



Storage Galore

**This project originally appeared in *The Family Handyman* magazine.
For subscription information, visit www.familyhandyman.com**

Please note that pages that appeared in the magazine as advertisements will not be included with this pdf. Page numbering may be interrupted if an advertisement ran within the original story. Addresses, phone numbers, prices, part numbers and other information may have changed since original publication



Storage Galore

Build this simple shelf and cabinet system to fit your garage

by Gary Wentz

When you think about garage storage, you probably think of flimsy metal shelves or crude plywood cabinets. But take a moment to think outside the box. Better yet, think about a different kind of box—because that's really what this storage system is: a series of simple boxes screwed to the wall. Open shelves fill the gaps between the boxes and rest on adjustable supports mounted in the box sides. This design maximizes storage space, saves labor and requires less material than a standard wall of cabinets.

This article will cover everything you need to know to build this system. You can adapt our design to suit your own special needs. You can build one cabinet or a dozen, build tall floor-to-ceiling cabinets or shorter ones that

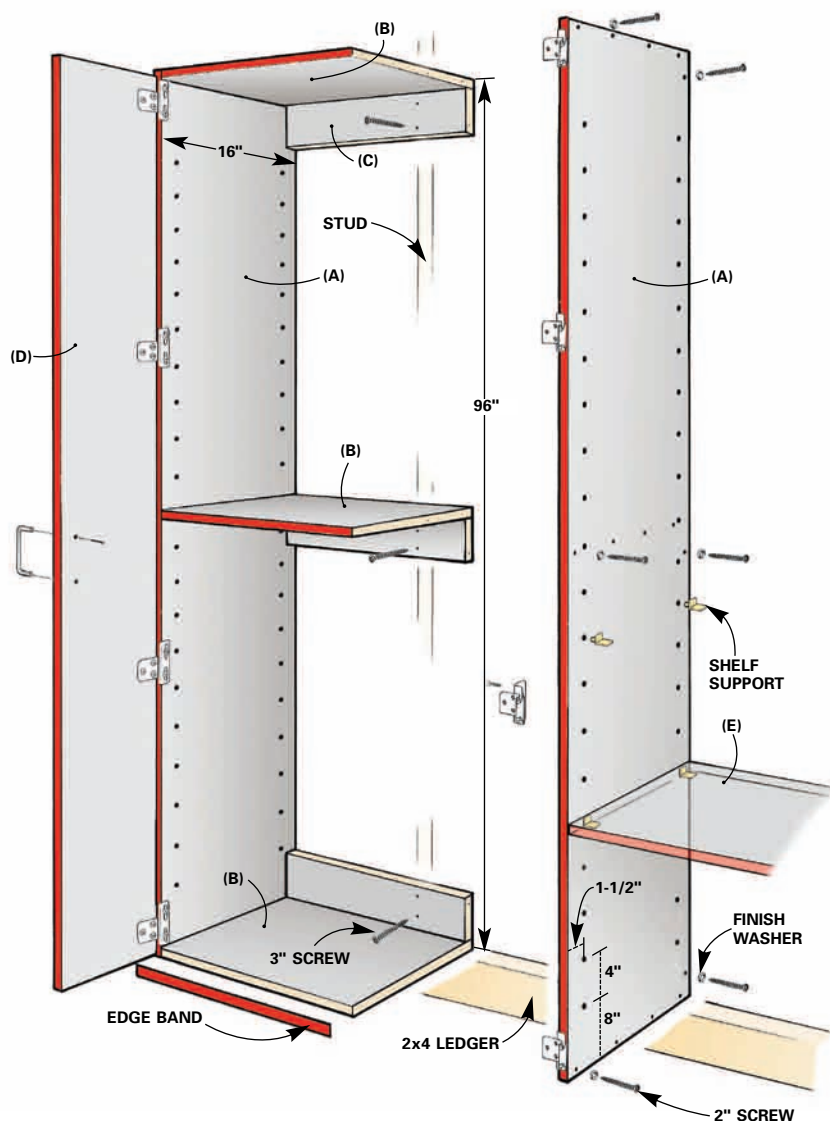
cover only part of the wall. You can even adapt this system for a laundry room, basement or closet.

Tools, materials and money

You could build this system with just a few hand tools, a drill and a circular saw, but a table saw will save you lots of time. The skills you'll need are just as basic as the tools. If you can make long straight cuts and screw parts together, you can build this system.

This whole system is made from just two materials: plastic-coated particleboard, usually called "melamine," and construction-grade pine 1x4s. (Melamine is the type of plastic used as the coating.) You could use 3/4-in. plywood or particleboard, but we chose melamine because

Figure A Upright cabinet construction



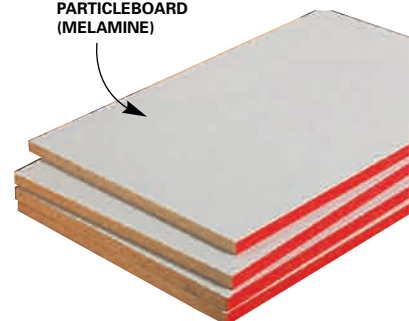
Parts List

Overall dimensions of cabinet box: 96" tall x 25-1/8" wide x 16" deep. All material is 3/4 in. thick.

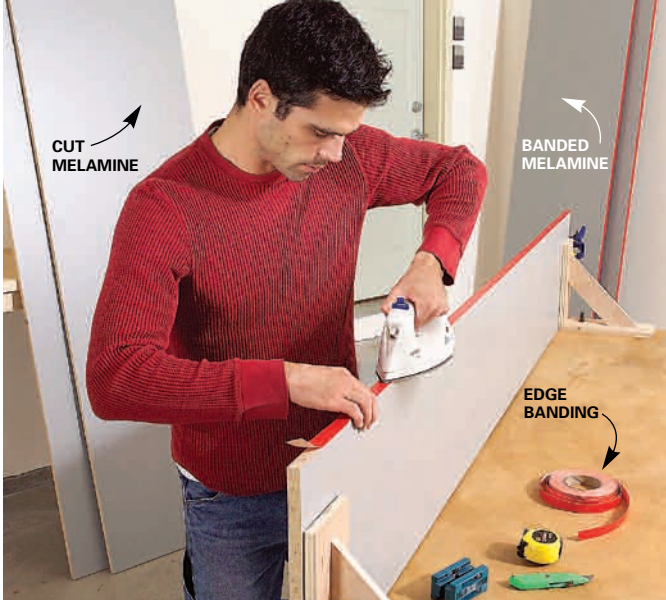
KEY SIZE & DESCRIPTION

- | | |
|---|----------------------------------|
| A | 16" x 96" (side) |
| B | 16" x 23-5/8" (fixed shelf) |
| C | 3-1/2" x 23-5/8" pine (cleat) |
| D | 12" x 95-1/4" (door) |
| E | 16" x 23-5/8" (adjustable shelf) |

PLASTIC-COATED PARTICLEBOARD (MELAMINE)



All dimensions are for the cabinets shown here.



1 Cut melamine to width and iron on edge banding. Position the banding so it overhangs the ends and sides. Let the banding cool before trimming.

2 Hold a wood block firmly over the end and carefully slice off the excess banding. Use a sharp new blade in your utility knife.

it doesn't require a finish. The melamine coating is tougher than most finishes and easy to clean.

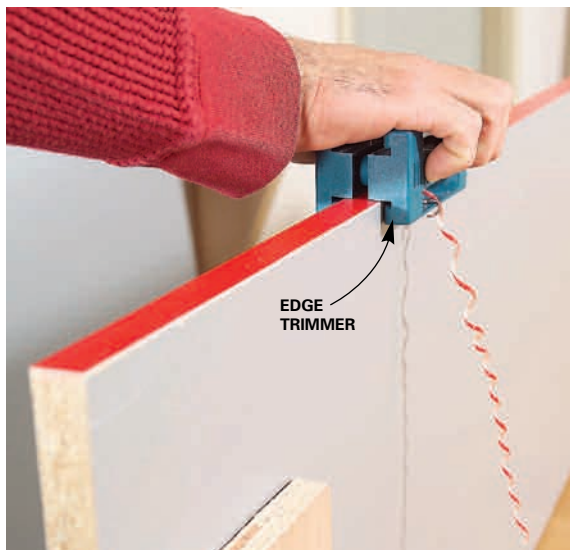
The materials for our floor-to-ceiling system cost about \$37 per linear foot of wall space. That's less than we would have paid for wimpy "utility" cabinets at a home center. Our garage walls were 10 ft. tall. If your ceiling is about 8 ft. tall, you can eliminate the deep upper cabinets. That will lower the cost to about \$27 per linear foot. If you opt for completely open shelving and eliminate the cabinet doors, your cost will drop to about \$20 per linear foot.

Plan the system to suit your stuff

This system is easy to adapt to the space available in your garage. Start the planning process with a tape measure and notepad. Survey your garage, basement, attic and any other place that currently holds stuff you'd like to store in the cabinets. Jot down the measurements of larger items (like luggage or boxes that hold holiday decorations).

Then go to the wall where you'll install the cabinets. Roughly block out the cabinet locations on the wall. Remember to space out the cabinets to leave room for shelves in between. Experiment with different cabinet widths and spacing until you find a layout that works well. Follow these guidelines:

- Each cabinet must have at least one stud behind it so you can fasten the cabinet securely to the wall.
- Limit door widths to 24 in. To cover an opening wider than that, install double doors. We limited most of our doors to 12-in. widths so that we could open them even when the car was parked in the garage.
- Shelves longer than 2 ft. often sag. If you make them longer, stiffen the melamine by screwing 1x4 cleats to the undersides.



3 Slice off the excess banding with an edge trimmer. Test the trimmer on a banded scrap first; you may have to adjust the blades for a perfect cut.



- If possible, size and space the cabinets so the shelves inside and between cabinets are the same length. That way, all your shelves will be interchangeable and faster to cut out.
- Size your cabinets to make the most of a full sheet of melamine. By making our cabinets 16 in. deep, for example, we were able to cut three cabinet sides from each sheet with no wasted material (see **Figure A** for other dimensions). Don't forget that your saw blade



4 Drill 1/4-in. shelf support holes through cabinet sides using a scrap of pegboard as a guide. For end panels that won't support shelves on one side, place a stop collar on the drill bit.

BRAD POINT BIT

STOP COLLAR

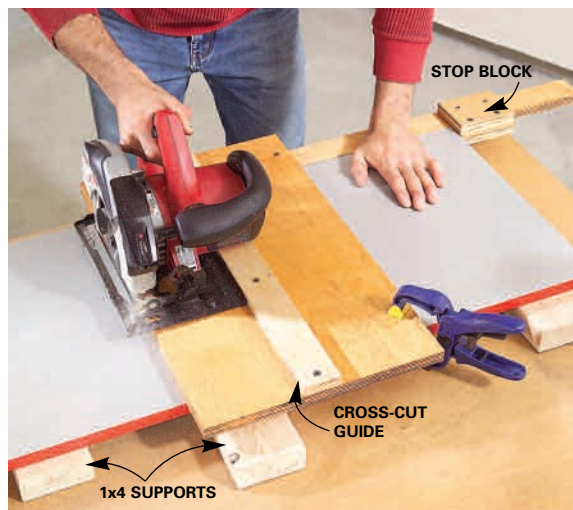


6 Predrill and screw 1x4s to melamine to form the fixed shelves. Screw all the fixed shelves to one cabinet side, then add the other side to complete the cabinet.

eats up about 1/8 in. of material with each cut. Most sheets of melamine are oversized by about 1 in. to account for this.

Buying melamine

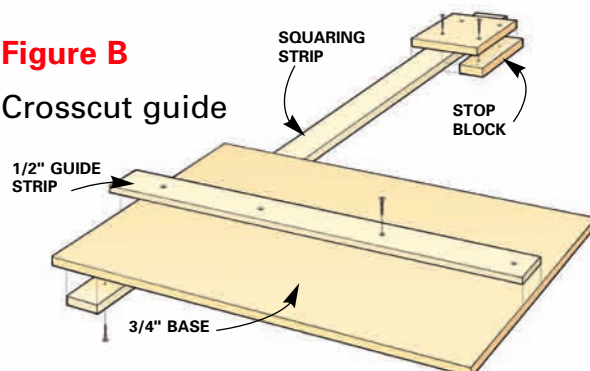
Most home centers carry melamine in 4 x 8-ft. sheets (\$30), usually only in white. For colors other than white, try a lumberyard that serves cabinetmakers (look in the Yellow Pages under "Cabinets, Equipment and Supplies" or "Hardwoods"). These suppliers often charge more (about \$40 per sheet) and might sell only to professionals, so call before you visit. Some cabinet suppliers stock a few colors like gray, black and almond. Others carry a



5 Cut parts to length using a crosscut guide. A stop block screwed to the guide lets you mass-produce identical lengths fast. Support the melamine on both sides of the cut with 2x4 scraps.

Figure B

Crosscut guide



This guide takes a few minutes to make but saves time when you're cutting the fixed shelves (Photo 5) and even more time later when you're cutting shelves (Photo 14). Our system required 30 shelves. To make a crosscut guide, screw a guide strip to the base and run your saw against the guide strip to trim the excess off the base. Add a squaring strip positioned perpendicular to the guide strip. Position the stop block to set the length of your parts.

dozen or more colors. Manufacturers produce hundreds of colors, but unusual colors are only available in large quantities (30 or even 60 sheets).

Plastic iron-on edge banding is available at home centers, usually only in white. Cabinet suppliers carry other colors, but be sure to get banding that can be ironed on.

Working with melamine

With your cabinet dimensions in hand, begin cutting the melamine into parts. Cut the material into equal widths for the sides and the fixed and adjustable shelves, but don't cut the stretchers and shelves to length until they're edge banded. Here are some pointers:

Get help. Melamine is too heavy to handle solo. If you have a large, stable table saw, you and a helper can cut full sheets. But it's usually better to slice a sheet into manageable sections with a circular saw first. Then make finish cuts on the table saw. For more help cutting sheet material, see "Sharpen Your Skills," p. 35.

Wear gloves when handling large pieces. The edges of melamine are sharp enough to slice your hands.

Avoid scratching the melamine surface. If your workbench has a rough surface, cover it with cardboard or old carpet. Pad sawhorses the same way. Run a few strips of masking tape across the base of your circular saw so it doesn't mar the melamine.

Be careful with edges. They're easy to chip. When you stand parts on edge, set them down gently. Don't drop or drag sheets across the floor.

Plan for chip-out. Saw blades often leave slightly chipped edges in the melamine coating. A new carbide blade will chip less than a dull one, but you can't completely prevent chips. Chipping is worse on the side where the saw teeth exit the material. When you run melamine across a table saw, the underside of the sheet is particularly prone to chipping. When you're using a circular or jigsaw, chipping is worse on the face-up side. Plan your cuts so that all the chipped edges are on the same side of the part. Then you can hide them during assembly by facing them toward the insides of cabinets.

Iron on the edge band

The first rule of edge banding is to protect your marriage and buy a cheap iron (less than \$10). Set the iron to the



7 Screw hinges to cabinets. Position top and bottom hinges 1/4 in. from each corner and space the others equally apart.

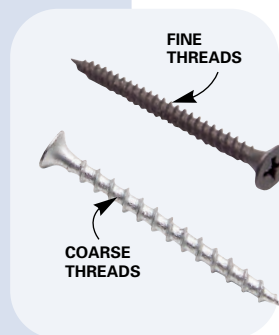


editor's note:

Making screws work in melamine

Screws are the only fastening method used in this entire project. They make fast, strong joints. But screwing into melamine presents a few complications:

Strip-out: Like any particleboard product, melamine strips easily if you overdrive screws. Go easy on the drill trigger as you drive screws home. Use coarse-thread screws only. Fine-thread screws will strip every time. Longer screws also minimize stripping. If this project had been built from plywood, 1-5/8-in. screws would have worked fine. But we used 2-in. screws to assemble the boxes.



Splits: Particleboard splits easily. Never drive a screw into particleboard without drilling a pilot hole. We drilled 7/64-in. holes and used No. 8 screws. Even with a pilot hole, screws will split particleboard if you place them close to ends. Keep them at least an inch from the ends of parts.

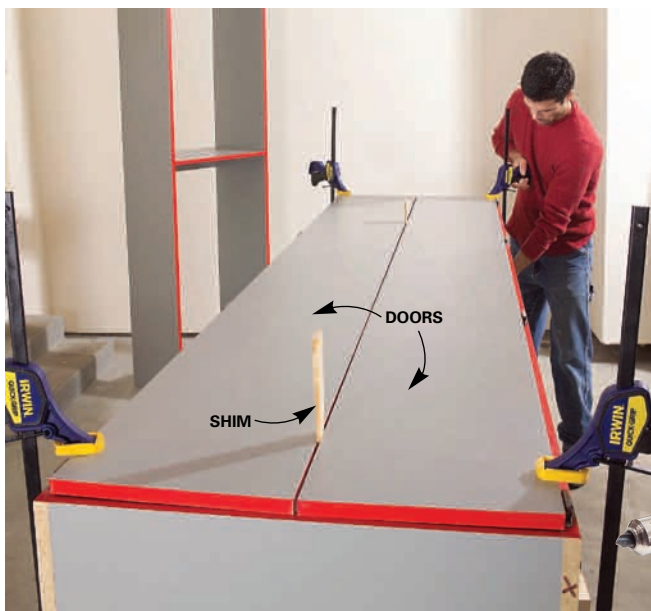


Countersinking: Tapered screw heads will sometimes sink into melamine, but often they'll strip out before the head is flush with the melamine surface. Next to an edge, they'll crush out the particleboard. Always drill countersink holes for screw heads. You can drill countersink and pilot holes in one stroke with a countersink bit (\$4).



Appearance: Even with a clean countersink hole, screw heads are a blemish in melamine's perfect surface. For a neater look, use finish washers (photo above) with any screws that will be visible. Finish washers also eliminate the need for pilot holes.





8 Position the doors over the hinges using shims to maintain a 1/8-in. gap. Use clamps or weights to hold the doors in place. A self-centering drill bit (below) makes positioning screw holes easy.



SELF-CENTERING BIT (\$7)

point drill bit for a clean, chip-free hole. To limit blowout where the bit exits the melamine, set a “backer” underneath. You can make a drilling guide from just about any material, but a strip of pegboard is a perfect ready-made guide (a 4 x 8-ft. sheet costs \$8). Label the bottom of your guide and the bottoms of the cabinet sides so all the holes will align. Otherwise you’ll end up with teeter-totter shelves.

Build fixed shelves and assemble the cabinets

The fixed shelves that fit between cabinet sides (A) are made from melamine panels (B) and pine 1x4s (C). We painted our 1x4s to match the melamine. Cabinets less than 4 ft. tall need only top and bottom fixed shelves. Taller cabinets also need a middle fixed shelf. To make the fixed shelves, just cut melamine and 1x4s to identical lengths and screw them together (**Figure A**).

Assembling the cabinets is a simple matter of fastening the sides to the fixed shelves (**Photo 6**). Predrill and drive a screw near the front of each fixed shelf first, making sure the banded edges of the fixed shelf and side are flush. Then drill and drive another screw near the backside of the cabinet to hold the fixed shelf in position before you add the other screws. Handle the completed cabinet boxes with care—they’re not very strong until they’re fastened to the wall.

“cotton” setting and iron the banding on in two or three passes (**Photo 1**). On the first pass, run the iron quickly over the banding just to tack it into place. Center the banding so it overhangs on both sides. Make a second, slower pass to fully melt the glue and firmly adhere the banding. Then check the edges for loose spots and make another pass if needed.

Trim the ends of the banding with a utility knife (**Photo 2**) before you trim the edges. It’s possible to trim the edges with a utility knife if you set the banded edge face down on a flat surface. But you’ll get faster, better results with a trimmer (\$13) that slices off both sides with one pass (**Photo 3**). If you damage the banding while trimming, just reheat it, pull it off and start over.



9 Predrill with a self-centering bit and drive one screw through each hinge from inside the cabinet. Add the other screws with the doors open.



10 Fasten a 2x4 ledger to the wall framing with 3-in. screws. Choose a straight 2x4 and make sure the ledger is level.

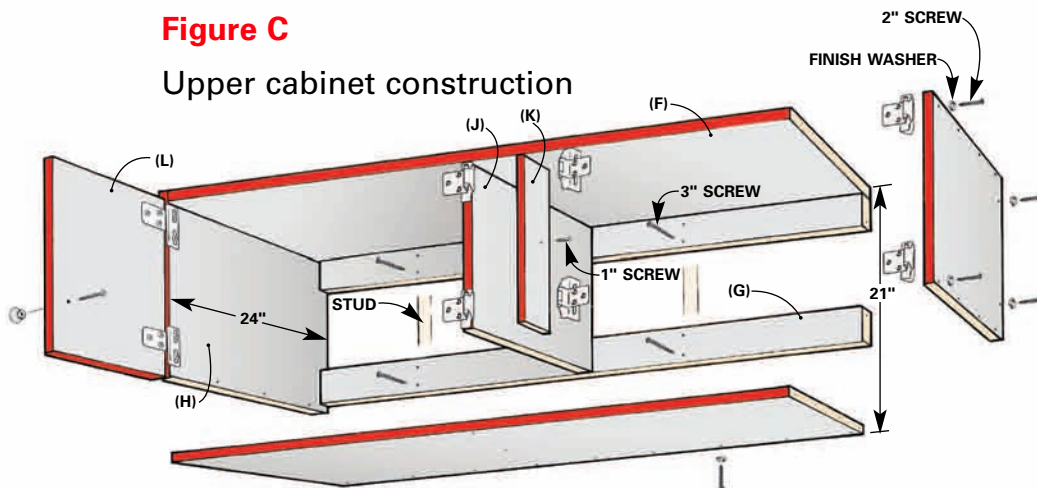
Drill shelf support holes

The adjustable shelves rest on shelf supports that fit into holes drilled into the cabinet sides (**Photo 4**). Drill all the way through the sides that will support shelves inside and outside the cabinet. Drill holes 3/8 in. deep in cabinet sides that form the outer ends of your shelf system. Tape wrapped around a drill bit makes a good depth marker when you’re drilling just a few holes, but a stop collar (\$4) is better for this job.

Check your shelf supports before drilling. Some require 1/4-in. holes; others require 5mm holes. Use a brad

Hang the doors

Make the doors *after* the cabinet boxes are assembled. To hang the doors, first screw hinges to the cabinets (**Photo 7**). The type of hinge we chose is called a “wrap” hinge because it wraps around the corner at the front edge of the cabinet. This design has two big advantages: It mounts more securely to the cabinet and it lets you position the doors perfectly (**Photo 8**) before you fasten them (**Photo 9**). Be sure to buy 1/4-in. “overlay” hinges (the door covers 1/4 in. of the cabinet edge).

Figure C**Upper cabinet construction****Parts List**

Overall dimensions of cabinet box: 21" tall x 72" wide x 24" deep. Your dimensions may differ. All material is 3/4 in. thick.

KEY SIZE & DESCRIPTION

F	24" x 70-1/2"	(top/bottom panel)
G	3-1/2" x 70-1/2" pine	(cleat)
H	21" x 24"	(side panel)
J	19-1/2" x 23-1/4"	(divider)
K	4" x 23-1/4"	(hinge spacer)
L	17-7/16" x 20-1/4"	(door)

Hinges with a larger overlay will protrude beyond the outer edge of the cabinet.

We used four hinges for each of our 12-in.-wide double doors. If you opt for a single wide door, use at least five hinges. The hinges themselves are strong enough to hold much more weight, but they're fastened with just two screws each. The particleboard core of melamine doesn't hold screws very well. So when in doubt, add more hinges.

With the hinges in place, measure between them to determine the door width (with double doors, allow a 1/8-in. gap between them). To determine the length, measure the cabinet opening and add 3/4 in. Cut the doors and set them in place to check the fit before banding the edges. When the doors are complete and screwed to the hinges, label each door and cabinet. Then unscrew the doors to make cabinet installation easier.

Mount the cabinets

Don't install the cabinets directly on the garage floor. Water puddles from dripping cars will quickly destroy particleboard. We mounted our cabinets about 6 in. off the floor—just enough space to allow for easy floor sweeping. This height also let us level the ledger and fasten it to the wall framing (**Photo 10**) rather than to the concrete foundation. We drove screws into the studs and sill plate.

You'll need a helper to install the cabinets (**Photo 11**). Install the two end cabinets first, then position the others between them, leaving equal spaces for the shelves that fit between the cabinets. Watch out for obstructions that prevent cabinet doors from opening. End cabinets that fit into corners, for example, should stand about 1/2 in. from the adjacent wall. We mounted one of our end cab-



11 Set the cabinet into place and screw it to the ledger. Then level the cabinet and fasten it to the wall with pairs of 3-in. screws driven through the upper and middle cleats into studs.



12 Build the upper cabinets with the same techniques and materials used for the uprights. Install a blank panel where cabinets will meet at a corner.



13 Set the upper cabinets on top of the lower cabinets and screw the uppers together with 1-1/4-in. screws. Then screw them to the wall studs and to the lower cabinets.

inets about 1-1/2 in. from the wall to allow for the trim around the entry door (see **Photo 11**).

Upper cabinets

The upper cabinets provide deep, enclosed storage space and tie the upright cabinets together so they can't twist away from the wall. Instead of installing upper cabinets, you could simply run a long shelf across the tops of the upright cabinets.

The upper cabinets are simply horizontal versions of the upright cabinets; you use the same techniques and materials (see **Figure C**). Here are some building tips:

- Minimize measuring and math errors: Build the upper cabinets *after* the upright cabinets are in place.
- To allow easy installation, leave a 1/2-in. gap between the ceiling and the upper cabinets. You could leave the resulting gap open, but we chose to cover it. Here's how: We ripped 1x4s into 1-in.-wide strips, painted the strips to match the edge band and screwed the strips to the tops of the cabinets. After the uppers were installed, we cut trim strips from 1x4, painted them and used them to cover the gap.
- You can build upper cabinet sections up to 8 ft. long. For strength and ease of installation, size the sections so they meet over the upright cabinets, not over open shelves.
- Remember to add hinge spacers (K) to dividers (J) so you can install hinges back to back.

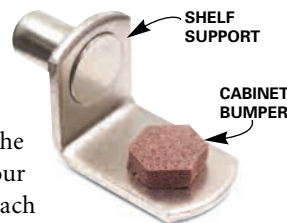
Shelves and hardware come last

Cut the shelves at the very end of the project (**Photo 14**). That way, you can take exact measurements inside and



14 Measure the spaces inside and between cabinets. Subtract 1/4 in. and cut shelves using the crosscut jig.

between shelves and use up any scraps. The number of shelves is up to you; we made four for inside each cabinet and six for each between-cabinet space. We didn't put any shelves in the upper cabinets. Install cabinet knobs or pulls after the doors are in place to make drilling a hole in the wrong location just about impossible.



Art Direction • MARCIA WRIGHT ROEPKE
Photography • BILL ZUEHLKE
Illustrations • SUSAN JESSEN

Buyer's Guide

All the tools and materials used in this project are available at most home centers. Most of the materials can also be ordered from www.woodworkershardware.com (800-383-0130).

- Finish washers, No. SCWCF08, \$5 for 100
- Shelf supports, No. G111NI, \$11 for 100
- 1/4-in. overlay hinges (burnished brass), No. A07566BB, \$1.63 per pair
- Edge band (white, black, gray and almond), \$33 for 250 ft.
- Double-sided edge band trimmer, No. VIAU93, \$13