



Model Train™ TECHNOLOGY

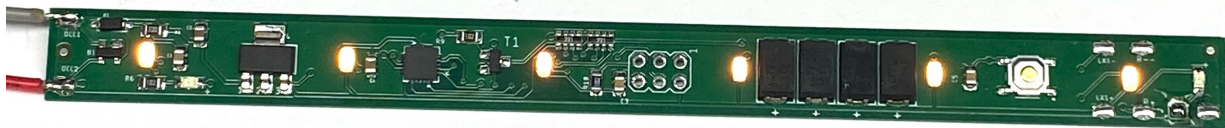
PASSENGER CAR LIGHTING for DC Layouts

OPERATIONS MANUAL

DC SERIES

Version 1.1a

Available Lengths are 124mm and 144mm



INTRODUCTION

There are two sizes of the N Scale LED DC light boards: 124mm and 144mm in length. The board is 11.5mm wide and 2.5mm thick. Both boards have 6 Main LEDs. The N-144-xx has rear red LED and pads for connecting a remote LED.

Both boards have 4 SuperCaps which help with flicker control.

The main and rear LED brightness is adjustable via the onboard pushbutton. The rear LED has option to blink at $\frac{1}{2}$ second per blink. There is a Blue LED which can be used to indicate power to the board. This can be switched off once you have configured the board to your liking. It will be useful to keep the blue LED activated so that it can provide feedback to you during the configuration process.

The onboard circuit will come alive at approximately 4v DC.

The onboard microprocessor will keep both the main and rear lights on at a steady brightness at about 5V. Between those two voltages the brightness will fade up or down depending on the throttle voltage.

The N scale boards will safely operate at HO voltages up to 16V. They should NOT be operated at G scale voltages of 18v and above.

SETTINGS

Adjusting the MAIN LED brightness

To adjust the brightness of the MAIN LEDs, press and hold the button. While holding the button, the LEDs will increase in brightness. When you reach maximum brightness, the blue LED will flash. Once you release the button, the current brightness setting is automatically saved.

If you press and hold the button again while the board is still powered, the lights will decrease in brightness down to the lowest level. When you reach the dimmest level, the blue LED will flash.

When you release the button, that setting will be the new brightness level.

The direction of dimming toggles up and down with each subsequent press and hold. The direction is always up or increasing brightness when you first apply power.

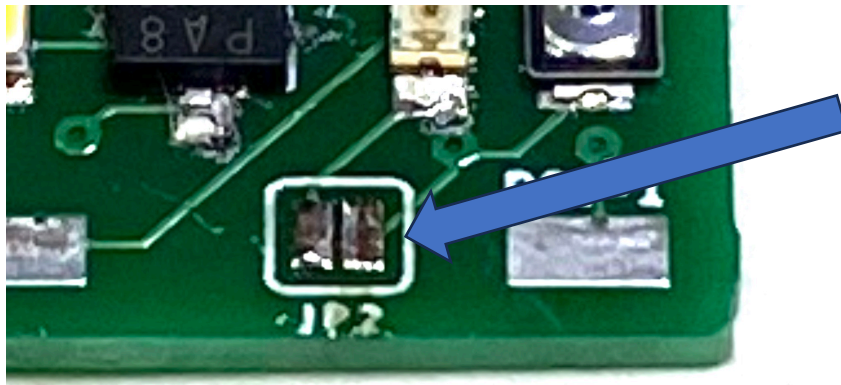
Adjusting the rear red LED brightness

The technique for adjusting the rear LED is similar to the process used for the MAIN LEDs. FIRST, press the button twice. Within 1 second the blue LED will flash twice. THEN, within 2 seconds of seeing the blue LED flash, press and hold the button. You will see the rear red LED brightness go up or down depending on what that last direction for any light adjustment was. When you release the button, the brightness setting of the rear LED will be automatically saved.

Turning the rear red LED on and OFF

Most of the time you will be installing the light boards in passenger cars that are in the middle of the train. However, for the last car you may want to install small read LEDs in the rear wall as warning lights. The light boards are design to light two 0603 or 0402 LEDs. In order to make this work you will need to remove the solder from the terminal pad as shown below.

There is no need to remove the LED, only the solder on the terminal solder pad. To do this, use a needle nosed soldering iron and wipe it on a damp rag or sponge and then touch the solder to the pad. Some solder will jump to the soldering iron and away from the solder pad. Wipe the soldering tip again and go back for more solder. Two or three times is usually enough to remove enough solder to break the connection.



To activate the rear LED, press the button three times. This feature is a toggle so pressing the button again three times turns the LED off

Activating the FLASHING MODE for the rear LED

To activate or deactivate the Flashing Mode of the rear LED, press the button four times. This feature is toggled on and off with subsequent three presses of the button

Activating/Deactivating the BLUE INDICATOR LED

To activate and deactivate the BLUE indicator LED, press the button 5 times. Pressing the button again five times turns the blue LED back on

RESET

To reset the board to factory default settings, press the button 8 times. When complete, the blue LED will flash 8 times.

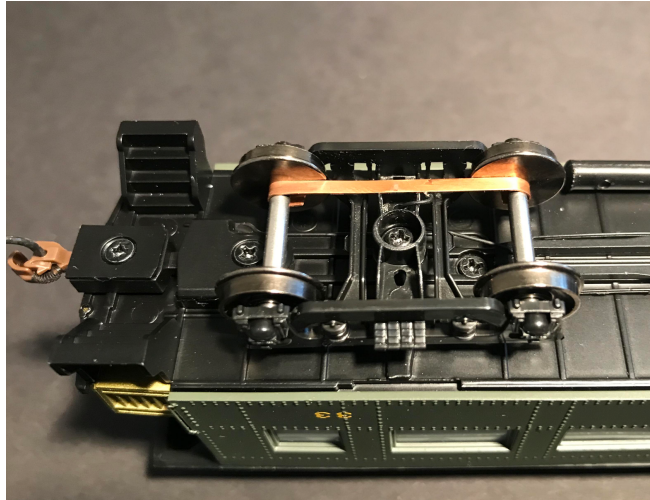
Summary:

Main LED adjust	1
Rear LED adjust	2+
Rear LED On/Off	3
Rear Flashing On/Off	4
Blue LED On/Off	5
Reset to defaults	8

FLOATING BRASS WHEEL PICKUPS

We have had the good results with KATO® passenger cars largely because they come with wheel pickups. One of the reasons we made these boards is that the rest of the KATO® lighting system is very “wimpy”. With KATO® we have found that the best hook up is to solder the wires to the very end of each of the two long copper strips that make contact with the wheel pickups. We tried to use a variation of the copper strip that slips inside and makes contact with the longer metal strips – it “sort of” works. Depending on the version of the board you purchased, you may have as many as 8 capacitors that are designed to reduce the flicker effect that comes from the physical “noisy” pickup and the wheels. In testing we found that this was still not enough to overcome a bad connection to the long metal strip. Soldering the two board wires directly to the long metal pickup improved the overall performance dramatically.

For all other cars that are not pre-configured with electrical pickups, we recommend our “floating” brass strips. A single 1mm or 2mm piece of brass is wrapped around each axle of the truck at either end of the car. Then, a 36AWG stranded wire (supplied) is soldered to the brass and connects to the DC1 and DC2 on the board. The reason we call this “floating” is that it is NOT fastened to the wheel truck. This allows it to shift with the movement of the axle and doesn’t bind the wheel. ALL the other types we tried required you to fasten their metal contact to the truck with a screw or by glue. This tends to put extra pressure on the wheel or axle and causes it to pinch inside the truck wheel holder. It also adds friction that cause the car not to roll freely.



The width of the board is 11.5mm. In a few situations you may have a better fit at about 11mm. For example, this was the case for the Amtrak Skylight car. It's perfectly ok to sand down the edge of the board up to a total of about 1mm. Use your good judgement on this. The underside of the board is ground (GND), and you can see that it starts a little bit away from the edge of the board. I know it's hard to see but wiggle the board under a light to see the reflective difference. Consider up the edge of the GND a safe zone for filing and sanding. I use a piece of 220 grit paper on a flat surface and slide the edge of the board over it. The PCB material is fairly soft so don't go overboard!

These boards are NOT designed to be shortened lengthwise. We have two lengths available for N Scale: 124mm (4 7/8") and 144mm (5 5/8") . If this doesn't fit your requirement, contact us to see if we can include a custom sized version in one of our manufacturing runs.

ELECTRONICS AND STATIC ELECTRICITY

The circuit board and components are exposed. Static electricity can cause component failure. Scuffing along a carpet and then touching one of the component connectors can cause a static spark. These components are fairly rugged – some designed for the automotive industry. Just be mindful of the risk. The current on the board will not harm you if the board is powered as per the instructions.

ONE YEAR MANUFACTURER WARRANTY: We warrants this **product** to be free from defects in workmanship and materials, under normal residential use and conditions, for a period of one (1) year for the original invoice date. Shipping and handling fees are to be paid for by the customer.

LIMITATION OF LIABILITY

UNDER NO CIRCUMSTANCE SHALL COMPANY OR ITS AFFILIATES, PARTNERS, SUPPLIERS OR LICENSORS BE LIABLE FOR ANY INDIRECT, INCIDENTAL, CONSEQUENTIAL, SPECIAL OR EXEMPLARY DAMAGES ARISING OUT OF OR IN CONNECTION WITH YOUR USE, OR INABILITY TO USE THE PRODUCT, WHETHER OR NOT THE DAMAGES WERE FORESEEABLE AND WHETHER OR NOT COMPANY WAS ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, COMPANY'S AGGREGATE LIABILITY TO YOU SHALL NOT EXCEED THE AMOUNT OF THE PRODUCT. THE FOREGOING LIMITATION WILL APPLY EVEN IF THE ABOVE STATED REMEDY FAILS OF ITS ESSENTIAL PURPOSE.



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