

## Calder Northern HO DCC Layout (electrics)

Specification for wiring, etc.

### **Main and subsection buses.**

The layout shall have one central command station and booster. Protected block sections will be wired off this main booster.

### **Protected block sections**

The layout will be divided into five electrically isolated blocks. The two 'yards' and the branch will be electrically isolated from the 'main' which is split in two.

Each block will have a suitable breaker of the NCE EB3 variety (or equivalent). These breakers must be set to trip before the main booster.

The isolation breaks must be put in when laying the track – not as an afterthought. Isolating rail joiners will be required.

### **Turnouts.**

These will be Peco code 83 electrofrog, except for a few such as the 2 x double slips and 3 way which will be Peco code 75.

They will all be driven by Peco PL-10 point motors, each with a piggy backed PL-13 accessory switch for controlling the live frog.

Isolation breaks must be put in at both the open ends of the frogs when laying the track using isolating rail joiners.

The Styrofoam sheet under the baseboard will be removed from the area around all switches to allow mounting of the PL-10s, via a Peco mounting plate, to the baseboard. A suitable oval hole must be cut through the MDF before fitting the points and checked so it does not foul the mechanism at either turnout direction.

### **Droppers.**

A standard colour coding must be adopted for the wiring. See the document CN Wiring Colours for this.

For the DCC buses wiring single stranded 1.5mm<sup>2</sup>. For droppers thinner wire 1/0.6 mm shall be used.

All track lengths and any other isolated shorter sections will need droppers. These will be soldered to the web of the track after laying. Holes will need to be made in the baseboard to accommodate these droppers, preferably lined with (eg) drinking straws to allow easy passage of the wires. We suggest dropper length of 18in to start with.

Track joiners shall not normally be soldered – to allow for expansion and replacement of faulty turnouts – and also not relied on for electrical continuity.

The exceptions to this rule are: 1) Where a short length of track is used to extend a full length piece, or 2) To avoid waste, two or more offcuts are used to make a longer piece. In these cases the joiners can be soldered rather than using droppers for such small lengths. Obviously in one set of droppers is needed for the made up piece.

This exemption does NOT apply to short sections between turnouts, etc, which must be wired with droppers and not be soldered to the adjacent specialwork.

## **Control panels.**

There will be four control panels.

Control panels will use conventional toggle switches (DPDT) with LEDs to show the direction set. The LEDs will be driven off the panel switches - ie. there will be no 'feedback' of the turnout position from the turnouts themselves. We feel the massive added complication and wiring requirement does not warrant this.

The switches will operate panel encoders from the MERG kit range. This will greatly simplify the layout wiring as only two control wires and two power wires are required to pass across each baseboard joint for accessories control. The power for the accessories and panel LEDs will be from a standard 'Gaugemaster' or similar 15 or 16 v AC supply.

## **Turnout drivers.**

The PL10 point motors will be driven by MERG decoders which have their own built-in CDUs (Capacitor Discharge Unit).

Each decoder has four outputs, and can drive an individual turnout or a complete crossover (two PL10s in parallel) from each output. These decoders will be located as close as possible to their respective turnouts so wiring is kept short.

The wires from decoders to the PL10s must not normally cross a board joint so there will probably be situations where not all four decoder outputs can be used.

## **Inter board connections.**

To use pluggable terminal strip as follows:

Each board has one or more 2/3-way female strips fixed to the end plate (flush with or just in from the edge). Boards are connected by cable loops with a 2/3-way male strip at each end, all such loops being identical and interchangeable.

The terminal strips leave all wiring and connections visible (even to the older naked eye) and by using screw terminals are simple to use and maintain.

## **The DCC system.**

The system of choice is NCE. There were several reasons for this choice.

1. Some CN member use it, so there is some expertise and knowledge of it in the club.
2. It is cheaper, like for like, than Lenz or Digitrax.
3. Reports on various email lists highly recommend it and those who have used all systems have considered it the most 'user friendly'
4. The CAB bus system is more flexible than Lenz.
5. NCE have a useful range of accessories.
6. The basic handheld control cab (as opposed to the full cab) is both low cost and easy to use.
7. There are several good UK distributors.

There will be one Command Station / Booster rated at 5 amps. If this proves insufficient, adding another booster is easy. The number of full and basic handsets to be decided. Full handsets are only needed for programming.

A separate programming track is to be provided on the layout.

### **Possible problems.**

We could not understand the reason for the thick Styrofoam under the MDF baseboards. The arrangement does not provide any extra mechanical rigidity but will make wiring and the attachment of wiring and accessory modules (like the turnout decoders and block cutouts) quite difficult.

You cannot attach cable clips to the foam and it will not take screws or adhesive pads. We believe there are some specialist adhesives that can be used, but getting good strength requires a significant contact area.

All droppers will have to pass through both the MDF and foam, and underboard wiring will possibly be more exposed to damage in transport being nearer the exposed underside. One possibility to alleviate this is to cut channels for the wiring in the foam and fill it in with 'something', although access for maintenance or changes needs to be kept in mind. Any attempts at soldering near the foam will cause it to melt.

### **Wiring the modules.**

Apart from fixing the track (with droppers, etc) no other 'things' should be fixed to the upper sides of baseboards until the wiring is completed. This will allow the baseboard modules to be inverted for wiring.

Having to wire from underneath is to be avoided at all costs.

### **Documentation.**

All wiring, including track sectioning, must be fully documented in a way that can be fully comprehended by future users.

All changes must be tracked and recorded and all copies updated when changes are made. (Document control procedure is required).

Changes should not be made on an 'ad hoc' basis except in an emergency and those changes must be noted and subsequently added to the documentation.

Mike Sheridan 16

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