



BNMRR N DIVISION INFO BULLETIN



OCTOBER 20, 2021

ELECTRICAL WIRING

This is the second in a series of offerings presented to help division members understand the NTRAK standards and methods used to build modules. There is room for much improvement of our layout at this point. By presenting this information, in this format, I hope we can all improve our modules to achieve better running trains and thus have more fun.

Blue underline text will link to websites of interest. The links at the bottom of the page will take you to the respective standards documents. *BC*

Last issue was concerned with track. Now we'll look at how the DCC power is distributed to the rails and how the LocoNet signal is routed around the layout.

First thing: do not spend money, at this time, to purchase any wire. We have a good stash of the various wires and hardware needed for both the DCC buss and the LocoNet buss.

A note regarding hardware supplies we have on-hand. We intend to remain, as much as possible, financially independent from the club's treasury. The hardware supplies we have on hand have come from donations. We ask that if you use division materials a modest reimbursement be made. We purchase these items in bulk to get the best price, thus we suggest you get them from the division to save money.

The national standard wiring section (pages 11 & 12), only about one page long, provides the

basic requirements. More details are available in the How-to Book in Chapter 7 Wiring Your Module.

List of materials on hand:

- Buss cable: 12ga two conductor.
- Intermediate track feeder wire 16-18 ga.
- Track feeder wire 20-24 ga.
- Suitcase connectors 3M-567.
- Power Pole 30 amp contacts.
- Power Pole housings.

(Feeder wires and Power Pole housings are available in the correct colors to match the standards.)

- LocoNet cable
- LocoNet 6P6C RJ12 connectors
- LocoNet 6P6C F-F straight inline couplers

We have the tools required to properly install both Power Pole contact inserts and the 6P6C

(Continued on page 2)

(Continued from page 1)

RJ12 connectors. These tools are expensive, thus there is no need for anyone to purchase them.

DCC track power buss:

From the standard, in part:

- “Track power shall pass through underneath the module in 12 AWG stranded copper zip wire, extending 12” beyond either end of the module.”
- “Feeder wires for tracks and accessories can be attached with suitcase connectors (3M 567, brown) or by soldering them to the bus wires.”
- “Connections between modules use Anderson Power Pole 30 A rated connectors.”
- “The community tracks have unique color codes assigned (see table below).”
- “The color codes are applied to the connectors by selecting proper colored shells...”
- “For track power, the primary color shall mark the wire feeding the front rail of the track.”
- “Do not use common rail wiring. There should be no connection between any of the rails of the three community tracks. Cross-overs need to have insulating gaps in both rails.”

The relevant portions of the table mentioned above are shown in the table below.

The DCC control signal and locomotive power are supplied to the track from the three DCC buss cables running the length of the layout beneath the modules. These cables, the large black wires, are connected together with Anderson Power Pole connectors at the ends of the modules. Power is routed from the DCC buss to the rails with feeder wires. We do not recommend using solid feeder wire because it is easily broken by work hardening. Stranded wire is less susceptible to this failure. This is one point where we disagree with the national standard.

Gauge 16-18 wire, about 6 inches long, is connected to the DCC buss cables using [3M Insulation Displacement Connector \(IDC\) #567](#). We have a small quantity on-hand. To this short wire is connected the individual track feeders that are routed up through the module top surface and are soldered to the rails.

Note in the table below the rear rail feeders wires are specified to be black. We are using an option of striped black with yellow or blue to help distinguish the feeders when working under the module. The red buss uses single black color feeders.

We have a spool of the DCC buss wire so no need to purchase any for your modules. The

(Continued on page 3)

Identification of tracks and wiring

| Track Name | Track Color Code | Track Position | Buss and Feeder Wire Colors | |
|------------|------------------|----------------|-----------------------------|-----------|
| | | | Front Rail | Rear Rail |
| Front Main | Red | 20 ins. | Red | Black |
| Rear Main | Yellow | 18.5 ins. | Yellow | Black |
| Branch | Blue | 17 ins. | Blue | Black |

-Track positions are measured from the rear of a 2' deep module.

(Continued from page 2)

two conductor cable has a 'rib' on one wire's insulation. That wire should be connected to the front track rail (the rail with red, yellow, or blue wire). We now have several spools of track feeder wire - again thanks to a member's donation.

The two conductors of the buss cable must be separated at the point where the suitcase connectors are installed. This can be done by very carefully using an Xacto knife to cut between the two cables. Use care not to cut into the insulation! The separation needs to be about 6 inches long to allow room for the connectors.

Anderson Power Pole connectors:

Power Poles are available in a variety of colors. We have a limited supply on-hand. I will order more when the need arises from a source in California that has good pricing. Just let me know if you need any.

A special crimping tool is used to affix the contact insert to the wire. I have this tool - please use it since it was designed solely for this purpose and does a good job. It is important to follow the correct orientation of the buss wires and the connectors so DCC phasing is correct. Detailed instructions for the use of Power Poles is in chapter 7 of the How-to Book and in Appendix C of our local DCC Manual at the clubhouse.

LocoNet:

The LocoNet cable is used to carry the DCC control signal from the command station to the various devices that need it. (The F-F inline connectors are used to connect the cable between modules.) These include the throttle panels, the PM42, and the boosters. When boosters are used, there exists a second LocoNet known as the 'booster net'. It consists of a LocoNet cable and a 'booster common' 12 gauge green wire, which together, ensure the booster is able to communicate with the command station. The booster common is often referred to as a 'ground' - it is NOT to be confused with the 120VAC ground in house wiring.

LocoNet cable is a six-conductor, flat cable. The connector MUST be installed in a specific orientation for the system to function properly. This is not covered in either the national standards or the How-to Book. I did include instructions in the Red folder I provided to most of the N Division members many months ago. Again we have the cable and connectors on-hand and the correct tool to install the connectors onto the cable ends. Refer to Appendix D in the DCC Manual available in the layout area.

One last note about the LocoNet cable: It must not be connected back on itself forming a loop. A loop will result in a short circuit which will cause erratic operation of the DCC system.

Next issue will address roadbed, more on track laying, and ballast application.
The next issue will be sent out on November 3rd.