The Complete Guide to

BUILT-INS

Second Edition

Updated with New Products & Techniques

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The Complete Guide to Built-Ins

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Understairs Bookcases

If your home has a staircase with open space below, chances are you’ve wondered how to make the most of that oddly configured square footage. This bookcase project could be the answer. Behind the two pairs of gently rising birch-frame doors you’ll find a bank of birch plywood shelves that are designed for use as a formal bookcase. Because the door panels are created with Plexiglas, the shelves are also quite suitable for display purposes.

While the bookcase cabinets must be custom-fit to your space, the basic design of the individual units is quite simple. Each cabinet is essentially a plywood box with an angled top. The boxes fit side by side in the understairs area, flush with the wall surfaces. The shelves in each unit incorporate birch 1 × 2 shelf edge to improve their appearance and stiffen the shelf boards.

A birch face frame is wrapped around the perimeter of the project, concealing the plywood edges. The swinging doors are also made of birch. The secret to building the face frames and the door frames is a clever woodworking technique known as the pocket screw joint made with angled screws driven into the back sides of the mating pieces.

Understairs storage units are often made with slide-out shelving or pull-out drawers. This strategy allows for efficient use of space since the pull-out units can be nearly as deep as the total stair width. The drawback is that the drawers or slide-out shelves can be a bit rickety, especially if you’re not an experienced cabinetmaker. When designing your project, you can increase the storage space by deepening the shelves and using them as storage cubbies. If your staircase is bounded by another interior wall, you can add a bookcase on the other side, with the two bookcases sharing a divided panel or wall.

A rich formal bookcase inhabits the previously wasted space underneath a staircase. The books are protected by birch doors with Plexiglas panels that have a soft, contemporary design feeling.

Tools & Materials

**Tools**
- Work gloves
- Eye protection
- Respirator
- Stud finder
- Level
- Pencil
- Utility knife or wallboard saw
- Pry bar
- Drill
- Router (and rabbet bit)
- Chisel
- Large pipe clamps
- Framing square
- Table saw
- Pneumatic brad nailer
- HVLP sprayer (optional)
- Hammer
- Nail set

**Materials**
- 2 × 4 lumber
- Plywood stock (¼”, ½”)
- Wood glue
- Brads
- 150- or 220-grit sandpaper
- Desired finish
- Pocket screws
- 6d finish nails
- 1¼” drywall screws
- Coarse-thread drywall screws
- Wood putty; frosted glass
- Plexiglas
- Glazer’s points
- Latches
- Pulls
- 1 × 2 hardwood
- Shims
- Hinges
Assemble the unit frames with wood glue and coarse-thread drywall screws driven through the outer faces and into the edges of the mating boards. Drill countersunk pilot holes for the screws. Work on a flat surface and check the joint with a framing square to make sure they are square. If you have large pipe clamps, use them to clamp the workpieces before driving the screws. Make both the Unit 1 and Unit 2 frames (tops, sides, and bottom panels).

Install shelf boards in the cabinet frame. The shelves should be flush with the back edges of the frame, leaving a ¾” reveal in the front. Draw shelf layout lines on both faces of the frame pieces so you can center the screws. Install the full-width shelves first. Assemble the shorter shelves and their divider supports into L shapes, and then install them as a unit. Cut back panels from ¼” plywood and attach them with brads.

Attach hardwood shelf edge to the shelves and the divider support edges. The tops of the 1 × 2 edge boards should be flush with the top surfaces of the shelves. The vertical edging pieces should be flush with the outside edges of the dividers.

Apply a finish to the cabinet units. Sand all wood surfaces with 150- or 220-grit sand paper, wipe down with mineral spirits, and then apply two to three light coats of water-based polyurethane. We used an HVLP sprayer to apply the finish, but wipe-on polyurethane works just fine if you don’t have spraying equipment.

Lay out the planned project on the walls. Be sure to identify and label all stud locations as well as any wiring, plumbing or ductwork in the project area. Try to plan the opening in the wall so it will be bordered by existing studs, and with the wall covering cut up to the studs but not beyond.

Cut and remove the wall covering with electrical service. First shut off electricity at the main service panel. To minimize dust, use a utility knife or wallboard saw to cut the wall covering along the cutting lines. Pry off the wall covering, taking care not to damage surrounding walls surfaces.

Install 2 × 4 sleepers on the floor after you’ve thoroughly cleaned up the project area and disposed of all debris properly. Sleepers should butt against the wall’s sole plate and run back in a perpendicular fashion slightly further than the planned project depth. Install a sleeper at the end of the project area, beneath the midpoint, and at 16” intervals.

Rip plywood stock into strips for making the cabinet frame and shelves. We used ¼” birch-veneer plywood to match the birch that is used for the face frame and door frames. The cabinet frame pieces are ripped to 12” wide but the shelves should be only 11¼” wide to allow for the ¾”-thick shelf edge strips. Cut all parts to length.

How to Build the Understairs Bookcase
Make the door frames. The frames will look best with the vertical stiles running full height and capturing the rails between them. As you work, lay each completed frame on a flat surface next to the previous one and make sure the line formed by the top rails follows the same angle as the top face frame rails. The joint options are the same for the door frames as for the face frames (we again used pocket screws). Make sure to leave at least 1" of clear stock on each corner so the router won’t cut into any fasteners when cutting rabbets.

Cut rabbet recesses for the door panel inserts. Use a piloted rabbet bit and router. The rabbets should be 3⁄8" deep and ½" wide. Make the cuts in multiple passes of increasing depth—don’t try to remove all the material in a single pass. Once all rabbets have been cut around the perimeter of each door frame back, square off the corners of the cuts with a sharp wood chisel. Note: In most cases, to create clearance you will need to cut a ½" chamfer on the top inside edge of the two door frames where the hinges are on the side with the point.

Install the door panels. You can use frosted glass (tempered is best), ¼" plywood, or Plexiglas. We used Plexiglas because of the risk of breakage. It is possible to cut both glass and Plexiglas to size, but given the high cost of materials and relatively low cost of custom cutting, you’ll be glad you chose to have the pieces cut to size at the store. Panels should be about ¼" smaller than the opening (including the rabbet widths) in each direction. Use glazier’s points to secure the panels.

Hang the doors and attach latches and pulls. Take great care when hanging the cabinet doors to make sure that the line created by the door tops is straight and parallel to the face frame, with a consistent reveal. Orient the cabinet door pairs so they close together in the center of each unit. Attach the door pulls roughly midway up each cabinet door. Add latches or catches so doors will stay closed. Note: You may need to bevel the inside faces of the frames on the hinge side.