

MOUNTAIN BLUEBIRD BIRDHOUSES



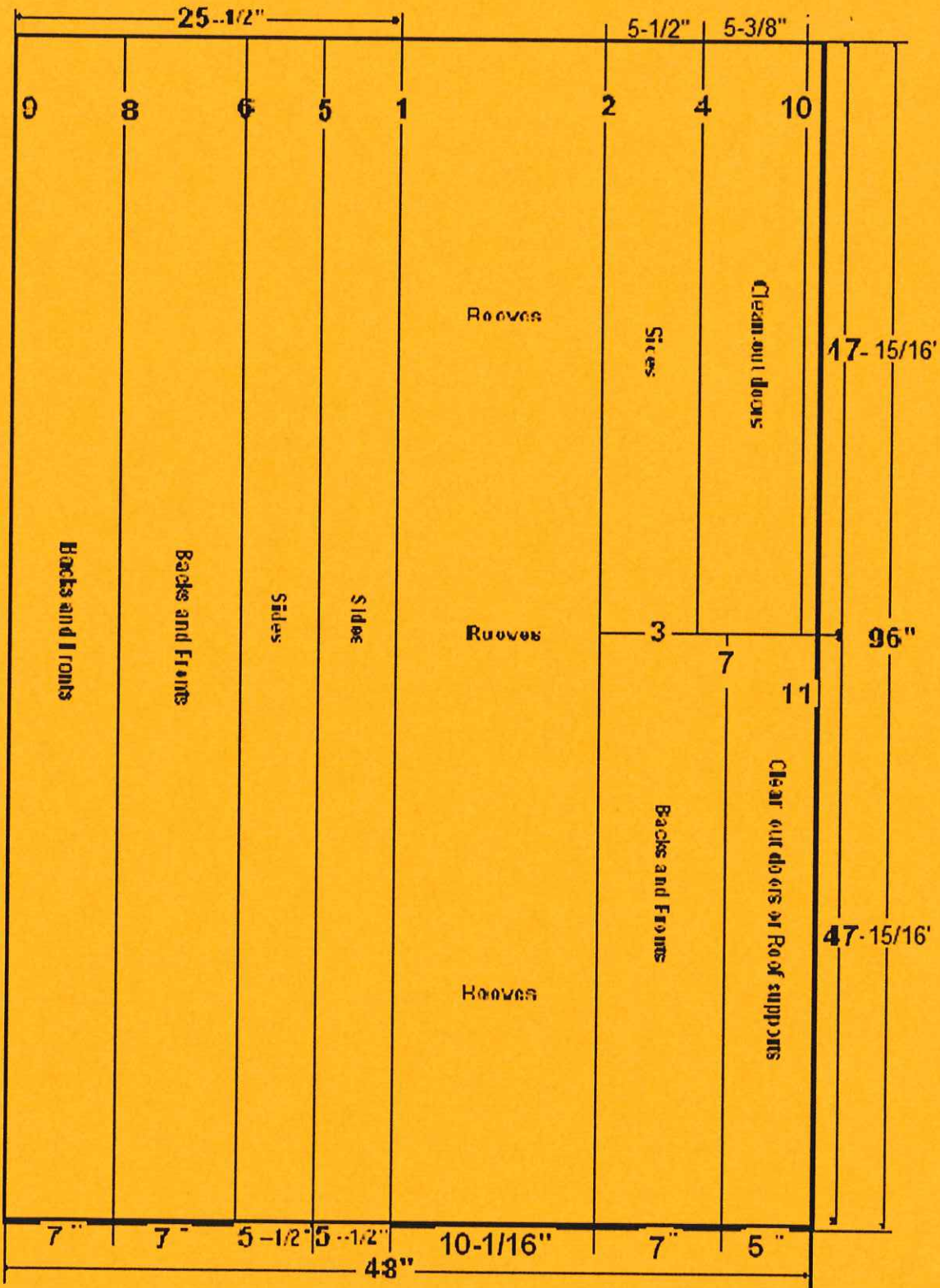
The Mountain Bluebird Society is extremely grateful for your participation in the woodworking program at the LCC, and thanks you for building birdhouses for them. The birdhouses provide sanctuary for the mountain bluebirds, offer a safe haven during the incubation and rearing periods and also allow for flight training and other parental duties that the young ones require.

***Important to get from Instructor:**

Before you start your birdhouse , get the- I.D numbers from your instructor. These numbers will be used to identify your birdhouses . The I.D #'S will be penciled on the inside (bad side) of all panels . You will be constructing your birdhouses out of 12/16" exterior grade plywood.

To get the maximum number of birdhouses out of a 4'x8 ' sheet of 12/16" exterior plywood, follow the instructions on the following pages.

POWER TOOLSAS ALWAYS USE PROPER SAFETY PROCEDURES**



Step 1: The First Rip. 25 8/16 "w x 96"L

To begin, you will rip a 48" w x 96 "L sheet of exterior grade plywood into two pieces.

The first piece will measure 25 8/16 "w x 96"L . Set aside the 25 8/16 "w x 96"L , to be used later for sides, fronts and backs.

Step 2: The Second Rip. **Roof** 10 1/16" W x 96' L.

Note :always use fresh cut side of plywood against the fence.

-Set the fence on the table saw to 10 1/16" .

-Place the fresh cut side of the **22 6/16"** piece of plywood against the fence and rip a piece 10 1/16" W x 96' L. Mark this piece "roof" , and set aside.

Crosscut The Remaining Piece. (47-15/16" From the remaining piece ; (APROX.) 12 3/16" Wide x 96" Long. We will crosscut this piece to make two pieces approximately 47 15/16" Long with the large radial arm saw or with a table saw. These pieces will be used in step 3.

Step 3: Ripping-Sides, Backs, Fronts.

Sides; 5 8/16" On the table saw set the fence to 5 8/16" w.-From one of the 12 3/16" Wide x 47 15/16" pieces from step 3, rip a 5 8/16" x 47 15/16" piece for the sides. Mark the remaining 6 8/16" wide piece as cleanout doors and set aside for now. **From the (25 8/16" x 96") piece that we set aside after the first cut, we will rip two side pieces 5 8/16" W x 96" L .**

Next: Backs and Fronts; Set at 7": Rip two 7" x 96" pieces for the front & back from the 14 4/16" x 96" piece that was left from cutting the sides.

From the other 12 3/16" x 47 15/16" rip a piece 7"W; Mark the remainder cleanout doors and set aside.

-You should have three pieces 5 8/16" wide, and three pieces 7" wide.

Step 4: Cleanout Doors. 5- 6/16" & 5"

-From one 6 8/16" x 47 15/16" piece we set aside earlier (cleanout door) .

Rip it to 5 6/16", (this piece will be crosscut at 5" later)

Use the 5" x 47 15/16". (cleanout door) to Rip a piece at 5"(It will be crosscut to 5 3/8" pieces later) or If needed, this piece can be crosscut to 4 4/16" for lid supports.

You now have the 4 x 8 sheet cut into workable pieces

Step 6: Crosscutting. 23-14/16"

-Move to Large Radial Arm Saw with your **6** pieces of plywood.

3 pieces **5- 8/16"** wide, and **3** pieces **7"** wide.

Crosscut your **5- 8/16"** piece to **23- 14/16"** .-Note: you will be making **10 pieces** (5- 8/16"W x 23 - 14/16" -Set two of these **5- 8/16"** pieces aside at each work station to be cut for sides later.

Now crosscut your **7"** pieces to **23 - 14/16"**.

Move the **7" x 23 - 14/16"** pieces to the small radial arm saw.

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Step 7: Crosscutting Fronts and Backs

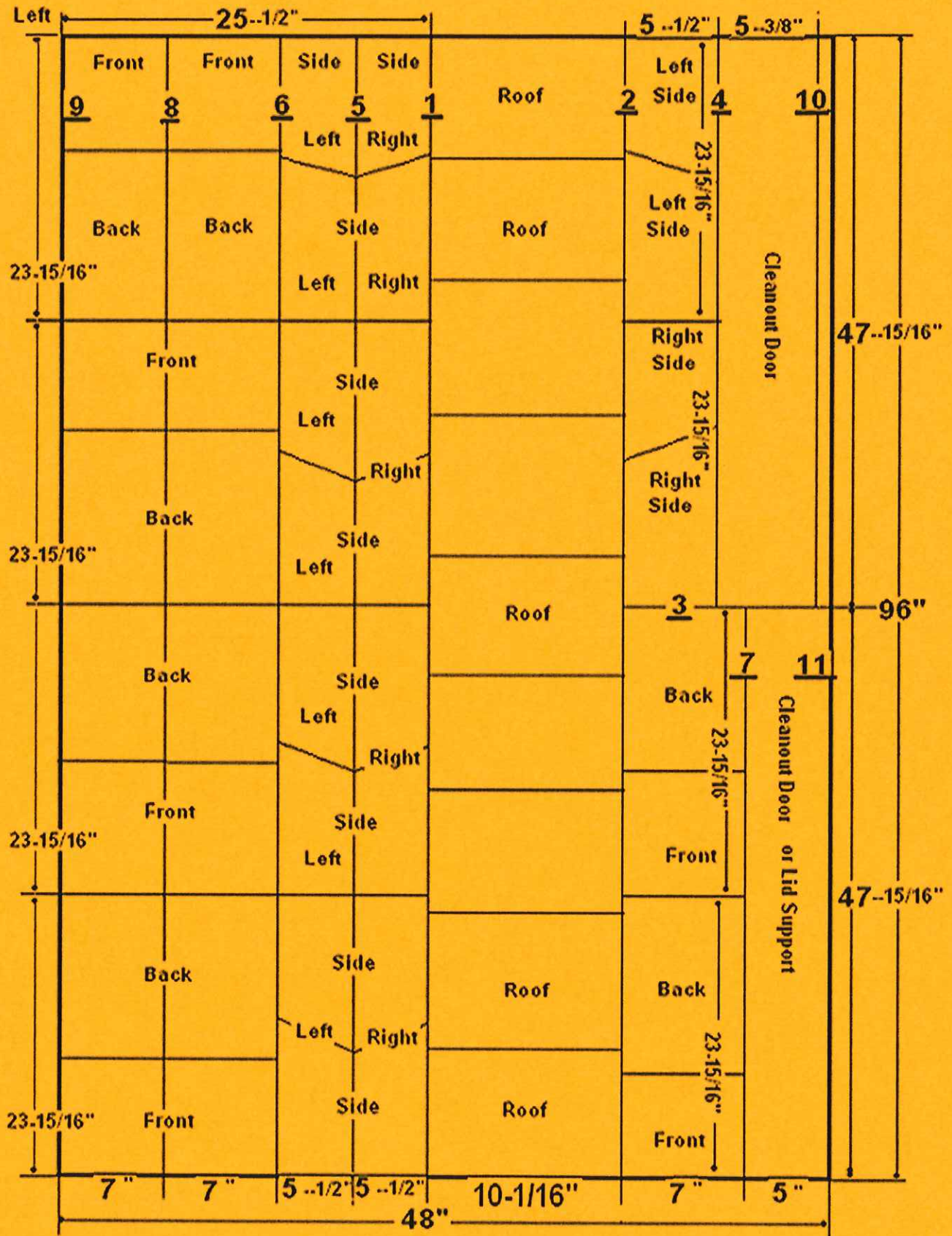
One crosscut will make the front and back panel of your birdhouse..

The SMALL RADIAL ARM SAW is set to **22- 8/16"** degrees (*double check*).

-The stopper block is set to **10- 3/16"** from the saw blade (*double check*)

-Place the **7" w X 23- 14/16"** L piece of plywood with (*BEST SIDE FACE UP*) and best looking end against preset stopper block

Note : Make sure plywood is tight to the table and tight against back fence



Step 7: Crosscutting Fronts and Backs

One crosscut will make the front and back panel of your birdhouse..

The SMALL RADIAL ARM SAW is set to **22 ½** degrees (*double check*).

-The stopper block is set to **10 3/16"** from the saw blade (*double check*)

-Place the **7" w X 23- 14/16" L** piece of plywood with (**BEST SIDE FACE UP**) and best looking end against preset stopper block

Note : Make sure plywood is tight to the table and tight against back fence.

Step 8: The Roofs.

-WE will be making **9** roofs out of our **10 1/16" W x 96" L** piece of plywood.

-Place the **10 1/16" W** piece of plywood (best side up) on the SMALL radial arm saw.

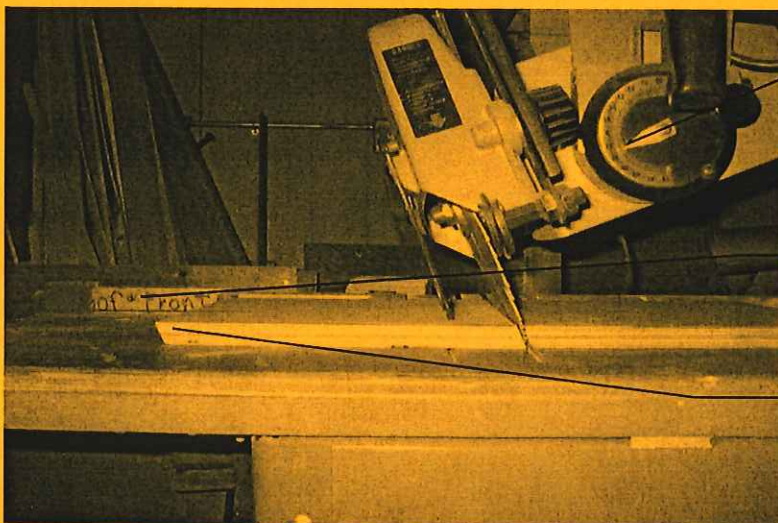
-Cut first angle cut (known as the plumb cut) as close to the end (left side) as possible. You now have your first **22 ½** degree angle cut on your piece of 12/16 " plywood.

-The Small Radial Arm Saw is already preset at an angle of **22 ½** degrees to make this crosscut (But Double Check to Make Sure).It should look like the below picture.

Note: Stopper block is set to 10 3/16 "L (Double check to make sure)

Gentle slide the plywood to the preset stopper block (left side of saw) keeping plywood tight to back fence and tight down on the table.

-Write your assigned **ID #'s** on the inside (worst side)of all your panels.



Small radial arm saw, set to **22.5**

Stopper block set to **10- 3/16" L**

Your first cut (know) as the plumb cut).

Step 9 : Left and Right Sides (5-8/16" W x 23-14/16" L)

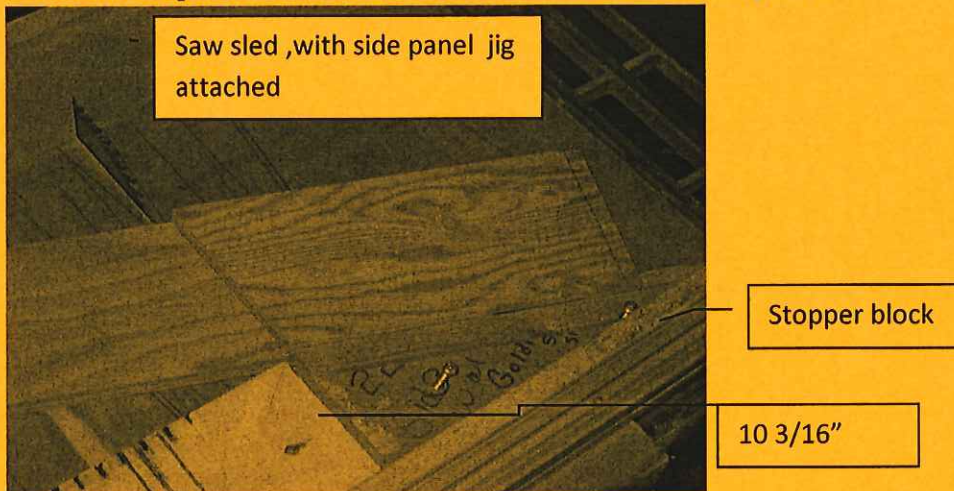
Note this will make left and right sides for two boxes.

- Take two 5-8/16"W x 23-14/16"L pieces of plywood to SMALL TABLE SAW with sled jig in place .
- Place the two good faces together. This will make left and right sides with one cut.

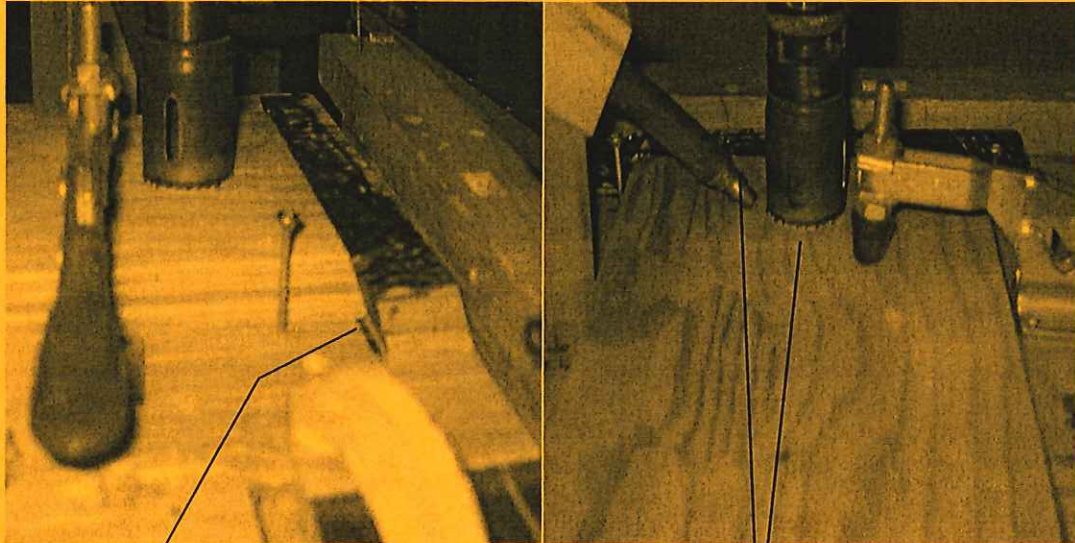
Note : Make sure you set plywood tight against jig and stopper.

Note : you now have completed both right and left sides of one birdhouse.

Number all panels and cut the sides to match the front panel.



Step 10: Finishing The Fronts.



Bevelled edge against back fence.

Compressed air, too clean drill bit

-In order to finish fronts (7"W x 10 3/16 " L) two things need to be done.

Drill the access hole and build the ladder.

. Drill a **1-8/16"** : access hole for the birds to get in and out of the birdhouse. The center of the hole is **1-12/16"** down from the top front face, and centered side to side.

-Move to the drill press with both front panels.

Note : Jig already in place to drill access hole.

Use air to clear sawdust and cool the hole saw.

****With assistance from instructor .***

-Drill your access hole with **BEST SIDE UP**. See above :

Note : Clean up any rough edges for the birds. -Note : Don't sand corners of plywood before assembly.

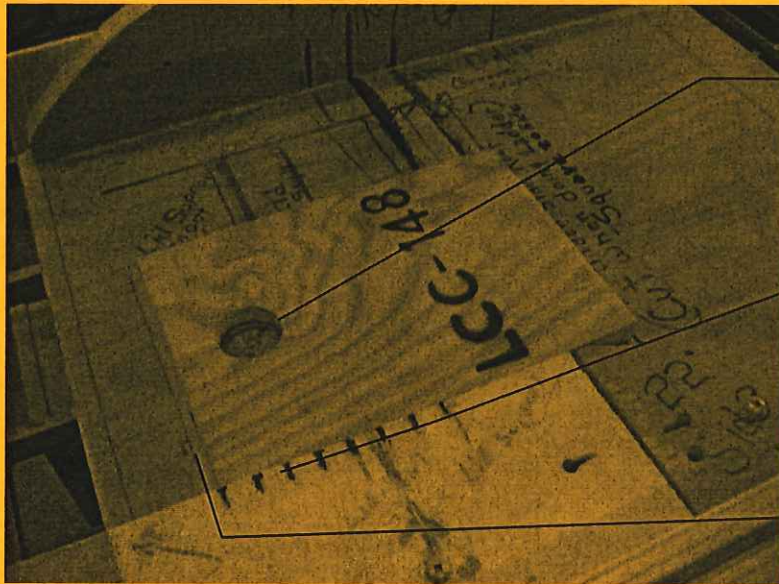
THE Ladder;

-Move to THE TABLE SAW with sled on top.

-Adjust saw blade so almost **3/32 "** of blade is showing.

-Cut grooves into underside of front panel at aprox 9/16" centers using marks on table saw sled jig. The grooves start 3/4" below the access hole and stop at approximately 5 1/2" below the access hole.

Note : Make sure access hole or 22 1/2 degree end is on the proper side of jig .



Access hole on left side of saw blade.

Saw sled jig marks

Long side of bevel down against saw sled.

Step 11: Routering Front Panel.

- Move to ROUTER , set up with **2/16"** round over bit.
- Place front panel on router table and round both sides of access hole.



Under side of front panel

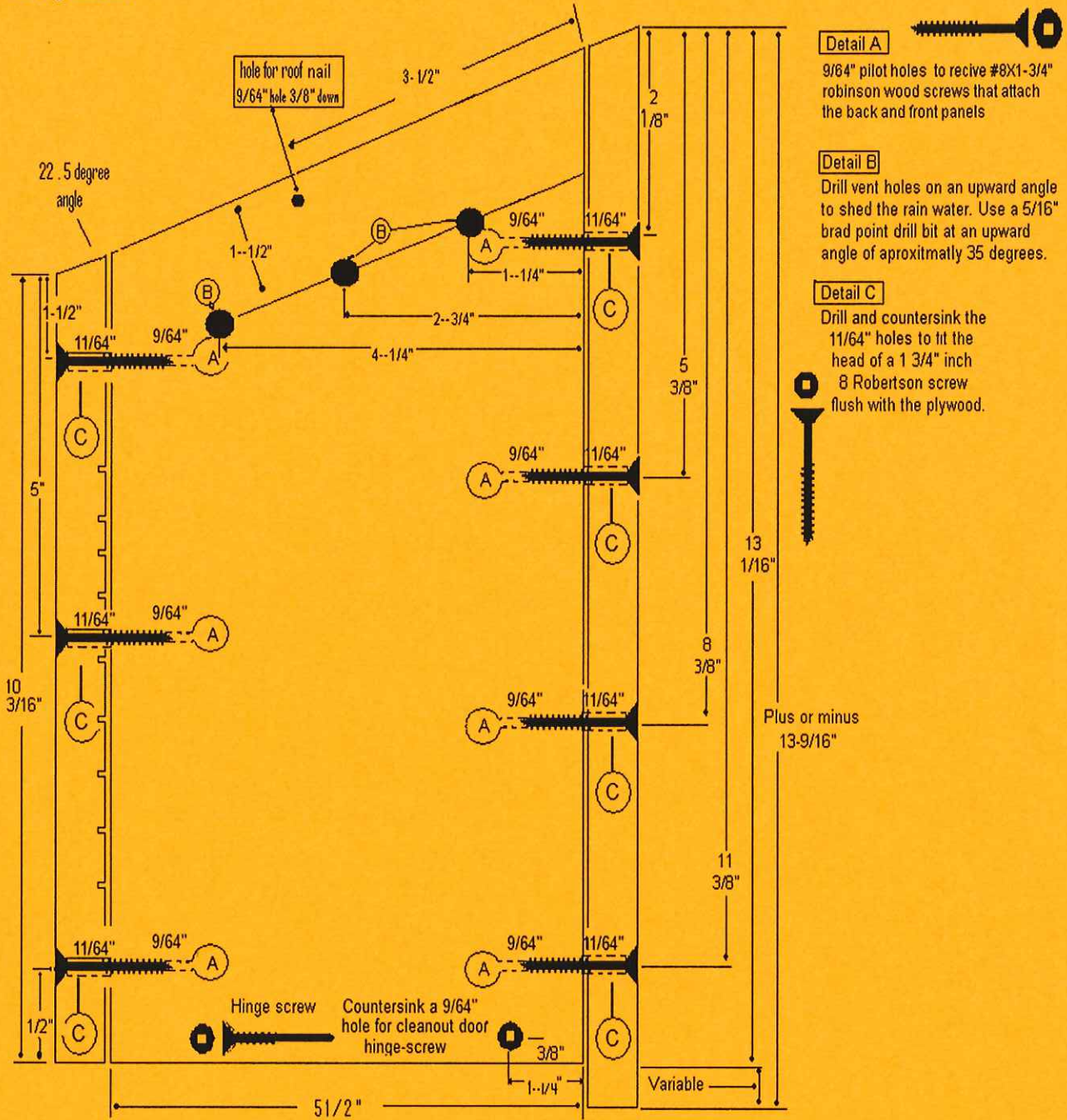
Place access hole over router bit ,take care *not to touch* inside of hole to router bit - until you are ready to trim edges.

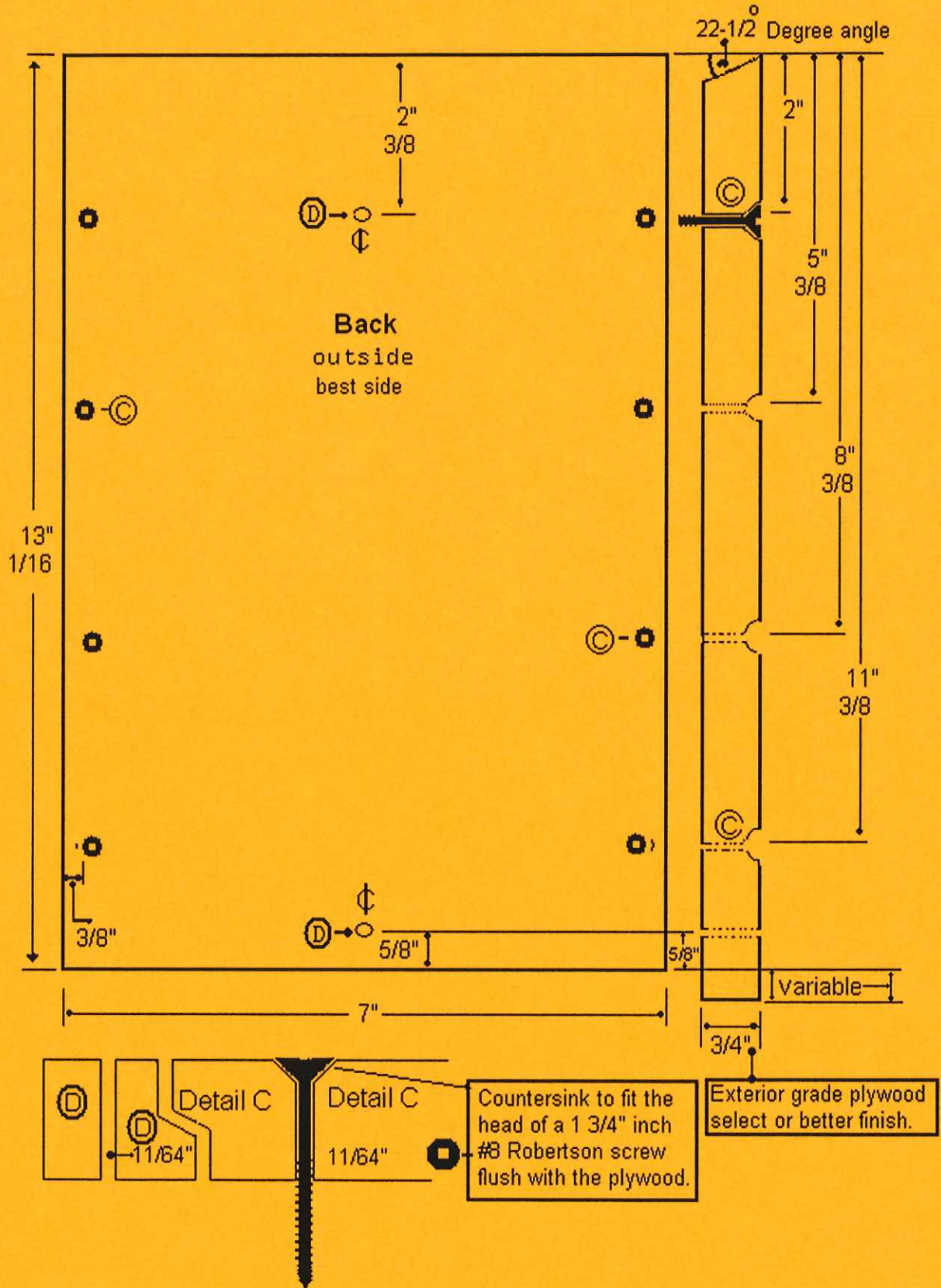
- With sandpaper block , sand ladder grooves (Ladder) of all splinters.

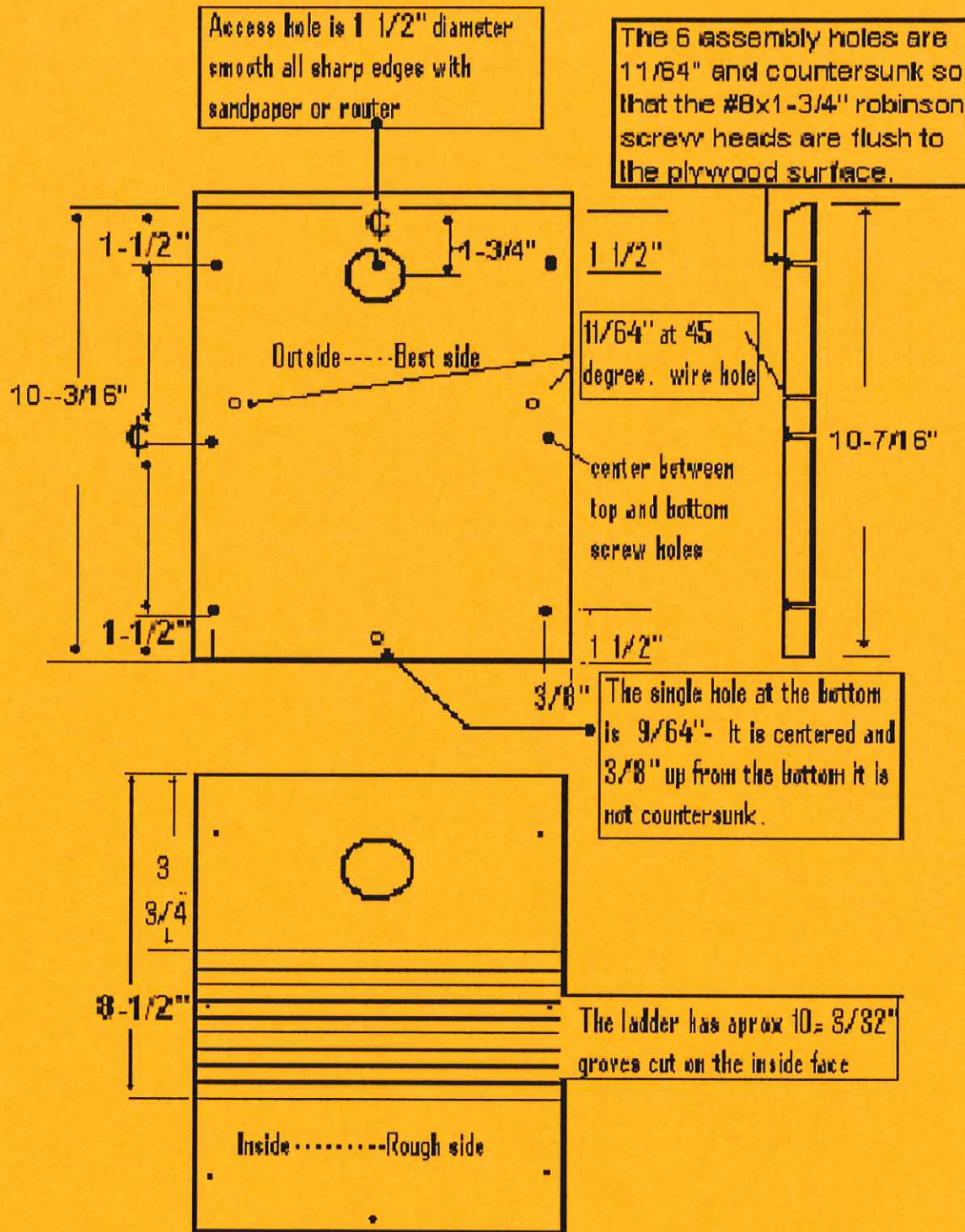
Note : This will clean up any rough edges for the birds. **-Note : Don't sand corners of plywood before assembly.**

Step 12: Marking Panels

Mark all the drill points and check the placement with the instructor before drilling holes in the panels.







Note : Use backing board to help prevent chip- outs the bottom side of the panel.

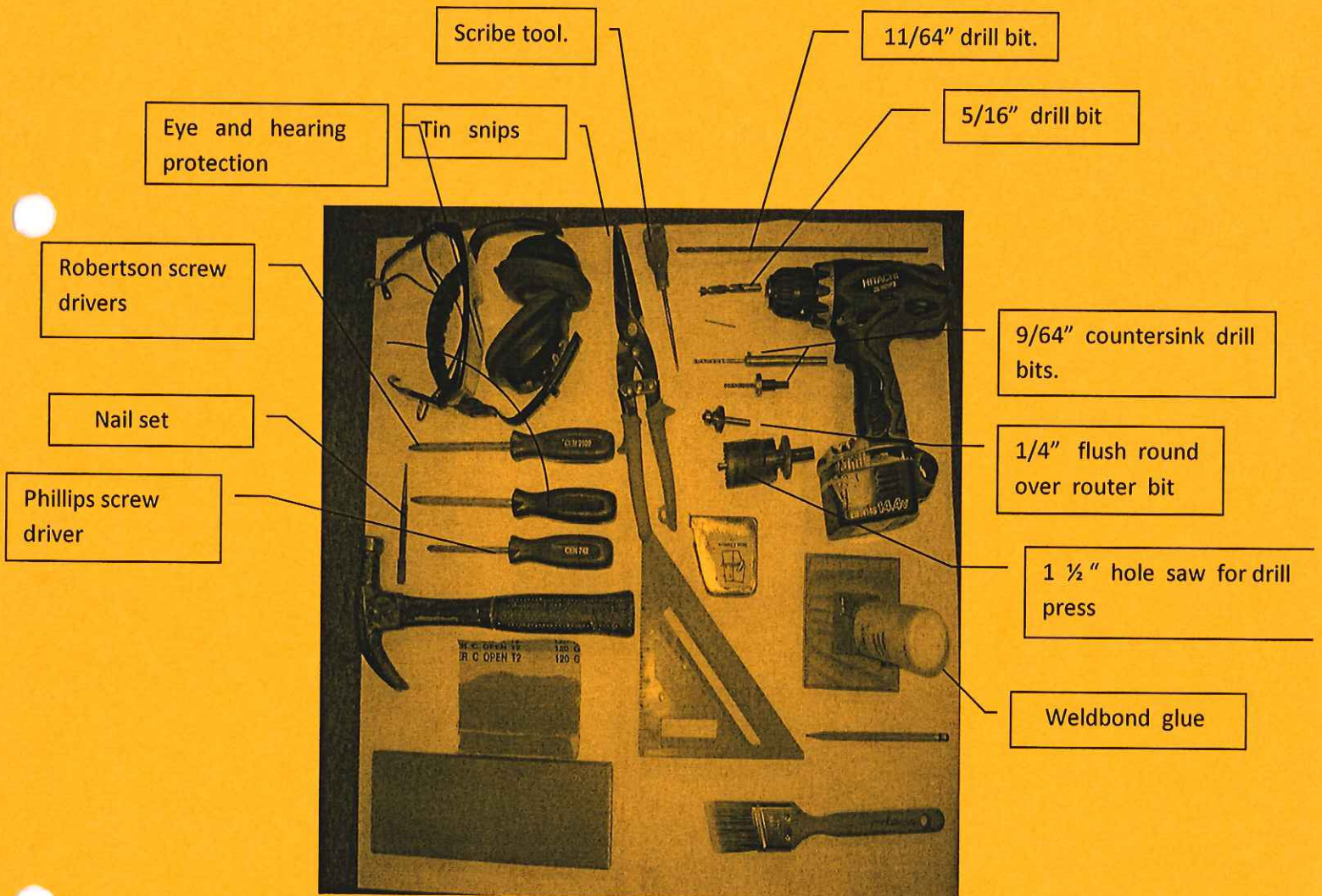
Step 13: Assemble birdhouses. Step 14: Assemble birdho

Front;

Secure the assembly at your work station. Set right and left panels with the best side out and the front side up Place front panel (good side up) on the top edges of side panels. Align and predrill the 9/64" holes into the side panel. Use lots of glue, and 6 --1-3/4" #8 Robertson screws to complete the assembly of this side before assembling the other side.

Allow the heads of the wood screws to sit flush with the plywood.

Assembly Tools:

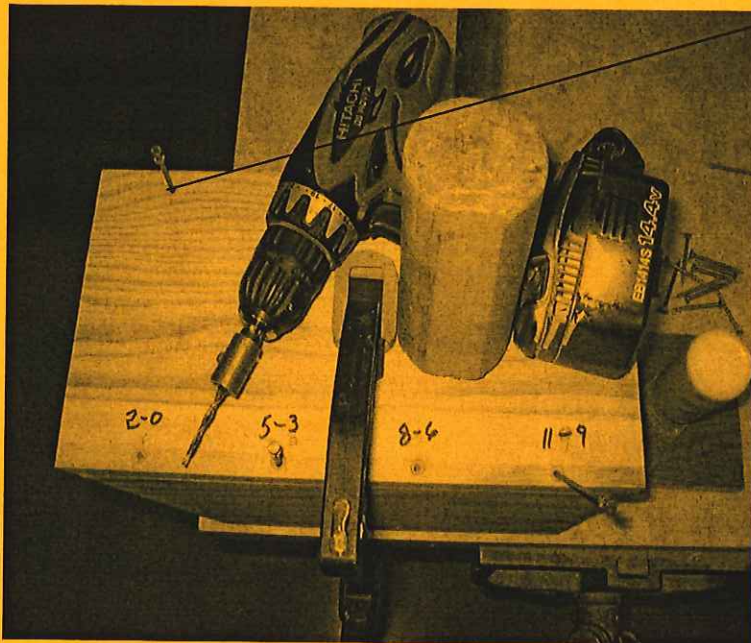


Back:

- Place birdhouse on workbench front panel down.
- Set back panel on bird house sides.

-Predrill 4 9/16" holes on each side of back panel, ensuring that the holes are centered to the side panes

-Use two headed nails to help keep the alignment as you line up and drill the rest of the holes . See below



Two headed nail

-Glue before screwing back onto sides

-Use # 8 x 1-12/16" - #8 ROBERTSON WOOD SCREWS to attach back panel.

Step 15: Attaching The Bottom Cleanout Door.

>Bottom Cleanout Door

-Take the **5-6/16" W or 5" wide** pieces of plywood to the a TABLE SAW . Using the saw sled crosscut the cleanout door to **5-6/16" x 5"**.

Now it is time to *take any sharp edges off your pieces.*

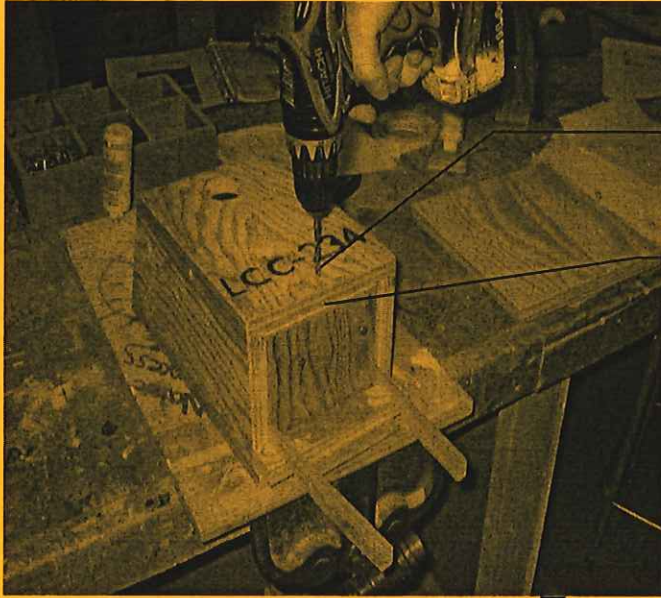
-Router or sand all edges of cleanout door.

Note : Router set up with round over bit.

Hinges; The Instructor will show you how to prepare the hinges screws from 1-8/16" X # 12 Stainless steel wood screws

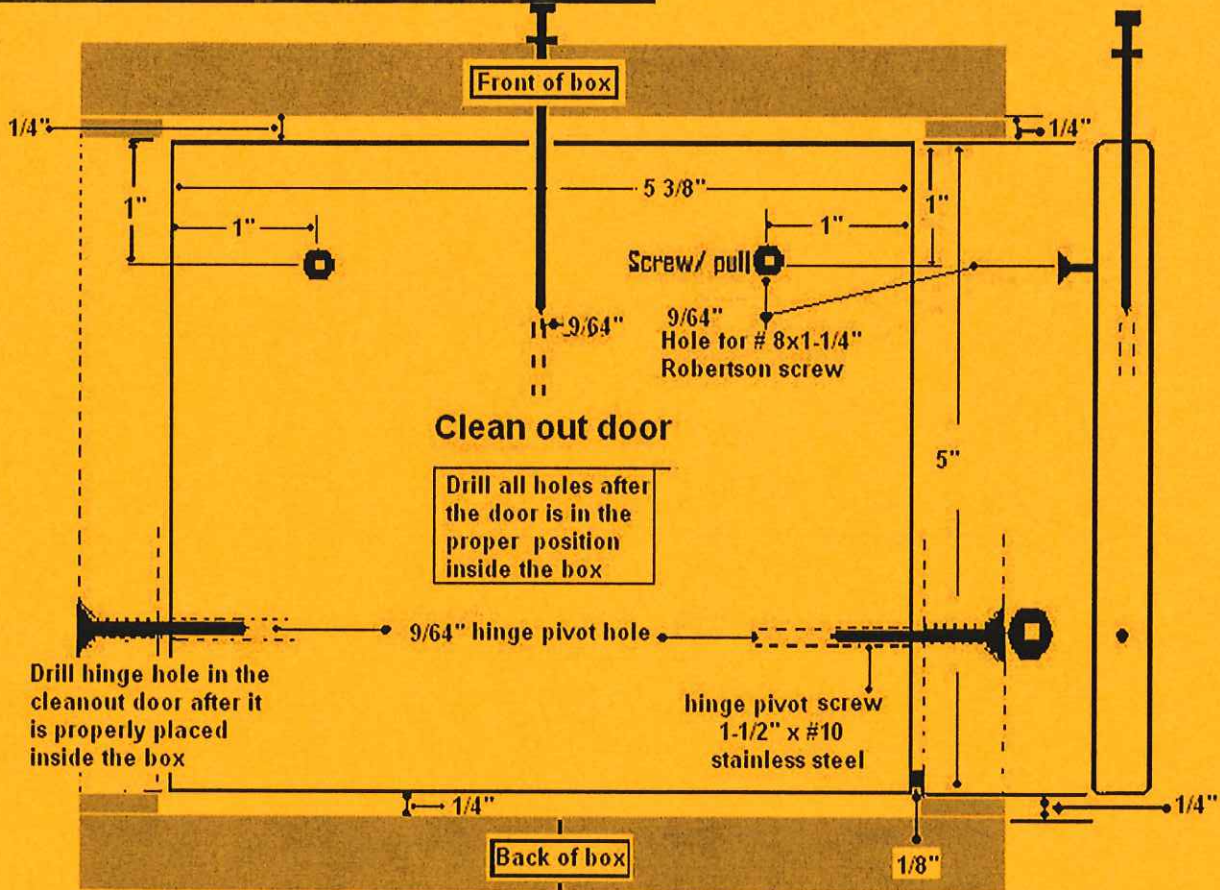
Place a **8/16" spacer at the bottom of the back panel**, then place the cleanout door tight to the side and flush with the bottom of the side panel and secure with shims. Drill and countersink a **9/64" hinge hole** in the side panel **1-4/16" from inside of back panel or 2" from the outside of the back** and **6/16" up from the bottom of the side panel**. **Install** hinge screw and repeat on opposite side. Now center the cleanout door and place a wedge centered and between the door and the front Panel. Drill a **2/16" hole**

-Put a two headed nail (**Duplex head**) into drilled hole to secure cleanout door.



Drilling - cleanout door pin hole $9/64''$ drill bit.

Place a *third* wedge between front panel and cleanout door too hold door in place
Not shown



For these holes use a $9/64''$ drill bit and countersink so the screw head sits flush with the surface. Ensure the hole will be centered in the cleanout door.

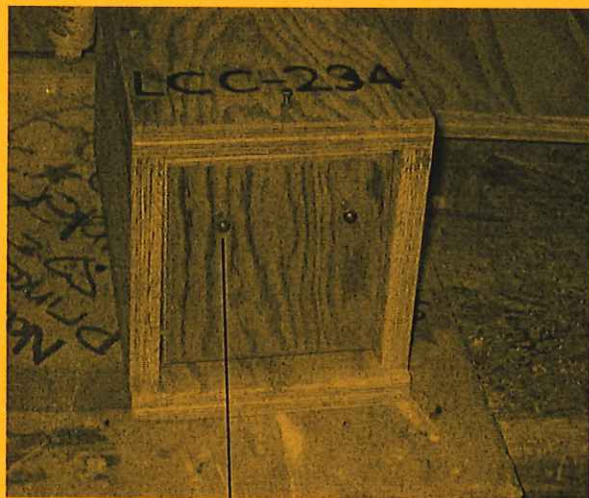
See below.



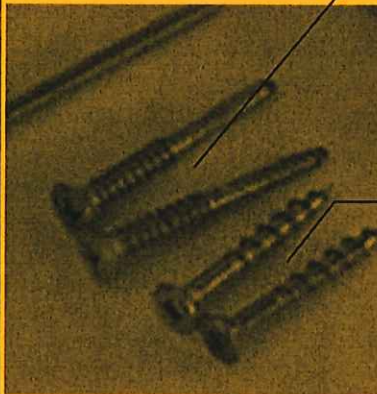
-Put a two headed nail (*Duplex head*) into drilled hole to secure cleanout door.

-Next drill 2 holes in underside of door , for handles to open and close the cleanout door.

-With drilled holes equally spaced and centered , attach 2 - 1-1/4" # 8 *Robertson wood screws* .



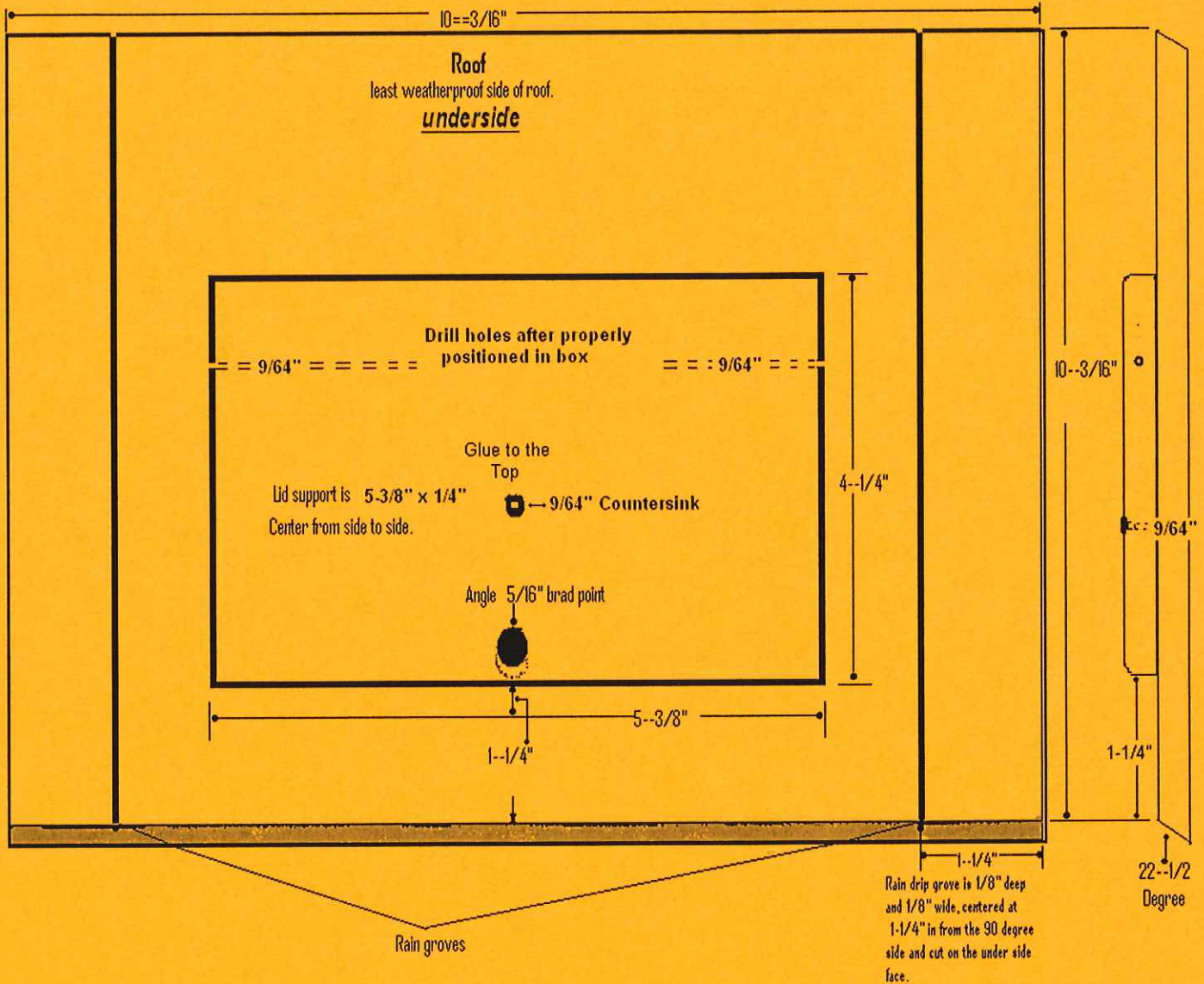
.Cleanout door handles.



Hinge screws - 1 1/2" stainless # 12 wood

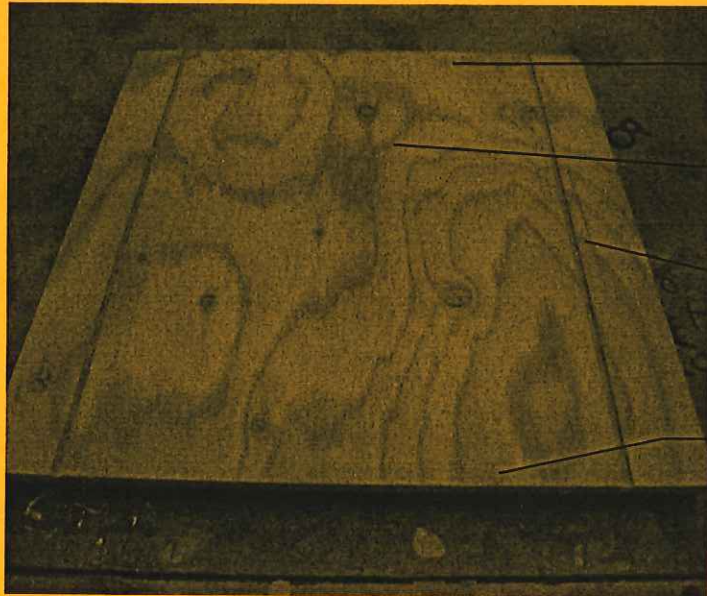
Cleanout door handles 1 1/4" # 8 *Robertson wood screws*.

Step 16: Rain Drip Grooves.



- In order to complete roof tops, you need to cut rain drip grooves into underside of roof top
- Running front to back cut a groove $1 \frac{1}{4}"$ from ends of roof top $1/8"$ deep. See below.

Note: Make sure measured marks are on the long point of beveled end of your roof top, this will help you line up your groove with the table saw blade.



Bevelled edge.

Under side of plywood.

Groove **1 1/4 "** from side
1/8" deep.

Bevelled edge

- Place saw sled on table saw.

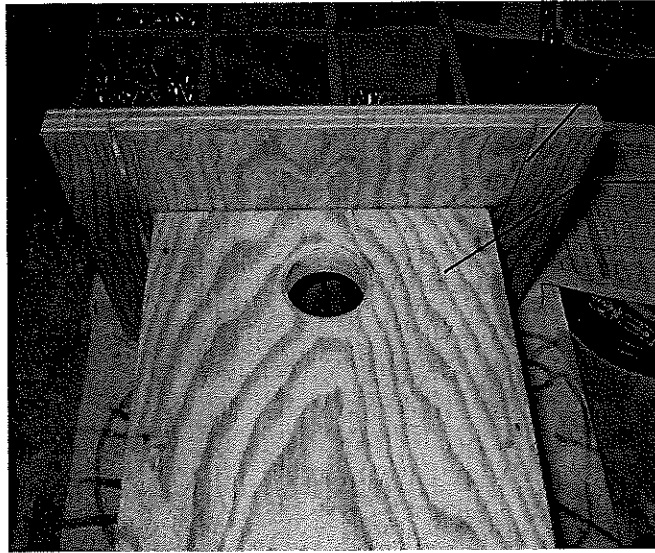
-Using tape measure, measure **1 1/4 "** from both side of roof top.

Step 15: Attach lid Support to roof.

>Lid supports:

4 1/4"W x 5 3/8" . cut on saw sled.

Router only the best sides of lid support.



Rain grooves.

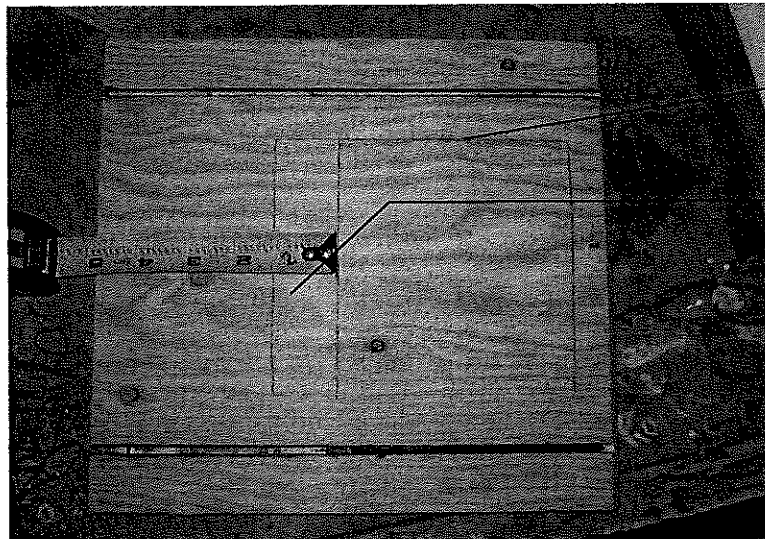
Bird house centered to rain grooves.

-Reach inside the birdhouse (*from bottom*) and trace an outline of the front and side panels onto the underside of roof top.

Note: make sure roof beveled 22 1/2 degree is flush with back side of birdhouse.

-Remove roof top and place it underside up on work bench.

-Draw a line 1 1/4" down from the front traced line you just made. See next page



Traced line of inside of panels

New line, too line up lid support.

-Next nail and glue the lid support flush with the line you just made (**1 1/4" down line**).

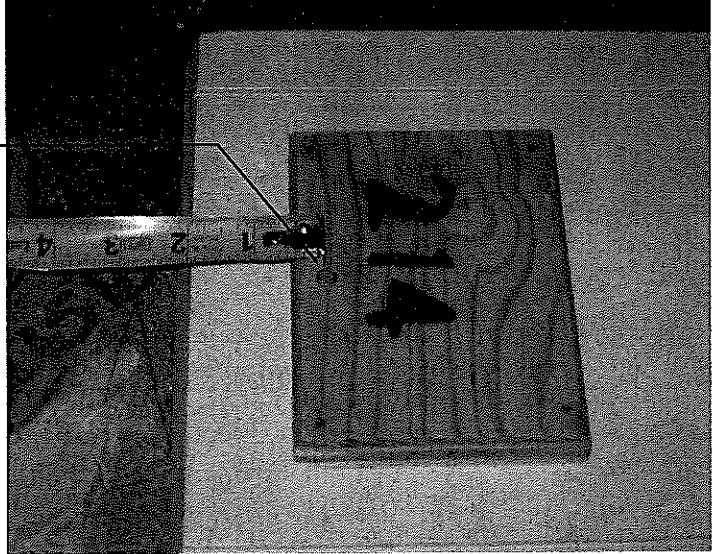
-make sure lid support is square on all sides.

-Next drill roof hanger hole into lid support.

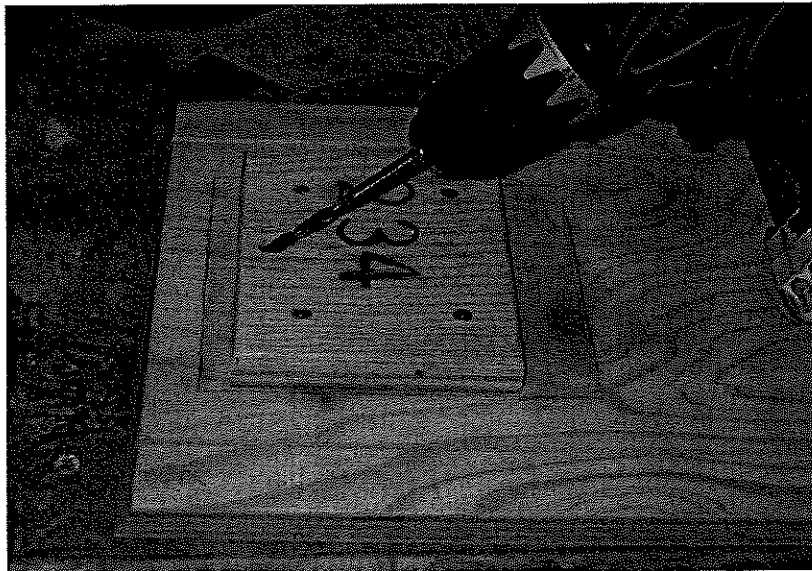
-Use a **5/16"** drill bit.

-Mark the lid support hanger hole **3/4"** from the back of the lid support and center it from side to side. See below

Hanger hole **3/4"** from edge and centered on lid support.

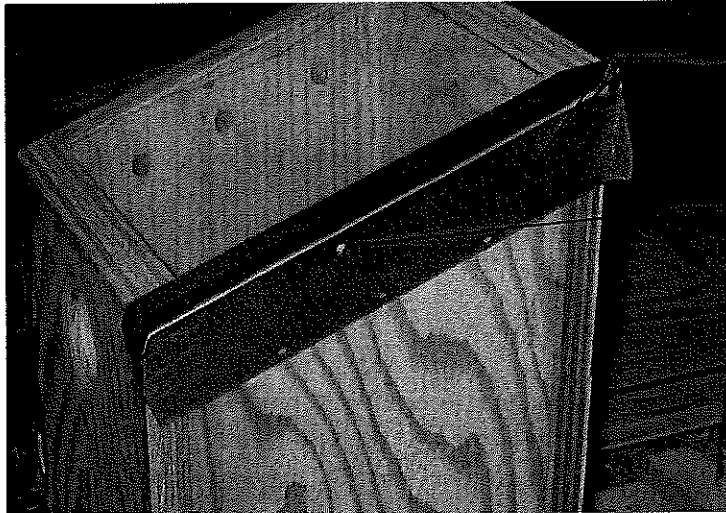


-Begin by drilling straight down about **1/16"** , **WHILL STILL DRILLING** (*high speed , little pressure*) tilt drill about **22 1/2** degrees and go into the plywood about **5/8"** further. See next page



Note: The angled hole does not have to be a perfect **22 1/2** degree angle.

- Next drill two holes that go through the sides of your birdhouse and into the lid support (this will hold down the roof to the side panels of you birdhouse.
- Place the metal hole jig (see instructor) onto the top edge of side panels see below

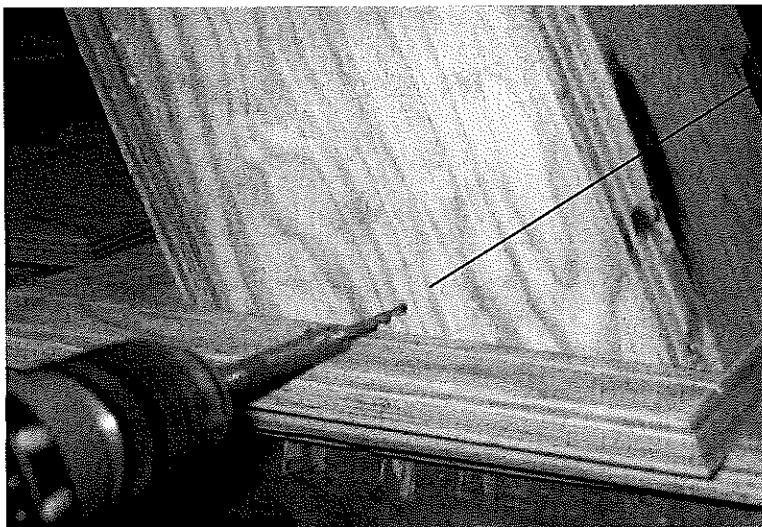


Metal jig for marking lid support and vent

Lid support hole.

- Drill holes (*one on each side*) using **9/64"** drill bit, make sure you go into the wood about **2 1/2"** to receive the **2 1/2"** double headed nail that will anchor roof top.

- Use **2 - 2 1/2"** double headed nails as pins

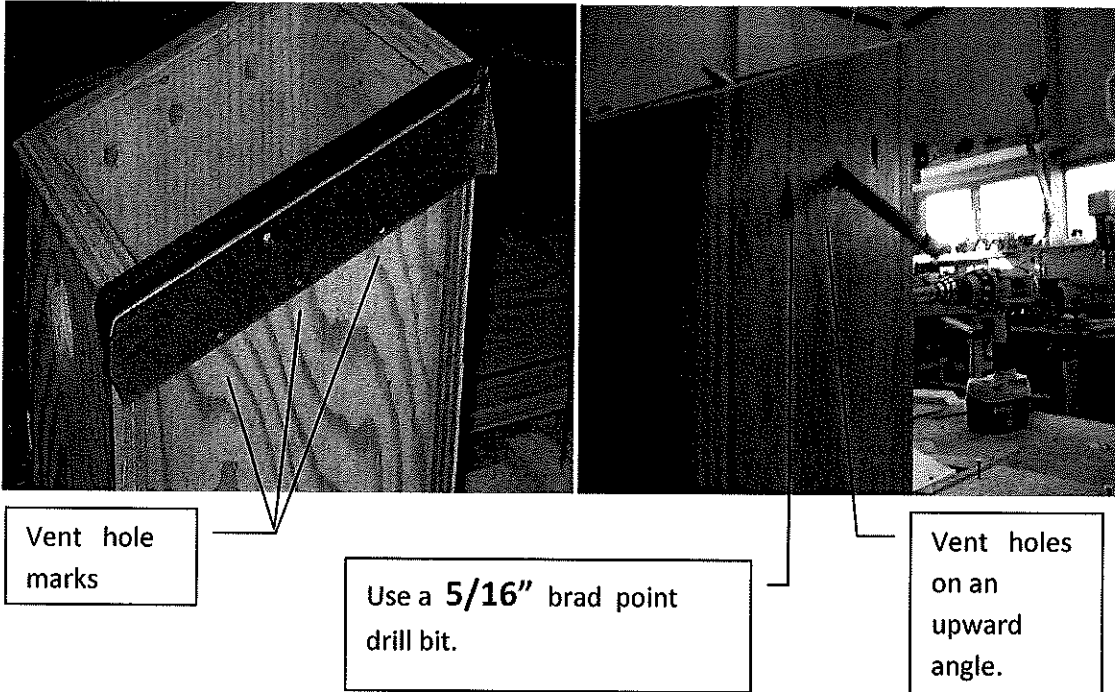


Drilling anchor holes for roof top. **Note** : center the hole in side panel . Use **9/64"** drill bit.

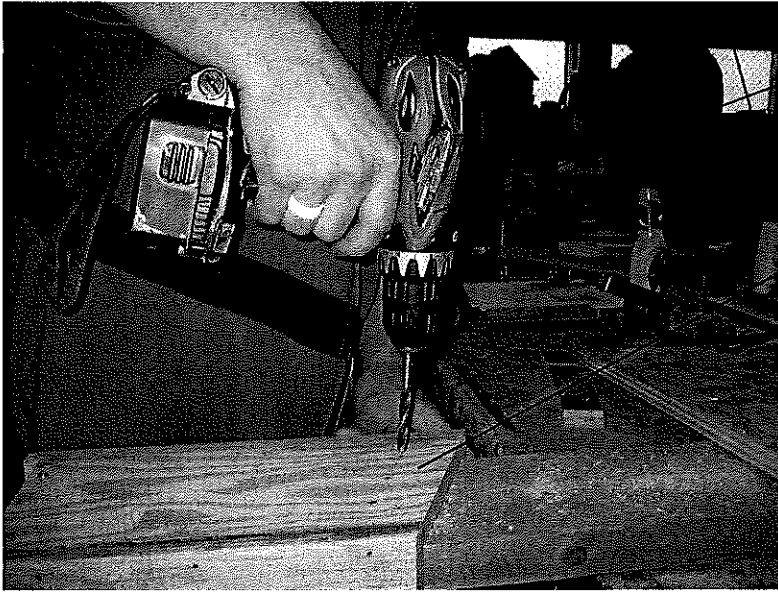
Step 16: Vent holes

- With same metal hole jig, mark **3** vent holes on each side of (*on top*) birdhouse.
- Drill these holes on an upward angle (*about 30 degrees*) with a **5/16"** drill bit.

Note: So rain can't poor into birdhouse. See below

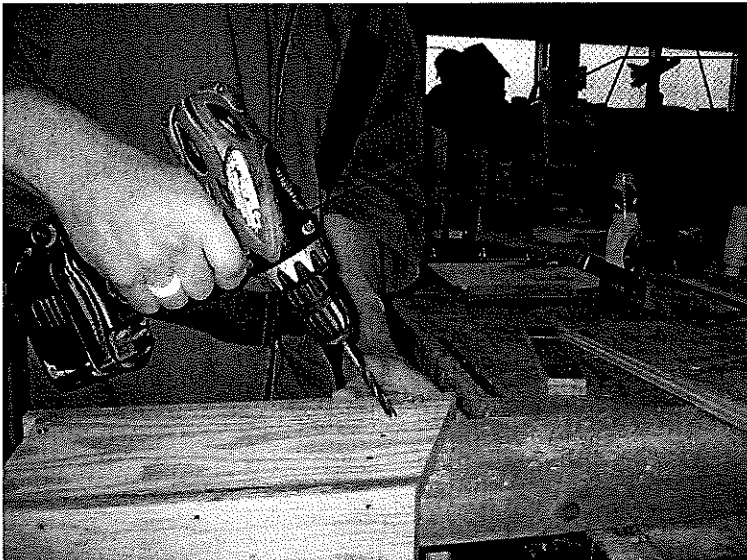


-Again (**HIGH SPEED WITH LITTLE PRESSURE**) drill these holes starting **90** degrees with side panel, drilling **1/16"** into the plywood and **WHILE STILL DRILLING** tilt drill to about **22 ½** degrees and drill throw side panel. See below



Start drilling at **90** degrees to plywood surface

Drill into plywood only **1/16"** before tilting drill.



While still drilling (**high speed little pressure**) tilt drill to **30** degrees , drill throw plywood.

Step 17: Drilling the Mounting screw holes.

-All that you need to do is drill two holes into the back of the birdhouse.

- Using a **11/64"** drill bit drill into the back of the bird house one hole **2-6/16"** down from the top of the birdhouse. (Make sure it is centered)
- Drill the **second** hole just below the bottom cleanout door ensuring it is centered as well.

Step 18: Numbering Your Birdhouse and 45 degree wire hole.

- Before you apply the finish, you need to brand your assigned numbers on your birdhouses.
- Everyone will do this at the same day, regardless of how close to completing your birdhouses.
- The process is simple , heat up the metal rods that match your assigned numbers and BURN them into the fronts of your birdhouses (near the bottom) and the undersides of your roof tops (on lid supports)



Mark a faint line to keep your I.D #'s nice and straight.

Note: Drill 45 degree wire hole with a **11/64"** drill bit in front panels.

See instructor for **45** degree jig.

Step 19: Sanding Birdhouses.

- Using sand paper block sand all corners and edges
- Don't forget to sand the roof tops.

Step 20: Applying the Finish.

- The finish is a mixture of **4** parts water and **1** part *Welbond* wood glue.
- Using the glue tray provided, sink the sides of the birdhouse into the glue.
- Using a small sponge apply glue to the cleanout door.
- Apply finish to the roof top, same method as side walls.
- Once finish is applied, hang the roof top and birdhouse on the rack.
- Let finish drip into trays. Sand between coats with well-worn sandpaper
- Repeat this **3** times to get a good (*finish*) weather proof seal on the birdhouses.

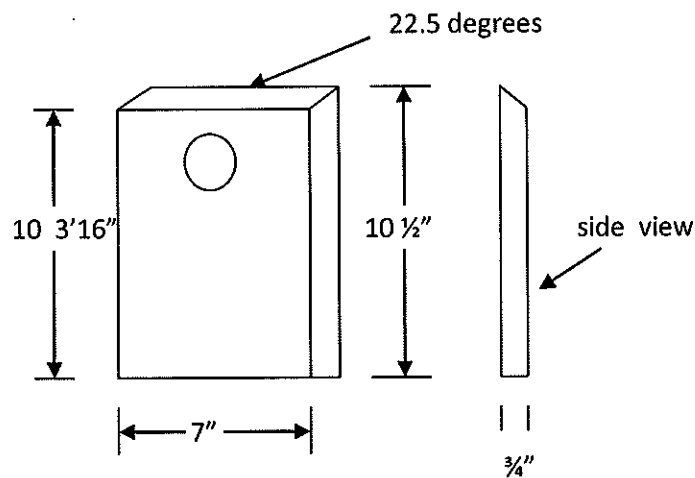
Step 21: Paint Roof Top

- Paint your roof tops with paint provided.
- Make sure you cover end grain on plywood.
- Let dry on paint stands.

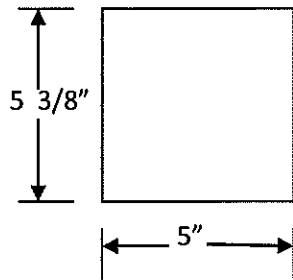
Step 22: Metal roof cap.

- The last thing to do is to cut and shape a metal roof cap that will keep the birdhouse dry.
- Instructor will show you how to make your 2 roof caps.
- Install caps with small wood screws ($\frac{1}{2}$ ")

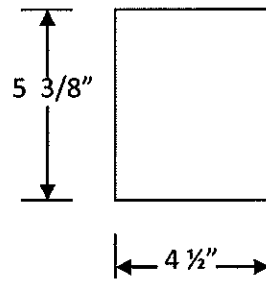
Front Panel :



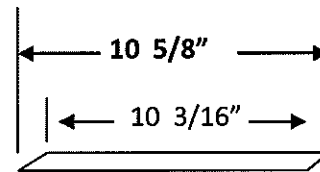
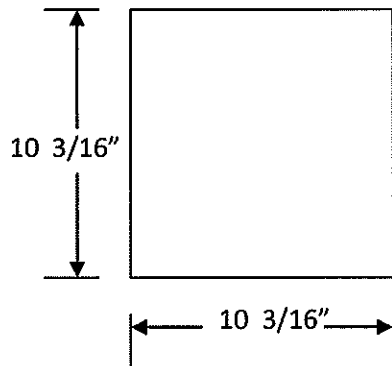
Cleanout door :



Lid support :



Roof top :



Side view

Side panels :



Step 11: Rain Drip Grooves.

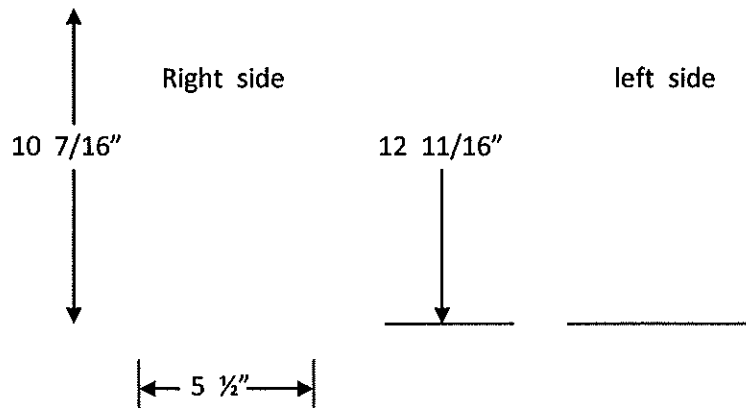
- In order to complete roof tops, you need to cut rain drip grooves into underside of roof top.
- Place saw sled on table saw.
- Using tape measure, measure **1 - 1/4 "** in from the sides of the under face of the roof.

Note: Make sure measured marks are on the long point of bevelled end of your roof top, this will help you line up your groove with the table saw blade.

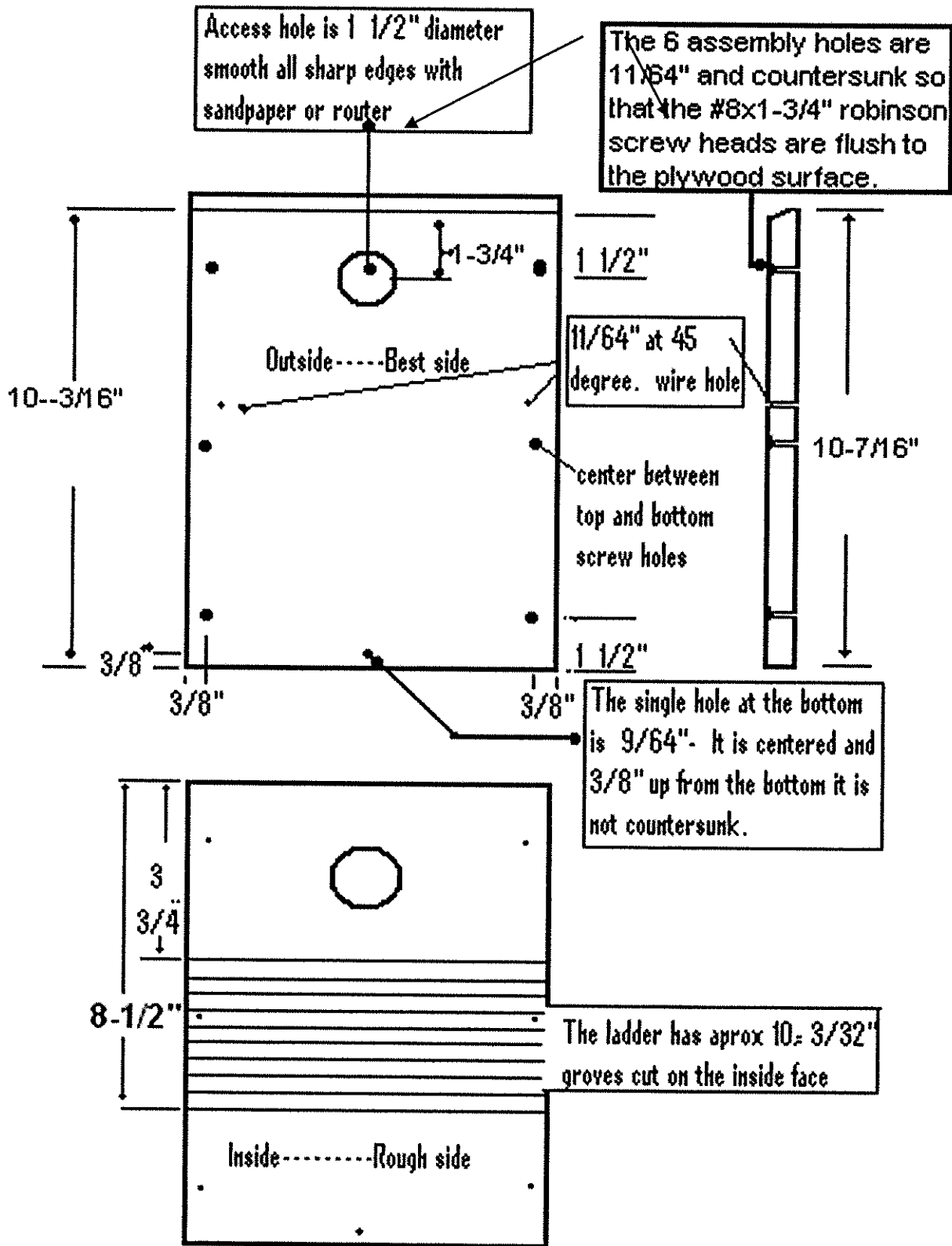
- Adjust your saw blade **1/8"** above saw sled.

Note: make sure saw blade is centered on your mark for both cuts.

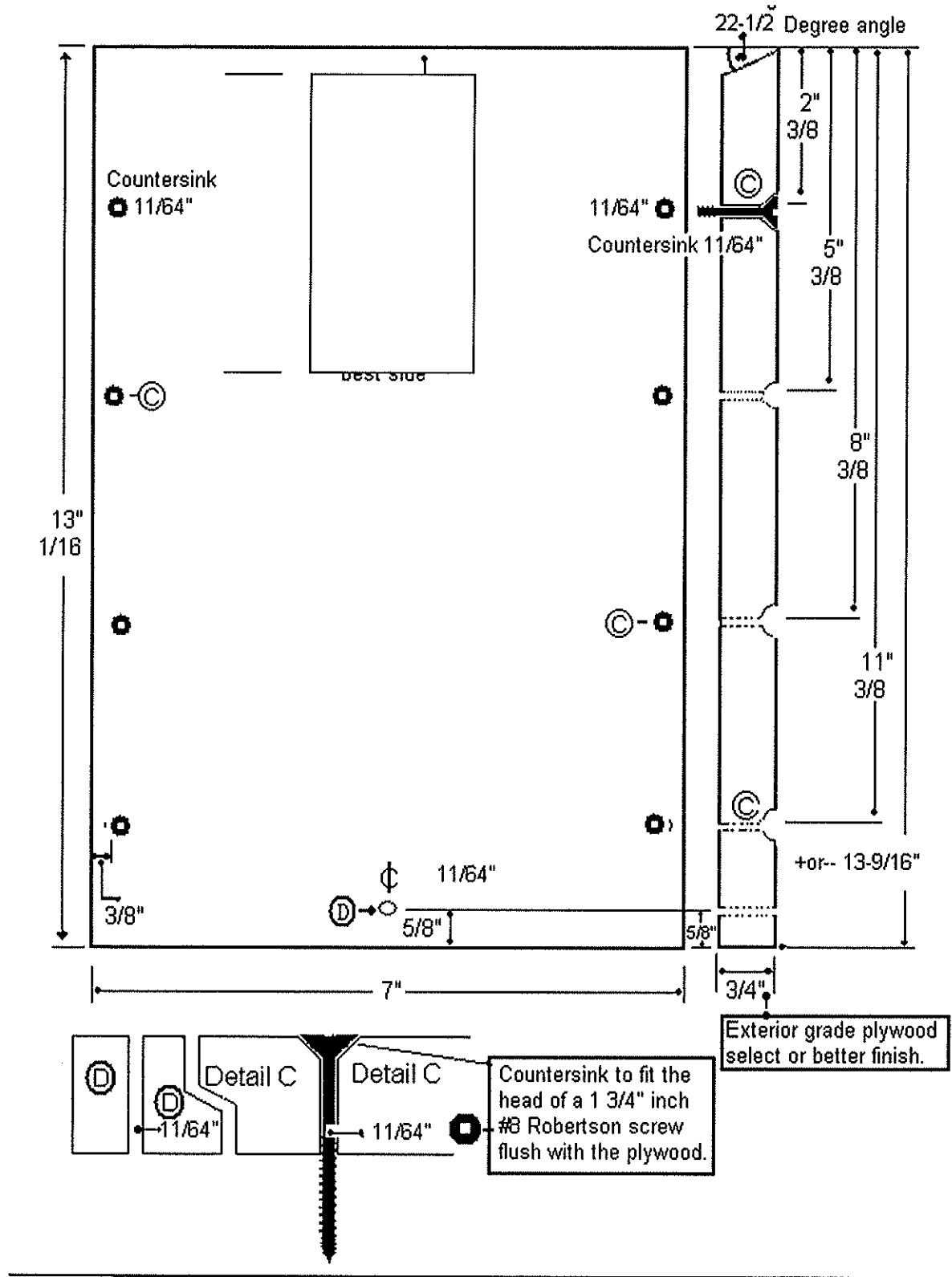
- Cut your grooves running front to back, centered at **1 - 1/4 "** from the sides under the roof **1/8"** deep. See below.

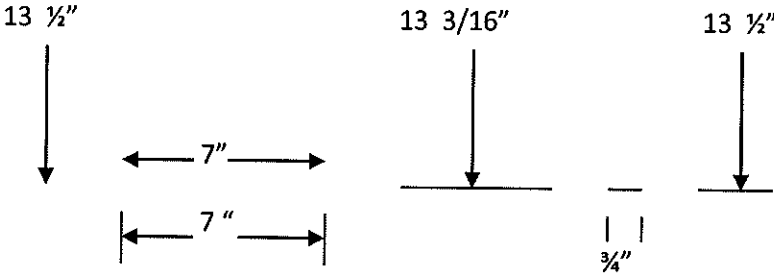


Back panel :



22.5 degrees





Brian V

