DIY Broadband Absorber

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One of the most important aspects of designing a project studio is the acoustics of your control room - this outweighs any preamp, microphone, or amplifier. Outlined below are the steps involved to create 2'x4' DIY Broadband Absorbers out of Roxul Safe’n’Sound that have absorption coefficients rivaling some of the top products on the market (shown in the table below). You may also make these double-thick (6") to raise the absorption coefficients. If you do not want to use Safe’n’Sound, which can be a bit messy, Roxul also makes a product called Rockboard 60 which is a rigid insulation board with an NRC of 1.00 at 3.0", but only 1.04 at 500Hz.

<table>
<thead>
<tr>
<th>Thickness</th>
<th>125 Hz</th>
<th>250 Hz</th>
<th>500 Hz</th>
<th>1000 Hz</th>
<th>2000 Hz</th>
<th>4000 Hz</th>
<th>NRC</th>
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</thead>
<tbody>
<tr>
<td>3.0&quot;</td>
<td>0.52</td>
<td>0.96</td>
<td>1.18</td>
<td>1.07</td>
<td>1.05</td>
<td>1.05</td>
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**Materials List:**

- 1x2 SPF Bracing (non-jointed)
- Right-Angle Brackets
- 1-1/2" Wood Screws
- 3/4" Wood Screws
- Picture Wire/20lb Fishing Line
- Fabric Covering
- Roxul Safe’n’Sound:
  - 24" Wood Studs - 8 Pcs/Pack (~$35)
  - 23"W x 47"H x 3"D

**Required Tools:**

- Table Saw/Circular Saw
- Electric Drill & Drill Bits
- 2" Hole Saw
- Tape Measure
- Screwdrivers or Bits
- Staple Gun & Staples
- Scissors
- Side Cutters

**Step 1)** Cut your frame pieces for the main outer perimeter of your broadband absorbers. The inner dimensions once assembled should be the same as the Roxul Safe’n’Sound, or ever so slightly larger - at least 23"W x 47"H.

**Step 2)** Take your 2" hole saw and begin the process of drilling out your frame pieces. If you are leaving your wood exposed and placing your fabric underneath, you may take this opportunity to create some interesting designs with this process. If not, you may space out your holes in a simple straight line. The more holes you create, the more surface area of absorption you are creating on the sides of your absorbers - the 2 gaps in each long piece are left for the 2 rear braces.

**Step 3)** Using your right-angle brackets, assemble your frames by screwing a bracket into each inner corner. I like using the wider brackets for sturdier construction. You may also use the 1-1/2" screws to connect each corner piece for extra support, however, I would highly advise pre-drilling the holes.
**Step 4)** Measure the exact inner width of your panels and cut two pieces of 1x2 SPF for each panel - these are your rear braces. Along with bracing the frame, they will also serve as a 3/4” air-gap between the insulation and the wall, thus raising the effectiveness even more. Pre-drill your holes and screw these braces in through the outside of the frame - I would suggest more than one screw per side so they cannot rotate in place.

**Step 5)** Take your fabric and cut it into appropriate sized pieces. Total width of your main covering should be the outer width of your absorber, plus two inches (an inch over hang on either side for stapling). Use the same formula for the height. You will also require one piece for the rear of your absorbers to enclose the final product (I guess this is optional, but I did it with mine for that finished feel).

**Important:** When selecting your fabric, ensure that it is breathable. The best test is to put it up to your mouth with your palm on the opposite side, and breathe into the fabric as if you were going to clean your glasses (Haaaaaa). The more air you feel on the opposite side of the fabric the better. This will ensure the sound waves are making it through the fabric to your absorbtive insulation.

**Step 6)** Attach the rear fabric first - should you be choosing to use a rear covering. Leave the 2 supports on the outside of the absorber, and staple the covering to the inside of the frame. Next, place your main covering on the floor infront of you, then your one or two pieces of Roxul Safe'n'Sound in the center, then place your frame over top. This next part is the trickiest bit. If you staple the back side as if you are tuning a snare drum, you should have no problems. Make one staple in the top-center, then grab the bottom and pull it tight (not too tight) and staple bottom-center. Then lightly pull the left side and staple left-center, and then pull the right side tight and staple right-center. Move around the rear of the absorber in this opposite fashion to keep a constant tension around the entire thing. When you come to the corners, fold them over in a neat fashion and staple them in a way that the staples are hidden from view. Repeat on all broadband absorbers.

**Step 7)** Take the small screws and place one on either side of the top brace - equal distance from the edges. Then attach your picture hanger or fishing line to either screw and tie it off. Ensure you do not use too much line or else they will hang off the wall at the top, and be touching the wall on the bottom.

**Step 7)** Once you have created all eight absorbers, get a mirror and a helper. Sit in your listening position and have your helper move the mirror along each wall until you see your speaker. Each time you see a speaker in the mirror, this is one of your reflection points which will cause phase-cancellation and comb-filtering - mark these positions with a pencil and hang an absorber in each of the marked positions. If you have a measurement microphone and sine-sweep software, do sweeps before and after hanging your broadband absorbers to quantify your hard work. Cheers.