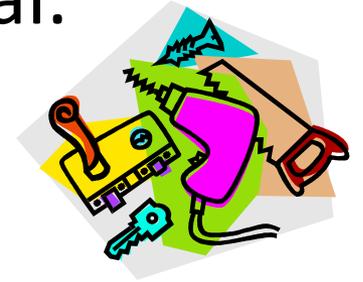
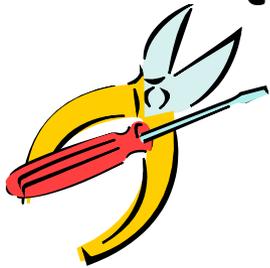


DIY Hot Air Collector Construction

Aluminum absorber plates made from trashed swimming pool material.



GRAB YOUR TOOLS AND LET'S GET CRANKING!

These simple to build hot air boxes will pump **90** to **135** degree HOT AIR back in to your house!

That's a 40 to 70 degree Temp Rise with outside ambient temps of 20 to 40 degrees. No Bull!

Introduction

- After viewing many hot air collector projects on Gary's great www.Builditsolar.com website I was siked! I immediately ripped out my tools to see what I could come up with.
- End result is I now have **4 units installed**, pumping 90 to 120 degrees of hot air (per/unit) back in to my house everyday the sun shines. The newest units are 20 times lighter, smaller in size so less cost to build, yet produce the same if not hotter air and much better volume of hot air into the house. None of my collectors are built using screen material yet still do a fantastic job. Maybe I'll add some screen to them at a later date to see what happens.
- Many people on [Builditsolar.com](http://www.Builditsolar.com) say.. BIGGER IS ALWAYS BETTER but I'll be the first to debate that subject anytime when it comes to hot air box construction and results. Contact me anytime and I'll share my thoughts. My eMail is: [Web401 @ Cox.net](mailto:Web401@Cox.net)

Introduction Part II

- The first unit I built was a 4 x 8 ft. unit using 2 x 4 pressure treated wood for the frame, 3/8 plywood for the back of the frame, 1/2 inch DOW Tuff –R foam board insulation, aluminum flashing material for the absorber plate, clear Polycarbonate from Lowe's for the sheathing, **4 inch** diameter supply and return holes with a **4 inch** booster fan pushing the hot air in to the house to see how this design would work. Once I saw the amazing results of 'this' panel I immediately built 3 more units trying different designs and materials to lighten up the weight of the hot air collector plus attempt to find a way to move more volume of air into the room without giving up too much of the heated air.

My first 2ft. X 8ft. collector built with PT wood, 4" supply/return tubing with 4" booster fan on SUPPLY End. Great heat but later – recut the holes to 6 inch, installed 6 inch fan and removed pieces of my baffles inside the collector for better air flow. MAJOR DIFFERENCE IN AIR FLOW.



Introduction Part III+

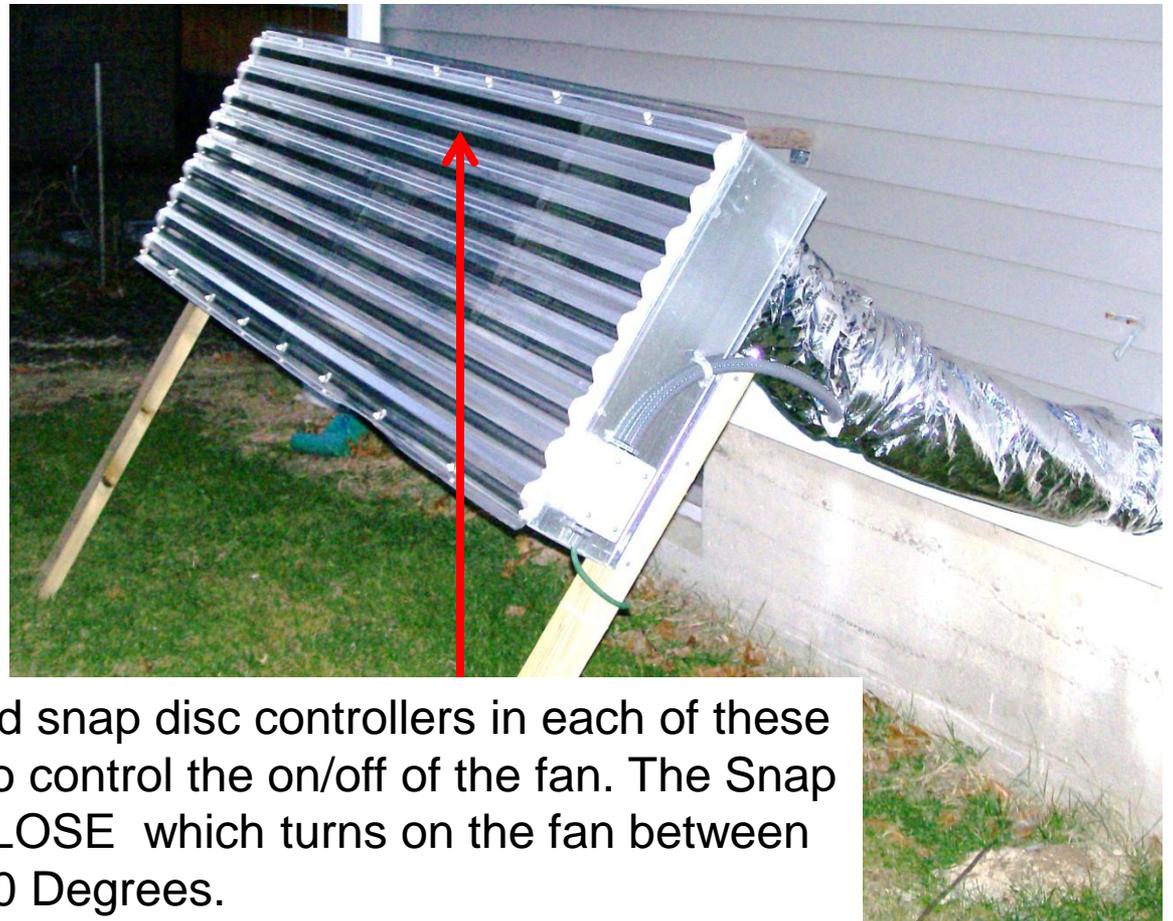
- **Here's what happened next...**

After building the large & heavy 4 x 8 ft unit out of wood I decided to build my next one out of 2" x 6" metal stud framing to see if I could lighten up the unit in some way. I also decided to go smaller on the width to see if I could get the same results of heat transfer into the house with less width yet **more depth** so I built the next one only 2ft. Wide X 8 ft. tall x 5 ½ inches deep. Because the metal frame depth was 5 ½ inches deep, I used a thicker 2" Dow Tuff-R foam board insulation between the back panel and absorber plate. Absorber plate was 2 ft. wide aluminum flashing I picked up at Lowe's at a discounted price.

Flashing costs (\$) from Lowe's

- **NOTE:** A box of 2ft. Wide x 50 ft. aluminum flashing at Lowe's is normally over \$130 dollars so not feasible for DIY building one panel. I happened to walk in one day and found a deal on a box of 50 ft. x 2ft. Wide flashing for just \$32.00. Somebody ordered a special color then never picked it up. Being I was going to be painting it black.. The color didn't matter to me so MY SCORE, their LOSS.
- So because I stole this aluminum flashing which turned out to be a great heat absorber plate I went on to build a horizontally designed 2nd hot box collector using all the same materials and dimensions.

Pictures of the next 2 - 2ft. X 8 ft. collectors I built using 2" x 6" metal stud framing.



I installed snap disc controllers in each of these panels to control the on/off of the fan. The Snap disc's CLOSE which turns on the fan between 90 to 110 Degrees.

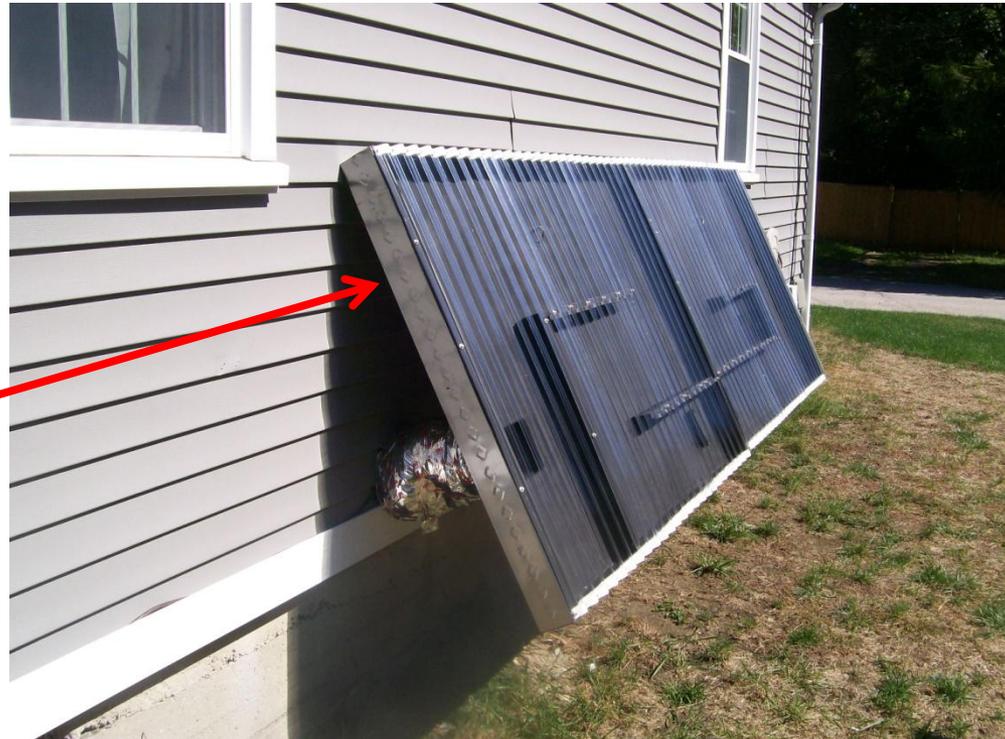
Introduction Part III+

- My latest design panels are super lightweight, cost between \$190 to \$220 ea. to build, depending on where you get your materials and each pump 110 to 123 degree air temps back in to my house. (About 35 to 49 degree Temp Rise) The newest 2 units I built are 4 ft. x 6 ft. wide in a 2" x 4" galvanized metal stud frame. I used ½" DOW Tuff-R insulation foam board laminated between 2 pieces of aluminum metal I scrounged free from someone that was tossing out a 4ft. X 25ft. Round swimming pool wall. Because these panels were so light weight, I ended up hanging the 2 of them on the south side of my house using a light weight aluminum bracket I picked up at Lowe's. One piece of the bracket attaches to the backside TOP of the panel and the other piece attaches to your house.

4ft Tall X 6ft Wide Collectors

- When you're done building your panel you just pick it up and hang it on the house. Connect your 6" insulated tubes to the house, plug it in and you're done!

I used 2 x 4 inch metal studs for the framing. Less depth, less space inside to heat up between absorber plate and polycarbonate sheathing. Less space means they heat up quicker and hotter.



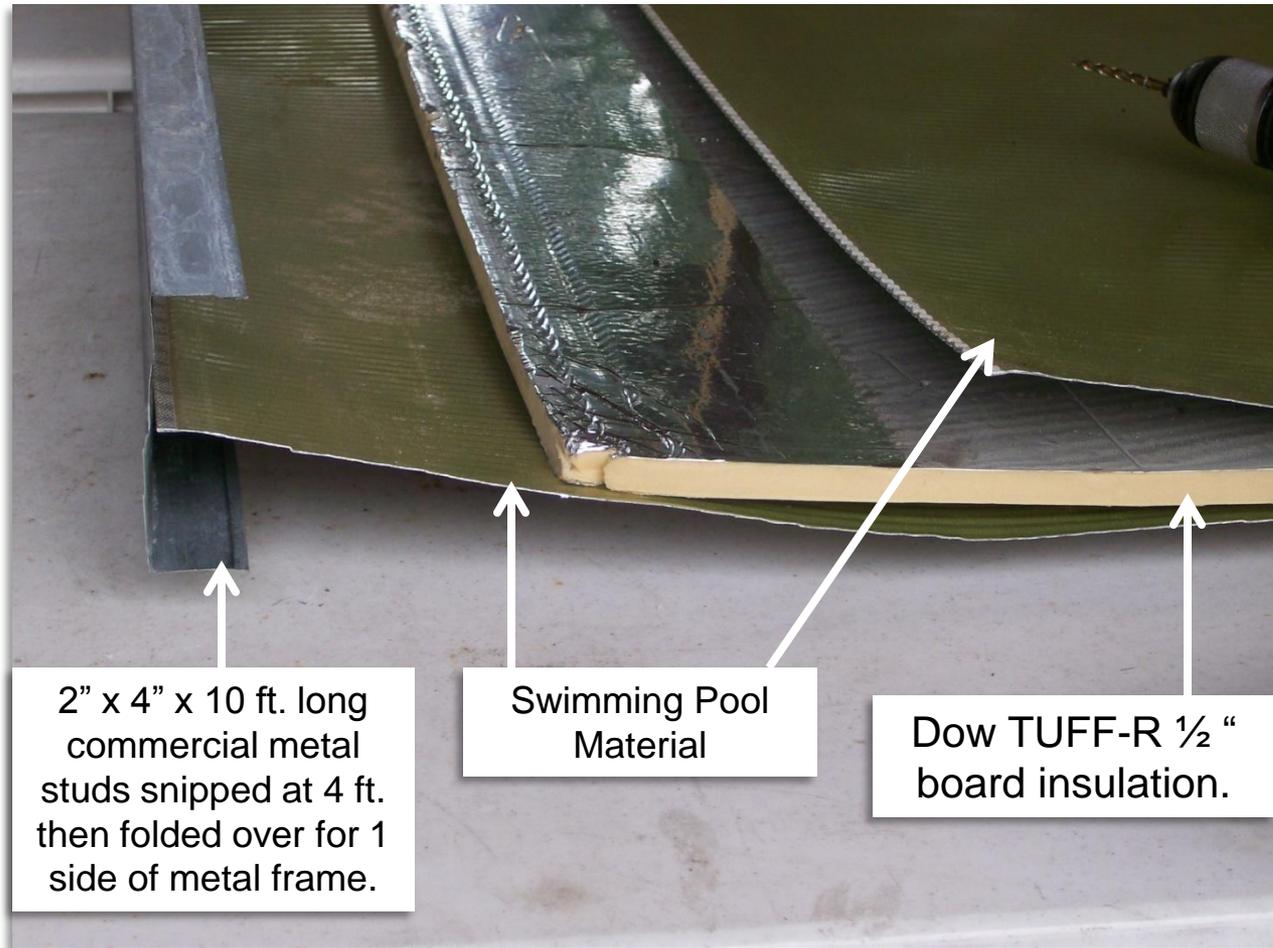
Keep your eye out for people tearing down their old swimming Pool.

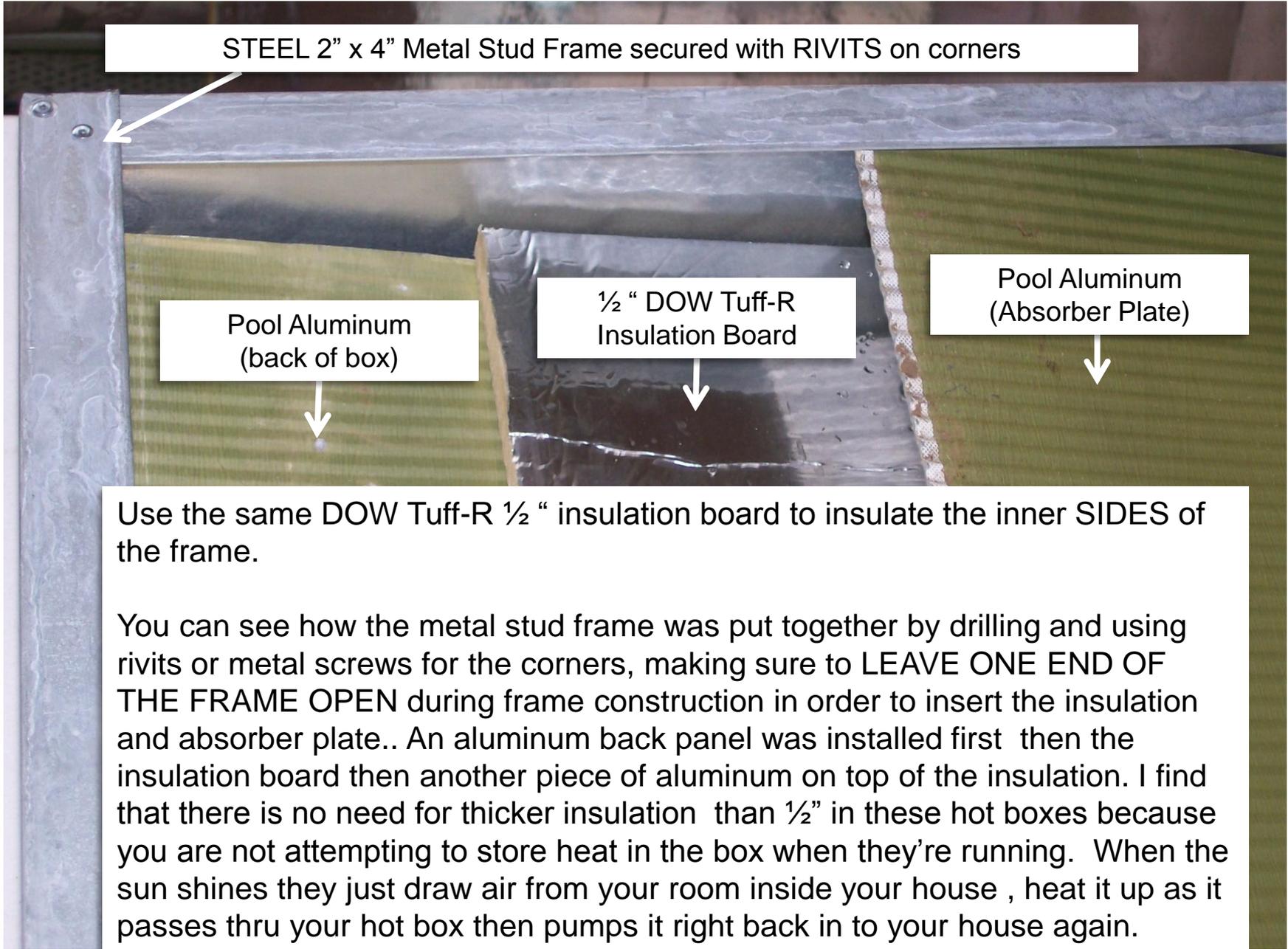
- Old swimming pool walls are all aluminum, nice and thick yet easy to work with for your absorber plate and also the back outer side of your hot air box.

The swimming pool walls are usually 4ft high x 25 ft round. Plenty of FREE material to build a few nice collectors.



This is how I sandwiched the materials together during Assembly.





STEEL 2" x 4" Metal Stud Frame secured with RIVITS on corners

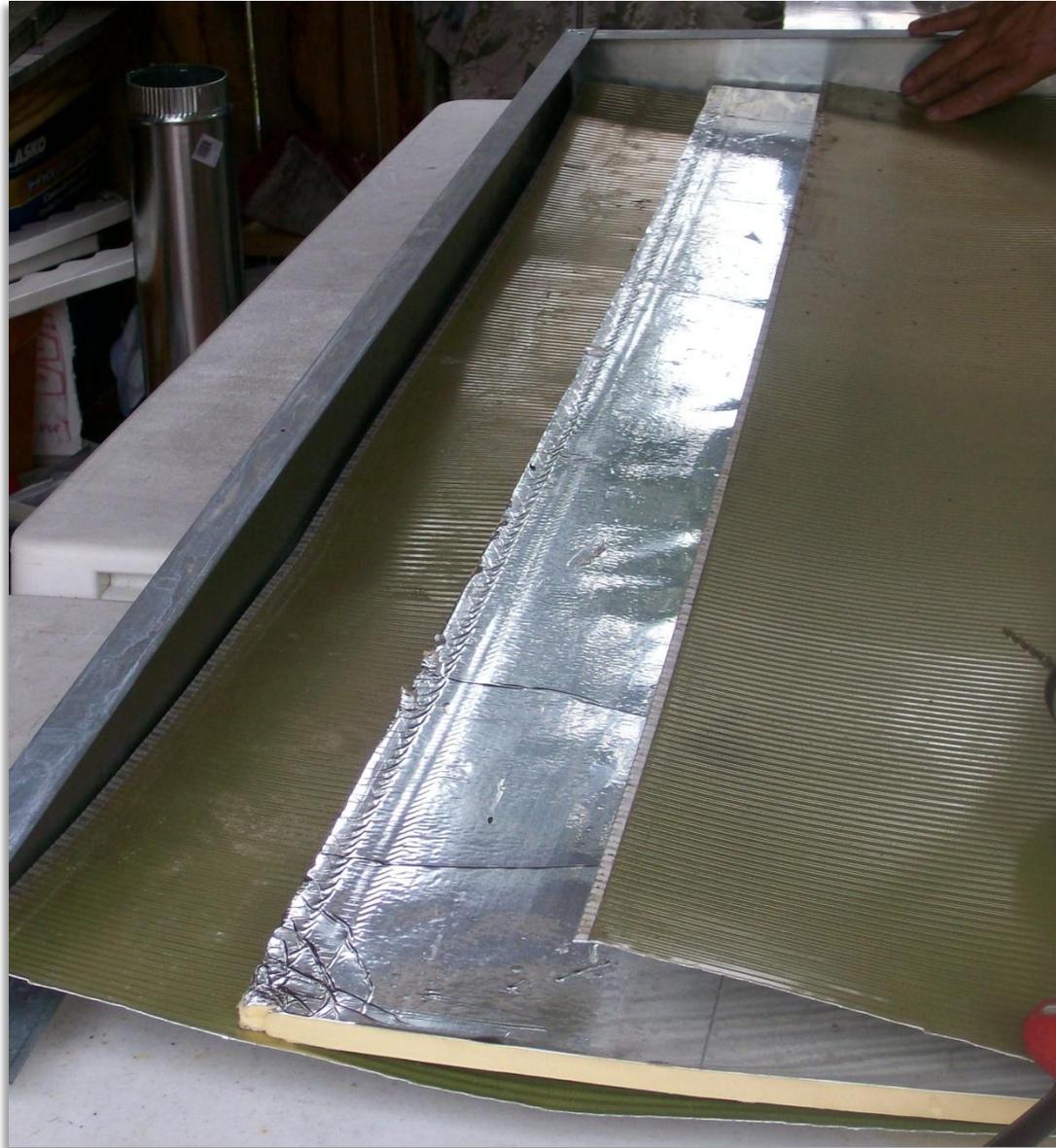
Pool Aluminum
(back of box)

1/2" DOW Tuff-R
Insulation Board

Pool Aluminum
(Absorber Plate)

Use the same DOW Tuff-R 1/2" insulation board to insulate the inner SIDES of the frame.

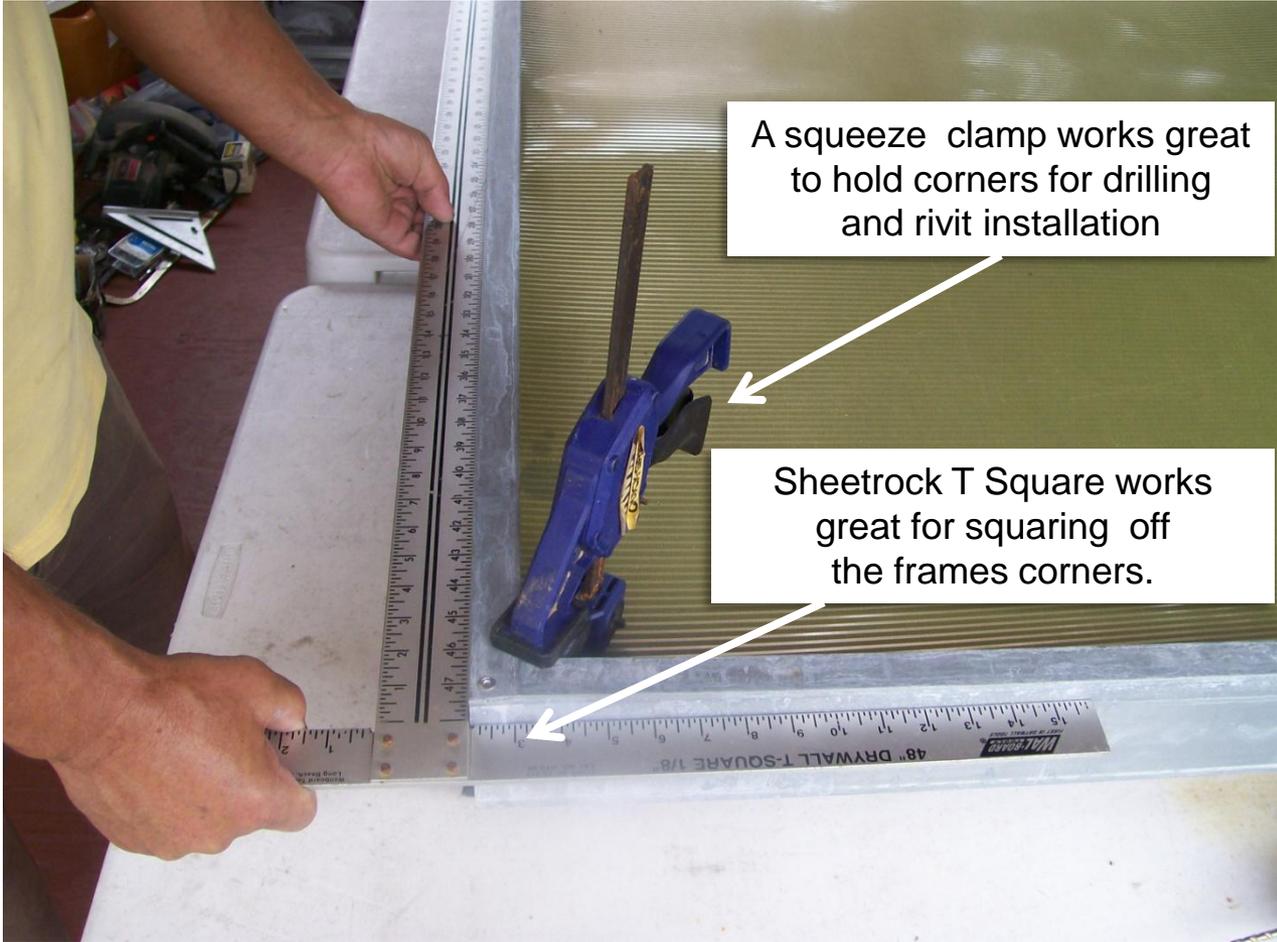
You can see how the metal stud frame was put together by drilling and using rivits or metal screws for the corners, making sure to LEAVE ONE END OF THE FRAME OPEN during frame construction in order to insert the insulation and absorber plate.. An aluminum back panel was installed first then the insulation board then another piece of aluminum on top of the insulation. I find that there is no need for thicker insulation than 1/2" in these hot boxes because you are not attempting to store heat in the box when they're running. When the sun shines they just draw air from your room inside your house, heat it up as it passes thru your hot box then pumps it right back in to your house again.



Just another view of material layout as it goes in to the metal frame.

NOTE the bottom end of the frame is left OPEN during construction allowing you to slide the materials into the frame without having to bend anything.

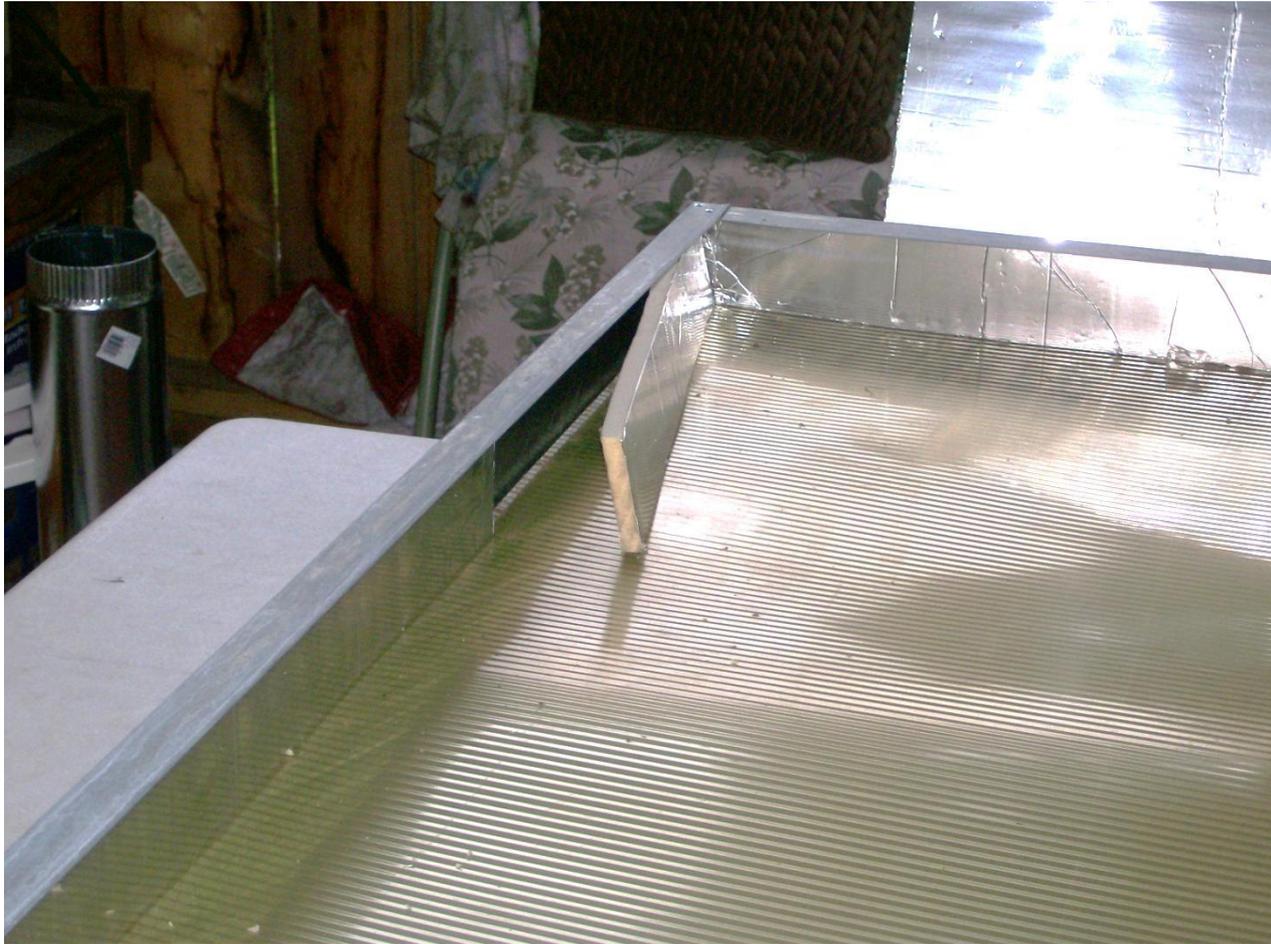
When assembling the metal stud frame..



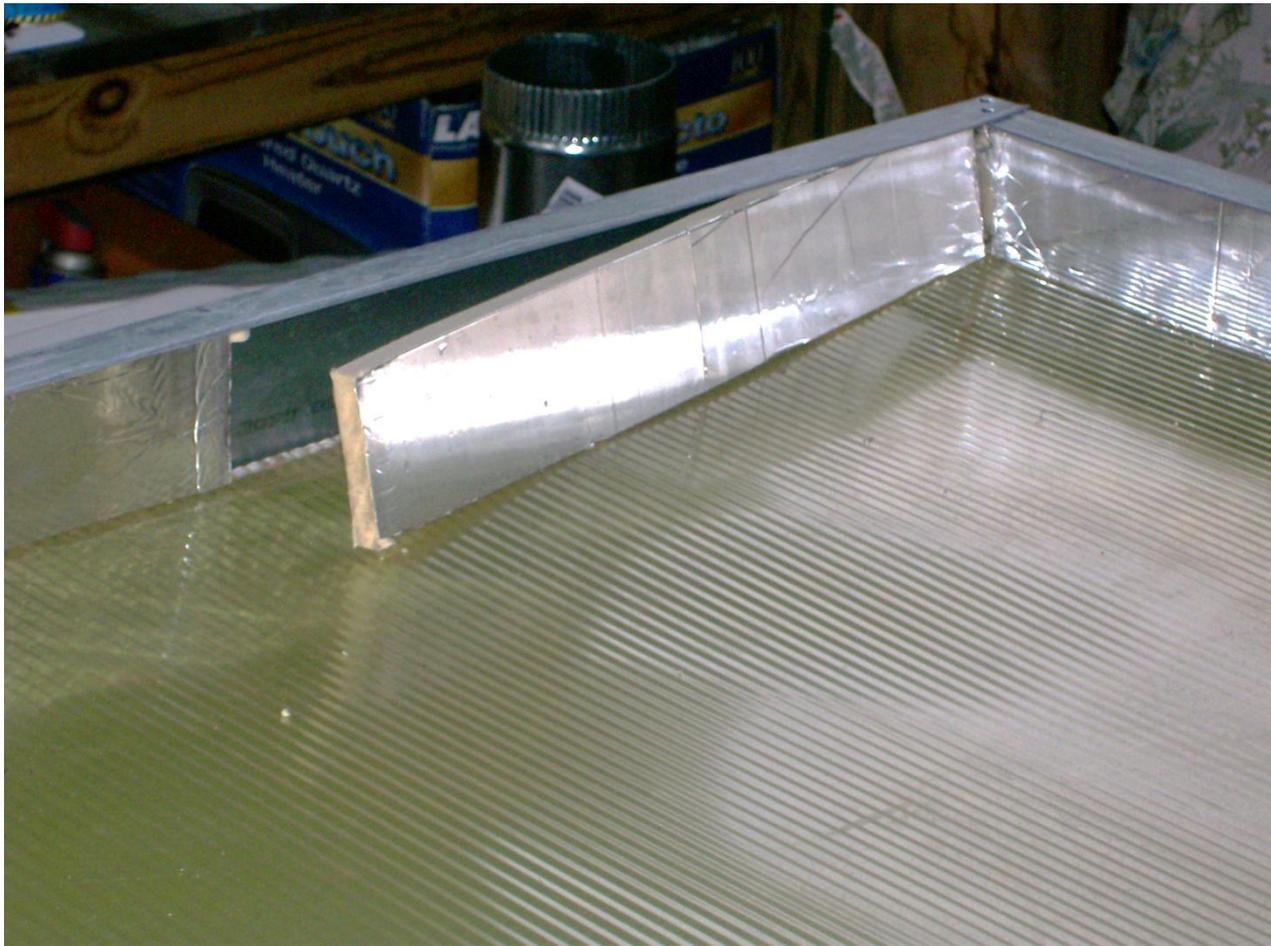
2 Rivits or Sheet Metal Screws in each corner is all you need for strength...



Inserting 1/2 " Dow Ruff-R Insulation
all the way around inside of frame.



Shot 2 of insulation going in around the inside of frame..



Frame is done. Aluminum absorber plate looks a little bumpy because of the el-cheapo table I was working on. It flattens right out when you install the baffles to route the heated air, so no biggy...



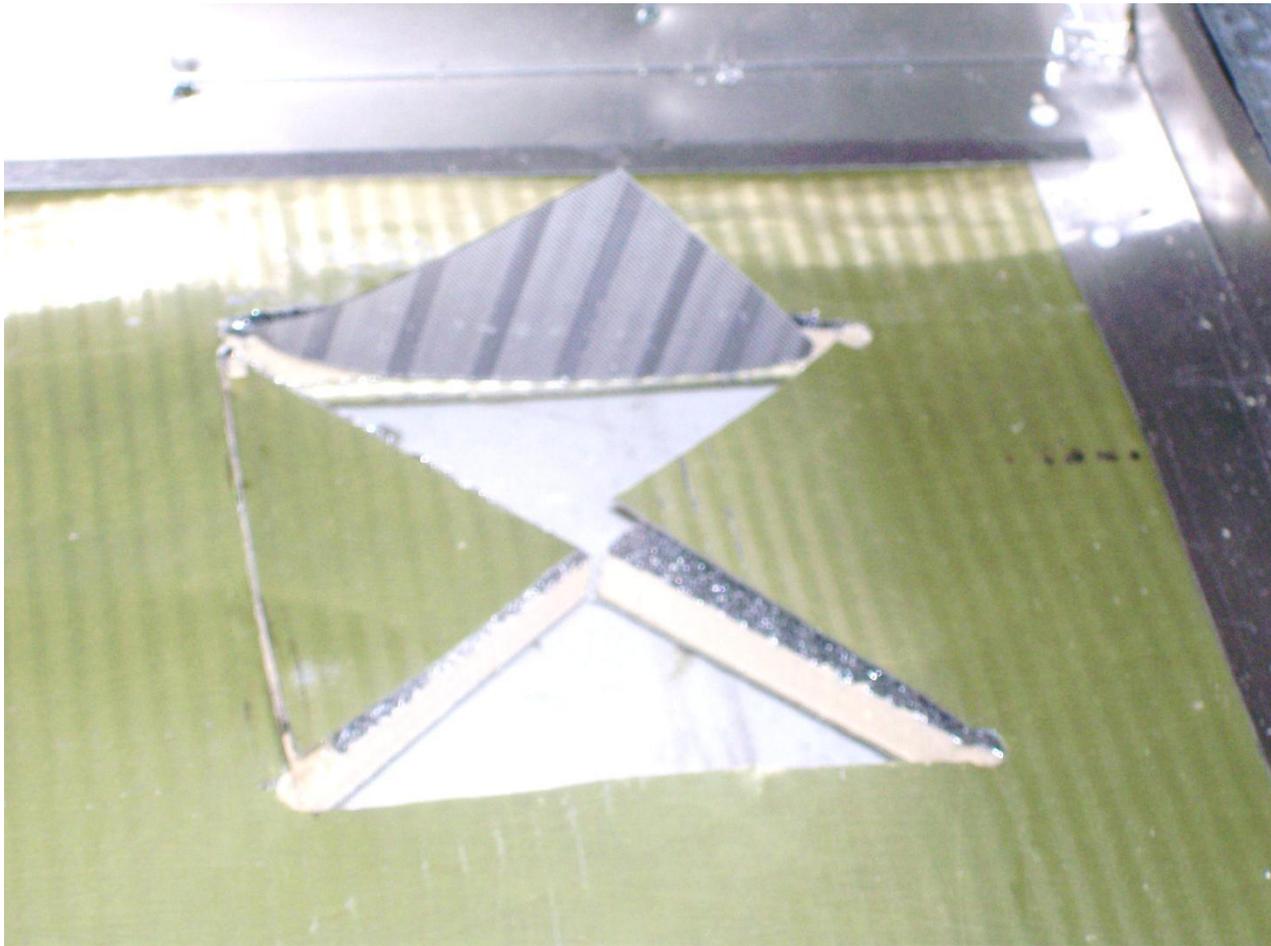
I riveted aluminum drip edge to sides and thru aluminum collector metal to keep everything secured.



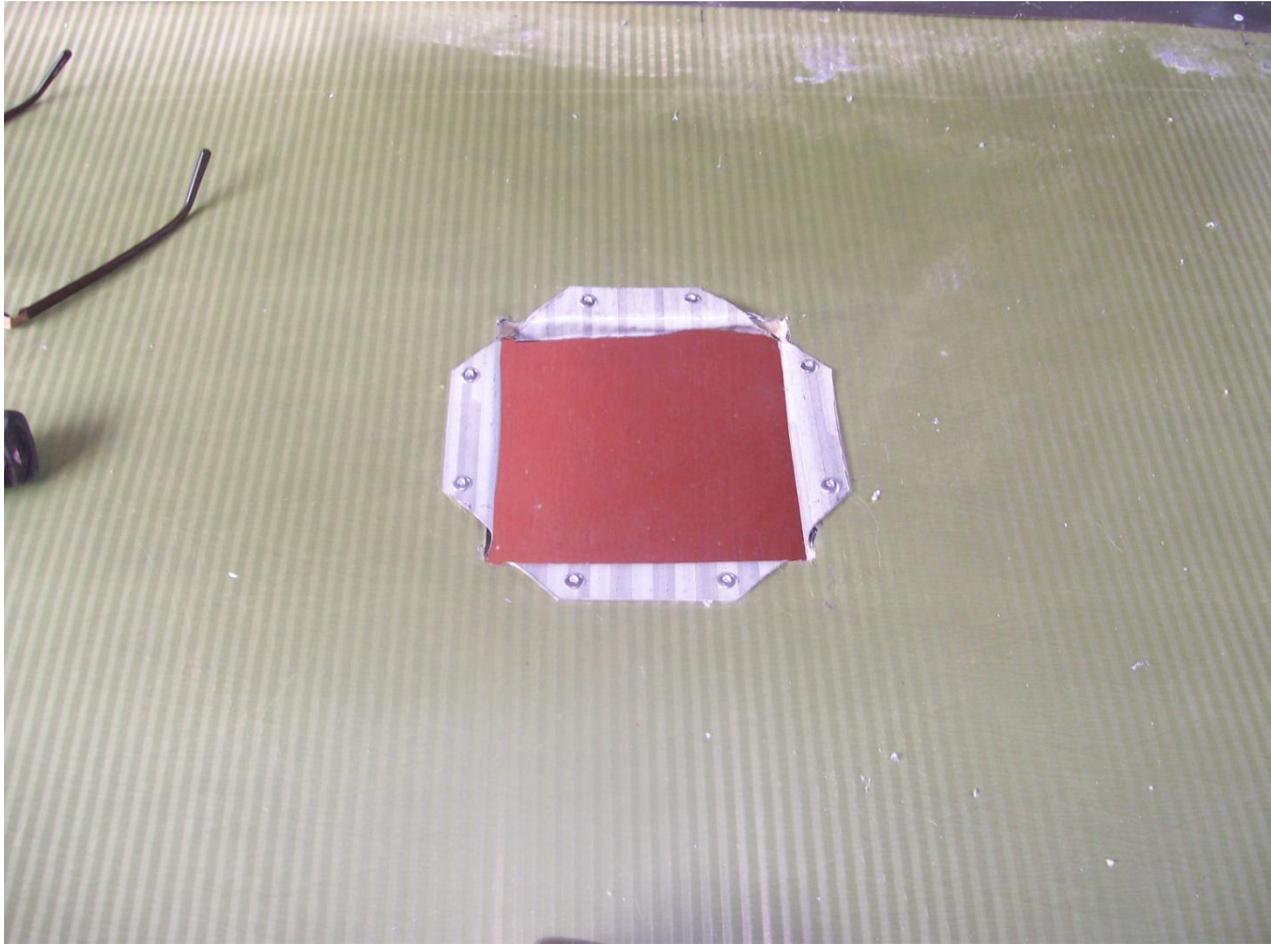
Rivit kit I picked up at Lowe's comes with 2 different size rivits. I mostly used 1/8" short and long style rivits for the whole job.



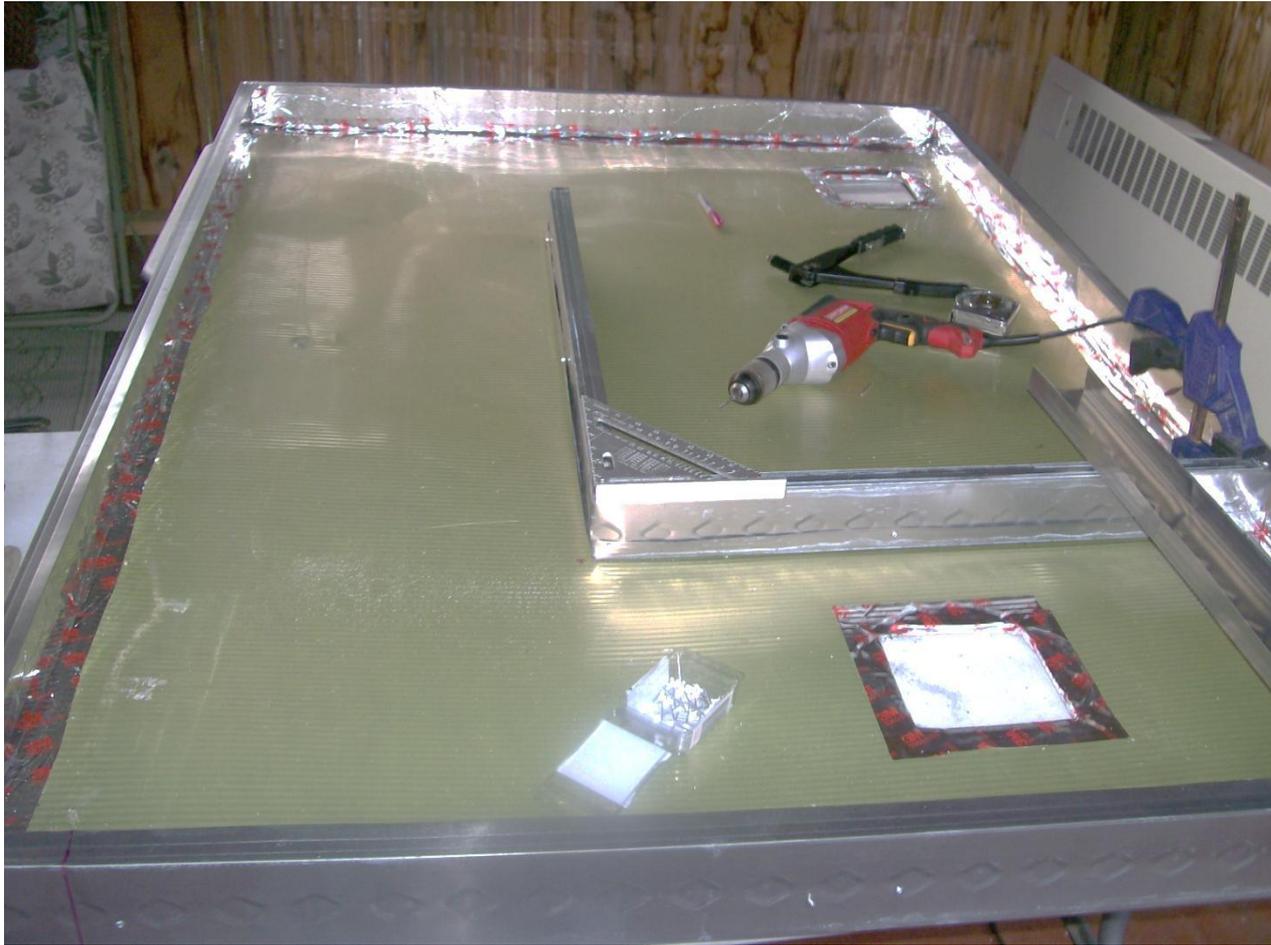
Supply and return holes were 6" wide so I criss-crossed my cuts thru the aluminum to fold the edges over then secured everything in place with rivits.



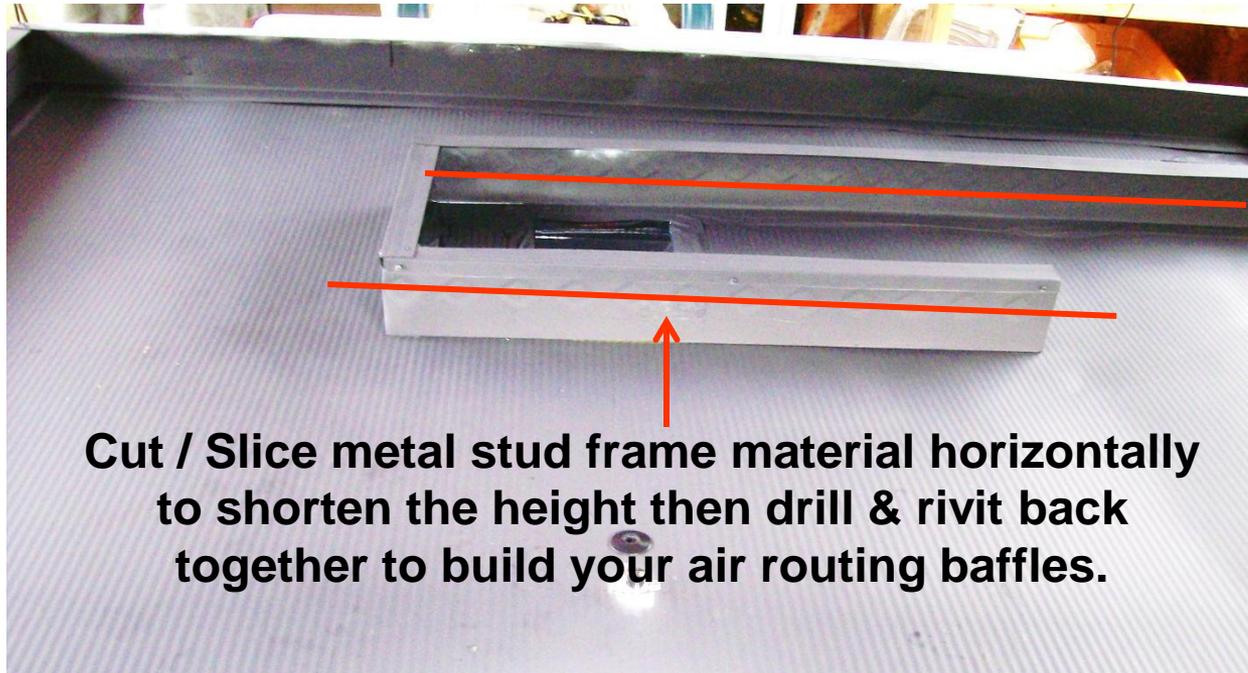
Supply and return holes fastened down with rivits. I then put metal tape over the edges to spruce it up a bit.



I installed baffles to slow down the solar heated air thru the panel which allows the air to heat up a bit longer before entering house.

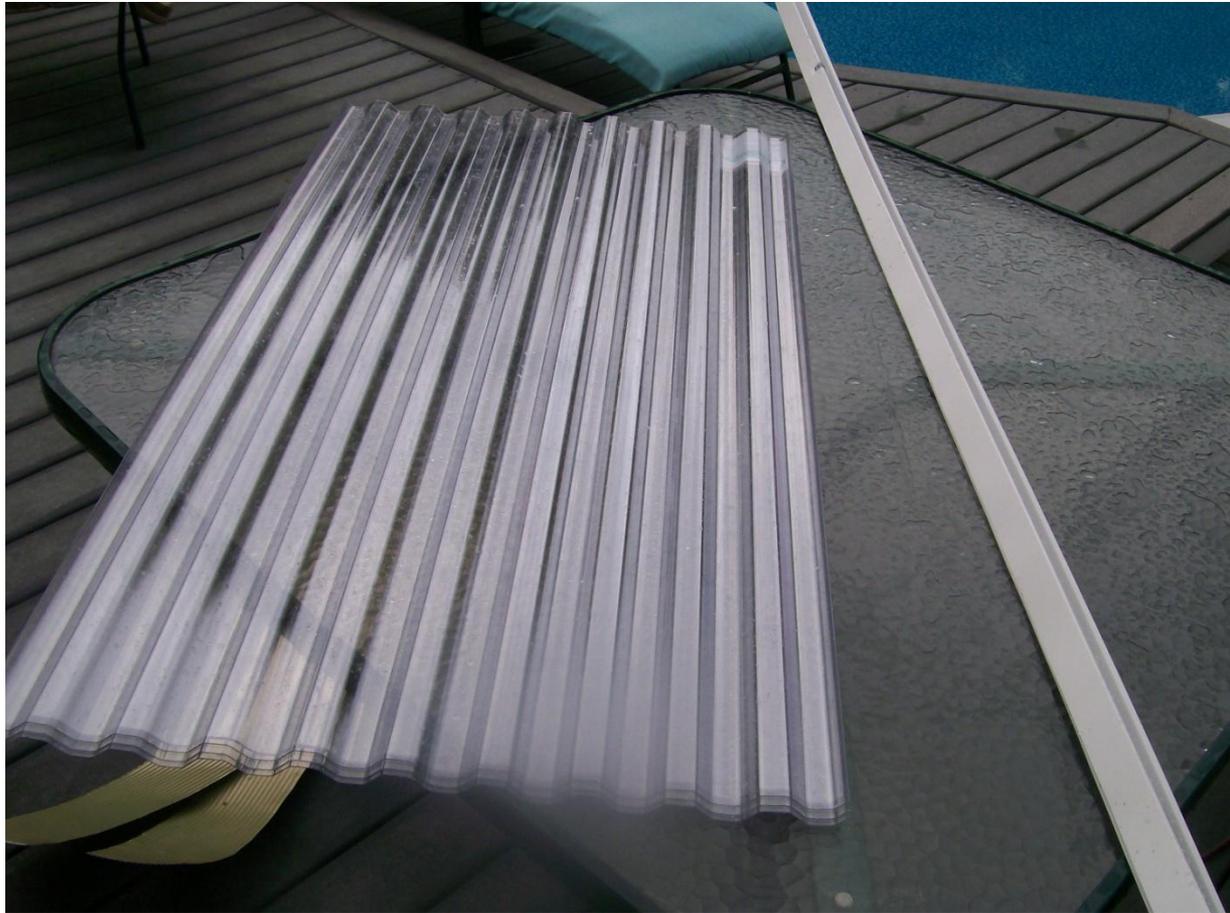


I used the same metal stud material I used on the frameto build the baffles.. Kind of a pain but you have to slice em in half horizontally to decrease their height in order to fit them between the Polycarbonate sheathing and the inside aluminum absorber plate.



Cut / Slice metal stud frame material horizontally to shorten the height then drill & rivit back together to build your air routing baffles.

I used clear Polycarbonate with the wobble strip edge insulation available at Lowe's for outside sheathing.



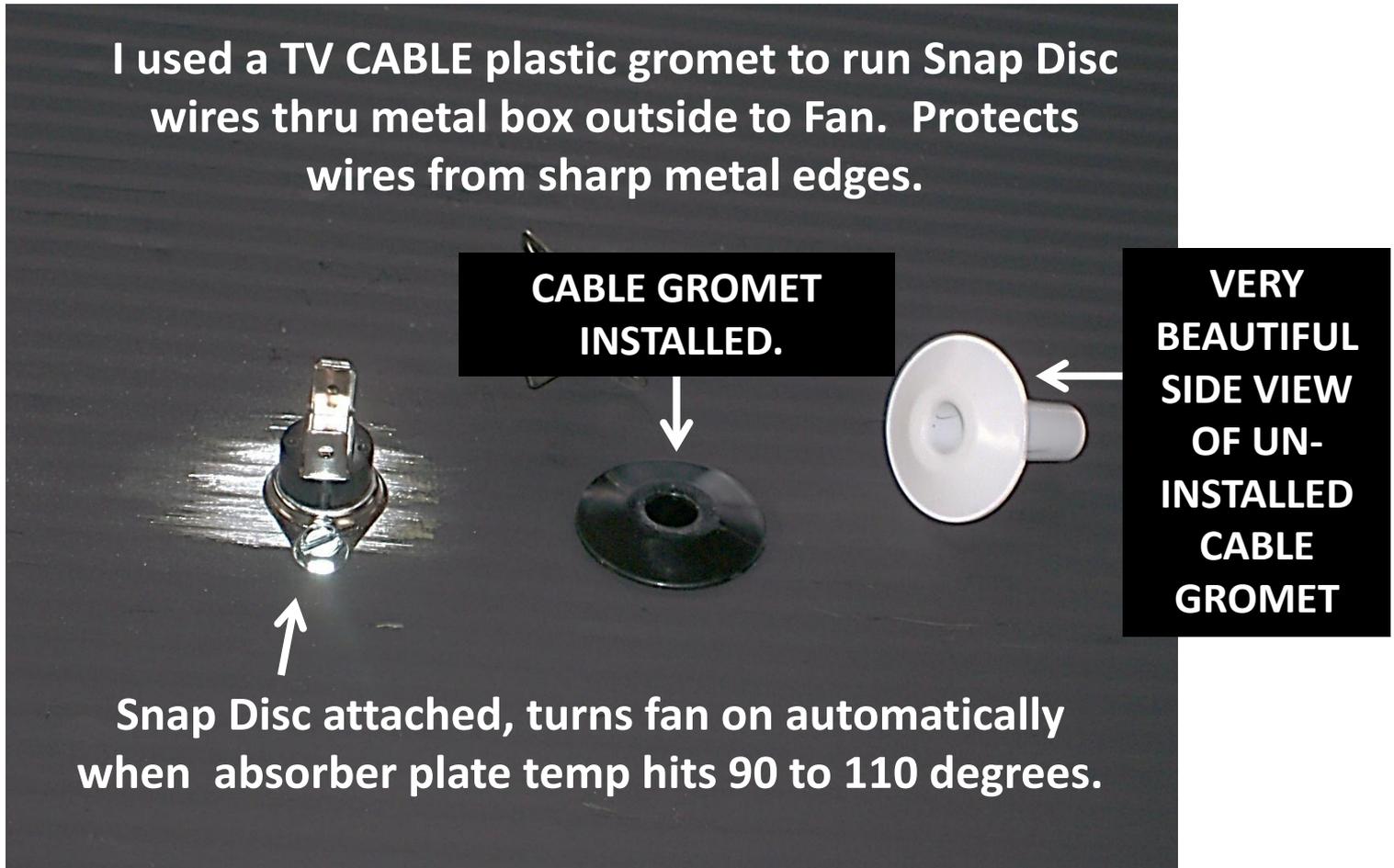
I used a Snap Disc 90 to 110 degree temp thermostat mounted to the absorber plate to control Fan On/Off

I used a TV CABLE plastic gromet to run Snap Disc wires thru metal box outside to Fan. Protects wires from sharp metal edges.

CABLE GROMET
INSTALLED.

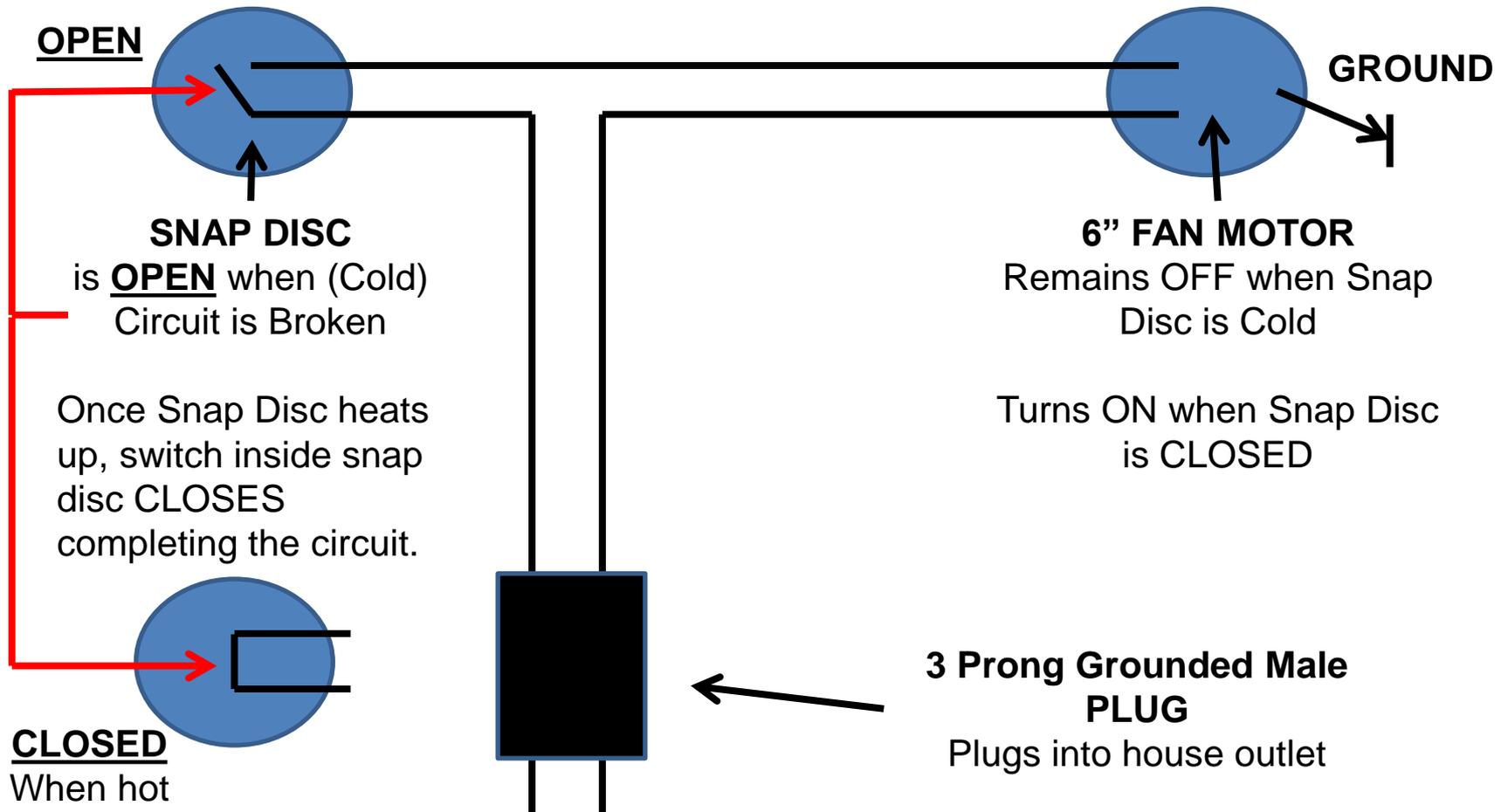
VERY
BEAUTIFUL
SIDE VIEW
OF UN-
INSTALLED
CABLE
GROMET

Snap Disc attached, turns fan on automatically when absorber plate temp hits 90 to 110 degrees.



Snap Disc to Fan Wiring is not hard to do at all...

The snap disc has 2 prongs on it. Instead of wiring both wires to the fan, send 1 wire thru the snap disc to interrupt the circuit to the fan which plugs into your house.



**C'mon now,
are you kiddn me?**

Wasn't that the most BEAUTIFUL wiring schematic you
have ever laid eyes on?

Whew!

just click to move on..

In Closing...

The Fans I use are 6 inch – 250 CFM Commercial Ductwork Booster Fans purchased from a local Furnace & Duct Supplier. **The fan motors can withstand temps of 250+**

IMPORTANT: Booster fans available at Lowe's or Homey Depot can only handle 140 Degree temps. It gets HOTTER than 140 degrees inside the box so to avoid your fan motor from melting you should seriously consider buying fans at a Furnace / Duct Supplier ok?

Snap Disc Controllers were purchased thru ebay. Just do a search for Snap Discs there and you'll find them. They're available in various temp settings. I used 90 to 110 degree Snap Discs

How I Operate The Hot Air Boxes with my Heating System:

My heating system is usually TURNED OFF at night so every morning I bring the house temp up to 68 degrees. As long as the sun is shining that day I then shut down my heating system completely. The hot air boxes turn on automatically between 8:30am and 9:30am and will maintain my room temps until the sun goes bye bye.

Click to continue..

Closing Part II

Mounting The Fans

I purchased ductwork pieces locally that were square where they mounted to the hot box but also had a round 6" tube to connect my tubing too. Drilled and rivited them in place over the 6 " square holes I cut in the back of the hot box. I then attached the 6 inch booster fans directly to that piece of round metal ductwork sticking out of the back of the hot box. NOW, on my newer panels (4ft x 6 ft panels) I used ROUND hole ductwork attachments with peel and stick seal lip trim then drilled and rivited them in place at 4 locations on the metal ridge trim. I then attached my 6 inch booster fans to them then attached 6" metal tubing from the fan to just inside my house then ran 6 inch insulated flexible ductwork all the way to the house heat registers.

TRICK I learned to Eliminate FAN NOISE almost completely:

When I hooked up my first hot air boxes to my house I used 6" metal ductwork tubing all the way from the fan to the heat register inside my house. **NO GOOD**. Way too much Fan Noise. So Instead of running 6 " metal tubing all the way from the fan to the heat register inside my house, I ended up running 4 to 5 ft of 6" diameter flexible insulation for the last part my run to the heat register and ALL NOISE FROM THE FAN WENT AWAY as in GONEzo! Matter of fact NOW, I have to walk over and put my hand over the register to see if the fan kicked in or not. MAN what a difference that made. Super quiet. Nice!

Before I forget... YES! – Spring Dampers are installed inside the hot boxes on all RETURN tubes to prevent any cold air backdraft from entering the house at night.

Contact Info

Email: web401 @ cox.net or call 401-781-4357
(East Coast Time Frame)

I welcome your calls and enjoy discussing anything to do with Solar however, unfortunately I'm not a Bat. I am a useless retired Vietnam Veteran human who enjoys his sleep so please try not to call less you know it's 7am or later in my neck of the woods ok? 8-)

Thank You! -- Enjoy Your Project!

Pat B. – Warwick, Rhode Island

Keep clicking to view more pictures of the units plugged in to my house...



These are 2 – 4ft High x 6ft Wide Units mounted Side by Side Hanging on the side of my house using an Aluminum 2 ft long Bracket purchased in the hardware Dept. at Lowe's. 1 piece of the bracket attaches to the back of the box up top and the other to the house. You then just pick the whole unit up and hang it on the house. As you let the unit swing down toward the house the 6" tubing gets inserted into the pre-cut 6" holes in your house. Installation is a BREEZE because each unit fully constructed with fan and sheathing only weights about 50lbs. Can't beat that right!







