



HOW-TO BOOKLET #3098

WOOD JOINTS



TOOL & MATERIAL CHECKLIST

- Power or Hand Woodworking Equipment
- Wood To Be Joined
- Adhesives
- Tape Measure
- Fasteners
- Abrasive Paper
- Marking Pencils

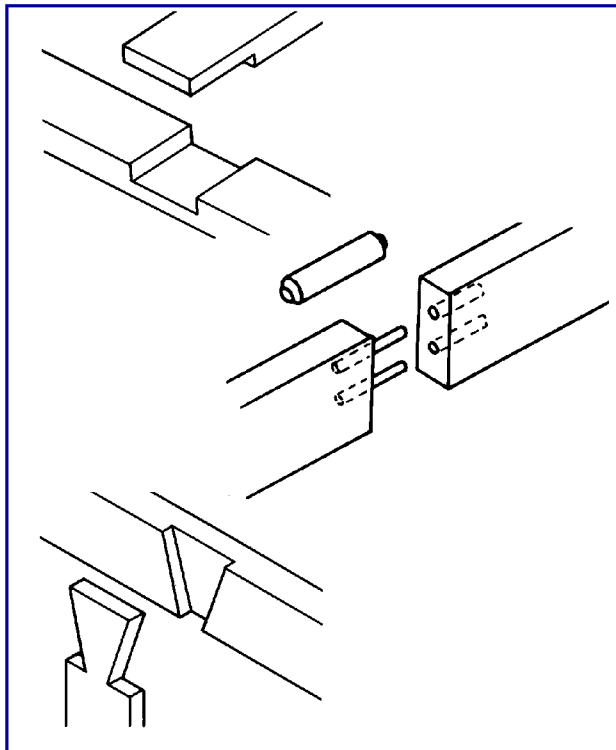
Read This Entire How-To Booklet for Specific Tools and Materials Not Noted in The Basics Listed Above

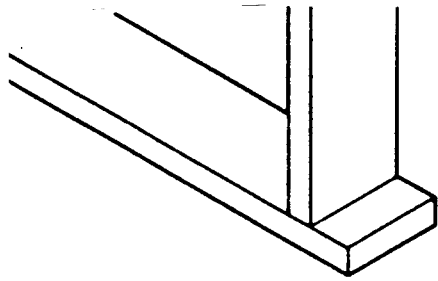
Build almost anything—from buildings to bookshelves—and the project will call for some kind of wood joinery technique. There are countless ways to make wood joints, and there are countless variations on these ways. You probably will even invent some of your own wood joints as you experiment with the basic joints and splices shown in this How-To Booklet.

BUTT JOINTS

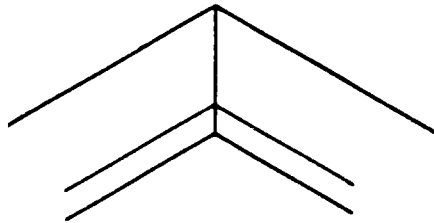
A butt joint is the easiest and simplest of all joints—wood or metal. You'll find it widely used in construction carpentry, but only rarely in fine woodworking or cabinetmaking. A butt joint depends on the fasteners (nails, screws, dowels, adhesive) for strength, and so the joint may be considered a weak joint. But “weak” may be good enough for the project.

When making a butt joint check the wood with a try or combination square to be sure that the end of the wood to be butted against the surface of the adjoining piece is perfectly square. Use the square to mark the surface to be joined, so that the two pieces will be at perfect right angles to one another. If possible, join the wood with both mechanical fasteners (nails, screws, dowels) and adhesive. You can add strength to the joint with metal angles and corner braces, if these devices will not spoil the appearance of the project.

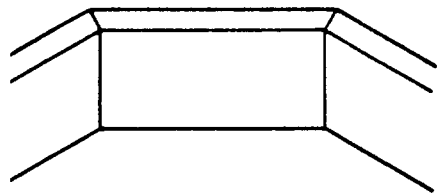




Butt joint is simply edge or end or even faces of two boards fastened together; joint is weak.



Miter joint can be any angle, but it usually is 45-degrees. Most accurate miter cut is made with a power saw or in a quality miter box.



Hexagon miters are cut at 60-degrees. Cut on a power saw, blade is angled over to 60-degree angle and wood is pushed through blade with a miter gauge. With a miter box, the cuts are made from edge-to-edge in deep box.

MITER JOINTS

If you want to hide the end grain of a board, a miter joint is the joint to make. Miter joints are used for picture frames, door and window trim, and around openings. Miter joints are weak joints—probably weaker than butt joints. In fact, miter joints are a form of butt joints, with the angle at the corner halved between the two pieces being joined.

The best way to make a miter joint is with a power saw. The second best way is with a quality miter box and backsaw—or a combination saw that has 8 or more teeth to the inch.

The most common miter joints are cut at a 45-degree angle and joined for a 90-degree corner. However, you can vary the angle to any degree you want (especially with a power saw and miter gauge) to fit the project. Example: a hexagon that requires 60-degree cuts.

Cutting Miters in a Box. Cutting miters in a box with a backsaw is easy. Before you make the final cuts in good wood, practice a few times. Here are the steps to follow:

1 Select the angles. Set the miter box at the angle at which you want to cut the wood. The instructions that come with an adjustable miter box will show you how to set the angles. In a regular miter box, you may be limited to 45- and 90-degree cuts.

2 Cutting the first piece. Set the piece of molding that will mate to an adjoining surface firmly in the box and then cut off an inch or two. The reason for this is to get a clean, finished end with which to work. Take the piece of wood and set it in position on the item on which you are working, at a point where you want the end of the molding to fall.

Mark the shape of the adjoining face onto the wood. Position the wood in the miter box so that when you make your second and final cut the saw will just follow and obliterate the

drawn guideline as the saw meets the edge of the wood.

If you have cut the miter a tad long, you can carefully trim it with a table saw—if you have one. It is better to cut too long than too short. If you cut the stock too short you have to start over again. If you don't have a table saw, you can trim the molding with abrasive.

3 Cutting and fastening the mating pieces.

Cut the other mating pieces the same way as the first one. When all the pieces are cut, fit them together and nail them in place on your cabinet or bookcase—or glue and nail them together to make a picture frame. A good tool for nailing the pieces is a brad driver.

When the brads are in position, set them below the surrounding wood surface with a nailset. This is called “countersinking.” Then fill the holes with wood putty and stain or paint the putty to match the wood.

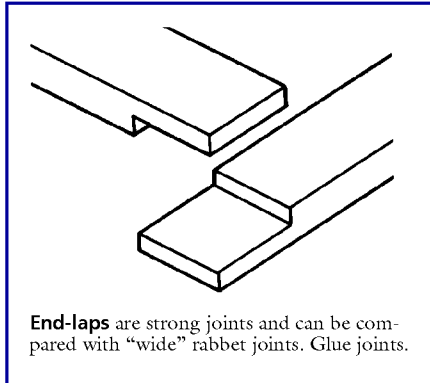
LAP JOINTS

Furniture construction, kitchen cabinets, and similar projects utilize lap joints. Full laps are used when boards of different thicknesses are to be joined. An example would be a 1x4 to a 2x4. The 2x4 is notched 3/4-inch (the thickness of a 1x4) to receive the thinner member.

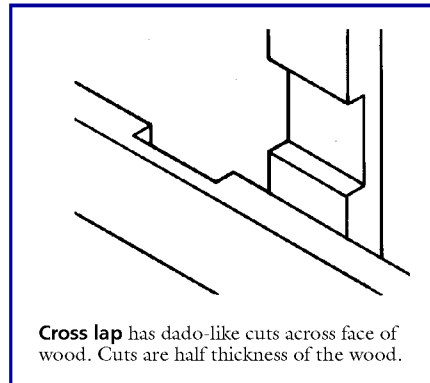
Half laps are generally used when joining two pieces of the same thickness. Each piece is notched half its thickness to complete the joint.

The most common lap joints are the end or corner lap, the cross lap, and the middle lap. A variation is the dovetail lap where the joined pieces are “locked” together resulting in an extremely strong joint.

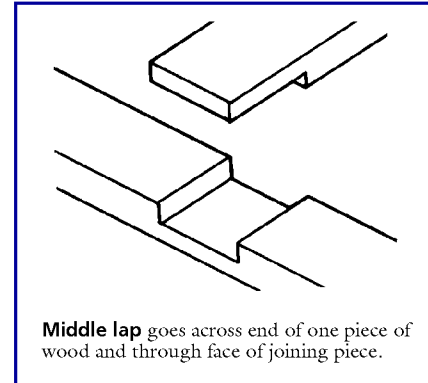
Corner Half Lap with Table Saw. Making a half lap with a table saw is the efficient way to do it. Be sure you keep your fingers clear of the blade when working and wear safety glasses.



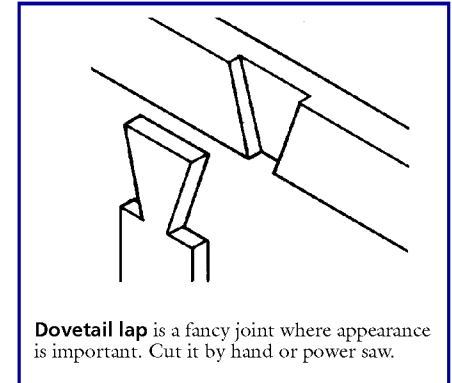
End-laps are strong joints and can be compared with “wide” rabbet joints. Glue joints.



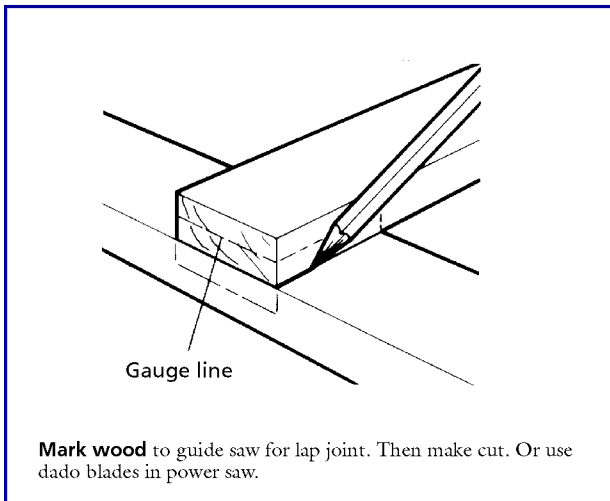
Cross lap has dado-like cuts across face of wood. Cuts are half thickness of the wood.



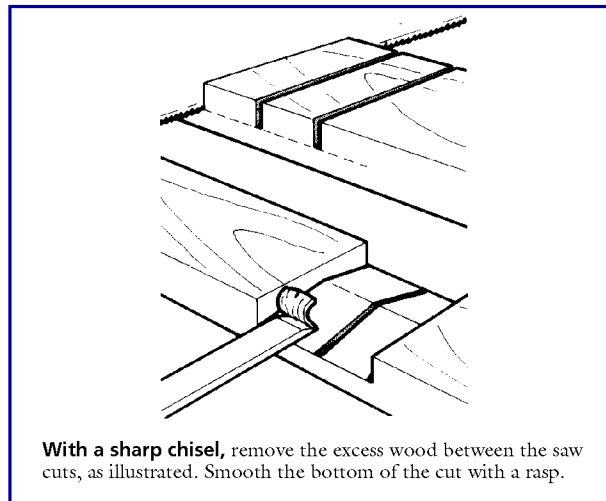
Middle lap goes across end of one piece of wood and through face of joining piece.



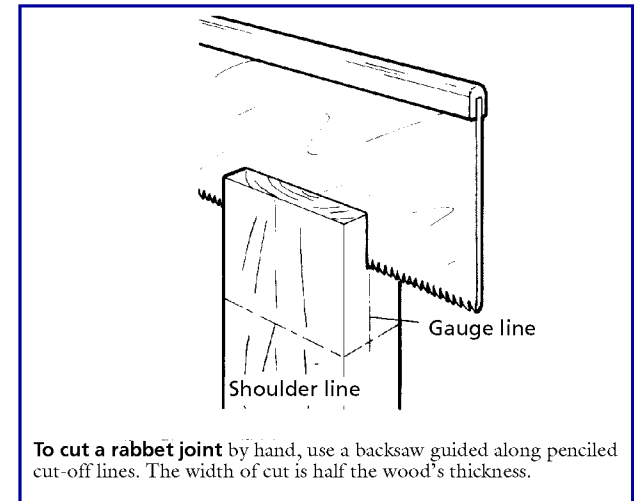
Dovetail lap is a fancy joint where appearance is important. Cut it by hand or power saw.



Mark wood to guide saw for lap joint. Then make cut. Or use dado blades in power saw.



With a sharp chisel, remove the excess wood between the saw cuts, as illustrated. Smooth the bottom of the cut with a rasp.



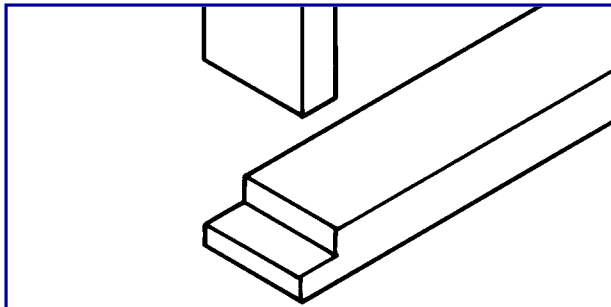
To cut a rabbet joint by hand, use a backsaw guided along penciled cut-off lines. The width of cut is half the wood's thickness.

- 1 Making the first cut.** Measure in from the end of each board by the width of the board to find and mark the overlap dimension. Draw the line across both. Set the boards next to each other and set the saw so that it will cut across both lines at half the depth of both pieces. Make the cuts.
- 2 The second cut.** Set the fence half the board thickness from the blade. Set the depth of cut the same as the width of the board. Stand one board on end and, using a push stick, push it through the saw. Repeat on the end of the second board.

- 3 Finishing the joint.** One board may overlap the other in the fit. If so, use a plane or abrasive to shave off the excess. The joint is fastened with screws or nails, and usually glue.
- Making a Middle Lap with a Handsaw.** By hand, this cut is more difficult, but it can be done.

- 1 Mark the pieces.** Mark gauge lines on both pieces for depth of cut. Make sure the pieces are square, then carefully mark the width of the cross piece on the receiving piece.

- 2 The first cut.** Clamp the receiving piece and make cuts at either end of the wood to be removed and one in the middle. Work within the inner edges of the gauge marks. Chisel away waste wood, working from either end toward the center.
- 3 Making the second cut.** Clamp the cross piece and cut along the gauge line just to the mark indicating the required depth. Then cut across the shoulder line and remove the waste wood. Finish the joint as detailed previously.



Only one piece of wood is cut to make a rabet joint. The joining piece must be cut square so it fits the joint, as shown. Rabet can be cut with dado blades on a power saw or by hand with a backsaw. Fasten this joint with glue and/or brads. Countersink nails.

RABET JOINTS

These joints are frequently used to assemble corners in drawers, bookcases, cabinets, and similar jobs.

The joint is formed by cutting a recess (rabet) in the end of one piece to accommodate the second piece to be joined (see illustration above).

- 1 **The first cut.** Draw an outline of the piece to be cut out onto the end of the wood. Set the blade at the depth required (half the thickness of the wood is standard) and run the wood through the saw.
- 2 **The second cut.** Turn the wood on its side. Then set the saw to the intended width. Then make the cut. Sand the cut; joint with adhesive/brads.

DADO JOINTS

Dadoes are channels cut across the grain of a board into which a second piece of wood is fitted. The most common dado is shown above, right. Variations include a stopped or grain dado, a stopped housed dado, and a dovetail dado.

- 1 With a power saw, use dado blades to the width of the dado cut. Depth should be about 1/2 the thickness of the wood—more or less.

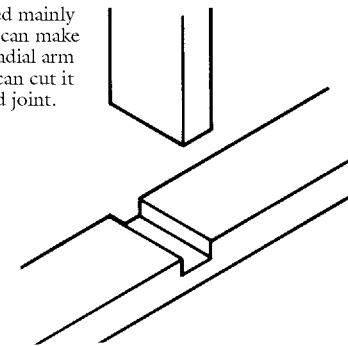
- 2 With a handsaw, mark the lines for the dado cut on the board. Saw to the depth of cut along both lines. Then clean out the excess wood with a chisel and smooth the bottom of the cut with abrasive. Join with adhesive, brads or other mechanical devices.

DOWEL JOINTS

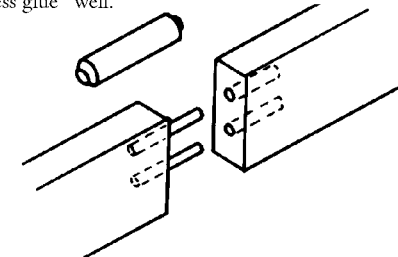
These are butt joints reinforced by dowels; the joint is a very strong one. Holes for dowels must be perfectly aligned and you can do this with a doweling jig. Also, the edges of the boards to be joined must be square.

- 1 **Alignment.** Clamp the boards together. Use a pencil and combination square to draw a straight line across both pieces at the point where they will be doweled. Remove the clamp.
- 2 **Align the jig.** Put the doweling jig on the first piece, clamping the jig in place after sighting the penciled line. Markings on the jig will help alignment.
- 3 **Drilling the holes.** Insert a drill bit into the drill guide on the jig and drill a hole that is slightly deeper than half the length of the dowel pin. Repeat on the other piece of wood. Most joints have 3 dowels.
- 4 **Insert the dowels.** Coat each dowel pin with glue and insert the dowels into the holes in one of the pieces. Then fit the other piece over the projecting dowels and tap the boards together with a rubber hammer. You may want to coat the edges of the joint with adhesive for a still stronger joint. Wipe off excess adhesive; sand; finish.

Housed dado joint is used mainly in shelf construction. You can make this cut with a table saw, radial arm saw, or a router. You also can cut it by hand similar to a lapped joint.



Dowels make a butt joint super strong. You must use a stationary drill press or inexpensive doweling jig for this job. You can buy dowel rod to make dowels. Bevel ends of dowels, notch surface of them to accept adhesive better. End-to-end doweling is called a "splice." About half of the dowel is inserted in each end of the board, but leave room at the bottom of the holes you drilled for excess glue "well."



Edges of boards must be perfectly square for perfect dowel joints. Insert dowels in one board. Then fit adjoining board to dowels and tap both together after applying glue to edges.

