

Installing Crown Molding

Upside down and backwards is the secret

by Tom Law



The first piece of molding (*left*) is cut square and run into the corner. The second piece (*right*) is cut to the shape of the molding's profile (*coped*) and will butt neatly into the face of the other piece. The paper-thin point on the bottom of the coped piece will make the finished joint look like a miter.

The old-time carpenters I learned from used to amuse themselves by quizzing young apprentices about the trade. If you could answer the easy questions, the last question would always be: "How do you cut crown molding?" And when you looked puzzled, they'd go off, chuckling to themselves something about "upside down and backwards." Of all the different moldings, crown molding is the most difficult to install, largely because of how confusing it can be to cope an inside-corner joint.

In classical architecture, crown molding (sometimes called cornice molding) is the uppermost element in the cornice, literally crowning the frieze and architrave. These moldings were functional parts of the building exterior when the ancient Greeks used them, but they have been used for centuries on interiors purely as decoration.

Crown molding is installed at the intersection of the wall and ceiling. Originally crown molding was triangular in cross section—the portions abutting the wall and ceiling formed two sides of a right triangle, and the molded face was the hypotenuse. But only the molded

face is visible, so much of the solid back has been eliminated to save material. Also, by eliminating part of the back, only two small portions of the molding bear on the wall and ceiling surfaces, which makes crown easier to fit to walls and ceilings that aren't straight or that don't form perfect right angles.

The crown tools—When I cut crown, I like to work right in the room where the molding will go so I can orient myself to the wall I'm working on. If a room is finished, however, I may have to do the cutting somewhere else. Then I have to imagine the molding in place when I'm positioning it in the miter box (and believe me, this can get tricky with crown molding).

I cut and install crown molding with hand tools. I use a wood miter box (top left photo, p. 66) because it's the kind I learned on, but also because my view is not obstructed by the electric motor of a power miter box. Installing crown molding is slow and calls for careful work, so the production speed of an electric miter box is not required. I cut miters with a standard 26-in. handsaw (10 or 11 point). Miter

cuts are made through the face of the molding, and a sharp handsaw will do a better job than a dull circular-saw blade will do.

For this kind of work, I prefer a workbench to a sawhorse. Mine is just a simple frame of 2x4s and 1x4s with a 2x12 top. It stands 34 in. high, which is a more convenient height to work on than a sawhorse provides. You don't need to deliver a lot of power to cut trim. A broad bench top is also convenient for holding tools.

Although you can still find deep-throated coping saws in the mail-order catalogs, most coping saws nowadays are 5 in. deep and have a 6-in. blade. The blades come with different numbers of teeth. I try each kind of blade to see which works best with the wood I'm cutting. Generally, finer teeth work best with hardwood and coarse teeth with soft wood, but not always. For the job shown here, I used a fine-tooth blade to cut soft wood. It works more slowly, but makes a smooth cut.

The blade of a coping saw can be inserted with the teeth directed toward you to cut on the pull stroke, or away from you to cut on the push stroke. Although it's strictly a matter of

personal preference, I orient mine to cut on the push stroke because it acts in the same manner as a handsaw.

Measuring and marking—Crown molding can be used by itself or combined with other moldings, but it should always be in proportion to the size and height of the room in which it's installed. Too much molding at the ceiling line tends to lower the ceiling visually. Three or four inches of molding at the ceiling line is about right for an average-size room.

In the rooms shown in this article, I used 3½-in. crown molding, which is the most common size available. This dimension is the total width of the molding, but it's not the critical dimension that you use when installing crown. You need to know the distance from the intersection of the wall and ceiling to the front of the molding, measured along the ceiling. Because the back part of the molding has been eliminated, you can't measure this directly. Instead, I put the molding inside a framing square to form a triangle and read the distance (top drawing, right). The molding shown here measures 2½ in. I mark that distance on the ceiling at each corner of the room and in several places along the walls. These marks will serve as a guide when I install the molding.

It's frustrating to drive a nail through a piece of molding and not hit anything more solid than drywall, so I locate the framing members ahead of time—when I can still make probe holes in the wall that will be hidden by the molding. If the room hasn't been painted, you can spot the studs and ceiling joists from the lines of joint compound and make pencil marks on the wall to guide the nailing. If the room has been painted, you can find the studs and joists by tapping with a hammer and testing with a nail. Electrical outlets and switches are nailed into the sides of studs and offer a clue to stud locations.

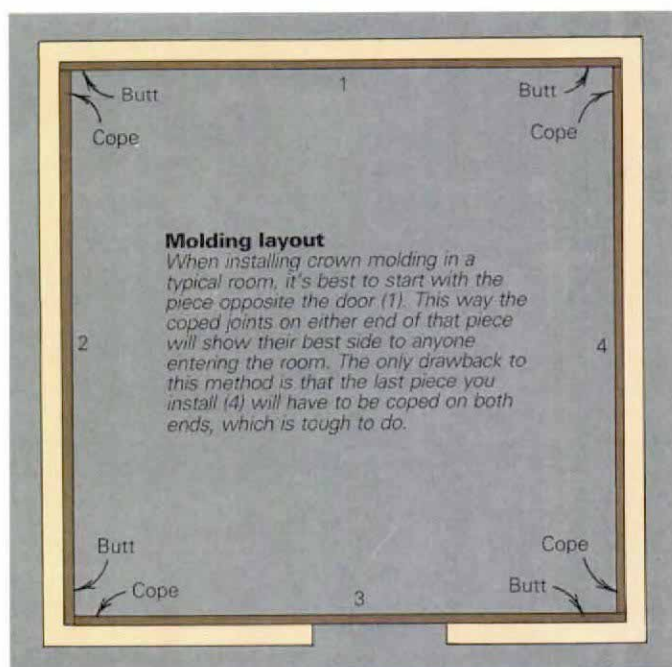
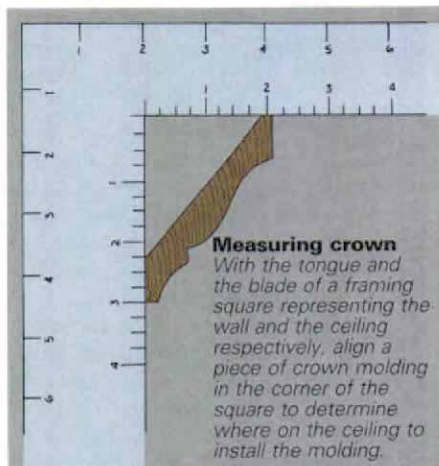
Running crown molding should be one of the final jobs on a new house. Walls and molding should be primed and first-coated, the molding installed and then finish coats applied. If you're retrofitting crown molding, it should be prefinished entirely so that all you need to do is touch up the paint or stain after installation.

On this job the walls were painted and the molding was prestained, so I marked the stud locations right on the crown molding. Rather than use a pencil to mark the wood, I made a slight hole with the point of a nail, which was easier to find in the dark stain and which I later nailed through.

Getting started—When I run crown molding in a typical room—four walls, no outside corners—I usually start with the

wall opposite the door (bottom drawing). Unless it's perfect, a coped joint looks better from one side (looking toward the piece that was butted) than it does from the other (looking toward the piece that was coped). By first installing the crown molding on the wall opposite the door, and coping the molding into it on both ends, the two most visible joints show their best side to anyone entering the room.

I put the first piece up full length with square cuts on both ends. I cut it for a close fit, but if it's a little short I don't worry. Any small gap will be covered by the coped end of the intersecting piece. I hold the molding in place, lining up the top edge on the 2½-in. mark, and nail it. I use the shortest finish nails that will reach the framing, usually 6d or 8d. I nail into the wall studs through the flat section of the molding near the bottom, and I nail into the ceiling joists or blocking through the end of the curve near the top. I don't nail too close to the ends when I first put the piece up. I leave them loose to allow for a little alignment with the intersecting piece.



Occasionally I need to pull the top edge of the crown tight against the ceiling, but there's no ceiling joist or blocking to nail into. When that happens, I use 16d finish nails to reach all the way to the double top plate on the wall. Or sometimes I put a little glue on the molding and drive a pair of 6d finish nails at converging angles into the drywall about ½ in. apart (drawing next page). This pins the molding to the drywall while the glue dries. Another trick for nailing up crown when you don't have adequate framing is to nail up triangular blocks as shown in the drawing on p. 67.

I usually work around the room from right to left because I'm right-handed, and making coped joints on the right is a little easier than on the left. The second piece of crown to go up needs to be coped on the right and square cut on the left.

Coping with crown—Finish carpentry can be harder at times than cabinet work because you often have to make perfect joints against imperfect surfaces. Coping inside joints rather than mitering them is one way to deal with that problem. If you miter the inside corner with crown molding, the joint will often open up when you nail the pieces because the wall gives a little. A coped joint on crown molding won't open up and will be tight even when the walls are not exactly 90° to each other.

A coped joint is like a butt joint, with one piece cut to fit the profile of the other (photo facing page). The first piece of molding is cut square and run into the corner. The second, or coped piece is made by cutting a compound miter on the end to expose the profile of the molding, then sawing away the back part of the stock with a coping saw, leaving only the profile. The end of the coped piece will then butt neatly into the face of the first piece.

Because I don't always get the cope right the first time, I start with a piece of molding longer than I need and cope the end before cutting it to length. The phrase "upside down and backwards" refers to the position of the crown molding in the miter box when you're coping it (photo next page, top left). Crown molding isn't laid flat against the side or bottom of the miter box; it's propped at an angle between the two, just as it will be when installed. But the edge that will go against the ceiling is placed on the bottom of the miter box and is therefore "upside down." The right-hand side (if that's the coped end) is placed on the left and is "backwards."

The crown has to be positioned so that the narrow flat sections on the back of the molding, which will bear against the wall and ceiling, are square against the side and bottom of the miter box. When they are, the bottom should measure out the



Before the crown molding can be coped, the end must be mitered to expose the profile. Positioned "upside down and backwards" in the miter box, the molding rests against small nails that hold it at the proper angle (top left). After exposing the profile of the crown molding, the back part of the stock is cut away with a coping saw, which must be held at a severe angle or the coped joint will not be tight (left). Even with the coping saw cutting at a severe angle, it's tough to remove enough wood through the S-curve in crown molding. Additional stock often has to be pared away with a utility knife (above).

required $2\frac{1}{8}$ in. Once I find this position, I usually draw a pencil line on the bottom of the miter box to help me position subsequent pieces. Sometimes I'll even put a few nails on the line or glue a strip of wood to it.

Even with the molding positioned correctly in the miter box, it's still easy to cut it wrong. When I make the 45° cut to expose the profile of the molding for the cope, I remind myself that I want to cut the piece so the end grain will be visible to me as I look at it in the miter box (photo top left).

Coped joints are always undercut slightly, but crown molding has to be heavily undercut through the S-curve portion of the crown (called the *cyma recta*) or it will not fit right. I start the cope at the top of the molding using light, controlled push strokes. If I'm having trouble going from the straight cut to the curve, I back the saw out and come in at a different angle to cut away the waste. I begin the curved line with a heavy undercut and hold this angle all way through. I cut as close to the profile line as I can (photo above left).

The bottom of the crown molding is made up of a horizontal flat section, a cove and a vertical flat section. I cut down to the upper flat and then take the saw out and start cutting from the bottom. Some carpenters simply square off the bottom, but I try to leave the little triangular piece intact (photo p. 64). I support it with my thumb as I'm coping and slice it paper thin. This little piece makes the coped joint look like a miter and helps close any small gap if the first piece didn't fit tightly to the wall.

I always test the cope against a scrap piece of molding to make sure I'm in the ballpark before actually trying it in place. Despite my best efforts to undercut the curved section, I usually have to pare away some more wood with my utility knife (photo top right).

I cut the piece just a little long and test it in place before cutting it to final length. If the fit of the coped joint is close, but still a little off, I can sometimes improve the fit by twisting both pieces either up or down the wall at this point—the $2\frac{1}{8}$ -in. mark on the ceiling isn't sacred. The buildup of spackle or plaster in corners can distort the intersection of wall and ceiling. Some carpenters carry a small half-round file with them to fine tune the fit of the cope.

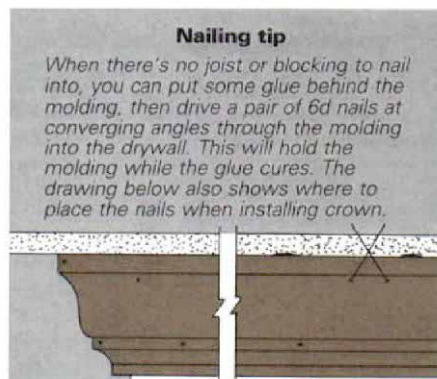
Around the room—Once the coped joint fits, it's time to cut the piece to length. You can measure the total distance from wall to

wall, but I find it easier to measure from either of the two vertical flat sections on the molding that the coped piece will butt into. If I'm working alone, I either step off the measurement with a measuring stick (a 12-ft. ripping, for instance), or I'll drive a nail into the wall (above the line of the crown molding) and hook the end of my tape measure over it. Wherever I measure from on the wall, I'm careful to measure to the same place on the piece I'm cutting.

When the coped piece is cut to length, I nail it up just like the first piece, leaving the square-cut end unnailed for the time being. If I need to draw the coped joint tighter, I nail through the coped piece into the piece it abuts.

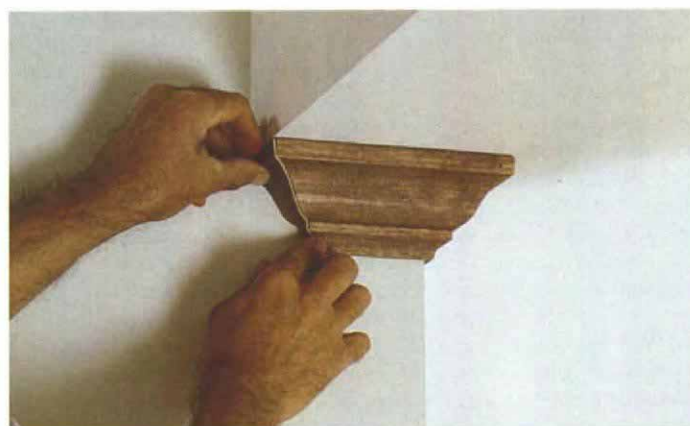
The third piece of crown molding goes up just like the second, but the fourth one needs to be coped on both ends (bottom drawing previous page), assuming the wall is short enough to be covered with a single piece of molding. I cut this piece about $\frac{1}{8}$ in. longer than the actual measurement, bow out the middle, fit the ends and snap it into place. The extra length helps to close the joints.

Some carpenters don't like having to cope the last piece on both ends because there's very little margin for error. The way to avoid this goes all the way back to the first piece of crown molding that's installed. Rather than put up the first piece with square cuts on both ends, you can temporarily nail up a short piece of crown molding and cope the first piece into it (photo left, facing page). Then take down the short piece, work on around the room and slip the butt end of the





If you install the first piece of crown molding in a room by cutting both ends square, the last piece will have to be coped on both ends. To avoid this, you can put up a short piece temporarily and cope the first piece of crown molding into it (above). If an outside miter is open just slightly, sometimes you can close it by burnishing the corner with a nail set (top right). When a line of crown molding has to be neatly terminated on an open wall, the end should be mitered and "returned" into the wall with a small piece of molding. To avoid splitting such a delicate piece, it's best simply to glue it in place (right).



last piece behind the first cope that you made. This way all four pieces of crown molding in the room will have one square-cut end and one coped end.

When I go into a room that's not a simple rectangle, the decision about where to start is influenced by where I'll end. If there is an outside corner in the room, I like to end by installing the shortest piece that has an outside miter. That way, there's less wood wasted if I cut it too short. If there's not an outside corner, I like to work so that the last piece is installed on the longest wall that can still be done with a single length of molding.

When I need more than one piece to reach from corner to corner, I cut the moldings square and simply butt them together rather than use scarf joints or bevel joints. Butt joints are easier to make for one thing. And for another, although wood isn't supposed to shrink in length, the truth is it does. Over the years, I've seen a lot of joints that have opened up, and of those, the butt joints looked better than the others.

Outside corners—These are also mitered with the molding upside down and backwards in the miter box, but the saw is angled to bevel the piece in the opposite direction. When you miter for a cope, you expose the molding's end grain, but with a mitered outside corner, the end grain is *behind* the finished edge. Sometimes I cut them at an angle slightly greater than 45° to ensure that the outside edges mate perfectly. I usually add a little white glue, then nail through the miter, top and bottom, from both sides.

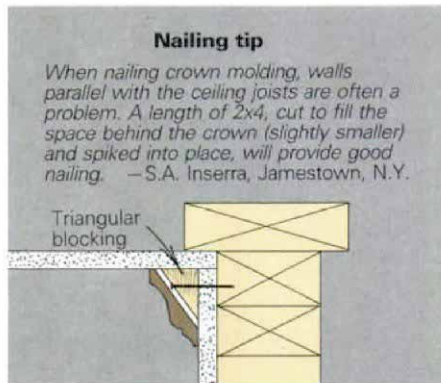
Sometimes outside corners will close tightly but the leading edge of one piece overhangs the other, perhaps because the corner is not exactly 90° or because one piece of molding is thicker than the other (more about that in a minute). If the molding hasn't been painted or stained, I'll trim the overhanging edge with a sharp chisel and sand it. This actually leaves a narrow line of end grain exposed at the outside corner, but once the molding is stained or painted, the end grain isn't very obtrusive. There are times when the molding has the finish coat already on it, and I can't do this because it would expose raw wood. In that case, I use my nail set to burnish the projection smooth (photo top right).

On this house, I ran crown molding in the foyer and had to terminate the molding at the stairwell opening. I ran the molding through the dining room, turned the corner at the

stair and ended the molding with a return—a mitered piece that caps the end of the molding. To make a return, I simply cut a miter for an outside corner on the end of a scrap of molding, then lay the piece face down on the bottom of the miter box and cut off the end. I glue this in place with white glue so as not to take a chance on splitting it by using a nail or brad (photo above).

What can go wrong?—Whether because the wood was wet when it was milled, or because the knives were dull, or because of internal stresses in the wood, the exact dimension and profile of the pieces in a given bundle of stock molding varies considerably. The differences aren't obvious until you try to fit an inside or an outside corner with two pieces that don't match. It's best to make joints from the same piece whenever possible.

There are times when the wall or ceiling is so crooked that gaps are left along the length of the crown. If there is a short hump that causes gaps on each side, I scribe the molding and plane it for a better fit. If the gaps aren't too bad, it may be best to fill them with caulk. Another trick I've used is that of leaving a small space (usually about ¼ in.) between the top of the molding and the ceiling, which makes it harder for the eye to pick up irregularities. If I'm doing this, I put up blocks to nail to, as shown in the drawing at left, and use a ¼-in. spacer block to ensure a uniform reveal. □



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