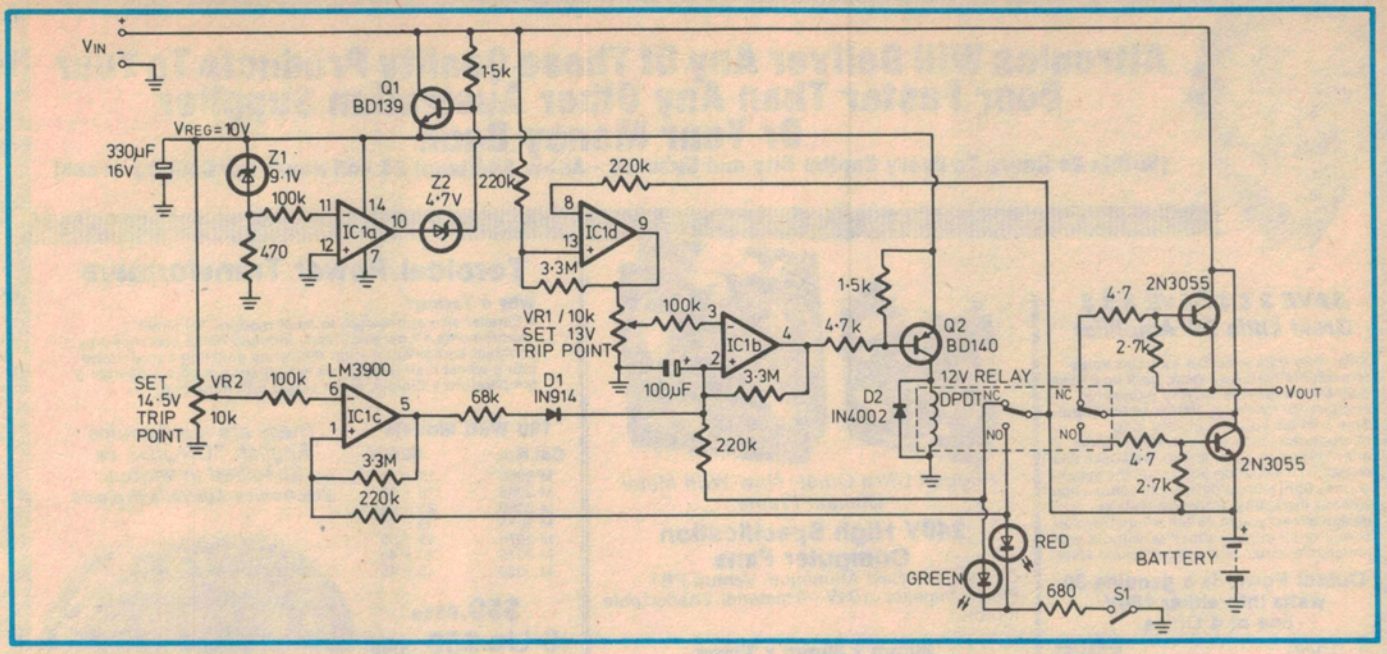

Improved battery charger controller

This is an improved version of the controller published in the September 1986 issue. The original circuit proved to have a few problems in some readers' applications, so I developed this more rugged version with automatic shut-down.

As before, the circuit allows battery charging whenever the battery voltage is below 13V and disconnects the battery from the charger when battery voltage reaches 14.5V. Typical chargers include solar panels and mains powered chargers.

An LM3900 quad Norton op amp IC1 is used for voltage regulation, voltage comparison and finally as an OR gate. A relay is used to switch to the battery charger.

IC1a is used as a voltage regulator and, in conjunction with Q1, sets the voltage of Vreg to about 10V.

IC1b monitors the battery voltage when the relay is switched off, via the RLY1a position C contact. When the voltage drops below 13V, the output of IC1b switches the output of OR gate IC1d high. This turns on transistor Q2 to switch on the relay.

At this stage, the battery is connected to the battery charger via relay contact RLY1b in position 2. IC1c now monitors the battery voltage via the RLY1a contact at position D.

When the battery voltage reaches 14.5V, the output of IC1c goes high and this is coupled into the positive input of IC1b via D1. This causes the output of IC1b to go high again, switching off Q2 and the relay. This disconnects the charger from the battery.

IC1d is used to introduce hysteresis into the 13V trip point reference voltage, to prevent chattering of the relay contacts.

Note that when the charger is disconnected from the battery, the charger voltage is directed via the RLY1b contact to Vout. This voltage can then be used to operate a similar charger circuit.

The LEDs are used to indicate the charger status. The green LED Indicates when the charger is disconnected from the battery and the red LED indicates that the charger is charging the battery.

Setting up is simply a matter of adjusting VR1 and VR2 so that the relay switches on with battery voltage below 13V and switches off above 14.5V. Note that if a mains operated charger is used, a 4700uF/25VW capacitor or larger should be connected between Vin and ground.

W. Jolly,
Nambucca Heads, NSW. **$15**