

Golf Ball Display Rack



Router bits used:

45-degree Chamfer Bit (MLCS #7677/ 5376)

1/2" Straight Bit (MLCS #7774/ 5474)

3/8" Keyhole Cutting Bit (MLCS #7738/ 5438)

1/4" Beading Bit (MLCS #8752/ 6452)

1-5/8" Core Box Bit (MLCS #8727)

Additional MLCS Accessories Used:

"OnPoint" Universal Laser Guided Router Plate (MLCS #9098)

Powergrip Router Mat (MLCS #9002)

Double Sided Tape (MLCS #9489/ 9493)

Merle Corner Clamp (MLCS #9012)

Preparing your stock:

Start by planning your stock to a 1/2" uniform thickness. Refer to the cut list on the last page to cut your pieces to the final dimensions. Mark each piece using a piece of masking tape to write on, to keep all of the pieces organized.

Making the frame:

A 45-degree chamfer cut must be made on both ends of the frame sides, top and bottom to create a joint that eliminates any end grain from showing when assembled. (See Figure A)



Figure A

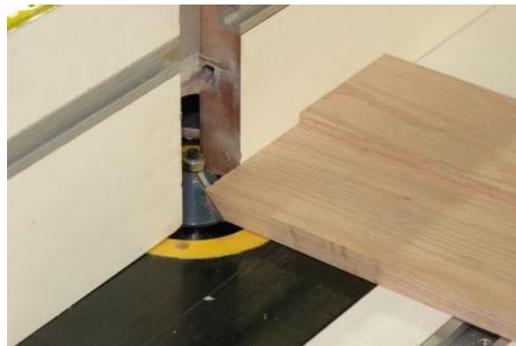


Figure B

Using the 45-degree Chamfer Bit, adjust your router table fence to cut across the entire thickness of the diagonal of the frame pieces, while being careful not to remove any extra length from the pieces. Using a piece of scrap stock behind the piece will aid in supporting the piece and help to eliminate tear out as the end grain is routed. (See Figure B)

After chamfering the ends, the sides will need to have dado slots cut into them to accept the intermediate shelves. Lay the sidepieces flat so that the inside is facing upward. Mark the centerline of the length of the face for the center shelf. Measure 3" to the left and right of the centerline and mark the center of the other intermediate shelf dados. (See Figure C)



Lay both side frame pieces side by side and mark the dado layout lines on them. Transfer the layout line onto each edge of each side frame piece so that the layout lines will be visible when the inside faces are face down on the router table surface. With the 1/2" Straight Bit in the router table, adjust your fence so the 1/2" Straight Bit is centered with the shelf dado layout lines.

(See Figure D)



Figure D

You should only have to make two adjustments to the fence because the two outer shelf dadoes will use the same fence position. Just turn the work piece around to the other end to make the second outside cut at the same fence setting. Adjust the router bit height to make a 3/16" deep cut for the dado. When cutting the dadoes you should place a piece of scrap stock behind your side piece to aid in supporting the piece and help to eliminate tear out as the router bit exits the cross grain cuts.

The keyhole slots will need to be cut into the edge of the frame top so that you can hang the display rack on the wall. Because the stock is only 1/2" thick, careful setup is required to avoid cutting completely through the top of the frame.

(See Figure E)



Figure E

Adjust the Keyhole Cutting Bit to a cutting height of $\frac{3}{8}$ " above the router table. To aid in setting up the stops used to control the cutting of the bit, a piece of masking tape applied to your router plate can be used to mark the centerline of the router bit. (See Figure F)

Adjustment of the fence is the most critical part of this setup. Allow the router bit to protrude a maximum of $\frac{3}{8}$ " from the fence face. Any farther and you will run the risk of cutting through the frame top. (See Figure G)



Figure F



Figure G

We are going to use two keyhole slots to hang the display rack because with only one there is more of a chance for the rack to swivel if accidentally bumped and then the golf balls may all fall out of it. Mark the position of the keyhole slots $1\text{-}\frac{3}{4}$ " from the outside end of the top frame piece. Position the keyhole slot so that it lines up with the bit centerline (marked on the masking tape). Place and clamp a stop at the end of each of the top frame piece to help control the cut. (See Figure H)



Figure H



Figure I

Turn on the router and with the router bit spinning slowly plunge the work piece into the router bit by holding the opposite end firmly against the router table fence.
(See Figure I)

The cut is complete when the work piece is flush to the router table fence. Repeat setting up the stops and making the cut on the opposite end of the top frame.

Before assembling the frame the depressions for the golf balls will need to be made.

Making the Golf Ball Divots:

The 1-5/8” Core Box Bit will be used to make the depressions in the shelves and bottom of the frame to keep the golf balls in place. Using the MLCS On-Point Universal Laser Guided Router Plate (MLCS item #9098) will make the job of creating the golf ball depressions very accurate and easy.
(See Figure J)

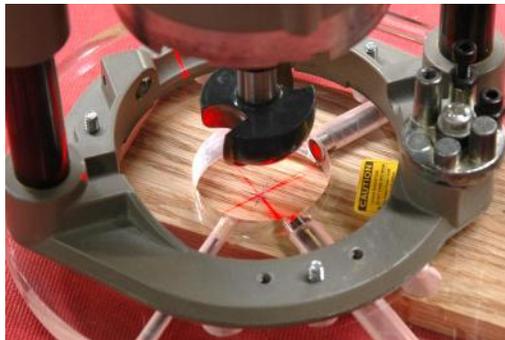


Figure J

The first step is to layout the ball depression marks on the three intermediate shelves and the bottom frame piece. The marks will be made 1-1/4” from the front edge of the shelves and bottom frame piece. Mark the center location by just locating the center point of each piece. The two additional outer depressions will be made 2-1/4” out from the center position. Because the work pieces are relatively small the MLCS Powergrip Router Mat (MLCS item #9002) can be used to hold the pieces in place while they are routed. A tip for using the On-Point Universal Laser Guided Router Plate to create the depressions is to use a piece of double sided tape (MLCS item# 9489/ 9493) to hold the router plate in position while making the plunge cut in the small work pieces. The reason for this is that the base is designed to slide easy over a flat smooth surface and the natural cutting action of the spinning router bit will try to pull the base out of a static position, causing a “grooved” cut versus a vertical plunge cut.



With the 1-5/8" Core Box Bit mounted into your router, place the center of the router bit over the intersection of your layout lines. Set the depth stop of your router to allow a 1/8" deep cut. Carefully plunge the spinning router bit into the work pieces to create the depressions for the golf balls. Do not allow the router bit to stay at the fully plunged position for any length of time as you will likely get burn marks from the heat generated. These burn marks can be very difficult to remove by sanding so do use caution to avoid the burn marks.

Making the Top and Bottom Cap:

Insert the 1/4" radius Beading Bit into your router table and adjust the router bit height to cut a 3/32" fillet above the bead. Adjust your fence to gain a full cutting depth to the ball bearing guide on the router bit. Rout across the end grain on each end of the Top and Bottom Cap. Once again using a piece of scrap stock behind the piece will aid in supporting the piece and help to eliminate tear out as the end grain is routed. After completing the ends of the Top and Bottom Cap pieces, the front edge only will need to be routed to complete the Top and Bottom Cap pieces.

Assembly:

Start by preparing the clamps to secure the frame as it is glued up. The Merle Clamp (MLCS item #9012) is the perfect clamp for gluing up box type frames such as the golf ball display case. Make sure to have the keyhole slots orientated to the back of the frame and the golf ball depressions orientated toward the front of the frame when laying out the pieces before assembly. Masking tape can be used to temporarily hold the assembly together until you can get it set in the clamps. Apply high quality wood glue to the surfaces of all four mitered corner joints. Place the glued up assembly into the clamp and allow the glue to dry.

(See Figure K)

Do not over tighten the clamp, as it is possible to squeeze enough glue out of the joint to cause the joint to fail. Use a wet rag to wipe off any glue that is squeezed out of the joints.

After the glue has dried, remove the frame from the clamp and apply glue to the dado slots in the frame sides. Carefully slide the intermediate shelves into the dado slots making sure to keep the golf ball depressions orientated to the front of the assembly. Use a wet rag to wipe off any glue that is squeezed out of the joints.



Figure K

The final step of the assembly is to attach the Top and Bottom Caps to the frame. Align the back edge of the Top and Bottom Cap with the back edge of the Display Rack. You will also need to align the position of the Display Rack Frame to be orientated in the center of the Top and Bottom Caps. Make an alignment line across both pieces to realign after applying glue to the bottom of the Display Rack Frame. After applying the glue to the bottom of the Display Rack frame, realign the Bottom Cap and set this aside until it dries. Repeat this procedure for the Top Cap after the glue has dried on the Bottom Cap.

Apply a stain if desired and a protective finish of your choice to the Golf Ball Display Rack. Mark two level, mounting screw locations, 5-1/2" on center on the wall at the location you plan to hang the display rack.

Golf Display Rack Cut List

Part Description	Length	Width	Thickness	Quantity
Frame Side	12"	3-3/8"	1/2"	2
Frame Top	9"	3-3/8"	1/2"	1
Frame Bottom	9"	3-3/8"	1/2"	1
Intermediate Shelf	8-3/8"	3-3/8"	1/2"	3
Top Cap	10"	3-7/8"	1/2"	1
Bottom Cap	10"	3-7/8"	1/2"	1