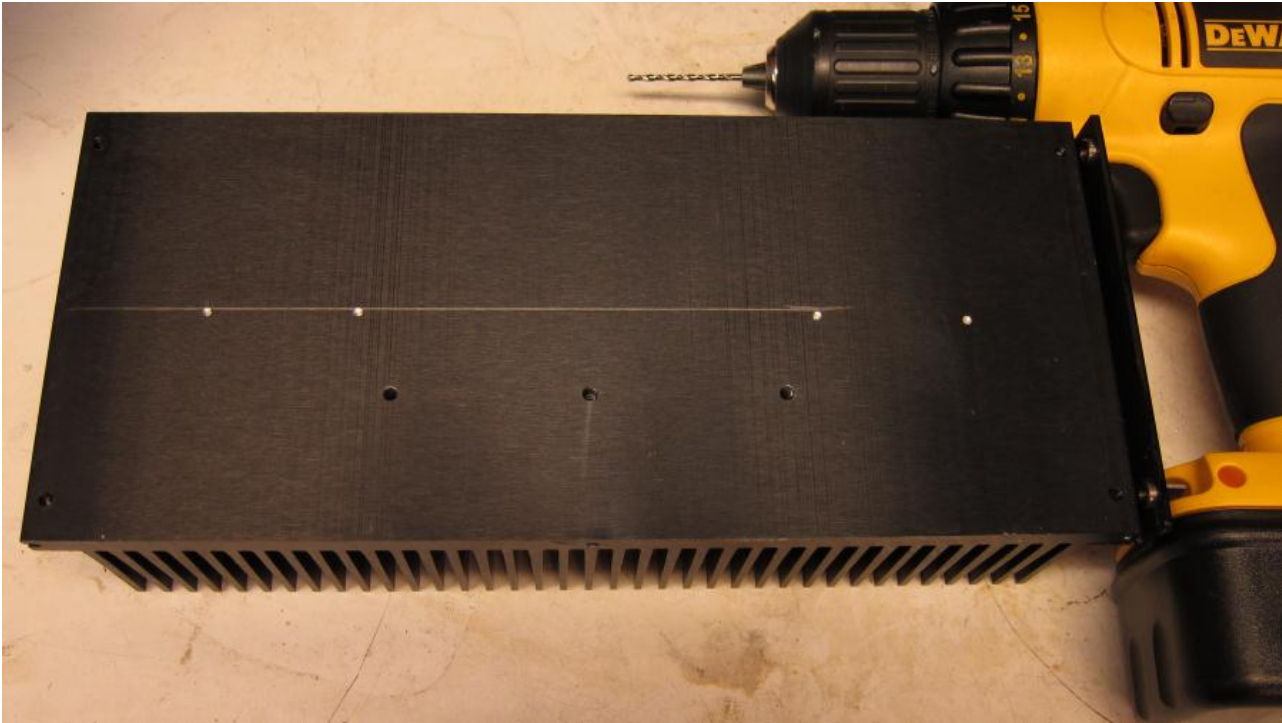


Preparing Heat Sinks

We decided that we would drill and tap the heat sinks and use 4-40 machine screws to hold the MOSFETs to the sink.

Below is a photo of one of the sinks with a line drawn midposition. You can see four superficial drillings to mark the sites of the four holes to be drilled and tapped. (Ignore the larger three holes on the bottom which came with the sink.) For those of you who are upset we are drilling in the midline of the sink, just be patient.



As noted previously, the holes in the MOSFETs are so small as to only allow a 4-40 machine screw, which also was the smallest tap we had from the hardware store. After drilling the holes with the recommended sized bit, the tap broke off in the first hole we attempted to tap. Hard steel tap. Lots of oil. Turning by hand very slowly so we (thought) we could feel too much torque. Backing out frequently to remove aluminum fragments. We could not get the broken tap out unless we drilled a major hole in the sink. A good lesson on trying to use a tiny tap in thick aluminum, despite the correct size drill bit and use of tapping oil. Other threads have recommended using two-flute taps or self-tapping screws, but we found those recommendations after doing the damage.

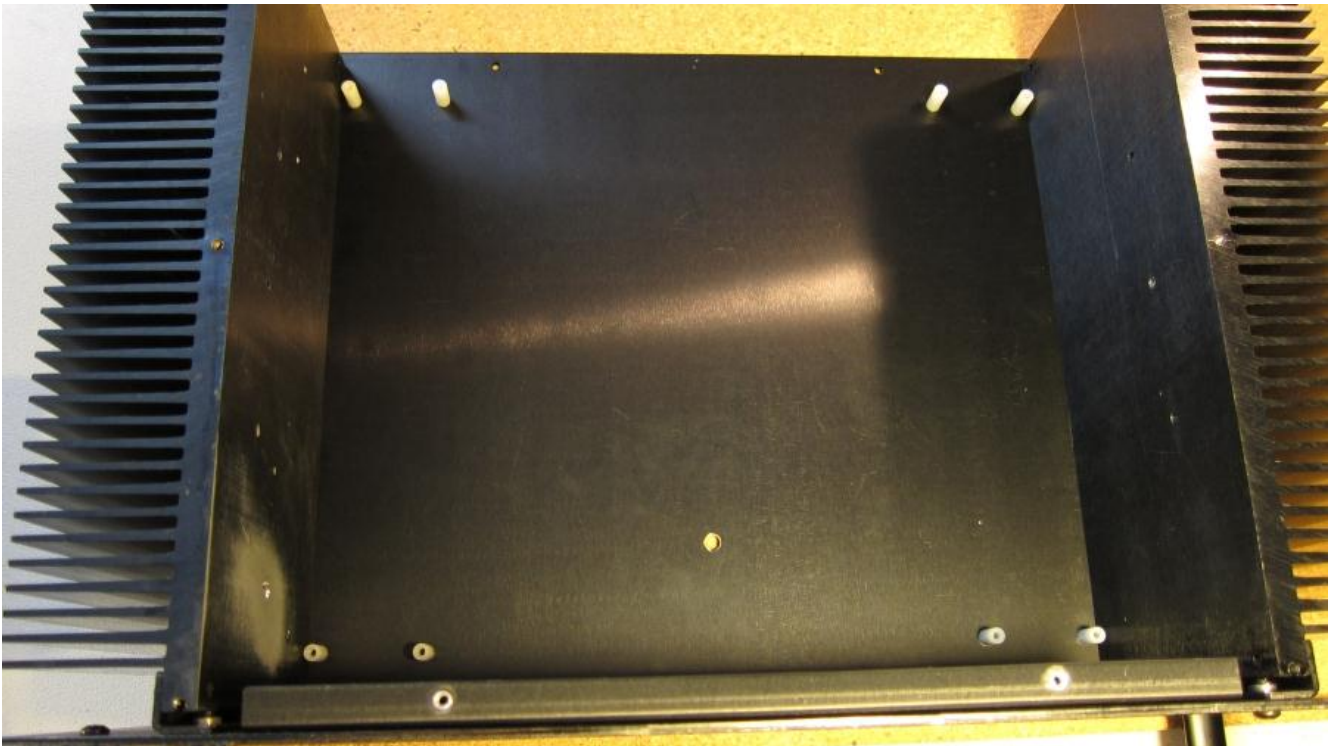
So, we drilled the broken tap down just below the surface and sanded down the surrounding sink, knowing that no one was going to see the inside anyway. We used progressively finer grades of wet sandpaper to make the sink's surface as smooth as possible below the hole. My son had earlier pointed out to me that it is best to mount the MOSFETs lower on the sink, anyway, since the hot air in the amp rises to the top, and you want the heat sink to also take the heat out of the air in the amp. In fact, we were careful to do this when building the original F5.

Thus, we changed strategy. We decided to mount the amp boards on nylon offsets on the bottom of the case and then create an aluminum bar to use as a clamp to hold the MOSFETs to the heat sink. We could then use larger taps and machine screws to hold the aluminum bar in place. We were using offsets for the PS board anyway.



The photo, above, is a close-up of a 1/2 inch double-threaded nylon offset along with the 6-32 machine screw that were used to hold it to the bottom of the case. Another 6-32 screw went through the circuit board and into the top of the tap. Got these at ACE Hardware on a quick trip. We used them on the F5 and they were fine.

Below is the bottom of the case with the offsets mounted for the amp boards.

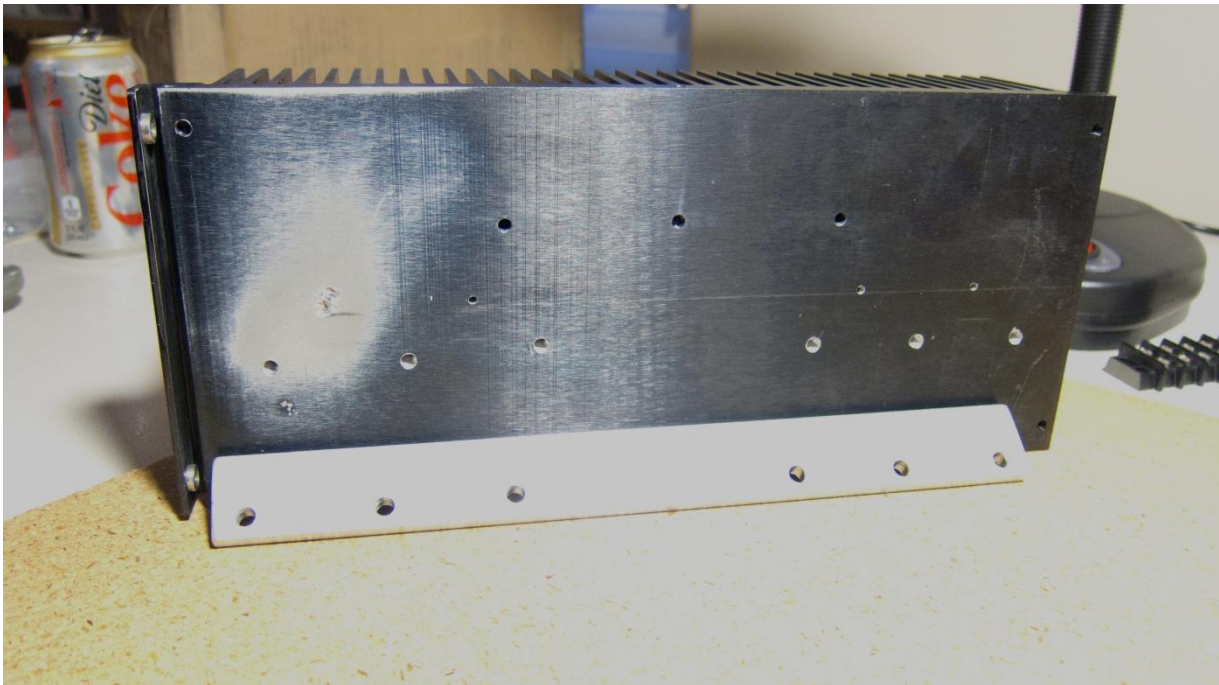


The large hole in front-center portion of the case bottom will be to hold the transformer to the case.

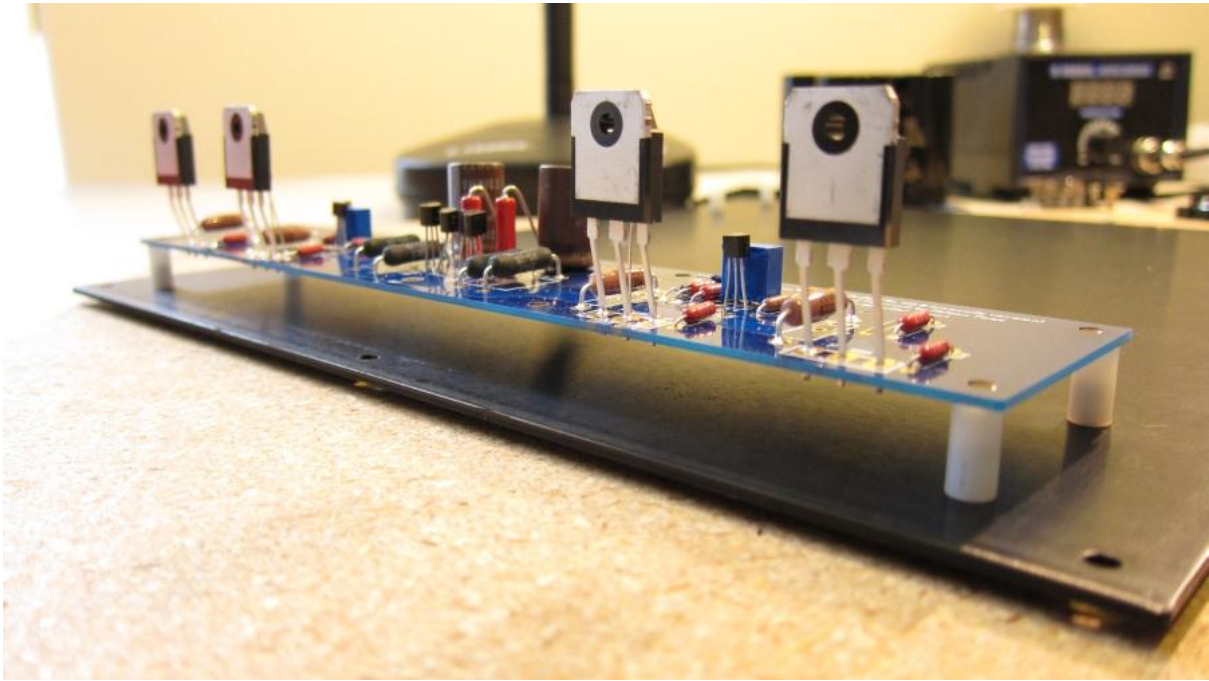
We laid out new holes to be tapped down lower on the sink and drilled them with a #25 bit to be tapped for 10-32 machine screw threads. Below, I am tapping the sink after holes have been drilled. Of course, the 10-32 tap is much larger than the 4-40, and did the job quite easily. I always prefer to tap by hand than with a drill.



The photo, below, is of the drilled and tapped heat sink (again, the top three holes came in the sink and are not of use to us). I picked up some aluminum bar (1 inch X 1/4 inch) at the hardware store and cut a 10 inch piece, the same length as the board. The bar has been drilled to allow 10-32 screws to pass through it and into the threaded holes in the sink. Sorry for the lousy exposure.

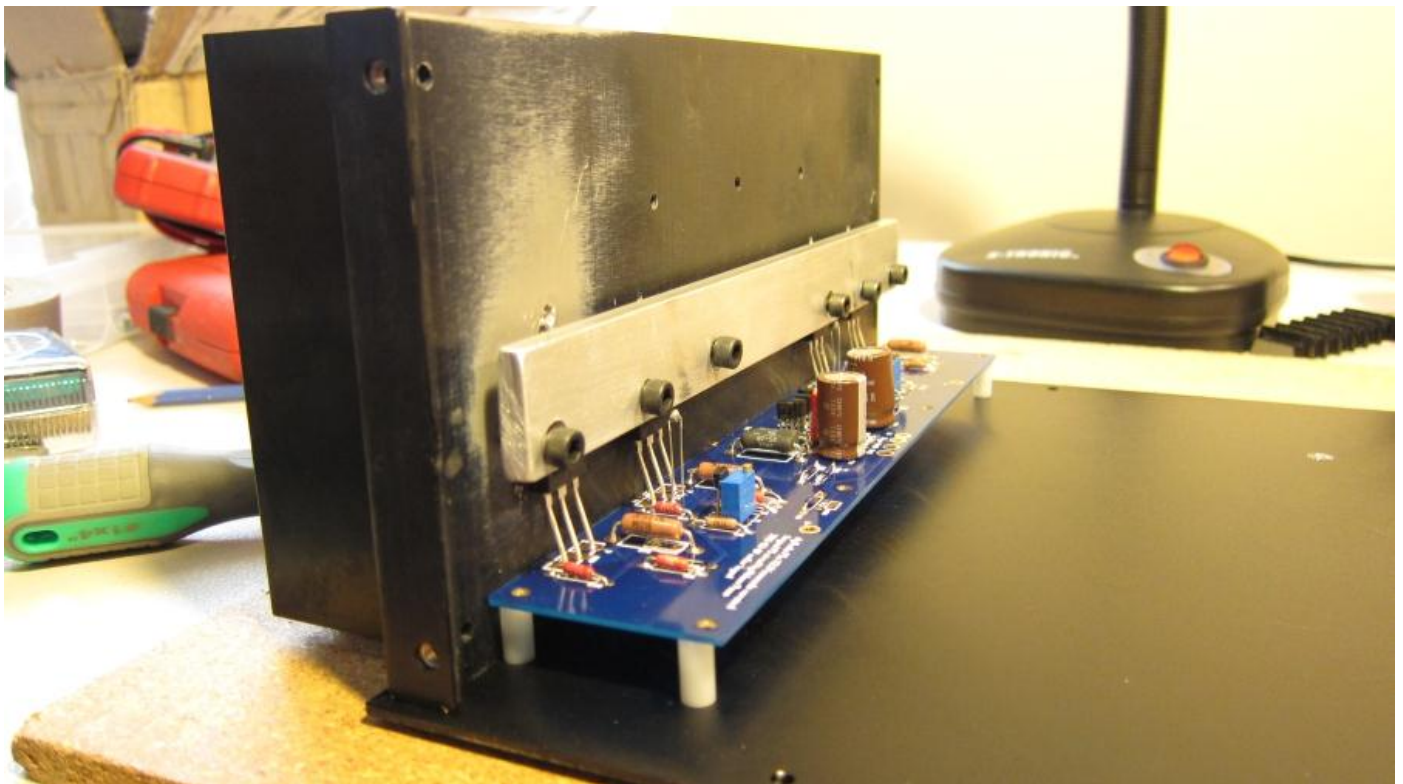


In the photo, above, you can see on the left where the original 4-40 tap had broken off and where we sanded down the sink after some minor drilling down of the tap. Fortunately, with lower mounting of the MOSFETs, the MOSFET case closest to this hole will be below any area that was disrupted.

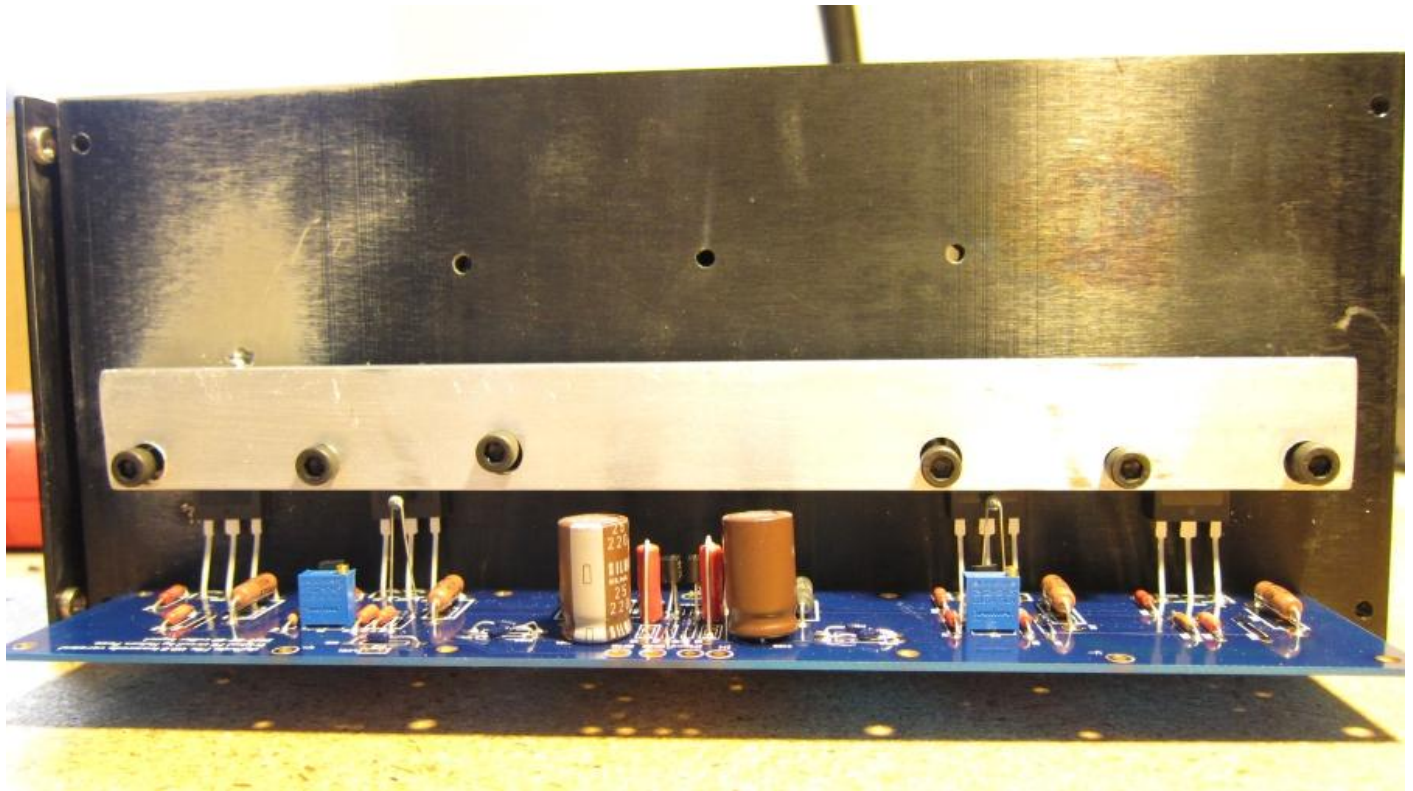


Above is an amp board sitting on the nylon offsets, but without screws holding it down, just to demonstrate how the setup works. Now the board will be supported below, rather than hanging from MOSFETs.

And for the photo below, we simply placed the board on the offsets and loosely clamped the MOSFETS to a heat sink to give you an idea as how this will fit together.



Here's another view, below, but without the bottom of the case.



You can see that we arranged it so there would be a 10-32 screw on each side of a MOSFET, so to provide even pressure downward. We over-drilled the holes in the aluminum bar so we could slide the bar around for adjustments, as we need to make sure we remain above those thermistors on the center two MOSFETs. We'll use generously-sized washers on the machine screws through the bar during final construction.

Continued in part 6.