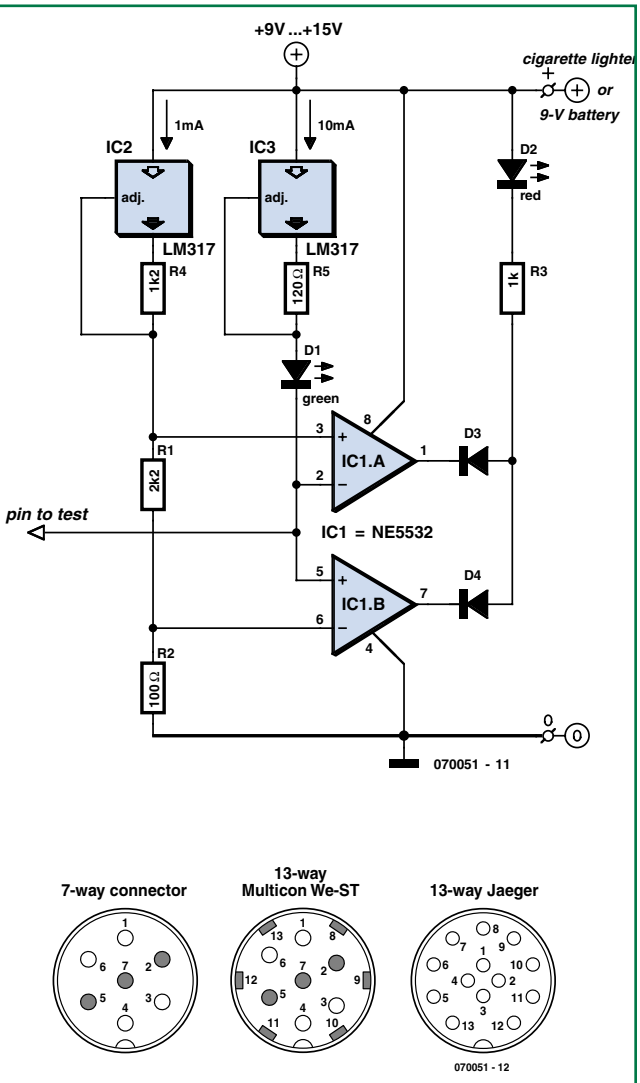
Testing trailer connectors



Erwin Deumens

For testing the lighting of trailers or caravans you really need two people: one to operate the switches and pedals, the other to check that the lights work. This has been the most practical way until now. When you use the circuit from this design tip you can do the testing on your own.

The circuit isn't complicated. The pin of the trailer that is tested is connected to two opamps (configured as comparators) and compared to two reference voltages. We have specified an NE5532 for the opamps, but any other opamp that can operate at about 14 V (such as a 741) can also be used. The reference voltages are obtained by passing a constant current of 1 mA through two resistors (R1 and R2). This creates a voltage of 100 mV at pin 6 and 2.3 V at pin 3 of IC1.

When the pin being tested (i.e. the lamp) works correctly, the voltage on the pin will be between 100 mV and 2.3 V (for example: a 12V/5W lamp has a resistance of about 30 Ω. At a current of 10 mA this creates a potential difference of 300 mV). A current of 10 mA will then flow through LED D1, which causes it to light up. The outputs of IC1A and IC1B are both high and D2 stays off. If there is a short to ground somewhere, the output of IC1B will become low and both D1 and D2 will light up. When the lamp has burnt out the voltage at the pin will be equal to the supply voltage of the circuit. In that case there is no current flow through D1. The output of IC1A is then low, which causes D2 to light up.

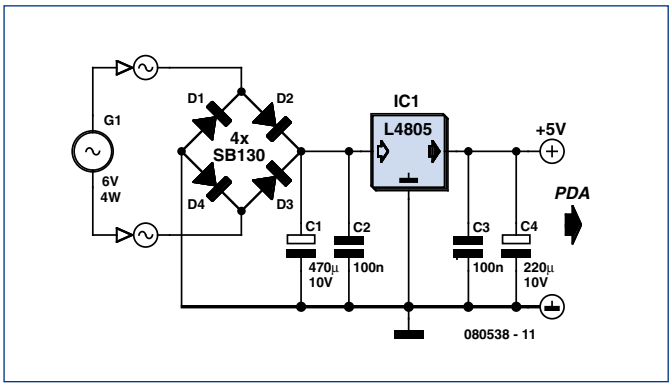
The ground of the circuit should of course be connected to the ground of the trailer or caravan. In the diagrams for some of the most common connectors you can see which pin is connected to which lamp, so you can easily find out where the problem is. It is of course also possible to build the circuit 7 or even 13 times, so you can test all lamps in one go, but it works just as well with a single circuit.

(070051-I)

PeDAl power

Jan Visser

Even if there are cycle tracks and special maps, some cyclists will stubbornly try to find their own way – these die-hards can be recognized not only by the latest GPS or PDA kit fitted to handle bars, but sadly also by the desperate looks and moaning as result of flat batteries experienced 'by the roadside'. According to Elektor's cycling expert Jan Visser, two hours of continuous use is about the most you can from a GPS-running PDA fitted on a bicycle. This Design Tip should lengthen the useable period to about five hours increasing the cyclist's chances of reaching the destination hopefully with meaningful GPS guidance.



The circuit shows that the alternating voltage supplied by the (hub or wheel) dynamo is rectified by Schottky diodes. These exhibit a forward drop of just 0.3 V and so allow some more headroom for the L4805 voltage regulator.
The USB cable connections allow the charging voltage to be fed directly to the PDA. The result is some charging of the battery while cycling and longer use of the GPS function on your bike.

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