3 Temperature indicator

This inexpensive temperature indicator is easy to build, and at the same time, makes an interesting conversation piece. Temperature is indicated by a flashing LED. The circuit shown provides four temperature ranges, but you easily can add another 324 integrated circuit and associated components to provide a total of eight.

Each amplifier segment of the 324 monitors the voltage across a temperature sensing diode, and compares it to a preset voltage. When the diode voltages rise above the preset level, the amplifier output swings positive, turning on the associated LED.

The temperature at which each LED is turned on depends on the setting of the associated variable resistor. To calibrate the setting, you'll have to use a standard thermometer. Although it is possible to set the amplifiers to turn on the LEDs over a range of a few degrees, it is more practical to set them for at least five degree steps, with 10 degree steps preferable.

The LEDs, when turned on, blink at a rate determined by the value of R1 and C1. The values given provide a flash rate of about one-half second. Blinking the LEDs conserves battery power. However, if you power the circuit from a dc power supply, you may prefer to have the LEDs remain on, rather than blink. All you need to do is connect the cathodes of the LEDs directly to ground. Removing the oscillator and transistor circuits will not otherwise affect the operation of the temperature indicator.

Use of a dc power supply will be necessary if you expand the circuit by adding a second 324 integrated circuit. The total current drain will then be near a tenth of an ampere when all the LEDs are on.

The temperature sensing diode can be any silicon diode. However, germanium diodes will not work in this circuit. If you do expand the circuit to include a second 324, use the 2N2222 or 2N2222A transistor. The 2N3904 current handling capability will be marginal at best.