

Folding Side Table



Bits and Tools Used:

5/32" radius Double Round Over bit (MLCS #7818 or #5518)
3/4" Straight Cutting bit (MLCS #7779 or #5479)
1/2" Flush Trim bit with at least a 1-1/16" cutting length (MLCS #7804 or #5504)
1/2" Forstner bit (MLCS #9205)
3/4" Forstner bit (MLCS #9209H)
5/16" drill bit (available in MLCS set #9178 or #9193)
#8 Countersink Drill bit (available in MLCS set #9365)
3/4" wide Double Sided Tape (MLCS item #9489 – 54' roll or #9493 – 108' roll)
Merle Multi-Corner Clamp (MLCS #9012)
Router Table
Table Saw
Chop Saw
Band Saw or Jig Saw
Drill Press or Hand Drill

Hardware:

5/16" x 1-1/2" Hex Head Bolts (4)
5/16" Flat Washers (12)
5/16 Hex Nuts with Nylon Locking Inserts (4)
#8 x 1-1/2" Tapered Head Wood Screws (8)
Wood Glue

Preparing the Legs:

Start by printing the three pages at the end of this plan that make up the leg template drawing. Carefully align the bottom, mid and top sections and tape them together to make a long paper template. Carefully cut out the template along the layout line. Place the template onto a piece of 1/2" plywood and trace the perimeter of the template. Use the band saw or jig saw to cut out the plywood leg template. Sand the edges smooth, as this will be used to create the legs for the table. Transfer the drawing onto each of the four legs and rough cut them to within 1/8" to 1/16" of the layout line (see Fig. A). Temporarily attach the plywood template to one of the rough cut legs and use the flush trim bit to trim the leg smooth and flush with the template (see Fig. B). Repeat for the remaining three legs.



Fig. A



Fig. B

Use the template to mark the locations for the holes in the legs. It is important to mark each leg to insure that you make the correct hole and counter bore or recess in the correct face of the correct leg. Refer to the paper template for location of each hole.

The Outer Legs:

The two outer legs will get only a 3/4" diameter x 3/8" deep counter bore and 5/16" through hole cut in the outer face. This hole is in the mid point of the leg and will be used to allow the inner and outer legs to scissor to fold up when not in use.

Tip: Start by making the 3/4" diameter counter bore first. You can then use the center pilot hole left by the forstner bit to center the 5/16" drill bit when completing the 5/16" through hole (see Figs. C & D).

The inner face of the outer legs will get a 1/2" diameter, 3/8" deep stopped hole in them for the 1/2" diameter support dowel. This hole is closest to the bottom of the legs.



Fig. C



Fig. D

The Inner Legs:

The two inner legs will get the same $\frac{3}{4}$ " diameter counter bore and $\frac{5}{16}$ " through hole in the mid section of the leg, but these will be made on the inner face and made to depth of $\frac{1}{2}$ " to accommodate the thickness of the flat washer and hex nut and be recessed enough so that the lower shelf will not contact it when it is folded up. In addition, the same size counter bored hole also needs to be made on the outer face of the inner legs near the bottom of the leg where the lower shelf will pivot as the table is folded up. Make the counter bore in the outer face $\frac{3}{8}$ " deep.

Now that the legs are prepared with all of the holes made of them, it is time to rout the edge profile on them. Install the double round over bit in the router table and adjust the bit height so that you will only be cutting the double round over profile and not cut the fillet at the outside edge of the bit. Only rout the long edges, do not rout the top or bottom of each leg (See Fig. E).



Fig. E

Assembly of the Legs:

The inner and outer legs need to be bolted together before the stretchers can be installed. Place one of the flat washers on a 5/16" hex bolt and insert it through the counter bored hole. Place another 5/16" flat washer over the bolt threads before sliding the inner leg over the threads. Finish by installing a flat washer and Nylock hex nut on the bolt threads. Tighten the nut enough to eliminate any lateral movement, but not too tight, as the legs need to be able move like a pair of scissor blades.

Cut the top cleats to size (2-1/2" wide x 3/4" thick x 16-1/2" long). Use the #8 countersink bit to make pilot holes in the top of the cleat 3/8" in from the end on the cleat for the outer legs, and 1-3/16" from the end on the cleat for the inner legs. The holes should be made at 3/4" and 1-3/8" from the inside edge of the cleat so that they properly align when the cleat is placed on top of the leg. To attach the cleat to the leg, place the inside edge of the cleat flush with the inside edge of the top of the leg. Use the #8 wood screws to attach the cleats to the tops of the legs. Cut the 1/2" dowel to a length of 15-3/4". Apply wood glue to the ends of the dowel and in the recess on the inside face of the inner legs. Carefully insert the dowel into the 1/2" diameter; 3/8" deep holes (see Fig. F). Use a clamp to apply pressure while the glue dries.



Fig. F

Making the Lower Shelf:

Cut five slats to size (2-1/2" x 3/4" x 12-1/4" long). Cut two long sides (2-1/2" x 3/4" x 18" long) and two short sides (2-1/2" x 3/4" x 15-1/2" long) to make the frame of the lower shelf. The lower shelf frame parts will be cut to final length when the 45-degree miter angles are cut. Take the lower shelf frame pieces to the router table and rout the double round over profile on the top and bottom of the outside face.

The mitered corners are to be cut next. Take the lower shelf frame parts to the miter saw and cut a 45-degree miter on one end of each piece (see Fig. G). Cut the 45-degree miter on the other end, leaving the finished length of the short pieces at 13-3/8", and the long pieces at 16".



Fig. G

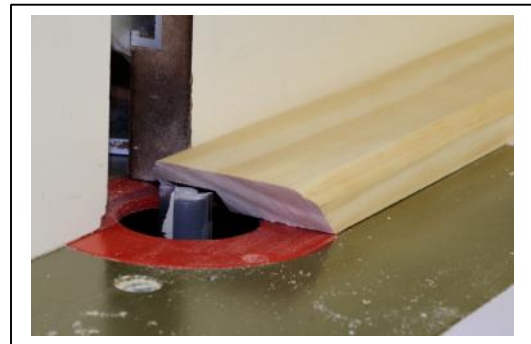


Fig. H

A 3/4" wide x 1/4" deep groove needs to be made along the length of the inside of the long pieces that make up the lower frame which will be used to accept the slats. The top of the groove is 1/4" from the top edge of the long lower shelf frame piece (see Fig. H).

Make a line 5/16" from the inside miter of the long lower shelf piece as a starting point for installing the slats (see Fig. I). Apply glue to the end of the first slat and slide it into position in the slot. Continue adding the other four slats, using a 5/16" drill bit as a spacing tool when installing the next slat (see Fig. J). Working quickly, glue the slats into the other long, lower shelf piece. Glue the short lower shelf pieces to the long pieces and set in the Merle Multi Corner clamp to dry (see Fig. K).



Fig. I



Fig. J



Fig. K

After the glue has dried on the lower shelf, the pivot hole and the notch that the dowel fits into need to be made. The pivot hole and notch are made in the long sides of the lower shelf frame. The pivot hole is made centered in the 2-1/2" wide long frame piece and the center point of the 5/16" diameter hole is placed 2-1/4" from the end of the long lower shelf frame (see Fig. L). The 1/2" diameter hole that creates the dowel notch is made 5/8" in from the bottom edge of the long lower shelf frame and the center point of the hole is placed 1-5/8" from the end of the lower shelf frame, opposite the end that had the pivot hole drilled through it (see Fig. M). Temporarily insert the lower shelf between the inner legs and slide a bolt through each pivot hole. Pivot the lower shelf downward until it is resting on the 1/2" dowel. Align the 1/2" dowel notch hole with the dowel rod. Mark the leading and trailing edges of the dowel across the bottom of the lower shelf frame (see Fig. N). Remove the bolts and use a jigsaw or small hand saw to cut the remaining part away to create the notch for the dowel.



Fig. L



Fig. M



Fig. N



To attach the lower shelf to the legs, place a 5/16" flat washer over the 5/16" hex bolt and insert that into the counter-bored hole in the outer face of the inner leg. Slide another washer over the exposed threads. Pull the bolt out enough to retain the inner washer and place the lower shelf in position. Slide the bolt threads through the pivot hole in the lower shelf. Add another flat washer and the locking nut with the nylon insert in it to secure the lower shelf to the leg. Repeat for the opposite side. Tighten the locking hex nuts just enough to allow enough the lower shelf to pivot.

Making the Matching Slatted Top:

Cut four slats 2-1/4" wide x 3/4" thick x 17-1/8" long and two additional end slats 2-13/16" wide x 3/4" thick x 17-1/8" long. The outer frame will be made up using four 2-1/2" wide x 3/4" thick x 18-1/8" long. Because they will be mitered, starting with 20" long pieces may be easier and then cut them to their final length when the miters for the joints are cut. Take the four top frame pieces to the router table and rout the double round over profile on the top and bottom of the outside face.

The mitered corners are to be cut next. Take the four top frame parts to the miter saw and cut a 45-degree miter on one end of each piece (as previously done with the lower shelf). Cut the 45-degree miter on the other end, leaving the finished length of all four pieces at 18-1/8".

A 3/4" wide x 1/4" deep groove needs to be made along the length of the inside of two of the four pieces that make up the top frame which will be used to accept the slats. The remaining two need to have the slot depth reduced to 1/8". The top of the groove is made 1/4" from the top edge of the top frame piece (same as the lower shelf slot).

Cut ten 1/4" x 1/4" x 3/4" long filler blocks that will be glued into the slat groove between each slat.

Mark the center point of the top frame sides that have the 3/4" wide by 1/4" deep groove cut in them. Start the slat installation by gluing one of the filler blocks directly in the center of the groove (see Fig. O). Continue by adding a 2-1/2" wide slat, then another filler block until you have all four of the 2-1/2" wide slats and all five filler blocks in place (see Fig. P). Finish the installation by adding the two 2-13/16" wide slats to the ends of the slot and glue the end frame pieces to the outside slats and the other top frame pieces. Place in the Merle Multi corner clamp until the glue dries.



Fig. O



Fig. P

Making the Checkerboard Top:

The checkerboard squares can be made by cutting them out of 1/4" thick wood, or you can purchase them already cut to size from Penn State Industries (www.pennstateind.com, 1-800-377-7297 - Item #CHESSQ - \$18,95). If you decide to cut them, you will need 32 squares in each contrasting color for a total of 64 1-3/4" squares.

Start with a piece of 1/2" plywood as a base to glue your squares to. The plywood should be cut to a size of 17-1/8" x 17-1/8". Draw a line 1-9/16" from each edge of the plywood. This will serve as the layout line for the squares. Start in one corner, gluing down the first square and quickly move gluing the remaining squares in place moving row by row, alternating the squares as you go (see Fig. Q). Set this aside until the glue dries. Once the glue has dried, the top surface of the squares will need to be sanding flat. An orbital sander makes this job very easy. Start with an 80 grit and progress your way up through intermediate grits until you do the final sanding using a 320 grit-sanding disc.



Fig. Q

The border around the chess squares will need to be filled and using some 1-7/8" wide x 3/8" thick x 17-1/2" long stock, that has a shallow 1/8" wide rabbet cut to the depth of the finished thickness of the squares, this will also help in covering up any unevenness in the edge of the squares (see Fig. R). The filler strips will be joined using a simple butted joint (see Fig. S). Cut two of the filler strips to a finished length of 13-13/16". The two longer ones can remain at 17-1/4" as all four of these will eventually be trimmed flush to the plywood sub base



Fig. R



Fig. S

Glue all of the filler strips to the plywood sub base. Use woodworking clamps as needed to hold the filler strips in place until the glue has dried. After the glue has dried and the clamps are removed, the filler strips will need to be trimmed flush with the plywood sub base. Use a flush trim bit in the router table to finish the top insert (see Fig. T).



Fig. T

The outer frame will be made up using four 2-1/2" wide x 3/4" thick x 18-1/8" long. Because they will be mitered, starting with 20" long pieces may be easier and then cut them to their final length when the miter for the joints are cut. Take the four top frame pieces to the router table and rout the double round over profile on the top and bottom of the outside face.



The mitered corners are to be cut next. Take the four top frame parts to the miter saw and cut a 45-degree miter on one end of each piece (as previously done with the lower shelf). Cut the 45-degree miter on the other end, leaving the finished length of all four pieces at 18-1/8".

A 1/4" deep groove needs to be made along the length of the inside of all four pieces that make up the top frame which will be used to accept the checkerboard top. The width of the groove is going to need to be made the same width as the thickness of the checkerboard top. The top of the groove is made 1/4" from the top edge of the top frame piece (same as the lower shelf slot). Using a 3/4" straight bit, make the upper cut of the groove on the first pass. Adjust the fence as needed to make the lower cut to the proper width needed to accept the checkerboard top. Apply glue in the lot and to the ends of the frame pieces. Quickly assemble the frame and top and use the Merle Multi Corner Clamp to secure the top until the glue has dried.

Using the Table:

Open the legs holding the cleats on the top of the legs until they are about 16" apart at the outside. Pivot the lower shelf downward and adjust the spread of the legs as need to allow the notch in the lower frame to fit over the 1/2" diameter dowel that stretches between the two outer legs. The top is designed to fit over the top of the cleats. This design allows you to pick and choose between either of the slatted or checkerboard tops included in this plan or design one of your own .



PART	THICKNESS	WIDTH	LENGTH	QUANTITY
BASE ASSEMBLY				
Leg Blanks	3/4"	5-1/2"	28"	4
Lower Shelf Frame– Short Sides	3/4"	2-1/2"	15-1/2"	2
Lower Shelf Frame– Long Sides	3/4"	2-1/2"	18"	2
Lower Shelf Slats	3/4"	2-1/2"	12-1/4"	5
Dowel Rod	1/2"		15-3/4"	1
Top Leg Cleats	3/4"	2-1/2"	16-1/2"	2
SLATTED TOP				
Top Frame Sides	3/4"	2-1/2"	20" **	4
Top Slats – Inner	3/4"	2-1/2"	17-1/8"	4
Top Slats – Outer	3/4"	2-1/2"	17-1/8"	2
Filler Blocks	1/4"	1/4"	3/4"	10
Filler Strips – Short	3/8"	1-7/8"	13-13/16"	2
Filler Strips - Long	3/8"	1-7/8"	17-1/4"	2
CHECKERBOARD TOP				
Top Frame Sides	3/4"	2-1/2"	20" **	4
Plywood	1/2"	17-1/8"	17-1/8"	1
Checkerboard Squares	1/4"	1-3/4"	1-3/4"	32 of each color / 64 total

** Rough Length- Parts will be cut
To a shorter dimension when they
receive the miter cuts.

PLEASE PRINT AT ACTUAL SIZE
1 BLOCK = 1 SQUARE INCH

ONLY ON THE INSIDE
OF THE TWO OUTER LEGS

$\frac{1}{2}$ "
DOWEL
HOLE
 $\frac{3}{8}$ "



DEEP
(DO NOT DRILL THROUGH)

$\frac{5}{16}$ "
THROUGH
HOLE

$\frac{3}{8}$ " DEEP
 $\frac{3}{4}$ " COUNTERBORE
AROUND THE $\frac{5}{16}$ "
THROUGH HOLE ON
THE OUTSIDE FACE
OF THE INNER LEGS

ONLY ON THE TWO
INNER LEGS

BOTTOM
SECTION

0

1

2

3

4

5

6

7

8

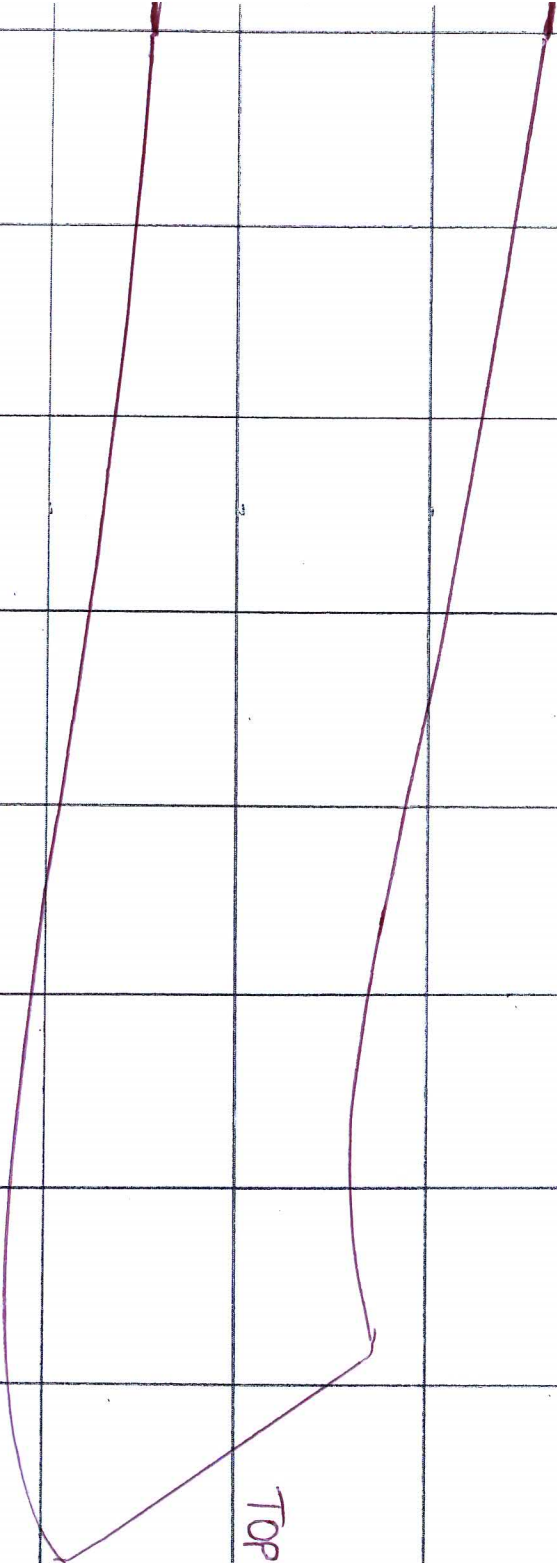
PLEASE PRINT AT ACTUAL SIZE
1 Block = 1 SQUARE INCH

3/8" DEEP -
3/4" COUNTER BORE
AROUND THE 5/16"
THROUGH HOLE ON
THE INSIDE FACE OF
THE INNER LEGS AND
OUTSIDE FACE OF THE OUTER LEGS

MID SECTION

8 9 10 11 12 13 14 15 16 17 18

PLEASE PRINT AT ACTUAL SIZE
1 BLOCK = 1 SQUARE INCH



TOP SECTION

18 19 20 21 22 23 24 25 26