

NEW IDEAS

Low-battery warning

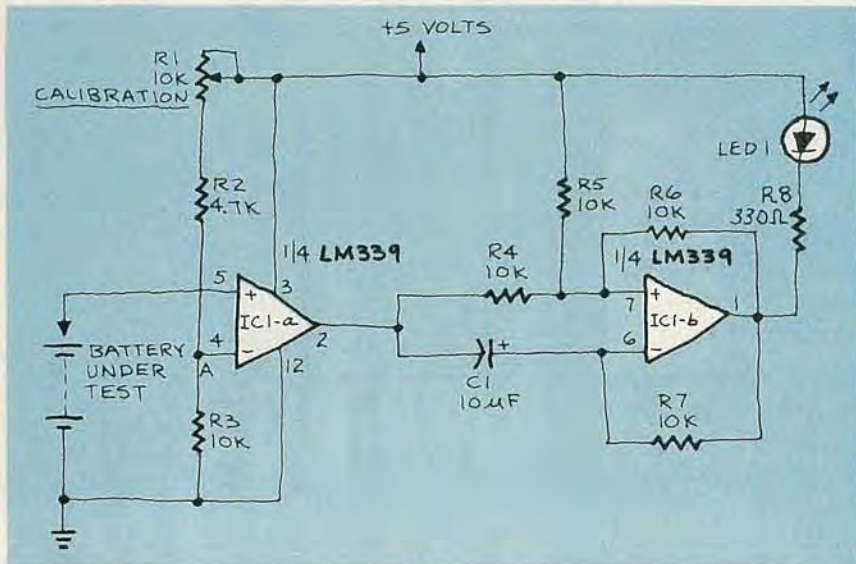


FIG. 1

WHEN WORKING WITH LOW-POWER DEVICES, the use of a battery back-up becomes practical, and in some instances important. Nowhere is that more true than in the case of non-volatile RAM (Random Access Memory). But batteries have a limited life span and their failure, if not detected, could have catastrophic results in the event that the main power source is disconnected from a memory device. After all, without some source of power the contents of the memory will be lost forever.

The circuit discussed here, and shown in Fig. 1, was designed to help prevent such an occurrence. It constantly monitors the condition of the batteries and signals if their voltage falls below a certain preset value. Use of a circuit such as this is especially important if carbon, alkaline, or nickel-cadmium batteries are used. Those devices have a relatively short shelf-life. What's more, they discharge relatively quickly.

Turning to the circuit itself, a voltage

divider consisting of R1, R2, and R3 is used to set the input reference voltage below which the batteries are to be replaced. That reference voltage, at point A, is varied by R1. With the voltage divider shown in Fig. 1, a range of 2 to 3.5 volts is possible.

When the battery voltage drops below that at point A, the output of IC1-a, $\frac{1}{4}$ of a LM339 quad comparator, switches from high to low. That triggers IC1-b, which is configured as an astable multivibrator.

Feedback resistors R6 and R7, coupled with capacitor C1, determine the time constant of the multivibrator. The output from IC1-b is connected to LED1 through dropping resistor R8. With the circuit values as shown, the LED will flash at a rate of 3 Hz.

Although this circuit was designed specifically to monitor RAM back-up batteries, it can of course be modified for use in just about any application where the condition of a battery must be found.—William T. Surgeson

NEW IDEAS

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