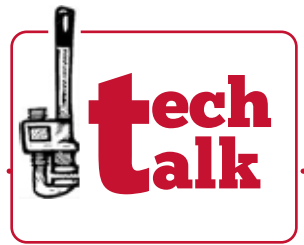


Adding LEDs to a 2013 NC2 ...



Words & photos: Rael Belterman

I'm not sure what it was that prompted me to explore getting LEDs for my MX5, but maybe I had too much time on my hands.

However, once I started looking, I had no time for anything else!

There is so much information out there (just watch any of the *Headlight Revolution* videos on Youtube!). These are really informative – and overwhelming), and so many suppliers and types of LEDs and such a wide range of prices.

After trying out a few little LED bulbs that I bought at one of the chain automotive parts stores, I settled on two Australian-based online suppliers for the rest of my LED needs.

I ended up spending \$470 in April to change all the old lights in my car to LEDs.

Overall, what I found through LED Shop Online (www.ledshoponline.com.au) and Stedi (www.stedi.com.au) were much cheaper than better-known brands, like JW Speaker or Phillips, and they were often brighter. For example, the LEDs for interior and boot festoon lights were \$4 each at LED Shop Online (120lm) compared to \$12 JW Speaker (68lm). I must say that some LEDs look more like the traditional bulbs, while others, like some of the ones I bought, look like they were put together in a back shed.



Festoon conversion LED

This was the first time I have ever installed LEDs in a car, or anywhere else for that matter. So, I am no expert. This article is just a long story into what I did to my NC, written here so you may not have to spend as much time as I did researching, if you trust me.

It is worth noting that I couldn't find literature relating specifically to the legality in Victoria of changing halogen headlights to LEDs. I can't find information about this matter on VicRoads or RACV websites. Other State websites, however, suggest it might make the car unroadworthy. Please do your own research, but either way, if you install them, make sure they don't dazzle other drivers (unlikely considering how low MX-5s are) and ask to have your headlights checked and realigned at your next service.

→ **CAN bus**

As far as I understand, getting LEDs for the NC does NOT require lights that are CANBUS-ready as NCs (or NA and NBs) don't give us a *light out warning* on the dashboard as they are not CAN bus-equipped vehicles. Some of the bulbs I am using are CAN bus-ready, others aren't. My NC's headlights didn't require a *CANBUS Cancellation* module.

Please note that many of the small white lights come in a choice of cool white and warm white. So you can get the benefit of the brightness of LEDs and retain the current look of your lights if you wish. Please note when buying your lights that the same

size bulbs can vary in brightness between brands and models and remember to get 12V, not 24V lights.

→ **Indicators (\$18 - 4 resistors + \$45 - 6 bulbs)**

Research: I spent a long time trying to find a way to use LED indicator lights. The issue is that they use less power, causing the car to think that a bulb is blown – so the blinkers hyperflash. Initially I thought I could use a replacement flasher box, however, I could not find such box for the NC despite some of the discussions online suggesting that they exist, as well as going to a couple of shops ... and finding that the one promising-looking box that I did find, didn't fit.

The solution instead was four resistors; one each for the front and rear indicator bulbs. These came with clamps although I did solder some in place just for fun (and because I clamped too hard and cut through one of the wires). Resistors were not required for the side indicators.



Resistor rear



indicator resistor installation

Difficulty Level and Fitting:

- » **Rear: Medium** difficulty because of the resistors. To access the rear light cluster, you need to remove the boot lining. The clips are easy enough to remove and the lights are easy to access. The resistors require being anchored so I found short screws and screwed them to the metal body of the car. **Do NOT anchor to plastic as the resistors get very hot and can melt plastic.**
- » **Front: Difficult.** To access the front indicators I accessed them through the wheel arch, after removing the wheel and then the arch guard, and brought them up to the top of the engine bay to access the wires and add the resistors. After installing the LEDs, I hung the resistors with zip ties to ensure they won't flap about and make any knocking noises while I drive. I couldn't find a place to fix them with screws, and thought that would be too difficult and unnecessary.
- » **Side: Easy.** Follow the owner's manual. These covers slide to the side and pop out.



Side indicators



Indicator bulbs

continued ...

■ **Please note:** All "Tech Talk" information is provided as a guide only. All work is carried out at the owner's risk.

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Verdict: The LED indicators are definitely brighter and more intense, and they flash quicker because they are 'on' then 'off', unlike incandescent bulbs which glow up then glow down. For the cost and trouble, I am not convinced the front and rear ones are worth the effort. The side LEDs were easiest and are really bright so I definitely would do these as part of a light upgrade.

→ Brake/Tail lights (\$16)

Research: Just needed to find a brake/tail light.

Difficulty Level and Fitting: **Easy.** Access rear light cluster as per indicators and reversing lights.

Verdict: Brighter, and because LEDs have a faster response time, they give the person behind you more time to stop, so a good addition.



Rear light cluster
(see above)



Reversing lights comparison
(see below)

→ Reversing Lights (\$14)

Research: It turns out there are a number of LED bulbs that will fit in here. Go for the brightest!

Difficulty Level and Fitting: **Easy.** Access rear light cluster as per indicators and brake/tail lights.

Verdict: This is a fantastic upgrade. So much brighter than the standard bulbs. Bright and white (warm is also available!)

Interior and Boot/Cargo lights (\$9)

Research: There are white and warm white lights to choose from. Read carefully when buying.

Difficulty Level and Fitting: **Easy.** Read the owner's manual. Easy to access and to swap the festoon lights.

Verdict: I went with the white lights. In the cabin the change is significant. It is so much brighter and crisper. However, in the boot the difference in visibility isn't so noticeable, but I think that has more to do with the position of the boot's light than the light itself. When the car lights are on, the number plate lights do a better job of illuminating the boot than the boot light does.

→ Footwell (\$11)

Somewhere in the LED rabbit hole I had fallen down, I started desiring lights in my footwells. A Mazda cable harness and lights costs about \$300. One day at Bunnings, I came across *Lytworx* one-metre, battery-operated, motion sensor LED strip light. \$10.90! I love it! I have the control unit in an easy-to-reach place and rather than use the sensor; I just turn it on when I need it, or

when I want to show off.



Interior lighting



Interior, including footwell

Number plate (\$9)

Research: There is a choice of white or warm white. Read carefully when buying.

Difficulty Level and Fitting: **Easy.** Read the owner's manual.

Verdict: Looks more modern with white lights.



Number plate lights

→ Front Position Lights (Parking lights) (\$14)

Research: I had two sizes to choose from here: 225lm or 490lm. I chose the 490lm bulb. Also available in warm white if you are sticking with your halogen headlights but want to upgrade your parkers.

Difficulty Level and Fitting: **Easy.** Of the front lights, the parking lights are the easiest to access as these can be done without removing anything. Small hands would work best because it is a squeeze.

Verdict: Depending on which lights you choose, they can be bright enough to enhance the visibility of your car during daytime driving, and certainly make it more visible when parked at night! I think they modernise the look of the car.



Front left - standard /
Front right - LED



Front LED complete

→ **Fog lights (Stedi - \$60)**

Research: Initially I was going to go with *LED Shop Online* ones, but Stedi makes a dedicated fog light at half the price. It has a solid heat sink.

Difficulty Level and Fitting: Medium because of the need to remove the wheel and the inner guard of the wheel arch. This was the easiest install of the three “driving” lights. Just remove the old bulb and unplug. Fit the new bulb and zip tie up the control module.

Verdict: These complete the look. If you are going to do the parkers, the low and high beams, then these are a must, and they look the part. I haven’t driven with them in fog yet though.



Low beam adaptor clip plus high beam rear



Rear of right fog light

→ **Low Beam (Stedi - \$150 plus \$11 adaptor L08)**

Research: Note that the NC has projector (not reflector) low beams and Stedi was the only company that I saw that mentioned an adaptor is needed to fit an LED *Projector H7* to the NC (they have a range of adaptors for a range of cars). So even if you get your *Projector H7* LED bulbs elsewhere, you might need to get the adaptor from Stedi. For cooling, the Stedi *Projector H7* uses fans.

Difficulty Level and Fitting: Medium. Remove the wheel and the inner guard of the wheel arch. Remove the dust cover and the halogen bulb. Clip in the adaptor. Cut off a section of the dust cover and push the bulb through it and then put it into place. Now is the time to check that the position of the bulb is correct and make appropriate adjustments. Then replace the dust cover, ensuring the best seal possible while keeping the fans free.

Verdict: The light is white and bright and smooth. Although I haven’t yet been able to meet up with any other NC2 owners at night with standard lights to compare.

→ **High Beam (\$110)**

Research: Too many brands to choose from, and because I was unsure about whether I would need a separate CANBUS adaptor I bought this particular one because it had a CAN bus (error cancelling) function built in.

For cooling, the *LED Shop Online* HB3 LEDs use copper straps for heat dissipation.

Difficulty Level and Fitting: Difficult – unless you have small hands. These are fitted from the top of the engine bay and it is tight. They are fiddly to get in and then twist to align the LEDs.

Verdict: I have noticed some shadowing from these lights when driving in the local area, particularly on fences, although I understand that this is a common problem with LED aftermarket headlights. However, I haven’t been on a long night drive to see if it is too annoying.

Again, I am looking forward to comparing my set up with another NC2 with conventional lights.

Overall, I love the look of the LEDs. On a daily-use basis the interior light is the best upgrade one can do. After that, the parkers, headlights, fog lights and licence plate lights make the car look more modern. The headlights do appear to be brighter, and I prefer the white light lighting up the way. LED headlights are generally in the colour spectrum similar to that of daylight.

It has been a fun little project and I am looking forward to getting out of lockdown and comparing the lights at night with another NC2. I will take some photos and write an update then.

Some Youtube Video to watch include these by Headlight Revolution:

- » The Truth about LED bulbs - Don't Buy LED Bulbs Before Watching This!
- » How To Align and Aim LED Bulbs For the Brightest Light Output | Headlight Revolution
- » Difference between Projector and Reflector Headlights - What's the big deal?
- » How to Aim and Align Your Headlights

I have a spreadsheet with attached URLs available to help with people’s research. Just copy and paste this link:

<https://docs.google.com/spreadsheets/d/1HUkhksvZzagyZ1G3KvHIEZX9XW-h-b5rGXxswDkhcTE/edit?usp=sharing>

or find it on the Tech Talk page in the “Mazda MX-5 Information” section of the Club’s website, <https://mx5vic.org.au/technical/>.



Dust cover low beam



Low beam rear view