

# TRA 2023 Tech Session – Electrical Hacks

## Reference -LED lights

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A key issue for me is safety when driving an older car, especially being seen by cars following me. Original equipment bulbs, either the dual filament tail/brake bulbs (type 1157) or single filament turn signal bulbs (type 1156) are not that bright compared to modern LED lights. This combined with less output as the incandescent bulb ages, contacts get corroded, and dirty lenses means less chance of being seen, especially in conditions such as bright sunlight (less contrast) or fog/rain. LED lights have some real advantages to address these issues. First of all, they tend to be brighter and have much faster response. Second of all they use a lot less current which is a bigger plus for cars with original generators as opposed to later (or converted) cars with alternators. Finally, they have a vastly longer life than incandescent bulbs.

LED lights also have some characteristics that are unique and need to be considered:

- LED lights need to be matched to the color of the lenses, red with red, amber with amber, and white with clear (for example a white LED behind a red lens gives sort of a pink color).
- LED lights have such a low current draw that they will not work with old style bimetallic strip flashers. One has to use an electronic flasher.
- LED lights are directional so getting the correct configuration (length, angle) is important to get the best look and performance.

LED lights also are more expensive, but the positive trade-offs are worth the price. Besides, since you really love your TR, don't you want to be seen in traffic situations (stopping, turning) as well as admired in the parking lot?

## TR Lighting

There has been a real growth in the number of types and suppliers of LED lights recently. There are a number of direct replacements for type 1156 and 1157 bulbs in addition to custom boards with LEDs to fit various tail light assemblies. My criteria include keeping everything as close to original as possible so that when looking at the car in a show situation, one could not tell of any modifications and that the car could be returned quickly to partial or full incandescent bulbs. From experience, I have sourced my bulbs from LiteZupp (<http://litezupp.com/>) in Texas. Their bulbs cost a bit more than some others but are of high quality (aluminum heat sinks), are made here in the U.S.A, and are direct replacements.

For the Triumph TR2-3 series, adding LED lights is relatively straightforward if the car has been set up for 12V negative ground (as my car has been to allow for charging modern accessories) or you have a later TR with the ground already switched. If you decide to keep your car positive ground, LiteZupp is the only supplier of positive earth lights and you will have to also buy their electronic flasher.

## Rear tail/brake lights

The tail lights (the light in the oblong Lucas housing at the back of the fenders) for the later TR2 through 3B have a type 1157 bulb (dual contacts, dual filament) that hangs down from the socket. For this application LiteZupp makes a right angle, red, 57 style (no. LR57RN) which hangs down in the socket with the LEDs oriented to the rear (Figure 1).



**Figure 1 – LiteZupp Red, Right Angle 1157 Replacement LEB Bulb**

While the angle of the light hanging down is not exactly 90 degrees, the LEDs are quite visible as the viewing angle is quite large and the red plastic lens also spreads out the light from the bulb. Note that what this bulb does changed over the years. For TR3s prior to TS18913 this bulb was a combination tail lamp and turn signal. For TR3s TS18913 and later (when the additional 2 turn lamps were added) this lamp was a combination tail and brake light assembly. This means that for the later cars this lamp can be substituted without concern for changing the directional flasher and is the easiest and most cost effective solution to improving visibility and safety. For cars prior to TS18913, and to use LEDs in the turn signals in post TS18912 cars, the flasher must be changed to an electronic one.

## Turn and Parking Lights (and Brake for early TR2-3)

The little Lucas bullet lenses and lamps on the front of the car and back of the post- TS18913 TR3s do not have a lot of space behind the lenses. For these types of lamp assembly, LiteZupp has a short LED light for use where the depth is not that great from the base to the lens. The standard LED is 1 ¾" in length while the short one is 5/16" shorter allowing better fit and light dispersion (Figure 2).

- The front parking/turn lights have a clear lens so what is needed is a Short Housing White 57 Style (no. LS57WN).
- For the turn lights on a post-TS18913 TR3 this is a single filament bulb so the light for this lamp is a Short Housing Red 56 Style (no. LS56RN).

One advantage of having LED lights in front is that they are bright enough to serve as daytime running lamps. A great safety factor on the highway.



**Figure 2 – Difference between the standard LED designed to fit a 1156 socket (and with a dual filament the 1157) on the left and the shorter one required for turn signal applications on my TR3A**

For pre-TS18913 cars there is a single brake/license plate lamp in the center of the car and this presents an issue. The bulb is a dual filament or type 1157 bulb. With an incandescent bulb there is no issue as when the lights are on, the low light filament is powered, bottom of the lamp is clear, and white light shines on the license plate. When the brake is applied the second filament lights up and indicates braking due to the increased intensity. You could fit a Short Housing Red 57 Style (no. LS57RN) LED to this, but doing so would cast a reddish glow on the license plate. However LiteZupp may have a solution to this that should work. It is designed for old Harley bikes that have a single tail, brake, and plate light – just like a TR2! This LED light called a Harley Brake and Tag with Flash (no. LH57RNF) and is a type 1157 bulb. It has 4 red LED's for the running and brake and a white LED for the license plate. It also has a microprocessor that flashes the light when brakes are applied (only available in negative ground).

### **Other Lights (Instrument, tail light, headlamp)**

There are other lights that can be substituted for LED lights. Among these there are the instrument lights that illuminate the Speedo and Tach and other gauges. There are direct replacements for the instrument lights ( ) and the license plate lights ( ) available from LiteZupp.

**NOTE:** Is very important to state that the charge indicating light on the dashboard CAN NOT BE SUBSTITUTED for an LED. A normal incandescence lamp is necessary as it is a part of the circuit and the same lamp characteristics must be maintained.

The 7" headlights can also be swapped out for LED headlights. It is really a matter of replacement of both the bulb and reflector or replacing the bulb in your present headlight if it is the type with a replaceable H4 bulb. For any driving after dark they provide a rear increase in visibility.

## THE HACK – Hiding the flasher on a TR2-3

### Electronic Flasher

As stated earlier, LED lights will not work with old style bimetallic strip flashers because of the low current draw, therefore an electronic flasher must be substituted. These are now available from a number of suppliers. Since the flasher is readily visible in the engine compartment of the TR2-3, substitution of an electronic flasher will result in a non-original item and appearance. This might not be an issue with some, but I wanted to retain a stock appearance.

If you want it to look original, the guts of the electronic flasher can be transplanted to a donor round can as I did this for my TR3A. To do this I recommend buying a new donor flasher, the one I used was from TRF but Moss and others also have. If you want it to look old, find a used one.

I have done this with two electronic flashers - one from LiteZupp , [www.litezupp.com](http://www.litezupp.com) , which comes in two shapes, square and round and the first unit I which i bought from Superbrightleds, [www.Superbrightleds.com](http://www.Superbrightleds.com) . Both of these will work with both LED and incandescent bulbs and are a plug in replacement for the bimetallic flasher (Figure 2).

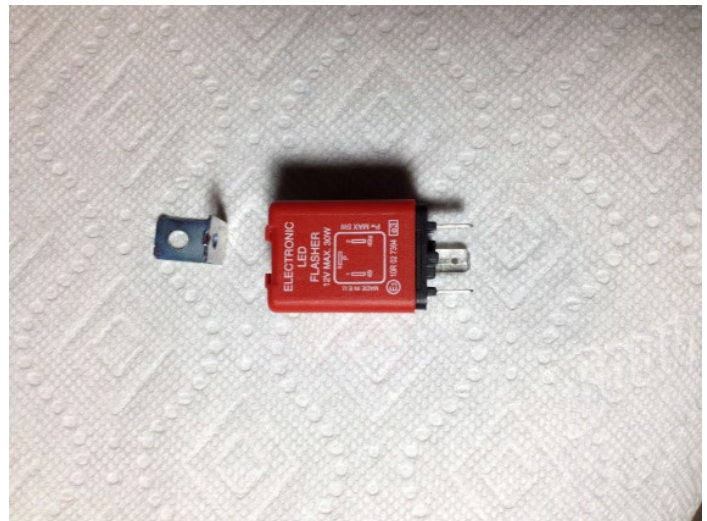


Figure 2 – Donor Lucas can and LiteZupp electronic flasher (left) and Electronic Flasher Unit from SuperbrightLEDs.com (right)

I removed the bimetallic element from the donor flasher by carefully bending the crimped bottom of the can (Figure 3).



**Figure 3 – Yep, that’s all that is inside the original-style flasher**



I used a 15mm length of wood dowel to act as a spacer to position the LiteZupp flasher at the correct depth in the can. The LiteZupp flasher requires a ground for the electronics so that was attached to the Lucas can by drilling a hole in the back of the can under the mounting tab and attaching the ground wire with a #6 screw and nylock nut . Since my TR3A was a pre-TS60000 with screw connectors, I drilled out the holes in the tabs so I could use the original screw connectors. Note that for post-TS600000 cars with spade connectors, this would not be necessary.

After putting the wood spacer in the bottom and the LiteZupp flasher in the Lucas can, black epoxy was used to hold the flasher in place (JB Weld fast cure).

In case of the SuperBrightLED electronic flasher I just separated the red case and the black bottom piece, and then pulled the printed circuit board with the three connector tabs from the bottom piece. To put the circuit board into the original style flasher canister I used the dimensions of the round board that held the bimetallic flasher element, took a general purpose printed circuit board (type used for electronic projects), and cut out a circle piece with holes for the tabs to match the three tabs on the LED printed circuit board (Figure 4).



**Figure 4 – Circuit board from electronic flasher being readied to put into original-style flasher canister**

I used two small zip ties to provide a support for the printed circuit board. Holes were sealed with silicone caulk. As a precaution, I lined the inside of can with plastic but I am not sure it was needed. As with the LiteZupp assembly, I drilled out the holes in the tabs so I could use the original screw connectors. Note that for post-TS600000 cars with spade connectors, this would not be necessary. Figure 5 shows the assembled circuit board ready to put into the canister and Figure 6 the finished product.



**Figure 6 – Completed and ready to put back in -SuperBrightLed (left) and LiteZupp (right)**

Connection to the car wiring is straightforward. The tab in the middle top marked P is the same as marked on the cover of the electronic LED flasher and in the Triumph wiring diagram. P goes to the turn signal indicator light. The tab on the right (with P at the top) goes to the lights and is indicated as L in the Triumph wiring diagram. The tab to the right indicated as B (or X) in the Triumph wiring diagram is the 12v that comes from the turn signal switch. Final installation should not be different from original bimetallic flasher unit. Figure 7 is the new flasher in my car.



**Figure 7 – Electronic Flasher in place in my car**

## Summary

So with a small investment and not a huge amount of elbow grease I converted my TR3A to LED lighting and in a way that retained the original looks to the untrained eye (and even a few trained ones I'll bet). I have brighter light, greater reliability, and less current draw than incandescent bulbs. The modifications are simple, and if you maintain your own car you can do this in an afternoon. See you around, and you will see me!

*Comments in this document are based on my work and preferences in adapting my 1959 TR3A (TS46868L) for LED lights. Differences along the TR series and individual preferences may involve different approaches. My experience is with my 1959 TR3A but I have tried to address the differences for TR2s and early TR3s (pre TS18913) although I have no experience with these early cars. For later cars such as the TR4, TR250, and TR6 the configuration of the lamps can be different but adding LED lights should be similar. Questions and/or comments to John Coutant ([john.coutant@gmail.com](mailto:john.coutant@gmail.com)).*