

When converting passenger car sets to led lighting, I usually hand wire a series set of 3 bright white leds (with load resistor) into the observation car for the side and rear markers. But this is a somewhat tedious procedure so I decided to whip up this little board just to make the process faster and easier.

It's 31 x 55 mm overall size, with pads to solder in a rear led, and two alternate locations for side marker leds. Which ones to use will depend on what fits the particular car best. (Only one set of the side marker pads should be used because they are wired in parallel on the board.)

The board includes a spot for a series load resistor R1. I have found something in the range of 220-330 ohms seems to work nicely when connecting the board to an overhead strip of 3528 leds powered by a constant current regulator board, set at say 25-30 ma output. Alternatively you can install a 1K trim pot such as a Bourns 3362P style in place of R1, for adjustment to get the marker led intensity that looks right.

Here is a table of R1 values and approx. currents for 3 x white leds:

R1 ohms	470	330	220	150	47	0
I; ma	2.2	3.0	4.0	5.0	8.0	11

There is also a series pad for a 1N4148 or similar GP diode, to rectify the track AC if no constant current board is used in the car. In this case the value of R1 will be higher than above and you may need to experiment or use a pot per above. Ordinarily when using with a constant current board, you would simply omit diode D1 and jumper the pads.

You can also use the D1 pads to wire another led into the circuit, such as for drumhead lighting for instance. This will necessitate adjusting the value of R1 of course.

First solder the three 3mm flat face white leds in with the leads full length, along with the other components, observing polarity. You can use a standard 0.1" pitch 2 pin header and connector for wiring, such as JST-XH or Dupont style. But simply soldering 2 short lengths (3" +/-) of #30 or so wire is an easy way to connect it to a convenient pair of +/- pads on the led strip lighting, observing polarity.

Then mount the board up inside the car roof, near the back end, to best fit the locations of the three existing red marker bezels. Use double sided foam adhesive tape, CA glue, or similar. Once the glue is dry use needle nose pliers to bend the led leads as needed, so that they shine directly onto the flat inner end of the bezels when the car is re-assembled. You can still use a full length strip of 3528 led lighting in the car by affixing the end section to the center open area of the board, which is left open for this purpose.

Some observation cars have a single roof mounting pedestal which attaches to the roof about 1-1/2" in front of the rear marker led. You should find that you can drill a suitable 3/8" or so clearance hole for this pedestal in the "V" shaped back open area of the board, using a step drill bit.

For two side-mounted pedestals the tapered "V" rear part of the board should fit between them nicely.

There is no 22uH DCS inductor on the board. Usually you would power the board from an led lighting strip powered by a constant current lighting board, which already has the inductor built in; so there is no need. Besides there is nothing about this simple circuit that might create DCS interference even if connected directly to track power. The constant current board is a better way to go though, as it already has a cap to mitigate flicker, a bridge rectifier, and adjustable regulated current output, as well as the inductor.

My plan is to pre-build about 6 of these at a time, so they are ready to drop in and hookup whenever converting an observation car to led lighting. I also plan to convert a few caboose to led marker lighting and these boards should work for that purpose too.