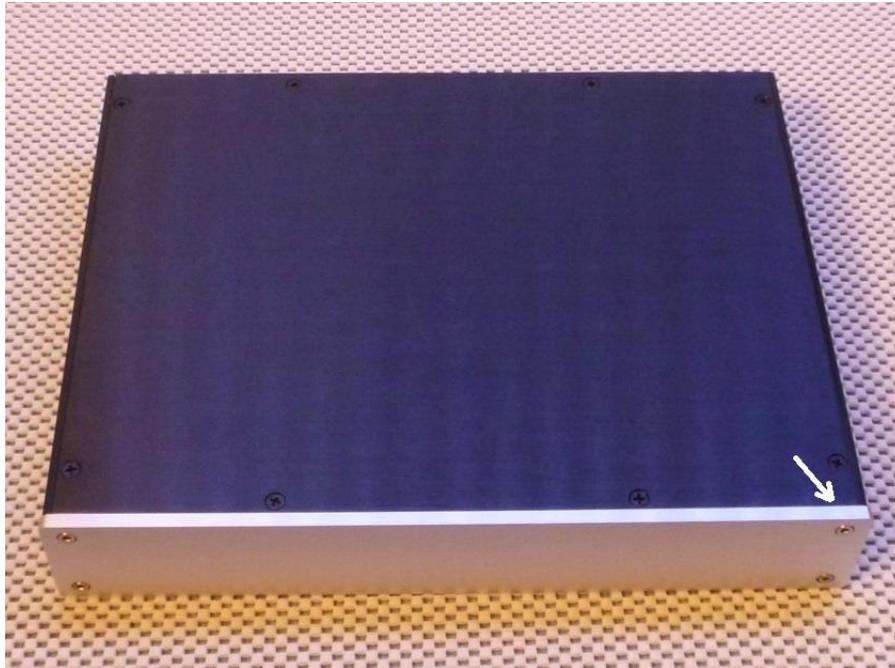


N-F-P Line Stage, Chassis Prep for Machining

1. Assemble the case installing all screws to ensure proper fit, see picture below.
2. Select which panel is to be the **top** of the cabinet.

Note: The **top** and **bottom** of the cabinet I chose will only fit on the front, back and sides one way. I.E. Front and back panels cannot be rotated 180° so it is important to mark them for machining the right way around.



3. With the front of the cabinet facing you draw an arrow on the right front corner of the **top** with a white china marker as shown in the picture above.

Oops, I've found that china marker can be really difficult to remove from the textured top of the cabinet. Place a sticky label or a piece of tape on the top instead and draw an arrow on it.

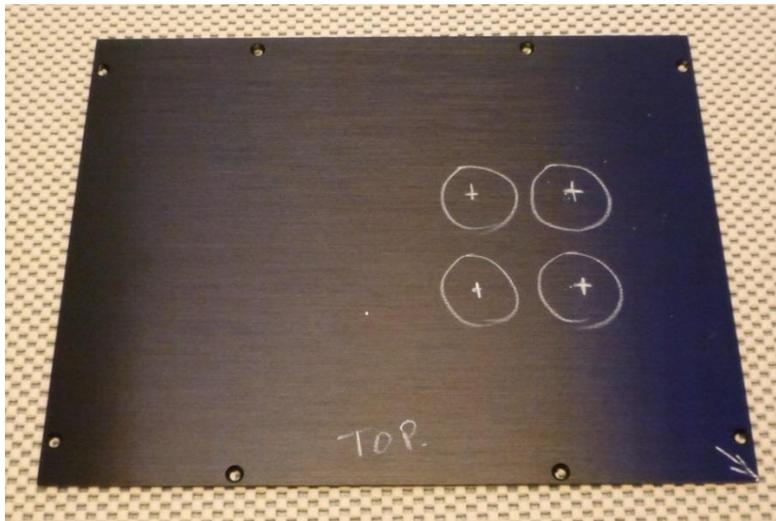
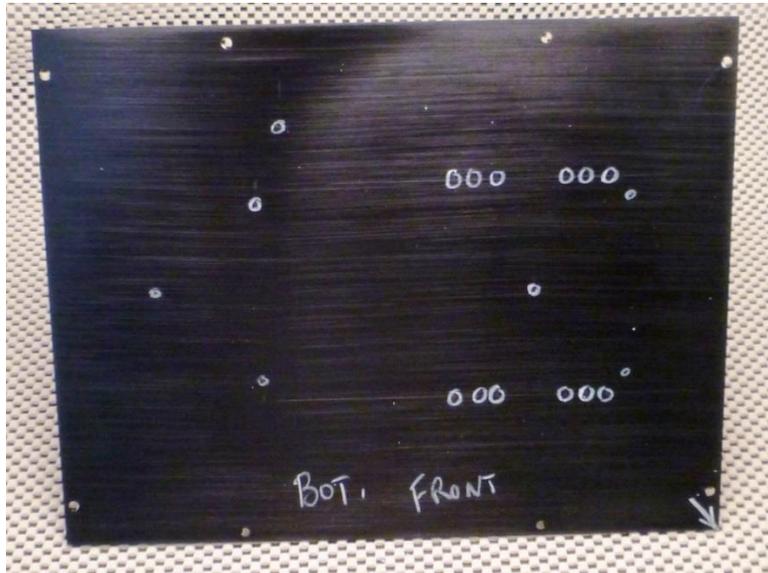
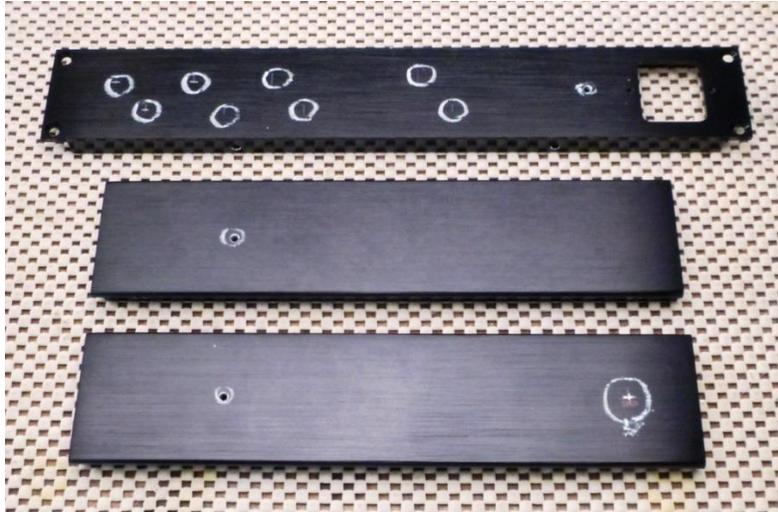
4. Remove the screws securing the **top**, remove the **top** and set aside.

Note: The **sides** of the cabinet I chose will only fit to the **front** and **back** one way.

5. Before dis-assembling the cabinet use a white china marker to identify the front right corner of the **bottom**, the left and right **sides** (including front and back designation) and using a Sharpie marker put an arrow facing up on the inside of the **front** panel. See picture below.
6. As well identify the top on the inside, see picture below.



7. Remove the rest of the screws from the cabinet.
8. Print out the drawings of the parts from the WoS website.
9. Thoroughly familiarise yourself with the parts and their drawings. If you are not 100% certain of the orientation of a drawing to its part put the chassis together again. Some of the drawings are the outside view of the part and some are the inside.
10. If you wish do a rough layout on the parts from the machining drawing using a china marker for the black parts and black Sharpie for the front panel. Note my earlier **oops** regarding the china marker on exterior surfaces.



11. Take your pieces of metal and the drawings to a tool and die shop as mentioned at the first of this installment. If you tell them you need it right away it will cost more. If you tell them any time will do it might take a while. The best thing is to ask for it in 2 to 3 weeks if possible. Tell them you will pay in cash.

Money Saving Tip

You might save \$20 or so from your machining costs by doing the work below if you wish.

Here's a tip to save a little if you want to do some of your own case work. Note: I don't recommend hand drilling holes over 6mm or ¼" in thin metal sheets. Leave larger holes to the professionals. This work can be done with a rechargeable electric drill (2 speed preferred) if you are careful.

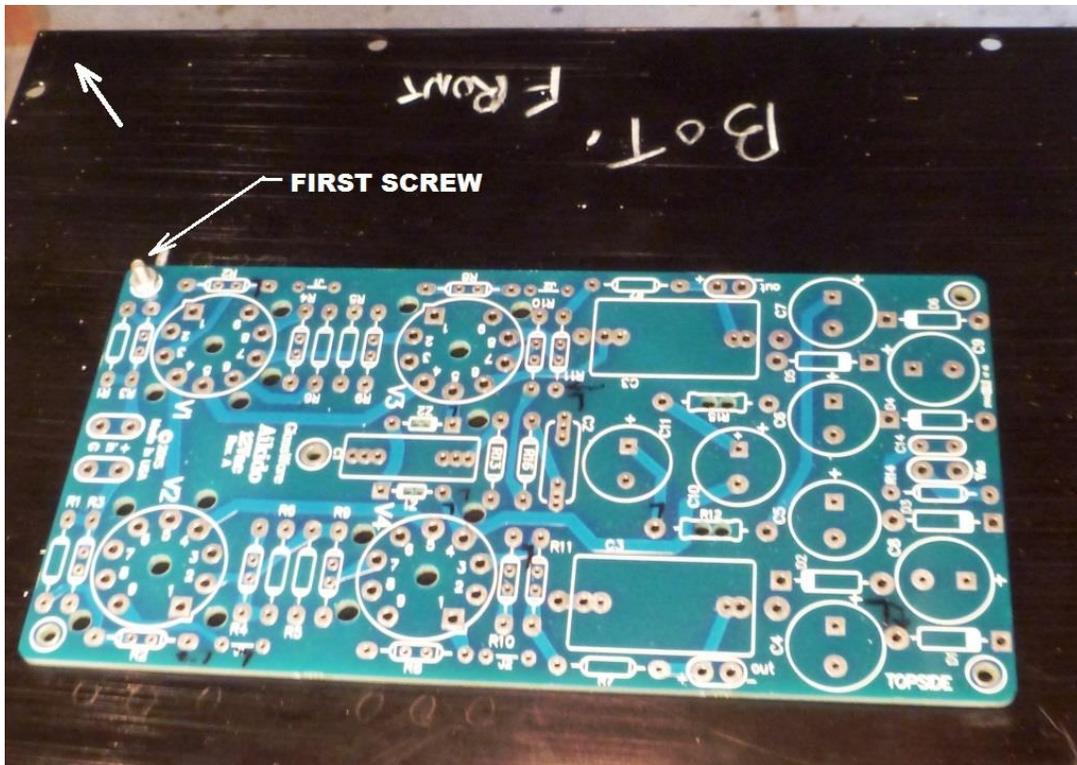
Measure and mark your hole positions then centre punch the spot. With your drill on low speed use a center drill to start where you will make the finished hole. If you don't use a centre drill the drill bit for the finished hole will wander and you'll hate yourself. After you drill the hole use a countersink and touching the panel lightly with your drill on low speed, de-burr the hole. A drop or two of automatic transmission fluid on drill bits and countersinks will make for easier cutting and a smoother finish when machining aluminum.

Busy Bee Tools is a decent source for hobbyist cutting tools. An inexpensive set of transfer punches comes in handy for transferring hole positions from one part to another, I.E. transferring hole positions from the circuit board to the chassis bottom.

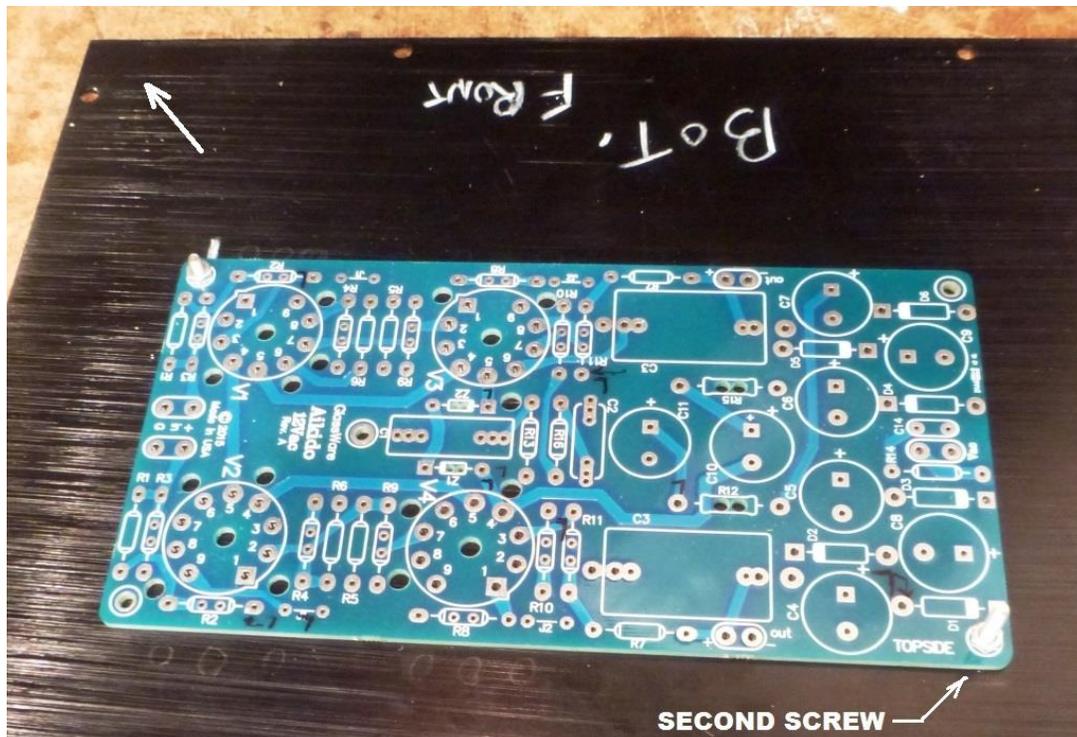
Don't use transfer punches as a centre punch. Just tap them lightly to make a small mark then enlarge the mark with a regular center punch.

Before assembling any components to the circuit board use it to mark the position of the holes used to attach it to the case.

1. Measure carefully the position of the corner hole closest to the arrow. This position should be within 0.5mm as the board position is important. You will want the tubes protruding through the top to line up with the holes in the top reasonably well.
2. Carefully centre punch where the hole will go, centre drill the spot then drill a hole 0.1mm larger than the screw size you are using. (I used a 3 mm screw)
3. Attach the board to the bottom with a screw and nut.



4. Ensure the board is parallel to the edge of the metal plate with a ruler or calipers.
5. Mark the mounting hole in the opposite corner with a small diameter centre punch or transfer punch.
6. Remove the board.
7. Enlarge the centre punch mark.
8. Centre drill the punch mark then drill the second hole.
9. Assemble the board to the bottom with two screws and nuts securing it in place.



10. Mark the positions of the 3 remaining screws and remove the board.
11. Drill the remaining holes 0.3 to 0.4 mm larger than the screw diameter.
12. Re-drill the first two holes to the larger diameter as well.
13. The positions of the other holes in the bottom are not as critical and can be measured out with a ruler then drilled.
14. The two small holes in the side panels (one in each) can be measured with a ruler and drilled as well.
15. Unless you have access to a milling machine I strongly recommend that you have a tool maker perform all of the remaining work on the panels.