## DIY Kit 11. LONG LIFE FLASHER & CONTINUITY TESTER

Most integrated circuits are designed to operate in the 4V to 40V range. In particular most circuits to use indicator lights and LED's must be over 3V and even then the lifetime is not great.

The LM3909 introduced by National Semiconductor changed all this. Obtaining long life from a single 1.5V battery it opened up a whole new area of applications for linear IC's. Sufficient voltage for flashing a LED's is generated from a cell voltage as low as 1.1V. In such low duty cycle operation batteries can last for years.

Kit 11A is such a long life flasher. Powered by just a 1.5V D cell this very simple circuit will flash an LED for over 2 YEARS. It can provide the location of a piece of equipment in a darkened room. Placed in a car or around a window can act as an imitation alarm system.

Kit 11B uses the LM3909 as a simple continuity tester. The solid tone at zero ohms rapidly rises in pitch up to about 100 ohms whereupon it is not generated any more. Cut the wire with crocodile clips at both ends to use as the probes.

The kits are constructed on a single-sided printed circuit board (PCB). Protel Autotrax was used to design the board.

Download the Data Sheet and AN154 about the LM3909 from the National Semiconductor website at

www.national.com

Assembly is very straight forward. It is most unlikely that the Kits will not work immediately the battery is connected. If it does not work then check that the battery, LED and electrolytic capacitor are around the right way. Check all solder joints. Extra tie holes have been provided for securing the PCB to the battery leads. Only one LM3909 has been provided. Share it between both circuits.

COMPONENTS	
100uF ecap	1
5mm RED LED	1
LM3909 IC	1
8 pin IC socket	2
Kit 11A PCB	1
Kit 11B PCB	1
1.5V AA battery holders	2
Crocodile wire with clips	1
47nF 473 ceramic	1
0.22uF 224 ceramic	1
1.5V piezo buzzer with drive circuit	1

