Joel DuBay and Scott Foster of Ready Acoustics Presents:

DIY BASS TRAPS MADE EASY

The keys concepts to efficiently building a high performance broadband Bass Trap are to chose the right material for the mineral fiber core, using a sufficient thickness of core material, choosing an appropriate fabric, and not overbuilding the frame work so as to yield an unwieldy [too heavy] device which cannot be easily installed in position for best performance. These fundamentals can be achieved by following a few simple rules:

1) **CORE:** Use the best priced mineral fiber material your local market can provide – with some consideration given to material handling properties. If available at reasonable cost, semi-rigid fiberglass insulation boards in the 3 lbs pcf, or 48 kg/m3 density range such as Owens Corning 703 [OC703] are an excellent choice as this material will provide you a medium to work with that will have good handling properties, rigidity, durability, modest cost, and excellent acoustic performance. Mineral wool materials such as Rockwool in the 6 lbs. pcf or 100 kg/m3 range or greater, will also work well, though this material is generally more floppy and less durable than fiberglass based alternatives [tends to crumble on the edges]. Use naked, panels, not foil, or paper scrim. These boards are typically easiest to source in 2" thickness, just stack them to achieve the desired overall size [a minimum of 4" thickness is recommended]. More information on acoustic insulation is available here: Bob Golds Excellent Absorption Coefficients Page

2) **FABRIC:** Any breathable fabric will work - literally put your mouth on the fabric and blow – if resistance is modest, the fabric will work fine, so just pick something that looks good to your eye, and can be had at a reasonable cost. But also, to the extent appropriate for the location you intend to use the units, give some consideration to ease in cleaning /stain resistance, durability against wear and tear, and fire retardant treatment. Upholstery and drapery fabrics work great or even muslin, craft grade felt or dyed burlap [hessian or jute] will work and are very cheap. A fabric with elasticity is helpful in getting a tight fit and a sharp edged panel. For this project we used Ready Acoustics elastic micro-suede - the same material used to make Ready Traps, and Ready Bags, but this material was chosen for purposes of getting a nice tight edge to the upholstery – not acoustic performance. More detail on fabrics here

3) **FRAME:** Here is where most DIY Bass Trap builders go overboard. Any material will work provided it affords you a means of attaching the upholstery, and mounting hardware. Most DIY Bass Traps use a wood frame,

but many people don't recognize that the lumber can be quite modest in size and so they build heavy frames that cover a large area of the acoustic insulation core – this is not best practice. Regardless of the size of the lumber used, it is a good idea to add corner gussets for reinforcement – you could also add a cross brace or two, or small metal corner brackets, but don't overbuild and add unnecessary weight, or occlude the sides or backside of the panels unduly.

Keep the unit as light as is practical, and leave as much of the mineral fiber core exposed as is practical. Best practice would be to both glue and screw the frame together [plain old yellow carpenter's glue is fine] and a counter-sink pilot bit will help keep your screws from splitting the wood.

Here is an example of a DIY Bass Trap that follows all of these design rules in a simple to follow series of steps using common materials available in any hardware store.

PARTS LIST FOR TWO BROADBAND BASS TRAPS:

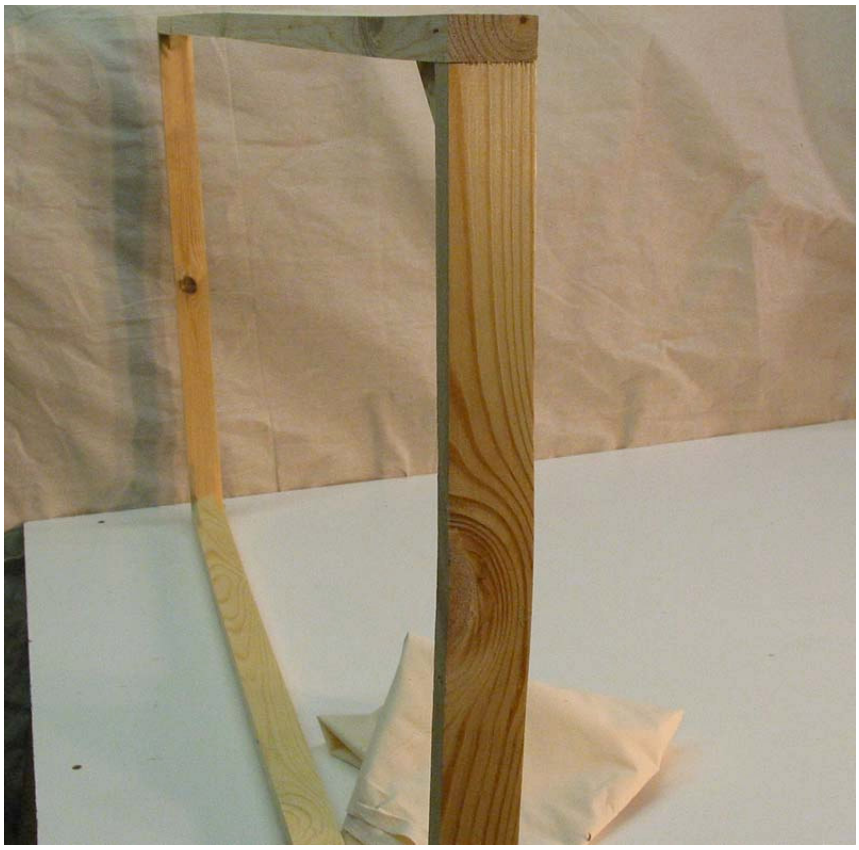
a. 3 – 1x2 inch wood lengths (8ft long each)
b. 2 – Pieces of ticking (or other cheap) fabric, 50x26 inches each
c. 2 – Pieces of "good" fabric 60x40 inches each
d. Wood screws, wood glue, metal corner brackets [or make wooden corner gussets as shown]
e. Staples and staple gun, hanger hardware

To Start:

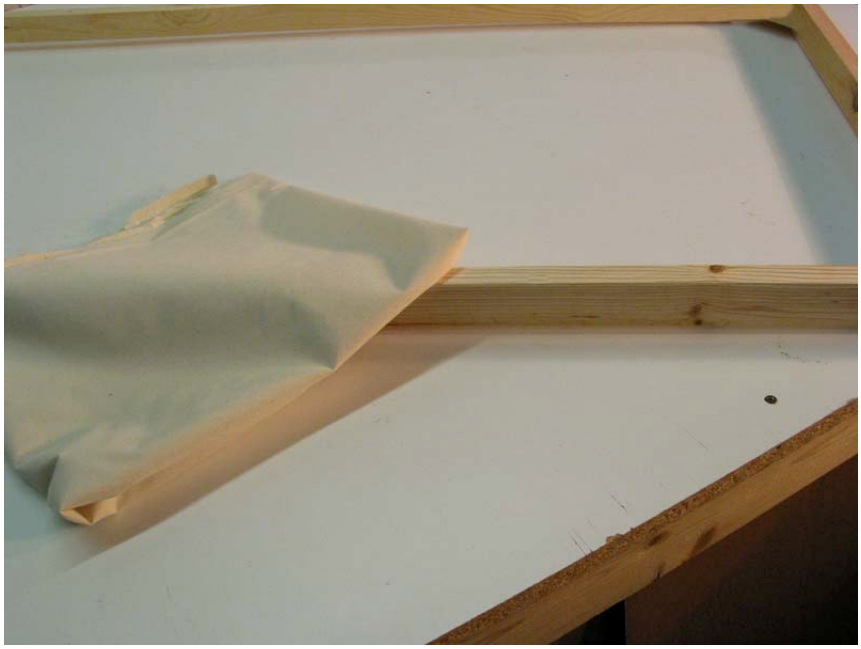
Cut one of your 8ft wood lengths at 22-inch intervals to yield four 22inch lengths. Next, mark and cut your remaining 8ft wood lengths at 48 inches. Then glue and screw together your wood "backer" frame to a size of 24x48". Start by piloting a small hole for a wood screw using a drill bit slight smaller then the screw you intend to use.

Pilot a hole for your wood screw on one end of your bass trap backer.

Use a wood screw on each end or your bass trap backer.

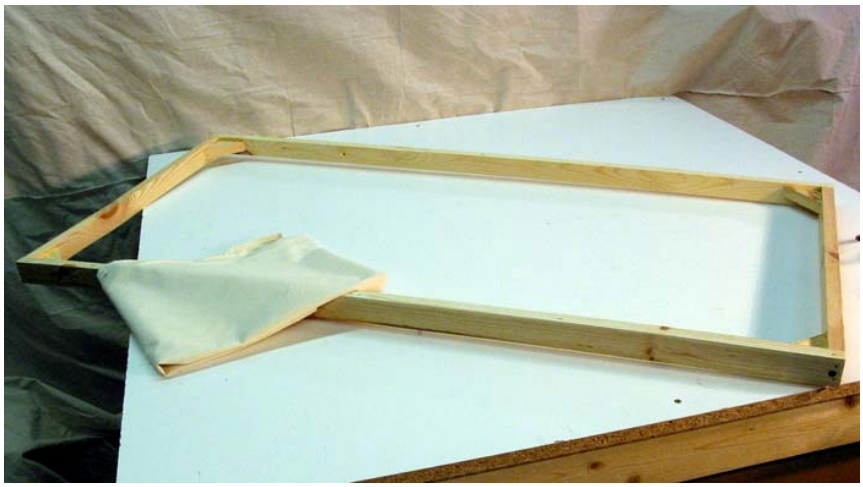


Connect the rest of your frame and add corner gussets or metal corner brackets. You now have a frame that is 48”x24”. Lay it to the side and clean the top of your work table.



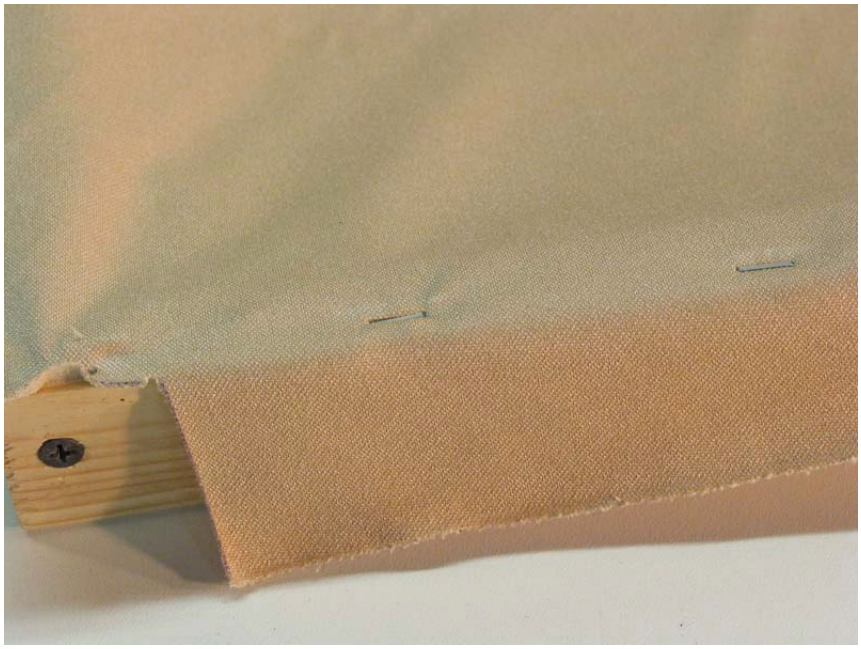
If desired, you can add ticking to the backside of the frame so that the mineral fiber core is covered on the back side. This is not required if the panels will be permanently

installed, but is good practice if you will be moving the panels around to any degree as it will keep you and your skin isolated from the itchy abrasive material especially if you use Rockwool for your core versus the more durable fiberglass. Ticking is the stuff you see on the underside of furniture and is generally the cheapest fabric you might find – of course you could also use the same fabric you are using for the face of the panel if this is convenient.



To install the ticking just center this material over the frame and fasten it with staples or other flat fasteners.

Muslin will work as a ticking fabric the cost of these pieces was about .50 cents



Start on the long side. When finished, go to the opposite long side.

Make sure you staple evenly and at all corners. Connect your backer fabric all the way around your bass trap. Make sure the fabric is somewhat tight for a nice look.

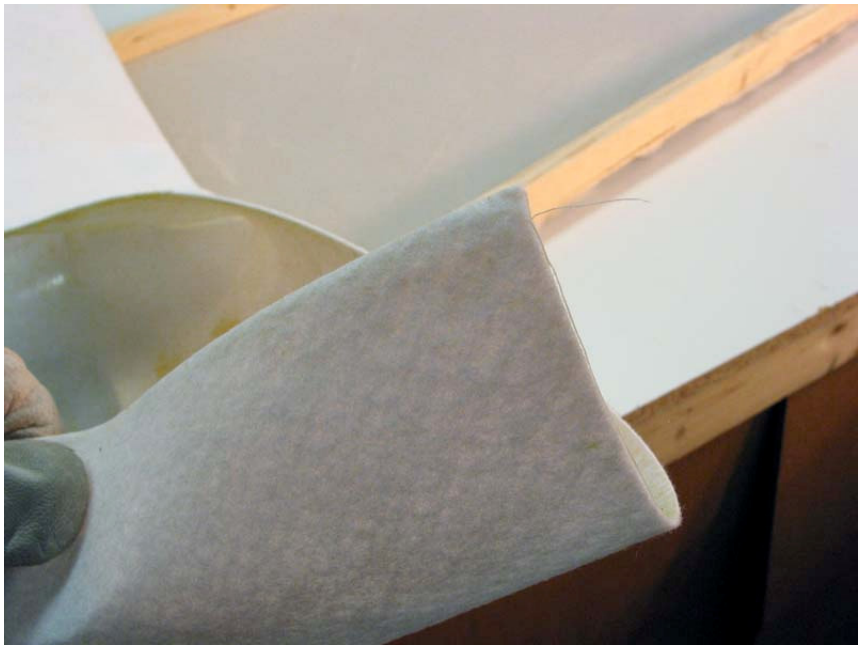
Trim off the excess fabric with a pair of scissors or a razor.

Bass trap backer with stapled fabric and trimmed fabric

Next, lay your “good” fabric (60x40 inches) on your clean table. Use a fabric that is pleasing to your aesthetics and thick enough (tight enough weave) to hold in any insulation fibers. There are many fabrics that will work well.

FABRIC EXAMPLES:

Canvas: Inexpensive, but difficult to get a tight fit, and will stretch over time.



Thick card-grade felt materials. Super cheap.

In this project we use a micro-suede fabric from Ready Acoustics. It is breathable yet tight weaved enough to prevent loss of acoustic fibers. It stretches, and stretches back which makes for a nice tight fit that will stay tight. No matter your choice, make sure you like the look of the fabric you are using and that it meets your needs for stain resistance, durability and fire safety.

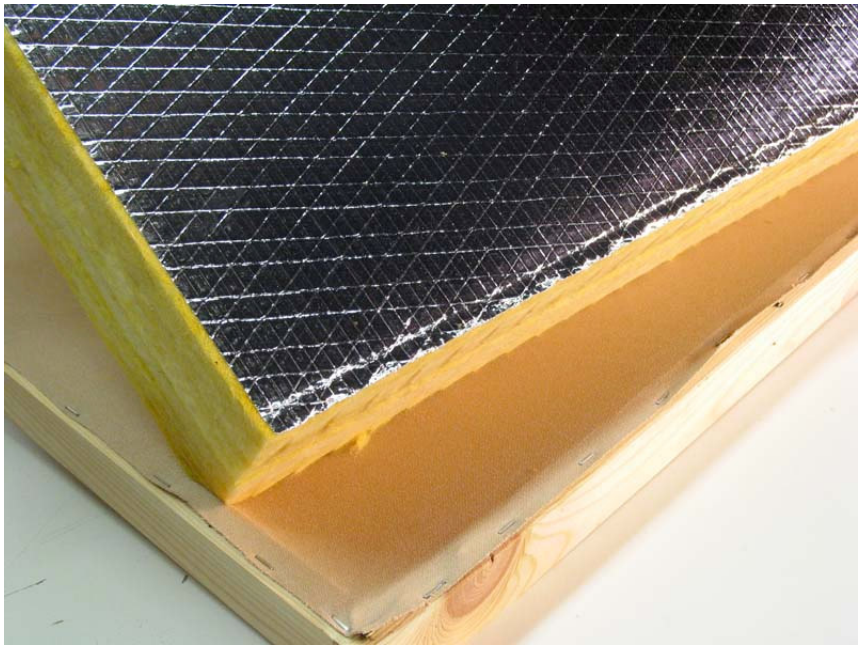
Next, grab 48x24x4" of your mineral fiber core material.

4” of 3 lbs. pcf density semi-rigid fiberglass board [703]: light weight, rigid, durable, excellent acoustic properties.

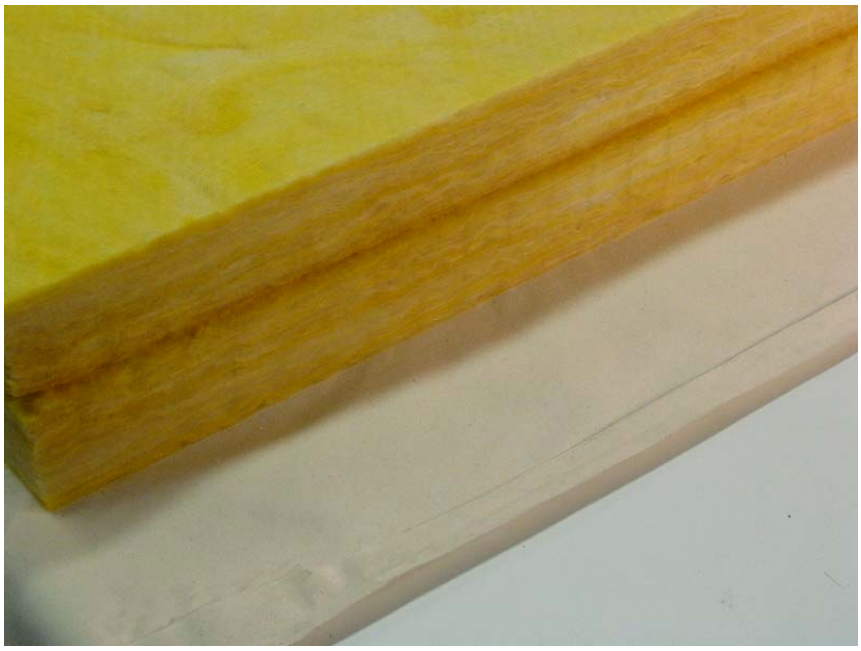
4” of 8 lbs. pcf density Rockwool: less rigid than 703, much heavier, tends to be flakey, inexpensive, excellent acoustic properties.

Usually these materials are easiest to source in 2” thick slabs. Simply stack the slabs to equal the thickness of your Bass Traps – 4” is the recommended minimum. For this example, use two, 2” thick slabs. For this project your total acoustic insulation size should be 48x24x4 inches.

Do not use foil or paper lined or scrimmed panels. This material is more expensive and will NOT operate as a broadband absorber

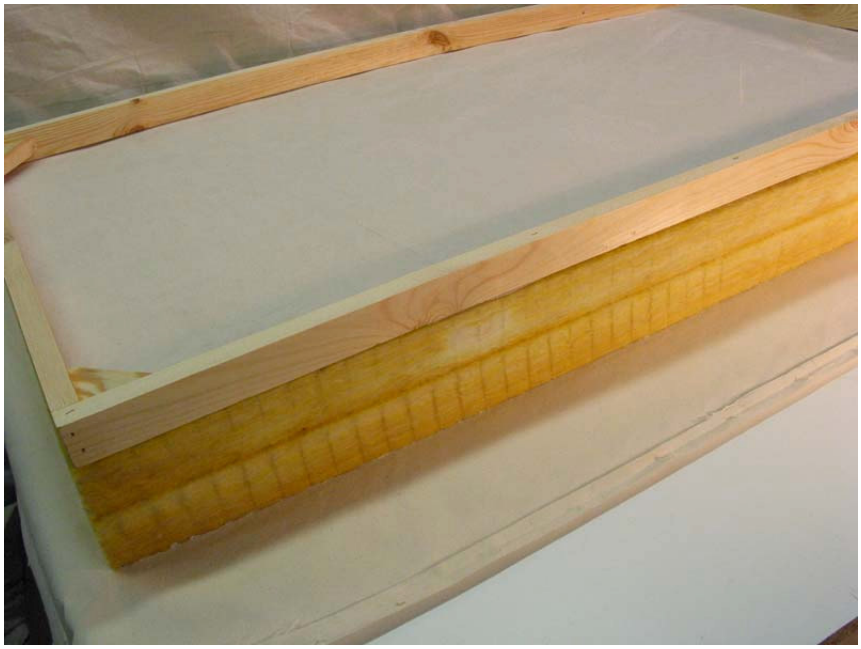


A common version of scrimmed insulation board, called FSK has a foil scrim that looks like “tin foil”. Scrimmed boards such as this are NOT “limp-mass” membranes (as touted by some) as they are “bonded” to the acoustic insulation. “Limp Mass” membrane refers to a thin style membrane that is free to move independently of the other acoustic insulation in the device. If all you have available is scrimmed insulation, peel/slice the scrim off the panels before use.

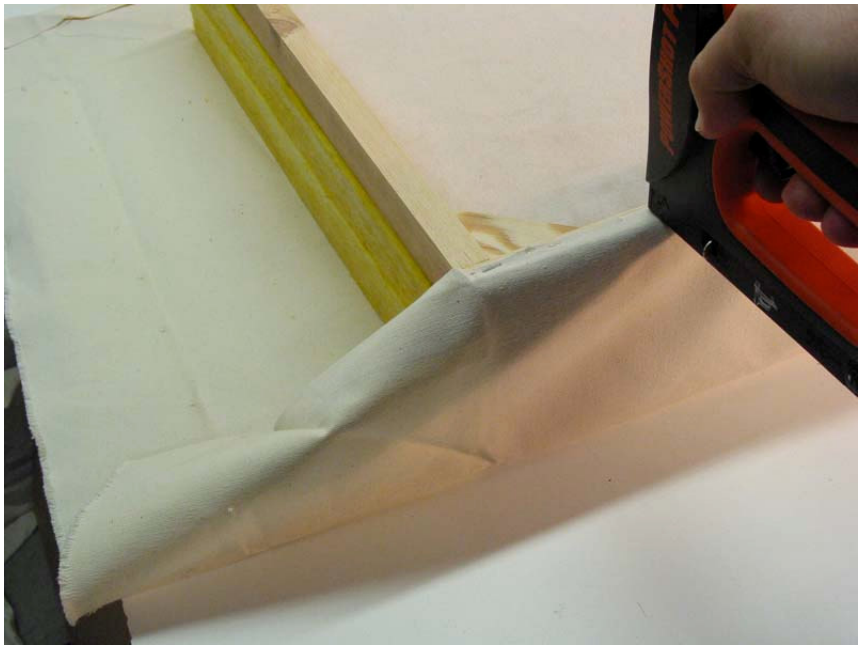


Center your acoustic insulation on top of your “good” fabric. Make sure the fabric does not get bunched up and is “flat’ under your insulation.

Center the frame on top of your acoustic insulation. Place the ticking side of your frame lays against the insulation.



3 layers: facing fabric, insulation (centered on fabric), frame – the Bass Trap is ready to upholster.

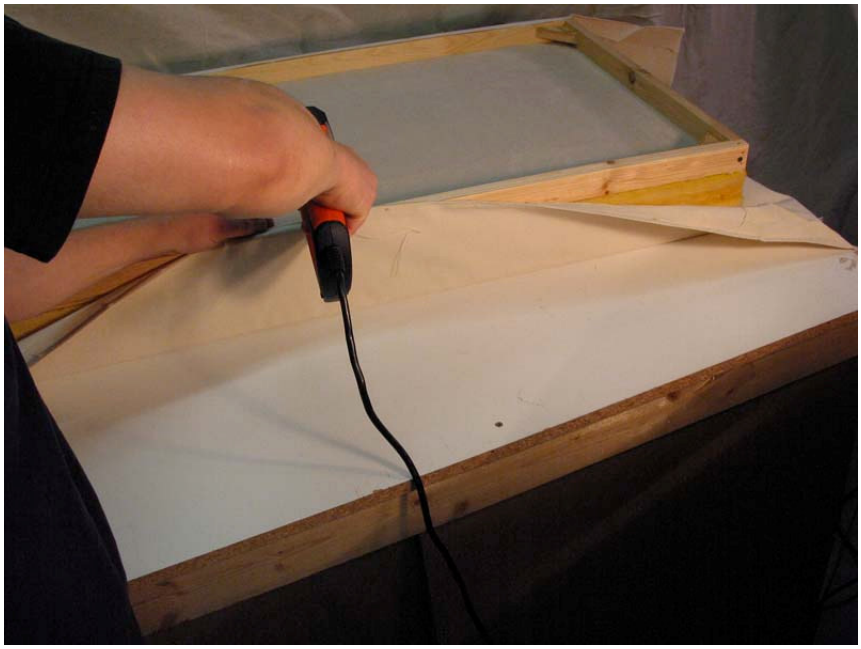


Begin attaching your “good” fabric to the backside of your frame on a long side (48” side) as shown.

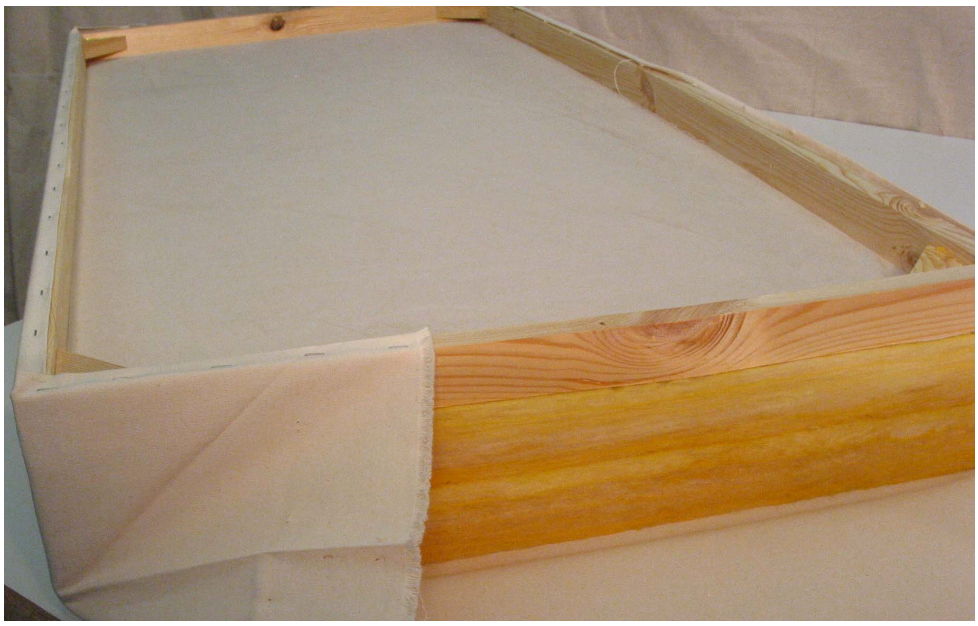
Space your staples a couple inches apart. Make sure your fabric is well attached to the corners of your frame. Make sure your staples are seated well, and do not stick up. Tap any non-flush staples in with a small hammer or better yet, pry them out and re-staple.

Go to the opposite long side of the bass trap and begin stapling your fabric to the backside of the wood frame. To create a nice tight surface for your Bass Trap's "face", push down on the frame slightly to compress the bass trap materials, and pull the fabric so it is "slightly" tight and not loose.

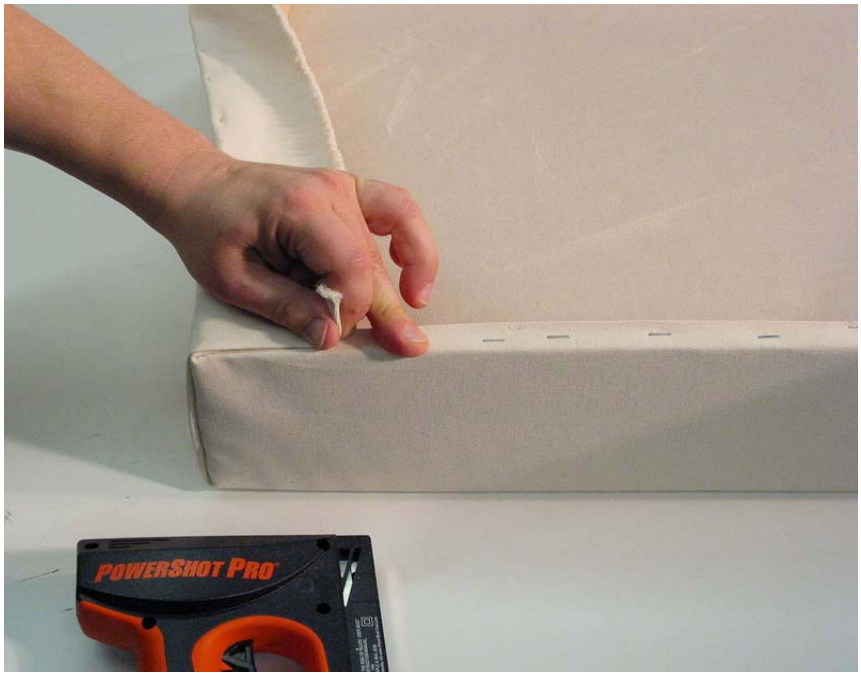
Slight downward pressure on the backer will allow you to pull the fabric a little more and create a wrinkle free surface. The Ready Acoustics fabric we used on this project assists in this regard as it is mildly elastic [stretches and then snaps back].



When finished, fold your fabric (on the 24” side) – one way to do it is like you would when gift-wrapping. Creating a nice fold on this end will ensure a nice aesthetic for your bass trap / acoustic panel corners.

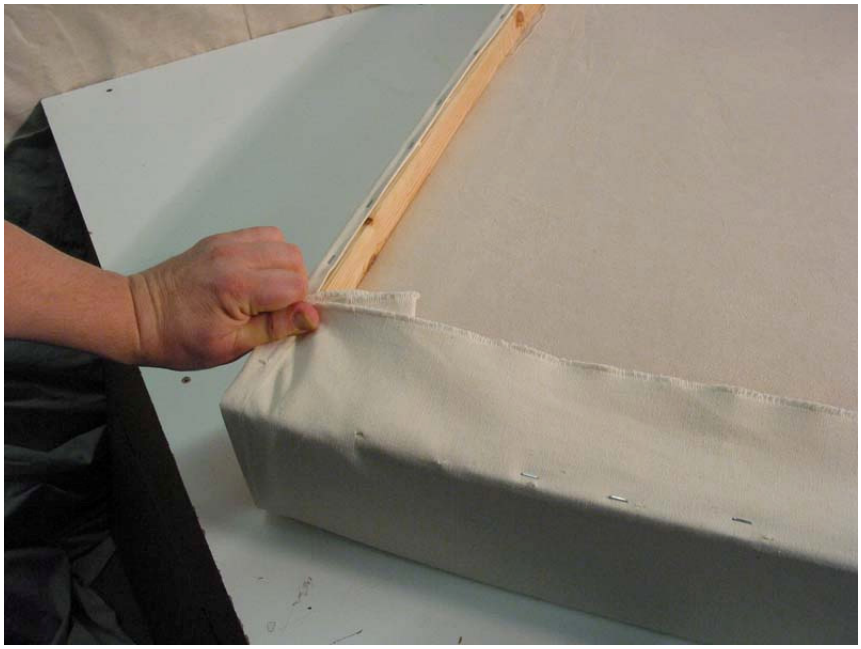


This is ONE way of folding fabric on the end of your bass trap. Make your own fold!

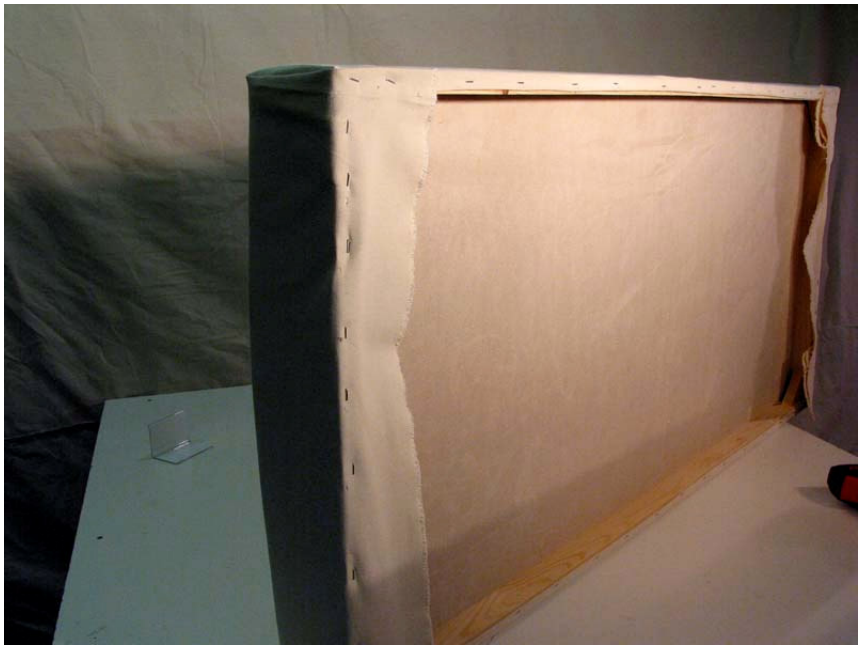


This is another way of folding fabric on the ends of your bass traps.

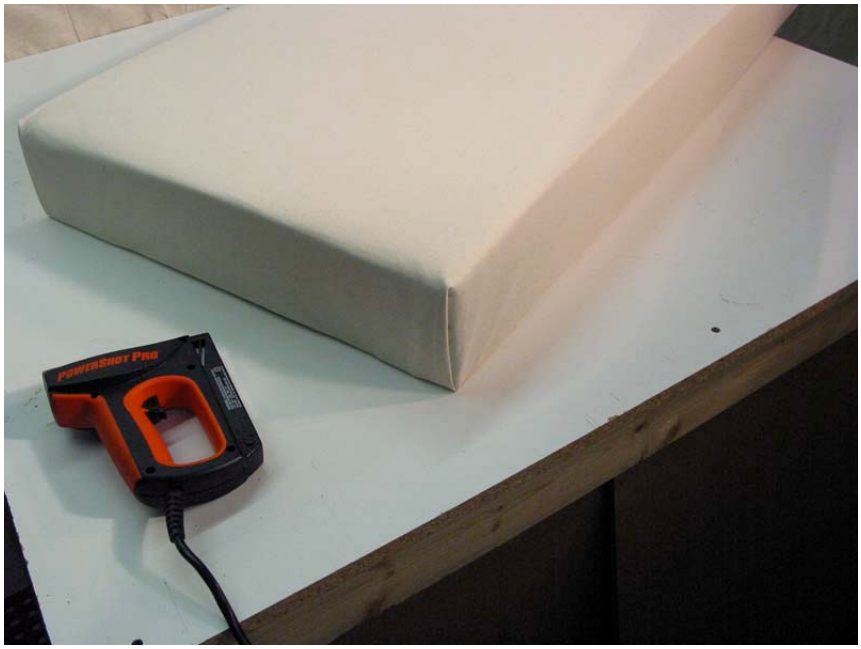
Staple one end completely making sure to keep the fabric even across your bass trap backer.



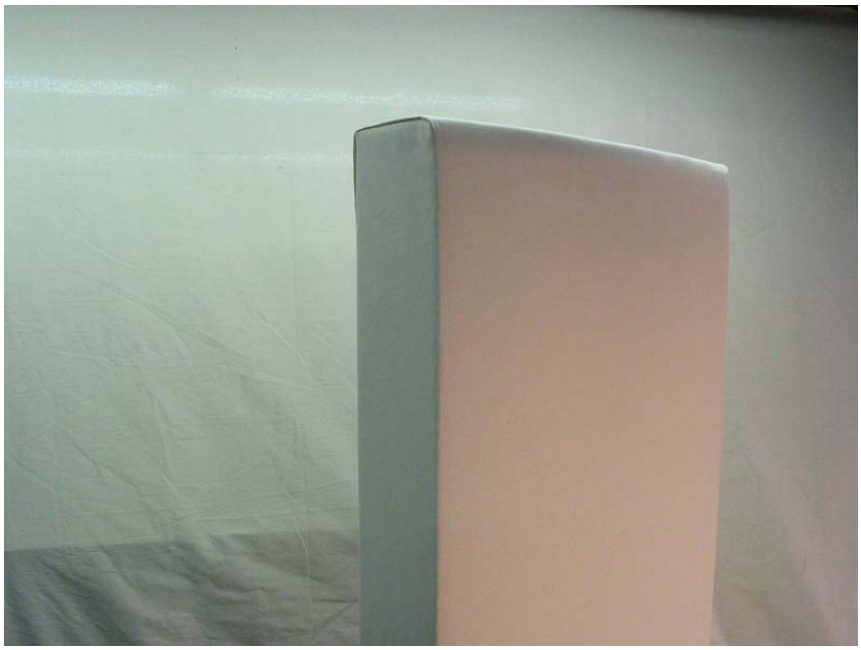
Finish attaching the fabric to the other short end of the Bass Trap – again pull the fabric slightly tight and press down as you staple.



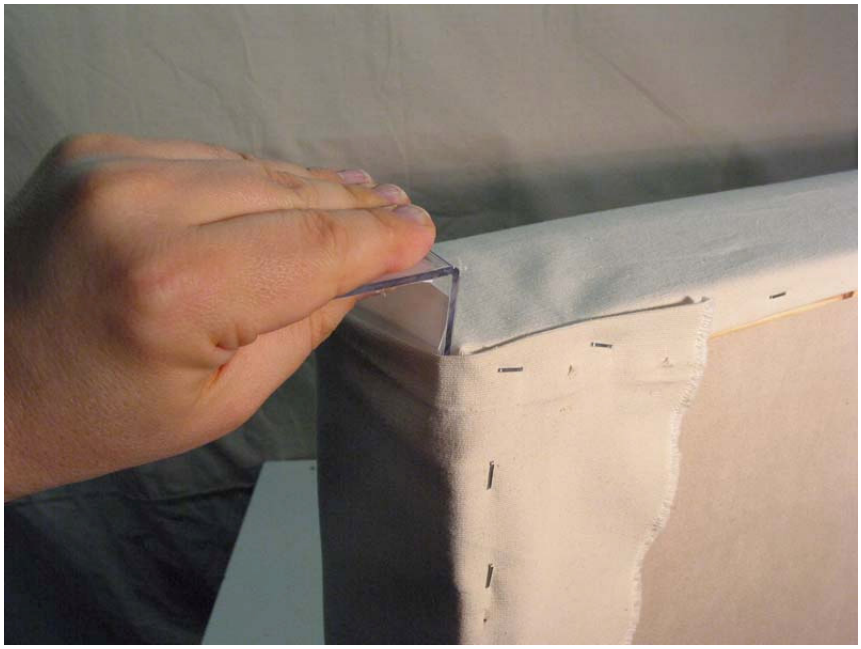
Underside view of the bass trap after attaching the fabric - trim the excess fabric from the ends and you are done with assembly.



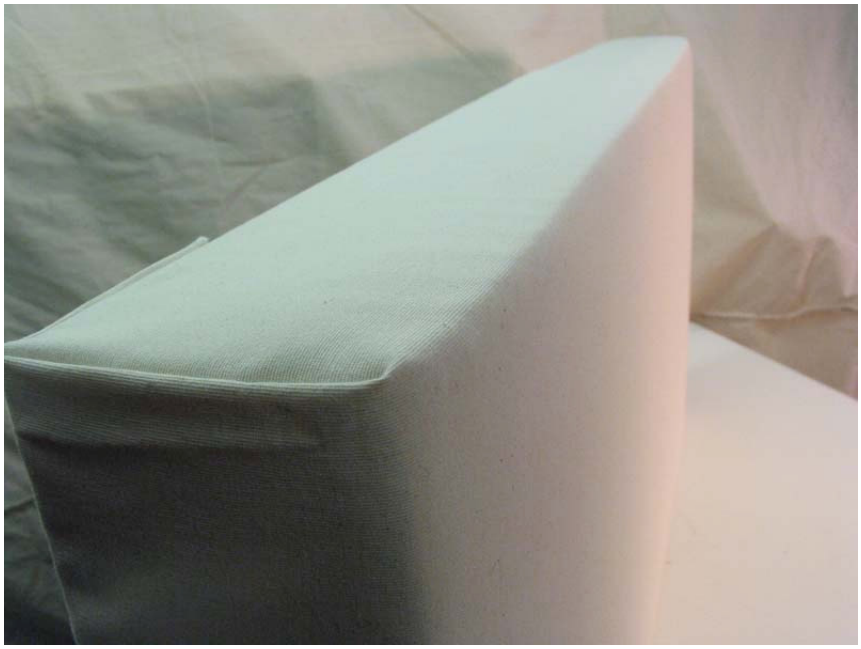
Turn your Bass Trap over and check for wrinkles. If you paid attention to keeping the fabric even and modestly tight, you should have a nice, smooth front on your new acoustic panel.



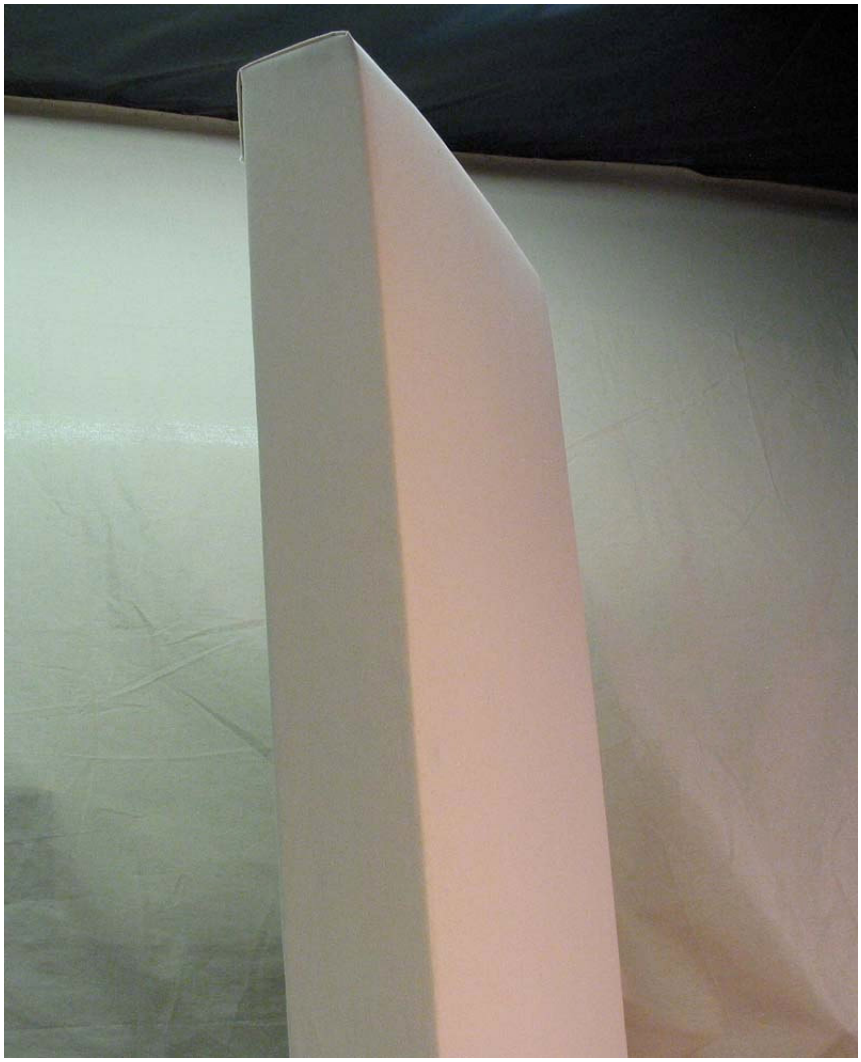
Check the corners for square.



Use a thin piece of plastic, putty knife or spatula to tuck in anything that isn't square and neat.



DIY Bass Trap – high and tight.



Finished view of DIY Broadband Bass Trap. This example shows a finished bass Trap using Acoustic Suede.

For hanger hardware, standard picture frame wire and eye hooks will do, or you can use light weight decorative chain as might be appropriate for the mounting position. The space create at the back by the frame will enhance low frequency absorption at low frequencies somewhat – adding spacers to create an overall gap of about 4" all the way around the panel ["hover" mounting] works even better. For "hover" mounting on a wall you can use a long metal hook for the hanger wire, and add screw-in door stops for stand offs for the lower back side edges.

Happy Bass Trap Building from Ready Acoustics!

Thanks to all our friends at http://forum.studiotips.com [Eric D, Savant, Boogle, and all the rest of that merry bunch of pranksters] for info and guidance in understanding and developing these design concepts.

Want to skip frame building and upholstery chores? Try our Ready Bags or our new Chameleon Frames!