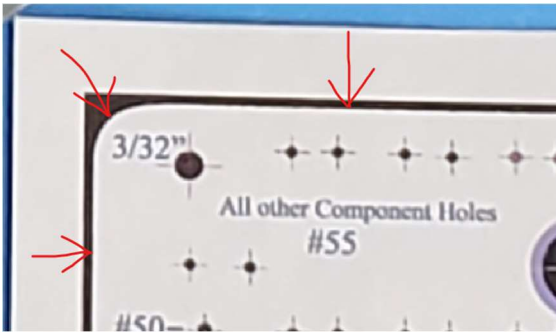


B9 Power Pack Faux Board Assembly Instructions

By Craig Reinbrecht 4/6/2023

Part 1: Building the Board

1. Peel and stick the Power Pack Drilling Template onto the piece of PCB material (G10 FR-4 Phenolic Glass Epoxy Laminate). Tip: Align two edges of the board on the template close to the edges of the PCB. This will reduce the amount of cutting required.
2. Cutout the Board shape based on the template. The actual finished board is white and the black outline should be cut away. Your first cut should leave some black, then sand/file to the finished shape.



I recommend cutting with a hacksaw while holding the piece firmly in a vise if possible.

Warning: The G10 FR-4 Phenolic Glass Epoxy Laminate board is very much like fiberglass, and take precautions to avoid breathing the dust. Use a good mask, and sand outside if possible.

3. With the board outer dimensions trimmed, now drill the holes using the drill bit sizes specified. Take great care to center the holes as precisely as possible for the best finished results. I highly recommend using a drill press, however if that is not possible a hand drill can be used, but take care to keep the drill as perpendicular as possible while drilling.

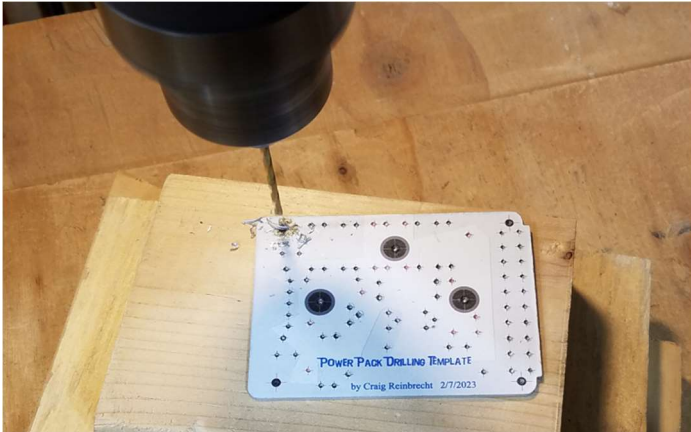
Note1: The red holes are optional. They are in places were a component will be missing, However for the most authentic look, drill these out also and use a bit of excess lead from other components, so that the lead sticks through on the back, and can be cutoff on the front. (More on this in Part 2 below)

Note2: If you are unfamiliar with Numbered Drill Bits (ie. #53) I highly recommend getting a set. The sizes specified will work the best, however this can still be done with standard fractional sizes. Here is a cross reference to fractional sizes to use instead:

#50 – 5/64"

#53 – 1/16"

#55 – 3/64"



4. Now use the board with drilled holes as a jig to drill the four $3/32$ " corner holes in the photos.

Note: Two photos of the front and back have been provided. One shows the hole locations and one does not. It is your choice as to which one to use, but I would recommend using the one with marked holes for ease of assembly. All the markings will be covered by components or the "faux solder".

Start with the "front of board" picture. Lay the photo on a flat piece of scrap wood. Then lay the board (with template still attached, template side up) over the photo, lining up the edges of the board to the board edges on the photo very carefully. Now drill the $3/32$ " holes in the four corners through the photo, with the board as your jig. This is how you will align the photo to the board when you glue it.

Next, lay the "back of board" photo on the scrap wood. Turn the board over (Template label side down) then lay the board over the photo, lining up the edges of the board to the board edges on the photo very carefully. Now drill the $3/32$ " holes in the four corners through the photo, with the board as your jig.

5. Now peel off the stick-on template from the board. Make sure it is completely removed. Use "Goo-Gone" if needed. Then use a Sharpie to mark "F" on the front side of the board so you don't lose track of the front and back of the board now that the label has been removed.
6. Trim the photos close to the finished size with scissors, but leave a little of the black around the edges. Final trimming will be done after the photos have been glued to the board.
7. Now you will need to make a simple alignment jig. This can be done with the flat piece of scrap wood you used earlier.

Place the board (front side up) on the scrap wood and tap a nail that fits close to the $3/32$ " hole (but not tight! – a **6d finish nail** is perfect) through the hole into the board into the wood. You must be very careful that your nails are perpendicular and not at an angle. Tip: If you have a drill

press, drill a starter pilot hole through the board hole into the wood. This will insure it is perpendicular.

Note: You only need two nails in opposite corners for alignment. You can do all four, but it is not necessary.

Now cutoff the head of the nail, leaving about 1/2". Lift the board off the jig. It should come off easily. If not, check the nails are very perpendicular with a square and "persuade" them into alignment if necessary. Your jig is now done.



8. In this step we will glue the photos to the board. I recommend "Elmer's Multi-Purpose Spray Adhesive" widely available at Walmart or Michael's or any big box store. It is inexpensive and works great for this type of bond.



Place the board, front side up, and the "front of board" photo, face down on some newspaper. Spray a light coat of the adhesive on the board and photo, making sure to get complete coverage. It doesn't take much.

After about 15 seconds, handling it by its edges, put the board (Front side up) onto the alignment jig. Immediately after, carefully pickup the photo, turn it over (take care not to get

your fingers sticky and onto the face of the photo). Ensure the correct orientation of the photo to the board, then slide the photo onto the jig and onto the board. Press down firmly to insure good adhesion.

Now for the back of the board. Pull the board off the jig, turn it over, and place it on fresh newspaper (throw out the old stuff!). The back of the board should be up. Also place the “Back of board” photo, face down onto the newspaper. Spray a light coat of the adhesive on the board and photo.

After about 15 seconds, put the “back side board” photo (photo side down) onto the alignment jig. Immediately after, carefully pick up the board, turn it over and ensure the correct orientation of the photo and the board (Tip: check this before spraying the adhesive and have the correct orientation planned). Slide the board onto the jig and onto the photo. Press down firmly to insure good adhesion.

Lift the board with adhered photos off the jig. Lay it on a flat surface and put some heavy books on top for at least an hour. Overnight would be ideal, but not necessary.

9. Once the adhesive has had time to cure, use an Exacto knife or razor blade to trim the edges of the photo to the board. You can then use some very fine sandpaper to get the edges nice and flush.
10. Next, we need to prepare the holes in the board. If you have REAL connectors, you will need to drill or poke out the holes for the connector pins (20 for the large connector, and 7 for the smaller connector). If you have resin cast or 3D printed connectors, this would not be necessary.

The 3 large holes for the mini plugs, can be cutout using an Exacto knife (the holes should already be cut in the board).

Use a nail to poke out all the component holes on both sides of the board. The hole “dots” can be used as a guide, and if the alignment was done carefully, should line up very well with the holes in the board.

11. The final step in the board is to use a brown stain pen or a brown Sharpie on the white exposed edge of the photo. Take care not to get it on the face of the photo. (Tip: have a paper towel in hand, and immediately wipe the photo where the stain bleeds over. If you wait, even a few seconds, the stain or Sharpie will become permanent.) This should dress up the edge of the board, and look quite authentic.



Part 2: Gluing the Components and “Faux Solder”

12. Next, we will glue the components on the board...

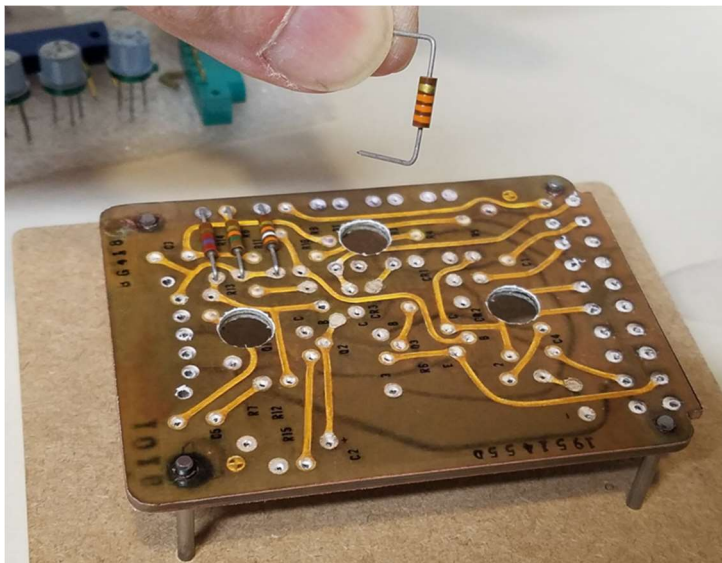
You will need 30-min. clear Epoxy. (It is not as common as 5-min. fast set Epoxy, but trust me you do not want to use that). I could not find this at Lowes so check around. Amazon may be your best bet.

13. My general strategy with adding the components is to add the shortest ones first and work your way up to the tallest which will be the connectors. (1. Resistors, 2. Diodes, 3. square resistors, 4. three transistors, 5. Trim pot, 6. Large Capacitor, 7. Small connector, 8. Large connector)

Note: The board and holes for the blue trim pot are set up for the 1K original version. Different value trim pots will have different pin configuration that may not match up to any of the holes in the board. In this case, just cut off the lead pins flush, and epoxy the trim pot to the board being careful to place it in the correct spot. You can use the cutoff leads on the back side of the board in those holes to make it look authentic.

14. For this step, I you should elevate the board to make it easy to add the components with leads sticking through. Carefully measure and bend the leads for all the resistors, the diodes and large capacitor. Cutoff the leads so you have about 1/4" to go through the board. Before you mix your epoxy, stick all the resistors and diodes in the board in the proper position (refer to photo references). Adjust any that need it. Also, add lead wire to the missing component spots.

15. Mix your epoxy. Pull out the first resistor, and using a toothpick, put just a tiny dab of epoxy on the back side of the resistor. Install it back in place, and push it down flat against the board. The idea is to have enough epoxy so that you cannot really see it, but enough to hold down the component.



Do this with each component in the order suggested above. You may want to save the large connector for last and mix up a separate batch of epoxy for that, letting the others components cure somewhat. The reason is that the large connector gets screwed in from the bottom which you should do when adding epoxy so it is aligned properly. And you don't want to lift the board and turn it over before the other components have set.

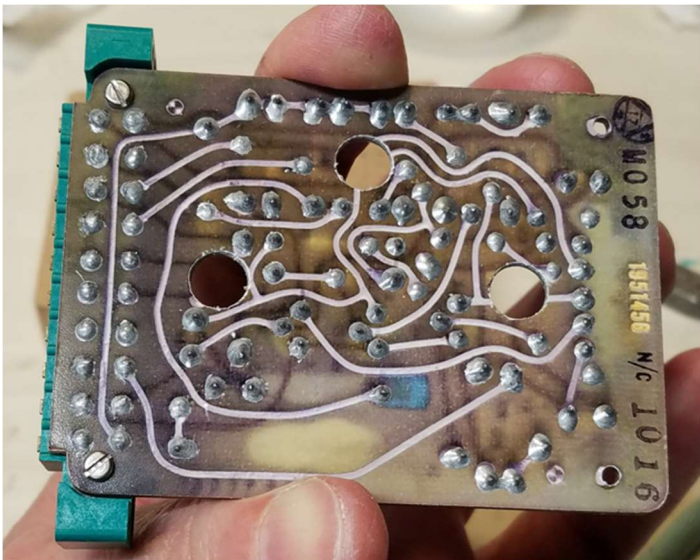
Let all the epoxy cure overnight.

16. With all the components and connectors glued on, its time to add the faux solder. Do it on the back of the board first. Begin by clipping off all the leads on the back side so they all protrude no more than about 1/16".

For the faux solder, ideally use an aluminum epoxy that already has the silver solder color. Again a 30-min. set epoxy is crucial. You can also use your clear epoxy and mix in some silver acrylic paint. (Yes, this works!)

You will apply the epoxy "solder" using a toothpick to the solder pads with leads sticking through. This is tedious, so just take your time. And there is a learning curve. I suggest mixing up a test batch of your epoxy, and test the process on your extra "back of board" photo. The epoxy wants to stick to the toothpick and you must spin it and learn how to detach without slopping it on the board where you don't want it. Epoxy is difficult to clean up, so get the hang of this first, then start on the real board.

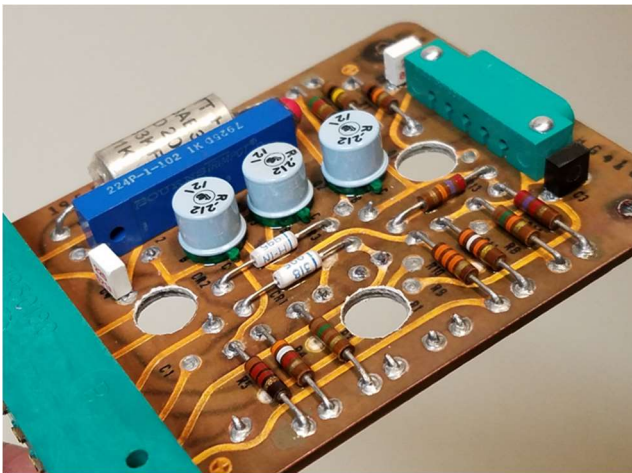
Take your time and be careful. But understand that the epoxy will get thicker as you go, and at some point you should just stop, and mix up a new batch. It may take 4 to 6 batches of epoxy to get all the spots done on the back of the board. Let it cure undisturbed overnight.



With care this can look really good!

17. Now for the front side of the board... There should be a bit of “solder” on the solder pad around each lead on the front side. However, for the front, I recommend just using silver acrylic paint. It is a bit thinner, not as “sticky” as epoxy, and easier to control with the toothpick around the leads. Since the components are epoxied on the front, and leads epoxied to the back, epoxy is not needed for this. The other advantage is that the acrylic paint is easier to clean up. If you do get some on a spot not wanted, you can clean it with a slightly damp paper towel. Just remember you are working on a photo, so too much water and you will have other problems...

Since the acrylic paint is water based and thinner than the epoxy, it shrinks a bit as it dries, I found I needed 3 coats on most spots to get the correct solder look.



When done, let it all cure overnight.

18. One last step... you need to apply a Clear Gloss finish to the whole board. The original Librascope card had a clear epoxy or lacquer over the entire board and components, front and back. The only thing that does not get clear gloss is the large connector.

Use painters masking tape to mask off the large connector, then hang the board so you can spray it. I used Krylon ColorMaxx Gloss Crystal Clear found at Lowes. Use multiple thin coats. This goes on heavy and will run if not careful.



The clear gloss, besides being authentic has the added benefit of protecting the photos, and the photo edges.

Let this cure overnight, and you are done! Look at your work... and congratulate yourself! You earned a beer for this! 😊