



Single Line Direction Lever Circuit

Operation and basic circuitry

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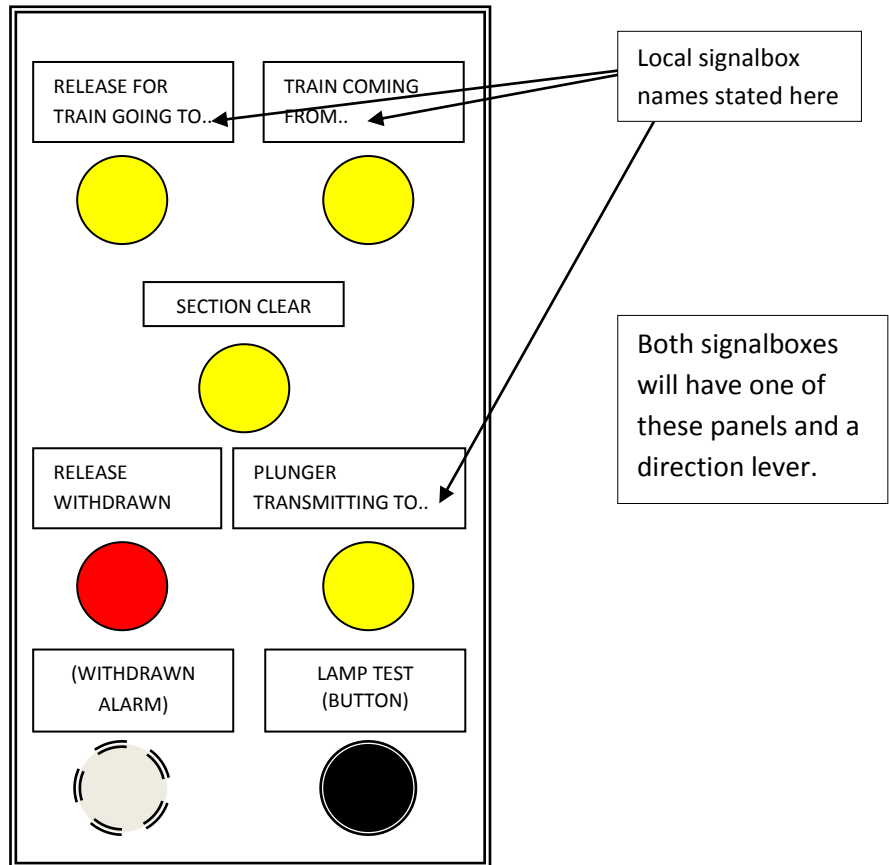
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The direction lever (or sometimes referred to as an 'Acceptance Lever') is a system used to regulate trains on a signal line instead of using a token/tokenless block, one train working, or other method.

It comprises of a direction lever and plunger at both controlling boxes. The signaller wanting to send a train has to ask for permission by operating the section plunger.

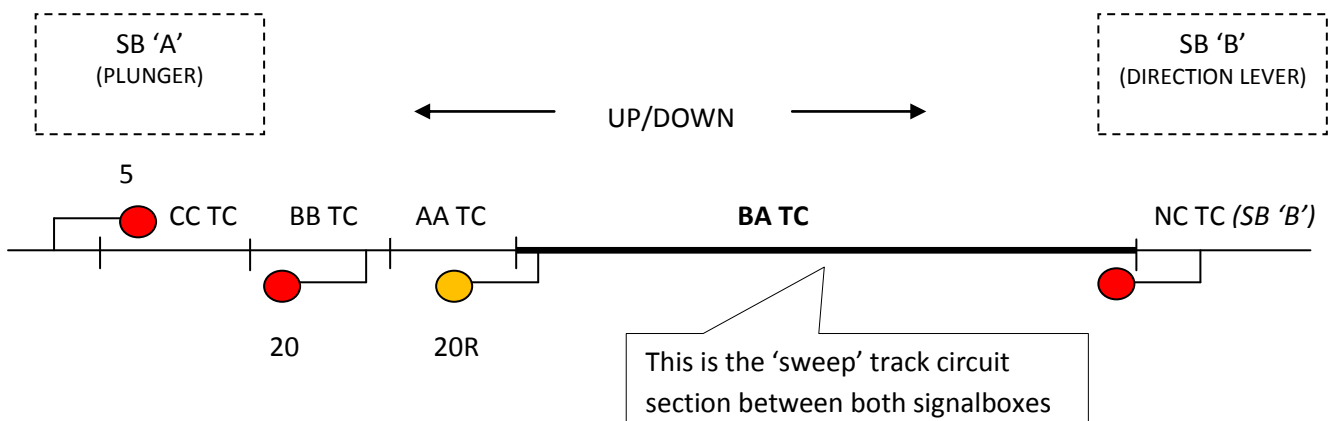
The receiving signalbox will then accept the train by reversing his direction lever once the signalling system has confirmed it is safe to do so.

The circuit comprises of checking relays, proving relays, sweeping track circuits, direction lever and plunger. There is also a small indication panel with coloured lights as shown below.



Only one lever reversed can select the route i.e. one has to be normal for the other route to clear.

The circuits below will use this diagram as a guide, but obviously your own area will be different. Also these example circuits only show the basics for clarity. Your own area will again be different.



- **The operation for route requested and accepted:**

Using diagram above; Signaller at box A requests the route to send a train towards box B by pressing his section plunger.

Referring to the figure 1.1 below, the B50 starts off by checking that 5 & 20 signal are normal, then it comes to the plunger and when pressed will go via the bottom path (push to make contact) and then to 10 NPLR, where this checks that his own acceptance lever is normal and has not accepted anything coming the other way.

It will then go along and check that 5 signal is showing a red aspect, his own tracks are clear and eventually end up and energised the UP ACC SR. (*Note the 'UP' is the direction is in this example only, but maybe different on your own area*).

This will then light up the LED for 'plunger transmitting to...' (and the box name).

This will then feed the sweep tracks proving each one in succession is clear (see figures 1.2 & 1.3).

Once the sweep tracks have proved clear, this will pick the TPR or T1PR at the other end and light up the section clear LED. This then tells the signaller that the section is indeed clear and then this releases his lock for his direction lever so he can accept the train.

Reversing this lever energises the 12 RLPR of that lever and sends a 50v supply along the DN ACC LR lines to the sending box (see figures 1.4 and 1.5).

12 RLPR energising lights up the 'Train coming from...' (*and the signalbox name*) LED on box B's panel.

Once this has gone through various location cases (this maybe over several miles), the DN ACC LR relay energises at box A and lights up the 'Train going to...' (*and signalbox name*) LED on box A's panel.

Once the DN ACC LR energises, this allows the DN LCSR to energise (see figure 1.6).

The DN LCSR relay energising allows the protecting signal to clear (number 5 in diagram on page one).

- **The operation for train cleared route and normalisation process:**

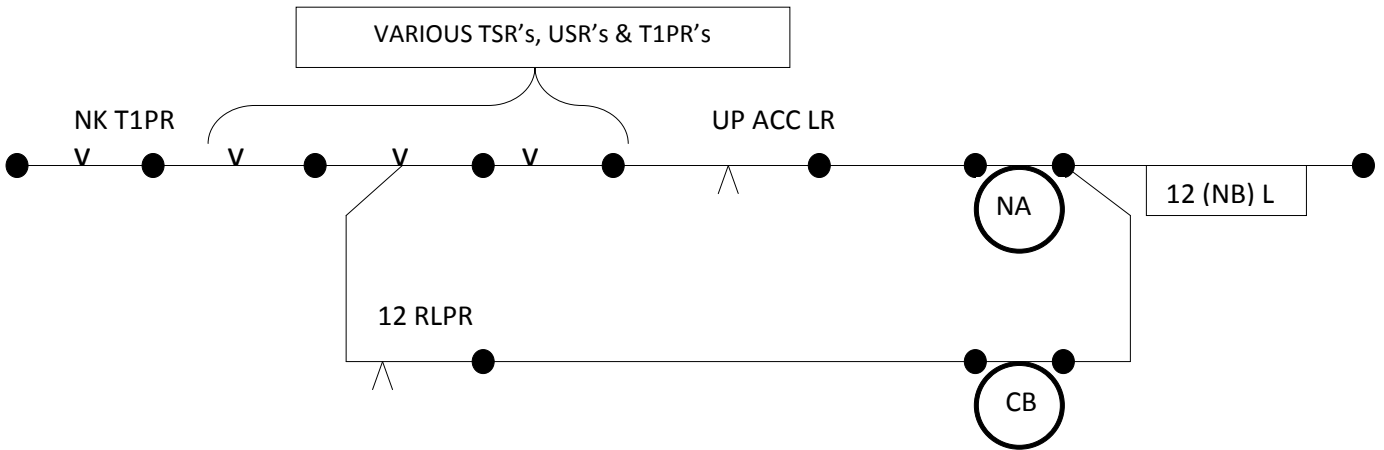
Once the train has gone through the route, the sweep track circuits will have occupied and cleared in sequence. The track circuits at the start of the route (AA, BB and CC) would also have occupied and cleared and thus destroyed the feed to the UP ACC SR, and therefore de-energised the DN ACC LR circuit.

The signaller at box B will inform box A via block bell that the train has arrived and cleared the single line section. The signaller at box B will then have to replace his direction lever, but the lever will only return to the back lock position until box A presses his plunger again. This will sweep the track circuits again and confirm that the section is actually clear. This will then allow the T1PR for BA TC to energise and release the lever lock and allow the lever to go back fully into normal, see figure 1.0

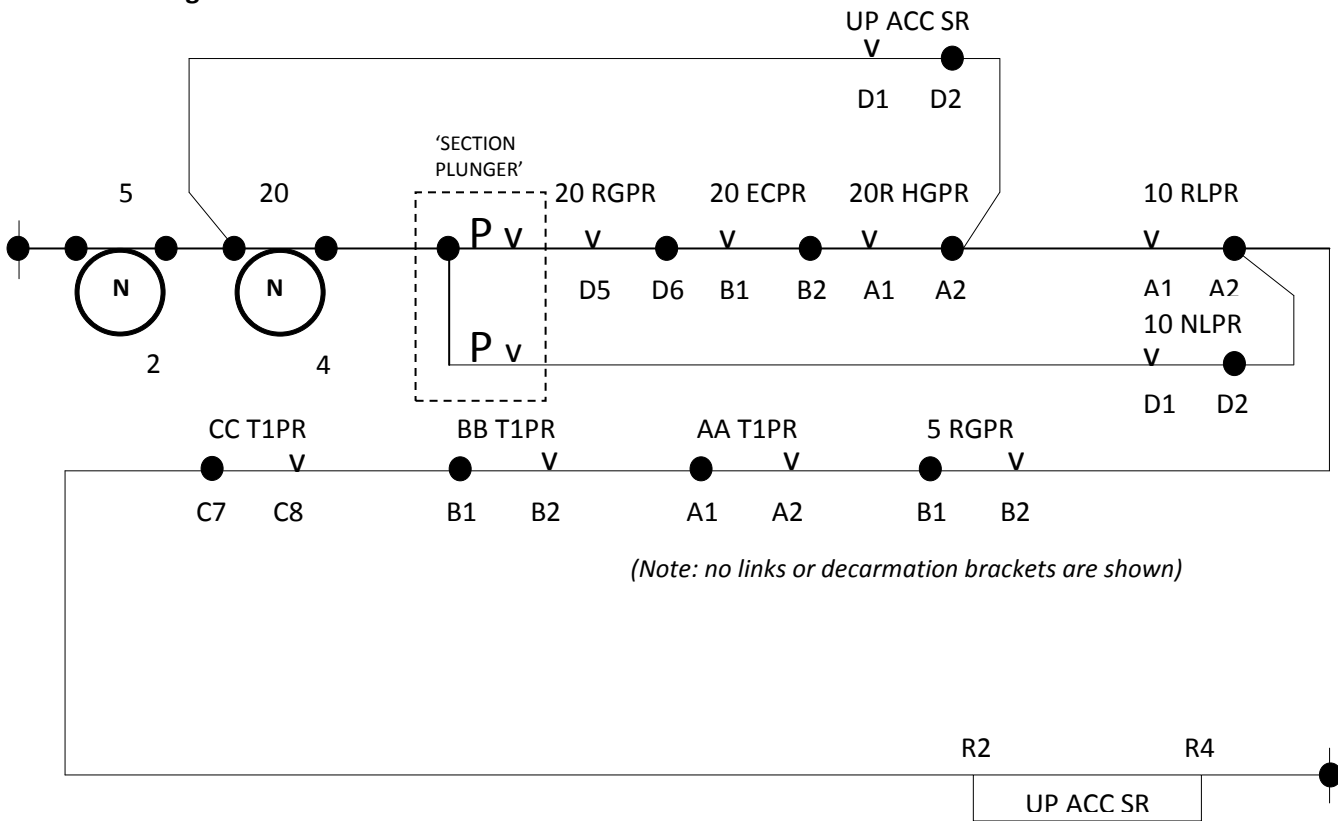
- **If train is cancelled and route needs to be cancelled:**

If the direction lever is replaced, or the section starting signal (number 5 as in diagram above) is replaced, this will destroy the ACC SR circuit and de-energise the ACC LR circuit and light up the 'Release Withdrawn' LED and sound an alarm.

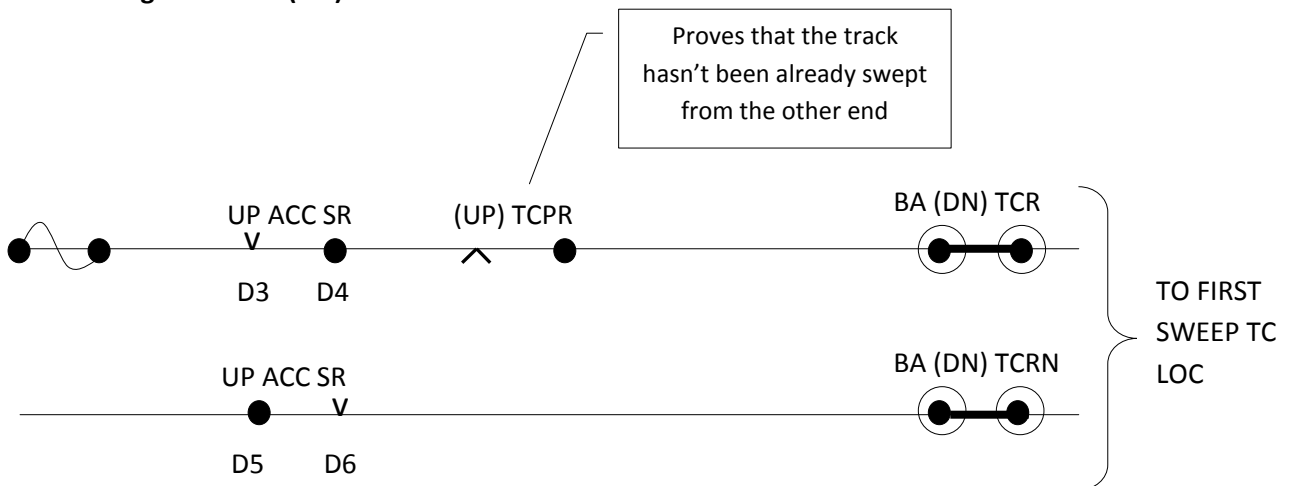
• **Figure 1.0 The direction lever lock circuit:**



• **Figure 1.1. UP ACC SR Circuit:**

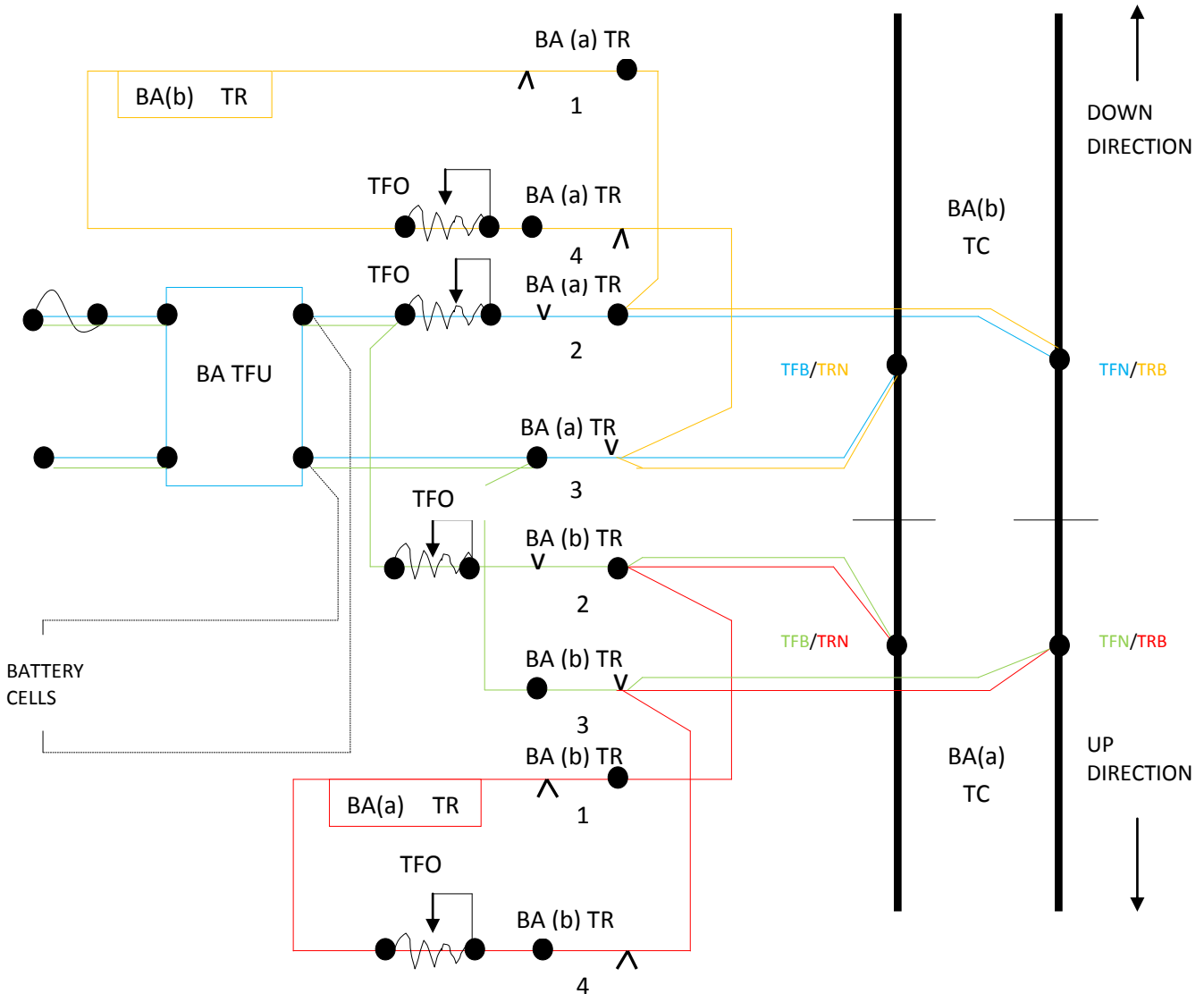


• **Figure 1.2 BA (DN) TCR Circuit:**



- **Figure 1.3 The sweep track circuit process:**

Single contact numbers are due to shelf type relay shown



Note: all wiring is single. Shown doubled for colouring purposes.

- **How sweep track circuit works:**

The UP ACC SR energising now sends a 50v supply for the BA (DN)TCR to the first loc and this starts to 'sweep' the track circuits to check they are all clear. Track circuit BA will be split into sections for example BA(a), BA(b) etc as a safeguard against a single track circuit which may go wrong-side. At the first loc the 50v sent will energise the BA(DN)TCR relay, this will then start a chain reaction of energising each track section in turn with the TR energising feeding the next track and checking all sections are clear in the process.

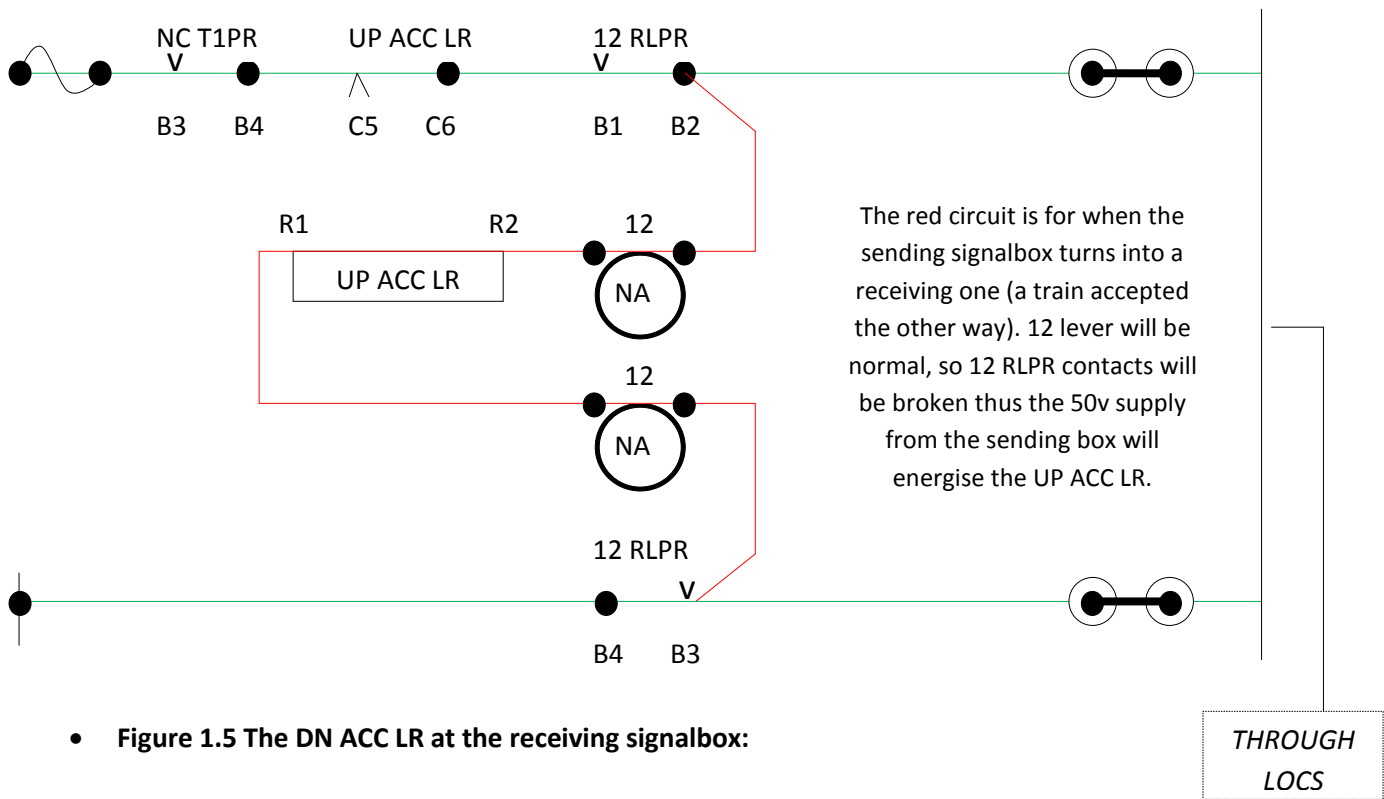
Depending on which direction the train is being sent, depends on which way the track circuits are swept and then the track terminations will be either feed or relay.

Using the colours in figure 1.3, the red path is the feed coming from the previous sweep track, or the BA(UP) TCR circuit which provides the first track circuit feed. The red path energises the BA(a) TR over the back contacts on (b)TR as it is not yet energised and cannot get past the front contacts. Once (a) TR is energised, the blue path provides a feed onto the next track and it carries on to the next.

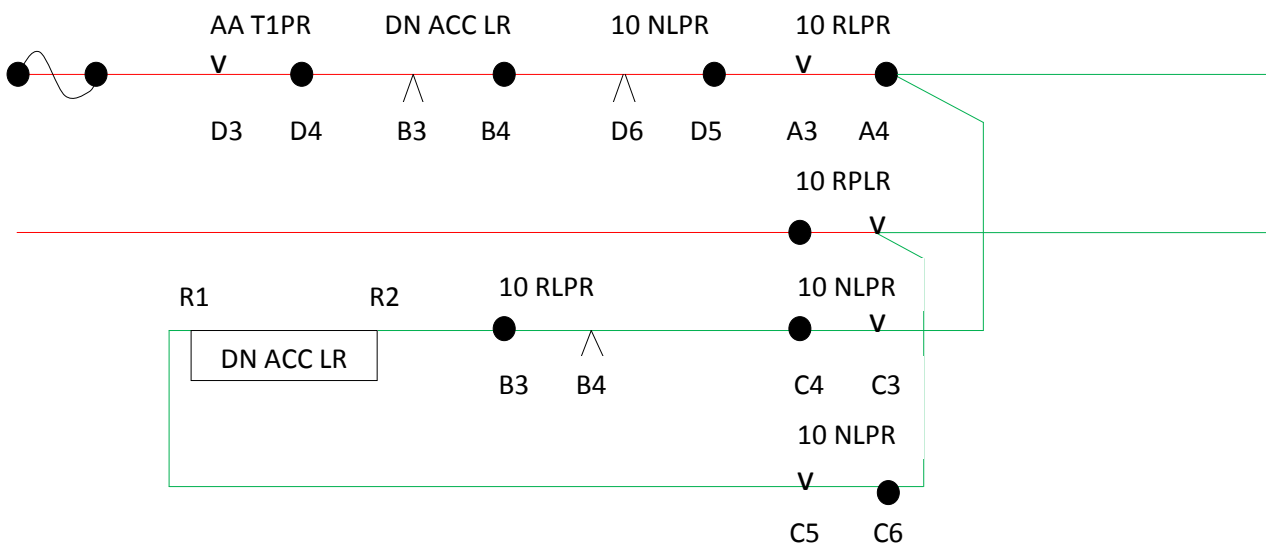
- **How sweep track circuit works (continued):**

The orange circuit is the tracks being swept in the opposite direction, so it energises BA(b) relay and that provides a feed (green path) onto the next track circuit over front contacts of (b) relay.

- **Figure 1.4 The DN ACC LR circuit at the sending signalbox:**

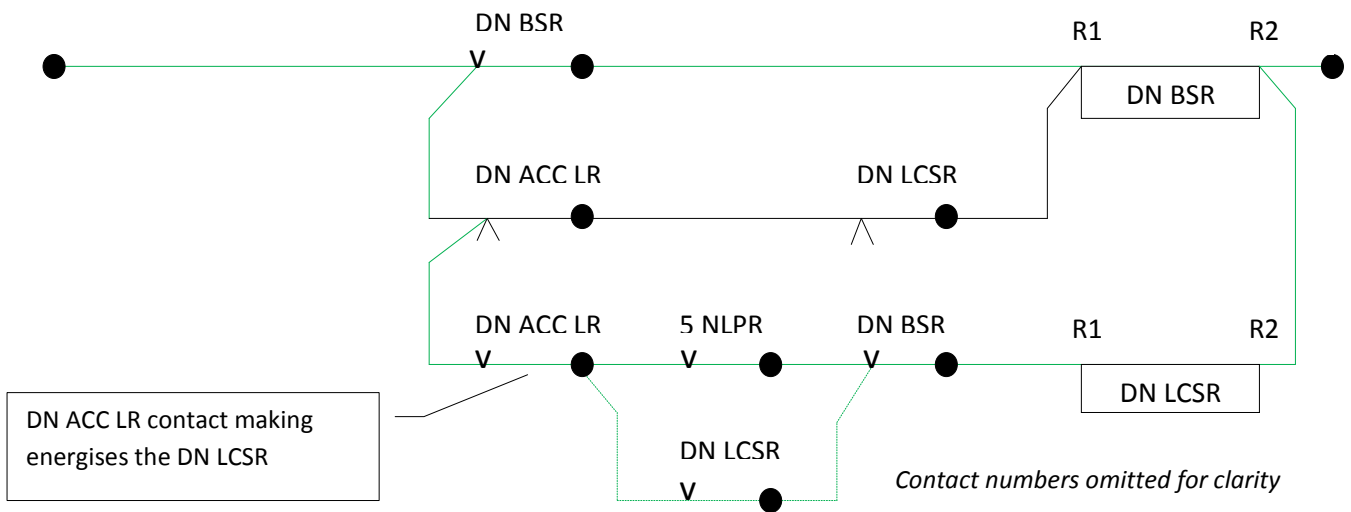


- **Figure 1.5 The DN ACC LR at the receiving signalbox:**



The red circuit is for when a train is being sent the other way. Signalbox A's direction lever (10 in this example) will be reversed, therefore 10 RLPR contacts will be made and send the 50v supply to signalbox B to energise the UP ACC LR at his signalbox.

- **Figure 1.6 The LCSR circuit:**



- **The indication LED's and what position the levers and relays need to be in to light them:**

The indications on the small indication panel are fed by which relays are up or down as follows:

“Section clear”: the sweep TC energised, so in this case BA T1PR (or similar) energised and the first indicated TC on panel clear, again in this case AA TC.

“Plunger transmitting”: Direction lever in NORMAL and (**)ACC SR energised.

“Release for train going to...” : (**) ACC LR energised.

“Train coming from...” : Direction lever in REVERSE and (**)ACC SR energised.

“Release withdrawn” (with alarm): (**)ACC LR de-energised (direction lever put back into frame)and the section signal replaced into back check position.

*The (**) notes the direction but will depend on your own area layout which this will be.*

- **AWS's using the direction lever circuitry:**

The AWS on the single line (if fitted) may use the ACC LR relays to suppress an AWS as shown in this diagram below. *(Links, resistors, cable details and contact numbers omitted for clarity)*

