If your bedroom looks a little chaotic, maybe you’ve simply got more stuff than you do places to store it. Or maybe when you head for college or your first apartment, you could use a sturdy strongbox to carry and keep your things. Whatever your needs, check out this classic piece of travel gear, the steamer trunk. With its distinctive details and vintage hardware, it’s got great style, and its solid, sturdy construction will get you through many moves. Tackle this as an advanced woodworker and your skills will be challenged and enhanced with precise tongue-and-groove and biscuit joinery and more than 60 parts to put together just right. And after you build it, you’ll learn more about applying stain and using clear protective finishes to protect the wood and keep it looking beautiful.
TOOLS REQUIRED

Hand Tools
- Framing square
- Combination square
- Clamps for gluing

Power Tools
- Table saw
- Miter saw
- Biscuit joiner
- Planer or surface sanding machine
- Band saw
- Jig saw
- Drill
- Orbital or other finish sander

Miscellaneous
- Tape measure
- Pencil
- Wood glue
- Safety glasses
- 120- and 220-grit sandpaper
- Sanding block
- Clean, lint-free cloths
- Respirator
- Gloves for finishing
- Minwax® Fast-Drying Polyurethane, Satin

SHOPPING LIST

Recommended Wood: Oak, solid and veneer plywood

<table>
<thead>
<tr>
<th>Parts</th>
<th>Material</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-O, U, V, X, Y</td>
<td>1x8</td>
<td>1 @ 10', 1 @ 12'</td>
</tr>
<tr>
<td>P-T</td>
<td>¼” plywood</td>
<td>½ sheet, 48”x48”</td>
</tr>
<tr>
<td>W</td>
<td>3/8” plywood</td>
<td>¼ sheet, 24”x48”</td>
</tr>
</tbody>
</table>

Source for hardware, available in antique or polished brass
www.rockler.com 1-800-279-4441

Item #s:
#74354 Steamer Trunk Hardware kit
#47087 Leather Trunk Handles
#74312 Unpinned Loops
#23713 Trunk Lid Support
#74326 Classic Oblong Catches

WOOD FINISHING PRODUCTS

Recommended Finish
Prep: Minwax® Pre-Stain Wood Conditioner (oil-based)
Stain: Minwax® Wood Finish™, Early American
Clear Finish: Minwax® Fast-Drying Polyurethane, Satin

Alternate Finish
Prep: Minwax® Water Based Pre-Stain Wood Conditioner
Stain: Minwax® Water Based Wood Stain, English Oak
Clear Finish: Minwax® Polycrylic® Protective Finish, Satin
BEFORE YOU BEGIN

Good craftsmanship begins and ends with good work habits, so make the following steps part of your routine workshop practice. If you have any doubts or questions about how to proceed with a project, always discuss them with your shop instructor.

- Carefully and fully review plans and instructions before putting a tool to the project lumber.
- Work sensibly and safely. Wear safety goggles. Wear the appropriate respirator whenever making sawdust or working with thinners or other solvents.
- At the end of every work session, clean up your shop area and put away all portable tools.

CUTTING AND ASSEMBLY

1. For overall guidance, see Fig. 1. Start by rough cutting material for all the frame pieces, A–M, to length (See Cutting List). Also make a few test pieces for the router table setups.

2. Joint one edge of rough cut material.

3. Rip the other edge of the frame pieces to width + \( \frac{1}{16} \)".

4. Make a blank \( \frac{3}{4} \)" wide from which two of the side stiles, H, can be cut. The stiles won’t be ripped to their final width until after grooves are cut into each edge. This is much safer than working with narrow pieces for the groove cut.

5. Send the material through a sander or planer to remove saw marks from cut edge and bring the material to its final width. (See Fig. 2). This is much safer, and provides more consistent results, than jointing the sawn edges. Be careful not to sand or plane off too much material.

6. Crosscut one end of each piece square, and then cut the pieces to their finished lengths. Be sure to use a stop block to ensure consistent lengths (See Fig. 3). Do not cut the front and back short stiles, E, or the top short stiles, M, at this time. They will be cut to fit later.

7. Set up a tongue-and-groove router bit in the router table.

8. Set the height of the groove cutter so it’s centered on the thickness of a test piece. Make a test cut, check that it’s dead center or adjust the height as needed (See Fig. 4).

9. Mark the good face—the face that will show—of all your frame pieces.

**Woodworker’s Tip:** Marking the good, or reference, face on your pieces is an important step in your projects. Besides telling you which face you are referencing your cuts from, it will also help when you assemble the project.

10. Cut the grooves into the frame pieces, always keeping the good face down on the table. Note that the external frame pieces, A, B, C, F, G, H, J, receive a groove on one edge only. Internal frame pieces, D, E, I, K, M, receive grooves on both edges.

11. Set the height of the tongue cutter by aligning it with a groove (See Fig. 5). Set the fence position and make a test cut.

12. Push the test tongue into a grooved edge and check the fit. The faces should be flush. If they aren’t, adjust the height of the bit.

13. When the fit is right, cut tongues into the ends of all the rails, A, B, D, F, G, I, always keeping the good face down on the table.

14. Rip the narrow side stiles, H, to size. Remove any saw marks by planing or sanding, as you did with the other frame parts.

15. Dry assemble each frame. Note that the midrails, D, I, are located to provide 5½” openings between rails.

16. Double check the length of the front and back short stiles, E, and cut them to size; don’t forget the extra length needed for the tongues on each end. Complete these pieces by cutting the tongues.

17. Lay out and cut the plywood panel material to make the 12 panels required for the front and back, P and Q, and the four panels required for the sides, R.

**Woodworker’s Tip:** Plan the plywood cuts according to how they’ll be placed in the frame so as to have a continuous grain pattern in the assembled panels (See Fig. 6). Use tape to label each piece so you can keep track of where they’ll go during final assembly.

18. Sand the interior edges of the frame pieces and the faces of the plywood panels.

**Woodworker’s Tip:** Gang the frame pieces together face to face to make a wider sanding platform. This will help prevent rounding of the corners.

19. Glue the frames together. The smaller sides are easiest to assemble, so to get some practice, do them first. Brush glue onto the tongues and slip them into the grooves, keeping the edge of the rail even with the ends of the stiles. Use a spacer cut to the right size to consistently position the midrails (See Fig. 7). When assembling any panel, always check them for square by measuring each pair of diagonally opposed corners; they should be exactly the same.

**Woodworker’s Tip:** When doing any gluing, allow any squeezed out glue to dry just to a rubbery consistency and then cut it off with a sharp chisel.

20. When assembling the front and back, do so in sub-sections. First assemble the rails, midrail, short stiles, and two panels, again using spacers cut to the right length to locate the short stiles (See Fig. 8). When the glue is dry, add the final panels and stiles.

21. When the glue for this round is dry, sand the surfaces of the frame and panel assemblies.

22. Rip the frame and panel assemblies to their final height of 17". Save the offcuts; they will be used to make the lips, N and O, for the lid.
Woodworker's Tip: Keep track of which panel each offcut comes from so that when they're joined with the top, they will sit on the edge of the same top rails from which they were cut.

23. Rip the offcuts to size; sand off any saw marks.

24. Join the trunk side, front, and back panels to each other using biscuits or similar to join the corners. With biscuits, center the slots 1/4" from the ends, and then locate subsequent slots 41/2" from them for a total of 4 slots per corner (See Fig. 9).

25. Glue up the trunk assembly. Make certain you orient the panels correctly with the top edge up so that the grain of the top rail aligns with the lid lips. Make diagonal measurements to check the trunk for square and correct as necessary while the glue is still wet.

26. Cut micro-biscuit slots or similar in the pieces for the top lip, one slot per corner, as shown in Fig. 1.

27. Assemble the lip for the top, checking again to keep the parts oriented correctly so the grain aligns with the top rails of the side, front, and back panels.

28. Check the lip frame for square and correct as needed. After the glue dries, set the lip onto the top of the trunk and check the fit.

Woodworker's Tip: The lip will be joined to the top panel, so ultimately all three elements—top, lip, and the top edges of the trunk base to align perfectly. Sanding should be enough to correct minor differences.

29. Cut the top stiles, L, to length to match the overall width of the lip, about 20".

30. Dry assemble the top frame and center the midrail, K. Measure for the final length of the top short stiles, M; don’t forget the extra length needed for the tongues on each end, ⅛ total. Complete these pieces by cutting the tongues.

31. Assemble the top using the same procedure as for the front and back panels.

32. When the glue is dry, sand the frame assembly. Lay the frame onto the lip and check the fit; small variances can be sanded out after the frame and lip are joined.

33. Glue the top frame to the lip (See Fig. 10). Use several C-clamps or similar to ensure a thorough bond; while clamping, be careful to keep the lip faces aligned with the frame edges. After the glue is dry, sand smooth any areas where the frame and lip faces don’t quite align.

34. Install the bottom cleats, U and V, with glue and brads. Locate the cleats with a spacer to maintain a uniform distance from the bottom edge of the panels (See Fig. 11). The spacer should be 3½” wide, ½” more than the thickness of the bottom, W.

35. Place the lid upside down on blocks on a workbench. Position the trunk on the lid such that the grain of the top rails and lips align. Clamp the trunk to the lid with the corners flush.

At this point, discrepancies between the trunk and lid alignment should be minor and correctable with sanding.

36. Apply glue to the cleat, insert the bottom, W, and screw it in place using 12 #8 x 1¼" flat head wood screws.

Woodworker's Tip: You may want to consider finishing the trunk interior and bottom before installing the bottom. If you do so, be sure you don’t apply finish in areas where glue will be applied between the bottom and the cleats.

37. Sand all trunk surfaces.

38. Make the support blocks for the handles, X, and lock, Y, by resawing solid stock with a bandsaw and then running it through a planer until the thickness matches that of the reveal where a plywood panel runs into a rail edge, about ¼". To make the lock block, mark out a curve on the lock support block that parallels the curve of the lock plate. Cut and sand the curve.

39. Install the lock support block by gluing and clamping it against the bottom edge of the top front rail, centered on the width of the trunk.

40. Install the handle support blocks by gluing and clamping them to the plywood panel tight against the bottom of the top side rails, centered on the panel.

41. Install the hardware. It will be removed for finishing, but it’s best to put it on now and make certain everything is working correctly. Be sure to predrill for all the woodscrews rather than trying to drive them into solid wood. Center the hinges and latches on the center of the short stiles. Instructions for installing the lid stay can be found here: http://go.rockler.com/tech/23713.pdf. After all this hardware is in place, make one final check for the lid and trunk alignment.

42. Install the handle strap keepers so that their tops are at the bottom of the top side rails. Put the keepers about 3½” apart so that the leather strap can be pulled out enough to make room for fingers and knuckles.

STAINING AND FINISHING

Woodworker's Tip: Though you may be tempted to cut short your sanding, preparation, and application time, don't do it. These tasks are very important steps in obtaining a high-quality finish. Remember, it is the finish, just as much as the fit and smoothness of the parts, that will have an impact on how people view your craftsmanship. To ensure an excellent result, follow the steps listed in this section and the instructions the finish manufacturer puts on its products.

WOOD FINISHING TIPS

- Test the stains and clear protective finishes you are planning to use on scrap pieces of wood. On the back of the scrap, mark the stain and clear protective finish combination and the type of wood. Allow all samples to dry thoroughly before making your final selection. Save your samples for quick reference on future projects.

- Use a fine grit sandpaper to smooth any rough edges or imperfections before applying the finish.

- Apply multiple coats of the finish to ensure a smooth and even application.

- Allow each coat to dry thoroughly before applying the next.

- Use a soft cloth to apply the finish in the direction of the grain.

- If necessary, use a light sanding block to smooth out any scratches or imperfections before applying the final coat.

CONTINUED – WOODWORKS: ADVANCED PROJECT 2014-2015 STEAMER TRUNK
CONTINUED – WOODWORKS: ADVANCED PROJECT 2014-2015  STEAMER TRUNK

- All stains and clear protective finishes must be allowed to dry thoroughly between coats. Remember that drying times can vary due to temperature, humidity, and other climatic conditions.
- If you have some leftover stain and clear finish, wipe the can rim so that it won’t dry out and prevent the lid from forming a tight seal.

**Before You Stain**
Carefully sand the parts in the direction of the grain. Start with 120-grit sandpaper and finish with 220-grit. Remove all the sanding dust. Then proceed with the stain and clear protective finish of your choice.

**RECOMMENDED STAIN AND FINISH**
Minwax® Pre-Stain Wood Conditioner
Minwax® Wood Finish™, Early American
Minwax® Fast-Drying Polyurethane, Satin

43. Before applying Minwax® Wood Finish™, apply Minwax® Pre-Stain Wood Conditioner (oil-based), following the directions on the can. Using a pre-stain wood conditioner will help to ensure even absorption of stain and prevent blotchiness.

44. Next, apply the Minwax® Wood Finish™ color you have chosen using a brush or a clean, lint-free cloth following the directions on the can. A brush will help you get the stain into the inside corners. Allow the Wood Finish™ to set for about 5 to 15 minutes, and then wipe off any excess stain. To achieve a deeper color, you may apply a second coat after 4 to 6 hours, repeating the application directions for the first coat. Allow the stain to dry for 24 hours before applying the clear protective finish.

*Woodworker’s Tip: When wiping off stain, make certain that your last wipe with the cloth goes with the grain of the wood.*

45. Apply Minwax® Fast-Drying Polyurethane following the directions on the can. Stir the polyurethane thoroughly. Using a good quality, natural-bristle brush, apply a thin coat. Allow the first coat to dry 4 to 6 hours.

46. Before applying a second coat, sand all surfaces lightly with 220-grit sandpaper. Dust off and wipe all surfaces with a cloth lightly dampened with mineral spirits. Then apply a second coat and set the piece aside to dry for 4 to 6 hours.

47. If desired, apply a third coat following step 46. Allow the final coat to dry 24 hours before normal use of the piece.

**ALTERNATE STAIN AND FINISH**
Minwax® Water Based Pre-Stain Wood Conditioner
Minwax® Water Based Wood Stain, English Oak
Minwax® Polycrylic® Protective Finish, Satin

Alt 1. Before applying Minwax® Water Based Wood Stain, apply Minwax® Water Based Pre-Stain Wood Conditioner following the directions on the can. It will help ensure even absorption of stain, prevent blotchiness that can occur, and minimize grain raise. Apply with a synthetic bristle brush. After one to five minutes, wipe off all excess pre-stain wood conditioner using a clean, soft cloth. Wait 15 to 30 minutes, then use 220-grit sandpaper to sand off any grain raise. Do not use steel wool. Proceed to the staining within two hours.

Alt 2. Next, apply the Minwax® Water Based Wood Stain to the wood using either a synthetic brush or a clean cloth. Allow the stain to penetrate no longer than three minutes. While the stain is still wet, wipe off any excess with a clean cloth that’s been lightly dampened with stain. Be sure to wipe in the direction of the grain. Allow the piece to dry for two hours before applying a second coat, if desired.

Alt 3. After allowing the pieces to dry for at least three hours, apply Minwax® Polycrylic® Protective Finish using a high-quality synthetic brush. Stir the can contents before starting and periodically throughout your work session. Follow the directions on the can. Apply in the direction of the grain. Do not overbrush. Do not shake.

Alt 4. Allow the clear protective finish to dry a minimum of two hours. Next, sand lightly with 220-grit sandpaper. Do not use steel wool. Thoroughly dust off and wipe all surfaces with a cloth lightly dampened with water.

Alt 5. For additional coats, repeat the steps above. Three coats are recommended. Allow the clear protective finish to cure for a few days before subjecting the piece to normal use.

**PRODUCT SAFETY**
For your safety and the safety of those you work with, always read and follow the safety warnings that manufacturers print on their labels.

**WARNING!** Removal of old paint by sanding, scraping, or other means may generate dust or fumes that contain lead. Exposure to lead dust or fumes may cause brain damage or other adverse health effects, especially in children or pregnant women. Controlling exposure to lead or other hazardous substances requires the use of proper protective equipment, such as properly fitted respirators (NIOSH approved) and proper containment and cleanup. For more information, call the National Lead Information Center at 1-800-424-LEAD (in U.S.) or contact your local health authority.

**DANGER:** Rags, steel wool, other waste soaked with oil-based stains and clear finishes, and sanding residue may spontaneously catch fire if improperly discarded. Immediately place rags, steel wool, other waste soaked with oil-based products, and sanding residue in a sealed, water-filled metal container. Dispose of in accordance with local fire regulations.

When using oil-based wood finishing products:

**CAUTIONS: CONTAINS ALIPHATIC HYDROCARBONS.** Contents are COMBUSTIBLE. Keep away from heat and open flame. VAPOR HARMFUL. Use only with adequate ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, wear respiratory protection (NIOSH approved), or leave the area. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.
FIRST AID: In case of eye contact, flush thoroughly with large amounts of water for 15 minutes and get medical attention. For skin contact, wash thoroughly with soap and water. In case of respiratory difficulty, provide fresh air and call physician. If swallowed, call Poison Control Center, hospital emergency room, or physician immediately.

DELAYED EFFECTS FROM LONG-TERM OVEREXPOSURE.
Contains solvents, which can cause permanent brain and nervous system damage. Intentional misuse by deliberately concentrating and inhaling contents may be harmful or fatal.

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

DO NOT TAKE INTERNALLY. KEEP OUT OF REACH OF CHILDREN.
CONFORMS TO ASTM D-4326. Contact a physician for more health information.

When using water-based wood finishing products:

CAUTIONS: Use Only With Adequate Ventilation. To avoid overexposure, open windows and doors or use other means to ensure fresh air entry during application and drying. If you experience eye watering, headaches, or dizziness, increase fresh air, or wear respiratory protection (NIOSH approved), or leave the area. Avoid contact with eyes and skin. Wash hands after using. Keep container closed when not in use. Do not transfer contents to other containers for storage.

FIRST AID: In case of eye contact, flush thoroughly with large amounts of water. Get medical attention if irritation persists. If swallowed, get medical attention immediately.

WARNING: This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm.

DO NOT TAKE INTERNALLY. KEEP OUT OF REACH OF CHILDREN.
CONFORMS TO ASTM D-4326. Contact a physician for more health information.
FIG 1.
FIG 2.

Plane stiles and rails to their final widths by ganging them together on edge. See Step 5.

FIG 3.

To make repeat cuts to the same length, clamp a stop block to the miter saw fence. See Step 6.
Set the height of the groove cutter so it’s centered on the edge of the stock. See Step 8.

Center the tongue cutter on the edge of the stock and make a test piece to check alignment with the grooves. See Step 11.
FIG 6.

Sample plywood layout for Front and Back Panels

Be sure to lay out and label your plywood cuts so the grain pattern will be continuous within each assembled panel. See Step 17.

FIG 7.

Use a spacer to locate midrails exactly between the top and bottom rails. See Step 19.
Be sure to lay out and label your plywood cuts so the grain pattern will be continuous within each assembled panel. See Step 20.

Use a spacer to locate midrails exactly between the top and bottom rails. See Step 24.
To ensure a proper bond, use several clamps when joining the lip to the top. See Step 33.

Use a $\frac{13}{16}$" spacer to locate the bottom cleats. See Step 34.