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## Instructions for Bench and Night Stand

### What you need:

#### Materials for 1 bench and 1 nightstand:

- 1 sheet of  $\frac{3}{4}$  inch thick plywood, 4 feet by 8 feet
- 1 Pint of Polyurethane glue, like Gorilla glue
- 1 Quart of denatured alcohol, to clean up the glue
- 1  $\frac{1}{4}$ " brads
- #60 Garnet Sandpaper, 4 sheets
- #80 Garnet Sandpaper, 4 sheets
- #100 Garnet Sandpaper, 4 sheets
- #120 Garnet Sandpaper, 4 sheets
- #180 Garnet Sandpaper, 6 sheets
- #220 Aluminum-oxide Sandpaper, 10 sheets
- #320 Aluminum-oxide Sandpaper, 10 sheets

#### Finishing supplies:

- 1 Qt. boiled linseed oil, Tung oil, or Polyurethane Varnish
- 1 -2" bristle brush
- Paint thinner
- Cotton rags
- Paste wax

#### Essential Tools:

- Craftsman 10 in. Table Saw
- 16" wide (minimum) bar or pipe clamps, at least 10 of them
- 1  $\frac{1}{2}$ " chip brush to spread the glue
- Estwing 16 oz. Rip Claw Hammer
- Companion 100 ft. Tape Measure
- Nail set
- Craftsman 3 x 21 in. Belt Sander, 7.5 amp (# 80 belt)

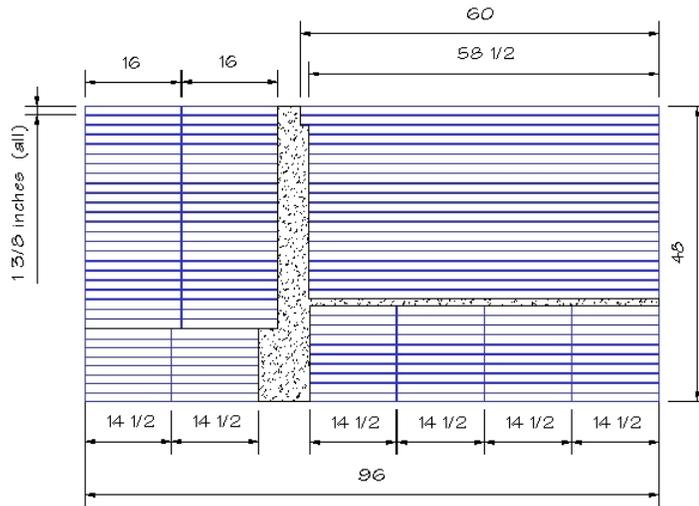
#### Nice to have tools:

- Craftsman 8-Drawer Workbench
- Craftsman 12 in. Compound Miter Saw
- Cabinet scraper
- Nail gun with 1  $\frac{1}{4}$ " brads
- Craftsman Professional 2 hp 9.5 amp Router with Carrying Bag with  $\frac{1}{4}$ " round over bit
- Craftsman 6 in. Orbital Palm Sander with # 120, 180 and 220 sandpaper disks
- Dead-blow mallet

**What you do:**

**1) Cut the parts**

- a) Cut your parts from the plywood sheet. Look at the cutting layout. *fig. 1*. To make the plywood sheet easier to handle, first cross-cut (cut across the grain) the plywood sheet at 34 inches from the end.



For the Nightstand:

<i>Qty</i>	<i>Part</i>	<i>Length</i>
2	top ends	16"
18	top strips	14 1/2"
22	leg strips	16"
18	leg strips	14 1/2"

## 2) Miter cut the end strips

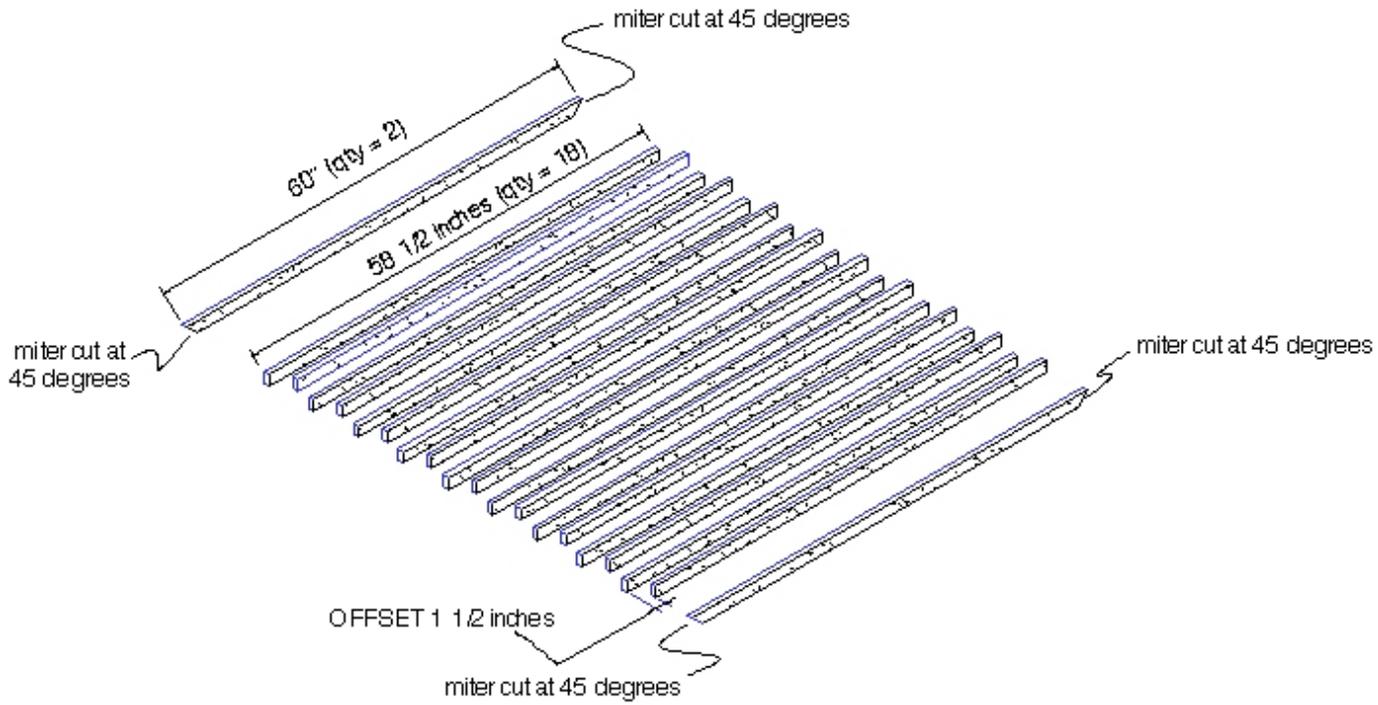
Take the two 60" long strips and cut both ends of each to 45°. Take six of the 16-inch strips and cut both ends of those to 45 degrees as well. Set these aside. They will be the first and last strip for each of the glue ups you will make next.

## 3) Glue up the strips

Separate out the eighteen 58 1/2" long strips and the two 60" strips. Lay them on a nice flat workbench, wide side up. See **fig. 2**. Brush an even coat of the glue on all the upward facing sides. Start with a 60" mitered strip, put a 48 1/2" strip on top of it, so that the ends are exactly 1 1/2" offset. It is important that you do this carefully, so that when you put the top and legs together, they fit tightly. To offset them precisely, use a scrap of wood that is 1 1/2" wide and use that as a spacing gauge. You must also be careful to align them so that the top edges are even. Do this by pushing the parts down against the table. When you are happy with the position, set a small bread in each end to keep the parts from shifting. Continue putting the parts together, offsetting them 1 1/2" so they are staggered. The last part should be the other 60" mitered piece. Now get your clamps, and place them at most 6 inches apart, squeezing this whole wood sandwich tightly. Clean the excess glue while it is wet with a rag and denatured alcohol. Be careful to clean the ends where they are staggered. This is where the top and legs fit together, and it must be clean when you fit them together. Let this assembly dry for *at least* 4 hours at room temperature. When the glue has dried and turned hard, remove the clamps.

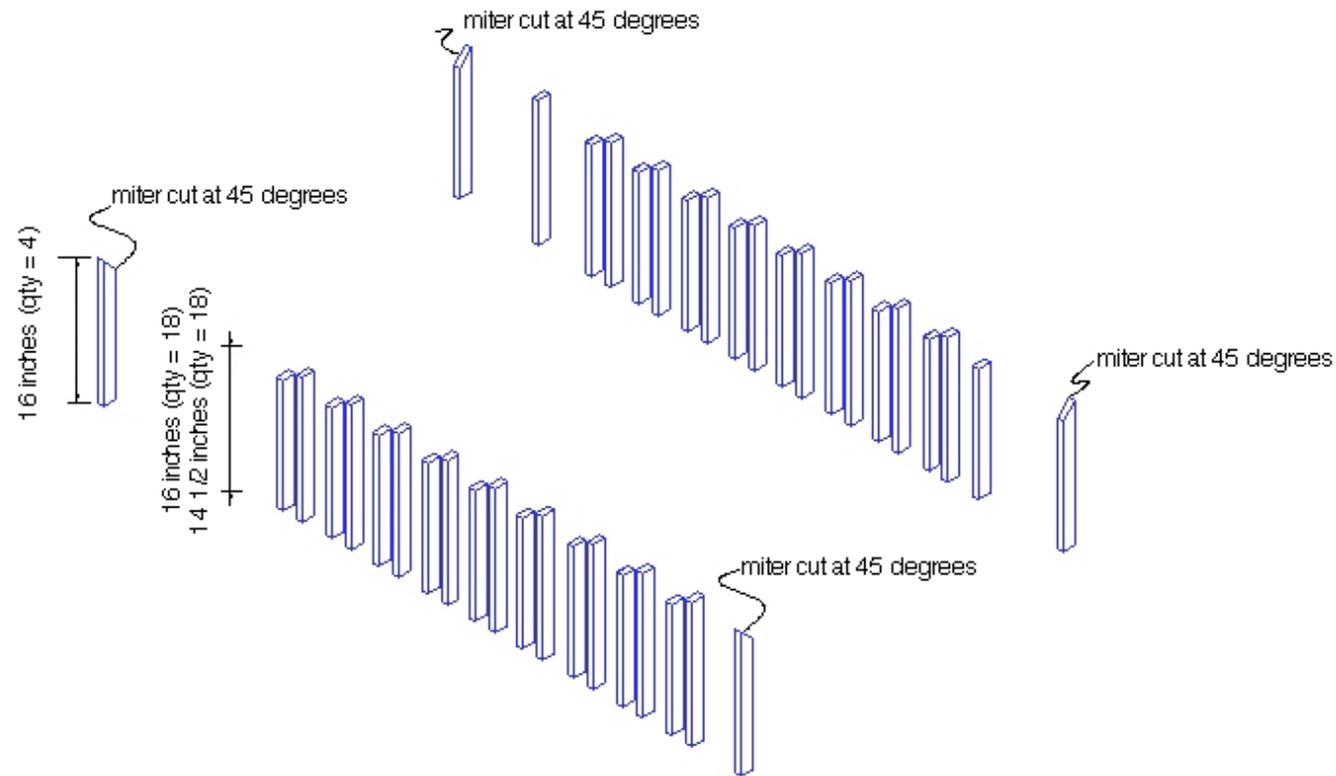
Repeat this process for the nightstand top. Remember to put the mitered pieces first and last. Carefully keep the ends offset 1 1/2", with the tops aligned even.

The process for the legs is similar. See **Fig. 3**. Pay close attention to how the staggered parts will interlock between the legs and top. Alternate long and short pieces. Start out arranging them so that they will fit properly together when the assemblies are dry.



Exploded view of Bench Top

Fig. 2



Exploded view of Bench Legs

Fig. 3

#### 4) Final Assembly

- a) Check the fit. See *fig. 4 and fig. 5*. Dry fit (without glue) the legs to the tops. Check that the fit well. If you were careful to align the parts and clean up excess glue, they should fit together fairly easily. You will need to use a dead-blow mallet to tap them together. Don't use an ordinary hammer alone, you may damage the wood. If you don't have a dead blow mallet, use a scrap of wood to protect the wood when you hammer the parts together.
- b) Glue the legs to the top. Once you are sure the parts will fit properly, glue up the joints, push the legs onto the top, and place a clamp across the joint to squeeze the "fingers" together. Take the framing square and make sure the legs and top are 90° to each other. Clean the excess glue with denatured alcohol, and set the assembly aside to dry.

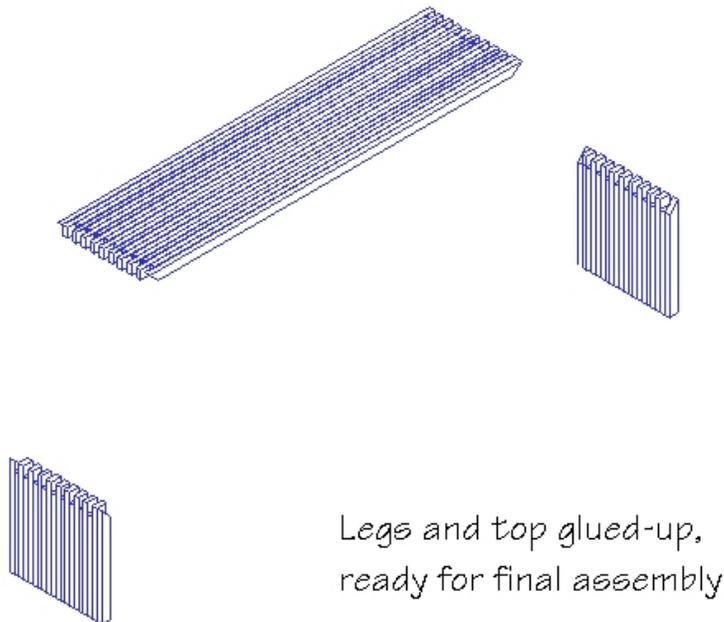
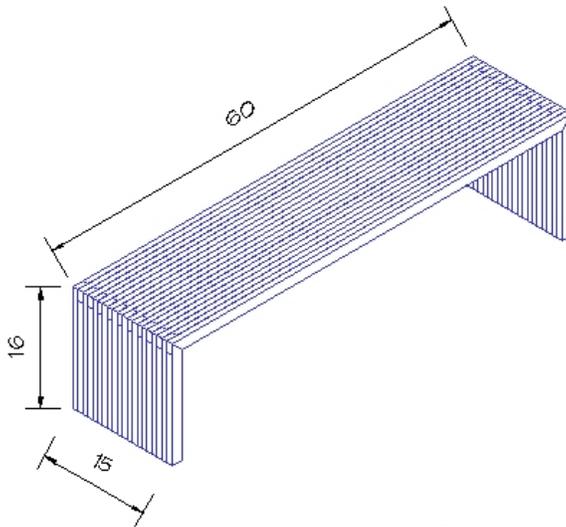


Fig. 4



The Bench

Fig 5

### 5) Sanding and Shaping

a) Sand Smooth. Once the assembling is done and the glue has dried well, take the clamps off. Use the belt sander to carefully sand down the places where the wood is misaligned . Hopefully the care you took during glue-up to align the parts is paying off now. Otherwise, you may have a lot of sanding to do! Sand the finger joints until they are nice and flush. When you have all the little misalignments sanded out, sand it all with # 100 paper until the scratches from the previous grit are removed. Keep doing this with progressively finer paper, #120, and #180 until you have reached #220. Don't skip any steps with the sandpaper grits here, it takes longer and does not come out as well if you do.

b) Round the corners. Round all the edges with a router set-up with a 1/4" round-over bit. If you don't have a router, you can easily round the edges with sand paper. Starting again with # 80 paper, sand the corners by hand, first at a 45° angle, then curve the paper over the edge and sand until a pleasing round edge is shaped. Use the same system of stepping down the sandpaper grits, #80, #100, #120, #180, #220, until the edges are smooth to the touch.

## 6) Finishing

*Oil finish:* Brush on a coat of boiled linseed oil or tung oil. Let it soak in for 10 minutes, sand lightly till smooth with #320 sandpaper. Wipe off the excess oil with a rag. Let it dry overnight. The next day, sand lightly with #320 sandpaper. Apply another coat of linseed oil, sanding and wiping off the excess as before. Let that dry overnight again. The next day, you can apply a coat of paste wax and buff it off.

OR

*Polyurethane finish:* Brush on a coat of thinned polyurethane. Let it dry overnight. The next day, sand with #220 sandpaper. Apply another coat of polyurethane, let it dry overnight again. The next day, sand lightly with #320 sandpaper. Apply a coat of paste wax and buff it off.

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