

Introduction to Cabinetmaking

Cabinetmaking Simplified

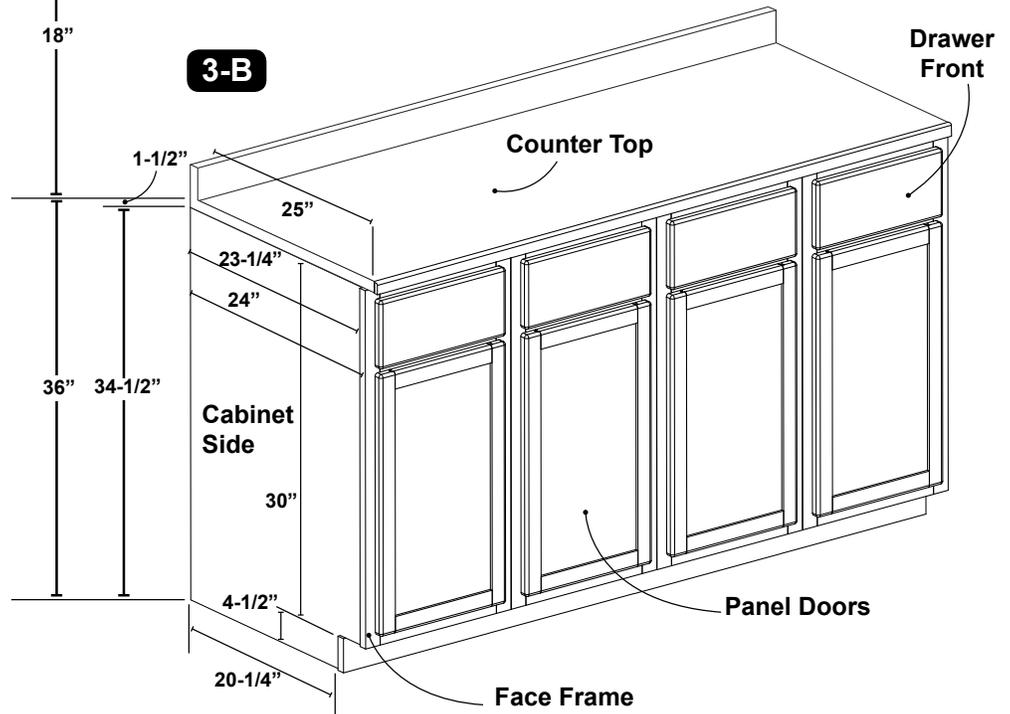
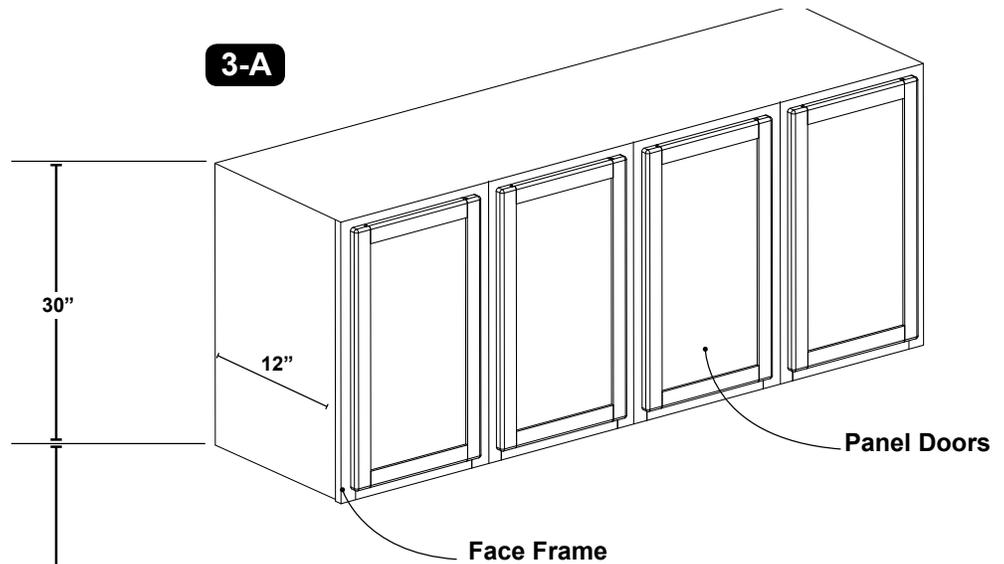
Every year professional and amateur woodworkers build thousands of cabinets. One of the biggest misconceptions about building cabinets is that you need a shop full of expensive machinery to achieve professional results. On the contrary, cabinets are actually quite simple constructions that with a few well-designed tools can be very easy to build.

Kreg Jigs®, invented in the late 1980's have changed the way many woodworkers choose to build.

This booklet is designed to act as a primer to get you started in cabinetmaking. Rather than offering a lot of theory we strive to teach you cabinetmaking by example.

The simple example that we chose to build in this booklet is a 15" wide base cabinet with one drawer and one door. This is a good place to start because it is full sized and yet small enough so one person can build the whole thing without any help. Once you build this cabinet and learn the system you will be able to build an entire kitchen. Using this system you will also be able to build professional looking bookcases, display cabinets, entertainment centers and just about any other type of cabinet that you would like.

WALL CABINETS

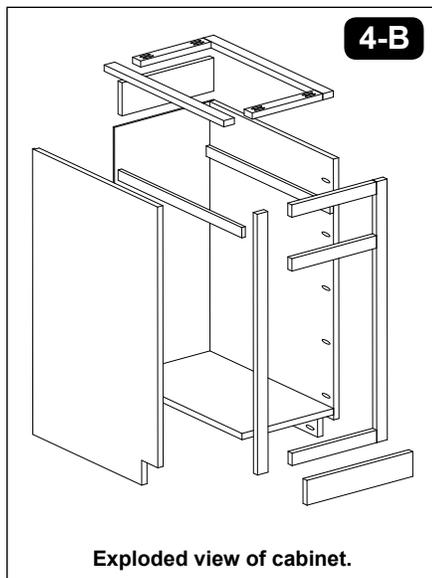
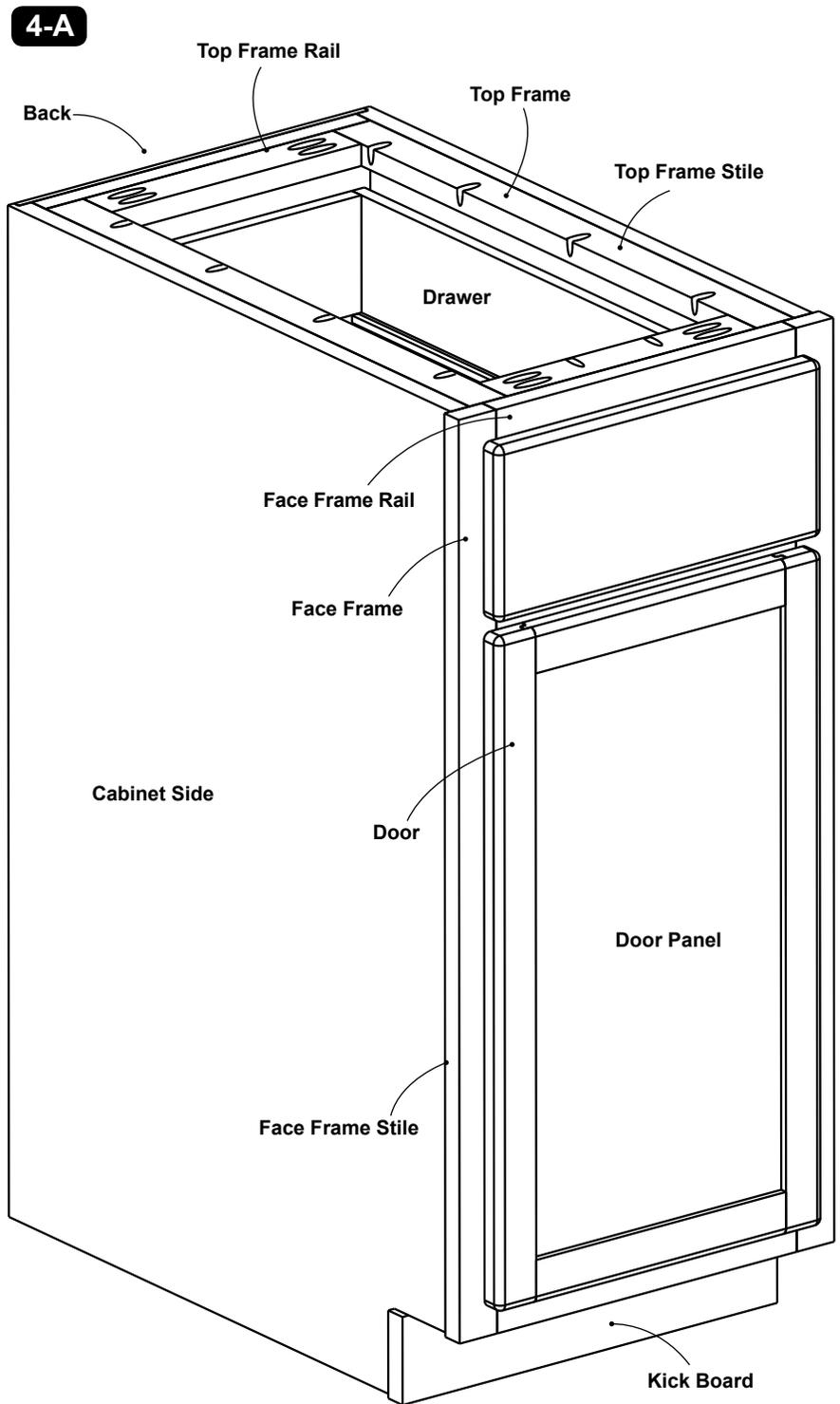


BASE CABINETS

Introduction to Cabinetmaking

Don't expect the first cabinet you build to be perfect. There will be some mistakes and that is to be expected. Try not to be too goal oriented or upset if you make a mistake. That is how you learn. We recommend that before you jump into building an entire kitchen, you should build at least two sample cabinets as you will learn quite a lot from each experience.

You can use your sample cabinets in your shop as a storage place, or a tool stand. The 15" wide sample cabinet detailed in this booklet is an excellent size for use as a stand for a drill press, grinder or sharpening station. Please read through the entire text and study the drawings before starting this project.



Face Frames Explained

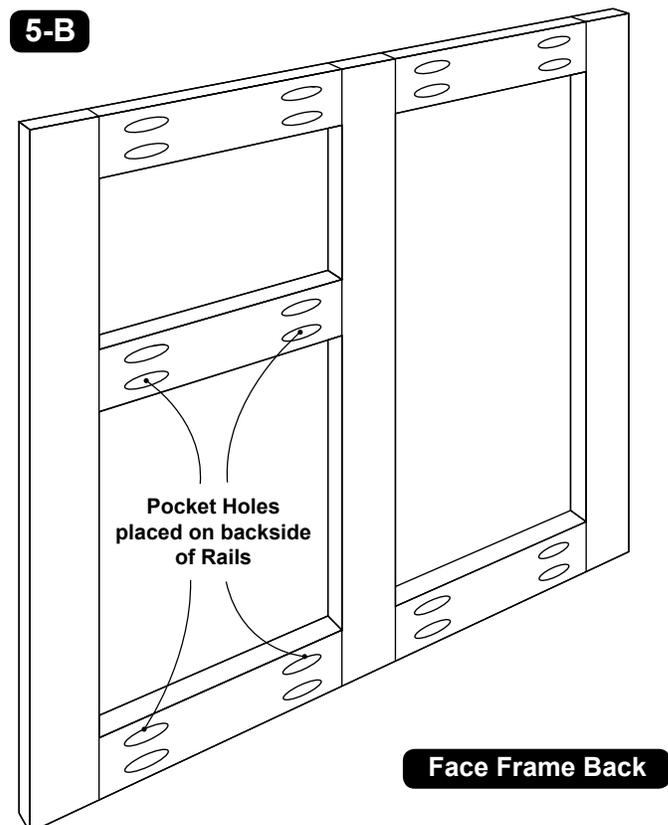
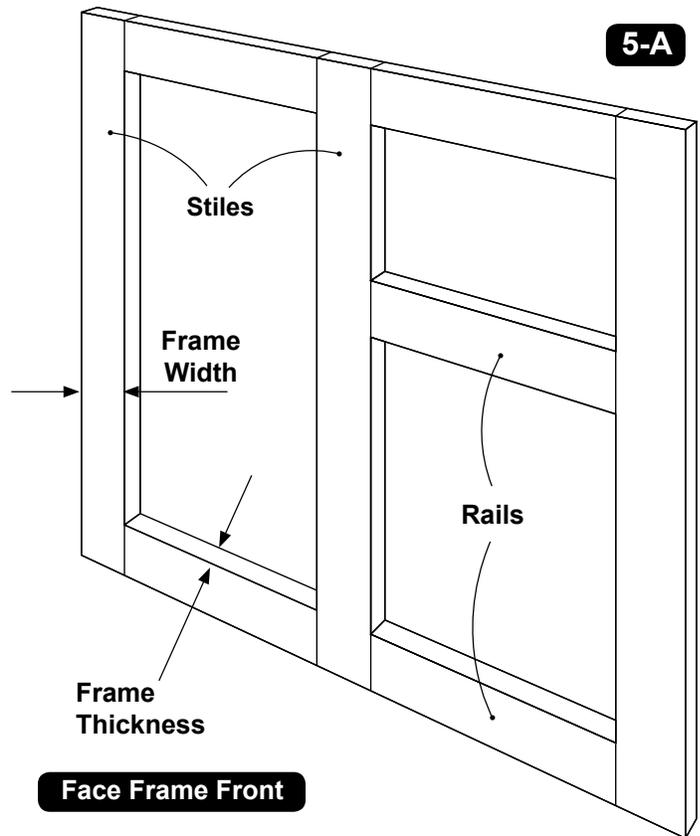
Introduction to Face Frames

Cabinet types are usually divided into two different construction methods: face frame and frameless. The 15" cabinet that we are making in this booklet is the face frame style which means that there is a frame on the front of the cabinet as shown in Fig. 4-A. Using a face frame is the traditional way of making cabinets and case furniture. The frameless cabinet styles are a more recent European development that is sometimes referred to as a Euro cabinet. Frameless cabinets, as the name suggests, don't have a face frame and require relatively expensive equipment to manufacture because there is little room for error. Face frame cabinets, like the one shown in this booklet, are easier for the small shop or the hobbyist to build. The cabinet is essentially a box with a face frame attached to the front of it. The face frame reinforces the box and helps to keep it square. The doors are then mounted to hang from the face frame. Because the face frame supports the box and keeps it square, the back of the cabinet can be made of thinner materials such as 1/4" plywood or another man-made material. The back provides little structural support compared to the face frame which is located on the front of the cabinet.

The face frame is designed to extend past the cabinet carcass 1/4" on each side so when the cabinets are attached to each other, there is a tight fit between the frames. The 1/4" of excess material on each side also allows the cabinet side to be scribed to the wall if it is not straight. The face frame also serves to cover the edge of the materials used to make the box. Single cabinets are often joined together at the face frame to make multiple cabinets as the one shown in Fig. 6-C. Another option is to make multiple cabinet compartments with one face frame.

Dimensions of the Face Frame

The face frame is the widest part of the cabinet. It is 1/2" (1/4" on each side) wider than the cabinet carcass. Because the width of the face frame determines the width of the cabinet, it should be the first measurement determined when designing a cabinet. If the distance between a refrigerator and a stove is 15-1/2", the cabinet should be designed with a 15" wide face frame. That would allow for a little space on each side of the cabinet. Fig. 5-A and 5-B shows the front and the back of the typical face frame. The Pocket Holes are located in the backside of the cabinet and are not visible from the front. The face frame stiles extend from the top of the cabinet to the bottom so end grain is not shown.



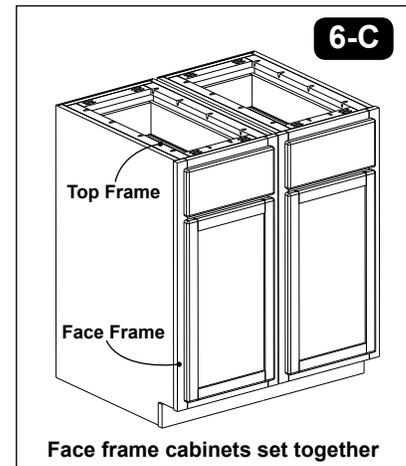
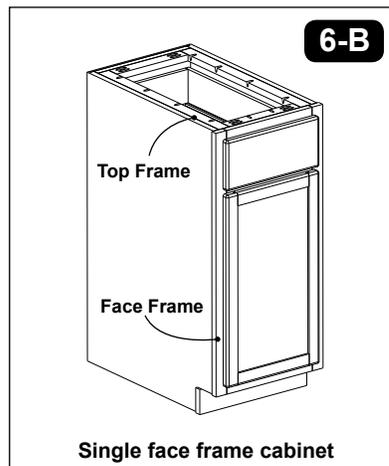
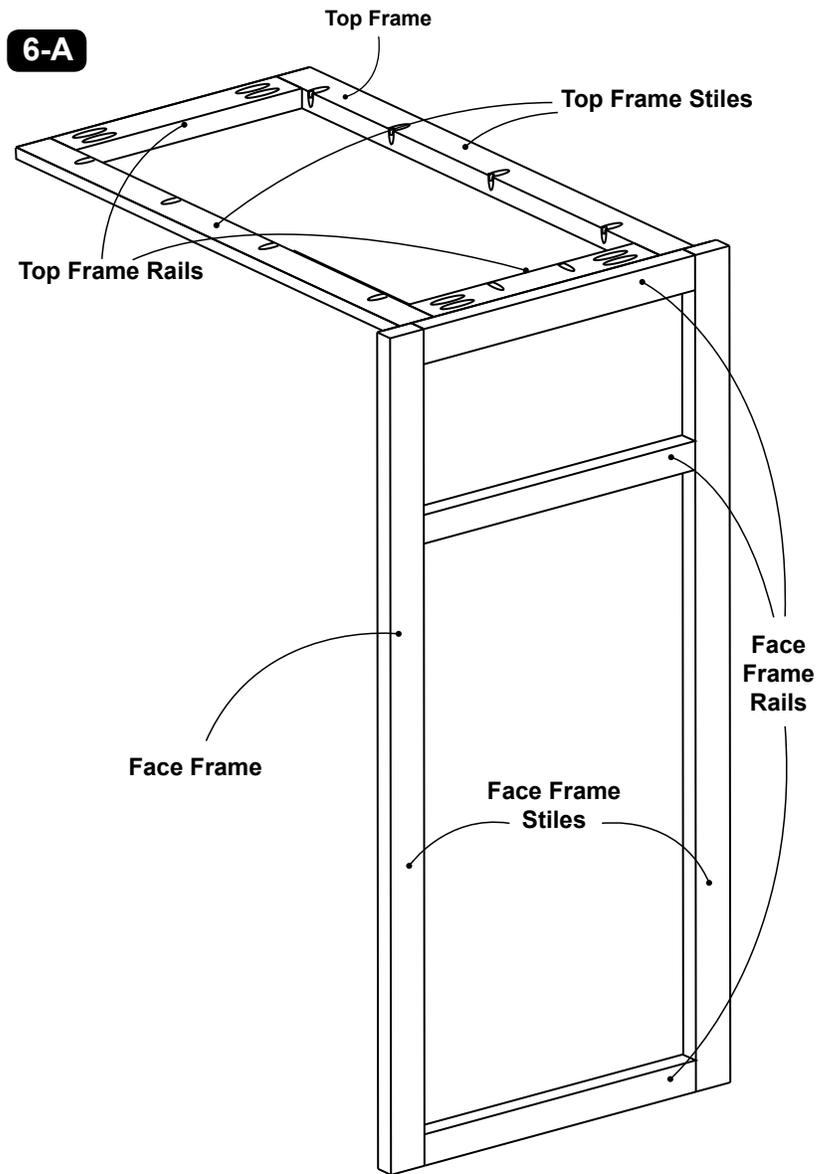
Face Frames Explained

Building a cabinet is essentially a matter of building a box. Most of the joinery used to build the cabinet in this booklet features Kreg Joinery™. Kreg Joinery™ is a relatively new technique in which an angled hole is drilled into one workpiece only and then is joined to the second workpiece using a specialized self-tapping wood screw. Kreg Joinery™ has many advantages compared to other wood joinery techniques for a variety of reasons. Alignment is simplified with Kreg Joinery™ as only one of the workpieces must be drilled prior to assembly. Assembly and clamping time is decreased as you can connect one joint at a time and not need to wait for the glue to dry.

This cabinet design has been simplified so that it can be assembled from the absolute least number of parts. There are only eight parts, including the optional mounting rail. The two identical sides, floor and back are made from manmade panel materials such as plywood, medium density fiberboard or particle board. The face frame and top frame are made from solid stock and are efficiently assembled using Kreg Joinery™. Complicated machining such as the use of dados and rabbets, are avoided. Rather than using individual pieces of wood or triangular corner blocks that are installed individually (which is time consuming and can be misaligned), this cabinet design employs a top frame.

The top frame is made of four pieces that are pocket screwed together. Because it is a one-piece frame it is easily installed. An optional nail rail at the back of the cabinet allows the cabinet to be secured to the wall at the time of installation.

To make sure that the cabinet sides are parallel to each other, the Top Frame and the floor must be **EXACTLY THE SAME WIDTH**. This is accomplished by first joining the frame together, then removing less than a 1/16th of an inch off the edge of the frame by running it through a table-saw. This will then give you the correct tablesaw setting to cut the floor **EXACTLY** identical to the top frame, which will result in perfectly parallel cabinet sides.



Building a 15" Base Cabinet

Simple Design - Yet Ready for Production!

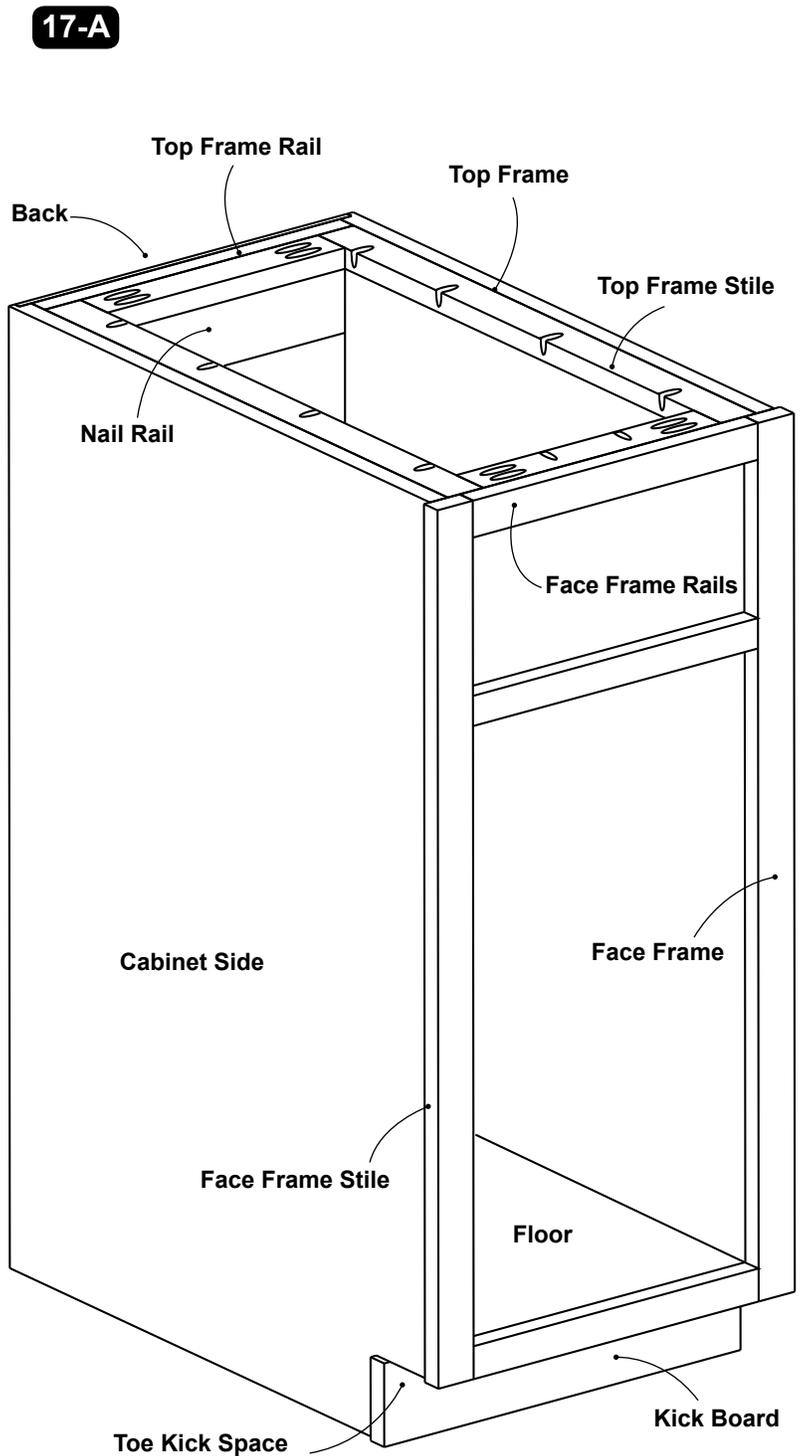
In this cabinet design, I create two simple frames with Kreg Joinery™ that serve as a reference point for the rest of the cabinet. The standard face frame and also a "top frame" which stabilizes the top of the cabinet. It makes the assembly of the cabinet a snap, and I think that it is a better overall product. It is especially easy for one person working alone to assemble.

I've used this design in cabinetmaking classes and now have students, some of whom have never done any woodworking, finish complete cabinets in two days. That includes re-saw and bookmatching the door panel. This booklet is designed to systematically present the information needed to build a high-quality, professional cabinet that can be easily replicated to build an entire kitchen. With that said, let's get started. I'm sure you'll enjoy the simplicity and speed of this construction process.

Placement of the Pocket Holes

Before you start, the placement of Pocket Holes in the side panels is important to plan out in advance. If the side panel is to be exposed to the room, you'll want to position the Pocket Holes on the inside face of the panel and plug them if necessary. If the side panel will be against a house wall or another cabinet, the Pocket Holes should be placed on the outside face, as it won't be visible. If the side panel will be against an appliance and trim will be used to hide the side panel, place the Pocket Holes on the outside face.

The 15" sample cabinet illustrated in this booklet is the face frame style, which means that there is a frame on the front of the cabinet as shown in Fig. 17-A. The cabinet is essentially a box with a face frame attached to the front of it. The frame reinforces the box and keeps it square. The frame is designed to be 1/2" wider than the cabinet so the when the cabinets are attached to each other there is a tight fit between the frames. This cabinet design also has a top frame which keeps the tops of the sides in place and makes the cabinet easier to assemble. The two frames are made from solid stock and are quickly assembled using Kreg Joinery™.



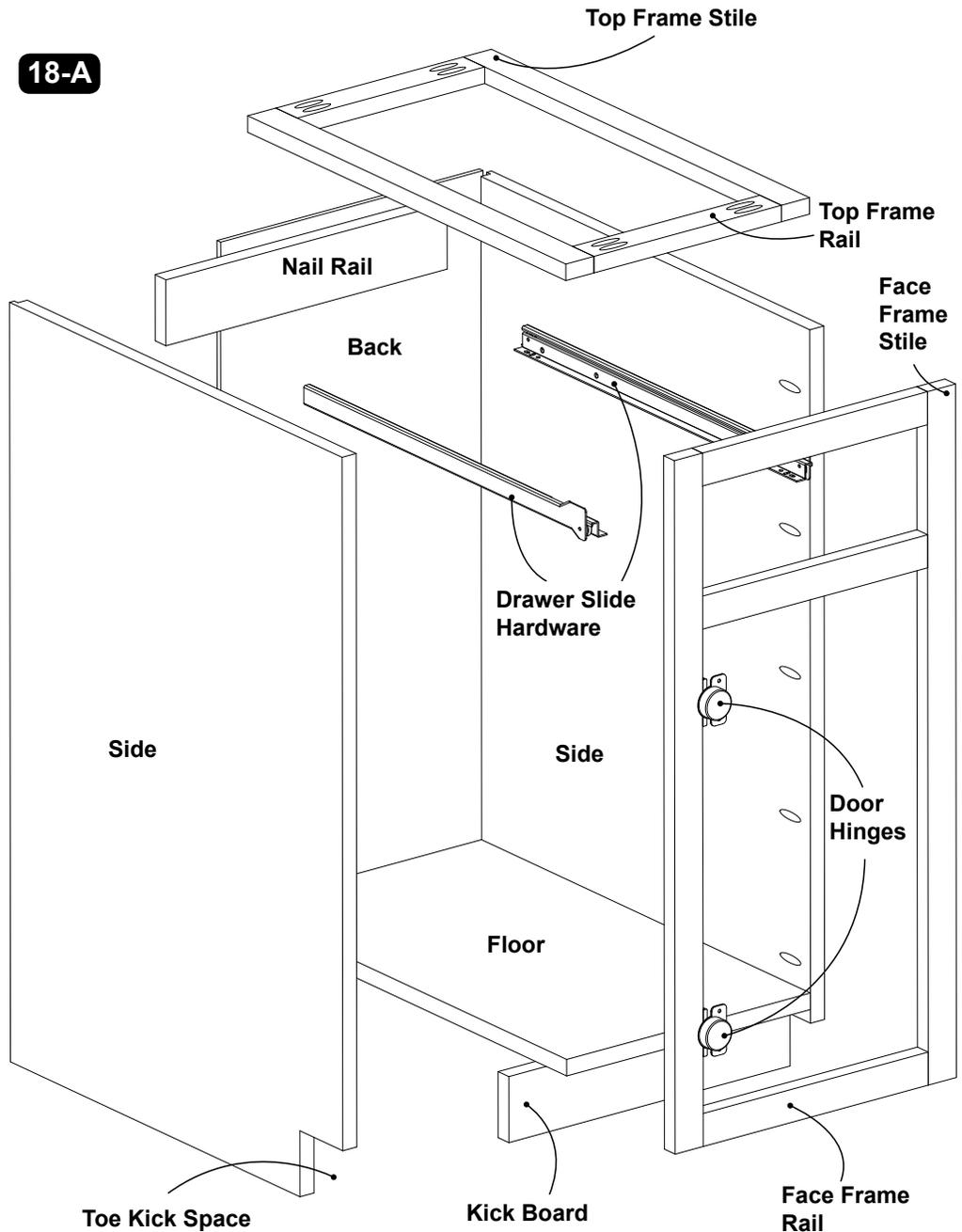
Building a 15" Base Cabinet

Cabinet Parts Overview

Fig. 18-A is an exploded view of the cabinet. The sides are secured to the floor and the top frame before the back and front face frames are attached to the box unit. With this design, complicated machining and the use of dados and rabbets can be avoided. Also avoided with the use of a top frame are filler pieces or angle brackets, which require tedious positioning and installation.

One of the questions to be answered when making a cabinet is how will the countertop be attached to the cabinet? Another often asked question relating to this issue is how do you keep the cabinet sides parallel to each other? In the past, individual corner blocks have been used to square the cabinet top and provide a place for securing the counter to the top of the cabinet. An alternative to the corner blocks is a filler piece called a "stretcher" which is the width of the floor and keeps the sides parallel.

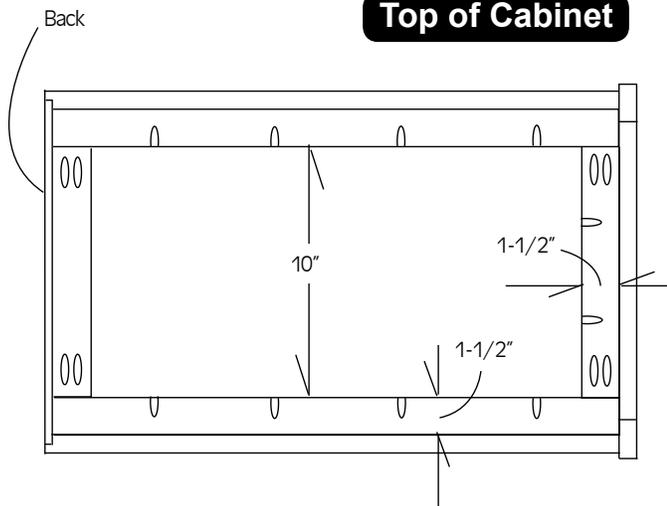
Rather than using triangular corner blocks which are installed individually this cabinet design employs a top frame. The top frame is made of four face frame pieces that are Pocket Screwed together. It provides the spacing function of the stretcher and the squaring function of the triangular blocks. Because it is a one piece frame, it is easily installed when aligned with the top of the cabinet.



Building a 15" Base Cabinet

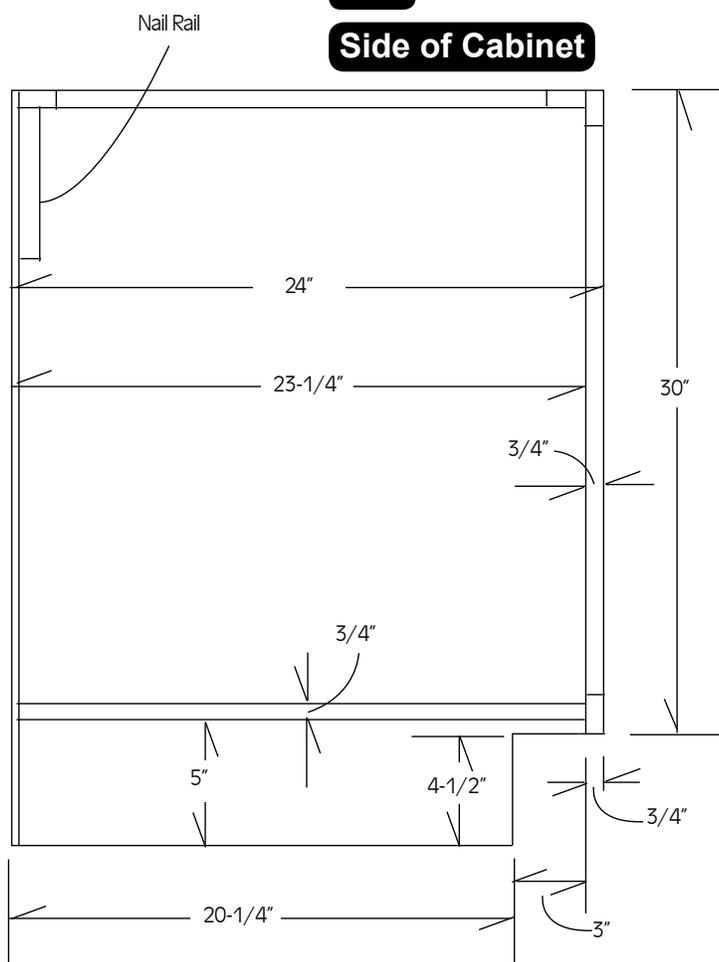
19-A

Top of Cabinet



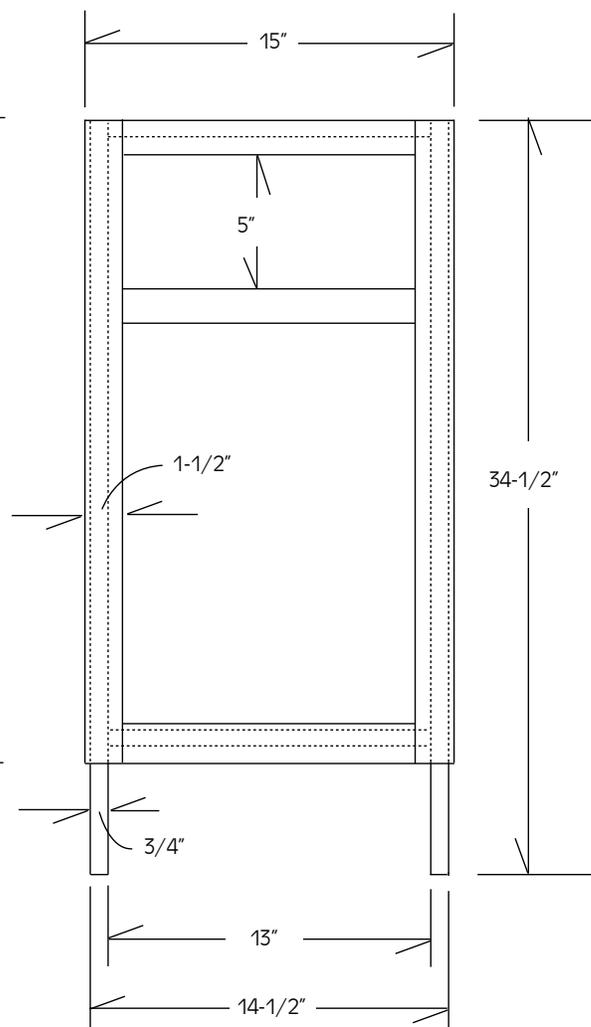
19-B

Side of Cabinet



19-C

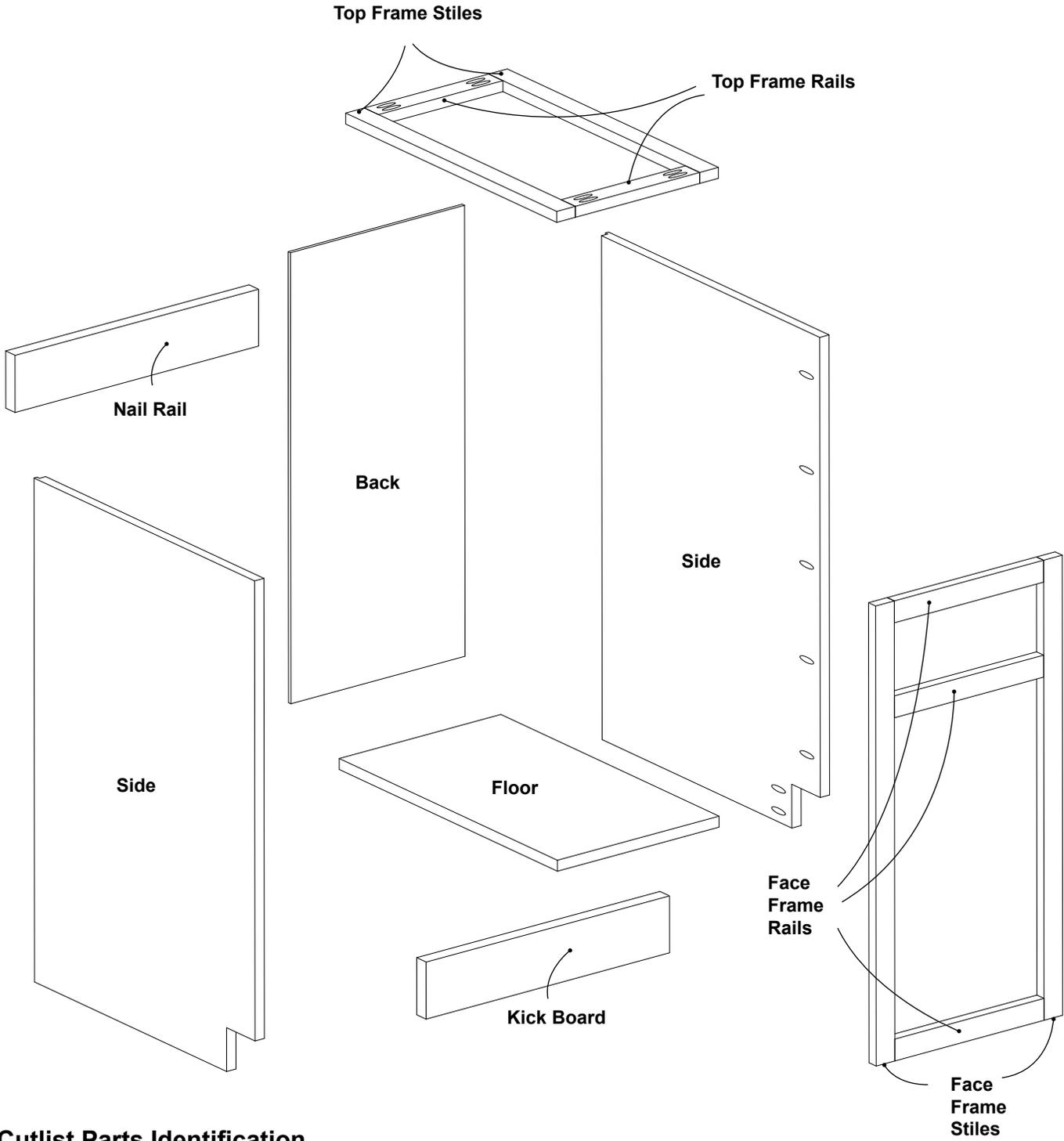
Front of Cabinet



Building a 15" Base Cabinet

20-A

Cutlist Diagram



Cutlist Parts Identification

The parts identified on this page correspond with the cutlist on the following page. Please reference dimensions from the list to size parts correctly prior to assembly.

Building a 15" Base Cabinet

Standard parts are always the same regardless of the width of the cabinet. These items can be made at one time and stockpiled for ease of processing when building a set of cabinets.

Standard Parts Cut List for 15" Wall Cabinet:

Part Name	Qty.	Thickness	Width	Length	Note:
Side	2	3/4"	23-1/4"	34-1/2"	Note: There is a cut out for the kick board that is 4-1/2" high and 3" wide. There is also an optional rabbet in the side panel that is 1/4" deep and 3/8" wide to accept the back panel.
Top frame stile	2	3/4"	1-1/2"	23"	
Face frame stile	2	3/4"	1-1/2"	30"	
Door frame stile	2	3/4"	2"	21-1/2"	
Drawer sides	2	1/2"	4"	21-1/2"	

Non-standard parts change in size (width or length) depending on the width of the cabinet (15", 18", 21", etc.). These parts include the floor, face frame rails, top frame rails, back, door frame rails, drawer rails, drawer fronts, nail rail, and kick board. The rule listed to the right of each component makes it very easy to re-calculate the dimensions for various sized cabinets.

Non-Standard Parts Cut List for 15" Base Cabinet:

Part Name	Qty.	Thickness	Width	Length	Rule:
Floor	1	3/4"	13"	23"	Width of cabinet (15") minus 2"
Top frame rail	2	3/4"	1-1/2"	10"	Width of cabinet (15") minus 5"
Face frame rail	3	3/4"	1-1/2"	12"	Width of cabinet (15") minus 3"
Back panel	1	1/4"	13-1/2"	29-1/2"	Width of cabinet (15") minus 1-1/2"
Door frame rail	2	3/4"	2"	9" Plus	The door frame rail is 9" for the 15" cabinet plus the length of the stub tenon or the length of the tenon on the cope and stick joint. The door panel should be sized AFTER the door frame is completed.
Drawer front rail	2	1/2"	4"	10"	Width of cabinet (15") minus 5" Note: The drawer bottom panel should be sized AFTER the drawer box is completed.
Drawer back rail	2	1/2"	3-1/4"	10"	Width of cabinet (15") minus 5" Note: The drawer bottom panel should be sized AFTER the drawer box is completed.
Drawer front	1	3/4"	6"	13"	Drawer front to be same width as door.
Nail rail	1	3/4"	5"	13"	Width of cabinet (15") minus 2"
Kick board	1	3/4"	4"	14-1/2"	Width of cabinet (15") minus 1/2".

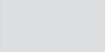
Building a 15" Base Cabinet

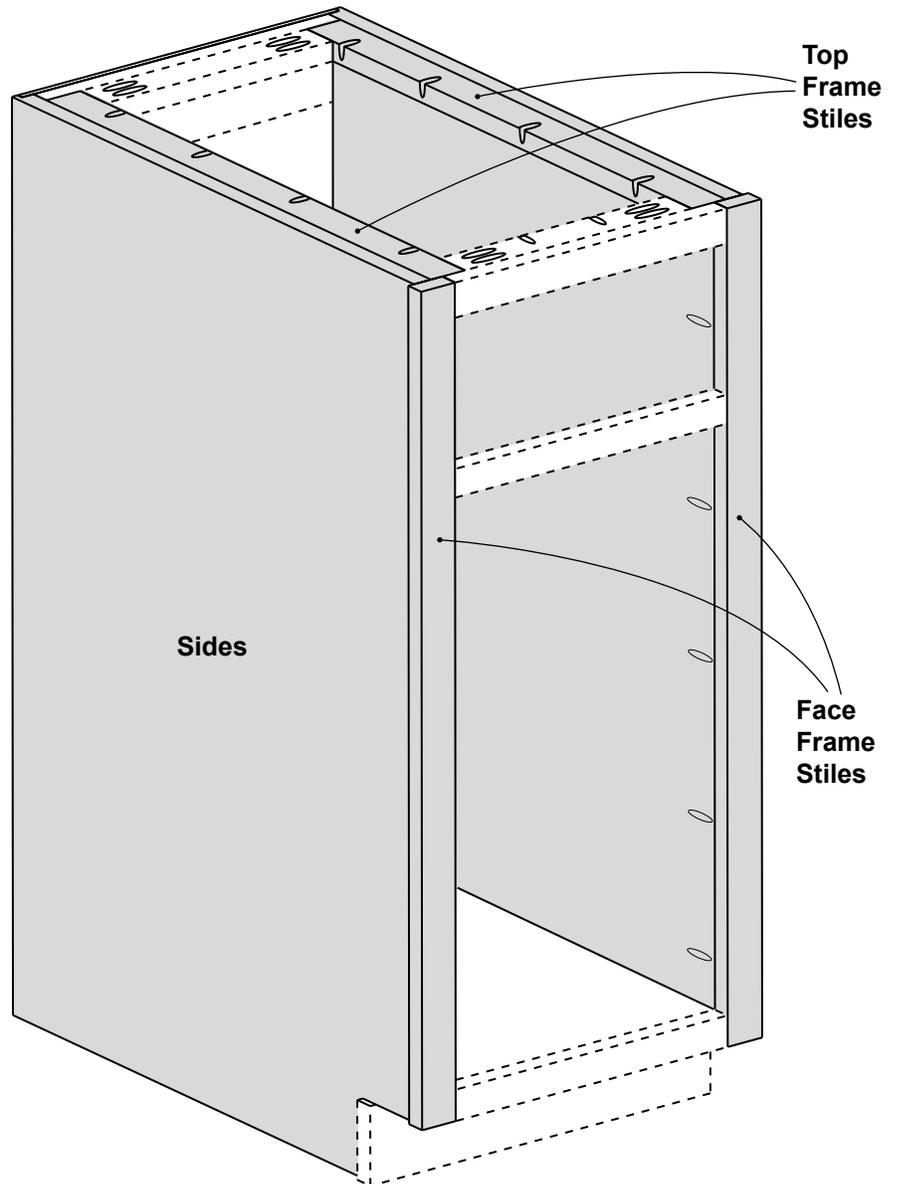
About Standard Parts

Standard parts shown shaded gray in Fig. 22-A are always the same size because they do not change with different cabinet widths (ie. 15", 18", 21"). Because these parts are not custom pieces, they can be made in quantity and "stockpiled". The sides, face frame stiles and top frame stiles are standard parts and are always the same no matter what the width of the cabinet may be.

22-A

Standard Parts

 Standard Parts

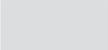


Building a 15" Base Cabinet

Non-Standard Parts

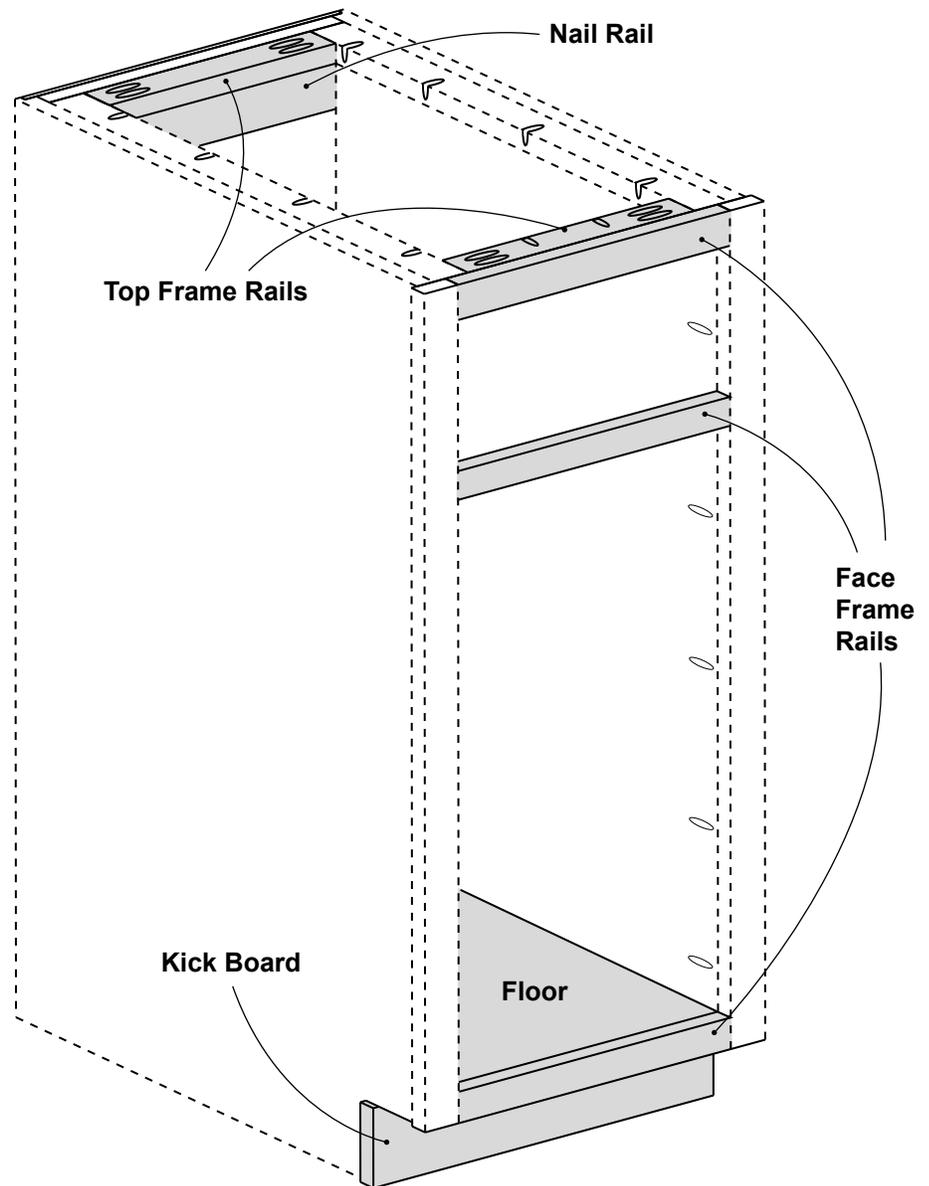
Nonstandard parts, which are shown shaded gray in Fig. 23-A, are the parts that determine the width of the cabinet. They are different lengths depending on the cabinet sizes. The bottom, back, kickboard, nail rail, and frame rails change in size as the cabinet changes in size.

To make sure that the cabinet sides are parallel to each other the top frame and the floor must be **EXACTLY THE SAME WIDTH**. This is accomplished by using the same tablesaw rip fence setting to cut a hair off the width of the top frame and then cut the floor to the same width.

 Non-Standard Parts

23-A

Non-Standard Parts



Building a 15" Base Cabinet

GENERAL CABINET BUILDING SUGGESTIONS

Building cabinets efficiently can best be accomplished by following the simple steps below.

Step 1: Make one complete cabinet at a time (with the exception of the countertop). We recommend beginning with a base cabinet that doesn't span a corner because these are the simplest. These types of cabinets are the focus of this booklet.

Step 2: Once all the cases are made, drawers and doors can be made and finished.

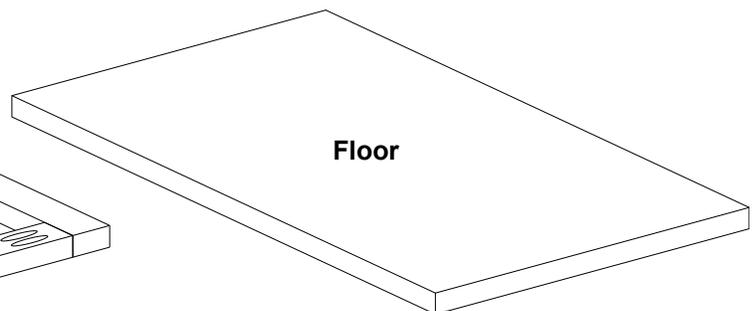
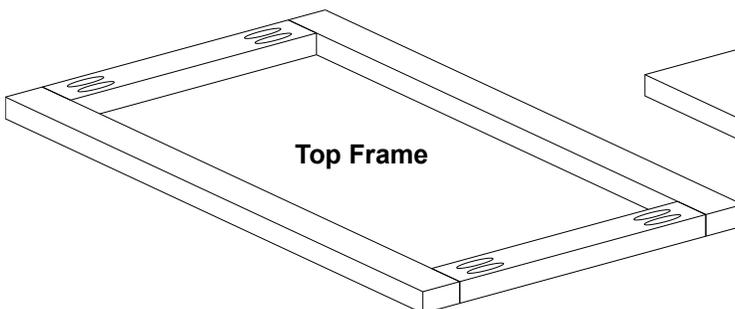
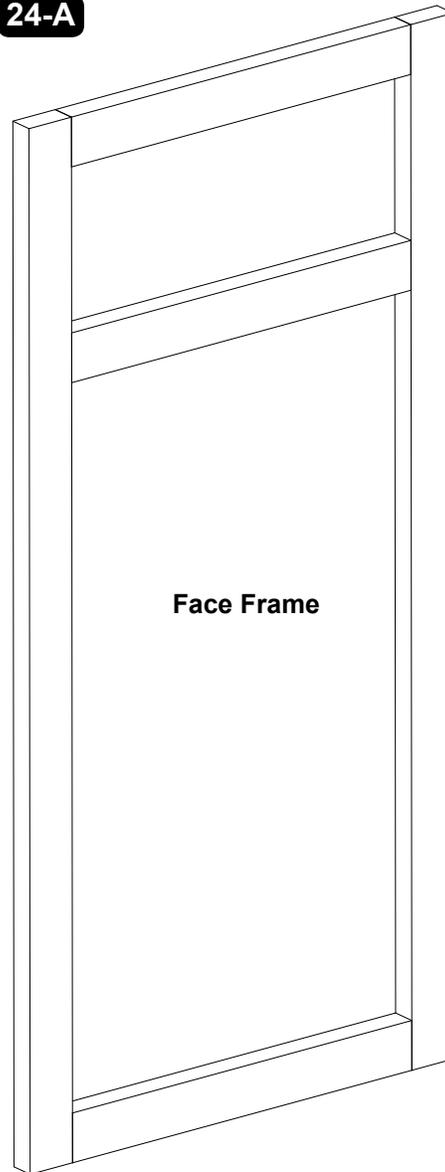
Step 3: Door and drawer hardware should be installed.

Step 4: Attach backs.

Step 5: Install cabinets.

Step 6: Countertops constructed and installed. Important! It will be easier to install your wall cabinets if you haven't installed the base cabinets.

24-A

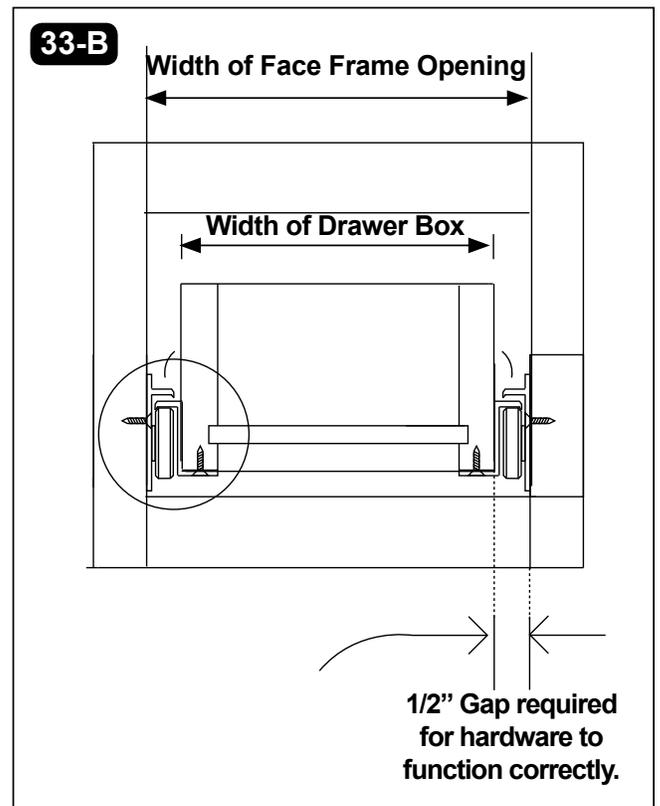
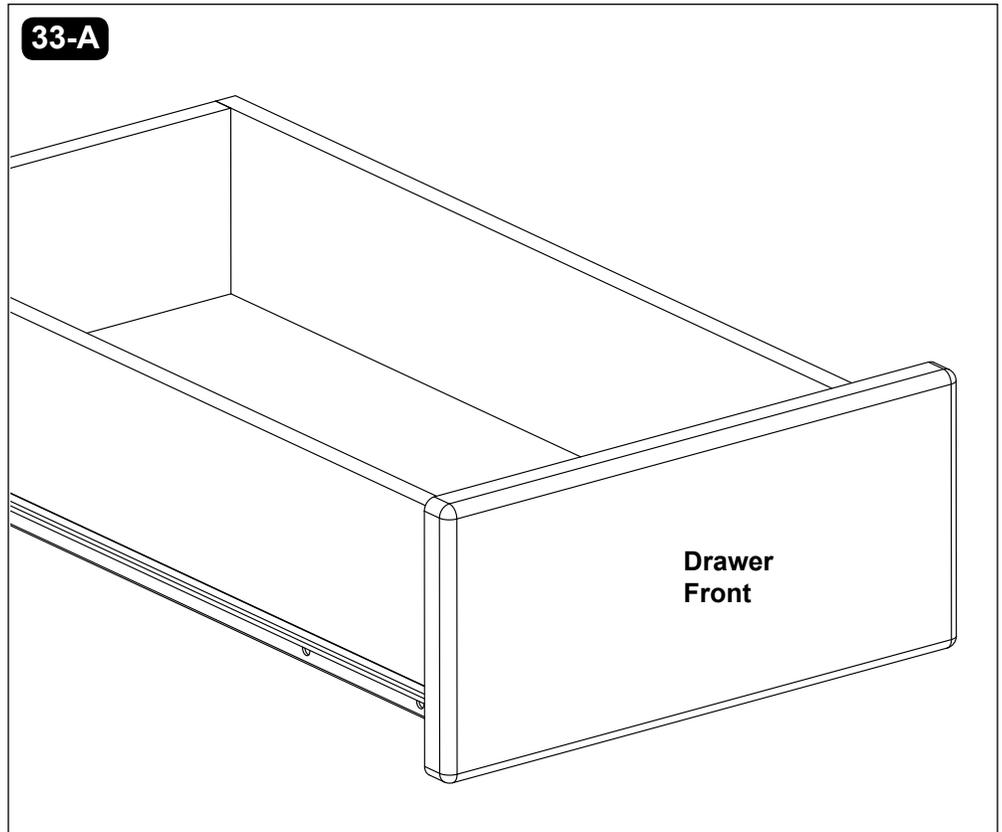


Top Frame and Floor are ripped to the exact same width on the tablesaw to achieve perfectly parallel cabinet sides.

Making the Drawer

After the doors are made, installed and aligned, the next task is to attach the drawer fronts. Carefully measure the width of the door and cut the drawer face to that width. Make a spacer that will rest on top of the door. With the drawer box in the cabinet, place the drawer front on top of the spacer. Roll the drawer box out and use a couple of clamps to secure the drawer front to the drawer box. Drive a screw from inside the box through the drawer box and into the drawer front.

We like to use the SPS-F1 (1") or SPS-F125 (1-1/4") screws because the self-tapping tips eliminate pre-drilling. Keep in mind that if you've used a 1/2" material for the drawer box and 3/4" material for the drawer front, a 1-1/4" screw is too long.



Making the Door

Cabinet doors are made in many different styles. Most cabinet doors are made with the frame and panel design because it is a good way of making a wide door without the expansion and contraction problems of solid wood. The style of the door determines the hardware design that can be used to mount it. If the door fits inside the face frame, it is called an "inset" door and requires the appropriate hardware. Furniture often is made with inset doors. Cabinets are usually made with overlay doors which are wider than the face frame opening. The first consideration should be whether you want overlay or inset style doors.

If you choose overlay doors, the next decision is how much overlay you want. Traditional cabinets typically use a 1/2" overlay, meaning the door covers a 1/2" of the face frame on all sides. Usually the overlay door is one inch wider and one inch longer than the face frame opening. The 15" sample cabinet door opening in the face frame is 20-1/2" by 12". The door will be made to be 21-1/2" by 13". The amount of overlay is determined by the hinge design. There are many choices in hardware and the details of the choices available are beyond the scope of this booklet. Magazines, books, catalogs, home centers and home shows are good sources of information.

There are many considerations when choosing hardware. Concealed hinges provide a more contemporary look and are typically used with solid, composite laminate or flat panel doors in either an overlay or inset style. All things being equal, overlay doors are easier to make and install because, with inset doors, the openings and the doors must be perfectly square.

Concealed European style cup hinges typically mount into a 35mm (diameter) hole bored 1/2" deep into the door, requiring a 35mm forstner bit used in a drill press. If you don't have a drill press, there are some jigs available through catalogs, which make a portable drill work like a drill press.

For the 15" sample cabinet that we are making in this booklet, we are using an overlay door that is one inch longer and one inch wider than the face frame opening. We are using two European style cup hinges for the door which are placed in 35mm holes in the door frames. The standard for mounting door hardware is to mount the centerline of the hinge 3" in from the top and bottom of the door. If the hinge provides a 1/2" overlay, then the centerline of the hinge should be mounted to the face frame 2-1/2" below where the stile meets the rail.

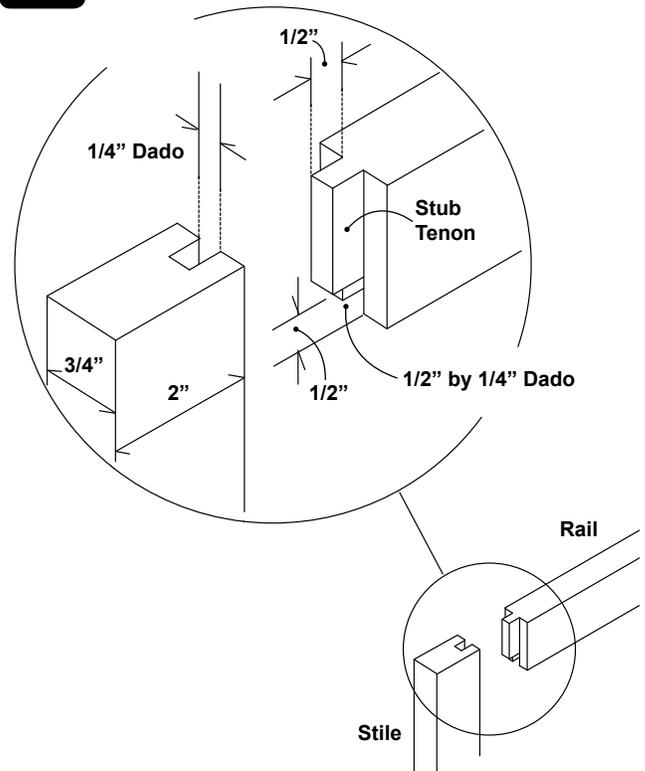
A huge advantage of the European style cup hinge is the adjustability factor. These hinges have screws that allow the door to be adjusted up or down or in and out which allows for squaring, leveling and alignment with the other doors in a set of cabinets.

After deciding on the door design and what kind of hinges you will use, you are ready to make the door. The door that we are making for the 15" cabinet is a simple panel door. The frame is made of the top and bottom rail (horizontal members)

and the side stiles (vertical members). The side stiles run the length of the door and cover the end grain of the horizontal rails. There are two options for making the door frames, which are shown in Fig. 34-A and 34-B on page 34. The easiest option is the stub tenon, which is made with standard woodworking equipment such as a dado blade or a slot cutter router bit. The door stiles and rails are 2" inches wide by 3/4" of an inch thick. A 1/2" deep dado that is 1/4" wide is made on the inside of both the rail and the stile pieces. The dado on the inside of the door is the space in which the door panel is located. The stub tenon, which is 1/2" by 1/4", is the same size as the dado and is glued in the dado after the door panel is fitted to the door frame. The stub tenon has a number of advantages. It is fairly easy to make and doesn't require the purchase of special equipment such as a matching set of router or shaper cutters. The simple design compliments just about any style of décor and is especially at home with the very popular Arts and Crafts designs. If you use the stub tenon, remember to add the 1" measurement (1/2" on each side) to the door rail. The rail for the 13" wide door should be 10" long.

Stub Tenon Door

34-A



Making the Door

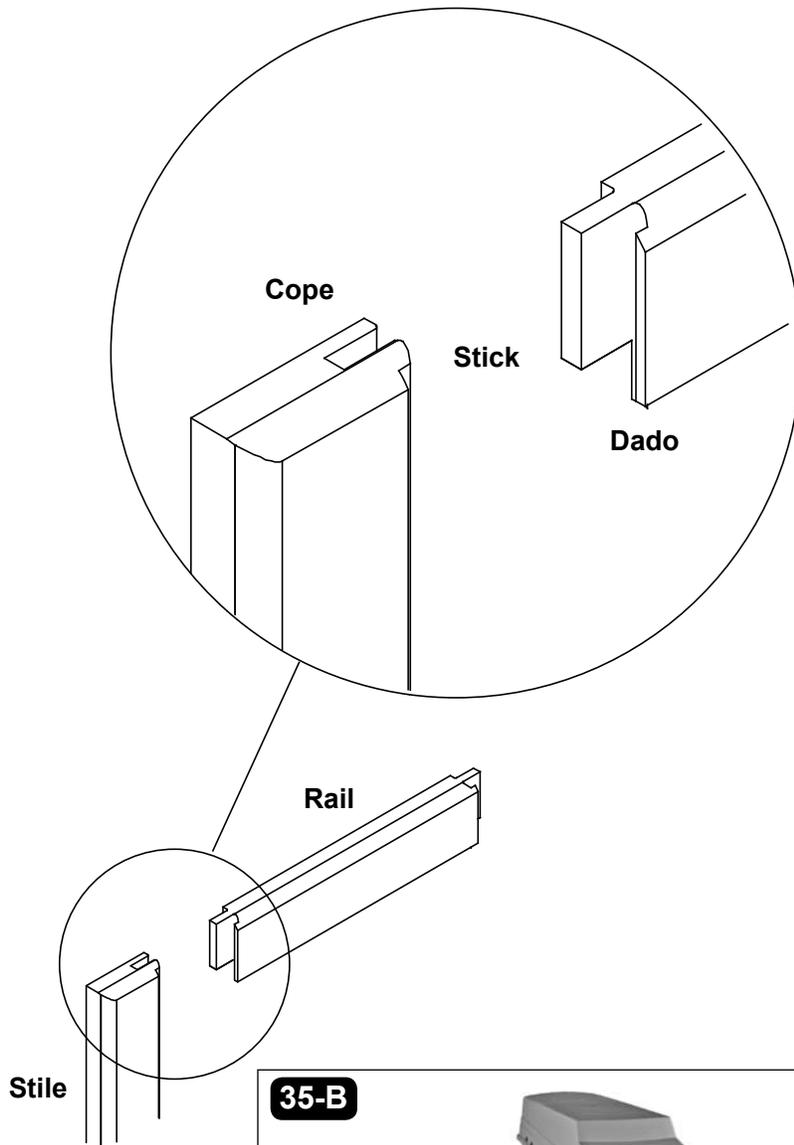
Cope and Stick Doors

A more complicated door design is the rail and stile shown in Fig. 35-A. An interlocking joint called the cope and stick joint is produced by either using router table cutters or shaper cutters. This joint requires making a series of cuts with two different cutters and precisely adjusting the set-up for a perfect fit. For the beginning woodworker, this task can be intimidating due to the complex nature of the required fit. However, cope and stick doors of professional quality are easily produced once you have mastered the techniques.

Cope and stick doors require a learning curve which requires study and practice. Like many woodworking joints, they are easily produced once you have the correct set-up and develop the technique. If you decide to use the cope and stick joint, practice making the joint and carefully measure the rail length for the 13" wide sample cabinet door. After the door is complete, drill the holes for mounting the European style cup hinges. The 2 door hinges are located in two 35mm holes drilled 1/2" deep in the door stile. The door hinges are screwed to the face frame edge. Drill the 35mm holes 3" from the end of the cabinet. Use a drill press with two stops, as shown in photo 35-B.

Cope and Stick Door

35-A



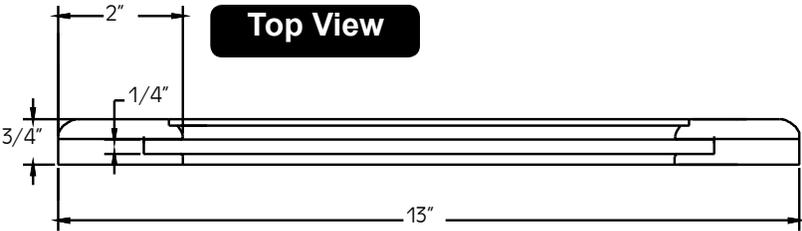
35-B



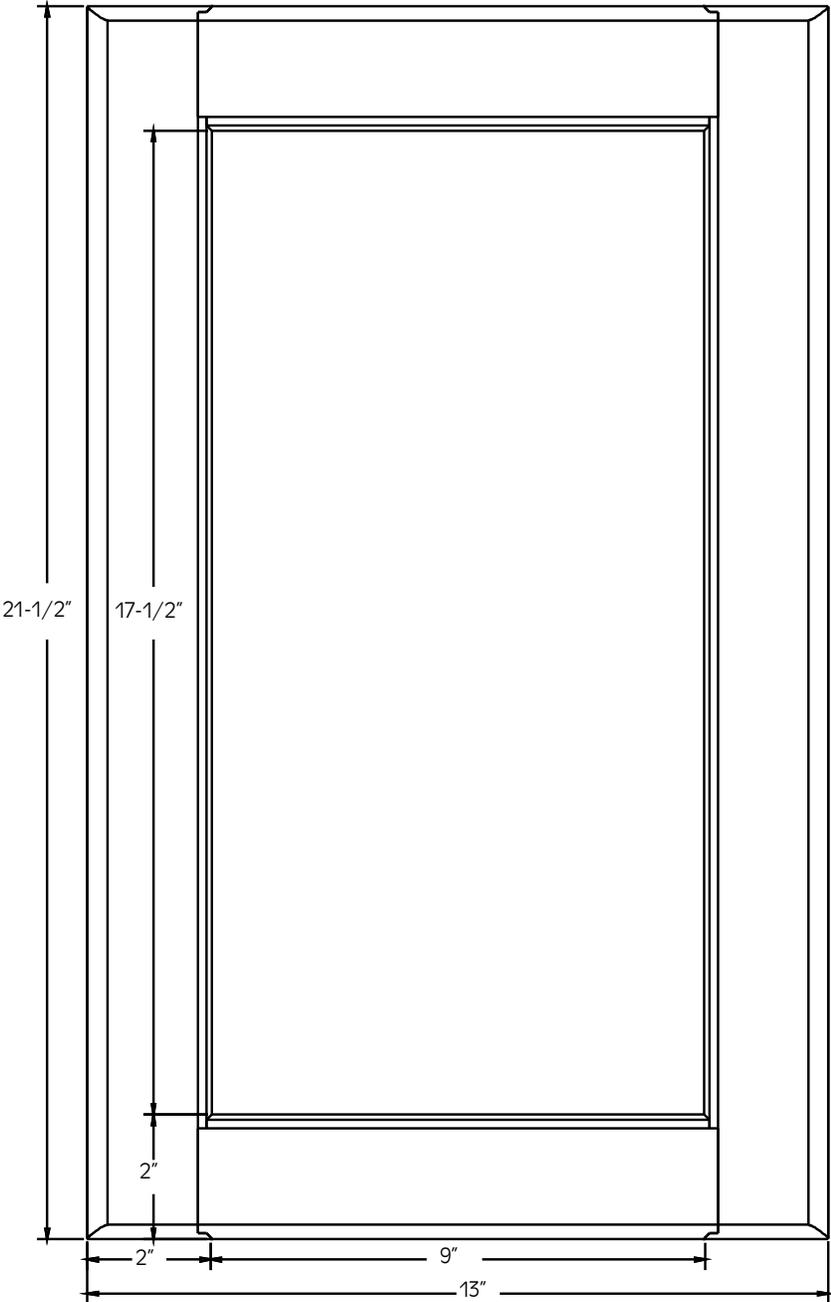
Drilling 35mm holes in door stile for hinge cups.

Making the Door

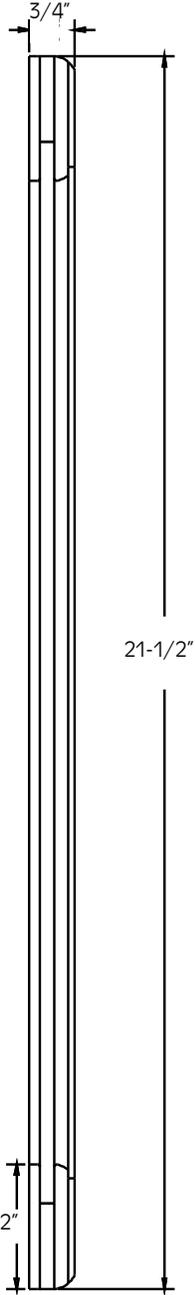
Cope and Stick Door Dimensions



Front View



Side View



Wall Cabinets

Building a 15" Wall Cabinet

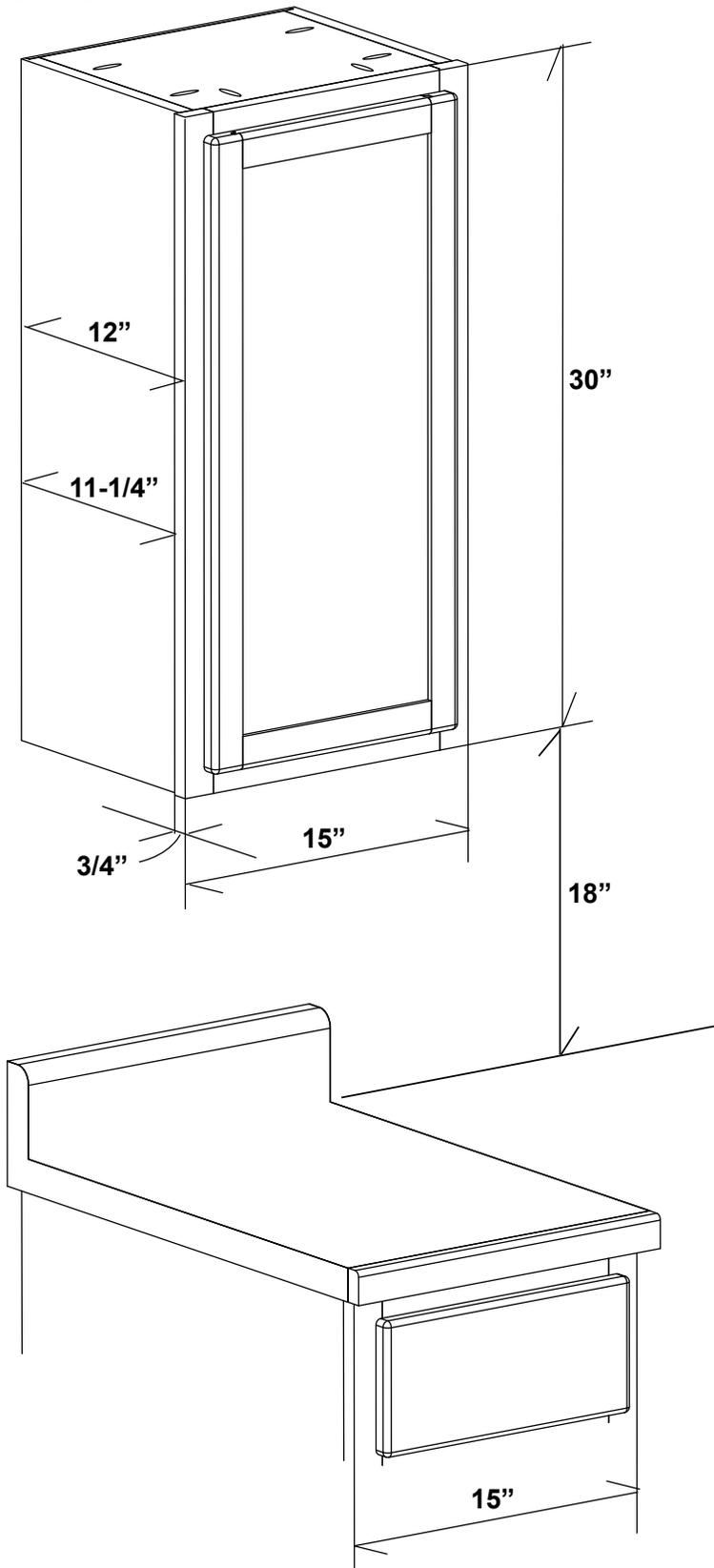
Wall cabinets mount on the wall above the base cabinets and are usually the same width as the base cabinet, as shown in Fig. 37-A. The depth of the cabinet is usually 12". When the wall cabinet is located above an appliance, such as a 30" wide stove the cabinet should be 30" wide. The standard height wall cabinet is 30" high and is designed to be used with a room soffit, which is box in the top corner of the ceiling and wall junction that is the same material as the wall. The soffit is usually a framed box that is secured to the corner of the room where the wall and ceiling meet. It is often covered with the wall material that is used in the rest of the room, which is usually drywall. The finished dimension (frame plus drywall thickness) of the soffit is usually 12" height and 14" wide.

Thus, the finished soffit extends past the top of the wall cabinet 2" which gives it a pleasing professional look.

Depending on the height of the ceiling and the size of the soffit, the distance between the wall cabinet and the countertop is usually 16 to 20".

In recent years, kitchens are frequently designed without soffits and, in some cases, the cabinet goes all the way up to the ceiling. A kitchen may have wall cabinets of varying heights to accommodate appliances such as stove hoods or wall mounted microwaves. To accommodate different kitchen designs (soffit or no soffit), appliance sizes, wall height variations, etc, commercially made wall cabinets are available in heights ranging from 9" to 48" in 3" increments. Obviously, the huge advantage of a custom made cabinet is that it can be designed and made for a specific space.

37-A



Wall Cabinets

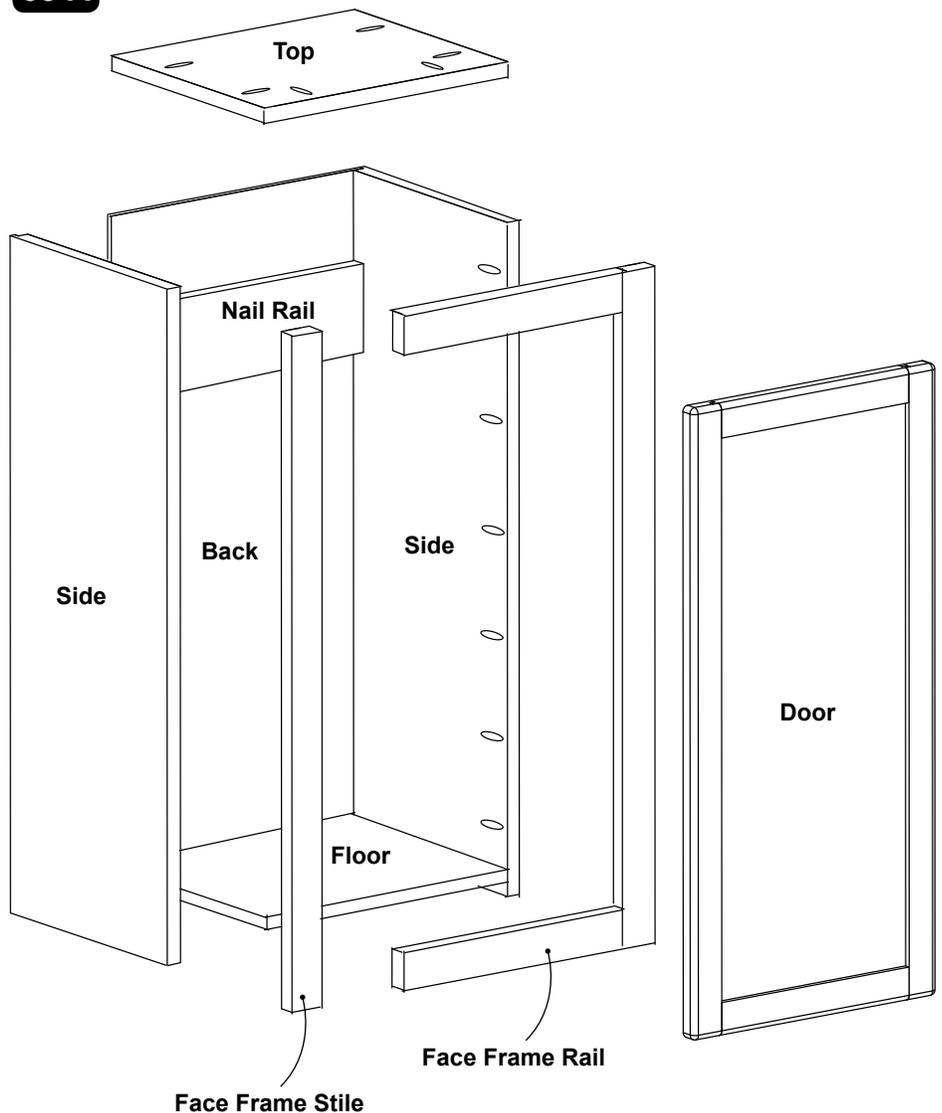
Most wall cabinets are designed with mechanisms for shelf height adjustment. The standard is the use of multiple holes with shelf supports on which the shelf rest. Another option is the use of a front and back track with adjustable shelf supports. Get the adjustable shelf hardware before planning and building the cabinet.

Compared to the base cabinet, the wall cabinet is a lot easier to build. It is smaller and has less pieces, plus it doesn't have a drawer. The face frame is a simple rectangle made of the standard 1-1/2" by 3/4" material. After the parts are cut to size using the wall cabinet cut list, assemble the parts in a similar manner as the bottom cabinet as described in the "assembly" section of this booklet. Make a spacer for measuring the distance between the floor and the bottom edge of the face frame. A 3/4" spacer will secure the floor flush with the top edge of the face frame rail. Another option is to use a 5/8" spacer so that the bottom is 1/8" lower than the top edge of the face frame.

The Pocket Holes on the top should be located on the front and sides of the top. They should be oriented so that the pocket holes are exposed on the top of the cabinet so, when you open the cabinet door, you don't see any Pocket Holes. For most wall cabinets, the Pocket Holes should be oriented on the bottom of the cabinet so when you open the door Pocket Holes are not visible. The one exception to having the holes on the bottom of the cabinet, is the wall cabinet above the sink where the bottom of the cabinet is visible. Plugs can be used to cover pocket holes in situations where they may be visible.

As with the bottom cabinet, orient the Pocket Hole screws so they are not visible from the outside of the cabinet.

38-A



15" Wall Cabinet Cut List:

Part Name	Qty.	Thickness	Width	Length
Side	2	3/4"	11-1/4"	30"
Face frame rail	2	3/4"	1-1/2"	12"
Face frame stile	2	3/4"	1-1/2"	30"
Floor	1	3/4"	13"	11"
Top	1	3/4"	13"	11"
Back	1	1/4"	13-1/2"	29-1/2"
Nail Rail	1	3/4"	13"	4"