Labeling Homebrew Projects
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Introduction

I do a lot of homebrewing and have throughout my ham radio “career”. One of the things I always take pride in is that most of my projects end up looking as professional as possible.

There are two parts to making that happen; one is using nice enclosures and doing careful metalwork and the other is properly labeling the controls and other items on the enclosure. Here I will present a couple of techniques for labeling things that have worked well for me.

There are basically two approaches that I have used. One method is to use water-slide decals and the other is to use adhesive backed clear labels. I’ll talk about both here.

Since first publishing this, Glenn (VK3PE) suggested a better way of doing the mechanical drawings, so I’ve updated the document to explain that approach (hint: it’s better than doing it by hand).

Designing the Label

Regardless of which medium you choose to use for your labels, the first step is to create the label on your computer. This is actually the more complicated part of the process!

Both the water-slide decals and adhesive backed labels are available in clear and various colors. I’ve personally only used the clear ones.

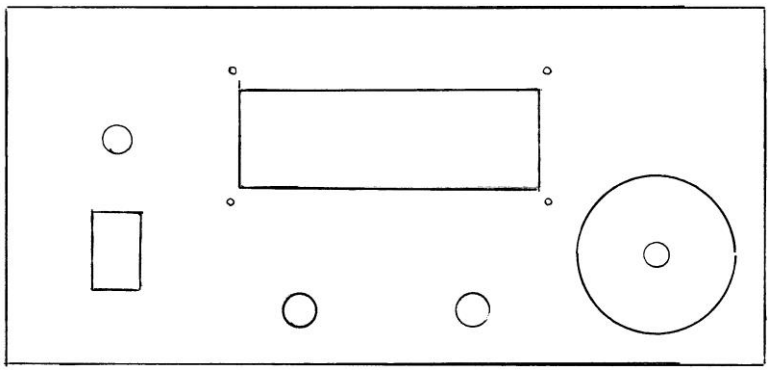
Step 1 – Mechanical Drawing

Whenever possible, I always use a single label for the entire panel.

The first thing one must do is to make an accurate drawing of the panel that you wish to label. This drawing can, of course, also be used to drill and cut the necessary holes in the panel you’re working on. I use this on ruled velum drawing paper available at all the office stores.

It’s best to do all the drilling and cutting first so you can test the almost finished label against the real panel. Two tools that are necessary for doing nice metal work are a nibbler (I use an Adel) and a step drill (or two).

Here's the initial drawing for the front panel of my homebrew smart controller for the old AR-22 rotator (not actual size):



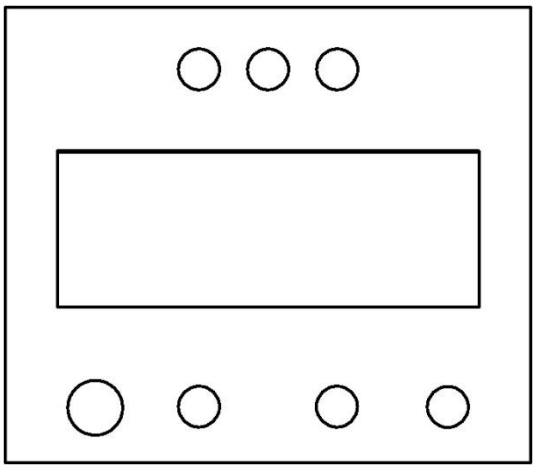
Step 1 – Mechanical Drawing (A Better Method)

After I published the initial version of this document, Glenn (VK3PE) who I work with on a lot of projects suggested a better way of doing the mechanical drawing which is to use the CAD tool I use for designing printed circuit boards.

The program I use is KiCad (a freebie) which doesn't have all of the capabilities of some of the higher-end programs such as Protel (now called Altium Designer), which Glenn uses. I assume any similar tool could be used just as easily.

The main advantages of using a CAD tool over a hand-drawn and scanned drawing is that the lines are all perfectly horizontal and vertical which is not always the case after you scan something. Also the measurements are much more precise.

Here’s the basic drawing for the front panel of my frequency counter/frequency standard project which is shown near the end of the document done using KiCad:



You can see it’s a bit neater than the hand-drawn layout for the rotator controller above! It’s also much easier to accurately position things to use the drawing to drill and cut the panel.

Step 2 – Scan and Process the Drawing

If you’re working from a hand-drawn drawing, scan the drawing into your computer and using any photo processing software you have crop the picture as close to the outline as possible. I use PhotoShop. That program allows you to rotate the image by very small amounts so that the top and bottom edges are precisely horizontal. Doing so makes life a whole lot easier!

If you made the drawing using KiCad (or some other CAD program), use the “Print-Preview” option to put an “Accurate scale 1” black and white image on the screen then use the “Shift + Print Screen” keys on your keyboard to copy the image to the clipboard. Then paste the image into your photo processing tool and crop it as described above before saving.

Once you have the drawing aligned and cropped, create a Word document and insert the picture. Note that based on how the margins are set in the Word document, it may automatically scale the drawing. If this happens, you can widen the margins and scale the drawing by dragging one of the corners. You can also change the page setting to landscape mode to give you more room.

Adjust it so that the dimensions are correct for your panel using the rulers at the top and left side of the window.

When you think you have it right, print it on plain paper and see how it lines up on the actual panel. Once it's the right size, save the file. It's also not a bad idea to make a backup copy of it just in case!

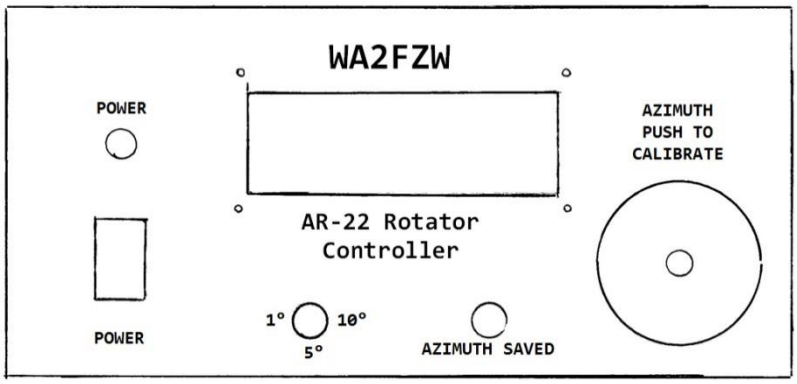
If it's not exactly correct, drag one corner of the drawing to slightly resize it and try again.

Step 3 – Add Text to the Drawing

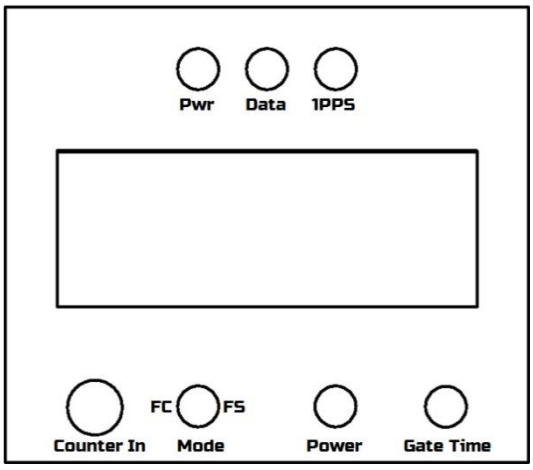
Using the Word document, you can now create "Text Boxes" to hold the actual text labels (or other graphics). When you create these, there are a number of options you might choose to use. The text boxes can have borders or not. They can be color filled or not and you can select any font, font size and text color you happen to like.

One option that I used on one project was to fill the entire panel with a color and specify white text. When this label was applied, the writing showed the bare aluminum behind the label.

Here's the front panel for the AR-22 controller with the text included:



And here’s the drawing with the labels for the frequency counter:



You can move the text boxes around very precisely by clicking on the border (instead of the text) and using the arrow keys. They can be dragged roughly into place using the mouse.

Glenn tells me that using Protel (aka Altium) that text can be added to the drawing, but we don’t want to take that approach; I’ll explain why in a moment.

Again, print the file on plain paper and see how it lines up on the actual panel.

Save this file and again it’s not a bad idea to make a backup copy.

Step 4 – Remove the Mechanical Drawing

The final step in preparing the label is to remove the mechanical drawing from the document. Make another copy of the file you created in Step 3; call it something like “Labels Only”.

Here is why you don’t want to add the labels to the drawing produced by the CAD tool. When you delete the drawing, the labels will be deleted also.

Right click on the mechanical drawing and select “Delete”. This should remove the drawing and leave just the text labels like this:

One more time, print it on plain paper and make sure everything lines up with the actual panel. If it does, you’re ready to actually make the label.

Water-Slide Decals

Surprisingly enough, I’ve never managed to find the decal paper in any of the local office stores or craft shops. The one I’ve used is from Amazon. This one is a clear decal; you can also find them with a white background, which is what you have to use should you want white lettering.

Note also that this particular one is designed to be used with an ink-jet printer. If you have a laser printer, you’ll need to shop around for decals that can be printed on a laser printer.

Step 1 – Print the Label

Load a decal sheet into you printer and click on print, but before you actually commit to printing the label, there are a couple of printing options you need to select. How you select those may or may not depend on your particular printer.

First you want to set the paper type to “Photo Paper Glossy” and secondly, set the print quality to “High Quality”. ***DO NOT*** **be tempted to use the print quality setting of “Fine”; that setting puts too much ink on the decal and thus it smears very easily.**

One trick I use on projects like the ones I'm describing here is to print the labels for the front panel, then turn the decal paper around in the printer and print the label for the rear panel. Assuming they fit, this saves a sheet of the expensive decal paper. If you're going to do this, let the first printout dry for a while so it doesn't get smudged when it goes back through the printer.

After printing, I generally let the ink dry for at least 2 or 3 hours.

Step 2 – Seal the Ink

Once the ink has had time to set up, the next thing I do is to apply 3 coats of Krylon (or similar acrylic) clear spray. This not only locks the ink in, but strengthens the decal.

Allow each coat to dry according to the directions on the can and allow the final coat to dry at least overnight.

Step 3 – Prepare the Surface

Before applying the decals, be sure to remove any burrs around the holes. Any irregularities in the surface will make it hard to apply the decal smoothly as it will cause bubbles under the decal.

You want to make sure there is no oil on the metal surface before applying the decal. Just touching the metal with your bare fingers can leave enough oil on the surface to screw things up!

There are two solvents I use for cleaning the surface. The one I usually use is something the local auto parts store will know as "Prep-Sol" (regardless of the brand). This is what body shops use to prepare metal before painting. Generally speaking this will not harm an already painted finish, but if that's what you're working on, test it first.

You can also use MEK, but that's sometimes hard to find and is pretty nasty stuff. Lacquer thinner might also be good, but I've never tried that. These are likely to destroy an already painted surface.

DO NOT use turpentine, naphtha or other paint thinner type solvents; these leave an oily residue.

Use a clean lint-free cloth to clean the surface and wear non-powdered doctor gloves.

Allow the solvent to dry thoroughly before applying the label.

Step 4 – Apply the Label

Trim the decal to slightly larger than the actual panel. Soak the decal in lukewarm water for about a minute then gently slide the decal off the backing paper onto your panel.

You can slide it around to line everything then using a soft clean cloth (I find the paper Scott blue Shop Towels work well), gently remove any air bubbles by working from the center of the panel to the edges.

Once you have the decal lined up on the panel, use a sharp razor blade or X-Acto (Hobby) knife cut “Xs” in the big holes (like the one for the display). This seems to make it easier to smooth the bubbles out of the decal.

Step 5 – Finish Up

After the decal has had several hours to dry thoroughly, trim any excess around the edges and the holes with a razor blade or X-Acto knife. You can also use a fine file, an emery board or fine sandpaper.

I use a fine round file for the circular holes. Smaller holes such as for screws can be punched out from the label side of the panel using the back end of an appropriate sized drill bit or an awl.

Once all is trimmed up, I always give it a final coat of clear Krylon which helps seal the edges of the decal.

Here’s the finished front panel of the AR-22 controller:

If you’re interested, this enclosure is from Circuit Specialists. They have a wide variety of really nice looking enclosures that are reasonable priced.

Adhesive Backed Labels

For my most recent project, I selected a Bud SC-12100 enclosure. Unlike the enclosures I’ve used for other projects which are bare aluminum, this one is powder coated and the water-slide decals did not want to stick to it!

For this project, I got the adhesive backed labels from Onlinelabels.com; the particular one I selected is item number OL176. That particular label is one full 8.5” x 11” sheet; it is available in clear and a variety of colors for both ink-jet and laser printers. They have sheets of smaller labels also, so shop around for what suits your project the best.

The processes of creating and printing the labels using this medium is identical to the processes of creating the water-slide decal labels with one exception; you really only need one coat of clear acrylic on them to seal the ink after printing.

The process of applying the label is a bit different however.

Applying the Adhesive Backed Label

Sorry, but I didn't take any pictures of this process; next time I do one, I'll either take some pictures or perhaps get really ambitious and make a short video.

Whereas when using the water-slide decals, I cut the label slightly larger than the panel, here I used a metal T-square (same one I use for scoring sheet rock) to accurately cut the label to the exact size of the panel.

Next use a razor blade or Xacto knife to get under one corner of the label and gently start to separate the backing paper from the label itself. ***DO NOT*** completely remove the backing paper; just get it started to the point where you can get your fingers on it.

Fold the backing paper back for about a half inch. It's best to do this on the narrower dimension. In other words, for the AR-22 controller panel described above I would have started from one side or the other; not from the top or bottom.

With the edge folded back, align the label with the panel, then press the exposed part of the label onto the panel.

Next slowly peel back the rest of the backing paper smoothing the label onto the panel as you go. You can use your fingers, but a soft cloth is probably better. If you see the alignment is off, you can gently (you don't want to stretch it) lift the label and start over. I'm not sure how many times you can get away with this however!

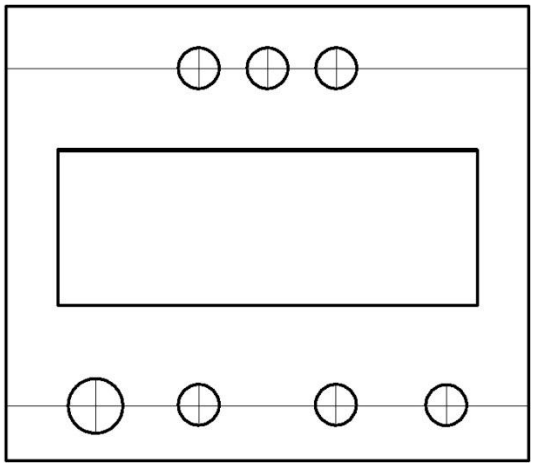
Here’s my finished frequency counter/frequency standard with the adhesive backed label:

Another Reason to Use a CAD Tool

After using KiCad to create the basic mechanical drawing for the front panel of the frequency counter, it dawned on me that by using another layer on the drawing I could add lines to show precisely where to center-punch for the holes to be drilled.

By turning this additional layer on or off when you do the “Print-Preview” they can be included or not in the displayed output.

Here’s the frequency counter front panel with the drill marks:



You could also add lines to show where to align the text boxes in the Word version.

Conclusion

It takes a bit of time to make nice labels for your project, but I think you’ll agree the end result is well worth the effort.

If you have questions, feel free to email me. My address is good on QRZ.com.