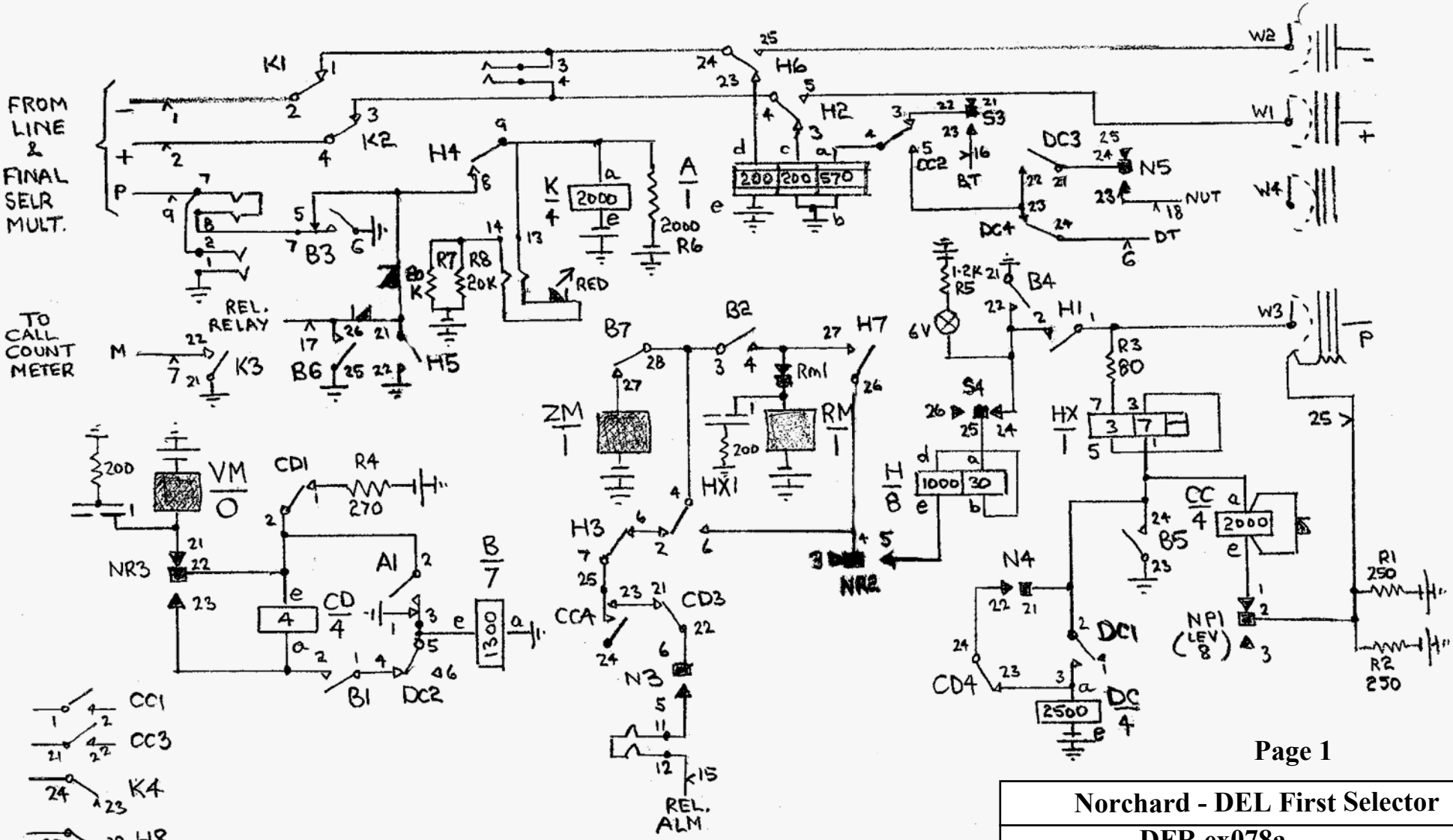

notes : This selector will only permit access to level 8 as set by the NP springs
The white lamp illuminates on an outgoing call
The red LED illuminates on an incoming call

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The Direct Exchange Line First Selector

Introduction

The DFR uses its UAX13 for both operational and demonstration purposes. Two demo phones in the museum generate a very large amount of traffic when the railway is running. However much of the wear on the UAX comes from people, especially children, lifting and replacing the handset. Many calls are attempted but fail due to incorrect dialling. Around 1000 calls a month succeed to operate the caller's meter. Probably 10,000 calls fail.

Everytime a call fails, over 32 magnet operations have to occur for the linefinder, first selector and allotter to obtain dial tone and release. The linefinders in particular have been hammered and have needed to be replaced.

To reduce this wear, new 4000 type first selectors have been introduced. These selectors have the demo phones connected directly to their incoming - and + wires. A lift and replacement of the handset now only results in the first selector taking one step vertically and then one operation of the release magnet. Two magnet operations instead of 32. We hope this will drastically extend the life of the exchange equipment.

It is also necessary for the selector to act as a line circuit on incoming calls to the demo phone. A K relay has been introduced to provide the P wire battery to the final selector multiple and to disconnect the A relay circuit when a final selector seizes the demo line by earthing the incoming P wire.

The donor selectors were originally PABX4 4000 type first selectors. They possessed the necessary N, NR, S and NP springs and a set of relays largely suitable for a conversion. This has resulted in circuit elements culled from the donor selector, a UAX13 first selector and a standard line circuit.

Incoming Calls

When a call is incoming to the demonstration line, The final selector tests for a battery on the called number's P wire. This is supplied by the 2000 ohm K relay in parallel with the 2000 ohm resistor so long as the selector is not busy. The final will earth the P wire to operate the K relay and light the red LED. K1 and K2 disconnect the A relay bridging apparatus. No magnets operate and when the call ceases, the P wire earth is removed to release the K relay and dim the red LED.

Outgoing Calls

When the caller lifts the demo phone handset, the loop operates relay A. A1 operates the B relay to the battery provided by the vertical magnet and R4.

B1 prepares the vertical stepping circuit but keeps relay C short circuited at this stage. B3 earths the incoming P wire and disconnects the K relay. B4 lights the white outgoing call lamp. B5 operates relay CC. CC2 returns dial tone to the caller.

During the dialling of the first digit, A1 earth operates both the vertical magnet and the CD relay. During the operate of relay A, relay CD is short circuited to make it slow to release. It holds during vertical stepping and releases when the dialled level is reached. At this point CD4 operates relay DC via the N4 contacts.

If any barred level is reached, relay CC continues to hold. CC4 prevents the rotary magnet from operating. With CC2, DC3and N5 operated, NU tone is returned to the caller. Further dialling pulses will not operate the vertical magnet as DC2 has disconnected the stepping circuit.

The only permitted level for demo calls is via level 8. The NP springs operate on level 8 and permit the release of relay CC. With CD3 and CC4 released The rotary magnet will drive the selector wipers into the bank. The selector will look for a battery on the P wire from the next selector.

When a free outlet is reached, relay HX will operate (quickly) and at HX1 disconnect the rotary magnet drive circuit. The selector stops and HX1 connects the magnet battery via NR2 and S4 to the H relay which operates. H1 extends an earth onto the final selector P wire to short circuit the HX relay which releases. H7 holds relay H.

H2 and H6 extend the loop to the final which returns an earth on the P wire to hold relay H. Relays A and B restore leaving H5 and H4 to busy the incoming P wire from the caller's multiple.

Should all outlets be busy the selector will drive to outlet eleven where the S springs operate. Relay HX operates to the 125 ohm battery of R1 and R2 to stop the selector. S4 prevents the operation of relay H, so that the A relay can return busy tone from CC2 released and S3 operated.

The release magnet will be operated when both relays B and H are released. The magnet is disconnected when N3 opens on the selctor reaching its normal position.

A call count meter can be connected to the incoming M wire if required. It will only record incoming calls.

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