LUCAS ST51

D-STYLE TAIL LAMPS

LED CONVERSION

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TC MOTORING GUILD

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1. INTRODUCTION

Over 70 years of old technology and use has left many MG-TC Tail Lamps both dim and unreliable. The conversion of those old incandescent lights, to modern solid state LED (Light Emitting Diode) technology, is a proper solution to both problems. While one could simply replace the existing incandescent light bulbs with their LED counterparts, that approach would not solve any connectivity problems associated with the original socket designs. An overall better approach is to replace all of the internal parts (which are associated with illumination) with arrays of LEDs mounted on printed circuit boards. Although this approach does not restore the Tail Lamps to their original configuration, the changes are all internal to the Tail Lamp assembly and, therefore, are not noticeable to a casual observer. The details of such a conversion are addressed in the following sections. These instructions are applicable to both "Positive-Ground" (Original) and "Negative-Ground" (Not Original) configurations. See Paragraphs 2.1 and 7.1 for specific differences.

2. NEW PARTS REQUIREMENTS

The LED conversion, as described herein, requires a number of new parts. These parts, and those that are associated with general restoration, are identified in the following paragraphs. Suggested sources are identified, however, the required parts are also available from alternate sources. The specified quantities are based upon the restoration/conversion of two (2) ST51 D-Style Tail Lamps.

2.1. From The Frame Up

- EL618* LED Conversion Panel (Positive Ground) (2 Each)
- EL619* LED Conversion Panel (Negative Ground) (2 Each)
- EL858 Clip, Lens Retaining (2 Each)
- RU050 Seal, "D" Lamp Side Lens (2 Each)
- RU052 Seal, "D" Lamp Main Lens (2 Each)
- RU054 Seal, "D" Lamp Main Body (2 Each)

*Note: The manufacturer of this part is Brittrix (www.brittrix.com)

2.2. Ace Hardware

- Spray Adhesive (Clear) (A/R)

3. DISASSEMBLY

3.1. Remove Electrical Wires – Cut, and remove, all electrical wires from the interior of the Tail Lamp enclosure. This will permit better access to other parts of the assembly.

3.2. Remove Light Bulb Socket/Reflector Assemblies – Drill, or grind, the head off of the two (2) mounting rivets which attach the assembly to the Tail Lamp baseplate. Punch out the remaining rivet pieces and separate the assembly from the baseplate. Both sides of the removed assembly are depicted in Figure 1.

FIG.1 Removed sockets and reflectors

3.3. Remove Lenses – Disengage both ends of the Lens retaining clip which holds both red and clear lenses in place. Remove both red and clear lenses from the assembly.

3.4. Remove Gaskets/Seals – Remove the two (2) lens seals, which surround the edges of the red lens and the clear lens within the Tail Lamp enclosure. Remove the seal which is attached to the interior of the baseplate within the Tail Lamp enclosure.

4. CLEANING

4.1. Remove Rust and Dirt – Using appropriate liquids, brushes and cloths, remove all visible rust and dirt from both the interior and exterior of the entire Tail Lamp assembly.

4.2. Paint the Baseplate – Paint (or re-touch) the Tail Lamp baseplate. Paint to match the original black paint.

4.3. Clean Lenses – Using appropriate liquids and cloths, clean both the red Lens (Tail Light/ Stop Light) and clear Lens (License Plate Illumination).

4.4. Polish Chrome – Using the appropriate chrome polish, restore the exterior of the Tail Lamp enclosure to its original luster.

5. BASEPLATE MODIFICATION

5.1. Locate Mounting Holes – Installation of the new LED Circuit Board Assembly requires that two 3/16" diameter holes be drilled in the Tail Lamp baseplate. The general location of these holes can be seen in Figure No. 2. The first hole is simply an enlargement of the original rivet hole and the second hole is a newly drilled hole which is located the same distance from the baseplate edge as the first. The distance between the two (2) holes is the same as that between the two (2) mounting holes on the new LED Circuit Board Assembly. Using these measurements, mark (center punch) the location of the second hole.

FIG. 2 Baseplate mounting holes

5.2. Drill Holes – Using a 3/16" drill bit, enlarge the first (i.e., rivet) hole and drill the second hole at the location marked by the center punch.

5.3. Elongate Holes – Proper positioning of the LED Circuit Board Assembly (within the Tail Lamp enclosure) will require that the two (2) mounting holes be slightly elongated (in

the direction of the baseplate hinge-line). The required elongation can be achieved with the proper use of a small "rat-tail" file. The required amount of elongation can be determined, by "trial-and-error", during the final assembly process.

6. ASSEMBLY

6.1. Install Gaskets/Seals – A total of four (3) seals are required for each of the two (2) Tail Lamps. They are:

- Main Lens Seal – P/N RU052 (Red Lens)
- Side Lens Seal – P/N RU050 (Clear Lens)
- Main Body Seal – P/N RU054 (Baseplate/Interior)

In each case, one side of the seal should be coated with Spray Adhesive (in accordance with the manufacturer's instructions). Each Seal should then be applied to the metal surface at its intended location. The specified "setting" time should be allowed prior to handling and/or installation of other parts.

6.2. Install Lenses – A red Lens (Tail/Brake Light), a clear Lens (License Plate Illumination) and a Lens Retaining Clip (P/N EL858) are required for this installation. In their proper locations/positions, the red Lens is located in the interior "D" shaped area of the Tail Lamp enclosure, and the clear Lens is located in the interior flat side of the Tail Lamp enclosure. In turn, the Lens Retaining Clip is located so that its center is tucked under the "dimple" in the enclosure (lower center of curved section) and each end is tucked under the head of a mating shoulder rivet (above the clear lens). This installation is depicted in Figure 3.

FIG. 3 Lens and clip installation

6.3. Assemble LED Circuit Boards – Each LED - Conversion Kit (P/N EL618 or EL619 as applicable) is comprised of two (2) LED Circuit Boards (LED arrays) and two (2) Nylon "stand-off" spacers. One LED array illuminates the clear Lens and the other, the entire red Lens. The two (2) "stand-off" spacers are used to mount the circuit boards to the Tail Lamp baseplate. The first step is to plug the smaller board into the other board (at right angles to one another). Make sure that the multi-pin connector is

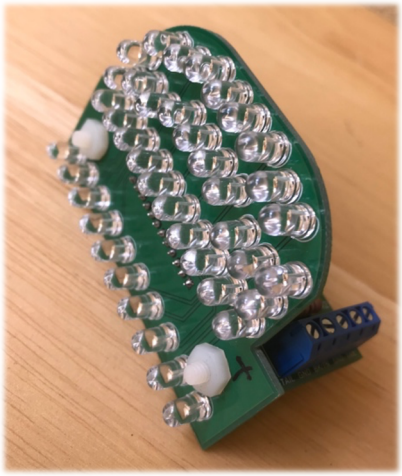

FIG. 4 LED Assembly (front)

properly seated before proceeding. The two (2) Nylon spacers should then be inserted into their respective holes on the backside of the larger LED array and the associated Nylon nuts installed/tightened securely. (Do not over tighten.) The complete subassembly is depicted in Figures 4 and 5.

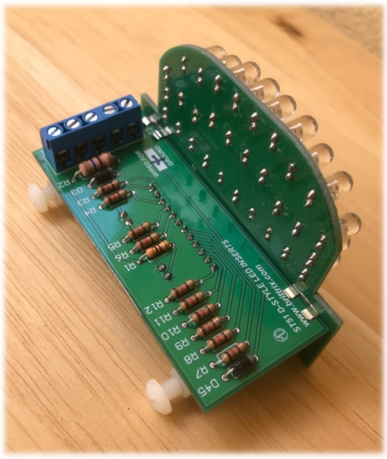

FIG. 5 LED Assembly (back)

6.4. Install LED Circuit Board Assembly – In this step, the completed LED Circuit Board Assembly is fastened to the inner surface of the Tail Lamp baseplate. This is accomplished by placing the two (2) Nylon "stand-off" spacers over the two (2) matching holes in the baseplate and securing them with two (2) Nylon screws. Before tightening the mounting screws, closure of the Tail Lamp Assembly should be attempted to assure that there is no interference between the LED Circuit Board Assembly and the Tail Lamp shell. If there is insufficient clearance, the holes in the baseplate should be elongated as necessary. When the proper (non-interference) fit is achieved, the two (2) Nylon screws should be inserted and securely tightened. (Do not over tighten.) This assembly is depicted in Figure 6.

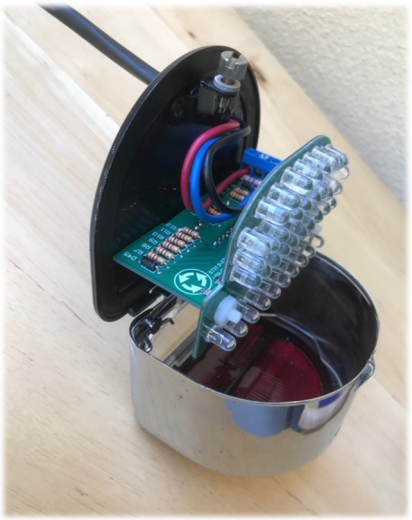

FIG. 6 Tail Lamp Assy. (Internal)

7. VEHICLE INSTALLATION AND TEST

7.1. Identify/Prep Vehicle Electric Harness Wires – Using an Ohmmeter and a DC Voltmeter, identify the three (3) wires which will interconnect the Vehicle Electric Harness with the two (2) Tail Lamps. Identify these three (3) Vehicle Electric Harness wires as follows.

For Positive (+) Ground (Original) Configuration:

- "GND" – Ground ("Common") and traceable to the Battery Positive (+) terminal.
- "TAIL" – Energized (–12 VDC) when the Dash Light Switch is in the "On" position.
- "BK/TN" – Energized (–12 VDC) when the Brake Pedal is depressed.

For Negative (--) Ground (Not Original) Configuration:

- "GND" – Ground ("Common") and traceable to the Battery Negative (–) terminal.
- "TAIL" – Energized (+12 VDC) when the Dash Light Switch is in the "On" position.
- "BK/TN" – Energized (+12 VDC) when the Brake Pedal is depressed.

Strip the insulation on each wire (to expose at least 3/16” of bare copper) and mark each (as noted). Also, tin each of the exposed copper wires, using rosin core solder.

7.2. Mount each of the Tail Lamps on the Vehicle – Using the proper hardware, securely mount the modified Tail Lamps on the rear of the vehicle. Route the Vehicle Electric Harness wires to each of the installed Tail Lamps and insert the assigned three (3) wires into the access hole provided in each of the two (2) baseplates.

7.3. Connect Wires to the LED Circuit Board Assembly – The Terminal-Block screws should, first be loosened, in order to provide clearance for the interconnecting copper wires. A service loop should be formed, for each of the three (3) wires, and their ends inserted into the Terminal Block as follows.

- “GND” Wire to “GND” Terminal
- “TAIL” Wire to “TAIL” Terminal
- “BK/TN” Wire to “BK/TN” Terminal

Terminal screws should then be securely tightened on all three (3) of the terminals. (Do not over tighten.) This assembly is depicted in Figure 6. Following completion of these steps, the Tail Lamp baseplate and shell can be closed and the securing screw inserted and hand tightened. The finished assembly is depicted in Figure 7.

FIG. 7 Tail Lamp Assy. (External)

7.4. Check Operation of Tail Lamps – To check for proper operation of the modified Tail Lamps, perform the following operations.

- Turn the Light Switch to the “ON” position. >>> The Clear License Plate lens and the entire Red Tail/Brake Light lens should be Illuminated (Normal intensity).
- Depress the Brake Pedal. >>> The entire Red Tail/Brake-Light lens should be Illuminated (Bright intensity).
- Turn the Light Switch to the “OFF” position. >>> The Clear License Plate lens and the entire Red Tail/Brake Light lens should be Extinguished.
- Depress the Brake Pedal. >>> The entire Red Tail/ Brake-Light lens should be Illuminated (Bright intensity).