Sprague Audio Works

SAMPLE PLANS

LA112a Plans

www.sprague audioworks.com
info@sprague audioworks.com

Optional Dual 12" Woofer section!

Dual or Single HF Driver Horn Option!

Note:
SAMPLE PLANS

- These plans are incomplete and meant to show a sample of what you will build with the full set of LA112 plans – which include plans for:
  - Single 12” cabinet
  - Dual 12” cabinet
  - Both with either a single or dual 1” waveguide.

Tools required

- Table Saw
- Router
- Hand held jig saw
- Drill
- Sander – bench belt sander handy for the horns
- Assorted clamps
- Optional: Air nailer

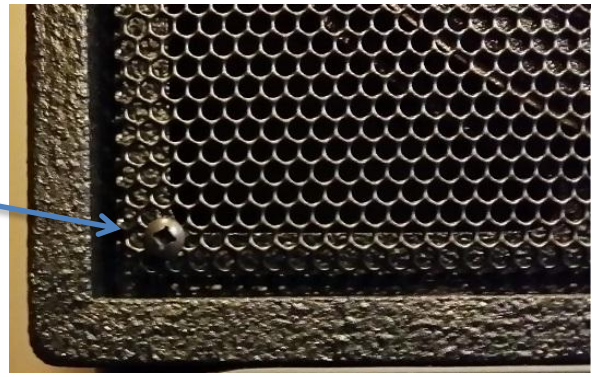
Speaker Part

- Woofer
  - Eminence Deltalite II 2512 8 ohm
  - Eminence Kappa LF 3012 HD 8 ohm
  - Eminence Delta Pro-12a 8 ohm
- Compression Driver
  - Single driver horn: Eminence PSD 2002 or PSD 2013 8 ohm bolt-on
  - Dual driver horn: Eminence NSD2005 or Selenium D220 (note, the dual driver requires a horn that is no larger than 4.5” in diameter)
- Crossover
  - Eminence PXB21k6 2 way 1.6K
- Misc
  - Grill, speakon connectors, wiring, feet, metal rigging hardware.

Grill

- Custom Grills can be purchased at:
  - http://www.reliablehardware.com/customspeakergrill.aspx
- The Grills shows us the 5/32” holes which is the R3152:
  - http://www.reliablehardware.com/customspeakergrill-532diastaggered.aspx
- The site has you enter the dimensions as well as any bending that you may want.
  - 13 ¾” wide x 12 ¾” height with a 3/4” bend all 4 sides.
  - Note: the site has you enter:
    - Height: 12 Fraction: ¾”
    - Width: 13 Fraction: ¾”
- The woofer baffle is set back 1” so the 3/4” bend makes gives the woofer plenty of clearance plus it sets back 1/4” from the front edge.
- Black pan head screws for mounting: http://www.mcfeelys.com/catalogsearch/result/?f=+product+0612+TRK+6+x+1+14+Wood+Screws+Black+Oxide+Plated+Truss+Head+Combo+Drive&q=0612+TRK+6+x+1+Wood+Screws+Black+Oxide+Plated+Truss+Head+Combo+Drive
  - 100 for $5.00

1 black pan head screw in each corner



Options

- Horn options (same cabinet works for both horn options)
  - **Single** 1” compression driver horn
    - Accep[illegible] ver[illegible] rg[illegible] 1”[illegible] n pr[illegible]s[illegible]on driver[illegible]
    - Up to 7” in diameter
  - **Dual** 1” compression driver horn
    - Required 2 (two) 1” compression drivers
    - Must not be larger than 4.6” in diameter
- Woofer baffle plate
  - Original
  - New Simplified
    - No sonic difference – just easier to cut
- **Dual 12” woofer section**
  - **See optional section at the end**

Acceptable 1” drivers for the dual horn option

brand	model	diameter	depth	weight	RMS	LF Freq
B&C	DE400TN	3.3	1.7	1.8	50	1500
Eminence	NSD2005	3.9	1.75	2.5	50	1500
RCF	N350	4	2.4	3.1	40	1700
FaitalPro	HF10RT	4.02	2.13	3.09	60	1300
PRV	D280TiB	4.52	2	3.65	80	2000
Selenium	D220Ti	4.53	2	4	80	1500

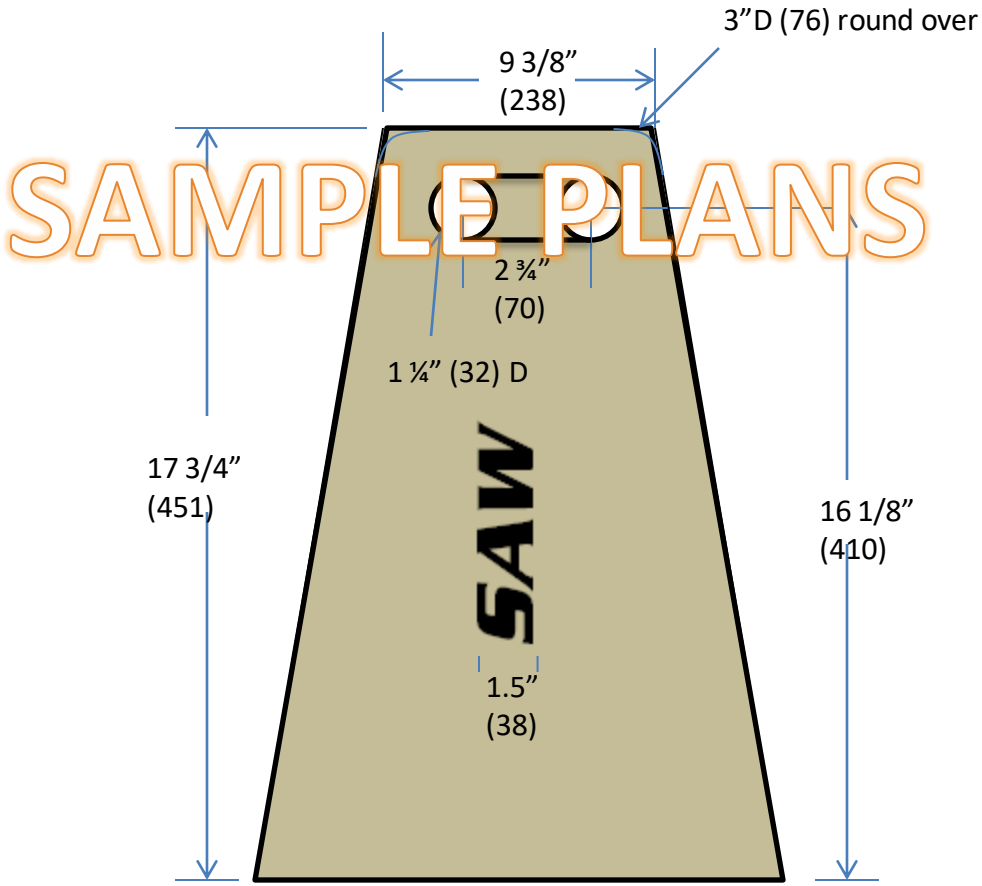
Assembly Instructions
Main Cabinet

- Material:
  - ½” high quality, void free plywood for the cabinet
    - Baltic Birch plywood recommended but will result in each cabinet weighing about 4 lbs more than most other plywood
  - ¼” Baltic Birch Plywood
    - Very small quantity used for the horn mount flanges
  - ¾” Baltic Birch Plywood for the speaker baffle plate.
    - This is critical to be of high quality wood as the woofer will be screwed into this plate

Main Cabinet

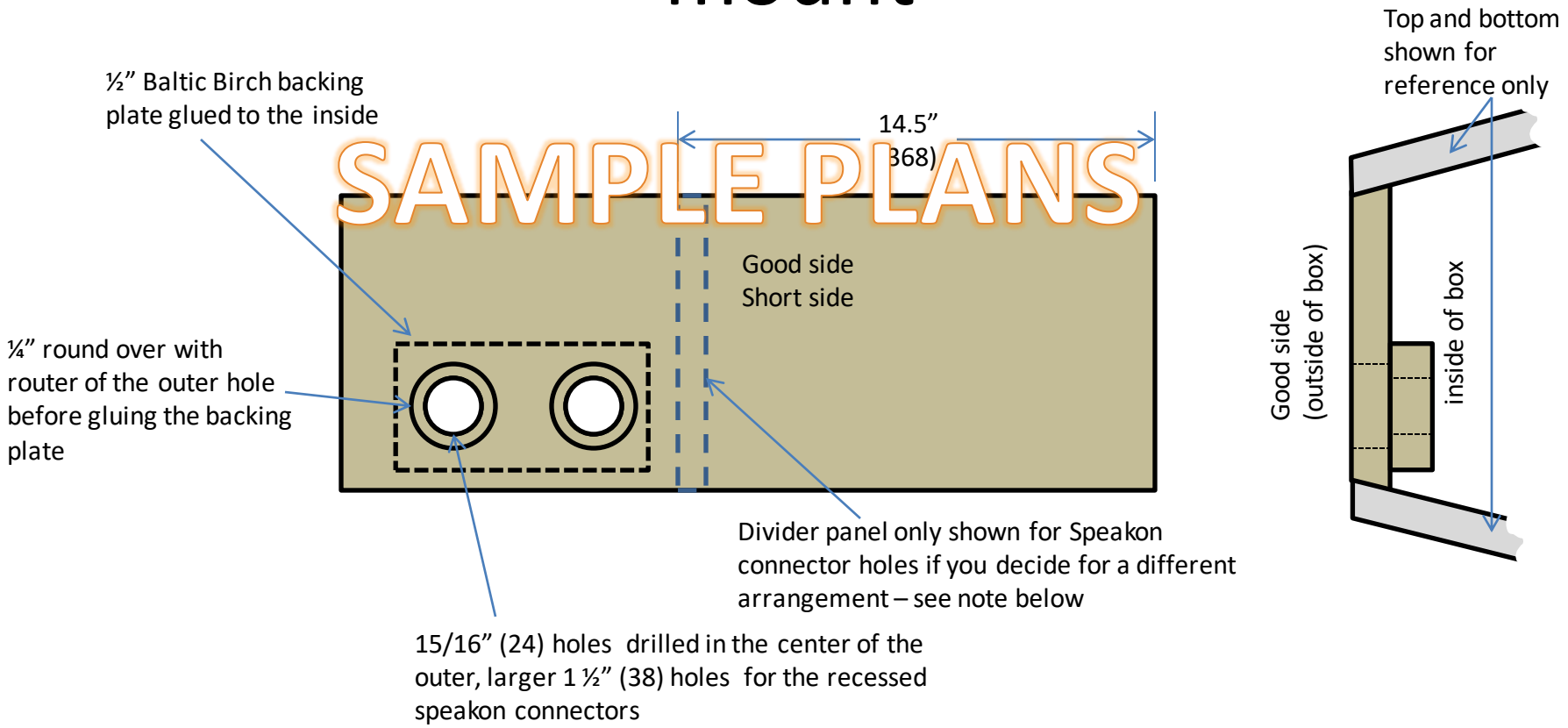
- Cut two end panels
  - Cut out the handles in the end panels
  - Optional: This is the time to router out a logo and round over half of the inner handle cutouts
- Cut the top and bottom panels
  - Pay attention to the 7.4 degree angle on the end of each panel
- Cut out the back panel

End Panels x2



Only one panel with emblem per pair
Bottom side will get rubber feet

Back panel – Speakon recessed panel mount



NOTE: The Speakon connector panel can be modified as needed. For instance, commercial connector panels can be used here and the placement can be modified. However, ensure that they will not interfere with the divider panel. Also ensure there will be room for the crossover and clearance for the compression driver.

Box construction photos

Small plate will be used
With exact hole for Speakon
Connectors (last page)

Ensure every thing is 100%
Square or the inner baffle
And horn assembly will
Not fit correctly and
Alignment with the hanging
Hardware will be off.

Note the 7.4° panel cuts
And alignment here

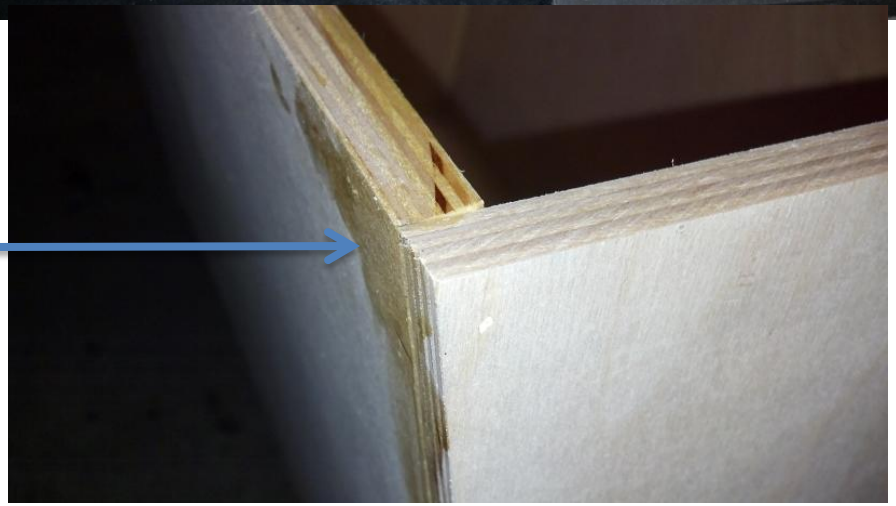
If unsure at this stage – build
One out of scrap plywood
As a throw away box to make
Ensure all angles and cuts
Are correct.

Use straight – void free plywood. Shown is Baltic Birch plywood.
Glue used is regular wood glue (Titebond II). Air nailer used to hold joints.
Must be air tight!

Note handle cutout
Alignment with
Back panel

Optional: before assembly,
Router this part of the
Handle with 3/16” round over.
You will not be able to get
A router in there at this point
And will have to sand it

Front corner view:
Note the alignment
Of the top/bottom
With the end panel



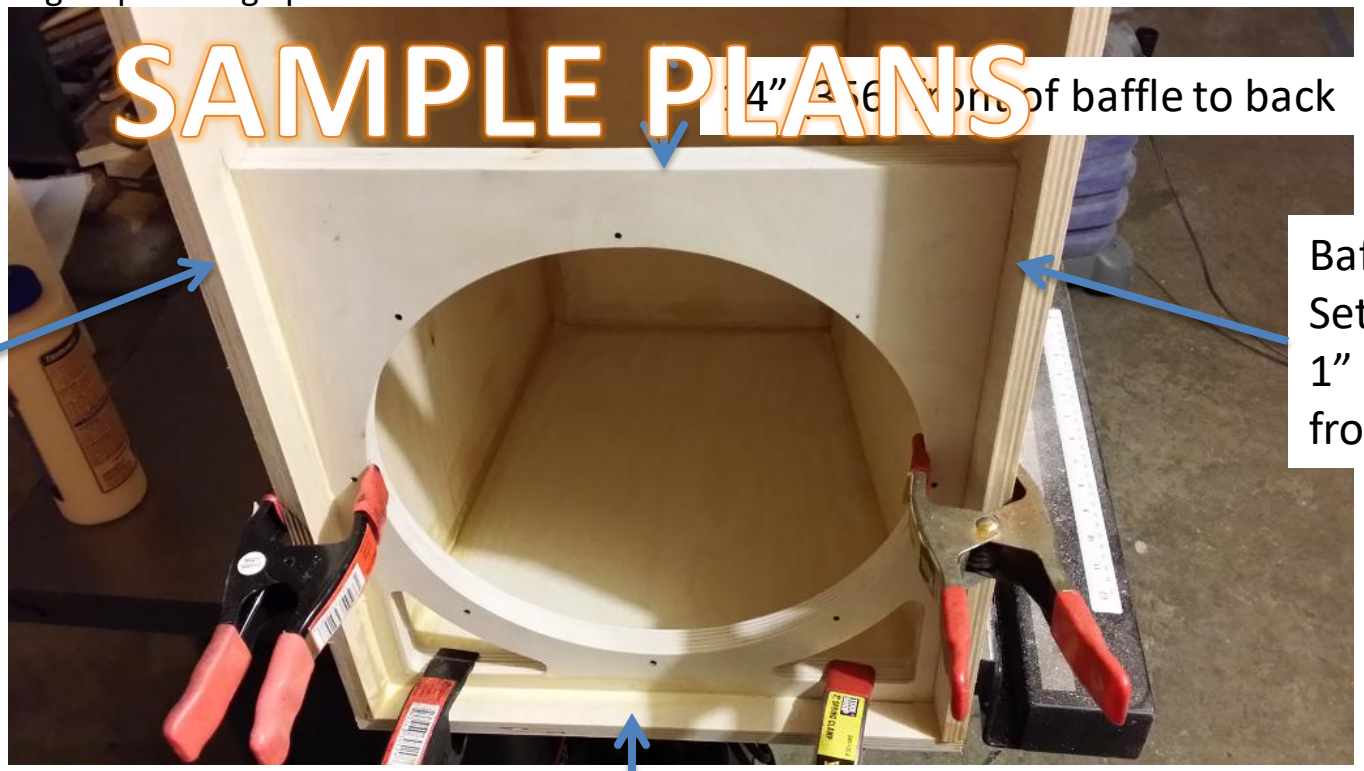
Inner box construction

- Cut out and install the front baffle plate
  - This can be trimmed to fit if the main box was not built to exact specified dimensions and not completely square
  - Cut out and install the inner divider panel (Shown earlier) and a corresponding horn mounting strip

Baffle Photo

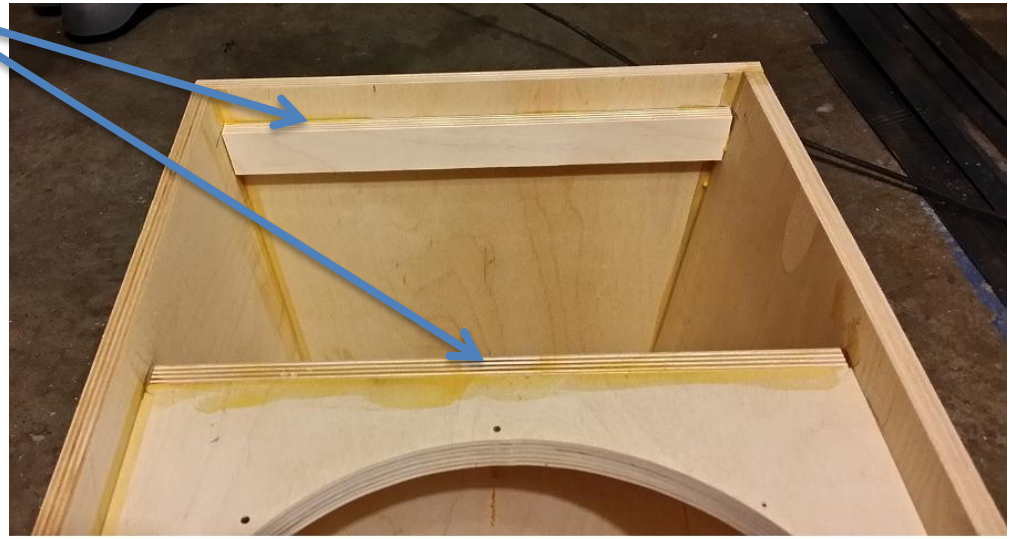
Inner box construction photos

Note: distance from front of baffle to the back should be 14” (356 mm). This will match the inner divider panel as well as
The horn mounting strip coming up next

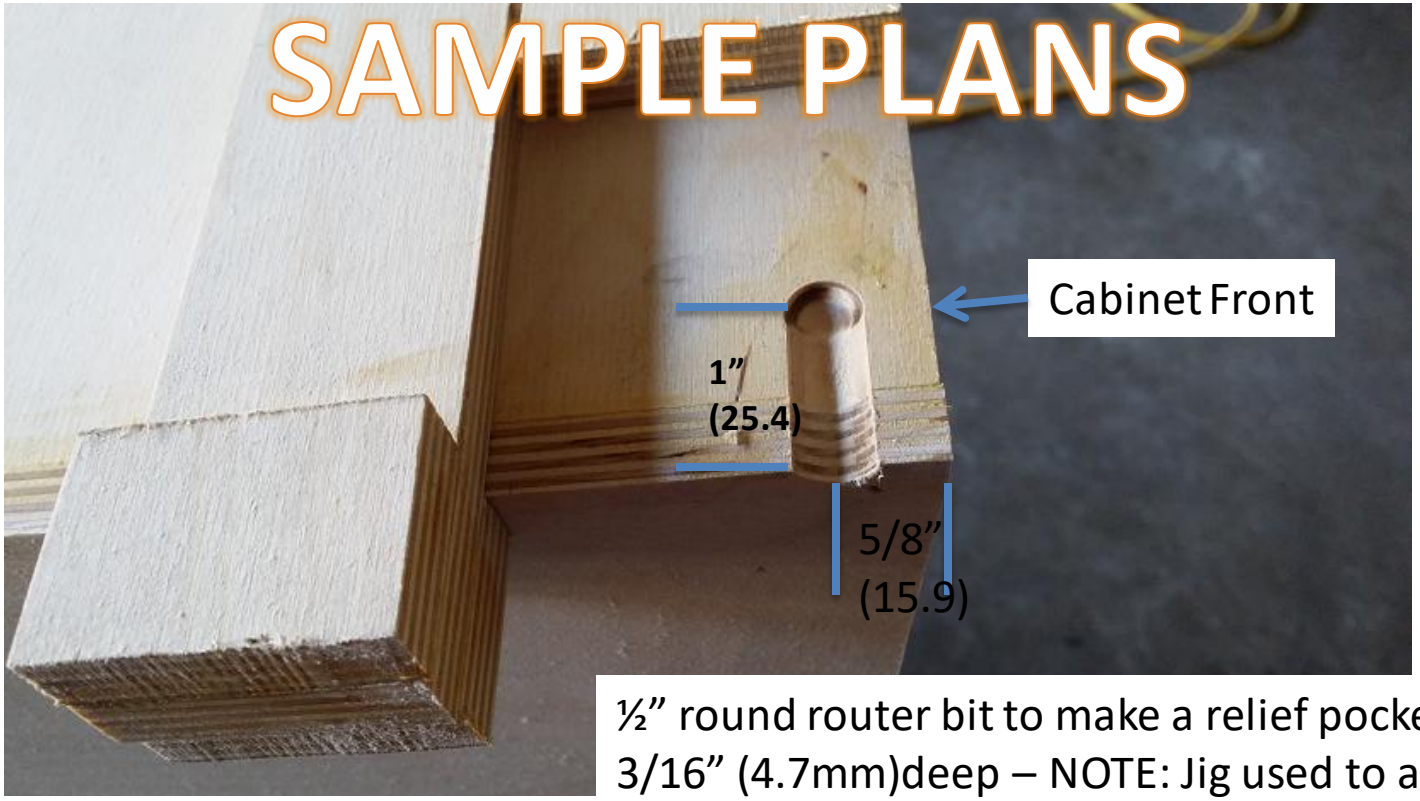


Divider Panel photos

This forms the horn
mounting surface
and must be 14” (356) from the back
with both sides parallel
with each other or
the horn will not fit correctly and
will be under stress when mounted



Rigging Pin Relief Pocket



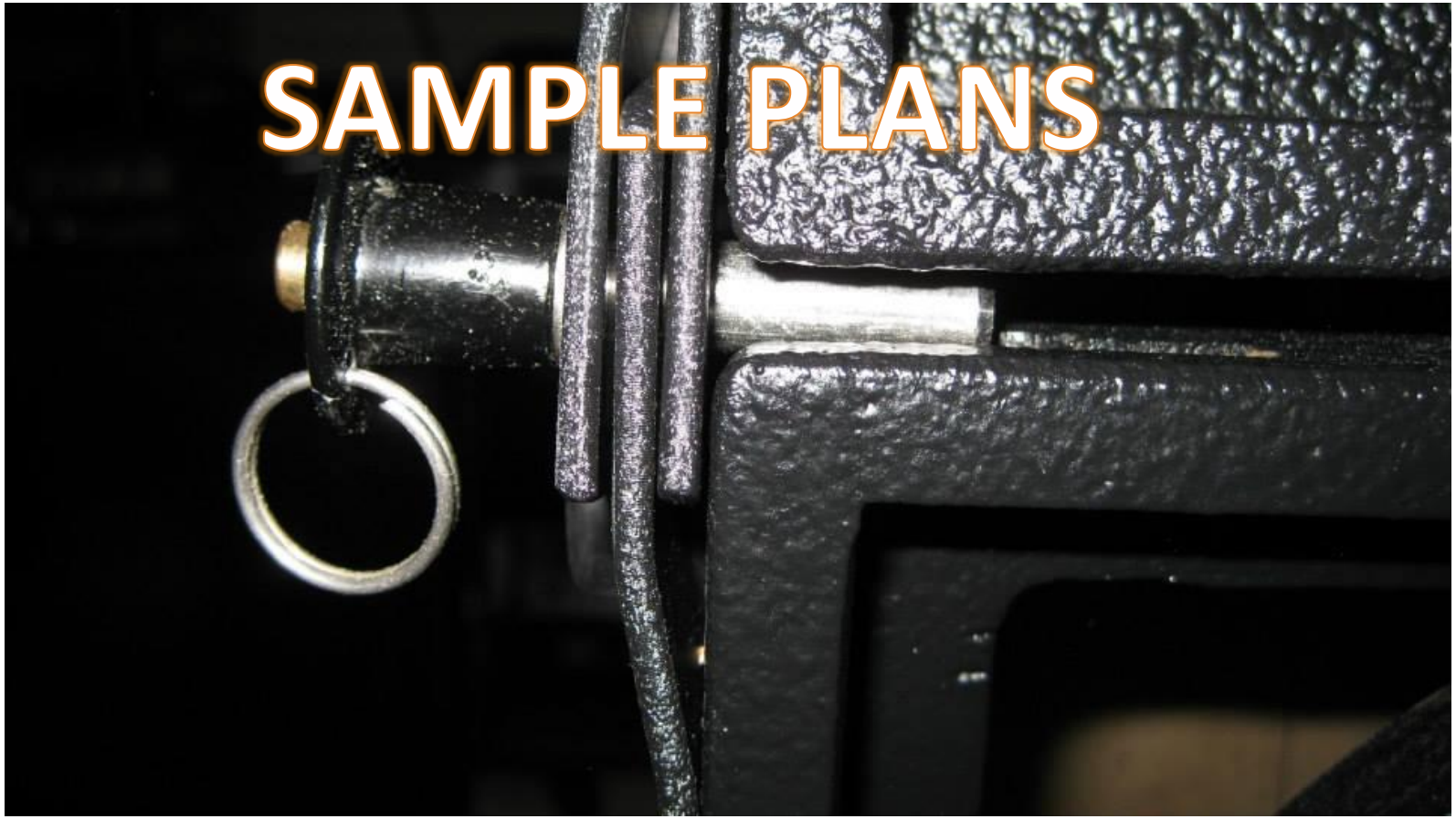
½” round router bit to make a relief pocket
3/16” (4.7mm)deep – NOTE: Jig used to accurately route Holes
There will be 4 of these each side top and bottom. See Next slides for other views

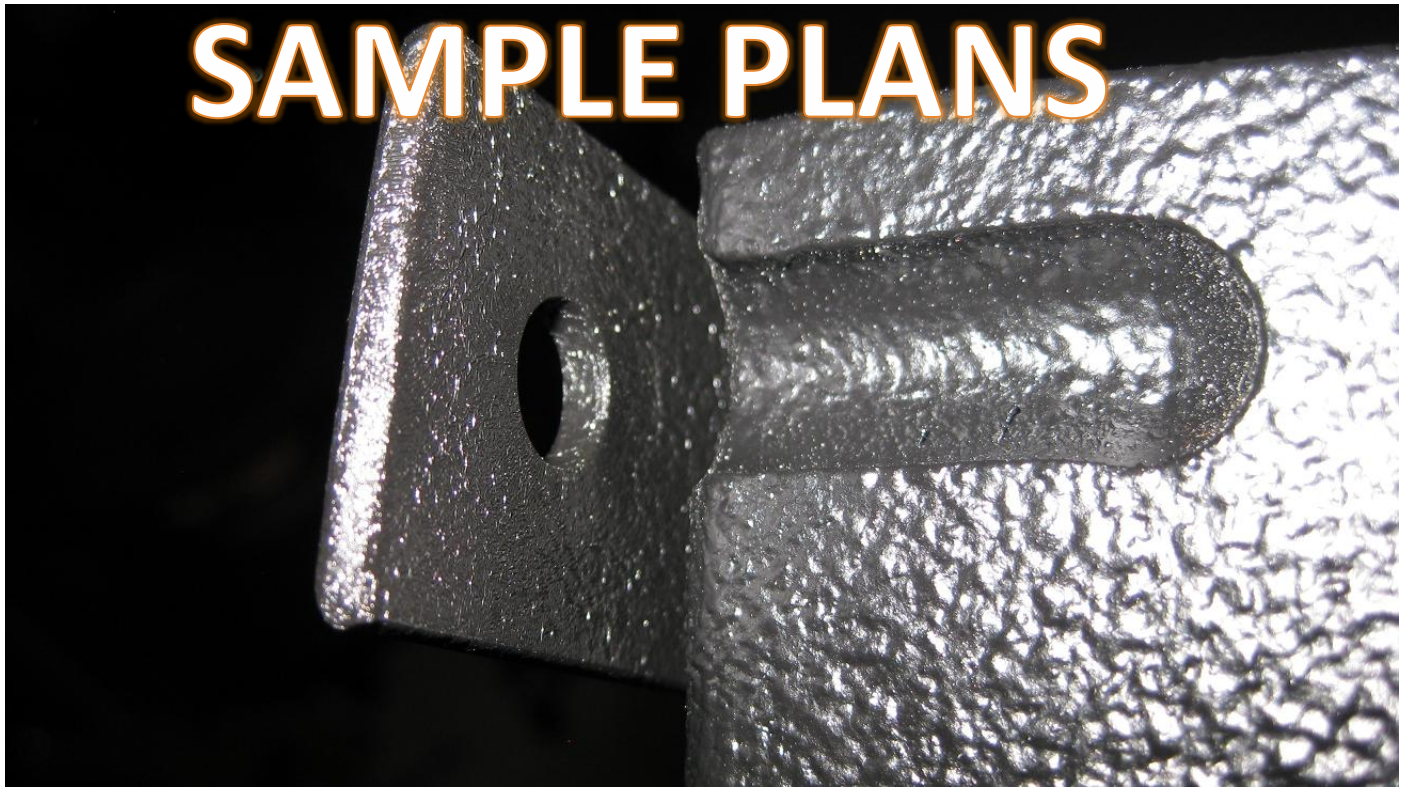
4 Pin relief Pockets

SAMPLE PLANS

Corners radius with ¼" router bit
Inner and outer handles use 3/16" router bit due to ¼" guide bearing being slightly to deep. Back and front just sand

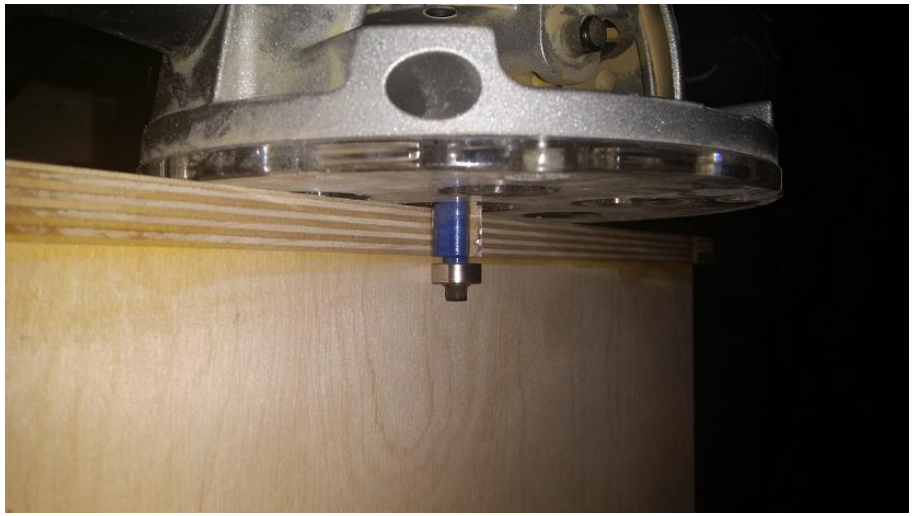
Purpose of this relief pocket is to allow the cabinets to fit together closer
And give clearance for the rigging pin




SAMPLE PLANS

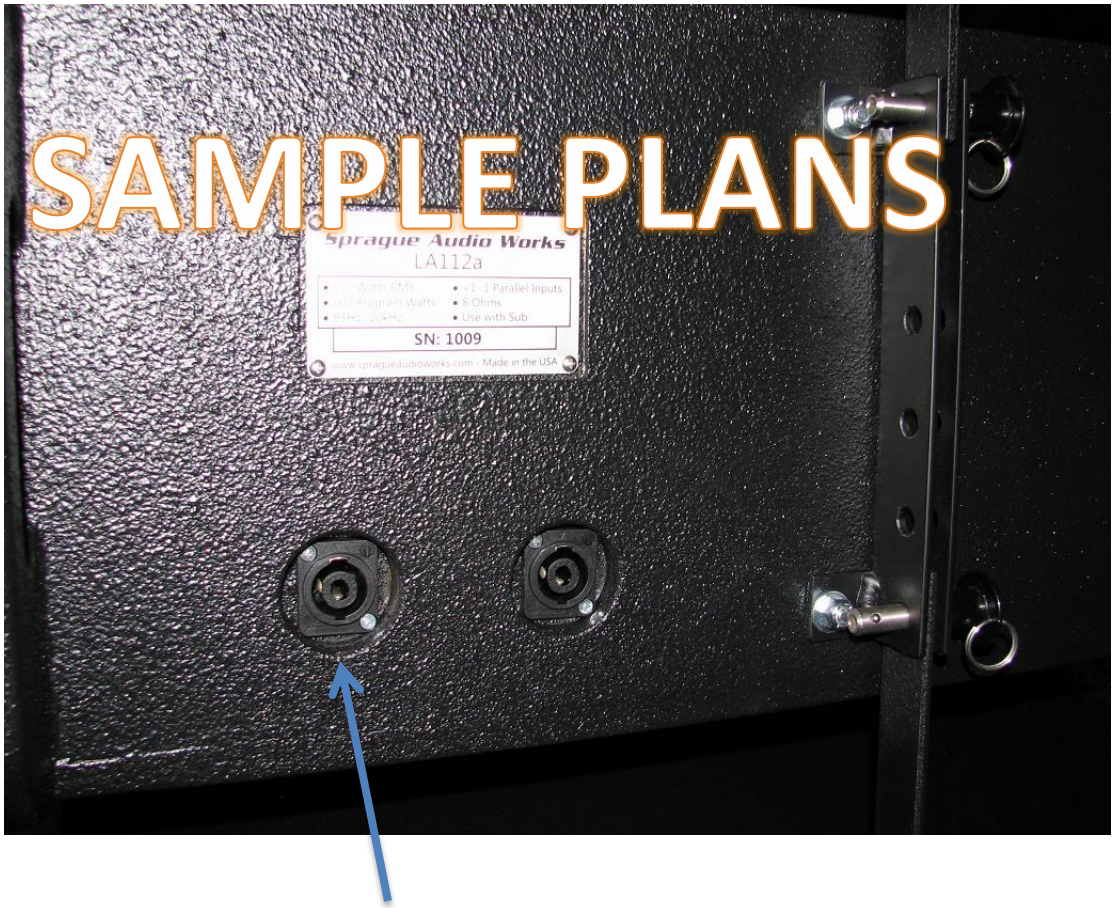
¼” radius on sides

SAMPLE PLANS



Use panel trim bit to make the sides perfectly flush.

SAMPLE PLANS



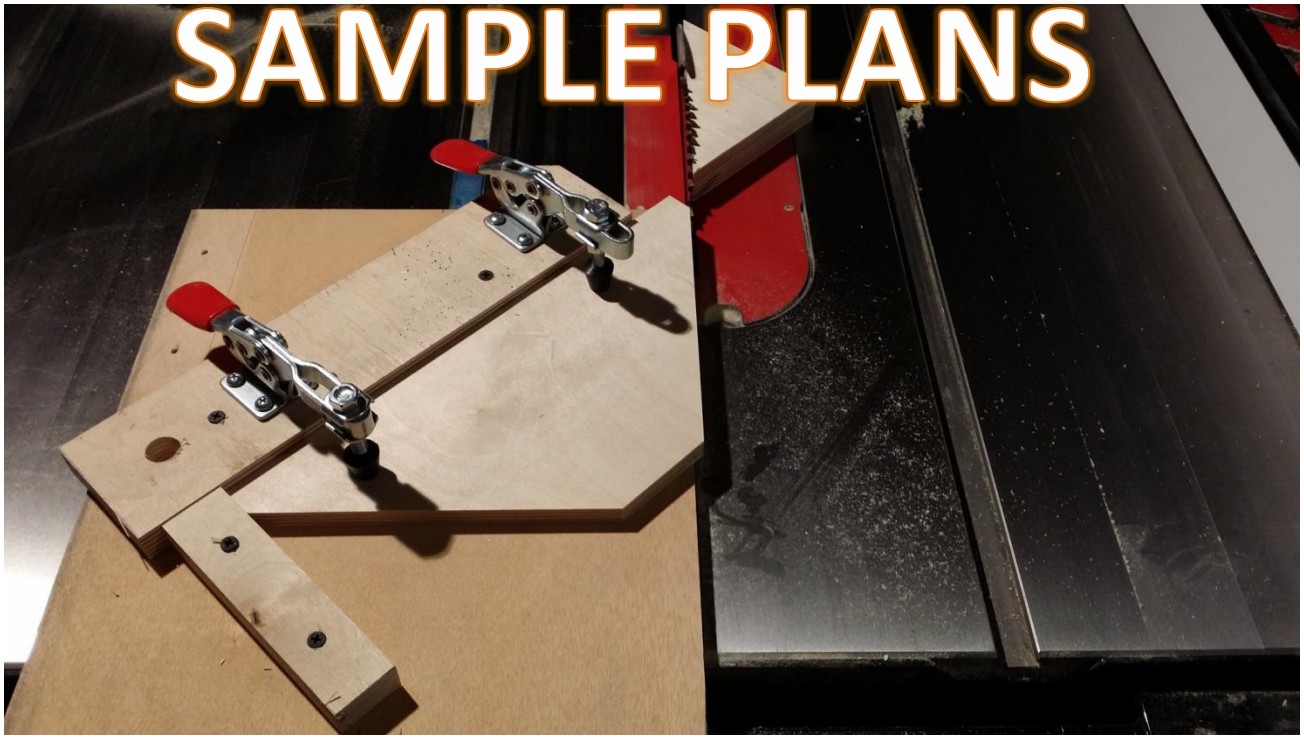
Inner block of ½” plywood drilled exact diameter of Speakon connectors
And glued on the inside. It just needs to cover the larger holes


SAMPLE PLANS

Single 1” horn option

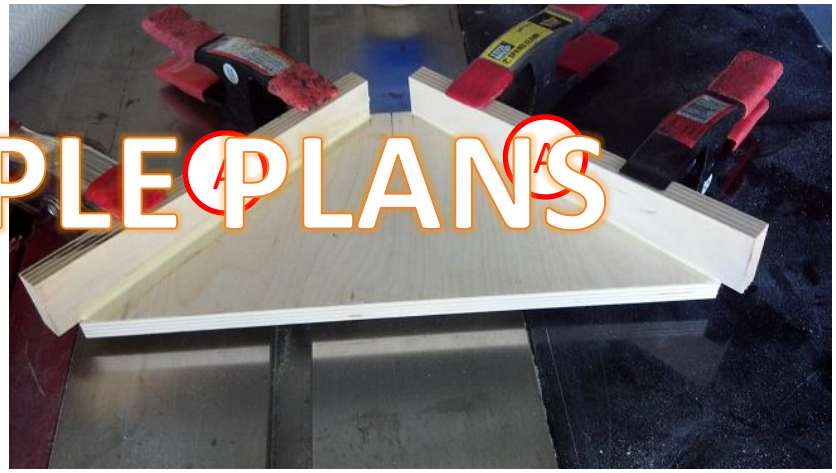
- This is the original wave guide horn
- Allows for very large 1” compression drivers
  - Should use a high quality driver with a cross over at least 1600 Hz or lower
  - Skip to the section on Dual 1” horn option if you choose to build that version
    - However, there are good construction photos and tips that are still applicable for both horns in this section
  - Note: both horns use the same mounting and are completely interchangeable in the cabinet
    - This allows for experimentation before committing to either option when building a large number of cabinets

Horn panel jig

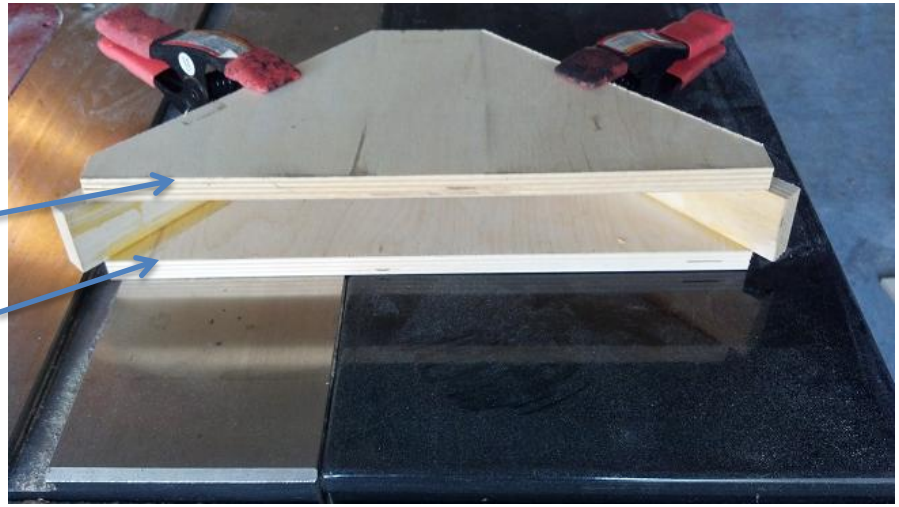


Horn Construction Photos

Make sure horn panels
Are flush with panel (A)



Make sure both horn
Panels are perfectly aligned
NOTE: this is shown without the
Waveguide baffles – put those in
Before gluing on the second panel

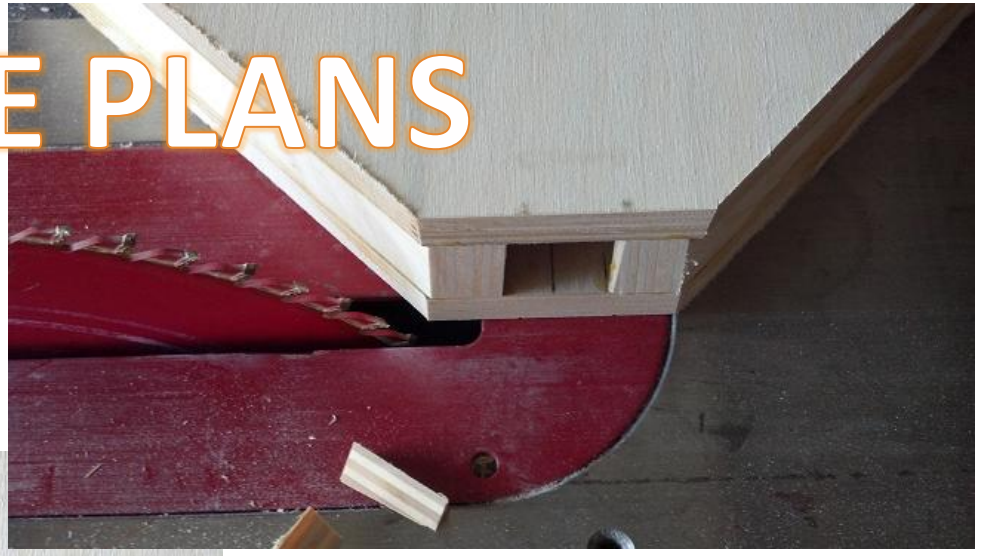


Horn Glue up

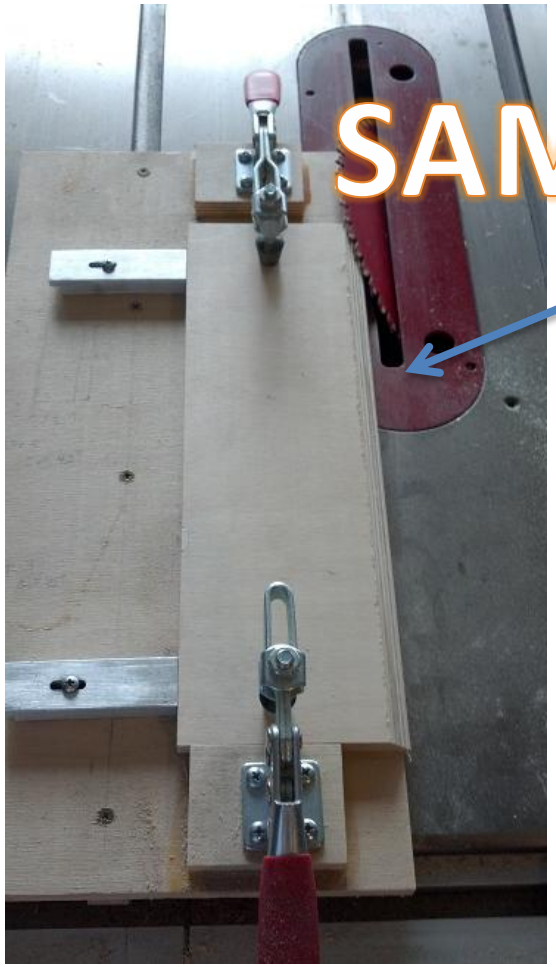
Note that these baffle blocks are the same size as for the dual CD horn

Note: The 1” side plates and the baffles must all be flush before the other side is glued on. Also note the small radius on the side corners of each baffle – Not the front or back – just the sides of the baffle parts

Compression Driver Flange Trimming

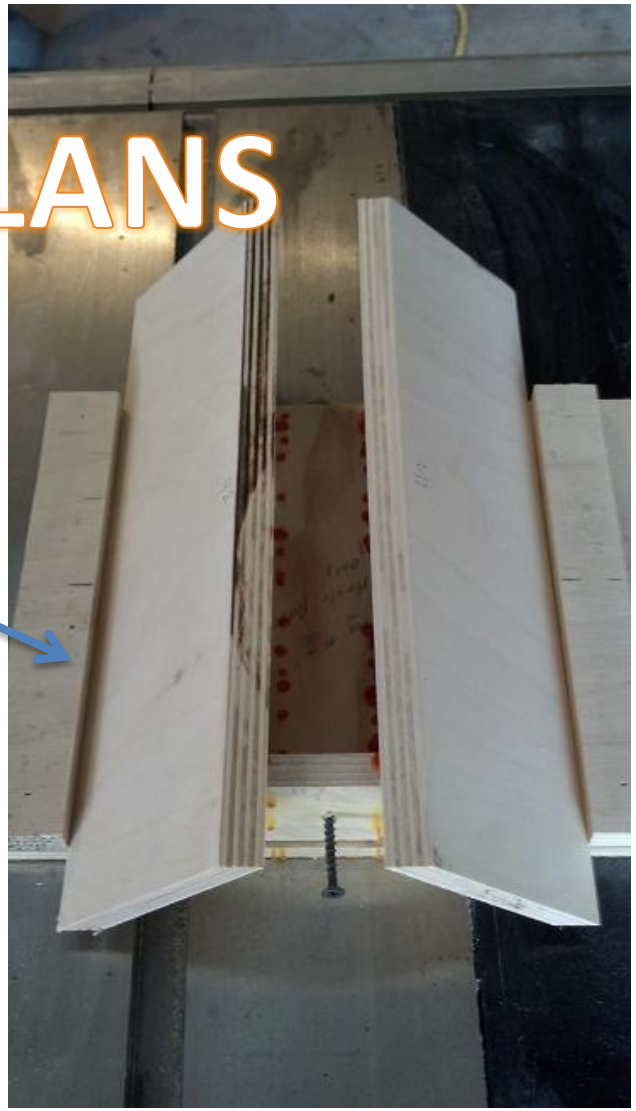


Horn Flange Parts and Assembly

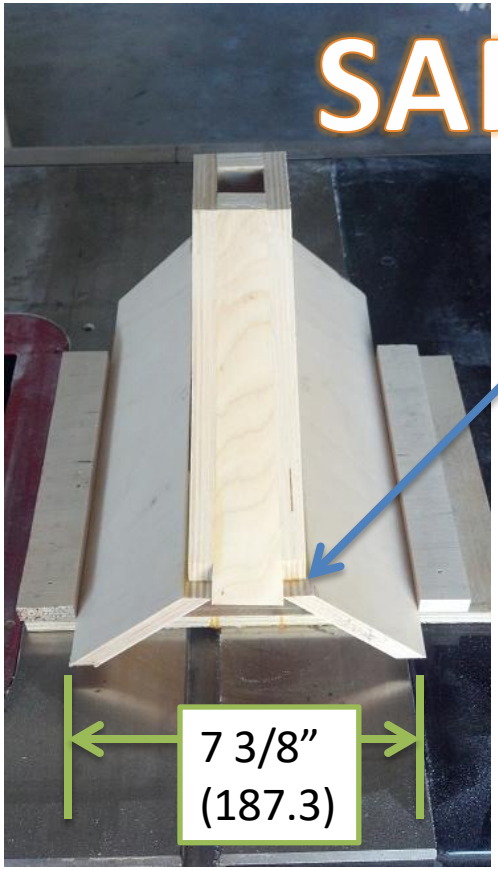


Cutting jig for the
4[illegible] and 45 angle
on the flange

Glue up Jig – panels
Are held 7 3/8”
(187.3) apart.
Final width with the
Mount flanges
will be 9” (228.6)



Use one more jig to glue up the horn mount flanges at 9” (228.6) overall width



Note the overhanging panels, This will be cut off next steps

Horn mount flanges get cut at 45° angle after glue has dried

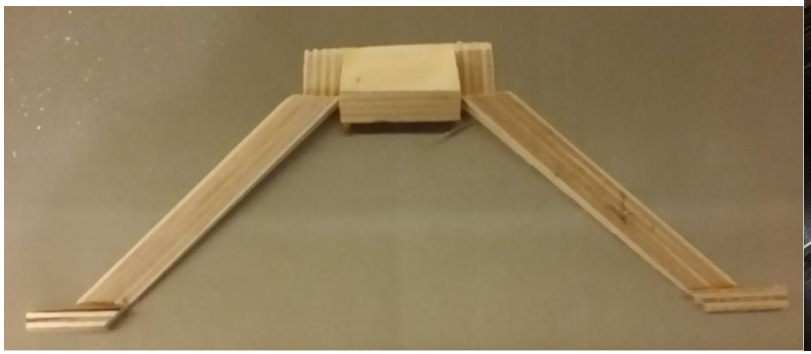
Cutting Horn

Note: this entire horn assembly can be purchased:
www.sprague audioworks.com

The horn will be cut to 12 ¾" (323.8) overall length. Find the center and measure 6 3/8" (161.9) one way and cut. Then measure for the overall 12 ¾" (323.8) for the second cut. A 10" table saw will not cut the entire length so finish with a hand saw.

Note the 7.4° angle to fit the 7.4° angle of the box. Also, some sanding on a belt sander might be required
- do several fit checks.

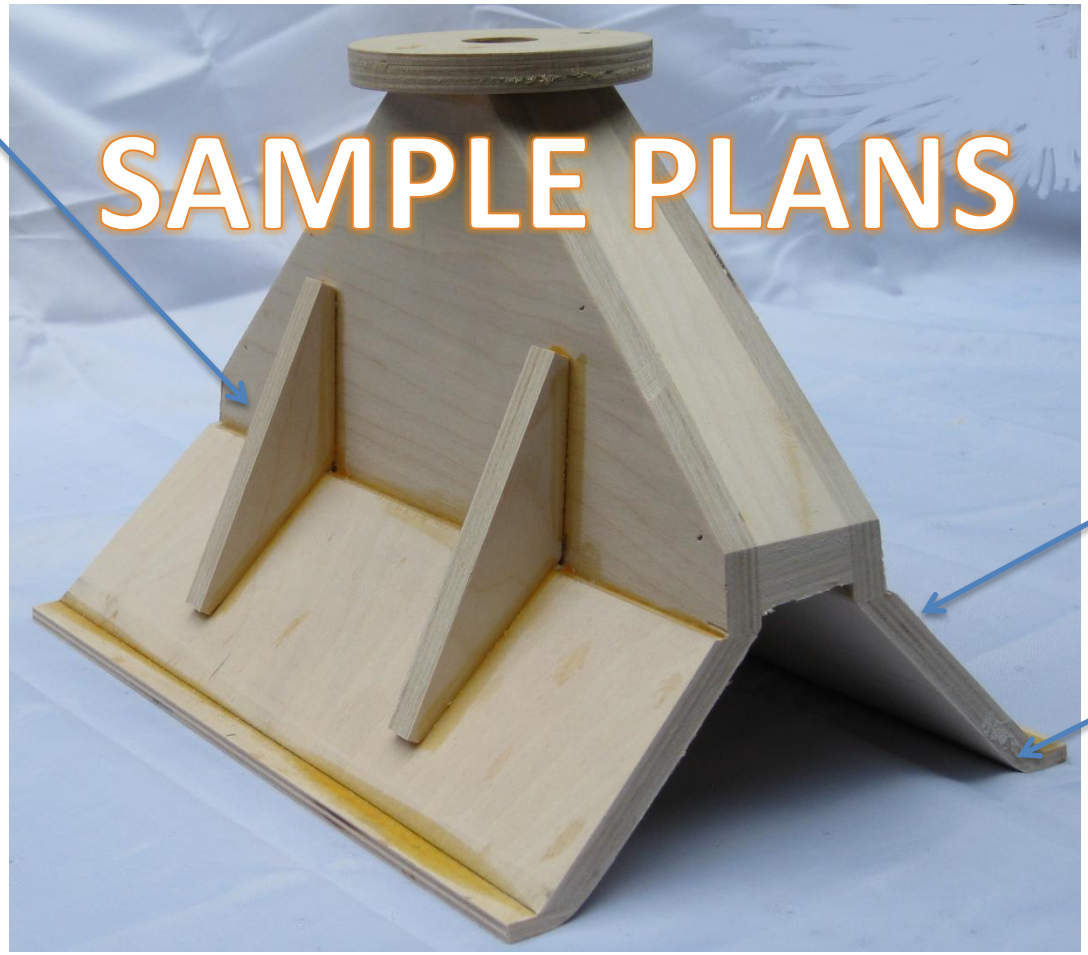
You should end up with a cut off piece that looks like this and is why you want the parts to be a little long when you first cut them out and glue them up



Raw Horn before drilling mount holes

Note the use of two ½” blocks of MFD to make up the 1” waveguide baffles.

Horn Assembly



Reinforcement Panels – cut to fit

Final assembly cut with table saw at 7.4 degree angle

Radius sanded on a belt sander

Horn Assembly

Note: this entire horn assembly can be purchased:
www.sprague audioworks.com

Horn Shown without
The waveguide baffles

Belt sanded radius

Counter sunk holes
For 1” drywall screws

Original Dual Horn construction photos

Clearance slots for the rigging bolts – same as the single driver horn

Note the reinforcement blocks – put them so they do not interfere with the driver hold-down bolts. 2” (50.8) from each end is good. See next page for a simple way to make the reinforcement blocks

NEW -- Dual 1” LA112 horn

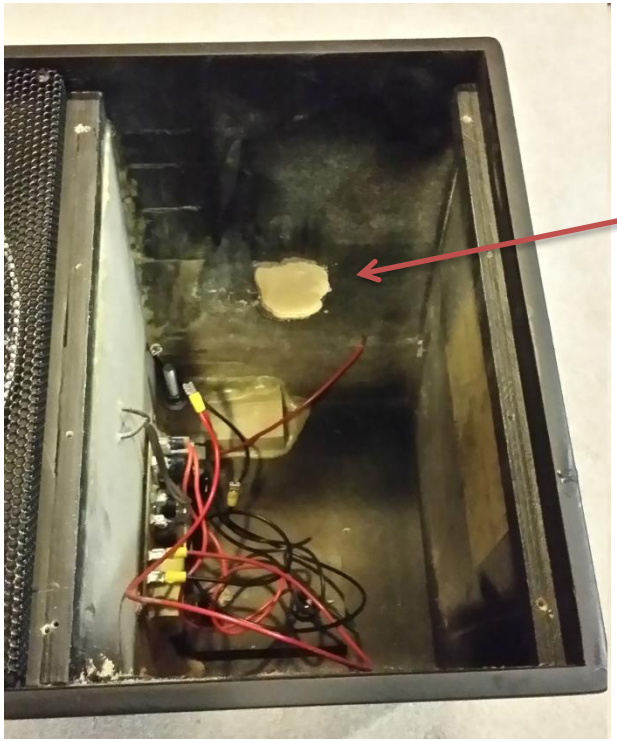
- This new waveguide horn is an exact replacement for the original LA112 horn
- HOWEVER –
- It requires that drivers are no greater than 4.5” in diameter
  - Even at that diameter, a small pocket may need to be routed out on the inside of the box
  - I used two Selenium D220 Ti that are the largest in the chart and I needed to route a 1/8” deep pocket where the drivers hit the inside of the box.
  - This can be done with a small, hand held router

Compression Driver Options

- Horn options (same cabinet works for both horn options)
  - **Dual** 1” compression driver horn
    - Requ[illegible]ed [illegible] 1 [illegible] compression driver
    - Must not be larger than 4.5” in diameter

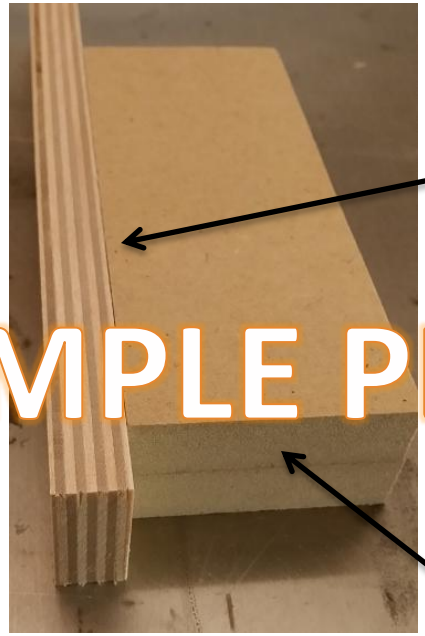
Acceptable 1” drivers for the dual horn option

brand	model	diameter	depth	weight	RMS	LF Freq
[illegible]	[illegible]	3.3	1.7	1.8	50	1500
[illegible]	[illegible]	[illegible]	1.75	2.5	50	1500
RCF	N350	4	2.4	3.1	40	1700
FaitalPro	HF10RT	4.02	2.13	3.09	60	1300
PRV	D280TiB	4.52	2	3.65	80	2000
Selenium	D220Ti	4.53	2	4	80	1500



1/8” routed pockets where the 4.5” Selenium D220 TI drivers hit

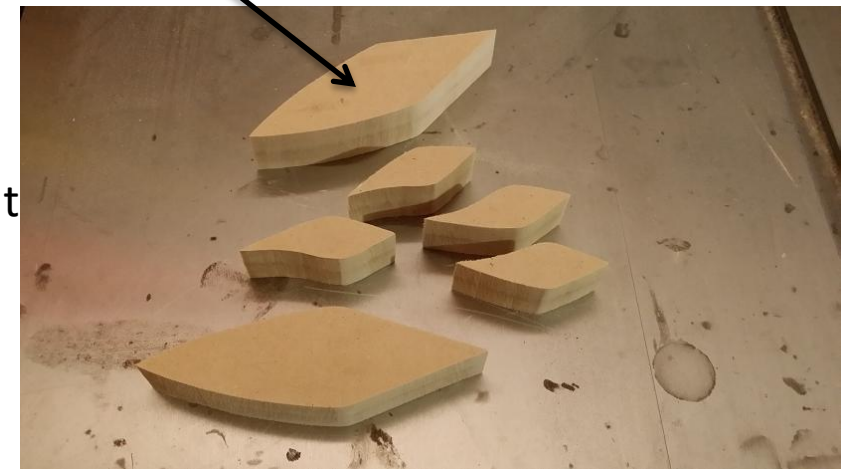
Ensure the glued up blocks that will make the channel dividers are the same thickness as the side wall panels



SAMPLE PLANS

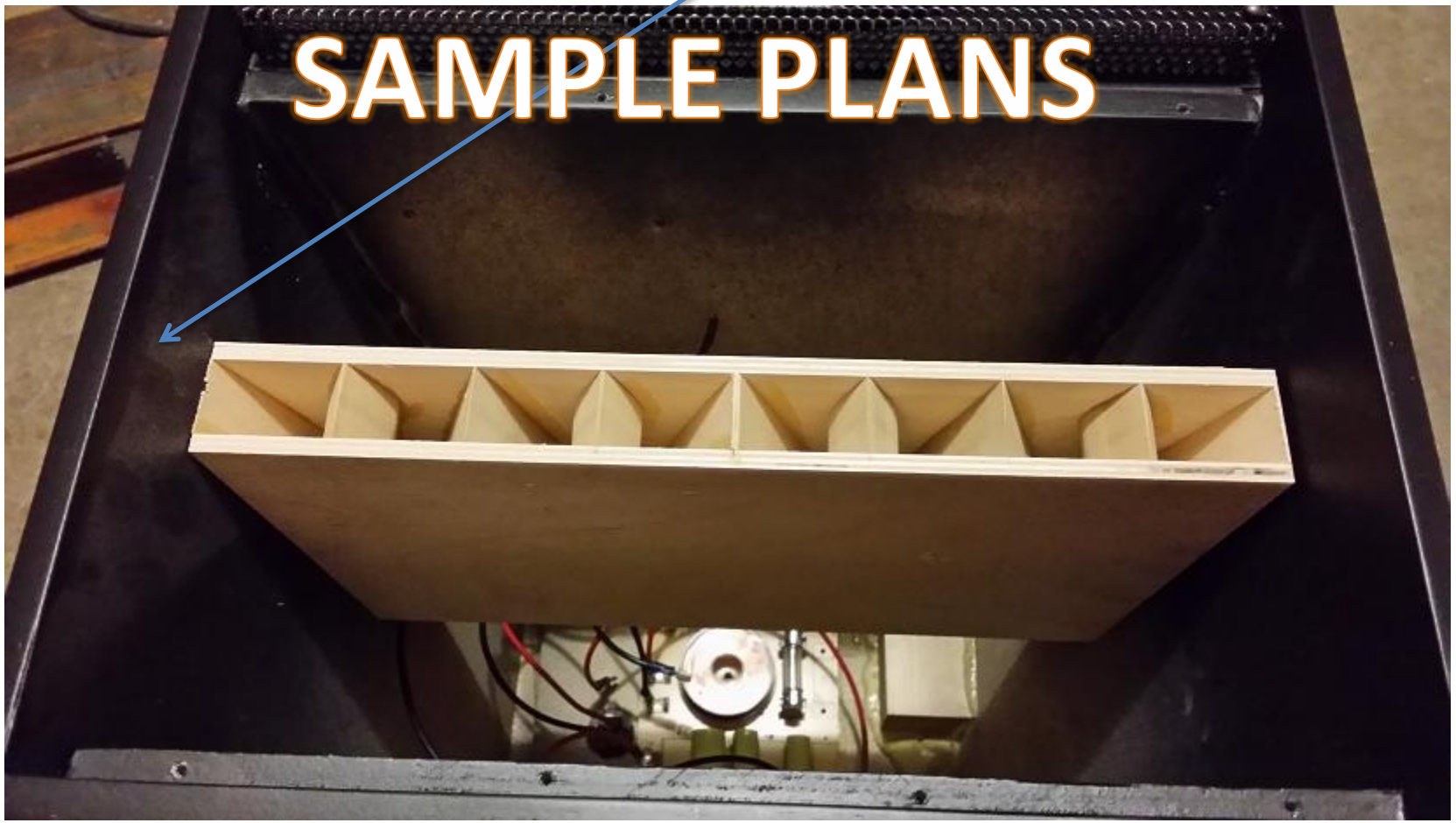
Print out and tape the paper templates to transfer onto a wood template panel

Use the wood templates to cut out the wave guide channel divider parts



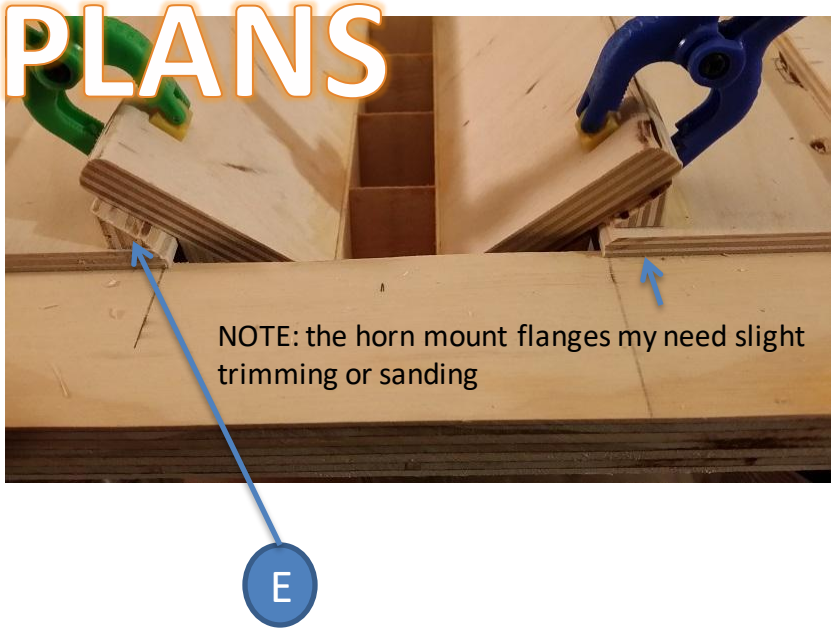
Fit Check

The waveguide horn should set back about 1 ½" to 2" – Ideally 1 ¾" . If it sets out too close to the front, the horn flair will stick out too far and the there will be a gap where the assembly is screwed onto the cabinet



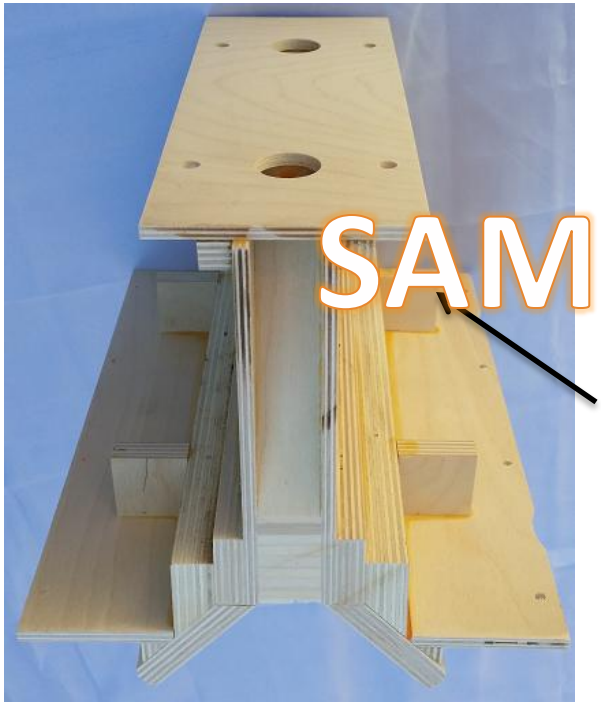
Horn Flange Mount Glue-Up

The Horn assembly is placed in the jig – and the mount flanges and glue strips are glued.



Parts E are now glued in to connect the horn mount flanges with the horn assembly

Finished Horn Photos

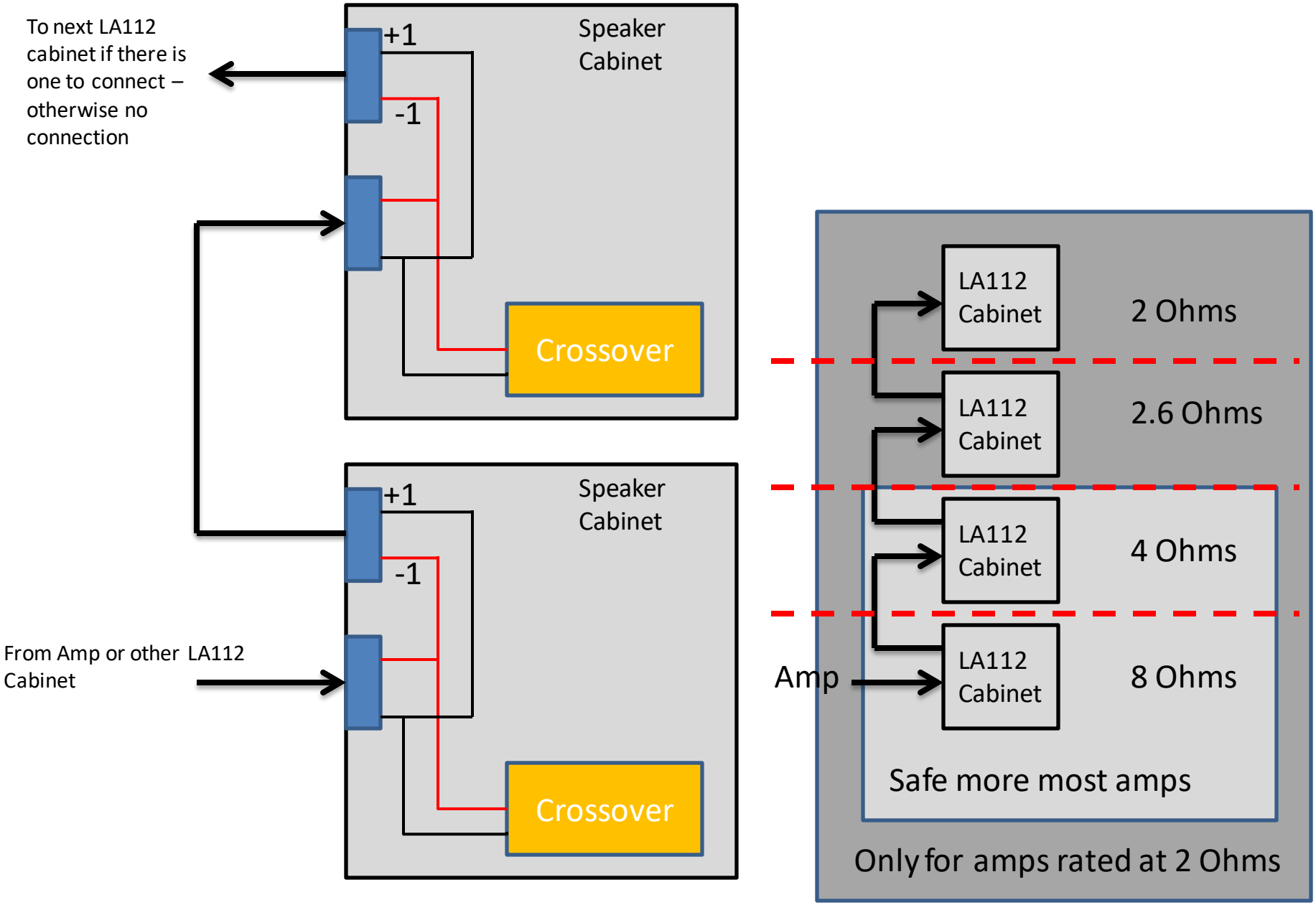


Add the additional reinforcement blocks as shown

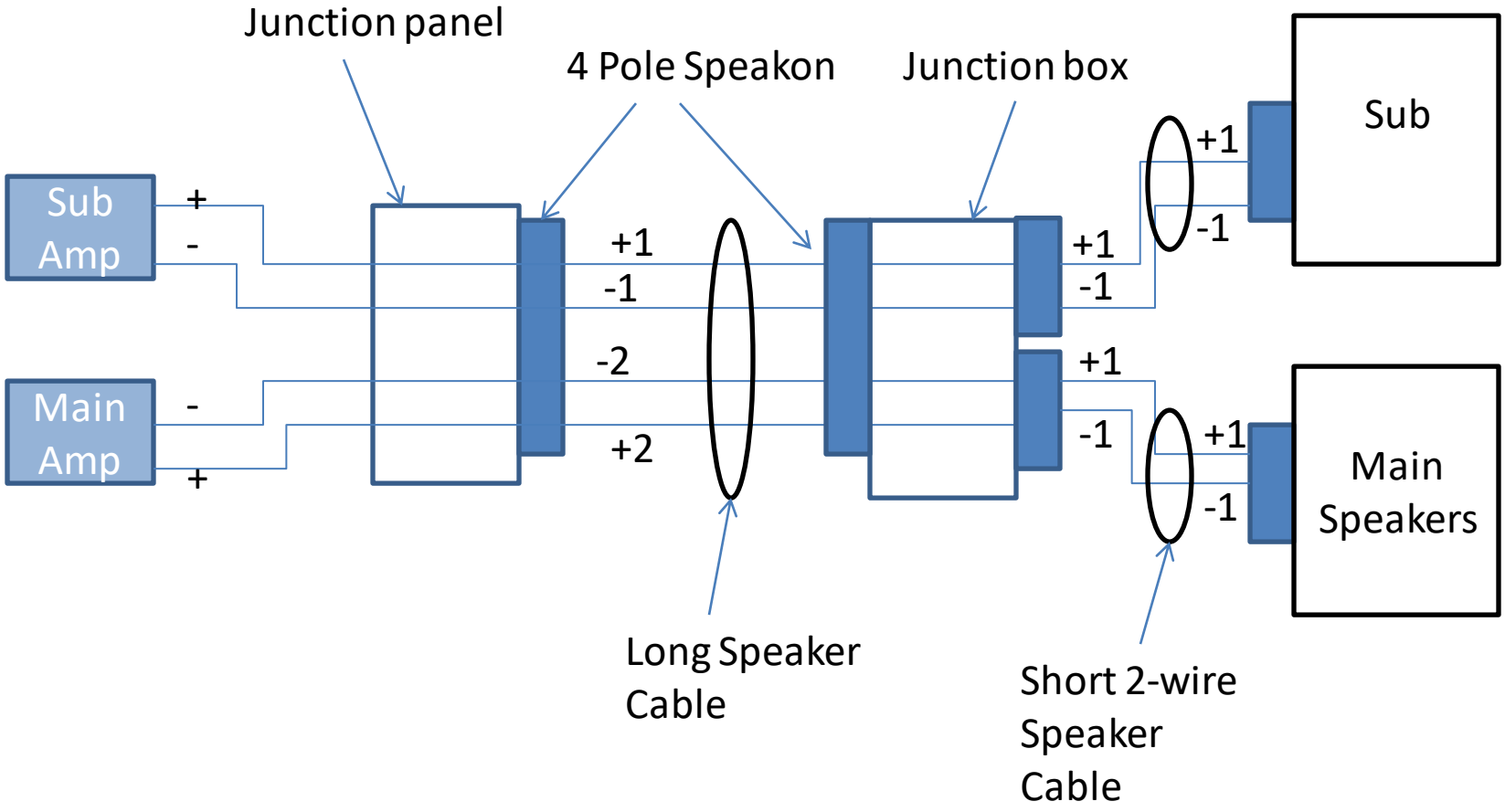
Finishing options

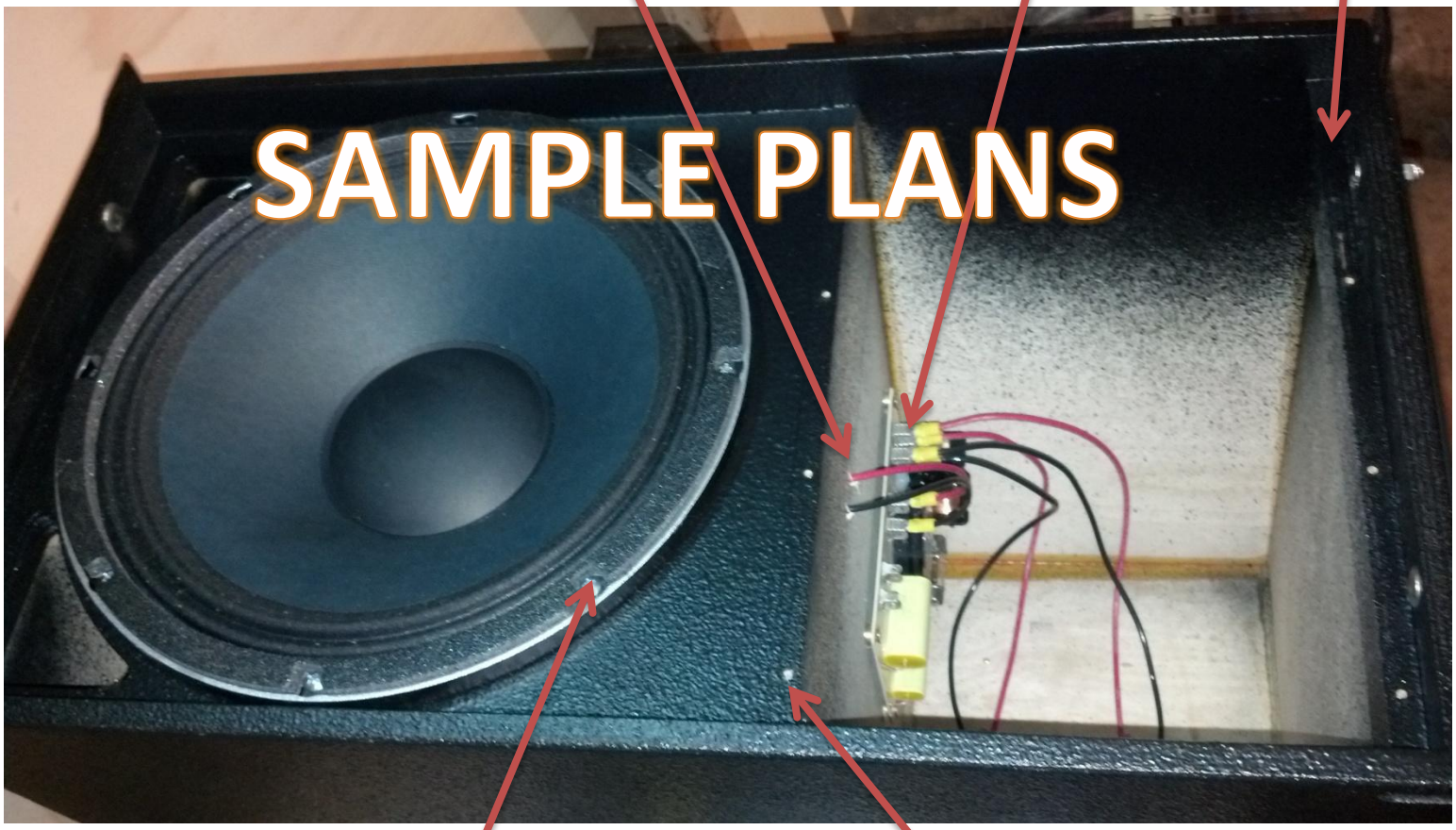
- Duratex
  - http://store.acrytech.com/Speaker-Cabinet-Coatings/
  - good finish that is very safe and easy to apply. Can be applied with a roller with very professional looking results
- Polyurethane spray-on truck bed liner (this is what we use on the factory cabinets and what is shown in the photos of the finished cabinets)
- For the Horn, a can of spray-on truck bed line provides a very nice looking finish and is what is shown in the finished horn photos

Parallel wiring of the Dual Speakons



Single 4 conductor stage cable

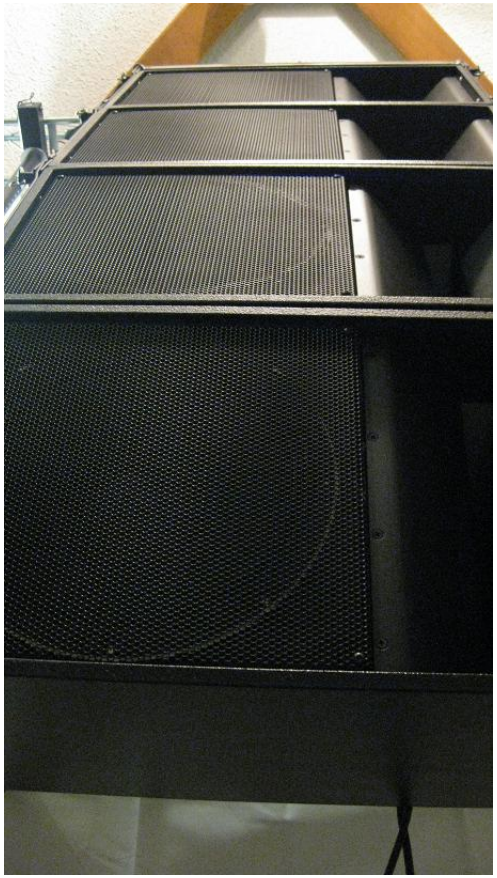



SAMPLE PLANS
2 air tight holes for
The woofer wires
Place crossover in back to
allow for Compression
driver clearance
½” strip 1 ½” (38.1) to
mount Horn - level with
baffle
And divider panel
#10 x 1 ½” pan head
screws
Screw pilot holes drilled in
both the Horn and the cab
at same time to ensure
alignment – 1” black dry
wall screws

Optional rubber feet mounted on woofer side (opposite side of the logo)

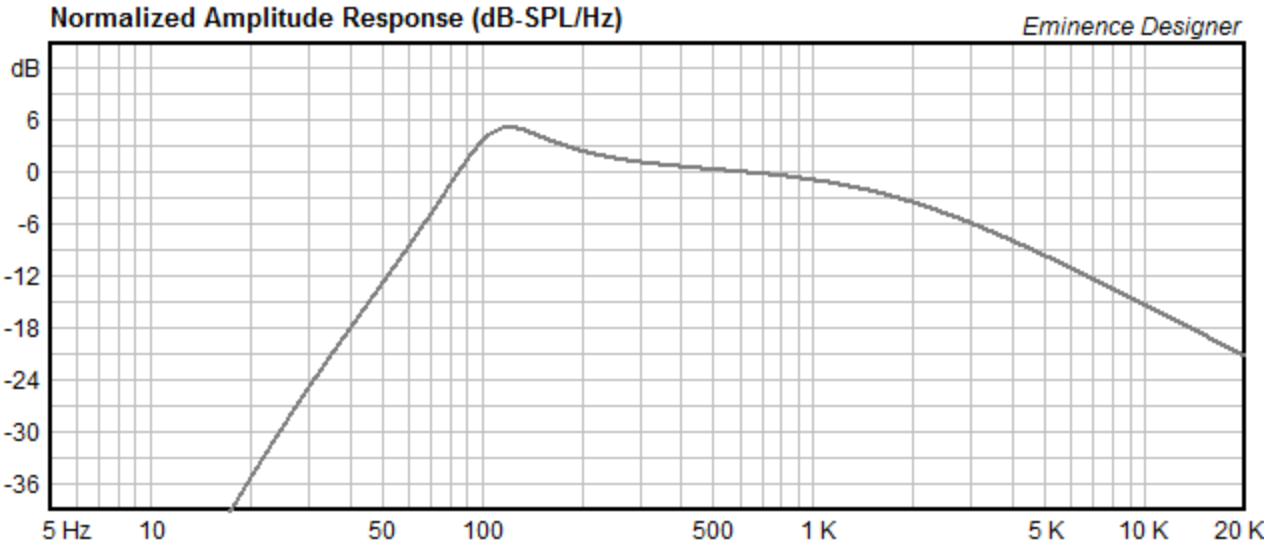
Shown with T-stand mount

Final photos



Shown with T-stand mount

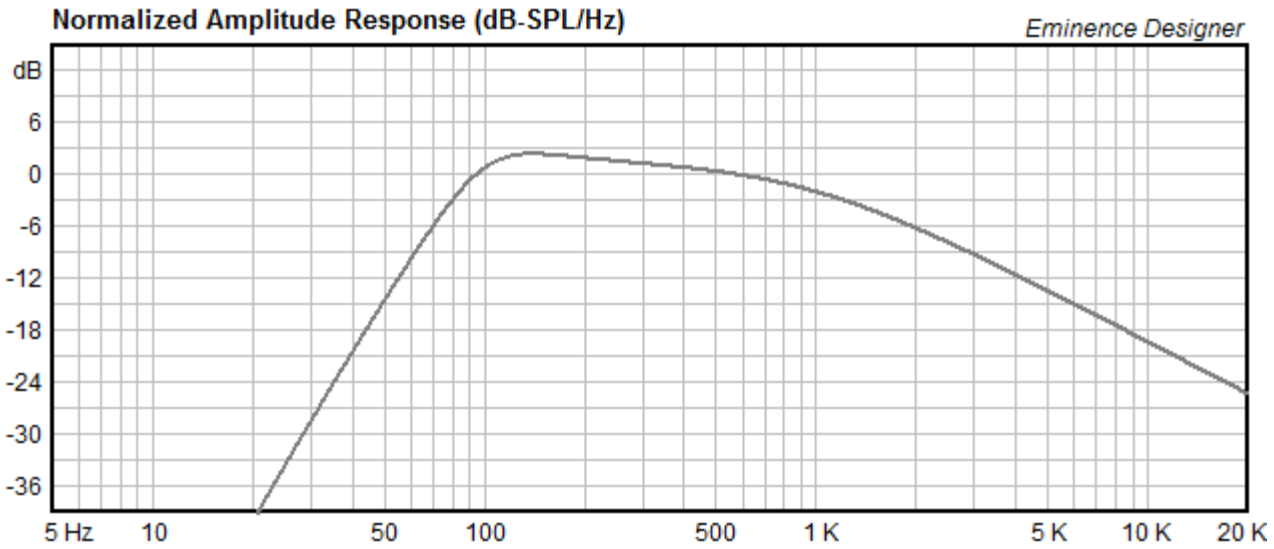
With DeltaLite II 2512



Graph for Woofer section only with DeltaLite II 2512

F3: 75 HZ
Box Volume: 1.02 Cu Ft
Vent Area: 4.5 Sq in
Vent Length: 0.75 in

With Delta Pro-12a



Graph for Woofer section only with Delta Pro-12a

F3: 79 HZ
Box Volume: 1.02 Cu Ft
Vent Area: 4.5 Sq in
Vent Length: 0.75 in

Ideas for mounting

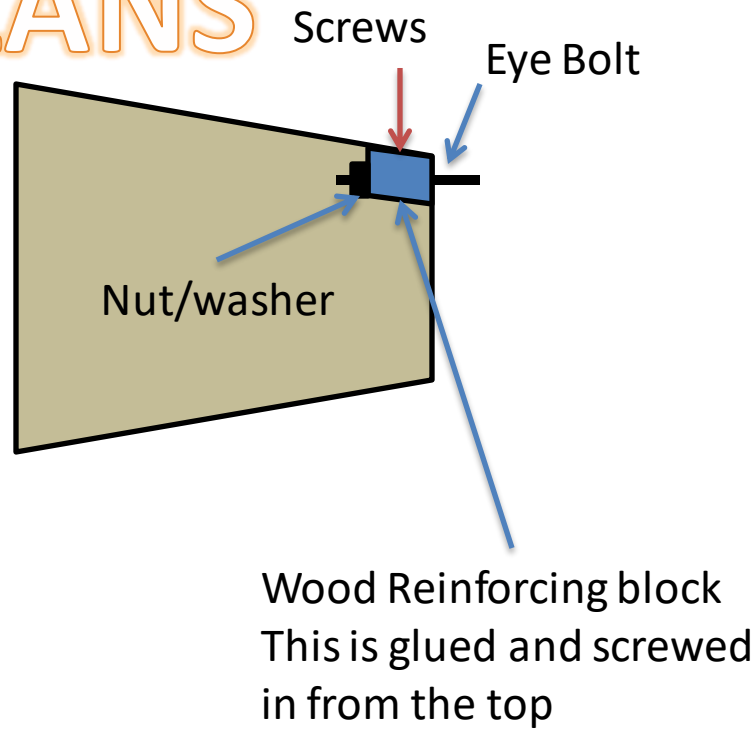
- As shown in the pictures, optional rigging plans are available for hanging or stacking the cabinets – but here are a couple of ideas that have been used and include:
  - Hanging from rear eye bolts
  - Fixed mounting by bolting the cabinets to a metal or wooden frame

None of these mounting options have been tested but are here to give you other ideas for mounting

Rear Eye bolt

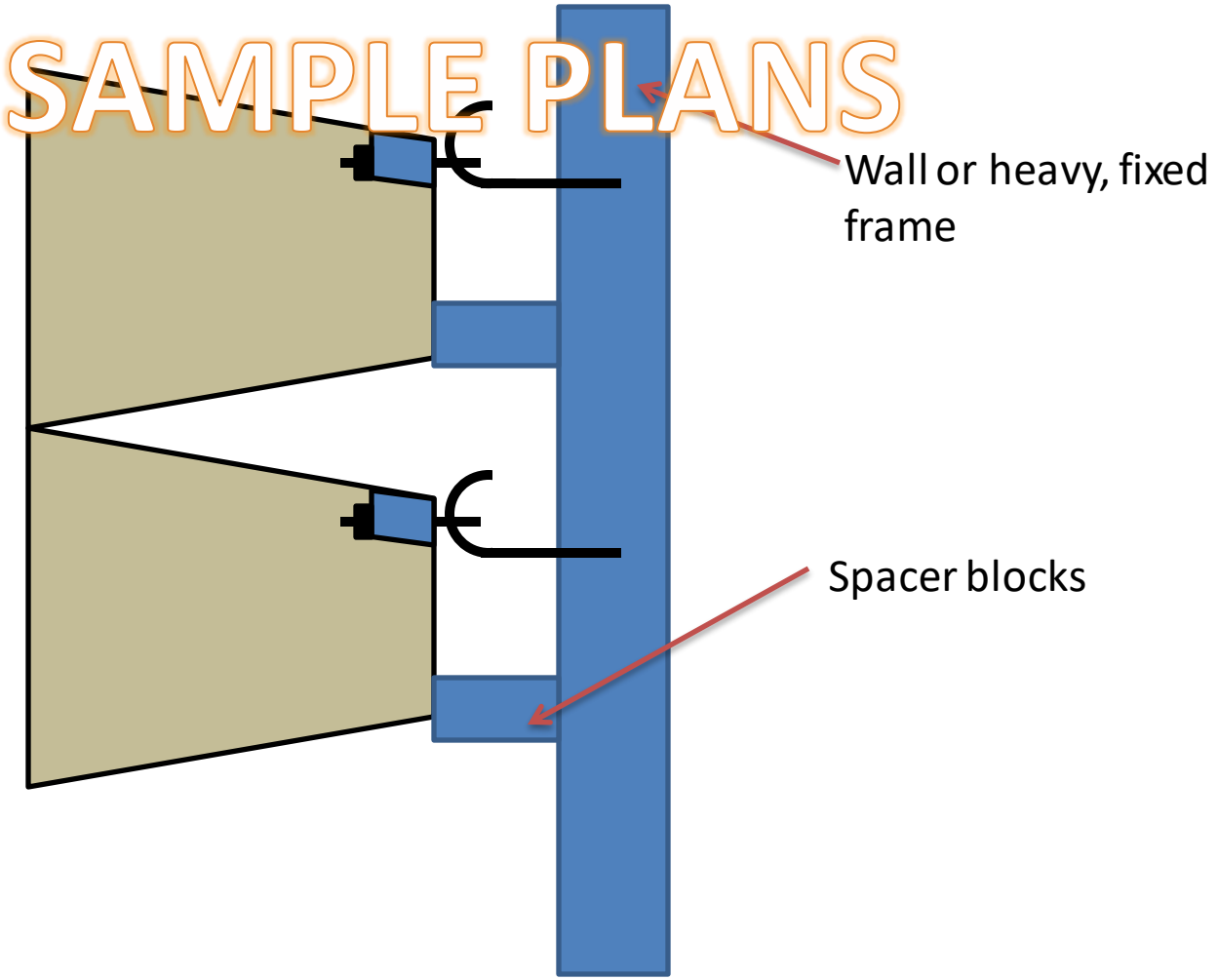
- This was the original concept for a very simple, low cost mounting system
- Large Eye bolts are mounted on the top rear of the cabinet as shown

SAMPLE PLANS



Rear Eye bolt

- For more permanent installations, simple corresponding Open Eye bolt or L-Bolts can be used in a frame to hang the cabinets as shown



Rear Eye bolt

- Here are some pictures of a T-Hat mounting frame that was built to use the Eye bolt mounts.

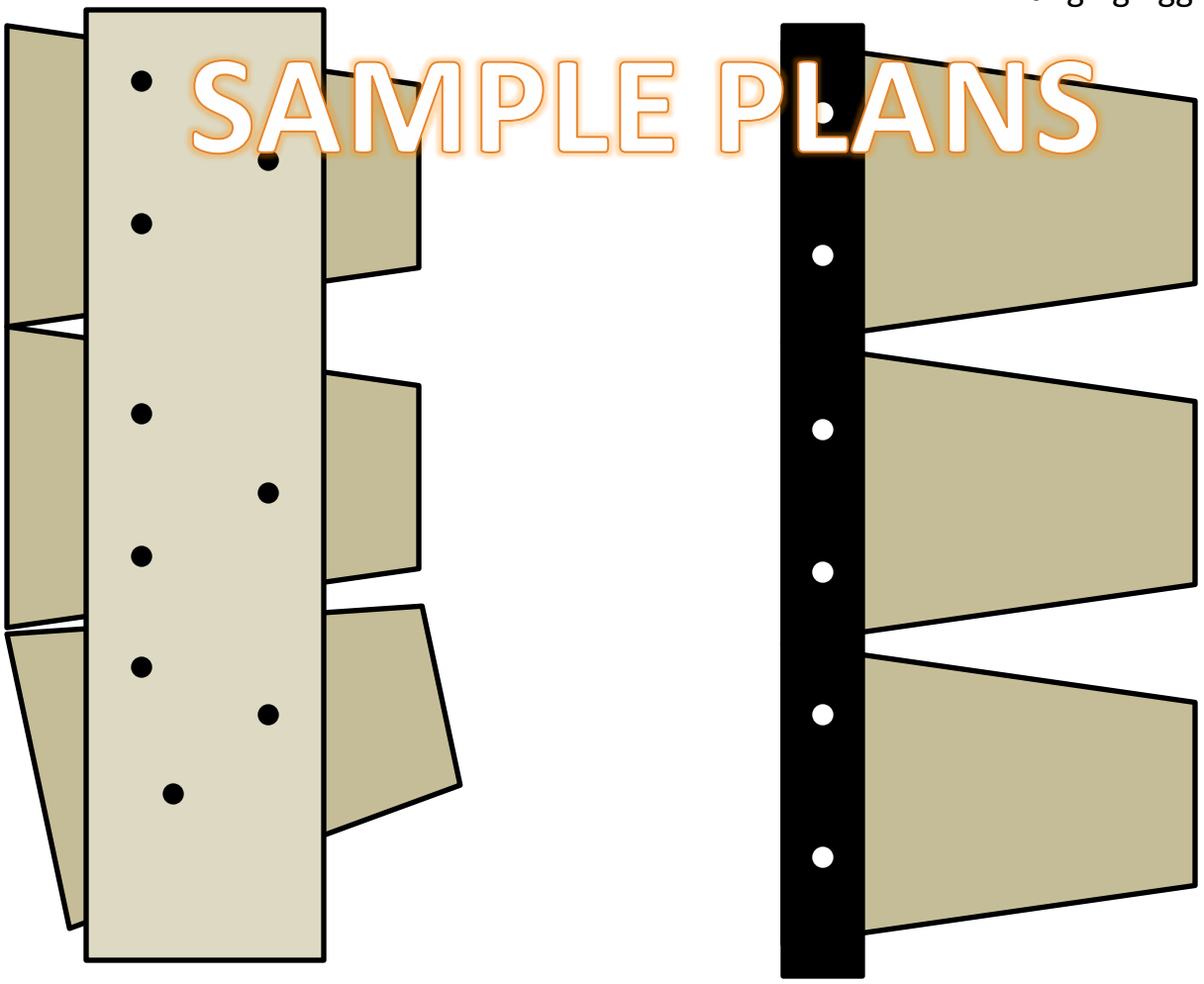
Note: This was difficult to get the boxes to align as the eye bolts did not hold the cabinets in perfect position. However, cabinets were easy to mount by simply setting a cabinet up and hanging on the eye bolts – starting from the bottom. Adjustable cabinet spacers were not very effective as the cabinets were very limited in the position that they could be mounted using this frame.

Rear Eye bolt

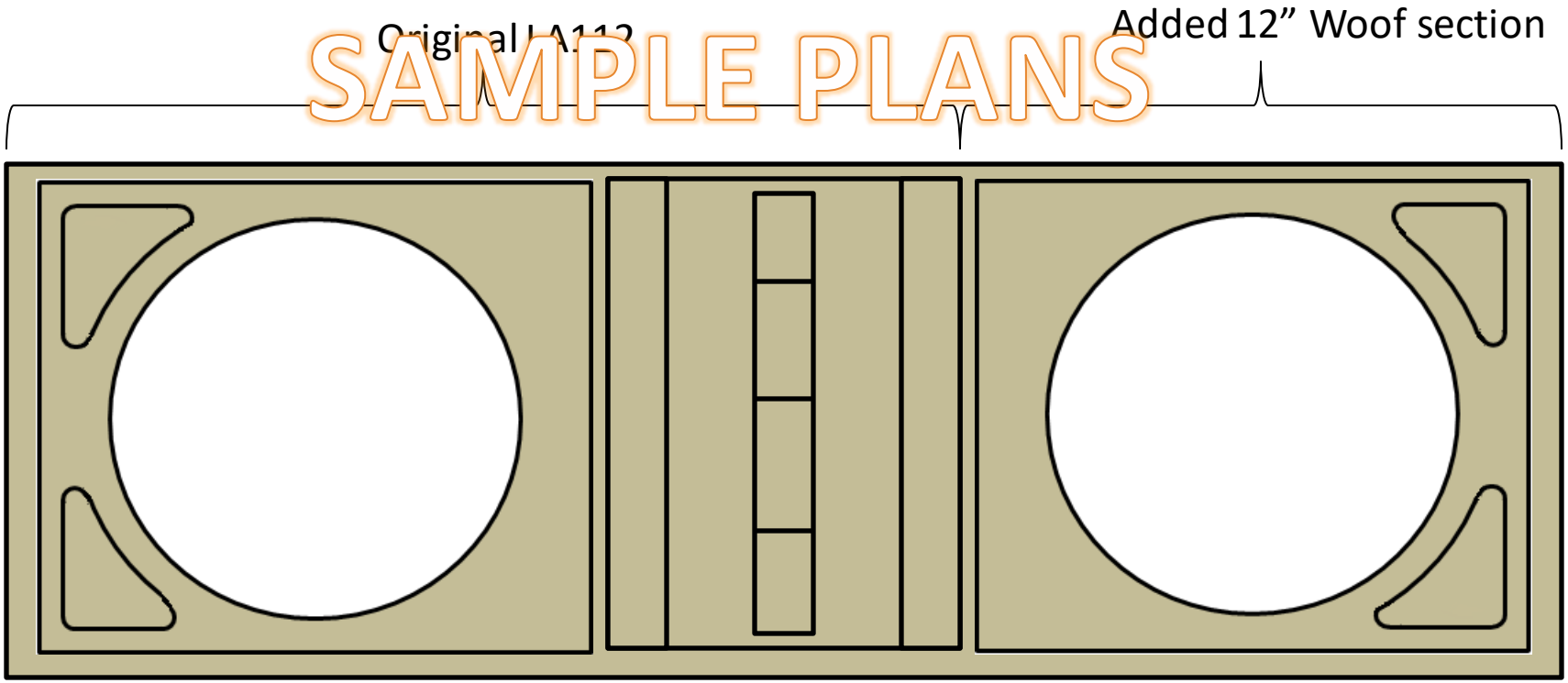
Permanent mount frame

- Other Ideas for installations

3” angle iron with bolts in the front cabinet lip using the same holes as the hanging rigging.



Dual 12”



SAMPLE PLANS

Enjoy – make your own sound and sawdust!