Car Alarm Battery Saver – Un-nobbled!

MY new car alarm locks to the steering wheel, preventing the car from being steered, as well as providing a vibration-triggered alarm in a plastic housing (this deafens the thief inside the car, not the neighbours outside!). It is armed and disarmed by entering a code on a keypad. The user "teaches" the code to the alarm, which is remembered as long as the internal batteries remain live – which is not that long, due to the high current drain!

On delivery, disappointment followed the opening of the box. Unlike the catalogue description, there was no lead to take power at 12V from the cigarette-lighter (accessory) socket. "We forgot to tell you, we changed the design", said Customer Services. No, I didn't ask for a refund, I'm an *EPE* reader! Consequently, the circuit in Fig.1 was developed, to economise on batteries.

Switching between the power from a lead plugged into the accessory socket and that from the internal batteries is seamless, preventing loss of code memory. This even works at the most critical time if a would-be thief triggers the alarm and then pulls out the plug in the hope of cutting the power. The internal batteries (well rested and not depleted) see that the alarm continues to sound and scares off the thief. In normal operation, the internal batteries are only required to keep the memory alive whilst the car is underway with the alarm removed and safely stowed behind the seat.

Circuit Details

Plenty of decoupling surrounds the three-terminal 6V regulator IC1, this is a harsh environment. Electrolytic capacitors are not good at handling pulses, so paralleled disc ceramics are used to get rid of short spikes.

The use of a Zener diode, D1, following the regulator may seem strange. However, if the regulator fails closed-circuit, 12V appears where only 6V is expected but Zener diode D1 conducts, clamps the voltage and blows the ultra-fast closely-rated fuse FS1. Of course this is catastrophic, the regulator must be replaced and even a 5W Zener might sacrifice itself. With a low-current fuse and lack of space, though, the use of a full-blown (pun?!) thyristor crowbar is not justified.

While the regulated 6V is present, the *p*-channel MOSFET TR1 is held off via diode D3 and the alarm is powered via diode D2. On loss of the 12V input, D3 isolates the gate (g) of TR1 from all influences other than that of resistor R1. This resistor pulls the gate of TR1 low, which turns the device on and allows the internal batteries to take over and power the alarm. Decoupling and a bit of supply reservoir is thrown in, using capacitors C5 and C6 for good measure.

Diodes D2 to D4 stop "back-feeding" of internal battery power that would otherwise continue to hold TR1 turned of. Resistor R2 keeps any static charge off the gate (just being over-cautious!). This is easy work for the electrically-big MOSFET and the alarm drains little current, so no heatsinks were needed. There was room inside the alarm case to fit the components "ugly" style, held in place by hot-melt polythene glue.

Godfrey Manning G4GLM, Edgware, Middx.

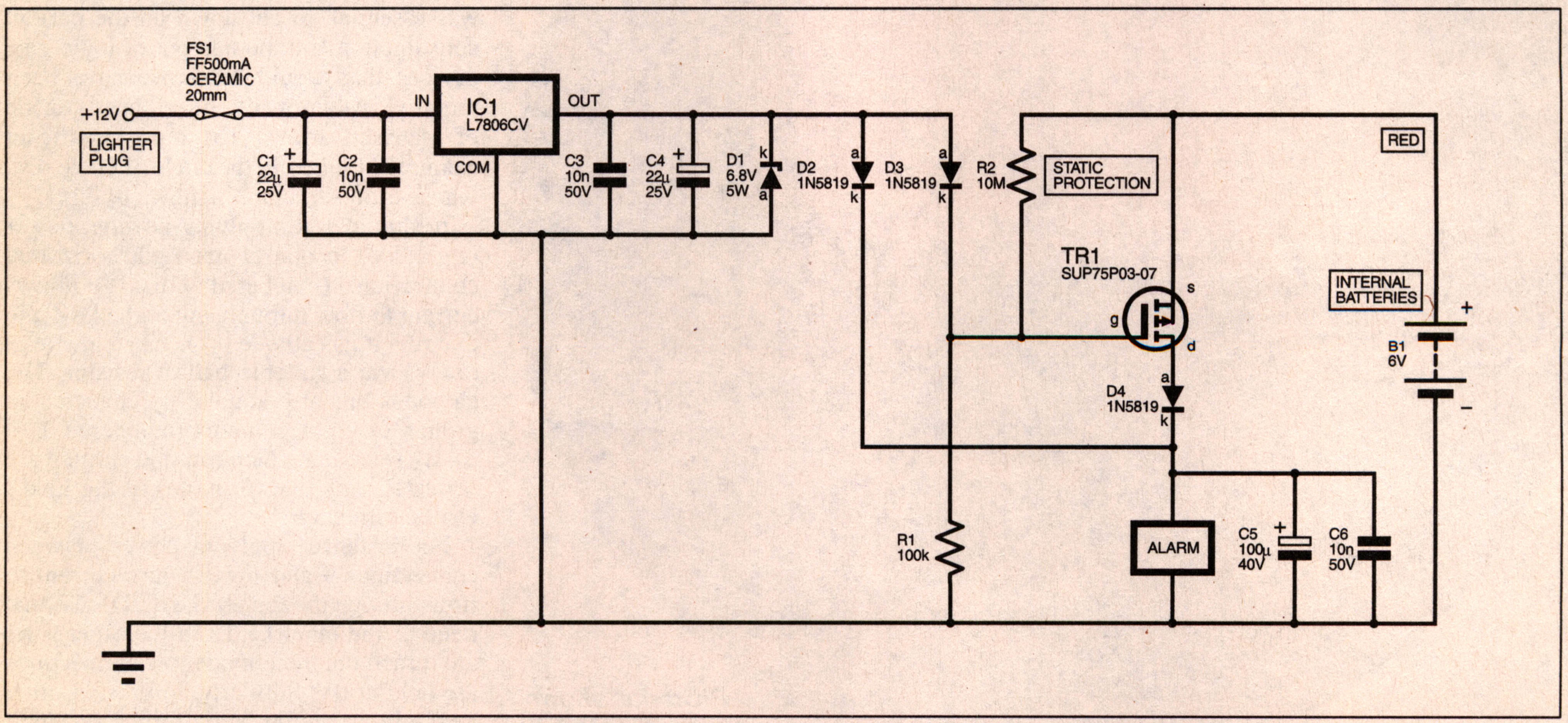

Fig.1. Circuit diagram for the Car Alarm Battery Saver.