

**MGB lamp upgrades - Phase 1.2**  
**Some details of upgrading a 1973 MGB to LED lamps - April 2020**  
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*Nov 2020: updated based on experience in this long saga.*

This **Phase 1** document on upgrading my 1973 MGB lamps concentrates on putting LED bulbs in interior and exterior lamps but not the headlamps.

The **Phase 2** document deals with upgrading the headlamps.

The rationale for doing this project was a) the dashboard lamps are weak for night driving b) to be better seen at night and c) to keep busy during the COVID pandemic.

I chose not to do the headlights since a) I have sealed beams not bulb-based lenses and b) there is much debate as to whether the H4 LED bulbs available are as precise in focusing as the original incandescent/Halogen bulbs. See Phase 2.

This report documents things that happened along the way. Some thinking got adjusted, as you will see, particularly when you read Phase 2.

After research in many places I decided to source from **ClassicCarLEDs.co.uk**. Their prices were better than US based options (except e-Bay stuff of debatable quality) and they offered a 'kit' list that helped for determining what was specific to my car.

Using the kit as a starting point I had many e-mail discussions with the supplier, and eventually we jointly came up with a kit matching my car, including solutions not listed on their website.

As questions were asked and answered it became necessary to remove all bulbs from my car to compare with the kit list and their answers. This was a pain but absolutely necessary as there were many anomalies. Perhaps the kit was UK based. Other suppliers didn't even provide a kit list to start with. The secret to several dashboard bulb removals was first removing the MPH gauge (see my previous advice on OMGC). All other bulbs are reachable. To help you find them print off some Google images of the reverse of the MGB dashboard.

The invoice list that I finished up with is attached but see suggestions for changes along the way.

The main discoveries were:

1. DO NOT replace the red alternator/ignition light with LED. Several reasons including false warnings and changing the charge point of the battery and so regularly flattening it. Red light will need 2000 RPM to go off.
2. The blue hi-beam lamp lens is “unobtainium” and I previously had to replace it with an integrated unit from Moss. That is barely blue and I tried several other options. See details later.
3. The oil gauge bulb is the same as all the other gauges (MPH, RPM, Temp and Fuel), even though it is rectangular.
4. Your cigar lighter may or may not have a bulb. Mine was a bayonet type that was also held in by bent-over metal tabs. They were possibly after-market installed.
5. The interior ‘door-open’ and boot ‘lid-open’ lights are identical though there may have been some bending of the tabs to hold bigger festoon bulbs. You have a choice of low power (5 watt equivalent) or high power (10W).
6. You may hear that you need a new dimmer switch. I discuss this in later sections below.
7. Use bulbs the same colour as the lens (red behind red, etc.) except for amber sidelights as the supplier advised that these amber bulbs are too weak in this case. Use warm white here.
8. You will have several bulb styles: screw in (E10), eared bayonet, post bayonet (symmetrical posts with single contact and asymmetrical posts with double contact) and festoon.
9. You need both a signal flasher relay (located beside the wiper motor) and a hazard flasher relay (behind the radio slot). These LED compatible flashers need to be grounded so take the ground-wire option. And they don’t fit the OEM flasher holders so buy the adaptor (which isn’t listed on-line).
10. Select colours that match the lenses except as noted above and select what temperature of white you want. White or warm white. This supplier says *“The warm white are 3000k so a similar classic warm glow to an incandescent just brighter. The cold white are 6000k which is a harsh daylight white as seen on modern cars. In our opinion the 3000k look better on a classic.”*
11. I made choices I thought appropriate for me. When I complete installation I may discover I’m wrong so if you aren’t sure feel free to come and look at mine to see if you want different options. I may agree with you and ask to piggyback my changes on your order. Do your own legwork, no guarantee provided.
12. The shipping costs are fixed regardless of volume, and very reasonable.

LED Dimmers:

Initial thinking based on rumours one hears. Actual results are discussed later.

- a. Dimming only becomes an issue if the level of brightness of the LEDs is too high and needs to be reduced.
- b. The OEM rheostat dimmer may work, but only in a limited form. I’ll know when I’ve completed the system. Reputedly it will not give a full range of variability, if any, and because it is using a resistor it does not reduce current consumption.

- c. The preferred technology for LED dimming is Pulse Width Modulation (PWM). It is basically very fast switching off and on to fool the eye that there is less light. It also consumes proportionately less power when 'dimmed'.
- d. I have found two suppliers, but each with problems.
- e. First: Kick Lighting has a dimmer that could be a direct drop in physically. I have used this in my kitchen under-cupboard lighting, fed from a 2-wire line-voltage transformer to 2-wire 12V feed to the LEDs, and it works superbly. Unfortunately it does its modulation on the negative line and may not work where the negative is through the typical auto-body ground rather than a dedicated negative line. I am discussing this with them to see what is possible.
- f. Second: Diode Dynamics has a dimmer that modulates the positive line and doesn't care about the chassis based ground. Unfortunately it is just an in-line module that is adjusted with a screwdriver. It doesn't slot into the OEM position on the MGB dashboard. The possibility is to place this out-of-sight under the dash and just set it initially and forget about it – no adjusting on the fly. And leave the disconnected OEM dimmer in place for aesthetics.
- g. While these PWM dimmers will work with regular incandescent bulbs there may be a high burnout rate because of the frequent on-off cycles.
- h. This all brings me to worry about the two incandescent bulbs I had not planned on changing (the fan switch and the hazard switch). Must I order up LED bulbs for these as an afterthought?
- i. The jury is still out!
- j. Fortunately the one dash bulb I must not change (the red alternator light) is not on the dimmer circuit so there is no problem.

Here is part of the dialogue I had with **ClassicCarLeds** who are supplying my LEDs.

*Q: I'm not sure what will happen with the OEM rheostat based dashboard dimmer when the LEDs are in place.*

*There are three possibilities*

- 1. I like what I see and don't need to dim them.*
- 2. The OEM dimmer works for my needs.*
- 3. I need a better dimmer*

*In anticipation of possibility #3 it seems that Pulse Width Modulation (PWM) is the answer. Unfortunately the one I found that fits in place modulates the ground side and doesn't behave for auto-chassis ground. The one I found that modulates the positive side (and doesn't care about the grounding method) is just an in-line box adjusted by a screwdriver and doesn't fit the OEM position.*

*In case this becomes necessary do you have a better solution?*

*And will I need to replace the incandescent bulbs on the Hazard and Fan switches (both green) with LEDs to prevent burnout of the incandescent bulbs due to frequent modulation?*

*A: Our LEDs will dim, unlike others, but whether they will on your vehicle will depend on the working voltage range of your rheostat and its condition. The LEDs start lighting at 9 volts and reach full brightness at 11 volts. That being said, we get a lot of customers ask the question then respond later that they are enjoying the light level and don't use the dimmer so then bypass it. LEDs do react faster than incandescent bulbs though due to the smaller working voltage range.*

*Solid-state dimmers, we don't stock yet sorry - mid way down on a long project list, but if you can find a suitable one, they work very well with LEDs if you find the need. You would not need to change the other lamps. Dimming them would actually reduce the problem of burnout.*

**Update:** 2020-05-27

- a) Materials arrived from UK yesterday, exactly 21 days after shipping, as promised.
- b) Everything complete and incredibly well packaged, and individually labelled (exactly as per the list below).
- c) Installed everything today. Cautiously. One bulb at a time installed and tested then on to the next.
- d) I couldn't have done it without removing the MPH gauge. You've been warned.
- e) Everything works as promised: Brighter from the rear; clearer gauges; and sides and front look safer too.
- f) The OEM dimmer works just fine, as per the discussion above. No need to go down the PWM path.
- g) None of the LEDs used is directional, but if they were the company marks them as such.
- h) The new flashers are a little tricky at first. The OEM is metal bodied and so self-grounds through its metal holder. The new flashers are plastic bodied and so need a ground wire AND they don't fit the OEM holder so you need the new holder, AND you supply a bracket to clamp it in place. Ask me how. The wiring is as follows (standard wire colour coding: LG=light green, N=brown, G=green). The OEM hazard flasher (in radio area) uses LG/N at spade L and N at spade B/+. Repeat for the new hazard flasher plus the ground wire at E (Earth). The OEM direction signal flasher (in the wiper motor area) uses LG/N at spade L and G at spade B/+. Repeat for the new direction signal flasher plus the ground wire at E (Earth).
- i) Walmart's delivery of the integrated hi-beam LED bulb I tried was long overdue (almost 2 months after order and 'got lost' several times), putting wrapping up of this project in limbo. I had also ordered a red LED bulb from Walmart.ca for the hazard indicator since its lens was cracked and NLA. The new 'fittings' are neither Lucas bullets (OEM) nor spade quick release (as Moss's part) but a pair of holes with tiny screws to clamp the wire. For the blue lamp I mean tiny so use thinnest possible wire. The red lamp takes the original wire. On first

installation the blue light switched on for hi-beam but had a very faint blue glow when 'off'. Turned out LEDs will operate on virtually no current and I had an electrical 'leak' somewhere. Turned out to be all the disconnected wires in the engine compartment leaking power across the ether to one another. Don't ask, I don't know. Fixed by simply connecting everything back together and the problem disappeared. Now the lights are very effective.

- j) If you still have a useable blue hi-beam bulb casing the LED bulb is BA7S-281 in blue. Change quantity to 1 in pick list below.
- k) A warning from the supplier: due to low current draw LEDs can be affected by poor electrical contacts. Ensure everything is clean.

**Update:** 2020-07-07 after my first run and testing under night driving conditions

- a) **The Walmart blue hi-beam bulb is very, very bright**, enough to prevent seeing the road when the hi-beams are on. To make it acceptable I have covered it with 6 layers of blue electrical tape. I'm looking for another source.
- b) The original **bulb behind the MPH gauge** is <25mm. The LED bulb is 28.5mm. On my car it interferes with the internal workings of the gauge preventing any speed readout. The manufacturer sells an 18mm bulb that is OK but with less light. My solution is to wrap the bulb base with a small electrical tie to prevent it going fully into the holder. **I have photos if you need**. Reputedly Moss bulbs are even longer and are a known problem here.
- c) Subsequent to this project I installed a Facet electronic fuel pump and it seems to emit radio frequency (RF), **which causes most of the bulbs to flicker**. The cause and cure are under investigation. The previous Carter pump does not do this.
- d) When the flickering is removed it was noticed that **the front park/signal lamp would not discriminate when the park lamp was switched on and the indicator activated**. This may need a massive resistor to be added on each side to simulate incandescent bulbs, or revert to incandescent bulbs. This despite the flasher being LED ready.

**Update:** 2020-09-09. Hi beam indicator solution and front turn signal surprise and solution.

- a) Blue lenses are available from UK suppliers but suffer from thin plastic lenses and so turn white when any white bulb is used and are super bright when a blue LED is used. Finally located an OEM blue lens in reasonable condition. It works well with the blue LED lamp.
- b) The lack of discrimination in the park/signal bulb was never resolved for that spec of LED bulb but UK spec LED bulbs were provided free of charge by CCL and it works as claimed. Theory is that original was stealing micro-volts from park lamp filament via ground and so not flashing. New bulb shuts off park lamp when flashing thus forcing flash filament to feed from flasher unit. Talk to supplier as to which is right for your car.

<u>ITEM</u>	<u>COLOUR</u>	<u>UNIT PRICE</u>	<u>QUANTITY</u>	<u>EXT'd PRICE</u>	<u>NOTES</u>	<u>NOTES</u>
<u>INTERIOR</u>						
Round Gauges (MPH/RPM/Temp/Fuel)	Warm white	£1.88	4	£7.52	Screw in	GLB987
Square Oil gauge	Warm white	£1.88	1	£1.88	Screw in	GLB987
Interior (door open)	Warm white	£3.13	1	£3.13	Festoon 37mm 10W	GLB239
Cigar lighter	Warm white	£2.21	1	£2.21	Bayonet	GLB989
Indicator warning	Green	£1.83	2	£3.66	Eared type	BA7S 281
Main beam	Blue	£1.83	1		N/A Sealed unit	BA7S 281
Heater knobs	Warm white	£1.83	2	£3.66	Eared type	BA7S 281
Boot	Warm white	£3.13	1	£3.13	Festoon 37mm 10W	GLB239
Alternator	Red		0		Cannot LED	
<u>EXTERIOR</u>						
Headlights	Warm white	£58.33	0	£0.00		
Indicators - Rear	Amber	£8.33	2	£16.66	Single contact bayonet	GLB382
Indicators- Front	Amber	£8.33	2	£16.66	Dual contact 1157	GLB380
Preferred alternate to above	Amber/WWhite	£6.67	2		BAY 15 D 1157	GLB380
Indicator relay - signal flasher	N/A	£8.33	1	£8.33		FL19 repl. With ground
Indicator relay - hazard flasher	N/A	£8.33	1	£8.33		FL19 repl. With ground
Holder for relay	N/A	£1.50	2	£3.00		
Stop/Tail	Red	£6.67	2	£13.34	Double contact bayonet	GLB380
Reverse	Warm white	£3.33	2	£6.66	Festoon 42 mm	GLB273
Front sidelight (marker on Fender/Wing)	Warm white	£2.21	2	£4.42	Bayonet	GLB989
Rear sidelight (marker on Fender/Wing)	Red	£2.21	2	£4.42	Bayonet	GLB989
Number plate	Warm white	£2.91	2	£5.82	Bayonet	GLB207