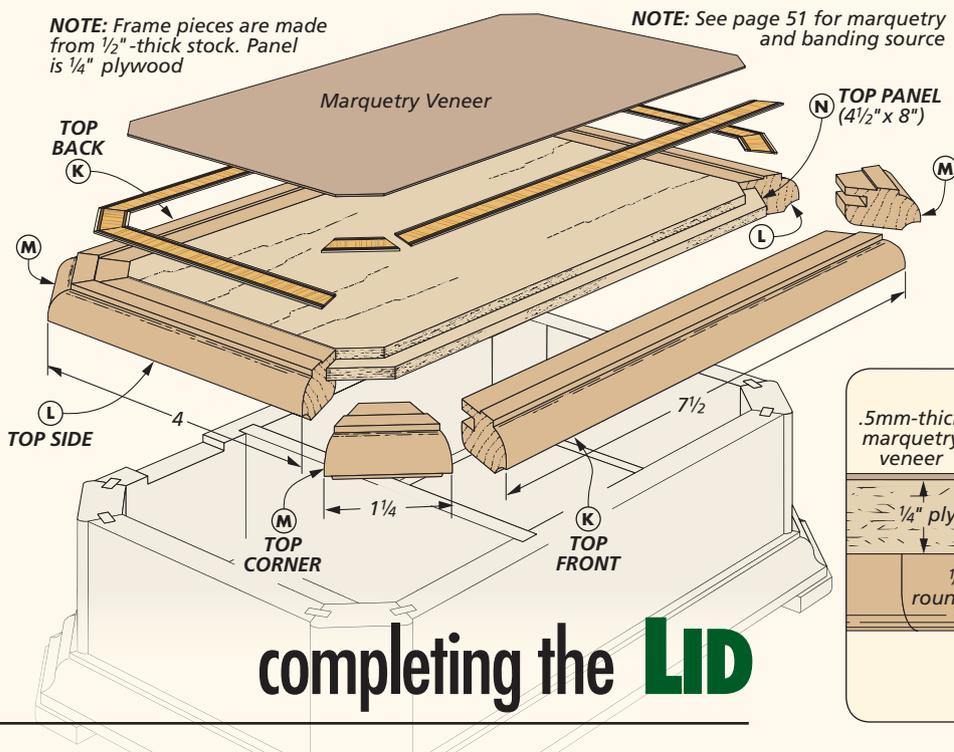
Attach the Feet. To install the feet on the base, I used a small piece of tape on each one to lock it in position while the glue dried.



Assembly. Using a piece of plywood as a clamping caul, a clamp on each corner is all it takes to assemble the body and base.

NOTE: Frame pieces are made from 1/2"-thick stock. Panel is 1/4" plywood

NOTE: See page 51 for marquetry and banding source



completing the LID

To complete the music box, I made a lid that incorporates a purchased piece of marquetry veneer surrounded by decorative banding. The frame and panel lid is built much the same way as the base you just completed, but the dimensions are subtly different.

LID FRAME. To start on the frame, rip some stock to final thickness and width. Leave it long so you'll have some extra for saw setups.

The box below steps you through the process of making the frame. After cutting the panel groove, I cut the very shallow

rabbit for the banding. Round over the inside edge and glue the banding into the channel before mitering the pieces to length.

DECORATIVE PANEL. Next up is the plywood top panel. I started by cutting it oversized and gluing the marquetry veneer to it.

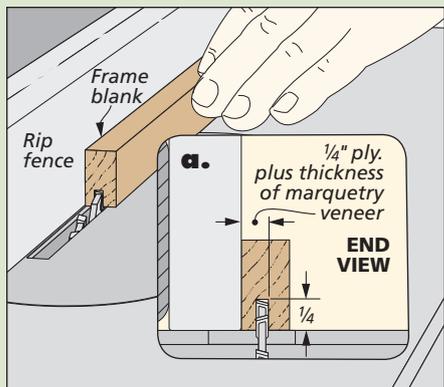
The marquetry I purchased was neatly cut but had some small gaps between the pieces. To avoid glue bleeding through the gaps, I used liquid hide glue. It has the added benefit of providing a little more open time to shift the piece around before it sets up.

After the glue dried, I dry-assembled the frame with a band clamp and used it to mark the panel borders. Then I added 1/4" to all the edges (to account for the tongue) and scribed a cutting line before cutting the panel to size.

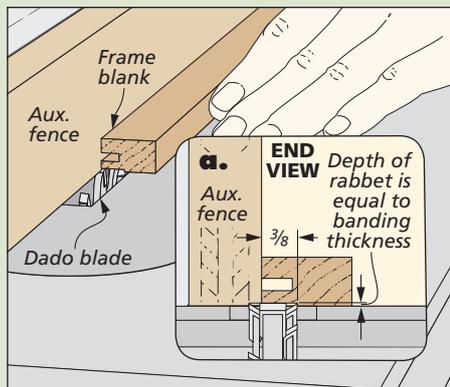
Like the base, the top panel needs a rabbet to form a tongue. For this, I installed a dado blade and buried it in an auxiliary rip fence. Use a chisel to slice away the corners and complete the rabbet.

TEST FIT. Release the band clamp on the frame and check for gaps around the panel. Sneak up on

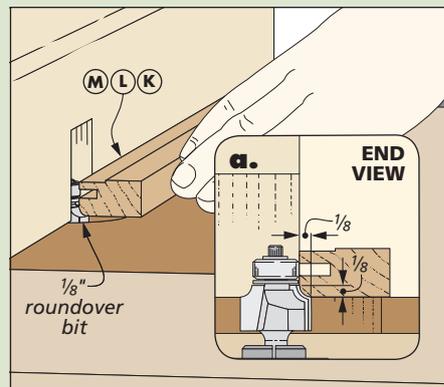
How-To: Groove, Rabbet & Roundover



Off-Center Groove. The panel groove in the frame is located so that the panel and frame are flush when assembled.



Shallow Rabbet. Size the depth of the rabbet for the banding so that it will sit flush with the face of the panel.



Inside Roundover. With the rabbeted side facing up, round over the inside edge of the frame blanks at the router table.

a good fit, fine-tuning it with a shoulder plane. The goal is a seamless joint line for the panel.

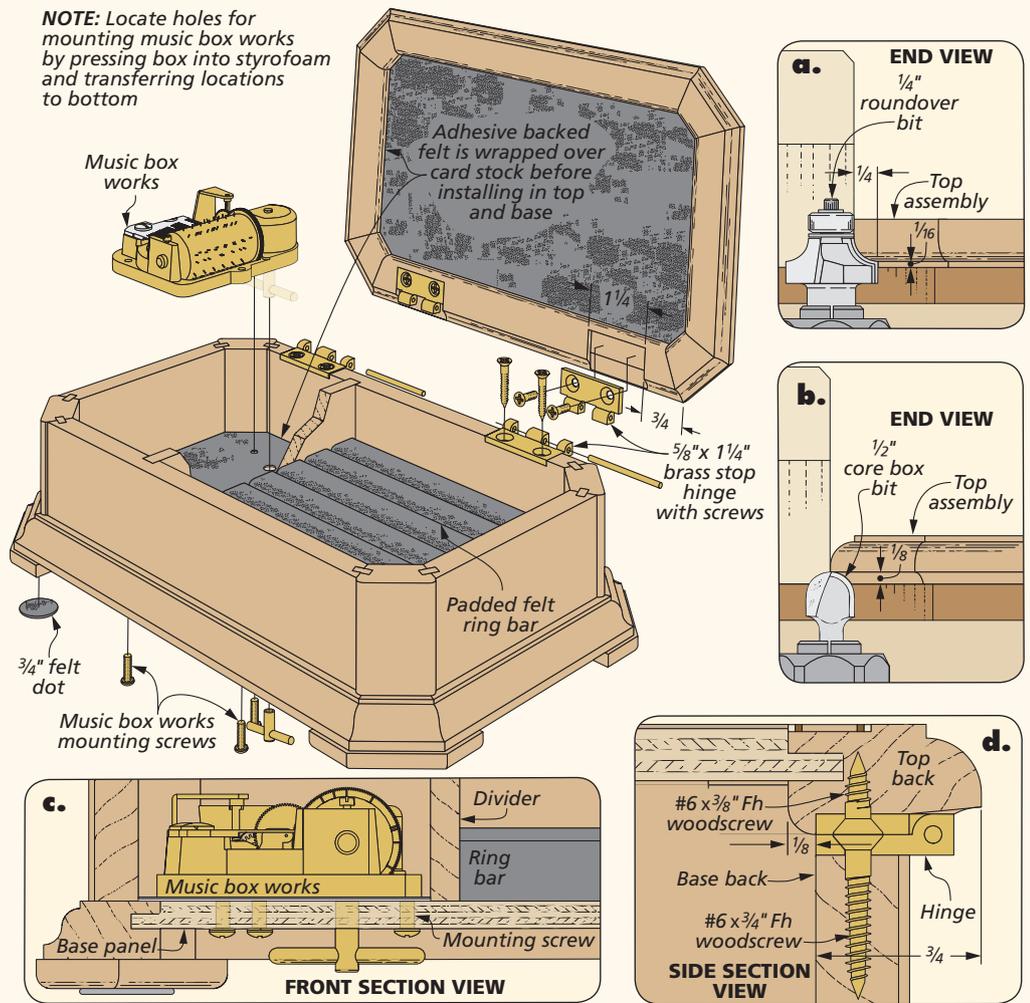
MOLDING PROFILE. Now you can assemble the top and then head over to the router table to rout the edge profile. It consists of a round-over and a cove profile (details 'a' and 'b' at right).

HINGE MORTISES. The next step is to rout the hinge mortises. The box below shows how a router makes short work of removing the bulk of the waste. Square up the corners with a chisel and test the fit. I also used a chisel to remove a little extra material to provide clearance for the hinge barrel. Detail 'd' shows the two different screw lengths used for the hinges.

FINAL DETAILS. Before completing the box, I oiled it and then finished it with several coats of spray lacquer. I also added a felt lining in the base and lid. Felt can be tricky to fit properly, so I first applied it to card stock that was cut to fit the openings.

To install the musical works, you'll need to drill a few holes for the winding and feet (detail 'c'). A trick you can use to lay out those holes is to cut a piece of styrofoam to fit in the opening. Simply press the works into the foam to make an impression of the feet and winding. Then, use the foam as a template to locate and drill the

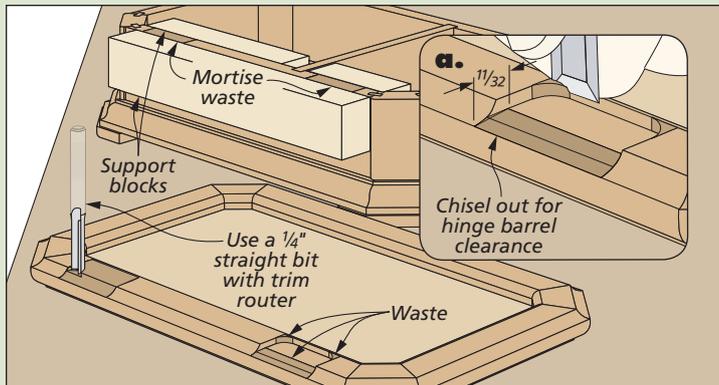
NOTE: Locate holes for mounting music box works by pressing box into styrofoam and transferring locations to bottom



holes in the bottom panel before mounting the works.

You can cut and fit the ring holder and add the felt dots on the feet. All that remains then is to install the hinges. When it's all done, the music box is sure to be an attention-grabber. **W**

Hinge Mortises



Hinge Mortises. Rout the hinge mortises in the lid and back, staying close to the layout lines. To help support the router when routing the mortises in the back, you'll need to use support blocks.

Materials, Supplies, & Cutting Diagram

- | | | |
|----------|---------------------|---|
| A | Front/Back (2) | $3/8 \times 1 1/2 - 7$ |
| B | Sides (2) | $3/8 \times 1 1/2 - 3 1/2$ |
| C | Corners (4) | $1/2 \times 1 1/16 - 1 1/2$ |
| D | Splines (8) | $1/8 \times 1/4 - 1 1/2$ |
| E | Divider (1) | $1/4 \times 1 1/2 - 4 1/2$ |
| F | Base Front/Back (2) | $1/2 \times 1 - 7 5/8$ |
| G | Base Sides (2) | $1/2 \times 1 - 4 1/8$ |
| H | Base Corners (4) | $1/2 \times 1 - 1 1/4$ |
| I | Base Panel (1) | $1/4 \text{ ply.} \times 4 3/8 - 7 7/8$ |
| J | Feet (4) | $1/4 \times 1 - 2 5/16$ |
| K | Top Front/Back (2) | $1/2 \times 7/8 - 7 1/2$ |
| L | Top Sides (2) | $1/2 \times 7/8 - 4$ |
| M | Top Corners (4) | $1/2 \times 7/8 - 1 1/4$ |
| N | Top Panel (1) | $1/4 \text{ ply.} \times 4 1/2 - 8$ |

- (1 pr.) $1 1/4 \times 5/8$ " Brass Stop Hinges
- (1) Music Box Works
- (1) 4" x 7" Marquetry Veneer
- (1) $3/8 \times 36$ " Banding
- (1) 12" x 24" Adhesive-Backed Felt
- (1) Padded Felt Ring Bar
- (1 Pkg.) $3/4$ " Felt Dots
- (4) #6 x $3/8$ " Brass Fh Woodscrews
- (4) #6 x $3/4$ " Brass Fh Woodscrews

$1/2 \times 6 \times 36$ " Walnut (1.5 Sq. Ft.)



ALSO NEEDED: One 12" x 12" sheet of $1/4$ " Baltic Birch Plywood

Sources for Music Box

- **Rockler**
Brusso Stop Hinge ... [62125](#)
Music Movement ... [32856](#)
Felt ... [22822](#)
Padded Ring Bar ... [35248](#)
Felt Dots ... [26351](#)
- **Whiteside Machine Co.**
5/32" R. Ogee Bit ... [2200/2202](#)
- **Inlay Product World**
Marquetry ... [309M-SDK](#)
Inlay Strip ... [397](#)

To finish the music box, I started with a coat of *General Finishes' Seal-a-Cell*. After letting that dry for a couple of days, I sprayed the box with two coats of lacquer.

These specific sources were also cited

- Inlay Product World
inlays.com
610-566-8660
- Rockler
rockler.com
800-279-4441
- Whiteside Machine Co.
whitesiderouterbits.com
800-225-3982