Control Panel Wiring & Standardization Tips

In this document I have included a number of drawings to help you organize and standardize your layouts basic wiring.

The first drawing demonstrates my main DCC bus line and switch machine power bus attached to the studs in my layouts center wall. The DCC bus is 10 gauge wire that I attach drops to for powering my track. I strip insulation off and solder 18 gauge wires to it which then go to pieces of barrier strip that connect to 20 & 24 gauge feeders going directly to my track-work. The switch machine power bus runs from barrier strip piece to barrier strip piece. The barrier strip pieces are mounted wherever I plan to place a back-plane for a control panel. I then run 18 gauge wires from the barrier strip piece to the back-pane's appropriate barrier strip piece representing the input power supply. (See figure 1)

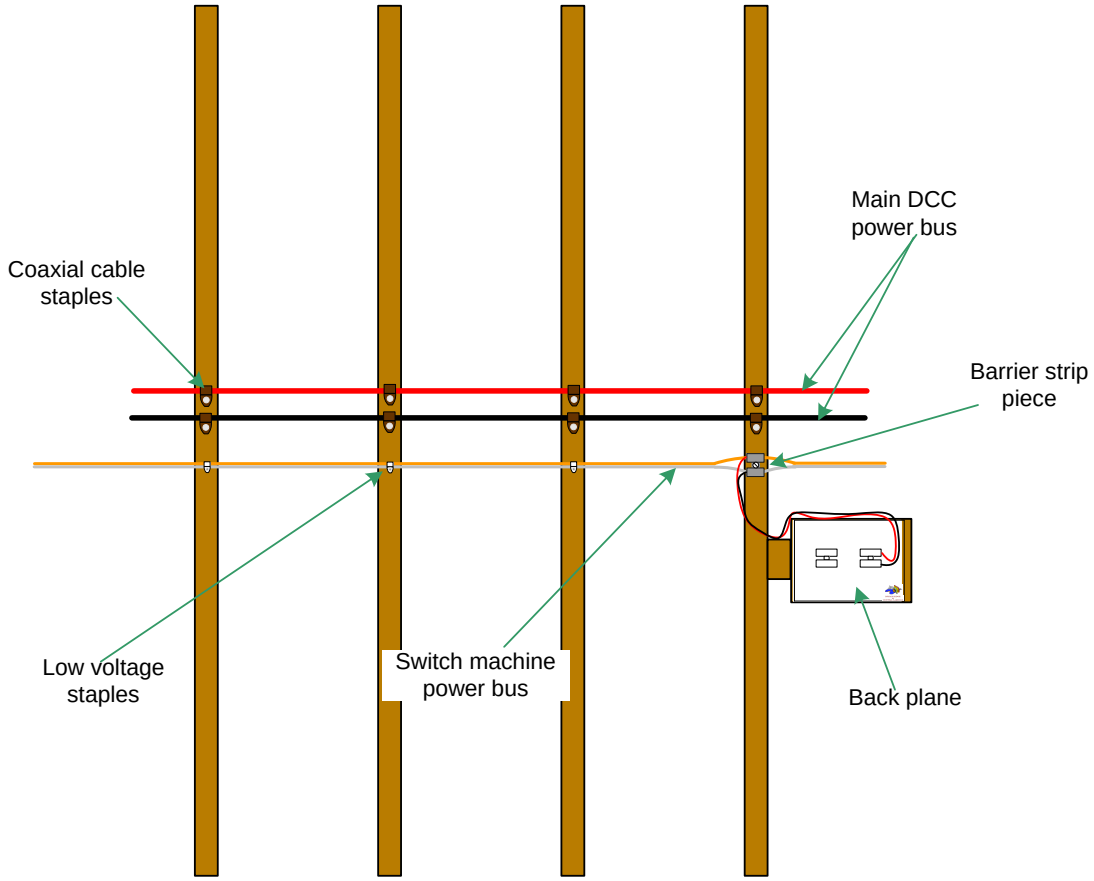


Figure 1

The object of this exercise is to break the wiring job into separate steps. This makes it easier to wire and in the future to trouble-shoot any problems that could arise.

The bus wires are mounted to the layout vertical frame using wiring staples. I typically use coaxial cable stables for the 10 gauge wire and low voltage staples for the 18 gauge switch machine power bus. The point is to make sure you use a staple that won't crimp your wires when you hammer them in. This is especially bad when you mount your DCC main bus which is normally 6 wire telephone wires. These can break very easily, so I use a slightly different strategy to mount this bus. I first glue or nail the low voltage staple to the stud or horizontal support I'm running the bus on. Then I use cable ties to actually attach the wire bus to the staple (See figure 2)

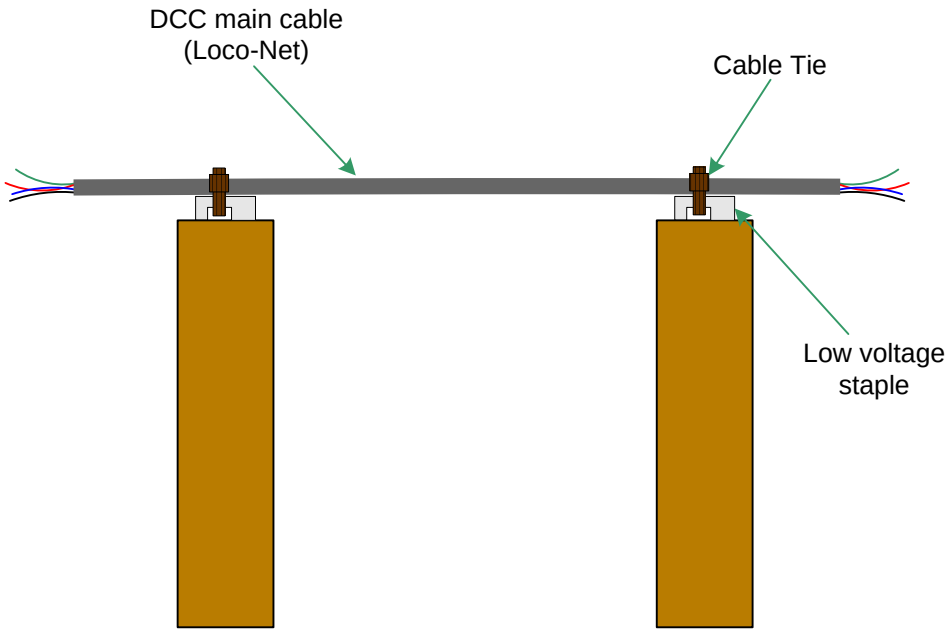


Figure 2

This brings me to a discussion about back-planes. They're my way of "staging" the wiring before I actually connect the control panel to the layout. I designed them in a standard fashion, one that is 3 ½ " x 4" and the other 3 ½" x 6" The first is for panels with 3 or less switches the other for 4 or more switches. They're made from a piece of 1 x 4 attached to a piece of 1 x 2 that serves as the mounting bracket. They can be connected to any vertical or horizontal support member on the layout. (See figure 3)

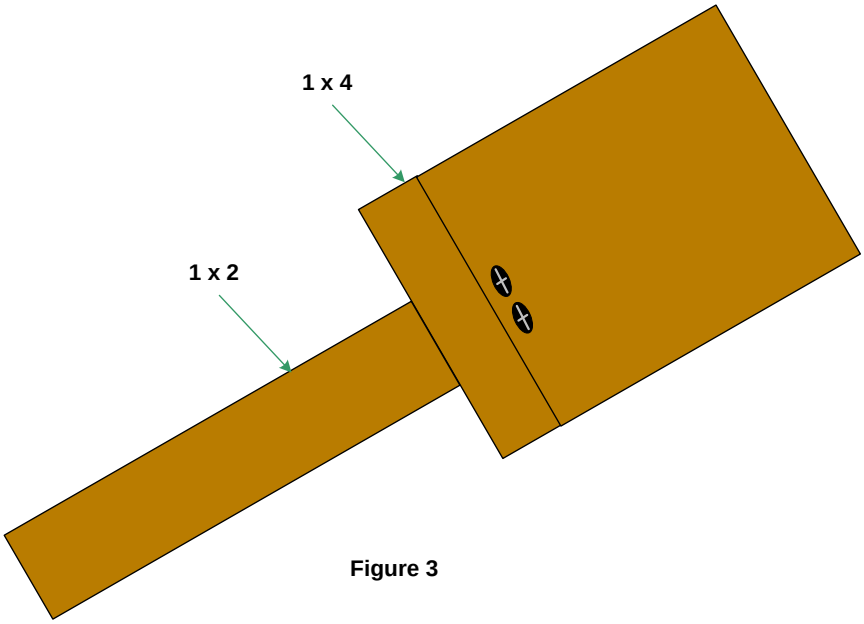


Figure 3

To map out where the wires are going to go, I create a printed diagram that shows where the inputs and outputs are going. Since I do this on my computer I can make it clear and concise as well as use the patter over and over again for simplification and standardization. A typical mainline back-plane print has at least two barrier strip pieces mapped out and I also include places where I mount low voltage staples to hold cable ties that in turn hold the actual wires. (See figure 4)

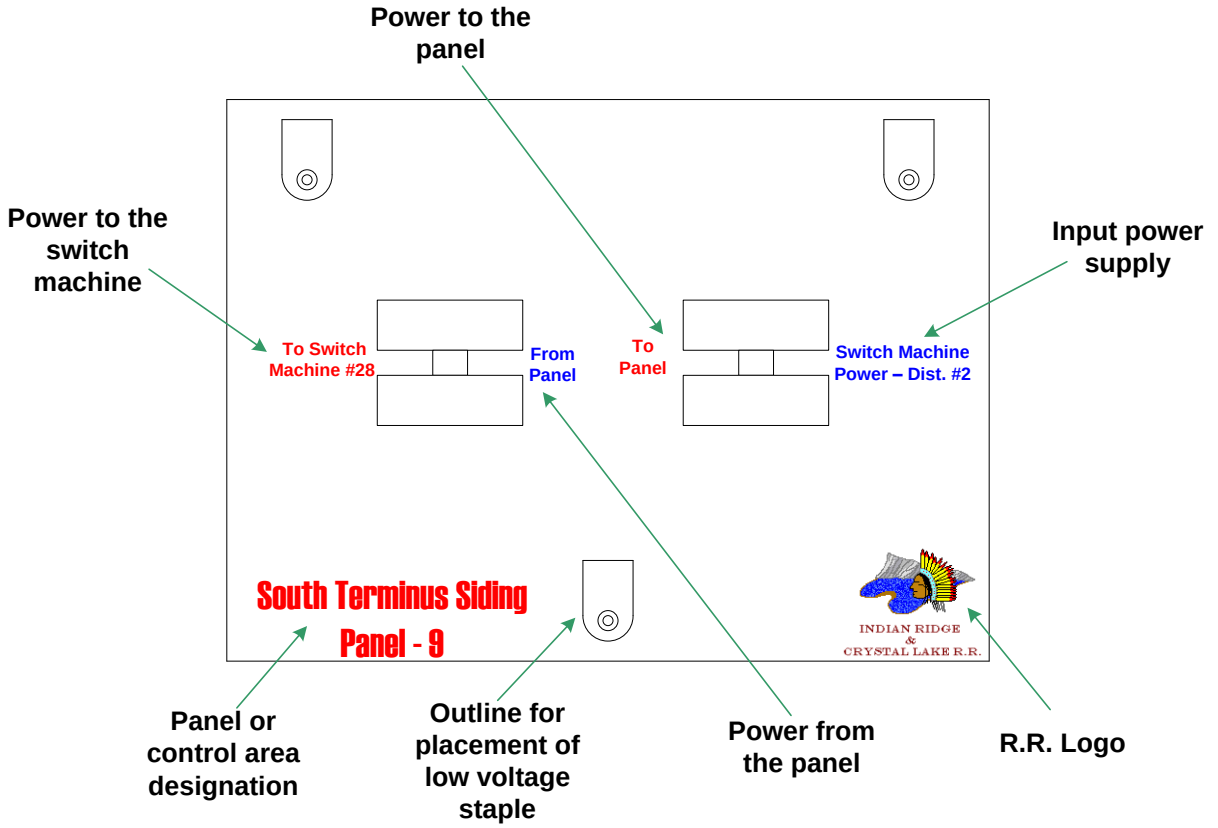


Figure 4

Once I have the back-plane mounted and wired in, I can then run the feeder wires out to the switch machines. I then test the switch machines by wiring in any DPDT switch directly into the back-plane.

To design control panels for my layout, I first decided to use recessed panels. I use recessed panels because they are harder to snag when walking by them and because I tip them back in their recess pans they are easier to see even when you're very close to the fascia.
I design my control panels on the computer using Visio, but you could just as easily design them with any number of programs Paint, CAD, Adobe etc. or just draw them out on paper.

I always start with what I call a "plotting" diagram. This is a drawing that takes into effect for where objects lie on the back of the panel and how much space each control takes up. This is important as I plot the schematic of the track, I want to insure the switches will actually fit on the panel. (See figure 5)

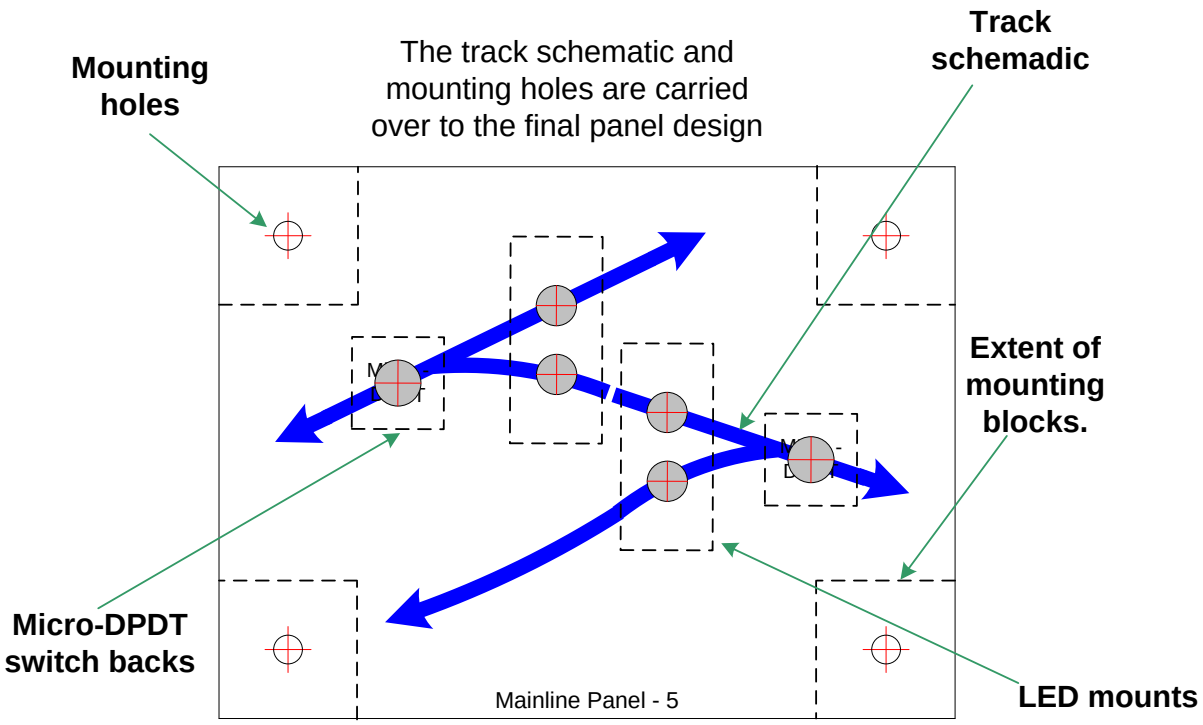
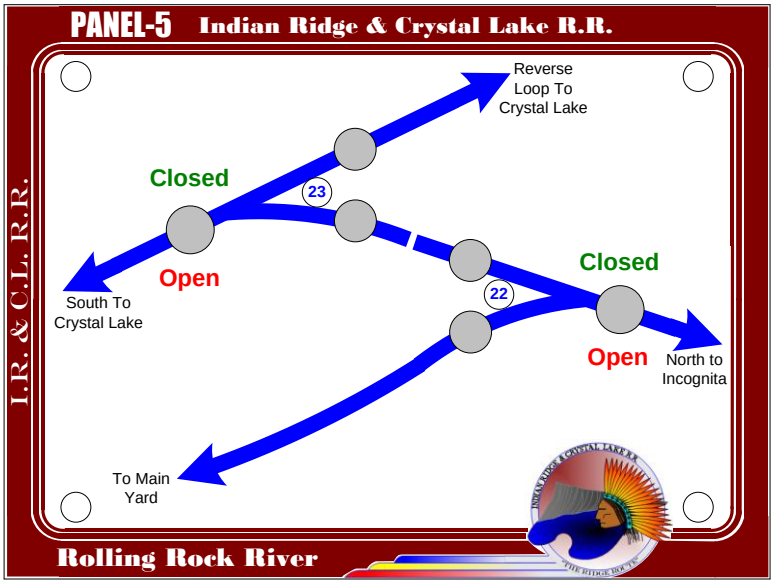


Figure 5

The plotting diagram is then printed on light cardboard. I then punch small holes at the centers of each switch and LED hole (see red cross lines). I then tape this to the masonite control panel back and drill small pilot holes at each cross line. Then I finish the holes using brad-point drill bits.



Mainline Panel - 5

Figure 6

On the computer I use this diagram to create the final panel design. I remove all of the dashed lines while carefully retaining the track schematic and mounting holes. I label all of the switches and the place names where appropriate and finally add in a custom border. The border is standardized by having

the panel number always appear in the upper left-hand corner, the place name in the lower left-hand corner and my railroad logo in the lower right-hand corner. This makes it easier on you and your operating crews to operate a given panel since once they are familiarized with one they can easily use any other on the railroad. (See figure 6)

When I complete the panel and I haven't finished the fascia yet I need a way to mount the panel to the layout without the recess pan. I use a simple mounting bracket made of two pieces of 1x2 screwed together with one screw. I mount the panel to it which allows me to tip the panel back to complete the wiring to the back-plane and to test my connections. (See figure 7 & 8)

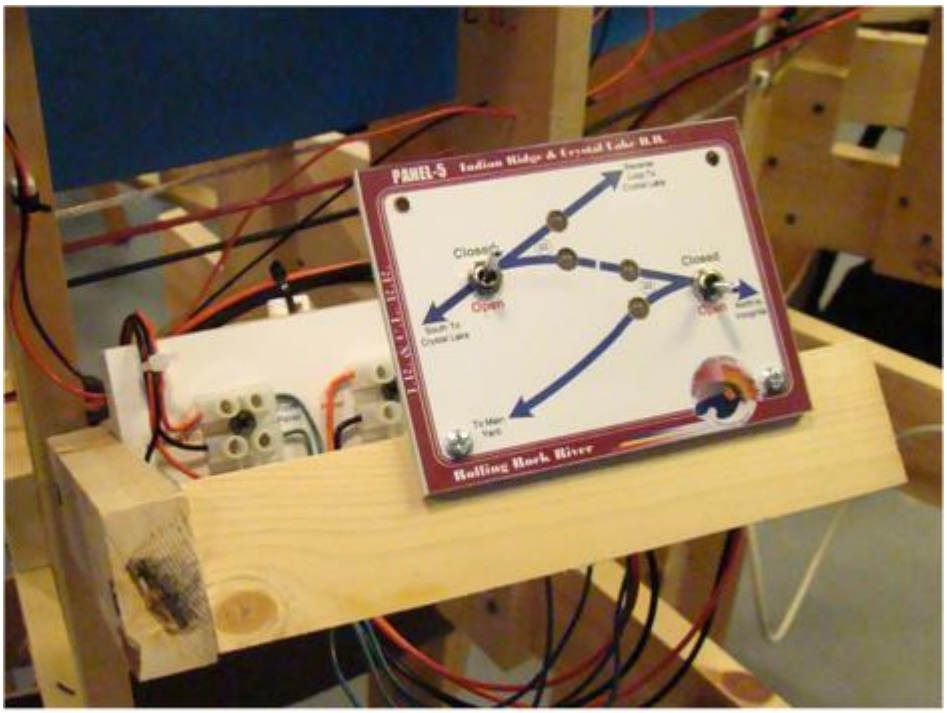


Figure 7

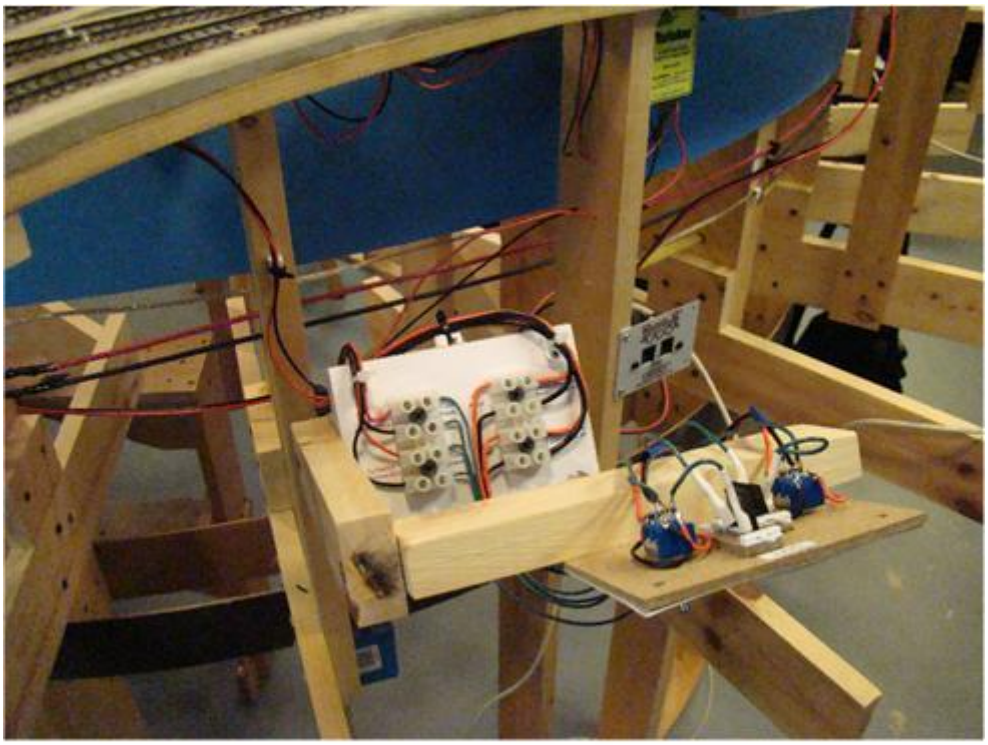


Figure 8

This concludes my clinic on basic wiring. I hope this gives you some ideas on how to organize your wiring and control panels especially if you plan to host operations.