

## Building Large Inexpensive Canvas Supports

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Artists have had the desire to work on a large scale since the beginning. Today, working on a large scale has a few prohibitions. This tutorial will offer you a process for overcoming one of those prohibitions. Large canvases require large supports that usually are prohibitively expensive. Here I will offer you one method for creating a large support for a stretched canvas that is easy to make and relatively inexpensive.

### **Advantages to making your own supports:**

-You will save a lot of money doing this yourself. The 60" x 75" supports average out to about \$18 each once you make a few of them. One Utrecht 60" heavy-duty stretcher bar retails for \$17.45. Their 72" retails for \$18.40. They don't offer a 75" support. The total cost for just the bars would be \$71.70 without any cross bracing if you were to use heavy duty commercially made stretcher bars. That is more than a \$53 difference per canvas. If you make 10 canvases for a show that is real money.

-You have greater control over all the dimensions of the artwork. You can control the length and thickness of the support. The Utrecht heavy-duty stretcher bars are available in only a few lengths and are always 1 1/4" deep.

-Quality. The quality is up to you, your skills, and the materials you choose to buy. If you get everything as inexpensively as possible you might end up with a very poor quality support. If you take your time choosing your materials, spend a little more, and develop good skills you can have a very high quality support.

-Pride in doing it yourself.

#### **Disadvantage to making your own support:**

-Time. Once you get good at this you will be able to cut and construct one of these in about an hour. Plus, you have to stock all your materials. That takes time. You save time and money by making several of these at a time.

-Strainer, not a stretcher. This support will not have adjustable corners. It is possible to make adjustable corners, but that is a whole other set of wood shop skills.

*Note that I refer to this as a "support", and not a "stretcher." I will be showing you how to make strainers in this demo. Stretchers and strainers differ in that a stretcher will allow the artist to easily adjust the tension of the canvas after the canvas has been stretched. Strainers have fixed corners that do not allow for this adjustment.*

#### **There are a few limiting factors when it comes to artists and large scale paintings. Here are a few basic considerations before you start:**

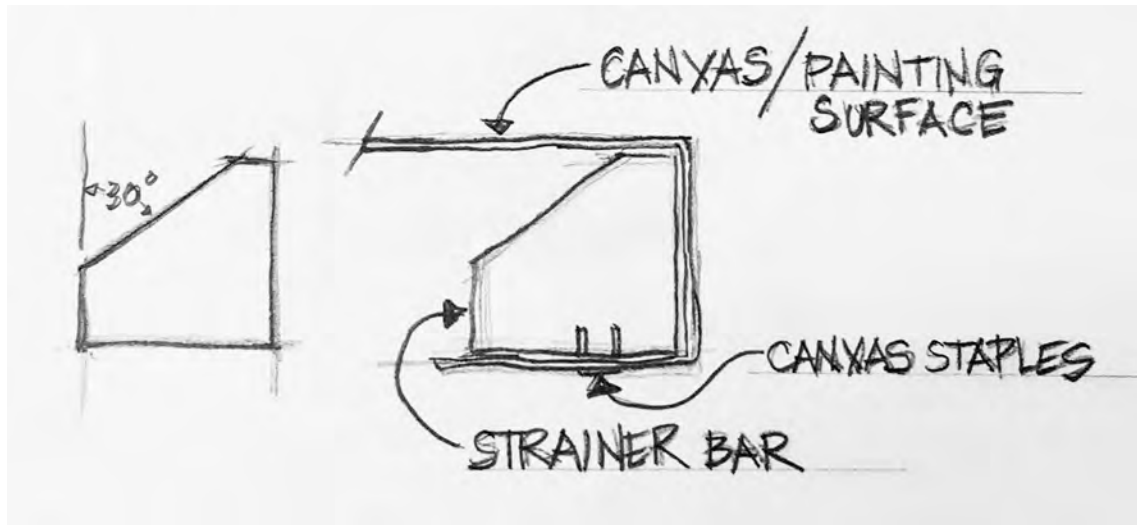
- 1) Do you have all the materials to create a canvas of the size you have in mind? Wood can be found at nearly any dimension with ease. Often the real limiting factor for an artist is finding artist's grade canvas that is large enough. When choosing your scale start with the canvas and build a support to suit the canvas. I've seen many artists build a support than not have canvas to fit it.
- 2) Do you have enough space in your studio for the canvas you plan on making?
- 3) Can you get the canvas through all the doorways of you studio building and your gallery?
- 4) Can you transport this canvas? Will it fit in your car? Can you fit it in a rental van?
- 5) Are you physically able to move this canvas, or do you have someone in your life that can help you move it?
- 6) Can you store a canvas of this size once it is finished? Can you store 10 of these canvases?
- 7) Do you have all the skills to safely make one of these supports? A wise man once said to me when he saw me misusing a table saw "you can't grow them back." **Make sure you know how to safely use the tools before you start using them. Power tools are not forgiving to those that try to learn through doing.** Get help and training if you are at all uncertain of how to use this equipment.

#### **Stretcher and Strainer basics**

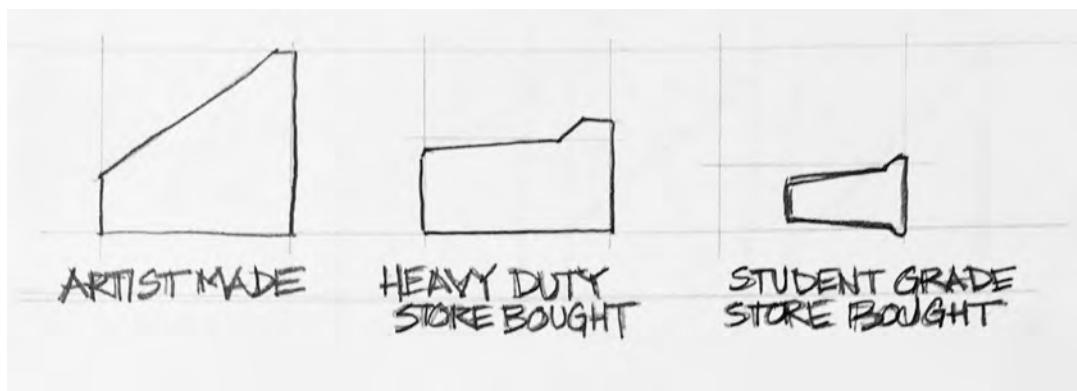
OK, lets get started by looking at the basic function of the support. The support is intended to do 3 basic things:

- 1) Give tension to the canvas.
- 2) Keep the canvas square, and the edges straight, and the surface flat.
- 3) Keep the painted surface of the canvas away from the support. This is important.  
The painting portion of the canvas should have minimum contact with the support.

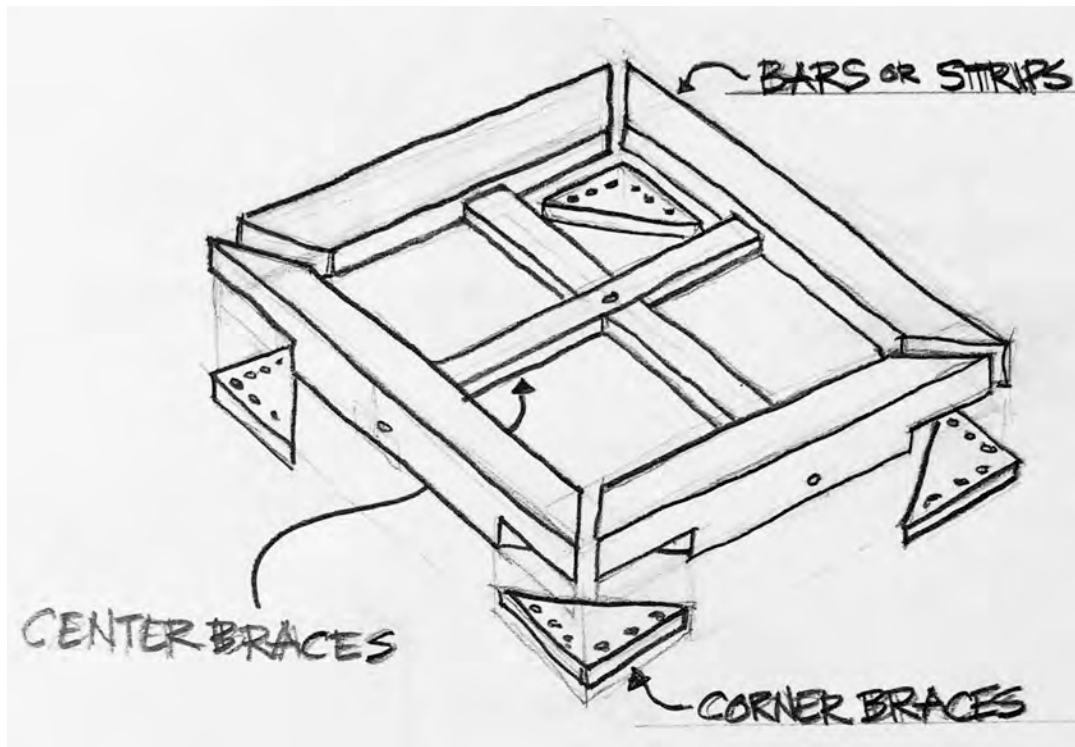
This is the basic profile of the support we will be making, and how it will function with the canvas:



This is the basic profile of your typical commercial supports:



This is a basic plan for how this support will be constructed



**Materials:** This is a list of the materials you will need, and a few things to look for when acquiring these materials:

1) **LUMBER:** We will be using basic 2" x 4" x 8' pine and 1" x 2" x 8' clear pine. Just about any hardware store will do. This wood came from my local Menards. Select each board with care. Look for dry lumber that is straight and has no significant knots. If you cannot find suitable lumber at the big box hardware store visit your local lumberyard. They will often carry lumber in a variety of grades. Lowes and Home Depot will have a lot of #3 grade lumber, and with careful selection you will find what you need from there. For a better quality support with less effort you can look for a prime grade lumber, but it will be more expensive. (and don't trust the big box hardware stores to be honest with their grading. They all call everything prime now. A lumberyard will guide you in the right direction)

Get to know lumber grades better here: <http://www.southernpine.com/grade-descriptions/>

2) **Plywood:** 1/2" or 3/8" a construction grade soft wood ply, or even MDF will work. I like to use a little higher quality hardwood veneer ply for my supports. Here are a few resources to help you unravel the complex world of plywood:

[http://www.popularwoodworking.com/techniques/basics/choose\\_the\\_right\\_plywood](http://www.popularwoodworking.com/techniques/basics/choose_the_right_plywood)  
[http://www.globalwood.org/tech/tech\\_softwoodplywood\\_grade.htm](http://www.globalwood.org/tech/tech_softwoodplywood_grade.htm)

3) **Wood Screws or Deck Screws.** This project will require 3/4" rough thread screws.

4) **T-Brackets and Mending Plates.** (optional), these are small metal brackets that can be used in place of some of the plywood braces and woodworking techniques, but are not necessary.

### Materials List Quantities for a 60" x 75" canvas support:

quantity	material	price
2	2" x 4" x 8' pine no. 3 grade	\$3.09 each/\$6.18
2	1" x 2" x 8' select pine board	\$3.99 each/\$7.98
1	24" x 24" x 1/2" plywood handi-panel	\$5.79 each/\$5.79
25	1 1/4" Grip fast construction screws 1 lbs. box	\$3.79 each/\$3.79
2	#6 x 0.5" flat head wood screw 20 count box	\$1.24 each/\$1.24

(notice that there is no glue in the construction of these strainers. The design gives ample strength without the glue, and the support can be disassembled for transportation or repair easily if it is not glued together)

### Additional Materials for the corner jig:

1	24" x 24" x 1/2" plywood handi-panel	\$5.79 each/\$5.79
total cost for the first support		\$30.77
Cost for the next few supports		\$14.16

### Tools needed to make the support

- Table Saw with a sharp blade
- Miter saw with a sharp blade
- Drill and drill bits (a counter-sink bit is preferable)
- Phillips head screw bit for you drill or a phillips head screw driver
- Tape measure
- Pencil
- Corner Jig (you will make this yourself)
- A friend to help (optional...and you probably shouldn't refer to your friends as tools)
- Sandpaper or a hammer (optional)

## Making the Support step by step

### Step 1: buy good materials

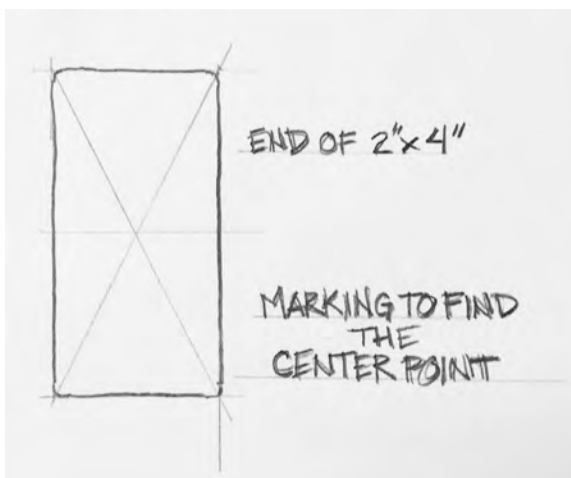
The 2 x 4s are the most important part of this project. Buy clear and straight boards. Lumber that is warped or twisted will not work for this project. When you select your boards hold the corner of the board up to your eye and look down its length. You are looking for a straight edge, and this angle will make any imperfections obvious. Inspect the board for large knots, cracks and splinters, as well. If you are at a big box hardware store you may have to inspect many boards before you find a suitable one. Take your time and don't settle for inferior lumber. This is the one of the most important parts of the process.



## Step 2: rip your 2" x 4"s

For this step you will be using a table saw. **Table saws are dangerous.** If you are not certain of how to use a table saw safely get help from a trained expert, and read this: <http://www.finewoodworking.com/2009/04/01/safety-manual-tablesaw>

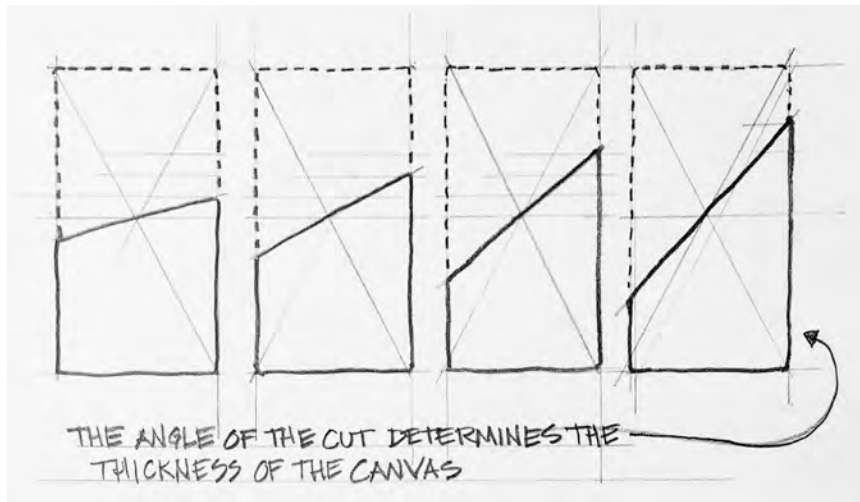
- 1- Mark the end of your 2 x 4 with an "x" from corner to corner, to find the center of the stud.



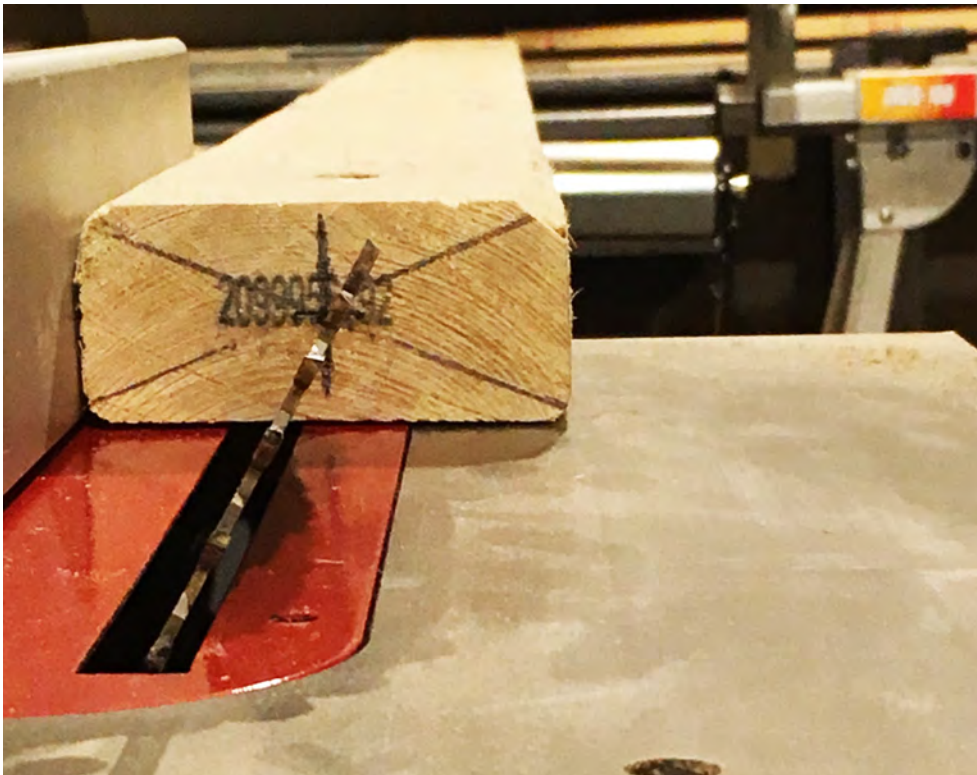
- 2- Decide on the angle of your bevel. A steeper angle will give you a deeper canvas, but may affect the structural integrity of the bar, if too steep. Too shallow, and you will have the canvas rubbing



the bar as you work. An angle between 15° and 30° should be fine. For this demo I will be making bars with a full 30° angle.



3- Set up the table saw by lifting the blade and tilting it to 30°. Make sure the blade is elevated just high enough to cut completely through the 2 x 4. Make sure the blade tilts away from the table saw's fence.





As you can see here, the cut is off center. This will result in uneven bars. Adjust the table saw's cutting fence to correct this.

4- Set up the table saw fence to cut the board directly through the center of the board. The “x” you marked on the end of the board earlier gives you reference for the center of the board. The blade needs to pass through that center point of the board. Remember that the cut has dimension to it. Both halves of the board need to be the same dimension.

-once the table saw is set up run a small length scrap of your 2 x 4 through the saw and compare the two pieces by placing them back to back. The tall side on the two pieces should match.



Here you can see the height of both is nearly identical.

5- Set up your out-feed support (this might be your friend or a shop assistant)



6- Rip the boards. Be careful. Use eye protection. Use a push-bar. Take your time. Never force the cut. The saw should do the work.



(From here on out we will refer to these pieces as “bars” or “strips.”)

Helpful tip #1: Plan on making at least 2 sets of bars at a time. When you rip the wood create 2 stacks, one from the left sides of the boards, and one from the right sides of the boards. Each of those stacks will have the same dimensions.

Helpful tip #2: Don't rip your 2 x 4s until you are ready to actually build the supports unless you buy very high quality kiln dried wood. It is tempting to rip a whole bunch of 2 x 4s at once and store them for later, but this wood is more moist at its core. Once ripped that moist wood is exposed to the air and it starts to dry and shrink. That can result in warping and twisting. If you assemble the strainer promptly the structure itself will keep the wood from warping. If you wait even a couple days you might have a lot

of unusable wood.

### **Optional step for making much nicer bars**

This step is free to do, but it adds time to your project. It is not necessary, but you end up with a much nicer support.

1- Adjust the blade on the table saw to be 0° and about 1/4" to 1/2" high.

2- Adjust the fence on the saw by laying one of your bars tall side down and with the flat vertical side toward the gate on the saw. Adjust the gate so that it will remove just the tip of the bevel on the bar.

3- Carefully run each bar through the saw.



### **Step 3: cut the bars to length**

For this step you will be using the power miter saw. If you are at all uncertain of how to use this tool ask for help and assistance from someone familiar with the safe operation of the tool. Power miter saws are particularly good at removing fingers and hands. Be aware of the “no finger zone” marked on the saw bed, and don’t rapidly “chop” with the saw. Lower the blade in a slow and controlled manner.

1- Set up the miter saw to perform a 45° cut, called a miter.



Note the angle of the miter cut. The lower side of the bar should also become the sorter side after the cut.

2- Cut a 45° miter, or angle cut, at one end of each bar. You do not need to measure anything yet, just make the cut near the end of the bar. The cut must be properly oriented to the application of the bar.





2- Measure each board to length from the outside edge of the miter and mark the length with a sharp pencil line. If you want the bar to be 60", as in this example, the longest edge of the bar needs to be 60". The inside length of the bevel will be shorter than 60"



3- Cut the miter on the opposite end of each bar. The miter saw has two 45° settings on it. One to the left, and one to the right. Rotate the blade of the saw to the opposite 45° index and cut each board to the length you measured. Again, the miter cut should result in the tall side of the board being the longest, and the lower side of the board being the shortest. See the images below





Helpful tip: Once the bars are cut to length place the boards that will be opposite one another back to back and compare their length. Each pair of boards must be the exact same length. If one is longer than the other mark the longer board with the shorter board and recut. You need 2 pairs of matching lengths to have a support with squared right angle corners.

#### **Step #4: cut your corner braces**

1- Set the table saw so that the fence is 8 inches from the blade. Return the blade to 0°, or straight up and down if it is still at 30°. Adjust the blade height so it is just above the thickness of the 1/2" plywood.

2- Cut the board into 3 lengths, each 8" wide.

3- Rotate each board 90° and run it through the saw two more times. You should end up with a total of 9 8" squares of plywood.



4- Draw a line diagonally across each square with a straight edge. You will be cutting these boards along that line.

*For the following steps you will be using the table saw once again, but now you will be using the table saw's miter tool, rather than the fence. Do not use the fence and the miter tool at the same time on the table saw.*

5- Slide the table saw's fence out of the way and place the saw's miter gauge in its slot.

6- Adjust the gauge to to cut a 45° angle. The image below shows how the saw should be set up with the wood piece ready to be cut.

**WARNING:** *be very careful with the following cuts. They are the most dangerous part of this whole process.*

7- With the saw **OFF** place the board against the miter gate so the line you drew earlier is parallel to the saw blade. Slide the gate toward the blade so that the leading corner of the board makes contact with the blade. If the corner of the board does not make contact with the center of the blade slide the board to the left or right.

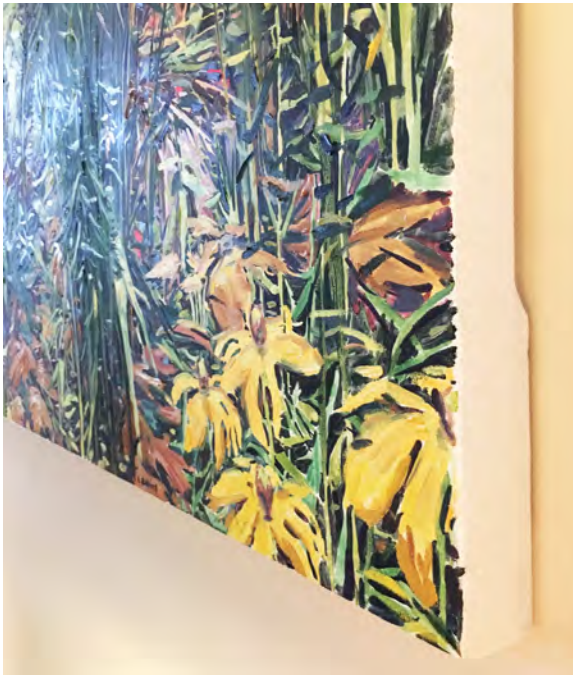
8- While holding the board firmly against the gate slide the two an inch or two away from the blade. Hold the two together with one hand and turn the saw on with the other.



9- Slowly and carefully guide the board through the blade. Keep your fingers away from the blade and use a push bar or push pads if you can. Repeat for the remaining squares of plywood. You only need 4 triangles for this project, but it is nice to make them in batches.

#### **Optional step for making much nicer bars**

This step is free to do, but it adds time to your project and requires some actual woodworking skill. It is not necessary, but you end up with a much nicer support.



As you can see in this image, the corner brace protrudes from the bar and can be seen from the side. The steps in this section will recess the brace into the bar for a cleaner look against the wall. If done well, the whole structure will be more stable, as well.



1- Set the bar so the bevel is tall side of the bevel is flat on the table.

2- Use one of your triangles to mark the board as shown below:



3- Adjust the height of the table saw blade to the exact thickness of the plywood.



4- With the miter fence still set at 45° run each bar past the blade along the line you just marked. The blade should pass to the outside of the line closer to the end of the bar. You might want to use the table saw to “nibble” a little more of the wood away from the board by making a few more passes with the saw, each cut should be slightly closer to the end of the bar.





5- Use the plywood corner to mark the thickness of the plywood on the bar.

6- Adjust the table saw blade to the thickness of the bar if the bar is set with the tall side down. Adjust the table saw's fence so that the bar is cut to the depth of the plywood. See the image below.



7- Cut the bar just to the previous cuts on the board. You should now have a recessed slot in the bar for the corner brace.



8- Repeat that for all 8 ends.

#### **Step #5: make your corner jig**

1- Find the scraps from when you cut your bars to length

2- Set the table saw blade so it is at 0°, and the blade is raised to the thickness of the scrap from the bars. Adjust the table saw fence so that you will rip the bar to remove the bevel from the bar. See the image below to get a better idea of how to do this.



3- Rip the pieces, and save both halves.

4- Use the other 24" x 24" piece of plywood as the base for this jig. Attach the bevels to the outside front of the board as shown. You can do this with wood screws or nails and glue. You might want to miter the ends to fit one another before you do this for a cleaner look.

5- Attach the two rectangular scraps of wood to the inside of the beveled pieces as seen below. Your jig is done. Now you can assemble your support bars.



Helpful tip: this jig will be used to hold your corners at a 90° angle. If the jig isn't square your support will not be square. Take the time to make sure you are making a jig with a true right angle, and check it before you use it.



### Step #6: assembly of the bars

1- Locate two bars that will go together and place them in your jig as shown below. Remember that unless you are stretching a square canvas you should have one longer bar and one shorter bar in the jig.



2- Place a corner brace at on the corner of the two bars and attach it with 3 1 1/4" screws on each bar, as seen below. It might help to pre drill holes for the screws with a counter sink bit.

3- Repeat this for all 4 corners of the support.

4- Check to make sure all the corners are square and true by either measuring the diagonals to see if they are equal or using a carpenter's square to check them.

5- Once all the bars are assembled check the corners for sharp edges or points that might pierce the canvas as you stretch it. If you find any knock them down with sandpaper or tap them with a hammer. If the top corners of the bars do not meet neatly you may have to disassemble the structure and make adjustments.

### Step #7: placing the braces

For all supports you will need some sort of bracing once the support gets to a certain size. Without the bracing the tension of the stretched canvas will pull and twist the sides of the support, and they will become warped. There is also the risk that the support will collapse under the tension of the stretched canvas. As a general rule you should place a support every 18", so a 36" canvas would require one support. Since these bars are made from rather solid lengths of 2 x 4 you might be able to get away with fewer braces. For this demo I will show you how to make one support for each length of the canvas. You might want to use more than that. The procedure is the same.

1- Measure for the support's length. Measure the inside dimension of the support from. The best way to do this is to measure the inside edges the length of the bars on both sides parallel to the direction of the support. they should both be the same length. If one is slightly longer than the other you should fix your support. It isn't square. Use this length as the length for your brace.

-Do this for both dimensions of the strainer, so you will have two braces when you are done: one for the canvas's length, and one for its width.

2- Measure and mark the 1" x 2" boards, and cut them to length on the miter saw with a simple 90° cut at your mark.

3- Find the mid-point for the length of both of the support bars and mark it with a pencil line.

4- Measure the width of the support material and divide that dimension by two. Take that dimension and place another line on either side of the centerline you made on the support.

5- Measure to half the thickness of the support, and place a line on the side of the support bar. You will be cutting a dado in each of these bars so they fit together where they cross.





6- Adjust the height of the blade on the table saw to the depth of the dado cut. That should be exactly half the thickness of the board.

7- Remove the fence from the table saw and set the miter gauge to 90°

8- Use consecutive cuts to nibble away the material to make the dado. If you have a dado blade for your table saw you might want to use it. If you are making a complex set of braces with multiple dado cuts a dado blade will prove to be very useful.



9- Attach the two braces to one another by placing one dado into the other. Use a small screw to attach the two pieces together at the joint. It is a good idea to pre drill the hole since this material is a bit thin.





This is an alternate method for creating cross braces. It is easier, but not as stable.

10- Set the assembled support face up on a table and then set the braces into the support and mark the edges of the support to make sure the braces are centered.

11- Pre-drill holes from the outside of the bars through the end of the braces as shown below. Countersink these holes so the screw head is not seen on the edge of the canvas when the canvas is stretched.

12- Secure the bars in place with 1 1/4" screws.

**Congratulations. You are done and ready to stretch the canvas.**