

# Two Sticks

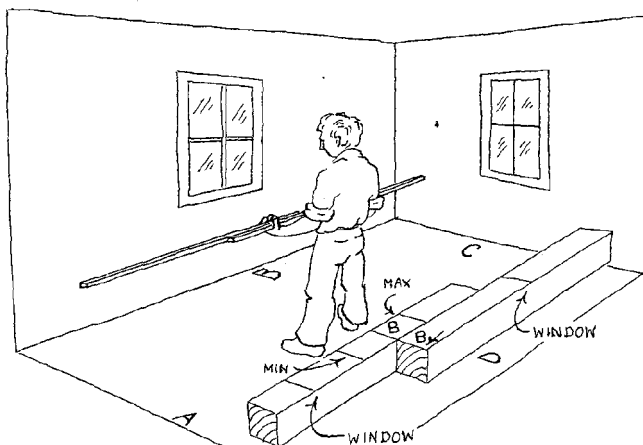
Ancient method simplifies layout of big jobs

by Hank Gilpin

The stick method of measuring and drawing is by no means new. I'm certain it predates all other methods used in designing furniture, since the availability of large pieces of paper is a relatively recent luxury. Prior to the introduction of S-curves in the late 17th century and the multiple-angle joinery of the Chippendale period, most furniture was joined very simply and readily adaptable to stick layout. The introduction of complex joinery and curved forms in furniture has not diminished this method's usefulness because even today most wooden objects are based on rectangles and squares. Contemporary English cabinetmakers use this method for nearly all construction except chairs, which are difficult to lay out on a stick. However, the simple Carver chairs of colonial America and the delicate chairs turned by the Shakers are obvious results of the stick method. In reproduction work the stick is very handy. If you are asked to duplicate a Sheraton bow-front chest, all you have to do is hold a stick to the front and scribe all the elements of the chest onto the sticks. Then you need only a full-scale drawing of the front curve.

I was introduced to the stick method by Tage Frid during the construction of a library circulation desk that measured 15 ft. by 18 ft. Frid grabbed the scale floor plan we'd drawn up, took a few measurements and covered two sticks with mysterious pencil lines. He made a cutting list, somehow related to those marks on the stick, attacked a 24-sheet pile of plywood, cutting, grooving and tonguing and in less time than it would have taken to execute a full-scale drawing (I'd still be hunting for an 18-ft. table) all the parts for the desk were cut to size,

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tongued and grooved, and ready to be glued together.

None of this really sank in until I had my own shop and was faced with my first big job. But, once I had adapted to the sticks as a substitute for full-scale drawings and devised my own method of marking, I wondered how I ever worked without them. Every element of a job can be drawn on just two sticks: doors, drawers, carcasses and frames, drawer sides, bottoms, pulls, hinges, edge-banding and shelves.

In this article I'll use a kitchen to illustrate the stick method of layout, but everything I'm going to discuss can be applied to any large job that is to be constructed in your shop and installed elsewhere. I'm focusing on a kitchen because it is a job you are likely to obtain; everybody needs one. Undoubtedly this will be a larger job than you've ever done, possibly including fifty feet of cabinets. No problem. If proper attention is paid to measuring, layout and some standardization, things will progress with staggering swiftness.

The first step is careful measurement of the room with sticks, two pieces of wood 3/4 in. square (it's a handy size), each at least 18 in. longer than half the largest dimension of the room. In an 8-ft. by 12-ft. room with an 8-ft. ceiling, two sticks each 7-1/2 ft. long will suffice for all necessary measuring, with a face of the pair of sticks used per wall. For large or complicated rooms I use two sets of sticks, one for the horizontals and one for the verticals.

Assuming walls B and D are to receive cabinets we'll proceed to measure, or "stick off," the room. Facing B, hold the sticks horizontally at chest height and push them apart until they meet walls A and C. Mark the two sticks appropriately and check for variations at floor and ceiling level, noting any differences on the sticks. This noting of variations in length

*Gilpin sticks off room, noting window position. Stick marks (left) establish scribing allowances for fitting cabinets.*



will prepare you to make the necessary allowances for scribing the cabinets upon installation.

If there is a constant, such as the window in wall B, the sticks must be marked to indicate its extreme dimensions, including moldings. Use a straightedge to carry the window lines to the floor and ceiling and again check for variations in the length of wall B. Any other permanent elements in the room should also be marked on the sticks. This might include radiators, electrical outlets, pipes, doors, ducts, etc. This process, if carefully done, gives you an exact, full-scale horizontal cross section of wall B.

To obtain a vertical cross section follow the same basic procedure, but use one of the unmarked faces on the sticks or two new sticks and push them from floor to ceiling, once again marking windows and such. Check and mark variations in height by moving the sticks all along the wall. If the floor has a truly dramatic pitch, not unusual in older buildings, I like to set a level line on the wall 36 inches above the highest point in the floor's rock and roll. With this line acting as an imaginary counter top, and thus a necessary constant, I set my sticks accordingly. This is important for fitting the cabinets around appliances such as stoves and dishwashers, which require a specific counter height.

The process of sticking off should be repeated on all the walls and in any other areas, such as the middle of a large room, that are to receive cabinets. After measuring the whole room and returning to the shop I transfer all the information to clean sticks cut to length, and often to a new stick for each marked face of the old ones. Since a 16-foot stick isn't easy to come by, I use short lengths overlapped and nailed together.

Now you must design the kitchen around the available dimensions. It is at this point that you discuss entrances and approaches: cabinet styles, paint, light, heat, type of wood, sinks, tiles, floors, everything, but most importantly, appliances. A real nuisance these refrigerators, stoves, ovens and dishwashers, but these are the fixed elements in the evolving picture. So they are where you start. It is imperative that you have all the dimensions of each and every appliance your customer desires and that once a decision has been reached you state firmly but diplomatically that no changes can be allowed without increase in cost. When considering all the other aspects of the room, remember that the final appearance of your work, which will dominate the room and thus be most open for criticism, depends to a great extent on forethought and coordination of details. This usually means working with

a number of subcontractors who may not be as concerned with esthetics as you are.

Once all of this preliminary discussion is completed you have to sit down and design the job. Referring to the sticks for overall dimensions, make a rough floor plan that includes all the appliances and various cabinet, drawer and counter combinations. Be careful to consider function with the esthetics.

It is helpful to make this floor plan to some scale, and 3/4 in. to the foot is easy to read and not overly cumbersome. Many cabinetmakers draw scale elevations to accompany the floor plan, but I find most customers just cannot project two-dimensional elevations into a vivid picture of the finished project. I've scrapped the elevations and instead present perspective sketches incorporating as much detail as possible. These sketches, along with the floor plan and a wood sample, give the customer a fairly good picture of what to expect. After you've done a few jobs it is always possible to take prospective customers to see a finished product, the best way of solving the problem of explaining ideas.

I know all this talk of appliances and plumbers seems contrary to the discussion of woodworking but I've learned that the preliminary planning, though time-consuming and a bore, is absolutely essential to a quick, trouble-free job.

Here is one of the basic structural approaches I use when building a kitchen. This is only *one* way of doing the job, and not *the* way.

I use 3/4-in. veneer-core plywood for all carcasses, usually birch for interiors and hardwood-veneered plywood for all visible exterior surfaces. It's wise to check the thickness of the plywood stock you buy as it often comes through a bit under 3/4 in. and this discrepancy might cause joinery problems. The carcasses are joined by tongue and groove in two basic forms, each with a 1/4-in. tongue. One uses the standard centered tongue and the second uses an offset tongue. The offset joint is simply a way to add a small amount of strength to what is obviously a less than convincing corner joint. By setting the tongue to within 1/16 in. of the inside you gain enough strength in the vertical member to prevent the short grain from popping while gluing. Always leave a shoulder, no matter how small, as it adds a bit of strength and helps keep things square.

These joints can be cut in a number of ways, but I find it quickest and easiest to run the groove on the table saw with dado blades and the tongue on a shaper with two pattern bits coupled by a spacer made of long-grain wood that has been



*This kitchen includes stove island, counters and wall cabinets. Complete layout was done on two sticks.*



fitted to the groove. A new wood spacer should be made whenever you sharpen your blades because the kerf gets smaller each time. I generally find it a good practice to cut the groove first and fit the tongue to it. I also cut the groove about 1/64 in. deeper than the tongue, to allow for glue build-up and any slight inconsistencies in the cutting.

I make the carcasses without backs, and the tops need not be solid pieces of plywood—a strip 4 in. or 6 in. wide at the front and back is enough to fasten the counter top to. I make my own counter tops of solid wood, usually 1-1/4 in. or 1-1/2 in. thick, with corners and edges carefully detailed. Sometimes I use floor tiles on the surface. After the carcasses are glued up I face each with a solid wood frame that has been mortised and tenoned together. Remembering that any given edge of veneer-core plywood is at least 40% long grain, it becomes obvious that nothing more than glue and clamps is necessary to fasten the frame to the carcase.

This frame adds the strength that was so menacingly deficient in the tongue-and-groove carcase.

In any case, the weakness of the carcasses will become inconsequential once they are screwed to the wall or floor at installation, even if the solid frame is omitted. To do this, I usually glue the edge of a 3/4-in. thick by 1-1/4-in. wide strip to the underside of the top of the carcase, at the back. I mark the location of this strip on the wall and drive nails until I hit a stud, then hold the cabinet in place and drill through for a No. 12 screw. I had a football player chin himself from an upper wall cabinet that was supported by screws into two studs; it held.

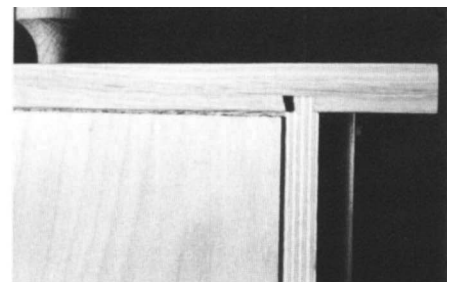
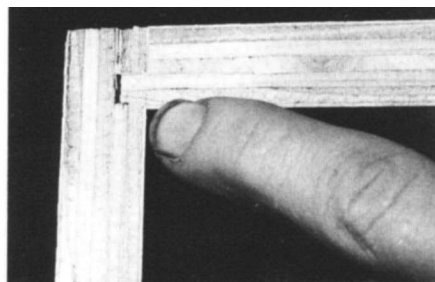
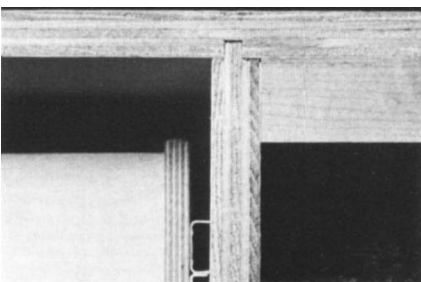
Remember that the frame is the element of the cabinet left oversize to allow for scribing as the carcase cannot be cut to match irregularities in the walls. Minor irregularities at floor level can be adjusted by scribing the lower cabinet kickboard supports before fitting the kickboard itself. Occasionally an

independent base must be fitted to a room that is really out of kilter, but this does not occur very often.

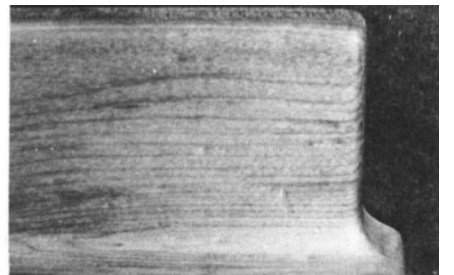
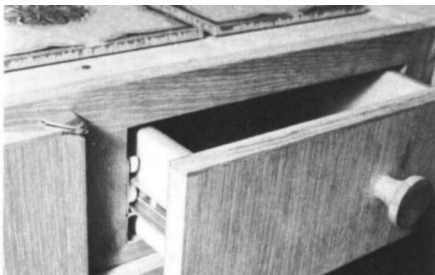
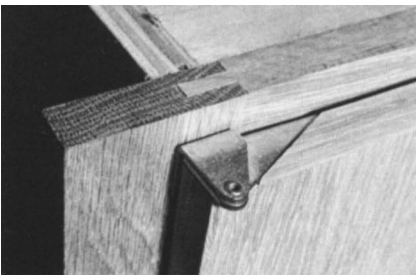
Our main concern now is transferring this information to the sticks, concentrating on the carcasses, the frames, and the spaces necessary for fitting appliances. (Doors and drawers should also be laid out, but style preferences complicate matters and we'll ignore them at this point.) The depth of cabinets is predetermined in most cases, 24 inches or so for floor cabinets and 12 inches plus for upper cabinets. These are only average sizes, not absolutes, and thus, not directly related to the stick layout. As in any full-scale working drawing, the main functions provided are location of all joinery and full-scale measurements for the cutting list.

I'll discuss only the sink cabinet, since it is typical and straightforward, but remember that everything applies to the entire job. After locating the space necessary for the dishwasher, leaving no more than 1/8 in. on each side for fitting, you begin by marking the extreme dimensions of the plywood carcase on the width stick, the one carrying the horizontal cross section of the long wall. The cabinet is to be 36 in. wide so draw two lines, A and A-1, 36 in. apart. Then measure in 3/4 in., or whatever is the actual thickness of the plywood, from each and draw the next two lines. These represent vertical plywood sections. Now mark the height stick. If the height of the cabinet is 34-1/2 in. (without the counter top), draw a line on the stick 34-1/2 in. from the floor mark. Then simply measure down the thickness of the plywood and draw the next line. This represents the carcase top. Assuming a 4-in. kickspace, your next mark should be 4 in. up from the floor level. Again, measure in the thickness of the plywood and draw a line to indicate the carcase bottom. If you have plywood drawer dividers or permanent shelves, they too are marked out at this point. These lines on both sticks represent the carcase elements and locate the joints. I should add that I find it very helpful to color-code the various markings. I use black pencil for plywood elements, red for frames and green for doors and drawers.

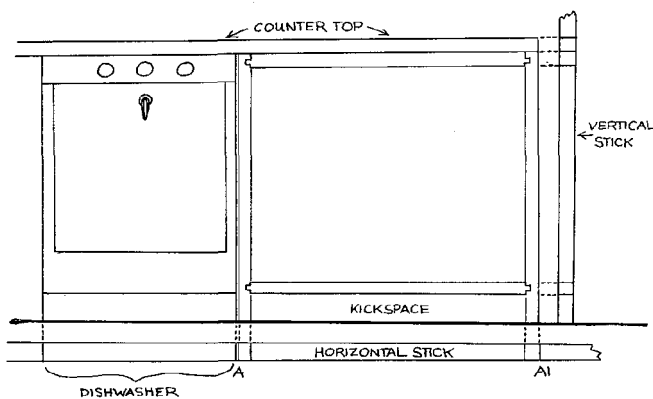
Once the carcase elements are laid out you turn to the



*Centered and offset tongues join carcase elements, and sliding dove tails fit the sides of this drawer to an overhanging front.*



*Cabinet at left has large allowance for scribing; it will be surfaced with ceramic tile. Splashboard, right, is carefully detailed.*

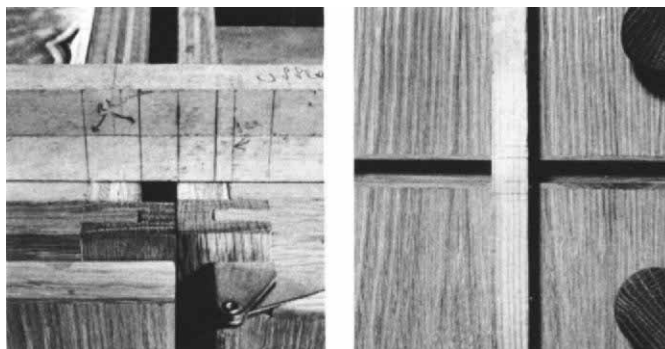


frames that face the carcass. If your design calls for 1-1/4-in. frames throughout, simply measure in 1-1/4 in. from the extreme dimensions on the carcass and, using the red pencil, mark the sticks appropriately. If you are allowing for scribing, this is the time to mark it on the sticks. If the wall to which you are fitting is 1/2 in. off square over the 3 feet needed for the cabinet, mark the frame 1/2 in. beyond the line indicating the outside of the carcass on the length stick and then measure 1-1/4 in. inward from the same line, thus ensuring finished symmetry.

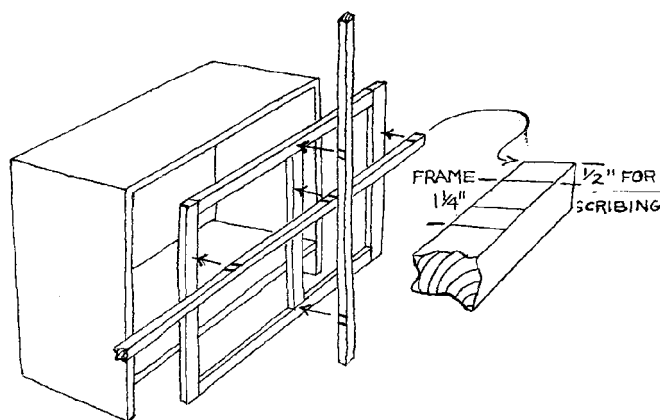
All vertical and horizontal stiles, integral parts of the frames necessary for the division of the doors and drawers, should also be drawn on the sticks. If you have decided to use lipped doors and drawers (3/8-in. square lip) they can be indicated on the sticks by simply measuring 3/8 in. out from the inside frame marks on both the length and height sticks. With face-mounted doors and drawers you must first determine the spacing that is desired between each and then mark each accordingly, remembering that these marks indicate finished sizes and might include edge-banding.

Now, with all the carcasses, frames, doors and drawers marked on the sticks, your next step is to compile cutting lists. One will include all the plywood elements (carcasses, shelves, and probably door and drawer fronts). The other will include all the frames. I always follow the same procedure to compile the cutting lists. On the plywood list I include a cabinet designation, what each piece is, the number of said pieces, type of wood and size. I indicate the pieces to be tongued and those to receive edge-banding.

You know the depth of the cabinets, so all the carcass pieces will be 23-7/8 in. deep (or 11-7/8 in. in the case of upper wall cabinets) and because all the floor cabinets stand 34-1/2 in., the vertical elements will be listed as such. In general, horizontal pieces have tongues, and verticals have grooves. The first pieces you must measure are the carcass top and bottom. Measure between the plywood marks on the length stick and add 1/4 in. for each tongue, noting same when you add the dimensions to the list. Example: If you have 37-1/2 in. between the plywood marks with two tongues, add 1/2 in., giving you a piece 38 in. long. This may seem academic but it is not often that the pieces will measure exactly 38 inches. You will more often have to fit the cabinet into a space 37-11/16 in. wide and careful measuring becomes imperative, lest you assume too much. Door sizes are simply measured and noted, although you must remember to



*Sink cabinet, left, is marked out on horizontal and vertical sticks. Above, photo at left shows sticks atop finishing cabinet, with marks for plywood carcass and front framing; right, vertical stick locates drawer dividers and finished drawer fronts. Sticks and frames below include a 1/2-in. allowance for scribing to irregular wall.*



subtract the thickness of the edge-banding if it is an element of the design because the marks on the sticks indicate finished dimensions. I make cabinet doors of solid ply, but they could be frame-and-panel for a more traditional appearance.

The frame list is compiled in the same way. All vertical end pieces will be 30-1/2 in. because all the kickspaces are 4 inches, all the cabinets are 34-1/2 in. high, and the frame does not extend to the floor. All other elements are determined by measuring between the frame sections drawn on the sticks, be they vertical or horizontal components, and adding the length of the tenons. In this case all the tenons are 3/4 in. long and shouldered on four sides (strictly personal choice—two shoulders satisfy many builders). Here again I note those pieces which will receive tenons. It is imperative to measure carefully because a 1/4-in. variation might not show up until you try and fit the frame to the carcass. Also, try to use the same ruler throughout the entire job as it is not unusual to find a 1/8-in. difference between two seemingly identical 6-ft. rules.

Once the cutting lists are complete and you have gathered the necessary stock you actually get to do some woodworking. One point I feel is helpful and hopefully obvious: When cutting plywood and lumber to size always start with the larger pieces and work to the smallest. This means you'll be cutting parts for different cabinets at the same time, which can get confusing, especially if you consider that an average-size kitchen might have 100 or more plywood parts and nearly as many frame parts. So this is not the time for casual conversation and extended coffee breaks. A few hours of uninterrupted concentration will prevent large headaches later.