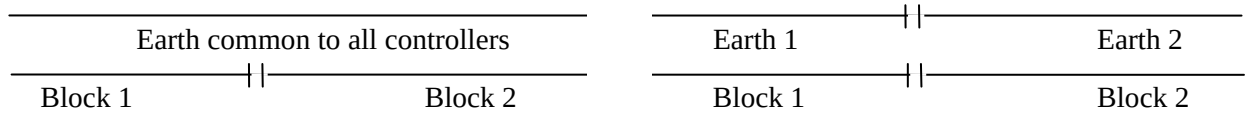
IRREGULAR FEATURE

Electrickery Pt.3

Clever Controllers

In part 3 of this little series on control techniques I am going to describe the master / slave system that has been functional for a long time on Paradigm, our display layout, and will eventually be wired into the permanent layout. If you remember from last issue diagram 2 had extra isolators added, this was to change from the normal common earth to a modified common earth (see diagram 3) as far as the track is concerned it is the same as the conventional wiring that makes it hard for Lima / Hornby etc locos that have diagonal pick ups to cross the boundaries between blocks, but because the separate power supplies are earthed together at the negative terminal the smooth crossing is still possible. This adds a little to the wiring but the reason for the change is to keep all the feeds to the track separate to prevent shorts when using the master / slave system, it also makes things a lot easier to add DCC at a later date as voltage doubling, (read decoder smoking) is prevented. Something that whilst quite a new item to most, was thought about during the planning stage a long time ago!

Common earth Diagram 3 Modified common earth



So, how does the system work? Each controller is wired through a bank of relays (4 relays for each controller on the 2 channel system on Paradigm) these are wired to intercept the speed and direction signals from the control panel and do one of three things depending on the setting of the 5 position rotary Master / Slave (M/S) control. If set to normal (a green light in the middle) they pass the signals to the local control which then behaves as any other. If the M/S is set to slave (a yellow light far left A channel or far right B channel) they block the local signals and connect those from either the A or B channel as appropriate giving control to the Master. If the M/S is set to Master (a green light one stop left A or one stop right B) they pass the signals to the local controller and also to the A or B channel as appropriate to let the local controller be the Master to all others that are set to be a Slave on that channel. To prevent more than one controller becoming a Master on the same channel at once there is also a simple ‘first in wins’ circuit similar to a quiz show buzzer that locks out all other controllers, this shows up as a red light in the Master position of all other panels. All this may sound complicated but it requires only three wires per channel and one (modified) common earth, in reality only six extra wires as the common earth has to be there anyway. The wires only have to be light gauge as they carry signals not track current, the highest draw would be when switched to reverse as this engages the direction relays at the slave positions (<20mA each) if this became a problem the simple insertion of a transistor to drive each relay would solve this.

To add DCC into the equation all we have to do is add one more relay after the direction relay to switch the track power from analogue to DCC in doing so we disconnect all the analogue side of the controller circuit from the track and prevent any problems of interaction between the two. This is where the modified common earth comes in to play as it is connected before the direction relay and is therefore out of the track circuit when DCC is in use but is still available to control the point relays etc. and the isolation so that an analogue loco can stand without buzzing or going up in smoke. Also because this affects only the local control an analogue loco can still be run on an adjacent track from another controller without any interference. This is possible because as discussed in part 2 the position of the points decide which controller has access to the track so under normal driving conditions, i.e. not running across wrongly set points which is problem whatever the control system, it is possible for DCC and analogue to live along side each other quite peacefully as it does on many other layouts much more complex than ours.

Catch you down the track....Tony Mikolaj.