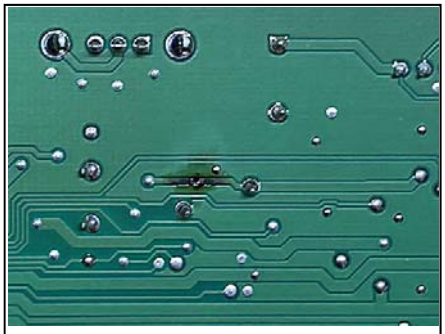
Are Abingdon MGs Some of the Last of the Classic Cars?

By Rick Astley

Bear with me; I'll get to the point of this article after this anecdote.

Last month, Anne and I took our first trip to Canada in over 2 years. We drove our 2004 Jaguar XK8 and enjoyed the ride over where we had a drink with Lynne and Dave Hornby before following them in their MGB to the Natter & Noggin at the Factory House restaurant. I parked and, deciding I hadn't done it very neatly, went to restart and move the car — but nothing happened, it was absolutely dead. Although I enjoyed both my meal and chatting with club members I'd not seen in ages, much of my time there was spent trying to get some life out of my car. My insurance doesn't cover international flat-bedding and even in non-COVID times, it's hard to find companies willing to do it, and so, as it became dark, I became concerned.

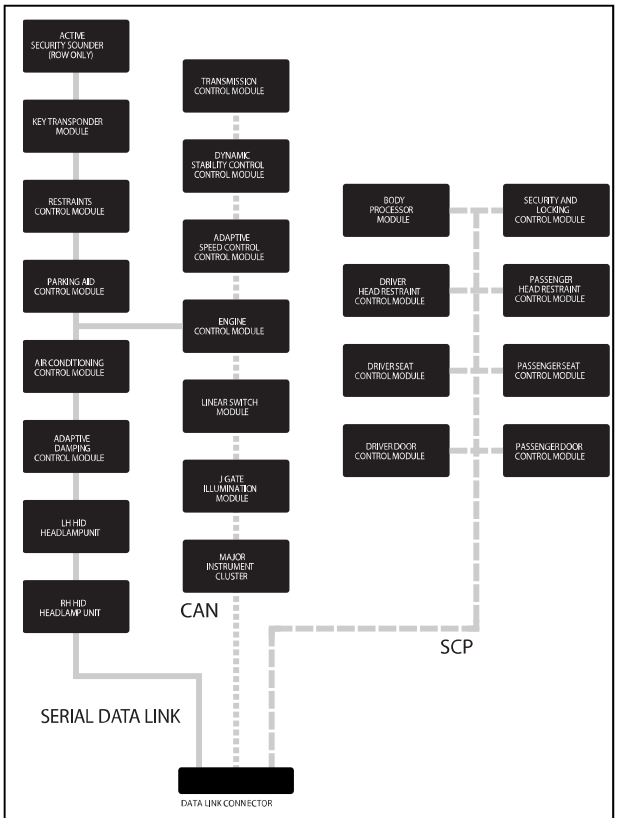
I checked the battery and its connections and then proceeded to check all the 80 or so fuses in the 5 fuse-boxes. Murphy's Law dictated that it was one of the last I tested that I found had blown – a 5 Amp that powers the instrument cluster. I had a couple of spares so I changed it, but the replacement blew, as did the next one. Then I tried a 10 Amp and another until I had exhausted those too. Did I dare try a 15 Amp? The instrument cluster in the Jag is the hub of the CAN bus network, so if it's not powered, nothing works, but there was certainly a reason there's a 5 Amp fuse and not one bigger. However, I was out of options and a 15 Amp fuse might survive or at least blow more slowly. I inserted one and turned the key immediately, the car started, the fuse blew, the instrument cluster and a lot else died but the engine kept running, the lights worked, and we were able to make it home.



The fried circuit trace

The root cause turned out to be a short circuit between traces less than 20 thousands of an inch apart of what is in effect a computer circuit board. The short had blown the smaller amperage fuse but sadly, once the 15 Amp fuse was installed there was a cascading failure of semiconductors upstream of the short circuit. By the way, no blaming Lucas here, the instrument cluster was made by the French company Valeo.

Once I saw the damaged board, I decided there was nothing I could do but go to eBay and look for a replacement instrument cluster. The closest equivalent I could find was from a 2003, but while I'm sure the one I received was good, it wouldn't run my incrementally different 2004. Despite that, with no circuit diagram, unidentifiable fried semiconductors, several failed attempts and 3-weeks of frustration, I finally managed to repair the board. However, the point of this entire article is that had I not been able to – and without some lucky guessing I wouldn't have – the next journey the car would take would be to the scrap yard.



Even my 18 year old Jaguar has 23 boxes interconnected by 3 different data protocols, far fewer than on more recent vehicles.

I had bought the Jaguar because my V8 MGB-GT, which was to be our retirement's long distance cruising vehicle, with its benefits of lots of power, high gearing, cruise control and sunroof, proved disappointing with its downsides of being hot, noisy and heavy-to-steer. I sold it, and for exactly its selling price, bought the much more modern Jaguar with so many more desirable features, not least of which were a power top, air-conditioning, power steering and a quiet luxurious ride. However, I was well aware when I bought the then only 11 year old car for a fraction of its original $85K price that it had depreciated in value so much because of its reputation of having an unreliable and expensive-to-repair electrical system. I'm sure we all find good reasons to justify wish-list purchases, and mine was arrogantly that as an automotive electrical and electronics engineer, I could handle anything the Jaguar might throw at me.

The recent incident with the Jaguar has rather squashed that arrogance. After all, what could I have done in terms of better servicing to avoid what happened? It certainly couldn't be predicted and something similar might well happen again. I've written 2-books about the electrical systems of pre 1980 British cars and I

sometimes think of them as part of my legacy. Long after I'm gone, I am sure someone will be consulting them to fix an antique car. They certainly should be able to. With its 4-fuses, and save for some diodes in the alternator and a couple of transistors in the tachometer, the MGB-V8 conversion I sold is pretty dumb and will be electrically repairable almost indefinitely. Not so the Jaguar, nor its contemporaries, and indeed any car built after around 1985.

Are the Abingdon MGs, and cars of their ilk built up to 1980, the last that will become classic cars driven long into the future? The final car rolled off the Abingdon assembly line in that year for many reasons, one of the main ones being that lack of investment and the need to compete in a market of increasingly sophisticated cars with electronics that were very costly to develop. But maybe the car that laughs last, laughs best. Long after all those newer upstarts have shuffled onto the scrap heap, will simple old MGs and their siblings still be humming along to the enjoyment our great great grandchildren? At least my old 1970 roadster is now with my eldest son in Wisconsin, so that's a start.

Why would a circuit board that operated faultlessly for 18 years suddenly develop a short-circuit? One explanation could be "dendrite growth". I've experienced a similar phenomenon with our oven where I happen to learned that dendrite growth problems were tracked down to contamination of the Chinese manufactured circuit board when they were washed in impure water. I don't know if Valeo had its circuit boards assembled in China, but there's a good chance they did. If the pollutants are there, then in the presence of moisture, dendrite growth can occur in seconds. Perhaps, being a humid day, the instrument cluster of the car was cooled by the nearby A/C ducts and water vapor condensed on the circuit board soon after the car was powered down and there wasn't time for it to evaporate before I tried to restart it.

I've seen dendrite growth on MGs too, not on original equipment but on replacement electronic SU fuel pumps. In the case shown here it's unforgivable. Given the environment in which many of their pumps can be expected to operate, SU could have done much more to ensure board cleanliness and could also have applied a conformal sealing coating over the circuit board to keep out moisture. I hope that they too have now identified the problem and taken action to prevent it.

All the white areas around the solder connections are due ionic residues and those at the bottom of the board have actually joined together, which is why it failed and I was asked if I could repair it. Fortunately I could, as well as cleaning and sealing it to prevent further failures.

There are other causes of migration of conductive material between circuit tracks or solder joints, among them solder cold flow, where solder alloy, which is a very soft material, when under mechanical pressure can actually flow at normal operating temperatures. Tin whisker growth is another failure mechanism and one not yet fully understood. A variety of metals, and especially tin, can form tendrils between solder joints and circuit traces, resulting in short-circuits.