

Do It Yourself

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Open Bookcase: Stock Prep and Base Assembly

From "[Wood Works](#)"

episode WWK-603 -- [More Projects »](#)

In this episode of *DIY Wood Works*, host David Marks builds a contemporary bookcase with an open-back design.

Made primarily from cherry wood and assembled using dovetail joinery, this tall contemporary bookcase is designed to be placed almost anywhere. With a modern Asian-inspired design, it is open on both sides so, if desired, it can be positioned in an area away from a wall and function as a display stand for art objects as well as books. The bookcase frame is 56 inches tall and has adjustable shelves. The base is made from ebonized maple, and joins the case with mortise and loose-tenon joinery.

In this first segment, he prepares the stock and begins assembly of the base.

Materials:

Cherry and maple stock

1/8" MDF for templates

Table saw

Multi-router

Band saw

Plunge router

Oscillating spindle sander

Disc sander

Clamps

Plastic resin glue

Carpenter's square

Carpenter's pencil

Safety glasses or goggles

Safety Alert: *Always* wear safety goggles or safety glasses, and follow proper safety precautions, when working with wood, power-tools, saws, drills, routers, etc.



This Asian-inspired bookcase is designed so that it can be placed in a room away from any walls. It features an open-back design so that decorative items can be displayed and viewed from all angles.



Dovetail joinery is used to provide strong joints as well as an attractive visual accent to the case.



The base of the bookcase features a wide stance, with curved legs made from maple. The legs are shaped on the band saw and given an ebonized finish.

Building the Base

The sturdy legs of the bookshelf curve outward for support (**figure A**). Complementary curves are cut in the aprons of the base. There's no formula for these curves. You can design your own curves to please your eye, make sketches and use trial and error to get a design that you're happy with. Once you're happy with an overall design, make a set of templates from MDF to guide the cuts for your base stock.



Figure A

- We created three templates made from 1/8" MDF (**figure B**) to cut the curves of our base.
- The template for the legs can be used to trace the curved profile on one side, then simply flipped to trace the corresponding curve on the other side. A second template is used to trace the long curve of the apron. The third is used to trace the curve on the short sides (**figure C**).



Figure B



Figure C

- The raw stock for the base consists of 16/4-stock for the legs, and 12/4 stock for the aprons.
 - Each of the four legs measures 8 inches by 3-1/8" square (**figure D**).

- The two long sides measure 15-1/4" long by 2-3/8" by 3-1/4".
- The two short sides measure 7-3/8" long by 2-3/8" by 3-1/4".
- With the stock milled to rough dimension, you can trace on the profile of the templates. When tracing the curves, make certain that you carefully line up the templates with the edges and center-lines on the stock (**figure E**). When you draw the profile onto the legs, flip the template over onto the adjacent side.



Figure D



Figure E

- Before cutting out the shapes of each base piece at the band saw, it's a good idea to lay out and cut the mortises for the joinery while the stock is still square. The mortises on the legs measure 1" from the inside edge, are 2-3/4" long (**figure F**) and 3/8" wide.
- On the aprons, the mortises are the same size and are positioned 1" from the back (or inside) edge, 7/8" from the front and 1/2" from the top (**figure G**).



Figure F



Figure G

- With the marks laid out, cut the mortises using a plunge router. A board taped to the end of the workbench can be used to guide the fence of the router for accurate cuts (**figure H**). Use 3/8" router bit and cut the mortises 3/4" deep.
- Repeat the procedure for the leg stock. Once the first leg mortise is cut, turn the leg stock and cut the mortise on the adjacent side.
- You can now cut the curved shapes for the legs and aprons using the band saw. For a smooth cut, use a sharp saw-blade that is 1/2" wide and has 6 teeth per inch. Rough-cutting the curves into the leg stock is a 2-step process. Make the first cut (**figure I**), making your cuts close to the curved markings.



Figure H



Figure I

- Then, to keep the stock square for the second cut, tape the fall-off back onto the leg (**figure J**) using carpenter's tape.
- Then make the cut on the adjacent side to complete the cuts for the curved leg (**figure K**).
- Cutting the apron stock is more straightforward. Just be sure to make your curved cuts close to the lines.



Figure J



Figure K

- Once the curves are rough-cut, you can refine the curves to the lines using the **oscillating spindle sander**. The vertical motion of the sanding sleeve and spinning drum (**figure L**) makes this the ideal tool for sanding curved surfaces since it minimizes scallop marks and doesn't run the risk of chip-out which can happen with a router.
- Repeat the procedure to sand the aprons smooth (**figure M**).



Figure L



Figure M

- At this point, you can conduct a dry-fit of the base components. The base is assembled using

tenons that are 2-3/4" x 1-1/2" x 3/8", and with edges rounded on the router table to fit the mortises.

- Once the pieces are dry-fit, the last bit of marking for the shaping can be made. Mark the areas where the square ends of the long and short aprons meet the curved legs as shown, so that these areas can be sculpted with matching curves so that the pieces will blend. To accomplish this, trace the curved profiles of the legs onto the aprons (**figure N**).
- With your markings done, slowly sand the sides of the apron to the curved line using a disc sander (**figure O**). Blending the aprons to the leg helps reinforce the illusion that the base was carved from a single block of wood.



Figure N



Figure O

- With all the base elements made and sculpted, glue-up of the base can begin. Apply plastic resin glue to the mortises (**figure P**), tenons and adjoining sides.
- Assemble the base upside down so that the tops of the aprons and legs are referenced against a flat surface.
- Once assembled, apply clamping pressure from all four directions (**figure Q**) and check for square. Allow the glue to set overnight.



Figure P



Figure Q

In the segment that follows, the dovetail joinery is created for the case portion of the shelves, and the case is assembled.

RESOURCES:

Woodworking Techniques: Best Methods for Building Furniture from Fine Woodworking

Model: 1561583456

Author: Fine Woodworking Magazine

The Taunton Press Inc

Newtown, CT 06470

Phone: 203-426-8171

Fax: 203-426-3434

Email: service@taunton.com

David Marks Website

David Marks, DIY's *Wood Works* host, is a master woodworker. For more information on cut sizes and project details, please contact him via his Website at www.djmarks.com

Fine Woodworking

A magazine devoted to high-quality craftsmanship in woodworking.

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Email: service@taunton.com

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