DCC Tips from www.Mr-DCC.com

(623) 640-4060

Wiring for DCC

When converting from DC, what changes do I need to make?

Perhaps none! If your layout works well on DC, it **MAY** work well on DCC! The best way to find out is to test it.

- Remove ALL power packs, as mixing DC and DCC on the same layout without precautions may destroy the booster.
- Connect the booster to everyplace you had a power pack. Turn on the booster and make sure track power is on. You might want to clip a 12 to 14-volt bulb to the track for a quick visual indication of track power – automobile or Malibu light bulbs are a very good choice.
- Do the "quarter test:" put a quarter across the rails. The booster should protect itself by shutting off the track power. Remove the quarter and track power should come back on in a few seconds. Test the track EVERY FEW FEET and at least three places on every turnout. Anywhere that the quarter doesn't shut the booster down the wiring is inadequate for DCC. Not only will your locos run inconsistently, you run the risk of welding a wheel to your trackwork in the event of a derailment or other short.

Now once you've mapped out your layout, you can decide to rewire or not.

I'm building a new layout or rewiring my existing layout – what should I do?

Here's what I recommend for HO or smaller (using a 5 amp or smaller booster or power manager):

The goal of this exercise is to provide a power drop to EVERY piece of track. I know that this sounds like overkill, but I've never seen a layout where this was done that had problems. Many that tried to shortcut this step do have problems. The extra time and a few dollars worth of wire are much less expensive than the frustration and time spent reworking a layout – especially after the scenery is in place!

Buy 20 AWG thermostat wire (home improvement stores sell it as twisted pair – two solid wires twisted loosely together). The last roll I bought was 500 feet of red and white for about $30. You'll use more of this than you think, so don't worry. Any smaller and the loss in the wire causes problems – any larger and it is difficult to connect to the track.

Buy enough 12 AWG house wire to run a loop around under your mainline plus about 20% for those gotchas that always happen. A quick check is to take add all the dimensions of the edge of your layout and add 10%. If you have a U-shaped layout with dimensions of 10, 17, 8, 4, 4, 9, 6 and 4, just add them up (62) and add 10% - buy about 70 feet of each wire. Since I got red and white thermostat wire, I'd buy 70 feet of red and 70 feet of white 12 AWG house wire.

Now comes the question – how do I connect the track feeders (20 AWG wires) to the power buss (the 12 AWG wires)? There are three methods – each with its advantages and limitations:

1. Quick and dirty – strip the insulation off the 12 AWG every three feet or so and solder the 20 AWG. Advantage: quick and cheap. Disadvantage: rework is a pain and twisting the 12 AWG wires to minimize interference may short out your layout!

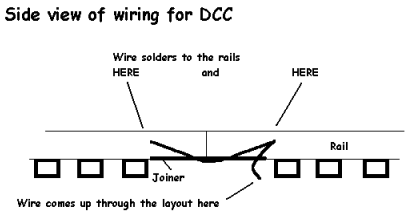
2. Slip on connectors – auto parts stores sell clips that will slide over large gauge wire and connect it to smaller gauge wire. Advantage: quick. Disadvantage: these are somewhat expensive and are much more prone to failure than soldered connections.

3. Most Elegant solution – mount a barrier terminal strip (fairly inexpensive and available at Radio Shack and other electronic suppliers) every so often under your mainline and at both ends of major yards. Using SEPARATE pieces of the heavy wire, connect all of the terminal strips. Thus, you can break up your layout wherever you wish in the future. Position the terminal strips so that you can run less than two feet of 20 AWG wire from the terminal strips to your track feeds. Advantage: easy to rework and troubleshoot while being reliable. Disadvantage: somewhat more time consuming and expensive. Just remember, you may only do this once, so why not do it right?

Now you run the 12 or 14 AWG wire around the layout under the track, using holes in the benchwork or cable clamps for support. Lightly twisting this buss wire seems to eliminate some problems. You might like to put a set barrier terminal strip wherever you plan to attach the booster.

Build a buzzer: a 9 volt battery and a buzzer (Radio Shack has them) connected between the two buss wires will buzz the instant you start to wire a short into the layout. The most frequent sources of shorts are “Electro-Frog” switches where the points aren’t insulated and getting confused wiring the track and crossing your wires.

At every other rail joiner, drill a hole near the rail on each side. Whether or not you solder the metal joiners to the track is your option – some like to leave room for rail expansion and so don’t solder the joiners. Since you’ll be soldering your power drop to every rail, you won’t need to solder the joiners for electrical conductivity. Solder your 20 AWG wire to the rail on each side of the joiner as shown.



Connect every rail to the buss by wiring like this every other joiner.

How do I handle turnouts (switches)?

Since DCC is a bit more sensitive to power disruptions than DC, improved reliability can be had by paying a bit more attention to your turnout wiring than you may be used to. Turnouts basically fall into two categories – here’s a discussion of both and how to handle them:

Peco “Inslu-Frog”, Atlas, and such

These turnouts can be used directly without any need for modification. Advantage: easy to use – Disadvantage: not as easy to set up signals and there is about a one inch dead spot right at the frog (locos with minimal pickup may stall on the switch). I like to drop power to the turnout four places: each of the four rails at the exit of the turnout.

Peco “Electro-Frog”, Shinohara, and such

These turnouts can be used directly by putting insulated joiners on each of the two rails connected to the points of the turnout. There may be some limited reliability, depending upon the contact between the moving point and each rail. To enhance the reliability of these turnouts, use an external switch (part of the ground throw or motor which moves the turnout) and connect power from the selected rail to the frog by an extra drop somewhere inside the triangle. Advantage is that there is almost NO area where the loco does not receive power. Also you can create “quick and dirty” signaling with these turnouts. With a bicolor three lead LED, connect each element to one side of the track. Connect the common lead to the points with a series dropping resistor. Now when the turnout moves the light changes. Power drops to the two outside rails will suffice, especially if you have used an external switch to switch power to the frog.

Can it really be that simple?

Yes, but lots of folks try to make it hard.

What about a programming track?

Many boosters are designed to work with a separate programming track to change addresses and other major changes. Most minor adjustments are done on the main using Ops Mode (Digitrax’ term) or POM (Lenz calls it Programming on the Main). A current limited programming track is the best place to take a newly decoderized loco. The current limiting function may keep the decoder from getting fried in the event of a wiring error.

If you have a booster that supports a separate programming track (Lenz or Digitrax Chief), then a siding with both rails insulated from the turnout will be needed. Install a Double Pole Double Throw (DPDT) switch with AT LEAST a 5-amp rating. Connect the common terminals to the two rails of the programming track. Connect one side (the RUN side) of the switch to the buss. Connect the other side to the programming outputs.

If your booster doesn’t have a programming track output, you can still create one. Contact Litchfield Station for more information.