Chapter 17. Cabinets

Tools needed by volunteers:

Nail apron
Tape measure
Hammer
Square
Utility knife
Pencil

Tools and equipment needed:
Extension cord
Lighting
Finish nailer
Chop saw
Table saw
Circular saw
Oscillating saw
Jig saw
Belt sander
Drill
Driver
Wood chisel
Framing square
Caulk gun
6’ Level
3’ Level
Cabinet & miscellaneous clamps
Rubber mallet
Cabinet kit
Stepladder

Materials needed:

2x4 Lumber, 54” long
¾”x2-7/8” Plywood strips, variable lengths
¾” Plywood, scrap
Cabinet filler strips
Weatherstripping
Countertop toggle bolts
1¼” Collated finish nails
2½” Collated finish nails
Tapered shims
Wood glue
Wood putty
Flashing tape
Air sealing caulk
Painter’s tape

Personal Protection Equipment:

Safety glasses (required)

Reference Materials:

Cabinet Plan

Safety First! Review the Safety Checklist before performing tasks in this chapter.

17.1. LAYING OUT KITCHEN UPPER CABINETS

1. Check the kitchen Cabinet Plan and confirm that all units are available on site. Unpack all cabinets and use the box material to cover all vinyl surfaces in the house to protect against damage. Inspect the units for damage and report any to the Construction Supervisor

2. Set up a temporary work bench to hold materials and tools.

3. Remove the doors on all cabinets by removing the screws from the stiles (leave the hinges on the doors). Collect the hinge screws and all cabinet related hardware in a container and store on the window sill.

4. The upper kitchen cabinets will be installed by mounting them to 2-7/8" wide strips of ¾" thick plywood. This installation method is used because the screws holding up the cabinets go into the continuous plywood, rather than having to precisely locate the cabinet screws to hit a stud while holding them in place. The cabinets are 30" tall, with the top of the cabinet 84" and the bottom 54" from the floor. The top plywood support strip will be located about 1" down from the top, and the bottom of the lower strip about 1" up from the bottom of the cabinets. The following steps refer to Figure 17-1.

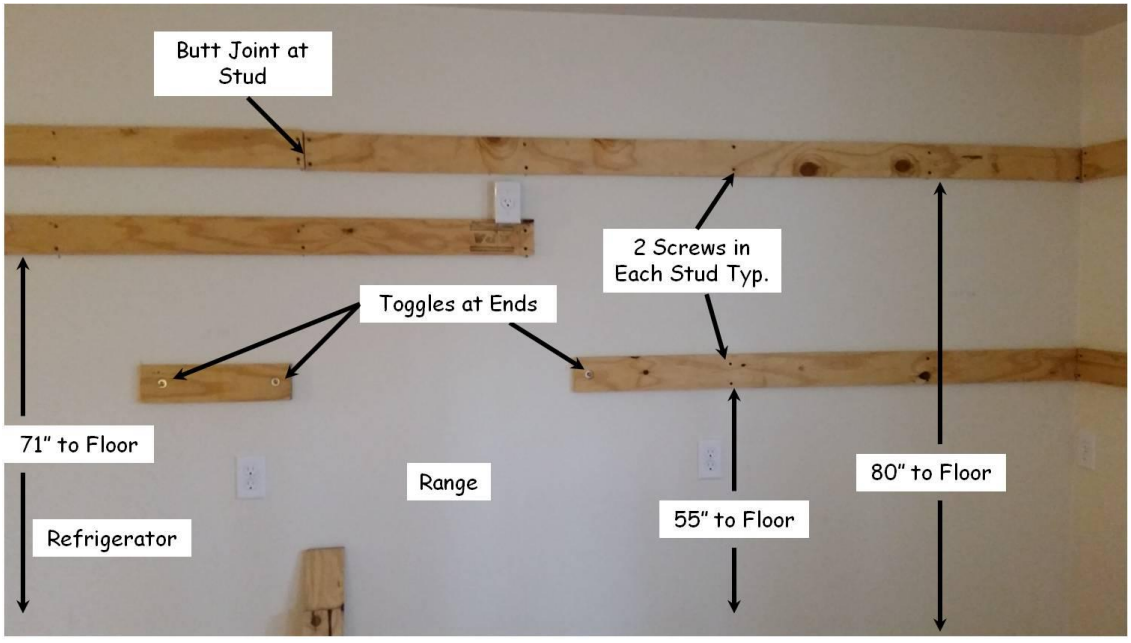

Figure 17-1. Kitchen Cabinet Support Strips.

5. Using the Cabinet Plan, mark the position(s) of the upper cabinets on the walls using light pencil lines. The Plan will specify an overall length (OAL) of the cabinets. Using a level, draw a horizontal line 80" up from the floor extending from the corner for the OAL of the cabinets. The OAL line will be approximately ¾" short of the eventual end of the cabinets, since they will be mounted ¾" off the wall.

6. Do the same with another line 55” up from the floor, except where the range and refrigerator will be located. These areas need lines 71” from the floor.

7. Locate all of the studs within the cabinet outline, and tack 2½” finish nails into each at the previously drawn lines. These nails will serve to temporarily support the plywood during installation, and will aid in locating the support strip installation screws. Also, with pencil, mark the stud locations approximately 38” above the floor. These marks will be handy when installing the base cabinets, but will be covered by the countertop backsplash.

8. Assuming a corner countertop arrangement, temporarily assemble the countertop with it supported on sawhorses. Install the countertop toggle bolts and tighten them snugly. Measure from the corner of the splash to each end, and confirm that the cabinet(s) will end the required distance from the countertop end(s). Rip cabinet filler strips to lengthen the cabinet width, if required. If the countertop appears to be too short and there are no filler strips to eliminate, consult with the Construction Supervisor for further direction.

17.2. INSTALLING KITCHEN CABINET SUPPORT STRIPS

1. Locate, in the trailer, suitable lengths of ¾”x2-7/8” plywood strips. Determine the lengths required per the Cabinet Plan, and cut to length. Many installations have more than 8’ of cabinets, so the plywood strips must be butted together at a stud.

2. Rest the support strips in place on the nails and mark the stud locations. Lower the strips, and drill two 3/16” clearance holes through the plywood strip at each stud location, about ¾” from the edge of the plywood. Where the strip butts up to another strip at a stud, drill the holes ¾” from the edges and the end, at an angle so the screws will hit the stud when installed.

3. If the end of a support strip lands between studs, prepare the end for a ¼"x3" winged toggle bolt before screwing the strip to the wall. With a 1” spade bit, drill a counterbore approximately $^{3}/_{16}$” deep (two plies of the plywood). Then drill a ⅝” through hole in the center of the counterbore.

4. Hold the strip to the wall again, and mark the location of the toggle bolt hole on the wall. Lower the strip once more, and carefully drill a ⅝” hole just through the sheet rock. Too deep punctures the poly behind, and can wrap the drill bit with insulation.

5. Assemble a $^{5}/_{16}$”x1” fender washer on the ¼"x3" winged toggle bolt, insert the bolt through the ⅝” hole in the plywood strip, then thread the toggle onto the bolt with the wings pointing toward the plywood. Put the strip up in position against the wall, and gently pound the toggle through the sheet rock. To provide an air seal for the hole, put two or three pumps of air sealing caulk into the sheetrock hole behind the support strip, and a bit behind the washer, and tighten the screw. Do not over-tighten!

6. Attach the strips using two 2½" exterior screws into all studs. At the corner, a 3½" sheetrock screw may be necessary, because the screw may need to be driven at an angle to hit the stud.

17.3. INSTALLING KITCHEN UPPER CABINETS

1. Prepare each cabinet for installation by drilling four 3/16" clearance holes in the back, drilling from inside to prevent unsightly breakout inside the cabinet. Holes should be located about 1" from each side, and about 2" from the cabinet top and bottom. Double units need six holes, with an additional pair behind the center stile. The corner cabinet will need four holes in each side – two as described above, and two in each side near the beveled section.

2. Begin the installation with the corner cabinet. Cut a 2x4 54" long and use it to support the cabinet under the front frame as it is held in place. Level across the top front, and check each side for plumb. Install a 1¼" wafer head screw in an upper hole on each side. Double check level and plumb, and shim as necessary to make certain this unit is level and plumb. Install the remaining 1¼" wafer head screws, checking level and plumb as each is installed.

   NOTE: Tightening the screws can pull the cabinet out of plumb.

3. Check the Cabinet Plan to see if filler(s) are required between the corner and adjacent units before proceeding.

4. Check that the spacing on each side of the window will be equal. If required, adjust the width of the filler strip (if any) to be sure that the window reveal will be equal on both sides, and that the upper cabinets end even with the base cabinets.

5. If filler(s) are required, attach them to the adjacent cabinet stile. Clamp as required, keeping the ends and face flush, and install construction screws the appropriate length through the filler into the stile.

6. Using the 54" long temporary support 2x4 as noted above, start on either side, hold the adjacent upper cabinet next to the corner unit, and clamp the stiles and/or side panels together using quick clamps. Adjust the position until the stiles and/or filler piece are flush.

7. Attach the unit to the support strip with 1¼" wafer head screws in the two top holes. Do not fully tighten the screws at this time.

8. Because corner units have angled stiles, the units on each side of the corner unit are attached with 1⅝" construction screws through the top and bottom of the corner unit SIDE PANEL into the stile and/or filler of the adjacent unit. Drill a ⅛" pilot hole through the side panel at an angle into the stile. Be VERY CAREFUL to not drill through the face or out the far side of the stile.

9. Attach the adjacent unit to the corner cabinet with 1⅝" construction screws. Check for level and plumb, adjust as required, and install 1¼" wafer head screws through the remaining back clearance holes into the support strips, checking for level and plumb as you proceed, and tighten all screws.

10. Repeat on the other side of the corner unit.

11. The next units are attached using the 54" 2x4 temporary support as before and clamping the stiles together using cabinet clamps and/or other clamps as required. Take care not to mar the finish on the stiles when clamping.

12. Get the stiles close to flush, and check that the unit is level, hold it in place by installing 1¼" wafer head crews into the support strip through the two top holes. Don't tighten fully at this stage. Once the stiles are screwed together, come back and install the remaining screws into the back.

13. Recheck that the stiles are flush; when complete, drill a ⅛" hole through one stile into the second stile. Be sure the bit is set deep enough so that the screw does not split the wood.

14. Screw the stiles together using 2½" trim screws. USE CARE when tightening - it's easy to break the screws. Turn the screws in until the heads are flush. Repeat as required for the remaining upper units. Two or three screws are usually adequate to ensure the stiles are flush and the joint is tight along the entire length.

15. Use tapered shims between support strips and cabinets as needed to keep adjacent cabinet fronts flush. Recheck for level, and install the remaining 1¼" wafer head screws into the support strips through the cabinet backs.

16. Follow the Cabinet Plan to complete the installation of all upper cabinets.

17.4. INSTALLING RANGE HOOD

1. Remove the electrical knockout from the junction box in the range hood.

2. Based on the knockout location, determine a hole location in the cabinet bottom for the cord to be inserted. Use a spade bit to drill a 1¼" hole for the cord. Drill from inside the cabinet.

3. From inside the cabinet above the range, drill four 3/16" clearance holes for the range hood pine strips in the cabinet bottom. The holes should be about 2" from each side, and 2" from the front and back.

4. Glue and screw 1x4 pine strips on the underside of the cabinet over the range to hold the exhaust fan. Screw DOWN into the strips from inside the cabinet with 1¼" wafer-head screws.

5. Remove the screws from the vent extension and re-secure it to the range hood with flashing tape cut to ~2" width. Be sure there are no gaps at the corners.

6. On the wall where the hood will go, draw a 4"x11" rectangle centered ½" below the cabinet.

7. Use an oscillating saw to cut out the sheetrock on the lines from above and remove. Be sure the top edge of the cutout is at least ½" below the bottom of the cabinet to provide for an air sealing surface (see Figure 17-2).

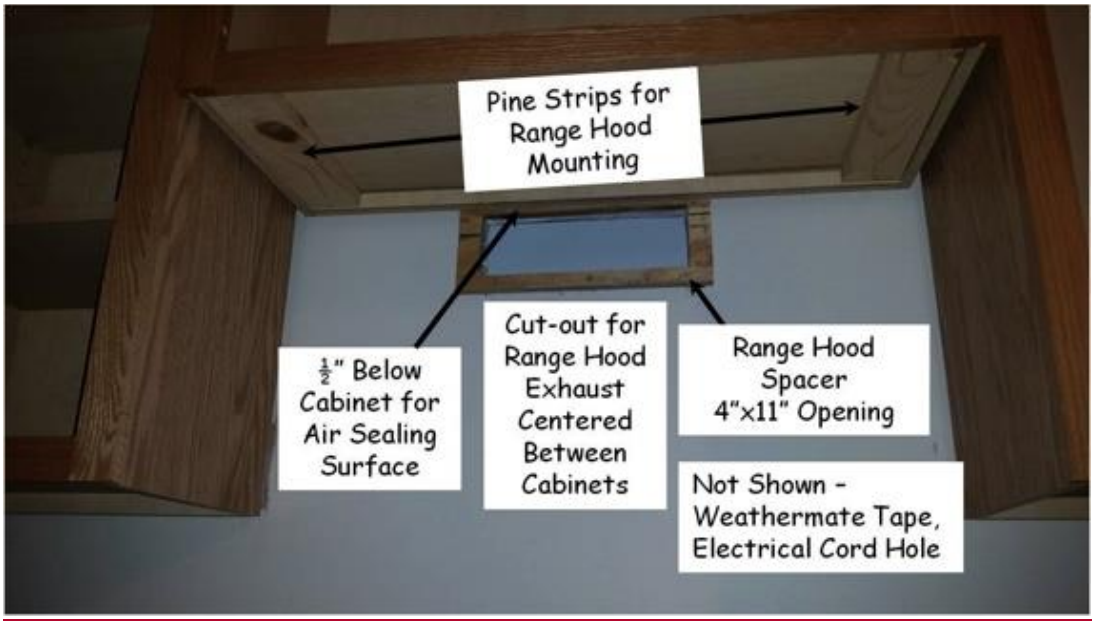

Figure 17-2. Range Hood Mounting Frame.

8. Using an oscillating saw with a fine metal cutting blade, carefully cut out the metal of the range plenum at the perimeter of the sheetrock opening.

9. If not supplied, cut a 6"x13" rectangular piece from ¾" plywood. Use a jig saw to remove a 4"x11" rectangle from this piece, leaving a frame 1" wide on all sides.

10. Align the inside edges of this frame with the wall cutout completed in Step 9 above, and secure in place using flashing tape. The top edge of the spacer will be recessed ½" behind the cabinet. Completely seal the space between the metal of the plenum, the sheetrock, and the plywood spacer, with no gaps, to prevent warm moist air from getting into the wall cavity.

11. Install weatherstripping on the face of the plywood spacer, around the perimeter of the opening, making sure there are no gaps.

NOTE: Thoroughly sealing this area is critical to ensure that warm, moist air from cooking does not enter the wall cavity and cause moisture and mold problems in the future.

12. Lift the range hood into place, sliding the vent extension into the cutout in the range plenum.

13. Make sure the back of the range hood fits tight against the range hood spacer frame so there are no gaps between the back of the hood and the weather stripping.

14. Fasten the range hood to the pine strips with 1¼" wafer-head screws.

17.5. INSTALLING KITCHEN BASE CABINETS

1. Remove drawers from the cabinets and store them in an out of the way place.

2. Set the corner carousel unit in place with the faces 36" from each wall as shown in Figure 17-3.

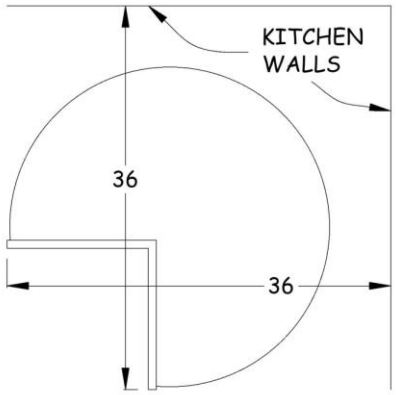

Figure 17-3. Corner Cabinet Installation

3. The sink unit may need holes to allow water pipes, drainage pipes and electrical boxes to pass through. Measure the location of the pipes and electrical box, using the window/cabinet centerline and floor as references. Transfer these measurements to the back and/or bottom of the cabinet.

4. The drain piping typically requires a 2½" hole. If that size hole saw is available, use that to make the hole. Otherwise, locate a spray can or similar object to use as a template, draw a round hole that size, then use a jig saw to cut the hole.

5. From inside the cabinet, drill 1" holes at the location of the hot and cold water supply lines.

6. Set the sink base in place centered below the window, then measure the space between the carousel and sink base frames. Refer to the Cabinet Plan to determine the width of any filler required adjacent to the corner unit. Attach as described for the upper cabinets.

7. Check the countertop length. The range is typically on the opposite side of the corner unit from the sink. The edge of the countertop adjacent to the range should end flush

with the cabinet above. Assemble per the Cabinet Plan the required unit(s) located between the range and corner unit. Clamp and screw the stiles together as described for the uppers.

8. Place this assembly next to the corner unit. Locate the end opposite the corner flush with the upper cabinet that is next to the range hood opening above. To align the ends, use a level against the stiles of both upper and lower units.

9. Measure the gap between the corner unit and the one adjacent, and rip a filler piece to that width. Attach it to the stile adjacent to the corner unit as described for the upper units, then assemble that cabinet (or assembly) to the corner unit.

10. Repeat Step 9 on the refrigerator end.

11. Check that the top of the assembled cabinets is level, and that the face is straight. Shim under the corners, and/or between the back and wall as required. Attach the assembly to the wall using 2½" wafer head screws into studs. Complete for all base cabinets.

12. If the range, refrigerator or dishwasher are adjacent to the floor corner cabinet, install a cabinet end cap between the appliance and the cabinet. Cut the front hardwood filler attached to the end cap to width (to allow enough room for the appliance). Notch the front lower corner of the end cap to match the cabinet toe kick. Hold the cut-to-width filler against the cabinet stile, and mark on the floor the location of the inside edge of the panel. With a framing square, draw a line square to the cabinet front from the mark to the wall (check for square to the wall).

13. Cut two pieces of 1x4 x 21" pine scrap. Align the edge of one of the pieces of pine board to the line from Step 12, on the corner cabinet side of the line. Screw it to the floor with three 1⅝" sheetrock screws. Place the second piece against the wall, on top of the first piece, with the bottom end flush on the floor piece, plumb it, and anchor to the wall (two or three 8d nails into a stud or ¼"x3" winged toggle bolts if no stud). Put the end cap in place, anchor it to the cabinet stile in the usual way, and nail the back and bottom of the end cap to the pine boards or plywood with 1¼" collated finish nails.

14. Sometimes there is a standalone cabinet at one end of the lineup. This cabinet will be fastened to a cleat. Determine the location of the cabinet and mark the outside of the front corners on the floor. Turn the cabinet over and measure the inside width of the toe kick base. Cut a cleat from scrap 2x4 or 2x6 1" shorter than that length. Align the cleat on the floor centered between the corner marks and out from the wall slightly more than the depth of the cabinet toe kick. Screw the cleat to the floor using two 2½" sheetrock screws. Set the standalone unit in place over the cleat and verify the position is correct. Secure the base of the cabinet to the cleat using two 1⅝" drywall screws through each end of the toe kick into the cleat.

NOTE: The wall stud spacing may be such that that one cannot attach the unit with screws into a stud. If so, use a ¼"x3" winged toggle bolt to attach the cabinet to the wall.

15. Install toe kicks with 1¼" collated finish nails, two into each end, and pairs spaced approximately 12" apart along the length.

    NOTE: If the Cabinet Plan includes a cabinet that may be removed for a future dishwasher, minimize the number of screws during installation. Cut a separate toe kick for this cabinet so the toe kick can then be easily removed without affecting the adjoining toe kicks.

17.6. KITCHEN COUNTERTOP PREPARATION

1. Lay a piece of 1x4 on top of the base cabinets near the wall corner. Place a 6' level on top of the 1x4 with the level extended into the corner, adjust to level and while holding the level tight to the wall, draw a line on the wall along the bottom of the level. Repeat on the other wall.

2. To provide support for the countertop in the corner, attach 2x4 scrap lumber about 26" long to the wall corner. Hold the top of the 2x4s even with the line from Step 1 and screw them to the wall using 3½" sheetrock screws into studs at each end.

3. Dry fit the mitered countertop by setting it in place to determine the need for scribing and sanding the back splash. If any gaps are > ⅛", tape the top of the back splash with painter's tape to protect the laminate. With the flat side of a carpenter's pencil against the wall (to match the largest gap between the backsplash and the wall), scribe a pencil line on the backsplash. Use a belt sander to remove excess material and avoid chipping the back splash. Sand leaving half of the pencil mark.

4. Dry fit the countertop by setting it in place to double check the fit is correct. If not, re-scribe and sand again to ensure a snug fit to the wall. The belt sander can be used to do fine adjustments, including putting a bevel (bottom farther from wall) on the edge of the backsplash. Make sure there is 30⅛" clearance for the stove, measured at both the front and back of the base cabinets.

5. Determine at what areas of the cabinets the countertop will be screwed to the cabinets. With the countertop temporarily in place, draw lines from below along the cabinet walls. There are usually corner blocks pre-installed in every corner of the cabinets that will work. Note the perimeter of the sink base for Step 17.7.1 below.

17.7. INSTALLING KITCHEN COUNTERTOP

1. Turn the countertop over and glue and screw 1x4x24" pine strips to the underside of the countertop that will mirror the same location of the corner blocks on the cabinets, except over the sink base. Drill three 3/16" clearance holes from inside the cabinet at the center and 1" from each end before securing with 1¼" wafer head screws. Later, screws will be placed through these cabinet corner supports to hold the countertop to the cabinets. Locate the pine boards so that they will lie on top of the cabinet walls. Be sure that the pine boards are outside of the sink base walls so they don't interfere with the installation

of the sink, and that the pine boards are located such that they will rest on TOP of the cabinet WALLS when the countertop is installed.

2. Rip a piece 1x4 pine board about 10" long to a ¾"x¾" dimension. Glue and clamp it at the front edge of the sink base cabinet, centered on the sink location. This will support the narrow front edge of the countertop that remains after the sink opening is cut out. Glue and clamp a 6"-10" piece of 1x4 on top of the lazy susan at the front of the corner miter joint to support the miter joint.

   NOTE: Do not place ANY blocking INSIDE the sink base cabinet

3. Drill 3/16" clearance holes through each of the diagonal support blocks in the cabinet corners where a pine board will be located.

4. Disassemble the dry fit and glue both edges and the spline. Reassemble and bolt units together making certain that top surfaces of both countertops are flush. Snug all bolts while checking that the top joined edges are flush along the length of the joint. Use a rubber mallet (NOT THE DEADBLOW HAMMER) to gently tap the countertop to make fine adjustments. Wipe off excess glue with a damp paper towel and verify that joined edges remain flush. Finish tightening the bolts uniformly, then set the countertop in place

5. Use 1¼" wafer-head screws to fasten the counter top to the cabinets from the bottom of the cabinet corner support into the pine strips under the counter top.

   CAUTION: Check length of screws to avoid screwing up through the top of the counter, ruining the unit.

6. If a pantry cabinet is to be placed next to the countertop, it may be necessary to carefully chisel a notch in the proud edge of the cabinet stile to fit around the countertop.

   NOTE: Ensure that the chisel is very sharp before attempting this notch.

7. Once the countertop is installed, reinstall all doors and drawers. Use the hinge adjustment screws as needed to plumb and align the doors. Remove the shipping pins form the lazy susan, and adjust it as required to align the door edges with the stiles and provide a uniform gap.

17.8. INSTALLING BATHROOM VANITY

1. Determine the location of the vanity from the drawing and drill 1" holes from inside the vanity through to allow for water supply lines. Cut a 2½" hole for the drain.

2. Level and fasten the cabinet in place with 2½" wafer head screws to the wall studs (use ¼"x3" winged toggle bolts if needed).

3. Dry fit the countertop to determine if scribing and sanding are required. If so, scribe and sand to fit per Sections 17.6.3 and 17.6.4.

4. Turn countertop over. Glue and screw (using 1¼" wafer-head screws) 1x4 pine strips to the underside of the countertop that will mirror the same location of the corner blocks on the cabinets.

5. Set the countertop in place and fasten to the cabinet following the same procedure used for the kitchen countertop (see Section 17.7).

   CAUTION: Check length of screws to avoid screwing up through the top of the counter, ruining the unit.

6. If a linen cabinet is to be placed next to the vanity, it may be necessary to carefully chisel a notch in the proud edge of the cabinet stile to fit around the countertop.

17.9. INSTALLING OPTIONAL CABINETS

17.9.1. Stairway Cabinets.

1. If there is an opening prepared in the kitchen for a built-in cabinet over the stairway, install a lower and upper cabinet in the opening. Unpack the units and inspect for damage. Report any damage to the Construction Supervisor.

2. Measure the outside dimensions of the two cabinets and verify they will fit into the rough opening. The opening should be 30"x55½".

3. Remove the drawers from the lower (base) cabinet. Cut off the bottom of the cabinet flush with the top of the toe kick with a circular saw.

4. Remove the shelves and doors from the upper cabinet by removing the screws from the stiles (leave the hinges on the doors). Store the hinge screws in a container and save.

5. Install the lower cabinet first. Drill two 3/16" clearance holes from inside the cabinet frame, 1½" inside the frame, about 2" down from the top and 2" up from the bottom.

6. Place the lower cabinet into the opening. Use a 3' level to verify the cabinet is level and plumb, shim underneath the cabinet, as necessary. Check to ensure the face frame protrudes ¾" out from the wall surface around the entire frame perimeter.

7. Secure the top of each side with 2½" wafer head screws. Tighten gradually and check for level and plumb as each is installed. Repeat with the bottom screws. Re-check for level and plumb and a uniform ¾" frame reveal. Adjust as necessary.

8. Drill two 3/16" clearance holes per side in the upper cabinet at the locations described for the lower cabinet (see Step 5 above).

9. Install the upper cabinet on top of the lower cabinet. Flush the upper and lower frame faces and clamp together. Drill two ⅛" pilot holes 2½" deep through the lower cabinet face frame and partially into the upper cabinet face.

10. Fasten the cabinets together with two 2½" trim screws. Verify reveal is still a consistent ¾" around the frame perimeters. Secure the two sides of the upper cabinet to the framing with 2½" wafer head screws.

11. Install door trim around the perimeter of the cabinet frame to conceal the gap between the cabinet and the opening. Orient the trim with the thicker edge against the cabinet frame. Miter cut and glue the corners and nail with 2½" collated finish nails.

12. Install the shelves and doors in the upper cabinet doors and adjust hinges, if necessary, to align door edges. Insert the drawers into the lower cabinet.

17.9.2. Barista Cabinets.

1. Barista cabinets are a modified set of two upper cabinets. For this installation, one has a toe kick added to one of the cabinets. The base cabinet is mounted directly under the upper cabinet. This arrangement is typically centered between the end of a wall and a closet.

2. Remove the shelves, then remove the doors by taking out the screws from the stiles (leave the hinges on the doors). Collect the hinge screws and any related hardware and save.

3. Drill four 3/16" clearance holes in the back of each cabinet per Section 17.3.1. Drill from inside the cabinet to avoid unsightly breakout.

4. Check the Cabinet Plan for location. Determine if there are two wall studs within the width of the cabinet. If there are, install cabinet directly to the wall. Mount 54" off the floor. Use a 3' level to draw a light level pencil line on the wall at 54" above the floor. Verify the cabinet is centered left-to-right and mount with 2½" wafer head screws in the top two holes. Refer to Section 17.3.2 for leveling and cabinet support instructions for installation. Shim as necessary to ensure cabinet is level and plumb, then install the bottom screws.

5. If studs are not available for mounting, layout and install upper and lower support strips to the wall as instructed in Sections 17.1 and 17.2.

6. Attach upper cabinet to the support strips with 1¼" wafer head screws (refer to instructions in Section 17.3).

7. Build and attach a toe kick base to raise the lower cabinet to the same toe kick height as the other kitchen base cabinets. See Construction Supervisor for details.

8. Make sure the sides of the base cabinet are aligned with the upper cabinet sides and install per base cabinet instructions provided in Section 17.5.14.

9. Install the toe kick board to the base cabinet per Section 17.5.15.

10. Dry fit the countertop to the wall to determine if scribing and sanding the backsplash are required. If so, scribe and fit per Sections 17.6.3 and 17.6.4.

11. Turn the countertop over. Using 1¼" wafer-head screws, glue and screw 1x4 pine strips to the underside of the countertop that will mirror the locations of the corner blocks on the cabinets.

12. Install the countertop per Sections 17.7.3–17.7.5.

13. Install the shelves and doors and adjust hinges as needed to align door edges.