# Roll Around Kitchen Cart

**MLCS Items Used:**
1/4” Radius Round Over router bit (#6352/8652)
1/2” Rabbeting router bit (#5393/7693)
3/8”-1/2” Lock Miter router bit (#5547/7847)
1/4” Edge Beading router bit (#5531/7831)
Rail and Stile router bit (Profile of Your Choice)
Raised Panel router bit (Profile of Your Choice)
31/64” Plywood router bit (#7793)
5/16” Solid Carbide Spiral Upcut router bit (#7466)
1-1/4” Forstner bit (#9217)
#6 Screw size Drill bit and Countersink (#9365/9665 sets)
5/64” Flash bit (#9370)
Double-sided Tape (#9489/9493)

**Additional Tools Needed:**
Phillips Screw Driver
Chisel
Hammer or Mallet
Spring Clamps
Bar Clamps
Wood Glue

**Making the legs:**

To make the legs, you can either use 1-1/2” square stock that is at least 36” in length or glue up two 3/4” thick pieces, 1-1/2” wide to make the square stock needed for the legs (the legs will be cut to final length at a later step). Using a 1/4” radius Round-Over bit cut a full radius on each side of the legs (do not cut a fillet above the radius, set the bit height to only use the radius section of the router bit).

**Making the blanks for the Top, Middle Shelf and Bottom:**

The top, middle shelf and bottom will be made up of solid hardwood that will be edge joined using a biscuit joint. For the top, middle shelf and bottom; refer to the cut list to get the final dimensions of these pieces. When planning this step try to use boards that have similar grain patterns and try to alternate the growth rings up and down to keep the final assembly from cupping. Allow extra width and length when doing the layout and gluing up of these assemblies. Make sure when cutting the biscuit slots that you place the biscuits in locations where they will not be visible when the blanks are cut to their finished dimensions. This is especially true of the top, as a section will be cut off to make the drop down table extension, and be careful not to place any biscuit slots where the knife slot will be.

**Making the Lower Storage Section and Upper Drawer Section:**

It will easier to make each the upper and lower section side and back pieces out of a single taller piece of plywood and then rip them to their finished height. This can aid in providing more stability and less tear out when routing the lock miter joint used to join these three pieces together. This will also insure that both the top and bottom sections will be the same width. The back piece will be run laying flat on the table and both ends will have the lock miter joint cut on them (see fig A). When you are routing the pieces that will be used for the sides, they will be standing on end and they will only have the edge that will mate to the back routed (see fig B).

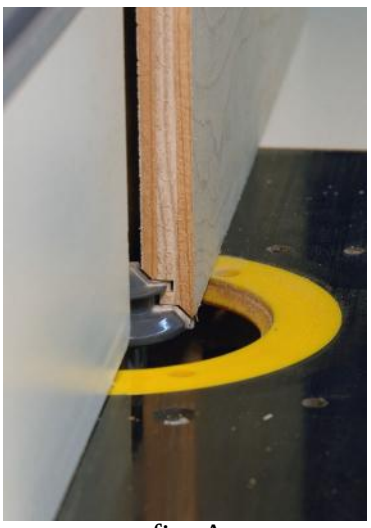


fig. A


fig. B

After routing the pieces, cut them to the finished length and height as listed in the cut list on the last page. The upper drawer section pieces will require additional machining as a 3/4” high by 3/16” deep rabbet will need to be cut along the full length of the top and bottom of these three pieces to accept the drawer support frames. The easiest way to accomplish this cut is to set your rabbeting bit so that the carbide protrudes 3/16” past your router table fence. Set the router bit height to cut at a height of 3/16” and make 4

passes on each piece, raising the router bit height 3/16” after each pass until you have reached the full 3/4” cutting height for the 4th and final pass. Glue up the three sides of each of these two assemblies, using two clamps along the back of the assembly to hold these pieces together until the glue sets.

**Upper Section Drawer Support Frame:**

Cut the pieces required to make the drawer support frame to their finished dimensions. A simple butted glue joint will be used to secure this frame together. Apply glue to the end grain of the side drawer frame supports and align them with the ends of the front and back drawer frame supports. Use a clamp on each side to hold these pieces together until the glue dries (see fig. C). After the glue has dried remove the completed frame from the clamps. Apply glue to the rabbets that were created along the inside of the upper drawer section and place the drawer support frames into the rabbets to attach the drawer support frames to the upper drawer section. Spring clamps or small woodworking bar clamps should be used to temporarily hold these three assemblies together until the glue dries (see fig. D). After the glue had dried apply the 31/64” by 3/4” hardwood edging strips to each front edge of the exposed plywood of the upper drawer section. These only need to be glued in place using an edge-to-edge glue joint (see fig. E). If the upper drawer section is going to be painted, now is the time to apply the painted finish to only the plywood exterior surfaces.


fig. C


fig. D


fig. E

**Attaching the Middle Shelf and Bottom to the Lower Storage Section:**

The middle shelf and bottom will get cut to the same finished dimension as listed on the cut list. Before these can be attached to the back and sides of the storage section, a 3/8" tall by 31/64" deep stopped rabbet will need to be cut on the bottom edge of the middle shelf and the top edge of the bottom (see fig. F). The rabbet will need to be stopped 3/4" from the front edge of these pieces so make a pencil mark to note the starting and stopping locations during the routing process (see fig. G). Your rabbeting bit should already be set up in your router table from the previous routing operation on the upper drawer section. Readjust the bit height to 3/8" and using the 3/4" starting / stopping marks, plunge the work piece into the router bit and rout along both sides until you complete the cuts along the end grain. Complete the cut by routing along the full length of the back edge. Use a chisel to square up the stopped rabbets on both the middle shelf and bottom (see fig. H).


fig. F


fig. G


fig. H

A 1/4" decorative edge bead needs to be made on the front edge of the middle shelf and bottom. The edge bead will be made using a 1/4" diameter Edge Beading router bit. The bead will get cut on the top edge of the middle shelf and the bottom edge of the bottom. Rout the edge bead along the entire edge of both the middle shelf and bottom.

Apply glue into the rabbet along the middle shelf and place the lower storage side assembly so that it fits into the rabbet created in the middle storage shelf. Secure with a couple of woodworking clamps until the glue dries. Repeat this step for the bottom piece to complete this assembly (see fig. I).

**Finishing the Lower Storage Section:**

After the glue has dried apply the 1” by 3/4” hardwood edging strip to each front edge of the exposed plywood of the lower storage section (see fig. J). These will complete the face frame of the lower storage section and will be used to attach the door hinges to the lower storage section. These only need to be glued in place using an edge-to-edge glue joint. If the lower storage section is going to be painted, now is the time to apply the painted finish to only the exterior plywood surfaces.


fig. I


fig. J

**Making the Raised Panel Doors for the Lower Storage Section:**

Cut the pieces of stock to length for the rails and stiles. Cut and glue up stock to the width and length needed for the center panel. You will have (4) rails, (4) stiles and (2) panels that will make up the two raised panel doors. *If you have never made a raised panel door before, please consult the MLCS online technical pages for further explanation of this operation.* Start by cutting the rail ends using the coping bit from the rail and stile router bit(s). A coping sled will be very useful as the rail width is very narrow and will be hard to control as it leaves the infeed fence and enters into the path of the router bit cut. After all of the rail ends have been coped, the stile bit will need to be used to create the profile and panel slot in all of the rail and stile pieces. This cut will only be made along the length of one side of each of these pieces. Set-up your table and use a test piece of the same thickness to check that the bit height is correct. If all is well, complete the pieces for the doorframe by routing all of the rail and stile pieces.

The raised panel will need to be made now. Use a single piece of wide stock or glue up two narrower pieces to achieve the 8-15/16”width needed for the center panel. Cut the panel to the finished dimension as given by the parts list. Install the raised panel router bit in your router table and cut the raised panel profile onto the raised panel leaving a 1/4” tongue on the edge to fit into the 1/4” wide slot in the rails and stiles. Dry fit the door

together and if all is well proceed to glue the rail and stile joint together (see fig. K). The raised panel should not be glued into the slot; it should be floating to allow for seasonal expansion and contraction.

The door edge profile is all that is left to do to complete the doors. Using a 1/4" radius round over bit cut a full radius with a 3/32" fillet above it around the entire perimeter of the door (see fig. L).


fig. K

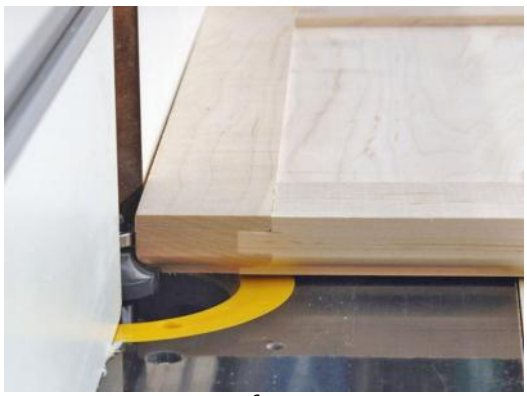


fig. L

**Attaching the Legs to the Lower Storage Section and Upper Drawer Section:**

Screws will be used to attach the legs to the lower storage section. The screws will need to have pilot holes drilled through the sides of the lower storage section and into the legs. The holes should be placed as close to the center of the legs as possible. Two screws in each back leg and three screws will be used in each front leg. Two of the front countersunk screws will be through the lower storage section side only and the third will be countersunk and through both the side and the front lower storage section frame (see fig. M). Two screws will be used to attach the legs to the upper drawer section. It is important that the screw heads be countersunk and at least flush with the inside of the upper drawer section. The drawer will be made to slide in the upper drawer section without using any drawer slides (see fig. N).


fig. M


fig. N

**Building the Drawer:**

Cut the drawer box pieces to size. A 31/64" wide by 1/4" deep dado needs to be cut 1/2" from the bottom edge of the drawer sides and front to accept the drawer bottom. A 31/64" wide by 1/4" dado needs to be cut 1/2" from the back edge of each of the drawer sidepieces to accept the drawer box back. Finally a 31/64" wide by 1/4" deep rabbet needs to be cut along the front edge of the drawer side pieces to accept the drawer box front (see fig. O).

fig. O

Apply glue to the ends of the drawer box front and attach the drawer box front to the sides of the drawer box. Slide the drawer bottom into the slots in the drawer assembly. Apply glue to the dadoes in the drawer box sides and slide the drawer box back into the dado in the drawer box sides. Clamp this assembly up and allow the glue to fully dry before removing the clamps (see fig. P).

fig. P

Cut the drawer front to the finished dimension. Using a 1/4" radius round over bit cut a full radius with a 3/32" fillet above it around the entire perimeter of the drawer front, similar to the edge treatment created around the raised panel doors.

Drill four countersunk holes in the front face of the drawer box near the ends of the drawer front face. The countersinks should be on the inside of the drawer box. Slide the completed drawer box into the opening in the upper drawer section. The drawer should slide easily in the opening. Using double sided tape, temporarily attach the drawer front

to the drawer box, registering the bottom of the drawer front so that it is flush with the bottom of the upper drawer section. Use six 5/8” screws to attach the drawer front to the drawer box. A couple of spring clamps can be used in addition to the double-sided tape to hold the drawer front in place while you attach it with the screws (see fig. Q).

fig. Q

**Making the Towel Bar / Knife Guard:**

Cut two blanks for the towel bar ends and double side tape them together. It will be easier to make a single cut to insure two matched pieces. Use double-sided tape to attach the template to the towel bar end blanks. If you decide to cut the template, making a copy or printing out a second template is suggested. If you are not planning to cut the template, transfer paper may be used to draw the profile on the towel bar ends. Use a sanding drum to remove any saw marks left on the edge of the towel bar ends (see fig. R).

Separate the two towel bar ends from each other. Then use a 1/4” radius round over bit and a starter pin in your router table, to a full 1/4” round over profile along the edge profile cut that was just made. Do not rout along the remaining straight edges of the towel bar ends. Repeat this for the other edge so that you have a round over profile on each edge of both towel bar ends (see fig. S).

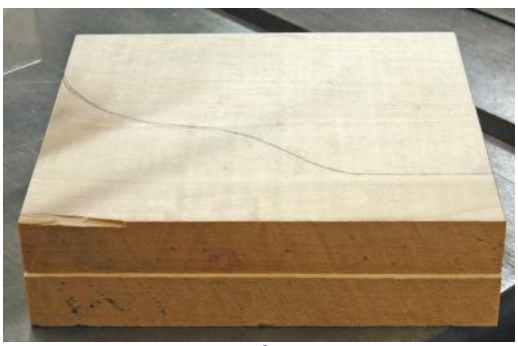


fig. R

fig. S

A 1-1/4” hole needs to be drilled to make the socket to accept the towel bar dowel. Refer to the template to mark the location. Drill a 3/8” deep hole to accept the towel bar dowel on the inside face of each towel bar end (see fig. T).

The knife blade guard needs to be made next. Cut the knife blade guard to the finished dimension. Using the 1/4" radius round over bit, rout both sides of the bottom edge. Drill and countersink the two mounting hole locations for the knife blade guard as marked on the towel bar end template. The countersink is on the outside face. The leg will cover these screws when the towel bar is mounted onto the roll around cart (see fig. U).


fig. T (inside)


fig. U (outside)

To assemble the towel bar assembly, center the knife blade guard on the two mounting hole locations and keep the top edge flush with the top of the towel bar ends. (*There should be approximately a 9/16" gap from the back of the knife blade guard to the back edge of the towel bar end. This is to allow the knife blades to drop through cart top and be stored between the upper drawer section and knife blade guard*). Screw one end in place, then place the towel bar dowel into the hole on the towel bar end. Place the other end of the towel bar dowel into the second towel bar end and align the second towel bar end with the knife blade guard. Screw the towel bar end to the knife blade guard, trapping the towel bar dowel in between the towel bar ends.

Slide the completed towel bar assembly between the front and back legs on the right side of the upper drawer section (see fig.V). Drill and countersink two screw holes in locations to be centered on the back edge of the towel bar ends. Once again, the screw heads need to be recessed or at least flush with the inside face of the upper drawer section sides to allow the drawer to slide properly. Use two screws at the front and back to attach the completed towel bar assembly to the upper drawer section (see fig. W).


fig. V


fig. W

**Attaching the Doors to the Lower Storage Section:**

It will be easier to attach the doors to the lower storage section if the cart is lying on it's back. Place a blanket down on the floor or bench to prevent scratching the legs while performing this step. Lay the doors face down on your work surface and attach the hinges to the door, 1-1/2" from the top and bottom of the door. Use a flash or vix bit to center the pilot holes for the mounting screws (see fig.X). After the hinges have been mounted to the door, center the two doors over the opening in the lower storage section. Use the flash / vix bit to drill the pilot holes in the stiles for the hinges. Screw the hinges to the lower storage section stiles and check the doors to make sure they open and close properly and that they are correctly aligned.

fig. X

**Making and Applying the Molding for the Decorative Trim:**

A simple decorative strip with a 1/4" diameter bead will be used to cover the end grain and joint of the plywood sides to the middle shelf and bottom of the lower storage section. This same trim piece will be used to complement the look on the bottom edge of the upper drawer section. Start by taking wider stock 2" minimum and running the edge bead profile along the length of both edges. Using a jig to hold the piece while ripping the thin molding strips off is the safest way to accomplish this task (see figs. Y and Z).

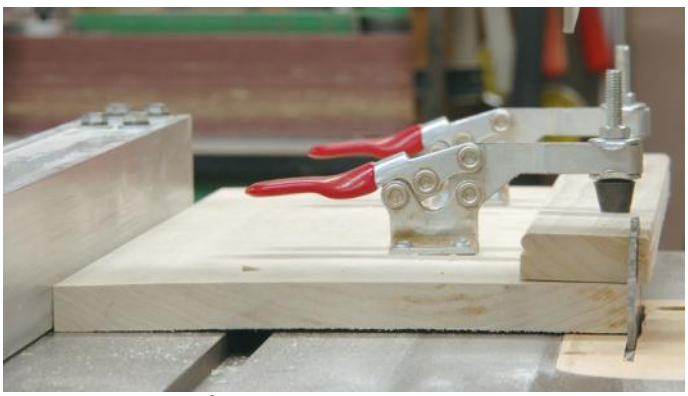


fig. Y

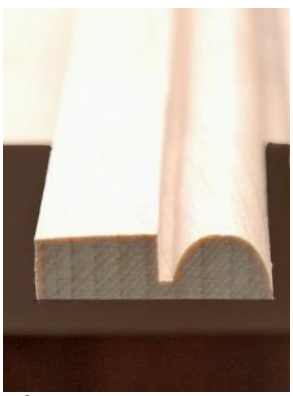


fig. Z

Cut the molding to length to fit between the legs at the top and bottom of the lower storage section. Apply glue to the back of these molding pieces and use clamps to hold them in place while the glue dries (see figs. AA and BB). Repeat this for the left side and back of the upper drawer section (the right side of the upper drawer section will be covered by the towel holder, no trim is applied to the right side).


fig. AA

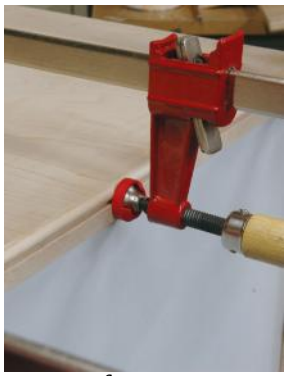


fig. BB

**Sizing and Machining the Cart Top:**

Cut the top to the finished dimension, as given on the parts list. Lay the top good face down on a piece of cardboard or a blanket to protect it. Flip the cart assembly upside down and center it over the top. Trace the location of the towel bar holder and mark the location for the knife slot (between the upper drawer section and knife blade guard on the towel bar). Draw a line 1/2” on the outside of the towel bar holder. A 1-1/4” diameter radius is made on all of the 90-degree corners of the top to avoid injury from any sharp corners. Remove the assembled cart from the top.

Use a forstner bit to drill a 1-1/4” through hole for the two interior radiuses where the recess is to access the towel bar. Use a jig saw or band saw to cut all of the outside corner radiuses and to cut away the recess in the top for access to the towel bar (see fig. CC). Use a straight edge and a flush trim router bit to flush trim all of the straight cuts made for the towel bar access (see fig. DD).


fig. CC


fig. DD

Drill a 5/16” through hole in the top at both ends of the knife blade slot location. Install a 5/16” straight or spiral upcut router bit into your router. Place the bit at the starting hole for the knife blade slot location and place a straight edge on both sides of the router. Move the router to the opposite hole and repeat the placement of the straight edges. Lock the straight edge guides in place, trapping the router base between them (see fig. EE). With the router adjusted to make a shallow pass, start at one of the two holes make a cut across to the other hole. Complete the knife blade slot by making multiple shallow passes, adjusting the router bit cutting depth between each pass (see fig. FF).

fig. EE

fig. FF

**Attaching the Top to the Cart:**

Drill three 1/8” through mounting holes on each sidepiece in the upper drawer section top-drawer support frame. Elongate the two outer holes to allow the top to expand with seasonal changes in humidity. Drill three 1/2” through holes in the same locations on the lower-drawer frame to allow easier access for a screwdriver when attaching the top to the cart (see fig. GG).

Place the top face down on the cardboard or blanket to protect it again. Place the cart assembly upside down on the top and center the base over the top again. Use 1-1/4” screws to attach the top to the cart (see fig. GG again). Turn the assembly right side up when you are finished fastening the top to the cart.

fig. GG

**Creating the Edge Detail on the Top:**

Use a 1/4” radius round over bit to create the edge profile that is present on the entire perimeter of the top edge of the cart top. Set the router bit height to cut a full 1/4 round profile and starting with the end grain make a complete cut around the entire top. Re-adjust the router bit height to make the final pass and create a 1/8” tall fillet above the radius.

**Installing the Castors:**

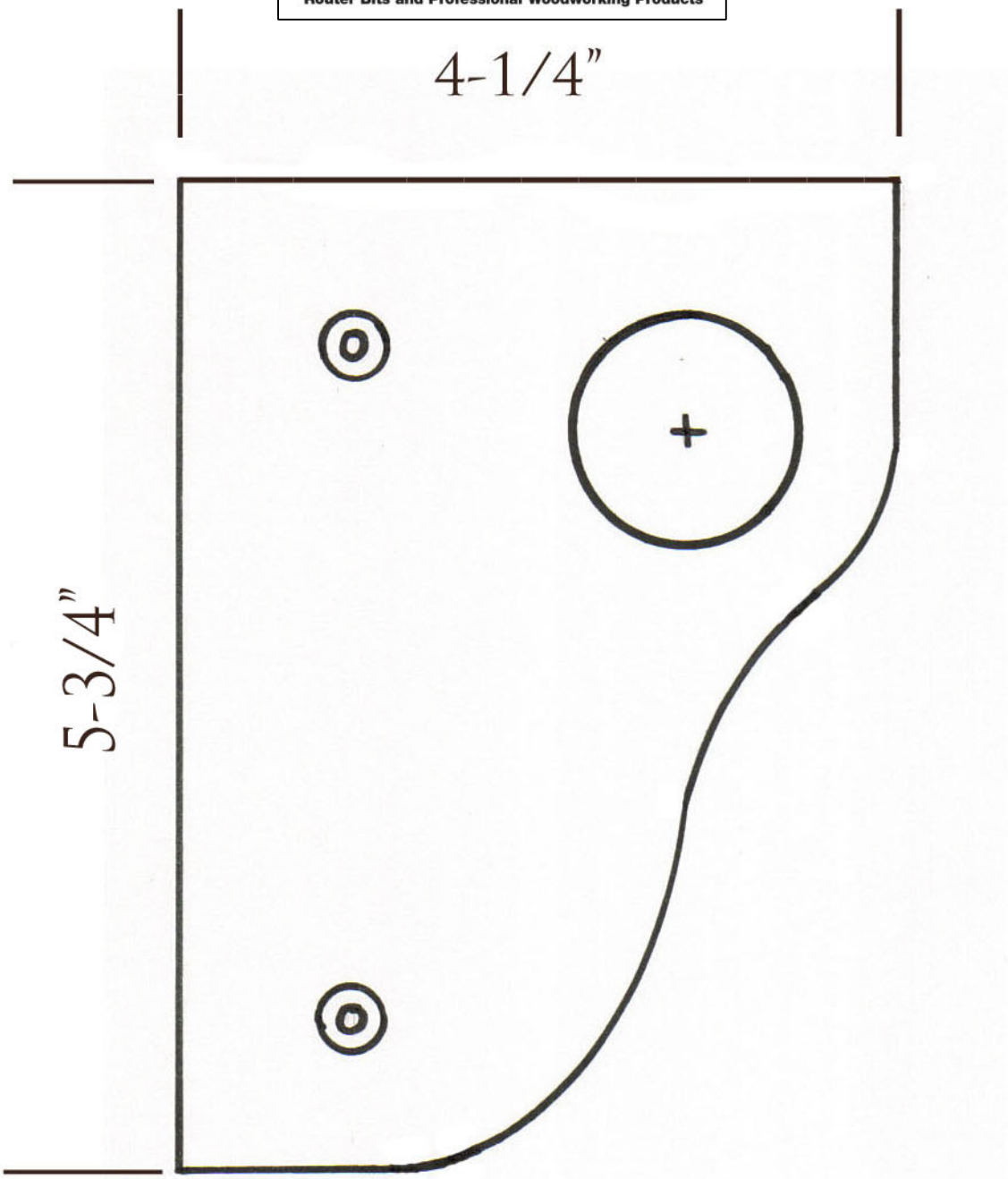
The castors we used on this cart have a threaded stud on them. A t-nut is installed into the bottom of each leg to accept the threaded stud. A pilot hole is required to allow the t-nut body and threaded stud of the castor to be installed in the leg. Check with the instructions supplied with your castor for the required hole size for the t-nut that is supplied with your castor. Make sure to drill a deep enough hole to allow the threaded stud to be fully threaded into the t-nut.

**Final Touches:**

The assembled cart is now ready for final sanding of the entire cart and having a finish applied. Remove the doors as it will be easier to finish them off of the cart. After the finish has cured, the drawer pull and cabinet knobs can be installed and door hinges can be re-mounted to the doors and cart.

# Parts List

| Part Description | Length | Width | Thickness | Qty. | Material |
|---|---|---|---|---|---|
| Top | 34-3/4” | 26-1/2” | 3/4” | | Glued Up Maple |
| Middle Shelf | 24” | 23-1/2” | 3/4” | | Glued Up Maple |
| Bottom | 24” | 23-1/2” | 3/4” | | Glued Up Maple |
| Legs | 32-3/4” | 1-1/2” | 1-1/2” | | Maple |
| Storage Section - Sides | 22-5/8” | 13-3/4” | 1/2” | | Birch/Maple Plywood |
| Storage Section – Back | 24” | 13-3/4” | 1/2” | | Birch/Maple Plywood |
| Drawer Section – Sides | 22-5/8” | 13-3/4” | 1/2” | | Birch/Maple Plywood |
| Drawer Section – Back | 24” | 13-3/4” | 1/2” | | Birch/Maple Plywood |
| Drawer Support Frame - Front & Back | 23-1/8” | 1-1/2” | 3/4” | | Maple |
| Drawer Section Frame – Sides | 18-3/4” | 1-1/2” | 3/4” | | Maple |
| Drawer Box – Front | 22-1/4” | 4-1/8” | 1/2” | | Birch/Maple Plywood |
| Drawer Box – Back | 22-1/4” | 3-1/4” | 1/2” | | Birch/Maple Plywood |
| Drawer Box – Sides | 22-3/8” | 4-1/8” | 1/2” | | Birch/Maple Plywood |
| Drawer Box – Bottom | 22-1/4” | 22-1/4” | 1/2” | | Birch/Maple Plywood |
| Drawer Front Panel | 23-7/8” | 5-3/4” | 5/8” | | Maple |
| Towel Bar Holder – Ends | 4-1/4” | 5-3/4” | 3/4” | | Maple |
| Towel Bar Holder – Rod | 19-3/4” | | 1-1/4” Dia. | | Maple |
| Towel Bar Holder – Knife Guard | 19” | 5-5/8” | 3/4” | | Maple |
| Drawer Section Edge Banding | 5-3/4” | 3/4” | 31/64” | | Maple |
| Storage Section Face Frame Stiles | 13-3/4” | 1” | 3/4” | | Maple |
| Door Rails | 9-7/8” | 1-1/2” | 3/4” | | Maple |
| Door Stiles | 13-1/2” | 1-1/2” | 3/4” | | Maple |
| Door Panels | 11-3/16” | 9-13/16”” | 3/4” | | Maple |
| Beaded Trim Moldings – Sides | 21” | 3/4” | 1/4” | | Maple |
| Beaded Trim Moldings – Back | 24” | 3/4” | 1/4” | | Maple |




# Template for Making the Towel Bar End
# 2 pcs. Are Required